



Support to the evaluation of the Industrial Emissions Directive (Directive 2010/75/EU)

Final Report



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Glossary

Acronym	Meaning
AAQ	Ambient Air Quality
AEL	Associated Emission Level
BAT	Best Available Technique
BAT-AEL	BAT-Associated Emission Level
BAT-AEPL	BAT-Associated Environmental Performance Level
BATC	Best Available Techniques Conclusions
BAU	Business As Usual
BOD	Biological Oxygen Demand (in water quality)
BOF	Basic Oxygen Furnace
BREF	Best Available Techniques Reference documents
CAK	Production of Chlor-Alkali
CBA	Cost Benefit Analysis
CCA	Cumulative Cost Assessment
Cd	Cadmium
CEFIC	European Chemical Industry Council
CEMS	Continuous Environmental Monitoring System
CER	Ceramic Manufacturing Industry
CLM	Production of Cement, Lime and Magnesium oxide
CLP	EU Regulation for Classification, Labelling and Packaging
CLRTAP	Convention on Long-Range Transboundary Air Pollution
CO ₂	Carbon dioxide
COD	Chemical Oxygen Demand (in water quality)
COSME	Competitiveness of Enterprises and Small and Medium-sized Enterprises
Cu	Copper
DG ENV	Directorate-General for Environment
EAF	Electric Arc Furnace
EC	European Commission
ECM	Economics and Cross-media effects BREF
EEA	European Environment Agency

Acronym	Meaning
EEB	European Environmental Bureau
EFS	Emissions from Storage
EIP	Entrepreneurship & Innovation Programme
EIPPCB	The European Integrated Pollution Prevention and Control (IPPC) Bureau
ELV	Emission Limit Value
EN14181	Stationary Source Emissions - Quality Assurance of Automated Measuring Systems
ENE	Energy Efficiency BREF
ENEF	Equivalent Nitrogen Excretion Factors
EPER	European Pollutant Emission Register (superseded by E-PRTR)
E-PRTR	European Pollutant Release and Transfer Register
EQ	Evaluation Question
EQS	Environmental Quality Standards
ESR	EU Effort Sharing Regulation
ETS	Emissions Trading System
ETV	EU Environmental Technology Verification
EU	European Union
EU ETS	European Union Emissions Trading System
EU-28	The 28 Member States of the European Union at the start of the contract (February 2019)
FDM	Food, Drink and Milk industries
FMP	Ferrous Metals Processing Industry
FP7	The Seventh Framework programme
FTE	Full time equivalent
GBR	General binding rules
Gg	Gigagram (equivalent to kiloton)
GHG	Greenhouse gas
GLS	Manufacture of Glass
GVA	Gross value added
H ₂ S	Hydrogen sulphide
HCHO	Formaldehyde

Acronym	Meaning
HCl	Hydrochloric acid
HF	Hydrogen fluoride
Hg	Mercury
I&S	Iron and Steel production
IA	Impact Assessment
ICS	Industrial Cooling Systems
IED	Directive 2010/75/EU of the European Parliament and of the Council of 24 November 2010 on industrial emissions
IEE	Intelligent Energy Europe
IMPEL	European Union Network for the Implementation and Enforcement of Environmental Law
INSPIRE	Infrastructure for spatial information in Europe
IPPCD	Directive 2008/1/EC concerning integrated pollution prevention and control (also known as IPPC Directive)
IRIS	Industrial Reporting Information System
IRPP	Intensive Rearing of Poultry and Pigs
JRC	EU Joint Research Centre
KEI	Key Environmental Issues
LCP	Large Combustion Plants
LCPD	Directive 2001/80/EC on the limitation of emissions of certain pollutants into the air from large combustion plants
LIFE	EU funding instrument for the environment and climate action (L'Instrument Financier pour l'Environnement)
LSU	Livestock Unit
LVIC-AAF	Large Volume Inorganic Chemicals – Ammonia, Acids and Fertilisers
LVIC-S	Large Volume Inorganic Chemicals – Solids and Others Industry
LVOC	Production of large Volume Organic Chemicals
MCP	Medium Combustion Plant
MDF	Medium Density Fibreboard
MiW	Make it Work Project Enabling eco-innovations for a circular economy
MS	EU Member State
MW	Megawatt
MW _{th}	Megawatt thermal

Acronym	Meaning
N ₂ O	Nitrous oxide
NECD	National Emissions Ceilings Directive
NFM	Non-Ferrous Metals industries
NGO	Non-Governmental Organisation
NH ₃	Ammonia
Ni	Nickel
NMVOG	Non-methane volatile organic compounds
NO _x	Generic term for the nitrogen oxides that are most relevant for air pollution
NVZ	Nitrate Vulnerable Zone
OECD	Organisation for Economic Co-operation and Development
OFC	Manufacture of Organic Fine Chemicals
OPC	Open Public Consultation
OSB	Oriented strand board
Pb	Lead
PCB	Polychlorinated Biphenyl
PCDD/F	polychlorinated dibenzo-p-dioxins and dibenzofurans
PM (2.5 and 10)	Particulate Matter of size < 2.5 µm or < 10 µm
POL	Production of Polymers
PP	Production of Pulp, Paper and board
PRTR	Pollutant Release and Transfer Register
QAL2	Quality assurance level of EN14181, on the validation of an Automated Measurement System following its installation
REACH	Regulation on Registration, Evaluation, Authorisation and Restriction of Chemicals
ROM REF	Reference document on Monitoring of Emissions to Air and Water from IED Installations
SA	Slaughterhouses and Animals By-products Industries
SED	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
SETIS	Strategic Energy Technologies Information System
Seveso	Refers to various council directives on the control of major-accident hazards involving dangerous substances (Seveso II, Seveso III).

Acronym	Meaning
	Most recent (Seveso III) is Directive 2012/18/EU of the European Parliament and of the Council of 4 July 2012 on the control of major-accident hazards involving dangerous substances, amending and subsequently repealing Council Directive 96/82/EC
SF	Smitheries and Foundries Industry
SILC	Sustainable Industry Low Carbon Scheme
SO ₂	Sulphur dioxide
SPIRE	Sustainable Process Industries through Resource and Energy Efficiency
SS	Suspended Solids
STM	Surface Treatment of Metals and Plastics
STS	Surface Treatment Using Organic Solvents including Wood and Wood Products Preservation with Chemicals
TAN	Tanning of hides and skins
T-N	Total dissolved nitrogen compounds
TOC	Total Organic Carbon
T-P	Total dissolved phosphorus compounds
TRL	Technology Readiness Level
TSS	Total Suspended Solids
TWG	Technical Working Group
TXT	Textiles Industry
UK	United Kingdom
UNECE	United Nations Economic Commission for Europe
US EPA	United States Environmental Protection Agency
UWWTP	Urban Waste Water Treatment Plant
WBP	Wood-Based Panels production
WFD	Water Framework Directive
WGC	Common Waste Water and Waste Gas treatment / management systems in the Chemical sector
WID	Directive 2000/76/EC on the incineration of waste
WI	Waste Incineration
WT	Waste Treatment
WWTP	Waste Water Treatment Plant

Abstract

This report presents the findings of a study to support the European Commission's evaluation of the Industrial Emissions Directive (IED, 2010/75/EU). The study involved a detailed review of available literature and datasets from across the EU. The study also gathered evidence and views from Member States, industry, NGOs and other stakeholders on the functioning of the IED, through an open public consultation, targeted stakeholder survey, interviews, focus groups and workshops. This report summarises the evidence base and presents the consultants' conclusions as input to the Commission's Staff Working Document. The analysis is structured under the five evaluation themes of effectiveness, efficiency, relevance, coherence and EU added value, and the 13 more detailed evaluation questions (and multiple sub-questions) under these themes. Conclusions are drawn about the overall performance of the IED and BREF process, whether the objectives of the Directive have been met and whether it is still relevant for the current needs of the EU. Ongoing issues and challenges associated with implementation of the IED have been captured to inform any future actions.

Ce rapport présente les résultats d'une étude en soutien à l'évaluation par la Commission européenne de la directive sur les émissions industrielles (DEI, 2010/75 / UE). L'étude comprenait une revue détaillée de la littérature et des ensembles de données disponibles dans toute l'UE. L'étude a également rassemblé des preuves et des points de vue des États membres, du secteur industriel, des ONG et d'autres parties prenantes sur le fonctionnement de l'IED, à travers notamment une consultation publique ouverte, une enquête ciblée auprès des parties prenantes, des entretiens, des groupes de discussion et des ateliers. Ce rapport résume les données de base et présente les conclusions des consultants comme contribution au document de travail des services de la Commission. L'analyse est structurée sous les cinq thèmes d'évaluation: l'efficacité, l'efficacité, la pertinence, la cohérence et de la valeur ajoutée européenne, ainsi que les 13 questions d'évaluation plus détaillées (et sous-questions multiples) sous ces thèmes. Les conclusions sont tirées sur la performance globale du processus IED et BREF, si les objectifs de la directive ont été atteints et si celle-ci est toujours pertinente pour les besoins actuels de l'UE. Les problèmes et défis en cours associés à la mise en œuvre de l'IED ont été saisis pour aviser toute action future.

Dieser Bericht enthält die Ergebnisse einer Studie, die die von der Europäischen Kommission durchgeführten Evaluierung der Industrieemissionsrichtlinie (IED, 2010/75 / EU) unterstützt. Die Studie umfasste eine detaillierte Recherche der verfügbaren Literatur und Datensätze aus der gesamten EU. Zusätzlich wurden als Teil der Studie Nachweise und Ansichten zur Funktionsweise des IED von Mitgliedstaaten, Industrie, NRO und anderen Interessengruppen durch eine öffentliche Konsultation, eine gezielte Stakeholder-Umfrage, Interviews, Fokusgruppen und Workshops gesammelt. Dieser Bericht fasst die Evidenzbasis zusammen und präsentiert die Schlussfolgerungen der Berater als Beitrag für das Arbeitsdokument der Kommission. Die Analyse ist untergliedert in die fünf Evaluierungsthemen Wirksamkeit, Effizienz, Relevanz, Kohärenz und EU-Mehrwert sowie in 13 detaillierte Evaluierungsfragen (und mehrere Unterfragen) in diesen Themenbereichen. Es werden Schlussfolgerungen zur Gesamtleistung des IED- und des BVT-Merkblätter-Prozesses gezogen, ob die Ziele der Richtlinie erreicht wurden und ob sie für die aktuellen Bedürfnisse der EU noch relevant sind. Anhaltende Fragen und Herausforderungen im Zusammenhang mit der Implementierung des IED wurden erfasst, um zukünftige Maßnahmen zu informieren.

1 Executive summary

French and German versions of the Executive Summary will be drafted once the English version has been reviewed by the Commission and is considered complete.

1.1 Introduction to the evaluation

This report presents the findings of a study delivered by Ricardo, Milieu and Umweltbundesamt (UBA) to support the European Commission in the evaluation of the Industrial Emissions Directive (IED, 2010/75/EU). The evaluation has assessed how the IED is working, whether it has the correct scope, and the degree to which its intended impacts have been achieved. This is the supporting study to the official evaluation of the IED being conducted by the European Commission. It provides the necessary analytical background to the Staff Working Document which will be published by the Commission for this evaluation. If it is appropriate, the outcome will provide one reference for a possible future Impact Assessment and possible proposal for revision of the Directive.

The IED entered into force on 6 January 2011 and had to be transposed by the Member States into national legislation by 7 January 2013. The IED combined and strengthened requirements previously set under 7 different EU Directives, specifically Directive 2008/1/EC concerning integrated pollution prevention and control (IPPCD) and a number of sectoral Directives. The IED was introduced following a 2-year long, extensive review of the industrial pollution policy framework. The motivation behind it was to further control industrial pollution while simplifying regulations and lowering the administrative burden, supporting innovation and improving enforcement and providing better coherence with other aspects of EU environmental policy acquis (specifically concerning air, water, soil, waste, circular economy).

1.2 Methodology

The evaluation process followed the European Commission's Better Regulation Guidelines for evaluations (European Commission, 2017a) and assessed the IED against five key evaluation criteria in line with the evaluation questions set out in the Evaluation Roadmap (European Commission, 2018a):

- **Effectiveness:** *To what extent do the effects induced by an intervention correspond with its objectives as they are outlined in the policy?* i.e. it aims to assess the extent to which the IED's objectives have been achieved, and the factors that may have influenced progress towards those objectives.
- **Efficiency:** *How economically have the resources used been converted into effects?* i.e. the assessment of efficiency compares the inputs used for a certain activity with produced outputs.
- **Relevance:** *To what extent is an intervention relevant in respect to needs, problems and issues identified in target groups?.* For the IED, the key consideration is the extent to which the challenges (i.e. environmental pressures caused by operating industrial plants) are being addressed or whether there is still scope for further improvements in the future.
- **Coherence:** *To what extent are the elements of the intervention logic complementary, mutually supportive and non-contradictory? To what extent do the objectives and activities support or contradict those of other public interventions?.* i.e. the assessment of coherence considers whether the IED is coherent internally, with other EU actions (e.g. water policy) and with international actions.
- **EU added-value:** This brings together the findings from all other evaluation criteria and focusses on the benefits and changes resulting from EU action on

industrial pollution control that are additional to those that would have resulted from action at local, regional or national level otherwise.

The evaluation covered all parts of the IED, including the process for elaborating BREFs and the BAT Conclusions, and the whole of the EU. It primarily covered the period from adoption of the IED in 2010, however it was also pertinent to look back further to its predecessor legislation.

The evidence for the evaluation was gathered via a combination of desk based research and engagement with stakeholders via a number of different routes:

- **Desk research:** More than 100 different sources have been reviewed, many of these were reports developed on behalf of the Commission e.g. assessments of Member State implementation reports, technical reports and other impact assessments, evaluations and fitness checks. Data and publications from the European Environment Agency (EEA) (including the European Pollutant Release and Transfer Register (E-PRTR)) were also utilised in a number of cases. Various position papers and wider resources were also provided by stakeholders throughout the evaluation.
- **Open public consultation (OPC):** The questionnaire was launched on the Commission's website¹ on 27 May 2019 and ran until 4 September 2019. The questionnaire was developed in English and was translated by the Commission services into all 23 EU official languages ensuring greater accessibility. There were 312 respondents in total to the OPC.
- **Targeted stakeholder engagement:**
 - **Online survey:** A targeted online survey was launched to gather the views of key groups of stakeholders, including Member State authorities (at any level of administration and IED implementation), industry (individual company or trade body) or other type of organisations (e.g. NGO, research body). The survey included questions grouped by 10 key themes relevant to the IED evaluation. A total of 285 stakeholders responded to the survey.
 - **Stakeholder interviews:** The online survey was complemented with telephone interviews to ensure that more in-depth views could be obtained from key stakeholders (Commission services, EEA, Member State authorities at national and sub-national levels, industry trade associations, NGOs). 22 interviews in total were undertaken.
 - **Focus groups:** two focus group discussions were used to consult a wider group of stakeholders with expertise in the BREF process in one setting. Representatives of Member State authorities, industry trade associations and the NGO community took part in the discussion.
 - **Stakeholder workshops:** two stakeholder workshops (each involving more than 100 participants) were organised to (i) launch the evaluation, explain the workplan and request inputs and (ii) share the draft findings and gather feedback for finalisation of the evaluation.

There were a number of limitations and data gaps encountered during the evaluation, the majority of which were identified at the start of the process so that appropriate actions could be taken to limit their impacts. The main limitations related to the challenges of disentangling the impacts of the IED from its predecessor legislation and some data gaps for assessing specific evaluation questions (in particular, on impacts of the BATC and changes in administrative burdens). Despite these limitations, the triangulation of the different data sources means that there is a good degree of confidence in most of the conclusions which are presented together with the corresponding robustness level.

¹ https://ec.europa.eu/info/law/better-regulation/initiatives/ares-2018-4758971/public-consultation_en

1.3 Key findings under each theme

1.3.1 Effectiveness

The IED has contributed to reducing air pollution from industrial activities in its scope. The IED has contributed to reducing water pollution from industrial activities, but to a lesser extent than for air.

Some assessments are available that demonstrate the impact that the IED has had, or is likely to have, on emissions to air. For emissions to water, the data is much less complete or robust making it harder to judge how the IED has impacted on emissions. For emissions to soil, there is very limited data available but this does appear to show a reduction in emissions. Whilst the IED appears to be fulfilling its objective of reducing pollution from industrial sources, some stakeholders have questioned the scale of such reductions.

The IED has been less effective in addressing resource efficiency and circular economy aspects.

There is little evidence on the IED's impacts on aspects such as energy use, raw materials and waste generation. The less binding nature of these aspects of BAT Conclusions could be expected to be one contributory factor towards the IED having less impact.

There are a small number of agro-industrial activities that may generate high levels of pollution that are not covered by the IED

This includes various intensive livestock activities (cattle, mixed farms, poultry farms just below IED activity thresholds), mining and aquaculture. Some of these were assessed for inclusion in the IED previously but were excluded for specific reasons.

The only pollutants excluded from inclusion in an environmental permit under the IED are GHGs which are covered under the EU ETS.

The BREF process is not limited to the IED Annex II pollutant list and has covered additional pollutants. Member State competent authorities are also obliged to establish emission limit values in permits where appropriate for any significant pollutants and this is not limited to those in Annex II of the IED or the list of pollutants with BAT-AELs in specific BATC.

IED provisions are more explicit in relation to environmental inspections than under the IPPCD and provisions relating to environmental permits have been strengthened. It is unclear if enforcement has been strengthened in practice.

Some uncertainty remains as to whether enforcement and inspections have improved. Most stakeholders agreed that the use of BATC and permits has led to better control over environmental impacts and that enforcement has been strengthened.

The IED has to some degree stimulated innovation in particular through provisions for identifying and deploying BAT, expansion of markets for BAT, and identification of emerging techniques.

The main impact has been deployment of BAT. The market for relevant techniques is larger in the EU than it would otherwise have been, and the market outside is also stimulated to the degree other jurisdictions copy aspects of the IED or BREFs. However, BAT are inherently 'backwards looking' and their ability to stimulate innovation has been limited. Emerging techniques are identified in the BREF process, and work is ongoing to better identify them through a pilot scale innovation observatory as part of frontloading efforts for the BREF process. This is expected to stimulate innovation further.

The merger of the predecessor Directives has clarified and simplified the requirements. Some complexities remain.

Despite this there remain aspects that are unclear. There are cases where installations are covered by the scope of BAT Conclusions as well as by specific chapters of the IED e.g. large combustion plants, waste incineration plants.

Access to information has improved under the IED but there remain some failings in implementation by Member States. There has also been some improvement in access to justice but limitations remain.

Overall, whilst there has been improvement some permits are not publicly available online, some information is available online but difficult to locate, in some Member States authorities have requested fees for access to permits. Public access to justice seems to be working, at least to some extent, where new permits are considered. The main limitation seems to be, at least in some Member States, the ability to challenge revisions to existing permits and interpretation of what constitutes 'substantial change'.

Overall, the BREF process is considered to be effective for what is a very difficult task, bringing together large groups of stakeholders often with diverging interests.

The main task of the BREF process is to identify BAT and BAT-AELs that are effective in achieving the IED's objectives. Existing efforts to improve the BREF process in recent years have improved its effectiveness (and efficiency) since the IED came into force. However, some specific areas were identified that have made it less effective than it could have been. Some of these shortcomings have common ground among stakeholders, and others are only supported by certain stakeholder groups.

Whilst the BREF process doesn't itself quantify human health and environment benefits of implementing BAT, the separate assessments that have been carried out concluded the benefits significantly exceeded costs.

There is a sound system of monitoring emissions from IED installations and monitoring techniques are cutting-edge, providing good information on emissions for assessing compliance.

The monitoring of emissions to air and water for compliance assessment purposes of IED installations is largely based on EN standards. Detailed provisions apply in Member States to ensure a high quality of the measured data.

Member States draw on the BREFs and BAT Conclusions when setting monitoring requirements in permits. There is variation in implementation across the EU, in particular in relation to compliance assessment.

More recent BAT Conclusions contain consistent approaches to specifying BAT for monitoring. Member State reporting shows that monitoring frequencies are respected in permit conditions. This has helped to improve transparency and consistency. Based on the evidence that is available, the differing application of compliance assessment rules between Member States risks creating distortions.

The reporting systems exist and are useful but are not cutting-edge and monitoring data is generally not publicly available via the internet.

A number of countries outside the EU as well as some EU regions and companies have real time monitoring and reporting of emissions monitoring and some make such information publicly available. Such approaches could potentially improve overall efficiency, ease of checking compliance and public access to information.

The IED has supported Member States in implementing BAT-based permitting.

BAT-based permitting has increased under the IED. The tendency appears to have been for permit emission limit values to be set on the basis of upper BAT-AELs more commonly than lower BAT-AELs. There is some evidence available that indicates variation across the EU as to whether or not the BAT-AEPLs (i.e. other than BAT-AELs) from the BAT Conclusions are included within permits although this is only known for some Member States. There is a limited proportion of installations granted Article 15(4) derogations although there is some variability in approaches across the EU.

The IED has contributed to a more level playing field compared to under the IPPCD, mainly through a reduction in differences in stringency of permit ELVs between Member States.

However, there remain variations in implementation among Member States, particularly on compliance assessment, the granting of derogations, and on setting permit ELVs at upper BAT-AELs versus lower values within the AEL range.

1.3.2 Efficiency

A limited number of BATC assessments have been undertaken, and these have identified, for the sectors assessed, that benefits from compliance with the BATC overall significantly exceeded compliance costs

The assessments have also shown that these conclusions were robust to sensitivity analysis of assumptions made. Furthermore, our own limited assessment of compiling the full costs of IED implementation for the iron and steel sector (i.e. including administrative burdens for operators and regulators), suggests that even adding non-investment costs related to compliance together with the BATC compliance costs, the benefits still exceed the costs significantly.

The BREF process has already been (and continues to be) subject to a process to improve its efficiency. Whilst successful, more could be done to further improve efficiency.

Several suggestions have been made by stakeholders to help deliver the IED's environmental objectives whilst improving efficiency. Many of the suggestions relate to the BREF process, which has itself already been (and continues to be) subject to a process to improve its efficiency.

Compared to under the IPPCD, some additional administrative costs have been incurred for additional requirements under the IED (such as baseline reports); these are not 'unnecessary'. There is limited evidence of any change in overall administrative costs.

Limited evidence has been identified to quantify overall administrative costs associated with the IED (in particular how these may have changed relative to under the previous legislation). The administrative costs of the BREF process have been estimated, including costs to all relevant stakeholders, and are considerably lower than the scale of compliance costs and overall benefits for those sectors where a detailed cost-benefit analysis has been undertaken (Iron & Steel, LCPs).

There is no evidence that the IED has materially impacted global competitiveness.

The IED both supports EU competitiveness in the global economy (e.g. driving environmental improvements outside the EU leading to export of EU expertise) and hampers EU competitiveness (e.g. additional compliance costs in EU compared to elsewhere). Eurostat data shows that overall industry environment compliance costs remain relatively constant.

The IED has improved environmental sustainability, it is less clear if it has improved social and economic sustainability.

Environmental impacts of the regulated sectors are decreasing which is beneficial for their environmental sustainability. Since assessments show the benefits exceed the costs this means the resulting health benefits also bring overall economic and social benefits. The economic and social benefits are less obvious since they will be indirect.

1.3.3 Relevance

The IED remains relevant to the needs of the EU within its objectives.

The steady decline in pollutant emissions from industrial activities (particularly to air) demonstrates that the IED and its predecessor legislation are having positive impacts and therefore standards are being set that are helping to protect human health and the environment. However, it is clear that industrial activities overall still contribute significantly to emissions of some pollutants (to air and water) resulting in significant health and environmental impacts. Hence the IED remains relevant to continue to address these impacts. The IED remains relevant for all of the different stakeholder groups including industry (creating a level playing field), Member States and EU citizens (health, public access to information and justice).

The IED is able to respond to new or emerging environmental issues through the BREF process but there are some limitations.

Since the IED in principle covers all environmental impacts and it is for the TWG to agree the scope of the BREF, it seems clear that the framework is able to respond to any new environmental issue. One major challenge in responding to emerging issues relates to timings; in particular the length of the BREF process and the time between reviews.

1.3.4 Coherence

The IED is overall largely internally coherent and consistent although several elements could be further clarified.

Overall, there appear to be no major issues of internal coherence under the IED. At the same time, it is clear that there are some issues that have been identified.

The IED is largely coherent with other EU environmental and wider EU policies and at least to some extent the IED is supporting the delivery of the objectives of other EU policies. However, there is potentially scope for greater contribution in some areas.

The evaluation has identified both synergies and potential gaps or overlaps. While the BREFs and BATs have contributed to the achievement of environmental objectives set out in wider EU policies, some areas are covered more comprehensively than others. A review of previous fitness checks and evaluations concluded that generally there are few inconsistency issues, although there are some exceptions. The IED and E-PRTR, for example, have strong overlaps, however, there are still mismatches, especially in terms of the activities and pollutants/thresholds covered.

1.3.5 EU added value

There is significant added value of EU action.

EU action has ensured a more consistent approach in the adoption of industrial emission standards with relatively limited deviation among Member States. There is some evidence to suggest that in the absence of EU action – initially under the IPPCD and then the IED – standards would have remained less demanding and, as a result, the level of emissions would have been greater. EU action has also ensured a more consistent approach in the monitoring and enforcement of the requirements across the EU. Finally, the BREF process would not be feasible to replicate at a Member State level to the same degree. All of these elements have helped to contribute towards a level playing field.

In addition, while the concept of BAT is also used in multilateral environmental agreements related to industrial pollution, there is evidence of similar concepts based on the EU system emerging in third countries, including the Russian Federation and Korea. The EU BREFs are also used as benchmarks within other systems e.g. in India. This is adding value at a global level.

2 Introduction, purpose and scope

2.1 Introduction

This is the final report for the project “Support for evaluation of Directive 2010/75/EU” (European Commission, 2010)², which is Service Request 18 under framework contract ENV.C.4/FRA/2015/0042. The specific contract number is 070201/2019/801155/SFRA/ENV.C.4. The specific contract entered into force on 27 February 2019 and ran until 26 February 2020 (12 months).

The aim of the service contract was to support the European Commission in the evaluation of the Industrial Emissions Directive (IED) through:

- Gathering, compiling and assessing evidence
- Drafting analytical support document(s) including reports and/or presentations.

The evaluation process followed the European Commission’s guidelines for evaluations (European Commission, 2017a) and assessed the IED against five key evaluation criteria: effectiveness, efficiency, relevance, coherence and EU added-value in line with the evaluation questions set out in the Evaluation Roadmap (European Commission, 2018a).

This is the supportive study to the official evaluation of the IED being conducted by the European Commission. It provides the necessary analytical background to the Staff Working Document which will be published by the Commission for this evaluation.

An overview of the status of all deliverables from the study is in the table below.

Table 2-1: Overview of deliverables for this study

Deliverable	Comment
Summary of response to Open Public Consultation	Published by European Commission ³
Contributions to Open Public Consultation	Published by European Commission ⁴
Final report	This report
Consultation synopsis	Annex 2 to this report
Analytical support documents	Annexes 13 to 17 to this report

This study has been undertaken by Ricardo, Milieu and Umweltbundesamt (UBA).

All the main strands of evidence and elements of the final report are included in this report. The position on these is in the following table.

² Commonly referred to as the Industrial Emissions Directive (IED)

³ See https://ec.europa.eu/info/law/better-regulation/initiative/1913/publication/5513621/attachment/090166e5c7bfd3fc_en

⁴ See https://ec.europa.eu/info/law/better-regulation/initiative/1913/publication/5513621/attachment/local-5513621-contributions_en

Table 2-2: Location of evidence strands and key elements of this report

Item	Location in current report
Evidence strands	
Bibliography and evidence base	Annex 6
Open public consultation	Annex 7
Targeted stakeholder engagement – online survey	Annex 8
Targeted stakeholder engagement – interviews	Annex 9 (Summary of method and list of organisations interviewed) Notes are provided in confidence to DG ENV and are not for open publication
Targeted stakeholder engagement – focus groups	Annex 10
Stakeholder workshops	Annex 11
Analytical support documents	Annexes 13-17 for documents of effectiveness, efficiency, relevance, coherence and EU added value respectively
Elements of this report	
Description of the Directive and its objectives	Section 3.1
Intervention logic	Section 3.2 – simplified version Annex 4 – full version
Baseline	Section 3.3
Evaluation questions/ matrix	Section 4 – evaluation questions Annex 5 – evaluation matrix
Implementation/ state of play	Section 6, with an extended version in Annex 12
Answers to the evaluation questions	Section 7
Conclusions	Section 8

2.2 Purpose

This evaluation is to assess how the IED is working, whether it has the correct scope, and the degree to which its intended impacts have been achieved. If it is appropriate, the outcome will provide the basis for a possible future Impact Assessment and possible proposal for revision of the Directive.

2.3 Scope of the evaluation

The evaluation covered all parts of the IED, including the process for elaborating BREFs and the BAT Conclusions, and the whole of the EU. It primarily covered the period from adoption of the IED in 2010, however it was also pertinent to look back further to its predecessor legislation. The scope of the evaluation is presented in Table 2-3.

Table 2-3: Scope of the evaluation

Scope element	Focus
Legislative coverage	<ul style="list-style-type: none"> • Full text of the IED including all Annexes: Directive 2010/75/EU • Implementing decisions accompanying the IED: <ul style="list-style-type: none"> ○ Commission Decision of 16 May 2011 establishing a forum for the exchange of information pursuant to Article 13 of the Directive 2010/75/EU on industrial emissions ○ Commission Implementing Decision (2012/119/EU) of 10 February 2012 laying down rules concerning guidance on the collection of data and on the drawing up of BAT reference documents and on their quality assurance (...) ○ Commission Implementing Decision (2012/795/EU) of 12 December 2012 establishing the type, format and frequency of information to be made available by the Member States for the purposes of reporting on the implementation of Directive 2010/75/EU ○ Commission Implementing Decision (EU) 2018/1135 of 10 August 2018 establishing the type, format and frequency of information to be made available by the Member States for the purposes of reporting on the implementation of Directive 2010/75/EU (repealing Commission Implementing Decision 2012/795/EU)
Geographical coverage	<ul style="list-style-type: none"> • EU-28
Sectoral coverage	<ul style="list-style-type: none"> • All activities covered by Annex I of the IED • All BREFs published and BATC adopted under the IED⁵
Temporal coverage	<ul style="list-style-type: none"> • As stated in the Evaluation Roadmap⁶, the evaluation period is from IED adoption (24 November 2010) until present (2019) although some of the analysis has looked further back to consider trends over time and impacts of the previous legislation
Counterfactual	<ul style="list-style-type: none"> • The impacts of the IED will be assessed by comparing latest evidence with the status pre-adoption of the IED
Evaluation criteria	<ul style="list-style-type: none"> • Effectiveness, efficiency, coherence, relevance and EU added value • Cross-cutting topics and themes assessed across the criteria

⁵ BATC as implementing acts have not been covered within the evaluation. However, the process to derive them and their outcomes have been assessed.

