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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

[COM(2007) 843 final]
[COM(2007) 844 final]
[SEC(2007) 1682]

TABLE OF CONTENTS

Chapter 1 provides the background of this initiative as well as a summary of the consultation and data collection process carried out to inform this review.

Chapter 2 presents some information on industrial emissions, the current legal framework and the key principles of the IPPC Directive which plays an important role for the impact assessment.

Chapter 3 describes the general problem definition as well as the general and five specific objectives set to address these problems.

The report is further structured along five main chapters (chapters 4 to 8) focusing on the five specific problems and objectives identified above. It presents, in a clear and structured way, the wide range of options and issues assessed while keeping the overall coherence of the impact assessment. In particular, the synergies and linkages between the various chapters, objectives and options have been carefully assessed throughout the whole impact assessment.

Chapters 9 and 10 present the outline for monitoring and evaluation arrangements as well as the conclusions of the impact assessment.

Index of Annexes

1. POLICY BACKGROUND, PROCEDURAL ISSUES AND CONSULTATION OF INTERESTED PARTIES

1.1. Policy background – why review the IPPC Directive and related legislation on industrial emissions?

The review of the EU legislation on industrial emissions has been driven by the following main policy developments.

Lisbon Strategy and the EU Sustainable Development Strategy

The EU Sustainable Development Strategy and the Lisbon Strategy identify environmental protection as an important pillar of current and future European policy and stress the role of environmental technologies as having *"significant economic, environmental and employment potential"*[1]. Along the same lines the 2006 Spring European Council endorsed *"a strong promotion and diffusion of eco-innovations and environmental technologies, inter alia through the Environmental Technologies Action Plan, ETAP"*[2]. This was echoed by the Council conclusions on industrial policy calling for suitable initiatives *"to promote the penetration of sustainable, environmentally friendly and safe technologies"*.

Within this context the renewed EU Sustainable Development Strategy stresses the importance of implementing the actions set out in ETAP aimed at tackling sustainable consumption and production, climate change and clean energy. The 2nd ETAP review report[3] presents an analysis and sets priorities for the future, identifying the IPPC Directive as a key tool to pave the way for sustainable production and eco-innovation.

As announced in the Mid-term review of industrial policy[4], the Commission will adopt a new initiative on a sustainable industrial policy in order to help industries to benefit from the emergence of new markets in environmental technologies. In addition, the Commission will also draw up a complementary Action Plan to promote sustainable production and consumption in the EU.

Specific developments in environmental policy

The Thematic Strategy on Air Pollution has set objectives to protect human health and the environment from key air pollutants. To transform these objectives into concrete obligations for emission reductions, the Commission will propose a revision of the National Emission Ceilings (NEC) Directive.

The regulation of industrial installations is expected to play a significant role in the emission reductions to be achieved in Member States. Without further emission

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1 Common Actions for Growth and Employment : the Community Lisbon programme; COM(2005)330 final

2 Presidency Conclusions of the 23-24 March 2006 European Council

3 COM(2007) 162 final

4 COM(2007) 374 final

reduction from IPPC installations, the positive health and environmental effects that are to be obtained from these objectives will not materialise. As illustrated in Annex 5, the full implementation of current legislation would not be sufficient to meet the 2020 targets of the Thematic Strategy. Further measures are needed in particular in the field of industrial emissions. In this context, Member States have been calling repeatedly for measures at EU level which could help them achieve their targets.

Other Thematic Strategies (on Soil Protection and on the Prevention and Recycling of Waste) have called for establishing and/or enhancing links with the IPPC Directive to help achieve their environmental objectives. The European Parliament and the Council, as part of the inter-institutional debate, have been supportive of such requests.

Furthermore, the "Energy and Climate Change Package" adopted by the European Council in March 2007 also stresses the need to further improve energy efficiency in industrial activities. The IPPC Directive plays an important role in this context since the efficient use of energy is one of the key environmental objectives of this legislation.

The policy measures currently developed under the above package will also lead to a higher use of renewable energy and changes in the energy mix with probable impacts on overall levels of industrial emissions (for instance through the reduced use of coal as fuel).

Better Regulation

The review of the IPPC Directive furthermore has been identified in the context of Better Regulation and has been included in the EC's Simplification rolling programme covering the period 2006-2009[5]. Better Regulation is about designing laws and regulations in ways that legislation is coherent, effective with a minimum of administrative burden, both in public administration and industry[6].

Experiences gained on implementation

More than 10 years after the adoption of the IPPC Directive, much experience has been gained on its actual implementation by Member States, on the problems raised and on the possibilities to improve the legal framework to ensure that its objectives are met.

1.2. Consultation

This impact assessment is based on an extensive consultation of stakeholders and collection of data, information and views (see Annex 2).

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5 COM(2005) 535 final

6 According to the Strategic review of better regulation in the European Union (COM(2006) 689 final), Better Regulation is further defined as follows: design laws and regulations in ways that maximise benefits whilst minimising costs, including in the area of protection of the environment and public health. This entails avoiding unnecessary administrative burdens on businesses.

The process started in 2003 with the consultation process launched as part of the 2003 Commission Communication[7] on progress in implementing the IPPC Directive. The Commission received on this occasion a number of contributions, expressing strong support for the IPPC Directive and the BAT-based permitting approach as well as comments which have been important drivers for this review process. Following its first IPPC implementation report[8] in 2005, the Commission then decided to formally initiate a review process.

The Commission set up the "IPPC Review Advisory Group" (composed of about 70 representatives of all Member States, Industry and NGOs) which was closely involved in the preparation of the studies carried out by the Commission and contributed largely to the collection of data. Throughout the process a continuous information exchange with stakeholders was carried out.

An electronic mailbox for receiving questions, comments and information on the IPPC review was created as well as a comprehensive public electronic library and information repository, called CIRCA[9]. This allowed stakeholders within and outside the Advisory Group to follow the work being carried out and to provide comments.

A public consultation based on an internet-questionnaire took place from mid-April to mid-June and a Stakeholder Hearing was organized in May 2007. A summary of the results of the consultation can be found in Annex 2.

Illustration on the extent of the consultation process: four plenary meetings with the Advisory Group; contribution to 10 studies; 5 questionnaires circulated; more than 120 replies to questionnaires; more than 150 additional comments received as part of the elaboration of the studies; consultation of authorities and stakeholders on more than 200 case studies and 40 fact sheets; 400 documents placed on the CIRCA website; 200 participants at the public hearing; 450 responses to the internet questionnaire.

In the light of the above, the stakeholder consultation in the review process has been carried out according to the Commission's general principles and minimum standards for consultation[10].

Furthermore, a Commission's inter-service group including all the relevant services[11] was set up in order to ensure the necessary internal co-ordination throughout the review process.

1.3. Expertise and information

This report is mainly based, but not exclusively, on the information gathered in the context of an extensive programme of studies commissioned by the Commission. The main 10 studies[12] carried out by the Commission in 2006 and 2007 in the context

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7 COM(2003) 354 final

8 COM(2005) 540 final

9 See CIRCA web site under http://circa.europa.eu/Public/irc/env/ippc_rev/library

10 COM(2002) 704 final

11 The inter-service group is composed of representatives from the Secretariat General, the Legal Service, DG ENV, ENTR, AGRI, TREN, RTD, JRC, MARKT, EMPL, SANCO, ECFIN, FISH and COMP

12 Available on CIRCA web site under http://circa.europa.eu/Public/irc/env/ippc_rev/library

of the IPPC review are described in Annex 3. A budget of about € 1.5 million was allocated to this data collection process.

In addition, support has also been obtained from other sources, such as the IMPEL network, the work carried out in the context of the Air Thematic Strategy, revision of the NEC Directive and previous studies such as the BEST project Expert Group on the "streamlining and simplification of environment related regulatory requirements for companies"[13]. Annex 14 provides a list of the main references used to draw up the impact assessment.

A lot of experience has also been gained and exchanged with Member States and stakeholders since the adoption of the IPPC Directive. Member States have reported to the Commission on its implementation twice, as well as on other sectoral legislation. In addition, the Commission has set up an Action Plan on implementation as part of its 2005 Report. This Action Plan was instrumental in collecting information and data on the permitting progress in Member States and on the difficulties that emerged during the implementation process.

The fact that existing installations had to fully comply with the IPPC Directive at the latest by 30 October 2007 has been taken into consideration in the collection of data on implementation. In order to meet this deadline, Member States had to issue or review existing permits in advance to it. The analysis of implementation is therefore based on the extensive experience and actual permitting practices put in place to meet this deadline.

However, it has to be noted that detailed information on some of the subjects covered by the studies, in particular with regard to quantitative data on environmental impacts and costs, could not always be obtained. In such cases the analysis is focused on the more qualitative aspects of the options considered.

1.4. Integration of the Impact Assessment Board's recommendations

On 8 October 2007, the Impact Assessment Board adopted the following opinion on the draft version of the Impact Assessment.

(A) Context

Together with the Large Combustion Plants, the Integrated Pollution Prevention and Control (IPPC) Directives are the major pieces of Community legislation regulating industrial emissions. The review of the legislation on industrial emissions has been driven by the underlying EU strategies for growth and jobs (Lisbon) and sustainable development. The Council has supported the promotion and diffusion of eco-innovations and environmental technologies. The Commission's second Environment Technology Action Plan review report identified the IPPC Directive as a key tool for sustainable production and innovation. In this respect, there is a policy link to the forthcoming initiatives on sustainable industrial policy (ENTR) and sustainable consumption and production (ENV). Existing thematic strategies on air pollution, soil protection and the prevention and recycling of waste, and the energy efficiency action plan are also relevant.

[13] IEEP, 2006 (b)

(B) Positive aspects

The IA report contains a wide range of options and detailed analysis of impacts. The stakeholder consultation has been sought in an appropriate manner.

(C) Main recommendations for improvements

The recommendations below are listed in order of descending importance. Some more technical comments have been transmitted directly to the author DG.

General recommendation: Whereas the IA report contains a good amount of information, some of the aspects (see below) must be made more visible. In view of the many sub-options considered, the IA report should present the scope of aggregate policy packages and the combined impact they will have.

Specific recommendations:

(1) The expected impact of the chosen policy mix should be made more visible. Whereas the IA report contains a good amount of analysis of impacts of sub-options, the combined impact of the overall preferred option could be made clearer (given that the IA report explicitly recommends preferred options). This recommendation holds also for the analysis of administrative costs, the results of which should be presented in a concise way in the main text of the IA report.

(2) Simplification benefits need to be highlighted. The IA concerns several directives being merged into a single one while the proposal also aims at enhancing the implementation of the best available technology (BAT). An additional option to be analysed, in order to facilitate effective implementation could be to provide assistance to the MS on implementation well before the new directive comes into force.

(3) The RAINS baseline used in the IA needs to be clarified, in particular concerning the extent to which experience with the current, insufficient implementation rates have been taken into account.

(4) Some of the impacts need to be clarified. In particular the impact on health, the regional impacts on employment and impact across various sectors need to be better analysed. The geographical location of the concerned installations should be presented.

(D) Procedure and presentation

The IA report is well written. It exceeds the 30 page limit provided in the IA Guidelines, but given the scope of the proposal and the impacts, this can be accepted.

All recommendations for improvements have been fully incorporated into the impact assessment as outlined below.

General recommendation: the executive summary and section 10 on conclusions have been refined to present in a clearer and more structured way the aggregate policy package and the combined impacts.

(1) The expected impact of the chosen policy mix should be made more visible

As indicated above, a clearer presentation is made on the combined impacts both in the executive summary and in section 10 on conclusions. The outcome of the analysis of the administrative costs is also presented more clearly in the main text of the Impact Assessment by providing an overall summary table in chapter 6 on administrative burden and by summarizing this issue in the executive summary and in section 10 on conclusions.

(2) Simplification benefits need to be highlighted.

The simplification benefits have been more clearly highlighted as presented above. In addition, as indicated in the accompanying Communication to this initiative, it is made clear that the assistance by the Commission to Member States on the implementation of the current or future legislation will be continued in particular through enhanced information exchange, guidance development, visits to authorities and training. In addition, an option (see under section 6.2) is included on the establishment of an action programme with Member States to share best practice and help identify actions to reduce administrative burdens at the national or regional level. Such an option would facilitate effective implementation of the existing or upcoming legislation.

(3) The RAINS baseline used in the IA needs to be clarified

The use of the RAINS baseline has been clarified in section 4.2.3 as well as in Annex 5 and Annex 7.

(4) Some of the impacts (on health, employment, across sectors and regions) need to be clarified

Further analysis has been carried out and presented in particular in section 4.1 on best available techniques, in section 4.2 on the use of sectoral emission limit values and in section 7 regarding the scope of the legislation. In addition, more specific information on the geographical location of the installations has been added in Annex 4.

2. BACKGROUND INFORMATION ON INDUSTRIAL EMISSIONS AND BEST AVAILABLE TECHNIQUES

2.1. Key figures on industrial emissions

The contribution of industrial activities to environmental problems is significant and varies widely according to the sectors or the impacts concerned. For instance industrial activities covered by the IPPC Directive (which covers about 52,000 installations[14]) emit about 55% of the EU's anthropogenic CO_2, 83% of SO_2, 34% of NO_x, 43% of particulate matter and 55% of VOC[15] emissions. About 38% of ammonia emissions are emitted by agricultural installations covered by the IPPC Directive[16]. IPPC installations also contribute to about 23% and 25% of mercury and dioxin emissions to air respectively[17].

In the field of emissions to water, the contributions of IPPC installations are also significant, for instance for phosphorus, nitrogen and heavy metals[18]. In addition, many priority substances and priority hazardous substances listed in the Water

14 LDK, 2007
15 2005 data, see Annex 4.
16 Alterra, 2007, IIASA, 2007 (a)
17 2004 data; various sources presented in Annex 4.
18 TNO, 2007

Framework Directive are exclusively or predominantly emitted by industrial installations falling under the IPPC Directive.

The installations covered by the IPPC Directive and more generally the legislation on industrial emissions are located in all the Member States. The 52,000 IPPC installations are spread across the Member States depending on their size and the level of their industrial activities. More information about the geographical and sectoral repartition of the installations as well as expected evolutions can be found in Annex 4.

The damage cost of industrial emissions (both locally and transboundary) is very high. For example, looking only at the pollutants covered by the Thematic Strategy on Air Pollution (NH_3, NO_x, particulate matter, SO_2 and VOCs), the combination of the 2004 EU25 emission levels reported in EPER (European Pollutant Emission Register)[19] and the externality cost factors used in the Thematic Strategy on air pollution gives a total annual damage cost estimate of €53-164 billion[20] (see Annex 4 for derivation). These costs cover human health impacts and crop damage but not other environmental costs (e.g. damage to biodiversity). Moreover, IPPC installations are emitting a great many more pollutants to air, water and land, as well as having other types of impacts which are not included in this estimation.

Industrial emissions have generally been reduced over the past 10 to 20 years as highlighted in Annex 4 (for instance by about 35% for NO_x and 55% for SO_2 between 1990 and 2000). However, as indicated in section 1.1, industrial emissions need to be further reduced to achieve current and forthcoming environmental objectives under the NEC Directive and the Thematic Strategies.

Illustration: in the field of air pollution, the following reductions of industrial emissions in 2020 (compared to the Member States' projected 2020 emissions through implementation of current legislation) have been estimated as cost-efficient within a package of measures to meet the targets of the Thematic Strategy on Air Pollution: -48 % for SO2, -50% for NOx, -43% for dust and -16% for VOC. More information on the outcome of the RAINS model can be found in Annex 5.

It should be noted that this modelling does not yet take into account of the agreement of the European Council on energy and climate change. The effects of this policy are being assessed in the context of the preparation of the upcoming Commission's Package on Energy and Climate Change (to be adopted in 2008) and of the revision of the NEC Directive. However, based on preliminary calculations, the above conclusions and the order of magnitude of the emission reductions needed to meet the Thematic Strategy targets would not change substantially.

[19] It should be noted, as presented in Annex 4, that emissions reported under EPER do not represent all the emissions from IPPC installations since only the emissions above certain thresholds have to be reported. EPER has been replaced by E-PRTR and Member States will report 2007 emissions to the Commission in September 2009.

[20] The variation reflects the two approaches (the value of statistical life (VSL), applied to the change in number of deaths and value of life year (VOLY), applied to changes in life expectancy) used in the CAFE Cost Benefits Analysis methodology reports.

The further prevention and control of environmental impacts of industrial activities is therefore essential to ensure a high level of health and environmental protection regarding both local and trans-boundary impacts[21].

2.2. Current EU legal framework on industrial emissions

The current EU legal framework on industrial emissions comprises the IPPC Directive and several "sectoral Directives", namely the Large Combustion Plants (LCP)[22], Waste Incineration (WI)[23], Solvents Emissions (SE)[24] and Titanium Dioxide (TiO2) Directives[25] (this body of legislation will be called "industrial emissions legislation" in this document since they lay down the main requirements for the permitting and control of industrial installations).

This legislation is based on Article 175 EC since its primary objective is the protection of the environment.

In addition, the IPPC Directive interacts with a number of other pieces of legislation affecting industrial activities, in particular:

- measures setting overall targets, objectives and policy context, in particular the National Emission Ceilings (NEC) Directive, the Air Quality legislation, the Water Framework Directive and Water Quality Standards, the Waste legislation and the Habitats Directive;

- other measures directly concerned with industrial emissions: the Environmental Impact Assessment Directive, the Control of Major Accident Hazards ("Seveso II") Directive, the Landfill Directive and the EU Greenhouse Gas Emission Trading Directive.

The interaction between the IPPC Directive and these pieces of legislation is further assessed in section 6.1.

The IPPC Directive

The main objective of the IPPC Directive is to ensure a high level of environmental protection with regard to the operation of the industrial activities listed in its Annex I covering the following main sectors: energy industries, metal production and processing, mineral industry, chemical industry, waste management, intensive livestock farming, etc.

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21 For more information on the effects of hemispheric long-range transport of pollutants, see in particular the recommendations of the Task Force of Hemispheric Transport of Air Pollution (HTAP) under the UN-ECE-LRTAP Convention (see http://www.htap.org/activities/2007_interim_report/reading/TF%20HTAP%202007%20Exec%20Sum%20070612.pdf)

22 Directive 2001/80/EC on the limitation of certain pollutants into the air from large combustion plants.

23 Directive 2000/76/EC on the incineration of waste.

24 Directive 1999/13/EC on the limitation of emissions of volatile organic compounds due to the use of organic solvents in certain activities and installations.

25 Directives 78/176/EEC, 82/883/EEC and 92/112/EEC related to the titanium dioxide industry.

The IPPC Directive came into force on 30 October 1996. New installations, and existing installations which are subject to "substantial changes", were required to meet the requirements of the IPPC Directive as of 30 October 1999. The Directive sets the compliance deadline for existing installations at 30 October 2007, therefore allowing eight years of transition.

The IPPC Directive sets general principles for the operation of installations concerned as well as requirements for granting permits and ensuring public participation. The Directive is based on two key principles:

- an ***integrated approach:*** permits must include conditions to prevent and control all environmental impacts taking into account the whole environmental performance of the installations, covering in particular emissions to air, water and land, generation of waste, use of raw materials, energy efficiency, noise, prevention of accidents, odours and restoration of the site upon closure;

- ***Best Available Techniques (BAT)***: the IPPC Directive places BAT, as defined in the Directive, as the central element of permitting (see section 4.1).

IPPC and the "sectoral" Directives on industrial emissions

The sectoral Directives (LCP, SE, WI, TiO2) regulate the emissions (generally to air and water) of installations from certain industrial sectors. These Directives define in particular specific requirements (generally emission limit values and monitoring provisions) for certain pollutants for the installations concerned. For the installations covered both by the IPPC Directive and by the sectoral Directives, the latter set only the minimum requirements which however apply without prejudice to the IPPC Directive. This means that the IPPC Directive may require stricter or additional conditions than would apply under the sectoral Directives alone (see section 4.2).

2.3. Best Available Techniques (BAT) and role of the BREFs

Definition of Best Available Techniques (BAT): in summary, BAT are defined in the IPPC Directive as established techniques (including the technologies used for the design, operation and maintenance) which are the most effective in achieving a high level of protection of the environment as a whole and which are developed on a scale that allows implementation in the relevant sector under economically and technically viable conditions taking into account the costs and advantages.

The implementation of BAT is the central element of permitting of IPPC installations. According to the IPPC Directive, the permit conditions *"shall be based on the best available techniques, without prescribing the use of any technique or specific technology, but taking into account the technical characteristics of the installation concerned, its geographical location and the local environmental conditions"*[26]. It is further stated that *"it is for the Member States to determine how the technical characteristics of the installation concerned, its geographical location and the local environmental conditions can, where appropriate, be taken into consideration"*[27].

[26] Article 9(4) of the IPPC Directive
[27] Recital 18

It should be noted that in the legal interpretation of the Commission the two elements are not of equal weight with the BAT requirement coming first and the "local factors" as a secondary consideration and limited to specific circumstances.

In addition, in order to identify and determine at EU level what is considered BAT for a particular sector, the Commission organizes a very inclusive exchange of information among Member States and other stakeholders on BAT, associated monitoring and their future development. The resulting documents are the 31 so-called BAT Reference Documents (BREFs) which are adopted by the Commission.[28] The BREFs are based on a consensus between technical experts from Member States and from industrial and environmental NGOs. In the rare cases where no technical agreement can be reached on certain specific issues, the diverging views are recorded in the documents.

The BREFs provide an interpretation of what should be considered BAT for a particular sector (EU-wide) often expressed as associated emission levels. With this, the BREFs provide a central reference point that should be fully taken into account by Member States and permitting authorities when they determine BAT in the context of their own practical application of the Directive.

While the BREFs are not binding documents, Member States have only limited discretion to apply permit conditions that deviate from those that would correspond to the application of BAT. This discretion is limited to the local factors[29] mentioned above. Thus, while it is clear that there is some flexibility in the context of the current legislation, this flexibility should only be used within limits in order to avoid undermining the objectives of the Directive.

Fundamentally, this means that conditions different from the normal application of BAT should be limited to the specific local factors mentioned in the Directive . Such a deviation should in addition be permitted only if determined on the basis of an assessment of costs and benefits, as was noted in the previous interpretation made by the Commission[30].

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28 According to recital 25 of the IPPC Directive, the purpose of the information exchange is *"the development and exchange of information at Community level about best available techniques will help to redress the technological imbalances in the Community, will promote the worldwide dissemination of limit values and techniques used in the Community and will help the Member States in the efficient implementation of this Directive"*.

29 See Article 9(4) of the IPPC Directive quoted above.

30 See in particular COM(2003)354 final.

3. GENERAL PROBLEM DEFINITION AND OBJECTIVES

3.1. General problem definition

The extensive analysis carried out as part of the IPPC review process led to the identification of five main problems or issues to be addressed.

These problems relate to:

- insufficient implementation of BAT leading to limited progress in the prevention and reduction of industrial emissions and to distortion of competition due to large differences in environmental standards
- limitations with regard to compliance, enforcement and environmental improvement that hinder environmental effectiveness and the stimulation of innovation
- unnecessary administrative burdens due to the complexity and incoherence of parts of the current legal framework
- insufficient scope and unclear provisions of the current IPPC Directive that could hinder the Thematic Strategies' objectives to be met
- a constraint on the use of more flexible instruments such as NOx and SO2 emission trading systems.

3.2. Objectives

The overall objective remains the prevention and control of pollution and its impacts arising from industrial activities to achieve a high level of protection of human health and the environment. This should be achieved in the most cost-effective and efficient way whilst ensuring the reduction of unnecessary administrative burdens.

This policy must be part of a European emission reduction strategy that addresses all emission sources, establishes the links with related policy areas such as climate change and energy and achieves its objective in a cost-effective way, in particular through improvements corresponding to BAT.

The future policy on industrial emissions should also contribute to the overall objective of the Lisbon Strategy "to promote the development of approaches and technologies that allow the EU to make the structural changes needed for long term sustainability".[31] This policy should eliminate or at least reduce distortion of competition due to different levels of stringency for permitting and control across specific sectors within the EU.

[31] COM(2005) 24 final

Finally, the legislation on industrial emissions should be clear, coherent and easy to use for those who implement this legislation with any unnecessary administrative burden removed in order to achieve the objective of better regulation and simplification.

In relation to achieving the overall objective, the option of abandoning the integrated BAT-based permit approach was considered and rejected at an early stage for the following reasons.

No evidence was received during the whole review process and previous series of consultation in 2003 and 2005 (see above section 1.2) to suggest that there were benefits from deviating from the BAT approach as a whole. On the contrary, the information collected[32] and the Impact Assessment confirmed that the approach is environmentally and economically sound (see in particular section 4).

To achieve the overall objective, five main specific objectives have been identified, corresponding to the five problem areas identified above.

(1) Increase the effectiveness of the legislation by supporting Member States in implementing BAT-based permitting

(2) Further increase the effectiveness by strengthening provisions on enforcement and environmental improvement, while stimulating innovation

(3) Cutting all identified unnecessary administrative burden and simplifying current legislation

(4) Better contribute to the objectives of the Thematic Strategies by amending, where cost-effective, the current scope and provisions of the IPPC Directive

(5) Facilitate possible future use of IPPC-compatible market based instruments such as a emission trading scheme for NOx/SO2

Structure of the report

The report is further structured along **five main chapters** focusing on the **five specific problems and objectives** identified above. It presents, in a clear and structured way, the wide range of options and issues assessed while keeping the overall coherence of the impact assessment. In particular, the synergies and linkages between the various problems, objectives and options have been carefully assessed throughout the whole impact assessment. A summary table with all the options considered can also be found in Annex 1.

[32] For instance, a specific study (DHV, 2007) also assessed the interactions between the BAT-based permitting and other instruments developed mainly at Member States level such as voluntary agreements, environmental taxes and environmental management systems. These instruments were found to be complementary to the BAT-based permitting but could not replace such a system.

4. SUPPORT MEMBER STATES IN IMPLEMENTING BAT-BASED PERMITTING

Problem definition

The description of the problem definition is based on the extensive collection and in-depth assessment of information from Member States' experience on the application of the IPPC Directive over the past years (see section 1).

Throughout the review process, it has been confirmed that permits issued under the IPPC Directive often are not based on BAT as described in the BREFs. This results in a lower uptake of BAT than expected from a proper implementation of the Directive and to a large variation of permit conditions across the EU.

A second main concern is the finding that deviations from BAT are generally not clearly determined on the basis of the criteria set out in the Directive (technical characteristics, geographical location and local environmental conditions while ensuring a high level of environmental protection). Overall, there is a lack of transparency in how the flexibility of the Directive is being used.

Illustration: A detailed evaluation[33] of the actual implementation of the Directive was carried out through a thorough analysis of various case studies. In particular, an analysis of 30 specific installations (which had been granted a permit by the authorities on the basis of the IPPC Directive), located in 12 Member States and covering 6 industrial sectors was carried out.

Permit conditions and in particular Emission Limit Values (ELVs) were compared against the BAT conclusions of the BREFs. Overall, out of the 30 permits assessed, nearly half contained conditions not based on BAT. In some of the case studies, significant differences were seen between the permit conditions and the performance corresponding to BAT (varying from a factor 2 up to 500 for certain pollutants even when considering only the less demanding end of the range of emission levels associated with BAT as laid down in the BREFs). In addition, the deviations from BAT as determined in the BREFs were not generally justified on the basis of the factors laid down in the Directive.

Examples of permit conditions not based on BAT:

- a paper mill with no permit conditions for release to water while the corresponding BREF determines a number of BAT on water discharges.
- two non ferrous metal plants without emission limit values and monitoring requirements on dioxins emissions while the corresponding BREF sets a range of performance associated with BAT
- a non ferrous metal plant with an emission limit value for SO2 at 800 mg/m3 while the corresponding BREF sets a range of performance associated with BAT between 50 and 200 mg/m3
- a chemicals plant with an emission limit value for benzene at 2500 mg/m3 while the corresponding BREF sets a performance associated with BAT at 5 mg/m3

Similar problems were found where general binding rules have been set, replacing individual permit conditions for certain requirements. A detailed analysis[34] of 16 general binding rules applied in the Member States to implement the IPPC Directive was carried out showing that about half of these were not in line with the BAT conclusions of the BREFs. It has not been possible however, in the context of this specific study to assess whether the permits granted for specific installations contain stricter conditions than these general binding rules.

[33] ENTEC, 2007 (a)
[34] VITO, 2007 (c)

Certain Member States have carried out internal assessments leading to similar conclusions. For instance, investigations carried out by the VROM Inspection and Inspection of Transport, Public Works and Water Management in the Netherlands revealed that only between 54 and 77% of the IPPC permits issued were based (or will be based by 31 October 2007) on BAT as determined in the BREFs[35].

Finally, the fact finding exercise[36] has also demonstrated that a number of Member States frequently apply the minimum emission limit values (ELVs) set out in the Directives on Large Combustion Plants, Waste Incineration, Solvents and/or Titanium Dioxide Directives as default requirements rather than determining BAT-based permit conditions as required by the IPPC Directive. This practice is not in line with the legal requirements. As presented further in section 4.2, this is mainly a problem for large combustion plants for which the minimum ELVs of the LCP Directive are far from BAT associated emission levels and therefore fail to harness the benefits of applying BAT.

Evolution of the problem in the future

During the consultation of stakeholders, this analysis on the current shortcomings on BAT implementation has been largely supported. Some stakeholders have suggested that the BREFs were too recent to allow a precise and full assessment of implementation and that a higher uptake of BAT could be expected in the future following a longer period of implementation of the IPPC Directive, taking for instance into account the investment cycle for the installation of new technologies. However, this was not supported by the actual implementation practice[37] based in particular on BREFs adopted in 2001 and by the modelling work carried out on the estimations and assumptions of future emissions.

Estimations were established with Member States on future projected emissions resulting from the application of permit conditions in certain sectors covered by the IPPC Directive. All the modelling work carried out (see below some illustrations) has highlighted large differences for the sectors analysed between BAT performance as set in the BREFs and the estimated future levels of emissions under the implementation of the IPPC Directive.

Other external policy factors, such as related to Climate Change, might have an effect on the structure of certain sectors, on the use of certain fuels (eg reduced use of coal and increased use of renewables in the energy mix) and therefore on the levels of overall emissions (see in particular analysis in section 4.1). However, these factors as such would not have impacts on the level of BAT uptake in specific installations.

This means that after the deadline for full implementation of the IPPC Directive (30 October 2007), there is no basis to expect the uptake of BAT to increase significantly if no further actions are taken in the context of the legislation on industrial emissions.

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35 VROM and IVW, 2007

36 See in particular IFO, 2006; ENTEC, 2007 (b); ENTEC, 2007 (c); OKOPOL, 2007; replies to the questionnaires by the Commission to the Member States on the implementation of the TiO2 Directives.

37 ENTEC, 2007 (a)

Outcome of modelling work for the LCP sector:

Work[38] has been carried out using the RAINS model. The so-called "national baseline scenario" (level of emissions under the implementation of the current IPPC and LCP Directives according to information from Member States' experts) was compared with two "IPPC scenarios" (representing the ends of the BAT ranges of the LCP BREF). The projected emissions of SO_2 and NO_x under the IPPC scenarios were clearly below those predicted under the national estimations. The gaps in emissions in 2020 without BAT application vary between 0,5 and 1 million tonnes for SO2 (-10 to -25% compared to overall national SO_2 projections) and between 0,4 and 0,9 million tonnes for NO_x (-5 to -15% compared to overall national NO_x projections). More information can be found in section 4.2 and Annex 7 .

Outcome of modelling work for the agricultural sector

For the agricultural sector, the same approach was followed for NH_3 emissions. A study[39] using the RAINS model shows the significant role of IPPC legislation to achieve emission reductions to meet the objectives set in the Thematic Strategy on Air Pollution. The full application of BAT conclusions from the BREF on intensive livestock farming was compared for the year 2020 against the national projections revealing about 40 percent difference (representing about 130 kt NH_3) in achieved reductions.

If these shortfalls in implementation continue, the achievement of the environmental objectives set out in other policies (e.g. air and water quality) will be undermined. In particular, the health and environmental objectives of the Thematic Strategy on Air Pollution could not be met by most of the Member States, with continued resulting excessive health, environmental and economic damage.

The RAINS model, used in the context of the review process to assess if current Member States' projections are sufficient to reach the 2020 targets of the Thematic Strategy on Air Pollution, clearly indicates that this is not the case. Instead, IPPC air emissions estimated by Member States for 2020 will have to be cut significantly (-48 % for SO_2, -50% for NO_x, -43% for dust and -16% for VOC; see also section 2.1 and Annex 5)[40].

Drivers of the problem

There are three drivers: (1) the role of the BREFs in permitting and their unclear status in the Directive (2) the interaction between sectoral ELVs set at EU level and BAT; and (3) the status and functioning of the process to elaborate and review the BREFs.

38 IIASA, 2007 (b)

39 IIASA, 2007 (a) – more details to be found in Annex 5

40 These estimations could be slightly changed in the context of the ongoing modelling related to the future climate change and energy policies and the revision of the NEC Directive but no significant changes are expected as regards the order of magnitude.

4.1. Role of the BREFs

4.1.1. Drivers of the problem

One key driver identified for the problem of limited BAT implementation is the fact that competent authorities do not take sufficient account of the BREFs and their BAT conclusions in setting permit conditions.

Based on the data collected and the consultation with stakeholders, this is largely due to the current status of the BREFs in the Directive and the way the flexibility allowed for in the Directive is being interpreted and applied. Compared to the situation when the BREFs started to be developed (around 1997), clear and detailed conclusions do now exist in the BREFs with regard to what is considered BAT at EU level.

Despite the Commission's view that the BREFs are the central reference point for the determination of BAT (see section 2.3) and that deviation from BAT can only be allowed in certain cases and must be objectively determined in accordance with limited factors, the Directive does not provide the sufficient legal clarity on these points.

As a result, a number of competent authorities and operators take a different legal interpretation of the provision on BAT-based permitting and a lenient approach to BAT implementation clearly focussing more on local considerations.

In addition, competent authorities often do not realize that the BREF's conclusions are the results of an extensive exchange of information with stakeholders (including costs and economic considerations) and have been agreed amongst experts at EU level[41].

4.1.2. Description of options

Options considered on the role of the BREFs [all options are mutually exclusive]

Business As Usual
Keep the current legal status of the BREFs while clarifying their role (option 1)
Require that ELVs are normally set within or stricter than the BAT Associated Emission Levels determined in the BREFs and that the reasons for possible deviation due to certain local factors have to be documented (option 2)
Require that ELVs are set within or stricter than the BAT Associated Emission Levels determined in the BREFs and remove the flexibility for taking certain local factors into consideration (option 3)

Under option 1, the current status of the BREFs would be kept but clarified in the IPPC Directive, in particular by providing a definition of the BREFs and a clearer reference to the BREFs in the determination of BAT. The current possible use of local considerations would remain as in the current Directive.

[41] ENTEC, 2007 (a)

Under option 2, the current requirements for use of the BREFs would be strengthened by making clear that the BREFs are the reference for setting permit conditions based on BAT. ELVs would have to be set within or stricter than the BAT Associated Emission Levels determined in the BREFs. Deviation from this rule could be granted by competent authorities in specific cases on the basis of an assessment of the environmental and economic costs and benefits taking into account the 3 factors (the technical characteristics of the installation concerned, the local environmental conditions and its geographical location) laid down in the Directive.

In addition, the reasons for such deviation and the conditions imposed would need to be documented and included as part of the information on the permitting decision which must already be provided to the public. As foreseen in the current IPPC Directive, ELVs could be supplemented or replaced by equivalent parameters or technical measures[42].

Under option 3, no flexibility would be provided to take into account local considerations and ELVs would have to be set at least within the ranges of BAT Associated Emission Levels as determined in the BREFs.

4.1.3. Analysis of impacts

Results of options

Option 1 would clarify the reference to the BREFs in the Directive but would not lead to legal changes on their status or the use of local factors. This option would therefore not create an additional burden on the competent authorities, but would also not create new incentives for competent authorities to change significantly their behaviour compared to the business as usual option.

Under option 2, the changes of the current requirements would be expected to have a greater effect in changing the behaviour of competent authorities, leading to more consistent consideration of the BREFs in permitting. The Directive would clarify that the BREFs provide the principal source of reference for determining BAT. Discretion would however be left to competent authorities at two levels. Firstly, the BREFs generally determine ranges of techniques and performance associated with BAT rather than a single performance standard. Secondly, a certain level of flexibility to deviate from the conclusions of the BREFs would remain in specific cases, but competent authorities would have to give the reasons for their decisions.

Under option 2, authorities are therefore likely to implement more closely the conclusions of the BREFs but would maintain a certain flexibility for specific cases. The operators are also likely to consider more thoroughly the BREFs in their permit applications. Overall, option 2 is expected to result in a significantly higher uptake of BAT than under business as usual and option 1.

Under option 3, very little discretion would be left to competent authorities, resulting in a stricter use of the BREFs and higher BAT implementation than under options 1

[42] Article 9(3)

and 2. The process of producing the BREFs is likely to be affected since it would be more difficult to agree with stakeholders on BAT conclusions in the BREFs.

The main environmental, economic and social impacts of options 1 to 3 are linked to the extent to which these options would lead to a higher level of BAT implementation.

The analysis presented below on the impacts of the implementation of BAT will not be repeated in the report but will be referred to at various places when relevant.

Environmental impacts

Environmental impacts of BAT implementation

The uptake of BAT as set in the BREFs would provide significant environmental benefits in installations that do not yet operate according to this level of performance. In view of the large number of sectors covered by the IPPC Directive and the numerous environmental issues raised in the process of BAT determination, it is not practical to estimate quantitatively all environmental impacts for the installations covered by the Directive.

However, as illustrated below, data have been collected to carry out the analysis for certain key sectors and pollutants. Where possible, the reductions of emissions have been monetised using the methodology and conclusions of the Thematic Strategy on Air Pollution. In addition, reductions of transboundary emissions can have positive impacts on the environment of third countries as illustrated in the Thematic Strategy on Air Pollution or through the implementation of the Water Framework Directive[43].

Illustration 1: A study[44] from the European Environment Agency carried out a comparison for the LCP sector between the emissions data reported under EPER (2004) and the impacts of applying BAT as determined in the BREF on LCP. As presented in Annex 7, for all the pollutants considered, the gaps between the level of emissions and what could be achieved through BAT introduction in the whole sector are very significant (overall NO_x and SO_2 emissions would be reduced by a factor 2 to 5).

Illustration 2: Specific modelling work was also carried out in the context of the application of NO_x abatement techniques in the cement sector[45]. Moving towards BAT in this sector (as defined in the BREF) would lead to significant benefits. The reduction of emissions compared to the baseline scenario (no policy change) ranges between 29 and 57 ktonnes per year[46], even based on the modest assumption that up to 40% of all installations in this sector would implement BAT. Based on the monetary value of NOx emissions reductions, the monetised benefits are between around € 330 and 660 million per year whereas the economic costs of the techniques are estimated between € 15 to 30 million per year.

43 See for instance Water Information System for Europe (WISE), http://www.eea.europa.eu/themes/water/wise-viewer

44 EEA, 2007 (a)

45 ENTEC, 2007 (b)

46 The range corresponds to the higher and lower end of the BAT Associated Emission Levels of the BREF.

Illustration 3: The same approach was followed for large coal power plants[47]. Assuming increases in the uptake of BAT from 5 to 40% in BAT compared to the current situation, the associated reductions in emissions would be around 30 to 260 ktonnes per year for NO_x (with valued benefits of € 100 to 2,200 million per year at abatement costs of € 75-600 million per year) and 0.3 to 8 ktonnes per year for dust (with valued benefits of € 7 to 600 million per year at abatement costs of € 2 to 160 million per year). Emissions of mercury would be reduced by 0.1 to 2 tonnes per year across the EU.

Illustration 4: The environmental benefits expected from BAT implementation concern not only emissions to air but overall environmental impacts due to the integrated approach of BAT. For instance, review of the implementation of the IPPC Directive in the United Kingdom[48] has shown significant reduction of emissions to air and water from the implementation of BAT-based permitting as well as important improvements in the use of resources.

It should also be underlined that the efficient use of energy is one of the key aspects to be considered in the determination of BAT. A higher uptake of BAT will have a beneficial impact on the reduction of CO_2 emissions since installations regulated under BAT-based permit conditions have to use their energy more efficiently.

The interaction between the IPPC Directive and the EU Greenhouse Gas Emission Trading Directive (GHG ETD) has been clarified through an amendment of the IPPC Directive (article 9(3)) in 2003.

As a result, IPPC permits can not contain emission limit values for greenhouse gases covered by the GHG ETD (currently only CO_2). However, the requirement to use the energy efficiently has not been removed from the determination of BAT (energy efficiency goes beyond the direct emissions of CO_2 of a particular installation) and remains a key objective of the IPPC Directive.

Environmental impacts of the options considered

It is expected that option 1 would lead to limited positive environmental impacts compared to the business as usual option since no significant change of behaviour is expected from competent authorities.

Option 2 is expected to lead to significant positive environmental impacts due to a higher uptake of BAT.

The environmental benefits from the implementation of BAT are expected to be the highest under option 3 since no discretion would be left to deviate from BAT. However, under option 3, the lack of flexibility could lead to negative environmental impacts for specific installations where the consideration of local factors could be justified from an environmental point of view due, for instance, to the specific cross-media effects of certain techniques.

Negative effects might also result if having no room to deviate from the BREFs' conclusions meant that the BAT conclusions of the BREFs themselves could only be agreed at a less ambitious level.

47 ENTEC, 2007 (b)

48 DEFRA, 2007; see also Gray et al. Integrated regulation – experiences of IPPC in England and Wales, in Water and Environment Journal 21(2007)69-73

Economic impacts

Economic impacts of BAT implementation

The main economic impacts of BAT implementation can be summarized as follows: (1) generally higher compliance costs for operators (2) potentially more efficient production (3) impacts on competitiveness between operators within and outside the EU and (4) impacts on the development of EU eco-industries.

Compliance costs

Compliance costs vary considerably between operators according to the sectors considered and the specific improvements required to implement BAT compared to the situation prior to IPPC implementation[49]. The uptake of BAT by operators results in compliance costs which can be, in certain cases, important[50].

The way BAT is defined in the Directive and determined through the BREF process provides that conclusions on what is considered BAT are economically viable for the industrial sector concerned with a balance between the likely costs and the benefits. These issues are addressed in the determination of BAT in the BREFs. Guidelines have been developed in a specific BREF on economics and cross-media effects to further support the determination of BAT in the sectoral BREFs from a methodological point of view.

Impacts on production efficiency

Some economic benefits can also be achieved from BAT implementation[51], for instance through waste prevention, more effective use of resources such as water or raw material, increased energy efficiency or labour productivity. These benefits are also often reported in the sectoral BREFs.

Impacts on competitiveness

In view of the large number and types of sectors covered by the IPPC Directive, the impacts of BAT on competitiveness have been assessed in particular through a literature review and two main studies[52] which focussed upon some of the most exposed sectors to competitive pressures both within and outside the EU.

In the analysis carried out (see below in the box and in Annex 6), no significant negative impacts on competitiveness and trade with third countries due to the uptake of BAT were found in the large majority of the sub-sectors analysed. In all cases, no long term impacts on growth were identified. Similar levels of stringency and regulatory quality across the EU have been found to provide a more level playing field between operators.

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49 See for instance examples in IFO, 2006.

50 ENTEC, 2007 (b); IIASA 2007 (b)

51 See for instance outcome of interviews of operators in IFO, 2006; DEFRA, 2007

52 Hitchens, 2002; IFO, 2006

Two specific studies have been carried out to assess the impacts on competitiveness of the application of BAT. A first study[53] considered 3 sectors (pulp and paper, non-ferrous metals and cement) and found hardly any negative impacts on competitiveness (including on SMEs). This study carried out in 2001 was based on the assumption that BAT, as set out in the BREFs, would be implemented. The study however pointed out that possible impacts would depend on the type and pace of IPPC implementation, stressing the importance of the timing of BAT investments.

A follow-up study[54] was carried out in 2006 and analysed 2 sectors (domestic glass and electric steel making) based on sectoral surveys and questionnaires/interviews of operators and authorities. No significant impact of IPPC implementation on competitiveness was identified in the large majority of the sub-sectors analysed[55]. Some short-term impacts were identified for certain sub-sectors which face a high degree of price competition from non-EU competitors and important jumps in the stringency of regulation (where pre-IPPC regimes were very lenient). However, no long term impacts on growth were identified. The costs of BAT implementation were found to be only one small factor compared to other issues such as labour costs, raw material or energy costs. The study also reported information showing that competitive distortions can result from different levels of stringencies and regulatory quality.

According to literature[56], environmental costs have a marginal impact on the delocalisation of industrial activities and the related loss of jobs[57]. Absolute environmental costs[58] increased by 3% between 1995 and 2002 while manufacturing production grew by 25%. The costs of environmental protection therefore decreased from 2,1% to 1,8% of gross value added between 1995 and 2002. For industrial sectors for which the implementation of the IPPC Directive leads to a high share of the total environmental costs, the total environmental costs represent 1% of the gross value added in 2005 for the textile and leather sector, 1,5% for the pulp, paper and printing sectors and 3% for the chemicals and plastics production sectors.

Impacts on the development of EU eco-industries

A higher uptake of BAT would have positive impacts on the development and employment of EU eco-industry, already a larger employer than the car industry[59]. It is likely to have particular effects on innovation, by providing an EU market for advanced emission reduction technologies, stimulating R&D by reducing the risks of returns on investments and increasing likely rewards in that industry sector. A strong domestic market for eco-industry would open up opportunities for EU firms' to be successful in an ever growing export market for eco-technology and services.

Evidence suggests that substantial competitive benefits in this sector accrue to the first movers who supply resource-efficient technologies to meet standards in one market that are subsequently adopted by other countries[60]. There is evidence that as countries develop they increasingly tackle environmental problems[61]. For instance, the market for pollution control technologies is growing fast in China, offering

53 Hitchens, 2002
54 IFO, 2006
55 This is also found in DEFRA, 2007 which indicates that there is little evidence of the competitive impact of IPPC implementation on business.
56 See in particular literature review carried out in IFO, 2006.
57 Commission Staff Working Document on the links between employment policies and environment policies, SEC(2005)1530.
58 EUROSTAT data (2005)
59 (Eco-industry: €3.4m FTE equivalents, Car Manufacturing: 2.7m); Eurostat EU Labour Force survey and Ernst & Young 2006
60 Reports from Commission High-Level-Group Report for the mid-term review of the Lisbon Strategy
61 so-called Kuznetz Curve

opportunities for technologies that have been developed in Europe[62] and contributing to the reduction of emissions in third countries. Due to increasing environmental pressures from expanding global production and adoption of higher standards as income increase, the global market for eco-technology has been predicted to exceed €500bn by 2010[63] and €2000bn by 2020[64].

Success in this global market would provide and secure large numbers of jobs, the extent of which is indicated by the following illustration which highlights the market of environmental technologies for the control of air pollution (which concern largely the implementation of the IPPC Directive and related legislation).

Illustration[65]: With about € 16 billion of turnover in 2004, the air pollution control sector represents around 10% of the total European eco-industry (which has € 227 billion turnover, around 2.2% of total EU GDP) and 180,000 jobs. The growth in the wider pollution management sector has led to a substantial increase of jobs (from 1,45 to 1,85 million between 1999 and 2004). The air pollution control sector is the largest export sector of the EU eco-industry with € 2.9 billion annual sales. Four countries (DE, UK, BE and FR) represent 75% of the total exports. The most development opportunities are in Asia (especially in China). The main drivers for the development of the environmental technologies in this sector have been legal requirements.

Furthermore, according to the information collected under ETAP[66], the promotion of process-integrated rather than end-of-pipe technologies (as underlined in the principles of the IPPC Directive, the BAT concept and the BREFs' conclusions) should lead to productivity improvements[67]. This effect would increase in line with the innovative capacity of the eco-industries.

Economic impacts of the options considered

The impacts on compliance costs of options 1 to 3 depend on their effects on BAT uptake. As presented above, option 1 is expected to have limited impacts compared to options 2 and 3. The compliance costs are expected to be the highest for option 3, and higher for option 2 than for option 1.

Under the business as usual option, not using the full potential of BAT would hamper the stimulation and uptake of environmental and innovative technologies reducing the potential for economic growth and employment in the eco-industry sector.

The functioning of the internal market would not be improved, leading to distortions of competition within a sector across the EU due to important differences in permit conditions.

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62 Commission Staff Working Document on the links between employment policies and environment policies, SEC(2005)1530.

63 Ernst & Young, 2006

64 Roland Berger Strategy Consultants, 2006

65 Ernst & Young, 2006

66 http://ec.europa.eu/environment/etap/index_en.htm /

67 "Environment and employment: sustainability strategies and their impacts on employment", Institut für Wirtschaft und Umwelt & AK Wien (2000) which concludes that "neutral or slightly positive quantitative effects on employment are to be expected"

Options 2 and 3 would have more positive impacts on the level playing field between installations across the EU. As underlined above, no significant impacts on competitiveness are expected from BAT implementation, in particular if the time needed to introduce BAT is taken into account for determining specific permit conditions.

Not allowing the possibility to deviate from the BAT conclusions of the BREFs (option 3) could in rare cases lead some specific installations to have to meet disproportionately high costs to implement certain BAT where an assessment could show that these costs are higher than the environmental benefits to be achieved. This could be the case where, for example, an installation is already operating close to BAT-based levels of performance but using a different technique, and would have to make a very large investment to implement BAT for a very small benefit.

The positive economic impacts of BAT implementation on production efficiency and the EU eco-industry would apply to a larger extent for options 2 and 3.

No additional significant administrative costs for operators (in particular related to permit application, monitoring of emissions and reporting to the competent authorities) are expected from the options considered since no major new information obligations on operators would be added compared to the business as usual.

A clarification of the role of the BREFs (all 3 options) would reduce the administrative burden on Member States since this will reduce the risk of misinterpretation and the need to provide guidelines at the level of each Member State.

As regards the possible requirement to document the use of local considerations in permitting (option 2), the impact on administrative costs for competent authorities would be minor. A requirement already exists in the IPPC Directive for competent authorities to make available to the public *"the reasons and considerations"*[68] on which the decision to set permit conditions is based.

Option 2 would simply make it explicit that this should include specific information on how the BREFs and the local factors have been considered. The additional administrative costs for competent authorities would be less than € 0.5 million per year for the EU as a whole.

Options 2 and 3 would also provide a good use of the important administrative resources spent on the development of the BREFs. The total administrative costs (for the Commission, Member States and other stakeholders) for developing the BREFs are estimated between € 150 and 300 million[69] during the period 1997 to 2007.

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[68] See Article 15(5)(b) of the IPPC Directive.

[69] Based on the estimation of a cost of about € 5 to 10 million per BREF (source BREF on surface treatment using solvents)

Social impacts

Social impacts of BAT implementation

A higher deployment of BAT and the associated environmental benefits would have benefits for human health as a result of reduced exposure to industrial emissions in particular to air, water and soil. As illustrated for certain sectors (see under the environmental impacts section), the monetised heath benefits of these reductions are expected to be much higher (up to a factor of 10 - 20) than the compliance costs.

Furthermore, evidence exists about the distributional effects of the reduction of pollution, which tends to disproportionately affect the less affluent. The reduction of industrial emissions has therefore positive impacts on the less affluent groups of the population contributing to a higher social cohesion.

In addition, a higher uptake of BAT would have positive impacts on health and safety at work since the prevention of accidents is one of the key issues taken into account in the determination of BAT.

In general, environmental regulation is either neutral or slightly positive for employment for the economy as a whole. For industrial sectors covered by BAT-based permitting, employment effects are also very likely to be negligible or slightly positive: – as described above, there appear to be no significant negative external competitiveness effects, partly because the costs of applying BAT are usually a small percentage of gross value added. BAT, as described in the BREFs, has already been assessed to be economically viable for the sector – therefore, for sectors as a whole, there would be no employment effects.

Where certain installations have not yet implemented BAT, they will need to incur the costs which other firms in their sector have already incurred. Where these are also the least efficient installations there may be negative impacts on employment as production shifts to more efficient installations in the sector. Employment effects between installations are likely to balance out. Regions which have already implemented BAT may gain at the expense of those which have delayed.

The analysis of the distributional effects is more specifically carried out for some specific sectors (see for instance in section 4.2 and section 7) and information on the regional repartition of installations in the EU can be found in Annex 4.

Social impacts of the options considered

As indicated above, the main social impacts of the options considered are linked to their effects on BAT implementation as presented above and will not be repeated here.

The additional positive social impacts of options 2 and 3 are to bring more transparency in the permitting of installations and increase the confidence of the public in the permitting regime.

4.1.4. Comparison of options

The comparison of the options is mainly linked to the extent to which they would lead to a higher level of BAT implementation.

Previous analysis under the Air Thematic Strategy and additional recent assessment of sector and company based data has shown that the environmental impacts as well as the reduction of health impacts linked to a higher uptake of BAT are positive and outweigh any economic impacts. For instance, the RAINS modelling has shown that measures to implement BAT in IPPC installations are not only needed to achieve set objectives under the Air Thematic Strategy but are cost-effective as part of a package of measures that include both mobile and stationary sources.

Positive impacts on the development of EU eco-industry are also expected. No significant impacts on competitiveness, social impacts or detrimental long-term effects on economic growth have been identified from a higher uptake of BAT as set in the BREFs with the possibility of some flexibility in well-founded and documented cases (option 2). Instead the analysis shows that a more unified application of BAT would help reducing distortion of competition in industry sectors covered by the IPPC Directive. However, fully binding BREFs (option 3) with no flexibility could lead to negative environmental impacts for specific installations or in rare cases to compliance costs higher than the environmental benefits to be achieved.

The policy option to be chosen both in terms of environmental and cost considerations is therefore to firm up the concept of BAT without making the BREFs entirely binding. Option 2 is therefore recommended.

4.2. Use of sectoral Emission Limit Values (ELVs) versus BAT

4.2.1. Drivers of the problem

As described earlier, although it is clear from the legislation that the provisions of the sectoral Directives have to be applied without prejudice to the IPPC Directive, there is evidence that in many cases the sectoral ELVs are applied as the default 'rule' instead of BAT as set out in the IPPC Directive. This practice is not in line with the legal requirements and fails to harness the benefits of implementing BAT (it lags behind the ambition level of BAT). There are 3 main causes to this problem.

Firstly, the interaction between the IPPC and the sectoral Directive is not well understood by many competent authorities and operators. This issue is more specifically addressed in section 6.1 relating to inconsistencies between legislation.

Secondly, the existing minimum ELVs of the sectoral Directives were set at a time when BAT for the sectors involved had not been determined at EU level and the BREF process had not been completed. As a result, a number of these minimum requirements (in particular for the LCPs and the TiO2 sector) are far from BAT.

Finally, minimum requirements can currently only be revised or set through the EU co-decision process. This is necessarily a lengthy process, especially given the technical details involved and does not encourage adjustments to technological

progress towards BAT on a regular basis. For example, standards for LCPs were first set in 1988 and not updated until 2001.

Similarly, ELVs for municipal waste incineration plants were adopted in 1989 and updated in 2000. The requirements for the authorisation of TiO2 installations were established in 1978 which were complemented by emission limit values in 1992. These were never updated.

As a result, application of the current minimum requirements by competent authorities can hold back the progress in the deployment of BAT.

4.2.2. Description of options

Options considered on the use of sectoral ELVs versus BAT [options 2 and 3 can be combined and are mutually exclusive with option 1]

Business As Usual
Remove ELVs from sectoral Directives for IPPC installations (option 1)
Strengthen existing minimum sectoral ELVs to align them with BAT in those sectors (LCPs, certain cement kilns co-incinerating waste, titanium dioxide) where the uptake of BAT is particularly low (option 2)
Establish a mechanism through Comitology procedure to adapt to scientific and technical progress non-essential technical requirements (option 3)

Under option 1, the installations concerned would only be subject to the requirements of the IPPC Directive and the sectoral ELVs would be repealed. fsfs

Under option 2, the current minimum sectoral requirements would be strengthened based on the BAT conclusions of the BREFs for the sectors where sectoral ELVs are far from BAT and the uptake of BAT is low. An analysis[70] was carried out for the 4 sectoral Directives (WI, LCP, TiO2 and SE) concerned. Compared to the LCP and TiO2 sectors, most of the current minimum requirements set in the WI and SE Directives are relatively close to BAT as determined in the BREFs.

The strengthening of the overall provisions of these Directives has therefore not been considered further in this impact assessment. However, in the context of the review of the WI Directive (for the purpose of implementing Article 14 of this Directive), an assessment[71] was carried out on the alignment of NOx ELVs for co-incineration of waste in existing and new cement kilns, taking into account the BAT conclusions from the BREF on Cement and Lime production.

In the LCP installations, the uptake of BAT is generally low and for both the LCPs and the TiO2 sector the emission limit values (ELVs) of the sectoral Directives are far from the emissions levels associated with BAT. These two activities are therefore subject to further analysis under this option. In addition, LCPs are very large emitters

[70] EEA, 2007 (a); Entec, 2007 (c); Ökopol, 2007; AEAT, 2007 (c)
[71] Ökopol, 2007

of key air pollutants requiring drastic emission reduction to achieve the objectives of the Air Thematic Strategy.

Under option 3, a mechanism for technical adaptation through a Regulatory Comitology procedure with the scrutiny of the European Parliament would be set up to adapt non-essential technical minimum requirements (in particular emissions monitoring and assessment of compliance with sectoral minimum emission limit values). Such adaptation would be based on the analysis of environmental, economic and social impacts. The process would also include an appropriate involvement of stakeholders.

