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Phase 2 of the Impact Assessment of Proposals for a Revised IPPC Directive

Part 3: Production of Chemicals for use as fuels or lubricants Final report

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Executive Summary

Introduction

The Commission published its proposal and an impact assessment for a Directive on industrial emissions (Industrial Emissions Integrated Pollution Prevention and Control, IE(IPPC)D [1]) on 21st December 2007. This consolidates seven existing Directives related to industrial emissions into "a single clear and coherent legislative instrument" and includes a number of changes related to new and existing activities. The main objective of this report is to assess, in outline, the likely impacts of the proposal in relation to installations within the UK for the production of chemicals for use as fuel or lubricants.

Proposed Changes

The Commission has proposed that section 4.7 of Annex 1, within the IPPC Directive, is inserted as a new inclusion that reads:

4.7 Production of chemicals for use as fuels or lubricants

The purpose of adding this activity was to improve the consistency of approach to regulation of installations producing biofuels across member states and to ensure that installations producing biofuels are regulated within the IPPC regime. A consequence of this is that potential adverse impacts from biofuel production installations are effectively managed.

The Commission's proposals to revise the IPPCD by insertion of category 4.7 into Annex I have been interpreted for the purpose of this impact assessment report as being supplementary to category 1.2 Gasification, Liquefaction and Refining Activities Part A(1) (i) The further refining, conversion or use (otherwise than as a fuel or solvent) of the product of any activity falling within paragraphs (g) or (h) in the manufacture of a chemical and 4.1.Organic Chemicals Part A(1) (a) (ii) organic compounds containing oxygen, such as alcohols, aldehydes, ketones,carboxylic acids, esters, ethers, peroxides, phenols, epoxy resins with the aim of capturing the production of biofuels and lubricants.

[1] "Proposal for a Directive of the European Parliament and of the Council on industrial emissions (integrated pollution prevention and control) (recast)". European Commission, Brussels, 21st December 2007. Available from: http://ec.europa.eu/environment/ippc/proposal.htm

Costs & Benefits

The following table presents indicative cost ranges based on the current number of installations in England and Wales that are not regulated under Pollution Prevention and Control or Waste Management Licensing (~1282 installations).

Requirement	Cost
Permit Application	£3,589,600
Preparation Costs	£384,600 - £1,923,000
Subsistence Fee	£589,720
Total	£4,563,920 – £6,102,320

The following table presents indicative costs based on there being no producers that are less than the existing Environment Agency threshold of 5,000 litres per annum biodiesel production. This is the number of installations that are forecast to be operating in 2016.

Requirement	Cost
Permit Application	£0
Preparation	£0
Subsistence Fee	£0

Limitations/Uncertainties

There are a number of limitations and uncertainties with the approach applied and input data available that should be noted:

- Arguments provided within this report are constructed on the basis that guidance relating to the interpretation of industrial scale allows regulatory authorities to set thresholds and that the guidance will not be retracted or changed. In the event that the guidance is retracted or changed then conclusions presented would no longer be valid; and

- Scotland and Northern Ireland may have installations that are below the respective thresholds. No data was available at the time of the study which presents significant uncertainty about potential costs and benefits.

Contents

1. Introduction

1.1 This Report

The overall aim of this work package is to provide support to Defra in response to the publication of the European Commission's proposal for a new Directive on industrial emissions. This work will be undertaken under Entec's framework contract with Defra on "*The Preparation of Regulatory Environmental Impact Assessments in Relation to Proposals for Air Quality Legislation"* contract (RIA). The main objective of this report is to assess the likely impacts of the proposal in relation to biofuel and biolubricant installations within the UK, building and commenting on as well as extending the Commission's Impact Assessment (IA), where appropriate. In particular, this report focuses on the proposed changes relating to the addition of the following sub-clause into the IPPC Directive: 'the production of chemicals for fuels or lubricants'.

The project team has consulted with the following stakeholders to support the development of this report:

- Environment Agency for England & Wales (EA);
- Scottish Environment Protection Agency (SEPA);
- Northern Ireland Environmental and Heritage Service (NIEHS);
- Allied Biodiesel Industries (UK); and
- selected operators within the biofuels sector.

1.2 What Is The Issue?

1.2.1 Overview of Revised IPPC Directive

The Commission has published its proposal and an impact assessment for a Directive on industrial emissions (Industrial Emissions Integrated Pollution Prevention and Control, henceforth cited as "IE(IPPC)D" [2]) on 21st December 2007, which consolidates seven existing Directives related to industrial emissions into a single clear and coherent legislative instrument. These existing Directives include titanium dioxide industry related directives (78/176/EEC,

[2] "Proposal for a Directive of the European Parliament and of the Council on industrial emissions (integrated pollution prevention and control) (recast)". European Commission, Brussels, 21st December 2007. Available from: http://ec.europa.eu/environment/ippc/proposal.htm

82/883/EEC, 92/112/EEC), the IPPC Directive (96/61/EC), the Solvent Emission Directive (1999/13/EC), the Waste Incineration Directive (2000/76/EC) and the LCP Directive (2001/80/EC). The Commission's IA[3] identified a number of problems related *"(1) to shortcomings in the current legislation that lead to unsatisfactory implementation and difficulties in Community enforcement actions and, thereby, to loss of health and environmental benefits and (2) to the complexity and lack of coherence of parts of the current legal framework."*