⁶ https://ec.europa.eu/info/law/better-regulation/initiative/1913/publication/326298/attachment/090166e5bf01919a_en

3 Background to the evaluation: Description, objectives and baseline

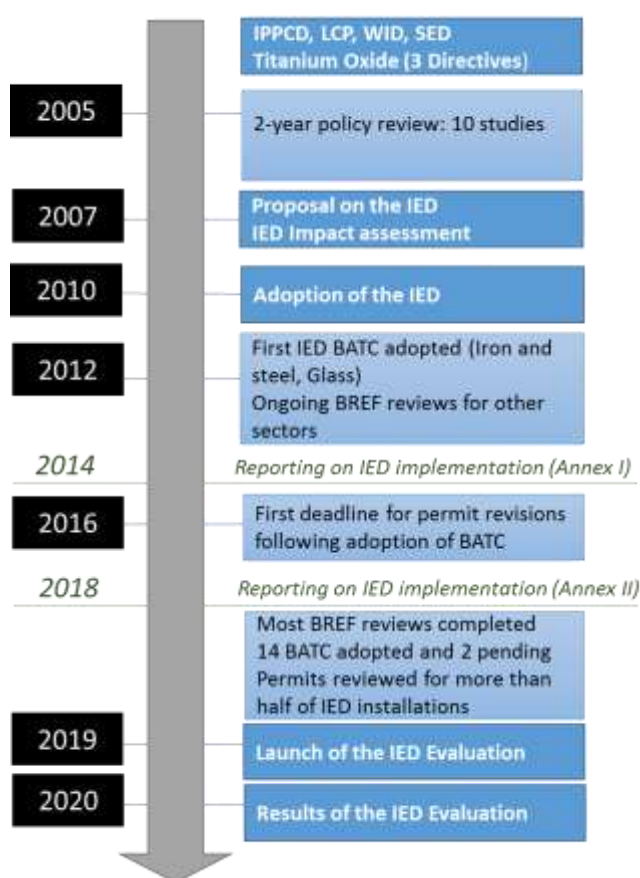
3.1 Description of the Directive and its objectives

3.1.1 Industrial Emission Directive and its predecessor legislation

The IED entered into force on 6 January 2011 and had to be transposed by the Member States into national legislation by 7 January 2013. The IED combines and strengthens requirements previously set under 7 different EU Directives, specifically:

- Directive 2008/1/EC concerning integrated pollution prevention and control (IPPCD)
- Directive 2001/80/EC on the limitation of emissions of certain pollutants into the air from large combustion plants (LCPD)
- Directive 2000/76/EC on the incineration of waste (WID)
- 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 (SED)
- Council Directive 78/176/EEC on waste from the titanium dioxide industry
- Council Directive 82/883/EEC on procedures for the surveillance and monitoring of environments concerned by waste from the titanium dioxide industry
- Council Directive 92/112/EEC on procedures for harmonising the programmes for the reduction and eventual elimination of pollution caused by waste from the titanium dioxide industry

Figure 3-1: History of the IED



The IED was introduced following a 2-year long, extensive review of the industrial pollution policy framework. The motivation behind it was to further control industrial pollution while simplifying regulations and lowering the administrative burden, supporting innovation and improving enforcement and providing better coherence with other aspects of EU environmental policy acquis (specifically concerning air, water, soil, waste, circular economy). The specific issues identified as part of the review of the industrial pollution policy framework are summarised in Section 3.1.3.1.

3.1.2 Key requirements and principles

3.1.2.1 Rationale for EU action on industrial pollution

The need to tackle industrial pollution at an EU level as opposed to national level was identified a number of years ago based on the scale of the problem and recognition that pollution from such sources can have impacts across borders. Furthermore, whilst some Member States already regulated industrial installations in an integrated manner, others did not so there was not a level playing field across the EU. As well as a need to reduce the environmental and health impacts of industrial activities in a consistent manner (including monitoring and enforcement), Member State action alone risked creating distortions in competition within a sector i.e. those companies operating in Member States with no or limited requirements to reduce impacts gained a competitive advantage to those having to make investments to comply with environmental standards in another Member State.

As a result of the needs discussed above, the IPPCD was developed and adopted in 1996 to provide the first EU wide framework for the permitting and control of industrial installations. The overall framework for permitting was modelled to some extent on approaches that were already in place in some Member States such as the UK. The IPPCD was based on four main principles (which were retained in the IED): (1) an integrated approach, (2) best available techniques, (3) flexibility and (4) public participation. Each of these is discussed in turn below:

- The **integrated approach** means that permits for an industrial installation must take into account the whole environmental performance of the plant, covering e.g. emissions to air, water and land, generation of waste, use of raw materials, energy efficiency, noise, prevention of accidents, and restoration of the site upon closure. The purpose of such an approach was to ensure a high level of protection of the environment taken as a whole, ensuring that cross media effects of different actions were considered. This approach is applied through individual permit conditions set for each installation – alternatively, Member States may set requirements via general binding rules (GBR) for specific sectors which are then referred to in permit conditions.
- The permit conditions including emission limit values (ELVs) must be based on **Best Available Techniques (BAT)**. The definition of BAT set out in the IPPCD initially and now the IED implies economic feasibility as “available techniques” are defined as *“...those developed on a scale which allows implementation in the relevant industrial sector, under economically and technically viable conditions, taking into consideration the costs and advantages, whether or not the techniques are used or produced inside the Member State in question, as long as they are reasonably accessible to the operator”*.

To assist in the determination of BAT, an exchange of information between experts from the EU Member States, industry, equipment manufacturers and environmental organisations was established. This work is co-ordinated by the European IPPC Bureau at the EU Joint Research Centre in Seville (Spain) and results in the adoption and publication by the Commission of the BAT Reference Documents (the so-called BREFs). This process aims to take an integrated approach to identifying BAT considering cross-effects as well as any evidence on excessive costs. Technical Working Group (TWG) members can all submit evidence to the process to take into consideration in the identification of BAT. Pooling knowledge across the EU provides greater insights into the sectors concerned, key environmental issues and techniques to control them than if such a process were to be implemented at a national level.

- The IPPCD and now the IED cover a wide range of diverse agro-industrial activities. As well as differences between sectors, there can often be significant variation between installations within a sector so a blanket approach to setting conditions

would not always be appropriate. The permitting approach contains elements of **flexibility** by allowing the competent authorities to take into account – on an installation basis – when determining permit conditions:

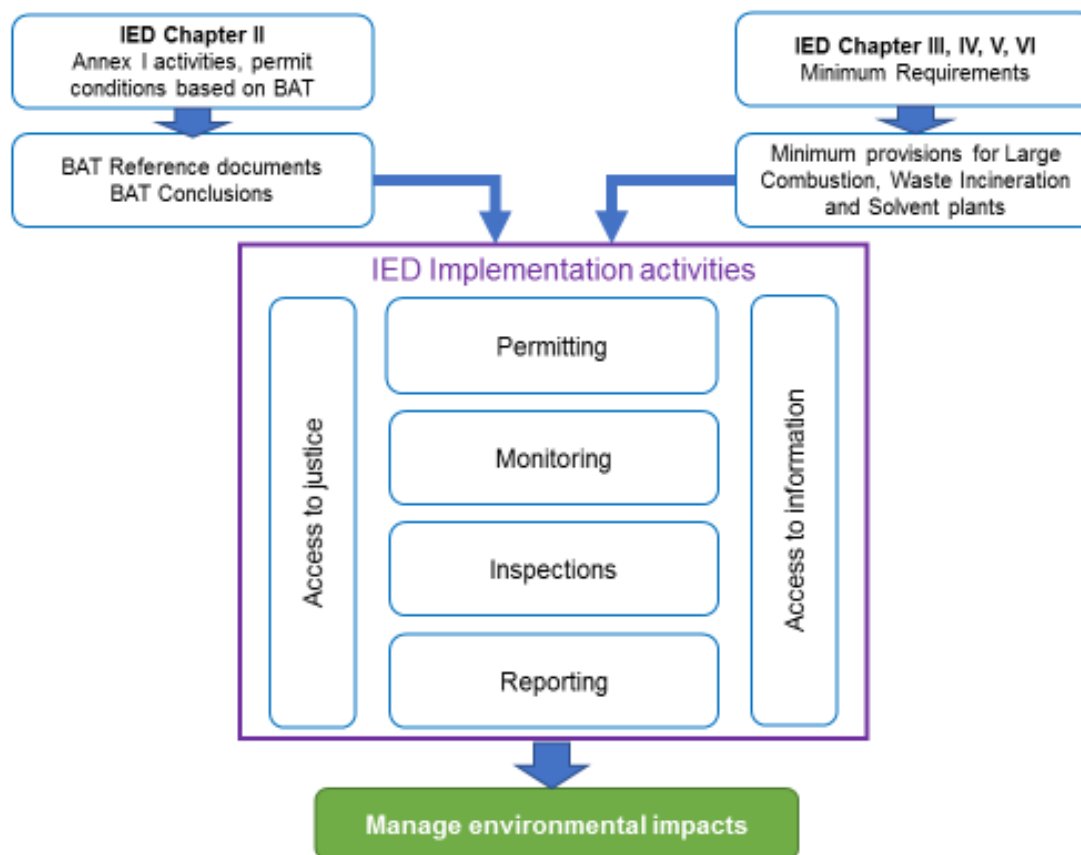
- (a) the technical characteristics of the installation;
 - (b) its geographical location; and
 - (c) the local environmental conditions.
- **Public participation** was made a key element of the IPPCD (and the IED) recognising the need for the public to have a right to participate in the decision making process, and to be informed of its consequences, by having access to:
 - (a) permit applications in order to give opinions;
 - (b) permits;
 - (c) results of the monitoring of releases; and
 - (d) the European Pollutant Release and Transfer Register (E-PRTR).

In addition to the IPPCD, a number of specific sectoral Directives were also introduced to tackle some of the specific challenges of certain sectors and ensure that certain minimum standards were applied across the EU. This was intended to complement the BAT and flexible approach within the IPPCD and ensure that a minimum level of environmental and health protection was delivered. These now form part of the IED.

3.1.2.2 IED overview

Figure 3-2 provides an overview of the IED and how its different elements link together and feed into the core activities of permitting, monitoring and enforcement; these are discussed further below.

Figure 3-2: Overview of the IED



Following the approach of the IPPCD, the IED aims to ensure that emissions from different industrial sources are dealt with in an integrated way and minimised. All installations conducting activities listed in Annex I to the IED are required to operate according to a permit – issued by the relevant Member State authorities, and reflecting the principles and provisions stipulated by the IED. These are the general requirements set out in chapters 1 and 2 of the IED. There are more industrial activities falling under the scope of the IED compared to the IPPCD. In 2015, ~51,700 installations were reported as undertaking the industrial activities listed under the scope of the IED (Ricardo, 2018b). In addition, there are sector specific chapters outlining additional requirements for certain sectors, based on the Directives other than IPPCD that were incorporated into the IED: combustion plants (chapter III), waste incineration (chapter IV), solvent-using installations (chapter V), installations producing titanium dioxide (chapter VI).

The permit extends to all environmental aspects of an installation's operating activities, including emissions, waste, resource use, noise, prevention of accidents and restoration of the site upon closure. All permit conditions must be based on Best Available Techniques (BAT) conclusions (BATC) within 4 years of adoption of the BATC. The BATC are adopted by the European Commission following an exchange of information among technical experts culminating in BAT Reference Documents (BREFs). They are adopted as implementing decisions. BATC can contain BAT-Associated Emission Limits (further referred to as BAT-AELs) (a numerical range of emission levels), BAT conclusions with associated environmental performance levels other than emission levels (further referred to as BAT-AEPLs) (e.g. BAT-associated environmental performance levels commonly concern raw materials, energy or water consumption, as well as waste generation) or may be descriptive requirements not associated with either BAT-AELs or BAT-AEPLs (e.g. concerning monitoring, site remediation or environmental management systems).

Installation operators may apply for a derogation from BAT for certain aspects of the permit, where they can demonstrate that achieving the BAT-AELs would lead to disproportionately higher costs compared to the environmental benefits owing to the geographic location, local environmental conditions, or technical characteristics of the installation. In addition, the IED sets provisions for environmental inspections of installations, requiring authorities to undertake site visits to permitted installations.

BAT has therefore been given a much more prominent role under the IED compared to the IPPCD, because there is now a legal obligation on the competent authorities to update the installation permit conditions to be in line with the content of the BATC, and for operators to then achieve compliance with the updated permits. This process has a defined timetable of 4 years from adoption of the BATC. This change has led to an increased interest in the process of BREF reviews. The Commission published Guidance on the collection of data and on the drawing up of BAT reference documents and on their quality assurance⁷. Nevertheless, over the years the process has been subject to greater scrutiny both by the industry (operators and trade associations representing them) and Member State representatives participating in the Technical Working Groups (TWGs), in many cases leading to longer reviews with significant commenting on draft documents.

3.1.3 Objectives of the IED and problems it is intended to solve

3.1.3.1 Issues identified in the IED IA

The IED IA identified a number of specific problems with the existing legislation, which the IED was intended to resolve:

- Vague provisions on BAT: flexibility for competent authorities to deviate from BAT in the permitting process and unclear role of the BREF in the permitting process. This had led to challenges with enforcement.

⁷ <http://eur-lex.europa.eu/legal-content/EN/TXT/PDF/?uri=CELEX:32012D0119&from=EN>

-
- Uncertainties regarding the legal framework on compliance reporting, inspections and permit reviews.
 - Complex legislation causing inconsistencies and uncertainties regarding interpretation of the requirements and unnecessary administrative burden.
 - Clarification and/ or extension of scope required to better control pollution and reduce emissions at source.

An additional problem concerned the legislative restriction within the IPPCD on the use of market-based instruments as an alternative to BAT-based permitting. However, the potential for a market-based instrument to replace individual BAT-based permitting (namely with an emissions trading scheme for select air pollutants including NO_x and SO₂) was reviewed and discounted as a viable option and as such it is not included in the future evolution of the counterfactual scenario⁸.

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

According to the IA, there were several issues in the **implementation of BAT**:

- Disparities between Member States caused by different approaches to environmental permitting, which reduced environmental benefits and increased the risk of distorted competition.
- Deviations from permitting occurred without due consideration of the technical characteristics of the installation, its geographical location and the local environmental conditions and limited transparency in how the flexibility is applied in practice.
- Partial application of BAT - Permits issued were often not based on BAT as described in the BREFs, resulting in a low uptake of BAT. Member States often applied the minimum ELVs set out in the sectoral Directives as default when setting permits.
- The IPPCD did not provide incentives for innovation that increase environmental performance beyond BAT because there was a high degree of uncertainty as to whether or not emerging techniques will become BAT. Therefore, there was a high risk to operators introducing new techniques.

Limitations with regard to compliance, enforcement and environmental improvement that hinder environmental effectiveness and the stimulation of innovation

Under the IPPCD, large differences in inspection, compliance reporting and enforcements as well as permit review regimes existed between Member States and regions within Member States as there was no structured framework for IPPC inspections or compliance enforcement. The differences concerned were:

- The frequency of inspections, with minimum inspection frequency rates only established in some cases.
- Member State inspection plans were only established in some cases.
- Reporting requirements for compliance and enforcement were not set for all Member States.
- The duration of permits, the frequency for reconsidered or updated permits varied between Member States.

⁸ Grebot, B. et al (2010) Economic analysis to support an impact assessment of the possible establishment of EU-wide emissions trading of NO_x and/ or SO₂. Final report for the European Commission.
<https://circabc.europa.eu/ui/group/442f566e-5951-4779-9c65-752289988907/library/f27bae68-7a67-4a9f-b09c-17e0f8d72504>

Unnecessary administrative burdens due to the complexity and incoherence of parts of the current legal framework

The administrative burden on Member States was dependent on implementation. Owing to the differences in implementation under the IPPCD and sectoral Directives (between Member States and regions within Member States), the administrative burden varied considerably. According to the IA, the unnecessary administrative burdens were:

- Limited use of GBR when setting permit conditions because of their complexity.
- Disparities between Member State use of combined permitting regimes (i.e. where Member States issued permits to implement the IPPCD and related legislation affecting installations at the same time).
- Instances where requirements were redundant. For example, the SED establishes the possibility to use national plans for the implementation of the Directive. As no Member State was found to adopt this measure, the requirement is unnecessary and could lead to undue complexities.
- Where ELVs were set by Directive (i.e. in the case of the sectoral Directives), minimum requirements could only be revised or set through the EU co-decision process and thus were not updated regularly to reflect BAT⁹. Only the WID allows for the adopt of additional provisions by implementing act on the monitoring and control of emissions.

Insufficient scope and unclear provisions of the current IPPC Directive that could hinder the Thematic Strategies' objectives to be met

According to the IA, there were a number of legal uncertainties arising from the wording in the IPPCD. This had led to inconsistencies in the scope of the Directive which has caused certain installations to be included while the same types of installations with similar environmental impacts are excluded. For example:

- The BREFs for the LCP and other sectors involving combustion would not contain BAT conclusions for combustion installations between 20 and 50 MW.
- Waste management activities under the IPPCD are not required to have a separate waste permit. However, the IPPCD does not adequately cover the type of waste treatment operations which have the most significant environmental impacts while the waste legislation would be insufficient to ensure that waste treatment activities are based on BAT.

Under the IPPCD and sectoral Directives the following activities were not regulated:

- Gasification/liquefaction of fuel (other than coal) >20MW (IED 1.4 (b))
- Production of chemicals by biological processing (4.1 – 4.6) - A broader range of disposal activities are covered including pre-treatment prior to incineration treatment of slags and ashes metal shredding
- Disposal of non-hazardous waste >50 tonnes (5.3(a))
- Recovery or recovery and disposal of non-hazardous waste >75tonnes/day (IED 5.3(b))
- Temporary storage of hazardous waste >50 tonnes (IED 5.5)
- Underground storage of hazardous waste (IED 5.6)
- Manufacture of wood panels >600m³/day (IED 6.1(c))
- Food and drink production (IED 6.4(b))

⁹ E.g. standards for LCPs were first set in 1988 and not updated until 2001; for waste incineration plants in 1989, updated in 2000; for titanium dioxide, 1978, and complemented by ELVs in 1992 and never updated.

- Wood preservation >75m³/day (IED 6.10)
- Independently operated WWTP (IED 6.11)

Limited access to information and public participation

Under the IPPCD, the main instrument to facilitate access to information on industrial emissions was the E-PRTR. Reporting of permits and information on installations under the IPPCD was via the Industrial Reporting Information System (IRIS).

Reporting requirements on permit inspections and reviews varied between Member States and were not set for all Member States, preventing compliance assessment and enforcement at Member State and EU levels. Annual environmental reports by operators did not contain information on compliance with respective permit conditions, limiting public access to information on the environmental impact of industry.

According to the IA, there was limited evidence of public engagement in the permitting process.

3.1.3.2 IED needs and objectives

Building on the IPPCD and sectoral Directives and issues identified in the IED IA, the IED is intended to address a number of needs. These include: to prevent, reduce and eliminate as far as possible adverse impacts arising from industrial activities on human health and the environment (air, water, land, waste, resource consumption); and to ensure a level playing field across the EU for industrial pollution control. In addition, the IED is intended to ensure access to information, public participation in decision-making and access to justice to the public on industrial activities' environmental permitting and performance. Finally, the IED aims to reduce unnecessary / excessive administrative costs for economic operators from existing legislation controlling industrial emissions.

In response to these needs, the IED has a number of objectives. These include: to establish a framework for the control and permitting of the main industrial activities; to ensure consistent environmental requirements for all economic operators; and to ensure that permitting of industrial installations is based on best available techniques. In addition, the IED aims to ensure effective and consistent enforcement and that only installations that hold a permit operate. The IED also aims to stimulate innovation by encouraging the development and application of emerging techniques and to ensure simplification and clarity of the legal framework and reduce / avoid unnecessary administrative burden.

3.1.4 Green Deal

For context it is noted that in December 2019, the European Commission announced the European Green Deal. This package of measures aims to meet the challenge of becoming the first climate-neutral continent by 2050. As part of the package, the Commission will review EU measures to address pollution from large industrial installations¹⁰ in 2021¹¹.

3.2 Intervention logic

A simplified version of an intervention logic for the IED is in Figure 3-3. A fuller version is in Annex 4. The full version starts from the **needs** that the IED is intended to address and the **objectives** of the IED (both outlined in Section 3.1.3). **Inputs** are then outlined from the EC, Member State authorities and economic operators and other stakeholders. These then undertake a range of **activities** – both the adoption of the IED and the actions on the Commission, Member States, industry and non-governmental organisations (NGOs) that follow from implementation of the IED (see Section 3.1.2).

¹⁰ See https://ec.europa.eu/info/sites/info/files/european-green-deal-communication_en.pdf

¹¹ Indicative timetable as at https://ec.europa.eu/info/sites/info/files/european-green-deal-communication-annex-roadmap_en.pdf

Following through the activities on BREFs, BAT Conclusions and permitting should lead to a number of **outputs**. All installations covered by the IED should hold regularly updated and BAT-based permits. The EU level BREFs and BATC should guide the permitting decisions. These permits should be complied with and this compliance should be enforced. In addition, the public should be involved in permitting decisions and have access to information on the environmental performance of industrial installations. In order to comply with permitting requirements, innovative techniques should be deployed to reduce the environmental impacts of industrial activities.

To ensure compliance and enforcement, appropriate monitoring and reporting systems should be in place at installations and within Member State competent authorities and accurate emissions data for all IED installations should be collected and reported.

If implementation of the IED is effective this should lead to **effects** in four areas. There should be reduced impacts on human health and the environment through lower emissions (to air, water, land), reduced waste production and higher resource efficiency (energy, materials, water). There should be a contribution to increased industrial and technological innovation in the EU. There should be reduced distortion of competition across the EU/level playing field secured. And finally, there should be improved transparency for the public regarding information on the environmental performance of industrial activities.

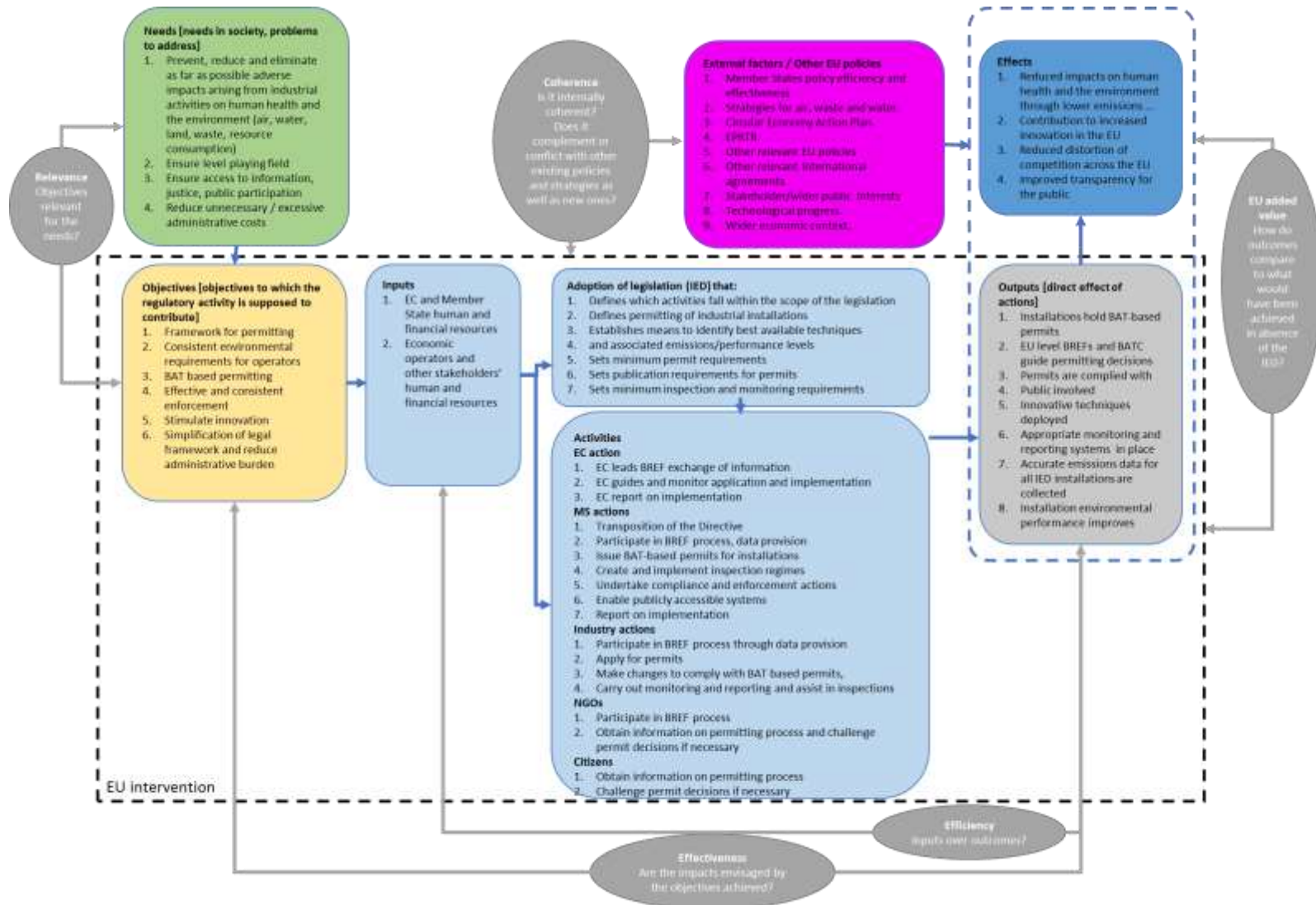
A number of **external factors** are relevant in relation to the intervention logic, i.e. factors outside of the influence of the intervention, which may still influence the delivery of the stated objectives. Delivery of the IED requires action by Member States and so one external factor will be the effectiveness and efficiency of Member States in transposing and implementing the Directive. Implementation requires effective cooperation within Member States between national, regional and local authorities and other actors. Implementation of the IED will also be influenced by **other EU policies** and their evolution.

Overlaid onto the intervention logic in Figure 3-3 are the five criteria which form the basis for any evaluation undertaken in line with the Better Regulation Guidelines:

- **Effectiveness:** are the impacts (**outputs** and **effects**) envisaged by the **objectives** achieved? This effectively considers whether the objectives themselves have been achieved in practice.
- **Efficiency:** how do the **outputs** compare to the **inputs**? Have they been achieved in an efficient manner?
- **Relevance:** are the **objectives** of the IED still relevant for the **needs** in society and problems to address?
- **Coherence:** is the IED internally coherent? Does it complement or conflict with other existing policies and strategies as well as new ones?
- **EU added value:** how do outcomes (**outputs** and **effects**) compare with what would have been achieved in the absence of the IED (or any EU policy on industrial pollution control)?

The intervention logic has been used to develop the individual evaluation questions under each of the evaluation criteria; these are described in Section 4.

Figure 3-3: Simplified version of intervention logic



3.3 Definition of the baseline/counterfactual

3.3.1 Introduction

To evaluate the impacts of the Directive, we have developed a counterfactual scenario which assumes the IED had not been implemented. The baseline provides a point of comparison to determine the actual impact of the Directive. The baseline covers:

- The evolution of the legal framework considering relevant external factors.
- The expected evolution of key variables relating to industrial emissions and production.

Our main point of reference for the definition of the baseline has been the Impact Assessment (IA) accompanying the proposal for the adoption of the IED (European Commission, 2007). The IA defined the problems associated with the EU legal framework on industrial emissions (IPPC Directive and sectoral Directives on industrial emissions) (summarised in Section 3.1.3.1) and its expected evolution in the absence of any further intervention (business as usual scenario). It has provided the starting point for the definition of the baseline.

However, it should be noted that the IED IA only considered some elements of the legislative framework and focused on the key problems identified with the existing legislation at that time. Impacts were assessed in the following areas:

- Supporting Member States in implementing BAT-based permitting.
- Strengthening compliance and increasing environment improvements, whilst stimulating innovation.
- Cutting unnecessary administrative burden and simplifying legislation.
- Reviewing the current scope and provisions of the IPPC Directive.
- Facilitate possible future use of IPPC-compatible market based instruments such as an emission trading scheme for NO_x/SO₂ (as discussed in Section 3.1.3.1 this was subsequently not taken forward).

Whilst quantitative information was reported for both the baseline and potential impacts of changes for some of the above areas (in particular, administrative burdens, new permits and permit reconsiderations, impacts for LCPs with tightening of minimum ELVs), the IA contains a number of gaps with respect to developing a baseline for this evaluation.

For example, the IA only considered changes in emissions to air for the LCP sector associated with changes to the minimum ELVs. Furthermore, no information was provided in the IA for emissions to water or transfers to soil or in relation to resource management (concerning energy consumption, waste generation, or water consumption). As the BATC were not known at this stage no assessments were made of potential costs and benefits associated with their implementation.

Gaps in the IED IA for the baseline for this evaluation have been filled through a combination of stakeholder engagement, expert judgement and baseline(s) documented in supporting studies e.g. assessments of the impacts of specific BATC.

The sections below set out the overall baseline for the evaluation. The baseline relevant for each evaluation question is summarised in a text box at the start of each question in Section 7 and then considered in greater detail in the answer to the specific question.

3.3.2 Expected evolution of the legal framework

3.3.2.1 Industrial pollution control legislation

In the absence of the IED, it is assumed that the existing legal instruments would continue to regulate industrial emissions including the IPPCD and sectoral Directives. Thus, business

as usual assumes a baseline involving Community action in the form of the IED predecessors.

The IPPCD was the main instrument setting the overall framework for regulating industrial emissions (application of BAT, environmental permitting, enforcement, public access to information etc.) and the other Directives listed above are defined as sectoral Directives, setting emission limit values and monitoring requirements for certain pollutants for specific sectors. Any requirements established by the sectoral Directives apply without prejudice to the IPPCD.

Under the business as usual scenario, the IPPCD system of integrated environmental permitting according to Best Available Techniques (BAT) reference documents (BREF) and non-legally binding BATC would continue. In sum:

- Permitting would be guided by a broad structure and a set of principles but ultimately approaches to permitting would competent authority (as regards emission limit values, monitoring and reporting requirements, enforcement, etc.).
- Member States would continue to be afforded flexibility to apply permit conditions according to local factors (i.e. taking into account the technical characteristics of the installation, its geographical location and the local environmental conditions). The approach taken would continue to vary by Member State.
- Evidence of some Member States establishing inspection plans in accordance with 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. However, the non-binding nature of the recommendation would not facilitate a uniform approach to conducting inspections.

Accordingly, the IA reports that while the IPPCD would continue as an important tool to bring about the diffusion of environmental technologies across industry through the uptake of BAT, further uptake of BAT cannot be ensured in all Member States.

Under the BAU scenario, the LCPD would be expected to continue as a driver for the installation of abatement technologies (to comply with ELVs) in LCPs as well as a driver for closure of LCPs that chose not to meet the LCPD ELVs and to opt for certain flexibilities instead e.g. limited lifetime derogation (Trinomics and Aether, 2018)¹². The LCPD included some ELVs for certain plants to comply with from 2016 onwards although the majority of the requirements applied much earlier (pre-2010).

Reporting of industrial emissions in the absence of the IED would continue to be regulated by the European Pollutant Release and Transfer Register (E-PRTR) (Regulation (EC) No 166/2006)¹³. The E-PRTR established a coherent, EU wide release and transfer register that can support public access to information concerning emissions from agro-industrial activities. The register and public access to it would be expected to remain in the absence of the IED.