4.2.3. Analysis of impacts

Business as usual

The problem of incorrect implementation of the IPPC Directive in correlation with the sectoral Directives would continue under the business as usual option. Keeping EU-wide sectoral ELVs which are far from the BAT ranges may be interpreted as a signal to apply them as the default ELVs and thus will not create an incentive for competent authorities to base permit conditions on BAT.

Option 1: Remove ELVs from sectoral Directives for IPPC installations

Results of option 1

This option has been considered to assess whether the removal of sectoral ELVs would indeed result in a higher uptake of BAT at the installations concerned (in particular LCPs). There is sufficient evidence to suggest that this is unlikely[72] since shortcomings in BAT implementation are also frequent in sectors which are not covered by sectoral minimum requirements. Other drivers have proven to have a much stronger impact on the (lack of) deployment of BAT (see section 4.1 on the role of the BREFs as well as section 6.1 on a possible combined Directive).

Therefore, the main direct result of repealing the requirements of the sectoral Directives will not be to improve the performance of the installations in these sectors towards BAT but rather to remove the "safety net" (minimum requirements) that these ELVs play in limiting the currently practiced flexibility.

As underlined previously (see section 4.1), the analysis of the actual implementation practices has revealed that the flexibility allowed for in the IPPC Directive can be misused and lead to the setting of permit conditions which are far from BAT.

Even though the revised Directive would limit such flexibility and strengthen the role of the BREFs in the permitting process as described in section 4.1, and even when taking into account the potential benefits of strengthening the inspection and permit review provisions (see chapter 5), this would not sufficiently ensure that BAT levels would be achieved quickly.

[72] See consultation carried out in the context of ENTEC, 2007 (a); ENTEC, 2007 (c) and Ökopol, 2007.

This would be especially problematic for the large combustion plants, as in these installations the current performance is far away from BAT levels and they are important for achieving the objectives of the Air Thematic Strategy. In addition, the removal of the current "safety net" would leave open the risk of having higher levels of emissions for certain installations compared to the business as usual scenario, for instance when permits are reviewed or updated due to substantial changes in operation.

Environmental impacts of option 1

The environmental impacts of removing the sectoral ELVs are likely to be negative compared to business as usual due to the removal of the "safety net" by allowing higher emission levels. The installations covered by the sectoral ELVs, in particular the LCPs, contribute over 90% to the overall industrial emissions of the key air pollutants SO_2 and NO_x. (see Annex 4 on industrial emissions data and Annex 5 related to the scenarios run under the RAINS model). Higher emissions would result in large environmental and health impacts and would bring the levels of the emissions further away from the current and future NEC objectives.

Economic impacts of option 1

Option 1 could lead to some cost savings for operators which would not be required to install or maintain certain abatement techniques. There will be no reduction of administrative costs under this option since the installations concerned would remain under the scope of the IPPC Directive and therefore be subject to the same permitting regime. By removing the current "safety net", the differences in permit conditions would become even wider and lead to a less level playing field than under the "business as usual" option.

Social impacts of option 1

The public could be affected by increased health impacts due to less stringent operating conditions in certain installations. Removing the current EU-wide minimum requirements would reduce the degree of confidence of the public on the setting of conditions for large emitters of pollutants of high concern, for instance dioxins, SO_2, NO_x and dust. No specific impact on employment is expected from this option.

Option 2: Align particular existing minimum sectoral ELVs with BAT

Align minimum requirements of the LCP Directive with BAT

Description of option 2 (LCPs)

The IPPC Directive covers combustion installations with a rated thermal input exceeding 50 MW. The LCP Directive sets limitations to the emissions to air of SO_2, NO_x and dust of combustion plants, the rated thermal input of which is equal to or greater than 50 MW. All of the large combustion plants covered by the LCP Directive are also covered by the IPPC Directive.

In many cases the emission limit values set in the LCP Directive are much higher than the range of emission levels associated with the application of BAT as defined in the LCP BREF, as is illustrated in Annex 7 (for existing plants). This means that installations having such permit conditions are allowed to have much higher emissions than could be achieved with the application of BAT.

The LCP BREF lists techniques which can be applied to reach emission levels associated with BAT (without prescribing any of them specifically). These techniques are well established and widely available on the market.

Under this option, the minimum emission limit values for SO_2, NO_x and dust for large combustion plants would be brought in line with BAT (upper end of the emission level ranges) as currently defined in the LCP BREF. In accordance with the conclusions of the BREF, a distinction would be made between existing plants (being those having a permit or having applied for a permit at the time the new ELVs come into force) and new plants to reflect the technological evolution.

The new ELVs would apply from 2016 on, in order to allow a certain alignment of the installation of new abatement measures with the companies' investment cycles, while ensuring that the resulting environmental benefits are not delayed. This date coincides with the entering into force of the new emission limit value for NO_x for solid fuel fired combustion plants above 500 MW from the LCP Directive. By that time a new BREF will have been published for the LCPs, reflecting further developments of BAT.

In order to assess the environmental as well as the economic impacts of aligning the future LCP ELVs with BAT, several studies have been performed[73].

Environmental impacts of option 2 (LCPs)

This option will achieve very large environmental benefits. This is due to the very significant contribution of LCPs to the overall emissions of especially SO_2, NO_x and particulate matter (about 90% of total industrial emissions), which also means that a large extent of emission reductions is needed to meet the objectives set in the Thematic Strategy on Air Pollution. This complete uptake of BAT and the consequent emission reduction could not be ensured when relying solely on the BAT-based permit approach as that still includes some flexibility for competent authorities to take local factors into consideration.

One study[74] looked at the theoretical emission reduction potential of applying BAT in large combustion plants as compared to the current situation. The results clearly indicate that the 2004 EPER emissions of SO_2 and NO_x[75] of the installations assessed in the study (covering 450 facilities) were 2 to 5 times higher than the calculated BAT associated emissions for all fuel types.

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73 mainly EEA, 2007 (a); IIASA, 2007 (b); AEAT, 2007 (a) and ENTEC, 2007 (c)

74 EEA, 2007 (a)

75 For dust, the uncertainty associated with the emissions reported under EPER was found to be too high, so no detailed assessment was done.

This highlights that the uptake of BAT in these LCPs was at that time still very incomplete. It also shows the very significant potential for emission reduction by applying BAT in this sector. Compared to 2004, the emissions of SO_2 and NO_x would be reduced between 60% and 87% and between 80% and 97%, respectively, if all assessed plants would perform within the BAT ranges. By far the largest reductions would be achieved at coal- and lignite-fired plants.

Another study[76] looked forward towards 2020 to assess how the full implementation of BAT for LCPs compares to the implementation of current legislation as projected by Member States and how BAT implementation may contribute to the objectives set within the Thematic Strategy on Air Pollution.

Analysis using the RAINS model has shown that scenarios based on the implementation of BAT as described in the LCP BREF would lead to a significant additional reduction of the emissions of SO_2, NO_x and dust in 2020 compared to the ongoing implementation of legislation (as projected by Member States under the so-called National Projections Baseline)[77]. For the large combustion plants, this reduction would be 19 - 35% for SO_2, 14 - 30 % for NO_x and 24 - 32 % for dust.

This confirms that Member States do not assume a full implementation of BAT as described in the BREF under the current legislation framework. However, the emission reductions achieved by full implementation of BAT would be the main element to help closing the gap between the 2020 baseline and the targets corresponding to the TSAP objectives. As can be seen in Annex 7, the gap related to the LCPs would be reduced by 39-74% for SO_2 and by 27–61% for NO_x (upper and lower range of BAT, respectively).

A more detailed description of the National Projections baseline and the outcome of this study are included in Annex 7.

In addition, the monetized health impacts in 2020 resulting from these emission reductions were assessed[78]. This showed that implementing the BAT scenarios would bring significant additional benefits, compared to the baseline under the National Projections scenario. In 2020, these benefits may be around 9 - 30 bn euros/year when emissions are at the upper end of the BAT range and even 20 - 65 bn euros/year when the emissions would reach the lower end of the BAT range[79]. The benefits of reduced impacts on ecosystems could not be quantified. The details of this analysis are summarized in Annex 7.

The environmental benefits of achieving the BAT associated emission range as compared to applying the ELVs from the LCP Directive were also estimated for a selection of individual combustion installations[80]. In addition, the emission limit

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76 IIASA, 2007 (b); AEAT, 2007 (a)

77 IIASA, 2007 (b); the effects of the new energy and climate change policies could not yet be taken into account but, based on preliminary calculations, the order of magnitude of these emission reductions will not change.

78 AEAT, 2007 (a)

79 The low estimates are based on the VOLY median while the high ones are based on the VSL mean, which are two different approaches to calculate the health impacts – see Annex 7

80 Entec, 2007 (c)

values included in the IPPC permits issued (if any) for these combustion plants were assessed.

The results of this assessment, based on some 43 case studies from different sectors (power plants, combined heat and power, petroleum refineries, iron and steel) confirm the significance of the overall environmental benefits from achieving the BAT emission levels. These benefits are much higher (1,3 times for NO_x, about 2 times for SO_2 and 3,5 times for dust when taking the upper end of the BAT range (less strict)) than the benefits from reaching the sectoral ELVs of the LCP Directive. It was also confirmed that IPPC permits for installations in this sector are more often based on the LCP Directive's emission limit values than on BAT as defined in the LCP BREF, with 90% of the case study plants having permitted emission limit values that allow emissions above the BREF's upper end of the BAT range.

Although the analysis has focused mainly on the pollutants which are regulated in the LCP Directive (SO_2, NO_x, dust), it should be stressed that additional environmental benefits will result from this option, such as a reduction of the emissions of heavy metals (especially mercury) and of organic pollutants (PAH, dioxins...). It has not been possible to quantify these additional benefits.

Economic impacts of option 2 (LCPs)

The RAINS analysis mentioned before[81] showed that the compliance costs of the BAT scenarios would lead to additional costs compared to the National Projections baseline of around 0.8 - 2.6 bn euros for SO_2, 1.3 - 3.7 bn euros for NO_x and 0.01 - 0.2 bn euros for dust (upper – lower end of the BAT range).

As an important part of all large combustion plants, and in particular the largest ones, belongs to the power generation sector, it is relevant to assess the potential impact of this option on the electricity price. As illustrated in Annex 7, the average increase of electricity prices as compared to the National Projections baseline due to applying BAT in the power sector would not be significant (about 0,6 – 2,6 % in 2020).

In practice, an important element determining the compliance costs is the way companies are able to fit the necessary environmental investments into their investment cycles. This is particularly important for the LCPs as these are large scale installations, for which the required abatement equipment will have a high capital cost. In such cases, unforeseen short term investments may be difficult to cope with.

To allow such an alignment, a transition period for implementing the new emission limit values until 2016 would be applied. By then further developments of the BAT may be expected, decreasing the costs and allowing to reduce the emissions down to or even beyond the lower range of the BAT as currently defined in the BREF.

Finally, this option will lead to a much more level playing field for the sectors concerned (mainly electricity generation, petroleum refineries, and iron and steel) by narrowing the range over which emission limit values can be set. In the context of the liberalisation of the energy market, this option would also avoid unacceptable

[81] IIASA, 2007 (b)

distortion of competition linked to very different levels of environmental standards currently applied in the electricity generation sector.

Social impacts of option 2 (LCPs)

The main social impact of strengthening the emission limit values would be the beneficial health impacts as discussed under the environmental impacts section. With the most deprived sectors of society suffering disproportionately from the economic and environmental impacts of air pollution, this measure would have a particularly strong benefit for the poorest members of society.

Ensuring the uptake of BAT in installations with such a significant share of the overall and industrial emissions of SO_2, NO_x and dust, will certainly increase the confidence of the public in the regulation of industrial emissions.

No negative impacts on the employment for the sectors concerned have been identified. Furthermore, the emission reductions would trigger growth of the eco-industry by creating a need for new and more cost-effective abatement measures that allows future success in international markets, creating lead markets and sustained employment growth.

Aligning the NOx minimum emission limit values for co-incineration of waste in existing cement kilns with those for new kilns and with BAT

Description of option 2 (NO_x in cement kilns)

The current minimum requirements set in the WI Directive are in general relatively close to BAT. However, in the case of cement kilns co-incinerating waste, the limit values set out in the Directive are different for "new" (500 mg/Nm^3) and "existing" plants (800 mg/Nm^3)[82]. The BREF for the Cement and Lime sector published in 2000 considers BAT associated NO_x emission levels for cement kilns to be in the range of 200-500 mg/Nm^3.

The review clause of the WI Directive (Article 14) requires an assessment of the economic and technical feasibility for existing cement kilns co-incinerating waste of respecting the NO_x emission limit value for new cement kilns and a proposal, as appropriate, for revision of the related provisions of the Directive.

Under this option the NO_x limit value for existing cement kilns co-incinerating waste would therefore be updated to 500 mg/Nm³ to bring it in line with the current BREF and in accordance with the provisions of the review clause of the WI Directive.

[82] Annex II.1.1.C of the WI Directive: for the implementation of the NO_x emission limit values, cement kilns which are in operation and have a permit in accordance with existing Community legislation and which start co-incinerating waste after the date mentioned in Article 20(3) (i.e. 28 December 2004) are not to be regarded as new plants.

Data[83] has been gathered and assessed as to the technical feasibility and the environmental, economic and social impacts of introducing a stricter limit value. It has been found that it is technically feasible for existing plants to respect a limit value of 500 mg/Nm^3, as proven for example by a number of plants in Sweden and Germany operating successfully for several years with emission levels below 500 mg/Nm^3 by applying SNCR.

Environmental impacts of option 2 (NO_x in cement kilns)

The measure could bring significant environmental benefits. Assuming application of the stricter limit value from 2010 onwards, it is estimated that NO_x emissions from these sources could be reduced annually by about 75,000 to 100,000 tonnes per year in addition to business as usual. Such a reduction would have positive effects on air quality, water and soil quality and health. The health and environmental benefits from such a reduction have been estimated at about 200 to 400 million euros per year in addition to business as usual.

Economic impacts of option 2 (NO_x in cement kilns)

The economic impacts of this option have been assessed assuming application of the stricter limit value for existing cement kilns co-incinerating waste after 2010. The additional annual costs compared to business as usual would then about € 30 to 45 million per year, taking into account investments and operational costs.

Social impacts of option 2 (NOx in cement kilns)

The main social impact would be the health benefits of reducing emissions, which have been calculated together with the environmental benefits (see above). The measure could also increase public confidence in the co-incineration of waste, due to the stricter limit value.

The labour market effects are expected to be low, but could occur in small installations due to relatively high impact of investments and increased operation costs.

Align the minimum requirements of the TiO2 Directive with BAT

Description of option 2 (TiO_2 sector)

Presently there are 18 TiO_2 producing installations in the EU. The environmental damage from this sector, related to dust and SO2 emissions only, is estimated to range between €54 and 157 million a year[84].

The TiO_2 producing installations use either the sulphate process, the chloride process or both for their production. Directive 92/112/EEC[85] sets out limit values for

83 Ökopol, 2007
84 AEAT, 2007 (c)

emissions into air and water for these installations, which apply without prejudice to the requirements of the IPPC Directive. The BREF on Large Volume Inorganic Chemicals – Solids and other Industry includes BAT conclusions for this sector, as well as emission levels associated with BAT.

As the sectoral Directive dates from 1992, the limit values set out by it are often far from BAT as specified in the BREF (see Table 13 in Annex 10). As a consequence, this option looks at updating the current sectoral emission limit values in order for them to act as an effective "safety net" and to bring them in line with the current BAT.

In order to evaluate the impact of this option, data have been gathered and assessed concerning the current permit conditions, emission levels and abatement measures within the sector. Data was collected mainly through questionnaires to Member States and industry and through a specific study[86] (see quantitative data presented hereafter).

From the data available, it appears that with regard to SO_2 emissions to air and sulphate emissions into water, a number of titanium dioxide producing installations do not perform within the BAT ranges. Current dust emissions in several installations are not in line with BAT levels. The level of chloride emissions from installations, where data is available, is in line with BAT levels.[87]

Environmental impacts of option 2 (TiO_2 sector)

Setting the sectoral emission limit values at the upper end (less stringent) of the BAT ranges would have beneficial environmental impacts in case of installations which do not perform according to BAT. The following annual emission reductions have been estimated[88]: 2.304 tonnes for SO_2, 64 tonnes for dust and 69.125 tonnes for sulphate.

The corresponding yearly monetized benefits in terms of health impacts have been estimated as follows: € 17,3 to 50 million for SO_2 emission reductions and € 2,5 to 7,4 million for dust emission reductions.

Setting the sectoral emission limit values at the more stringent end of the BAT range would lead to more environmental benefits since the majority of the installations do not currently perform according to these levels. The following yearly emission reductions have been estimated: 2.747 tonnes for SO_2, 286 tonnes for dust and 252.176 tonnes for sulphate.

The corresponding yearly monetized benefits in terms of health impacts have been estimated as follows for the air pollutants: € 20,6 to 59,6 million for SO_2 emission reductions and € 10,6 to 31,1 million for dust reduction.

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85 Directive 92/112/EEC on procedures for harmonizing the programmes for the reduction and eventual elimination of pollution caused by waste from the titanium dioxide industry

86 AEAT, 2007 (c)

87 Data is available from 4 out of 5 installations, see AEAT, 2007 (c)

88 All data in this section are from AEAT, 2007 (c). Their analysis was based on data collected from Member States and 1999 data from the TiO2 industry.

Economic impacts of option 2 (TiO_2 sector)

The economic impacts of setting the ELVs at the upper end of the BAT ranges will mostly relate to the measures needed to reduce SO_2 emissions into air and sulphate into water. For sulphate, this would mean an additional cost of about 4,4 million/year for the industry. For SO_2 emissions, yearly costs have been estimated at € 9,6 million. As regards dust emission, this reduction would mean an additional €1,8 million/year investment for producers. For chloride emissions, no additional investment would be necessary.

Setting the emission limit values at the lower end of the BAT means higher costs for titanium dioxide producers. Reducing the emissions would result in an estimated yearly cost of at least €12 to13 million in the case of sulphate, €18,7 million for SO_2 emissions and € 6,4 million for dust emissions.

No additional administrative costs are foreseen.

Social impacts of option 2 (TiO_2 sector)

The main social impact of strengthening the emission limit values would be the beneficial health impacts from reducing the emissions (see above).

According to the titanium dioxide industry the main impact on employment could relate to the setting dust emissions at the stricter end of the BAT (not the preferred option). Otherwise, no impact on employment is expected.

Option 3: Establish a mechanism for technical adaptation through Comitology procedure to update non-essential technical minimum requirements if necessary

Results of option 3

Currently, only the Waste Incineration Directive includes the possibility to adapt through a Comitology procedure the provisions on the monitoring and control of emissions. Under the other sectoral Directives, such technical requirements can only be amended through the EU co-decision procedure, which is a long process and not necessarily suited to incorporate technological and scientific developments. The current technical requirements were set nearly 10 years ago (or longer for the TiO_2 Directives). Since then, the BREFs have established conclusions on what is considered BAT at EU level, including issues on the monitoring of emissions.

The Regulatory Comitology procedure would be more flexible and has recently been used in other legislative processes (see in particular the REACH Regulation and the proposed new Directive on waste where minimum standards could be adopted for certain waste treatment operations). This procedure would include an appropriate involvement of stakeholders.

The same Committee would also be used for setting reporting requirements from Member States to the Commission to assess the progress in the implementation of legislation (see section section 6.3). A closer and more effective interaction would

thus be ensured between the reporting on implementation and the possible amendment of requirements on the monitoring and control of emissions in order to improve the quality of the data collected.

Overall, the system of updating non-essential technical requirements through Comitology would be faster and more appropriate to adapt to technological and scientific progress in the respective areas.

Environmental impacts of option 3

The environmental impacts of this option would be positive compared to the business as usual option since the updating of non-essential technical requirements would be carried out in a faster and more coherent way. The analysis of the environmental impacts of the potential specific proposals in the context of the Comitology procedure would depend upon the individual measures proposed.

Economic impacts of option 3

The amendment of the non-essential technical requirements of the legislation could require investments or additional operating costs but the economic impacts will depend on the specific amendments proposed which will be assessed on a case-by-case basis.

Social impacts of option 3

The European Parliament would be kept fully involved through the use of a Committee procedure with scrutiny. A stronger interface between the information on actual implementation and the assessment of the need for updating non-essential technical requirements would improve the transparency of the decision-making process. The social impacts of each potential measure would be assessed on a case-by-case basis.

4.2.4. Comparison of options

As illustrated in the calculation performed in section 4.1 on the implementation of BAT, the monetised (negative) impacts on human health of the increased level of emissions resulting from removing the sectoral ELVs would be much higher than the economic savings for operators. Therefore option 1 is not recommended.

For option 2, the economic costs of achieving BAT for the LCPs are outweighed many times by the environmental benefits (even without including the ecosystem impacts), with an estimated benefit to cost ratio of 4.4 - 13.9 (upper end of the BAT range) and 3.2 - 10.1 (lower end of the BAT range).

Lowering the emissions from LCPs to the BAT levels would strongly contribute to closing the current gap between the projected emissions (RAINS "National projections baseline") and the 2020 objectives of the Air Thematic Strategy.

Furthermore, in the context of the liberalisation of the energy market, this option would also avoid unacceptable distortion of competition linked to very different levels of environmental standards currently applied in this sector.

The complete uptake of BAT and the resulting emission reductions could not be ensured by relying on the BAT based permit approach as that still includes some flexibility for competent authorities to take into account local considerations. Therefore option 2 is recommended for LCPs with application of updated ELVs by 2016 onwards.

For the co-incineration of waste in existing cement kilns, it was found that reducing the NO_x emissions is technically feasible and would bring environmental benefits, which clearly exceed the additional compliance costs. Therefore, option 2 is also recommended for the co-incineration of waste in cement kilns by setting an emission limit value of 500 mg/Nm³.

The analysis also showed that in the case of the Titanium Dioxide industry the environmental benefits of achieving the BAT range, where quantifiable and comparable, outweigh the economic costs[89]. On the basis of the analysis, it is recommended to strengthen the current sectoral minimum emission limit values and align with the upper end of the BAT ranges the following requirements: sulphate emissions to water, chloride emissions to water for installations using slag and SO_x emissions to air per tonne of TiO_2 produced.

Option 3 is recommended as the Comitology procedure offers a faster and more efficient way to amend non-essential technical requirements taking into account technological and scientific progress, while not creating adverse economic or social impacts.

4.3. Status of the BREF process

4.3.1. Drivers of the problem

The review of existing BREFs is essential to ensure that technological developments are reflected in the determination of BAT at EU level. In addition, this review process should also address the current gaps identified in the BREFs (in particular as regards energy efficiency, waste management and lack of quantified performance associated with certain BAT conclusion).

In order to improve the quality of the BREFs and the collection of data to determine and update BAT conclusions, a more efficient information exchange on BAT is necessary.

During the last 10 years, the voluntary contribution of industry has generally been significant. As a result, it is not envisaged to change the status of the contribution of the stakeholders concerned.

However, a number of Member States have not contributed to the information exchange. These Member States may therefore not feel strongly committed to using the BREFs which are then not sufficiently known and used by competent authorities. In addition, the current situation leads to a lack of information to review the existing BREFs.

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89 AEAT, 2007 (c)

4.3.2. *Description of options*

Options considered on the status of the BREF process [all options are mutually exclusive]

Business As Usual
Promote a more active voluntary participation in the BAT information exchange and an improved data quality through guidance (option 1)
Provide possibility for obligatory contribution of Member States to the BAT information exchange through comitology (option 2)
Introduce full obligatory contribution of Member States to the BAT information exchange (option 3)

4.3.3. *Analysis of impacts*

The analysis is based on the outcome of a particular study[90], the experience gained during the preparation of 31 BREFs and the on-going review of several BREFs.

Environmental impacts

The improvement of the quality of the BREFs would have positive environmental impacts since this would lead to more representative and substantiated information for the permitting of IPPC installations. By providing the possibility to fill some data gaps through mandatory contributions, it can be expected that option 2 would have more positive impacts on the quality of the BREFs than a purely voluntary approach (option 1)[91].

The environmental impacts of option 3 might not be more positive than under option 2 due to the risks of increasing the quantity rather than the quality of the data collected.

Economic impacts

The additional administrative costs for Member States would be negligible for option 1 (no change in the status of the information exchange). As regards option 2, some specific contributions would be required, if necessary, to fill important data gaps. However, this would be realized as part of the overall streamlining of reporting requirements which is expected to lead to cost savings compared to the "business as usual scenario" (see section on reporting).

The improvement of the BREF process is also linked to the functioning of the European IPPC Bureau of the Commission which is in charge of the elaboration of the BREFs. All options will therefore need to be accompanied by an appropriate level of resources allocated to this Bureau.

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90 IEEP, 2006 (a)

91 Ways to improve the collection of data in order to establish BAT conclusions in the BREF have been identified as part of the on-going discussions carried out by the Commission with the Member States and other stakeholders.

Social impacts

An improved functioning of the BREF process will increase transparency in the determination of BAT at EU level as well as public confidence in this process.

4.3.4. Comparison of options

Option 3 would lead to an important change of the status of the information exchange (from voluntary to mandatory) with a risk to increase the quantity (at high administrative costs) rather than the quality of the data. Option 2 would lead to more environmental benefits (through a resulting expected better quality of the BREFs) than option 1 which would remain purely voluntary. Furthermore, option 2 would be in line with the general streamlining of reporting requirements (see section 6.3). Option 2 is therefore recommended.

5. STRENGTHEN COMPLIANCE AND INCREASE ENVIRONMENTAL IMPROVEMENTS, WHILE STIMULATING INNOVATION

In addition to the options analysed in the previous chapter to increase the effectiveness of the IPPC Directive's implementation, aiming more specifically at a higher uptake of BAT, this chapter focuses on policy options to strengthen the enforcement provisions of the current legislation and facilitate environmental improvements and innovation. The interactions between these two chapters which both address the effectiveness of the legislation are underlined throughout the following analysis.

Problem definition

The data gathering and assessment exercises have shown that operators in different Member States are provided with varying incentives to meet the requirements of the IPPC Directive due to very large differences in inspection, compliance reporting and enforcement as well as permit review regimes across the EU. A lack of incentives for meeting the requirements will cause a reduced level of environmental protection. The highly different practices between different competent authorities also create distortions in the internal market.

As regards environmental inspections, the information gathered[92] has shown a large variation in policies between and even within Member States. Given the large number of IPPC installations and their diversity in type, size and environmental impacts, a targeted and co-ordinated inspection approach is needed to ensure efficient and effective compliance checking and enforcement. Such an approach is currently lacking in many Member States, having no structured framework for IPPC inspections and compliance enforcement. Although some competent authorities are making inspection plans and programmes as described under the Recommendation 2001/331 providing for minimum criteria for environmental inspections (RMCEI)[93], their level is variable and such planning is still under development in many Member States. A large variety of practices also exists in frequency of inspections for individual installations. Some Member States have set a (more or less binding) minimum inspection frequency. However, this does not guarantee that all installations are inspected thoroughly nor that the inspection is being effective in ensuring compliance.

Reporting of monitoring results by the operators may facilitate compliance checking and is as such a complementary tool to field inspections. However, in many Member States the obligations for operators to report on (non-)compliance are very vague or even non-existent which makes the follow-up of the monitoring results and their use in compliance checking and enforcement unsure. While often operators are required to submit a yearly environmental report, containing the overall emission figures, currently such reports rarely contain information on compliance with the permit

92 IEEP, 2006 (a) and IMPEL, 2007 (b)

93 Recommendation of the European Parliament and of the Council of 4 April 2001 providing for minimum criteria for environmental inspection in the Member States, 2001/331/EC

conditions. Insufficient reporting will lead to a lack of confidence and knowledge about the compliance with the permit conditions. It will also prevent situations of non-compliance to be timely discovered and remedied.

Assessment of the actual practices for reviewing and updating environmental permits in Member States has revealed a large variation in the length of permits, in the frequency with which they are reconsidered or updated and in the type of reconsideration carried out[94]. Unduly long review periods will fail to achieve the purpose of the IPPC Directive, as installations will not be required to keep up to date with developments in BAT and to strive for continuous improvement of their environmental performance.

Besides this, the IPPC Directive is also an important tool to bring about the diffusion of environmental technologies across industry through the uptake of BAT. However, the current Directive does not provide strong incentives for innovation that increase environmental performance beyond BAT and help operators to improve continuously their performance.

Evolution of the problem in the future

Under the existing framework, the various problems are not expected to improve much in the near future.

Regarding inspections, some improvements may be expected as some of the Member States, especially those who have acceded to the EU more recently, are still in the process of setting up their inspection systems. Ongoing initiatives to improve the application of the RMCEI can help to mitigate the problem, but their impact will be limited due to the non-binding nature of the Recommendation.

The current reporting requirements for operators are unlikely to be sufficient for ensuring that all of the emission data will become available to the competent authorities and the public to improve compliance assessment. In addition, the current status bears the risk that the interest of competent authorities in the IPPC installations decreases after the deadline for the permitting and that the compliance monitoring and enforcement will not get the necessary attention.

Concerning the review and update of the permits, the current variety of approaches is unlikely to disappear. However, the ongoing revision of the BREFs might lead to some improvements, through adaptation of BAT to technological progress, if and when permits are updated.

Drivers of the problem

The main drivers identified for the problems described relate to the current vagueness of the IPPC Directive regarding inspection, compliance reporting and permit reviews. In addition, also the lack of incentives from the current Directive to apply innovative technology has been identified as a problem. These issues are further described in the following 4 sections.

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94 IMPEL, 2007 (a)

5.1. Inspection framework

5.1.1. Drivers for the problem

The lack of a concrete obligation for competent authorities to perform environmental inspections in IPPC installations has allowed Member States to take their own approaches, leading to great differences in the number of "on-site" inspections, their depth and quality and the resulting enforcement actions. Although some good practices have been found in several Member States, in many others systematic and targeted inspection approaches are non-existent or only in the start-up phase.

The RMCEI contains very useful recommendations on the planning of inspections, their content, the criteria used to decide which installations to inspect and how inspections should be reported upon. However, relying only on the RMCEI has proven to be limited as it is non-binding to Member States and the approaches are not specific for IPPC installations. This assessment is confirmed by the Commission's Report on the implementation of the RMCEI[95].

5.1.2. Description of options

Options considered on improving the inspection framework

Business as usual
Set a general compliance enforcement framework by requiring inspections to be performed taking into consideration the Recommendation 2001/331 on minimum criteria for environmental inspections (RMCEI) (option 1)
Strengthen compliance enforcement framework by requiring inspections to be performed on the basis of specific plans and programmes (option 2)
Set minimum frequency of inspections of 1 site visit per year unless an IPPC inspection programme based on an appropriate appraisal of environmental risks is in place (option 3)
Set minimum frequency of inspections of 1 site visit per year for all IPPC installations (option 4)

As options 1 and 2 mainly focus on the way the inspections are performed and options 3 and 4 rather on the frequency of inspections, both groups could be complementary and are not mutually exclusive.

Option 1 is to specify that both routine and non-routine inspections must be conducted in order to assess compliance with the IPPC permit and these should provide a basis for assessing if enforcement action is necessary.

Option 2 is as option 1, but additionally requiring competent authorities to take a systematic approach to inspection producing an environmental inspection plan (strategic level), complemented by annual (routine) inspection programmes and to

[95] Annex to the Communication from the Commission to the Council, the European Parliament, the European Economic and Social Committee and the Committee of the Regions on the review of Recommendation 2001/331/EC providing for minimum criteria for environmental inspections in the Member States (COM(2007) 707 final).

ensure a systematic feedback between inspections and permitting. This would incorporate the main elements of the RMCEI into the IPPC Directive.

Option 3 is to require that competent authorities conduct routine inspections at least annually at all sites. However, instead of applying a minimum inspection frequency, they may choose to establish an IPPC inspection programme based on a systematic and appropriate appraisal of the environmental risks of the installations involved using criteria such as (potential) environmental impact (considering the type of activity, size of the installation, etc), environmental management, compliance track, etc. The criteria on the appraisal of the environmental risks would be established through a comitology procedure. This option draws from existing inspection programmes in some Member States as well as from the Seveso II Directive[96], under which a programme has to be established, entailing at least one on-site inspection per year, unless the programme is based upon a systematic appraisal of major-accident hazards.

Option 4 is to require that competent authorities conduct both routine and non-routine inspections with routine inspections to be performed for all installations on at least an annual basis.

5.1.3. Analysis of impacts

The information contained in this part of the assessment is mainly taken from a study for the Commission[97], which used Member States' IPPC implementation reports and the reports on implementation of the RMCEI (both based on the result of extensive Member State consultations). A view of the current inspection and enforcement practices has been obtained through different reports[98].

Results of options

Option 1 would not change current inspection practice significantly, as it does not set new specific requirements and as most competent authorities already perform on-site inspections. All provisions of the RMCEI would remain non-binding and are likely to be taken up only to a limited extent on a voluntary basis.

Option 2 would result in an improvement in inspection practice, requiring Member States' competent authorities to perform inspections on the basis of coherent inspection plans and programmes. Such a systematic and co-ordinated approach is likely to lead to improved results both with regard to the quantity and quality of compliance data and their interpretation and follow-up.

By setting an obligatory minimum frequency at installation level, option 4 will increase the number of inspections for individual installations in several Member States, depending on current practice. Replies to the IMPEL questionnaire[99] have

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96 Directive 96/82/EC on the control of major-accident hazards involving dangerous substances (Seveso II Directive)

97 IEEP, 2006 (a)

98 LDK, 2007; ENTEC, 2007 (a); Member States reports on the RMCEI (http://ec.europa.eu/environment/impel/countries.htm); IMPEL, 2007 (b)

99 IMPEL, 2007 (b)

indicated that the yearly number of inspections per IPPC installation or per inspector range considerably depending on the competent authority responsible.

Given the current average frequency of about 1 on-site inspection per year across Member States[100], making such a minimum frequency obligatory at the installation level might carry the risk of actually reducing the inspection frequency for many installations in Member States that are currently performing better. On the other hand, it would impose additional costs for those Member States which are below an overall annual average.

By offering Member States an alternative for applying an obligatory minimum inspection frequency, option 3 would allow some of the potential negative impacts of option 4 to be mitigated, while keeping the annual frequency as a safeguard. The IMPEL report[101] showed that a few competent authorities are already applying a so-called risk appraisal based approach when establishing the inspection frequency for individual installations.

A well-known example is the UK OPRA scheme[102]. Such strategies show that prioritizing and better targeting of the inspections can be useful instruments in improving the efficiency and effectiveness of the compliance checking. Better targeting of inspections was also one of the recommendations of the BEST project on streamlining and simplification of environment related regulatory requirements for companies[103].

In order to ensure the environmental benefits, it would however be important that an appraisal of the pollution potential is carried out in a systematic way based on well defined criteria. It could be more acceptable to reduce the inspection frequency at certain installations, for instance those being certified according to EMAS. Commission guidance documents could be helpful in this regard as has been shown for the Seveso II Directive[104]. Such documents could be developed and adopted via Comitology.

Environmental impacts

Environmental impacts associated with the different options will depend on the degree of compliance they are leading to as well as on the potential environmental impacts of non compliance for any particular installation. Concrete evidence of the causal link between increased quantity and quality of inspections and the resulting environmental performance of installations is difficult to find. Cultural differences between Member States influence the degree to which compliance depends on the (threat of) inspection and enforcement action.

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100 This means that certain installations are inspected more than once per year and others less than once per year

101 IMPEL, 2007 (b)

102 http://www.environment-agency.gov.uk/business/1745440/444671/466170/411964/?version=1&lang=_e; see also Gray et al. Integrated regulation – experiences of IPPC in England and Wales, in Water and Environment Journal 21(2007)69-73

103 http://ec.europa.eu/enterprise/environment/index_home/best_project/best_2006_simplification_final_report.pdf

104 http://mahbsrv.jrc.it/GuidanceDocs.html

The impact of amending the inspection requirements will also depend on the way the other elements of the compliance enforcement system are set up and applied, such as the permitting, the emission monitoring and reporting and the enforcement practices in case of non-compliance.

Instead of quantifying the environmental impacts of inspection, it is easier to calculate the potential impact of non compliance. From the simple example given below – on air emissions exceeding the limit values - it can be seen that even very small reductions in the level of non-compliance can result in potentially substantial benefits. As a consequence any increase in compliance resulting from improved inspection is important[105].

Example of the potential costs of failure to comply

In this hypothetical example a medium sized installation, permitted to release 1000 tonnes of sulphur dioxide, is used as the basis for calculations. A possible scenario might be as follows:

- the installation fails to comply, resulting in a 10 percent increase in emissions
- this breach of permit conditions remains undetected for one year
- this leads to an increase of emissions by 100 tonnes of sulphur in a year
- the additional external cost of this failure to comply with a permit would, therefore, be between €560,000 to €1,600,000[106]

Option 1 would only lead to a small increase in the number of inspections performed by some competent authorities and would have no significant impact on the quality and effectiveness of the compliance checking. Thus, also the environmental impact would be negligible.

The improved inspection planning and programming under option 2 will contribute to more targeted inspections of a higher quality. This will lead to checking compliance of big polluters more efficiently and breaches being detected earlier. Thus, it can cause significant environmental benefits, the size of which will depend on the improvement of effectiveness compared to current practice in each Member State.

Option 4 will increase the number of inspections for particular plants in some Member States. As such, this would lead to improved compliance, hence environmental benefit. However, as indicated before, the benefits of this option might be limited if the minimum frequency would be applied as the default by those competent authorities that currently apply a higher frequency or if the quality of the inspections and their follow up would deteriorate due to focusing too much on the number of inspections.

Taking an appropriate risk appraisal based approach under option 3 as an alternative to having a fixed inspection frequency will improve the targeting of inspections and thus the efficiency of the compliance checking. As demonstrated before, the environmental benefits of the early finding of breaches, especially from big emitters, will be substantial.

105 IEEP, 2006 (a)

106 Based on CAFE methodology

Economic impacts

For all of the options, the greatest cost impact would be on public authorities, i.e. the inspectorates. The costs for the regulators will depend on the current organisation, inspection approaches (planning) and inspection frequency.

For option 1, there will only be impacts for those few competent authorities which are not yet performing on site inspections. For option 2, additional resources and training of staff will be needed to cope with the preparation and implementation of the inspection plan and programmes. In the longer term these costs could be compensated by an increase in efficiency.

For options 3 and 4, the economic impact will depend on the current inspection frequency and total number of inspections. For option 4, when competent authorities would tend to apply the minimum frequency as the default, the actual number of inspections might even decrease. However, the resulting cost reduction for the authorities may actually be limited in the longer term by causing a need for greater efforts at other stages of the implementation cycle (e.g. more permit reviews, more complaints). For option 3, it is likely that the costs will be lower as most Member States would take the more flexible risk appraisal based approach, allowing them to reduce the total number of inspections, while optimizing the efficiency of their inspection systems.

Some estimations were carried out to assess the costs quantitatively, based on EU-15 figures[107] which have been extrapolated here to EU-27. The "business as usual" cost for competent authorities, assuming the average inspection frequency is annual with 3 days of inspection time spent per installation, is in the order of € 80 million per year. Additional costs under option 4 (minimum frequency of 1 inspection per year for all installations) are estimated at about € 18 million per year.

Under option 3, it is probable that the impact would be somewhat lessened, but as it is uncertain which Member States would adopt such an approach, a cost estimate is not possible. It should be stressed that the figures mentioned have a high degree of uncertainty[108].

Apart from the additional compliance costs they might induce, the four options will have a rather small impact on administrative costs to operators[109] due to increased time to be spent assisting the competent authorities during the inspections. Some limited data gathered[110] indicated that the current number of yearly inspections is about equal to the total number of installations. Therefore, it may be assumed that options 4 (and possibly 3) would induce only relatively small overall additional administrative costs for operators. As a rough estimate, these were calculated to be in the order of € 3 million.

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107 IEEP, 2006 (a); for extrapolation to EU-27 from these data, also adjusted hourly tariffs were applied

108 IEEP, 2006 (a)

109 IEEP; 2006 (a)

110 IMPEL, 2007 (b)

Under options 2 and 3, the inspections will be more efficient in checking the big emitters and non-compliant installations. This means that the administrative costs will shift more towards the installations with the highest environmental impact and thus the highest potential of environmental benefits in case non compliance can be prevented or stopped. Effective inspection and enforcement also prevents that non compliant installations unjustly profit from avoiding compliance costs.

Under several options, some cost reductions are even possible, due to the better organisation of the inspections (option 2), more pro-active pollution prevention measures being taken as a result of the increased chances of being inspected (options 3 and 4) and the creation of a more level playing field (all options, but mainly 3 and 4). The economic impacts of all options considered will be small compared to the overall compliance costs

Social impacts

The only important social impact of the options considered will be in terms of public confidence. Under the "business as usual" option, this impact will tend to be negative over time, due to a potential increase in incidents and non-compliances and a remaining lack of transparency. Option 1 will have little impact. Option 2 will have a positive effect upon public confidence by increasing transparency and clarity by requiring the inspection of IPPC installations to be planned. The publicly available plan will help increase the public's understanding of the regulator's inspection approaches.

Options 3 and 4 would also increase transparency, and, provided they lead to more effective inspections, increase public confidence. Both options 3 and 4 are expected to have no significant effect on the number of jobs in the sectors covered.

5.1.4. Comparison of options

Option 2 would result in an improvement in inspection practice, requiring the Member States' competent authorities to perform inspections and to consider their quality.

The obligatory minimum inspection frequency for every single installation set under option 4 would increase the costs for competent authorities currently applying a lower frequency. This also bears the risk of lowering the number of inspections at many installations by the other competent authorities, when distributing the same overall number of inspections over all IPPC installations instead of targeting them according to the needs.

Option 3 allows some of the potential negative impacts of setting a fixed inspection frequency to be mitigated by giving more flexibility to competent authorities. This should create an incentive to aim for more targeted and efficient approaches, while keeping the yearly frequency as a safeguard.

Options 2 and 3 are therefore recommended.

5.2. Regular reporting from operators to demonstrate compliance

5.2.1. Drivers for the problem

The current IPPC Directive contains only very general reporting requirements for operators in order to demonstrate compliance with permit conditions. No details are given in the Directive on either the frequency or the contents of the reporting.

Although the BREF on "General Principles of Monitoring" provides some information on the reporting of monitoring data, its main focus is on the emission monitoring itself and not on the compliance reporting.

Member States' replies to the first and second questionnaires on the implementation of the IPPC Directive[111] have indicated that the current reporting practices for the purpose of demonstrating compliance with permit conditions are very diverse. National or regional legislation transposing the IPPC Directive mentions either "regularly", "annual" or "on request" as the reporting frequency. In many Member States, no legally binding reporting frequency exists.

5.2.2. Description of options

Options considered on reporting from operators to demonstrate compliance [the 3 options could be complementary and are not mutually exclusive]

Business as usual
Guidance on reporting or use of BREF on monitoring (option 1)
Requirement for annual (at least) reporting from operators to demonstrate compliance, possibly linked to the E-PRTR annual reporting obligation. Possibly less frequent reporting based on appraisal of pollution potential (option 2)
Ensure that operators report on the emissions and performance in comparison to BAT as defined in the BREFs (option 3)

Under option 1, additional guidance is issued, either via separate guidance documents to be agreed upon via Comitology, via the Monitoring BREF and/or via the sectoral BREFs.

Option 2 looks at inserting a requirement that operators report to competent authorities at least once a year for the purpose of demonstrating compliance. Such reporting should be explicitly linked to the reporting under E-PRTR, in order to minimize additional administrative burden. Flexibility regarding the frequency could be provided for certain installations considering their compliance track, pollution potential and specific criteria such as EMAS registration.

Option 3 adds a requirement to the Directive that operators report about their emissions and performance in relation to the BAT as defined in the BREFs by using the same parameters, units and reference conditions. This would facilitate the comparison of the reported values with the BAT conclusions of the BREFs.

[111] LDK, 2004 and LDK, 2007

5.2.3. Analysis of impacts

This assessment will only consider additional needs for reporting requirements for compliance purposes since this will improve the effectiveness of the IPPC implementation. Reporting can be supporting, supplementing and even (partly) replacing "on–site" inspections. It should be noted that other reporting requirements exist under E-PRTR and sectoral Directives and that overlaps with the new reporting requirements should be avoided. Due to the close link between the different reporting obligations, it is not always easy to determine what information is required specifically for compliance assessment and thus what the costs of this additional reporting obligation would be.

The assessment is mainly based on a study done for the Commission[112], relying on the Member States' IPPC implementation reports and other literature.

Results of options

Under business as usual, reporting on compliance will remain very variable between Member States, depending on the approaches taken by competent authorities.

The development of guidance under option 1 can be dealt with largely during the revision of the BREFs, both by improving the horizontal BREF on Monitoring as well as by introducing or strengthening a separate monitoring/reporting section in the sectoral BREFs. In addition, IMPEL could be contributing to the sharing of best practices in this area, as was done already in the past.

Option 2 has two aspects: requiring operators to report annually (their monitoring results and possibly other information) for the purpose of demonstrating compliance and streamlining the reporting with the E-PRTR requirements. The information provided in this way might also be used in the permit review process and thus lead to better alignment of the permit conditions with BAT.

Option 3 specifies that the reported data should be comparable with the BREF conclusions, where possible. This would allow a better comparison of the real emissions of installations with the BAT conditions set in the permits. It will make it clearer to operators and authorities how well the installation is performing as compared to BAT and create a trigger for operators to take measures to fully implement the BAT and for authorities to ensure that permit conditions are based on BAT. It should also result in more accurate data for the information exchange process for the BREFs, thus helping to improve their quality and usefulness. In addition, comparable performance data will better allow the Commission to assess the improvement of the installations' performance towards BAT and thus the need for strengthening certain minimum requirements through a Comitology procedure.

Environmental impacts

No quantified evidence illustrating the effect of more and better reporting on the environmental performance of installations could be found. However, better

[112] IEEP, 2006 (a)

reporting will increase the knowledge of the performance of the installations versus the permit conditions. This will thus lead to more efficient and earlier detection of non-compliance. It will also facilitate inspection and may enhance the set up of better targeted and thus more efficient inspection programmes. As illustrated in section 5.1on inspections, avoiding non compliance may result in significant environmental benefits.

The expected environmental benefits of option 1 are likely to be minor due to the fact that no legal changes will take place (guidance will be non-binding) leading to only small changes in behaviour of competent authorities and operators.

Although the direct environmental benefits of option 2 are uncertain, a clearer requirement to report on compliance, setting a fixed frequency, will lead to faster detection and rectification of non-compliance. Again, the avoidance of non compliance may have significant environmental benefits.

The results of option 3 will lead both directly - through the awareness raising of the operators - and indirectly – through the improved alignment of the permits with the BAT conclusions and the increased quality of the BREFs – to an increased uptake of BAT and thus to environmental benefits.

Economic impacts

Increasing the reporting frequency will cause some additional administrative costs for both operators and authorities. In general however, none of the options will have significant cost implications, especially not when compared to compliance costs. Administrative costs can even be further decreased by developing and applying appropriate IT tools in order to facilitate reporting. Application of such tools is already common practice in some Member States[113] and will certainly be further developed in the coming years.

Option 1 would not alter very much the current reporting practices and thus not add to the administrative costs.

Setting a (minimum) reporting frequency as under option 2 will possibly impose more frequent reporting requirements on some operators. Streamlining the compliance reporting – or at least its frequency - with the (existing) annual E-PRTR reporting may however reduce the administrative costs of the reporting as the different purposes of reporting monitoring data may be served at the same time. This cost reduction will be higher if the compliance reporting can be integrated effectively into existing reporting. The fixed reporting frequency could possibly be lowered for those installations having an EMAS certification or having a proved low potential of non compliance. The additional administrative costs incurred by operators this option have been estimated at about € 6 million (see Annex 9).

Option 3 would bring some additional reporting requirements for those installations or sectors where the available monitoring results are not immediately comparable to the BREF BAT ranges. For those cases, some additional data might need to be

[113] BEST project, see IEEP, 2006 (b)

gathered and processed, possibly including some process data in case specific emission factors are used. However, in practice, this reporting could be done mainly through calculation without involving the gathering of new data.

Social impacts

The largest impact of improved monitoring and reporting would be a higher public confidence regarding environmental pollution control. Reporting on the degree of compliance more often and more extensively should lead to an increased involvement and confidence of the public about the efficiency of the legislation to reach its objectives. In turn, pressure from the public due to knowledge of environmental performance of the installations, may trigger operators to take additional action to prevent and control pollution, which leads to environmental benefits.

5.2.4. Comparison of options

Options 2 and 3 are recommended as they increase the certainty of relevant data being reported and strengthen its usefulness for both checking compliance and for the BREF process, while not causing adverse economic impacts.

5.3. Review of permit conditions

5.3.1. Drivers for the problem

A timely review of the conditions set out in the IPPC permits is essential to ensure continuous environmental improvement and the uptake of BAT. Large variations currently exist between Member States concerning the length of permits, reconsideration frequency and type of reconsideration, as well as concerning the practices of permit reviews due to substantial changes in the best available techniques. This problem is mainly due to the fact that a permit review is currently required only in general terms in the IPPC Directive. Member States have the duty to check "periodically" the existing permits and evaluate the need for updating permit conditions, which leaves a large degree of flexibility.

5.3.2. Description of options

Options considered on review of permit conditions

Business as usual
Development of guidance on a methodology for Member States to determine frequencies for permit review (option 1)
Review of all permits concerned within 4 years after publication of a revised BREF (option 2a) Idem, with option to have a prior assessment of the need to review permits at Member State (option 2b)
Review of all permits concerned with a fixed minimum frequency of 5 or 10 years (option 3)

Under business as usual, no changes in the current practices of permit reconsideration are to be expected. Therefore, an appropriate review of the permit conditions and the resulting further uptake of BAT can not be ensured in all Member States.

Option 1 would keep the current flexibility for the review frequency, but guidance would be developed to use a common methodology for assessing the interval between two reviews. Criteria to be taken into account could include installation size, sector, emissions, (potential) environmental impact, evolution of technology, environmental management systems (EMS), etc. The guidance may be established via Comitology or in a less binding form (e.g. via IMPEL).

Under options 2 and 3, a minimum frequency for permit reviews would be set.

Options 2a and 2b don't have a fixed review frequency, but rather link the revision of permits to the time of publication of a revised BREF. In practice, this means that the average review frequency will be about every 8 years. Option 2b adds the possibility for Member States to assess if a permit revision is needed, taking into account the revised content of the BREF and the permit conditions already in place in their Member State. Depending on the outcome of such an assessment, it may be decided to revise no or only a limited number of permits.

Option 3 looks at setting a fixed minimum frequency. Two possibilities have been looked at: either every 5 or every 10 years.

An additional option to be considered could have been the full harmonization of the way the permit reconsideration is performed. Such a 'one size fits all' approach may, however, lead to overlooking local needs and good practices, and overburden those countries with higher permitting costs and higher costs of meeting new permit conditions. Therefore, this option was not considered, as it is not in line with the principles of subsidiarity and proportionality. The Commission has the possibility to develop guidance on this issue, if appropriate, within the existing framework.

5.3.3. Analysis of impacts

The information contained in this part of the assessment is mainly taken from a Commission study[114], which used the Member States' IPPC implementation reports. A view of the current permit review frequencies and practices has been obtained through different reports[115].

Results of options

Different frequencies and types of permit reconsideration will influence the level of environmental protection. This will be increasingly important after the implementation deadline of October 2007 has passed since the review of the permits will be the only administrative vehicle to ensure the uptake of BAT for existing

114 IEEP, 2006 (a)

115 LDK, 2007; Entec, 2007 (b); IMPEL, 2007 (a)

installations. If no appropriate review is taking place, it will be very hard to improve this.

In general, more frequent and more thorough permit reviews will lead to more permits being identified as outdated and therefore in need of change.

Option 1 will not bring major changes to the current practice in most Member States, though the approaches between Member States may become more streamlined.

Depending on the frequency chosen, option 3 may cause either a status quo (10 yearly revision) in most Member States or double the current number of permit reviews (5 year frequency).

Options 2a and 2b will link the review process clearly to the BREF and thus stresses the importance of keeping the permit conditions up to date with technical progress in BAT. It would thus help to strengthen the central position of the BREF within the Directive and the permitting process (see section 4.1 on the role of the BREFs). Option 2b avoids that unnecessary permit reviews take place for installations already performing on the basis of or beyond BAT.

Environmental impacts

It is not easy to find quantitative evidence illustrating the causal link between increased quality and quantity of permit reviews and the resulting environmental performance of installations. More permit updates should improve the application of BAT, leading to earlier reduction of emissions. As illustrated in section 4.1 on BAT, the environmental benefits which can be gained from the full application of BAT are very significant. The case study[116] given in section 6.1 on inspections illustrates the significant environmental benefits a timely review of the permit conditions may bring by the avoidance of emissions.

However, the extent of the benefits will depend on the discrepancy between current practice and a cost-effective permit review system. In addition, not only the frequency but equally the quality of the permit review process will determine the level of improvement.

For option 1, the environmental impact will be small since pure recommendations are not likely to be taken up to an extent that would result in an environmental improvement.

Under options 2 and 3, one can expect that the higher the review frequency, the higher the environmental effect. When the review period becomes however too short, there will be little additional benefit, as the evolution of technologies and the time needed to implement them ultimately determine the possible progress.

An additional environmental benefit from option 2 will be due to the streamlining of the review periods of the permit and the BREFs, allowing a swifter uptake of new

116 IEEP, 2006 (a)

BAT once they have been defined in the BREF. This would optimize the implementation time of new BAT, taking into account the investment cycle.

Economic impacts

The frequency of permit reconsideration will have very different economic impacts, since administrative costs associated with permitting vary between and even within Member States. Some examples of these costs have been gathered[117]. To the extent that strengthened permit revision provisions lead to an increase in the uptake of BAT, they will also induce additional compliance costs associated with BAT.

Under all options there would be additional administrative costs to both public authorities and industry as compared to the business as usual, given that the overall number of permits to be reviewed would increase.

Under option 1, the additional costs will not be substantial, as it is unlikely that pure recommendations will alter the review frequency significantly in most Member States. The impact of introducing a minimum frequency (options 2 and 3) will vary among countries and sectors depending on current practice. Setting the frequency at around 10 years will not represent a radical change compared to the general current practices[118]. It might even lead to reduced costs in some Member States currently having a higher revision frequency.

Bringing the review frequency in line with the BREF review period (option 2) will generally increase the review frequency slightly in most Member States with some additional administrative costs. However, a more frequent permit review e.g. every 5 years as under option 3, will further increase administrative costs to industry in most Member States, depending on current practice.

The administrative costs of permit reviews for operators and authorities were estimated using the figures mentioned in Annex 8. For this purpose, no distinction has been made as to whether or not competent authorities are charging fees to cover their costs. These additional costs would affect about 1.300 installations per year, when assuming a shift of the average permit review frequency from 10 yearly (current practice) to 8 yearly (review frequency of BREFs). As a result, the total annual administrative costs were estimated at around € 6,5 million for Member States and € 3 million for operators.

However, in as far as the review process will lead to an improvement in the uptake of BAT, these costs will generally be much lower than the compliance costs and, to even a greater extent, than the resulting environmental benefits.

Social impacts

The social impact on final consumers of any of the options is expected to be positive, be it to a rather limited extent. Options 2 and 3 would increase the level of control over environment and pollution perceived by the public. The increase in public

117 IEEP, 2006 (a)
118 IMPEL, 2007 (a)

confidence will be much less for option 1. The impact on jobs in the public sector is probably limited. Many competent authorities will have to some extent the possibility to reallocate a number of staff once the initial implementation phase of the Directive has passed (after 2007).

The number of jobs in the private sector is expected not to be affected significantly by changes in permit review methodology or frequency. When leading to a quicker and more general uptake of new BAT, the impacts on job creation in the eco-industry will be positive.

5.3.4. Comparison of options

Option 2b is recommended as it ensures a timely revision of the relevant permits in order to update them to the newly defined BAT in the BREFs.

5.4. Facilitating continuous improvement by increasing IPPC's impact on the innovation of BAT

5.4.1. Drivers for the problem

By having the application of BAT as its central requirement, the IPPC Directive is an important tool to stimulate the diffusion of state-of-the-art environmental technologies across industry. The BREFs are key to the dissemination of information about such techniques and their environmental performance. As the Directive states that permit conditions should not prescribe the use of specific techniques or technologies, the legal obligation for the operator is to meet performance standards rather than specifying the means of achieving it. This means that cost-effective choices and use of new techniques are possible. This is fully in line with the recommendations of the High Level Group on Competitiveness, Energy and the Environment[119] to stimulate innovation and technology deployment.

However, the current IPPC framework does not provide strong incentives for innovation beyond BAT or for continuous improvement of environmental performance. The fact that the BREFs actually define techniques as being BAT and outline BAT emission levels for use across the EU may even constitute a barrier for operators to look for better performing or innovative techniques. The permit generally will refer to the BAT performance, and thus there will be little incentive for the operator to look further than the BAT as defined in the BREFs, and so no market demand for innovative techniques.

Currently, in the BREF process, so-called "emerging techniques" are defined within a sector and included in the BREF, being those techniques which are not yet BAT due to their limited application (e.g. pilot scale) or too high costs, but have a potential to become BAT. Such techniques represent an innovation potential for the sector concerned and re-considered when the BREFs are reviewed.

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119 http://ec.europa.eu/enterprise/environment/hlg/reference.htm (see in particular the report on "Helping energy intensive industries adapt to the energy and climate change challenges; incentives, innovation and technology policy" (27 February 2007)).

However, there are no real triggers to stimulate the development or deployment of emerging techniques on a larger scale, because there is uncertainty over whether they will become BAT and so whether there is future demand for them. Furthermore, operators will often not want to take a risk by introducing new techniques to their installations, which have not been applied before at an industrial scale, as their environmental performance in such context may still be uncertain and may even cause permit conditions to be breached.