The Commission has provided an indicative timeline for discussion and implementation of the proposals. It is important to note that this is dependent on the length of time it takes to discuss and agree the proposed directive within the co-decision procedure. The initial timetable is set out below in Table 1.1

Table 1.1 Key Dates for The Discussion and Implementation of the Proposed IE(IPPC)D

Date	Description
12/2007	The Commission adopts its proposal for a Directive on industrial emissions as well as issuing its Communication 'Towards an improved policy on industrial emissions'
01/2009	First reading in the European Parliament and political agreement in Council.
12/2010	Completion of the co-decision process and publication of the Directive on industrial emissions within the Official Journal.
07/2012	Member States fully transpose the new Directive (18 months after entry into force). The Directive applies to all new installations from this date onwards.
01/2014	All existing installations previously subject to IPPC, Waste Incineration, Solvent Emissions and Titanium Dioxide Directives must meet the requirements of the new Directive. Large Combustion Plants do not yet need to meet the new Emission Limit Values (ELVs) prescribed within the Directive
07/2015	The newly prescribed activities such as additional poultry installations, smaller combustion units and wood preservation activities must meet the requirements of the new Directive.
01/2016	Large Combustion Plants must meet the requirements set out in Chapter 2 of the new Directive, as well as the ELVs set out in Annex V

[3] "Commission Staff Working Document: Accompanying document to the Proposal for a Directive of the European Parliament and of the Council on industrial emissions (integrated pollution prevention and control) (recast). Impact Assessment." European Commission, Brussels, 21st December 2007. Available from: http://ec.europa.eu/environment/ippc/proposal.htm

1.2.2 Proposed Changes:

The EC has proposed the addition of the following as a listed activity within the proposed IPPC directive:

4.7 ‘Production of chemicals for use as fuels or lubricants’.

The purpose of adding this activity was to improve the consistency of approach to regulation of installations producing biofuels across member states and to ensure that installations producing biofuels are regulated within the IPPC regime. A consequence of this is that potential adverse impacts from biofuel production installations are effectively managed.

The Commission’s proposals to revise the IPPCD by insertion of category 4.7 into Annex I have been interpreted for the purpose of this impact assessment report as being supplementary to category 1.2 Gasification, Liquefaction and Refining Activities Part A(1) (i) The further refining, conversion or use (otherwise than as a fuel or solvent) of the product of any activity falling within paragraphs (g) or (h) in the manufacture of a chemical and 4.1.Organic Chemicals Part A(1) (a) (ii) organic compounds containing oxygen, such as alcohols, aldehydes, ketones,carboxylic acids, esters, ethers, peroxides, phenols, epoxy resins with the aim of capturing the production of biofuels and lubricants.

1.3 What Are the Objectives and Intended Effects?

The main drivers for the revision of industrial emissions legislation are described in the IA undertaken by the Commission:

- The Lisbon Strategy and the EU Sustainable Development Strategy; this strategy stresses the role of environmental technologies in having “*significant economic, environmental and employment potential*”;
- the different Thematic Strategies (Air Pollution, Soil Protection etc.) set objectives to protect human health and the environment from key air pollutants. Industrial emissions regulation has a major role in meeting these objectives;
- the need for “Better Regulation” and designing laws and legislation in a more coherent way and with minimum administrative burden; and
- experience in the implementation of the IPPC Directive in the last 10 years and ways to improve the legal framework to ensure that its objectives are met.

The Commission’s proposals aim to address the issues identified via a number of amendments to the existing legislation including the following:

- Clarification and strengthening of the concept of BAT;

- revision of the minimum ELVs for some sectors (for example, large combustion plants) to bring them into line with BAT standards;
- introduction of provisions on inspection and environmental improvements;
- stimulating innovation and the development and deployment of new techniques;
- simplifying and clarifying certain provisions on issuing permits, monitoring and reporting to cut unnecessary administrative burdens; and
- extending and clarifying the scope and provisions of the legislation to better contribute to the objectives of the Thematic Strategies.

For this particular amendment, the main objectives are to ensure consistency across Member States with regards the regulation of installations producing biofuels and biolubricants.

Biofuels involve two distinct fuels: biodiesel and bioethanol. Biodiesel is a mixture of fatty acid alkyl esters produced by a transesterification (chemical process) of vegetable oils or physical (heating of oil to remove water, filtration and blending with hydrocarbons). Bioethanol (or fuel ethanol) is the term used for fermentation ethanol when it is produced for or used in the biofuel sector. Bioethanol is made by fermenting (biological process) the sugar components of biomass followed by distillation.

There is currently no clarification in the Commission's Fact Sheet[4] on whether the proposals made relate to the production of biodiesel using chemical or physical methods of production. For the purposes of this report, it has been assumed that production of biodiesel includes that material produced by using chemical but not physical methods. Further clarification on this point is required from the Commission.

1.3.1 Biodiesel Production

The production of biodiesel is captured within the existing PPC regulations Section 4.1 Organic Chemicals, Part A (1) (a) Producing organic chemicals such as – (ii) organic compounds containing oxygen, such as alcohols, aldehydes, ketones, carboxylic acids, esters, ethers, peroxides, phenols, epoxy resins.