In the absence of the IED, it would be expected that the developments to establish a systematic framework for environmental reporting under the INSPIRE Directive (2007/2/EC)¹⁴ would have progressed and facilitated reporting of geospatial data. However, the EU Registry on Industrial Sites (hereafter the EU Registry)¹⁵ to streamline

¹² Trinomics and Aether (2018) Decomposition analysis for air pollutants and CO₂ emissions from large combustion plants across Europe. <https://www.aether-uk.com/CMSPages/GetFile.aspx?guid=14ca8d73-614e-42db-811d-738425f0b218>

¹³ Regulation (EC) No 166/2006 of the European Parliament and of the Council of 18 January 2006 concerning the establishment of a European Pollutant Release and Transfer Register and amending Council Directives 91/689/EEC and 96/61/EC. <https://eur-lex.europa.eu/LexUriServ/LexUriServ.do?uri=OJ:L:2006:033:0001:0017:EN:PDF>

¹⁴ Directive 2007/2/EC of the European Parliament and of the Council of 14 March 2007 establishing an Infrastructure for Spatial Information in the European Community (INSPIRE). <https://eur-lex.europa.eu/legal-content/EN/ALL/?uri=CELEX:32007L0002>

¹⁵ Commission Implementing Decision (EU) 2018/1135 of 10 August 2018 establishing the type, format and frequency of information to be made available by the Member States for the purposes of reporting on the implementation of Directive 2010/75/EU of the European Parliament and of the Council on industrial emissions. https://eur-lex.europa.eu/legal-content/EN/TXT/?uri=uriserv%3AOJ.L_.2018.205.01.0040.01.ENG&toc=OJ%3AL%3A2018%3A205%3ATOC

industrial pollution reporting would not have been established. Thus, it could be expected that reporting requirements concerning installations under the scope of the IPPCD, LCPD, SED, WID, and E-PRTR would continue to run in parallel while, in each instance, reporting would need to comply with the INSPIRE Directive. Owing to the fact that an established EU regulatory framework was provided by these instruments, it is expected that Member State national policies would not play a major role in the evolution of the legal framework.

3.3.2.2 Wider legislation

The IA reported that there were inconsistencies between the IPPCD and sectoral Directives with other Community legislation owing to the fact that they have been enacted at different times with different approaches, definitions and standards. In this context, the IA referred to Directives on the Environmental Impact Assessment, Seveso II, GHG emissions trading and Landfill without giving detail of the inconsistencies noted. It would be expected that the inconsistencies would continue in the absence of the IED.

Besides the role of the IPPCD and the sectoral Directives, industrial emissions could also be mitigated to varying degrees by other existing environmental legislation which would be expected to continue having an effect even in the absence of the IED. These are summarised in Table 3-1 below.

Table 3-1: Impacts of wider EU policy on industrial emissions

Policy	Potential impacts
Climate change and energy policies ¹⁶	It is possible that the drive to reduce GHG emissions will lead to improved application of BAT through Member State planning via National Energy and Climate Plans (of relevance to industrial emissions where BAT entail more efficient energy use with subsequent GHG emission reductions).
Seveso Directive (2012/18/EU) ¹⁷	It would continue to manage the risk of major accidents involving dangerous substances in industry. However, in the absence of the IED, information on accidents would not be used to facilitate systematic targeting of environmental inspections.
Regulation on Registration, Evaluation, Authorisation and Restriction of Chemicals (REACH) (1907/2006) ¹⁸	In the absence of the IED, it is assumed that installation inspections would continue on a more ad hoc basis; as such, it could be assumed that there would be less harmonisation at EU level in dealing with authorisations and restrictions during permitting and inspections.
National Emissions Ceiling Directive (2016/2284) ¹⁹	In the absence of the IED, it is assumed that compliance with BATC would continue to serve as a relevant measure for achieving emission reduction commitments; however, the

¹⁶ GHG emissions from industrial activity would continue to be regulated by the EU ETS (Directive (EU) 2018/410)¹⁶ and the Effort Sharing Regulation (2018/842)¹⁶. Reporting requirements would continue to be regulated by the Monitoring and Reporting Regulation (2018/2066)¹⁶ and would be expected to develop to incorporate geospatial data in accordance with the INSPIRE Directive.

¹⁷ Directive 2012/18/EU of the European Parliament and of the Council of 4 July 2012 on the control of major-accident hazards involving dangerous substances, amending and subsequently repealing Council Directive 96/82/EC. <https://eur-lex.europa.eu/legal-content/EN/TXT/?uri=CELEX:32012L0018>

¹⁸ Regulation (EC) No 1907/2006 of the European Parliament and of the Council of 18 December 2006 concerning the Registration, Evaluation, Authorisation and Restriction of Chemicals (REACH), establishing a European Chemicals Agency. <https://eur-lex.europa.eu/legal-content/EN/TXT/?uri=CELEX%3A02006R1907-20140410>

¹⁹ Directive (EU) 2016/2284 of the European Parliament and of the Council of 14 December 2016 on the reduction of national emissions of certain atmospheric pollutants. https://eur-lex.europa.eu/legal-content/EN/TXT/?uri=uriserv%3A0J.L_.2016.344.01.0001.01.ENG

Policy	Potential impacts
	extent of BAT uptake is unclear (as BATC would not be mandatory).
Ambient Air Quality Directive (2008/50/EC) and fourth daughter Directive 2004/107/EC	The need to comply with the standards in the legislation has driven Member States to set tighter standards for some industrial installations where they are causing or contributing to any exceedances; this would continue even in the absence of the IED.
Water Framework Directive (2000/60/EC) ²⁰	In the absence of the IED, EU industry would be expected to comply with EQS and establish an inventory of emissions, discharges and losses, thus achieving a degree of environmental protection from emissions to water regardless.
The Nitrates Directive (91/676/EEC)	Intensive agricultural practices are a key source of nitrate releases, and as such the Nitrates Directive has direct implications for agro-industrial emissions and would be expected to continue managing emissions in this regard.
Waste framework directive (2008/98/EC) ²¹	Within Member State waste prevention programmes, waste prevention measures shall be defined, with a view to facilitating the implementation of BAT by industry. In the absence of the IED, it could be expected that uptake of BAT by the waste sector may improve regardless as a result of Member State waste prevention programmes.
Circular economy action plan ²²	While not directly relevant, the action plan adopted could be expected to reduce waste generation, water consumption and facilitate the use of clean energy by industry, which would be expected to contribute to emission reductions by industry. In the absence of the IED, the extent to which the action to include guidance on circular economy into BREFs for several industrial sectors would have been included is uncertain and the expected impact of this action would be limited.
Directive on the landfill of waste (1999/31/EC) ²³	In the absence of the IED, emissions from landfill sites would continue to be regulated by this Directive but the application of BAT would be reduced.

According to the IA, while many of the interacting policies could contribute to incentivise the uptake of BAT by industry, ultimately, there is no basis to expect the uptake of BAT to increase significantly as a result. Without increased application of BAT, emissions would not be expected to decrease.

²⁰ Directive 2000/60/EC of the European Parliament and of the Council of 23 October 2000 establishing a framework for Community action in the field of water policy. <https://eur-lex.europa.eu/legal-content/EN/TXT/?uri=CELEX:32000L0060>

²¹ Directive 2008/98/EC of the European Parliament and of the Council of 19 November 2008 on waste. <https://eur-lex.europa.eu/legal-content/EN/TXT/?uri=CELEX:32008L0098>

²² European Commission, Circular Economy. URL: https://ec.europa.eu/environment/circular-economy/index_en.htm [last accessed 18/10/2019]

²³ Council Directive 1999/31/EC of 26 April 1999 on the landfill of waste. <https://eur-lex.europa.eu/legal-content/EN/TXT/?uri=CELEX:01999L0031-20180704>

3.3.3 Description of the situation at the time prior to the adoption of the IED and expected evolution in the future

As set out in Section 3.1.3.1, the IED IA identified a number of issues with the existing legislation; these are discussed in turn below and would be expected to remain under the baseline.

3.3.3.1 Insufficient implementation of BAT

Under the baseline scenario, the issues identified in the IA would be expected to continue. In particular, the following would be expected:

- ELVs in permits would be set according to the upper limit in sectoral Directives.
- Differences in application of BAT.
- Long implementation periods for BAT, which may not complement industry investment cycles for new technologies and would further limit uptake of BAT.
- No incentives for innovation to increase environmental performance beyond BAT as the risks to operators associated with introducing new techniques would be expected to continue.

The IA concluded that external factors such as wider legislation would not be expected to result in significant BAT uptake by installations.

Overall, in the absence of the IED, challenges with the implementation of BAT would be expected to continue. The main issues expected would be low ambition when setting ELVs and application of BAT hindering progress in the prevention and reduction of industrial emissions, and differences between Member States and sectors leading to an unfair market. Interaction with related policies could contribute to increased uptake of BAT in certain sectors (namely energy supply and waste management).

3.3.3.2 Limitations with regard to compliance and enforcement

In the absence of the IED, challenges with assessing compliance and enforcement at Community level would continue owing to the different approaches taken by Member States and varying levels of completeness in reporting data for inspections.

According to the IA, certain developments to the policy framework would still be expected, including:

- Ongoing efforts to establish inspection plans but as the recommendation providing for minimum criteria for environmental inspection in the Member States was non-binding, progress would be limited (Section 3.3.2).
- Average frequency would be expected to continue at one on-site inspection per year (average across Member States)

Overall, in the absence of the IED, differences in inspection, compliance reporting and enforcement would be expected to continue. Owing to the significance of these processes in stimulating permit reviews and updates, the differences would be expected to hinder the environmental performance of installations and fail to stimulate innovation. Furthermore, the differences between Member States would be expected to contribute to market distortion where operators are subject to more rigorous compliance and enforcement regimes in some Member States compared to others.

3.3.3.3 Unnecessary administrative burdens

Under the baseline scenario, administrative burdens associated with permitting and meeting reporting requirements would be expected to continue:

- There would be limited use of General Binding Rules (GBR) to facilitate competent authorities when setting permit conditions.

-
- Member States would continue to have the option to establish combined permitting regimes; however, the variability between Member State application of this provision would be expected to continue owing to the barrier of reconciling the various requirements.
 - Redundant requirements would continue adding to the complexity of the legislation without serving a purpose.
 - Minimum requirements for the sectoral Directives (except the WID) would not be updated to reflect BAT. Due to the provisions in the WID to adopt additional requirements by implementing act, it would be expected that minimum requirements would be updated more regularly in this case to reflect BAT. Under the BAU scenario, the application of BAT by LCP installations would be expected to diminish after 2008 once installations achieved compliance with the ELVs. Similarly, the extent of closures would be capped.

Overall, unnecessary administrative burden would continue in the absence of the IED. The intended opportunities to reduce administrative burden under the IPPCD would not be materialised (with respect to combined permitting regimes and the use of GBR). Minimum requirements established by sectoral Directives would not be updated to reflect BAT (except in the case of the WID) with the result that the existing legal requirements would become out of date.

3.3.3.4 Insufficient scope and unclear provisions of the current IPPC Directive

In the absence of the IED, the scope of industrial emissions legislation under the IPPCD would result in regulatory gaps and the extent to which the EU would be able to meet relevant environmental objectives would be limited.

While emissions from MCP would not be regulated by the IPPCD, it was subsequently resolved with the adoption of the MCPD rather than inclusion in the IED. It is unclear therefore if the MCPD would have been adopted in the absence of the IED.

Overall, in the absence of the IED, the EU would not be able to meet relevant environmental objectives in full and there would be examples of unregulated industrial activities.

3.3.3.5 Limited access to information and public participation

In the absence of the IED, the following would be expected:

- Access to information on industrial emissions would continue via the E-PRTR.
- Public access to information on environmental permitting and compliance would vary by Member State.
- The extent to which reporting via IRIS would be streamlined with other relevant environmental reporting systems would be uncertain. It is possible that the framework established by the INSPIRE Directive for geospatial environmental reporting could facilitate such streamlining that would lead to certain reduction of administrative costs

Overall, access to information and public participation would vary between Member States. Information at EU level would be limited to the industrial emissions data reported in the E-PRTR.

3.3.4 Expected evolution of key variables under the baseline scenario

Besides the qualitative description of the baseline presented above we have also considered how some key variables and economic and environmental parameters should be expected to evolve. More specifically, variables relating to economic activity (level of production) and level of emissions have been used to describe the expected evolution under the baseline scenario. Data for the variables have been sourced from the IA and

from Member State implementation reports for the period 2012-2013 (2011/631/EU)²⁴. Data from the latter has been incorporated within the baseline analysis presented here for completeness. It is reported in the IA that permitting progress (reported for the year 2007) is likely to be much higher than the figures presented. Thus, information on permitting from the IA was not considered to provide an accurate depiction of expected evolution of permitting under the IPPCD. Limitations to reporting have restricted the information available on the scale of EU industrial production and industrial emissions.

3.3.4.1 Economic parameters

Concerning the economic aspects, the following variables were considered:

- Number of installations (2012-2013)
- Number of permits issued, reconsidered or updated (2012-2013)
- Number of inspections per year per installation (2012-2013)
- Compliance and administrative costs to operators and regulators

Numbers of installations and permits

Member State reporting was provided to cover the years 2012 and 2013 (i.e. the state of play reported at the end of the IPPCD). At that time, the total number of permitted installations across the EU27 was 51,528 (Amec Foster Wheeler, 2016). Of the permitted IPPC installations, 51,335 were reported as compliant, with 12 Member States that reported instances of non-compliant installations. The IA reported that the evolution of this variable may change subject to economic pressures or growth; but that it was not possible to determine the extent of such changes. Thus, for the purposes of defining the baseline we consider it appropriate to assume that the number of permitted installations would remain largely the same.

Numbers of inspections

The share of IPPCD installations which received a site visit inspection between 2012 and 2013 was 50% (25,981 installations) (Amec Foster Wheeler, 2016). The average frequency of inspections carried out per installation ranged between 1 (reported by 10 Member States) and 6 (by Slovenia only). There were considerable differences between Member States regarding the share of IPPCD permitted installations that were inspected (which is in keeping with the disparities reported on how the provisions relating to inspections have been implemented).

Under the BAU scenario, we expect that the share of IPPCD installations which would receive a site visit inspection would continue to be around 50%. Similarly, the disparity between Member States should also be expected to continue.

Compliance costs

According to the IA, compliance costs to the operator under the IPPCD varied considerably by Member State, by sector and by BAT uptake.

Owing to the ongoing differences expected between Member States and sectors as regards BAT uptake, compliance costs to the operator would be expected to continue to evolve in a similarly varied way. No quantitative estimates were reported in the IED IA for baseline compliance costs.

Administrative costs

The IA presents the combined impacts of the administrative costs. The main administrative costs to operators and regulators are summarised below.

²⁴ Commission Implementing Decision (2011/631/EU) of 21 September 2011 establishing a questionnaire to be used for reporting on the implementation of Directive 2008/1/EC of the European Parliament and of the Council concerning integrated pollution prevention and control. <https://eur-lex.europa.eu/legal-content/en/ALL/?uri=CELEX:32011D0631>

Table 3-2: Summary of IPPCD provisions and related administrative costs

IPPCD provision	Administrative cost
Permit procedure for new installations - Articles 4, 6-8 and 15(1) and (5)	Cost to operator producing the application. Administrative cost to regulator of processing and determining the application (including the cost of public participation in the permit procedure).
Permit procedure for existing installations - Article 15(5)	As above if the procedure is the same as 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 (including to cost of public participation).
Release monitoring and data submission requirements - Articles 9(5) and 15(2)	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 (including cost to provide monitoring data to the public).
Changes in operation - Articles 12(1) and 15(5)	Cost to operator of informing regulator of any planned change in operation. Administrative cost to regulator of processing the information received (including cost of providing information to the public).
Reconsideration of permits - Articles 12(2), 13, 15(1) and (5)	Cost to operator of producing information (if any required) for the reconsideration. Administrative cost to regulator of undertaking the reconsideration (sometimes including cost of public participation, where required).
Compliance checking - Article 14	Cost to operator of giving assistance to regulators in undertaking inspections and providing any necessary follow-up information. Administrative cost to regulator in undertaking inspections.
Data on ELVs - Article 16(1)	Cost to Member States of compiling and submitting to the Commission the data on emission limit values.
Implementation reports - Article 16(3)	Cost to Member States of compiling and submitting to the Commission the implementation reports.

Source: (European Commission, 2007)

Based on the number of permitted IPPCD installations reported for the year 2013, it is assumed that going forwards, the administrative costs to regulators associated with permitting will primarily concern the reconsideration or update of permits. According to

the IA, these costs were approximately half the cost of issuing a new permit²⁵. Maintaining the current process for the reconsideration of permits, costs per year would vary according to the frequency of reconsiderations, 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

The annual inspection frequency would be expected to continue (i.e. coverage of installations inspected, and the frequency of inspections conducted would vary between Member States). On average, a site inspection would involve 3 days of inspection time per installation, amounting to a total cost of €80 million per year to regulators.

The administrative costs associated with the development of a BREF under the IPPCD were estimated at between €5 to 10 million per BREF. These costs would be expected to remain the same under a BAU scenario.

3.3.4.2 Environmental parameters

The IED IA only considered emissions to air. The contribution of IPPC activities to air emissions would be expected to remain fairly constant under the IPPCD, assuming that the application of BAT would not increase significantly and the minimum ELVs are applied. As a share of total emissions, emissions from industrial activities would be expected to become more significant as other sectors would be expected to deliver emission reductions in order to meet Member State emission reduction commitments under the NECD.

Additional data from EPER was reported in the IA for some air pollutants (for the years 2001 and 2004). However, the level of coverage was limited (mainly because emissions reporting is only required above certain thresholds) and is not possible to use for the definition of the baseline.

By sector, the main analysis undertaken in the context of the IA concerned LCPs as regards SO₂, NO_x and dust (using 2004 data reported to EPER). LCPs contribute over 90% to the overall industrial emissions of SO₂ and NO_x. According to the IA, without BAT, SO₂ emissions from LCPs would be between 0.5 and 1 million tonnes and between 0.4 and 0.9 million tonnes for NO_x (compared with total national emissions for the respective pollutants this would account for 10 to 25% of SO₂ and 5 to 10% of NO_x). In the absence of the IED, the LCPD would be expected to remain and application of BAT would be limited without updates to the ELVs adopted by legislation expected (updates to ELVs would be limited owing to the complexity of the process, as discussed in Section 3.3.3).

Based on the emissions data reported in the IA, the future evolution of emissions from LCP is unclear because of subsequent improvements to emission factors used by the sector which brought about considerable emission reductions between 2007 and 2008 for SO₂ (resulting in reductions at EU level between 71 and 75%) and NO_x (resulting in reductions at EU level of 38%). Improvements to the emission factors used had different effects at Member State level which are not reflected here. Interaction with climate and energy policies would however be expected to drive reductions in energy intensity by industry and changes in the energy mix of electricity generation which would be expected to achieve overall emission reductions by the LCP sector, irrespective of BAT application and increased economic activity (Trinomics and Aether, 2018)²⁶.

²⁵ The unit costs assumed in the IED IA for new permits varied between €2,700 (lower end of range for agricultural installation) and €29,000 (upper end of range for a chemicals installation) per installation. Costs for permit reconsiderations were assumed to be about half the costs of issuing a new permit.

²⁶ Trinomics and Aether (2018) Decomposition analysis for air pollutants and CO₂ emissions from large combustion plants across Europe. <https://www.aether-uk.com/CMSPages/GetFile.aspx?guid=14ca8d73-614e-42db-811d-738425f0b218>

4 List of evaluation questions

The evaluation questions are listed. These are reformulated from the evaluation questions included in the terms of reference for this work and include sub-questions. The full evaluation matrix is in Annex 5.

The evaluation questions and sub-questions were further developed and tailored for use in the stakeholder consultation (See Section 5.3.2 and Annexes 7-11).

4.1 Effectiveness

This evaluation criterion is defined as: *To what extent do the effects induced by an intervention correspond with its objectives as they are outlined in the policy?* I.e. it aims to assess the extent to which the IED's objectives have been achieved, and the factors that may have influenced progress towards those objectives. The direct outputs need to be known as well as what has resulted from these. It is also important to try and identify any unexpected impacts that have occurred.

EQ1 - To what extent have the objectives of the IED been achieved?

1a To what extent has the IED contributed to reducing and (as far as possible) eliminating pollution arising from industrial activities? To what extent can the effects reasonably be credited to the IED?

- Are there any industrial activities that fall outside of the scope of the IED (partially or fully) which generate high levels of pollution?
- Have there been any pollutants that have been omitted/fallen outside the scope of the Directive?

1b Has the IED strengthened provisions on enforcement and environmental improvement?

1c Has the Directive stimulated innovation in the prevention and control of pollution from industrial activities?

1e Has the IED led to simplification of the legislation and cut unnecessary administrative burden?

1f Has the IED strengthened public access to information? How does it compare to the previous situation (IPPC)?

1g Has the IED strengthened public access to justice?

EQ2 - How effective is the process of elaborating BREFs and BAT Conclusions?

2a To what extent does the BREF process identify the techniques that are the most effective techniques (and identify the most appropriate associated emission or performance levels) for achieving a high level of environmental protection?

2b Does the BREF process sufficiently consider both costs and benefits in identifying the best available techniques?

2c To what extent has the IED supported Member States in implementing BAT-based permitting?

2d To what degree are exceptions taken up that result in permits not being based on BAT?

EQ3 - How effective is the emissions monitoring and reporting process?

3a To what extent does the emissions monitoring and reporting system facilitate the assessment of compliance under IED, and of the quantity of released emissions?

- Are the monitoring requirements fit for purpose?

EQ4 - Are there significant differences between Member States and sectors in implementation?

4a Are there significant differences between Member States or between different sectors (including social costs as a consequence of poor implementation)?

4b Has the IED contributed to creating a level playing field?

4c What is causing them; and do these differences affect the costs or benefits of the IED?

4.2 Efficiency

This criterion is defined as: *How economically have the resources used been converted into effects?* i.e. the assessment of efficiency compares the inputs used for a certain activity with produced outputs. In many evaluations this is judged by a combination of participant opinion and comparisons, particularly of administrative costs, with other programmes or policies. This is challenging for the IED because of issues with trying to estimate compliance costs with the BAT Conclusions.

EQ5. The extent to which the costs are justified, given the impact of the IED and the benefits it has delivered?

5a What are the costs and benefits (monetary and non-monetary) associated with the implementation of the IED in each Member State, and in the EU as a whole?

5b Have the benefits been achieved in a cost-effective manner?

5c To what extent are the costs justified, given the impact of the IED and the benefits it has delivered?

5d How proportionate were the costs for different stakeholder groups, taking into account the benefits achieved?

EQ6 – Could efficiency have been improved?

6a What factors could have improved efficiency by strengthening delivery of the objectives while minimising unnecessary costs?

EQ7 – To what extent has administrative burden been reduced with respect to initial expectations?

7a What are the administrative costs to the Member States, Commission, and IED operators?

7b What are the administrative costs of the BREF process?

7c How timely and efficient is the process for reporting and monitoring?

7d Taking account of the objectives and benefits of the IED is there evidence that the costs have caused unnecessary or excessive administrative burden?

EQ8 - Has implementation of the IED supported or hampered EU competitiveness in the global economy; Has the implementation of the IED improved or been detrimental to economic, social and environmental sustainability?

8a How has the IED affected the competitiveness of the EU industry?

8b Has the implementation of the IED improved or been detrimental to economic, social and environmental sustainability?

4.3 Relevance

The evaluation criterion is defined as: *To what extent is an intervention relevant in respect to needs, problems and issues identified in target groups?* For the IED, the key consideration is the extent to which the challenges (i.e. environmental pressures caused by operating industrial plants) are being addressed or whether there is still scope for further improvements in the future. Furthermore, it considers if the IED is adapting / can adapt to new and emerging issues e.g. pollutants, circular economy, decarbonisation.

EQ9 – To what extent do the IED objectives still correspond to the needs of the EU?

- 9a Has the IED addressed the most relevant environmental impacts and pollutants?
- 9b Has it set relevant standards and obligations to protect human health and the environment?
- 9c How relevant is the IED for the different stakeholders and to EU citizens in particular?

EQ10 – Is the IED able to respond to new or emerging environmental issues?

- 10a Has the IED been flexible enough to respond to new or emerging issues?

4.4 Coherence

This criterion is defined as: *To what extent are the elements of the intervention logic complementary, mutually supportive and non-contradictory? To what extent do the objectives and activities support or contradict those of other public interventions?* i.e. the assessment of coherence looks at how well different actions work together, and thus points to synergies as well as areas where there are potentially contradictory objectives or approaches that may cause inefficiency. It is important to assess whether EU intervention is coherent internally (IED), with other EU actions (e.g. water policy) and with international actions.

EQ11 – To what extent is the IED internally consistent and coherent?

11a To what extent is the IED internally consistent and coherent, in particular among its different chapters?

- Are there any identified cases of overlaps, contradictions or other inconsistencies in terms of the provisions / requirements?
- To what extent do provisions match the objectives of the Directive?
- What, if any, are the inconsistencies, contradictions, unnecessary duplication, overlap or missing links between provisions and activities listed in Annex 1?

EQ12 – To what extent is the IED coherent with other EU environmental and wider EU policies, and with market based instruments?

12a To what extent is the IED coherent with wider EU policies, like climate and energy, and market-based instruments, in particular the EU-ETS, the circular economy and the sustainable use of resources, as well as specific EU environmental policies such as those concerning water, air, waste, and chemicals?

12b Does the IED adequately contribute to the achievement of the EU environmental policy objective and targets?

12c How do objectives, provisions and implementation compare and what are the possible gaps, overlaps and inconsistencies?

12d Are there any changes needed under the IED/BREFs to improve its contribution to these objectives?

-
- 12e To what extent is the IED coherent with the E-PRTR?
- 12f How do objectives, provisions and implementation compare and what are the possible gaps, overlaps and inconsistencies?
- 12g What progress has been made for streamlining reporting activities?
- 12h To what extent does the IED complement or interact with key EU funding programmes?
- 12i To what extent does the IED comply with the international regulatory framework?

4.5 EU added value

The EU added value criterion brings together the findings from all other evaluation criteria and focusses on the benefits and changes resulting from EU action on industrial pollution control that are additional to those that would have resulted from action at local, regional or national level otherwise.

EQ13 – What is the added-value from the IED, compared to what is likely to have been achieved by Member States in its absence?

13a To what degree has the IED enabled Member States and their competent authorities to take successful action to improve beyond what would have been possible without EU action?

13b Does the IED and its means of implementation create synergies or overlaps with other Community objectives, and how has the distribution of responsibilities between EU, Member State, regional and local levels impacted on the management of environmental impacts for use in surveys, interviews and focus groups

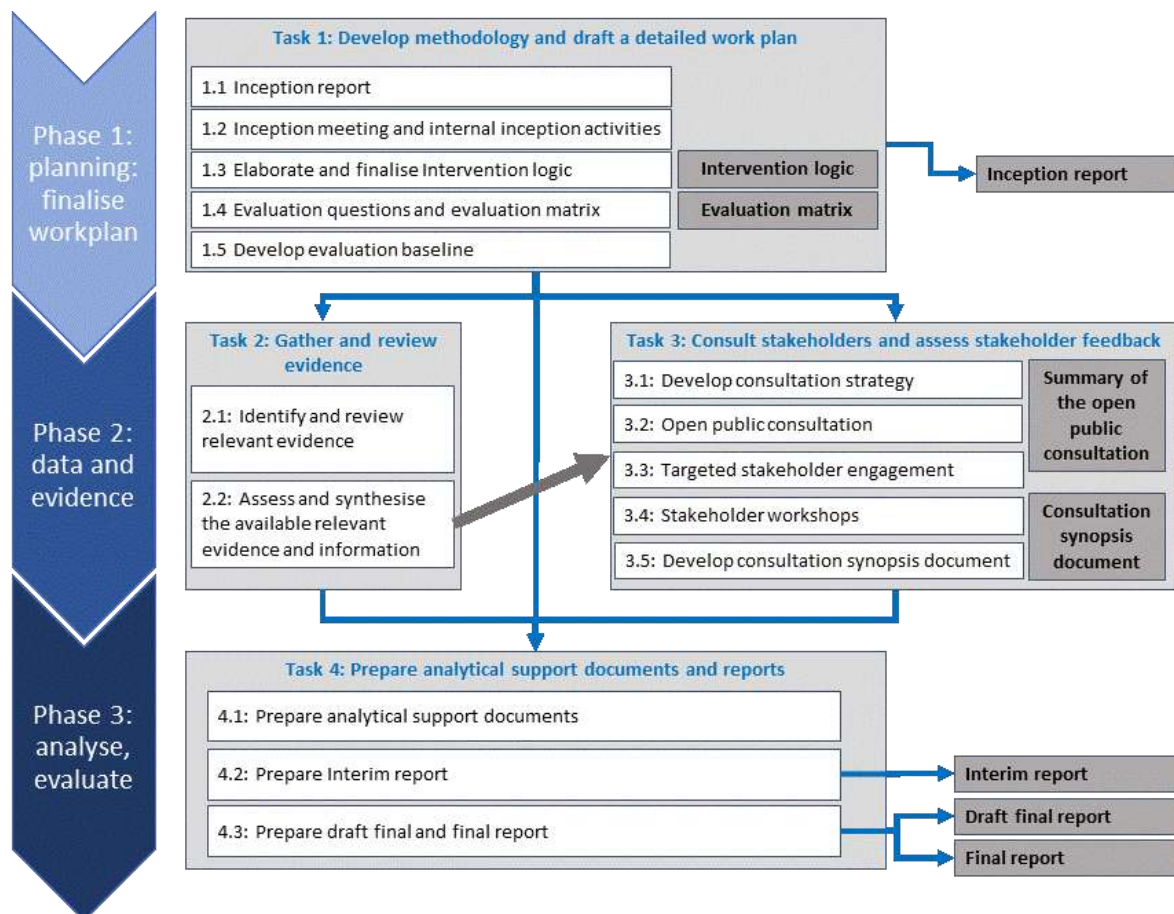
5 Methodology

5.1 Overview

This study in support of evaluation of the IED has been undertaken between February 2019 and February 2020.

The framework for the study is in the following figure. The work has been undertaken in three overlapping phases involving: planning and finalisation of the workplan; gathering of data and evidence; and analysis of the data/evidence leading to assessment of the evaluation questions.

Figure 5-1: Framework for study in support of evaluation of the IED



Source: Current study

5.2 Answering the evaluation questions/Evaluation matrix

The evaluation matrix is in Annex 5. This is based on the twelve areas for assessment set out in the evaluation roadmap (European Commission, 2018a). Compared with the roadmap:

- The area on "Whether there are significant differences between Member States and sectors in implementation?" has been moved from the heading of efficiency to that of effectiveness (See EQ4 in Section 4.1)

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- A new question has been added in discussion with DG Environment. This is EQ8 (See Section 4.2) – “Has implementation of the IED supported or hampered EU competitiveness in the global economy; Has the implementation of the IED improved or been detrimental to economic, social and environmental sustainability?”

The evaluation matrix in Annex 5 sets out the following aspects for each evaluation question, which were used to structure the study approach:

- **Sub-questions:** Sub-questions have been developed for each of the 13 evaluation questions assessed. These draw out aspects of each question based on our interpretation and understanding of the evaluation questions.

Against each question, we have mapped out the:

- **Assessment criteria:** these describe the operational questions we would seek to answer for each sub-question. They will also be used to support the development of questions to be asked to stakeholders as part of the interviews and surveys.
- **Indicators:** This column highlights potential indicators that can be used to monitor/measure the respective impacts. These indicators will provide a metric which can be used to measure the different components of the intervention logic. In defining these indicators we have drawn upon existing indicator frameworks relating to the IED and industrial emissions more broadly”.
- **Data analysis approach:** This describes in detail the overall approach and the methods and tools to be used by which we expect to answer the question. Where possible, data will be assessed at sector and Member State level before aggregating so that impacts can be considered at different levels.
- **Data sources and data collection methods:** This describes the key sources we expect to use to answer the question as well as the way in which the data may be gathered e.g. via consultation of selected stakeholders.

