Title: Implementation of amendments to environmental permitting guidance on waste incineration **IA No: DEFRA1471** **Lead department or agency: Department for Environment, Farming and Rural Affairs** **Other departments or agencies: Welsh Government**	Impact Assessment (IA) **Date: November 2015** **Stage: Final stage** **Source of intervention:** EU **Type of measure:** Other (Guidance) **Contact for enquiries:** Nicola Leeds 020 7238 4731
Summary: Intervention and Options	**RPC Opinion:** GREEN

Cost of Preferred (or more likely) Option				
Total Net Present Value	**Business Net Present Value**	**Net cost to business per year** (EANCB 2014 prices; 2015 PV)	**In scope of One-In, Three-Out?**	**Measure qualifies as**
£-75m	£-235m	£27.3m	NO	N/A

What is the problem under consideration? Why is government intervention necessary?

The Industrial Emission Directive (IED) looks at managing industrial emissions and is transposed via the Environmental Permitting Regulations. Current government guidance covering England and Wales includes advice that simple devices with no technical sophistication, primarily Small Waste Oil Burners (SWOBs) are exempt. Given the human health issues linked to poor air quality, incineration of waste oil without emission abatement results in more pollution than is socially desirable. The Government has reviewed the guidance and has concluded that the guidance needs amendment to deliver health and environmental benefits.

What are the policy objectives and the intended effects?

The main policy objective is to reduce emission of pollutants from the use of waste oil as a fuel in a way that minimises the costs imposed on businesses. A secondary objective is that waste oil arising from the motor trade industry and elsewhere will be sustainably managed, including through an increase in the amount of waste oil being recycled and managed further up the waste hierarchy by the waste oil recycling industry. The intended effect is to improve air quality.

What policy options have been considered, including any alternatives to regulation? Please justify preferred option (further details in Evidence Base)

Option 0 - Do nothing: Continuing with the current guidance

Option 1- Update guidance on waste incineration and waste co-incineration plants to include SWOBs which use waste fuel with effect from April 2016. SWOB which uses alternative, clean fuel will continue to be exempt. This is the preferred option because it allows operators of simple devices with no technical sophistication (e.g. SWOBs) a sufficient period of time to consider the alternatives available to them and to install any equipment needed over a transitional period.

Other options (non-regulatory and earlier implementation) were considered but screened out as not viable. These options are discussed briefly in the body of the IA.

Will the policy be reviewed? It will not be reviewed. **If applicable, set review date:** Month/Year						
Does implementation go beyond minimum EU requirements?			No			
Are any of these organisations in scope? If Micros not exempted set out reason in Evidence Base.	**Micro** Yes	**< 20 Yes**	**Small** Yes	**Medium Yes**	**Large** Yes	
What is the CO_2 equivalent change in greenhouse gas emissions? (Million tonnes CO_2 equivalent)			**Traded:** N/A		**Non-traded: +0.016**	

I have read the Impact Assessment and I am satisfied that, given the available evidence, it represents a reasonable view of the likely costs, benefits and impact of the leading options.

Signed by the responsible Minister: Rory Stewart Date: 16/12/2015

Summary: Analysis & Evidence Policy Option 1

Description: Applying the requirements of the IED to SWOBs with effect from April 2016

FULL ECONOMIC ASSESSMENT

Price Base Year	PV Base Year	Time Period Years	Net Benefit (Present Value (PV)) (£m)		
2015	2015	10	**Low: - 239**	**High: 3**	**Best Estimate: - 75**

COSTS (£m)	Total Transition (Constant Price)	Years	Average Annual (excl. Transition) (Constant	Total Cost (Present Value)
Low	N/A	N/A	31.7	**264**
High	N/A		41.6	**346**
Best Estimate	N/A		31.7	**264**

Description and scale of key monetised costs by 'main affected groups'

Monetised costs mainly comprise the additional costs of replacing heating equipment and the cost of energy for the part of consumption previously covered by waste oil. We estimate that the present value cost of gradually replacing equipment with more efficient systems would be £6m while the cost of alternative fuel for affected operators would be around £258m (using central fuel price projections) over a ten year period. This is equivalent to a total annual cost of around £1,800 per operator. Low and best estimates are identical due to the same fuel price projections.

Other key non-monetised costs by 'main affected groups'

A possible non-monetised cost would arise if small workshops do not dispose of waste oil in sufficient volumes to be paid for it. These costs are considered to be negligible because current collection rates suggest that even small workshops gather large enough quantities to be paid for their waste by recyclers.

BENEFITS (£m)	Total Transition (Constant Price)	Years	Average Annual (excl. Transition) (Constant	Total Benefit (Present Value)
Low	N/A	N/A	13.1	**107**
High	N/A		32.7	**267**
Best Estimate	N/A		23.1	**189**

Description and scale of key monetised benefits by 'main affected groups'

Monetised benefits mainly comprise local air quality benefits and waste oil disposal revenue to operators of SWOBs. The central PV health benefit is around £160m over the whole appraisal period, mainly arising as a result of a reduction in emissions of NOx, PM_{10}, and SO_2. Waste oil producers are also likely to get a payment of between 4-6p per litre, resulting in a total disposal revenue of £29m in the central scenario. Greenhouse gas emissions could increase slightly (0.016MtCO2eq) as emissions from alternative fuels and processing outweigh carbon emissions from waste oil.

Other key non-monetised benefits by 'main affected groups'

Non-monetised benefits also include significant emissions reductions of heavy metal pollutants present in waste oil, such as 201kg of arsenic (As), 14kg of cadmium (Cd), 88kg of chromium (Cr), 3,322kg of lead (Pb), 7kg of mercury (Hg) and 9kg of nickel (Ni). These pollutants are recognised as being harmful to human health and ecosystems as they tend to accumulate in the environment and can be easily transported from one place to another. Additionally, the non-monetised benefits also include annual average exchequer revenue from fuel duty worth around £3.3m.

Key assumptions/sensitivities/risks **Discount rate** 3.5%

Assumptions informed by input from industry, including the Oil Recycling Association and the Retail Motor Industry. 15,000 SWOBs estimated to be in use, each consuming 5,000 litres/year of waste oil. Figures are based on scenario C (gradual replacement of SWOBs). Cost range captures sensitivities around fuel price projections, benefit captures range based on damage costs, carbon values, and rates paid for waste oil disposal. NPVs combine highest cost with the lowest benefit, and vice-versa.