The Environment Agency has set a biodiesel production threshold of 5000 litres per annum for small-scale personal use. This means that industrial / commercial installations producing more than 5000 litres per annum need to apply for a PPC permit. For those that produce less than

[4] Data gathering and impact assessment for a possible technical review of the IPPC Directive – Part 2, Fact Sheet 3 Chemical Industry, September 2007

5000 litres per year they are determined based on a risk assessment approach. Non-commercial premises, including those that are part of a community scheme, that produce more than 5000 litres biodiesel but store less than 5000 litres of waste cooking oil at any point in time are not required to have a PPC permit or waste management licence. Installations that store more than 5000 litres of waste cooking oil at any point in time and do not have a PPC permit require a Waste Management License. The Environment Agency currently has no limit on the storage of waste derived biodiesel product.

Northern Ireland Environment and Heritage Service consider its implementation of the existing IPPC Directive to be consistent with the Environment Agency's approach.

SEPA have also identified a threshold limit (this requirement is being implemented and is currently at a final peer review stage), whereby installations that are commercial or industrial and produce more than 200 tonnes Biodiesel per annum are regulated under the PPC regime. Those plants that produce less than 200 tonnes biodiesel per year or produce biodiesel for non-commercial/industrial purposes are not covered by the existing PPC regulations although they do require a waste management licence exemption.

1.3.2 Bioethanol Production

Bioethanol production requires an IPPC permit. Production of bioethanol is a listed (Scheduled) Activity under the Pollution Prevention and Control (England and Wales) Regulations 2000. Section 4.1 Part A(1) (a)(ii). Producing organic chemicals such as organic compounds containing oxygen, such as alcohols, aldehydes, ketones, carboxylic acids, esters, ethers, peroxides, phenols, epoxy resins.

1.3.3 Lubricant Production

The production of chemicals on an industrial scale in the UK for use as lubricants is presently likely to fall under either:

Section 1.2 Part A(1) (i), the further refining, conversion or use (otherwise than as a fuel or solvent) f the product of any activity falling within paragraphs (g) or (h) in the manufacture of a chemical; or

Section 4.1 Part A(1) (ii) Producing organic chemicals such as: organic compounds containing oxygen, such as alcohols, aldehydes, ketones, carboxylic acids, esters, ethers, peroxides, phenols, epoxy resins.

Which activity the process will ultimately fall under is dependent to a certain extent on the type of lubricant required and therefore will be covered under the existing Environmental Permitting

Regulations. The production of lubricants themselves typically involves a blending activity of chemicals supplied from large chemical producers. The activity of blending chemicals to produce lubricants is outside the scope of the proposed changes to the IPPC Directive and therefore is not considered further in this report.

2. Policy Options

This section presents the policy options considered in this report for the proposed changes for installations that produce chemicals for use as fuels or lubricants. These were discussed and agreed with Defra at the inception meeting (08th April 2008).

2.1 Production of Chemicals for Use as Fuels or Lubricants

The following two options have been considered for installations that produce chemicals for use as fuels or lubricants:

1. No change (i.e. No inclusion of sub-clause 4.7); and
2. as proposed in the IE(IPPC)D.

Guidance on Interpretation and Implementation of the IPPC Directive

Guidance has been provided on the interpretation of the existing IPPC directive. The existing IPPC Directive and subsequent PPC Regulations in the UK apply to the production of biodiesel and bioethanol on an industrial scale. Interpretations have been determined within the UK in accordance with this guidance. An extract of the EC guidance has been provided below:

"Production on an Industrial Scale":

Annex I Section 4 ("chemical industry") contains no quantitative capacity thresholds but only a reference to "production on an industrial scale". The scale of chemical manufacture can vary from a few grams of a highly specialised product to many tonnes of a bulk chemical product, yet both scales may correspond to "industrial scale" for that particular activity. If the activity is carried out for "commercial purposes", it should be considered as production on an industrial scale, even if the material is an intermediate product and therefore not itself traded. By contrast, other activities producing chemicals exclusively for their own consumption - for example domestic, academic or laboratory activities - would not be covered.

Furthermore, "commercial purposes" may be taken generally to imply that the activity is being undertaken principally as a professional business activity. The existence of a form of trading account associated with the activity, or other such indicators, may illustrate the conduct of a business. If such indicators are absent, for example as may be the case in the small-scale production of "artisanal soap", it may be concluded that the activity is not being undertaken for "commercial purposes" and hence is not on an industrial scale.

As a general remark and in view of the very large number of possible situations (as regards chemical processing, chemical substances or groups of substances produced, types and places of activities), it remains for the competent authorities to make an informed and justified judgment on whether or not a particular installation falls under the scope of the IPPC Directive, using this guidance as a tool to promote consistency and prevent possible abuse in the interpretation of the scope of the Directive as regards section 4 of Annex I[5].

The provision of this guidance potentially excludes a large number of small producers from the PPC regulatory regime. It is therefore considered that the second option can be split. The two variations of this second option are provided below:

- As proposed in the IE(IPPC)D with interpretative guidance equivalent to that provided above; and
- as proposed in the IE(IPPC)D without the provision of guidance for the interpretation of industrial scale.

[5] http://ec.europa.eu/environment/air/pollutants/stationary/ippc/general_guidance.htm

3. Who Is Affected?

This section presents a list of those stakeholders likely to be affected by the proposed changes.