The global market for environmental technologies is estimated to stand at 500 MEUR a year with forecasts that it will double by 2020[120] as both industrialised and developing countries face increasing environmental and resource constraints on production. A lack of incentives for innovation in their domestic market would hinder EU technology firms' ability to capture future global market share.

5.4.2. Description of options

Options considered on facilitating continuous improvement and increasing IPPC's impact on innovation of BAT

Business as usual
Improve the use of the BREF process to identify emerging techniques and their potential to become BAT (option 1)
Implement a "lead markets" concept in the field of eco-innovative techniques for IPPC installations (option 2)
Allow authorities to temporarily authorise permit conditions different from BAT based ones in order to allow testing innovative techniques (option 3)

Option 1 focuses on increasing the ability of the BREF process to identify the full range of innovative possibilities and so provide information on techniques that could become BAT.

Option 2 is about stimulating demand (or "lead markets") to speed up the development and application of innovative techniques, going beyond minimum requirements and BAT standards. The inclusion of the full range of emerging techniques in BREFs would increase diffusion of information about new techniques and thus the demand for them by raising the confidence of investors and buyers in innovative technologies.

Making use of this information, the Commission would prioritise funding in the Competitiveness and Innovation Programme for emerging techniques in its 2008 Annual Programme onwards and look to provide greater links between the Research Framework Programmes and emerging techniques.

Member States would be stimulated to develop and implement policies to provide incentives for installations applying innovative technologies in "lead markets". Taking a lead from the emerging techniques mentioned in the BREF, a Committee to be set up under Comitology would determine the type of industrial activities for

[120] Ernst and Young, 2006; Berger al., 2006

prioritised development and application of emerging techniques and discuss indicative targets regarding the degree of application of such techniques in Member States. These targets might, for instance, be defined as a proportion of total public or private investment in a sector. Tools to assess the progress made would also need to be established.

Option 3 would allow authorities, under certain specific conditions, to temporarily set permit conditions different from those associated with the use of BAT in order to allow operators to apply and further develop emerging and innovative techniques with a view to improving the environmental performance of the installation concerned.

All three options are not mutually exclusive and might be combined.

5.4.3. Analysis of impacts

Results of options

Under business as usual, no further incentives to implement innovative techniques or to improve the performance of the installation beyond BAT would be given. Option 1 would enhance determination of new or emerging techniques through the BREF review process by improving the information exchange on them and including more detailed information in the BREFs.

Making more use of the outcome of environmental research programmes and giving promising research results a higher profile and visibility by referring to them in a BREF, should stimulate such research and the further development of the results to an industrial scale. This option is likely to increase investor and operator willingness to develop techniques that are perceived to have a future market, as well as other techniques which achieve the same standards by different means.

Option 2 should lead to greater investments in development of emerging techniques, and by supporting the demonstration of promising techniques achieve the development of more commercial eco-technologies. If adopted with Option 1, it would provide additional incentives for the provision of information on innovative techniques to the BREF process for scrutiny. The signalling effect of provision of public funding in an emerging technique may leverage greater private investment.

In line with the Environmental Guidelines on State Aids (under revision), Member States could make use of financial incentives if this supports an improvement beyond the applicable conclusions on BAT as set out in the BREFs. Other types of incentives, such as a reduced level of inspection or reporting are covered in Chapter 5.

Option 3 would remove some uncertainty and a barrier for certain operators, who are interested in applying new or emerging techniques, while not wanting to take the risk to breach certain BAT based permit conditions. Restrictions should be set to ensure that the "experimental" techniques and the test programme are well described and have a potential of delivering a significant environmentally beneficial impact within a restricted time.

Environmental impacts

By stimulating the further development and uptake of innovative techniques with the potential of performing better than BAT, all three options will have a beneficial effect on the environment. The extent and timing of this benefit will depend on the techniques emerging and being applied at an industrial scale and are as such very hard to estimate up front. In some cases, several beneficial impacts may be combined through the application of innovative techniques.

Economic and social impacts

Innovative techniques will be often designed in such a way that they combine several environmental benefits, including savings in the use of raw materials, water and energy. As such, they may also have direct economic benefits for the industries involved and create competitive advantages for European industry.

The development of new techniques is likely to increase the cost-effectiveness of reaching environmental policy objectives, such as the NEC Directive ceilings, with direct benefits for the economy as a whole.

The competence and technologies gained through the development and application of innovative techniques and services, likely to accrue mainly to EU based firms, would increase the EU's ability to capture significant shares of the growing global export markets for industrial eco-technology. This would, in turn, lead to more employment in this sector. Any increase in the rate of innovation may increase the rate of structural economic change, with potential employment shifts and needs for retraining.

5.4.4. Comparison of options

Options 1, 2 and 3 are recommended as they all contribute to the uptake of innovative environmental techniques, contributing to the objectives of the IPPC Directive, without causing adverse economic or social impacts.

6. CUT UNNECESSARY ADMINISTRATIVE BURDEN AND SIMPLIFY LEGISLATION

This section sets out the main issues and options assessed relating to administrative burdens and legislative simplification. Further detail can be found in Annex 8, in the information sources referenced, and in the table summarising the assessment of administrative costs based on the Standard Cost Model (SCM) (see Annex 9).

The spring 2007 European Council underlined that reducing administrative burdens is an important measure for boosting Europe's economy, agreeing that burdens from EU legislation should be reduced by 25% by 2012. This target is also reflected in the Commission's action programme for reducing administrative burdens[121]. The IPPC Directive is already included in this action programme as one of the priority areas for the measurement of administrative burdens deriving from information obligations. This will primarily focus on identifying and measuring those burdens that exist as a result of Member States' application of the Directive.

The implementation of the IPPC Directive involves several information obligations, as discussed below, with significant variations in practices and costs across the Member States. The cost of these IPPC-related information obligations is expected to be a small fraction of the estimate of total EU administrative burdens of €350 billion per year, or even of the proportion attributed to environmental legislation (4% or about €14 billion)[122]. The administrative costs will typically be much lower than the compliance costs[123], and smaller still compared to the resulting benefits (illustrated in section 4.1 on BAT implementation).

The European Council also stressed the importance of achieving concrete results in the field of legislative simplification and better regulation. Avoiding unnecessary costs is only one of the reasons for such action. Simpler and better regulation should also be easier to understand for the public (with benefits in terms of transparency, participation, accountability and confidence in the regulatory system) and more effective in achieving environmental outcomes.

The main issues addressed in this section relate to inconsistencies between Directives, costs of permitting and enforcement, and costs of Member States' reporting. These were identified as the priority topics for attention in the review as a result of the studies and consultation with stakeholders. In particular, a series of case studies was performed looking at the application of the IPPC Directive, plus related legislation, at 15 installations[124]. The purpose of the case studies was to assess whether potential problems identified in literature or by stakeholders had actually proved significant in practice, and to distinguish problems in the Community legislation from those in Member States' implementation. Certain issues were

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121 Action programme for reducing administrative burdens in the European Union, COM(2007) 23 final, 24.1.2007.

122 The estimation is based on the work carried out in 4 Member States and then extrapolated to the whole EU.

123 IFO, 2007; ENTEC, 2007 (b); ENTEC, 2007 (c); Hitchens, 2007; IEEP, 2006 (a); IEEP, 2006 (b); VITO, 2007 (b)

124 ENTEC 2007 (b)

therefore removed from further consideration where it was clear that there was no real evidence of any practical difficulties or that the issues were purely historical.

Some of the other issues addressed elsewhere in this report can also support better regulation and cut administrative burdens. This is particularly the case for some of the possible modifications to the scope of the IPPC Directive to clarify the present coverage rather than to introduce new sectors. These are dealt with in section 7.

Finally, it is foreseen to cut some provisions in the legal text, which are no longer relevant or never have been applied in practice. A good example is Article 6 of the Solvents Emissions Directive, establishing the possibility to use National Plans for the implementation of the Directive. As no Member State is making use of this possibility, this provision can be removed, without having any impact except simplifying the legislative body.

6.1. Addressing inconsistency in multiple Directives

6.1.1. Problem definition

The IPPC Directive exists alongside other pieces of Community law affecting many of the same installations. The range of separate pieces of legislation, enacted at different times, has led to problems of interaction, difficulties in reconciling the different standards and approaches used, and confusion over differences in definitions[125].Examples include:

- use of different terms for the regulated unit, e.g. "installation" in the IPPC and SE Directive versus "plant" in the LCP and WI Directives;
- other differences in definitions – e.g. inconsistent definitions of "permit", "operator", "substance" "emissions" and "pollution";
- different ways in which standards and requirements are expressed – e.g. BAT-based ELVs in IPPC, minimum ELVs in the sectoral Directives, some flexible alternatives to the minimum ELVs in the LCP and SE Directives, and emission trading for greenhouse gases – without a clear understanding on the part of many stakeholders on how these various requirements fit together.

In relation to the last of the above points, a particular problem concerns the relationship between the sectoral ELVs and the requirement for BAT-based permitting, and the fact that these provisions are stated in separate Directives. Since the IPPC Directive presents only general principles whereas the sectoral Directives present concrete (albeit minimum) requirements, their legal separation appears to make it easy and attractive for operators and authorities to simply focus on the latter. More generally, the LCP Directive (for example) is seen by some operators and authorities as the Directive relating to combustion plants, rather than viewing the LCP and IPPC Directives together. This then leads to "default" application of the sectoral ELVs as described in section 4.2. This is also often the case in the TiO2

[125] ENTEC 2007 (b), BRTF 2004, IMPEL 2006, NEEPA 2007

sector which only covers 18 installations in the EU raising strongly the question whether to keep or not a stand-alone legislation within the context of simplification.

A further issue concerns the extent to which Member States have introduced combined permitting systems. The Community legislation allows combined permitting regimes for implementing the IPPC Directive and related legislation affecting industrial installations, and several Member States have already introduced such regimes. However, other Member States have not. Partly this is probably a consequence of regulatory inertia, or reluctance to modify established divisions of responsibility among authorities for different Directives. However, the practical difficulties of establishing combined regimes, reconciling all the requirements of the Community measures, are also seen as a barrier.

6.1.2. Description of options

Options considered for addressing inconsistency between Directives [the 3 options are mutually exclusive]

Business as usual.
Make amendments to each individual Directive to improve consistency and coherence (option 1).
Create a new combined Directive integrating the requirements of the current measures (option 2). This could be done at two main levels: firstly by integrating the IPPC Directive with the other immediate industrial emissions Directives (Option 2a); or secondly also including other broader instruments like the Seveso II, EIA and Greenhouse Gas Emission Trading Directives (option 2b).
Make no change to the legislation but address inconsistencies through guidance (option 3).

The options are described in more detail in Annex 8.

6.1.3. Analysis of impacts

Environmental impacts

Although these options aim at reducing administrative burdens and achieving better regulation, making clearer the relationship between the minimum emission limit values and BAT could also bring environmental benefits. The scale of the environmental benefits of moving towards BAT-based performance is illustrated in section 4.1. The different options considered here could be expected to support the achievement of the benefits linked to a higher uptake of BAT. The options described here would provide additional benefits to the options presented in section 4.1.

Clarifying the relationship between ELVs and BAT-based permitting by amending the individual Directives (option 1) could be of some benefit in this respect, but probably not a great deal more than business as usual. This is because, when the individual Directives are examined, the legal precedence of BAT-based permitting is already very clear (see for example Article 18(2) of the IPPC Directive plus the recitals and provisions of the sectoral Directives). Addressing the issue through guidance (option 3) would probably have less impact still. The Commission has

already issued some guidance on this topic[126], yet problems of confusion or application still arise.

Thus option 2a has greater potential to address this problem, since the requirements of the presently separate Directives would be merged through recast of existing Directives into a single text and the current confusion on the interaction between the BAT-based permitting and the sectoral ELVs would be removed. This could therefore make a much greater contribution to achieving the environmental benefits illustrated in section 4.1. Option 2b would offer no additional benefit compared to option 2a, however, since the other Directives in question do not contain ELVs.

Economic impacts

Economic impacts considered here relate to administrative costs and burdens, which are the focus of this section. However, any greater application of BAT as discussed above would also involve some additional impacts on industry. Such additional impacts have been illustrated in section 4.1.

The total potential for cost savings for both operators and authorities from combined permitting has been estimated to be of the order of €10-60 million per year[127]. This relates not just to the industrial emissions legislation but also legislation on wastewater, the greenhouse gas emission trading Directive and the Seveso II Directive. The analysis assumed that different approaches would promote combined permitting to different degrees.

Amending individual Directives (option 1) would achieve an assumed 10% of the potential savings (€1-6 million per year). In contrast, a single Directive achieving an assumed 50% of the savings potential would lead to savings of €5-30 million per year (options 2a and 2b). Since most of the problems of interaction identified in the review lie within the industrial emissions legislation rather than cutting across into other Directives, option 2a, focusing on a narrower set of Directives, would probably have similar impact than option 2b.

On the other hand, the amendment of legislation could itself consume quite significant resources in negotiation, transposition and implementation. These costs would be higher the larger the number of present measures combined. Some stakeholders have in particular voiced fears that the costs of development and implementation (i.e. transition from the current systems) of such a single Directive would outweigh the benefits.

Analysis has suggested that this could possibly be the case[128] if changes were only made in the legislation for the purposes of promoting combined permitting.[129] In any cases, if other changes were to be made anyway (for instance to ensure a higher

126 http://ec.europa.eu/environment/ippc/general_guidance.htm#17

127 ENTEC, 2007 (b)

128 However, it should be noted that it is unlikely that such type of additional costs of implementation exceed the administrative savings linked with a combined permitting as presented above.

129 ENTEC, 2007 (b)

uptake of BAT, see section 4.1), limited additional resources would be required compared to the benefits over time.

The option of guidance (option 3) seems unlikely to have a major impact on the incidence of combined permitting, which is where the main opportunities for cost savings appear to lie. However, it could still reduce the administrative costs of implementation by making it clearer what has to be implemented.

Social impacts

These options are not expected to have social impacts except at a rather general level relating to the transparency and comprehensibility of legislation. The business as usual option would leave a fragmented body of law which even many stakeholders who are directly affected find hard to understand.

Option 2 would appear to be the most favourable in this respect, since it would allow interested stakeholders to see a single Directive covering all main requirements for industrial installations. Option 2b could be slightly advantageous over option 2a through its higher legal consolidation, although the actual legal text would necessarily be longer and more complex.

Options 1 and 3 would have the social benefit of clarifying the legislation in one way or another, but without the benefit of bringing any legal provisions together. No changes in employment are foreseen as a result of any of the options.

6.1.4. Comparison of options

Option 2a is preferred as it is attractive in terms of promoting combined permitting, supporting legal clarity and transparency, and contributing to promoting BAT-based permitting. Option 2b does not appear to offer sufficient additional benefit to justify the more complex legislative, administrative and transitional exercise that it would entail. Options 1 and 3 could be of modest benefit but do not really address the main problems at hand. The business as usual option would allow the problem to persist.

6.2. Reducing costs of IPPC permitting and enforcement

6.2.1. Problem definition

Some legislative design features and resulting administrative burden will be necessary for achieving the benefits of legislation. The Commission's action programme does not focus on such necessary elements, but rather aims to cut obsolete, redundant or repetitive information obligations. The problem to be addressed in this review is that there are some possible costs savings that would not affect the benefits of the Directive, but which are not realized due to the current implementation practice or IPPC requirements.

As a general framework, the IPPC Directive contains few precise requirements, rather setting out the broad structure and principles of permitting. Member States have flexibility in making decisions on how to implement the Directive, including in relation to issues such as the choice of competent authorities, permitting approaches,

use of general binding rules versus site-specific permitting, monitoring and reporting obligations, approaches to enforcement, etc.

As a result, the administrative burdens will be highly dependent on the choices of the Member States. Using the limited available data from the Member States, plus assumptions and calculations, Annex 8 builds up an estimate of administrative costs associated with implementing the Directive, and shows the wide variety of costs and approaches across the EU. It also illustrates the differences in cost recovery through fees between different Member States (ranging from no fees, such as in the Netherlands to full cost recovery in the UK and Ireland).

A specific area in which it has been suggested that the Directive could be improved concerns the scope it offers to cover different operators and installations under a single permit. This was raised in the context of the ENAP project[130], which suggested that the regulation of activities carried out on different sites by the same company can be more effective and efficient when a uniform, company wide approach is pursued.

The present provisions of the Directive are in fact a little ambiguous in this respect, since they state explicitly that a permit may cover one or more installations on the same site operated by the same operator, but say nothing about the possibility of a permit covering installations on different sites.

A related difficulty concerns situations where two or more companies operate different parts of an installation. Discussions with Member States in the context of producing guidance[131] on the IPPC Directive showed that authorities take a variety of different approaches for this topic. This could lead to activities that are "directly associated" with an IPPC activity, but have a different operator, being covered under the Directive in one Member State but not in another.

The Directive allows that permit conditions be imposed through individual permits or general binding rules. Using general binding rules should, in principle, be a simpler and therefore less administratively costly approach. Despite this, few Member States have opted for general binding rules to any significant degree so far. One reason identified for this is that, where general binding rules are used, the same requirements for permitting under the Directive still apply. It has therefore been suggested that the requirements should be simplified where general binding rules are applied[132].

While the IPPC Directive only contains general provisions on monitoring and reporting, the sectoral Directives contain quite precise obligations. Consultation with stakeholders in the preparation of this review did not raise significant questions over most of these requirements. However, the monitoring requirements of the WI Directive were seen by some stakeholders as too rigid, requiring monitoring even where emissions would be negligible.

130 VROM, 2004

131 http://ec.europa.eu/environment/ippc/pdf/installation_guidance.pdf

132 BRTF, 2004

6.2.2. *Description of options*

Options considered for reducing costs of IPPC permitting and enforcement (see Annex 8 for detail) [the 4 options can be combined]

Business as usual.
Clarify the flexibility for a permit to cover multiple operators, or installations operated by the same operator but on different sites (option 1).
Allow a "lighter" regulatory approach based on the use of general binding rules with less detailed applications and public consultation (option 2).
Allow authorities to opt not to apply certain monitoring requirements of the WI Directive, where it can be established there is no prospect of the emission limit values being exceeded (option 3).
Establish an action programme with Member States to share best practice and help identify actions to reduce administrative burdens at the national or regional level[133] (option 4).

The options are described in more detail in Annex 8.

6.2.3. *Analysis of impacts*

Environmental impacts

In general these options are not expected to have significant environmental impacts compared to business as usual.

Option 1 could have some environmental benefit by ensuring that all activities that technically form part of an IPPC installation are regulated as such, regardless of any division of operation.

Option 2 could have some negative environmental impacts if simplification of the application requirements meant that it would not be possible to impose conditions stricter than BAT where necessary to comply with an environmental quality standard (IPPC Article 10). However, this problem would be avoided by including as part of the option a provision in the legislation making clear that this obligation remains.

Option 3 could have some environmental impacts, as the costs of WID-compliant monitoring may act as a deterrent to waste incineration. On the one hand this is positive because it creates an incentive for waste avoidance and minimisation. But on the other, it can prevent operators who generate waste from using it as a fuel on-site, thus leading to transfer of the waste to another location.

In addition, some operators who might want to use certain wastes (such as waste oil) as a fuel can be put-off by the cost of monitoring, and so instead use a non-waste material such as fuel oil which might even lead to higher emissions (e.g. SO_2). These issues have been explored in the review, but the stakeholders affected could not provide any data which would allow their quantification[134]. An environmental risk

[133] This would be based on the BEST project [see IEEP 2006(b)] and the outcome of the Commission's measurement exercise on IPPC burdens at national level

[134] ENTEC, 2007 (b)

linked to monitoring exemptions is that limit values may be exceeded without this being noticed. This risk is however low if it is made sure that any possibility for exemptions is accompanied with sufficient guarantees that this situation will not arise.

Economic impacts

Option 1, being in essence a clarification of what is already possible (and stated to be so through guidance), could not be expected to have a large economic impact. The possibility to issue one permit covering several installations operated by the same company could allow a modest reduction in administrative burdens, though it has not been possible to quantify this. Since Member States' current practices are inconsistent under the Directive, this option should also support a more level playing field.

Option 2 would reduce the administrative burdens of permitting and ongoing regulation. The use of general binding rules has been assessed through a separate study[135]. This analysis has pointed at the restrictions for such burden reduction as general binding rules are currently mainly used for sectoral requirements, not covering all aspects of the integrated permit. Thus, there will often still be a need for the individual assessment of the applications in order to grant the integrated permit. Also, the main period in which general binding rules could have been used – the transitional permitting of existing installations – will have passed by the time any such amendment could enter into force. Nevertheless, such a provision could still apply to new installations, new sectors, or substantial changes.

According to data from the Netherlands (VROM) moving non-IPPC companies (not including agricultural sites) from regulation based on permits, to a system of notification and common rules, delivers a cost reduction of €6,800 per company. For non-IPPC agricultural companies, the introduction of new common rules in place of permitting reduces the administrative burden from about €2,000 to about €300 per company per year. The saving (both from business and the administration) stems partly from avoided permit application costs, but is mostly driven by having a standardised approach replacing permit conditions that vary from one authority to another.

Option 2 is not identical to the approach considered by VROM, since it would still involve a permit – but it would involve important common elements including the possibility to stipulate all permit conditions through rules (a possibility which in fact already exists but can be made clearer), and to have public consultation on the rules rather than on the individual permit applications. The requirement under the option for each installation to have a permit would ensure that there was still an assessment of whether each installation could be expected to comply with the rules, as well as the consideration of the need for any possible stricter conditions in order to comply with environmental quality standards.

Since possibilities for exemptions already exist in the WI Directive, cost savings for further exemptions do not seem to be very important taken as a whole. Waste

135 VITO, 2007(c)

incineration and co-incineration encompasses around 1.800 installations with a turnover of around 6 billion euros per year. The total cost savings for further monitoring exemption can be estimated to be 0,6 – 2 million euros per year[136]. Exemptions from monitoring could however be of economic relevance to smaller companies where the equipment investment and operating costs are higher per unit than for large companies.

One study[137] has looked specifically at the application of the WID to the burning of tallow in the boilers of animal rendering plants. There are about 500 such plants in the EU, about half of which presently burn tallow. In the majority of cases where tallow is pre-processed to the necessary standards, there is little prospect of significant emissions of pollutants other than dust. In this study, it was estimated that monitoring costs (no monitoring for HCl, HF, heavy metals, TOC and dioxins) would be lowered from around €11,000 per year to under €1,000.

Option 4 would not itself achieve direct economic benefits but rather pursues indirect benefits through actions at Member State level, and in fact would require some small administrative costs to collect data and provide support to Member States. It is also expected that, through such enhanced exchange of information, Member States will receive stronger support from the Commission on the implementation of existing or upcoming legislation. The scale and variation of present costs suggests quite significant potential for cost savings in the Member States. Such cuts could be up to the five- or tenfold of the cost savings resulting from action at the Community level (€ 150 – 300 million)[138].

Social impacts

Options 2 and 3 could have quite important social impacts whereas options 1 and 4 are not expected to be significant in this respect.

Option 2 would represent a significant alteration of the scope for public participation in the permitting procedure. In essence, this participation would shift from the actual permitting of an installation to the earlier development of general binding rules. This could have some negative impacts on confidence in the regulatory regime. In particular, it seems likely that most members of the public would not choose to engage if some general binding rules were being developed unless they had a specific interest in the sector concerned, but would be much more likely to express their point of view when it came to an installation being proposed in their neighbourhood. This problem would however be lessened if the installation were also subject to the Environmental Impact Assessment Directive, which applies to the great majority of IPPC installations and contains its own public participation provisions.

The social impact of option 3 needs to be considered in the context of the sensitive and often politically-charged nature of waste incineration and co-incineration. In this respect, monitoring is not undertaken simply as a basis for compliance checking and enforcement, but also to demonstrate that the activity is not having an adverse effect

136 Ökopol, 2007

137 Ecolas, 2006

138 This estimation is based on best practices in certain Member States as described in IEEP, 2006 (b)

on the neighbourhood. Public confidence in incineration and co-incineration – which is often already low – could fall further if monitoring requirements were reduced. It would therefore be necessary to accompany any such initiative with appropriate safeguards, for example a clear requirement for justification of the derogation including proof of no or low risk that emission limit values will be exceeded.No significant changes in employment are foreseen as a result of any of the options.

6.2.4. Comparison of options

All of the options appear beneficial compared to business as usual. There is no need to compare them against each other since they can all be implemented in parallel. It should be noted that options 2 and 3 have positive and negative aspects. In relation to administrative burdens, both offer potential annual savings of the order of millions of euros.

However, both could be negative in terms of reducing public information and/or confidence in the regulatory systems, although with appropriate safeguards (for instance appropriate justification and information made public as presented above) there should be no actual environmental disbenefit.

6.3. Reducing costs of Member State reporting

6.3.1. Problem definition

Information obligations placed by the IPPC Directive on Member States for reporting to the Commission comprise reporting every three years under Article 16(1) on emission limit values and under Article 16(3) on implementation. Member States have not been able to provide any official data to quantify these administrative costs. However, it is roughly estimated that the cost will be of the order of €1 million per reporting cycle (see Annex 8 for derivation).

Even allowing for imprecision, it seems very unlikely that the administrative cost will be significant compared to other costs of the Directive, especially when divided across the 27 Member States. Yet it is clear that these reporting obligations have an undeniable irritant effect because of the aggravation for officials of having to collect data from a variety of sources to support an activity that they do not see as very useful. There is therefore an issue of credibility even if the scope to reduce administrative burdens is small.

The ELV reporting has been of little practical value to date, due to the lack of comparability of the limit values reported (e.g. different units or averaging periods) and variable quality of the reporting. This has been addressed in the third round of ELV reporting to support the production of the BREF documents, but there is still scope to consider further improvements (see Section 4.3).

A further source of irritation and cost is that Member States must report not just on the IPPC Directive but also separately on other Directives (e.g. WI and SE Directives), despite these covering many of the same installations and implementation issues.

6.3.2. *Description of options*

Options considered for reducing costs of Member State reporting (see Annex 8 for detail)

Business as usual.
Remove the reporting requirements (option 1).
Streamlining and combining the current IPPC reporting requirements (option 2).
Combining the reporting requirements of the IPPC Directive and other Directives (option 3).

The options are described in more detail in Annex 8. Option 1 is mutually exclusive while options 2 and 3 could be applied together or separately.

6.3.3. *Analysis of impacts*

Environmental impacts

Significant direct environmental impacts are not expected from any of the options.

There could however be some important indirect environmental effects. For instance, the complete removal of reporting requirements in option 1 would take away a mechanism through which stakeholders are able to scrutinise implementation of the Directive(s). This could therefore reduce the incentive for an effective application of the legislation, thus possibly lowering its environmental effectiveness. Reporting is important, in particular, for the European Parliament, which otherwise has a role as co-legislator in developing legislation but no feedback mechanism on its implementation.

A more tailored approach (options 2 and 3) would in particular improve the reporting on progress towards BAT, with the benefits described in section 4. Competent authorities and operators would then have easier access to information on the performance of existing installations facilitating the setting of BAT-based permit conditions.

In addition, this streamlined reporting would be based on the principles of the Shared Environmental Information System (SEIS) set up following the adoption of the INSPIRE Directive. It would build upon the Industrial Reporting Information System (IRIS) being currently developed by the Commission on the basis of the latest IPPC implementation reports[139].

Economic impacts

Option 1 would save the administrative costs of reporting under the IPPC Directive, estimated at around €1 million every three years. If this option were extended to other Directives the savings could be multiplied accordingly.

[139] LDK, 2007

Options 2 and 3 would reduce the current administrative through streamlining. It is not possible to precisely quantify the reduction potential since this will depend on what reporting is found still to be required, and with what frequency. The detailed analysis would take place on a case by case basis in the context of the Comitology procedure. As a rough approximation, however, it is considered that option 2 might achieve up to a 50% cut of the current IPPC reporting obligations, therefore saving around €500,000 every 3 years.

Option 3 could be expected to achieve a higher percentage reduction, since the number of actual reports to be submitted would be reduced, although the individual report would possibly be larger and the burden would be concentrated at one point in time. The saving might be of the order of €500,000 every year rather than every three years. The use of IT tools (as foreseen though IRIS) would also increase savings.

Most of the savings are expected to be within government departments and agencies which have to supply the data and generate the reports. There is expected to be little direct impact on operators.

Social impacts

Option 1 would reduce the amount of information available on implementation of the legislation. This would make it harder for the public to understand the regulatory system and its application.

Options 2 and 3 should make the information clearer. In particular option 3 should allow for clearer presentation compared to the separate reporting of Directives under business as usual. Reporting would be more transparent and useful for the public.

Nevertheless the social impacts are not expected to be significant for any option.

6.3.4. Comparison of options

Options 2 and 3 are preferred and can be taken forward in parallel, reducing costs while making reporting more useful. Option 1 is not favoured as it would drastically cut the available information on implementation of the Directive for relatively small administrative cost savings.

7. BETTER CONTRIBUTE TO THE OBJECTIVES OF THE THEMATIC STRATEGIES BY REVIEWING THE CURRENT SCOPE AND PROVISIONS OF THE IPPC DIRECTIVE

General problem definition

Several policy and legal instruments, in particular the Thematic Strategies, have set agreed EU environmental goals requiring additional actions related to industrial emissions to improve the quality of certain media (for instance air or soil) or to reduce the environmental impacts of certain activities (for instance waste treatment).

The IPPC Directive, in particular through the implementation of BAT, is in principle an effective piece of legislation, if applied properly and to its full extent, to regulate the emissions of industrial installations at EU level. Section 4.1 on BAT implementation has shown the main benefits of such an approach. The main purpose of this chapter is therefore to assess, on a case-by-case basis, if the scope of the IPPC Directive should be extended to additional sectors and whether the IPPC Directive would be the most cost-effective tool to address the specific problems related to industrial emissions identified in other policy areas.

In this context, the following five specific issues are addressed in the five sections of this chapter.

1. Would the inclusion of additional installations under the IPPC Directive be a cost-effective tool to help achieving the objectives set in the Thematic Strategy on Air Pollution?

2. Would the inclusion of additional installations or clarification of the scope of the IPPC Directive be a cost-effective tool to help achieving the objectives set in the Thematic Strategy on the Prevention and Recycling of Waste?

3. Would the clarification and inclusion of additional provisions on soil contamination be a cost-effective tool to help achieving the objectives set in the Thematic Strategy on Soil Protection?

4. Would the IPPC Directive be a cost-effective tool to regulate other industrial installations?

5. Should the current scope of the IPPC Directive be clarified to ensure a more consistent implementation?

It should be noted that the impact assessment for the up-coming Commission's Proposal on Carbon Capture and Storage covers the analysis of the scope of the IPPC Directive related to the installations capturing CO2 gases from industrial installations such as large combustion plants. This issue is therefore not repeated here.

General methodology for assessing impacts related to the IPPC scope

A number of specific studies[140] have been carried to collect and assess information to inform this part of the impact assessment.

The following summary table presents the key issues which have been considered for assessing the impacts of bringing a specific new sector under the scope of the IPPC

[140] In particular AEAT 2007 (b); IEEP 2006 (a); VITO 2007 (a); VITO 2007 (b)

Directive and assess, on a case-by-case basis, the necessity, the value added and the proportionality of the possible extension of the IPPC scope.

Environmental impacts: - Installations concerned (e.g. number of installations, localisation, trends in the sector concerned) - Type of environmental impacts generated by these activities (multi-media impacts? Comparison with overall impacts) - Current national legislation (to what extent Member States regulate this sector? are all key environmental impacts already regulated? are there important disparities in the standards across the EU? Are there national regulations based on BAT?) - Possible estimation of what BAT could be (keeping in mind that the determination of BAT at EU level through the BREF process had not yet been carried out) - Potential impacts of bringing this activity under IPPC in terms of emission reductions Economic impacts - Estimation of costs of BAT deployment in the sector concerned - Estimation of administrative costs on both operators and authorities Social impacts - in particular impacts on health protection and employment Overall subsidiarity assessment

From an environmental point of view, the best candidates for a possible inclusion under the IPPC Directive are sectors with (1) rather important number of installations located in many Member States, (2) leading to important environmental impacts and (3) subject to different levels of regulatory stringency across the EU.

This section aims at summarizing the key information collected in order to support the analysis. As described below, it has not been possible to quantify the impacts in all cases. The more specific analysis for each of the subjects addressed can be found in Annex 11. This Annex contains a number of tables presenting in some more details the outcome of the analysis carried out.

7.1. Help achieving the objectives set in the Thematic Strategy on Air Pollution (combustion installations below 50 MW and intensive livestock farming)

As illustrated in Annex 5, the "National Projections baseline" emissions of SO_2 and NO_x from industrial installations need to be cut by about 50% in 2020 to achieve the objectives of the Air Thematic Strategy. As shown in section 4.2 on the use of sectoral ELVs and in Annex 7, the main contribution to this gap closure (some 30-60%) will come from the full uptake of BAT at large combustion plants (LCPs).

Furthermore, the strengthened provisions on inspections and permit review will generally contribute to improve compliance with the BAT emission levels and the continued uptake of BAT. This will ensure that the BAT emission levels are maintained in the longer term and thus help to achieve the TSAP targets. However, it has not been possible to quantify the contribution of these measures to achieving the targets.

Next to this, some activities not yet covered by the IPPC Directive have been identified where applying BAT could contribute to achieving the Air Thematic Strategy objectives. For two of these activities (combustion installations below 50

MW and intensive livestock farming) an assessment of the impacts of including them under the IPPC Directive has been performed.

7.1.1. Combustion installations below 50 MW

Problem definition

At the moment, Annex I of the IPPC Directive covers combustion installations with a rated thermal input exceeding 50 MW. Some installations (and units) with an input of less than 50 MW may already be covered by the Directive where the aggregated capacity on site is more than 50 MW or if they are "directly associated activities with a technical connection" to other IPPC activities.

Given the many questions raised by the various stakeholders on this issue, it is clear though that differences in implementation of this aspect currently exist between Member States. Furthermore, the BREFs (for the LCP or other sectors) currently don't contain BAT conclusions for combustion installations below 50 MW.

The EU Greenhouse Gas Emissions Trading Directive (ETD) has a threshold of 20 MW for combustion installations and information concerning its application[141] indicates that at least 3100 combustion installations in this range would be operated in EU-25, spread over nearly all Member States in many different sectors.

The diversity of activities is even much larger for installations below 20 MW as these are also applied in many non-industrial (commercial, residential, institutional) facilities. There are currently no reliable estimates of the number of such installations.

An assessment of the current national or regional legislation applicable to combustion plants below 50 MW has shown very large differences in the emission limit values between Member States[142].

Description of options

Options considered on combustion installations with a rated thermal input of less than 50 MW

Business as usual
No change in IPPC threshold but update the BREFs to include BAT for combustion installations less than 50 MW (option 1)
Lowering the threshold of the IPPC Directive for combustion installations from 50 MW: - to 20 MW (option 2a) - to a threshold lower than 20 MW (to be determined) (option 2b)

141 EEA, 2007 (b)

142 IEEP, 2006 (a) and AEAT, 2007 (b)

Option 1 would not change the scope of the current Directive, but would define BAT for the combustion installations below 50 MW already covered by the Directive. Option 2 would bring additional installations under the Directive by lowering the current capacity threshold, either to 20 MW (in line with the GHG Emission Trading Directive) or below. Two specific studies[143] were performed to support the assessment of these options.

Analysis of impacts

Environmental impacts

The main environmental impact from combustion plants is their contribution to air pollution, especially through emissions of particulate matter, SO_2 and NO_x, and also heavy metals (especially mercury) and POPs. The overall contribution of all small combustion installations (< 50 MW) to total industrial combustion emissions to air in EU-25 was estimated to be quite significant for SO_2, NO_x and PM10 (about 11%, 11% and 18% respectively)[144]. A study looking more specifically at the combustion installations between 20 and 50 MW, has estimated their overall emissions to be 119 ktonnes of NO_x, 86 ktonnes of SO_2 and 20 ktonnes of PM[145].

Option 1 would enhance the uptake of BAT by installations already regulated under IPPC and stimulate the development of new and better technologies specifically suited for this type of installations. This would lead to some stricter emission limit values being set in the permits for these installations in several Member States and thus reduce their emissions. As BAT is not defined yet, the impact of this could not quantified, but it would be only a fraction of the impact under options 2a and 2b.

Under option 2a, several scenarios were looked at to assess the impacts of applying different levels of emission limitations, taking into account existing legislation (LCP Directive, national and regional legislation) and the LCP BREF. This showed that the overall emission reductions for EU-27 (some 3200 installations) could be 14–83% for NO_x, 42-95% for SO_2 and 65-95% for particulate matter assuming an average of 3000 operational hours per year[146]. The estimated associated health benefits would range from 1 to 2,6 bn EUR[147] (without including environmental benefits, which could not be quantified).

As the number of combustion installations covered would increase drastically by further lowering the capacity threshold, the overall environmental benefits under option 2b will be much larger as much more installations and sectors would apply BAT. It will also address important specific impacts, such as POPs and particulate matter emissions more effectively, as these are generally relatively higher for smaller installations. However, environmental or health impacts could not be quantified.

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143 IEEP, 2006 (a) and AEAT, 2007 (b)

144 AEAT, 2004

145 AEAT, 2007 (b)

146 The range mentioned includes different scenarios, going from applying LCP Directive emission limit values (for new 50 MW installations) to maximum feasible reductions (almost full implementation of best performing available emission abatement measures).

147 AEAT, 2007 (b)

Economic impacts

Under the business as usual, some combustion installations below 50 MW in some sectors are currently covered by the Directive (as "directly associated activities"), while others are not. This causes similar installations to be subject to largely different requirements depending on the national or regional legislation[148] as well as on the interpretation of the "installation" definition by competent authorities. This leads to competitive distortion.

Under option 2a, the additional annual overall costs – including compliance costs and administrative costs (especially for permitting, monitoring and reporting) – were estimated to range between 291 and 989 MEUR/year for various scenarios (stringency of emission limit values for SO_2, NO_x and particulate matter). Applying the IPPC regime to all installations in this capacity range would be beneficial for creating a more level playing field amongst sectors.

The additional costs for authorities (permitting, inspection) will be rather limited under option 2a, as many of these installations in several Member States are already covered by permitting and enforcement regimes. These costs will increase substantially though by further lowering the threshold (< 20 MW) as the number of installations will become much higher, while they will be less covered by existing legislations. It would be possible to limit some of the administrative costs through the application of general binding rules (GBR) for installations below a certain threshold.

Even under option 2a very small installations (units) could come under the scope of the IPPC Directive though, due to the current aggregation rule (adding up all thermal capacities on site to determine the installation's capacity). In order to avoid covering installations consisting only of very small combustion units, a "de minimis" rule would be applied, for units below a certain capacity threshold (e.g. 3 MW). In addition, plants with very low operating hours, e.g. functioning only as stand-by plants, would be excluded from the scope.

Social impacts

Option 2b would have the greatest impact on increasing the public confidence. No significant impacts on employment can be expected from option 2a, but this will change when further lowering the threshold, which would lead to inclusion of some very small companies under the IPPC Directive.

Comparison of options

Option 1 would bring only limited additional environmental benefits, while the current lack of level playing field would remain.

Lowering the capacity threshold to 20 MW to bring it in line with the ETD (option 2a) would target the most important emissions and achieve cost-effective emission reductions of the key pollutants. The concrete requirements will depend on the future

[148] see examples in AEAT, 2007 (b)

definition of BAT for these installations. Including more installations below 20 MW (option 2b) would lead to higher environmental benefits, but the compliance and administrative costs would become unevenly high due to the large number of small installations and companies concerned.

Therefore, option 2a is recommended.

As the emissions from these plants will be of a transboundary nature, the objective of limiting them cannot be sufficiently achieved by the Member States alone, but Community action is needed to define EU wide BAT or additional standards. This approach corresponds to the principle of subsidiarity, as the concrete implementation of the measures will be left to the discretion of the Member States.

7.1.2. Intensive livestock farming

Problem definition

As further described in Annex 11, the achievement of the objectives of the Thematic Strategy on Air Pollution requires a further reduction of 850 kt[149] of ammonia in the agricultural sector in 2020 compared to the so-called "NEC baseline scenario" (which models the implementation of current legislation).

As indicated in section 4.1 on BAT and in Annex 11, a scenario reflecting a realistic view of a proper implementation of BAT as determined in the BREF relevant to this sector in the installations currently covered by the IPPC Directive would contribute to a reduction of 130 kt of ammonia compared to this "NEC baseline scenario" (which reflects the estimations of Member States effects of the implementation of the IPPC Directive).

Two specific studies[150] were carried out to determine the most cost-effective measures in the agricultural sector to achieve the objectives of the Thematic Strategy. The measures analysed in this context relate to the implementation of the IPPC Directive as well as of other legislation with an impact on emissions from agricultural activities (mainly the Water Framework Directive and the Nitrate Directive[151]).

As part of this broader analysis, these studies have identified and investigated possible options for changes to the IPPC Directive. This led to the identification of two main specific issues related to the IPPC Directive: (1) the implementation of BAT for the land spreading of manure and (2) the possible clarification and extension of the scope of the IPPC Directive.

149 IIASA, 2007 (a) and Alterra, 2007

150 IIASA, 2007 (a) and Alterra, 2007

151 The Water Framework Directive (Directive 2000/60/EC) sets requirements to ensure inter alia a significant reduction of water pollution to achieve good quality of surface water and groundwater. The Nitrate Directive (Directive 91/676/EEC) aims at reducing water pollution caused by nitrates from agricultural sources.

Specific problem definition on the land spreading of manure

In view of the current definition of the term "installation" in the IPPC Directive, the spreading of manure is not covered by this legislation since this activity is most generally not carried out on the site of the main IPPC activity (intensive rearing of pigs or poultry). As a result, the IPPC Directive does not contain a requirement for operators to carry out BAT-based manure spreading. However, in view of the significant environmental impacts linked with the spreading of manure, the BREF on intensive rearing of poultry and pigs contains BAT conclusions on this issue.

Specific problem definition on the scope of the IPPC Directive

Two specific problems have been identified:

- The same threshold (40000 places) is currently applied for poultry without taking into account the different types of species (for instance broilers, hens, turkeys). The rearing of these species leads to different environmental impacts due in particular to the different weight of the animals. For instance, under the current scope, an installation with 39999 places for turkey would be excluded while having an environmental impact 3.5 times higher than installation with 40000 places for broilers. Furthermore, certain installations carry out on the same site the rearing of different types of species (for instance the rearing of turkeys and broilers in a same installation). The IPPC Directive does not set a specific threshold for such types of installations leading to uncertainties and inconsistencies in the implementation of the Directive as highlighted during the consultation process.

- The current thresholds of the IPPC Directive exclude a large number of animals (about 80% of the total number of pigs and 40% for poultry) and do not cover the rearing of cattle which is an important contributor of ammonia.

Description of options

Beside the business as usual option, 3 options have been considered

Options considered on the intensive livestock farming [The options considered can be complementary]

Business as usual
Include BAT for manure land spreading as part of the IPPC Directive (option 1)
Include different thresholds for poultry species to reflect the same environmental impacts (option 2)
Extend the scope of the IPPC Directive to cattle farming and include more pig and poultry farms (option 3)

The options considered as further described in Annex 11.

Analysis of impacts

Environmental impacts

These impacts have been estimated using three complementary models (RAINS, MITERRA-EUROPE and CAPRI)[152]. The main impacts considered are the emissions of ammonia.

Option 1 would lead to significant reduction of emissions of ammonia (about 50 to 60 kt) and very small differences as regards other emissions (methane, nitrate). In addition, applying BAT for land spreading would provide an appropriate integrated management of nitrogen. Reducing losses from housing and storage through BAT application (to be already achieved through the implementation of the IPPC Directive) leads to higher nitrogen content in manures that will be lost in the environment if BAT for the spreading of manure is not applied.

Option 2 would lead to a small increase of the number of farms covered by the IPPC Directive (about 900 additional installations for the rearing of laying hens and other big types of poultry). In view of the limited number of additional installations brought under the IPPC Directive, the total expected reductions of ammonia emissions are rather limited (about 10 kt per year[153]).

However, the quantities of ammonia abated per installation remain high and are equivalent to the current abatement efficiency (i.e. estimated quantities of emissions abated per IPPC installations operating according to permits based on BAT). In addition, this option would ensure that poultry installations with similar environmental impacts are regulated under the IPPC Directive whatever species are being reared.

Under option 3, the impact of the reduction of the thresholds for pig and poultry and the inclusion of the largest cattle rearing farms would be rather limited (reduction of ammonia emissions from 10 up to 50 kt depending the scenario and the model used[154]) compared to the large number of additional installations which would be brought under the IPPC Directive (between 9000 and 25000 additional installations depending the scenario).

As a result, the quantity of ammonia abated per permit (described as permit efficiency) is rapidly decreasing when the thresholds are lowered. In the case of cattle rearing, the large installations (above 450 or 350 places) are numerous (between 8000 and 15000) but only cover a small proportion of the emissions of ammonia of the whole sector (about 10% for dairy cows and lower for other cattle).

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152 IIASA, 2007 (a); Alterra 2007

153 This estimation does not include the implementation of option 1 (BAT based manure spreading).

154 These estimations do not include the application of BAT for the land spreading of manure. The impacts of such measure are assessed under option 1.

Economic impacts

The analysis carried out (see Annex 11) has shown that option 1 is the most cost-effective option. Under this option, the average cost[155] of reducing ammonia has been estimated to about € 2400 per tonne abated which is lower that the average cost for the NEC baseline estimated at 6000 € per tonne.

No significant additional administrative costs are expected since these installations already fall under the IPPC Directive. Operators would have to include in their current reporting to the competent authorities additional information on the spreading of manure. No specific costs data could be collected but it is assumed that these additional costs would not be significant compared to the business as usual.

Under option 2, the total annual compliance costs for bringing these installations under the IPPC Directive have been estimated to be less than € 10 million. The average cost of reducing ammonia has been estimated to be about € 1000 per tonne. The administrative costs would be in the same order of magnitude than for the current IPPC farms and would ensure a more level playing field in this sector since the current IPPC thresholds exclude certain poultry installations with similar or higher environmental impacts than IPPC installations.

The annual compliance costs under option 3 range from about € 90 million to € 300 million[156] depending the extension considered (see Annex 11 for further details). The average cost of reducing NH_3 is estimated at nearly 8000 € per tonne. Another analysis[157] shows total economic welfare costs between € 530 million and € 1700 million depending the changes made in the scope of the IPPC Directive.

Social impacts

No significant social impacts are expected from options 1 and 2. Option 3 would have impacts on consumers through increase of meat price assuming that a significant part of the net direct cost for NH_3 emission abatement measures on IPPC farms can be passed on to consumers. If this would not be the case under option 3, the economic losses fall entirely on the farmers concerned. The impact of this on the competitive position and possibly on the employment in the sector segments concerned could not be assessed.

Comparison of options

Options 1 and 2 are the most cost-effective measures to help achieving the objectives of the Thematic Strategy on Air Pollution. The costs related to a large IPPC extension (option 3) would be significant in particular on the price of meat or, if the costs can not be passed through to consumers, on the most vulnerable farmers. The environmental benefits of option 3 would be rather limited in comparison with these costs. Options 1 and 2 would also provide more coherence in the application of the

155 These costs are additional to the current costs of applying the IPPC Directive to the installations concerned.

156 IIASA, 2007 (a)

157 Based on the CAPRI model, see Alterra, 2007

IPPC Directive. Options 1 and 2 are recommended. As these options will set minimum standards for the prevention and control of industrial emissions throughout the Community, and these emissions may be of a transboundary nature, their objectives cannot be sufficiently achieved by the Member States alone, but Community action is needed. This approach corresponds to the principle of subsidiarity, as the concrete implementation of the measures derived from the options will be left to the discretion of the Member States.

7.2. Help achieving the objectives set in the Thematic Strategy on the Prevention and Recycling of Waste

General problem definition

One of the main objectives of this Thematic Strategy is to improve the current legal framework in order to reduce the overall negative environmental impact of the use of resources by preventing the generation of waste, by regulating waste treatment installations and by promoting recycling and recovery.

As regards more specifically the permitting of waste treatment installations, the Waste Framework Directive contains a general requirement for competent authorities to grant permits to installations carrying waste recovery or disposal activities without further specific requirements on the content of such permits (in particular, the legislation does not require permit conditions to be based on BAT). The Proposal for a new Directive on waste[158] makes it clear[159] that an activity falling under the IPPC Directive does not need a separate waste permit.

During the preparation of the Thematic Strategy[160], it appeared that the IPPC Directive does not cover adequately the type of waste treatment operations which have the most significant environmental impacts. The problem is that the waste legislation would not be sufficient to ensure that waste treatment activities with the highest environmental impacts operate according to permit conditions based on BAT to achieve a high level of environmental protection and to reduce the disruption of the internal market.

A specific study[161] was therefore carried out to further assess this problem and a large consultation with Member States and other stakeholders led to the determination of a list of waste treatment activities which could be potentially included under the IPPC Directive due to their environmental impacts. This study identified two other main problems:

158 COM(2005) 667 final
159 Article 20
160 See Communication (2005) 666 final and the accompanying Impact Assessment SEC(2005) 1681
161 VITO, 2007 (a)

- The current wording of the scope of the IPPC Directive is very unclear leading to important legal uncertainties.

- Inconsistencies in the current scope cause certain installations to be included while the same types of installations with similar environmental impacts are excluded.

7.2.1. Clarification of the current scope of the IPPC Directive

Specific problem definition

The current scope of the IPPC Directive regarding waste activities is very complex and unclear leading to serious problems of interpretation as underlined during the consultation with Member States and other stakeholders. As a result, the IPPC Directive is implemented differently in the Member States leading to inconsistencies and confusion on what activities are covered and therefore to additional administrative costs.

Description of option

The option considered is to delete the reference to the current recovery and disposal codes set in the Annexes of Directive 2006/12/EC on waste and to list in the IPPC Directive the actual waste treatment activities covered by this legislation. The current scope of the IPPC Directive would not be changed but clarified.

Analysis of impacts

The proposed option would not lead to environmental impacts since the scope of the IPPC Directive would not be changed compared to the full implementation as intended by the Directive as initially adopted. The main positive impact would be to improve consistency and transparency in the application of the Directive leading to a reduction of administrative burden. The option would also lead to a more level playing field in this sector. This option is largely supported by stakeholders. This option is recommended.

7.2.2. Inconsistency in the current IPPC scope

Specific problem definition

The inconsistencies identified relate to the following three activities:

- Biological treatment of organic waste

- Pre-treatment of combustible waste for co-incineration

- Off-site treatment installations for slag and ashes for recycling

These types of waste treatment are covered under the current scope of the IPPC Directive only if they result in final compounds or mixtures which are discarded through disposal operations. The relevant BREFs contain BAT conclusions for these types of installations. This means that similar installations (with similar

environmental impacts) resulting in waste or products (e.g. composting) which are not disposed of but recovered or used as products are not covered under the scope of the IPPC Directive. These inconsistencies result in possible distortion of competition between similar types of installations and a lower level of environmental protection for installations not covered under the IPPC Directive.

Description of options

The options considered relate to the inclusion under the scope of the IPPC Directive of installations carrying out the 3 activities mentioned above with a capacity exceeding 10 tonnes per day for the disposal and recovery of hazardous waste and 50 tonnes per day for the recovery of non hazardous waste (current thresholds in the IPPC Directive).

Summary analysis of impacts

The analysis carried out (see details in Annex 11) shows that removing the current inconsistencies related to the three sectors considered would lead to significant environmental benefits (linked to the implementation of BAT) and limited economic and social impacts. In these three cases, the relevant BREFs contain some BAT conclusions which could be applied to these sectors. In addition, positive impacts on the consistent permitting of these installations are expected contributing to the objectives of the Waste Thematic Strategy. It is therefore recommended to cover the three sectors concerned in a coherent way through the IPPC Directive.

7.2.3. Possible addition of other waste treatment activities

Specific problem definition

During the consultation with stakeholders and the analysis of which sectors might potentially be covered by the IPPC Directive, 9 activities (see Annex 11 for further details) were identified for possible inclusion in the scope of the IPPC Directive. A first screening exercise[162] and consultation with stakeholders lead to the identification of the following sectors for further analysis:

- Sorting and crushing of construction and demolition waste
- Treatment of scrap metal

In addition, the IPPC Directive only covers installations for the incineration of municipal waste (as defined in the former Municipal Waste Incineration Directives 89/369/EEC and 89/429/EEC) with a capacity exceeding 3 tonnes/hour (activity 5.2) and for the incineration of hazardous waste with a capacity exceeding 10 tonnes per day (activity 5.1). This means that installations incinerating non-hazardous waste other than municipal waste (e.g. various industrial wastes and sewage sludge) are not covered by the Directive.

However, certain of these installations will have large capacities and similar environmental impacts as municipal solid waste incinerators. Both types of installations are also covered by the Waste Incineration Directive 2000/76/EC. In

162 VITO, 2007 (a)

addition, municipal waste and industrial waste are often incinerated in the same plants.

Description of options

For the two sectors concerned, the options considered relate to the inclusion under the scope of the IPPC Directive of installations with a capacity exceeding 50 tonnes per day (thresholds currently set in the IPPC Directive for non-hazardous waste treatment). It also includes extending the scope of activity 5.2 to incineration of all types of non-hazardous waste.

Summary analysis of impacts

As presented in Annex 11, the sorting and crushing of construction and demolition waste would not be a good candidate for inclusion under the scope of the IPPC Directive.

As regards the treatment of scrap metal, about 230 integrated shredders of End of Life Vehicles (ELV) and Waste Electrical and Electronic Equipment (WEEE) would be covered by this option. Other installations within this sector would fall below the threshold of 50 tonnes per day. These installations already fall under the scope of the ELV and WEEE Directives and are subject to minimum requirements for the protection of soil and water. These requirements are very general and no specific techniques based on BAT are indicated.

The environmental benefits related to this option would be significant mainly due to the reductions of dust and dioxin emissions from these installations. As shown in the Member States where BAT has been implemented, the economic impacts of BAT introduction for this sector would be limited.

No significant additional administrative costs are expected since these installations are already subject to permitting under the waste legislation. Positive social impacts are expected through reduced impacts on health. For more information, see Annex 11.

It is therefore recommended to cover treatment of scrap metal (above the threshold of 50 tonnes per day) sector under the IPPC Directive.

As regards the extension of activity 5.2 to all types of non-hazardous waste incineration (while keeping the threshold of 3 tonnes per hour), no precise data could be collected on the number of installations concerned but it can be expected that their number is rather limited. As these installations are already covered under the Waste Incineration Directive, the additional compliance or administrative costs and environmental benefits will be limited.

This amendment would mainly be a measure of good administrative practice, clarifying the scope of the Directive (e.g. in the frequent case where plants are incinerating a mixture of industrial and municipal waste) and ensuring the level playing field between similar installations.

7.3. Help achieving the objectives of the Thematic Strategy on Soil Protection

The Thematic Strategy on Soil Protection[163] identified the IPPC Directive as a key instrument to help achieving its main objectives regarding soil contamination from point sources: prevention and remediation of impacts where necessary.

Based on the Impact Assessment of the Thematic Strategy as well as the additional collection of data[164] carried out in the context of the revision of the IPPC Directive, two main issues have been identified: (1) the introduction of an obligation of soil monitoring during the operation of IPPC installations, and (2) the clarification of the current requirements of the Directive relating to the prevention of contamination and the remediation of contaminated sites upon cessation of activities.

7.3.1. Soil monitoring

Problem definition

The life span of IPPC installations covers often several decades. In these installations, it is common to handle, store and use dangerous substances[165] (e.g. fuel, chemicals) for the manufacturing of the products, for the maintenance of the machinery (e.g. lubricants, disinfectants), or to produce large amounts of waste that need to be disposed of.

Over the years this may lead to an accumulation of dangerous substances in and on the soil due to atmospheric depositions, accidental spills or continuous leakages. Such accumulation can, if undetected, lead to significant risks for human health or the environment[166].

Where such accumulation of dangerous substances in the soil is only identified at the closure of the site, severe impacts for human health or the environment may have already occurred resulting in remediation costs significantly higher than if the pollution was identified earlier and its migration prevented.

The current IPPC Directive does not contain any specific requirements on soil monitoring and leaves it to the discretion of Member States to add such requirements in permits.

A detailed analysis of the practices in the Member States[167] has revealed that a large majority of competent authorities do not require operators to carry out regular soil monitoring. As a result, no early warning system is in place in a large number of IPPC installations.

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163 COM(2006) 231, 22.9.2006

164 VITO, 2007 (b)

165 Substances or preparations within the meaning of Directive 67/548/EC or Directive 1999/45/EC

166 For more specific information and data, see the Impact Assessment for the Thematic Strategy on Soil Protection (SEC(2006) 620, 22.9.2006).

167 VITO, 2007 (b) and the Impact Assessment for the Thematic Strategy on Soil Protection

Description of options

Against this background, the following options have been considered:

Options considered on soil monitoring

Business as usual
Introduction of an obligation of periodic soil monitoring of dangerous substances with a minimum frequency of at least every 5 to 10 years (option 1)
Introduction of an obligation of periodic soil monitoring of dangerous substances with a frequency to be determined on a case-by-case basis, but not less than once every 7 years; criteria for the determination of the frequency to be set through comitology (option 2)

Options 1 and 2 have two elements in common: the provisions leave it to Member States to decide on the substances to be monitored and the sampling and analytical strategies to be employed, and the obligation of monitoring would have to be included in the permit.

The difference between the 2 options is the frequency of the periodic monitoring, either a fixed period for all installations or a customised frequency depending on the installation.