5.3 Data sources and analytical support documents

5.3.1 Desk research

Desk research has comprised two strands: literature/evidence assessment and some quantitative assessment within selected questions related to emission reductions and administrative burdens.

Evidence and literature has been sourced by a number of routes: from references in the terms of reference for this support study; from current work being undertaken by project partners; from reports and other evidence signposted by EC; from a review of literature; and from respondents to stakeholder engagement for this study through response to the open public consultation, targeted stakeholder survey, interviews, focus groups and workshops.

Evidence and literature have been collated and currently number 121 items. 48 of these have been assessed in detail for evidence against each of the evaluation questions and sub-questions. This analysis is in Annex 6. The remaining items contain lower amounts of evidence and have been used to support responses for selected evaluation questions. These are briefly reviewed in Annex 6

5.3.2 Field research

5.3.2.1 Open public consultation (OPC)

An online open public consultation is a requirement of the Better Regulation Guidelines. It offers an opportunity for any interested individual from any stakeholder group to give their opinion on the main evaluation questions.

The questionnaire was launched on the Commission's website²⁷ on 27 May 2019. In line with the Better Regulation Guidelines, the OPC was open for 12 weeks. The consultation period was closed on 4 September 2019. The questionnaire was developed in English and was translated by the Commission services into all 23 EU official languages ensuring greater accessibility.

The questionnaire started with an introduction of the Directive and the consultation process. It then presented questions that identified the respondent and their familiarity with the IED. The questionnaire included 20 questions about the IED. The questionnaire consisted of a generic part aimed at the wider public and a section for participants with more extensive understanding. Finally, respondents had the opportunity to provide any further comments in a free-text comment box. There were 312 respondents to the OPC. Of these, 176 also provided open text responses.

The submissions to the OPC were analysed in detail – both qualitatively and quantitatively. Quantitatively, all multiple-choice questions were summarised both for headline results, and results by stakeholder group. Our analysis is presented in Annex 7. A factual summary report highlighting the key outcomes of the consultation was also prepared and was published by the Commission in September 2019.²⁸

5.3.2.2 Targeted stakeholder engagement: online survey

In order to gather information from those stakeholders who have a good understanding of the implementation of the IED a combination of targeted stakeholder consultation methods was used. As a first step, a targeted online survey was launched to gather the views of key groups of stakeholders, including Member State authorities (at any level of administration and IED implementation), industry (individual company or trade body) or other type of organisations (e.g. NGO, research body).

The survey was developed using an open source online survey tool (Survey Monkey). The questionnaire script was based on the relevant evaluation questions, but tailored to make the survey more user-friendly, and also to reflect the relevant audience. The questionnaire included a range of semi-quantitative questions, based on a 5-point Likert scale, for assessing the degrees of options on an issue, and these were complemented with open questions which allowed respondents to provide further explanations and wider opinions. Similar to the OPC, respondents were asked first to identify themselves and indicate which stakeholder group they represent. The survey included questions grouped by 10 key themes relevant to the IED evaluation. The survey was available only in English.

The online survey was launched on 27 June 2019 and was open until 13 September 2019 leaving sufficient time for respondents to provide their inputs. Invitations to the survey were disseminated by both Ricardo and the Commission. Regular reminders were sent to receive a representative number of responses. A total of 285 stakeholders responded to the survey. By stakeholder group there were 188 from industry, 88 from Member State authorities, of which 33 were from national Member State authorities and 55 from local/regional Member State authorities²⁹, and 9 "others".

The submissions to the online survey were analysed in detail – both qualitatively and quantitatively. The analysis was done in parallel and with the same methodology as the OPC. To aid in clarity and identifying which consultation the results are from, the colour scheme for figures from the targeted survey is different (red to green) from the OPC (blue).

We received 285 responses to the targeted survey in total, of these 33 (12%) were national level Member State Authorities, 55 (19%) were local Member State Authorities,

²⁷ https://ec.europa.eu/info/law/better-regulation/initiatives/ares-2018-4758971/public-consultation_en

²⁸ Available at: https://ec.europa.eu/info/law/better-regulation/initiatives/ares-2018-4758971/public-consultation_en

²⁹ The set of Member State authorities was partitioned between national and local/regional authorities by examination of the organisation name and email address. Four submissions were anonymous and were included in the (larger) group of local/regional authorities.

188 (66%) were responses from industry (either individual installations, companies or trade associations), and 9 (3%) were others, including NGOs. Out full analysis is presented in Annex 8.

5.3.2.3 Targeted stakeholder engagement: interviews

The online survey was complemented with telephone interviews to ensure that more in-depth views could be obtained from key stakeholders. The interviews were grouped into three categories: stand-alone interviews with stakeholders who were not targeted by the online survey (e.g. EU institutions, such as EEA, JRC's EIPPCB and relevant units of the Commission); follow-up interviews with survey respondents who expressed their interest to take part in interviews to further discuss their inputs to the survey; interviews with further stakeholders who had not completed the survey to fill some remaining gaps – this last group primarily comprised sub-national level permitting authorities. A total of 22 interviews were undertaken.

The interview questionnaires built on the survey questionnaire (where available) but went into more detail on specific points to ensure that more in-depth stakeholder insights were gathered, and specific data gaps filled.

Responses from the interviews were analysed and a more detailed methodological overview of the interviews is provided in Annex 9. The interview notes accepted by the interviewees will not be made publicly available but inform assessment of the survey questions.

5.3.2.4 Targeted stakeholder engagement: focus groups

Complementing the online survey and interviews, focus group discussions were organised and took place in Brussels on 15 October 2019, as back-to-back meetings with an IED Forum meeting. With such a setting it was possible to consult a wider group of stakeholders with expertise in specific topic areas - on the effectiveness of the BREF process - in one setting. Representatives of Member State authorities, industry associations and the NGO community took part in the discussion. Attendance at the focus group was by invitation only and the selection of the participants was in agreement with the Commission. The focus group was run twice with separate groups of attendees.

Further details and results of the focus group discussions are presented in Annex 10.

5.3.3 Stakeholder workshops

The first stakeholder workshop supporting this evaluation was organised in Brussels at the early stages of this contract (22 May 2019). The workshop was also web streamed in order to support access for a wider audience and stakeholder following the discussion online also had an opportunity to raise questions via an online tool (Slido). The aim of the workshop was to assist the project team in gathering evidence, confirming the evaluation methodology, getting feedback from participants that no key issues are overlooked and raising awareness of the evaluation of the IED.

The second workshop took place on 17 December 2019 in Brussels. A background paper summarising initial findings was circulated before the workshop. During this final workshop the initial findings of the evaluation were presented to stakeholders who were invited to provide feedback at the workshop as well as afterwards in writing.

The agendas, lists of participants (organisations), notes of the two stakeholder workshops and a list of organisations providing feedback after the second workshop are presented in Annex 11.

5.4 Limitations

There were a number of limitations and data gaps encountered during the evaluation, the majority of which were identified at the start of the process so that appropriate actions could be taken to limit their impacts. These included the following:

- The IED IA only considered certain elements of the legislation due to uncertainties over future BATC and what they may contain. This led to some gaps in relation to the baseline as well as expected outputs of the IED. Gaps in the baseline were filled based on stakeholder feedback, expert judgement and specific studies that have been undertaken to assess the impacts of aspects of the IED including the BATC.
- Challenges of disentangling the impacts of the IED from its predecessor legislation. This has meant that for some questions data sources are presented which include impacts of both. Implications of this are discussed on a case by case basis.
- Certain data gaps e.g. for assessing certain questions there are gaps in evidence such as: how BATC have been implemented in practice (except for air), on impacts of the BATC except for a limited number of sectors; on how administrative burdens have changed under the IED; and on whether enforcement has improved. These gaps are highlighted for each specific question, where relevant, and any implications of such gaps for the results and robustness of findings discussed.
- Risk of bias in stakeholder survey results (including provision of additional information) due to greater number of industry stakeholders and their proactivity in responding to both the OPC and targeted stakeholder survey. In contrast only 2 NGOs responded to the targeted survey and only 1 of them (EEB) is proactively involved with the IED on a regular basis. To address this, survey results are presented separately for stakeholder groups and feedback from different groups has been considered carefully to try and avoid bias.

It was also noted that due to the broad scope of the IED, it was not going to be possible to investigate all aspects and all sectors in detail. As an example, an ex post assessment of the costs and benefits of the BAT Conclusions for a single industrial sector can take of the same order of resource as allocated to this support study to the IED evaluation. Therefore, in some instances the evaluation of certain questions considers specific case studies rather than a whole EU and sector wide assessment.

Sources of evidence considered are given for each evaluation question and key data gaps and limitations are flagged. The number and strength of these sources together with the degree of agreement (degree of triangulation) of the information leads to an estimate of robustness that is reported alongside each finding. **Despite the limitations described above, the triangulation of the different data sources means that there is a good degree of confidence in most of the conclusions.**

6 Implementation/state of play

6.1 Current status

As set out in Section 3, the IED combines and strengthens requirements previously set under seven different EU Directives. The IED entered into force on 6 January 2011 and had to be transposed by the Member States into national legislation by 7 January 2013.

Currently, there are 31 BREFs, of which seven are undergoing the BREF review process covering the following IED activities: Surface Treatment using Organic Solvents (including Wood and Wood products Preservation with Chemicals), Ferrous Metals Processing, Common Waste Gas Treatment in the Chemical Sector, Textiles, Smitheries and Foundries, Slaughterhouses and Animal By products, and Ceramics³⁰. The Commission aims to update BREFs no later than 8 years after the latest BREF document was published in accordance with Recital 13 of the IED.

Since 2016, BREFs have been finalised for: the common waste water and waste gas treatment/management systems in the chemical sector; intensive rearing of Poultry or Pigs; large combustion plants; non-ferrous metal industries; the production of large volume organic chemicals; food, drink and milk industries; waste incineration; and waste treatment. In 2019, the draft final BREF for surface treatment using organic solvents including wood and wood products preservation with chemicals was published.

A total of 16 BAT Conclusions have been adopted covering the following sectors (listed in order of the year of adoption together with their code for reference): Iron and Steel Production (03/2012) (I&S), Manufacture of glass (03/2012) (GLS), Tanning of hides and skins (02/2013) (TAN), Production of cement, lime and magnesium oxide (04/2013) (CLM), Production of Chlor-alkali (12/2013) (CAK), Production of pulp, paper and board (09/2014) (PP), Refining of mineral oil and gas (10/2014) (REF), Wood-based panels production (11/2015) (WBP), Common Waste water and waste gas treatment / management systems in the Chemical Sector (06/2016) (WGC), Non-ferrous metals industries (06/2016) (NFM), Production of Large Volume Organic Chemicals (12/2017) (LVOC), Intensive Rearing of Poultry and Pigs (07/2017) (IRPP), Large Combustion Plants (07/2017) (LCP), Waste Treatment (08/2018) (WT), Waste Incineration (02/2019) (WI) and Food, Drink and Milk Industries (12/2019) (FDM).³¹

6.1.1 IED reporting requirements

Member State reporting requirements under the IED require information on the approaches and processes taken to transpose the requirements of the legislation (for the year 2013) and information on the implementation changes covering the years from 2013 to 2016 (2012/795/EU)³². For 2013-2016, sector specific reporting requirements also covered:

- Implementation of the provisions in the I&S BATC and GLS BATC in terms of number of relevant installations, status of updating permits, setting stricter permit conditions and different emission limit values (ELVs) than established in the BATC, details of the derogations granted according to Article 15(4), and monitoring among others.
- Implementation of the provisions for WI, including installation ID, types of waste incinerated, capacity of waste throughputs and operating conditions; and on

³⁰ European Commission (2019) Update on progress on the work programme for the exchange of information under Article 13(3)(b) of the IED and the way forward. 14th IED Article 13 Forum meeting. Brussels, 14 October 2019.

³¹ <https://eippcb.jrc.ec.europa.eu/reference/>

³² Commission Implementing Decision of 12 December 2012 establishing the type, format and frequency of information to be made available by the Member States for the purposes of reporting on the implementation of Directive 2010/75/EU of the European Parliament and of the Council on industrial emissions. <https://eur-lex.europa.eu/legal-content/EN/TXT/?uri=CELEX%3A32012D0795>

solvent emissions, covering the use of reduction schemes, the number of installations granted derogations.

Reporting requirements on information concerning the number of installations operating in each Member State and the activities covered by the IED is determined by Commission Implementing Decision (EU) 2018/1135 which forms the legal premise for the EU Registry. These reporting obligations have been simplified in accordance with the conclusions and recommendations of the Fitness Check of EU Environmental reporting obligations. All contextual reporting has been converted into reporting of factual data generated by Member States as they implement the IED. This includes a range of administrative data (e.g. relating to location, permit, activities carried out) and specific information for each IED installation (e.g. on permit updates, derogations or inspections). Furthermore IED reporting has been streamlined with E-PRTR reporting to ensure better consistency and increase the value and usefulness of the reported data. All non-confidential information is made public. In accordance with these reporting requirements, implementation of the IED by Member States is summarised in Section 6.2.

For operators, the emission limits set in permits under the IED are primarily expressed in pollutant concentrations and are accompanied by corresponding monitoring obligations for operators (discussed further in the next section). Operators must provide Member State authorities with appropriate monitoring results so that they can verify compliance. The results of emissions monitoring are held by the competent authority which shall make this data publicly available. There is no reporting of emission concentrations required to EU bodies.

Industrial operators have at the same time the obligation under the E-PRTR to determine the annual quantity of released pollutants using measurements, calculations or estimations, and report them to Member State authorities, which in turn report them to the EEA. These data are the basis for assessing the emissions performance of industrial activities. Although there is a large overlap in scope, not all IED installations are under the E-PRTR scope and vice-versa.

6.1.2 Monitoring requirements

Monitoring of emissions to air and water is considered a key mechanism to support the prevention and reduction of pollution from EU industry (e.g. with the use of monitoring data to check compliance with ELVs set in a permit or to check the performance of abatement systems).

Accordingly, under the IED, monitoring of emissions to air and water for BAT shall be addressed by the exchange of information process to draw up, review and update BREF (Article 13(2(b))) and included in the corresponding BAT conclusions (Article 3(12)). Installation permits shall stipulate emission monitoring requirements (Article 14(1)(c) and (d)) and where possible, these requirements shall be based on the associated monitoring for BAT included in the BAT conclusions (Article 16(1)). Emission monitoring results shall be made publicly available by the competent authority (Article 24(3(b))).

Approaches to monitoring vary between direct measurements (including continuous, periodic and campaign) and indirect methods (surrogate parameters, mass balances, emission factors, and other calculations). Guidance is also set out in the reference document on Monitoring of Emissions to Air and Water from IED Installations (07/2018; reference code ROM). on determining approaches to monitoring is available to Member States. Examples are presented in Annex 12^{33,34}.

6.1.3 Permitting under the IED

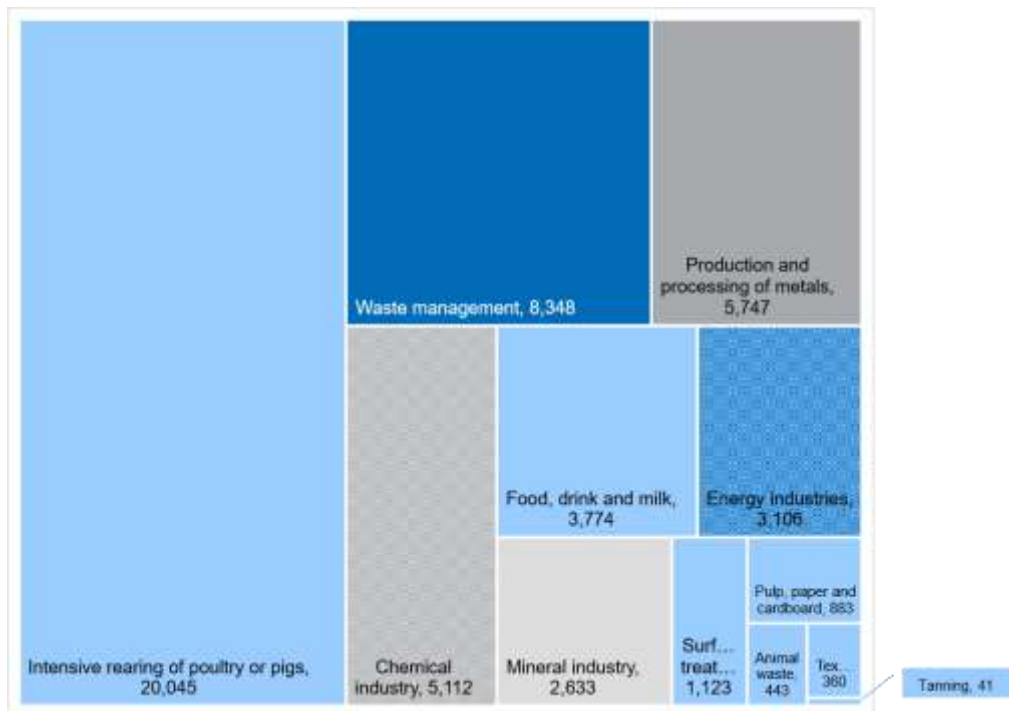
At EU level, 51,615 installations were permitted under the IED in 2015. The largest share of installations permitted is for the intensive rearing of poultry and pigs (IRPP) sector

³³ JRC (2018) JRC Reference Report on Monitoring of Emissions to Air and Water from IED Installations.

³⁴ BAT-AEL Conclusions Search Tool.

(20,045 permitted installations), with the majority situated in France, Germany, Spain, the Netherlands, Italy, Denmark and the UK. Other sectors with a significant share of permitted installations include, waste management, production and processing of metals, and the chemical industry.

Figure 6-1: Total number of permitted installations by sector (EU28, 2015)

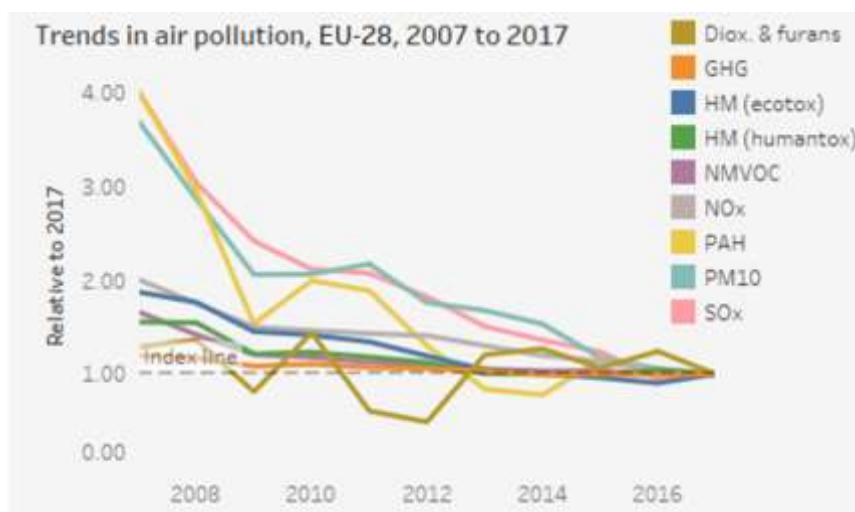


Source: Data collated as part of study (Ricardo, 2018b)

By Member State, the largest number of permitted installations are located in Germany, France, Italy, Spain and the UK. By sector, the number of permitted installations follows the same trend at Member State as EU level, with significant sectors in this respect including IRPP, waste management, production and processing of metals, and the chemical industry. Whilst these sectors have the greatest number of permitted installations, this does not correlate with overall impacts on the environment due to the size and nature of these activities (see Figure 6-3: for comparison). A breakdown of total number of permitted installations by sector and Member State for 2015 is provided in Annex 12.

6.1.4 Industrial emissions and environmental performance under the IED

Under the IED, industrial emissions to air and releases of water pollutants have generally decreased in recent years (EEA, 2019b). Moreover, since 2007, reductions of key air pollutants have been achieved at the same time as economic growth, indicating that there has been a decoupling of industrial activity from emissions to air (Figure 6-2). In 2017, EU industry accounted for 20% of gross value added (GVA) (EEA, 2019).

Figure 6-2: Indexed emissions to air for industry (EU-28)

Note: The data emissions reported by NFR codes which do not include thresholds for reporting (whereas some IED activities do).

Source: EEA (2019) [data source: CLRTAP]³⁵

Despite improvements, industry is still a key emitting sector of air pollutants. In 2017, it was responsible for over half the emissions to air of CO₂, SO_x, NMVOC and the heavy metals Cd, Hg and Pb across the EEA-33. To a lesser extent industry was also a key source of NO_x (32%) and PM₁₀ (28%). Significant sectors within industry include:

- Energy supply: air pollutant emissions of Hg (38%), CO₂ (35%), NO_x (17%) and SO_x (51%).
- Ferrous metal production: emissions of heavy metals to air (17% of Cd, 25% of Pb, and 16% of Hg).
- Non-ferrous metal production: emissions of heavy metals to air (19% of Cd, 20% of Pb, and 7% of Hg).
- Other manufacturing processes: 42 % of NMVOC emissions to air.

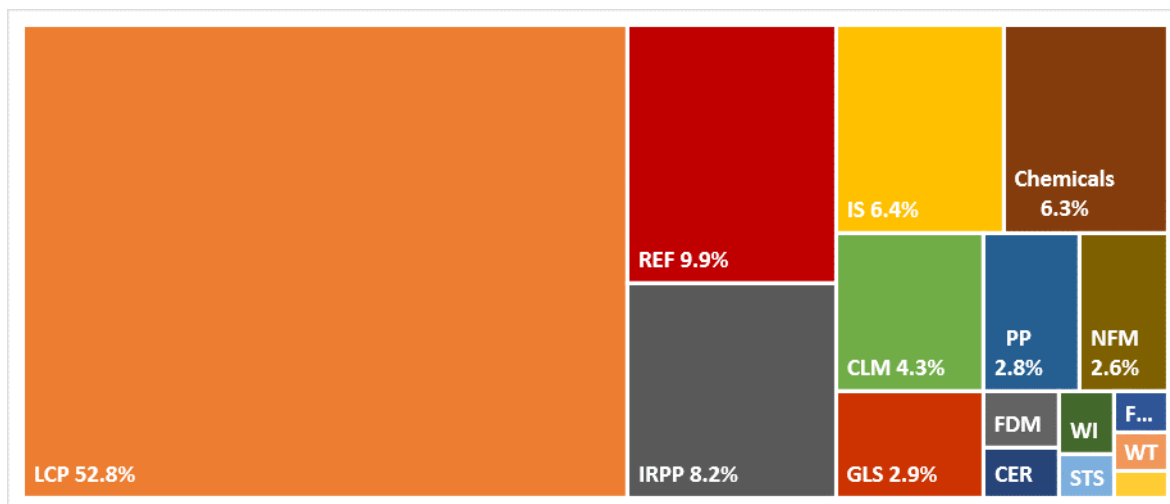
NH₃ emissions from industrial processes are not presented in the above chart. A significant share of NH₃ emissions occur from agricultural practices (3,580 Gg in 2017 accounting 92% of total EU28 NH₃ emissions). Only a share of this will be emitted by agro-industrial activity regulated under the IED (i.e. from intensive rearing of pigs and poultry above specified activity thresholds in the IED). Other industrial sources of NH₃ emissions are energy production and distribution, energy use (in industry), and industrial processes. Combined, these sources emitted 161 Gg in 2011 accounting for 4% of total EU28 NH₃ emissions). Compared to 2008, NH₃ emissions have remained fairly static, decreasing overall by 16 Gg between 2008 and 2017. (EEA, 2019)³⁶

Figure 6-3: below presents the share of total damage costs to air amongst industry sectors. This shows that the LCP sector contributes nearly half of the total damage costs associated with industrial activities.

³⁵ EEA (2019) 2019 Industrial pollution country profiles, EU-28. URL: <https://www.eea.europa.eu/themes/industry/industrial-pollution/industrial-pollution-country-profiles-2019>

³⁶ EEA (2019) National Emission Ceilings Directive emissions data viewer 1990-2017. URL: <https://www.eea.europa.eu/data-and-maps/dashboards/necd-directive-data-viewer-2#tab-based-on-data> [last accessed 31/01/2020]

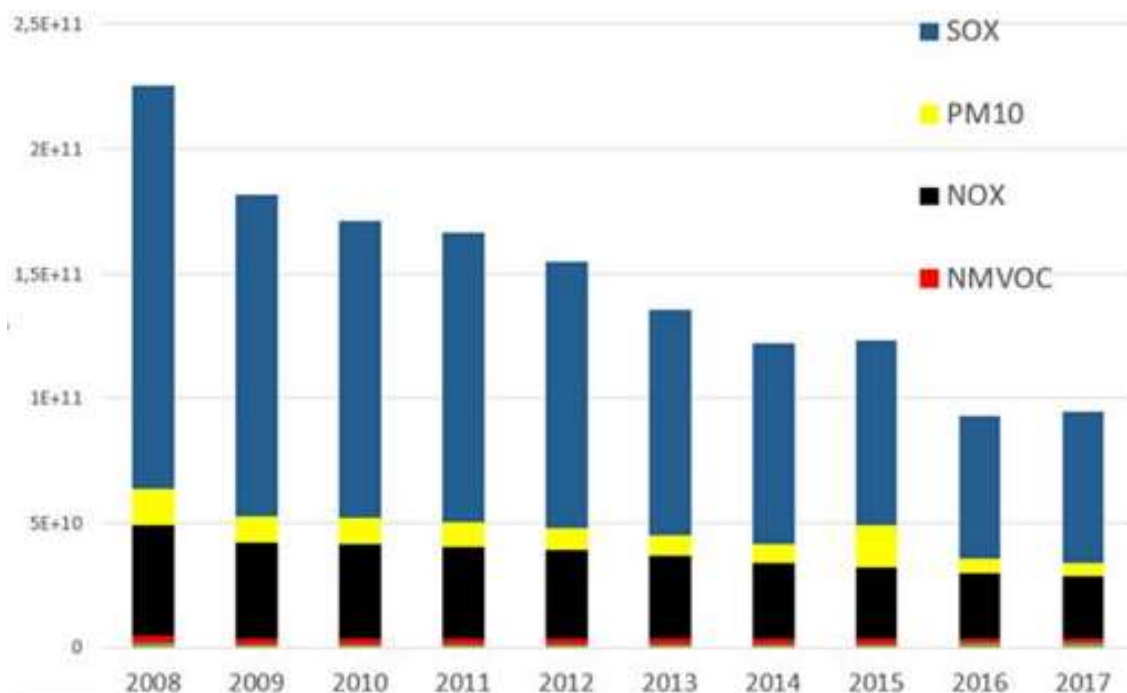
Figure 6-3: Share of damage costs to air amongst industry sectors (EU28, 2017)



Source: European Commission, personal communication.

Figure 6-4 below presents the damage costs associated with emissions to air from IED installations by pollutant. This shows that emissions of SO_x, NO_x and, to a lesser extent, PM₁₀ contribute the most to damage costs for emissions to air.

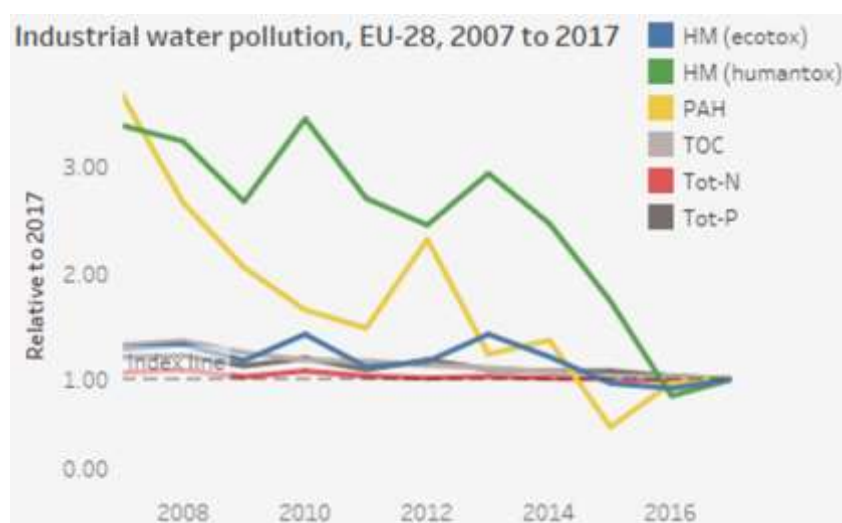
Figure 6-4: Damage cost of emissions to air from IED installations by pollutant (€/year)



Source: (ICF, 2018a)

For emissions to water, a similar trend demonstrating decoupling of economic growth from emissions is apparent for emissions of heavy metals (Cd, Hg, Pb and Ni). However, releases of N and P have remained relatively stable since 2007 (Figure 6-5).³⁷ It should be noted that the quality of data on water emissions from industry is considered to be less robust than emissions to air. This is discussed further in Section 7.1.2.1.

³⁷ Trends in industrial emissions to European water are further explored in an EEA report (<https://www.eea.europa.eu/highlights/industrial-emissions-to-water-decreased>).

Figure 6-5: Indexed releases of water pollutants for industry (EU-28)

Source: EEA (2019) [data source: E-PRTR]³⁸

According to releases to water that are reported to E-PRTR, significant sectors responsible for releases to water within industry include:

- Chemicals production: releases of heavy metals (including Cd (7%), Ni (7%), Pb (18%), and Hg (21%)).
- Energy supply: releases of Hg (24%).
- Ferrous metal production: emissions of heavy metals to air (including 11% of Pb).
- Pulp, paper and wood: 26% of TOC.

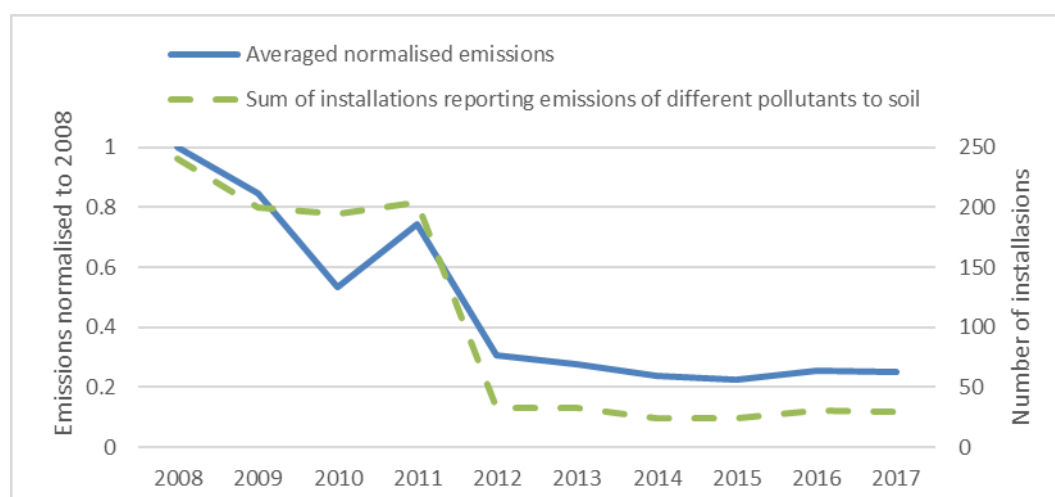
In 2017, industry was responsible for 24% of energy consumed and 62% of water used. Up to 50% of non-hazardous waste and 75% of hazardous waste was generated by industry (excluding waste generated by the extractive industry which is not regulated by the IED). IED sectors accounting for a significant share of hazardous waste include waste management, energy supply and metal production. Waste generated by the waste management sector includes waste collected from other sources. (EEA, 2019).