3.1 Installations That Produce Biofuels

- Operators of biofuel-producing installations currently falling outside of the scope of the IPPC Directive will be affected by the proposed changes;
- competent authorities e.g. Environment Agency, Scottish Environment Protection Agency (SEPA), Northern Ireland Environment and Heritage Service and Defra; and
- others, including those possibly affected by emissions from installations.

4. Baseline Definition

4.1 Approach

This section outlines the approach that has been taken to define the baseline for the relevant installations and/or activities and their associated emissions that may be affected by the proposed changes to the Directive.

4.1.1 Biodiesel Installations

England, Wales and Northern Ireland

The Environmental Permitting Regulations[6] in England & Wales and Pollution Prevention and Control Regulations in Northern Ireland[7] enact the existing IPPC Directive. It has been interpreted under the existing Legislation that installations producing biodiesel for commercial or industrial purposes are captured under Section 4.1 Part A(1) (a) (ii) producing organic chemicals such as organic compounds containing oxygen, such as alcohols, aldehydes, ketones, carboxylic acids, esters, ethers, peroxides, phenols, epoxy resins.

The Environment Agency and Northern Ireland Environment and Heritage Service have interpreted the scope of 'industrial scale' against biodiesel producing installations and concluded that installations producing more than 5000 litres per annum are of an industrial scale and as such, require a PPC permit. Those that produce less than 5000 litres per annum and store less than 5000 litres of waste cooking oil at any point in time are subject to risk assessment although it is unlikely that they would require a PPC permit. Any installation that does not have a PPC permit and stores more than 5000 litres of waste cooking oil requires a Waste Management Licence (no installations meeting this requirement have been identified).

Scotland

The PPC Regulations (Scotland)[8] enact the existing IPPC directive. It has been interpreted under existing Legislation that installations producing biodiesel for commercial or industrial purposes are captured under Section 4.1 Part A (a) (ii) Producing or manufacturing by chemical

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[6] Environmental Permitting (England and Wales) Regulations 2007 (SI 2007/3538) (as amended).

[7] Pollution Prevention and Control Regulations (Northern Ireland) 2003 (SR 2003/46). The Regulations have been amended including, most recently, by the Large Combustion Plant (National Emission Reduction Plan) Regulations 2007 (SI 2007/2325).

[8] Pollution Prevention and Control (Scotland) Regulations 2000 (SSI 2000/323) (as amended).

means organic chemicals including organic compounds containing oxygen, including alcohols, aldehydes, ketones, carboxylic acids, esters, ethers, peroxides, phenols, epoxy resins.

SEPA have set a de-minimus biodiesel production level of 200 tonnes per annum. Those installations that produce more than 200 tonnes per annum are considered to be industrial scale and as such, require a PPC permit. Those installations that produce less than 200 tonnes are not required to have a PPC permit.

Number of Installations

Discussions have been held with the separate authorities[9] regarding the general regulatory situation relating to operation of biodiesel and bioethanol installations in the UK, under PPC. Discussions with regulatory authorities, industry associations and producers has identified that significant change has been seen within the biofuels sector as a result of a variety of economic pressures. These changes have impacted the availability of data with reference to the number of biodiesel producers in the UK that are not currently regulated. General opinions from the industry are that the number of producers is reducing and that this trend is set to continue.

Data has been supplied by stakeholders that shows the number of installations that they consider to require regulation under the existing PPC regulations Section 4.1. - a summary of this data is presented in Tables 4.1 to 4.3.

Data from the regulators was only available for those plants that are currently permitted or are awaiting determination. Information relating to the number of installations that are not currently regulated due to being below the threshold in England and Wales has been provided by the industry association, Allied Biodiesel Industries (UK). This data includes both producers and distributors of Biodiesel.

Table 4.1 Biodiesel Producers in England and Wales

Production Capacity (Litres Of Biodiesel)	No. Premises	Current Regulation
2,500 – 10,000 (England/ Wales)	54 (22 Producers)	Estimate that 50% IPPC Part A (1)
<2,500 (England/ Wales)	1261	Not regulated

[9] Environment Agency for England and Wales (part A(1) processes ; DEFRA for A2 and part B; SEPA for processes in Scotland; NIEHS for processes in Northern Ireland

Note: Data provided by Allied Biodiesel Industries (UK), data includes manufacturers and distributors.

There are understood to be 1282 installations located within England and Wales that produce less than the threshold volume set by the Environment Agency of 5,000 litres per annum. These premises are not currently regulated under the PPC regime. It should be noted that these figures do not exclude those plants that do not produce biodiesel but simply store and distribute. Based on current trends it is assumed that a large proportion of these sites do not produce biodiesel (~50%).

Industry Association

Discussions with the industry association and various operators within the biodiesel sector would seem to indicate that the general view is that many operators are stopping production. Allied Biodiesel Industries (UK) estimated that 108 biodiesel producers (<5000 litres per annum) stopped production between July 2007 and January 2008. Allied Biodiesel Industries (UK) expected to see this trend continuing at a similar rate as a result of a number of factors including those listed below:

- Increasing costs of raw materials;
- imports of subsidised biofuels; and
- fiscal regime within the UK.

Based on this rate of decline it is estimated that 182 installations will close each year. Based on this assumption there will be no biodiesel installations that are producing less than 5,000 litres per annum operating at the time of implementation of the revised IPPC directive.