BUSINESS ASSESSMENT (Option 1)

Direct impact on business (Equivalent Annual) £m:			In scope of	Measure qualifies
Costs: 30.7	**Benefits: 3.4**	**Net: - 27.3**	No	N/A

CONTENTS

1. Executive Summary

Small Waste Oil Burners (SWOBs) are typically small, basic appliances which use oil as a source of fuel. They are primarily used by the retail motor garage trade as a convenient way to provide space heating, and at the same time make use of waste lubricating oil gathered during vehicle services onsite. Currently users must obtain an environmental permit from the local authority to reduce the impact of their use on air pollution, as burning waste oil can give rise to a number of pollutants including nitrogen oxides (NOx), particulate matter (PM_{10}), sulphur dioxide (SO_2) and heavy metals such as arsenic (As), cadmium (Cd), chromium (Cr), lead (Pb), mercury (Hg) and nickel (Ni).

The Industrial Emissions Directive (IED) requires that all waste incineration plants and waste co-incineration plants meet stringent requirements on their emissions, as well as on monitoring and reporting.

Current government guidance covering England and Wales includes advice that units such as SWOBs, are not covered on the basis that they fall outside the definitions of a "incineration plant" and "co-incineration plant" in the Waste Incineration Directive (WID) which preceded the Industrial Emission Directive (IED).

The revised guidance will make it clear that the definitions of incineration and co-incineration plants do include SWOBs which use waste oil as a source of fuel. Particular consideration has been given to ensure the policy doesn't go beyond the requirements of the IED; the impact on human health and the environment of the use of waste oil as a fuel without sufficient emission abatement equipment to limit the emission of harmful pollutants; and the availability of alternative routes for the recycling of waste oil, for example, the maturity of the waste oil recycling sector in the UK. As waste oil is predominately burnt in close proximity to residential areas, emissions of harmful pollutants could potentially have an increased impact on human health and the environment. The objective is to reduce the emissions of pollutants in order to protect human health and encourage sustainable management of waste oil through increased levels of recycling.

This impact assessment considers two options. Option 0 is the baseline option against which the costs and benefits of the preferred option are calculated. Under Option 1 the requirements of the IED will be applied to all waste incineration and waste co-incineration plants (including SWOBs) with effect from April 2016. In practice, as SWOBs are primarily used for space heating during the winter months, option 1 is expected to fully impact on operators from autumn 2016. This is the preferred option. Other options, including earlier implementation and non-regulatory approaches, were considered but ruled out. Earlier implementation would not have provided time for consultation or for businesses to adjust to the changes nor would constitute fair process or stimulate compliance. As this issue concerns which plants the requirements of an EU regulation apply to, a non-regulatory approach would not be feasible.

The relative costs and benefits to businesses of this change will depend on the course of action operators choose. For the purpose of this impact assessment, we have considered three possible scenarios. Scenario A assumes that operators would continue to use their SWOB but burn alternative non-waste oil. In Scenario B, SWOBs are immediately replaced by gas-fired heating where connections to the gas grid are available, and if connections aren't available operators would need to burn alternative non-waste oil. In Scenario C, SWOBs are replaced gradually as they become life- expired (1500 units per year). This is considered the most likely scenario so is used for the central estimates.

Table 1: Present value of central costs and benefits over 10 year appraisal period, £m 2015 prices

£m, 2015	Sensitivity		Central estimate
Scenarios	A	B	C

OPTION 1	Central costs	341	235	264
	Central benefits	171	196	189
	NPV	**- 170**	**- 39**	**- 75**

In the central scenario (C), gradual replacement of SWOBs with more efficient systems results in total monetised costs of £264m. This captures the costs of replacing heating equipment and the energy consumption costs for the part of fuel use previously provided by waste oil. Estimates are based on the assumption that there are 15,000 SWOBs in use, each consuming around 5,000 litres of waste oil per annum. Option 1 enables operators to consider the cheapest sources of heating available to them and make the relevant changes that will bring them into compliance.

Monetised benefits under Option 1 would be around £189m over 10 years in the central scenario, comprising benefits to public health from reduced emissions of NOx, PM_{10} and SO_2 (approx. £160m) and waste oil disposal revenue from collectors (£29m). Significant non-monetised benefits would also be generated from the reduction in emissions of heavy metals which are produced from burning waste oil. Emission estimates show that burning alternative fuel, such as gas could reduce the level of emissions by 88kg of chromium; 201kg of arsenic; 14kg of cadmium; 7kg of mercury; 9kg of nickel and 3,322kg of lead. Using EU damage costs, we quantified that a decrease in lead would bring a present value benefit between £2-34m. As these values are not specifically developed for use in the UK, we have excluded them from our benefits modelling. Nevertheless, reduction in heavy metals would be expected to contribute to reductions in air, soil and surface water contamination, as well as reduced health impacts.

EVIDENCE BASE

2. INTRODUCTION

The Industrial Emissions Directive (IED) replaced the Waste Incineration Directive (WID) and places operating, monitoring and reporting requirements upon any “waste incineration plant” or “waste co-incineration plant”, irrespective of its size or capacity, in which waste is burned. The Directive aims to prevent or limit as far as practicable the release of harmful pollutants to land, air and water.

For many years, motor vehicle servicing and repair workshops have stored the waste oil arising from their business in situ. From the storage tank, the waste oil is piped to fuel a combustion device to provide heating when required for the workshop area. The device is typically simple and is not technically sophisticated without any form of air pollution abatement, therefore any contaminants in the waste oil such as PM_{10}, NOx, SOx and heavy metals may be released to air. Such devices are usually referred to as small waste oil burners (SWOBs). While the appliance is used mainly by the motor garage trade, it can also be found in farms and some types of domestic setting where it provides a cheap source of heating. It is a device used seasonally rather than throughout the year.

3. PROBLEM UNDER CONSIDERATION

As part of its implementation in England and Wales, comprehensive guidance on the WID was drawn up and first published in 2003. This included guidance that devices like SWOBs are typically simple and lack the attributes which would make them “incineration plants” or “co-incineration plants” as defined in the WID, and so would not be subject to WID requirements. The guidance explained that regulators should assess each device on a case-by-case basis to determine whether it had the necessary technical sophistication to be an incineration plant or co-incineration plant. Since the IED has superseded the WID, this guidance has been applied to the regulation of waste incineration plants and waste co-incineration plants under the IED. The Government has undertaken a review of this guidance, taking account of various views and perspectives, and considers that it is necessary to apply the waste

incineration provisions of the IED to all devices that burn waste oils including simple devices which would typically be SWOBs. This approach will help to reduce the emission of harmful pollutants to the air which impact on human health and the environment.

4. RATIONALE FOR INTERVENTION

The IED imposes operating and monitoring requirements on incineration and co-incineration plants. Waste oil contains hazardous heavy metals and other substances which can be emitted to air when waste oil is burnt. The emission of NOx, SO_2, PM and heavy metals can harm human health and the environment. In addition, waste oil is predominately used by small businesses, often in close proximity to residential areas; therefore the emission of these pollutants could have a greater impact on human health. Such impacts will not generally be taken into account by operators of SWOBs, resulting in negative externalities because more waste oil will be burnt than is socially desirable. The Government has a commitment to improve air quality and has taken account of various views and perspectives in deciding to amend the guidance on incineration. Hence the rationale for intervention is reflected by the drive to deliver health benefits through improved air quality whilst ensuring that operators have sufficient time to make the transition and explore alternative heating and fuel sources to comply with IED requirements.