In contrast to emissions to air or water, emissions to soil and groundwater are much harder to ameliorate once they have occurred. The IED therefore focuses on measures to prevent emissions. This requires the use of techniques such as impermeable floors, avoidance of leaks and secondary containment for vessels. These techniques have been included as BAT in relevant BAT conclusions and should have been required in permit conditions where appropriate.

Emissions to soil from IED installations are also reported under E-PRTR and the same thresholds apply as for emissions to water. Very few installations report any emissions as illustrated for the average of a number of pollutants³⁹ in Figure 6-6. Whilst there is very limited reported data, the amount of emissions appears to have decreased over the period (as installations have reduced their emissions they have fallen below the reporting thresholds for E-PRTR hence the reduction in data being reported).

³⁸ EEA (2019) 2019 Industrial pollution country profiles, EU-28. URL: <https://www.eea.europa.eu/themes/industry/industrial-pollution/industrial-pollution-country-profiles-2018/2018-industrial-pollution-country-profiles#tab-based-on-data>

³⁹ The pollutants emitted to soil considered in this graph are: Arsenic, Cadmium, Chlorides, Chromium, Copper, Halogenated Organic compounds, Lead, Mercury, Nickel, Polychlorinated Biphenyls, Total Phosphorus and Zinc.

Figure 6-6: Trend in selected pollutant emissions to soil from IED sectors

Source: European Commission analysis, personal communication.

Furthermore, operators of installations are responsible for remedying any contamination of the soil that took place during their operation. Evidence of the initial condition of the soil at the installation comes from baseline reports required under Article 22 of the IED, which must be produced at the start of operation or before the first permit update after January 2013. The status of baseline reports has been reported under the Second IED Reporting Decision. Operators will be obliged to return the soil to the existing condition on cessation of activities and therefore have a strong interest to avoid polluting it.

Article 16 of the IED requires periodic monitoring of soil and groundwater to verify there are no releases. On cessation of activities, IED Article 22 requires the soil and groundwater condition to be checked again and remediated, if necessary.

It should be borne in mind that IED installations cover a very small proportion of total EU land area and represent a very small proportion of polluted sites in the EU⁴⁰.

6.2 Implementation of the IED across the EU Member States

6.2.1 Member State implementation reporting

An overview of Member State implementation reporting is presented in Annex 12 covering transposition of the Directive in 2013 and any changes which occurred between 2013 and 2016. At the time of this evaluation, public information on IED installations reported via the EU Registry was not complete and therefore not used to give an overview of implementation status.

To date there have been limited infringement cases where Member State competent authorities have been taken to court for failure to adequately implement the requirements of the IED. In most cases, failure to implement IED provisions led to a formal notice being issued by the European Commission which was then resolved without court referral. A Court decision was taken in the following cases:

- European Commission v Slovenia: A cement factory in Slovenia⁴¹ was found to be operating without a permit to carry out waste incineration in its cement kilns. Slovenia was taken back to Court by the European Commission in 2015 after failing

⁴⁰ Based on https://esdac.jrc.ec.europa.eu/public_path/shared_folder/doc_pub/EUR29124.pdf and <https://www.eea.europa.eu/highlights/soil-contamination-widespread-in-europe>

⁴¹ http://europa.eu/rapid/press-release_IP-15-4492_en.htm

to take adequate action since the first Court ruling in 2010. The plant was forced to close until a permit with adequate conditions was granted.

- European Commission v Germany: Public access to information in the permit review procedure was deemed insufficient⁴².

6.2.2 Article 15(4) Derogations

Article 15(4) of the IED allows for derogation from the requirements to set ELVs in accordance with BAT-AELs, where an assessment shows that implementing them would lead to disproportionately higher costs compared to the environmental benefits due to:

- a) the geographical location or the local environmental conditions of the installation concerned; or
- b) the technical characteristics of the installation concerned.

A report by Amec Foster Wheeler and REC (Amec Foster Wheeler, 2018) on the application of IED Article 15(4) derogations shows the findings from reviewing a little over one hundred derogation requests made to the Member States (of which nearly three quarters were granted), and of reviewing the processes that Member States have adopted to assess derogation requests. Case studies have also been developed to demonstrate the application of these processes in practice. For example, the Czech Ministry of Environment provides guidance to operators and permitting officers on the economic appraisal of compliance with BAT-AEL including spreadsheets with cost calculation for the justification of derogations. Derogations in according to this guidance were granted for example to several glass works.

Despite evidence of good examples, not all Member State practices meet the requirements and/or spirit of Article 15(4), e.g. due to the derogation criteria applied and the inclusion of wider socio-economic benefits in the decision process. For example, in Greece, power plants in Amyntaio and Kardina have been granted derogations, despite the fact that they do not meet the conditions listed in the Directive. The Commission has issued a formal notice requiring Greece to respond.⁴³ Similarly, a Court Judgement was passed negating a derogation granted by the UK based purely on economic and safety reasons. The derogation related to ELVs applicable to an LCP (2016)⁴⁴.

6.2.3 Key challenges experienced by Member States when implementing the IED

Member State difficulties experienced when implementing the IED are summarised in Annex 12 – as submitted by Member States to meet Annex II, Module 1 reporting requirements in 2012/795/EU. The key challenges reported related to the short timescales for implementation of the BATC (4 years), issues with national implementation, specific sectoral challenges, application of the Article 15(4) derogations, monitoring frequencies and interpretation issues of specific articles, BATC and other elements (Ricardo, 2019d).

Member State competent authorities have reported further challenges as part of the consultation and data gathering exercises conducted for ongoing work for DG ENV under the contract “Supporting IED Implementation”. Common challenges concern:

- **Issues with implementation of BATC for specific sectors:** the sectors most commonly mentioned by the Member States were Intensive Rearing of Poultry and Pigs and Waste Treatment

⁴² Case C-137/14: European Commission v Federal Republic of Germany. https://eur-lex.europa.eu/legal-content/en/TXT/PDF/?uri=uriserv%3AOJ.C_.2015.406.01.0004.01.ENG

⁴³ European Commission (2019) July infringements package: key decisions. URL: https://europa.eu/rapid/press-release_INF-19-4251_EN.htm

⁴⁴ Case C-304/15: European Commission v United Kingdom of Great Britain and Northern Ireland.

<http://curia.europa.eu/juris/document/document.jsf?text=&docid=191712&pageIndex=0&doclang=en&mode=lst&dir=&occ=first&part=1&cid=7526039>

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- **Issues related to BAT-AELs, AEPLs and setting ELVs in the permits:** main challenges relate to setting ELVs in permits based on information in BATC, difficulties in assessing if a specific technique can be considered as BAT
 - **Issues related to the definitions in the IED:** main difficulties concern definitions of installation, directly associated activities, Other Than Normal Operating Conditions. Lack of coherence with definitions used in other legislation applicable to industrial sites has also been reported.
 - **Scope of activities covered by Annex I of the IED and BATC:** Member States reported issues in defining main activity of the installation, directly associated activities and have reported numerous questions on whether a specific activity is covered by Annex I.
 - **Conflicting requirements of other national legislation, including other types of permits:** Some Member States have reported that IED permits are not always well aligned with the planning permits or other permits that sites are issued. In a few cases national legislation prevents implementation of some of the provisions in the IED and/or specific BATC.
 - **Setting ELVs for indirect emissions to water:** some Member States have reported challenges with setting emission limit values for emissions to water which is being transferred off-site for treatment in the urban or independently operated waste water treatment plants
 - **Article 15(4) derogations** specifically lack of information on implementation of Article 15(4) in other Member States and issues with cost-benefit analyses (CBA) methodologies
 - **Issues related to measurements:** their representativeness, measurement uncertainty and monitoring below the detection limits.

6.3 Impacts on other policy areas

With its broad coverage of different industries and various aspects of environmental topics, the IED is one of the tools enabling the EU to achieve some of its broader strategic objectives. This includes:

- **National Emission Directive (NECD):** IED and BATC are one of the key Union source-based air pollution legislation referred to in the NECD. The majority of Member States have referenced the IED and industrial emission standards in their National Air Pollution Control Programmes submitted in 2019 under the NECD.
- **Climate and Energy Package:** Provisions in the IED and LCP BATC directly impact the operation of EU power plants, supporting more efficient and cleaner generation. It also places energy efficiency requirements across other industrial sectors.
- **Water Framework Directive (WFD) (2000/60/EC):** sets ELVs and of environmental quality standards (EQS) (Directive 2008/105/EC) relating to priority substances. The IED and BATC contribute by lowering the impacts of direct releases from industry to water environment. Permit conditions can include stricter ELVs for releases to water if there is a risk to water quality or compliance with EQS. Based on the 2nd River Basin Management Plans, in most countries industrial point sources covered by the IED are identified as a relatively small source of pressure, suggesting that the IED is effective in controlling industrial pollution.
- **Provisions on soil in the 7th Environmental Action Programme⁴⁵:** IED requirements concerning the baseline report help ensure that the operation of industrial installations does not deteriorate the quality of soil.

⁴⁵ http://ec.europa.eu/environment/soil/index_en.htm

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- **Circular Economy Action Plan:** To some extent, the IED enables EU's transition towards circular economy through BAT minimising the use of materials and hazardous substances, generation of waste and supporting industrial symbiosis.

While the concept of BAT is also used in multilateral environmental agreements related to industrial pollution (e.g. Minamata Convention on Mercury, Stockholm Convention on Persistent Organic Pollutants and Oskar Convention for the Protection of the Marine Environment of the North-East Atlantic), there is evidence of similar concepts based on the EU system emerging in third countries, including the Russian Federation and Korea:

- **Russian Federation:** Adopted a BAT-based policy to regulate industrial emissions in 2014 which entered into force in 2018. The system does not establish legally binding BAT but the BAT-AELs form the basis of installation permit conditions which in turn form legal requirements. The methodology for establishing BAT is based on the recommendations of the EU Reference Document on Economics and Cross-Media Effects (European Commission, 2006)⁴⁶.
- **Korea:** Adopted a BAT-based policy to regulate industrial emissions in 2015 which entered into force in 2017. As with the approach adopted by the Russian Federation, BAT are the basis for BAT-AELs which are used to set ELVs in permits and only the ELVs are legally binding.

EU BREF are also used as benchmarks within other systems e.g. in India, EU BREF are reviewed among the information collected and evaluated to develop Comprehensive Industry Documents Series which provides a set of sector-specific guidelines to inform the development and application of Best Available Techniques/Technology Not Entailing Excessive Cost. (OECD, 2018)⁴⁷

Furthermore, a number of other countries around the world, including the US and China, apply a similar framework to the IED (i.e. integrated permits with conditions based on some variation of BAT) for the control of pollution arising from industrial activities.

⁴⁶ European Commission (2006) Reference Document on Economics and Cross-Media Effects.
http://eippcb.jrc.ec.europa.eu/reference/BREF/ecm_bref_0706.pdf

⁴⁷ OECD (2018) Best available techniques (BAT) for preventing and controlling industrial pollution. Approaches to establishing BAT around the world. <https://www.oecd.org/chemicalsafety/risk-management/approaches-to-establishing-best-available-techniques-around-the-world.pdf>

7 Answers to the evaluation questions

The following sections set out the findings against each of the evaluation questions (EQ) that were set out in the IED Evaluation Roadmap and then further developed at the start of this study. They are grouped against the five evaluation criteria: effectiveness, efficiency, relevance, coherence and EU added value.

Effectiveness

7.1 EQ1 - To what extent have the objectives of the IED been achieved?

7.1.1 Introduction

In order to answer this evaluation question, we have examined the following set of operational questions, as these have been identified in the evaluation matrix:

- a. To what extent has the IED contributed to reducing and (as far as possible) eliminating pollution arising from industrial activities? Are there any industrial activities that fall outside of the scope of the IED (partially or fully) which generate high levels of pollution? Have there been any pollutants that have been omitted/fallen outside the scope of the Directive? To what extent can the effects reasonably be credited to the IED?
- b. Has the IED strengthened provisions on enforcement and environmental improvement?
- c. Has the Directive stimulated innovation in the prevention and control of pollution from industrial activities?
- d. Has the IED led to simplification of the legislation and cut unnecessary administrative burden?
- e. Has the IED strengthened public access to information?
- f. Has the IED strengthened public access to justice?

Baseline: The baseline assumptions for this specific EQ are set out below broken down by sub-question.

a. The IED IA only included some estimates of how emissions to air from LCPs were expected to evolve into the future in the absence of any further actions as well as with this introduction of more stringent emission limit values in the IED itself (but not the BATC themselves as they were not available at the time). However, no further estimates (for emissions to air, water or other environmental impacts) were reported for any other sectors as it was unknown at that time what the BATC may contain for individual sectors. Therefore, the baseline for this sub-question is based on the assumptions made in the limited specific studies that have assessed the actual or expected impacts of the BATC (LCPs, iron and steel), this includes the retention of the LCPD minimum emission limits and current (limited) uptake of BAT under the IPPCD. Furthermore, the pollutant and sectoral scope would remain as per the IPPCD and sectoral Directives.

b. According to the IA, under the IPPCD, provisions to enforce regulatory requirements on industrial emissions under the IPPCD and sectoral Directives were limited owing to: Low uptake of BAT; Member States often applied the minimum ELVs set out in the sectoral Directives as default when setting permits; Deviations from permit conditions without adequate justification; Incomplete monitoring data; and Different approaches to

Member State inspections. These issues would be expected to have continued under the baseline.

c. In relation to innovation, under the baseline it is assumed that the BREF process as per under the IPPCD would have continued with no specific initiatives to further stimulate innovation. Furthermore, the BREFs and BAT Conclusions contained therein would have continued to be utilised in a variable / inconsistent manner across the EU i.e. uptake of BAT would not be uniform across all Member States.

d. The baseline for this sub-question assumes that the IPPC and separate sectoral Directives would have remained in force with their associated requirements and administrative burdens.

e. As part of the review of the IPPCD and development of the IED, a number of shortcomings with respect to public access to information were identified including a lack of access to permits for industrial installations. These shortcomings are assumed to have continued under the baseline.

f. Public access to justice was not explicitly considered within the IED IA so there is no information on what would have been anticipated with and without the IED. However, under the baseline we have assumed that the shortcomings that were identified for public access to information (which is inherently linked to public access to justice) would have remained.

Information sources used:	Literature and data sources	Open Public Consultation	Targeted online survey	Interviews	Focus groups
	YES	YES	YES	YES	NO

7.1.2 To what extent has the IED contributed to reducing and (as far as possible) eliminating pollution arising from industrial activities? To what extent can the effects reasonably be credited to the IED?

The overarching objective of the IED, and the IPPCD before it, is to prevent, reduce and (as far as possible) eliminate pollution arising from industrial activities. The main driver for reducing emissions under the IED is the BREF process and adoption and implementation of the BAT Conclusions (as well as the minimum emission limit values for selected sectors such as LCPs). This is a dynamic process that is still ongoing with only 8 BREFs/BAT Conclusions having passed the four year implementation window. Therefore, the impacts of the Directive are still being realised and will continue for a number of years as the requirements stemming from more BAT Conclusions (those already adopted and yet to be developed) will be implemented. For this reason, it is not feasible to quantify the full impacts of the IED plus there is the added challenge of assessing BAT Conclusion impacts robustly. The IED IA did not attempt to quantify potential impacts of future BAT Conclusions due to the uncertainties over what they would contain, in particular the level of ambition of any BAT-AELs. However, for those sectors where the BAT Conclusions have been adopted and the four-year window for implementation has passed one would expect to see reductions in emissions of pollutants where BAT-AELs have been set for specific sectors.

The updated requirements for LCPs (minimum emission limit values included within the IED itself) have also taken effect from 2016 onwards although a number of the flexibilities allowed (e.g. transitional national plan) still apply. The IED IA estimated the reductions that would be expected with the changes in emission limit values included in Annex V of the Directive to better align with BAT as set out in the LCP BREF at the time (note that this did not include potential impacts of a new BREF and BAT Conclusions). Compared to 2004, emissions of SO₂ and NO_x would be reduced by 60-87% and 80-97%, respectively,

if all plants assessed applied the BAT ranges from the existing BREF at the time. The majority of these reductions would be achieved at coal- and lignite-fired plants. A further assessment looked forward towards 2020 to assess how the full implementation of BAT for LCPs (implementation of BAT-AEL ranges) would compare to the implementation of current legislation as projected by Member States. These scenarios showed that the implementation of BAT as described in the LCP BREF at the time would lead to reductions of 19-35% for SO₂, 14-30% for NO_x and 24-32 % for dust in 2020 compared to the ongoing implementation of existing legislation.

To answer this question, there is a further challenge of separating out the impacts of the IED from other drivers and legislation, most notably the IPPCD and sectoral Directives. For example, there will have been impacts still resulting from the IPPCD and sectoral Directives in the early years of the implementation of the IED.

The indicator included within the evaluation matrix is as follows:

- Level of emissions (to different environmental media) from industrial activities by pollutant type.

7.1.2.1 Review of literature and relevant datasets

There is a significant volume of data on emissions to air and, to a lesser extent, emissions to water from data sources such as the E-PRTR and Member State reporting under the NECD and the Convention on Long Range Transboundary Air Pollution (CLRTAP). Furthermore, data on other parameters such as industrial energy use and waste generation are also available. These are all collated and analysed by the EEA on a regular basis and presented in their industrial pollution country profiles⁴⁸.

Figure 6-2 and Figure 6-5 in Section 6.1.4 present the data available for emissions to air and water from industrial sources between 2007 and 2016. As the figures demonstrate, for emissions to air there have been clear reductions from industrial sources since 2007 for most pollutants, most notably SO_x and PM₁₀. For some pollutants, emissions have stayed relatively flat. For emissions to water the picture is slightly more variable (also reflecting the lower quality of data available) but for a number of pollutants, the emissions still appear to have been reduced over the last 10 years. Releases of nitrogen (N) and phosphorous (P) have been largely stable since 2007. Emissions of heavy metals (Cd, Hg, Pb and Ni) have decreased significantly since 2007. Overall, releases for all the above mentioned pollutants to water were lower in 2016 than in 2007, despite an 11 % increase (corrected for inflation) in industry GVA during the same period i.e. emissions intensity of European industry is reported have declined over time as the ratio of air pollutant releases generated to production of industrial goods and energy decreases.

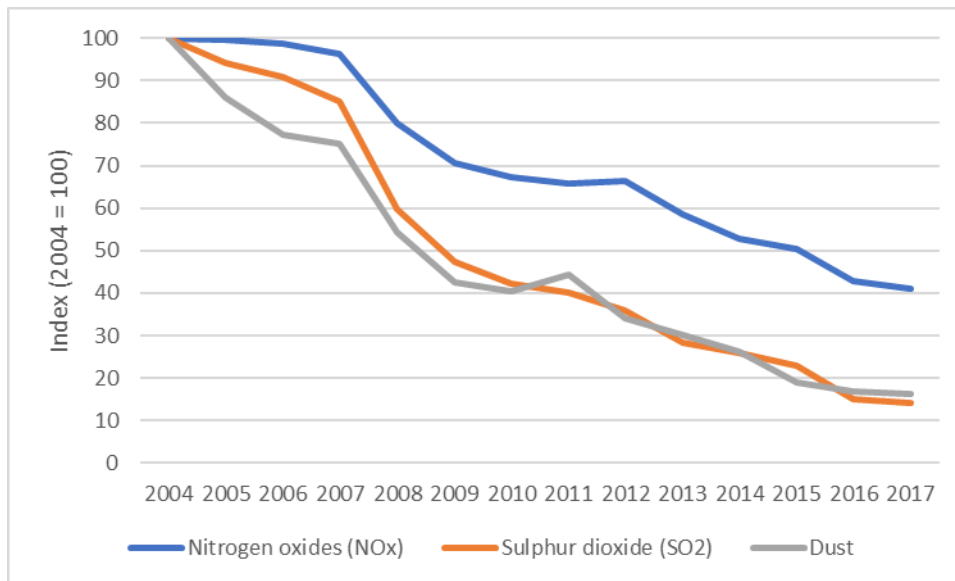
For a number of industrial sectors, permits are yet to be updated in line with the BAT Conclusions either because the four year window since publication has not passed or because the review of their BREF is still to be finalised/started.

Emissions to air

The LCP sector is responsible for a significant proportion of emissions to air in the EU, contributing around 44% and 14% of the total EU emissions of SO_x and NO_x, respectively in 2015. However, emissions from LCPs have dropped considerably since 2004 in the EU with emissions reduced by 86 % for SO₂, 59 % for NO_x and 84 % for dust⁴⁹. This reduction is illustrated in the figure below.

⁴⁸ <https://www.eea.europa.eu/themes/industry/industrial-pollution/industrial-pollution-country-profiles-2018/2018-industrial-pollution-country-profiles>

⁴⁹ <https://www.eea.europa.eu/data-and-maps/indicators/emissions-of-air-pollutants-from/assessment-1>

Figure 7-1: Indexed SO₂, NO_x and dust emissions from LCPs in the EU

Source: https://www.eea.europa.eu/data-and-maps/daviz/indexed-so2-nox-and-dust-3#tab-chart_1

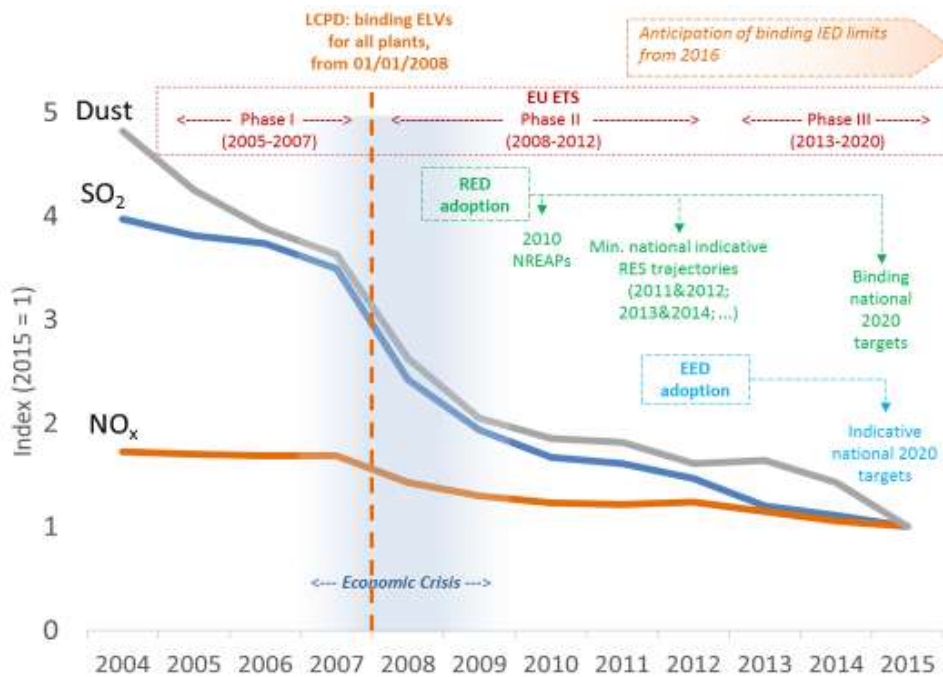
Considering the timescales for which data is available, the majority of the reductions visible in the figure above will be linked to drivers other than the IED including the LCP and IPPC Directives, economic crisis and closures of plants. However, considering that the IED minimum emission limit values applied from 2016 and are tighter than those from the LCPD plus the BAT Conclusions have now been adopted further tightening emission limits, it is expected that the downward trajectory will continue both in recent years and into the future.

The EEA also recently undertook a decomposition analysis to break down the different factors driving the changes observed in the reduction in emissions in the LCP sector and to attribute a relative weight to each of them⁵⁰. The objective was to understand the extent to which European industrial policy, in particular the LCPD, had driven reductions in emissions from LCPs. During the period considered, 2004-2015, the report identified three main reduction trends, summarised below and illustrated in Figure 7-2:

- A significant decline in emissions from 2007 to 2009 which is partially due to the emission limits imposed by the LCPD which were binding from 2008 for existing plants. While the report identified evidence of a causal relationship with the LCPD through statistical analysis, other drivers such as the financial crisis in 2008/09 also had an effect on emission trends along with fuel price changes and other macroeconomic changes in Europe.
- Emissions from 2010 levelled off (or only decreased slightly) and remained relatively stable for a few years. This aligns with the maturity of the LCPD requirements and move to replace the LCPD with the IED.
- The more recent trend began in 2012/13 where emissions started to decline again. The report indicates that this appears to be in anticipation of the stricter emission limit values included within the IED which came into force in 2016.

⁵⁰ <https://www.eea.europa.eu/publications/effectiveness-of-eu-policy-on>

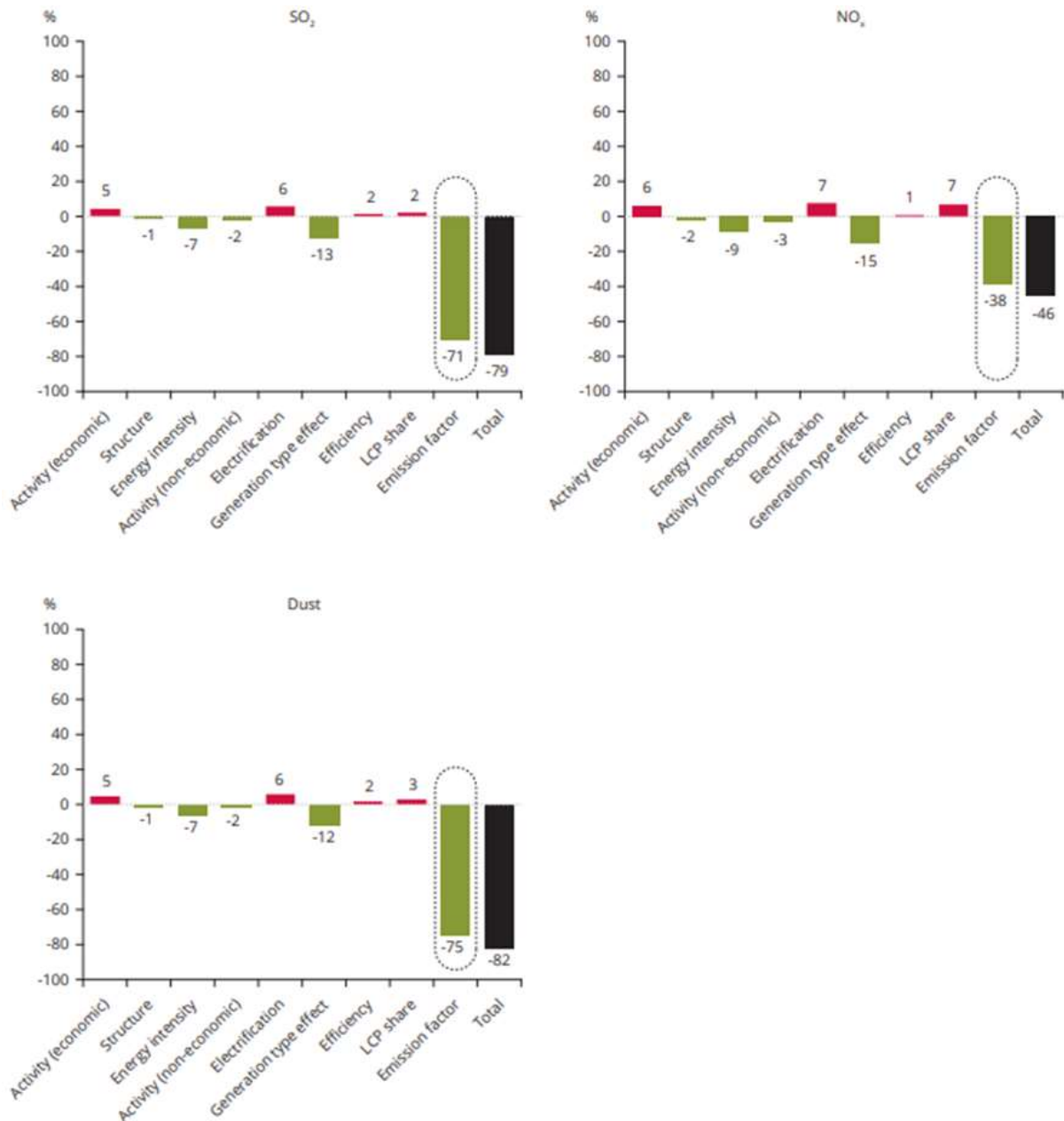
Figure 7-2: Emission trends for LCPs annotated with key policy interventions



Source: (EEA, 2019a)

The results of the decomposition analysis are presented in the figure below. The contribution that the LCPD has made, and to a lesser extent the IED so far, is represented by the change in emission factor implying an improvement in production e.g. through the use of cleaner fuels, application of abatement technologies.

Figure 7-3: Contribution of each factor in the detailed composition to changes in total EU28 emissions of SO₂, NO_x, dust and CO₂ between 2004 and 2015, as a % of 2004 emissions, for electricity generating LCPs



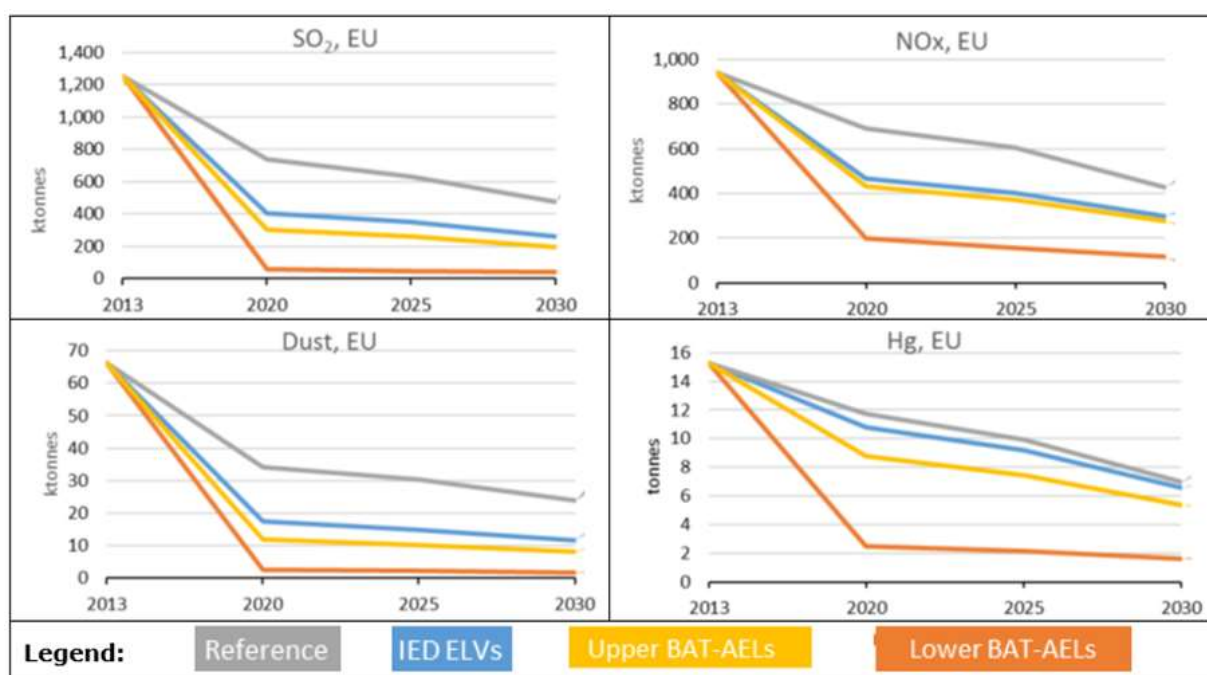
Source: (EEA, 2019a)

The study concludes that the LCPD and, to a lesser extent, the IPPCD and more recently IED has made a significant contribution to reductions of emissions of the main air pollutants from LCPs since 2004 (based on changes in the derived emission factor), in particular for SO₂ (-71%) and dust (-75%) but also for NO_x (-38%).