PPC Permitted Sites - Biodiesel

Table 4.2 Numbers of Biodiesel Installations Permitted Using Specified Approaches

No. Installations	Location	Installations assessed under EP-OPRA	Low Impact Installation	Permitting Stage
47	England and Wales	6	41	Permitted
14	England and Wales		14	In determination
1	Scotland	-	-	Permitted
1	Northern Ireland	-	-	Permitted

Notes: A definition of low impact installations can be found in Table 4.6, Data Provided by Environment Agency March 2008 and SEPA

PPC Permitted Sites - Bioethanol

Table 4.3 Number of Bioethanol Installations in England and Wales

Permitting Stage	No. Installations
Permitted	4
In determination	0
Pre application	5
Total	9

Data Provided by Environment Agency March 2008

Whilst there are 9 permitted bioethanol installations in England and Wales many of the permits are for tentative installation proposals, not all of which are expected to be constructed. It is understood that there are no bioethanol plants in Scotland or Northern Ireland.

Biodiesel Summary

Environment Agency (EA)

The existing PPC regulatory framework within England and Wales already captures those installations that produce biodiesel for commercial or industrial purposes. Based on the guidance for the interpretation of 'industrial scale' the threshold of 5,000 litres production per annum set by the Environment Agency screens out those installations that are considered to be domestic (non industrial) in nature. It is therefore assumed that the addition of sub-clause 4.7 would not alter the existing threshold level set by the Environment Agency and as such would not bring any additional installations located in England and Wales into the PPC regime.

Scottish Environment Protection Agency (SEPA)

The existing PPC regulatory framework within Scotland captures those installations that produce biodiesel for commercial or industrial purposes. SEPA have set a deminimus threshold value of 200 tonnes biodiesel production per annum. Those plants producing less than 200 tonnes per annum are excluded from PPC and are eligible for a waste management licence exemption. The 200 tonne threshold has been introduced to allow a distinction between industrial and non industrial producers. The 200 tonne threshold is also consistent with the waste management licence exemption threshold.

Northern Ireland Environment and Heritage Service

Northern Ireland EHS is the same as Environment Agency and as such details are same as above.

Bioethanol Summary

Bioethanol plants in the UK are all captured by existing PPC regulations and as such, the number of sites will not be impacted by the proposed changes to the IPPC directive.

4.2 Emissions

Biodiesel

The BREF on Large volume organic chemicals gives a general overview of the environmental issues of the esterification processes used in the production of biodiesel:

Table 4.4 Environmental Issues of Esterification Processes

Media	Comment
Air	Solvent vapours can be collected and treated (e.g. by incineration, adsorption)
Water	Effluent generation is generally low, as water is the only by-product of esterification reactions. The choice of solid polymer based ion exchange resins avoids the need for catalyst neutralisation and the associated waste water treatment. Most esters possess low toxicity because they are easily hydrolysed on contact with water or moist air, and so the properties of the acid and alcohol components are more important. Spillage of raw materials or product into watercourses.
Wastes	Waste streams can be reduced by recovering (and reusing) any organic solvents, water and alcohol components. Any wastes from waste water treatment can be incinerated (if they have high boiling points) or recovered by distillation for re-use (for low boiling point components).

More specifically, 'production of biodiesel includes the handling and use of an alcohol (usually methanol) and a strong base (usually sodium hydroxide or potassium hydroxide, also known as lye). Environmental concerns that must be addressed include fugitive emissions of methanol, the ultimate disposal of the by-product glycerine, and the generation and disposal of wastewater containing free fatty acids that have a high biochemical oxygen demand.

Bioethanol

The BREF on large volume organic chemicals gives an overview of the environmental issues of the vapour phase hydration of ethylene in order to produce bioethanol and as such the environmental issues associated with this process differ from those associated arising from ethanol produced by indirect hydration of ethylene with H_2SO_4 and alcoholic fermentation.

Without guidance provided by the current BREF document, the introduction of a new dedicated category covering, *inter alia*, the manufacture of bioethanol can be expected to trigger the

European Commission to review the BREF and / or instigate a new information exchange on Best Available Techniques.

4.3 Overview of Current Legislation

4.3.1 IPPC Requirements for Biodiesel Installations

The existing IPPC Directive does not specifically name biodiesel production as a listed activity which has resulted in some areas of possible misinterpretation of Section 4.1 with regards to biofuel production. However, the UK has transcribed Section 4.1 of the existing directive into UK legislation and subsequently applied Section 4.1 Part A (a) (ii) to both Biodiesel and Bioethanol production. As such, all installations that produce bioethanol in the UK require a PPC permit. Due to the number of small scale biodiesel installations that are either non industrial/commercial or located on farms, the EA, SEPA and Northern Ireland Environment and Heritage Service have set thresholds in order to help with identifying those installations that require PPC permits.

Currently, an IPPC permit[10] is required for Biodiesel installations that are producing more than 5000 litres Biodiesel per annum in England, Wales and Northern Ireland or 200 tonnes Biodiesel per annum in Scotland.

In practice, most biodiesel producing installations within England and Wales have applied for a low impact installation (LII) permit which means that they meet the requirements set out in Table 4.5. The Environment Agency interprets LII as being those installations producing between 5000 litres and 3000 tonnes of biofuel per annum[11]. However, there is additional consideration of whether the LII designation is suitable made to those installations that have a poor compliance history, or are associated with other PPC listed activities.