Additionally the current guidance on incineration originated in 2003, when arrangements for dealing with waste oil were not as developed as they are now. In accordance with the waste hierarchy set out in the Waste Framework Directive (2008/98/EC), recycling of waste oil is preferable to energy recovery through burning it. The oil recycling sector has matured in recent years and robust arrangements now exist for the collection of waste oil from motor garages and other points where it arises prior to being recycled at central locations. It is expected that this is case even for more remotely located operators. However it would also be possible for the waste oil to be collected for suitable disposal. In many cases recycled waste oil can meet the criteria set by the Environment Agency under which the material is no longer regarded as a waste.

5. POLICY OBJECTIVES

The policy objective is to reduce emissions of pollutants which impact on human health and the environment through the use of waste oil as a fuel. This will be achieved through the revision of Government guidance in England and Wales such that simple waste incineration and waste co-incineration plants, primarily SWOBs become subject to the requirements of the IED. A proportionate approach is used to allow time for users to mitigate, as much as possible, their cost by granting them a sufficient time to explore options for alternative heating equipment or fuel type.

6. DESCRIPTION OF OPTIONS CONSIDERED

6.1 Option 0 – Business as usual (BAU)

Under Business As Usual (BAU) the current guidance is left un-amended and SWOBs users continue to burn waste oil. The use of SWOBs is currently subject to regulation by local authorities (under the Environmental Permitting Regulation (EPR), Part B processes). The EPR regulates emissions to air from the use of these appliances through the inclusion of specific conditions within an environmental permit. The guidance currently advises Local Authority regulators to carry out a case-by-case assessment of whether an individual SWOB is a technical unit and therefore should be subject to the more stringent requirements of IED.

This option would allow the continued use of SWOBs for burning waste oil, with continuing concerns about their emissions of heavy metals and at variance with the waste hierarchy which clearly favours collection and recycling as the means of dealing with waste oil.

This option will continue to negatively impact on air quality, public health and the environment. In essence, the BAU option means that the problem identified above will remain and will prevent the government from achieving its main objective of preventing waste incineration and protecting human health. Taking no action is not considered a viable policy option in light of the government's determination that the IED applies to all waste incineration and waste co-incineration plants burning waste oils including simple appliances. Hence the "do nothing" option simply provides the baseline against which the costs and benefits of the preferred option are calculated (in line with IA guidance).

6.2 Option 1 – Apply the requirements of the IED to all waste incineration and waste co-incineration plants including simple devices with no technical sophistication (i.e. SWOBs) with effect from April 2016.

Under this option, the combustion of waste oils in SWOBs would be subject to the regulations of the IED. This approach has already been implemented in Scotland and Northern Ireland. Units which continue to use waste oil as a fuel would be required to meet emission limits, monitoring and reporting requirements as set out in the IED. In practice, given the requirements of the IED, the use of waste oil as a fuel in these units would stop. As a result, operators of SWOBs would be required to find an alternative non-waste fuel for use in the same unit or invest in alternative space heating equipment, for example a gas-fired boiler. This would therefore reduce the emission of pollutants to air and reduce the health impacts from burning waste oil in SWOBs. The new legislation is not expected to result in any further enforcement costs as SWOBs are already regulated under the baseline. Additionally, if an operator doesn't use waste oil in their SWOB and instead uses alternative fuel they will not need to obtain a "Part B Processes" Environmental Permit to operate it.

Additionally, waste oil would have to be disposed of appropriately, or collected for waste oil recycling. Subject to users' own actions in the wake of changed guidance and enforcement by local authorities, this would lead to better observance of the waste hierarchy. We do not believe that amending the guidance should lead to an increase in illegal dumping because waste oil has a value and there is a full and widespread collection service for waste oil from garages.

In reaching a decision the Government has taken account of various implementation dates. Option 1 would take effect from April 2016. This provided time for consultation with stakeholders and gives operators time to consider and deliver the changes needed to ensure compliance.

It is not certain how users of SWOBs would choose to heat their premises in response to being unable to burn waste oil, three scenarios have been considered in order to illustrate the possible range of costs and benefits, denoted by A, B and C.

- Scenario A is that SWOB users continue to burn oil to heat their premises: either heavy oil such as gasoil, or recycled waste oil in the form of Processed Fuel Oil (PFO).In this scenario, garages continue using their SWOBs but opt to use non-waste fuel to heat their premises.

- Scenario B shows a situation where SWOBs are retired, and replaced by gas-fired heating immediately. Where connections to the gas grid are available, SWOB users will switch to using gas, which is a cheaper way to heat premises than gas oil (we assume around 80% of premises would have access to the grid). We assume replacement heating systems would have similar lifetimes to SWOBs, around 10 years, so would not need replacement during the appraisal period.

- Scenario C is that SWOBs are replaced by gas-fired heating as they become life-expired (we assume an average lifetime of 10 years, based on information from industry experts).

We believe that these scenarios capture the most likely range of responses although it is possible that garages choose to react in a way not covered here. For the purpose of this impact assessment, we use

scenario C as the central estimate, while scenarios A and B are used as part of our sensitivity analysis. A scenario where operators choose to continue burning waste oil is very unlikely because meeting the IED requirements would be prohibitively expensive.

In addition to the three scenarios, we also applied high, central and low sensitivities to reflect further uncertainty with our monetary valuation. The ranges of estimates illustrate sensitivities around projected fuel prices, damage costs, carbon prices and rates paid to operators for their waste oil. Figures on the front sheets reflect the central scenario (scenario C) and the valuation sensitivities around it.

6.3 Screening analysis of options

An initial analysis of options looked at a broader set of possible options. Non-regulatory options were considered however, no viable alternative to regulation was identified. As the issue under consideration concerns which plants the requirements of an EU Directive apply to, an approach which took a non-regulatory approach to these plants would not have been consistent with the requirements of the directive.

Alternative implementation dates were also considered. Options that would delay implementation beyond April 2016 were screened out. Further delay in implementing the necessary changes in the guidance would have resulted in unabated emissions continuing to be produced with the consequential potential impacts on human health and the environment. Earlier implementation was also considered. An immediate amendment to the guidance could enable implementation in September 2015. This would bring forward the benefits from reduced emissions but also the costs of compliance. Overall a September 2015 implementation could have total present value costs of around £270m and benefits of £211m. However this option would not provide operators with sufficient time to explore the options for alternative heating or fuels and for disposal of their waste oil. Also, it would not have allowed time to undertake a consultation on the proposed amendments to the guidance nor would constitute fair process or stimulate compliance. As such, earlier implementation was also screened out. Implementation in April 2016 (Option 1) is judged to provide the best balance between ensuring the benefits from bringing SWOBs into the scope of the IED while allowing operators to mitigate the costs of this as much as possible.