Aside from the EEA analysis described above, the only other targeted assessments that have been undertaken looking explicitly at an EU level of the impacts of selected BAT Conclusions for specific sectors have been two Ricardo studies for the European Commission looking at the ex-ante impacts of the LCP BAT Conclusions for large (>300MWth) solid-fuelled LCPs and an ex-post analysis of the Iron and Steel BAT Conclusions. The findings of both assessments are set out below.

(Ricardo, 2016) was undertaken after the final draft of the LCP BREF was developed but before the BAT Conclusions had been finalised. An ex-ante assessment of compliance costs and benefits of meeting the proposed upper and lower BAT-AELs for solid fuel fired LCPs >300MWth across the EU was undertaken and compared to the existing requirements of the IED Annex V ELVs. The study found that around half (136/264) of plants expected to still be operational in 2025 were estimated to need to fit additional techniques to those already fitted to meet the IED ELVs. Around 20% of plants (53/264) were estimated to need to fit different techniques to comply with the upper BAT-AELs than those techniques they already had fitted to meet the emission limit values in the IED. The remainder (75/264) were judged to already comply with the BAT conclusions upper BAT-AELs. The figures below summarise the changes in emissions estimated in the study for solid fuelled LCPs >300MWth meeting the IED emission limit values and upper and lower BAT-AELs.

Figure 7-4: Change in emissions per year of reference (no IED ELVs), IED ELVs, Upper BAT-AEL and Lower BAT-AEL scenarios to 2030 from 2013 baseline (for solid fuelled LCPs > 300MWth)



Source: (Ricardo, 2016)

As the figures illustrate, the IED ELVs are expected to lead to significant emission reductions relative to the reference scenario (existing LCPD emission limits and uptake of BAT under the IPPCD). In particular the study estimated a substantial decline for SO₂, NO_x and dust emissions (45%, 32%, and 50% respectively as an average across all years relative to the reference scenario). Although there are no IED ELVs for mercury, due to the implementation of other pollutant abatement techniques, an 8% reduction of mercury emissions was also estimated to occur. The Upper BAT-AEL scenario was estimated to bring about further declines for SO₂, NO_x, dust and Hg. Compared to the IED scenario, there are further reductions of 25% of SO₂ emissions, 8% of NO_x emissions, 31% of dust emissions, and 19% of Hg emissions (averages of all years). Finally, the Lower BAT-AEL scenario is estimated to result in substantial further reductions in SO₂, NO_x, dust and Hg emissions relative to the upper BAT-AEL scenario: 81% lower SO₂, 56% lower NO_x, 78% lower dust and 71% lower Hg (averages of all years) (although as discussed for EQ4 in Section 7.4 the large majority of permit limits for all sectors tend to be set at the upper BAT-AEL).

Ricardo (2018)⁵¹ was an ex-post assessment of impacts of implementing BAT conclusions for the iron and steel production sector in order to determine the level of environmental protection achieved and associated costs and benefits. A detailed process -level assessment of costs and benefits was undertaken focused on the most important emissions sources, pollutants and BAT-AELs. The study found that the BAT Conclusions have led to reductions in emissions of 13.9kt of SO₂, 0.5kt of NO_x, 8kt of dust, 0.5t of mercury and 12.9g of PCDD/F.

In addition to the data sources and studies presented above, additional analysis has been undertaken for this evaluation to identify the extent to which the IED has reduced (or will reduce) pollution from industrial activities. This analysis is presented in Annex 13 and summarised below.

Review of NECD emission inventories and projections

An evaluation of Member States' emission inventories reported under the NECD was undertaken to consider how emissions to air have changed for selected Member States and sectors. Emissions data was correlated with corresponding activity data for the refineries and pulp and paper sectors in six Member States⁵² to estimate implied emission factors e.g. unit of emissions per tonne of product produced. Using implied emission factors rather than just mass emissions removes the influence of changes in activity levels due to e.g. market factors. The intention was to identify whether there has been a noticeable decrease in the implied emission factor that could be correlated to the IPPCD and BAT Conclusions under the IED. Because of the various limitations of such an analysis changes are simply presented qualitatively. The findings of this assessment are summarised in the table below. For the majority of Member State / sector / pollutant combinations, the assessment has identified a decrease in the implied emission factors. In only a handful of cases the assessment has identified no change and in one instance (Finland, dust emissions from refineries) there appears to be an increase in the implied emission factors. The reasons for such an increase are unclear from the data available.

Table 7-1: Summary of changes in implied emission factors in the refinery and pulp and paper sectors in selected Member States (comparison between 2008 and 2016 values)

Member State	Refineries			Pulp & Paper		
	Dust	NOx	SOx	Dust	NOx	SOx
DE	↓	↓	↓	↔	↔	↓
FI	↑	↓	↔	Note 1	Note 1	Note 1
SE	↓	↓	↓	↓	↓	↔
ES	↓	↓	↓	↓	↓	↓
RO	↓	↓	↓	Note 2	Note 2	Note 2
CZ	↔	↓	↓	↓	↓	↓

Note 1: Finland has not provided any activity data so the assessment could not be completed.

Note 2: Since 2007 the pulp figures for Romania are confidential.

Key:

↓	Decrease in implied emission factor
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⁵¹ <https://circabc.europa.eu/ui/group/06f33a94-9829-4eee-b187-21bb783a0fbf/library/28bb7d3c-cf70-4a80-a73a-9fb90bb4968f/details>

⁵² Czechia, Finland, Germany, Romania, Spain, Sweden. Member States were selected based on geographical distribution and sectoral performance.

↔	No change in implied emission factor
↑	Increase in implied emission factor

Source: Analysis for this evaluation

In addition to the emission inventories reported by the Member States under the NECD, an assessment has been undertaken of the emission projections reported and the extent to which Member States are expecting reductions in emissions from industrial activities to support their compliance with their overall emissions reduction commitments. Based on 2017 and 2030 data, Member States are projecting the following reductions:

- The industry sector is projected to reduce emissions of SO₂ by 22% and the energy production sector by 40% in 13 years to meet the NECD emission reduction commitments.
- For NO_x, the industry sector is projected to reduce emissions by 21% and the energy production sector by 25%.
- For PM_{2.5}, the industry sector is projected to reduce emissions by 15% and the energy production sector by 36%.

These projections show that the Member States have assumed further significant emission reductions to be realised by industrial activities to support their achievement of their emission reduction commitments. This is backed up by the fact that the majority of Member States have reported the IED and BAT Conclusions and further controls for industrial activities as key policies and measures within their first National Air Pollution Control Programmes submitted under the NECD⁵³.

Assessment of reduction potential of WBP and FDM BREFs

The potential reduction of emissions to air and water triggered by the Wood Based Panels (WBP) and the Food, Drink and Milk (FDM) BREFs has been estimated, in order to assess the contribution of the IED in reducing pollution from industrial activities. The data collected for the revision of these two BREFs provided a good picture of the current situation and was used for this assessment.

The assessment showed that the BAT-AELs in the respective BAT Conclusions will trigger a reduction of emissions to air. In particular, a significant reduction will be realised if ELVs are set according to a value within or at the lower end of the BAT-AEL range. Setting ELVs according to the upper BAT AEL will result in comparably smaller improvements and a smaller reduction in emission loads. For example, formaldehyde emissions to air from the WBP industry would be lowered by more than 500 tonnes per year if permit limits are set at 5 mg/Nm³ (lower BAT-AEL). Setting future ELVs according to the upper BAT-AELs (10 mg/Nm³ for PB, 15 mg/Nm³ for MDF and 20 mg/Nm³ for OSB dryers) the emission reduction will be almost 10 times lower (in total around 60 tonnes per year).

Emissions to water

For emissions to water, reported emissions data are less complete or robust, but appear to show reductions (e.g. see Figure 6-5). No specific assessments have been undertaken of the potential or realised impacts associated with the IED or any of the BAT Conclusions. The EPRTR reporting thresholds mean that only a limited number of total plants report emissions data; in 2016, around 3,600 facilities, equivalent to 10% of all reporting facilities, reported emissions to water. An additional complication results from the fact that a significant number of industrial installation discharge indirectly to the urban sewerage system (known as "transfers"). Such emissions are therefore part of the emissions from urban waste water treatment plants, only some of which report emissions data to the EPRTR. Furthermore, there are uncertainties (evidence gaps) as to whether or not it is

⁵³ <https://rod.eionet.europa.eu/obligations/753/deliveries>

being treated sufficiently as such plants. As a result of these factors, it is more difficult to judge to what extent the IED has impacted emissions to water.

EEA (EEA, 2019c) looked at the issue of direct versus indirect discharges in detail and found that large scale industrial sectors tend to have a higher proportion of direct releases to water which would require on-site treatment. This includes the pulp and paper (82 %), iron and steel (81 %), energy supply (86 %), non-ferrous metals (76 %) and chemicals (49 %) sectors. However, smaller scale industrial sectors such as other manufacturing, and food and drink production, tend to report higher proportions of releases to the sewer system (i.e. indirect releases) than direct releases to water. According to E-PRTR data, direct emissions (in mass) to water from industry for most pollutants have slightly decreased in recent years and, in the meantime, transfers from industry towards UWWTPs have marginally increased (except for heavy metals).

Whilst there are limitations in the evidence available, reductions are expected because BAT-AELs for emissions to water have been included in many sectoral BAT Conclusions which should lead to tightening of permit ELVs. As described above, the potential reduction of emissions to air and water triggered by the Wood Based Panels (WBP) and the Food, Drink and Milk (FDM) BREFs has been estimated for this evaluation (full analysis in Annex 13). This has shown that the BAT-AELs in the respective BAT Conclusions will trigger a reduction of emissions to water which could be significant if ELVs are set according to a value within or at the lower end of the BAT-AEL range (although as discussed for EQ4 in Section 7.4 the large majority of permit limits tend to be set at the upper BAT-AEL). For example, the reduction potential for COD emissions to water from dairies can be five times higher if permit limits are set according to a value within the BAT-AEL range (i.e. from 60 mg/l to less than 125 mg/l) than setting them according to the upper BAT-AEL (125 mg/l).

Emissions to soil and groundwater

In contrast to emissions to air or water, emissions to soil and groundwater are much harder to ameliorate once they have occurred. The IED therefore focuses on measures to prevent emissions. This requires the use of techniques such as impermeable floors, avoidance of leaks and secondary containment for vessels. These techniques have been included as BAT in relevant BAT conclusions.

Furthermore, operators of installations are responsible for remedying any contamination of the soil that took place during their operation. To enable this, evidence of the initial condition of soil comes from baseline reports required under Article 22 of the IED. The status of baseline reports has been reported under the Second IED Reporting Decision.

Article 16 of the IED requires periodic monitoring of soil and groundwater to verify there are no releases. On cessation of activities, IED Article 22 requires the soil and groundwater condition to be checked again and remediated, if necessary.

Very limited specific evidence has been identified on the scale of any industrial emissions to soil and/or groundwater or the impacts that the IED has had to date. The only data available is that reported to E-PRTR on emissions to soil which shows some reductions over time but is only available for a very limited number of installations (as described in Section 6.1.4).

Other environmental issues

Data available for consumption of natural resources, energy use and waste generation is much less clear and much harder to disentangle from other drivers. The contribution of the IED to wider EU environmental policy (including, amongst others, water and circular economy policy) is discussed under EQ12 in Section 7.12 (coherence).

7.1.2.2 Stakeholder feedback

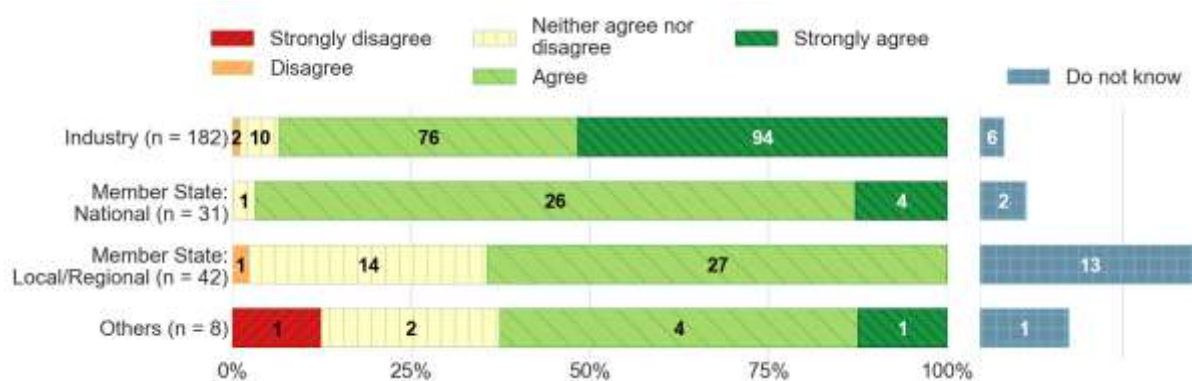
A number of questions included within the OPC asked stakeholders for their views on the extent to which the IED has contributed to reducing emissions and overall environmental impacts. Across all stakeholders, 188 out of 277 (68%) report that in their opinion

environmental impacts from large industrial installations have decreased somewhat or decreased significantly in the last 5 years. By stakeholder group, the highest response that impacts have decreased somewhat/significantly is from industry (148 out of 181 responses, 82%), with much lower responses from public authorities (50%), EU citizens (34%) and environmental NGOs (24%)⁵⁴. Indeed for the environmental NGO group, just over a third of respondents feel that impacts have increased somewhat/significantly (6 out of 17 responses, 35%). Across all stakeholder groups there is relative agreement (at the somewhat/strongly agree level) that the IED has contributed to reducing environmental impacts arising from large industrial activities.

In addition to the OPC, the targeted survey asked stakeholders various questions on the impacts of the IED. The results from these questions are summarised below.

Overall, nearly 90% of respondents agreed (51%) or strongly agreed (38%) that the IED has contributed to reducing pollution from industrial activities. Only four respondents in total (2%) disagreed (disagree / strongly disagree) with the statement. Both industry and national level Member State authorities expressed strong agreement with the statement (around 95%) with industry more positive in terms of the proportion of respondents expressing strong agreement. Local/regional Member State authorities and others were less positive although more than 60% of responses were still in agreement.

Figure 7-5: Responses from the targeted survey to the question “To what extent do you think that the IED has contributed to reducing and (as far as possible) eliminating pollution arising from industrial activities?”

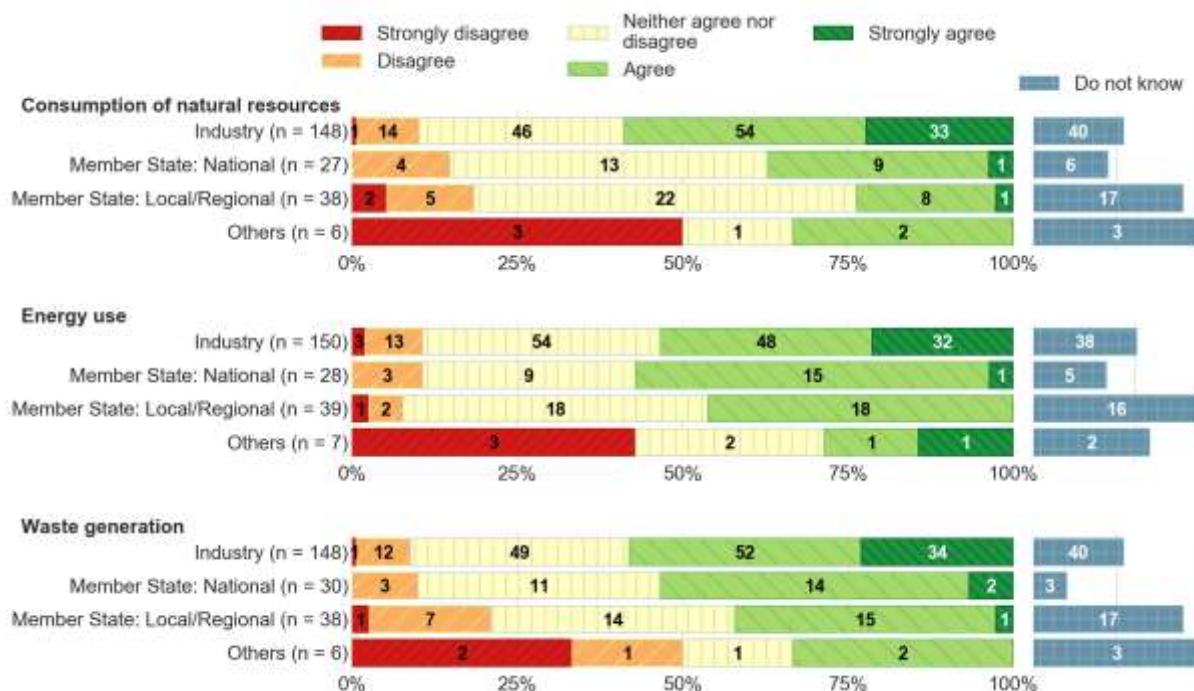


Source: Targeted stakeholder survey

Furthermore, the targeted survey asked stakeholders the extent to which the IED had contributed to reducing wider environmental impacts such as consumption of natural resources, energy use and waste generation.

⁵⁴ Respondents to the Open Public Consultation could identify that they belong to one of 9 stakeholder groups. For all the graphical analysis by stakeholder groups, 'Business association' has been merged into 'Company/business organisation'. Further, 'Non-governmental organisation (NGO)' and 'Environmental organisation' have been merged into '(environmental) NGO' referred to as 'environmental NGOs' in the text. Finally, due to their low sample size, 'Trade union' and 'Academic/research institution' has been merged into the 'Other' category. This leaves 5 categories for breakdown in the analysis.

Figure 7-6: Responses from the targeted survey to the question “To what extent do you think that the IED has contributed to reducing the following for agro-industrial activities?”



Source: Targeted stakeholder survey

Overall for all three elements, around 50% of respondents agreed or strongly agreed that the IED has contributed to reducing their use or generation. A further 34-37% responded neutrally and the remainder disagreed. There is some variation between stakeholder groups for each element with industry and national level Member State authorities typically most positive and “others” (and local/regional Member State authorities for natural resource consumption and waste generation) least positive. Overall this picture is much less positive than the equivalent figures (presented in Figure 7-5) asking stakeholders whether the IED has contributed to reducing emissions from industrial activities.

A specific question was also included about the extent to which the IED contributes to the reduction of hazardous substances. A similar pattern can be observed as for the previous question with industry particularly positive about the IED impacts (around 94% expressing that they somewhat / strongly agree with the statement). Local/regional and national level Member State authorities also agreed with 70% to 81%, respectively somewhat or strongly agreeing with the statement. As with the previous questions “other” respondents were less positive than the other stakeholder groups with half of respondents agreeing with the statement and a further three out of eight respondents neutral.

In addition to the specific questions above, written feedback received as part of the survey from multiple stakeholders – with supporting examples in many cases (particularly for emissions to air) was that the IED has been positive in terms of reducing emissions for their sector and/or Member State, in particular due to the changes in status of the BATC. The EEB indicated that it is difficult to know whether the IED has contributed to reducing or eliminating pollution from industrial activities due to a lack of proper reporting on environmental performance. They also highlighted that the benefits associated with the BATC very much depend on how they are translated into permit conditions.

7.1.3 Are there any agro-industrial activities that fall outside of the scope of the IED (partially or fully) which generate high levels of pollution?

7.1.3.1 Literature and data sources

As part of the review of the IPPCD as well as of the development of the IED IA and the Directive itself, a review of the scope of the legislation was undertaken and an assessment of potentially excluded activities was developed. As a result, the following activities that were not regulated (or only partially) under the IPPCD and sectoral Directives were brought into the IED:

- Gasification/liquefaction of fuel (other than coal) >20MW (IED 1.4 (b))
- Production of chemicals by biological processing (4.1 – 4.6) - A broader range of disposal activities are covered including pre-treatment prior to incineration treatment of slags and ashes metal shredding.
- Disposal of non-hazardous waste >50 tonnes (5.3(a))
- Recovery or recovery and disposal of non-hazardous waste >75tonnes/day (IED 5.3(b))
- Temporary storage of hazardous waste >50 tonnes (IED 5.5)
- Underground storage of hazardous waste (IED 5.6)
- Manufacture of wood-based panels >600m³/day (IED 6.1(c))
- Food and drink production (IED 6.4(b) – expanded scope)
- Wood and wood products preservation with chemicals >75m³/day (IED 6.10)
- Independently operated WWTP (IED 6.11)

A number of other activities were considered as part of the IED IA but subsequently not included within the Directive for various reasons, including in a number of cases economic concerns, e.g. administrative burden. These included, amongst others, aquaculture, intensive livestock rearing (BAT for land spreading of manure off-site, extension to cattle and differentiated poultry thresholds) and combustion plants below 50 MW_{th}. For the latter, whilst they were excluded from the IED, they are now regulated under the MCP Directive (for emissions to air).

For aquaculture, a specific study was carried out as part of the IPPC Review⁵⁵ and it was considered within the IED IA. The environmental impacts of this sector mainly relate to emissions to water. In 2017, 160 facilities were listed in E-PRTR. They contributed 16% of total reported emissions to water of Cu and compounds of all activities within E-PRTR, 2% of Zn and compounds, 4% of total nitrogen, 5% of total phosphorus and 6% of total organic carbon. The large majority of those installations reporting emissions to water are located in Norway and the United Kingdom (more specifically in Scotland).

For cattle, the EC report (COM(2013) 286 final) "Report from the Commission on the reviews undertaken under Article 30(9) and Article 73 of Directive 2010/75/EU on industrial emissions addressing emissions from intensive livestock rearing and combustion plants" explains that results gathered from the review on the control of emissions from the intensive rearing of cattle give a clear indication of the benefits of taking action to reduce emissions of ammonia from this sector. The report further explains that 90 million cattle in approximately 3.5 million farms are reared in the EU, ranging in size from large centralised farms to smallholdings of only one cow. Cattle rearing including feeding and manure management leads to air emissions of about 1 500 kt/year of ammonia (41% of the total EU emissions) and 7 000 kt/year of methane (2% of the total EU emissions).

⁵⁵ <https://circabc.europa.eu/ui/group/442f566e-5951-4779-9c65-752289988907/library/9ee3aa7a-a367-4c14-a860-41f21a9965e2/details>

Cattle rearing is also an important factor in the pollution of ground and surface waters by nitrates, with EU action to tackle such pollution taken through the Nitrates Directive.

The mixed rearing of poultry and pigs on one site (e.g. mixed pig and poultry farm falling below individual species thresholds but with environmental impacts higher than some IED regulated farms) is not considered with a mixed threshold in Annex I of the IED. The Commission report (COM(2013) 286 final) "Report from the Commission on the reviews undertaken under Article 30(9) and Article 73 of Directive 2010/75/EU on industrial emissions addressing emissions from intensive livestock rearing and combustion plants" discussed the potential inclusion of a rule based on equivalent nitrogen excretion factors. One way to handle mixed farms is to calculate the percentages of each animal category (compared with the threshold of the animal category) and to summarize the percentages of the different animal categories. If they are above 100 % the mixed farm could be included in Annex I IED. The EU report states that a number of Member States already regulate mixed farms and that the results indicate that the inclusion of mixed farms under the IED would result in ammonia emission reduction of around 1 – 20 kt/year and that approximately 600 to 1800 farms would likely be affected.

An Amec (2012) study⁵⁶ (which the above Commission report was based on) looked at the issue of differentiated activity thresholds for poultry species. It found that a number of Member States already regulate different poultry installations through the application of a weighted approach to derive thresholds. There were three main approaches to this based on Livestock units (LU or LSUs), Equivalent Nitrogen Excretion Factors (ENEF) and animal-equivalent (weighted approach based on nitrogen and phosphorus excretion factors and other variables). If a weighted approach were to be taken, then NH₃ emissions were estimated to be reduced by between 4-35 kt per year depending on thresholds applied and certain assumptions.

Manure management according to the IRPP BAT Conclusions is only included in the scope of the BAT Conclusions if it is an on-farm process, which means that the fields belong to the farmer. Because most fields are leased, manure management and in particular the land spreading is in most cases out of the scope. The Commission report (COM(2013) 286 final) already stated that the largest emission reduction in IRPP relates to manure management (about 70%).

For the mining sector, a BREF has already been produced⁵⁷ focused on the management of tailings and waste-rock in mining activities. It is intended to support the implementation of the Directive on the management of waste from extractive industries (2006/21/EC), which requires measures taken to be based on BAT.

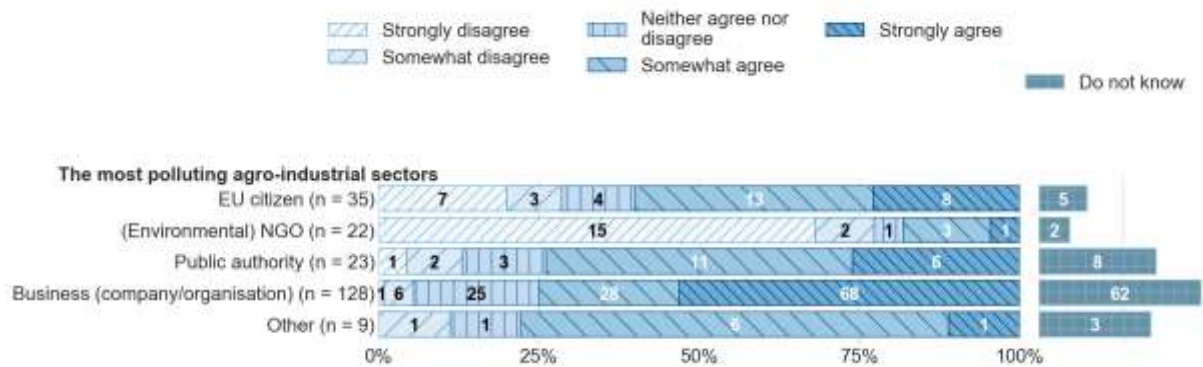
7.1.3.2 Stakeholder views

To help understand the situation now and whether stakeholders believe that the IED does capture the most polluting sectors, the OPC and targeted survey both included questions related to this. The results of these are summarised below.

⁵⁶ <https://circabc.europa.eu/ui/group/06f33a94-9829-4eee-b187-21bb783a0fbf/library/0e4a2ffd-1f87-4ee3-9154-f6e3ce284d41/details>

⁵⁷ https://eippcb.jrc.ec.europa.eu/sites/default/files/inline-files/jrc109657_mwei_bref_-_for_pubsy_online.pdf

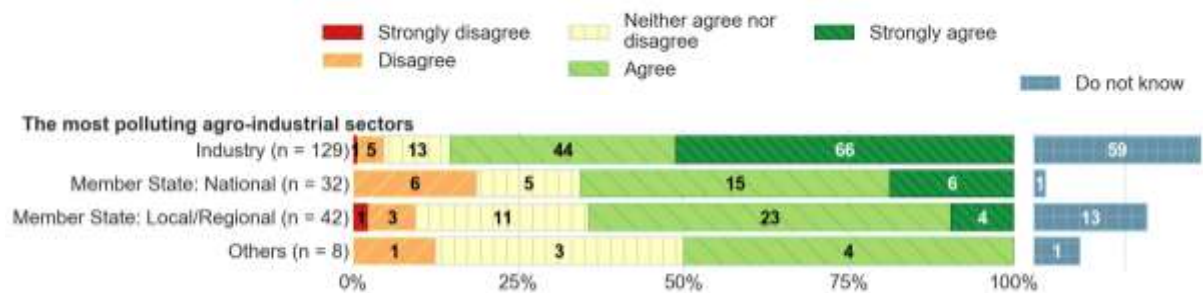
Figure 7-7: Responses from the OPC to the question “To what extent do you agree that the IED addresses the following?”



Source: Open Public Consultation

There are high levels of (somewhat/ strong) agreement from business and public authorities (around 75% of respondents), a lower, but still more than 50% agreement from EU citizens and (somewhat/ strong) disagreement (around 75% of respondents) from NGOs. A relatively high number of respondents (80 out of 297 in total) indicated that they did not know.

Figure 7-8: Responses from the targeted survey to the question “To what extent do you think that the IED addresses the following?”

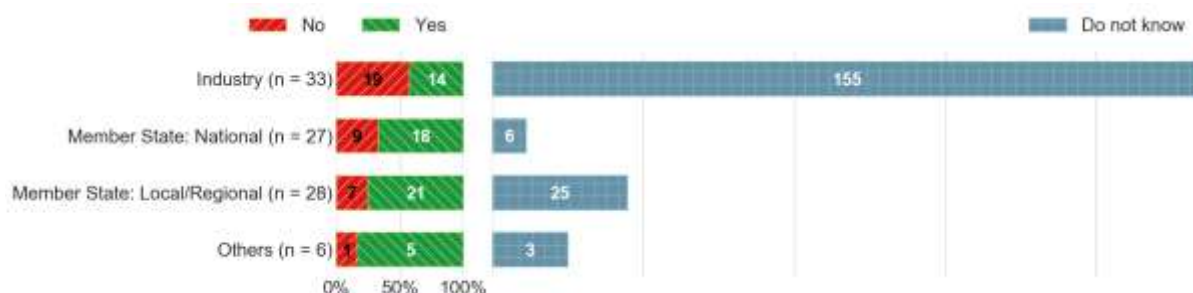


Source: Targeted stakeholder survey

The same question was included within the targeted survey. Similar to the OPC, industry had a high level of agreement (agree/strongly agree) that the most polluting sectors are captured under the IED (85%). Member State authorities (local/regional and national) also had high levels of agreement at around 60-70%. Half of the “other” respondents agreed and the majority of the remainder were neutral. As for the OPC a high number of respondents answered “do not know” to the question.

Finally the targeted survey asked respondents directly if they felt that any high polluting activities fell outside of the scope of the IED.

Figure 7-9: Responses from the targeted survey to the question “Are there any agro-industrial activities that fall outside of the scope of the IED (partially due to the thresholds in Annex I of the IED or fully) which generate high levels of pollution?”



Source: Targeted stakeholder survey

The majority of respondents answered “do not know” to this question (189 out of a total of 283 respondents), most of whom were from industry. This is to be anticipated as industry respondents to the survey were from sectors already covered by the IED who may not necessarily know about other high polluting sectors. For those respondents that did answer the question, around 60% answered yes in that they do believe that some high-polluting sectors have been excluded from the scope of the IED. All stakeholder groups except for industry responded yes to the question more than 50% and in the case of “others” and local/regional Member State authorities this was 83% and 75% respectively.

With such a high proportion of respondents (excluding the do not know responses) responding yes to the question, it is valuable to consider the open text feedback received. Stakeholders were invited to provide details of those activities they feel are out of the scope but should be captured. The agro-industrial activities missing in IED Annex I that have been mentioned most by stakeholders as part of the targeted survey are the intensive rearing of cattle, landspreading of manure of site, differentiated thresholds for intensive poultry farms, mining and aquaculture. Urban waste water treatment plants have been identified by some Member State authorities and the indirect discharge of industrial waste waters through them.