If guidance on the interpretation of industrial scale changes or is withdrawn and those installations that produce less than 5,000 litres of biofuel per annum become captured by the PPC regulations It is likely that they will meet the conditions of LII unless they have been subject to enforcement actions (it has been assumed for the purposes of this study that these installations have not been subject to enforcement actions).

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[10] The Environment Agency have indicated that a future direction may be to use the 'Standard EPR Permit' for installations producing less that 20,000 tonnes per annum with 'traditional' bespoke permits for those above this threshold – this action is as yet to be confirmed.

[11] It has been indicated that the Environment Agency intent to review this with the intention of reducing the LII threshold from 3000 to 2000 tonnes per annum.

Requirement for Low Impact Installations are provided in Table 4.5.

Table 4.5 Requirements for Low Impact Installations

Requirement	Condition
Management Techniques	The installation must have an intrinsically low environmental impact.
Aqueous Wastes	The installation must not release more than 50 m^3 per day of water from process activities.
Abatement systems/ Releases to Air	No reliance on abatement or correct operation of equipment to achieve criteria set out in guidance.
Groundwater Regulations	No planned or fugitive emissions from the permitted installation into the ground, or any soakaways.
Waste Production	Installations must not give rise to more than 1 tonne of Directive waste (or 10kg of Hazardous waste) per day, averaged over a year.
Energy Consumption	The installation must not consume energy at a rate greater than either 3 MW or, if the installation uses combined heat and power to supply any internal process heat, 10 MW
Accident Prevention	The installation must at all times contain less than 10% of an lower tier qualifying inventory set out in Schedule 1 of the Control of Major Accident Hazard Regulations (COMAH) 1999.
Noise	Installations must have a low potential for offence due to noise.
Emissions of Polluting Substances	There must be no likelihood of a release of any particular substance from the whole installation to the environment at a rate greater than that determined as ‘insignificant’ as set out in the Environment Agency’s IPPC H1 guidance note.

Table 4.5(continued) Requirements for Low Impact Installations

Requirement	Condition
Odour	There must be only a low potential for offence due to odour.
Compliance history	If any of the following enforcement actions have taken place (and not been, where appropriate, overturned on appeal) at the same installation under the same management, then it will not be considered further as a low impact installation: Prosecution Formal Caution Suspension Notice Enforcement Notice relating to an actual or potential environment incident.

The Pollution Prevention and Control (England and Wales) Regulations 2000 SI 1973, Environment Agency IPPC Regulatory Guidance Series, No.7, Criteria for determining whether an installation can be classified as low impact Version 3 – June 2006.

There is a requirement to demonstrate that no significant pollution is caused by presenting an assessment of the environmental impact of emissions from the activities as a whole. The IPPC Technical Guidance Note for Large Volume Organic Chemicals[12] provides a screening tool that gives an initial assessment of environmental impacts, and identifying whether further detailed investigation is or is not necessary. This includes a 6-step process to assess the impacts of an installation on the environment:

- Step 1: Identify the sources of emissions and activities that impact on the environment.
- Step 2: Identify the emission.
- Step 3: Identify the receptors.
- Step 4: Describe the negative impact and duration.
- Step 5: Identify the significance of the impacts.

[12] Sector Guidance Note IPPC S4.01, Issue 4, 2003

- Step 6: Identify the mitigation or management measures that you will have in place to reduce the impacts.

4.3.2 Further Requirements

The Environment Agency's Low Risk Approach

The Environment Agency considers an activity to be low risk if it believes it would not be in the public interest to require a waste management licence for the activity although legally, one is required[13]. The low risk position relates only to waste management licences. The following activities involving waste vegetable oil and biodiesel have low risk status:

- The secure storage of up to 5,000 litres of waste cooking oil destined for recovery;
- secure storage of any quantity of waste-derived biodiesel; and
- the physical treatment of up to 250 litres at any time of waste cooking oil to produce biodiesel.

Biodiesel producers that produce >5000 litres per annum of biodiesel for commercial purposes fall under PPC, negating the requirement for a waste management licence. If a biodiesel producer produces less than 5,000 litres per year, the company will need a waste management licence.

4.3.3 Requirements Outside of IPPC Permitting

The Control of Pollution (Oil Storage) (England) Regulations 2001 (SI 2001/2954)

The objective of these regulations is to reduce the risk of pollution of water from oil stores in England. They apply to installations that are storing more than 200 litres of oil above ground on industrial, commercial and institutional (residential and non-residential) premises (outside only). Farms are not covered by this legislation and are instead covered by *The Control of Pollution (Silage, Slurry and Agricultural Fuel Oil) Regulations 1991)*. The requirements of the oil storage regulations are for the construction of storage tanks and ancillary equipment, the positioning of tanks, and secondary containment measures.

[13] The Environment Agency, in conjunction with the Waste and Resources Action Programme, has produced and consulted upon proposals to enable the manufacture of biodiesel from waste vegetable oil to be undertaken without the requirement for an Environmental Permit provided manufacture is in accordance with a voluntary Quality Protocol standard. It is anticipated that this Quality Protocol will come into effect later in 2008.