Environmental impacts

Options 1 and 2 would lead to the following results:

- Detecting pollution at an early stage allows for taking more effective prevention measures and early remedial actions before the pollution has reached other environmental media, hampered the soil functions or posed a significant risk to human health.

- Periodic monitoring will allow the competent authority to check more easily the efficiency of the preventive measures undertaken and limit environmental pollution.

Option 1 is easier to implement, also from an administrative viewpoint, as the frequency would be the same for all installations and no assessment would be needed on a case-by-case basis. Moreover, this option could be perceived as being less subjective.

Option 2 is more flexible and allows customising the frequency to the potential risk posed by the particular installation, account being taken of the types of industrial process, soil quality, presence of groundwater, etc. This flexibility could allow coupling the monitoring of the soil to the specific preventive measures applied.

This option could result in interpretation problems causing competent authorities across Member States to implement this flexible approach in a different manner. However, criteria for the determination of the frequency would be set though a comitology procedure.

Economic impacts

Options 1 and 2 would lead to the following economic benefits:

- Periodic monitoring will allow detecting pollution at an early stage thus avoiding more severe and widely spread impacts on a bigger extension of soil (and groundwater), hence avoiding higher costs of remediation for the operator.

- Periodic monitoring will allow the operator to realise the loss or leakage of dangerous substances, such as fuel, thus avoiding wastage of energy resources and raw materials, and reducing production costs. These losses are often small in terms of operating conditions and so may go easily unnoticed, but can have an important cumulative effect in the soil and in groundwater.

- Soil monitoring might contribute to lower costs for environmental insurance for the operator because the risks of high remediation costs for returning the site to a satisfactory state are diminished.

- Establishing a minimum level of soil monitoring requirements will contribute to a level playing field across Member States.

As indicated in the problem definition, very few Member States require periodic monitoring of soil, hence such an obligation would be an extra cost compared to the current implementation of the IPPC Directive.

The costs of performing some chemical analysis of the soil vary enormously from site to site depending on the dangerous substances analysed, on the mixture of different contaminants present, on the number of sampling points, on the size of site and on the soil characteristics.

As soil monitoring is currently not performed in almost any Member State, the data on costs is scarce. However, a literature review has provided some estimates ranging from €1,300 to €4,900 per site[168].

Administrative costs will be limited. The introduction of a soil monitoring requirement will be part of existing and established procedures for permitting, monitoring and control of installations.

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168 In the Netherlands, an average site investigation with a screening of soil quality with a limited amount of boreholes and analysed samples ranges between €1,300 and €4,900 per site (Leidraad Bodembescherming, June 2004, Sdu (in Dutch)); in Portugal, the estimated cost of the sampling is about €1,349 per site on average; in the United Kingdom, basic analytical costs, excluding any determination of organic compounds, are evaluated at €2,500 per site; in Germany, the laboratory costs for the analysis of around 20 of the most relevant parameters (including organic compounds) are estimated at around €4,000 per site (L. Van Camp, B. Bujarrabal, A-R. Gentile, R.J.A Jones, L. Montarella, C. Olazábal and S-K. Selvaradjou (2004), Reports of the Technical Working Groups Established under the Thematic Strategy for Soil Protection, EUR 21319 EN/5, OPOCE, Luxembourg, p. 679 and 702)

Social impacts

Periodic monitoring will allow detecting pollution at an early stage thus allowing the prevention or reduction of the exposure of workers (and wider population) to soil contaminants before health effects occur.

The existence of mandatory soil monitoring could be regarded by the general public, in particular by those living or working nearby an IPPC installation, as a further element strengthening permit compliance, thus contributing to the acceptance of industrial development close to where they live or work.

Comparison of options

For both options 1 and 2, given the average costs of remediation for installations covered by the IPPC Directive, several studies in Member States as well as the Commission's Impact Assessment of the Thematic Strategy for Soil Protection have concluded that the benefits of early warning and early action on soil contamination outweigh the costs of periodic monitoring and that these options therefore compare favourably to the business as usual option (in any case, figures quoted above show that the costs linked with periodic soil monitoring are rather limited, account being taken of the type of activities to which they refer).

It is difficult to differentiate between option 1 and option 2 as regards the costs as it can not be known at this stage if a case-by-case frequency would overall be more or less frequent than 5 or 10 years (some installations might be required to do so more regularly and some less).

However, option 2 would provide more flexibility than option 1 to take into account the potential risk caused by the specific installations concerned. Option 2 is therefore recommended.

7.3.2. Prevention of soil contamination and site remediation

Problem definition

Article 3 (f) of the IPPC Directive states that "upon definitive cessation of the activities, the site should be returned to a "satisfactory state". However, at the moment the interpretation of "satisfactory state" differs across Member States leading to large variation in the level of environmental protection[169]. In certain Member States, the current unclear requirement of the IPPC Directive leads to a low level of environmental protection for many contaminated sites.

Nevertheless several Member States apply two different regimes for site contamination[170]. A risk-based regime (more pragmatic and cheaper) for "historical" contamination[171], on the basis that this is a heritage from the past, coupled with a

169 VITO, 2007 (b)

170 VITO, 2007 (b)

171 Defined as contamination having taken place *before* a certain cut-off date determined by national legislation

more strict "no-risk-based approach" for future contamination[172], on the basis that with the current techniques and knowledge, site contamination can and must be prevented and hence no soil accumulation of dangerous substances in the soil (also preventing any leaking to groundwater) is allowed. In such Member States, the approach for new installations relies on not allowing new soil contamination to occur regardless of the risk involved.

Description of options

Options considered on prevention of soil contamination and site remediation

Business as usual
At the latest upon cessation of activities, return the site to a state that, taking account of its current use and approved future use, no longer poses significant risk to human health or the environment (option 1)
Establish a baseline report on the state of soil and groundwater contamination by dangerous substances at the start of activities (for new installations) or at the point of permit review (for existing installations) coupled with the obligation, upon cessation of activities, to return the site to the state as established in the baseline report; criteria on the content of the baseline report to be determined through comitology (option 2)
Upon cessation of activities, return the site to a state fit for all possible uses (option 3)

The business as usual option, taken as the baseline, builds on the existence of an obligation (derived from the Environmental Liability Directive[173] (ELD) and the future Soil Framework Directive[174] (SFD)) to remediate sites where there is a significant risk to human health or the environment. This is based on the assumption that the Commission Proposal for a SFD is adopted and enters into force.

The ELD applies to environmental damage (to soil, water and biodiversity) that has taken place after 1 May 2007 and specifies that remedial action has to be taken without delay. If the environmental damage has been caused before 1 May 2007, the SFD will require soil remediation but no deadline would be set for that, as it would be up to the Member State to establish when the remediation has to take place. In both cases the risk must be assessed taking into account current land use and approved future use.

Option 1 differs from the business as usual scenario in that it would specify a timescale (time of cessation of activities) for remediation of the damage to soil that occurred before 2007. This would be without prejudice to the ELD which establishes a stricter regime (remediation without delay when the damage to soil has occurred) for soil damage after 2007.

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172 Defined as contamination taking place *after* the above-mentioned cut-off date

173 Directive 2004/35/CE on environmental liability with regard to the prevention and remedying of environmental damage

174 Proposal for a Directive establishing a framework for the protection of soil and amending Directive 2004/35/EC

Option 2 requires the operator to establish a baseline report where the activity involves the use, production or release of dangerous substances. The operator would then have to return the site upon cessation of activities to the same state in which it was at the start of the activity (for new installations) or to the state at the time of the permit review. Currently, in the Member States where this is applied, it does not imply a "zero tolerance" for soil contamination but rather an approach not allowing significant added contamination[175].

Option 2 is stricter than option 1 because it would require a site to be brought back to its initial status (i.e. at the baseline contained in the soil report to be drawn up before the installation is operated or when the permit is reviewed), even if the accumulation of dangerous substances would have not necessarily led to a significant risk to human health or the environment. In case no baseline is required by the competent authority, the operator would have to take the necessary measures upon definitive cessation of the activities to ensure that the site does not pose any significant risks to human health and the environment.

Option 3 requires the operator to remediate the site so that it can be subsequently used for *any* land use. This approach aims at ensuring multifunctionality of the soil after the closure of the activity.

Environmental impacts

Option 1 does not have significant environmental benefits compared to the business as usual scenario. It does however, set a fixed maximum deadline for remediation of the contaminated site either without delay (if the ELD applies) or at the cessation of the activity.

Option 2 provides the same level of protection to soil as already established for air and water in the existing sectoral legislation by also applying a strict non deterioration approach. This option would set strict and clear goals for soil and groundwater protection, thus facilitating the determination of remedial measures, as operators will have certainty on their soil related obligations throughout the operation. It will ensure that preventive measures and acting at source will be given priority, since no accumulation would be allowed.

Option 3 implies for contaminated sites a thorough remediation in order to bring back the soil to a state that it can be used for all land uses, including for instance residential use. This is the most environmentally ambitious option as it would preclude any risk for any use thus improving the state of the environment, guaranteeing that all soil functions would be preserved, and reducing to a minimum the risk to human health, while at the same time increasing the land availability for any use. This ambitious approach would also ensure that preventive measures and acting at source will be given priority to avoid the need for later remediation in case of a subsequent change in land use (from a less to a more sensitive type of use).

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175 Two Member States, the United Kingdom and the Netherlands, are currently applying such an approach. The baseline established by the Netherlands relies on a chemical analysis of the soil. In the UK the baseline established is mainly a desk study about the initial situation of the site (in some cases for potentially very risky installations a chemical analysis is also required).

Economic impacts

Option 1, by fixing a maximum deadline for the remediation provides some certainty to operators which can then plan the necessary investments. Option 2, by establishing a baseline of the state of the soil, at the start of the activity would give the operators and competent authorities a very clear knowledge of the initial soil quality and therefore certainty in terms of future liability, thus avoiding possible litigations.

This harmonised approach would reduce the distortion of competition between operators located in Member States with different interpretations for the risk based approach. Option 3, by restoring the multifunctionality of soil, will increase land availability which will benefit the economic sectors whose activities rely on "usable land and soil" (e.g. agriculture, tourism, mineral extraction).

Option 1 would not imply additional costs, as the obligation to remediate would already exist. It only sets a fixed deadline.

In case of option 2, the expected costs for the selected sampling sites and the baseline investigations are calculated to be between €5,000 and €10,000 per site and per sample (including determination of organic compounds) according to German estimates. According to UK estimates, based on the projection from historical data, the baseline investigations costs are estimated to be between €4,000 and €5,000 per site, and basic analytical costs (excluding determination of organic compounds) are estimated at €2,500 per site[176].

Option 3 constitutes the most costly option. Some estimates from the Netherlands, which applied the multifunctional approach in the past, concluded that this option would typically cost twice as much as a fit-for-use approach (option 1).

Further information concerning remediation costs can be found in the Impact Assessment for the Thematic Strategy on Soil Protection.

Comparison of options

Option 1 would not significantly improve the existing level of environmental protection, because it would only set a fixed deadline for implementing an existing obligation (assuming the implementation of the SFD as well as the ELD). Moreover, option 3 would lead to significantly higher costs than option 2, because reaching a multifunctional approach for soil requires the application of extensive remediation techniques.

Furthermore, option 2 would considerably improve on the level of environmental protection, while at the same time maximising benefits in comparison to costs. Option 2 is therefore recommended.

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176 L. Van Camp, B. Bujarrabal, A-R. Gentile, R.J.A Jones, L. Montarella, C. Olazábal and S-K. Selvaradjou (2004), Reports of the Technical Working Groups Established under the Thematic Strategy for Soil Protection, EUR 21319 EN/1, OPOCE, Luxembourg, p. 679

7.4. Possible regulation of additional industrial sectors through the IPPC Directive

Problem definition

As indicated in the general problem definition of this chapter, the IPPC Directive, and in particular the implementation of BAT, is in principle an effective piece of legislation, if applied properly and to its full extent, to regulate the emissions of industrial installations at EU level. The issue at stake is therefore to assess, on a case-by-case basis, to what extent the scope of the IPPC Directive should be extended to additional industrial activities which pose significant risks to the environmental, based on the methodology described in the introduction to this chapter.

In order to select the potential candidates for such assessment, the following method was applied: (1) to carry out a consultation of Member States and other stakeholders and (2) to compare the scope of the IPPC Directive with other legislation addressing industrial installations, in particular the E-PRTR Regulation[177].

The following list of 7 activities was then established for further assessment. All these sectors are covered by the E-PRTR but not by the IPPC Directive.

- Aquaculture
- Any gasification and liquefaction installations
- Manufacture of coal fuel products and solid smokeless fuel
- Industrial plants for the preservation of wood and wood products
- Production of other primary wood products than paper and board
- Installations for the building of, and painting of or removal of paint from ships
- Independently operated industrial wastewater treatment plants

Options considered

For each of the activities identified, the options considered relate to the inclusion of the installations above a certain threshold (specific to each sector) within the scope of the IPPC Directive. Two specific studies[178] were carried out on this issue to assess the impacts of these options.

Out of the 7 activities considered, 3 of them (aquaculture, coal fuel products manufacturing and ship building) are not at present recommended for inclusion under the IPPC. The following sections present a summary of the analysis for the 4 other activities.

7.4.1. Any gasification and liquefaction installations

Problem definition: The Directive currently only covers the gasification and liquefaction of coal. Other feedstock can also be used (in particular gas and biomass) in particular to produce "transport fuel". The use of these processes is expected to increase significantly in the future in view of the growing use of biofuel and the more stringent future standards on fuel quality.

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177 The 2006 E-PRTR Regulation transposes the UNECE Protocol on Pollutant Release and Transfer Registers (PRTR)

178 IEEP, 2006 (a) and VITO, 2007 (b)

All of the gasification units in the EU are currently covered by the IPPC Directive since they are directly associated with IPPC installations (in refineries, chemicals and large combustion plants). However, future new installations in particular to produce "transport fuel" are likely to be stand-alone installations and not covered by the IPPC Directive[179].

Description of option: to bring all gasification and liquefaction installations under the IPPC Directive

Summary analysis of main impacts: The impacts on the environment and human health of this option would be positive. BAT conclusions have been determined in the BREFs for these types of processes. It would also provide a coherent permitting regime for all gasification and liquefaction installations, avoiding distortion between similar types of processes. The economic impacts are expected to be small because the costs identified in the BREFs for introducing BAT are not significant. In addition, for more information, see Annex 11.

It is recommended to cover this activity under the IPPC Directive.

7.4.2. Industrial plants for the preservation of wood and wood products

Problem definition: This industry has been a significant source of some of the POPs (persistent organic pollutants) mainly caused by the use of creosote. The use and emissions of these substances have decreased in particular through the implementation of the Biocidal Products Directive and other legislation on chemical substances. However, the risks for soil and (ground)water contamination (for instance heavy metals, PAHs…) through the use of ecotoxic products remain significant in view of the type of substances used for the preservation of wood. Currently, only the installations using solvents above a certain threshold (about 30% of the sector) fall under the scope of the IPPC Directive despite having similar environmental impacts to water and soil than the rest of the industry (using in particular waterborne and oil based products)

Description of option: to bring installations for the preservation of wood and wood products with a production capacity of 75 m³ per day under the IPPC Directive

Summary analysis of main impacts: It is estimated that about 300 additional installations would fall under the scope of the IPPC Directive out of which an estimated 225 installations are not being already covered by a BAT-based permitting regime. The BREF on surface treatment using solvents already contains BAT conclusions on the prevention and control of emissions to soil and water. The application of these BAT would have significant positive environmental benefits on this sector. The costs of BAT implementation identified in this BREF would not be significant for the whole sector. The option considered would provide a more level playing field in this sector since installations with similar impacts on water and soil

[179] It could also be interpreted that gasification and liquefaction installations fall under the definition of chemical installations for the production of organic or inorganic basic chemicals. However, in view of the possible different interpretation of this issue in the Member States, it would be more appropriate to name these processes explicitly under the scope of the Directive.

(using solvents or not) would be subject to the same permitting regime. The social impacts would be positive through the uptake of BAT and higher protection of human health. For more information, see Annex 11.

It is recommended to cover this activity under the IPPC Directive.

7.4.3. Production of other primary wood products than paper and board

Problem definition: The analysis has shown that within the whole primary wood sector, the production of wood-based panels leads to significant environmental impacts (emissions to air of dust, combustion gases and VOC, generation of wood residues, use of energy, use of binders and additives and consumption of water and releases to water). In order to cover most of the installations concerned while excluding the small installations (in particular in the fibre board and plywood sub-sectors), a production capacity threshold of 600 m^3 per day would have to be set.

Description of option: to bring installations for the production of wood-based panels above a production capacity of 600 m^3 per day under the IPPC Directive

Summary analysis of main impacts: About 110 installations would then be concerned by this option. The analysis of the impacts has also shown that the production of plywood leads to less environmental impacts than the manufacturing of other primary wood-based products. The implementation of BAT in this sector would lead to significant positive environmental benefits. The BREF process will ensure that BAT is economically viable for this sector. Positive social impacts are expected through reduced impacts on human health. For more information, see Annex 11.

It is recommended to cover this activity under the IPPC Directive with the exclusion of plywood production.

7.4.4. Independently operated industrial waste water treatment plants

Problem definition: Industrial waste water treatment plants are covered under the scope of the IPPC Directive if they are directly associated and have a technical connection with an IPPC activity and are located on the same site. As stressed in the guidance established by the Commission[180] on the term "installation" and "operator", the industrial waste water treatment plants do not necessarily need to be operated by the same operator than the IPPC activity to fall under an IPPC installation. This issue of interpretation is addressed more specifically under section 6.2 on IPPC permitting. Industrial waste water treatment plants located outside the site of an IPPC installation would not be included under the scope of the IPPC Directive.

Analysis of impacts: The analysis has shown that only a small number of industrial waste water treatment plants are not located on the site of an IPPC installation. These are most generally plants treating a mixture of domestic waste water with industrial waste water. These installations are subject to the requirements of Directive 91/271/EEC concerning urban waste water treatment except if they treat only

[180] http://ec.europa.eu/environment/ippc/pdf/installation_guidance.pdf

industrial waste water and discharge directly to the receiving water (see article 11 of Directive 91/271/EEC)[181].

No specific information could be collected on the number of installations concerned but this is most likely very small. Including these installations under the scope of the IPPC Directive would provide more consistency, a more level playing field as well as positive environmental and social impacts through the implementation of BATs already established in existing BREFs.

It is therefore recommended to cover under the IPPC Directive the installations treating waste water from IPPC installations but not located on the site of an IPPC installation and not covered by Directive 91/271/EEC concerning urban waste water treatment. No specific capacity threshold is proposed since the current IPPC Directive does not contain such thresholds for installations already covered by this legislation.

7.5. Clarification of current IPPC scope

The current scope of the IPPC Directive has been subject to a detailed review as part of discussions with Member States and other stakeholders on the interpretation and implementation of the Directive. The following three issues have been identified as requiring further clarification in the scope of the Directive.

- Chemicals production – biological processing, biodiesel and pharmaceutical intermediates production
- Ceramics production
- Food production

A study was carried out to assess the impacts of the clarification of the IPPC scope related to these activities[182].

The current different interpretations of the scope by Member States lead to uncertainties for operators as well as distortion on the application of Community legislation and on competition. If certain Member States do not interpret and implement the IPPC Directive in the industrial sectors concerned correctly and consistently, this would lead to a lower level of environmental protection (for instance, BAT would not be implemented) for the operation of these installations than as intended by the Directive as initially adopted. The details of the analysis can be found in Annex 11.

It is recommended to clarify the current scope related to these sectors in order to harmonize permitting practices, provide environmental benefits through the uptake of BAT and avoid distortion in the permitting of these installations across the EU.

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181 In the case of the food processing sectors listed in Annex III of Directive 91/271/EEC, this Directive applies to direct discharges to receiving waters with a load exceeding 4000 population equivalent (see Articles 13)

182 VITO, 2007 (b)

8. FACILITATE POSSIBLE FUTURE USE OF IPPC-COMPATIBLE MARKET BASED INSTRUMENTS SUCH AS AN EMISSION TRADING SCHEME FOR NO_X/SO_2

Problem definition

In recent years calls for using emission trading for air pollutants have intensified. Positive views on market-based instruments[183], the EU ETS experience[184] and the expected cost savings from trading have attracted the attention of many interested parties.

Although, in principle, the use of market-based instruments, such as emission trading is possible under the IPPC Directive, the directive limits the use of such instruments, since every operator is required to comply with BAT-based emission limit values (ELVs) set in individual permits (or in general binding rules). Market-based instruments could currently only serve to go beyond the application of BAT at the installation level. These limitations to emissions trading lead to the inability to realize certain costs saving and an efficiency loss in economic terms.

Description of options

The options assessed examine the potential of an increased flexibility such as provided by an emissions trading scheme in principal terms rather than suggesting a full-fledged trading scheme or other market-based instruments. An attempt will be made to illustrate the potential impacts by looking at the combustion sector.

Detailed discussions on market-based mechanisms for reducing air pollutants, including considerations on timing, the level of fixing rules, cap setting, allocation methods, compliance checking, banking and borrowing possibilities, are included only to the extent necessary to show whether facilitating the option of future action in this area could have potential benefits. The analysis is limited to NO_x and SO_2 emissions where experiences at EU and international levels have been gained in particular from the Netherlands and the United States.

Options considered on Flexible Instruments [the two options are mutually exclusive]

Business as usual
Subject to the adoption of a possible future legal instrument, allow Member States to achieve BAT-based emission levels through an emissions trading system based on EU rules instead of individual BAT-based permit conditions for NO_x and SO_2 (Option 1)
Allow Member States to use nationally determined approaches instead of individual BAT-based permit conditions for NO_x and SO_2 (Option 2)

Option 1 would mean allowing Member States either to maintain the individual BAT-based permit conditions for NO_x/SO_2 or to opt for an emissions trading scheme (subject to EU rules) instead. These EU wide rules would be set to ensure in

183 See the Commission's Green Paper, COM(2007)140

184 EEA, 2006

particular that overall BAT-based emission levels are achieved. This would require the adoption of a separate legal instrument to amend the IPPC Directive and establish those EU rules. Under this option 1, the possibility for Member States to use National Emission Reduction Plans to implement the LCP Directive would then be removed in view of the flexibility offered by such an approach.

Such trading schemes are likely to be chosen by a limited number of Member States within certain designated control areas. These areas would have to be set to ensure that environmental and health objectives set out in the Thematic Strategy on Air Pollution are met as regards trans-boundary effects (see analysis below). In addition, safeguards would have to be made in the IPPC permits to ensure local environmental quality standards such as the requirements of the Ambient Air Quality Directive.

The additional question of whether also installations would have the choice to opt-in or opt-out to a future emission trading scheme will need to be further assessed as part of the EU-wide rules to be developed at a later stage. This option would have no immediate impacts, since the trading instrument would only be created and enter into force later through a separate EU measure.

Option 2 looked at other types of marked-based instruments not subject to EU rules. Under this option Member States, instead of applying individual permits (including ELVs), would calculate the total emissions of the pollutants for all the installations concerned and design a plan[185] to achieve at least the same overall reduction of emissions from all of the installations collectively.

This could be done by trading (but not subject to EU-wide rules), or alternatively by other means such as re-allocation of emission limits (e.g. more than BAT-based limits for some installations and less than BAT-based limits for others) or emission taxes. It should be noted, however, that emission taxes alone could not ensure that the total emissions would not be exceeded. Other complementary instruments would be needed.

Member States would need to submit their plans to the Commission for assessment using a similar approach as for the National Emission Reduction Plans under the LCP Directive. Provision would also be made for the Commission to reject the plan if the Member State did not sufficiently correct it.

Analysis of impacts[186]

Business as usual

The analysis carried out looked ahead up to 2020 at potential savings under different emission baselines for the large combustion plants sector. Three baselines have been considered[187]: (1) national projections (based on the application of current legislation according to Member States' estimations) (2) implementation of the upper end (less

185 The plans would need to identify the installations concerned, show the calculations of the emission levels, set out the measures to achieve the necessary overall emission reductions, and provide details of how emissions would be monitored

186 Main data sources: Entec, 2007 (b); IIASA, 2007 (b); various EEA reports, see source list

187 IIASA, 2007 (b)

strict) of the BAT range of the LCP BREF (so-called "BAT upper end") and (3) implementation of the lower end (more strict) of the BAT range of the LCP BREF (so-called "BAT lower end").

Option 1: Allow Member States to achieve BAT-based emission levels through an emissions trading system based on EU rules instead of individual BAT-based permit conditions for NO_x and SO_2

Environmental impacts

Under option 1, EU wide rules would be set to ensure that overall BAT-based emission levels are achieved. A cap-and-trade system is assumed which is easier to manage compared to a baseline-and-credit scheme which might also lead to smaller reductions in emissions if economic expansion is higher than foreseen[188].

In the calculations it is assumed that the trading cap would be set at the level of one of the 2 BAT-based baselines (see above), thus the trading (subject to EU rules) would result in the same overall emission reductions as the individual BAT-based permitting approach.

However, the probability of achieving environmental objectives in terms of overall NO_x and SO_2 emissions would be increased under this option. This is due to the fact that the overall level of emissions would no longer depend on individual decisions by competent authorities on permit conditions for specific installations.

An emissions trading scheme would be most effective if designed for specific 'control areas' within which Member States could trade. This is due to the specific characteristics of SO_2 and NO_x emissions and their effects which are regional or local rather then global (unlike CO_2).

A specific study[189] has shown that such "optimal control areas" could in principle be set up covering groups of Member States[190]. In order to achieve the maximum environmental effects such an emission trading scheme would need to be subject to EU rules.

However, as NO_x and SO_2 cause also local environmental damage, a trading scheme could in theory lead to higher levels of pollution in some locations. Any trading scheme would therefore have to be designed to limit or prevent damage from hotspots and to comply with ambient air quality standards.

The analysis[191] carried out did not show evidence that the removal of NO_x and SO_2 from an integrated permitting approach would lead to increased environmental impacts from other emissions or on other media.

188 EEA, 2006
189 TNO, 2006
190 This issue will need to be addressed in the context of the revision of the NEC Directive.
191 ENTEC, 2007 (b)

Economic impacts

Cost savings from trading are based on differences in marginal abatement costs, assuming that abatement is redistributed by the market and implemented where it costs less.

The total potential for trading and the corresponding cost savings greatly depend on how inclusive the trading system is. Trading with national boundaries may disadvantage smaller economies and also limit the benefits of the whole system. Larger zones embracing several countries may help limit these disadvantages, but this raises the need for a harmonised system which might best be designed at the EU level to lower costs[192]. Uptake by Member States and the level of participation of installations in those Member States would also determine the benefit levels.

In the absence of specific rules on the design of possible emission trading schemes, it is not possible to determine precise levels of cost savings. However, in order to illustrate the order of magnitude of such cost savings, an assessment has been carried out for the LCP sector since this is the main source of NO_x and SO_2 emissions (see box below). Trading might also extend to other industrial sectors, substantially increasing the potential benefits.

Illustration 1: The potential cost savings of a trading scheme that only includes LCPs have been estimated based on assumptions on the difference between average marginal abatement costs and the lowest marginal costs. The details of the outcome of these calculations can be found in Annex 12. To illustrate the order of magnitude, the potential costs savings with a cap based on the upper end (less strict) of the BAT range would be around € 100 – 300 million annually for SO2 and around € 200 – 700 million for NO_x during the period 2010 till 2020. These costs savings are compared with the business as usual baseline leading to the same overall environmental achievements.

Illustration 2: Another study[193] estimated the potential cost savings using another methodology based on the comparison of the costs of applying a particular NO_x abatement technique (considered BAT) in all coal fired power plants in a hypothetical Member State with a trading scheme achieving an overall cap based on BAT. Scaling up the results would lead to cost savings around € 500 – 1000 million per year for the EU 27. For further information, see Annex 12.

Based on the calculations presented above, it can be expected that the introduction of an emission trading scheme for NO_x and SO_2 could significantly reduce compliance costs.

However, as presented in Annex 12, these potential cost savings might not be fully realized. This depends in particular on the size and characteristics of such a trading market (for instance number of sectors covered, geographical scope of the market and share of installations with potential low-cost abatement techniques) as well as on any additional administrative costs incurred by it (e.g. monitoring, reporting, enforcement and compliance systems that will have to be designed). However, in the absence of detailed rules for such trading schemes, a more precise calculation of these additional costs could not be carried out. These issues will have to be assessed when setting up specific EU rules on SO_2 and NO_x emissions trading.

192 EEA, 2005
193 ENTEC, 2007 (b)

By placing a value on emission reductions (which would approximate the marginal cost of an emission reduction), the introduction of trading would create economic incentives with effects on:

- Faster development of cheaper, more efficient technologies – which reduce the costs of meeting given emission levels for installations;

- Increased development of an EU wide industrial sector that is innovative and supplying these emission reduction technologies. This has both direct effects on R&D and employment in the EU and indirect effects, by creating lead markets for technologies that can also be exported to new markets such as China with significant growth prospects.

Social impacts

By offering cost reductions against the business as usual option, option 1 may reduce the cost of electricity generation from fossil fuel plants. This cost reduction may, under certain circumstances depending on a number of economic or other factors, be passed through to customers in electricity prices – with a resulting greater relative benefit for low-income households, for whom electricity costs are a larger part of their income.

Option 2: Allow Member States to use nationally determined approaches instead of individual BAT-based permit conditions for NO_x and SO_2

Environmental impacts

This option would provide less probability of achieving environmental objectives. In particular, no BAT-based overall caps for the installations concerned would be set and decisions with regard to the setting of caps, etc. would be left to Member States. The instruments foreseen under this option would be very difficult for the Commission to enforce since this would require a detailed assessment of the plans set up by the Member States. Overall, the increased flexibility under option 2 is likely to lead to higher levels of overall emissions (and therefore negative environmental impacts) compared to the business as usual option or option 1.

Economic impacts

The lack of common EU rules (e.g. overall caps, allocation method, monitoring and compliance systems) would limit considerably any trading of emissions across borders. In comparison with option 1, where trading would be likely to happen within different trans-national areas, this option would restrict the number of installations participating in any one trading scheme which would limit the potential of using least cost solutions. For international firms, trading between their EU installations would be hampered considerably compared to option 1 and their administration costs might increase due to a need to conform to different administrative procedures in different countries. Total administrative cost changes would depend on the form of flexible instrument chosen in Member States. Co-ordination of some flexible mechanisms between authorities, particularly where environmental responsibilities are devolved, may create additional administrative costs.

The administrative costs on Member States to establish their plans and on the Commission to assess them would be high. There would be two levels of administration at the national level. At the first level determination of individual, BAT-based emission limit values, taking into account local factors, for each installation would have to be carried out. At the second level, these emission limit values would need to be translated into installation-specific emission totals and then summed up to establish the necessary overall emission reductions, prior to re-allocating those reductions by the means chosen by the Member State.

Negative impacts on the level playing field are likely, and could be very considerable, leading to distortions of competition between sectors and installations in the internal market. Member States may use different approaches with very diverging environmental ambition levels for any particular sector, or installation. For example, the form of allocation of emissions, whether by grandfathering or auctioning, could be economically significant for profitability of an installation or national sector. It is likely that, within a national setting, the allocation of emissions between sectors or installations will be strongly influenced by national factors, and by the consideration that other Member States may also be planning their own systems with possible advantages to their industries. This would clearly jeopardize EU competition rules and would not be in line with the experience currently gathered from the CO_2 emissions trading scheme where more harmonized rules seemed to appear necessary in order to render the scheme viable and effective.

Social impacts

Social impacts are hard to predict given the extent of flexibility that might be used in Member States. Public confidence in terms of environmental outcome, clearness of legislation and enforceability would be harmed. Option 2 would also lead to less transparency on the determination of the levels of emissions allowed from individual installations.

Comparison of options

The first option offers a higher probability of achieving BAT-based emission reductions. Such an emission trading scheme could also lead to annual costs savings which were estimated up to several hundreds of million euros. However, the details of the specific features of such a scheme would need to undergo further assessment.

The second option is likely to increase negative environmental impacts. It also offers reduced potential economic benefits, would prevent trading between Member States and generally lead to distortions of the internal market.

The policy option 1 is the preferred one. Its implementation would require the adoption of new legislation. Further work is however needed on this issue in particular to possibly determine EU-wide rules[194] to allow Member States to replace individual BAT-based permitting with emissions trading for SO_2 and NO_x.

[194] These rules would need to be set up in close interaction with the upcoming revision of the NEC Directive.

9. MONITORING AND EVALUATION

9.1. Indicators of progress towards meeting the objectives

The overall objective of the policy on industrial emissions is to prevent and control pollution and its impacts arising from industrial activities in the most cost-effective and efficient way including the reduction of unnecessary administrative burden.

In addition, five specific objectives have been set against which several options have been analysed and compared to each other. As a result of the analysis, a package of policy options is recommended (see section 10 and Annex 2 with summary of options retained).

The core indicators for progress towards meeting the five specific objectives set for this policy initiative are the following:

(1) Evolution in the levels of emissions from industrial activities and extent to which IPPC installations implement Best Available Techniques in practice

(2) Overall extent, effects and efficiency of the measures taken by Member States to implement the legislation related to industrial emissions

(3) Extent to which unnecessary administrative burdens are cut at EU and Member States levels

(4) Extent to which amending the scope of the IPPC Directive contributes to the objectives of the Thematic Strategies

(5) Extent to which emission trading schemes for NO_x and SO_2 are used in Member States subject to EU-wide rules

9.2. Outline for monitoring and evaluation arrangements

Based on the monitoring and review of the progress made towards the set of objectives using the above mentioned indicators, the Commission will evaluate the results of this policy and report every three years to the Council and the European Parliament.

These monitoring and evaluation exercises will be based on streamlined and targeted reporting requirements on the Member States (see in particular section 6.3). The main instrument for streamlining this reporting will be the setting up of a Regulatory Committee. This Committee will, *inter alia*, determine in close cooperation with stakeholders specific data needs and collection processes to monitor the progress made using the core indicators mentioned above. The details on the frequency and means of this reporting process will be left to the decision of the Committee.

The following issues will in particular be addressed in the setting up of the monitoring and evaluation arrangements:

- focus the monitoring and reporting on the key data which are necessary to assess the extent to which the objectives of the legislation (in particular the uptake of BAT) are being achieved.

- organize the IT collection of data on the basis of the principles of the INSPIRE Directive and the Shared Environmental Information System and therefore avoid the collection of unnecessary data.

- further improve the information exchange on BAT organized by the Commission to review the existing BREFs and ensure that these documents are updated regularly and contain all the necessary information to determine BAT at EU level.

- continue to support Member States throughout the introduction and implementation of the revised legislation

- use the outcome of the on-going Commission's measurement exercise on IPPC burdens at national level[195] to assess the reduction of unnecessary administrative burdens.

Taking into account the outcome of the implementation monitoring and evaluation, the legislation on industrial emissions will continue to be reviewed by the Commission.

[195] see COM(2007) 23 final

10. CONCLUSIONS

The recommended options of the **overall policy package** are summarized in the following table (for more information about the specific options recommended, see Annex 1).

Role of BAT : strengthen and clarify the concept and use of BAT, increase transparency by requiring that the use of flexibility must be justified and documented
Use of sectoral Emission Limit Values (ELVs) versus BAT: strengthen existing minimum requirements in certain sectors (LCP, certain cement kilns co-incinerating waste, titanium dioxide)
Status of BREF process: to improve collection of data and increase consistency between data formats used in the BAT reference documents and the permit
Inspection, reporting on compliance, permit review: introduce clear requirements whilst giving Member States some flexibility in approach as long as minimum criteria are met
Innovation: facilitate continuous improvement by increasing IPPC's impacts on innovation
Addressing inconsistency in multiple Directives: merge, by means of a recast, the IPPC Directive and six sectoral Directives into a single Directive on industrial emissions
Reducing costs of IPPC permitting and reporting: introduce changes in the legislation to simplify permitting, reduce reporting by operators, introduce Action Programmes to support Member States in reducing unnecessary administrative costs, streamline reporting by Member States.
IPPC scope and provisions: clarify the current scope; include some additional activities (eg. combustion installations between 20 and 50 MW, preservation of wood and wood products, production of wood based panels, specific waste treatment activities); introduce more specific provisions on soil monitoring and remediation
Facilitate use of market based instrument: subject to the adoption of a possible future legal instrument, allow Member States to achieve BAT-based emission levels through an emissions trading system based on EU rules instead of individual BAT-based permit conditions for NO_x and SO_2

The cumulative impacts of the policy package can be summarized as follows:

- Significant improvement in Member States' performance in basing permit decisions on BAT taking into account the costs and benefits, and improvement in the scope of information in future BREFs.

- Calculated health and environmental benefits from enhanced take up of BAT that would greatly exceed the costs for installations to comply with the Directive. The benefits depend on the current performance of BAT-based permitting for a region or sector; for example, for LCP the EU-wide net benefits would be € 7 - 28 billion per year including the reduction of premature deaths / years of life lost by 13,000

and 125,000 respectively (excluding any additional environmental benefits such as reduced eutrophication and acidification).

- A reduction in the gap between Member States predicted emissions and the agreed Thematic Strategy on Air Pollution (TSAP) objectives for 2020 by 30-70 % from LCP.

- No significant long term impacts on competitiveness, social impacts or detrimental long-term effects on economic growth have been identified given possible flexibility in well-founded and documented cases. Instead the analysis shows that a more unified application of BAT would help reduce distortion of competition in the industry sectors covered by the Directive.

- The inclusion of some 4,400 installations within the scope of IPPC will contribute to some key environmental and health objectives (e.g. inclusion of the 20-50 MW combustion installations helps to close the gap between Member States projected industrial emissions and the TSAP objectives by 2 - 6% and the net environmental and health benefits of such inclusion are estimated to be €732 million to €1.6 billion). The achievement of the benefits from extending the scope would incur necessary administrative costs of about €37m/year of which about €19m/year would fall on operators.

- The additional environmental benefits incurred from more specific provisions on compliance and environmental improvements would further contribute to proper application of the legislation on industrial emissions and therefore ensure the achievement of environmental objectives as set for instance in the TSAP. This would at the same time result in an increase in the necessary administrative burden estimated at about €40m per year of which some 65% would have to be borne by Member States authorities.

- Positive environmental, economic and social benefits from the stimulation of innovation and the possibility of developing lead markets.

- Elimination of unnecessary administrative burdens of about €30m/year through combined permitting and €2m/year through streamlined reporting and monitoring. Significant administrative costs reduction will also be achieved at Member State level (estimated to be in the order of €150-300m/year) as most opportunities to cut administrative burden are found at the national or regional level (see **Table 1**).

- Significant potential costs savings compared to individual BAT permitting can be expected from the use of emission trading of NO_x and SO2 subject to the possible development of EU-wide rules.

- The overall policy package will not have an impact on the EU budget.

Table 1: Changes in administrative burden as a result of the Commission's proposals

	Administrative burden (per year)		
	Increase of NECESSARY burden (million €)		Decrease of UNNECESSARY burden (million €)
	For Member States	For operators	For Member States and operators
Promotion of combined permitting			- 30
Streamlining of monitoring and reporting			- 2
Actions to reduce unnecessary administrative burden at Member State level			- 150 to - 300
Extension of the scope of the Directive	18	19	
Actions to strengthen compliance and increase environmental improvements	26	14	
Total	**44**	**33**	**- 182 to - 332**
Total Net REDUCTION of administrative burden	**- 105 to - 255 million €**		

The interactions between the different measures can lead to add on effects which have been highlighted in the report. They can also result in multiple benefits, such as environmental benefits and a reduction of the distortion of the internal market or combine environmental, economic and social advantages.

The proposed single Directive on industrial emissions with all the recommended options of the policy package will improve the efficiency of the legislation in achieving its environmental and health objectives in the most cost-effective way. It will also reduce administrative burden, with an expected net reduction estimated between €105 and 255 million per year, and minimise distortions of competition within the EU without hampering the competitive position of European industry.

Annex 1: Summary tables of policy options considered and recommended

The recommended options are grey shaded

1. Support Member States in implementing BAT-based permitting
Role of the BREFs
- Keep the current legal status of the BREFs while clarifying their role (option 1)
- Require that ELVs are normally set within or stricter than the BAT Associated Emission Levels determined in the BREFs and that the reasons for possible deviation due to certain local factors have to be documented (option 2)
- Require that ELVs are set within or stricter than the BAT Associated Emission Levels determined in the BREFs and remove the flexibility for taking certain local factors into consideration (option 3)
Use of sectoral Emission Limit Values (ELVs) versus BAT
- Remove ELVs from sectoral Directives for IPPC installations (option 1)
- Strengthen existing minimum sectoral ELVs to align them with BAT in those sectors (LCPs, certain cement kilns co-incinerating waste, titanium dioxide) where the uptake of BAT is particularly low (option 2)
- Establish a mechanism through Comitology procedure to adapt to scientific and technical progress non-essential technical requirements (option 3)
Status of the BREF process
- Promote a more active voluntary participation in the BAT information exchange and an improved data quality through guidance (option 1)
- Provide possibility for obligatory contribution of Member States to the BAT information exchange through comitology (option 2)
- Introduce full obligatory contribution of Member States to the BAT information exchange (option 3)
2. Strengthen enforcement and environmental improvements, while stimulating innovation
Inspection framework
- Set a general compliance enforcement framework by requiring inspections to be performed, taking into consideration the Recommendation 2001/331 on minimum criteria for environmental inspections (RMCEI) (option 1)
- Strengthen compliance enforcement framework by requiring inspections to be performed on the basis of specific plans and programmes (option 2)
- Set minimum frequency of inspections of 1 site visit per year unless a IPPC inspection programme based on an appropriate appraisal of environmental risks is in place (option 3)
- Set minimum frequency of inspections of 1 site visit per year for all IPPC installations (option 4)
Regular reporting from operators to demonstrate compliance
- Guidance on reporting or use of BREF on monitoring (option 1)
- Requirement for annual (at least) reporting from operators to demonstrate compliance, possibly linked to the E-PRTR annual reporting obligation. Possibly less frequent reporting based on appraisal of pollution potential (option 2)
- Ensure that operators report on the emissions and performance in comparison to BAT as defined in the BREFs (option 3)
Review of permit conditions
- Development of guidance on a methodology for Member States to determine frequencies for permit review (option 1)
- Review of all permits concerned within 4 years after publication of a revised BREF (option 2a)
- Idem, with option to have a prior assessment of the need to review permits at Member State (option 2b)
- Review of all permits concerned with a fixed minimum frequency of 5 or 10 years (option 3)
Facilitating continuous improvement by increasing IPPC's impact on the innovation of BAT
- Improve the use of BREF process to identify emerging techniques and their potential to become BAT (option 1)
- Implement a "lead markets" concept in the field of eco-innovative techniques for IPPC installations (option 2)
- Allow authorities to temporarily authorise permit conditions different from BAT based ones in order to allow testing innovative techniques (option 3)
3. Cut unnecessary administrative burden and simplify legislation
Addressing inconsistency in multiple Directives
- Make amendments to each individual Directive to improve consistency and coherence (option 1)
- Create a new combined Directive integrating the requirements of the current measures (option 2). This could be done at two main levels: firstly by integrating the IPPC Directive with the other immediate industrial emissions Directives (Option 2a or secondly also including other broader instruments like the Seveso II, EIA and Greenhouse Gas Emission trading Directives (option 2b).
- Make no change to the legislation but address inconsistencies through guidance (option 3).

Reducing costs of IPPC permitting and enforcement
- Clarify the flexibility for a permit to cover multiple operators, or installations operated by the same operator but on different sites (option 1) - Allow a "lighter" regulatory approach based on the use of general binding rules with less detailed applications and public consultation (option 2) - Allow authorities to opt not to apply certain monitoring requirements of the WI Directive, where it can be established there is no prospect of the emission limit values being exceeded (option 3) - Establish an action programme with Member States to share best practice and help identify actions to reduce administrative burden at the national or regional level (option 4)
Reducing costs of Member States reporting
- Remove the reporting requirements (option 1) - Streamlining and combining the current IPPC reporting requirements (option 2) - Combining the reporting requirements of the IPPC Directive and other Directives (option 3)
4. Better contribute to the objectives of the Thematic Strategies by reviewing the current scope and provisions of the IPPC Directive
Help achieving the objectives set in the Thematic Strategy on Air Pollution
Combustion installations below 50 MW
- No change in IPPC threshold but update the BREFs to include BAT for combustion installations less than 50 MW (option 1) - Lowering the threshold of the IPPC Directive for combustion installations from 50 MW: * to 20 MW (option 2a) * to a threshold lower than 20 MW (to be determined) (option 2b)
Intensive livestock farming
- Include BAT for manure land spreading as part of the IPPC Directive (option 1) - Include different thresholds for poultry species to reflect the same environmental impacts (option 2) - Extend the scope of the IPPC Directive to cattle farming and include more pig and poultry farms (option 3)
Help achieving the objectives set in the Thematic Strategy on the Prevention and Recycling of Waste
- Clarification of the current scope of the IPPC Directive - Address the inconsistency in the current IPPC scope - Possible addition of other waste treatment activities
Help achieving the objectives of the Thematic Strategy on Soil Protection
Soil monitoring
- Introduction of an obligation of periodic soil monitoring of dangerous substances with a minimum frequency of at least every 5 to 10 years (option 1) - Introduction of an obligation of periodic soil monitoring for dangerous substances with a frequency to be determined on a case-by-case basis, but not less than once every 5 years; criteria for the determination of the frequency to be set through comitology (option 2)
Prevention of soil contamination and site remediation
- At the latest upon cessation of activities, return the site to a state that, taking account of its current use and approved future use, no longer poses significant risk to human health or the environment (option 1) - Establish a baseline report on the state of soil and groundwater contamination by dangerous substances at the start of activities (for new installations) or at the point of permit review (for existing installations) coupled with the obligation, upon cessation of activities, to return the site to the state as established in the baseline report; criteria on the content of the baseline report to be determined through comitology (option 2) - Upon cessation of activities, return the site to a state fit for all possible uses (option 3)
Possible regulation of additional industrial sectors through the IPPC Directive
- For each of the activities identified, the options considered relate to the inclusion of the installations above a certain threshold (specific to each sector) within the scope of the IPPC Directive.
Clarification of current IPPC scope
5. Facilitate possible future use of IPPC-compatible market based instruments such as an emission trading scheme for NO_x/SO_2
- Subject to the adoption of a possible future legal instrument, allow Member States to achieve BAT-based emission levels through an emissions trading system based on EU rules instead of individual BAT-based permit conditions for NO_x and SO_2 (Option 1) - Allow Member States to use nationally determined approaches instead of individual BAT-based permit conditions for NO_x and SO_2 (Option 2)

Annex 2: Consultation process

Advisory Group

The Commission set up the IPPC Review Advisory Group (composed of about 70 representatives of all Member States, Industry and NGOs) which was closely involved in the preparation of the studies carried out by the Commission and contributed largely to the collection of data. Throughout the process a continuous information exchange with stakeholders was carried out.

The list of the members of the Advisory Group, the minutes of the meetings, the comments made by the group on the various studies carried out can be found on the CIRCA web site[196] dedicated to the review process. This allowed stakeholders within and outside the Advisory Group to follow the work being carried out and to provide comments.

Stakeholder Hearing

A Stakeholder Hearing took place on 4 May. About 170 experts participated to this meeting. The main studies carried out by the Commission were presented and the key strategic questions (in particular on the implementation of BAT and Better Regulation) were discussed among two panels and through debates with the audience. The key documents including the minutes of the meeting can be found on the CIRCA web site.

Internet questionnaire

An internet consultation was organized during the period 17 April till 18 June. About 450 responses were received and analysed. Most of the replies originated from private companies (~ 40%), organizations representing the private sector (~ 25%) and individuals (22%). Some national and international environmental NGOs (~ 4%) and some authorities (~ 6%) also responded to the questionnaire. Five countries (UK, Germany, Belgium, France, Spain) accounted each for more than 10% of the total number of responses and together represented more than 65% of the replies received.

The main outcome of the consultation can be summarized as follows:

- The very large majority (more than 97%) of the respondents agreed that the EU legislation should continue to cover all main environmental impacts of the IPPC installations in an integrated way. More than 80% of the respondents expressed their strong agreement with this view.

- Most of the respondents (over 90%) also agreed that the implementation of Best Available Techniques (BAT) should remain the key instrument of the EU policy on industrial emissions. Nearly 70% expressed a strong agreement. About 60% were of the opinion that additional action at EU level was necessary to improve the implementation of the BAT.

- A very large majority (more than 90%) agreed that the BREFs should play a more central role in determining the required standards for industrial installations (but not be binding in order to leave some flexibility in setting permit conditions). About 95% also agreed that

[196] http://circa.europa.eu/Public/irc/env/ippc_rev/library

the possible deviation from the environmental performance associated with BAT given in the BREFs should be documented and justified by the authorities in a transparent way.

- The issue of the possible harmonization through the setting up of EU-wide minimum standards for certain sectors raised split views: about 60% were against and 38% in favour of such an initiative if insufficient progress is made towards the implementation of BAT.

- Most of the respondents (~80%) considered it very or relatively important to set some minimum rules at EU level regarding the issue of inspection. In the field of the monitoring and reporting of emissions, the very large majority (about 90%) expressed support for additional actions at EU level. Fewer respondents (about 50%) supported actions regarding the review of permit conditions to ensure continuous environmental improvement.

- The very large majority (more than 90%) supported specific research that can help to identify new techniques for consideration as potential future BAT. About 60% agreed with the suggestion to allow for temporary derogations from the permit obligations during the testing phase of new innovative techniques with the potential of pollution reduction.

- As regards actions to reduce unnecessary administrative burdens, more respondents (about 75%) supported an amendment of existing legislation to improve their interaction rather than an integration of the pieces of legislation into a single legal framework (about 30%). Furthermore, large support was expressed for the following proposed initiatives: to remove unnecessary monitoring and reporting requirements from operators (90%), to combine and streamline all the reporting requirements from Member States to the Commission (70%) and to develop an Action Plan to assist the Member States to reduce their administrative burden (60%).

- A majority of the respondents (about 75%) disagreed with the suggestion that Member States should have the possibility to reduce SO_2 and NO_x emissions through emission trading (instead of requiring individual BAT-based permits). If such possibility would be established, about 45% of the respondents supported the setting up of rules at EU while 30% had no opinion about this issue.

Annex 3: Main studies carried out by the Commission during the IPPC review process

The main studies carried out by the Commission in 2006 and 2007 in the context of the IPPC review are the following.

- Assessment of implementation of the IPPC Directive by Member States (carried out by ENTEC)

- Assessment of different approaches to implementation of the IPPC Directive and their impacts on competitiveness (carried out by IFO and Carl Bro)

- Assessment of the theoretical emission reduction potential of SO_2 and NO_x due to implementation of BAT in the LCP sector (carried out by the European Topic Centre for Air and Climate Change for the European Environment Agency)

- Assessment of options to streamline legislation on industrial emissions and analysis of the interactions between the IPPC Directive and possible emission trading schemes for NOx and SO2 (carried out by ENTEC)

- Data gathering and impact assessment for a possible review of the IPPC Directive, covering various potential specific amendments (carried out by IEEP and VITO as lead consultants)

- Beyond regulatory compliance: incentives to improve the environmental performance of IPPC installations (carried out by DHV)

- Impact assessment of a possible modification of the IPPC Directive as regards intensive livestock rearing (part of a project on integrated measures in agriculture to reduce ammonia emissions carried out by the consortium Alterra, Wageningen UR, EuroCare, University of Bonn and A&F, Wageningen UR)

- The assessment of the environmental impacts and costs arising from the implementation of the LCP and IPPC Directives for combustion installations with multiple boiler units (study carried out by ENTEC)

- The assessment of the application and possible development of Community legislation for the control of waste incineration and co-incineration (study carried out by Ökopol)

- Assessment of the benefits and costs of the potential application of the IPPC Directive to industrial combustion installations with 20-50 MW rated thermal input (study carried out by AEAT)

The IMPEL network also published 3 reports relevant for the review of the IPPC Directive: the "Interrelationship of the IPPC Directive with other Directives", "Review of compliance promotion, inspection practices and enforcement for IPPC installations" and "Review of approaches to the reconsideration and updating of IPPC permits".

Background information and summary of some of the main studies carried out by the Commission

TITLE: ***Assessment of implementation by Member States of the IPPC Directive.***
Background – information: Entec UK Limited. February 2007 See full report.
Summary The aim of this study is principally: - to determine the number of permits already issued and the number that remain to be issued in each Member States. - to collect information on the permitting process and how permitting data is collected in each Member State. - to select and to analyse specific permits to assess whether they have been issued in accordance with the IPPC Directive. From the data available, around 36.000 existing installations are covered by the IPPC Directive (4 Member States (Germany, France, Spain, UK) represent about 65% of the total number); At the date of state of play (around the end of 2006), about 18.000 installations had been granted a permit under the application of the IPPC Directive. 5 Member States (Germany, France, UK, Netherlands and Belgium) had issues approximately the 76% of the total number of permits. Based on the permitting information, seems to be two groups of Member States, those that issue new permits for existing installations and those that reconsider and update where necessary existing permits. Regarding the pre-IPPC legislation, approximately half of the Member States had an integrated permitting procedure in place before the implementation of the Directive, requiring the application of BAT; in some others Member States, there were significant gaps between their legislation and the IPPC Directive. The study has assessed in details 30 specific permits. The assessment covers in particular the way permit conditions have been determined, whether they are demonstrably based on BAT, whether the installations concerned perform according to BAT and the compliance with the permits. One of the key questions of the analysis is that nearly half of the permits assessed contain conditions not based on BAT.

TITLE: ***Assessment of different approaches to implementation of the IPPC Directive and their impacts on competitiveness.***
Background – information: IFO Institute and Carl Bro Group. December 2006. See full report.
Summary This study builds on a predecessor study by Hitchens et al. (2001) which also focussed on the impact of applying BAT on the economic performance and viability of existing plants in three different industrial sectors in the EU (cement, pulp and paper, non-ferrous metals). The analysed 2 sectors (domestic glass and electric steel making) based on sectoral surveys and questionnaires/interviews of operators and authorities. No significant impact of IPPC implementation on competitiveness was identified in the large majority of the sub-sectors analysed. Some short-term impacts were identified for certain sub-sectors which face a high degree of price competition from non-EU competitors and important jumps in the stringency of regulation (where pre-IPPC regimes were very lenient). However, no long term impacts on growth were identified. The costs of BAT implementation were found to be only one small factor compared to other issues such as labour costs, raw material or energy costs. The study also reported information showing that competitive distortions can result from different levels of stringencies and regulatory quality.

TITLE: ***Assessment of the theoretical emission reduction potential of SO_2 and NOx due to implementation of BAT in the LCP sector.***
Background – information: European Topic Centre Air and Climate Change of the European Environment Agency. Draft Final report – July 2007. See full report.
Summary The study assesses the theoretical reduction potential of emissions to air which would occur if BAT were fully introduced in large combustion plants (LCP) within EU-25. An indication is also provided of the potential effect of implementing the LCP Directive emission limit values (ELVs) at the facilities included within the scope of the work. For 450 facilities, the 2004 emissions as reported to EPER were combined with data on their fuel use, capacity and installed abatement techniques (Platts database197) in order to compare the current situation with the situation where the emissions from all facilities would be within the BAT range set in the BREF on Large Combustion Plants or below the emission limit values form the LCP Directive. The results of the study clearly indicate that emissions of NOx and SO2 from the facilities considered can be significantly reduced if BAT were to be implemented. For NOx, they would be 59-87 % lower compared to 2004 if all plants would perform according to the upper (less strict) and lower (more strict) end of BAT, respectively. For SO2, the emission reduction would then be 80 - 97 %. By far the largest emission reductions would occur at coal- and lignite-fired plants. Clear differences between Member States were found, with only a few where LCPs seem to be well on the way to fully implementing BAT, while for most, the reported EPER emissions (2004) appear to be much higher than the expected BAT performance (by a factor of two to three compared to the upper end of the BAT ranges). When comparing the reported NOx and SO2 emissions for 2004 from the 450 facilities included in the study with those corresponding to the LCP Directive ELVs, the gap is much smaller (50 % and 150 % respectively). The study also includes a sensitivity analysis for some major assumptions and a Monte Carlo simulation to assess the importance of the uncertainties in a few important parameters, used in the calculations. The quantitative levels of the reduction potential appear to be relatively insensitive to these assumptions and parameter values.

TITLE: ***Assessment of options to streamline legislation on industrial emissions and analysis of the interactions between the IPPC Directive and possible emission trading schemes for NO_x and SO_2.***
Background – information: Entec UK Limited (including the Institute for European Environmental Policy, the Regional Environmental Centre for Central and Eastern Europe, CE Delft and Burges Salmon). June 2007. See full report
Summary The purpose of the study is to evaluate the scope to improve the functioning of the Directive, its coherence with other industrial emissions legislation and the effectiveness of market-based instruments in this context, while not altering its main underlying principles and level of ambition, and the EU's overall approach to controlling the environmental impacts of industry. The intention was to go beyond general statements or anecdotal comments on inconsistency, duplication and other possible difficulties. The objective was to provide clear, precise, practical and quantitative information illustrated by real examples, in order to make the problems, consequences and possible solutions clear. Based on the problematic interactions (analysed in the study), possible objectives for future policy to address those issues were identified. A number of possible policy scenarios (6) aimed at achieving those objectives were developed. The study contains the assessment of the economic, social and environmental impacts of possible streamlining options based around policy scenarios involving different degrees of interaction of legislation, BAT-based permitting, emission limit values and the interaction of the IPPC Directive and possible emission trading schemes for NOx and SO2 at national or EU level.