7. ANALYSIS OF OPTIONS

A consultation on the implementation of the amendments to the environmental permitting guidance on waste incineration was conducted to understand and integrate as much as possible views and perspectives of different stakeholders. The analysis of options has not been changed in light of the consultation responses because very limited additional data was provided and the current assumptions are based on the best available evidence. Table 8 provides clear explanation for each assumption and the rationale behind the estimates. Annex 1 also shows an additional adverse scenario based on the information supplied by consultation respondents.

7.1 COSTS METHODOLOGY AND ASSUMPTIONS

The most recent data from industry experts, including the Oil Recycling Association (ORA) suggests that there are around 15,000 burners in use, each consuming an average of 5,000 litres of waste oil per year (assuming that oil is not used during the summer season). This gives a total estimate of 75m litres of waste oil consumed each year.

We calculated the amount of non-waste oil and gas consumed in each period and compared it to the current scenario where users continue to use waste oil. While operators have the option to continue burning non-waste oil in their SWOBs, the central scenario (scenario C) assumes that they would transition to gas when their equipment expires (1,500 units pa) due to the lower costs of fuel. Total

energy costs in every period have been estimated by multiplying the projected gasoil price by the volume of gasoil and the projected natural gas price by the amount of gas required. The analysis is highly sensitive to the fuel price projections[1] of gasoil and natural gas. We used the central fuel price forecast to estimate the cost of energy, also applying the high and low sensitivities.

Total costs under scenarios B and C also include the cost differential of replacing heating equipment with more efficient gas-fired systems rather than with a new SWOB. The price paid for a range of gas and waste oil burners was provided by the Retail Motor Industry (RMI), from which we have taken the average, before VAT (we use £4,179 for gas and £3,688 for a SWOB, implying that gas-fired heating are 13% more expensive than SWOBs).

Implementation of IED will not necessarily make SWOBs redundant as users can continue burning alternative non-waste fuel. It is assumed all operators choose to do this in scenario A. While the cost of replacing heating equipment under scenario A would not change compared to the counterfactual, the cost of energy would be considerably higher due to the higher projected costs of fuel. Industry experts have also suggested that there are limited distribution models handling small deliveries of PFO. As natural gas used in gas-fired boilers is a cheaper source of heating, there isn't a strong economic reason for users to replace their burners with a new burner beyond their lifespan. Hence we only include this scenario to illustrate the possible range of costs.

If SWOBs are replaced by gas-fired heating immediately (scenario B) there would be a large one-off cost in the first period, as gas-fired heating is installed. Over the appraisal period ongoing replacement costs for new SWOBS would be avoided as the costs of replacement were borne in the first year. In general disposal costs of old SWOBs are captured under the baseline because we expect users to pay for their disposal regardless of the policy. However these costs would be brought forward under scenario B and some users may incur some additional costs as a result. The cost of energy in future periods is also expected to be lower as gas is a cheaper source of heating than other virgin fuels. We assumed that around 20% of SWOBs would not have access to the grid and would instead use gasoil.

7.2 MONETISED COSTS UNDER OPTION 1

Under option 1, the requirements of the IED are fully applied to simple incineration and co-incineration plants from April 2016. In practice, as SWOBs are primarily used for space heating during the winter months, costs are not expected to be incurred until autumn 2016. This will allow time for users to mitigate, as much as possible, their costs by allowing them to use waste oil until they transition to their preferred source of heating. This approach is preferred because it looks to balance the burden imposed on small businesses against the environmental objectives set out in the Directive. The application of the IED to these appliances will increase costs for the operators as they would be required to pay for the part of energy consumption previously provided by waste oil.

The central present value cost of alternative fuel for affected operators would be around £258m over a ten year period, corresponding to an average annual undiscounted cost of £31m. The present value costs of gradual replacement of equipment would be around £6m over a ten year appraisal period, corresponding to an undiscounted average annual cost of £0.7m. This number represents the additional cost paid by operators to install a gas boiler instead of a new burner. The disposal cost of old SWOBs is not additional to what would have happened anyway under the baseline because burners would only be replaced as they expire. The total present value cost under scenario C is therefore expected to be £264m, equivalent to around £1,800 per operator per annum. All costs fall to operators of SWOBs. These costs are summarised in Table 2 below, which also presents costs under scenarios A and B.

[1] Updated Energy and Emissions projections: 2014, Department for Energy and Climate Change (DECC). https://www.gov.uk/government/publications/updated-energy-and-emissions-projections-2014

Table 2: Present value and undiscounted average annual total costs, under option 1, over 10 year appraisal period, £m 2015 prices and 2015 PV base year

£m, 2015		Sensitivity		Central estimate
Scenario		A	B	C
PV costs	*Central	341	234	264
	High	447	307	346
	Low	341	234	264
Undiscounted average annual costs	Central	41.5	27.7	31.7
	High	54.5	36.6	41.6
	Low	41.5	27.7	31.7

* The variations between the low, central and high scenarios are due to differences in fuel price projections (refer to table 8).

The Government considers that an April 2016 implementation date would manage expectations of operators and regulators by giving them enough time to adjust to the changes. Implementation in April 2016 will also ensure that changes in operator's heating practices are not required to occur during the winter time, thus reducing the risk and negative impacts on businesses.

7.3 BENEFITS METHODOLOGY AND ASSUMPTIONS

Emission reductions are calculated based on the level of pollution emitted from burning waste oil relative to the total amount of emissions from non-waste oil and gas. We have estimated the emissions intensities of burning waste oil in SWOBs, and used emissions factors for industrial use of oil and natural gas from the National Atmospheric Emissions Inventory (NAEI).

Table 3: Emissions factors for waste oil, gasoil and natural gas

Pollutant	Ktonnes /Mtonne of fuel		Ktonnes/Mtherm of fuel
	Waste oil	Gasoil	Natural gas
Carbon	865	870	1.47
Methane	0.13	0.13	0.0
NOx	21.9	2.94	0.01
SO_2	11.4	0.59	0.0
PM_{10}	2.73	0.064	0.0

We also assumed that all waste oil requires processing and the emissions arising from the process are included in our modelling. Emissions factors for processing waste oil are taken as an average of the five techniques examined from a report by the German Institute for Energy and Environmental Research[2]. These are in kg of emissions per tonne of waste oil processed: 184kgCarbon/tonne; 0.836kg SO_{2e}/tonne and 0.168kg PM_{10}/tonne – or in total 11,798 tonnes of CO_2, 53 tonnes of SO_2 and 11 tonnes of PM_{10}. GHG emissions are likely to increase in cases where processing emissions offset any savings at the point

[2] Horst Fehrenbach (1995) *Ecological and energetic assessment of re-refining used oils to base oils: Substitution of primarily produced base oils including semi-synthetic and synthetic compounds* IFEU, Heidelburg

of use. This impact assessment does not take into account the environmental damage caused by the collection of waste and the delivery of recycled oil due to the lack of information on the likely scale of impact. However we have made the assumption that the benefits of burning clean oil will outweigh the potential costs caused by transport emissions.