The Water Environment (Oil Storage) (Scotland) Regulations 2006 (SSI 2006/133)

These regulations impose similar requirements to those within England, although they also include the storage of agricultural fuel oil and waste oil. Existing oil stores in use prior to 1st April 2006 have until 1 April 2010 to comply with the regulations, whilst those situated less than 10 metres from any surface water or wetlands or less than 50 metres from a well or borehole required to comply by 1st April 2008.

Summary

The addition of sub-clause 4.7 will only impact the regulation of smaller installations that currently operate out with the existing PPC regulations. These smaller installations are excluded as a result of interpretative guidance provided for the existing IPPC directive which allows member states to determine industrial scale which in the UK has been done through the identification of a production threshold. Discussions that have taken place with the regulatory authorities indicate that existing thresholds are unlikely to change unless the guidance is withdrawn or revised.

5. Costs

5.1 Approach

5.1.1 Compliance Costs

It is not expected that there will be any additional costs to the bioethanol producing industry as they are covered by the existing IPPC regulations and are already applying BAT.

Biodiesel Installations

As it is likely that installations will be low impact, the most stringent requirements will relate to the storage of oil. Installations are already required to comply with the requirements of the oil storage regulations and as such, this is not considered to change as a result of the proposed changes to the PPC directive.

5.2 Administrative Costs

5.2.1 Operators

Administrative costs for operators can be broken down into two main elements each of which can be further sub-divided:

- Permit application (one-off):
  - Permit application fees – Low Impact Installation (£2,800 in England and Wales)
  - Permit application fees – (£4,800 Scotland)
  - Time to prepare the permit and all of the supporting information required (varies depending upon whether or not the operator uses consultants to prepare the application – assumed to vary between £300 and £1,500)
- Subsistence costs (annual):
  - subsistence charge – Low Impact Installation (£460 in England and Wales)
  - subsistence charge – (£1,611 Scotland)
  - time for record keeping, inventory preparation, staff training and inspections (£300)

5.2.2 Regulators

The following cost summary has been based on the assumption that fees are sufficient to cover the regulators costs for the processing of the permit and ongoing enforcement.

5.3 Summary

The following table presents indicative cost ranges based on the current number of installations in England and Wales (~1282 installations).

Table 5.1 Current Scenario – Annual costs (£)

Requirement	Best Case Scenario (Continued Use Of Threshold Limits)	Worst Case Scenario (No Threshold Limits)
Permit Application (annualised cost)[14]	0	252,568
Preparation Costs	0	384,600 - 923,000
Subsistence Fee	0	589,720
Total (annualised value)	0	1,226,888– 1,765,288

The following table presents indicative costs based on there being no producers that are less than the existing threshold of 5,000 litres per annum biodiesel production. This is the number of installations that are forecast to be operating in 2016.

[14] One-off costs have been annualised using a discount rate of 3.5% over a 20 year lifetime in accordance with the HM Treasury Green book

Table 5.2 Scenario Based On Future Directive Proposal

Requirement	Cost
Permit Application	£0
Preparation	£0
Subsistence Fee	£0

6. Benefits

6.1 Approach

England, Wales and Northern Ireland

The respective regulatory authorities (Excluding SEPA) expect that in the event that the 5,000 litre per annum production threshold was removed, installations would be regulated as Low Impact Installations. Low impact installations are inherently low risk and are not reliant on abatement or excessive management controls to prevent pollution.

Section 4.2 identifies the main environmental aspects associated with the production of biodiesel. It is considered that the small scale plants operating at <5,000 litres per annum production, produce a very small mass of VOCs (fugitive and point source) and therefore controls required under BAT would not be likely to be technologically or sectorally economic for installations to equip their process vessels with.

Scotland

SEPA have a more stringent interpretation of Low Impact Installations which they confirmed during discussions would exclude biodiesel production. As such, in the event that the threshold was removed and all producers of biodiesel in Scotland were required to be regulated under Sub-clause 4.7 a full PPC permit would be required (if greater than 200 tpa?). Data on the number of installations was not available at the time of producing this report and no quantitative data was available for the likely benefits of regulating these smaller installations under PPC. However, all installations regulated under the PPC regulations will have to demonstrate BAT and comply with prescriptive improvement conditions. From this it can be assumed that there will be an environmental benefit although this is not quantifiable.

7. Competition Assessment

The competition guidelines (August 2007)[15] set out four main questions, which requires asking whether the proposed revisions in the IPPC Directive would affect the market by:

1. Directly limiting the number or range of suppliers?
2. Indirectly limiting the number or range of suppliers?
3. Limiting the ability of suppliers to compete?
4. Reducing suppliers' incentives to compete vigorously?

A brief summary of the four questions are presented below in Table 7.1 and for those where the answer to one of the questions is "Yes", then an explanation is provided in the following sections.

The results should be included in the "Evidence Base" within the Impact Assessment template.

Table 7.1 Summary of the Competition Test

Question	Biodiesel Installations (Continued Threshold[16])	Biodiesel Installations (No more threshold[16])
Q1. Directly limit the number or range of suppliers?	No	Yes
Q2. Indirectly limit the range of suppliers?	No	Yes
Q3. Limit the ability of suppliers to compete?	No	Yes
Q4. Reduce suppliers' incentives to compete vigorously?	No	No

[15] http://www.oft.gov.uk/shared_oft/reports/comp_policy/oft876.pdf

[16] e.g. 5,000l/p.a in England and Wales and 200 tonnes p.a. in Scotland

If the proposed changes in IPPC are implemented without removing the threshold[16] limits then there is unlikely to be any changes in costs and there will only be BAU changes in the market. This is because all installations above the current thresholds are already subject to IPPC and therefore would not be subjected to any further costs as a result of the proposed IPPC regulation. However if the thresholds were superseded by the proposed revisions to the IPPC directive approximately 1,282 installations could be affected (who are currently below the threshold).