197 **Platts** (http://www.platts.com/) is a provider of energy information

TITLE: ***Data gathering and impact assessment for a possible review of the IPPC Directive, covering various potential specific amendments.***

Background – information:

3 specific studies have been carried out in this context:

- Data gathering and impact assessment for a possible review of the IPPC Directive, Final report to the European Commission, IEEP, BIO, VITO, Part I, December 2006 – See full report

- Data gathering and impact assessment for a possible review of the IPPC Directive, Final report to the European Commission, IEEP, BIO, VITO, Part II, September 2007 - – See full report

- Data Gathering and impact assessment for a review and possible widening of the scope of the IPPC Directive in relation to waste treatment activities, Final Report to the European Commission, September 2007 – See full report

Summary

This work aimed to collect data on a range of issues seen as areas to consider for potential "technical" amendments to the IPPC Directive, to identify different options that could address these issues, and explore the pros and cons of different options. The work included, where needed, the development of methodologies to assess the environmental, economic and social impacts of the different options and to develop substantiated arguments for the various options. The aim of this project was to present the arguments and analysis for different options in a transparent and balanced manner so as to facilitate the European Commission's task of deciding what policy options are the most appropriate for each of the areas under consideration.

TITLE: ***Beyond regulatory compliance: incentives to improve the environmental performance of IPPC installations.***

Background – information: DHV Group. December 2006. See full report.

Summary

The main aim of this study was to identify and assess tools or instruments that encourage IPPC installations to change their behaviour and to innovate and perform beyond regulatory compliance.

The specific instruments assessed in the case studies are the environmental charge on NO_x emissions in Sweden, the Performance Track in the US, the Green network in Denmark, the Solvent tax in Switzerland and France, the energy efficiency policies in Slovenia and the Netherlands and the assessment of the development of emerging techniques.

For all of the instruments described in the case studies no real barriers to the use of these complementary tools in parallel to the IPPC Directive were found. Some instruments appeared to fit better to the main IPPC principles (networking programs fitting very well with the integrated approach) than others (energy efficiency, taxes and charge instruments). However, the latter instruments seemed to result in more significant environmental impacts, in many cases beyond regulatory compliance.

TITLE: ***Impact assessment of a possible modification of the IPPC Directive as regards intensive livestock rearing (part of a project on integrated measures in agriculture to reduce ammonia emissions).***

Background – information: Alterra, Wageningen UR, EuroCare, University of Bonn and A&F, Wageningen UR. June 2007. See full report.

Summary

The general objective of the service contract is to have defined the most appropriate, integrated and consistent actions to reduce nitrogen (N) emissions from agriculture to atmosphere, groundwater and surface waters under the integrated approach set out by the Thematic Strategy on Air Pollution.

Part of this study was to assess the impacts of the possible extension of the IPPC Directive in agriculture. The analysis shows in particular that the IPPC pig and poultry installations contribute to large extent to the emissions of ammonia because of the large number of animals (20 to 80%) that fall under the IPPC Directive. The study provides detailed analysis of the possible extensive of the Directive in particular in view of the objectives of the Thematic Strategy on Air Pollution.

TITLE: ***The assessment of the environmental impacts and costs arising from the implementation of the LCP and IPPC Directives for combustion installations with multiple boiler units.***

Background – information: ENTEC UK Ltd, Final report for the European Commission, November 2007. See full report.

Summary

The purpose of this study was to provide the Commission with a summary of the data collection and analysis that has been undertaken looking at the environmental impacts and costs arising from implementation of the LCP and IPPC Directives for combustion installations with multiple boiler units.

The objective was to gather information from a number of existing large combustion plants and then to evaluate the environmental and cost differences of implementing the LCP Directive by applying different interpretations of the definition of 'combustion plant' (boiler, flue and common stack) and also to compare this with implementation of the IPPC Directive.

This was done for 43 case study installations from 9 Member States, covering different sectors, fuels and capacities. For each case study installation, a number of different emission reduction scenarios were considered based on the emission limit values or BAT-AELs that would need to be achieved. 'Low-operating' plants (< 1,500 hours per year) were considered separately. For each case, the costs and benefits of achieving the emission targets under the different scenarios were calculated and compared.

TITLE: *•The assessment of the application and possible development of Community legislation for the control of waste incineration and co-incineration*
Background – information: Ökopol, Final report for the European Commission, November 2007. See full report.
Summary The objective of this study was to provide the Commission with an assessment of the implementation of the Waste Incineration Directive (WID) 2000/76/EC, with proposals for possible amendments of this Directive and with assessments of those possible amendments. This is to provide a basis of the review foreseen by Article 14 of the WID, to facilitate possible further development of the Directive and to provide an input in the broader context of the review of the IPPC Directive and related legislation. The report presents the results in three general sections: • Information on the implementation of the WID in the Member States, • Case studies on costs and benefit of the implementation, • Options for amendment of the WID

TITLE: *Assessment of the benefits and costs of the potential application of the IPPC Directive to industrial combustion installations with 20-50 MW rated thermal input*
Background – information: AEA Technologies (in co-operation with VITO), Final report for the European Commission, November 2007. See full report.
Summary The current IPPC Directive covers combustion installations above 50 MW in energy industries, while Directive 2003/87/EC on establishing a scheme for greenhouse gas emission allowance trading (EU ETS) includes combustion installations above 20 MW. This study analyses the costs and benefits of adopting thresholds similar to those under EU ETS for installations under the IPPC regime. The project involved gathering data on combustion installations (emissions, abatement measures and their costs, emission reduction potential) and existing emission legislation in selected Member States. This information was then extrapolated to the other Member States and the whole EU. A baseline emission scenario was developed and then compared with several potential emission control scenarios. The emission control scenarios represent a range in emission control levels such as application of LCP Directive emission limits, of BAT Association Emission Levels as described in the LCP BREF, the most stringent national regulations and a maximum feasible reduction scenario. A 20-50 MW installation mostly consist of different combustion units whose capacity is usually significant smaller than the one of the whole installation. More than half of the combustion units have a capacity smaller than 3 MW. The analysis shows that despite low load factors evident for small combustion installations and the large number of small combustion units (<3 MW); the environmental and health benefits of all the selected reduction measures outweigh the compliance and administrative costs.

Annex 4: Background data on industrial emissions

Table 2: Significance of air emissions from industrial sources (including farms falling under IPPC) at EU level

Pollutant / Source / Year	Total emissions, *kt*	Industry sources, *% of total*	IPPC sources, *% of total*	Total emissions, *kt*	Industry sources, *% of total*	IPPC sources, *% of total*
	Year 2005			**Year 2010**		
CO_2[1]	4,217	55%	~ 55%	4,298	54%	~ 54%
NO_x	11,211	36%	~ 34%	9,590	38%	~ 36%
SO_2	7,808	88%	~ 83%	5,462	88%	~ 83%
NH_3	3,835	96%	~ 38%	3,570	96%	~ 39%
PM	4,038	51%	~ 43%	3,725	51%	~ 43%
VOC	8,963	55%	~ 55%	7,294	59%	~ 59%

(1) According to article 9(3) of the IPPC Directive, the permit of an installation shall not include an emission limit value for direct emissions of CO_2 for activities which are specified in Annex I to Directive 2003/87/EC. However, energy efficiency is part of the general principles of the IPPC Directive and of the definition of BAT. Furthermore, Member States may decide not to impose requirements related to energy efficiency.

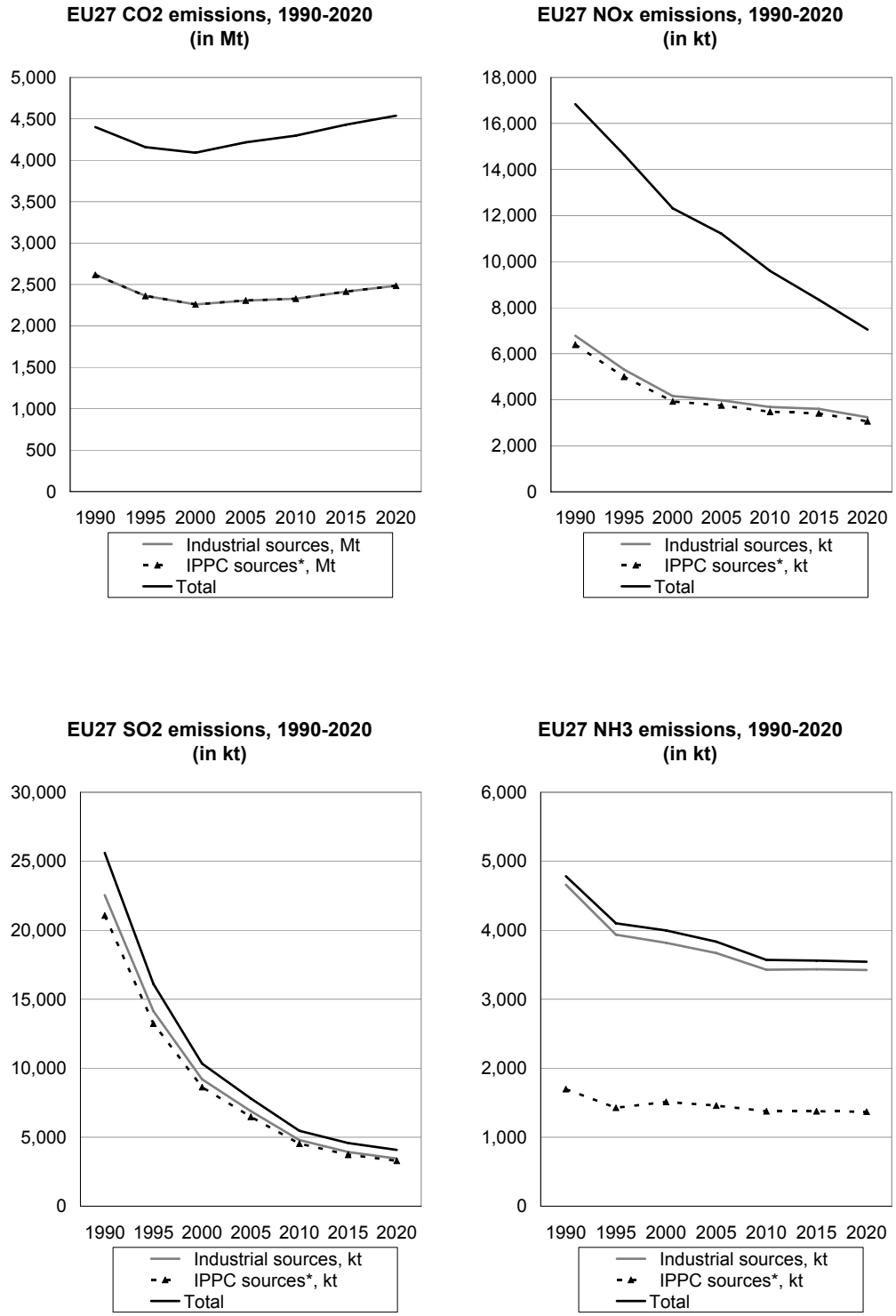
Source: Regional Air Pollution Information and Simulation model (RAINS) baseline (version: Aug. '06), IIASA Institute (Laxenburg, Austria), IPPC background studies

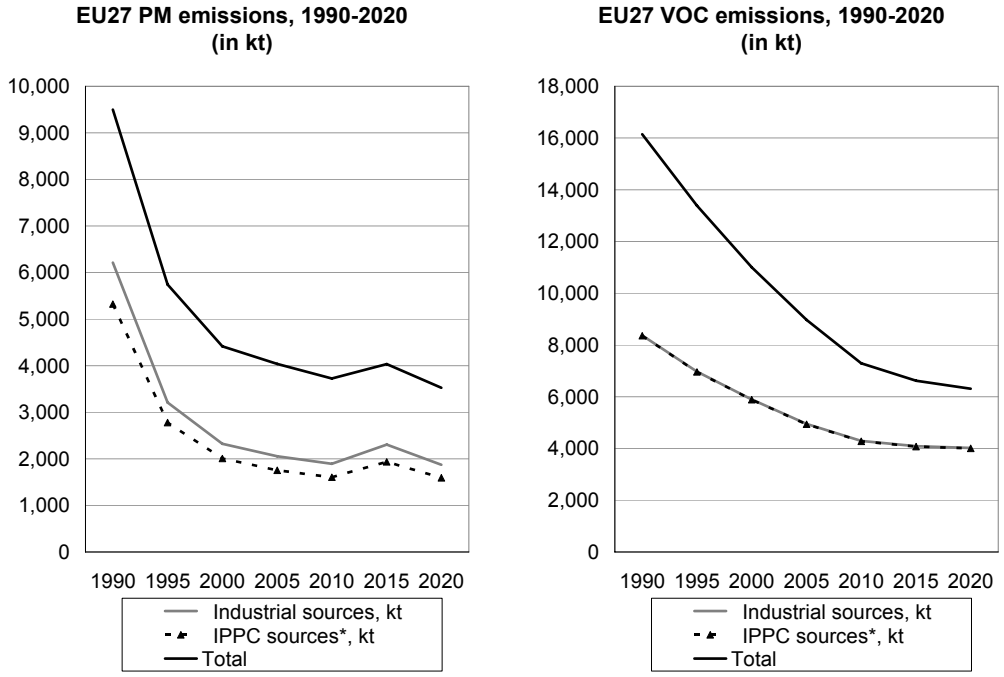
Table 3: Significance of other pollutant emissions from industrial sources at European level

Pollutant	Total emissions	IPPC sources[1]		IPPC sources[1]	
		Year 2001 (EU15)		Year 2004 (EU25)	
	To air and water	To air	To water	To air	To water
Mercury and its compounds (tonnes/year)	~ 141 [2]	24 (17,0%)	2,0 (1,4%)	32 (22,8%)	4,8 (3,4%)
Dioxins and furans (kg TEQ/year)	5,6 [3]	0,79 (14,1%)	-	1,4 (25,2%)	-

(1) Direct emissions. Source: EPER (EEA).
(2) Emissions in 2000 for EU-27. Source: EC Mercury Strategy, Impact Assessment, 2005.
(3) 'Identification, assessment and prioritisation of EU measures to reduce releases of unintentionally produced/released Persistent Organic Pollutants.', BIPRO, 2006. The values refer to EU25 for 2000-2003. Other sources indicate annual releases of dioxins to air to be around 6 kg in EU27, out of which industry's share is 20-35%.

Figure 1: Trend in industrial emissions





Source: RAINS baseline, IIASA

Estimation of overall impacts of IPPC installations

According to EPER, total 2004 EU-25 emissions of NEC pollutants were as follows (in tonnes):

NH_3	126.000
NO_x	3.226.000
PM10	235.442
SO_x	5.110.000
VOC	533.000

According to the latest EPER review report, however, these figures do not represent all the emissions from IPPC installations (only emissions above certain thresholds specified in the EPER Decision are reported) but only the following percentages:

NH_3	61%
NO_x	97%
SO_x	99%
VOC	93%
PM 10	91%

The figures can therefore be scaled up to 100% for each pollutant, and then multiplied by the following externality cost factors (in €/tonne) developed during the production of the thematic strategy on air pollution (and reproduced in the IPPC economics and cross-media reference document):

NH_3	11.000 - 31.000
NO_x	4.400 - 12.000
PM2.5	26.000 - 75.000
SO_2	5.600 - 16.000
VOC	950 - 28.000

The health impacts and benefits outlined above have been expressed in monetary terms, using the approach outlined in the CAFE Cost Benefits Analysis (CBA) methodology reports[198] There are two methods that can be used for the valuation of mortality impacts – the value of statistical life (VSL, applied to the change in number of deaths) and value of life year (VOLY, applied to changes in life expectancy). For the CAFE CBA methodology, the independent external peer reviewers and several stakeholders suggested that both the VSL and the VOLY approaches be used, to show transparently the variation in results arising from use of these two approaches. It was noted above that despite major differences in the unit valuations, there is significant overlap in the ranges of analysis based around use of the VOLY and VSL approaches.

The abovementioned factors are EU-25-wide averages (excluding Cyprus), with the lower estimates being based on the VOLY median while the high ones are based on the VSL mean.

It is noted that EPER data are for SO_x and PM10 whereas the externality cost factors are for SO_2 and PM2.5. Therefore, there is some inaccuracy in multiplying the two figures together. However, since the figures are only being used for illustration of the partial impacts of IPPC installations, and not as a precise quantification, this is not considered a serious deficiency.

Repartition of IPPC installations across Member States and sectors

The information provided in the following tables and figures is based on data provided by Member States as part of their reporting requirements. The data have been summarized and analysed in a study[199] carried out for the Commission.

198 Holland, M., Hunt, A., Hurley, F., Navrud, S., Watkiss, P. (2005a) Methodology for the Cost- Benefit analysis for CAFE: Volume 1: Overview of Methodology http://cafe-cba.aeat.com/files/CAFE%20CBA%20Methodology%20Final%20Volume%201%20v4e.pdf; Holland, M., Hurley, F., Hunt, A. and Watkiss, P. (2005b) Methodology for the Cost-Benefit analysis for CAFE: Volume 3: Uncertainty in the CAFE CBA http://cafe-cba.aeat.com/files/cba_method_vol3.pdf.

199 ENTEC, 2007 (a)

Table 4: Number of Existing Installations in each Industrial Category (Based on Available Data for 2006)

Annex 1 Category of Industrial Activity	Total Number of Existing Installations	% of Existing Installations
1. Energy Industries	2,341	6.5%
2. Production and Processing of Metals	4,237	11.8%
3. Minerals Industry	2,006	5.6%
4. Chemicals Industry	4,931	13.7%
5. Waste Management	5,079	14.1%
6. Other Activities - 6.6(a)	7,106	19.7%
7. Other Activities – 6.6(b)	3,707	10.3%
8. Other Activities - other	6,051	16.8%
9. Unallocated [1]	545	1.5%
10. Unaccounted [2]	-4	0.0%
TOTAL	35,999	100.0%

Notes

1. The unallocated for total includes the total number of existing installations for Slovakia, since the data provided in this case was not broken down by industrial category.

2. Unaccounted for installations where the calculated total number of installations based on information received from individual member states (and the sum of installations in each sector) differs from the reported total number of installations.

Table 5: Number of Permits[1] Issued, Reconsidered and Updated for Existing Installations in each Annex 1 Category of Industrial Activity by Member State[200]

MS	1. Energy industries	2. Production and processing of metals	3. Minerals industry	4. Chemicals industry	5. Waste management	6. Other activities - 6.6(a)	6. Other activities - 6.6(b)	6. Other activities - other	Not allocated into industrial category	Unaccounted 2	Total number of permits issued, reconsidered and updated 3
Germany	553	866	370	1854	996	1071	698	308	0	0	6716
France	90	238	54	158	454	469	663	102	0	0	2228
UK	92	325	126	356	403	662	20	8	0	0	1992
Netherlands	48	77	17	91	138	275	400	397	0	0	1443
Belgium 4	57	134	22	150	80	179	468	0	0	9	1099
Denmark	62	63	76	61	200	136	444	0	0	0	1042
Hungary	33	50	40	46	112	101	154	170	0	0	706
Spain	9	33	41	43	128	134	96	112	0	0	596
Czech Republic	58	43	36	91	69	81	10	56	0	0	444
Ireland 5	37	25	5	58	54	57	3	89	0	-17	311
Slovakia 6	0	0	0	0	0	0	0	0	283	0	283
Finland	35	41	14	37	48	43	49	11	0	0	278
Poland 7	32	11	21	12	21	15	10	16	0	0	138
Lithuania	19	1	7	5	28	20	15	21	0	0	116
Austria 11	15	17	10	9	31	16	0	0	0	0	98
Portugal	3	8	6	3	3	27	3	1	0	0	54
Latvia	4	2	5	3	1	4	8	16	0	0	43
Luxembourg	1	13	4	0	6	1	0	0	0	0	25
Estonia	2	2	4	1	1	6	0	3	0	0	19
Cyprus	3	2	9	0	0	1	0	0	0	0	15
Greece 8	5	1	0	0	0	0	0	0	0	0	6
Malta	0	0	0	0	0	0	0	0	0	0	0
Slovenia	0	0	0	0	0	0	0	0	0	0	0
Italy 9	NIA 10	NIA	NIA	NIA	NIA	NIA	NIA	NIA	NIA	NIA	NIA
Sweden	NIA	NIA	NIA	NIA	NIA	NIA	NIA	NIA	NIA	NIA	NIA
TOTAL	1158	1952	867	2978	2773	3298	3041	1310	283	-8	17652

[200] Based on Available Data, and ordered in descending order of total number of permits issued, reconsidered and updated.

Notes

1) "Existing installations" are as defined by Article 2(4) and "permits" as defined by Article 2(9);

2) Unaccounted for permits are where the calculated total number of permits based on information received from individual member states (and the sum of permits in each sector) differs from the reported total number of permits issued, reconsidered and updated. The cause of this uncertainty is in some cases due to no differentiation in reported data on where installations have multiple permits;

3) For some MSs, where multiple permits may be issued for a single installation the total number of permits issued, reconsidered and updated does not necessarily equal the total number of existing installations;

4) Based on information submitted by Belgium, the total number of permits issued, reconsidered and updated is slightly more (9 permits) than the summed totals of permits issued in each category of industrial activity. Also, the total indicated for category 6.6a is the total for category 6.6 in this MS;

5) Based on information submitted by Ireland, the total number of permits issued, reconsidered and updated is slightly less (17 permits) than the summed totals of permits issued in each category of industrial activity;

6) Slovakia has not provided a breakdown by sector, only the total number of permits issued, and therefore this total is included in a separate column;

7) For more up-to-date information see the Ministry of Environment's website;

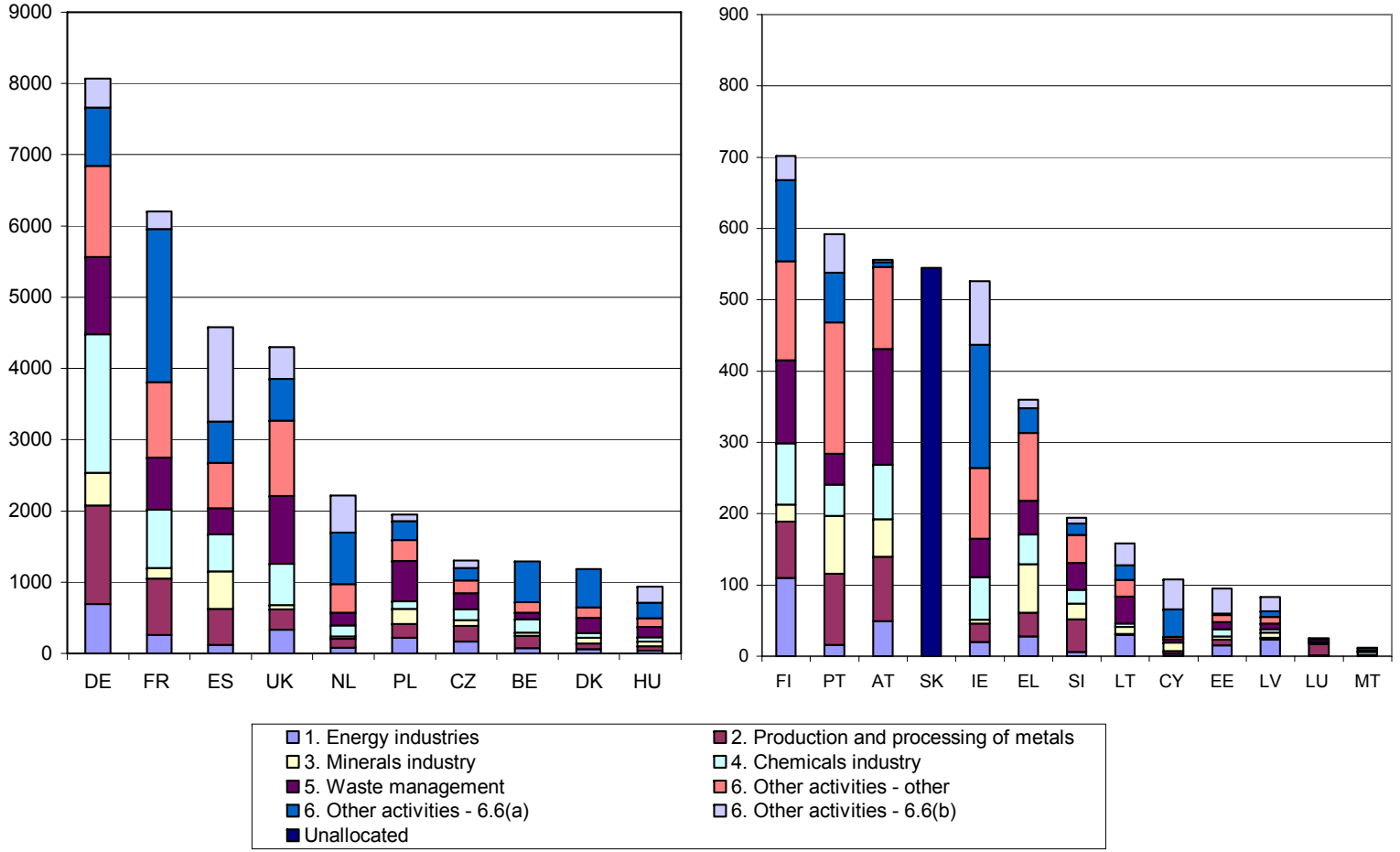
8) More recent information provided by Greece has indicated that the number of permits issued is 7 (1. Energy Industries), 1 (2. Production and Processing of Metals);

9) Partial information was provided in December 2005 and September 2006 by Italy, although this is not included in this analysis due to the information being incomplete. According to the partial information received in a letter from Italy, the data provided is not 'official data', and represents the estimated number of existing installations based on checks done across each relevant sector. However, only 43 out of 54 authorising authorities have responded to a request for information, and of these 7 have provided data that is incomplete or associated with queries. The Italian authorities have indicated that the estimated number of existing installations is circa 8,147. Italy has provided more specific information from certain authorities covering 2735 installations. Out of this total, around 152 had been granted a permit;

NIA is an abbreviation of No Information Available

Permitting progress is likely to be much higher than the figures provided for the state of play.

Figure 2: Number of Existing Installations in each Annex 1 Category of Industrial Activity by Member State (Based on Available Data)



Future evolution of the numbers of installations covered by the IPPC Directive

In view of the large number and variety of sectors covered, it was not possible to obtain data from each industrial sector on the evolution of the number of installations expected to be covered by the IPPC Directive in the future due for instance to economic growth or changes in the structure of the sectors. No overall presentation of the evolution could therefore be developed but information about the evolution of specific sectors can be found in the individual sectoral BREFs[201].

Furthermore, the various sections of this Impact Assessment contain information about current and expected number of installations for the sectors subject to a specific analysis. This includes for instance projections under the RAINS model on the level of activity in the energy sectors (see in particular for more details Annex 5). Projections could also be made for the intensive livestock farming sector under the RAINS, MITERRA-EUROPE and CAPRI models (see section 7.1.2 and Annex 11) and for some specific sectors which were subject to assessment of inclusion under the IPPC Directive (see section 7 and Annex 11).

[201] http://eippcb.jrc.es/pages/FActivities.htm

Annex 5: Cost optimized emission reductions to achieve the TSAP objectives (2020)

Cost-optimized emissions to achieve TSAP in 2020
Range: EU27, based on NEC Scenario Analysis report 5, Tables 6.7 - 6.11 (June 2007)

COMPARISON AT TOTAL (EMISSIONS) LEVEL under National Projections scenario

Comparison of cost-optimized NECD emissions (to meet TSAP targets in 2020) with emissions in 2000 (ktonnes)

Absolute figures	SO2	NOx	PM2.5	VOC	NH3
Emissions in 2000	10.322	12.322	1.782	11.007	3.975
MS baseline 2020	4.074	7.011	1.171	6.321	3.594
Cost-optimized NEC emissions 2020 (TSAP targets)	**2.194**	**4.909**	**945**	**5.250**	**2.746**

Changes (%)	SO2	NOx	PM2.5	VOC	NH3
2000 -> Nat Proj MS BL	-61%	-43%	-34%	-43%	-10%
2000 -> TSAP targets	-79%	-60%	-47%	-52%	-31%
Nat Proj MS BL -> TSAP targets	**-46%**	**-30%**	**-19%**	**-17%**	**-24%**

COMPARISON FOR INDUSTRY under National Projections scenario
Note: does not include "waste treatment" and "agriculture"
Comparison of cost-optimized NECD emissions (to meet TSAP targets in 2020) with emissions in 2000 (all in ktonnes)

Absolute figures	SNAP sector	SO2	NOx	PM2.5	VOC	NH3
Emissions in 2000	1. Energy industries	7.009	2.495	199	108	6
	3. Combust. in industry	1.516	1.416	143	56	4
	4. Production processes	650	237	236	1.157	75
	TOTAL Industry	**9.175**	**4.148**	**578**	**1.321**	**85**
Nat Proj MS baseline 2020	1. Energy industries	1.774	1.482	140	101	13
	3. Combust. in industry	1.109	1.488	132	79	6
	4. Production processes	568	259	204	1.109	64
	TOTAL Industry	**3.451**	**3.229**	**476**	**1.289**	**83**
Emissions for cost-optimized scenarios in 2020 (TSAP targets)	1. Energy industries	971	862	69	101	21
	3. Combust. in industry	542	626	92	79	14
	4. Production processes	297	129	110	899	54
	TOTAL Industry	**1.810**	**1.617**	**271**	**1.079**	**89**

Changes (%)	SNAP sector	SO2	NOx	PM2.5	VOC	NH3
2000 -> Nat Proj MS BL	1. Energy industries	-75%	-41%	-30%	-6%	117%
	3. Combust. in industry	-27%	5%	-8%	41%	50%
	4. Production processes	-13%	9%	-14%	-4%	-15%
	TOTAL Industry	**-62%**	**-22%**	**-18%**	**-2%**	**-2%**
2000 -> TSAP targets	1. Energy industries	-86%	-65%	-65%	-6%	250%
	3. Combust. in industry	-64%	-56%	-36%	41%	250%
	4. Production processes	-54%	-46%	-53%	-22%	-28%
	TOTAL Industry	**-80%**	**-61%**	**-53%**	**-18%**	**5%**
Nat Proj MS BL -> TSAP targets	1. Energy industries	-45%	-42%	-51%	0%	62%
	3. Combust. in industry	-51%	-58%	-30%	0%	133%
	4. Production processes	-48%	-50%	-46%	-19%	-16%
	TOTAL Industry	**-48%**	**-50%**	**-43%**	**-16%**	**7%**

Emission projections for SO_2 and NO_x for 2020 were made under RAINS using the "National Projections" scenario, based on the energy projections from Member States as communicated to IIASA between the end of 2005 and early 2007 (where such projections were not available, the PRIMES €20 energy projections were used).

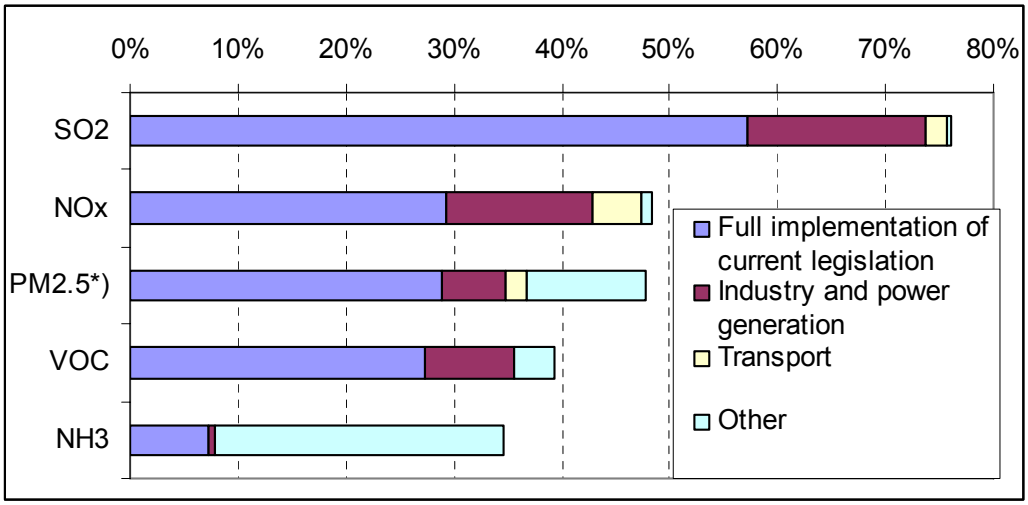
For the **overall NEC emissions**, this shows that - despite the significant emission reductions compared to 2000 - the projected EU 27 "baseline" emissions for 2020 (including the "current legislation" being implemented by Member States) are significantly higher than the (cost-optimized) emissions needed to achieve the objectives of the Thematic Strategy on Air Pollution (TSAP), in particular for SO_2 and NO_x.

Additional emission reductions of 46% and 30%, respectively, of the 2020 baseline emissions would be needed to achieve the TSAP targets.

Looking only at the **emissions from industrial sources** (the 3 sectors indicated), the figures indicate that 2020 emissions here would need even larger additional cuts (48% for SO_2, even 50% for NO_x) to achieve the EU-27 overall "industry TSAP (sub-)targets".

Another illustration of this issue is the following (see figure below). It shows the emission reduction needed in 2020 to meet the TSAP objectives compared to the NEC 2010 ceilings. On top of the implementation of "current legislation", further measures are necessary, in particular in the industry and power generation sector.

Figure 3: Total emission reductions in 2020 beyond the National Emission Ceilings (2010) through current and additional measures in order to achieve the 2020 objectives of the Thematic Strategy on Air Pollution



It should be noted that the National Projections baseline mentioned above will not be the final one to be applied for the future policies on air quality as Member States' national energy projections used would lead to an increase of CO_2 emissions in 2020 as compared to the Kyoto baseline. This is not in line with the agreement reached by the European Council in March 2007 on the objectives regarding the reduction of greenhouse gas emissions by 20% in 2020 as compared to 1990 as well as increasing the share of renewables to 20%.

In order to take the future EU policies on reducing GHG emissions and energy into account, new projections of emissions are currently being calculated. As a first estimate of the effect of these policies, a so-called "coherent scenario" was developed[202], with a drastically different projected fuel mix, leading to domestic CO_2 emissions being reduced by 20% in 2020 as compared to 1990, and renewable energy constituting about 17% of the total primary energy used. Although this is not the final new baseline, it has shown that the envisaged policy decisions concerning GHG emission reductions and energy will also have very strong impacts towards the air pollution policy.

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[202] NEC Scenario Analysis Reports 4 and 5 IIASA, 2007. http://ec.europa.eu/environment/air/iam_nec_dir.htm

An updated PRIMES baseline was finished by DG TREN in July 2007. On that basis, new scenarios are being developed in the framework of an agreement on the sharing of the 20% GHG reduction and 20% renewables targets among Member States. Results will be used for the revision of the NEC Directive. At this moment, it may be assumed that the fuel mix projected for the new baseline will be intermediate between the National Projections and the Coherent Scenario ones since a large part of the reduction in GHG emission will come from non-CO_2 greenhouse gases. This implies that the reduction in CO_2 emissions in 2020 compared to 1990 will be around 15%. Consequently, SO_2, NO_x and PM emissions are likely to be reduced less due to the shift in fuel mix than assessed under the coherent scenario. This implies that there will be a greater need for additional measures (BAT or beyond) to meet the targets of the TSAP.

Annex 6 : Background information on competitiveness impacts

The information provided is based on the outcome of a study carried out by IFO and Carl Bro in the context of the IPPC review [IFO, 2006] on the analysis of the impacts of IPPC implementation on competitiveness. A literature review was carried out as well as a detailed analysis of 2 specific sectors.

General issues related to competitiveness - literature review

- Some studies highlight the concern that the private costs imposed by stringent environmental policy impair competitiveness and productivity.

- However a number of other studies *[in particular based on the important work of Porter]* show that environmental regulation spurs innovation in a number of ways. There are "win-win" opportunities where simultaneously pollution is reduced and productivity increased. These studies show a type of "first mover advantage" by the development of environmental technology from which firms can benefit in later times when other countries also have to adopt stricter environmental legislation *[see for instance work done by OECD]*

- The mixed results from these studies can be explained by the different methodologies used and highlight the problem that there is no coherent distribution of evidence across the various hypotheses in the environment / competitiveness debate.

- However, existing studies stressed that costs resulting from environmental legislation are most generally a small factor influencing competitiveness. Other competitive factors, such as labour costs in major non-EU competitor countries, exert a higher degree of pressure on EU producers.

- It is therefore very important to assess the potential impacts on competitiveness using robust methodologies based on sectoral and micro-level analysis, as in the case of the IPPC studies on competitiveness.

IPPC Studies

Hitchens, 2002: this study was carried out by the Commission on 3 sectors (pulp and paper, non-ferrous metals and cement) based on more than 100 interviews: the study found hardly any negative impacts on competitiveness (including on SMEs) but pointed out that eventual impacts would depend on the type and pace of IPPC implementation, stressing the importance of the timing of BAT investments (in particular to link them to overall investment cycles of specific sectors).

Summary [IFO, 2006] of the 3 main results of the case study applied to pulp and paper manufacture, cement and lime production and non-ferrous metals processes are as follows:

1. Primary measures (process-integrated measures) had a generally positive impact on productivity and plant performance. Secondary (i.e. end-of pipe) measures had a mixed impact on plant performance: some had a positive impact, others were neutral and others had a negative effect.

2. When BAT measures as a whole were related to plant performance, strong BAT/environmental performers were not economically disadvantaged, i.e. they were not doing any worse than any other plants with less BATs in place and still having higher emissions. In many cases there were special circumstances which facilitated good

environmental performance at minimum compliance cost. These facilitating factors comprised: high physical productivity (this illustrated the strong competitive position of a plant), modern or technically up to date machinery (this ensured efficient production both in economic and natural resource terms), plant growth (both in terms of turnover and physical output), high quality human capital inputs (including skills, management and R&D), continuous investment in environmental initiatives (was found to be important with respect to the size of investment required for the adoption of BAT; this investment could be related to location and the history of regulation in a particular Member State). ownership (was found to be important due to reasons of economies of scale in multinational enterprises, use of human capital, experience and, where necessary, plant rationalization).

3. Many plants with a strong environmental performance were able to use this as a competitive strength. Infrequently was environmental performance considered a competitive disadvantage.

IFO, 2006: the Commission consulted all main IPPC industrial sectors calling them to participate to this analysis. Only 2 sectors (domestic glass and electric steel making) agreed to collaborate to this project. The analysis is based on sectoral surveys and questionnaires/interviews of operators and authorities.

- no significant impact of IPPC implementation on competitiveness was identified in the large majority of the sub-sectors analysed

- some short-term impacts were identified for certain sub-sectors which face a high degree of price competition from non-EU competitors and important jumps in the stringency of regulation (where pre-IPPC regimes were very lenient). However, no long term impacts on growth were identified (IPPC is only one small factor compared to other issues such as labour costs, raw material or energy costs).

- The study collected data on IPPC administrative costs showing that these are insignificant.

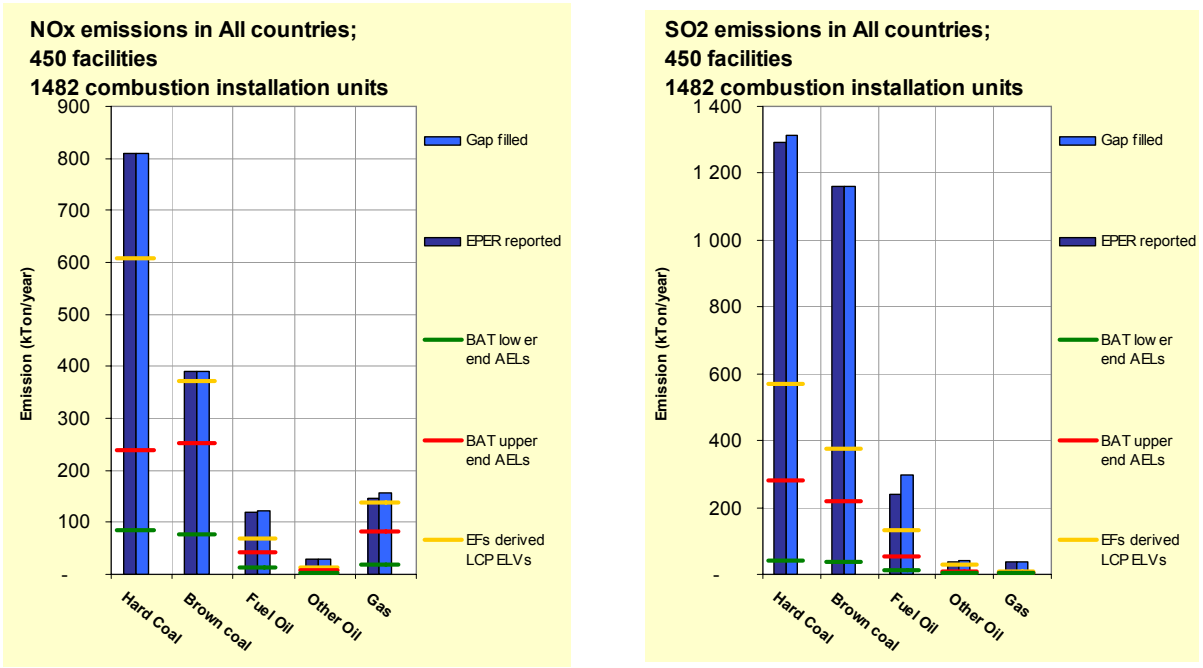
- The study has also reported information showing that competitive distortions can result from different levels of stringencies and regulatory quality. For instance, interviews of environmentally high performing plants have revealed that their competitive position would improve (in the sense of a more level playing field) if the stringency of regulation in previously more leniently regulated countries was to increase.

Annex 7: Background data on LCP emissions of SO_2 and NO_x

1. Comparison of BAT associated emission levels with EPER 2004 reported emissions (EEA, 2007(a))

The following figures gives an overview of the outcome of the assessment for EU 25 for NO_x and SO_2 comparing the EPER 2004 reported data (*blue bars*), the emissions which would be achieved when applying BAT (upper and lower end of the ranges: *red and green lines, respectively*) and the emissions corresponding to the LCP Directive's emission limit values (*yellow lines*).

Figure 4: Assessment of the theoretical emission reduction potential of SO_2 and NO_x due to implementation of BAT in the LCP sector



The different marker lines in the graphs represent the level of emissions expected when using the lower and upper end of the BAT ranges (AELs) for emission estimations as well as emission factors derived from the LCP Directive's emission limit values.

2. Comparison of particular emission levels associated with BAT (ranges) from the LCP BREF with corresponding emission limit values from the LCP Directive (minimum requirements)

The following table illustrates some of the big differences between the emission limit values of the LCP Directive (for existing plants) and the range of emission levels associated with BAT as defined in the LCP BREF (for existing installations). For the sake of simplification, the BAT ranges mentioned are the broadest possible ranges from the BREF (using the lowest and highest concentration mentioned in all ranges for the particular type of fuel and capacity class). Within these, narrower specific BAT ranges may in fact apply for a certain combustion technology and/or fuel type (e.g. hard coal vs lignite).

This comparison does not take into account the possible derogations under the LCP Directive, which allow setting less stringent emission limit values.

Table 6: Comparison of LCP Directive and LCP BREF

Fuel type	**Rated thermal input**	**SO_2 (mg/Nm³)**		**NO_x**	
		LCPD ELV	**BAT range**	**LCPD ELV**	**BAT range**
coal and lignite	50 - 100 MW	2000	200 – 400	600	90 – 450
	> 500 MW	400	20 – 200	500	50 – 200
liquid fuels	100 – 300 MW	1700	100 – 250	450	50 – 200
	> 500 MW	400	50 - 200	400	50 – 150
gaseous fuels (general)	> 500 MW	35	no range given	200	50 – 100

3. Outcome of the BAT scenario runs by IIASA for the LCP sector to assess the potential benefits of BAT implementation

3.1. Introduction

The Commission launched a project to estimate the potential impacts which would emerge if BAT associated emission levels (BAT ranges as set out in the LCP BREF) were fully applied by operators in the Large Combustion Plants sector. The work carried out by the International Institute for Applied Systems Analysis (IIASA) used the regional air pollution and simulation model (RAINS/GAINS) which already supported EU legislative work in the context of the CAFÉ programme and currently in the context of the National Emission Ceilings Directive (NECD) review.

The RAINS model enables to run different scenarios, depending on a number of different inputs (fuel consumption of different sectors in each EU Member State (MS), boiler size distribution information, raw emission factors, abatement technologies, rate of implementation of technologies in the sectors etc.).

The main features of the BAT scenario runs:

- Geographical coverage: EU27.
- Sector: Large Combustion Plants (LCP, > 50 MWth), out of which the following 3 subsectors are assessed: power plants (existing and new) and industrial boilers. The domestic sector, the fuel conversion (other than in power plants), the industrial combustion in furnaces were not included in the assessment.
- Impacts to be assessed: environmental impacts (including emission reductions, health impacts and ecosystem impacts) and cost implications.
- Pollutants analysed: SO_2, NO_x, PM (particulate matter, dust).
- Time horizon: selected years are 2010 and 2020 with focus on the latter. For 2010 only emission reductions are calculated, while for 2020 the full range of impacts is assessed (see specific assumptions on 2020 later).
- Comparative assessment: the results of the BAT scenario runs (for the 3 combustion subsectors) are compared to the NEC baseline, i.e. the National projections baseline (to show the extra benefits and costs on top of the baseline), and on the other hand to the optimized NEC results.
- As regards inputs, the scenario analyses under the RAINS model were based on 'control strategies'[203] developed by the Commission with the support of IIASA

[203] A control strategy defines the extent of implementation of different pollutant abatement technologies for different sub sector – fuel combinations. Other main inputs of the model: detailed fuel use, boiler distribution, unabated emission factors data.

3.2. Comparison of BAT scenarios with the baseline

In general, one can distinguish among different baselines as regards emission scenarios for the future. The most apparent baseline is referred to as the 'National projections baseline' while further ones also exist such as the PRIMES baselines and recently the so-called 'Coherent scenario'[204]. These baselines represent different environmental ambition levels. The Coherent scenario for instance assumes a radical decrease in coal use and significant increase of the share of renewable energy sources. The IIASA analysis established two BAT-scenarios (assuming the uptake of BAT corresponding to the upper and lower ends of the BAT range as described in the LCP BREF) which were compared to the National projections baseline[205] in the following analysis as regards the LCP pollutants (SO_2, NO_x, dust).

Emission comparison

According to the **National projections baseline** the total **SO_2 emissions** of the EU27 will be 5,504 kt in 2010 which will decrease (by 26%) to 4,085 kt by 2020. Out of these, the share of industrial combustion[206] is very dominant: 78% in 2010 and 71% in 2020. Within the industrial combustion the main emitter is the energy sector which accounts for 58% of the total SO2 emissions in 2010 and 44% in 2020. As regards **NO_x**, the EU27 total emissions are 9,562 kt in 2010 and 7,014 kt in 2020 which corresponds to 27% reduction in the annual emissions. In case of NO_x, the contribution of the industrial combustion sector to the total emissions is lower than for SO2. This share stands around 36% in 2010, but it will increase to 42% by 2020, mainly due to the fact that emissions from combustion in the manufacturing industry rise (by 7%) between 2010 and 2020. It has to be noted that in case of NO_x the main emitter is the transport sector, accounting for 54% of total NO_x emissions in 2010, and 44% in 2020. Concerning **dust**, the **total suspended particles (TSP)** emissions will be 3,731 kt in 2010 and 3,537 kt in 2020, which means a moderate 5% decrease in annual emissions. The share of industrial combustion will be around 18% in both years. **PM2.5** annual emissions make 1,386 kt in 2010 and will decrease faster, by 16% to 1,167 kt in 2020. The share of industrial combustion (related to total PM2.5 emissions) will however slightly increase during the period, from 21% in 2010 to 23% in 2020, mainly resulting from increased emissions of combustion in manufacturing industry. Other important sources of PM2.5 emissions are the production processes and road transport.

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204 The National projections baseline was developed by the International Institute for Applied Systems Analysis (IIASA) in the context of the NEC Directive review during intensive consultations with the Member States. The assumptions underlying this baseline are described in detail in NEC Scenario Analysis report Nr. 3 (IIASA, 2007 (b)). PRIMES is an energy-related model of the National Technical University of Athens. (For more information see Mantzos-Capros, 2006 or 2007). The Coherent scenario reflects the impacts of the March 2007 Council decision on the Energy and Climate Change Package. Discussions are still ongoing to finalize the Coherent scenario in the context of the NEC Directive review.

205 Version: NEC_NAT_CLEV3 (as of March 2007). A National Projections baseline scenario with emission controls reflecting current legislation (national activity paths, CLE control strategies on stationary sources; controls on road transport: Euro 5 and 6 on cars and light-duty trucks, Euro V on heavy-duty trucks and buses).

206 Industrial combustion includes combustion in energy industries, plus combustion in manufacturing industry but excludes emissions from production processes (and also excludes non-industrial combustion).

Under the **BAT scenarios**, the emissions could be further reduced significantly compared to the National Projections Baseline. In case of implementing BAT for the large combustion sector (as described by the BAT AELs in the LCP BREF), the additional emission reductions on top of the baseline for the EU27 in 2020 are 531-1,023 ktonnes of SO_2, 411-907 ktonnes of NO_x and 150-197 kt in case of particulate matter (PM TSP)[207]. The two figures correspond to applying the upper and lower ends of the BAT AELs range, respectively. This corresponds to the following additional emission reductions (in percentage, on top of the baseline cuts): 19-35% for SO2, 14-30% for NO_x and 24-32% for PM TSP (reflecting the upper and higher end of the range). The additional reductions are mainly concentrated in the power sector (combustion in energy industries). For details, see section 3.4 below.

Comparison of costs

According to the **National Projections baseline**, the total (for all sectors) annual air pollution mitigation costs (related to all NEC pollutants[208]) of the current legislation make around 56 bn euros in 2010 which increases significantly (by 42%) to 80 bn euros by 2020. Among the total costs, the share of NO_x costs (for all sectors) will further increase, from 43% to 57% between 2010 and 2020. The Coherent scenario (described earlier) revealed however that implementing the climate change and energy measures (March 2007 Council decision) could reduce the total costs of air pollution abatement of the current legislation annually by 10 bn euros in 2020 as a side-effect[209]. Out of the total air pollution mitigation costs (for all NEC pollutants), the share of costs of the combustion sector makes 23% in 2010 and 17% in 2020, with the decreasing trend being true for all 3 LCPD pollutants.

SO2 mitigation costs make 16.4 bn euros in 2010 and increase (by 3%) to 16.9 bn euros in 2020. Out of these, the share of the combustion sector will be 47% in 2010 and 44% in 2020. Annual **NO_x** abatement costs are around 24.5 bn euros in 2010 which will largely increase (by 87%) by 2020. In the meantime the share of the combustion sector will remain low and even decrease from 6% to 5%. Concerning **dust** (TSP), the baseline costs amount to 9.7 bn euros in 2010 and to 10.6 bn in 2020 (9% increase). Out of these, the combustion sector will make 42% in 2010 and 37% in 2020.

Implementing BAT as it is defined in the LCP BREF would lead to additional costs on top of the baseline costs. According to the **BAT scenarios**, these additional costs (reflecting the AELs range) would be around 0.8-2.6 bn euros for SO2, 1.3-3.7 bn euros for NO_x and 0.01-0.2 bn euros for dust (PM TSP). In percentages, it would mean a cost increase of 11-35% for SO2, 63-173% for NO_x and 0-5% for PM. The significant NO_x cost increase (for the case of the lowest BAT AELs) would mainly relate to the cost increases (in absolute terms) in the power generation sector where the annual costs would rise from 1.9 bn in 2010 to 4 bn euros in 2020. Further details are included in Background Table 9 at the end of this Annex.

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207 In case of PM2.5 the additional reduction may vary between 52-74 kt.

208 SO_2, NO_x, PM, VOC, NH_3

209 It has to be noted that on the other side, the new climate change and energy measures will cause additional costs which are still under assessment. These extra costs may however be higher than cost reductions for air pollution

Comparison of benefits

The assessment of benefits follows the methodology of the CAFE CBA analysis and was carried out by AEAT in 2007. Both the health and ecosystem impacts were calculated but only health impacts could be expressed in monetary terms. As is shown in Table 10, according to the **National projections baseline** the health impacts of implementing the current legislation would amount to 192-609 bn euros annually. For health impacts the low estimate is based on the VOLY median while the high one is based on the VSL mean[210].

Implementing the **BAT scenarios** can however bring significant benefits which may be around 9-30 bn euros in case of the use of the upper end of the BAT range and 20-65 bn euros when applying the lower end of the BAT range. These benefits are significantly higher than the additional costs (2.1-6.5 bn euros) which means the benefit to cost ratio (without ecosystem benefits) is estimated between 4.4-13.9 (for the upper end of BAT case) or 3.2-10.1 (for the lower end of BAT case).

Monetisation of the benefits for the ecosystem is much more difficult, a common methodology is still under development. However AEAT, 2007(a) has quantitative estimates (without monetisation) revealing that considerable additional benefits would emerge from implementing the BAT scenarios as regards acid deposition indicators in forest ecosystems, in semi-natural ecosystems and in freshwater bodies, as well as the eutrophication indicators.

Note: the above-mentioned calculations have been done using the National Projections baseline. However, as indicated in Annex 5, updated baseline and optimized scenarios are being developed to take into account the policy agreement on Energy and Climate Change.

[210] VOLY (value of life year) relates to changes in life expectancy, while VSL (value of statistical life) relates to change in the number of deaths.

3.3 Relation with the objectives of the Air Thematic Strategy

When comparing the emissions from industry of SO_2 and NO_x as projected by the Member States (National Projections baseline) – which is assuming implementation of the current legislation - with the targets needed to achieve the TSAP objectives, a big gap becomes apparent. This means that additional emission reduction measures will be needed in industry to meet the TSAP targets. For industrial emissions of SO_2, the gap between the 2020 baseline and the TSAP targets is 1.641 ktonnes and for NO_x it is 1.612 ktonnes. In particular for the large combustion plants (LCP), the gap for SO_2 is 1.370 ktonnes and for NO_x 1.482 ktonnes.

It was calculated to what extent the full implementation of BAT for LCPs would contribute to closing this gap by running the abovementioned "BAT scenarios"[211]. As shown in the table below, the gap for "LCP" (see footnote below the table) would be reduced by 39-74% for SO_2 and by 27–61% for NO_x (upper and lower end of BAT range, respectively). For the overall industrial emissions (including process emissions), the gap closure would thus be 32-62 % for SO_2 and 25–56 % for NO_x.

Table 7: Contribution of applying BAT for large combustion plants (LCP) to achieving the TSAP objectives for SO_2 and NO_x (emissions in ktonnes except where noted)

Industry (*)	**SO_2**	**NO_x**
Member States National Projections baseline 2020 (MS BL)	3.451	3.229
Thematic Strategy on Air Pollution target 2020 (TSAP)	1.810	1.617
gap MS BL -> TSAP	***1.641***	***1.612***
Upper end of BAT	2.931	2.822
gap filled by upper end of BAT	520	407
→ in % of gap	***31,7%***	***25,2%***
Lower end of BAT	2.440	2.325
gap filled by lower end of BAT	1.011	904
→ in % of gap	***61,6%***	***56,1%***

LCP (**)	**SO_2**	**NO_x**
Member States National Projections baseline 2020 (MS BL)	2.883	2.970
Thematic Strategy on Air Pollution target 2020 (TSAP)	1.513	1.488
gap MS BL -> TSAP	***1.370***	***1.482***
Upper end of BAT	2.351	2.563
gap filled by upper end of BAT[212]	532	407
→ in % of gap	***38,8%***	***27,5%***
Lower end of BAT	1.868	2.066
gap filled by lower end of BAT[212]	1.015	904
→ in % of gap	***74,1%***	***61,0%***

(*) "**industry"** here comprises installations covered by SNAP_1 codes 1 (combustion in energy industries), 3 (combustion in manufacturing industries) and 4 (production processes).

(**) "**LCP"** here comprises installations covered by SNAP_1 codes 1 (combustion in energy industries) and 3 (combustion in manufacturing industries). This covers more installations than the combustion plants > 50 MW.

[211] The analysis was not done for PM as the TSAP objectives are set for PM 2.5 and emission data is only available for total PM. In addition, secondary PM will influence ambient PM 2.5 concentrations.

[212] The gap filled by LCPs for SO_2 is larger than for "industry" due to the fact that the modelled emissions for "production processes" are slightly higher under the BAT scenarios than under the MS Baseline.