We valued changes in the level of emissions associated with changes in fuel in line with the standard appraisal guidance in the Green Book. Damage costs are available for NOx, SOx and PM_{10} that capture health impacts and carbon values for changes in carbon and methane emissions capture GHG impacts. However these are only a subset of the pollutants – the rest are non-monetised.

7.4 MONETISED BENEFITS UNDER OPTION 1

Amending the guidance to reflect the strict requirement set out in IED, with effect from April 2016, will deliver health improvements by reducing emissions of air pollutants. To demonstrate the break-down of monetised health benefits by pollutant, Table 4 below shows the central annual average values of the change in emissions. The numbers predominantly capture chronic mortality and morbidity effects, plus small scale damage to buildings and materials. This shows that the monetised benefits are mainly driven by reductions in NOx, PM_{10}, and SOx.

Negative figures indicate an increase in emissions – this may be the case where emissions from processing outweigh any savings at the point of use. In the central scenario we calculated the emissions from processing and burning recycled oil until SWOBs are replaced with gas, followed by gas emissions in subsequent periods. Carbon emissions from processing and alternative fuels outweigh emissions from burning waste oil. While the negative impacts in the central estimate decrease in the future as more people switch to gas, overall there is a small net increase in carbon emissions. As a comparison, we estimated a decrease in carbon emissions under scenario B where we have assumed that operators would switch to gas immediately.

Table 4: Central average annual benefit of emissions reductions under option 1, by pollutant, £m 2015 prices and 2015 PV base year

£m, 2015	Sensitivity		Central estimate
Pollutant	A	B	C
Carbon	- 2.85	0.59	- 0.35
Methane	0.00	0.03	0.02
NOx	13.9	13.3	13.6
SO_2	1.27	1.35	1.34
PM_{10}	4.91	4.99	5.00
Total	**17.2**	**20.3**	**19.6**

Evidence on the health impact of NO_2 has strengthened significantly in recent years. While uncertainties remain around the exact health impact, evidence suggests that NO_2 has a bigger adverse impact on health than previously thought. The Committee on the Medical Effects of Air Pollution (COMEAP), an independent expert group advising the government on the impact of air pollution, published a statement in March 2015 that recognised the link between NO_2 and mortality[3]. A full report to be published later this year is expected to contain recommendations for how to account for the direct links between NO_2 and mortality. The Committee has provided advice on how to account for the impacts in

[3] Committee on the Medical Effects of Air Pollution (2015): Statement on the evidence for the effects of nitrogen dioxide on health. https://www.gov.uk/government/publications/nitrogen-dioxide-health-effects-of-exposure

the meantime, which has been used as the basis for interim Defra guidance[4]. The estimated benefit of NOx emission reductions in Table 4 above follows this interim guidance. The high and low sensitivities in Table 5 below also use the recommended range from the guidance to reflect the uncertainty around the central estimate.

Further, the waste oil recycling industry is developed enough to sustainably manage waste oil arising from the motor trade industry and elsewhere. As waste oil is a valuable resource there is likely to be an increase in the amount of waste being recycled and managed further up the waste hierarchy. Total benefits also include potential revenue to SWOB users from selling their waste oil. Data from the Oil Recycling Association (ORA) suggests that collection volumes (above 1,000 litres per collection) from vehicle workshops/serving activities would generate a payment to the waste producer between 4-6p per litre. Assuming that the part of fuel consumption previously covered by waste oil (5,000 litres per year) is now recycled, operators stand to gain a benefit of around £29m in the central scenario (present value, over ten years). Table 5 below illustrates the total benefits, including health benefits from reduced pollution and revenue from waste oil disposal.

Table 5: Present value and undiscounted average annual total benefits, under option 1, over 10 year appraisal period, £m 2015 prices and 2015 PV base year

£m, 2015		Sensitivity		Central estimate
Scenario		A	B	C
PV benefits	*Central	170	196	189
	High	240	277	267
	Low	97	125	107
Undiscounted average annual benefits	Central	20.8	23.9	23.1
	High	29.2	33.8	32.7
	Low	11.8	15.3	13.1

* The variations between the low, central and high scenarios are due to differences in damage cost estimates, carbon prices and rates paid to operators for their recycled oil (refer to table 8).

8. NON – MONETISED COSTS AND BENEFITS

8.1 NON - MONETISED COSTS

It is possible that smaller or more rural operators would incur additional costs if they have to pay for their waste oil to be recycled. This would arise if they recycle less than 500 litres per collection. Data provided by the ORA suggests that current collection rates for small business without a SWOB are around 1100 litres per month (assuming 22 working days). Larger franchises are expected to be able to gather quantities two, three, or even four times that amount. In our consultation stage impact assessment we set out the view that it is reasonable to assume that smaller or more remote businesses would not need to pay for the disposal of their waste oil. However a few respondents challenged this assumption and suggested that small businesses are unlikely to gather waste oil in sufficient volumes to be paid for it. Annex 1 illustrates an extreme scenario which takes into account these potential costs. This scenario is added as additional sensitivity as on balance we retain the current central estimate. Some of the costs may be passed through to customers of businesses using SWOBs, although we do not estimate the extent to which this will take place (since this does not change the overall balance of costs

[4] https://www.gov.uk/guidance/air-quality-economic-analysis

and benefits). It is also believed that small garages already receive a significant contribution towards their environmental costs by charging their customers a waste disposal charge of £5.

There is potentially a fraction of users under scenario C who would have to pay a fixed cost to transition to gas if they are not included in the grid over the 10 year period. Alternatively, they could just switch to gasoline if it is more economical. The timing of the proposed guidance and proposed implementation of IED for SWOBS, in addition to the assumption of ramping up the transition over the 10 year period allows for substantial flexibility for current SWOB users to transition.

8.2 NON – MONETISED BENEFITS

The main environmental concerns regarding the use of waste oil as a fuel are around heavy metals and some organic substances. The IED sets specific requirements on the emission of these pollutants. Table 6 shows the potential change in annual emissions of heavy metals from using gasoil instead of waste oil, based on burning 75m litres of oil p.a. Gasoil emissions are taken from the National Atmospheric Emissions Inventory, waste oil emissions are Defra estimates based on a range of sources. Natural gas is not shown, as it emits negligible amounts of these pollutants. The estimates in Table 6 are based on emissions from combustion at source when the fuels are burned. There could be some emissions produced when waste oil is processed, however we have no data on this so assume these would be negligible.