7.1.4 Have there been any pollutants that have been omitted/fallen outside the scope of the Directive?

Annex II of the IED sets out the list of polluting substances covered by the Directive. This has not changed from the IPPCD. However, Article 14(1) sets out the measures that permits should contain and states the following in point (a): “*emission limit values for polluting substances listed in Annex II, and for other polluting substances which are likely to be emitted from the installation concerned in significant quantities, having regard to their nature and their potential to transfer pollution from one medium to another.*” This means that Member States are not limited to the list in Annex II when setting permit conditions for an installation.

The question of scope of the BREFs and BAT Conclusions is considered in more detail under EQ2 in Section 7.2.

7.1.4.1 Literature and data sources

A comparison of the list of polluting substances to air in Annex II of the IED with BAT-AELs given in BATC finalised to date has identified that POPs other than PCDD/F, like PCB are missing in IED Annex II. For example, a BAT-AEL is set for dioxin-like PCBs in the WI BATC and I&S BATC. Furthermore HCHO is not included in the IED Annex II list: formaldehyde is now classified as CMR-pollutant, which means that formaldehyde falls under Article 58 and Annex VII Part 4 of the IED. In the GLS, LVOC, WBP and LCP BAT Conclusions, BAT-AELs for formaldehyde are set. Formaldehyde is also relevant for the following BREFs under revision: CER, STS, SF, TXT, WGC. Comparing the list of polluting substances to water no

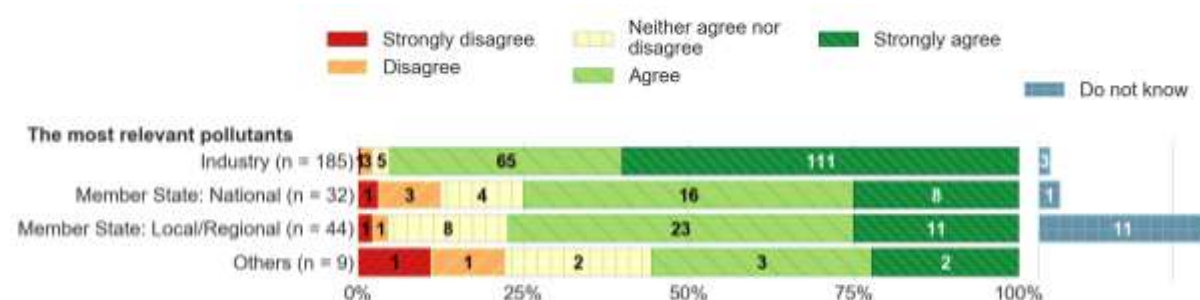
omitted substances have been found (i.e. between IED Annex II and BAT-AELs in BATC). Overall, whilst Annex II of the IED appears to be missing some key pollutants, this does not preclude them from being considered as part of the BREF process and for competent authorities to establish permit limits where appropriate. There are some examples of the former identified by stakeholders via the targeted survey but no evidence was identified on the latter point. .

Article 9(1) of the IED states the following in relation to greenhouse gases: “Where emissions of a greenhouse gas from an installation are specified in Annex I to Directive 2003/87/EC in relation to an activity carried out in that installation, the permit shall not include an emission limit value for direct emissions of that gas, unless necessary to ensure that no significant local pollution is caused.” This means that in practice the majority of IED installations do not have emission limits for GHGs covered under the EU ETS due to the overlap in scope between the two instruments.

7.1.4.2 Stakeholder views

For both the OPC and targeted survey, respondents were asked if the IED addressed the most relevant pollutants. For the OPC, Public authorities, businesses and other stakeholders have all expressed similarly high levels of agreement (around 90%) that the IED addresses the most relevant pollutants. EU citizens are slightly lower at 62% (and 35% disagreement) whilst environmental NGOs overall disagree with the statement (70%). The same question was included within the targeted survey.

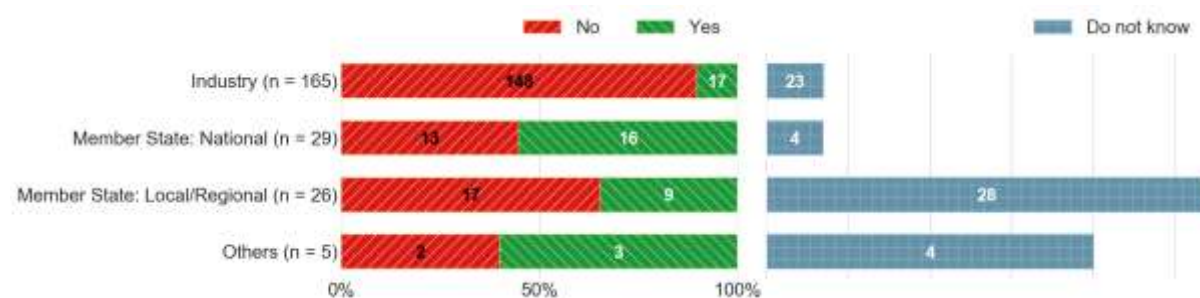
Figure 7-10: Responses from the targeted survey to the question “To what extent do you think that the IED addresses the following”



Source: Targeted stakeholder survey

Overall, nearly 90% of respondents agree or strongly agree that the IED addresses the most relevant pollutants. Industry is most in agreement (95%) followed by Member State authorities (around 75%). Just over half of the “other” respondents agreed with the statement. Only 12 out of 270 responses overall (4%) disagreed with the statement including the EEB.

Figure 7-11: Responses from the targeted survey to the question “Are there any pollutants that have been omitted or fall outside of the scope of the IED which, in your opinion, should be captured?”



Source: Targeted stakeholder survey

Overall, the majority of stakeholders (80%) responded “no” to the question i.e. they do not think that any pollutants have been omitted or fall outside of the scope of the IED. This proportion varies considerably between stakeholder groups with industry with the greatest number of respondents answering no (90%) dropping down to 40% for “others” (only 2 out of 5 responses). Member State authorities were between 45% and 65% (answering “no” to the question).

As part of the written feedback accompanying the survey, a number of stakeholders (Member State authorities and NGOs) have highlighted the exclusion of CO₂ and other GHGs such as methane (provided that they are covered by the ETS) as a gap in the coverage of the Directive. In contrast some industry stakeholders feel that is best kept separate to avoid overlap between the IED and other legislation e.g. EU ETS. Some Member State authorities have also highlighted a need to improve the interface between the legislation on priority substances under the Water Framework Directive and the IED and also between REACH and the IED.

7.1.5 Has the IED strengthened provisions on enforcement and environmental improvement?

Under the IED, provisions relating to environmental permits have been strengthened – namely by establishing BATC and the BAT-AELs, associated monitoring requirements and other aspects contained therein as the legally binding basis for setting permit conditions. This change has strengthened the legislative basis for both setting tighter and more consistent permit limits and establishing monitoring and reporting requirements which forms an important foundation to support enforcement together with inspections.

Under the IPPCD and sectoral Directives, the provisions on inspections were not as explicit with the result that approaches varied considerably between Member States. As described for the baseline, the share of IPPCD installations which received a site visit inspection between 2012 and 2013 was 50% and the average frequency of inspections carried out per installation ranged between 1 and 6 per year although most were at the lower end of the range. Very few Member States adopted an inspection plan.

The indicators included within the evaluation matrix were as follows:

- The number/frequency of enforcement checks
- Levels of (non-) compliance
- The number of penalties levied.

However, based on the review of available evidence it has not been possible to identify appropriate quantitative data to base the evaluation of this question on. This includes data for the indicators above (except for numbers of site inspections) as well as information on other aspects such as the quality of the actual inspections being undertaken. Therefore, the response to this question is based predominantly on stakeholder feedback.

7.1.5.1 Literature and data sources

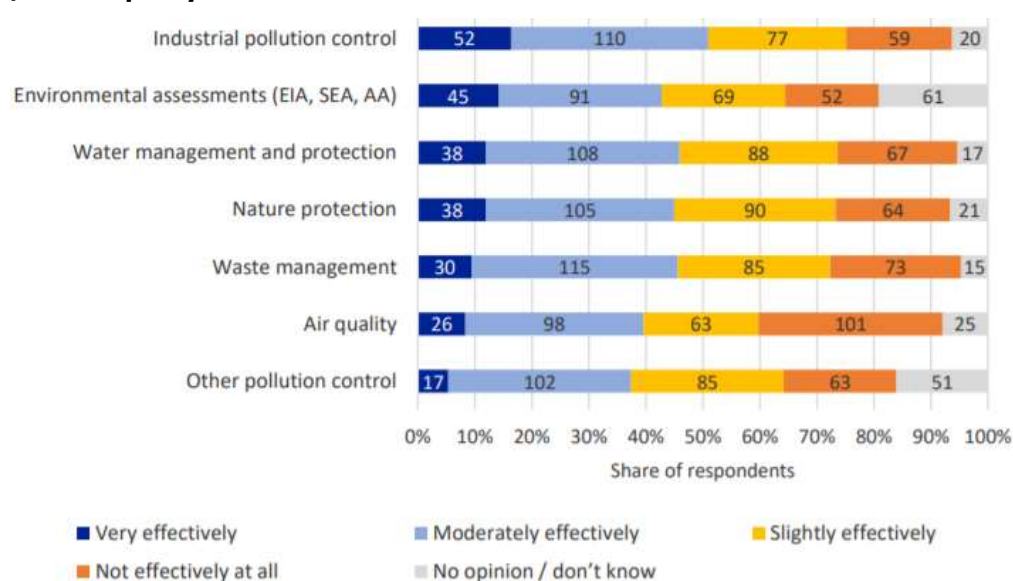
In view of the very large number of installations and the hundreds of competent authorities overseeing them, it is essential for the checking of compliance with IED permit conditions and enforcement action, if needed, to be taken in a decentralised manner. The IED therefore requires permits to contain the measures necessary for checking compliance with the relevant conditions. This includes requiring operators to provide the necessary information to the competent authorities for them to verify compliance with the permit conditions. The emissions monitoring information provided by operators to the competent authorities must be made available to the public.

Under the IED, environmental inspections are required as part of a system that shall be established according to a plan (Article 23). Member State implementation reporting for the year 2013 indicated that 24 Member States had established plans. Furthermore, as part of the Member State reporting on IED implementation for the period 2013-2016, five Member States indicated that inspection plans have been drawn up or updated since the

last reporting period. The effect of these provisions on enforcement is expected to be positive by improving Member State capacity to enforce the IED requirements as well as addressing differences that exist between Member States. Some examples of good practice were also reported by the Member States (Ricardo, 2019d).

(Milieu, 2019) summarises the results of a survey undertaken of environmental practitioners in administrations, businesses and organisations that enforce environmental law and citizens who have a keen interest in compliance and enforcement in their country, region or municipality on how to improve the implementation and enforcement of environmental legislation. The figure below summarises responses to main question of relevance for this evaluation. This shows that of all the thematic areas, respondents were most positive in relation to effective implementation and enforcement of industrial pollution control legislation.

Figure 7-12: Responses from stakeholders to the question: “Do you think that environmental law is effectively implemented and enforced in your Member State / region / municipality?”



Source: Milieu (2019).

Competent authorities are required to carry out inspections of installations at a frequency that depends on the environmental risk posed. Inspections may involve non-routine visits as appropriate. The IED also enlists the support of the public and environmental NGOs who may file complaints about environmental problems related to an installation. If these relate to serious environmental problems, the authority would normally be expected to carry out an inspection and also has the power to suspend operations.

Table 7-2 below provides a provisional extract of Member State reported data on site visits in 2017 and 2018 (reported to the EU Registry in 2019). The provisional data shows significant variation between the Member States in terms of average number of visits per site with an overall average of around 0.5 visits per site per year (i.e. one visit every two years). In contrast, the baseline (see Section 3.3.3.2) assumed an average of one on-site inspection per year (average across all Member States).

Table 7-2: Provisional extract of Member State data on site visits in 2017 and 2018

Member State	Number of sites	2017 site visits	2018 site visits	2017 Visits per site	2018 Visits per site
AT	643	417	163	0.6	0.3
BE	2,125	4,007	4,553	1.9	2.1

Member State	Number of sites	2017 visits	2018 visits	2017 Visits per site	2018 Visits per site
BG	420	357	428	0.9	1
CY	95	101	108	1.1	1.1
CZ	3,283	776	816	0.2	0.2
DE	9,145	3,848	3,827	0.4	0.4
DK	2,564	1,728	1,477	0.7	0.6
EE	163	59	59	0.4	0.4
ES	6,957	0 (Note 1)	401	0	0.1
FI	924	858	860	0.9	0.9
FR	8,651	1,369	1,369	0.2	0.2
GR	405	73	47	0.2	0.1
HR	335	195	203	0.6	0.6
HU	1,250	1,148	966	0.9	0.8
IE	913	1,525	1,469	1.7	1.6
IT	6,286	2,672	No data	0.4	No data
LT	450	222	228	0.5	0.5
LU	42	19	17	0.5	0.4
LV	98	124	128	1.3	1.3
MT	No data				
NL	3,842	1,300	2,567	0.3	0.7
PL	3,412	1,005	1,140	0.3	0.3
PT	832	12	243	0	0.3
RO	1,043	1,999	1,668	1.9	1.6
SE	1,366	1,423	1,591	1	1.2
SI	237	90	130	0.4	0.5
SK	No data				
UK	9,386	5,884	4,900	0.6	0.5
Total	65,184	31,281	29,430	0.48	0.45

Note 1: Spain reported zero inspections for 2017 as part of its submission to the register. It is unclear if this actually the case or whether it is an error in reporting.

Source: Member State reporting to the EU Registry in 2019.

Where operators are found to not be respecting permit conditions, it is for the relevant competent authority to take enforcement action. It would normally be expected that once operators are informed by a competent authority of any shortcoming in their compliance with permit conditions, they would rectify those within the period required. It is only in case of uncooperative operators or very serious pollution incidents that action before a court might be needed. Since there is no obligation for Member States to report information on such compliance problems, very limited information is available about enforcement action or court cases. The available information suggests that there might annually be court cases affecting less than a few tenths of a percent of all IED installations (European Commission, personal communication).

Little information is available on penalties actually imposed as a result of those cases due to the lack of a central register. However, data gathered on the type and scale of penalties that may be imposed under IED Article 79 shows a significant variation in these among Member States and that these have changed little from those under the IPPCD

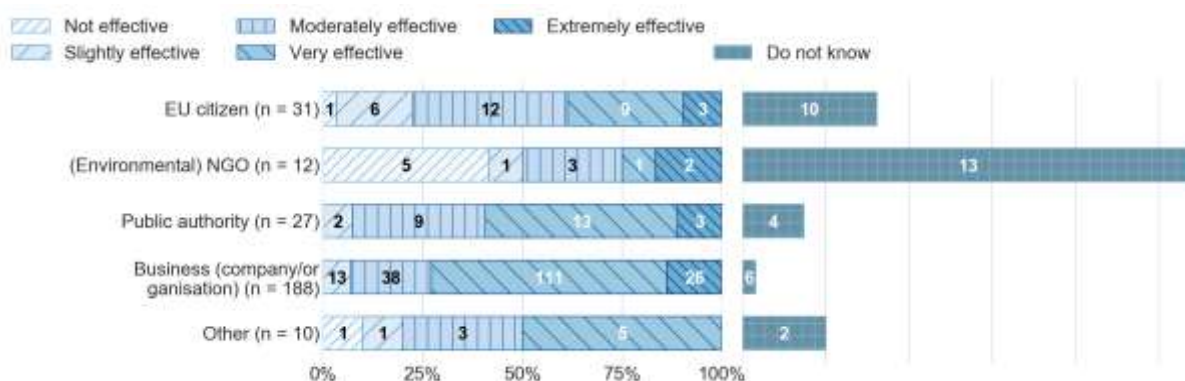
(summarised in Annex 13 based on (European Commission analysis, personal communication) in turn informed by (Milieu, 2011) and (Metro, 2002).

Under the IPPCD, the main instrument to facilitate access to information on industrial emissions was the E-PRTR. Reporting of permits and information on installations under the IPPCD was via the Industrial Reporting Information System (IRIS). The extent to which public involvement contributed to enforcement and environmental improvement was not assessed by the IA. As such it is not possible to determine if provisions are more effective under the IED – this uncertainty is reflected in stakeholder responses.

7.1.5.2 Stakeholder views

The OPC had two questions looking at strengthening provisions of enforcement and environmental improvements, while the targeted survey had one question on this. Figure 7-13 shows the extent to which permits are considered effective (in the OPC) in controlling the environmental impacts of large industrial installations. This question shows that over 97% of respondents believe that permits are having some effect on this, with almost 65% believing that permits have been either very or extremely effective. Environmental NGOs are less confident about the effect of permits to control environmental impacts, with 50% of responses stated they have had no effect or only slightly effective. Comparatively, 73% of business responses stated that these permits had been very or extremely effective.

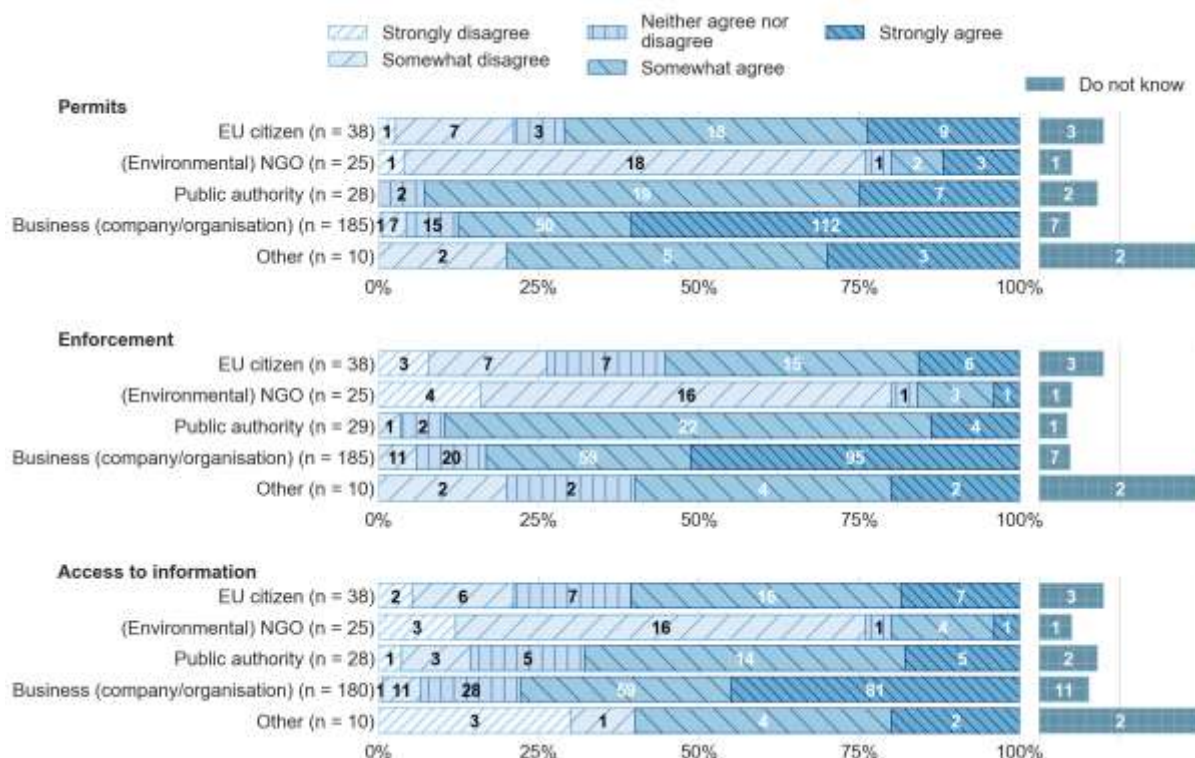
Figure 7-13: Responses from the OPC to the question: “To what extent are permits issued to large industrial installations based on the IED and BREFs effective in controlling the environmental impacts of those installations?”



Source: Open Public Consultation

The final question in the OPC (relevant to this evaluation sub-question) asked about the extent to which various provisions in the IED led to more effective control of the impacts of large industrial installations; responses to this were split by three key provisions, permits, enforcement and access to information.

Figure 7-14: Responses from the OPC to the question: "To what extent do you agree that the provisions of the IED on the following (permits, enforcement and access to information) have led to more effective control of the environmental impacts of large industrial installations?"



Source: Open Public Consultation

The trends between stakeholder groups were consistent across the three provisions (as well as the previous question). Business and public authorities have similar high levels of agreement (combining somewhat and strongly agree) that the provisions of the IED on permits (88%, 162 out of 185 responses; 93%, 26 out of 28 responses, respectively) and on enforcement (83%, 154 out of 185 responses; 90%, 22 out of 27 responses, respectively) have led to more effective control of the environmental impacts of large industrial installations. Related responses for access to information are lower at 78% for business (140 out of 180 responses) and 68% for public authorities. At least 55% of EU citizens agree (somewhat or strongly) for all three sub-questions. The majority response from environmental NGOs is (somewhat/strong) disagreement with levels being 76% to 80% for the three sub-questions.

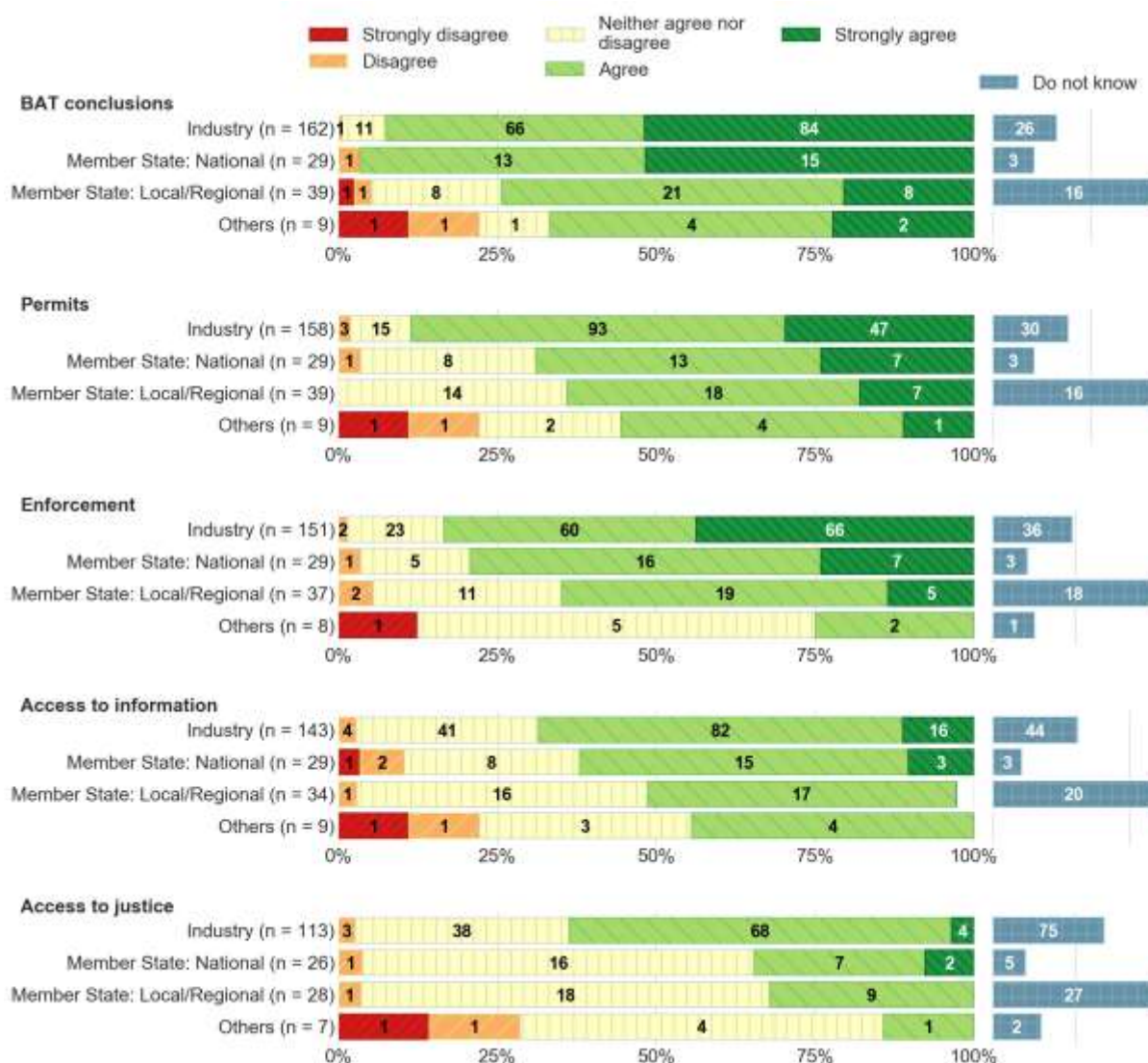
Figure 7-15 presents responses to the targeted stakeholder survey regarding how provisions of IED have led to more effective control of the environmental impacts of large industrial installation, specifically in relation to the previous IPPC and sectoral Directives. This questions closely follows Figure 7-14 and the related question from the OPC. However it includes additional provisions: 'BAT conclusions' and 'Access to justice'.

On the whole, these responses closely follow the previous OPC question, which is to be expected. The only divergence is the 'access to justice provision (which is not included in the OPC question), and for which a larger proportion than for the other question elements (44%) indicated they 'neither agree nor disagree' that access to justice has led to more effective control of environmental impacts (although it is also worth noting that just over 50% of responses agreed or strongly agreed with the same statement).

A majority of responses, across all stakeholder types agreed that the use of BAT conclusions and permits has led to better control over environmental impacts. The same can be said for enforcement and access to information as provisions, except for the "other"

stakeholder group, where there was less agreement on the impacts of these provisions. Respondents were also less in agreement on 'access to justice'; while a majority of industry responses agreed or strongly agreed, for all other stakeholders 'neither agree nor disagree' was the most frequent response.

Figure 7-15: Responses from the targeted survey to the question: "To what extent do you think that the provisions of the IED on the following have led to more effective control of the environmental impacts of large industrial installations relative to the situation under the IPPC and sectoral Directives (i.e. prior to the adoption of the IED)?"



Source: Targeted stakeholder survey

Analysis of the accompanying open text responses to this question provides further insights on the responses. The most frequent response from industry was that it is too early to tell and while these provisions may have led to some improvements, it is not possible to say for sure. Another common response was that the binding (as opposed to voluntary) nature of the BAT Conclusions (and primarily the BAT-AELs) had led to more effective control. Member States echoed a similar response, saying that the binding nature of BAT-AELs in the BAT Conclusions has helped authorities impose stricter ELVs. Other responses present a more mixed picture. The EEB highlighted that while BAT-AELs are now binding, several other aspects of the BAT conclusions are not, and therefore are largely ignored. The point about tighter limits was flagged by some Member States as part of their IED implementation reporting for the period 2013 to 2016 in that some authorities

have found it challenging to set permit limits lower than the upper BAT-AEL as it is often challenged by industry.

7.1.6 Has the Directive stimulated innovation in the prevention and control of pollution from industrial activities?

One of the objectives of the IED is to stimulate innovation, including specifically through the development and deployment of new techniques. The IED and its associated development of BAT and emerging techniques forms part of the EU's approach to eco-innovation (ICF, 2015).

The main tools in the IED in this context i.e. specifically targeting innovation are:

- The identification of "emerging techniques" within the BREF process for each sector
- Encouraging the use of emerging techniques through specific provisions in the IED

Article 3 of the IED defines an "emerging technique" as "*a novel technique for an industrial activity that, if commercially developed, could provide either a higher general level of protection of the environment or at least the same level of protection of the environment and higher cost savings than existing best available techniques*".

Furthermore, the adoption of BAT Conclusions and their use for establishing permit conditions for industrial installations should drive the deployment of BAT across the EU (albeit of commercially available technologies).

Section 7.2 covering EQ2 goes into more detail evaluating the BREF process overall.

7.1.6.1 Literature and data sources

Identifying emerging techniques through the BREF process to stimulate innovation

The identification of emerging techniques in the BREF process is required by the IED through Article 3(11) and Article 13(2)(c), and this is further confirmed in the BREF Guidance i.e. Commission Implementing Decision 2012/119/EU. Each BREF includes a chapter on emerging techniques, which acts as an indication of future techniques that could in the future (i.e. 'if commercially developed') be considered as best available techniques. There is therefore a pathway for stimulating innovation by identifying techniques as 'emerging techniques' in the BREF, which, as a published document referred to quite widely across the EU and further afield, provides a platform to advertise these techniques to readers of the BREF. It encourages the continual focus on further reducing the environmental impacts of industrial activities ('either a higher general level of protection of the environment') or innovating in ways save costs compared to existing BAT ('higher cost savings').

Positives have been identified. The EIPPCB considered that the BREF review cycle has stimulated innovation: the EIPPCB understands (from contact with technique developers/equipment suppliers and operators) that the technique developers are aware of the BREF process, and sector representations are able to anticipate that there will be an updated BREF in e.g. a 10-year cycle. The EIPPCB have indicated, as part of this evaluation, that some of these stakeholders try to develop, test or commission new techniques to coincide with this anticipated timetable, so that the next BREF review captures the outcome from this development. An example was cited of the Cement & Lime (CLM) sector which specifically highlighted to the EIPPCB that they were undertaking / supporting innovation activity in advance of the start of the CLM BREF review, as the industry is anticipating lower BAT-AELs. Nevertheless, overall the extent of the BREF process to reach out to technique developers is limited by the membership of TWGs (see Section 7.2.2.5).

It is acknowledged that the scope of the BREF reviews may limit its impact: the BREFs focus on available techniques (the Seville process is backward looking), i.e. not those which are currently under development and not commercially available. The BAT-AELs

effectively are backward-looking, not forward-looking as they reflect what has already been achieved in industry to date (at least by some plants/installations). This in a sense limits the potential for the BREF process to stimulate breakthrough innovation. The parts of the BREFs on emerging techniques showcase possible future solutions, but one has to recognise that it is not currently considered the main focus of the BREF process (and hence has been the subject of attention for an Innovation Observatory – see more below). The EIPPCB believes that if the upper ends of the BAT-AELs are too ambitious, for example with an intention to promote innovation, it can risk plant closures or relocation outside Europe rather than stimulating innovation.

The identification of emerging techniques within the BREF has been undertaken under IPPCD as well as under the IED. What is different under the IED, in relation to the BREF process, is the way in which emerging techniques have been identified. Previous work has been undertaken to explore the potential for improving the exchange of information concerning emerging techniques, which is linked to the support for innovation. That project included a study to identify options for improving the information exchange on emerging techniques (ICF, 2015).

To address identified issues with the information exchange process for emerging techniques, one conclusion from ICF (2015) was to establish an 'Innovation Observatory' for novel techniques. Since 2018, a trial operation of an Innovation Observatory has been undertaken, to support the BREF review processes for the Textiles (TXT) and Slaughterhouse/Animal by-products (SA) sectors. This trial is being led by Ricardo and is currently ongoing, with website https://ied_innovation_observatory.vito.be. The purpose of the Innovation Observatory, compared to existing practices of identifying emerging techniques in the BREF process, is to:

- (1) more consistently capture information on emerging techniques (i.e. using the 10 heading format);
- (2) increase stakeholder engagement in the information exchange process (i.e. greater involvement of stakeholders specifically relevant to emerging techniques but who have not been represented in the TWGs);
- (3) improve the timing of when information is gathered on emerging techniques (i.e. to more regularly update information on techniques under development).