The current trend in the market for biodiesels in the UK is that many installations are leaving the market. These installations are typically smaller installations, and the inclusion of IPPC permit costs is likely to be a significant factor in these installations leaving the bio-fuels market. The reasons for this are outlined below:

- High costs of feedstock – Feedstock is the single biggest cost component in making biofuels. Over the past year feedstock prices are increased substantially in part due to raising populations, increased demand for food and biofuel, and a lack of supply due to poor harvests. High feedstock costs have made biofuel production become unprofitable for smaller installations;

- US Subsided biofuel “B99” - The US "B99" subsidy is controversial because it benefits exporters. In most of Europe, tax breaks are available only at the point of sale. The perfectly legal trick - coined "splash and dash" by the industry[17]. Traders are buying biodiesel on the European market in Rotterdam and shipping it to the US. There, conventional gasoline is added to the biodiesel blend - or "splashed with gas" - to qualify for the subsidy. Then the cargo is shipped back - or "dashes" - to Europe and resold at a lower price. Because Europe’s fledgling biofuel industry is highly dependant on these tax breaks, and are not favourable to US subsided rates, this has made production of biofuels in the UK unprofitable for many smaller installations (based on current market conditions);

- improved production efficiencies across the world has made it more difficult for the UK to compete with other countries with lower taxation and access to “second generation” feedstocks - Biodiesel feedstock markets world-wide are in transition from increasingly expensive first generation feedstocks soy, rapeseed and palm oil to alternative, lower cost, non-food feedstocks such as algae, jatropha, castor, used vegetable oil, tallow, and other sustainable feedstocks;

- loss of economies of scale - With feedstock accounting for as much as 80 percent of the cost of producing biodiesel, surging palm oil prices due to rising demand as an

[17] Independent (2007) http://www.independent.co.uk/news/business/news/europe-threatens-trade-war-over-us-biodiesel-subsidies-446603.html

ingredient in food, consumer, and industrial products have undermined the economics of biodiesel production. Currently France and Germany have the agricultural production capacity to produce ethanol and biodiesel in large enough quantities to reach economy of scale. This is shown in Table 7.2; and

- high investment costs – with all the uncertainty in feedstock prices and disparities with tax subsidies across the globe, the high capital expenditure needed in constructing processing plants may act as a deterrent for UK installations thinking of seriously competing on the global market. Outside of the mature bioethanol economies of Brazil and the US and the biodiesel industry in Germany, emerging biofuel industries are generally characterised by high capital costs, low productivity and modest profit margins in the short term.

Table 7.2 Top 4 Biodiesel Producers

Country	Litres (millions) in 2005
Germany	1,920
France	500
United States	300
Italy	250
Austria	100

Deloitte (2006)[18]

[18] http://www.biodiesel-expo.co.uk/download/1%20Deloitte%20Bio%20Diesel4.pdf

8. Distributional Effects on Different Size Firms

If the proposed changes in IPPC are implemented without removing the threshold[16] limits then there is unlikely to be any changes in costs and there will only be BAU changes in the market. This is because all installations above the current thresholds are already subject to IPPC and therefore would not be subjected to any further costs as a result of the proposed IPPC regulation.

However if the thresholds were superseded by the proposed revisions to the IPPC directive approximately 1,282 installations could be affected (who are currently below the threshold). The current trend in the market for biodiesels in the UK is that many installations are leaving the market. These installations are typically smaller installations, and the inclusion of IPPC permit costs is likely to be a significant factor in these installations leaving the bio-fuels market. The reasons for this were outlined in section 7.

9. Summary

Biofuel installations of an industrial scale in the UK are captured under the existing IPPC directive and as such, it is not considered to change as a result of the introduction of the revised IE(IPPC)D. Those installations that fall below thresholds set by the regulatory authorities in the UK are excluded from regulation under the PPC regulations. If the guidance on the interpretation of industrial scale changed and resulted in the removal of existing thresholds or a reduction in the threshold there is a potential for increased costs to operators. Costs have been provided on a worst case basis based on the number of installations operating in England and Wales (2008). As a result of existing economic pressures it has been estimated that no <5,000 litre per annum producers will exist in 2016.

Consideration should therefore be given to the significance of the existing guidance and the importance of either providing similar interpretation with the IE(IPPC)D or the setting of a threshold in the directive. A threshold or more prescriptive interpretive guidance would ensure that the interpretation if industrial scale was consistent across member states.

9.1 Limitations/Uncertainties

- Arguments provided within this report are constructed on the basis that guidance relating to the interpretation of industrial scale allows regulatory authorities to set thresholds and that the guidance will not be retracted or changed. In the event that the guidance is retracted or changed then conclusions presented would no longer be valid; and

- Scotland and Northern Ireland may have installations that are below the respective thresholds. No data was available at the time of the study which presents significant uncertainty about potential costs and benefits.