Table 6: Heavy Metal Emissions, kg/year

Kg/year	Waste oil	Gasoil	Absolute difference	Percentage Difference
Chromium	89.4	1.92	87.5	-98%
Arsenic	203	2.1	201	-99%
Cadmium	15.3	1.68	13.6	-89%
Mercury	8	0.9	7.1	-89%
Nickel	105	96	9	-9%
Lead	3,342	19.8	3,322	-99%

While we can quantify the change in emissions of heavy metals, we do not have values with which to monetise the impacts. Nevertheless, these pollutants are recognised as being harmful to human health and ecosystems as they tend to accumulate in the environment and can be easily transported from one place to another. Given the significant reduction in emissions, we expect to see considerable benefits as users switch to gas.

Given the large absolute difference in lead emissions between waste oil and gas oil, we have looked beyond UK guidance for methods of valuing the impacts of lead. One such study, by the European Environment Agency[5], quantifies the impact of lead emissions (among other heavy metals) on IQ loss for EU citizens at €965/kg, within a range €90-€1,480 (in 2005 prices). First, we converted the damage costs from EUR to GBP using the 2005 exchange rate £1=€1.46, then we adjusted for inflation from 2005 to 2015 using the GDP deflator. The central value used is £824/kg, within the range £77-£1,264. Under option 1 (scenario C), the present value benefit of the reduction in lead emissions is £2.1 - £34m with a central estimate of £22m.

[5] See Table A2.5 of http://www.eea.europa.eu/publications/cost-of-air-pollution

These estimates are indicative as the values are not based on damage costs developed for use in the UK. A UK damage cost would differ somewhat, given that the geographic scope would be limited to the UK, as opposed to measuring the impacts on all EU citizens. As these values are not included in agreed UK valuation methodology, we exclude these estimates from the benefits modelling.

Another aspect that we must consider is the impact on exchequer revenues. SWOB users currently pay no fuel duty on the waste oil they use as a fuel, but the market price of oil or PFO will include fuel duty (10.7p/l). Under option 1, the average annual fuel duty receipts under scenarios A, B and C are £15.1m; £3.0m and £3.3m respectively. As these are transfer payments between individuals they do not affect the cost-benefit analysis. Nevertheless, the impacts are outlined here as tax revenue could be used to support economic activity in other sectors.

The monetised air quality benefits only cover a subset of the impacts for which robust evidence is available leaving aside other health benefits and impacts on ecosystems. In addition, reduced emissions of heavy metals would be expected to contribute to reductions in air, soil and surface water contamination thereby reducing acidity and the potential for these substances to bio-accumulate in the food chain and humans. Reduction in the emissions of organic substances should also lead to a downward trend in the release of carcinogens[6].

9. SUMMARY OF COSTS AND BENEFITS

Table 7 shows the present value costs and benefits of Option 1. In the absence of full information of the likely change in behaviour, we assume that scenario C is the most likely form of action. Net present values on the front pages represent the worst and best case outcomes under scenario C in order to demonstrate an extreme range of impacts. The high NPV (most favourable outcome) shows the high benefit net of the low cost, while the low NPV (worst outcome) illustrates the low benefit net of the high cost. Option 1 gives a central cost of £264m over 10 years, and benefits of £189m, with a Net Present Value of £ -75m.

Table 7: Summary of costs and benefits for option 1, £m 2015 prices and 2015 PV base year

£m, 2015	Sensitivity		Central estimate
Scenario	A	B	C
Central cost	341	235	264
Central benefit	170	196	189
NPV (benefit – cost)	**-171**	**-39**	**-75**
High cost	447	307	346
Low benefit	97	125	107
Low NPV	**-350**	**-182**	**-239**
Low cost	341	235	264
High benefit	240	277	267
High NPV	**-101**	**42**	**3**

There may be considerable uncertainty about predicted impacts and their appropriate monetary valuation. Hence the results have been monetised using three different scenarios (low, central and high) to present a set of possible outcomes. In addition to the most likely scenario (central), high and low are also included to reflect sensitivity around projected fuel prices, damage costs, carbon prices and rates paid to operators for their waste oil (between 4-6p per litre). The high fuel price is comparable to the low damage cost and price paid to operators in order to present the extremes in costs and benefits.

[6] Revealing the costs of air pollution from industrial facilities across Europe – a summary for policy makers.

10. WIDER IMPACTS

In terms of waste oil collection and correct disposal, the UK now has a very good record. Our statistics indicate that the UK collection rate for waste oils is over 67%, with some of the remaining oil being used in appliances such as SWOBs. The systems we have put in place have sustained this trend for high waste oil collection rates and ensure the protection of human health and the environment. The oil recycling sector will be a beneficiary of the proposed change to the guidance as it is expected that recycling rate of waste oil should go up. It will mean that there is more consistency in Government's approach to waste management overall and give the business community more regulatory certainty.

It has been suggested that amending the guidance to clarify that the requirements of the IED apply to all waste incineration and waste co-incineration plants including simple appliances e.g. SWOBs could lead to an increase in the illegal dumping of waste oils which are currently being burned as a source of heating, with consequent adverse impact on the environment. We do not believe that amending the guidance should lead to an increase in illegal dumping because waste oil has a value and there is a full and widespread collection service for waste oil from garages. Therefore recyclers would pay operators to collect their waste, leading to an increase in the above collection rate. It is also worth noting that there are legal requirements on the management of waste oil which ensure its proper disposal through safe and environmentally sound disposal methods.

11. RISKS AND ASSUMPTIONS

Failure to amend the guidance and ensure that all waste incineration and waste co-incineration plants, including simple appliance e.g. SWOBs are subject to the requirements of the Industrial Emissions Directive carries significant infraction risk.

In order to produce this impact assessment, it has been necessary to make a number of assumptions. These are summarised in the assumptions table below. Through consultation, we have tested the assumptions with industry, experts and specific businesses impacted across enterprise size. When taking into consideration the best available evidence, the headline assumptions are broadly robust. Annex 1 presents key conclusions from the consultation responses against headline assumptions. The Annex also presents an unlikely adverse scenario, to reflect comment received.