3.4 Data tables:

Table 8: Emissions under the National projections baseline and the BAT scenarios

I. Individual scenarios

Scenario: National projections [1]												
	SO2 emissions, kt			NOx emissions, kt			PM TSP emissions, kt			PM 2.5 emissions, kt		
SNAP1_codes	2000	2010	2020	2000	2010	2020	2000	2010	2020	2000	2010	2020
1:Combustion_in_energy_industries	7009	3205	1782	2495	2026	1485	481	362	311	199	165	140
2:Non-industrial_combustion_plants	741	528	488	702	701	702	764	583	469	567	437	356
3:Combustion_in_manufacturing_industry	1516	1075	1109	1416	1394	1488	418	308	313	143	120	132
4:Production_processes	650	565	572	237	249	259	964	775	805	236	194	205
5:Extraction_and_distribution	0	0	0	0	0	0	132	92	74	7	6	5
6:Solvent_use	0	0	0	0	0	0	0	0	0	0	0	0
7:Road_transport	156	16	14	5599	3601	1807	719	710	713	310	184	99
8:Other_mobile_sources_and_machinery	236	104	109	1851	1571	1254	176	132	77	157	118	69
9:Waste_treatment	8	6	6	10	8	8	97	96	96	85	85	85
10:Agriculture	5	5	5	11	11	11	669	673	677	77	77	78
Sum	10322	5504	4085	12322	9562	7014	4420	3731	3537	1782	1386	1167

Scenario: Upper end of BAT AELs range [2]												
	SO2 emissions, kt			NOx emissions, kt			PM TSP emissions, kt			PM 2.5 emissions, kt		
SNAP1_codes	2000	2010	2020	2000	2010	2020	2000	2010	2020	2000	2010	2020
1:Combustion_in_energy_industries	7009	1470	1409	2495	1346	1354	481	174	176	199	98	92
2:Non-industrial_combustion_plants	741	528	488	702	701	702	764	583	469	567	437	356
3:Combustion_in_manufacturing_industry	1516	893	942	1416	1132	1209	418	289	298	143	114	128
4:Production_processes	650	572	580	237	249	259	964	775	805	236	194	205
5:Extraction_and_distribution	0	0	0	0	0	0	132	92	74	7	6	5
6:Solvent_use	0	0	0	0	0	0	0	0	0	0	0	0
7:Road_transport	156	16	14	5599	3601	1807	719	710	713	310	184	99
8:Other_mobile_sources_and_machinery	236	104	109	1851	1571	1254	176	132	77	157	118	69
9:Waste_treatment	8	6	6	10	8	8	97	96	96	85	85	85
10:Agriculture	5	5	5	11	11	11	669	674	677	77	78	78
Sum	10322	3595	3554	12322	8619	6603	4420	3525	3387	1782	1312	1115

Scenario: Lower end of BAT AELs range [3]												
	SO2 emissions, kt			NOx emissions, kt			PM TSP emissions, kt			PM 2.5 emissions, kt		
SNAP1_codes	2000	2010	2020	2000	2010	2020	2000	2010	2020	2000	2010	2020
1:Combustion_in_energy_industries	7009	1055	953	2495	1051	949	481	141	141	199	84	79
2:Non-industrial_combustion_plants	741	528	488	702	701	702	764	583	469	567	437	356
3:Combustion_in_manufacturing_industry	1516	868	915	1416	1044	1117	418	277	286	143	106	119
4:Production_processes	650	565	572	237	249	259	964	775	805	236	194	205
5:Extraction_and_distribution	0	0	0	0	0	0	132	92	74	7	6	5
6:Solvent_use	0	0	0	0	0	0	0	0	0	0	0	0
7:Road_transport	156	16	14	5599	3601	1807	719	710	713	310	184	99
8:Other_mobile_sources_and_machinery	236	104	109	1851	1571	1254	176	132	77	157	118	69
9:Waste_treatment	8	6	6	10	8	8	97	96	96	85	85	85
10:Agriculture	5	5	5	11	11	11	669	674	677	77	78	78
Sum	10322	3147	3062	12322	8237	6107	4420	3481	3340	1782	1291	1093

II. Scenario comparisons

Emission comparison: Upper end of BAT AELs versus National projections baseline												
	SO2 emissions, kt			NOx emissions, kt			PM TSP emissions, kt			PM 2.5 emissions, kt		
SNAP1_codes	2000	2010	2020	2000	2010	2020	2000	2010	2020	2000	2010	2020
1:Combustion_in_energy_industries	0	-1734	-372	0	-681	-132	0	-188	-134	0	-67	-48
2:Non-industrial_combustion_plants	0	0	0	0	0	0	0	0	0	0	0	0
3:Combustion_in_manufacturing_industry	0	-182	-167	0	-262	-279	0	-19	-15	0	-6	-4
4:Production_processes	0	7	9	0	0	0	0	0	0	0	0	0
5:Extraction_and_distribution	0	0	0	0	0	0	0	0	0	0	0	0
6:Solvent_use	0	0	0	0	0	0	0	0	0	0	0	0
7:Road_transport	0	0	0	0	0	0	0	0	0	0	0	0
8:Other_mobile_sources_and_machinery	0	0	0	0	0	0	0	0	0	0	0	0
9:Waste_treatment	0	0	0	0	0	0	0	0	0	0	0	0
10:Agriculture	0	0	0	0	0	0	0	1	0	0	0	0
Sum	0	-1909	**-531**	0	-943	**-411**	0	-205	**-150**	0	-73	**-52**

Emission comparison: Lower end of BAT AELs versus National projections baseline												
	SO2 emissions, kt			NOx emissions, kt			PM TSP emissions, kt			PM 2.5 emissions, kt		
SNAP1_codes	2000	2010	2020	2000	2010	2020	2000	2010	2020	2000	2010	2020
1:Combustion_in_energy_industries	0	-2150	-829	0	-975	-536	0	-221	-170	0	-81	-61
2:Non-industrial_combustion_plants	0	0	0	0	0	0	0	0	0	0	0	0
3:Combustion_in_manufacturing_industry	0	-207	-195	0	-350	-371	0	-30	-27	0	-14	-13
4:Production_processes	0	0	0	0	0	0	0	0	0	0	0	0
5:Extraction_and_distribution	0	0	0	0	0	0	0	0	0	0	0	0
6:Solvent_use	0	0	0	0	0	0	0	0	0	0	0	0
7:Road_transport	0	0	0	0	0	0	0	0	0	0	0	0
8:Other_mobile_sources_and_machinery	0	0	0	0	0	0	0	0	0	0	0	0
9:Waste_treatment	0	0	0	0	0	0	0	0	0	0	0	0
10:Agriculture	0	0	0	0	0	0	0	1	0	0	0	0
Sum	0	-2357	**-1023**	0	-1326	**-907**	0	-250	**-197**	0	-95	**-74**

(1) Version: NEC_NAT_CLEV3
(2) Sometimes referred to as less/least strict BAT
(3) Sometimes referred to as the most strict BAT

Source: IIASA, 2007 (b)

Table 9: Costs of abatement measures under the National projections baseline and the BAT scenarios

I. Individual scenarios

Scenario: National projections [1]									
	SO2 emissions, MEUR			NOx emissions, MEUR			PM TSP emissions, MEUR		
SNAP1_codes	2000	2010	2020	2000	2010	2020	2000	2010	2020
1:Combustion_in_energy_industries	5.312	6.419	6.034	1.162	1.109	1.851	2.893	2.985	2.729
2:Non-industrial_combustion_plants	817	1.140	1.032	656	939	1.099	1.755	2.660	3.685
3:Combustion_in_manufacturing_industry	929	1.295	1.366	181	256	293	972	1.106	1.172
4:Production_processes	233	304	339	276	312	318	1.831	2.494	2.607
5:Extraction_and_distribution	0	0	0	0	0	0	339	352	281
6:Solvent_use	0	0	0	0	0	0	0	0	0
7:Road_transport	3.197	6.073	6.963	7.459	20.753	36.599	0	0	0
8:Other_mobile_sources_and_machinery	470	1.132	1.196	9	1.122	5.673	0	0	0
9:Waste_treatment	0	0	0	0	0	0	0	0	0
10:Agriculture	0	0	0	1	1	1	103	123	125
Sum	10.959	16.363	16.931	9.744	24.491	45.834	7.893	9.719	10.600

Scenario: Upper end of BAT AELs range [2]									
	SO2 emissions, MEUR			NOx emissions, MEUR			PM TSP emissions, MEUR		
SNAP1_codes	2000	2010	2020	2000	2010	2020	2000	2010	2020
1:Combustion_in_energy_industries	5.312	7.623	6.624	1.162	2.832	2.316	2.893	3.028	2.741
2:Non-industrial_combustion_plants	817	1.140	1.032	656	939	1.099	1.755	2.660	3.685
3:Combustion_in_manufacturing_industry	929	1.496	1.554	181	1.045	1.177	972	1.107	1.168
4:Production_processes	233	304	339	276	312	318	1.831	2.494	2.607
5:Extraction_and_distribution	0	0	0	0	0	0	339	352	281
6:Solvent_use	0	0	0	0	0	0	0	0	0
7:Road_transport	3.197	6.073	6.963	7.459	20.753	36.599	0	0	0
8:Other_mobile_sources_and_machinery	470	1.132	1.196	9	1.122	5.673	0	0	0
9:Waste_treatment	0	0	0	0	0	0	0	0	0
10:Agriculture	0	0	0	1	1	1	103	123	125
Sum	10.959	17.768	17.708	9.744	27.003	47.184	7.893	9.763	10.609

Scenario: Lower end of BAT AELs range [3]									
	SO2 emissions, MEUR			NOx emissions, MEUR			PM TSP emissions, MEUR		
SNAP1_codes	2000	2010	2020	2000	2010	2020	2000	2010	2020
1:Combustion_in_energy_industries	5.312	8.657	8.321	1.162	4.117	4.028	2.893	3.125	2.824
2:Non-industrial_combustion_plants	817	1.140	1.032	656	939	1.099	1.755	2.660	3.685
3:Combustion_in_manufacturing_industry	929	1.600	1.670	181	1.603	1.815	972	1.194	1.256
4:Production_processes	233	304	339	276	312	318	1.831	2.494	2.607
5:Extraction_and_distribution	0	0	0	0	0	0	339	352	281
6:Solvent_use	0	0	0	0	0	0	0	0	0
7:Road_transport	3.197	6.073	6.963	7.459	20.753	36.599	0	0	0
8:Other_mobile_sources_and_machinery	470	1.132	1.196	9	1.122	5.673	0	0	0
9:Waste_treatment	0	0	0	0	0	0	0	0	0
10:Agriculture	0	0	0	1	1	1	103	123	125
Sum	10.959	18.906	19.521	9.744	28.847	49.534	7.893	9.947	10.778

II. Scenario comparisons

Emission comparison: Upper end of BAT AELs versus National projections baseline									
	SO2 emissions, MEUR			NOx emissions, MEUR			PM TSP emissions, MEUR		
SNAP1_codes	2000	2010	2020	2000	2010	2020	2000	2010	2020
1:Combustion_in_energy_industries	0	1.204	589	0	1.723	465	0	43	12
2:Non-industrial_combustion_plants	0	0	0	0	0	0	0	0	0
3:Combustion_in_manufacturing_industry	0	201	188	0	789	884	0	1	-4
4:Production_processes	0	0	0	0	0	0	0	0	0
5:Extraction_and_distribution	0	0	0	0	0	0	0	0	0
6:Solvent_use	0	0	0	0	0	0	0	0	0
7:Road_transport	0	0	0	0	0	0	0	0	0
8:Other_mobile_sources_and_machinery	0	0	0	0	0	0	0	0	0
9:Waste_treatment	0	0	0	0	0	0	0	0	0
10:Agriculture	0	0	0	0	0	0	0	0	0
Sum	0	1.405	**777**	0	2.512	**1.349**	0	44	**9**

Emission comparison: Lower end of BAT AELs versus National projections baseline									
	SO2 emissions, MEUR			NOx emissions, MEUR			PM TSP emissions, MEUR		
SNAP1_codes	2000	2010	2020	2000	2010	2020	2000	2010	2020
1:Combustion_in_energy_industries	0	2.238	2.286	0	3.008	2.177	0	140	95
2:Non-industrial_combustion_plants	0	0	0	0	0	0	0	0	0
3:Combustion_in_manufacturing_industry	0	305	303	0	1.348	1.522	0	88	84
4:Production_processes	0	0	0	0	0	0	0	0	0
5:Extraction_and_distribution	0	0	0	0	0	0	0	0	0
6:Solvent_use	0	0	0	0	0	0	0	0	0
7:Road_transport	0	0	0	0	0	0	0	0	0
8:Other_mobile_sources_and_machinery	0	0	0	0	0	0	0	0	0
9:Waste_treatment	0	0	0	0	0	0	0	0	0
10:Agriculture	0	0	0	0	0	0	0	0	0
Sum	0	2.543	**2.590**	0	4.355	**3.699**	0	228	**178**

(1) Version: NEC_NAT_CLEV3
(2) Sometimes referred to as less/least strict BAT
(3) Sometimes referred to as the most strict BAT

Source: IIASA, 2007 (b)

Table 10: Benefits of the National projections baseline and the BAT scenarios

The table shows the additional estimated annual monetised health benefits in 2020 due to air pollution in the EU-27 for the BAT scenarios (i.e. applying BAT at large combustion plants) as compared to the national NEC baseline (€ million per year).(AEAT, 2007(a)).

The health impacts were calculated using the methodology outlined in the CAFE CBA methodology reports[198] with Member State specific data.

				IPPC implementation cases	
End point	**Population at risk**	**Impact**	**Poll**	**Least strict**	**Most strict**
Acute Mortality (VOLY median)	All	Premature deaths	O_3	23	50
Acute Mortality (VSL mean)	All	Premature deaths	O_3	53	113
Respiratory Hospital Admissions (RHAs)	Elderly	Cases	O_3	1	2
Minor Restricted Activity Days (MRADs)	Adults	Days	O_3	36	75
Respiratory medication use	Children	Days	O_3	0	1
Respiratory medication use	Adults	Days	O_3	0	0
Cough and LRS	Children	Days	O_3	56	115
Chronic Mortality - YOLL (VOLY median)	All	Life years lost	PM	6,548	14,273
Chronic Mortality - YOLL (VSL mean)	All	Life years lost	PM	14,699	32,037
Chronic Mortality – deaths (VOLY median)	All	Premature deaths	PM	13,002	28,637
Chronic Mortality – deaths (VSL mean)	All	Premature deaths	PM	26,750	58,919
Infant Mortality (VOLY median)	Infants	Premature deaths	PM	31	62
Infant Mortality (VSL mean)	Infants	Premature deaths	PM	63	125
Chronic Bronchitis	Adults	Cases	PM	1,205	2,602
Respiratory Hospital Admissions	All	Cases	PM	4	9
Cardiac Hospital Admissions	All	Cases	PM	3	6
Restricted Activity Days (RADs)	Adults	Days	PM	930	2,004
Respiratory medication use	Children	Days	PM	0	0
Respiratory medication use	Adults	Days	PM	1	2
LRS symptom days	Children	Days	PM	167	361
LRS among adults with chronic symptoms	Adults	Days	PM	393	857
Low estimate (VOLY median)				**9,400**	**20,419**
High estimate (VSL mean)				**29,662**	**65,189**

Note two alternative metrics are used for the presentation of chronic mortality from PM. Firstly in terms of years of life lost and secondly in terms of numbers of premature deaths. These are not additive.

Source: AEAT, 2007(a)

3.5 Potential impact of applying BAT on electricity prices

In order to assess the potential impact of the full uptake of BAT in the power sector (to which a major part of all large combustion plants in the EU belong), the following methodology was applied, using 2020 data for EU-25 from the RAINS model.

The projected electricity production is 3.292 TWh, while the electricity price under the PRIMES 2007 baseline will be 4,62 eurocent/kWh.

The additional compliance costs for full implementation of BAT in the power sector (a subset of the SNAP_1 sector 1 "combustion in energy industries" shown in the previous Tables) as compared to the baseline were then divided by the electricity production to calculate the associated increase in electricity prices. The results are shown in the table below.

Table 11: Effect of full implementation of BAT on electricity prices in 2020 (based on RAINS model, IIASA, personal communication)

	Additional compliance costs compared to the baseline	Increase of electricity prices	
	(€ million)	(eurocent/kWh)	(% of electricity price 2020)
upper end of BAT range	SO_2: 571,3 NO_x: 426,5 total: 997,8	0,03	0.65%
lower end of BAT range	SO_2: 2242,1 NO_x: 2084,9 total: 4.327	0,12	2,6%

Annex 8: Background data concerning administrative burdens related to permitting and reporting

This annex presents factual data, where available, that are relevant to assessment and possible reduction of administrative burdens.

1. Approximate population sizes (Eurostat 2006)

EU-15 population = 385 million

EU-25 population = 464 million

EU-27 population = 493 million

2. Numbers of installations

Approximate numbers of installations can be derived from different sources and then cross-checked.

ENTEC 2007 (a) (table 2.2) gives 35,999 existing installations in 23 MS (not IT, SE, RO or BG) plus 1,636 new installations in EU15 reported in the period 2000-2002. IT has indicated that it has around 8,147 installations, although this is not an official figure. According to the last IPPC Experts Group meeting RO has about 561 existing installations and about 77 new installations, BG has about 234 new and existing installations, and SE has 1050 new and existing installation. As a rough approximation it is assumed that about 90% of the BG and SE installations are existing and 10% new.

The approx total EU27 number of existing installations starting from the ENTEC report is therefore 35,999 + 8,147 (IT) + 561 (RO) + 945 (SE) + 210 (BG) = 45,862.

LDK 2007 (section 4.6.1.1) gives 41,235 existing installations in operation at end of 2005 plus 2915 new installations permitted in 2003-2005, all for EU25. However, the figure of existing installations in this report for IT is given as 2785, whereas the more recent IT estimate (in IEG meetings) is 8,147. The number of existing installations making an adjustment for this difference is 46,597. To this we still need to add figures for BG and RO, giving a total number of existing installations starting from the LDK report of 47,368.

The total number of existing installations is therefore around 45,862 – 47,368.

If we scale up the number of EU-15 2000-2002 new installations given in ENTEC 2007 (a) to EU-25, simply on the basis of population sizes, we go from 1,636 to 1,975 new installations from this period. Since this figure is for 2000-2002, we can also speculate about the additional number of new installations over 2003-2007 inclusive. If we assume the same rate of establishment then this figure is 3,293. In contrast, data in the LDK 2007 report give a figure of 2915 new installations permitted in EU-25 over 2003-2005 inclusive, which would equate to about 4858 over the period 2003-2007 (assuming a constant rate of permitting, although on the other hand it is likely that some new installations will replace rather than supplement existing ones.).

These figures give a total EU25 estimate of new installations of 5,268 – 6,833 over the period 2000-2007. To this we can add about 77 new installations in RO and about 23 new installations in BG, giving an overall approx EU27 total of 5,368 – 6,933 new installations.

The overall total number of new and existing installations, summing the figures above, is then 51,230 – 54,201.

This can finally be cross-checked by Member States' own reported totals (given in LDK 2007), which for EU25 total 50,536. This figure relates for most (but not all) MS to the end of 2005. Once the installations for BG and RO are added in and some allowance is made for the most recent new installations, the total will lie within the above range.

Since the range is quite narrow, and the figures are based on some assumptions (e.g. we don't know the rate at which new installations will supplement or replace existing ones), it seems reasonable for the purposes of this analysis to use general figures of **about 52,000 installations in total** comprising about **46,000 existing installations** and **6,000 new installations.**

3. Breakdown of installations

ENTEC 2007 (a) and LDK 2007 give almost identical sectoral breakdowns. Based on these sources, the following is assumed:

Energy industries	7%
Metal	13%
Minerals	6%
Chemicals	13%
Waste	14%
Pig and poultry farms	31%
Other and unallocated	16%

4. Gross added value of IPPC installations

Eurostat data give a total sum of €951 billion for the following sectors: food, textiles, leather, pulp and paper, coke and refineries, chemicals, metals and minerals. This inevitably includes some manufacturing that does not fall under IPPC, because of some installations being below the IPPC thresholds, and because some of the Eurostat categories used are broader than the IPPC Annex I categories (e.g. including tobacco in the food/drink sector, leather products, paper products, etc). On the other hand, some sectors that fall under the IPPC Directive are excluded from this figure, e.g. intensive farms and waste. The figure of €1 trillion is therefore used as an illustrative, order of magnitude indication of the value of industry under IPPC.

5. What are "administrative costs" and "administrative burdens" in the context of the IPPC Directive

Administrative costs are generally defined as costs arising from reporting and information obligations laid down by legislation[213]. The definition of "administrative costs", as measured by the methodology the Commission has adopted is *"Administrative costs mean the costs incurred by enterprises, the voluntary sector, public authorities and citizens in meeting legal obligations to provide information on their activities"*.

An administrative burden, on the other hand, is not necessarily 100% of the administrative cost but rather comprises that part of the administrative cost that would not have been incurred in the absence of legislation. To give an example, legislation requires that companies prepare and submit financial accounts. This entails an administrative cost. But, if the legislation did not require it, good financial management would still entail a degree of financial accounting to ensure companies' economic sustainability. Thus, the administrative burden is the additional cost of undertaking certain additional actions (e.g. ensuring that the accounts meet certain standards) that would have not have happened without the legislation requiring that they take place.

What, then, are the main potential administrative costs and administrative burdens of the IPPC Directive? These are discussed below by reference to the articles of the Directive.

Articles 4, 6 and 8 set out the **permitting procedure for new installations**. Operators have to submit an application to obtain a permit for a new installation. A competent authority must decide whether or not to grant a permit. The administrative costs therefore include costs to the operator of producing the application, and costs to the regulator of determining it. In some Member States, these costs (or a part of them) are passed on to the operator through permit fees. In order to decide how to design and run an installation, however, it is evident that companies would need to generate some of the information for themselves anyway. Depending on the sector and the operator concerned, it would be reasonable to expect an operator to need to know some information covered by most of the points listed Article 6, which details the information to be included in an application. However, it will generally be difficult to differentiate between information that operators would require or generate anyway, and that which they will only produce in order to satisfy the IPPC application requirements.

A further issue to consider here is whether the cost of the regulator in determining an application – and in particular the technical work of assessing the operator's application and determining the appropriate permit conditions – is an administrative cost or burden. This activity by the regulator is mostly not about meeting a legal obligation to provide information, but rather is about undertaking the technical assessment of an application, as the basis for determining the permit conditions. However, it will inevitably be difficult to disentangle the "administrative" costs of determining an application from the "technical" costs. In any case, certainly those aspects of the process that relate to access to information and public participation (see Article 15 below) can be considered as entailing administrative costs and burdens.

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213 SEC(2005)175 http://ec.europa.eu/governance/impact/docs/key_docs/sec_2005_0175_en.pdf.

Article 5 sets out the requirement for **granting permits for existing installations**. Here Member States have a choice of following the same process as for new installations (see previous paragraphs) – in which case the administrative costs and burdens would be similar – or reconsidering and, where necessary, updating previous authorisations. In the latter case, there is not an explicit requirement for an application as such. There would however still need to be a reconsideration process by the regulator, as part of which they might request some information from the operator. Since 2005 there will also be a need at least for information on the decision taken to be made available to the public (see Article 15 below). The overall administrative costs and burdens would nevertheless be reduced compared to the "full" permitting procedure, possibly considerably. The practicality for a Member State of opting for reconsideration/updating previous permits will depend upon, firstly, whether or not such previous permits actually exist and, secondly, whether they provide a suitable base for implementation of the IPPC Directive. According to ENTEC 2007 (a), at the time the data were reported 10,866 existing installations had been brought under IPPC by issuing new permits while 6,786 had been brought under IPPC by reconsidering previous permits (with 4,098 not having been updated and 2,688 having been updated). These figures are used to create a basic assumption of 60% of existing installations receiving new permits, 15% having their old permits reconsidered and updated, and 25% having their old permits reconsidered but not updated.

Article 7 sets out the requirement for an **integrated approach to issuing permits**. This requires that, where more than one competent authority is involved in issuing a permit, the procedures are fully coordinated. Note however that the Directive does not require that there be several authorities, and indeed the purpose of the article is to ensure that the integrated approach of the Directive is retained even if there several authorities rather than just one. Where there are multiple authorities involved, it seems very probable that administrative costs and burdens will be increased, for example due to a need for more communication and consultation between authorities, and even the simple fact of having to produce more copies of applications or different parts of applications for different authorities. These are issues that can only really be addressed in practice at the national level. However, some Member States, in their most recent reports on implementation of the IPPC Directive, indicated that the Directive itself has induced an improvement. For example, CZ indicated that operators will now receive one integrated permit, replacing previously separate permits, decisions, etc. IT also referred to the same effect, stating that the IPPC Directive can therefore be an instrument for administrative simplification, bring together in a single technical and administrative procedure the processes which were formerly separate, independent and carried out by different offices.

Article 9 sets out the requirements for the **conditions of permits**. Mostly these requirements relate to compliance with environmental performance standards (e.g. expressed as emission limit values), and therefore are not relevant in the context of administrative costs and burdens. However, Article 9(5) states that permits are to contain suitable release monitoring requirements. This will entail an administrative cost, some or all of which will also be an administrative burden depending on whether or not the operator would carry out the monitoring anyway. The administrative costs/burdens may include the costs of purchasing and operating monitoring equipment, and hiring third parties and use of laboratories to take measurements.

Article 9(5) also includes an obligation to supply the competent authority with data required for checking compliance with the permit. This is presumed to be both an administrative cost

and an administrative burden, although some operators might already have similar data submission activities as part of their participation in voluntary environmental management schemes. Having received such data, it is reasonable to assume that an authority will (or should) do something with it, in particular by checking to see whether or not there has been compliance with the permit conditions. Thus there is an additional administrative cost and burden associated with such activity by the authority, which in some cases is passed on to the operator in the form of regulatory fees. Except where explicit requirements are set out in sectoral legislation (e.g. the LCP and WI Directives), it is for the authority concerned to establish the precise requirements for monitoring and reporting under the IPPC Directive.

As with determination of permit applications, it is debatable whether the work of the regulator in assessing monitoring data for the purposes of ensuring compliance should be considered an administrative cost. This activity provides an important basis for enforcement action, and is not simply about meeting legal obligations to provide information. However, the requirement to provide monitoring information to the public participation (see Article 15 below) can clearly be considered as entailing administrative costs and burdens.

A further feature of Article 9 is its eighth paragraph, which allows the **use of general binding rules in the permit procedure** instead of having to determine individual permit conditions. This is expressed as being "without prejudice to the obligation to implement a permit procedure", but nevertheless should entail less administrative cost and burden. It is expected, for example, that an operator will not have to put as much effort into describing in an application how they propose to apply BAT where BAT is already clearly set out in the GBRs. There will also be a reduced need for consideration of technical and economic factors by the authority in those cases where the permit conditions can be set by reference to general binding rules. Despite these potential benefits, however, it is apparent that take-up of the option of general binding rules has been limited to date. Only AT, BE, DE, FR and NL appear to have applied GBRs to IPPC installations across a large number of sectors.

Article 12 requires that operators inform authorities of any **planned changes in operation**. This will entail some administrative costs and burdens, although these will be very dependent on the nature of the changes involved as well as the procedures put in place by Member States for dealing with them. Where a permit is updated, information on the update and the reasons behind it must be made available to the public (see Article 15 below). Other than this, the Directive has no precise requirements setting out how changes should be handled, except in relation to proposed "substantial changes", which are changes that could have significant negative effects. In this case the full permitting procedure of Articles 4, 6 and 8 applies (see above).

According to LDK 2007, there were 4691 substantial changes over the period 2003-2005 in relation to 41,235 installations. This represents 1563 substantial changes per year, indicating that on average a single installation could be expected to be substantially changed only about once every 26 years. In addition, IMPEL 2007 (a) has suggested that substantial changes would often prompt regulators to undertake a periodic reconsideration (see Article 13 below), rather than treating these two provisions separately. Therefore, the substantial change provisions of Article 12 are not expected to have much additional impact on administrative costs and burdens, on top of those that would arise in relation to the periodic reconsideration requirements.

Article 13 requires that authorities **reconsider and update permit conditions** periodically and when certain factors occur. The Directive does not specify what process should be applied to reconsider a permit or how often it should take place. It can be assumed that in the event of a reconsideration there will be some administrative costs and burdens, which will vary according to the processes applied. The nature of these costs (though not necessarily their magnitude) will again be similar to those discussed above in relation to permit applications. The public must have a chance to participate in the procedure (see Article 15 below) where a permit has to be reconsidered because the installation is causing significant pollution, although this is expected to be rare. In addition, where a permit is updated information on the update and the reasons behind it must be made available to the public (see also Article 15 below).

Article 14 requires that Member States take measures to ensure that **permit conditions are complied with**. This includes an obligation for operators to inform authorities of the results of monitoring (already discussed in relation to Article 9 above), plus a requirement for operators to give assistance to authorities to enable the latter to carry out inspections. This will entail an administrative cost and an administrative burden for operators, for example in accommodating site visits and responding to further information requests. As with determination of permit applications and assessment of monitoring data, it is debatable whether the work of the regulator in undertaking inspections should be considered as an administrative cost.

Article 15[214] deals with **access to information and public participation** and is therefore very clearly relevant in the context of administrative costs and burdens. Article 15(1) requires that the public has a chance to participate in the issuing of a permit for a new installation or a substantial change, or the reconsideration of a permit where the installation is causing significant pollution. Article 15(2) requires that monitoring data be made available to the public. Article 15(5) requires that when a decision has been taken under the Directive the authority has to inform the public and make certain information available, including the permit or any updates and the reasons and considerations on which the decision is based. Note however that this provision was introduced by an amendment to the Directive in 2005 and therefore will not have applied to decisions made before this date.

Article 16 contains provisions on exchange of information. Article 16(1) requires Member States to send **available representative data on emission limit values**. Article 16(3) requires that Member States send the Commission **reports on the implementation of the Directive** following the questionnaire-based approach of Directive 91/692/EEC. Both of these activities will impose administrative costs and burdens on the authorities responsible for gathering and submitting the data, though not directly on operators. In addition, Article 16(2) provides for an exchange of information between MS and the industries concerned on BAT in order to inform the Sevilla process. Submission of information under this article is not a legal obligation but nevertheless entails costs.

Article 17 deals with consultation between Member States in cases where an installation may have **transboundary effects**. In such cases, there are additional consultation and public

[214] In addition to those parts of Article 15 discussed in this paragraph, Article 15(3) provides the basis for the European Pollutant Emissions Register (EPER), which entails both administrative costs and burdens. However, EPER is now being replaced by the European Pollutant Release and Transfer Register under a separate legal instrument and therefore is not discussed further here.

participation requirements compared to the standard provisions of Articles 4 and 12 (see above). However, implementation reports from the Member States have indicated that installations are rarely considered to have such effects, with the consequence that Article 17 is applied infrequently, and thus should have only a very small impact on administrative costs and burdens.

Based on the above, the main areas of cost which are of interest for the purposes of reviewing the IPPC Directive are outlined in the table below. As already discussed, some of these are possibly only partly administrative costs (partly being technical or compliance costs), but are nevertheless included here for completeness and to give a broader perspective on the potential for cost savings.

Table 12: Summary of IPPC provisions and related administrative costs and burden

Article reference	Provisions	Administrative cost?	Administrative burden?
Articles 4, 6, 7, 8 and 15 (1) and (5)	Permit procedure for new installations	Cost to operator of producing the application. Administrative cost to regulator of processing and determining the application (possibly excluding the "technical assessment"). Includes cost of public participation in the permit procedure plus provision to the public of the permit and the reasons behind it.	Cost to operator of producing the application less cost of that information the operator would have wanted, required or generated anyway. Same as administrative cost.
Articles 5 and 15(5)	Permit procedure for existing installations	As above if the procedure is the same as that for new installations. Otherwise reduced administrative cost for operator of providing information (if any) for the permit reconsideration. Administrative cost to regulator of undertaking the reconsideration (possibly excluding the "technical assessment"). Includes cost of provision to the public of the permit and the reasons behind it.	As above if the procedure is the same as that for new installations. Cost of providing information (if any) less cost of that information the operator would have wanted, required or generated anyway. Same as administrative cost.
Articles 9(5) and 15(2)	Release monitoring and data submission requirements	Cost to operator of meeting monitoring requirements (e.g. through purchasing and operating monitoring equipment, and hiring third parties and use of laboratories to take measurements) and of supplying data to the regulator. Administrative cost to regulator of processing the monitoring data (possibly excluding the "technical assessment"). Includes cost of provision of monitoring data to the public.	Same as administrative cost less cost of any elements the operator would have carried out anyway (e.g. for purposes of operational control, participation in a voluntary environmental management scheme, etc.). Same as administrative cost.

Articles 12(1) and 15(5)	Changes in operation	Cost to operator of informing regulator of any planned change in operation. Administrative cost to regulator of processing the information received (possibly excluding any "technical assessment" if necessary). Includes cost of provision to the public of information on any update to the permit and the reasons behind it.	Same as administrative cost less cost of that information the operator would have wanted, required or generated anyway. Same as administrative cost.
Articles 12(2), 13, 15(1) and 15(5)	Reconsideration of permits	Cost to operator of producing information (if any required) for the reconsideration. Administrative cost to regulator of undertaking the reconsideration (possibly excluding the "technical assessment"). Includes cost of public participation (in rare cases of substantial change or significant pollution), plus provision to the public of the permit update and the reasons behind it.	Cost to operator of producing the information less cost of that information the operator would have wanted, required or generated anyway. Same as administrative cost.
Article 14	Compliance checking	Cost to operator of giving assistance to regulators in undertaking inspections and providing any necessary follow-up information. Administrative cost of regulator in undertaking inspections (possibly excluding the inspections themselves plus related "technical" elements).	Same as administrative cost. Same as administrative cost.
Article 16(1)	Data on emission limit values	Cost to Member States of compiling and submitting to the Commission the data on emission limit values.	Same as administrative cost less cost of any elements that would have been undertaken anyway (e.g. for purposes of national supervision).
Article 16(3)	Implementation reports	Cost to Member States of compiling and submitting to the Commission the implementation reports.	Same as administrative cost less cost of any elements that would have been undertaken anyway (e.g. for purposes of national supervision).

6. Assessment of administrative costs and burdens associated with the IPPC Directive

As has been noted above, there are some uncertainties over whether particular activities – e.g. technical assessment of permit conditions based on applications – should be included in estimating administrative costs and burdens. A further difficulty is that, in any case, most of the data available do not make much distinction between administrative and non-administrative costs, and so do not provide a basis for removal of the technical elements anyway. Rather, cost estimates and data tend to look at particular stages or periods of the regulatory process – e.g. getting a permit or being subject to ongoing monitoring and control – and do not greatly differentiate between technical and administrative elements therein. The cost estimates therefore are therefore likely to include both administrative and non-administrative elements.

6.1 Cost of bringing installations under the IPPC Directive

The cost of getting a permit covers the costs incurred by operators in understanding the legal requirements, preparing applications, responding to requests for information from regulators, etc., and the costs to administrations of producing application materials (forms, guidance, etc.), consulting the public, determining the application, etc. As noted above, in some cases installations are being brought into IPPC by reconsidering previous permits rather than issuing new ones, in which case the costs will be reduced.

Costs to authorities

Some regulators charge permit fees. These range from zero (e.g. in NL, where regulators' costs are covered by general taxes) to tens of thousands of euros per installation. It is evident that many regulators do not charge fees or only have partial cost recovery so the price paid is not necessarily representative of the actual cost. Two Member States that have full cost-recovery provisions for regulators are IE and UK. In Ireland, the following charges are applied (from IEEP 2006)

Sector	**New permit fee**	**Permit review fee**
Minerals	€5078 – 16506 (mid point = 10,792)	€3174 – 12,697 (mid point = 7,936)
Energy	€5713 – 16506 (mid point = 11,111)	€4,444 – 12,697 (mid point = 8,571)
Metals	€5078 – 8888 (mid point = 6,983)	€3,809 – 6,983 (mid point = 5,396)
Chemicals	€7618 – 22855 (mid point = 15,237)	€5,713 – 16,506 (mid point = 11,110)
Agriculture	€3174 – 8888 (mid point = 6,031)	€1,904 – 6,983 (mid point = 4,444)
Waste	€5713 – 13967 (mid point = 9,840)	€4,444 – 10,157 (mid point = 7,301)
Other	€5078 – 12697 (mid point = 8,888)	€3,174 – 8,888 (mid point = 6,031)
Average	mid point of the above: €9,976. mid point excluding farms:€10,634	mid point of the above: €7,256 mid point excluding farms: €7,724

This suggests that a permit review in IE typically costs (in terms of the fee) about 73% of the cost of a new permit application. IPPC is largely being implemented in IE by reconsidering pre-existing permits.

UK also has full cost recovery but this is more difficult to present in such a simple way as above because the cost varies not just according to the sector but also according to certain individual factors (e.g. past performance of the operator). Defra 2007 gives an average UK application cost of £15,000, which is therefore about €22,000. This figure will not have covered farms, however, since the transitional date for permitting had not yet been reached for these installations at the time of the assessment.

The website of the Environment Agency – the main IPPC regulator for England and Wales - gives a permit application fee of £3441 (= approx €5000) for a standard farm. This covers 66 hours (just under 9 days) of staff time, which gives an average hourly rate of £52/hour, or £390/day, which is equal to about €580/day (c.f. IEEP 2006 estimate below of €800/day). The Environment Agency also has a farm permit variation fee of £350. This is about 10% of the permit application fee. For other sectors, however, the variation fee is about 30% of the permit application fee.

Once the number of, and permit fee for, intensive farms is considered the average UK permit fee is likely to be around €17,000.

In Brussels determining an integrated permit takes 15-25 days of staff time (IEEP 2006). IEEP 2006 also estimated cost of staff time at €800 per inspector-day in EU 15, including overheads, though this seems very high. Combining these figures would give a cost of €12,000 – 20,000 per permit in Brussels. If we use the probably more reasonable UK figure of €580 day we get a range of €8700 – 14,500. This is similar to the range of costs in IE. Regulatory staff time per reconsideration in Brussels (from IMPEL 2007 (a)) is estimated at 3-10 days (c.f. 15-25 days of time to get a new permit, i.e 20-40% of time).

CZ has estimated that a permit reconsideration takes about 50% of the time to determine a permit application, DK has estimated that a reconsideration takes about 6.5 – 33 days, EE has estimated 2-3 days for simple cases through to 120 days for complex ones, and NL has estimated 10-133 days (all from IMPEL 2007 (a)). In NL, there are no permit fees but the average cost for NL authorities has been calculated at €6000/permit (IEEP 2006). This covers a large number of installations (below IPPC thresholds) so is probably only likely to be representative of small, less complex IPPC installations. This is quite consistent with the low end of the ranges in IE. It is also quite consistent with unpublished data provided by VROM for the purposes of the IPPC review which has suggested a minimum administrative cost for getting a permit of €1,747 (agriculture), an average of €9,883, and a maximum of €78,307 (heavy chemical industry).

Putting these figures together it can be hypothesized that the permitting costs are quite similar for most sectors in IE and Brussels, while being higher in the UK (alternatively it may be that the costs are the same but UK achieves a greater rate of cost recovery). The exception seems to be for farming, where the UK and IE figures are very similar, and the NL figure for less complex installations points in the same direction.

For the purposes of analysis, therefore, it is assumed that for MS having relatively similar unit costs (e.g. per staff hour) of administration, the average costs of issuing a new permit will range from the lower end of the range in IE to 1.5 times the upper end, except for farms, for which just the IE range is used, as follows:

- Minerals €5078 – 24759
- Energy €5713 – 24759
- Metals €5078 – 13332
- Chemicals €7618 – 34282
- Agriculture €3174 – 8888
- Waste €5713 – 20950
- Other €5078 – 19046

It is however recognised that unit costs of administration across the EU will differ because of variations in employment costs. According to Mercer (2005) [add ref] total average employment costs per employee in € in different countries were as follows:

BE	53,577	NL	34725	HU	9946
SE	52,800	IT	32271	CZ	9540
DE	50,455	ES	29176	PL	8257
LU	49752	AT	28612	EE	7621
UK	46541	FI	26191	SK	6541
DK	46050	EL	25944	LT	5649
FR	45879	PT	18889	LV	4752
IE	38259	SI	18765		

From these figures and the ENTEC 2007 (a) implementation report we can calculate "installation-weighted" employment costs, i.e. ((number of installations x average employment cost for each country) / total number of installations).

For our four "reference" countries – BE, IE, NL, UK the average installation weighted employment cost is:

$$\frac{(1295 \times 53577) + (558 \times 38259) + (2335 \times 34725) + (4359 \times 46541)}{(1295 + 558 + 2335 + 4359)} = \textbf{€43838}$$

Whereas for all of the above listed countries, the average installation weighted employment cost is €37276. Therefore, to get more representative EU-wide permitting costs, we need to multiply the previously assumed figures by a factor of 0.85 (=37276/43838). This gives the following results (rounded to the nearest €100 to avoid giving a false impression of accuracy):

- Minerals €4.300 – 21.000
- Energy €4.900 – 21.000
- Metals €4.300 – 11.300
- Chemicals €6.500 – 29.100
- Agriculture €2.700 – 7.500
- Waste €4.900 – 17.800
- Other €4.300 – 16.200

The above costs can be applied to new installations, and to the estimated 60% of existing installations receiving new permits. For the 15% of existing installations that have their permits reconsidered and updated, it is assumed that costs are 50% of the above. For the 25% of existing installations that have their permits reconsidered but not updated, it is assumed that costs are 10% of the above.

Thus the **average cost to authorities** of bringing all 52,000 new and existing installations under IPPC will be about 73% of the above figures, or:

- Minerals €3.100 – 15.300 (average: € 9.200)
- Energy €3.600 – 15.300 (average: € 9.450)
- Metals €3.100 – 8.200 (average: € 5.650)
- Chemicals €4.700 – 21.200 (average: € 12.950)
- Agriculture €2.000 – 5.500 (average: € 3.750)
- Waste €3.600 – 13.000 (average: € 8.300)
- Other €3.100 – 11.800 (average: € 7.450)

Therefore, as a transitional exercise, the total costs to regulators of bringing all 52.000 installations under IPPC over the period 1999 – 2007 (including permitting new installations established in this period) is estimated to be in the range of €160 – 580 million. This equates to about €20 – 73 million on an annual basis. As already noted, this work will have included a substantial technical element rather than just information obligations. However, no data are available to divide the cost between these two factors.

From this, the following costs per installation were applied for calculating the administrative costs (using the SCM) for authorities regarding the permitting of installations, proposed to be newly included under the scope of the IPPC Directive:

- combustion plants (20-50 MW): € 9.450

- intensive livestock farming: € 3.750

- wood preservation and wood-based panel production: € 7.450

It was assumed that a new permit application would be needed every 20 years.

For waste related activities, the costs were estimated to be equivalent with those from reviewing the permits (50% of full permitting costs for authorities - see below), as these already have a (more limited) permitting obligation under the Waste Framework Directive.

Costs to operators

In some cases operators will cover the costs of regulators through permit fees, but this has already been addressed above. It is however necessary to consider how much operators have to pay in terms of their own administrative costs (i.e. their own staff time or payments to consultants).

IEEP 2006 estimated operators' costs of preparation of applications to be small - £400 in the UK. But this seems rather low except for the simplest or most standard installations (e.g. perhaps the farms). In contrast Defra 2007 gave an average operator application cost of £50,000, which was compared with average one-off compliance costs of £350,000.

Rambøll 2005 reported average administrative costs to industry of getting a permit to be €3850 (c.f. investment to secure compliance at €32,197).

One reason for the difference between the Defra and the Rambøll figures may be that all UK installations have had to get entirely new permits, whereas in other MS some pre-existing permits were reconsidered and updated. However, this alone cannot explain the enormous difference in the numbers. Another reason may be that the Defra figures cover all sorts of costs involved in putting together an application – including technical costs that the operator might incur anyway (though not necessarily at the same time) - while the Rambøll figure is limited to the more precise administrative costs.

Ifo 2006 looked at permit application preparation costs in a small sample of companies in the steel and glass sectors. Costs of in-house staff time were found to range from €5 – 100 thousand, with an average of €40,000. However, Ifo also noted that some companies in fact calculated the staff efforts going into continuous interaction between the companies and the authorities, which will therefore be greater than the administrative costs of just producing the application. Ifo also found that costs were higher – on average €70,000 – where the company used a consultant rather than its own staff to prepare the application. But again, it was evident that part of this cost relates to services of a technical rather than an administrative nature (e.g. Ifo referred to costs for a consultancy to set up a dust extraction system).

Overall, figures are very scarce in this area and it is therefore necessary to make some basic assumptions. The basic assumption is that as an order of magnitude the average administrative

costs for operators are about half of those calculated above for authorities. This would place the costs on average above the figures calculated by Rambøll but below those calculated by Defra and Ifo. The costs could therefore be considered as on the high side for companies' "pure" administrative costs (i.e. data formatting, collation, submission etc.), but not inclusive of those technical elements necessary to demonstrate compliance. Hence the total administrative cost to operators of being brought under the IPPC Directive (not including technical assessments, or costs to regulators discussed above) is estimated to be in the range of €80 – 290 million, or €10 – 36 million per year. The technical work involved in assessing environmental impacts, BAT etc. - allowing the operator to make its decisions on how to comply with the legislation and providing the basis for the substantive assessment by the regulator of whether or not to grant the permit – is likely to have a higher cost (perhaps 2-4 times these figures).

Note that Defra 2007 also calculated average one-off compliance costs of £350,000 (= approx €525,000), of which the majority (£307,000) constitutes capital investment. Although this figure was reportedly influenced by particularly high investment required at a single installation, it nevertheless illustrates that capital costs may be much higher than administrative costs.

From this, the following costs per installation were applied for calculating the administrative costs (using the SCM) for operators regarding the permitting of installations, proposed to be newly included under the scope of the IPPC Directive:

- combustion plants (20-50 MW), wood preservation and wood-based panel production: € 20.000 (average of Defra, 2007 and Rambøll, 2005)

- intensive livestock farming: € 3.850 (Rambøll, 2005)

It was assumed that a new permit application would be needed every 20 years.

For waste related activities, the costs were estimated to be equivalent with those from reviewing the permits (25% of full permitting costs for authorities - see below), as these already have a (more limited) permitting obligation under the Waste Framework Directive.

6.2 Cost of periodic reconsideration of permits

Costs to authorities

Data on the costs to regulators of reconsidering permits are given above. From these data it was hypothesized that the costs to regulators of reconsidering a permit are about **half the costs of issuing a new permit**, therefore on average being as follows:

- Minerals €2.200 – 10.500 (average: € 6.350)
- Energy €2.500 – 10.500 (average: € 6.500)
- Metals €2.200 – 5.700 (average: € 3.950)
- Chemicals €3.300 – 14.600 (average: € 8.950)
- Agriculture €1.400 – 3.800 (average: € 2.600)

- Waste €2.500 – 8.900 (average: € 5.700)
- Other €2.200 – 8.100 (average: € 5.150)

Applying these costs to all 52.000 installations gives a range of **€112 – 402 million**. Details of the present timing of permit reconsideration are given in the table attached. As a simplification, if all reconsiderations were carried out on average every 5, 10 or 15 years, the costs per year would be as follows:

- Every 5 years: €22 – 80 million per year
- Every 10 years: €11 – 40 million per year
- Every 15 years: €7 – 27 million per year.

From this, for calculating the administrative costs (using the SCM) for authorities regarding the reconsideration of permits a figure of € 5.000 per installation was applied (being the average of the total costs = € 262 million, divided by 52.000 installations).

For calculating the administrative costs (using the SCM) for authorities regarding the issuing of new permits for waste related activities (which already need a permit under the Waste Framework Directive, half of the costs of the full permitting per installation (see above) were applied.

Costs to operators

It was assumed above that for the purpose of bringing installations into IPPC, operators would have pure administrative costs of **about half of those calculated for authorities**. This assumption is maintained as an order of magnitude in relation to subsequent reconsideration of permits. Hence the total administrative cost to operators of having their IPPC permits reconsidered (again not including technical assessments, or costs to regulators discussed above) are estimated to be in the following ranges:

- Every 5 years: €11 – 40 million per year
- Every 10 years: €6 – 20 million per year
- Every 15 years: €4 – 13 million per year.

The technical work involved in assessing environmental impacts, BAT etc. is again likely to have a higher cost.

From this, for calculating the administrative costs (using the SCM) for operators regarding the reconsideration of permits, half of the costs of those for authorities (see above) were applied.

6.3 Annual costs

In addition to creating "one-off" administrative costs at the point a permit is granted or reconsidered, there are ongoing administrative costs. For the regulator, these relate to the costs of checking compliance, maintaining systems to make information available to the public, updating permit conditions (without amounting to a full reconsideration of the permit),

etc. For the operator, they include providing monitoring reports, accommodating site visits by inspectors, reporting changes in operation, etc.

Costs to authorities

Again, some MS' authorities charge fees which are meant to cover their annual costs. IEEP 2006 gives the following examples:

- FR –simple plant €300 through to large chemical plant €30.000
- SE
- Dairy € 2.860 – 8.140
- Pulp/paper mill € 9.570 – 27.500
- LCP (>200MW) €4.400 – 12.430

Note, however, that FR and SE have very low (i.e. not cost recovering) permitting fees, and therefore the annual charges may cover some or all of the original permitting exercise as well as the annual costs. Therefore, if one were to subtract the original permitting cost, the ongoing annual cost would be lower.

Rambøll 2005 reports an average UK annual charge of £16,000 in 2005. Ifo 2006 gives €22,400, which is very similar. In a more recent assessment, however, Defra 2007 gives a figure of £8400, which is about €12,000. In addition, the Environment Agency website gives a farm annual subsistence charge of £2303 – 2806 (= approx €3400 – 4200). The average UK figure including farms is therefore likely to be around €9,000.

For calculating the annual administrative costs (using the SCM) for authorities for those installations, proposed to be newly included under the scope of the IPPC Directive, it was assumed that 50% of the above mentioned figures relate to pure administrative costs. Therefore, the following cost figures were applied:

- combustion plants (20-50 MW), waste related activities, wood preservation and wood-based panel production: € 6.000 (50% of UK figure from Defra, 2007)

- intensive livestock farming: € 3.800 (50% of average of UK EA figure for farms)

Costs to operators

For operators, Rambøll 2005 reported average administrative costs for monitoring and reporting of €1,500 (the unit of time was not clearly specified but is presumed to be per year), as opposed to the "compliance cost" of monitoring and reporting (presumed to mean running the monitoring equipment) of €37,000 (again assumed to be per year).

Defra 2007, on the other hand, reported UK average annual ongoing costs of about €14,000 on monitoring and €4,500 on reporting. It may be the case that the total UK figure of around €18,500 covers some or all of what Rambøll referred to as the monitoring and reporting "compliance cost". This is possibly approximated by assuming that the figure of €14,000 relates to operation of the monitoring equipment while the figure of €4,500 relates to the

handling of monitoring data and reporting to the regulator. However, this is speculative since the data source simply is not clear.

For calculating the annual monitoring and reporting costs (using the SCM) for operators for those installations, proposed to be newly included under the scope of the IPPC Directive, the following figures were used, taking into account the above mentioned information:

- reporting: € 3.000 per installation (average of Defra, 2007 and Rambøll, 2005 figures)

- monitoring: € 2.800 (20% of Defra, 2007 figure, assuming that this reflects the administrative costs), except for intensive livestock farming (no monitoring assumed)

6.4 Differences in costs between different regulatory approaches

Unpublished data provided by VROM for the purposes of the IPPC review has illustrated the differences in costs between approaches based on the use of site-specific permits and those based upon general rules without permits.

In these data the total administrative burden per year for installations with individual permits, comprised of the permitting cost (divided over a number of years) plus the annual cost, was calculated to be about €2,000 for an agricultural facility, €6,000 on average and about €125,000 in an extreme case (heavy chemical industry). In contrast the average administrative burden for smaller and simpler facilities covered by common rules but not requiring permits is about €700, although the cost for larger facilities covered by this type of approach is higher (e.g. €2,100 for petrol stations).

According to VROM, the main reasons for the differences in the costs between the two approaches are that:

- under the first approach operators have to apply for permits, whereas under the second they only have to submit a notification; and

- the yearly costs for companies covered by notifications for measurement, registration and reporting are a lot lower. This is because under the common rules these activities are now standard, whereas with a permit the obligations are dependent upon the local government and are usually much higher.

VROM has calculated that moving 23,000 non-IPPC companies (not including agricultural sites) from permits to common rules delivers a cost reduction of €158 million per year, or €6,800 per company. For non-IPPC agricultural companies, the introduction of new common rules in place of permitting has been calculated to reduce the administrative burden from about €2,000 to about €300 per company per year.

These figures illustrate the potential for Member States to reduce administrative burdens at the national level. In this case the exercise in NL has related to non-IPPC installations, but it is considered that there is also potential for MS to explore approaches to reduce costs of IPPC implementation. For example, few MS make use of the option under the Directive to apply general binding rules. An important point to note in this respect is that it appears that most of the savings calculated in the NL result from having a standardised approach, rather than from removing the permitting requirement. Of the average annual administrative burden of €6000

for an installation covered by a permit, for example, only about 16% relates to the actual permit application cost.

The main different between the costs of the two approaches reportedly stems from the fact that permit conditions vary from one authority to another. However, with use of general binding rules under the IPPC Directive it is not necessary that such variation exists. This will depend on how Member States define what the rules say and what powers implementing authorities have to deviate from them. There is nothing in the Directive to prevent a Member State from laying down entirely uniform general binding rules if they so wish. The only exception is that it is necessary to ensure that, where required, stricter conditions are imposed if needed to comply with an environmental quality standard. However, the obligation to comply with environmental quality standards is an over-arching one for a Member State and so in fact applies to all activities.

6.5 Costs of reporting by Member States to the Commission

As discussed above, there are two main reporting obligations: emission limit value reporting and implementation reporting. Both happen once every three years at present. Member States have not been able to provide official data in the context of the IPPC review in order to quantify these administrative costs. However, the German authorities have unofficially estimated that the most recent cycle of reporting on implementation and emission limit values required about 730 person-days of effort. Germany has about 10,000 installations, and so if this level of effort is scaled up to all 52,000 installations in EU-27 the total is about 3,800 person-days, or 18 person-years. Applying the average installation weighted employment cost of €37,276 calculated previously, the total cost across EU-27 is about €670,000 for each reporting cycle.

In each case there will also be a need for some further processing and analysis of the data. At the Commission level this has in the past involved studies by consultants. Taking this into account, the overall cost of both sets of reporting considered together is estimated at around €1 million per reporting cycle.

In contrast to the above figures, another study has estimated the potential cost savings of combining MS reporting requirements to be in the region of €1-10 million per year (ENTEC 2007 (b)). However, this estimate seems rather high, since it calculated costs on a per installation basis, whereas in fact implementation reporting does not focus on specific installations but rather on application of the Directive as a whole. There is some installation data in relation to the ELV reporting under Article 16(1), but this relates to a small proportion of the installations in each reporting cycle.

7. Further detail on specific issues and options dealt with in the impact assessment

7.1 Inconsistency in multiple Directives

As has already been noted, the IPPC Directive exists alongside several other pieces of Community legislation affecting many of the same installations. These include not just the other pieces of industrial emissions legislation but also further measures – the Environmental Impact Assessment, Seveso II, Greenhouse Gas Emission Trading, Landfill, etc. Directives. The range of separate pieces of legislation, enacted at different times, has led to problems of interaction, difficulties in reconciling the different standards and approaches used, and some confusion over differences in definitions. This makes the overall body of law quite hard to understand and causes unnecessary administrative cost to both operators and Member State authorities.

The different options envisaged to deal with this issue are as follows:

Option 1 - Making amendments to each individual Directive to improve consistency and coherence. This would involve tabling a single legal proposal which would amend a number of specific Directives while leaving them as separate legal instruments. For instance, there would remain IPPC, LCP, WI, SE etc. Directives. The main areas where the Directives would be amended would be in relation to: establishing a more consistent set of definitions; and providing further clarity on the relationship between the requirement to apply BAT and the minimum requirements of the sectoral Directives.

Option 2 - Creating a new combined Directive through recast integrating the requirements of the current measures. This could be done at two main levels: firstly by integrating the IPPC Directive with the other immediate industrial emissions Directives (Option 2a); or secondly also including other broader instruments such as the Seveso II, EIA and Greenhouse Gas Emission trading Directives (option 2b). Option 2a would therefore create a single, harmonised text setting out, in different chapters, the broad framework of industrial permitting (taken from the IPPC Directive) plus the specific minimum requirements for industry sectors. Unless specifically decided otherwise the requirements applying to particular sectors would not be altered – so for example the combined Directive would still maintain (while making clear) the division between small users of solvents subject only to the minimum requirements, and larger users subject also to the application of BAT. Option 2b would then extend the approach to the other Directives mentioned, although in this case the nature of the integration would be slightly different since the issue of interaction is not so much about standards (BAT versus minimum requirements) but rather procedures (operational permitting in IPPC, development consent in EIA, greenhouse gas emission trading, measures for the prevention of accidents in Seveso II).

Option 3 - Making no change to the legislation but addressing inconsistencies through guidance. This would address broadly the same issues as are described above, but without any legal amendment. The Commission would instead publish guidance – much as it has done to provide information on the present provisions of the IPPC Directive[215] – explaining the interaction with the other Directives. However, there would be no possibility under this option to actually alter legal provisions which are presently unclear or duplicative. While being on

[215] http://ec.europa.eu/environment/ippc/general_guidance.htm

the one hand less constrained on what topics it could address and when, the guidance would be limited to reflecting the provisions of the current legal texts, and could not itself have a binding legal status.

In view of the flexibility given to Member States to implement Community legislation, and the principle of subsidiarity, it does not appear realistic to include an option that would require Member States to implement combined permitting. Therefore the options should be seen as facilitating combined permitting should Member States wish to pursue it.

7.2 Reducing costs of IPPC permitting and enforcement

Option 1 addresses the fact that certain permitting possibilities could be clarified in the Directive to make sure Member States are clear about the flexibility they have to grant permits at the level and in the way they consider most effective and efficient. This relates to the way Articles 2(3) (the definition of "installation"), 2(9) (the definition of "permit") and 2(12) (the definition of operator) are presently worded. These provisions have been interpreted by some parties as meaning that it is not possible at the moment for an installation to have more than one operator, or for a permit to cover more than one operator, or for a permit to cover installations operated by the same operator but on different sites. From a technical perspective there is no good reason why such approaches should not be implemented, subject to each installation and operator being made subject to substantive conditions that meet the requirements of the Directive and provide clear responsibilities to the operators concerned. Moreover guidance[216] published by the Commission services considers that such approaches are already possible with the current framework of the Directive. Some Member States already implement such approaches[217], but others do not, potentially because of uncertainty over the legal possibilities and constraints. This option would therefore clarify these provisions of the Directive to make the possibilities clear.