Table 8: Assumptions and uncertainties

Assumption	Value/Rationale	Source
It has been assumed that there are 15,000 SWOBs users in the UK and equipment tends to have a 10 - year lifespan.	While the number of SWOBs currently permitted under the Environmental Permitting Regulations is approximately 2,000, discussion with industry indicate that the actual number of users is considerably higher. It is believed that the majority of users are located in England and Wales as other Devolved Administrations have already applied the requirements of the IED to all waste incineration and waste co-incineration plants.	Industry experts
It has been assumed that each SWOB consumes around 5,000 litres pa. Hence total waste oil consumption in this analysis	Around 650m litres of new lubricants is placed each year on the market and while some small amount may be lost in the environment, the majority of this oil is used in application. Data from the ORA indicates that around 375m litres of waste oil should	Oil Recycling Association (ORA)

is around 75m litres per year.	be available for collection, but current estimates suggest that only 67% of that is actually accounted for by the waste oil recovery sector. As a result there is a gap of 125m litres between the projections of what volume should be collected and the amount actually reported. While this gap can be explained by a number of reasons, it is widely believed that the use of SWOBs contributes to a big proportion of the difference. Following the information provided by the ORA, it is assumed that 75m litres are used in SWOBs each year.	
The central scenario has assumed that operators would switch to gas as their equipment expires (1,500 units per year).	The regulation will not necessarily make SWOBs redundant as operators may prefer to burn non-waste oil in their existing equipment. While this scenario exists as an option, the most likely scenarios would be for SWOBs to be replaced as they expire. This assumption is reasonable given the lower projected cost of gas. Additionally, processed fuel oil which is granted non-waste oil status can only be obtained as a substitute fuel for similar virgin residuals. In practice, it is quite unlikely that users would prefer to use their burners beyond their lifespan, although a few operators with no access to a gas grid may not have other alternatives.	Industry experts
It has been assumed that operators would be paid between 4- 6p per litre by recyclers to collect their waste oil. The modelling assumes that operators are paid 4ppl in the low scenario, 5ppl in the central and 6ppl in the high scenario. Annex 1 also illustrates a case where operators need to pay for their disposal.	Although small quantities of 500 litres may be charged a negligible disposal cost, it is believed that the majority of workshops gather significantly higher volumes as waste oil is only one source of waste that workshops need to recycle. Evidence based on current collection rates for small businesses without a SWOB show that small workshops gather around 1100 or more litres per month. Larger franchises are expected to be able to gather even larger quantities. The range of 4-6p per litre is a recent estimate and so is assumed to reflect the current low oil price.	ORA
Modelling results are particularly sensitive to fuel prices projections. On average, the fuel price in the low scenario is 23% lower than under the high scenario.	Central fuel prices are based on central estimates of growth and fossil fuel prices while the low and high scenarios include lower/higher projected economic growth. The numbers between the low and the high scenarios also vary due different population growth projections. The total costs under the low and central scenarios are identical because the projected prices are not significantly different to have a major impact.	Department for Energy and Climate Change (DECC)
We have assumed that	Emissions factors do not reflect real world emissions	National

emission factors for the use of propane-fired garage heaters would also be appropriate for natural gas-fired boilers.	as the available factors tend to be very generic, and it is difficult to find data for specific fuel/technology combinations.	Atmospheric Emissions Inventory (NAEI)
Impacts of air pollution. In applying damage costs to value air quality impacts it is important to consider the effects which have not been possible to monetise due to the high level of uncertainty.	Damage costs estimates exclude several key impacts, such as: morbidity impacts from exposure to PM; effects from exposure to ozone (including both health impacts and effects on materials); and changes in visibility. Additional caveats also relate to the geographic location of emission sources and meteorology. The value of NOx emission changes are based on the interim Defra guidance that recognises the direct impacts of NO2 on health. The guidance discusses the uncertainties around the interim values.	More information behind the damage costs methodology is presented in Defra, 2011, Air Quality Appraisal – Damage Costs Methodology[7] and the interim guidance on valuing NOx[8]
We have used the GDP Deflator, March 2015 (Quarterly National Accounts)	All costs and benefits have been assessed at 2015 prices and uplifted to 2015 PV base year. However the Equivalent Annual Net Cost to Business (EANCB) figure is calculated at 2014 (real) prices and 2015 Present Value base year. Methodology is consistent with the Green Book and supplementary guidance.	Produced by the Treasury from data provided by the Office of National Statistics[9]

12. DIRECT COSTS AND BENEFITS TO BUSINESSES CALCULATIONS (following OI3O methodology)

Following the EANCB requirements, costs and benefits calculated here use a 2014 price base year and a 2015 PV base year. The direct costs to business include both fuel costs and any replacement boiler costs, while the direct benefits to business include the revenue from waste oil disposal. Under Option 1, the equivalent annual direct cost to business is estimated to be £30.7m, while the equivalent annual direct benefit to business is estimated to be £3.4m. Overall, this gives an EANCB of £-27.3m. It must be noted, this calculation demonstrates and presents the net difference for business between the baseline position with no change in guidance and the preferred option (option 1). As this is EU driven regulation, and the implementation doesn't go beyond the minimum EU requirement, it is out of scope of 'One-in, Three-out' in accordance with the current methodology.

13. SMALL AND MICRO BUSINESSES ASSESSMENT

The potential impact on SMEs has been considered by estimating the ability of businesses to cope with the new regulatory burden. The preferred option will allow time for users to mitigate, as much as possible, their cost by allowing them to use waste oil until they transition to their preferred source of heating in April 2016.

[7] Air Quality Appraisal – Damage Costs Methodology, February 2011
https://www.gov.uk/government/uploads/system/uploads/attachment_data/file/182391/air-quality-damage-cost-methodology-110211.pdf
[8] https://www.gov.uk/guidance/air-quality-economic-analysis
[9] GDP Deflator, March 2015, https://www.gov.uk/government/statistics/gdp-deflators-at-market-prices-and-money-gdp-march-2015-quarterly-national-accounts

Quantitative analysis was carried out by comparing the total annualised cost under option 1 to the average gross operating surplus (GOS) per business in the '*Wholesale and retail trade and repair of motor vehicles and motorcycles'.* This measure of the affordability was considered most relevant as it represents the capital available to companies to repay their creditors, to pay taxes and eventually to finance all or part of their investments[10].

The impacts are differentiated based on business size. Data on business numbers and their turnover was sourced from the Department for Business, Innovation and Skills (BIS), while GOS figures come from the Office of National Statistics (ONS)[11]. Table 9 below shows the number of businesses in each size category and their respective turnover.

Table 9: Number of businesses and their turnover in the wholesale and retail trade and repair of motor vehicles and motorcycles sector

Size of businesses	Number of businesses	Turnover (£, millions)
Solo traders	68,115	6,912
Micro	38,815	21,882
Small	5,310	19,287
Medium	795	30,740
Large	180	65,560

The economic sector used captures a wider range of businesses than those that will be affected by the options in this impact assessment. It is challenging to assess independently the number of garages affected by the policy. Hence the figures presented in Table 10 below should be used as a very broad indication of the possible scale of impacts on smaller business. In addition it is uncertain whether many SWOBs operators would be sole traders.