Option 2 considers the possibility for Member States to apply less burdensome permitting approaches. As already described, the Directive requires that all IPPC installations obtain permits, and that permits for new installations are only granted after consideration of an application from the operator and public consultation. The Directive allows that the conditions to which installations are subject can be expressed in general binding rules rather than in individual permits. This means in practice that a permit can simply identify the operator and the installation, referring to the general binding rules for the substantive obligations.

Despite this apparent possibility for a simpler approach, few Member States have opted for general binding rules to any significant degree so far. One reason for this may be that the use of general binding rules is likely to entail a more standardised set of operational controls. Despite the benefits of such an outcome in terms of transparency, predictability and simplicity, this can be in conflict with the idea of a tailored, site-specific permit which many Member States and industries value. Another reason for hesitation to use general binding rules may be cultural or political unfamiliarity with them in some Member States. But a third reason may be that, where general binding rules are used, there is still a requirement under the Directive for permit applications and consultation. It is expected that both applications and consultation could be simplified where general binding rules apply, since both operators and the public should have a clear idea of what standards would be applied. However, this option

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216 See http://ec.europa.eu/environment/ippc/general_guidance.htm

217 ENAP project documents.

considers the impacts of making it clearer that reduced requirements would apply in those cases where general binding rules were used. In particular, this option would involve:

- stating explicitly that competent authorities could make reference to the general binding rules in the permit (i.e. they would not need to reproduce the rules in each permit)

- stating that there would be no need for permit applications to cover details described in general binding rules (Member States could also, for example, produced more standardised application forms, although this is already possible under the Directive and would not need to be elaborated in any new legal provisions)

- removing the consultation requirements for applications based fully on general binding rules. Public consultation would instead be undertaken at the stage of producing the general binding rules. This however would be subject to the installation also being covered by the EIA Directive, which would be necessary to satisfy the Community's legal obligations under the Aarhus Convention.

Option 3 would affect installations covered by the WI Directive and would allow non-application of monitoring requirements in those cases where the corresponding pollutants were not emitted or were only emitted in quantities that could safely be predicted to be well below the ELVs. The option envisages that this would operate on the basis of a case-by-case judgement to be made by the competent authority considering a request for derogation from the operator. Member States could also choose to disapply the monitoring requirements for certain sectors and waste streams, as laid down in general binding rules, where established in advance that the ELVs could not be exceeded. Provision would also be made for criteria concerning derogations to be set at Community level through a comitology procedure to be established under the Directive. Any such derogations would also need to be reported to the Commission.

Finally, **option 4** recognises that most scope to reduce administrative burdens under the IPPC Directive lies at the Member State level or below. The scale and variation of present costs suggests quite significant potential for cost savings in the Member States. Such cuts could be up to the five- or tenfold of the cost savings resulting from action at the Community level (€ 150 – 300 million)[218]. Therefore, this option would involve development of an action programme with Member States and possibly some subsequent guidance to assist Member States that would like to investigate opportunities for them to reduce their administrative burdens. This would be based among other things on the BEST project and the outcome of the measurement exercise on IPPC burdens at national level which is to be carried out under the Commission's general initiative on administrative burdens.

7.3 Costs of Member State reporting

Option 1 would simply remove the Member State reporting requirements. This could be limited to the requirements of the IPPC Directive (Articles 16(1) and (3)), or extended to the similar reporting provisions of other Directives, notably the WI and SE Directives, and the emission inventory reporting requirements of the IPPC Directive.

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218 This estimation is based on best practices in certain Member States as described in IEEP, 2006 (b)

Option 2 would change the reporting requirements of the IPPC Directive. This option addresses the fact that the current reporting provisions of Articles 16(1) and (3) are somewhat inflexible, of limited policy relevance, and not very clearly linked with the exchange of information for the purposes of Article 16(2) and the production of BREFs. For example, the fixed, three-yearly reporting of Articles 16(1) and (3) does not necessarily reflect the most useful reporting cycle for policy assessment and development purposes. Nor does this support particularly well the BREF process, which is ongoing. As a result, although the costs of the reporting are not high, the reporting is nevertheless an irritation for Member States.The option considered is therefore to replace the current, separate reporting provisions of Articles 16(1) and (3) with a new streamlined reporting procedure. The exact requirements (content and timing of the reporting) would be established under a comitology procedure to be included in the Directive, and could therefore be tailored to evolving needs. The reporting would be set up on the basis of the principles of the Shared Environmental Information System following adoption of the INSPIRE Directive. This option would also permit the reporting to provide more useful information on progress towards BAT.

Option 3 would provide for a combined reporting covering not just the IPPC Directive but also other Directives as well. Logically such combined reporting would match any combination of Directives pursued as an outcome of the review. However, even if the Directives were kept separate, it would be possible to alter the reporting provisions so that, for example, reports on implementation of the WI and SE Directives would be delivered as part of the IPPC Directive reports.

Annex 9: Assessment of Administrative Costs based on the Standard Cost Model (SCM)

1. **Unnecessary burden** to be removed through the review process

Proposal for a Directive of the European Parliament and of the Council concerning integrated pollution prevention and control						Tariff (€ per hour)		Time (hour)		Price (per action or equip)	Freq (per year)	Nbr of entities	Total nbr of actions	Total cost	Regulatory origin (%)			
1. UNNECESSARY BURDEN to be removed through the review of legislation																		
No.	Ass. Art.	Orig. Art.	Type of obligation	Description of required action(s)	Target group	i	e	i	e						Int	EU	Nat	Reg
1	Promotion of combined permitting through single Directive		Application for individual authorisation or exemption	Retrieving relevant information from existing data	Member States	65		-25,00		-1.625,0	1,00	9.000	9.000	-14.625.000			100%	
2	Promotion of combined permitting through single Directive		Application for individual authorisation or exemption	Retrieving relevant information from existing data	Operators	65		-25,00		-1.625,0	1,00	9.000	9.000	-14.625.000			100%	
3	Reduction of monitoring for waste (co-)incineration		Other	Producing new data	Operators	65		-16,00		-1.040,0	2,00	600	1.200	-1.248.000		100%		
4	Streamlining of Member States reporting		Submission of (recurring) reports	Retrieving relevant information from existing data	Member States	65		-1.000,00		-65.000,0	0,30	27	8	-526.500		100%		
														Total administrative costs (€)		**-31.024.500**		
																-1.774.500	-29.250.000	0
														Administrative costs by origin (€)	0			
														Total administrative costs for OPERATORS (€)	***-15.873.000***			
														Total administrative costs for MEMBER STATES (€)	***-15.151.500***			

2. Additional **administrative burden necessary to strengthen compliance and increase environmental improvements**

Proposal for a Directive of the European Parliament and of the Council concerning integrated pollution prevention and control						Tariff (€ per hour)		Time (hour)		Price (per action or equip)	Freq (per year)	Nbr of entities	Total nbr of actions	Total cost	Regulatory origin (%)			
2. Additional ADMINISTRATIVE BURDEN necessary to achieve the objectives																		
No.	Ass. Art.	Orig. Art.	Type of obligation	Description of required action(s)	Target group	i	e	i	e						Int	EU	Nat	Reg
1	Documentation of possible deviation from BAT		Application for individual authorisation or exemption	Retrieving relevant information from existing data	Member States	65		16,00		1.040,0	0,10	5.000	500	520.000		100%		
2	Inspection		Inspection	Inspecting and checking (including assistance to inspection by public authorities)	Member States	65		24,00		1.560,0	0,50	23.400	11.700	18.252.000		100%		
3	Inspection		Inspection	Inspecting and checking (including assistance to inspection by public authorities)	Operators	65		4,00		260,0	0,50	23.400	11.700	3.042.000		100%		
4	Compliance reporting		Submission of (recurring) reports	Submitting the information (sending it to the designated recipient)	Operators	65		8,00		520,0	0,50	23.400	11.700	6.084.000		100%		
5	Permits review		Application for individual authorisation or exemption	Retrieving relevant information from existing data	Member States	65		77,00		5.005,0	1,00	1.300	1.300	6.506.500		100%		
6	Permits review		Application for individual authorisation or exemption	Filling forms and tables	Operators	65		38,50		2.502,5	1,00	1.300	1.300	3.253.250		100%		
7	Soil Monitoring		Submission of (recurring) reports	Submitting the information (sending it to the designated recipient)	Operators	65		8,00		520,0	0,10	52.000	5.200	2.704.000		100%		
														Total administrative costs (€)		**40.361.750**		
																40.361.750	0	0
														Administrative costs by origin (€)	0			
														Total administrative costs for OPERATORS (€)	***15.083.250***			
														Total administrative costs for MEMBER STATES (€)	***25.278.500***			

3. Additional **administrative burden due to the extension of the scope** of the Directive

Proposal for a Directive of the European Parliament and of the Council concerning integrated pollution prevention and control						Tariff (€ per hour)		Time (hour)		Price (per action or equip)	Freq (per year)	Nbr of entities	Total nbr of actions	Total cost	Regulatory origin (%)			
3. Additional ADMINISTRATIVE BURDEN due to the extension of the scope of the Directive (new activities)																		
No.	Ass. Art.	Orig. Art.	Type of obligation	Description of required action(s)	Target group	i	e	i	e						Int	EU	Nat	Reg
1	Combustion plants 20-50MW		Application for individual authorisation or exemption	Retrieving relevant information from existing data	Member States	65		145,00		9.425,0	0,05	1.500	75	706.875		100%		
2	Combustion plants 20-50MW		Application for individual authorisation or exemption	Retrieving relevant information from existing data	Operators	65		308,00		20.020,0	0,05	1.500	75	1.501.500		100%		
3	Combustion plants 20-50MW		Other	Retrieving relevant information from existing data	Member States	65		92,00		5.980,0	1,00	1.500	1.500	8.970.000		100%		
4	Combustion plants 20-50MW		Submission of (recurring) reports	Producing new data	Operators	65		43,00		2.795,0	1,00	1.500	1.500	4.192.500		100%		
5	Combustion plants 20-50MW		Submission of (recurring) reports	Submitting the information (sending it to the designated recipient)	Operators	65		46,00		2.990,0	1,00	1.500	1.500	4.485.000		100%		
6	Intensive Livestock		Application for individual authorisation or exemption	Retrieving relevant information from existing data	Member States	65		58,00		3.770,0	0,05	450	23	84.825		100%		
7	Intensive Livestock		Application for individual authorisation or exemption	Retrieving relevant information from existing data	Operators	65		59,00		3.835,0	0,05	450	23	86.288		100%		
8	Intensive Livestock		Other	Retrieving relevant information from existing data	Member States	65		29,00		1.885,0	1,00	450	450	848.250		100%		
9	Intensive Livestock		Submission of (recurring) reports	Submitting the information (sending it to the designated recipient)	Operators	65		46,00		2.990,0	1,00	450	450	1.345.500		100%		
10	Waste related activities [1]		Application for individual authorisation or exemption	Retrieving relevant information from existing data	Member States	65		64,00		4.160,0	0,05	795	40	165.360		100%		
11	Waste related activities [1]		Application for individual authorisation or exemption	Retrieving relevant information from existing data	Operators	65		32,00		2.080,0	0,05	795	40	82.680		100%		
12	Waste related activities [1]		Other	Retrieving relevant information from existing data	Member States	65		92,00		5.980,0	1,00	795	795	4.754.100		100%		
13	Waste related activities [1]		Submission of (recurring) reports	Producing new data	Operators	65		43,00		2.795,0	1,00	795	795	2.222.025		100%		
14	Waste related activities [1]		Submission of (recurring) reports	Submitting the information (sending it to the designated recipient)	Operators	65		46,00		2.990,0	1,00	795	795	2.377.050		100%		
26	Wood preservation		Application for individual authorisation or exemption	Retrieving relevant information from existing data	Member States	65		115,00		7.475,0	0,05	300	15	112.125		100%		
27	Wood preservation		Application for individual authorisation or exemption	Retrieving relevant information from existing data	Operators	65		308,00		20.020,0	0,05	300	15	300.300		100%		
28	Wood preservation		Other	Retrieving relevant information from existing data	Member States	65		92,00		5.980,0	1,00	300	300	1.794.000		100%		
29	Wood preservation		Submission of (recurring) reports	Producing new data	Operators	65		43,00		2.795,0	1,00	300	300	838.500		100%		
30	Wood preservation		Submission of (recurring) reports	Submitting the information (sending it to the designated recipient)	Operators	65		46,00		2.990,0	1,00	300	300	897.000		100%		
31	Wood-based panels		Application for individual authorisation or exemption	Retrieving relevant information from existing data	Member States	65		115,00		7.475,0	0,05	110	6	41.113		100%		
32	Wood-based panels		Application for individual authorisation or exemption	Retrieving relevant information from existing data	Operators	65		308,00		20.020,0	0,05	110	6	110.110		100%		
33	Wood-based panels		Other	Retrieving relevant information from existing data	Member States	65		92,00		5.980,0	1,00	110	110	657.800		100%		
34	Wood-based panels		Submission of (recurring) reports	Producing new data	Operators	65		43,00		2.795,0	1,00	110	110	307.450		100%		
35	Wood-based panels		Submission of (recurring) reports	Submitting the information (sending it to the designated recipient)	Operators	65		46,00		2.990,0	1,00	110	110	328.900		100%		

[1] This includes Composting, Pre-treatment before co-incineration, Off-site treatment of slags and ashes, Treatment of scrap metal

Total administrative costs (€) **37.209.250**

37.209.250

Administrative costs by origin (€) 0 0 0

Total administrative costs for OPERATORS (€) ***19.074.803***

Total administrative costs for MEMBER STATES (€) ***18.134.448***

4. **Summary of changes in overall administrative burdens as a result of the proposals**

Proposal	**Administrative burden (per year)**		
	Increase of NECESSARY burden (million €)		**Decrease of UNNECESSARY burden (million €)**
	For Member States	**For operators**	**For Member States and operators**
Promotion of combined permitting			- 30
Streamlining of monitoring and reporting			- 2
Actions to reduce unnecessary administrative burden at **Member State level**			- 150 to - 300
Extension of the scope of the Directive	18	19	
Actions to strengthen compliance and increase environmental improvements	26	14	
Total	**44**	**33**	**- 182 to - 332**
Net total REDUCTION of administrative burden	**- 105 to -255 million €**		

Annex 10: Background information on Titanium Dioxide

Table 13: Emission limit values for substances in Directive 92/112/EEC and emission levels associated with the application of BAT for these substances

Pollutant	Emission limit values in Directive 92/112/EEC	Emission levels associated with the application of the BAT
Air emissions		
Dust	<50 mg/Nm^3 from major sources <150 mg/Nm^3 from other sources	Chloride process: 0,1-0,2 kg/t TiO_2 pigment Sulphate process: 0.004-0.45kg/t TiO_2 pigment <5-20 mg/Nm^3
SO_2	<10 kg /t of TiO_2 produced from the digestion and calcination steps	Chloride process: 1,3-1,7 kg/t TiO_2 pigment Sulphate process: 1-6 kg/t TiO_2 pigment
Chlorine	<5 mg/Nm^3 as daily average or <6 g/t TiO_2 produced <40 mg/Nm^3 chlorine at any time	Avoiding uncontrolled emissions from the chlorination unit.
Water emissions		
Sulphate	For weak acid and neutralised waste from the sulphate process: <800 kg /t of TiO_2 produced	100-550 kg/t TiO_2 pigment
Chloride	For weak acid waste, treatment and neutralised waste from the chloride process: <130 kg of chloride/t of TiO_2 produced using neutral rutile <228 kg of chloride/t of TiO_2 produced using synthetic rutile <450 kg chloride/t of TiO_2 produced using slag	38 – 330 kg/t TiO_2 pigment

Simplification of the requirement of the titanium dioxide Directives

The origins of Community legislation related to waste from the titanium dioxide industry go back to the early 1970s when waste from this industry was disposed of in the sea or in coastal waters thereby giving rise to considerable environmental concern.

The European Communities' Action Programmes on the Environment of 1973 and 1977 urged the Community to take action against the pollution caused by the waste generated by this industry. In 1978, the Council adopted Directive 78/176/EEC which established a system of prior authorisation before waste from the titanium dioxide industry could be disposed of either into water, land or air. This Directive set out that waste disposal should be accompanied by monitoring of waste and the impact it has on the environment concerned. Furthermore, according to this Directive, Member States were required to set up programmes to reduce the environmental impacts of waste from this industry. In 1982, the Council adopted Directive 82/883/EEC, which laid down detailed rules for the procedures to be followed for the monitoring and surveillance of the environment concerned by waste from the titanium dioxide industry. Finally, in 1992, Council Directive 92/112/EEC further harmonised the Member States' programmes for the reduction of waste from this industry required by Directive 78/176/EEC, and set limit values for the emission into air and water.

Since the adoption of Directives 78/176/EEC, 82/883/EEC and 92/112/EEC, new pieces of Community legislation have come into force. The coherence between these pieces of legislation and the titanium dioxide Directives can be strengthened and provisions of the titanium dioxide Directives can be simplified. Such simplification of legislation is in line with the Commission's Action plan "Simplifying and improving the regulatory environment" (Communication from the Commission of 5.6.2002, COM (2002)278 final). Moreover, the simplification of the titanium dioxide Directives can rationalise the existing Community legislation, and reduce the administrative burden associated with implementing the Directives without lowering the level of environmental protection afforded.

The simplification will take into account the fact that some of the provisions of the titanium dioxide Directives have become obsolete, either because they refer to actions taken in the past or because they have become redundant following new developments in Community legislation. The definitions used throughout the Directives can be modernised and made more consistent with other relevant pieces of Community legislation. The detailed rules related to the procedure for the monitoring and surveillance of the environment concerned by the waste from this industry can also be rationalised and simplified.

Simplifying and merging the provisions of the three abovementioned titanium dioxide Directives and including them into the IPPC Directive would facilitate the coherent application of the requirements related to the TiO2 industry for the public authorities. This can reduce the administrative burden without lowering the ambitious level of environmental protection.

A gap analysis was carried out by external experts[219] on the proposed simplified provisions of the above Directives. This was taken into account as appropriate when preparing the Commission's proposal.

[219] AEAT, 2007 (c)

Annex 11: IPPC Scope: background information on the analysis of impacts for possible extension and clarification

Issues being addressed in this annex regarding the scope of the IPPC Directive:

Intensive livestock rearing
Biological treatment of organic waste
Pre-treatment of combustible waste for co-incineration
Treatment installations for slag and ashes for recycling
Sorting and crushing of construction and demolition waste
Treatment of scrap metal
Aquaculture
Any gasification and liquefaction installations
Manufacture of coal fuel products and solid smokeless fuel
Industrial plants for the preservation of wood and wood products
Production of other primary wood products than paper and board
Installations for the building of, and painting of or removal of paint from ships
Independently operated industrial wastewater treatment plants
Chemicals production – biological processing, biodiesel and pharmaceutical intermediates production
Foundries
Ceramics production
Food production

Intensive livestock farming - more detailed information on the analysis of the options considered

Part 1: Ammonia emissions from the intensive livestock rearing sector

The agricultural installations covered by the IPPC Directive emit large quantities of pollutants to air (eg about 25% of all emissions of ammonia) and water (in particular nitrogen and phosphorus emissions). In addition, permits issued under the IPPC Directive have also to address local impacts such as odour.

A proper implementation and enforcement of the IPPC Directive as well as the application of BAT are therefore of great importance for achieving the reduction of emissions set in particular in the Thematic Strategy on Air Pollution and the NEC Directive.

A study[220] based on the RAINS model shows that large differences exist between the estimations of the Member States of the level of emissions expected in 2020 from the implementation of the IPPC Directive and the emission levels that result from a scenario that models what can be reasonably assumed concerning the application of BAT as described in the BREFs (so-called "European IPPC").

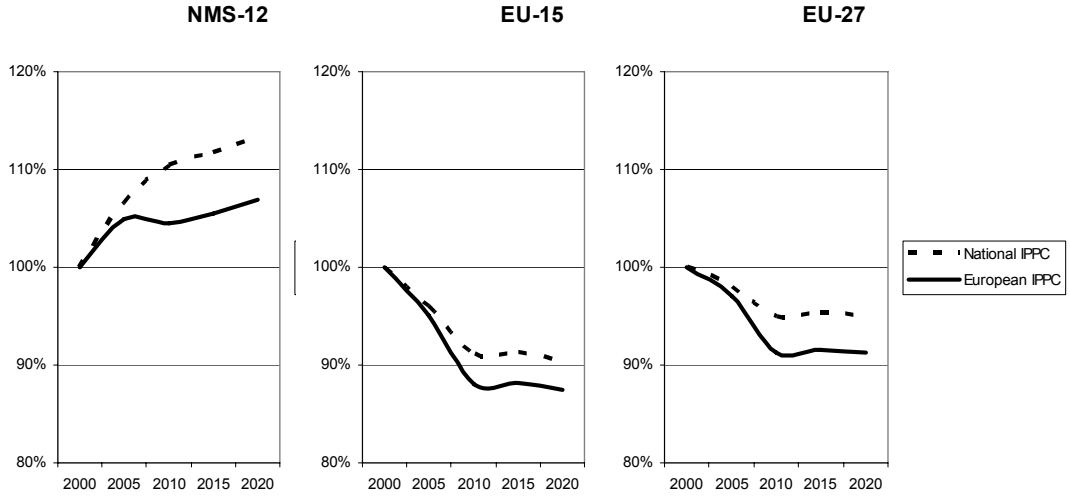
The figure below shows the outcome of the following scenarios:

- The so-called "national IPPC" scenario shows the effects of the implementation of current legislation (including the IPPC Directive) according to the estimations of Member States of the expected reduction of emissions compared to the 2000 level of emissions from the agricultural sector

- The so-called "European IPPC" scenario shows the effects of the implementation of the same legislation (including the IPPC Directive) based on a more rigorous application of BAT as described in the BREFs

[220] IIASA, 2007 (a)

Figure 5: Impact of interpretation of the IPPC Directive on agricultural NH3 emissions in the EU between 2000 and 2020 (NEC baseline scenario; 100%=2000 emissions)



The differences between the two scenarios demonstrate that Member States do not expect that the implementation of the IPPC Directive will result in the full application of BAT as described in the BREFs.

The application of BAT as described in the BREFs ("European IPPC" scenario) would reduce by 130kt the emissions of ammonia in the EU27 compared to the "national IPPC" scenario. This would lead to important environmental benefits, for instance by reducing the unprotected area from eutrophication by about 13000 km^2. This represents a large contribution (about 15%) of the total reductions (850 kt) needed to meet the 2020 objectives of the Thematic Strategy on Air Pollution compared to the so-called NEC baseline (implementation of current legislation). This analysis therefore stresses the importance to consider measures to further implement BAT in the agricultural sector (see section 4.1 on the analysis of options to help Member States to implement BAT).

Part 2: Analysis of the impacts of the options considered (see section 7.1.2)

The options considered are the following:

Include BAT for manure land spreading (option 1)
Include different thresholds for poultry specifies to reflect same environmental impact (option 2)
Extend the scope of the IPPC Directive to cattle farming and include more pig and poultry farms (option 3)

Environmental impacts

Option 1: BAT for manure spreading

Under option 1, the application of manure would have to be based on BAT as described in the BREF. The Nitrate Directive was not identified as the best tool to ensure that manure

spreading is based on BAT. Action Programmes to be established by Member States relate to so-called "designated vulnerable zones"[221] (unless they have established an action programme on the whole territory) and do not always include measures on specific techniques for manure spreading.

The environmental impacts of applying BAT for manure spreading have been estimated to the reduction of 50 to 60 kt of ammonia compared to the NEC baseline (with full IPPC/BAT implementation).

Table 14: Ammonia reduction (in kt in 2020) estimated with different models and compared to different baseline scenarios

RAINS	60	Compared to NEC baseline
MITERRA	50	Compared to NEC baseline

Option 2: different thresholds for poultry species

Under option 2, based on a reference point of 40.000 broilers (current IPPC threshold for poultry), specific thresholds would be set per type of poultry species to reflect the same environmental impacts based on the excretion of nitrogen. Under option 2, no other changes are foreseen compared to the business as usual.

The analysis of this option does not include the application of BAT for manure spreading.

Thresholds considered are the following using the excretion of nitrogen to determine the thresholds for different species with the same environmental impact.

Table 15: Nitrogen excretion conversion factor between different animal species [Alterra, 2007]

	Conversion factor	Calculation based on conversion factor	Thresholds considered for IA
Fattening pigs	11	2000	2000
Sows	28	786	750
Broilers	0,6	36667	40000
Laying hens	0,8	27500	30000
Ducks	1	22000	24000
Turkeys	2,1	10476	11500

For installations for the rearing of different species, the IPPC threshold would be calculated proportionately based on the above mentioned threshold per species.

[221] See Article 5 of the Nitrate Directive.

For instance, an installation with 20% places for turkeys and 80% for laying hens would need to be compared with a threshold of (20%*30000 + 80%11429)=26286 places. The number of installations currently covered by the IPPC Directive is presented in Table 16.

Table 16: Number of farms and animals covered by the current IPPC thresholds (2003 data) [Alterra, 2007]

	Farms		**Animals (in million head)**	
	Total	IPPC	Total	IPPC
Fattening pigs	1927260	6040 (0.3%)[222]	150.0	23.8 (16%)
Sows	769070	2360 (0.3%)	16.1	3.6 (22%)
Laying hens	3017570	2450 (0.1%)	460.8	270 (59%)
Broilers	1147190	5180 (0.5%)	839.3	539 (64%)

About 900 additional farms would be covered under the scope of the IPPC Directive.

The reduction of ammonia emissions has been estimated at around 10 kt. The impacts on other pollutants (eg CH4, N2O) have been estimated to be negligible.

Option 3: extend IPPC scope

Option 3 would involve the setting of several reduced thresholds for pigs and poultry and the inclusion of cattle. The table below contains details on the specific thresholds assessed.

The table below presents the current IPPC thresholds and the proposed three scenarios with modified levels for pig and poultry and the inclusion of dairy and beef cattle.

Table 17: Current IPPC thresholds (number of places) and proposed extensions

Animal category	Current IPPC (t0)	Extension of the IPPC Directive		
		(scenario 1 – t1)	(scenario 2 – t2)	(scenario 3 – t3)
Fattening pigs	> 2,000	> 2,000	> 1,750	> 1,500
Sows	> 750	> 750	> 675	> 600
Hens	> 40,000	> 27,500	> 25,000	> 20.000
Broilers	> 40,000	> 37,000	> 32,000	> 27,000
Dairy cows	-	> 450	> 400	> 350
Other cattle	-	> 1,000	> 850	> 700

[222] Numbers between brackets indicate the number of "IPPC farms" and "IPPC animals" in percent of the total number of farms and total number of animals, respectively.

These scenarios have also been assessed in combination with the application of BAT for manure spreading, referred to in the report as Low Nitrogen Application (LNA, presented below as t1 LNA)

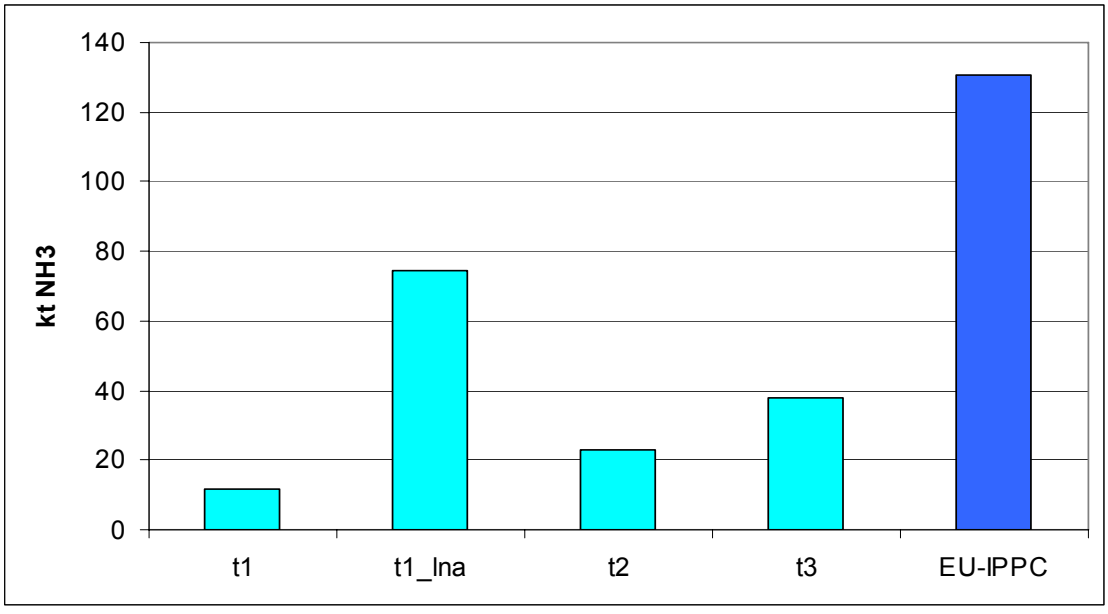
The impact of applying these scenarios on the number of installations covered by the IPPC Directive is presented in the table below.

Table 18: Number of farms covered by various possible extension of the IPPC scope

Scenarios	Fatteners	Sows	Laying hens	Broilers	Dairy cows	Other cattle	Total
Current IPPC	6040	2380	2450	5180	0	0	16050
t1	6040	2380	3572	5862	7283	383	25520
t2	8360	3238	3953	6998	9357	1149	33054
t3	10680	4115	4716	8474	11430	2298	41714

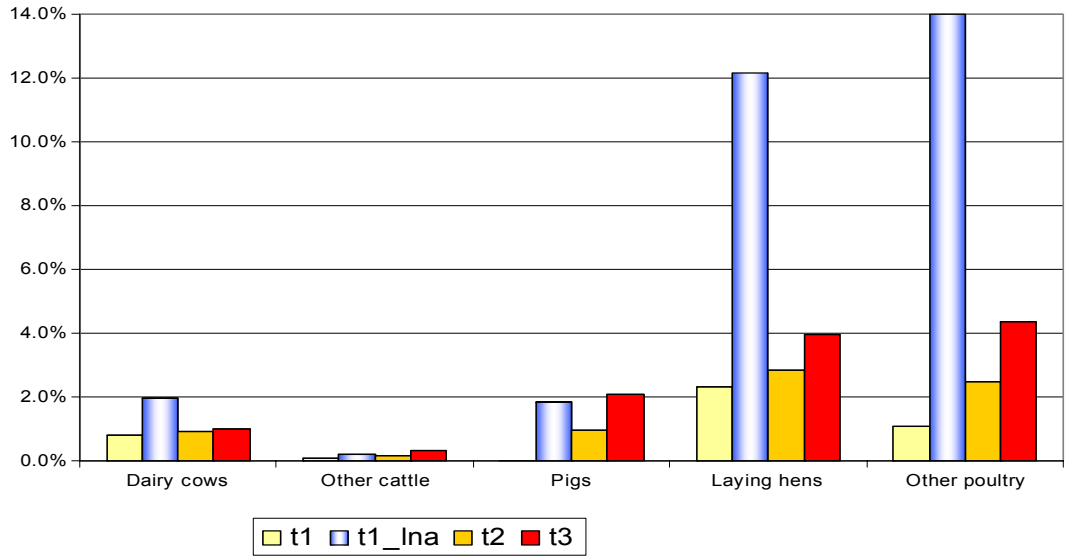
The impacts on the reduction of emissions have been estimated using both the RAINS and the MITERRA model based on the same key assumptions. The differences of results can be mainly explained in particular by the MITERRA takes into account the impacts of the full application of the Nitrate Directive.

Figure 6: RAINS model: additional NH3 reductions for the NMS-10 and EU-15 in 2020 in the IPPC extension scenarios compared to the NEC baseline (European IPPC) case, kt NH3.



These reductions of emissions can be compared to the NEC baseline (Figure 5)

Figure 7: Additional NH3 reductions for the EU-27 in 2020 in the IPPC extension scenarios compared to the NEC baseline (European IPPC) case



2. Economic impacts

Option 1: BAT for manure spreading

In the analysis carried out, the most cost-effective scenario is the application of BAT for manure spreading for which the average cost of reducing ammonia has been estimated to about € 2400 Mg^{-1} which is lower that the average cost for the NEC baseline estimated at 6000 € Mg^{-1}. No significant additional administrative costs are expected since these installations already fall under the IPPC Directive and have to report to the competent authorities.

Option 2: different thresholds for poultry species

The compliance costs for bringing these installations under the IPPC Directive have been estimated to about € 10 million. The average cost of reducing ammonia has been estimated to about € 1000 per tonne which is lower that the average cost for the NEC baseline estimated at € 6000 € Mg^{-1}.

In the UK, the application fee for a standard farm is about € 5000 and about around € 3000 of annual administrative costs for operators and authorities. Using the costs from the UK, the total permitting costs for bringing these installations under the IPPC Directive would be around € 4.5 million for the EU with additional annual administrative costs of € 2.7 million. These figures are likely to be over estimated since consultation with other Member States have shown that much lower costs can be expected, in particular when general binding rules are being set.

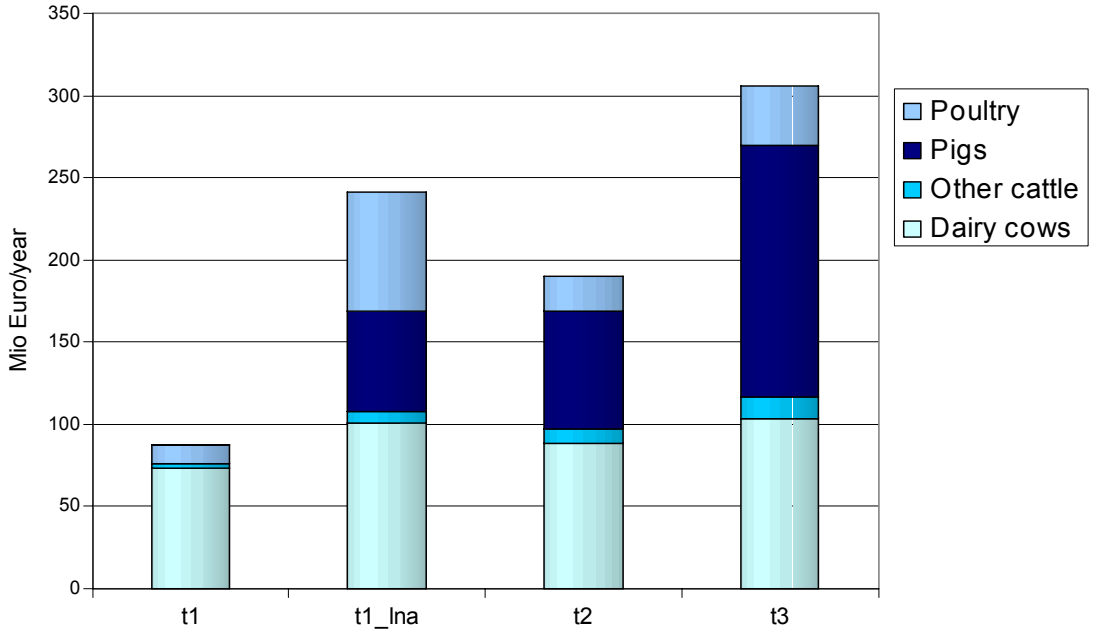
Option 3: extend IPPC scope

A brief comparison of costs of the analyzed scenarios with the costs of the NEC baseline is presented (see figure below) for EU-27. The additional annual costs range from about € 87 million for *t1* to € 306 million for *t3*.

It is important to note that no significant difference in costs for dairy cows is visible between scenarios indicating that thresholds of 450 and 350 animal places do not make a big change and already the first threshold captures most of the animals on very large farms. On the other hand, pig production seems to be far more sensitive to the threshold as the costs double when changing the threshold by about 15 percent from 1750 fatteners and 675 sows to 1500 and 600, accordingly. Costs for poultry grow with lowered threshold but do not represent more than 15 percent of total cost increase.

The average cost of reducing NH_3 is estimated at nearly 8000 € Mg^{-1} NH_3 for the *t3* scenario while the average cost for the NEC baseline was estimated at about 6000 € Mg^{-1} NH_3. The most cost effective scenario is *t1_lna* where average cost of reduction is about 3200 € Mg^{-1}.

Figure 8: Additional costs (compared to the NEC-baseline case) for the IPPC extension scenarios.



Background analysis on the possible changes in the IPPC scope for the waste treatment sectors (see section 7.2)

1. Inconsistency in the current IPPC scope

The inconsistencies identified relate to the following three sectors:

- Biological treatment of organic waste:
- Pre-treatment of combustible waste for co-incineration
- Off-site treatment installations for slag and ashes for recycling

These types of waste treatment are covered under the current scope of the IPPC Directive only if they result in final compounds or mixtures which are discarded through disposal operations. The relevant BREFs contain BAT conclusions for these types of installations. This means that similar installations (with similar environmental impacts) resulting in waste or products (eg composting) which are not disposed of but recovered or used as products are not covered under the scope of the IPPC Directive. These inconsistencies result in possible distortion of competition between similar types of installations and a lower level of environmental protection for installations not covered under the IPPC Directive.

Options considered

The options considered relate to the inclusion under the scope of the IPPC Directive of installations carrying out the 3 activities mentioned above with a capacity exceeding 10 tonnes per day for the disposal and recovery of hazardous waste and 50 tonnes per day for the recovery of non hazardous waste (current thresholds in the IPPC Directive).

More detailed analysis is provided below and in the following tables. For the three sectors concerned, the options considered to include them under the scope of the IPPC Directive would harmonize permitting practices and avoid distortion in the permitting between installations with similar environmental impacts.

Biological treatment of organic waste

There are about 6000 installations for the biological treatment of organic waste in the EU (3500 composting installations and 2500 anaerobic digestion installations). The very large majority of the anaerobic digestion installations have very small capacities (mainly on-farm digesters) and it has been estimated that 120 installations would be centralised installations above the 50 tonnes per day threshold. A large part of these installations are already covered by a BAT-based permitting regime (e.g. in Germany). As a result, it could be estimated that out of the 120 anaerobic digestion installations, around 25 would not yet be covered by a BAT-based permit.

As regards composting installations, the total treatment capacity is about 31 million tonnes. Out of this, 25 million tonnes are already covered by a BAT-based permit (corresponding to about 2600 BAT-based installations). An additional 3 million

tonnes (out of a remaining 6 million tonnes produced in about 900 installations) would fall under the proposed extension of the IPPC Directive to installations with a capacity above 50 tonnes per day. This means that an estimated additional 150 installations would have to be permitted under a BAT regime if the scope of the IPPC Directive would be extended.

The environmental benefits (in particular relating to emissions to air, release to water and odour) would be significant for Member States which do not yet regulate these installations according to BAT-based permitting. The BREF on waste treatment already establishes BAT conclusions for installations carrying out biological treatment organic waste prior to disposal which have similar impacts than installations treating such waste prior to recovery.

As demonstrated in the Member States where BAT has been implemented, the economic impacts of this are limited. No significant additional administrative costs are expected since these installations are already subject to a permit under the waste legislation. The smallest installations would not be covered by the IPPC Directive since their production capacity is below 50 tonnes per day. Positive social impacts are expected through reduced impacts on health and more confidence of the public in the permitting of these types of installations.

For more information, see the table below related to this sector. It is recommended to cover this sector under the IPPC Directive.

Pre-treatment of combustible waste for co-incineration

The installations for the pre-treatment of combustible hazardous or non-hazardous waste for incineration are covered by the scope of the IPPC Directive but similar installations pre-treating waste for co-incineration are excluded (except if they are part of an IPPC co-incineration installation as directly associated activity). The number of installations which would be concerned by this change of the scope of the IPPC Directive is rather limited (estimated at about 270) but could increase in view of the developments in the waste co-incineration.

These installations are regulated through BAT-based permitting in some of the Member States. The BREF on waste treatment already contains in particular BAT conclusions for the preparation of waste to be used as fuel. The environmental benefits related to this option would be significant compared to the impacts of the overall waste treatment activities already regulated under the IPPC Directive. The economic impacts would be the largest for the non-hazardous waste treatment installations but the BREF sets BAT conclusions which are economically viable for this sector. The social impacts would be positive. For more information, see the table below related to this sector.

It is recommended to cover this sector under the IPPC Directive.

Off-site Treatment installations for slag and ashes for recycling

Treatment installations for ashes (mainly bottom ashes from municipal waste incinerators) and for slags (mainly from the ferrous industry) fall under the scope of the IPPC Directive only if they are directly associated activities of an IPPC

installation. Off-site treatment installations with similar environmental impacts are currently not covered by BAT-based permitting except in some Member States. Only a small number of installations would be concerned (maximum of 75 for the treatment of ashes and 45 for the treatment of slags).

The main environmental impacts of these installations are the emissions of dust which are significant compared to the emissions of other waste treatment activities. A BREF on storage provides BAT conclusions to prevent and reduce dust emissions. The environmental benefits of implementing BAT would be significant (up to 90% of dust reduction compared to the current levels of emissions of this sector). No significant costs from BAT uptake are expected. No significant additional administrative costs are expected. Through reduced dust emissions, the health impacts would be reduced and the social impacts positive. For more information, see the table below related to this sector.

It is recommended to cover this sector under the IPPC Directive.

2. Possible addition of other waste treatment activities

Specific problem definition

During the consultation with stakeholders and the analysis of which sectors might potentially be covered by the IPPC Directive, the following 9 activities were identified for possible inclusion in the scope of the IPPC Directive:

Sorting and crushing of Construction and Demolition waste
Mechanical recycling of plastics
Chemical recycling of plastics
Recycling of wood
Recycling of rubber
Recycling of minerals
Treatment of scrap metal
Recycling of edible oils/fat
Recycling of gypsum

A first screening exercise[223] (using the methodology described above in the introduction to this chapter) and the consultation with stakeholders lead to the identification of the following sectors for further analysis.

Sorting and crushing of Construction and Demolition waste

Treatment of scrap metal

Options considered

For the two sectors concerned, the options considered relate to the inclusion under the scope of the IPPC Directive of installations with a capacity exceeding 50 tonnes per day (thresholds currently set in the IPPC Directive for non-hazardous waste treatment).

Summary analysis of impacts

[223] VITO, 2007 (a)

Sorting and crushing of construction and demolition waste

A rather large number of installations would be covered under the IPPC Directive through this option (more than 8000 installations including more than 2000 mobile installations). The environmental impacts relate mainly to dust emissions and noise in particular for installations locates closed to urban areas. It has been estimated that the techniques to prevent and reduce dusts emissions are already in place in about half of the installations. The introduction of BAT in all installations would some positive environmental and social positive impacts. However, the sector is under important competitive pressure from the production of raw materials and an increased price of recycled products could have negative impacts on the recycling of construction and demolition waste. For more information, see the table below related to this sector.

It is recommended not to cover this sector under the IPPC Directive.

Treatment of scrap metal

Only about 230 integrated shredders of End of Life Vehicles (ELV) and Waste Electric and Electronic Equipments (WEEE) would be covered by this option. Other installations within this sector would fall below the threshold of 50 tonnes per day. These installations already fall under the scope of the ELV and WEEE Directives and are subject to minimum requirements for the protection of soil and water. These requirements are very general and no specific techniques based on BAT are indicated. The environmental positive benefits related to this option would be significant mainly due to the reductions of dust and dioxins emissions from these installations. As shown in the Member States where BAT has been implemented, the economic impacts of BAT introduction for this sector would be limited. No significant additional administrative costs are expected since these installations are already subject to a permit under the waste legislation. Positive social impacts are expected through reduced impacts on health. For more information, see the table below related to this sector.

It is recommended to cover this sector under the IPPC Directive.

Possible regulation of additional industrial sectors through the IPPC Directive (see section 7.4)

Problem definition

As indicated in the general problem definition of this chapter, the IPPC Directive, and in particular the implementation of BAT, is in principle an effective piece of legislation, if applied properly and to its full extent, to regulate the emissions of industrial installations at EU level. The issue at stake is therefore to assess, on a case-by-case basis, to what extent the scope of the IPPC Directive should be extended to additional industrial sectors which pose significant risks to the environmental, based on the methodology described in the introduction to this chapter.

In order to select the potential candidates for such assessment, the methodology followed was the following: (1) to carry out a consultation of Member States and other stakeholders and (2) to compare the scope of the IPPC Directive with other legislation addressing industrial installations, in particular the E-PRTR Regulation[224] and the Emission Trading Scheme Directive. The following list of sectors was then established for further assessment. All these sectors are covered by the E-PRTR but not by the IPPC Directive.

Aquaculture
Any gasification and liquefaction installations
Manufacture of coal fuel products and solid smokeless fuel
Industrial plants for the preservation of wood and wood products
Production of other primary wood products than paper and board
Installations for the building of, and painting of or removal of paint from ships
Independently operated industrial wastewater treatment plants

Options considered

For each of the sectors identified, the options considered relate to the inclusion of the installations above a certain threshold (specific to each sector) within the scope of the IPPC Directive. In complement to the analysis presented in section 7, a summary is provided below on the sectors which are not recommended for inclusion under the scope of the IPPC Directive.

Aquaculture

Summary analysis of main impacts: The environmental impacts of this sector relate mainly to emissions to water. These emissions are small compared to the overall impacts on waters (for instance the total eutrophication potential from all aquaculture represent 1% of the total eutrophication impacts) however the local impacts can be important. The largest installations (covered by the E-PRTR) are located in a small number of Member States which already regulate these operations. Economic developments in this sector could however lead to the increase in the number of large installations. Lowering the threshold below the E-PRTR threshold

[224] The 2006 E-PRTR Regulation transposes the UNECE Protocol on Pollutant Release and Transfer Registers (PRTR).

could potentially lead to the inclusion a large number of installations leading to higher environmental benefits (which could not be quantified). This sector is exposed to strong competitive pressure.

During the analysis, it appeared that the impacts of the possible extension of the IPPC Directive to the aquaculture sector should be further reviewed on the basis of the following factors:

- Aquaculture activities continue to grow steadily at EU level, and in some countries forecast growth is very substantial. With capture fisheries in decline, aquaculture is more and more seen as a necessary substitute to maintain supply of fish to our markets.

- Member States recently adopted National Fisheries Strategies, elaborated in the context of the European Fisheries Fund 2007-2013. These, together with the associated national Operational Programmes which are now undergoing EC review, will allow a more detailed analysis of the potential future environmental impact of the aquaculture sector.

- The European Commission has recently held a specific consultation of stakeholders on the opportunities for the development of community aquaculture (the consultation was closed on 15 July 2007) (see http://ec.europa.eu/fisheries/cfp/governance/consultations/consultation_100507_en.htm). The results of this consultation for environmental policy directions need to be further considered in more detail.

- National authorisation systems currently in force are generally based on an Environmental Impact Assessment approach, with an evaluation of the compatibility of the proposed aquaculture production (and its effluents) with the sensitivity of the planned location of the facility. Nationally, systematic policies aimed at reducing the pollution generated by this activity at the source, aiming to improve the eco-efficiency of aquaculture production, does not seem to exist.

Manufacture of coal fuel products and solid smokeless fuel

Problem definition: Certain smokeless fuel and coal fuel products are produced during the coal processing and transformation in installations already covered by the IPPC Directive. The only 2 main sectors not covered by the IPPC Directive are the production of fuel briquettes and patent fuels manufactured.

Summary analysis of main impacts: A small number of installations carry out these 2 types of activities. UK and Germany produce together more than 80% of these products and already regulate the environmental impacts of these installations through permitting based on high standards. The inclusion of these installations under the IPPC Directive would not lead to significant environmental, economic and social impacts but would not respond to the criteria considered important for such an inclusion under the Directive (see methodology described in the introduction to chapter 7). For more information, see table below related to this sector.

It is recommended not to cover this sector under the IPPC Directive.

Installations for the building of, and painting of or removal of paint from ships

Problem definition: There are about 300 shipyards in the EU mainly located in the Netherlands, Germany, UK and Spain. About 150 shipyards have a capacity for ships above 100 m (scope of the E-PRTR). The main environmental impacts relate to the maintenance rather than the building of ships. The main impacts to air are the emissions of VOC from the painting activities but only a small number of installations (estimated to 6) are above the current threshold of the IPPC Directive for activities using solvents. As regards emissions to water, the main impacts relate to the use of antifouling coatings and the cleaning of ships and dock floors.

Analysis of impacts: The option considered would concern only a limited number of installations in some Member States. This option would have some positive environmental impacts but a large proportion of these installations are already regulated under a BAT-based permitting regime. Since the large majority of shipyards use solvents below the current threshold of the IPPC Directive, there inclusion under the IPPC Directive would not be consistent compared to other activities using solvents. In addition, coating activities (including metallic and plastic surfaces of ships) above certain thresholds are covered by the Solvents Emissions Directive. For more information, see table below related to this sector.

It is recommended not to cover this sector under the IPPC Directive.

Clarification of the current IPPC scope (see section 7.5)

The following three sectors have been assessed based on the outcome of a specific study.[225]:

Chemicals production – biological processing, biodiesel and pharmaceutical intermediates production
Ceramics production
Food production

Chemicals production - biological processing, biodiesel and pharmaceutical intermediates production

Problem definition: three main problems have been identified relating to the interpretation of the current scope for the production of chemicals. This is summarized in the following table:

Biological processing	Biological processing in the production of chemicals refers to the processes that use living micro-organisms or their enzymes to bring about chemical reactions. For instance, fermentation is one of the mail biological process used for instance in the production of ethanol and bio-based polymers. While the scope clearly refers to the production of chemicals on an industrial scale by chemical processing, legal uncertainty remains to what extent the production of chemicals through biological processing is also covered by the IPPC Directive

225 VITO, 2007 (b)

Production of biodiesel	Two types of biofuels are produced: mainly bioethanol (or other alcohols) and biodiesel. The production of bioethanol is carried out by fermentation which is addressed under the previous point (biological processing). Biodiesel is produced by transesterification from vegetable oils and possibly biomass in the future. The production of esters is based on a chemical process and is clearly covered by the Directive. However, a limited number of Member States consider that the production of biodiesel would not be covered since biodiesel is a chemical mixture (mainly of esters) and could not be considered as "basic organic chemicals"[226].
Pharmaceutical intermediates	The scope of the IPPC Directive refers to the "production of basic pharmeutical chemicals". Different interpretation exists in the Member States concerning the extent to which pharmaceutical intermediates are covered by the IPPC Directive.

Summary analysis of impacts of options considered:

The main impact of clarifying the current scope would be to harmonize permitting practices and avoid distortion in the permitting of these installations across the EU. More specific impacts are described below.

Biological processing

The option considered is to clarify the scope of the IPPC Directive by indicating that installations producing chemicals on an industrial scale by biological processing[227] are included in the Directive.

The analysis (see table below related to this sector) shows that this option would have positive environmental impacts in a limited number of Member States which do not consider these installations covered by this legislation. No impacts are foreseen in other Member States. The economic impacts are expected to be small because the costs identified in the BREF for introducing such BAT are not significant. In addition, the key BAT conclusions for this type of processes have been considered economically viable for the sector concerned as part of the BREF process.

The social impacts are positive through the reduced impacts on health in particular from the reduction of VOC emissions through BAT implementation. No significant impacts on employment are expected. This option was supported by a large majority of Member States and by CEFIC (the European Chemicals Association).

226 The current scope of the IPPC Directive covers "basic organic chemicals". The interpretation of the term "basic" has been subject to a guidance document which indicates that the term "basic" should be interpreted in a wide sense meaning that it cannot only mean those chemicals requiring further processing.

227 Biological processes in the production of chemicals involve the use of living micro-organisms or their purified enzymes as biocatalysts.

Production of biodiesel

The analysis of this option (see table below related to this sector in Annex 11) highlights that only a limited number of Member States do not consider biodiesel production as covered by the Directive. This sector is growing very fast in view of the EU policy to increase the use of biofuel to combat climate change. The environmental impacts of covering these installations would be positive in view of the potential to reduce the emissions of these installations through BAT implementation.

BAT conclusions on the esterification process (used to produce biodiesel) have already been determined in the BREF on Large Volume Organic Chemicals and have been considered economically viable for the sector concerned. The social impacts are positive through the reduced impacts on health in particular from the reduction of VOC emissions through BAT implementation. No significant impacts on employment are expected. This option was supported by a large majority of Member States and by CEFIC in particular this will clarify the current scope and harmonize the permitting of these installations.

Production of pharmaceutical intermediates

The option considered is to clarify that the production of pharmaceutical intermediates is covered by the Directive. As indicated in the table below related to this sector in Annex 11, the environmental impacts would be positive for the few Member States which do not consider these installations already covered. BAT conclusions have already been determined in a specific BREF and no significant economic impacts are expected. Positive impacts on health through emissions reduction are foreseen as well as no significant impacts on employment. For the reasons mentioned above, the vast majority of Member States and CEFIC support this option.

It is recommended to clarify the current wording in Directive[228] to show explicitly that these 3 sectors fall under the scope of the IPPC Directive.

Ceramics sector

Problem definition: The current scope of the IPPC Directive is unclear and leads to inconsistent application of the Directive. It refers to several different criteria (1) production capacity exceeding 75 tonnes per day, and/or (2) with a kiln capacity exceeding 4 m³ and with a setting density per kiln exceeding 300 kg/m³. The term "and/or" is interpreted differently in the Member States leading to inconsistencies in the permitting of similar installations. The main environmental impacts relate to air emissions (in particular NO_x, SO_2, dust, VOC, HCl, HF).

Summary analysis of the impacts of the options considered: In the sector concerned, the kiln capacity is most generally above 4 m3. In order to simplify the current wording of the scope, this criterion is therefore not further explored in the

[228] See section 4 of Annex I of the IPPC Directive

options considered. Two options have been considered: option 1 corresponding to the use of the tem "and" and option 2 to the term "or". Option 1 is the most exclusive and would only reflect the permitting situation in Portugal. Some of the sectors with the main environmental impacts (e.g. bricks, roof, and tiles) would be excluded and this option would lead to negative environmental and social impacts. Economic impacts are likely to be small.

Option 2 reflects the most common practice in the Member States and would have positive environmental and social impacts through BAT implementation in the installations which are currently excluded by certain Member States. This option would provide a more level playing field and more consistency in the interpretation of the Directive. For more information, see table below related to this sector.

It is recommended to clarify the current scope of the IPPC Directive by referring to installations with production capacity exceeding 75 tonnes per day or with a setting density per kiln exceeding 300 kg/m³.

Food production

Problem definition: The current scope of the IPPC Directive is ambiguous regarding food production installations using a combination of animal and vegetable raw materials. It could be roughly estimated that few hundreds installations could be concerned but no precise data could be collected. Thresholds are only set for the production from exclusively one type of raw materials (75 tonnes per day for animal raw materials and 300 tonnes per day for vegetable raw materials). As a result, Member States interpret differently the Directive leading to inconsistencies in the way this sector is being regulated.

Summary analysis of the impacts of the options considered: Two main options have been considered. Option 1 is to apply the stricter threshold (75 tonnes per day) if any animal raw material is used in the production. Option 2 is based on a "mixing rule" (on the basis of existing thresholds with a 4-fold difference between animal and vegetable raw materials) that is used to determine the prescribed capacity for a range of installations that use mixed raw materials, combined with a "de minimis rule" (the higher threshold of 300 tonnes per day would still be applied when the use of animal raw materials would be below a certain percentage[229]).

Option 1 would lead to applying the stricter threshold even for installations with a small fraction of animal raw materials (for instance gelatine, finings, butter). This would not reflect the different environmental impacts of the processing of animal and raw materials. A number of additional installations would be covered under the IPPC Directive (no quantification could be made). Option 2 would lead to a consistent and harmonized permitting across the EU. This option reflects the practice in most of the Member States and would not have a significant impact on the number of installations covered by the IPPC Directive. The environmental, economic and social impacts would be limited. The main positive environmental impact would be in terms of better regulation to clarify the current scope of the Directive. Option 2 is therefore recommended.

[229] 10% could be used for this de minimis rule as applied in the UK.

Table 19: Analysis of impacts of inclusion of biological treatment of organic waste (if treated waste not finally disposed of)

	Business as usual	***Option: include installations for the biological treatment of organic waste (if treated waste not finally disposed of) with a capacity above 50 tonnes per day***
General issues	- Biological treatment of waste which results in final compounds or mixtures which are discarded by disposal operations is currently covered by the IPPC Directive. However, similar biological treatment installations resulting in waste or products (e.g. compost) which are not disposed of are not covered under the scope of the IPPC Directive. This results in possible distortion of competition between similar types of installations and a lower level of environmental protection. - 2 main processes are used: (1) composting under aerobic conditions to produce compost to be used as organic fertilizer and soil conditioner; (2) anaerobic digestion to produce energy-rich biogas. The total capacity in the EU has been estimated to be around 36.8 Mt.	- a large number of Member States already regulate these installations under a BAT-based permitting regime. Based on the outcome of a questionnaires circulated to the Member States and on literature review, about 81% of composting capacity and 89% of digesters capacity already operate according to BAT-based permitting. Under the option considered, this proportion of the capacity will increase to 89% and 99% respectively (smaller installations would remain uncovered by the IPPC Directive). BAT is already defined in a number of MS as well as in the BREF on waste treatment. - about 150 composting installations and 25 anaerobic digesters, which are not yet covered by a MS BAT-based permitting regime, would additionally be covered under the IPPC Directive . The small on-farm digesters and composting installations would fall below the threshold of 50 tonnes per day.
Environmental impacts	- generally, the main environmental impacts of these installations are air emissions (ammonia, GHG such as methane and N2O), releases to water, use of energy for anaerobic digestion, water emissions and odour.	- Emissions from installations currently not operating under BAT-based permit conditions would be reduced. The total reductions of air emissions have been estimated to: -5kt for NH3, -2.5 kt for N2O, -7kt for CH4. - other environmental impacts (energy use, water release, odour) would be reduced but it was not possible to quantify these benefits.
Economic impacts		- limited economic impacts are expected since the inclusion would lead to minor changes in operating conditions. BAT determined in the BREF on waste treatment and in a number of Member States do not lead to significant economic costs on operators. The installations concerned are already subject to a waste permit and no significant additional administrative costs for operators and competent authorities are expected. This option would provide a more level playing field within the EU
Social impacts		- Positive impacts through the reduced impacts on health. More confidence of the public in the operation of these installations.