Table 10: Additional costs to businesses as a percentage (%) of their GOS

Size of businesses	Central (%)	Low (%)	High (%)
Solo traders	43.6	43.6	57.2
Micro	7.9	7.9	10.3
Small	1.2	1.2	1.6
Medium	0.1	0.1	0.2
Large	0.0	0.0	0.0

The data suggests that the average annual cost would be around 7.9% of the Gross Operating Surplus (GOS) for micro and 1.2% for small business. While the additional costs would have a negligible impact on medium businesses (0.1%) and no impact on large corporations, it is likely that if operators of SWOBs were sole traders they could be disproportionately affected by changes to the guidance.

[10] http://epp.eurostat.ec.europa.eu/statistics_explained/index.php/Glossary:Gross_operating_surplus_(GOS)_-_NA
[11] Department for Business Innovation and Skills, October 2013, Business Population Estimates for the UK and Regions: https://www.gov.uk/government/collections/business-population-estimates

Although some businesses, at least to a certain degree, may be disadvantaged by the higher cost of compliance, introducing an exemption is not an option as it would undermine the purpose and reduce the likelihood of achieving the identified benefits. However extending the amount of time SWOBs users have to consider alternative sources of heating is expected to mitigate the negative impacts.

14. SUMMARY AND PREFERRED OPTION WITH DESCRIPTION OF IMPLEMENTATION PLAN

The preferred option is to amend the guidance to make clear that all waste incineration and waste co-incineration plants including simple appliances e.g. SWOBs and other similar units are subject to the requirements of the IED and for the amended guidance to take effect from April 2016. This would align England and Wales government guidance with the situation in Scotland and Northern Ireland and other Member States. It would also result in reduced emissions, particularly of heavy metals, such as lead. This would lead to a reduction in the impacts on human health and the environment through the use of waste oil as a fuel. The revision of the guidance, , will be drawn to the attention of the organisations which have already been engaged in this issue and which have contributed information incorporated in this impact assessment.

Enforcement of the revised guidance thereafter would be a matter for the Environment Agency who, as regulators of waste incineration plants and waste co-incineration plants under the Environmental Permitting Regulations 2010, will take suitable and proportionate steps should operators continue to use waste oil as a fuel in SWOBs after that date.

ANNEX 1: Outcomes of the consultation on the implementation of amendments to the environmental permitting guidance on waste incineration

A public consultation was held from 14th September until 26th October 2015 to seek views on whether the amendments to the environmental permitting guidance for the use of Small Waste Oil Burners (SWOBs) are clear. A summary of consultee responses, along with the Government response can be found at www.gov/defra and www.wales.gov.uk. This annex sets out where evidence gathered through the consultation and further discussions with stakeholders have led to closer examination of the assumptions and sensitivities used in the analysis. While we recognise that costs will vary depending on the individual circumstances of different operators, the limited information gathered during the consultation cannot be used as the basis for estimating the central values in this impact assessment. Hence the data is only used to inform an additional sensitivity scenario presented later in this section.

Twenty-one responses were collected in total and the table below details only those responses which are relevant to the evidence base in the impact assessment. Additional comments regarding the clarity of the guidance are addressed separately.

Table 11: Summary of consultation responses

Stakeholder	Summary of information provided
Commercial Vehicle Workshops	A small number of workshops/operators expressed concerns about the potential costs to their business and supplied additional data to inform the analysis. One respondent reported considerably smaller quantity of waste oil consumption in the range of 500 - 700 litres per year. It was also suggested that small workshops are more likely to pay a premium to get their waste oil recycled due to their remote location and insufficient volume. In addition, one individual highlighted that the cost of disposal is likely to be higher when the price of crude oil is low and the demand for recycled products is also low.

	It was highlighted that the waste oil emissions outlined in the impact assessment appeared to be over-estimated. However, the emission factors have stayed the same because the estimates have been informed by the best available evidence and no additional information has been supplied by stakeholders.
Local Authorities	Most of the consultation responses were submitted by representatives of different local authorities and vary in terms of their views. While a small number of responses indicated that some workshops are more likely to be charged for their waste oil disposal, one individual also recognised that potential recycling revenue will help offset some of the energy costs. It was suggested that waste oil varies in quality and some may not be cost effective to recycle which may then lead to disposal charges. However, prior to the consultation, a number of industry and internal experts have advised that the difference of whether operators get paid or not depends on wider economic factors (e.g. price of oil) and the volume of waste rather than the quality. One respondent questioned the assumed amount of waste oil consumed per year and suggested that the figure was over-estimated by 70 per cent.
Environmental groups	The environmental benefits were also recognised as part of this consultation. A member of the Royal Society for Public Health supported the change and acknowledged that waste should be recycled instead of burned.
Trade Associations	The Garage Equipment Association (GEA) indicated that there are 20,000 SWOBs users. The increase in costs and benefits are proportionate when only this assumption is changed.

As very limited data has been provided through the consultation, the information has only been fed into the development of an additional sensitivity scenario. This highlights the remaining uncertainty in the analysis, and demonstrates what the net benefit position could look like if the key assumptions in table 8 do not hold. The key findings of the sensitivity scenario are based on the following:

- The modelling assumes that 20% of operators consume 1,500 litres; 30% consume 2,500 litres and the rest consume 5,000 litres per annum. This is equivalent to a total quantity of 53.25m litres of waste oil burned in SWOBs, compared to 75m litres in the main estimates.
- It has been assumed that 30% of operators will get their waste oil recycled for free and 20% will need to pay for that service. Data supplied through the consultation suggests that a sum of £200 is charged for collections of quantities lower than 400 litres. This implies a total cost of £800 per operator assuming that four collections are needed every year.
- The number of businesses assumed to be paid for their waste oil disposal has been reduced to only 50% of the total. The rate paid to users has remained the same at 5ppl.

Table 12: Summary of central costs and benefits under the additional sensitivity scenario

£m, 2015	Description	Sensitivity		Central estimate
		A	B	C
Costs	Cost of equipment replacement	-	12	6
	Costs of energy use	242	158	183

	Disposal costs (20% of users)	20	20	20
	Total costs	**262**	**190**	**209**
Benefits	Air quality human health benefits	100	118	113
	Waste disposal revenue (50% of users)	10	10	10
	Total benefits	**110**	**128**	**123**
Total	Net Present Value (NPV)	**-152**	**-62**	**-86**

The modelling results show a decrease in the total cost under the sensitivity scenario. While we have taken into account the additional disposal charges, the cost of substitute energy has decreased relative to the main estimates. This is explained by the lower amount of waste oil assumed to be burned in SWOBs. Despite the additional cost of disposal, the overall burden on all businesses is roughly the same as before, because the cost of heating is considerably smaller than what was previously estimated.

In reality, the most negative scenarios would only be expected to encompass a very small fraction of the estimated user base. Additionally, the renewable oil industry is getting better at reusing oil, and this proposal will introduce incentives to expand the market further, so the recycling cost pressure on the most negative responses will reduce as the technology improves and market thickens.