Table 20: Analysis of impacts of inclusion of pre-treatment of combustible waste for co-incineration

	Business as usual	***Option: include installations for the pre-treatment of combustible waste for co-incineration with a capacity above 10 tonnes per day for hazardous waste and 50 tonnes per day for non-hazardous waste***
General issues	- The installations for the pre-treatment of combustible hazardous or non-hazardous waste for incineration are covered by the scope of the IPPC Directive. Similar installations pre-treating waste for co-incineration are not covered except if they are part of an IPPC installation (directly associated activity to a co-incineration installation). This results in possible distortion of competition between similar types of installations and lower level of environmental protection for installations not covered under the IPPC Directive. - The sector of the pre-treatment of combustible waste for co-incineration is very diversified involving a number of different processes. Some treatments are already covered by the IPPC Directive. However, the following stand-alone installations would currently not be covered: treatment (mechanical or/and biological treatment) of municipal solid waste, treatment of waste oil and hazardous waste.	- the following estimations could be made on the size of the sector: annual production of about 9 million tonnes of waste derived fuel in 270 installations for EU 15 (small additional number in EU 10+2) including installations for treatment prior to incineration and on-site installations which are already covered under the IPPC Directive. There are rapid changes in this sector and the number of installations could increase. - a large number of MS already regulate installations pre-treating hazardous waste under a BAT-based permitting regime. The treatment of non-hazardous waste is covered by BAT-based permitting in some Member States. - the BREF on Waste Treatment provides BAT conclusions on the pre-treatment of combustible waste.
Environmental impacts	- the environmental impacts of these installations are significant and relate to air emissions (SO2, NOX, CO, VOC) and use of energy.	- BATs are already current practice in the treatment of hazardous waste and used in some installations for the treatment of non-hazardous waste. - The introduction of BAT in the treatment of non-hazardous waste and waste oil would lead to significant positive environmental benefits. It has been estimated that this sector represents significant impacts compared to the overall waste treatment activities already covered under the IPPC Directive.

Economic impacts		- limited economic impacts are expected for the treatment of hazardous waste and waste oil treatment since these sectors are already largely subject to BAT-based permitting. Costs for implementing BAT for the treatment of municipal solid waste would be more important but the BREF on Waste Treatment includes economic data showing that this is viable for the sector to bare such costs. - The installations concerned are already subject to a waste permit and no significant additional administrative costs for operators and competent authorities are expected. This option would provide a more level playing field within the EU
Social impacts		- Positive impacts through the reduced impacts on health. More confidence of the public in the operation of these installations.

Table 21: Analysis of impacts of inclusion of off-site treatment installations for slag and ashes for recycling

	Business as usual	***Option: include off-site installations for the treatment installations for slag and ashes for recycling with a capacity above 50 tonnes per day***
General issues	- Treatment installations for ashes (mainly bottom ashes from municipal waste incinerators) and for slags (mainly from the ferrous industry) fall under the scope of the IPPC Directive only if they are directly associated activities of an IPPC installation. This results in possible distortion of competition between similar types of installations and lower level of environmental protection for installations not covered under the IPPC Directive. - In these installations, the ashes and slags are treated usually through mechanical treatment; ageing and possibly thermal treatments.	- It has been very difficult to estimate the number of off-site treatment installations. It was estimated that about 11 to 19 million tonnes of bottom ash are produced annually and that about half is re-used after pre-treatment. However, the number of off-sites installations is not known. Based on assumptions on the capacity of such installations, it could be calculated that the maximum number of installations concerned would be around 75. For the off-site treatment slag from the ferrous industry, the number of installations concerned would be even smaller (up to 45). - the regulation of these installations vary a lot according to the Member States concerned. Only some Member States regulate these installations under a BAT-based permitting regime. The BREF on storage provides already BAT conclusions on the prevention and reduction of dust emissions which could be used in the context of this sector.
Environmental impacts	- the main environmental impacts of these installations are the emissions of dust. These emissions are 15 to 30 times higher than the total emissions of the hazardous waste disposal and recovery sector and 1.2 to 2 times compared to the non-hazardous waste treatment sector. Other types of emissions (for instance SO2, NOX from combustion units) are less significant.	- The introduction of BAT in this sector would reduce significantly the emissions of dust (up to 90% according to certain estimations).
Economic impacts		- Limited economic impacts are expected for the introduction of BAT in this sector. Based on the data included in the BREF on storage and the current BAT conclusions on dust emissions, no significant economic impacts are foreseen. - The installations concerned are already subject to a waste permit and no significant additional administrative costs for operators and competent authorities are expected. This option would provide a more level playing field within the EU
Social impacts		- Positive impacts through the reduced impacts on health from dust emissions. More confidence of the public in the operation of these installations.

Table 22: Analysis of impacts of inclusion of sorting and crushing of construction and demolition waste

	Business as usual	***Option: include off-site installations for the treatment installations for slag and ashes for recycling with a capacity above 50 tonnes per day***
General issues	- The analysis has shown that the main impacts during the management of construction and demolition waste are during the sorting and crushing.	- Around 450 million tonnes of construction and demolition waste (CDW) are generated every year and about half are recycled. - It has been estimated that about 4100 sorting and 4500 crushing (half are mobile) installations are operating in the EU. - there are several techniques (in particular wetting the material and inclosing the installations) which can be used to reduce dust emissions. It has been estimated that about half of the installations use these techniques.
Environmental impacts	- the main environmental impacts of these installations are the emissions of dust. The emissions are higher from the crushing installations. - these installations have also noise impacts in particular if located closed to urban areas.	- No BREF exists on this sector to determine precisely what is considered BAT. The introduction of BAT would reduce emissions but it has not been possible to quantify these positive impacts.
Economic impacts		- the introduction of the techniques mentioned above would have a costs of few euro cents to € 0.5 per tonne of recycled material (compared to a treatment cost between 1 to € 6 per tonne). The recycled materials are under important competitive pressure from the production of virgin materials (price difference between € 1 to 2 per tonne). - The installations concerned are already subject to a waste permit and no significant additional administrative costs for operators and competent authorities are expected.
Social impacts		- Positive impacts through the reduced impacts on health from dust emissions.

Table 23: Analysis of impacts of inclusion of treatment of scrap metal

	Business as usual	*Option: include off-site installations for the treatment installations f scrap metal with a capacity above 50 tonnes per day*
General issues	- Post consumer scrap usually follows the following route: scrap dealers for the collection of waste, dismantling, depollution and scrap treatment (involving sorting, separation, size reducing and shredding). - The total scrap treatment sector includes more than 7000 installations (majority of SMEs). Dedicated dismantling and depollution installations have typically a capacity below 50 tonnes per day. About 230 integrated shredder installations (producing about 8 M tonnes per year of ferrous metal) have a capacity above this threshold.	- The 230 shredders concerned by the possible inclusion under the scope of the IPPC Directive are most generally covered by the Directives on End of Life Vehicles (ELV) and Waste Electric and Electronic Equipments (WEEE). - The WEEE and ELV Directives set minimum requirements for the protection of soil and water. These requirements are very general and no specific techniques based on BAT are indicated (it is for instance referred to "appropriate measures for storage" and "equipment for the treatment of water" without indicating a level of environmental protection). - Only some Member States regulate these installations under a BAT-based permitting approach. The BREF on storage provides already BAT conclusions on the prevention and reduction of dust emissions which could be used in the context of this sector.
Environmental impacts	- the main environmental impacts of these installations are the emissions of dust and dioxins (mainly due to high temperature and PCB-containing material which can not be completely avoided in shredders) which can be significant. Other impacts relate to emissions to water and contamination of soil.	- The introduction of BAT in this sector would reduce significantly the emissions of dust and dioxins. The minimum requirements set under the WEEE and ELV would be complemented by the introduction of BAT for emissions to water.
Economic impacts		- Experiences of the introduction of BAT in certain Member States show that limited economic impacts are expected from the introduction of BAT in this sector. In addition, the BREF on storage set BAT conclusions on dust emissions which would not lead to significant economic impacts. - The installations concerned are already subject to a waste permit and no significant additional administrative costs for operators and competent authorities are expected. This option would provide a more level playing field within the EU
Social impacts		- Positive impacts through the reduced environmental impacts. More confidence of the public in the operation of these installations.

Table 24: Analysis of impacts related to the possible inclusion of aquaculture in the IPPC scope

	Business as usual: aquaculture not covered by IPPC	***Option 1: Additional of aquaculture installations with a production capacity of 1000 tonnes of fish per year (same threshold as in E-PRTR)***	***Option 2: Additional of aquaculture with a production capacity lower than 1000 tonnes of fish per year***
Environmental impacts	- Total number of installations in the order of 8000-10000 (some very small). Production concentrated (75%) in 5 MS (ES, FR, UK, IT, EL) - Environmental impacts mainly related to finfish rather than shellfish - Main impacts are on water pollution and biodiversity. Total eutrophication potential from all aquaculture is small (1% of total potential) but can be high at local level - very limited contribution to total EU economy externalities. Biodiversity and eco-toxicological impacts addressed through specific EU legislation - Most MS issue permits to regulate these installations	- not many installations above this threshold; located mainly in Scotland (~60) and Norway (~300) and regulated by national laws - potential small positive environmental impacts since limited number of installations concerned and already under rather strict regulation	- no data available on the repartition of number of installations according to their capacity. Most likely that a lower threshold would bring many installations under the IPPC scope - potentially more positive environmental impacts but not possible to quantify them since not possible to estimate number of installations concerned and current level of emissions
Economic impacts		- positive environmental impacts but not possible to estimate	- potential important economic impacts (not possible to estimate) - sector under important competitive pressure
Social impacts		- probably limited impacts	- possible increase in fish price to consumers and negative impacts on employment in the small installations needs to be further assessed

Table 25: Analysis of impacts of inclusion of any gasification and liquefaction installations

	Business as usual	*Option: include any gasification and liquefaction installations under the IPPC Directive*
General issues	- Gasification converts carbon-containing material into a synthetic gas (syngas) composed primarily of CO and hydrogen. Feedstock can be coal, petroleum based materials, gas or biomass. The output (syngas) is an important intermediate in the chemicals industry (mainly ammonia industry and methanol), is used (as hydrogen) in refineries as well as fuel to produce electricity (in large combustion plants). A growing market is the production of "transport fuel" (through "gas to liquids" process). The use of natural gas or biomass (so-called "biomass to liquid") as feedstock is under development. Generally the production of such types of "transport fuel" is expected to grow significantly in the coming years in order to meet more stringent standards on fuel emissions and in view of the increased use of biofuel. - Liquefaction is a process to reform coal, gas or biomass into a liquid form than can be used as a "synthetic fuel". This is also a growing sector with a 1st installation for natural gas liquefaction to start operating in Europe (Norway) at the end of 2007.	- about 50 gasification units have been identified in 11 MS (more units expected for EU27). All these units are activities directly associated with large combustion plants, refineries or chemicals installations and therefore fall under the scope of the IPPC Directive. However, the production of fuel through gasification of other feedstock than coal (for instance biomass or gas) is not covered by the IPPC Directive. No installations could be identified in the EU (some are in operation in the other regions of the world). However, in view of the growing demand for cleaner fuels, this market will develop in the EU and new installations are most likely to start operating in the coming years. - BAT for gasification (from coal and other fuel) already determined in the BREFs on Large Combustion Plants, Refineries and Large Volume Inorganic Chemicals-Ammonia, acids, fertiliser.
Environmental impacts	- important and wide environmental impacts (emissions to water and air in particular dust and NOx) from the gasification and liquefaction processes. Installations that do not currently fall under IPPC have similar impacts than coal gasification and liquefaction units directly associated with IPPC installations (LCP, refineries, chemicals installations)	- positive environmental impacts from the introduction of BAT in the installations not yet covered by the IPPC Directive.
Economic impacts		- harmonize permitting practices and avoid distortion in the permitting of installations using similar processes. No significant impacts expected since BAT conclusions already established in the BREFs for this type of processes and considered economically viable for the sector. In addition, mainly new installations would fall under the IPPC Directive and could implement BAT without significant economic impacts because this would be designed into the construction of the installation at the initial stages.
Social i.		Positive impacts through the reduced impacts on health.

Table 26: Analysis of impacts of inclusion of installations for the manufacture of coal fuel products and solid smokeless fuel

	Business as usual	*Option: include installations for the manufacture of coal fuel products and solid smokeless fuel*
General issues	- Certain smokeless fuel and coal fuel products are produced during the coal processing and transformation in installations already covered by the IPPC Directive. The only 2 main sectors not yet covered by the IPPC Directive are the production of fuel briquettes and patent fuels. The UK and Germany produce together 80% of patent fuels and Germany produce more than 85% of EU brown coal briquettes. These MS already regulate through permitting these types of production.	
Environmental impacts	- this type of production leads mainly to the emissions of particular matters and release to water.	- limited environmental impacts expected since the MS where the main production is taking place already regulate these installations through advanced abatement techniques
Economic impacts		- limited economic impacts expected since the inclusion would lead to minor changes in operating conditions.
Social impacts		- limited social impacts expected

Table 27: Analysis of impacts of inclusion of installations for the preservation of wood and wood products

	Business as usual: wood preservation activities not covered by IPPC	***Option: include installations for the preservation of wood and wood products with a production capacity above 75 m³ per day***
General issues	- The wood preservation industry is a small fraction of the total woodworking industry and accounts for about 0.9 to 1.8% of the output of the wood sector.	- It has been estimated that the sector consists of about 1000 installations. Less than half of them would be concerned by this option (production capacity above 75 m^3 per day). About 30% of these installations use solvents and already fall under the scope of the IPPC and SE Directives. As a result, this option would concern about 300 additional installations which do not use solvents (or small quantities). Some Member States have established BAT-based permitting for this sector. It is estimated that additionally about 225 installations would have to be regulated under a BAT-based permitting.
Environmental impact	- Since installations using solvents already fall under the scope of the IPPC and SE Directives, the main environmental impacts for the installations concerned by this option relate to the emissions to soil and (ground)water. - The industry has been a significant source of some of the POP (persistent organic pollutants) mainly due to the use of creosote. The use and emissions of these substances have decreased in particular through the implementation of the Biocidal Products Directive and other legislation on chemical substances. However, releases of other dangerous substances (for instance heavy metals) remain significant. The risks for soil and (ground)water contamination through the use of ecotoxic products are significant in view of the type of substances used for the preservation of wood	- the BREF on surface treatment using solvents (as well as some national BAT analysis) contains a number of BAT conclusions for the prevention and control of emissions to soil and water. This option would lead to significant environmental benefits through the implementation of BAT in this sector. - the application of BAT for the sector not using solvents would also lead to significant environmental benefits as demonstrated in the Member States where such a regime is already in place.
Economic impacts		- In the determination of the BREF on surface treatment using solvents, the implementation of BAT has not been considered as leading to significant costs on this industry. - The option considered would lead to a more level playing field since only part of this sector currently fall under the scope of the IPPC Directive despite having similar environmental impacts to water and soil.
Social impacts		- Positive impacts through the reduced impacts on health.

Table 28: Analysis of impacts of inclusion of installations for the production of other primary wood products other than paper and board

	Business as usual	*Option: include installations for the production of wood-based panels with a production capacity above 600 m^3 per day*
General issues	- the sector of production of primary wood products other than paper and board covers a number of sub-sectors such as furniture manufacturing, packaging, building components. Within this sector, the following 2 sub-sectors have the main environmental impacts: (1) sawmilling and planing and (2) the wood-based panel industry. - the sawmilling and planing sector leads to rather limited environmental impacts mainly focused on dust emissions and run-off water. The analysis has shown that the benefits of including these installations under the scope of the IPPC Directive would be limited. The analysis is therefore focussing on the production of wood-based panels.	- Distribution of the market: about 170 installations producing particle boards, MDF and OSB with an average production per site between 880 and 1000 m^3 per day; for the production of plywood, 3 installations above 333 m^3/day and 140 installations below this production capacity; for hard board, 20 installations with an average production capacity of 170 m^3/day and for soft board 14 installations with an average 420 m^3/ day. Overall, it can be estimated that the total number of installations potentially covered is about 350 installations. In order to cover the largest installations, a threshold could be set at 600 m^3/day excluding therefore the smallest installations. The remaining largest installations (about 110) would fall under the following sub-sectors causing the main environmental impacts: particleboard, MDF and OSB - some of the installations concerned may be already subject to the IPPC Directive due to the use of solvents or due to the operation of combustion or incineration plants. Only some Member States have established BAT-based permitting regimes for this sector.
Environmental impacts	- the main environmental impacts of the wood-based panels industry are emissions to air (dust, combustion gases and VOC), the generation of wood residues, the use of energy as well as binders and additives. In addition, depending the type of panels produced, consumption of water and releases to water can be significant	- the analysis carried out has revealed significant environmental impacts from this sector which can be reduced through the application of BAT. The analysis has also shown that the plywood production leads to less environmental impacts than production of other wood-based panels.
Economic impacts		- no BREF is available for this sector. The determination of BAT through the BREF will take into account the costs of implementing BAT for this sector in order to ensure that these techniques are economically viable for this sector. As a result, no significant costs are expected from this option. In addition, the smallest installations would be excluded through the setting of a capacity threshold (see above).
Social impacts		- positive health impacts are expected from the introduction of BAT

Table 29: Analysis of impacts of inclusion of installations for the building of, and painting of or removal of paint from ships

	Business as usual	***Option: include installations for the building of, and painting of or removal of paint from ships***
General issues	- this sector covers mainly the building of ships and the maintenance of ships.	- There are about 300 shipyards (100 dedicated to shipbuilding) in the EU mainly located in the Netherlands, Germany, UK and Spain. About 150 shipyards have a capacity for ships above 100 m (scope of the E-PRTR). - Only a small number of installations (estimated to 6) meet the current threshold of the IPPC Directive for activities using solvents. - a large proportion of the installations concerned are already regulated under a BAT-based permitting regime.
Environmental impacts	- the main environmental impacts are the emissions of VOC from the painting activities mainly in open air. Shipbuilding has smaller environmental impacts since the quantities of solvents used for painting are smaller for building compared to maintenance. - Other impacts relate to the cleaning operations of the dock floors and of the ships leading to waste water.	- Since the large majority of shipyards use solvents below the current threshold of the IPPC Directive, their inclusion under the IPPC Directive would not be consistent compared to other activities using solvents. On the other hand, the operations in shipyards are mainly executed in open aid which increases their environmental risks. - the environmental impacts would be positive but it was not possible to quantify them.
Economic impacts		- the introduction of BAT would lead to costs for the installations not operating on BAT-based conditions up to few million € for large shipyards.
Social impacts		- Positive impacts through the reduced impacts on health.

Table 30: Analysis of impacts for biological processing

	Business as usual	***Option: clarify that the production of chemical products through "biological processing" is covered under the IPPC Directive***
General issues	- biological processes are commonly used in the production of fine chemicals and their use is increasing in the chemical industry (for instance in the context of fermentation processes, production of bio-based polymers, manufacturing of technical enzymes). Several hundreds of installations already use these types of processes. - processes used in at least 20 Member States - Units using biological processes directly associated to IPPC activities are already covered. The uncertainty relates to installations dedicated to this type of production.	- Large majority of Member States consider that installations using biological processes are already covered by the IPPC Directive (however a limited number of Member States have a different interpretation). - BATs for fermentation (key biological process) have been determined in the BREF on Organic Fine Chemicals
Environmental impacts	- wide range of important environmental impacts from the production by biological processing (e.g. emissions to water, VOC, use of energy, generation of waste)	- positive environmental impacts from the implementation of BAT in this sector for a limited number of Member States which do not consider these installations covered. No impacts in other Member States.
Economic impacts		- harmonize permitting practices and avoid distortion in the permitting of these installations across the EU - no significant impacts expected in the Member States concerned. BAT conclusions for fermentation in the BREF on Organic Fine Chemicals considered as economically viable for the sector.
Social impacts		- positive impacts through the reduced impacts on health (in particular from VOC reduction of emissions through BAT implementation). No significant impacts on employment expected.

Table 31: Analysis of impacts for biodiesel production

	Business as usual	***Option: clarify that the production of biodiesel is covered under the IPPC Directive***
General issues	- the production of biodiesel is carried out through esterification of vegetable oils (or possibly in the future biomass) by a chemical process. - the production of biodiesel is carried out in about 120 installations on industrial scale in the EU (about 6 Mt produced annually).The number of installations and the production are expected to increase significantly in the coming years in view of the current EU policy to increase the use of biofuel (about 30 to 50 new installations under construction). - the uncertainty regarding the scope of the Directive relates to the fact that biodiesel products are composed of a mixture of esters and are final products which are not further processed. As a result, a small number of Member States consider that they could not be considered as "basic organic chemicals" as referred to in the Directive. This interpretation of the term "basic" is not in line with the guidance provided by the Commission on the interpretation of the term "basic" which also includes final products.	- Large majority of Member States consider that biodiesel production is covered by the IPPC Directive (however a limited number of Member States have a different interpretation). - BAT for esterification already determined in the BREF on Large Volume Organic Chemicals
Environmental impacts	- wide range of important environmental impacts from the production by biodiesel (e.g. emissions to air (solvents), to water and the generation of waste)	- positive impacts from the implementation of BAT in this sector for a limited number of Member States which do not consider these installations covered. No impacts in other Member States.
Economic impacts		- harmonize permitting practices and avoid distortion in the permitting of these installations across the EU - no significant impacts expected in the Member States concerned. BAT conclusions in the BREF on Large Volume Organic Chemicals considered as economically viable for the sector.
Social impacts		- positive impacts through the reduced impacts on health (in particular from VOC reduction of emissions through BAT implementation). No significant impacts on employment expected.

Table 32: Analysis of impacts for pharmaceutical intermediates

	Business as usual	***Option: clarify that the production of pharmaceutical intermediates is covered under the IPPC Directive***
General issues	- Pharmaceutical intermediates are primary chemicals produced by organic chemical processes for the manufacture of products such as active pharmaceutical ingredients. - Most of the installations concerned produced both intermediates and active ingredients. In this case, the production of intermediates is likely to be a directly associated activity to the production of active ingredients. There may be only few installations specialised only in the production if intermediates. No information could be collected on the exact number of installations concerned. - Most of the Member States consider that the production of pharmaceutical intermediates is covered by the scope of the IPPC Directive since these are organic or inorganic chemicals. However, a small number of Member States do not agree with this interpretation and do not cover such installations under the production of "basic pharmaceutical chemicals" or other activity descriptions.	- BAT for the production of pharmaceutical intermediates already determined in the BREF on Organic Fine Chemicals
Environmental impacts	- the environmental impacts of the production of pharmaceutical intermediates are similar to the manufacturing of active pharmaceutical ingredients and other fine organic chemicals covered by the scope of the IPPC scope	- positive impacts from the implementation of BAT in this sector for a limited number of Member States which do not consider these installations covered. No impacts in other Member States.
Economic impacts		- harmonize permitting practices and avoid distortion in the permitting of these installations across the EU - no significant impacts expected in the Member States concerned. BAT conclusions for these types of installations considered as economically viable for the sector in the BREF on Organic Fine Chemicals.
Social impacts		- positive impacts through the reduced impacts on health (in particular from VOC reduction of emissions through BAT implementation). No significant impacts on employment expected.

Table 33: Analysis of impacts related to the clarification of the IPPC scope for the manufacture of ceramics

	Business as usual:	***Option 1:*** **(1) production capacity exceeding 75 tonnes per day, and (2) with a setting density per kiln exceeding 300 kg/m³**	***Option 2:*** **(1) production capacity exceeding 75 tonnes per day, or (2) with a setting density per kiln exceeding 300 kg/m³**
General issues	- the current IPPC scope is unclear since it refers to several criteria: (1) production capacity exceeding 75 tonnes per day, and/or (2) with a kiln capacity exceeding 4 m³ and with a setting density per kiln exceeding 300 kg/m³. - the use of the term "and/or" is interpreted differently in the Member States leading to inconsistencies in permitting of similar installations. - in the sector concerned, the kiln capacity is most generally above 4 m3. This criteria is therefore not further explored in the options considered to simplify the current wording of the scope	- this option would only reflect the permitting situation in Portugal.	- this option reflects the most common practice in the Member States. The change would mainly affect Germany (but these installations already fall under a BAT-based permitting regime) and Portugal
Environmental impacts	- the main environmental impacts are the emissions to air of NO_x, SO_2, CO, VOC, HCl and HF	- some of the sectors with the main environmental impacts (e.g. bricks, roof, tiles) would be excluded. This option would lead to negative environmental impacts.	- some positive environmental impacts in the limited number of Member States (in particular Portugal) which currently cover less installations
Economic impacts		- possibly some costs savings in installations which would not fall anymore under the IPPC Directive (not possible to quantify)	- more level playing field and consistency in the interpretation of the Directive.
Social impacts		- possibly negative impacts due increase of levels of emissions	- some positive impacts on human health through reduced levels of air emissions

Annex 12: Background analysis of flexible instruments including emission trading for NO_x and SO_2

I. Theoretical formula to estimate the potential cost-savings from emission trading

Assumptions to the model:

- The operators, who think that allowance prices will be higher than their own abatement costs, will implement abatement techniques themselves, thus cover their emissions and possibly supply the market with allowances.
- Those operators, who think that allowance prices will be lower than their own abatement costs, will not implement abatement measures, but they will try to cover their emissions with purchased allowances from the market.
- 3 groups (A, B, C) are assumed to operate in the sector with different marginal abatement costs per tons: C_A = 10 cost units, C_B = 15 cost units, C_C = 20 cost units.
- It is assumed that the sector has to reduce its emissions by 100 weight units which in the default case is distributed equally among the 3 sectors.
- There is an equilibrium situation in the market, in which demand equals to supply. It practically means that all targeted emission reductions take place.

Summary of assumptions:

	Marginal abatement cost (cu / wu)	Default case		Extreme case	
		Emission reduction (wu)	Reduction cost (cu)	Emission reduction (wu)	Reduction cost (cu)
Group A	10	33.3	333.3	100	1000
Group B	15	33.3	500	0	0
Group C	20	33.3	666.6	0	0
TOTAL	**15**	**100**	**1500**	**100**	**1000**

Notes: cu = cost units, wu = weight units

Argumentation:

- In the default case (with different marginal abatement costs) the total emission reduction cost for the sector is 1500 cost units. *(With formulas: Total cost = Average marginal abatement cost * Total amount of reductions.)*
- In the extreme (ideal) case all emission reduction was realized by Group A where the marginal abatement cost is the lowest. The total abatement cost would make 1000 cost units for the sector. *(With formulas: Total cost = Average marginal abatement cost * Total amount of reductions, but in this case the average cost was basically the cost of Group A)*

- The extreme case clearly leads to save 500 cost units. In general terms: Total cost (extreme case) – Total cost (default case) = (Marginal abatement cost of Group A * Total amount of reductions) – (Average marginal abatement cost * Total amount of reductions)

Maximum of cost savings = (Marginal abatement cost of Group A – Average marginal abatement cost) * Total amount of reductions

- Note that above expression applies to any practical cases regardless of the actual size of costs and/or quantity of emission reductions.

II. Estimation of the potential cost savings for SO_2/NO_x from trading for the LCP sector

Approach and results

SO2

- The RAINS baseline foresees 4,279 kt emissions for EU27 for the combustion sector (SNAP1+3 sectors[230]) in 2010 which would fall to 2,891 kt in 2020. As it could be seen earlier, additional measures are necessary on top of the baseline to meet TSAP objectives. These additional cuts correspond to the amount of emission reductions that could be achieved through the implementation of BAT as described in the LCP BREF. Considering both end of the BAT AELs range, this could mean additional cuts of around 542 kt and 1,022 kt in 2020 (lower and upper end of BAT AELs range respectively). Considering a time period between 2010 and 2020 and making annual calculations, for modelling purposes the sum of the RAINS baseline reduction plus the additional reductions can be interpreted as marginal emission reductions annually.

- Similar approach can be applied to costs. The annual RAINS baseline costs for SO2 abatement for the combustion sector in 2010 are 7.7 EUR billion which go down to 7.4 EUR billion in 2020. The additional costs to meet BAT performance varies between 1.3 and 2.4 EUR billion in 2010 and between 0.8 and 2.6 EUR billion in 2020 depending on the level of BAT AELs. The baseline and additional costs can also be used to compose the annual marginal abatement costs for the examined period.

- Breaking down the figures to annual analysis between 2010 and 2020, it becomes possible to calculate the annual average marginal abatement costs for the combustion sector.

- Since real-life data on the difference between the lowest and the average marginal abatement cost is hard to gather, it was only possible to establish assumptions on the size of that volatility. Some indications however were taken into account on the potential range of savings (EU ETS, Dutch scheme as seen earlier). 2 cases were examined: in the first one, a 10% difference was assumed between the lowest and the average marginal abatement costs, while in the second case it was 30%.

- The analysis showed that if the above difference in marginal costs would be true, then the maximum potential for cost savings (i.e. the currently forgone benefits) for SO2 could be around 0.1-0.3 EUR billion annually during 2010-2020 for the EU27 in the combustion

[230] SNAP 1 sector includes energy industries while SNAP 3 relate to combustion in industry excluding production processes (http://reports.eea.europa.eu/EMEPCORINAIR4/en/page002.html)

sector if the ambition level of reductions (and so the cap) is fixed at the upper end of BAT AELs.

Interpretation: the above figures can only be interpreted within the conditions described. Furthermore, the actual cost savings in practice are expected to be much lower than the maximum potential, depending on the mentioned (plus possible other) constraining factors discussed above. See details in Section 3. of 4.1.

NOx

- The RAINS baseline foresees 3,421 kt emissions for EU27 for the combustion sector (SNAP1+3 sectors) in 2010 which would fall to 2,973 kt in 2020. Additional measures to meet TSAP/BAT objectives would be 411 kt for the upper and 907 kt for the lower (strictest) end of the BAT AELs range in 2020.

- The RAINS baseline costs for NO_x for the combustion sector in 2010 are 1.4 EUR billion, increasing to 3 EUR billion in 2020. The additional costs to meeting BAT varies between 2.5 and 4.4 EUR billion in 2010 and between 1.3 and 3.7 EUR billion in 2020 depending on the level of stringency.

- Carrying out similar calculations as for SO_2, annual marginal abatment of pollutants and marginal costs can be examined. Using the same assumptions of variability of marginal abatement costs across sectors and countries, it becomes possible to estimate potential cost savings from trading.

- The analysis for NO_x showed that if the assumed spread in marginal costs (10% or 30%) would be true the maximum potential for cost savings (i.e. forgone economic benefits at the moment) for NO_x could be around 0.2-0.7 EUR billion annually during 2010-2020 for the EU27 in the combustion sector if the ambition level of reductions is fixed at the upper end of the BAT AELs range.

For NO_x the same limitation in interpretation holds as described for SO_2 in the previous section.

Table 34: SO_2 emissions under RAINS Model

SO2

EMISSIONS

BL emissions, kt

SO2	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020
1:Combustion_in_energy_industries	3205	3062	2920	2778	2636	2493	2351	2209	2066	1924	1782
3:Combustion_in_manufacturing_industry	1075	1078	1081	1085	1088	1092	1095	1099	1102	1106	1109
Total combustion	4279	4140	4002	3863	3724	3585	3446	3308	3169	3030	2891

Additional reductions on top of BL from BAT scenarios, kt

SO2	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020
Least strict IPPC	-1916	-1778	-1641	-1503	-1366	-1228	-1090	-953	-815	-678	-540
Most strict IPPC	-2357	-2224	-2090	-1957	-1823	-1690	-1557	-1423	-1290	-1156	-1023

Marginal emission reductions, kt

SO2	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020
Target 1. BLreductions (comp. to prev. year)	0	-139	-139	-139	-139	-139	-139	-139	-139	-139	-139
Target 2. BL reductions + LS IPPC	-1916	-1917	-1780	-1642	-1504	-1367	-1229	-1092	-954	-816	-679
Target 3. BL reductions + MS IPPC	-2357	-2362	-2229	-2096	-1962	-1829	-1695	-1562	-1429	-1295	-1162

COSTS

BL abatement costs, EUR m

SO2	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020
1:Combustion_in_energy_industries	6419	6381	6342	6304	6265	6227	6188	6150	6111	6073	6034
3:Combustion_in_manufacturing_industry	1295	1302	1309	1316	1323	1331	1338	1345	1352	1359	1366
Total combustion	7714	7683	7651	7620	7588	7557	7526	7494	7463	7431	7400

Additional costs on top of BL, EUR m

SO2	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020
Least strict IPPC	1405	1342	1279	1217	1154	1091	1028	965	903	840	777
Most strict IPPC	2543	2548	2552	2557	2562	2567	2571	2576	2581	2585	2590

Marginal abatement costs, EUR m

SO2	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020
Target 1. BLreductions (comp. to prev. year)	0	31	31	31	31	31	31	31	31	31	31
Target 2. BL reductions + LS IPPC	1405	1374	1311	1248	1185	1122	1060	997	934	871	808
Target 3. BL reductions + MS IPPC	2543	2579	2584	2589	2593	2598	2603	2607	2612	2617	2621

AVERAGE MARGINAL ABATEMENT COSTS (ANNUALLY)

Average marginal abatement costs, EUR m/kt (or EUR thousand/tons)

SO2	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020
Target 1. BLreductions (comp. to prev. year)	#DIV/0!	0.23	0.23	0.23	0.23	0.23	0.23	0.23	0.23	0.23	0.23
Target 2. BL reductions + LS IPPC	0.73	0.72	0.74	0.76	0.79	0.82	0.86	0.91	0.98	1.07	1.19
Target 3. BL reductions + MS IPPC	1.08	1.09	1.16	1.24	1.32	1.42	1.54	1.67	1.83	2.02	2.26

LOWEST MARGINAL ABATEMENT COST

Lowest marginal abatement costs (at 90% of average), EUR m/kt (or EUR thousand/tons)

SO2	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020
Target 1. BLreductions (comp. to prev. year)	#DIV/0!	0.20	0.20	0.20	0.20	0.20	0.20	0.20	0.20	0.20	0.20
Target 2. BL reductions + LS IPPC	0.66	0.64	0.66	0.68	0.71	0.74	0.78	0.82	0.88	0.96	1.07
Target 3. BL reductions + MS IPPC	0.97	0.98	1.04	1.11	1.19	1.28	1.38	1.50	1.65	1.82	2.03

Lowest marginal abatement costs (at 70% of average), EUR m/kt (or EUR thousand/tons)

SO2	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020
Target 1. BLreductions (comp. to prev. year)	#DIV/0!	0.16	0.16	0.16	0.16	0.16	0.16	0.16	0.16	0.16	0.16
Target 2. BL reductions + LS IPPC	0.51	0.50	0.52	0.53	0.55	0.57	0.60	0.64	0.69	0.75	0.83
Target 3. BL reductions + MS IPPC	0.76	0.76	0.81	0.86	0.93	0.99	1.07	1.17	1.28	1.41	1.58

DIFFERENCE of lowest marginal abatement cost from average marginal abatement cost

Lowest marginal abatement costs (at 90% of average), EUR m/kt (or EUR thousand/tons)

SO2	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020
Target 1. BLreductions (comp. to prev. year)	#DIV/0!	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02
Target 2. BL reductions + LS IPPC	0.07	0.07	0.07	0.08	0.08	0.08	0.09	0.09	0.10	0.11	0.12
Target 3. BL reductions + MS IPPC	0.11	0.11	0.12	0.12	0.13	0.14	0.15	0.17	0.18	0.20	0.23

Lowest marginal abatement costs (at 70% of average), EUR m/kt (or EUR thousand/tons)

SO2	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020
Target 1. BLreductions (comp. to prev. year)	#DIV/0!	0.07	0.07	0.07	0.07	0.07	0.07	0.07	0.07	0.07	0.07
Target 2. BL reductions + LS IPPC	0.22	0.21	0.22	0.23	0.24	0.25	0.26	0.27	0.29	0.32	0.36
Target 3. BL reductions + MS IPPC	0.32	0.33	0.35	0.37	0.40	0.43	0.46	0.50	0.55	0.61	0.68

ESTIMATED POTENTIAL BENEFITS FROM TRADING

In case of 10% difference, EUR million

SO2	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	Total value* 2010	Total value* 2020
Target 1. BLreductions (comp. to prev. year)	#DIV/0!	3.14	3.14	3.14	3.14	3.14	3.14	3.14	3.14	3.14	3.14	23	35
Target 2. BL reductions + LS IPPC	140.50	137.36	131.08	124.80	118.52	112.24	105.96	99.68	93.40	87.12	80.84	987	1461
Target 3. BL reductions + MS IPPC	254.30	257.91	258.38	258.85	259.32	259.79	260.26	260.73	261.20	261.67	262.14	2185	3234

In case of 30% difference, EUR million

SO2	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	Total value* 2010	Total value* 2020
Target 1. BLreductions (comp. to prev. year)	#DIV/0!	9.42	9.42	9.42	9.42	9.42	9.42	9.42	9.42	9.42	9.42	70	104
Target 2. BL reductions + LS IPPC	421.50	412.08	393.24	374.40	355.56	336.72	317.88	299.04	280.20	261.36	242.52	2962	4384
Target 3. BL reductions + MS IPPC	762.90	773.73	775.14	776.55	777.96	779.37	780.78	782.19	783.60	785.01	786.42	6555	9703

* Total value = The sum of all benefits in each year, expressed either as present value in 2010 or future value in 2020, using a discount factor of 4%.
Values for 2011-2019 are linear transitive values between 2010 and 2020.

Table 35: NO_x emissions under RAINS Model

NOx

EMISSIONS

BL emissions, kt

NOx	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020
1:Combustion in energy industries	2026	1972	1918	1864	1810	1756	1702	1648	1594	1539	1485
3:Combustion in manufacturing industry	1394	1404	1413	1422	1432	1441	1450	1460	1469	1478	1488
Total combustion	3421	3376	3331	3286	3242	3197	3152	3107	3063	3018	2973

Additional reductions on top of BL, kt

NOx	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020
Least strict IPPC	-943	-890	-837	-783	-730	-677	-624	-571	-517	-464	-411
Most strict IPPC	-1326	-1284	-1242	-1200	-1158	-1117	-1075	-1033	-991	-949	-907

Marginal emission reductions, kt

NOx	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020
Target 1. BLreductions (comp. to prev. year)	0	-45	-45	-45	-45	-45	-45	-45	-45	-45	-45
Target 2. BL reductions + LS IPPC	-943	-935	-881	-828	-775	-722	-669	-615	-562	-509	-456
Target 3. BL reductions + MS IPPC	-1326	-1329	-1287	-1245	-1203	-1161	-1119	-1077	-1036	-994	-952

COSTS

BL abatement costs, EUR m

NOx	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020
1:Combustion in energy industries	1109	1183	1257	1332	1406	1480	1554	1628	1703	1777	1851
3:Combustion in manufacturing industry	256	260	263	267	271	275	278	282	286	289	293
Total combustion	1365	1443	1521	1599	1677	1755	1832	1910	1988	2066	2144

Additional costs on top of BL, EUR m

NOx	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020
Least strict IPPC	2512	2396	2279	2163	2047	1931	1814	1698	1582	1465	1349
Most strict IPPC	4355	4289	4224	4158	4093	4027	3961	3896	3830	3765	3699

Marginal abatement costs, EUR m

NOx	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020
Target 1. BLreductions (comp. to prev. year)	0	78	78	78	78	78	78	78	78	78	78
Target 2. BL reductions + LS IPPC	2512	2474	2357	2241	2125	2008	1892	1776	1660	1543	1427
Target 3. BL reductions + MS IPPC	4355	4367	4302	4236	4171	4105	4039	3974	3908	3843	3777

AVERAGE MARGINAL ABATEMENT COSTS (ANNUALLY)

Average marginal abatement costs, EUR m/kt (or EUR thousand/tons)

NOx	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020
Target 1. BLreductions (comp. to prev. year)	#DIV/0!	1.74	1.74	1.74	1.74	1.74	1.74	1.74	1.74	1.74	1.74
Target 2. BL reductions + LS IPPC	2.66	2.65	2.67	2.71	2.74	2.78	2.83	2.89	2.95	3.03	3.13
Target 3. BL reductions + MS IPPC	3.28	3.29	3.34	3.40	3.47	3.53	3.61	3.69	3.77	3.87	3.97

LOWEST MARGINAL ABATEMENT COST

Lowest marginal abatement costs (at 90% of average), EUR m/kt (or EUR thousand/tons)

NOx	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020
Target 1. BLreductions (comp. to prev. year)	#DIV/0!	1.57	1.57	1.57	1.57	1.57	1.57	1.57	1.57	1.57	1.57
Target 2. BL reductions + LS IPPC	2.40	2.38	2.41	2.44	2.47	2.50	2.55	2.60	2.66	2.73	2.82
Target 3. BL reductions + MS IPPC	2.96	2.96	3.01	3.06	3.12	3.18	3.25	3.32	3.40	3.48	3.57

Lowest marginal abatement costs (at 70% of average), EUR m/kt (or EUR thousand/tons)

NOx	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020
Target 1. BLreductions (comp. to prev. year)	#DIV/0!	1.22	1.22	1.22	1.22	1.22	1.22	1.22	1.22	1.22	1.22
Target 2. BL reductions + LS IPPC	1.86	1.85	1.87	1.89	1.92	1.95	1.98	2.02	2.07	2.12	2.19
Target 3. BL reductions + MS IPPC	2.30	2.30	2.34	2.38	2.43	2.47	2.53	2.58	2.64	2.71	2.78

DIFFERENCE of lowest marginal abatement cost from average marginal abatement cost

Lowest marginal abatement costs (at 90% of average), EUR m/kt (or EUR thousand/tons)

NOx	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020
Target 1. BLreductions (comp. to prev. year)	#DIV/0!	0.17	0.17	0.17	0.17	0.17	0.17	0.17	0.17	0.17	0.17
Target 2. BL reductions + LS IPPC	0.27	0.26	0.27	0.27	0.27	0.28	0.28	0.29	0.30	0.30	0.31
Target 3. BL reductions + MS IPPC	0.33	0.33	0.33	0.34	0.35	0.35	0.36	0.37	0.38	0.39	0.40

Lowest marginal abatement costs (at 70% of average), EUR m/kt (or EUR thousand/tons)

NOx	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020
Target 1. BLreductions (comp. to prev. year)	#DIV/0!	0.52	0.52	0.52	0.52	0.52	0.52	0.52	0.52	0.52	0.52
Target 2. BL reductions + LS IPPC	0.80	0.79	0.80	0.81	0.82	0.83	0.85	0.87	0.89	0.91	0.94
Target 3. BL reductions + MS IPPC	0.99	0.99	1.00	1.02	1.04	1.06	1.08	1.11	1.13	1.16	1.19

ESTIMATED POTENTIAL BENEFITS FROM TRADING

In case of 10% difference, EUR million

NOx	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	Total value* 2010	Total value* 2020
Target 1. BLreductions (comp. to prev. year)	#DIV/0!	7.79	7.79	7.79	7.79	7.79	7.79	7.79	7.79	7.79	7.79	58	86
Target 2. BL reductions + LS IPPC	251.20	247.36	235.73	224.10	212.47	200.84	189.21	177.58	165.95	154.32	142.69	1767	2616
Target 3. BL reductions + MS IPPC	435.50	436.73	430.17	423.61	417.05	410.49	403.93	397.37	390.81	384.25	377.69	3500	5181

In case of 30% difference, EUR million

NOx	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	Total value* 2010	Total value* 2020
Target 1. BLreductions (comp. to prev. year)	#DIV/0!	23.37	23.37	23.37	23.37	23.37	23.37	23.37	23.37	23.37	23.37	174	257
Target 2. BL reductions + LS IPPC	753.60	742.08	707.19	672.30	637.41	602.52	567.63	532.74	497.85	462.96	428.07	5301	7847
Target 3. BL reductions + MS IPPC	1306.50	1310.19	1290.51	1270.83	1251.15	1231.47	1211.79	1192.11	1172.43	1152.75	1133.07	10501	15544

* Total value = The sum of all benefits in each year, expressed either as present value in 2010 or future value in 2020, using a discount factor of 4%.
Values for 2011-2019 are linear transitive values between 2010 and 2020.

Practical Constraints on achievement of the theoretical maximum cost efficiencies

It must be considered that in practice many factors may work against the realization of the total cost-saving potential. Some of the constraining factors:

(i) The lowest-cost installations are unlikely to have sufficient capacity to implement all emission reductions for the whole sector. If further installations are involved the costs apparently increase thus less cost-savings can be realized. Model calculations showed that significant share of installations (may be up to 75% depending on the cap) would still need to implement abatement measures close to BAT to be able to provide sufficient amount of allowances for the system.

(ii) The actual distribution of abatement will be governed by the play of demand and supply in the market which depends on many factors, for instance on the expectations on future allowance prices and on the risk profile of the operators. It is assumed that the operators try to avoid risk if possible, thus they will only implement emission reductions if it is very likely that future allowance prices (in medium or long term) would be higher than their own marginal abatement costs. In practice it is uncertain what future allowance prices would be, what expectations the operators (with low abatement costs) would have on them and how attractive these expected prices would be (taking account of the low-risk profile of operators). These uncertainties impact upon the extent of abatements concentrated at cheap or higher-cost places.

(iii) The more sectors and geographical locations a trading scheme covers the higher the maximum for cost saving is. Limitations or restrictions on the above two elements may limit the theoretical potential for savings.

(iv) Any trading system would impose some administrative costs or burden (permitting, monitoring, verification, reporting) which can be moderate as a whole but also significant (depending on design) thus resulting in lower net savings.

III. Streamlining study findings on emission trading (Entec, 2007 (b))

Genaral description

- The study was commissioned to assess the scope for streamlining of industrial emissions legislation and the possible facilitation of emission trading for SO_x and NO_x.

- The structure of the study included different types of assessments (literature analysis, questionnaire-based, 15 case studies, impact assessment). In the impact assessment different options for streamlining the industrial emissions legislation were considered. Option 6 specifically aimed at assessing emission trading in relation to the IPPC Directive.

- Concerning trading the main conclusion was that it can be regarded as a cost-effective tool in general. Nevertheless the final efficiency (actual costs) would greatly depend on the system design (method of allocation, size of caps, administrative arrangements).

- The study did not test specific scheme designs. Rather, as a starting point for further work, it tried to assess emission trading versus installation-specific permitting from a theoretical point of view. This was done within the framework of a scenario analysis, which was carried out for NO_x. A hypothetical model was created, in which it was assumed that emission trading takes place on a voluntary basis, in addition to the general IPPC permitting requirements, but with NO_x allowances (as the basis for trading) replacing the requirement for installation-specific NO_x emission limit values. The main benefit of such a system would come from the differences in marginal abatement costs across the installations (at single installation it corresponds to the difference between the marginal abatement cost and the price of the allowances). The efficiency of the whole system would greatly depend on the extent of participation which directly impacts on demand and supply.

- The analysis set out a hypothetical member state with a total coal fired electricity generation capacity of 20 GWe, comprising 40 individual units of 500 MWe, all without advanced NO_x abatement (selective catalytic reduction, SCR). The BREF document gives BAT-associated emission levels (AELs) for NO_x in the range 90-200 mg/m^3, and indicates that SCR can reach performance in this range. Newly installed SCR is assumed to be able to bring down emissions to 100 mg/m^3. Emissions without SCR are assumed to be 500 mg/m^3.

- The analysis compared the costs of having each unit install SCR (in order to comply with installation-specific emission limit values) against the costs under an emission trading regime. In the latter case there may be two types of actors in the market: the first implements SCR and so reduces emissions, which can be sold as allowances on the market; and the second can buy these allowances instead of reducing emissions.

- Three simple cases of allocation were assumed and assessed:

1. Stringent allocation (based on the strict end of the BAT-AEL range): 90 mg/m^3

2. Medium allocation (middle of the BAT-AEL range): 145 mg/m^3

3. Lenient allocation (upper end of the BAT AEL range): 200 mg/m^3.

- In the first case (most stringent allocation) the supply of allowances is insufficient, thus the market does not function. In the second case, those who implement SCR will have an individual supply of 55 mg/m3 which can be sold. Those who do not implement SCR will have to buy allowances, each having an individual demand of 355 mg/m3. The sector is only able to comply (en bloc) if the majority of operators implement SCR. The study concluded that cost savings (compared to full-SCR case) could be up to €40 million/year/MS. In the third case (most lenient allocation) those who implement SCR will have an individual supply of 110 mg/m3 which can be sold on the market. Those who do not will have an individual demand of 300 mg/m3. This situation is therefore better from a market operation perspective, although the number of operators implementing SCR should still be roughly three times higher than of those not implementing it, to be able to ensure coverage for all operators (thus for the whole sector). This means that even with the most lenient allocation (200 mg/m3), around ¾ of operators are assumed to implement SCR to provide entire coverage for the whole sector to reach the specified environmental ambition. If the administrative costs are minor compared to the saved SCR costs, then the system could bring considerable benefits. The cost saving of the most lenient allocation is estimated at around €85 million/year. The necessary share of installations implementing BAT and the possible savings may vary depending on the cap, it is certain however that significant share of installations will still need to implement stringent abatement techniqes to provide allowances for the whole system.

- As regards impacts the hypothetical analysis showed that the "full-BAT" case (all installations on SCR) would reduce NOx emissions by 148 ktpa while emission trading would bring emission reductions of 111 ktpa (least stringent allocation), 131 ktpa (middle allocation) or 148 ktpa (most stringent allocation – in this case every installation has to apply SCR anyway and so there is no difference between emission trading and individual permitting). This means that emission trading with the medium or least stringent allocations may induce cost savings of €40-85 million if the target is to achieve defined overall emission reductions corresponding to the middle point or less strict end of the BAT-AEL range respectively.

- On the other hand, the environmental benefits would also be lower (by €65-370 million) compared to the BAT-based permitting case. Looking at cost-efficiency, if one compares the above cost savings with the forgone environmental benefits (due to trading) it can be seen that the cost-benefit balance of emissions trading is negative compared to the BAT approach, suggesting therefore that trading is less cost-effective than BAT. However, this is partly because the analysis only reflected a binary choice between newly installing SCR and achieving emissions of 100 mg/m^3, and not installing SCR with emissions of 500 mg/m^3. In reality, variations in plant sizes, levels of use, and nature of operation of SCR equipment, mean that different levels emissions will be possible.

- It should finally be noted that that the available evidence suggests that it is far from certain that the practical application of the Directive will lead to permit

conditions that require the installation of SCR in all cases. The important point, therefore, is that emission trading offers a possible way to achieve a predictable environmental outcome, at a lower compliance cost than under installation-specific permitting targeting full-BAT implementation.

Estimation of forgone cost-savings (Entec, 2007 (b))

- The theoretical cost savings of emission trading have been assessed in the IPPC review as part of a specific study[231]. The analysis looked at NO_x emissions in a hypothetical member state with a total coal fired electricity generation capacity of 20 gigawatt[232], or about 40 units of 500 MW, without advanced NO_x abatement (i.e. Selective Catalytic Reduction, SCR).

- The BREF document gives BAT-associated emission levels (AELs) for NO_x in the range 90-200 mg/m^3. The study found that, compared to the option of fixing BAT-based emission limit values requiring SCR at each installation, emission trading to achieve a specified overall objective could have lower compliance costs compared to the full BAT case.

- The cost savings are shown in the table below for allocation benchmarks[233] of 145 mg/m^3 (mid point of the BAT-AEL range) and 200 mg/m^3. If the benchmark were set at the most strict end of the BAT-AEL range (90 mg/m^3), all installations would have to apply SCR thus there would be no cost-saving.

Table 36: Estimate of cost savings for a hypothetical Member State

Per country	**Allocation of 145 mg/m^3**	**Allocation of 200 mg/m^3**
Cost savings in the hypothetical Member State	€ 40 million/year	€ 85 million/year

Source: Entec, 2007 (b)

- Scaling the results to the EU level (EU27) would imply that – depending on how the emission limit value is set – as an order of magnitude the cost saving of emission trading for large coal fired power stations could be up to around €0.5 to 1 billion per annum in 2020.

- Entec estimates on cost savings from trading are in the same order of magnitude for NO_x as those which result from the current analysis described earlier. It must be noted however that the methodology behind is slightly different. In the analysis of this impact assessment the cost savings are estimated compared to the actual implementation (as represented in the baselines), while the Entec analysis calculated the cost savings relative to the most

231 Entec, 2006 (b)

232 To put this into some perspective, the UK has about 60 GW of installed thermal electricity generation capacity (about 50% coal) and Bulgaria has about 12 GW. The total generation capacity in the EU is projected to be over 600 GW for thermal installations.

233 These benchmarks for the purpose of the calculation defined both the cap as well as determined the allocation of allowances to individual plants

stringent BAT case (lower end of BAT AELs) thus possibly overestimating the potential savings.

IV: Note on Local effects of emissions and Optimal Control Areas

The cap-and-trade system in practice may however be made somewhat flexible to allow for groups of Member States to deviate from their individual NEC ceilings while maintaining the compliance for the group as a whole. This idea, reflected in the discussions on 'Optimal Control Areas[234]' can also be a solution to the earlier described distributional problem, if the trading bubbles are created in a way to guarantee that local air quality remains protected. EU-wide trading (uncontrolled trading) could lead to serious deterioration of local health and ecosystem conditions which underlines the importance of developing the framework of SO_2/NO_x trading at EU level.

Air pollutants are different from greenhouse gases because it matters where pollution is released and where nature and population is exposed. For instance, the damage caused by 1,000 tonnes of SO_2 in Southern EU is much less than in Scandinavia, where the buffering capacity of nature is very limited. If cross-border trade in air pollutants takes place, it is therefore vital to ensure that the integrity of meeting environmental and health objectives is maintained. Because of this concern the Commission has studied the impact of different trading areas, called "joint control areas". The results are not yet final, but it seems evident that it would be possible to allow groups of Member States to allow installations to trade SO_2 or NO_x emissions amongst one another, albeit under certain conditions, the main ones being: (i) boundaries of these "joint control areas" need to be defined, (ii) a "tonne of pollutant" in one Member State has to be equivalent to a "tonne of pollutant" in another Member State. This requires that the design of the emission trading system and its implementation needs to be developed centrally.

V: Administrative Costs of a trading scheme

Since specific design for a future emissions trading instrument have not been established one can only assess examples or some assumed elements of such a system. It is likely however that total costs would remain under the level of benefits, since if it is an opting system, only those would opt in (or whom do not opt out) if or where allowed assume that for them the benefits are higher than costs.

The possible administrative cost elements of a future emissions trading instrument may include (i) for authorities: informing installations on allocation of allowances, verification of emission reports, reception and process of data from monitoring/inspection, maintaining registries, reporting to supervising authorities and (ii) for operators: continuous or periodic monitoring, reporting (e.g. every 3, 6 or 12 months) to authorities on emissions and on allowances etc.

The examples show that in case of certain (not necessarily trading) schemes the administrative costs may remain low (the Swedish NO_x charge scheme imposed around 0.5 EUR million administrative costs for the Swedish EPA in 1999, equal to 5 men-year, which corresponded

234 TNO, 2006

to 0.6% of the total charge revenues[235]. At the same time monitoring costs were around 12,000 EUR per plant on average.

Under trading schemes however with more administrative needs, the administrative costs may be more significant: for the US SO_2 Acid Rain Programme, for large plants continuous monitoring and quarterly reporting costs around 125,000 USD per year on average.

For the LCPs, continuous monitoring of NO_x and SO_2 is already in place for plants over 100 MW, so no large increase of monitoring costs would be expected. This would be different for other sectors.

[235] Swedish EPA, 2000

Annex 13: Glossary

BAU	Business As Usual
BAT	Best Available Techniques (as defined in the IPPC Directive, Article 2(11))
BAT-AELs	BAT Associated Emission Levels
BREF	BAT reference document
CAFÉ	Clean Air For Europe
CCS	Carbon Capture and Storage
CIRCA	web site (http://circa.europa.eu/Public/irc/env/ippc_rev/library)
CLE	Current Legislation
ECM	Economics and Cross-Media Effects
EEA	European Environment Agency
EIA	Environmental Impact Assessment
ELVs	Emission Limit Values
EMAS	Eco-Management and Audit Scheme
EMS	environmental management systems
EPER	European Pollutant Emission Register
E-PRTR	European Pollutant Release and Transfer Register
ET	Emission Trading
ETAP	Environmental Technologies Action Plan
GBR	General Binding Rule
GHG	Greenhouse gas
IA	Impact Assessment
IPPC	Integrated Pollution Prevention and Control
IMPEL	Implementation and Enforcement of Environmental Law, informal network
IRIS	Industrial Reporting Information System
LCP	Large Combustion Plants
LNA	Low Nitrogen Application
N/A	Not available
NEC Directive	National Emission Ceilings Directive

NERP	National Emission Reduction Plans (as under the LCP Directive)
NGO	Non Governmental Organisation
PM	Particulate Matter
POP´s	Persistent Organic Pollutants
RMCEI	Recommendation of the European Parliament and of the Council of 4 April 2001 providing for minimum criteria for environmental inspection in the Member States
SCR	Selective Catalytic Reduction
SED	Solvents Emissions Directive
SEIS	Shared Environmental Information Systems
SMEs	Small and Medium Enterprises
SNCR	Selective Non-Catalytic Reduction
TiO2	Titanium Dioxide
TSAP	Thematic Strategy on Air Pollution
VOC	Volatile Organic Compounds
WID	Waste Incineration Directive

Annex 14: List of main references used in the report

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[236] For more information about this and other NEC reports see http://ec.europa.eu/environment/air/iam_nec_dir.htm

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