The Innovation Observatory has delivered outputs identifying emerging techniques to the kick-off meetings of the BREF reviews of the TXT and SA sectors, as well as identifying potential candidates for BAT. Initial anecdotal feedback suggests that the Observatory has improved the process for identifying emerging techniques. Whether this has also specifically stimulated innovation (i.e. encouraged additional innovative activity in the design and development of techniques that wouldn't have otherwise occurred) is unclear.

The ICF (2015) study also identified good practices in Member States regarding methods for encouraging the development and application of emerging techniques, and identified synergies between EU programmes supporting eco-innovation and the BREF review process. The study found that there are a variety of programmes in place at national level to support the development of techniques (including funding programmes, tax incentives, competitiveness clusters, information portals, and administrative measures), but that there is (or 'was' in 2015) considerable scope for improving the support provided to the development and application of such techniques in the IED sectors. It was found that a limited number of Member States have a comprehensive framework to support the development and implementation of emerging techniques.

ICF (2015) identified five Member States as having programmes or mechanisms in place to support the development or implementation of emerging techniques (Belgium, Germany, France, the Netherlands and Spain). Whilst Article 27(2) of the IED requests the Commission makes guidance available to Member States to encourage the development and application of emerging techniques, no such guidance has yet been published (although the instigation of the Innovation Observatory acts to some extent towards

meeting this need). For those Member States that do have support in place to encourage emerging techniques, there is no evidence in ICF (2015) to suggest that these programmes were put in place as a direct result of the IED, and some of the programmes clearly predate the IED (those in the Netherlands and Germany). However there is a strong coincidence for example, that the CORTEA programme in France and the Ecology Premium Plus scheme in Belgium were both launched in 2011, the same year as the IED was adopted.

Whilst not attributable to the IED itself, there are some links between the EU’s eco-innovation policies and the IED which helps to better stimulate innovation. ICF (2015) identified that many of the schemes in place to support eco-innovation and the development of emerging techniques do not directly relate to the IED or the BREF review process. The few existing links that were identified in ICF (2015) were in the following schemes: Horizon 2020, EU Environmental Technology Verification (ETV). For the most part however, the same study identified several actions to improve the links between the IED and its BREF process and eco-innovation policies; the policies and initiatives are shown in Figure 7-16. Therefore it is concluded that there was rather limited integration between the IED/BREF process and EU policies on eco-innovation.

As a further example, there have been more recent efforts to highlight the links between the EU ETV programme and the BREF process and Innovation Observatory. A Joint meeting of the ETV Steering Group and Technical Working Groups held in June 2019 sought to identify overlaps ETV and BREF process, and proposed a future approach of:

- Verification Bodies to be aware of the work of the Innovation Observatory and the planned revision of BREFs
- Statements of Verification of technologies potentially relevant for IED to be communicated to the Innovation Observatory
- Innovation Observatory and BREF expert groups to consider ETV verified technologies to be referenced where appropriate.

Figure 7-16: EU programmes to support the development of clean technologies and eco-innovation (situation in 2014) – reported in ICF (2015).

TRL1-2	TRL 3-4	TRL 5-6	TRL 7	TRL 8-9		
Basic R&D	Applied R&D	Early Demonstratio	Full-scale demonstration	Commercialisati on	Market accumulation	Diffusion
Common Strategic Framework for Research and Innovation						
Horizon 2020 including the legacy of IEE						
FP7 – Ongoing research projects*						
			SILC			
			LIFE Environment			
			LIFE Climate Action			
			EIP – Eco-innovation Market Replication*			
Research Fund for Coal and Steel						
SPIRE						
Factories of the Future						
				EU ETV Pilot Programme		
				Task Force for Advanced Manufacturing		
SETIS						

COSME – Competitiveness of Enterprises and Small and Medium-sized Enterprises

EIP – Entrepreneurship & Innovation Programme
IEE – Intelligent Energy Europe
ETV – Environmental Technology Verification
FP7 – The Seventh Framework programme
SILC – Sustainable Industry Low Carbon Scheme
SPIRE – Sustainable Process Industries through Resource and Energy Efficiency
SETIS – Strategic Energy Technologies Information System

Encouraging the use (uptake and testing) of emerging techniques

The IED itself includes a means to encourage the use of emerging techniques.

- a) Recital (17): *“In order to enable operators to test emerging techniques which could provide for a higher general level of environmental protection, or at least the same level of environmental protection and higher cost savings than existing best available techniques, the competent authority should be able to grant temporary derogations from emission levels associated with the best available techniques.”*
- b) The possibility to have permit limit values deviating from BAT-AELs to accommodate the testing of emerging techniques in Article 15(5):

“The competent authority may grant temporary derogations from the requirements of paragraphs 2 and 3 of this Article and from Article 11(a) and (b) for the testing and use of emerging techniques for a total period of time not exceeding 9 months, provided that after the period specified, either the technique is stopped or the activity achieves at least the emission levels associated with the best available techniques.”

- c) The IED encourages MS to develop and apply emerging techniques in Article 27:

“1. Member States shall, where appropriate, encourage the development and application of emerging techniques, in particular for those emerging techniques identified in BAT reference documents.

2. The Commission shall establish guidance to assist Member States in encouraging the development and application of emerging techniques as referred to in paragraph 1.”

In practice, only three cases have been identified across the EU for the sectors that have had detailed IED implementation reporting - glass and iron and steel (Ricardo, 2019d). To try to understand the reason for this low take up, feedback provided by stakeholders during the Focus Groups has indicated that a likely reason for the low take up of this flexibility mechanism has been the short length of time allowed for this derogation (9 months), compared to the expected length of time needed in practice for implementing and testing emerging techniques (indicated by selected Member State authorities to be 3 to 4 years). Overall therefore, the low uptake of Article 15(5) derogations suggests the IED has not stimulated innovation through encouraging the testing of not-yet-commercialised techniques.

Deployment of BAT

In addition to the development of BAT and identification of emerging techniques discussed above, the main impact of the IED has been deployment of BAT itself across the EU (albeit of commercially available technologies). This is due to the adoption of the BATC and their use in establishing permitting conditions for individual installations. The extent to which the IED has enabled Member States to implement BAT-based permitting is discussed in EQ2 in Section 7.2.4.

The market for relevant techniques is larger in the EU than it would otherwise have been and has grown strongly in recent years and is expected to continue to grow further in future years e.g. as documented in various market assessment studies⁵⁸. The market

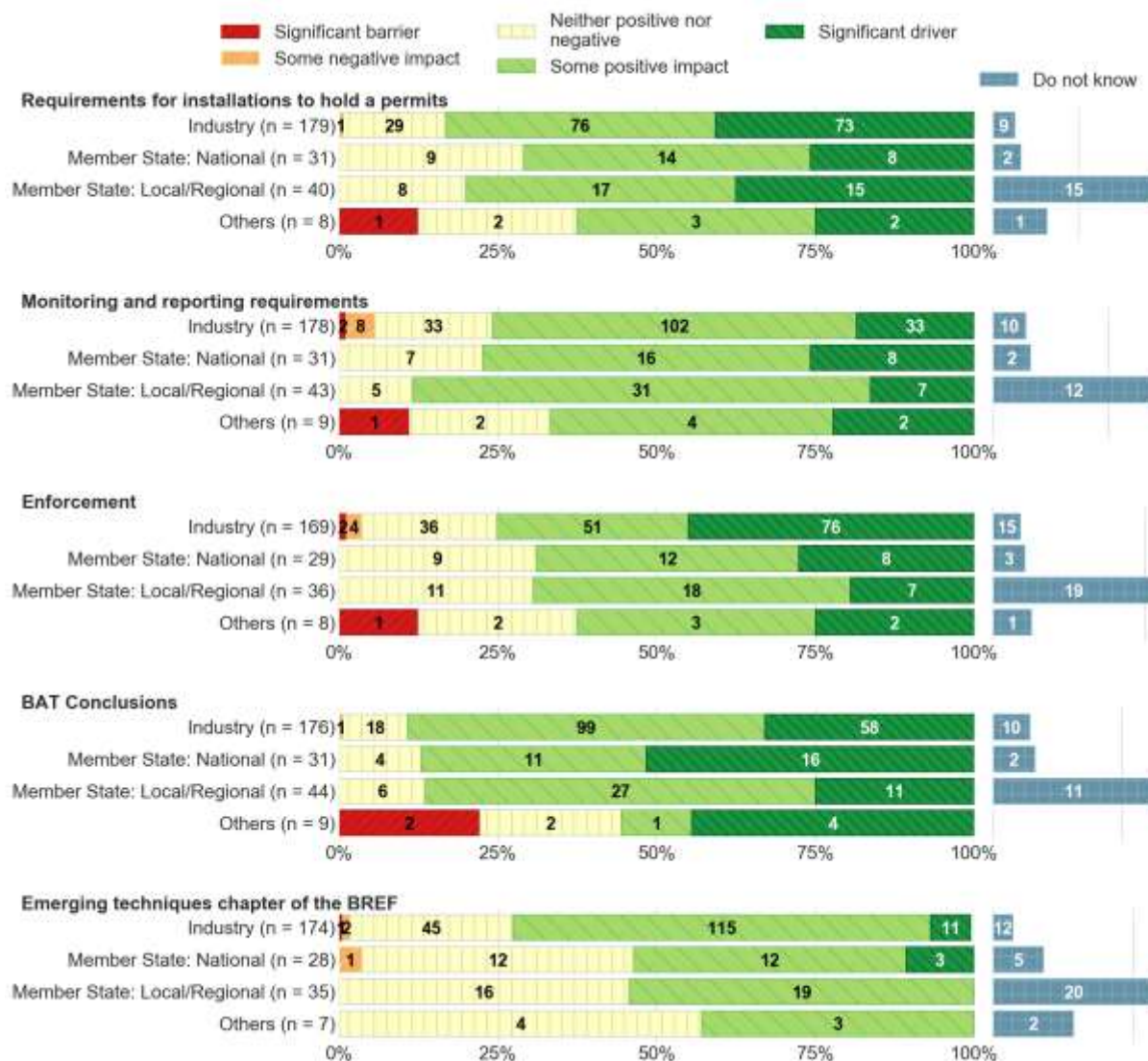
⁵⁸ <https://www.inkwoodresearch.com/reports/europe-air-pollution-control-system-market/>

outside is also stimulated to the degree other jurisdictions copy aspects of the IED or BREFs e.g. Russia, Korea.

7.1.6.2 Stakeholder views

The targeted survey asked respondents to comment on which elements of the IED and BREF process have had the greatest impacts on driving innovation; the results of this are presented in the figure below.

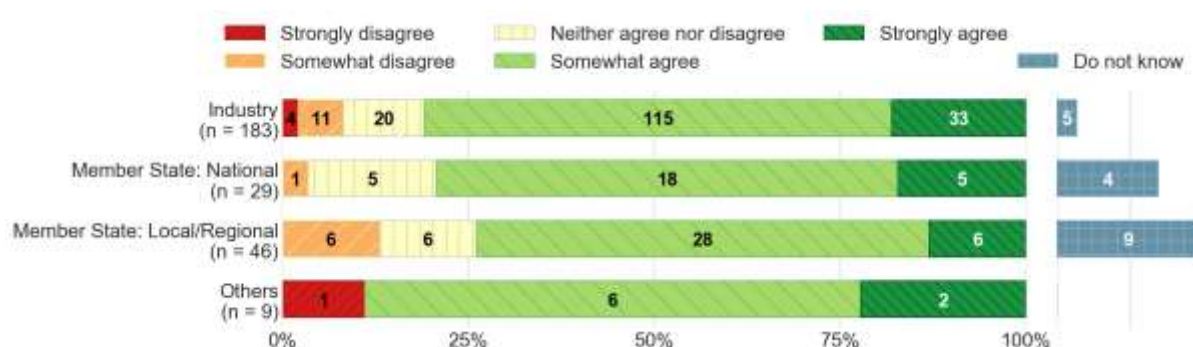
Figure 7-17: Responses from the targeted survey to the question “Which elements of the IED and BREF process have the greatest impact on driving innovation in the prevention and control of pollution from industrial activities?”



Source: Targeted stakeholder survey

The targeted survey also asked stakeholders the extent to which they consider the IED and BREFs and BAT conclusions have stimulated innovation. The results (Figure 7-18), confirm that the majority of respondents (213/267, 80%), across all stakeholder groups, somewhat or strongly agree with the statement. A minority (23/267, 9%) somewhat or strongly disagree and thus consider the IED and the BREFs/BAT conclusions do not stimulate innovation. Only a small proportion of respondents responded that they did not know (18/285, 6% of all respondents) or neither agreed nor disagreed (31/267, 12%).

Figure 7-18: Responses from the targeted survey to the question "To what extent do you think that the regulation of environmental impacts through the IED and development of BREFs and BAT Conclusions has stimulated innovation in the prevention and control of pollution from industrial activities?"



Source: Targeted stakeholder survey

Respondents provided additional feedback to support their answers to the questions asked in Figure 7-17 and Figure 7-18. Several industry organisations highlighted that it is not the role of the IED to drive innovation. Moreover, while many commented that the BREF process may be 'a driver' it is not 'the driver'. Other stakeholders indicated that the BREF process does not induce innovation but rather facilitates the spreading of information on current innovations to other installations and industries who may not have considered the techniques. Some Member States stated that the timescales concerned (e.g. in the Seville process) were simply too long to be a driving force for innovation. On the other hand, this resulted in a more universal application of abatement techniques which could be seen as a form of innovation. Some stakeholders considered that the length of the BATC implementation period was often not long enough to test and implement emerging techniques. This typically resulted in resorting to implementing techniques that had previously been in place before instead.

There was a separate question in the survey asking whether the composition of the Technical Working Groups assembled for the BREF review process was considered to help stimulate innovation. This is discussed separately in EQ2 in Section 7.2.2.5.

7.1.7 Has the IED led to simplification of the legislation and cut unnecessary administrative burden?

The discussion for this EQ focuses on whether or not the IED led to simplification of the legislation primarily through the merging of seven previously separate Directives. Overall administrative burdens are considered under EQ7 in Section 7.7.

The Commission formalised an overall goal of reducing administrative burden, as expressed in the EU staff document on the Action Programme for Reducing Administrative Burdens⁵⁹ When reflecting on this goal for the IED, the IED Impact assessment states the following:

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. 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. [...] 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.

⁵⁹ https://ec.europa.eu/info/sites/info/files/action-programme-for-reducing-administrative-burdens-in-the-eu-final-report_dec2012_en.pdf

As the IED brought together previously seven separate directives, it was expected that the regulation would be able to simplify the environmental standards for industrial sectors under a common framework, as well as clarify and simplify permitting and reporting processes. This evaluation question emphasizes the reduction of *unnecessary* administrative burden, not overall burden. At the IED regulatory level, this could be caused by overlapping regulations applying to the same industrial process and/or outdated provisions that are not used/should not be used by any Member State, leading to obsolete reporting requirements. On the implementation side, there can be an unnecessary burden if the IED is ambiguous in its legal requirements, which could contribute to different permitting conditions/requirements for companies across the EU based on interpretation differences.

7.1.7.1 Literature and data sources

The 'Fitness check on Reporting and Monitoring of environment legislation' is an EU initiative to review the state of play on reporting environmental data to the EU. This was initiated as part of the Better Regulation agenda, which explicitly states the EU will '*Launch a broad review of reporting requirements to see how burdens can be alleviated.*'⁶⁰ Among the reasons to carry out the 2017 Fitness Check, the EU states that '*reporting can be creating sometimes unnecessary extra administrative efforts without clear benefits*'⁶¹

The fitness check states that '*Industrial emissions legislation, including EPRTTR regulation and IED, has a relatively large overall reporting burden but this is primarily related to the EPRTTR which requires reporting by large numbers of individual operators – majority of this burden stems from internationally-derived obligations (UNECE Kiev protocol) rather than EU legislation.*' A review of the IED reporting requirements was carried out, and for each major reporting element of the IED the significance of the administrative burden is estimated. Based on each conclusion on the 11 studied reporting obligations, no evidence was presented here that indicated significant *unnecessary* reporting burden arises from the IED⁶².

Furthermore, no direct evidence was identified from any other literature on any identified unnecessary burden.

7.1.7.2 Stakeholder views

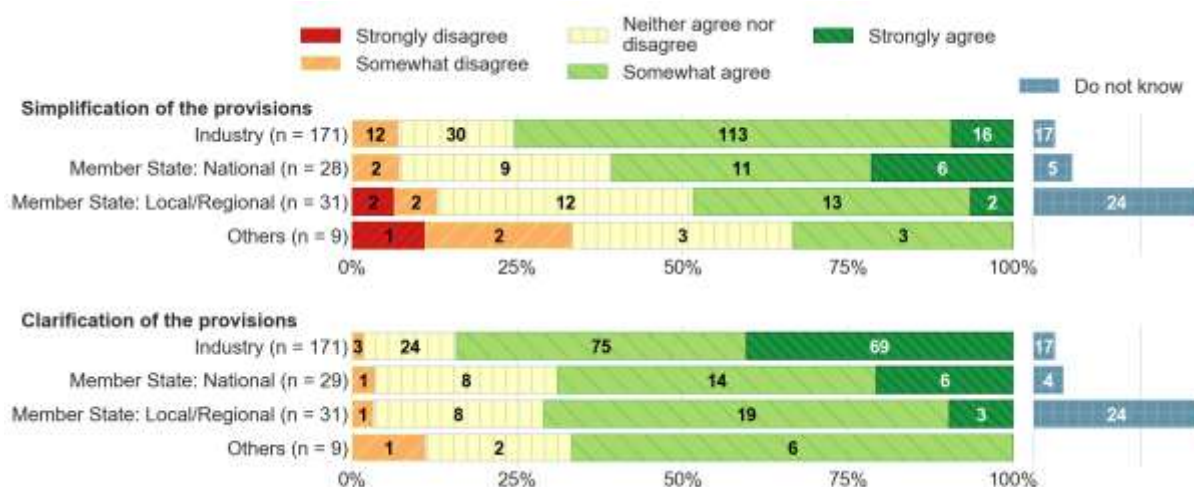
The targeted survey asked stakeholders various questions on the impacts of the IED on reducing unnecessary administrative burden and simplification of regulation. The results from these questions are summarised below.

⁶⁰ https://ec.europa.eu/info/law/law-making-process/planning-and-proposing-law/better-regulation-why-and-how_en

⁶¹ https://ec.europa.eu/environment/legal/reporting/fc_overview_en.htm, bullet point 3 under header "Why a Fitness Check?"

⁶² ICF, IEEP (2017) Support to the Fitness Check of monitoring and reporting obligations arising from EU environmental legislation
https://ec.europa.eu/environment/legal/reporting/pdf/Reporting%20and%20monitoring/support_fitness_check_report_annexes.pdf

Figure 7-19: Responses to targeted survey to the question: "By bringing the [permitting, monitoring, reporting] requirements of previously separate Directives together into one instrument, to what extent do you think that the IED has achieved the following relative to the previous regime?"

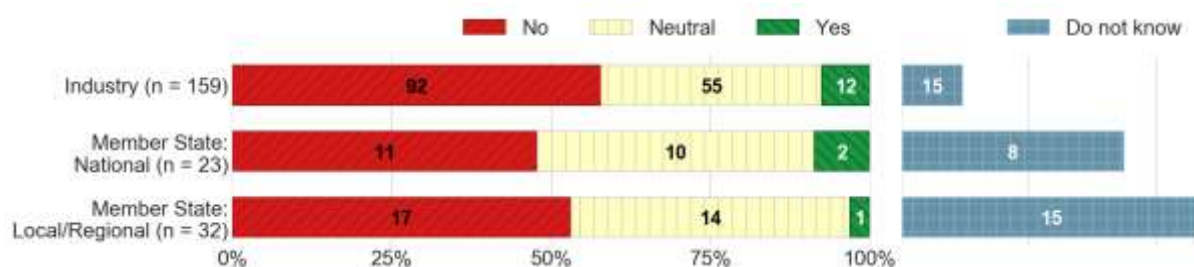


Source: Targeted stakeholder survey

Overall, nearly 70% of respondents somewhat agreed (59%) or strongly agreed (10%) that the IED has contributed to simplification of the provisions relative to the previous regime. 21 respondents in total (~ 9%) disagreed (somewhat disagree / strongly disagree) with the statement. Notably, industry was most positive about simplification, whereas Member State authorities and others were less positive, though never to a point where > 40% of any respondent group disagreed with the statement on simplification.

Regarding clarification of provisions, the respondents are also generally very positive. 80% of all respondents somewhat agreed (48%) or strongly agreed (33%) that the IED has contributed to clarification of the provisions compared to the previous regime. Industry is again the most positive (84%), with the other stakeholder groups averaging around 70% positive answers. Only very few respondents (2.5% of the total) had a negative opinion to this statement.

Figure 7-20: Responses to targeted survey to the question: "Has the implementation of the IED led to a reduction in unnecessary administrative burden for industrial installation operators/Member State competent authorities?"



Source: Targeted stakeholder survey

When asked whether the implementation of the IED has led to a reduction in unnecessary administrative burden for operators and/or Member State competent authorities, the respondents are generally negative to neutral. 56% of total respondents disagreed with the statement, with Industry being the most negative. Only few respondents among stakeholder groups gave a positive response (7% of the total), with only few Member State authorities across national and local/regional government (3 out of 55, 5%) agreeing with the statement.

Additional written feedback received as part of the survey focused more on perceived additional administrative burdens under the IED (primarily from industry) such as the requirement to develop baseline reports. It should be recognised however that no examples were provided by industry that evidence this being an unnecessary requirement. Section 7.7 on EQ7, on the administrative burden of the IED, covers this topic in more detail. Some industry stakeholders did highlight the complexities of being regulated under Chapters II and III-V of the IED for some sectors (e.g. LCPs) with differing requirements e.g. averaging periods. Some Member States also flagged this as an issue leading to additional burden for regulatory authorities. For these stakeholders it was felt that the IED has not simplified or clarified the provisions.

7.1.8 Has the IED strengthened public access to information? How does it compare to the previous situation?

A core element of the IED, and the IPPCD before it, relates to public access to information on industrial installations operating in each Member State including details of permits that have been or might be granted and their environmental performance. These requirements are intended to enable public participation in the permitting of industrial installations.

The IED IA documented a number of small changes that were subsequently included within the IED itself that would help to improve public access to information and confidence in the permitting process. For example, as part of the considerations of moving towards making the BAT Conclusions from BREFs mandatory the requirement to document any deviations from them was already partially in place for the IPPCD but further strengthened within the IED. The IA considered the additional positive social impacts of this change (moving towards mandatory use of BAT Conclusions and documenting clearly how they have been taken into account) would be to bring more transparency in the permitting of installations and increase the confidence of the public in the permitting regime. Furthermore, with the introduction of Article 15(4) allowing the use of derogations when certain criteria were met, a further requirement for consulting with the public was included before any decisions have been made by the competent authority.

The main changes introduced to the IED relative to the IPPCD are as follows:

- An additional requirement for the public to be consulted when an installation has applied for a derogation from the BAT Conclusions under Article 15(4) and the competent authority is considering granting or updating a permit.
- Additional requirements for competent authorities to make available information on the measures taken by the operator when an installation is closed (with reference to Article 22 which covers site closure and soil and groundwater contamination).
- More specific requirements on the type of information that should be made available to the public when a decision on granting, reconsidering or updating of a permit has been taken. This includes more explicit information on how permit conditions have been determined relative to the BATC.

The main indicators included in the evaluation matrix for this particular question were:







- Level of agreement among stakeholders that public access to information has improved since adoption of the IED.
- Number of MSs providing permits online accessible to the public (including consultations on new and revised permits and derogations).

7.1.8.1 Literature and data sources

The most relevant literature source that has focused primarily on this point of public access to information is the EEB report ("Burning: The Evidence. How European Countries Share Industrial Pollution Permit Information Online. A case study on Large Combustion Plants", 2017) (EEB, 2017). The study examined how effectively the Member States are making information about industrial installations and permits available to the public online. The

study reviewed the websites that Member States (and in some instances regions) have established to share this information and identified significant variation. The websites were assessed against multiple areas including access to permits, emissions and compliance reports, other information and ease of use. Most significantly it found that the minimum requirements of the IED are not met in every Member State. The figures below summarise the findings of the study for each Member State with a number judged as “failing” with respect to the IED requirements.

Figure 7-21: Findings of the EEB’s review in 2017 of public access to information across the EU (Note 1)

Overall Based on all areas assessed	Permit information Were permits available online, were they uploaded in a useful format and was information about permits under review available?	Reports Assessing the presence and quality of inspection and compliance reports
		
Additional Information Assessing the quality of extra information including emissions monitoring data	User Appreciation Based on whether the website was up-to-date and easy to use.	Search feature How good was the county's online search function and were there options for filtering results?
		

Source: (EEB, 2017)

Note 1: Following the presentation of the above findings at the second stakeholder workshop for this evaluation in December 2019, the Finnish authorities provided additional information which, in their opinion, disputed the findings for Finland presented above. They indicated that in Finland there has been a web based service with search utilities on information about environmental and water permits since 2014

(<https://tietopalvelu.ahtp.fi/Lupa/>). It contains information about on-going permit processes and about decisions made. Searches can be made using phase of the permit process, timeframe, permit type, name of applicant and name of commune where the installation is going to be located.

In addition to the specific study referenced above, the EEB also provided details of further research that they have been undertaking more recently to access permits in Germany (EEB, personal communication). This found that a number of regions requested fees for accessing permits in contrast to others within Germany where they were provided free of charge. This is consistent with the findings of Eunomia (Eunomia, 2019) which assessed the stringency of permitting conditions for 112 CLM and 20 I&S permits across the EU (summarised in the figure below).

Figure 7-22: Ease of access of selected permits for CLM and I&S plants

Country	Ease of access	Country	Ease of access	Country	Ease of access	Country	Ease of access
Austria	Yellow	Estonia	Yellow	Ireland	Green	Poland	Light Green
Belgium	Green	Greece	Light Green	Italy	Light Green	Portugal	Green
Bulgaria	Light Green	Spain	Light Green	Lithuania	Green	Romania	Green
Cyprus	Green	Finland	Yellow	Luxembourg	Green	Sweden	Light Green
Czechia	Light Green	France	Green	Latvia	Green	Slovenia	Light Green
Germany	Red	Croatia	Yellow	Malta	White	Slovakia	Green
Denmark	Green	Hungary	Yellow	Netherlands	Light Green	UK	Light Green

Key to ease of access:

Online and easy to find	Online but problems	Not online but easy to obtain	Not online and major issues
Green	Light Green	Yellow	Red

Source: (Eunomia, 2019)

In addition, a recent review of the Member States' IED implementation reports (Ricardo, 2019c) looked at the availability of permit links for the installations reported as part of the 'sectoral spotlight' on iron & steel and glass BAT Conclusions. The figure below summarises the findings of the assessment on this particular issue.

Figure 7-23: Availability of permit links for installations reported in 'sectoral spotlight' on I&S and GLS BATC in the Member State IED implementation reports covering 2013-16



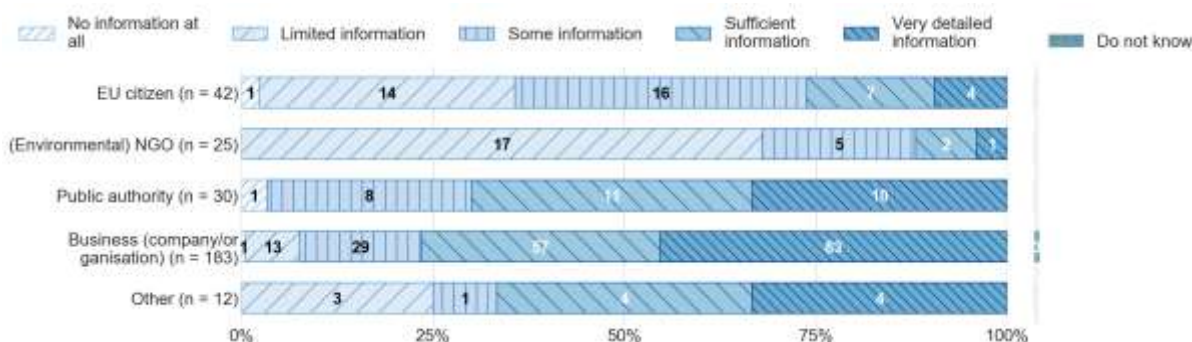
Source: (Ricardo, 2019c)

This showed that whilst a large number of reports provided direct links to permits, there were a number of gaps as well as links that went to general permit portals.

7.1.8.2 Stakeholder views

A number of questions included within the OPC touched upon public access to information and overall knowledge on the permitting process and performance of industrial installations. Overall, the majority of respondents had a good understanding of the authority in charge of regulating industrial installations in their places of interest. The group that is least familiar with their permitting authorities is the environmental NGOs. Slightly less, but still around 80% of all respondents, indicated that they were aware of how to participate in permitting decisions. This was higher for those respondents from industry or public authorities as would be expected. However, it was also lower for the EU citizen and NGO respondents, 32 and 39% of respondents, respectively, stated "No. I don't know". This indicates that those stakeholders not directly involved in the IED had a much lower level of awareness (although still 60% plus).

Figure 7-24: Responses from the OPC to the question "Do you have access to sufficient information on the level of environmental impacts of large industrial installations?"

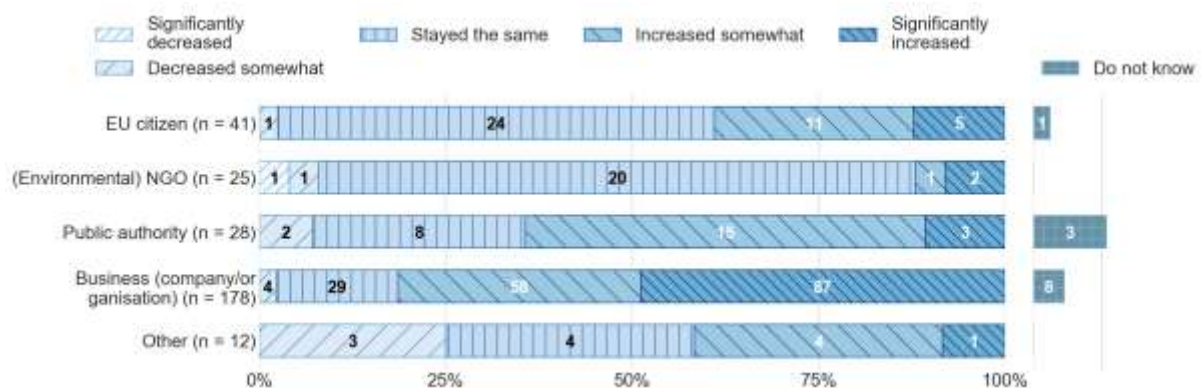


Source: Open Public Consultation

Just over 60% of all respondents to the OPC indicated that they have access to sufficient (or very detailed) information on the level of environmental impacts of large industrial installations. A further 20% indicated that they have access to some information and a further 16% indicated that they only had limited information. Only three respondents indicated that they had access to no information at all. As with previous questions, the picture broken down by stakeholder group is quite varied with 70% or more of respondents from public authorities and industry indicating that they have access to sufficient or very

detailed information. However, for environmental NGOs more than 60% of respondents stated that they only had access to limited information and a further 20% only some information. EU citizens were in between the environmental NGO and industry/public authority responses with 33% indicating that they had access to limited information and a further 38% only some information.

Figure 7-25: Responses from the OPC to the question "In your opinion, the availability of information on the level of emissions from large industrial installations in the last 5 years has...?"

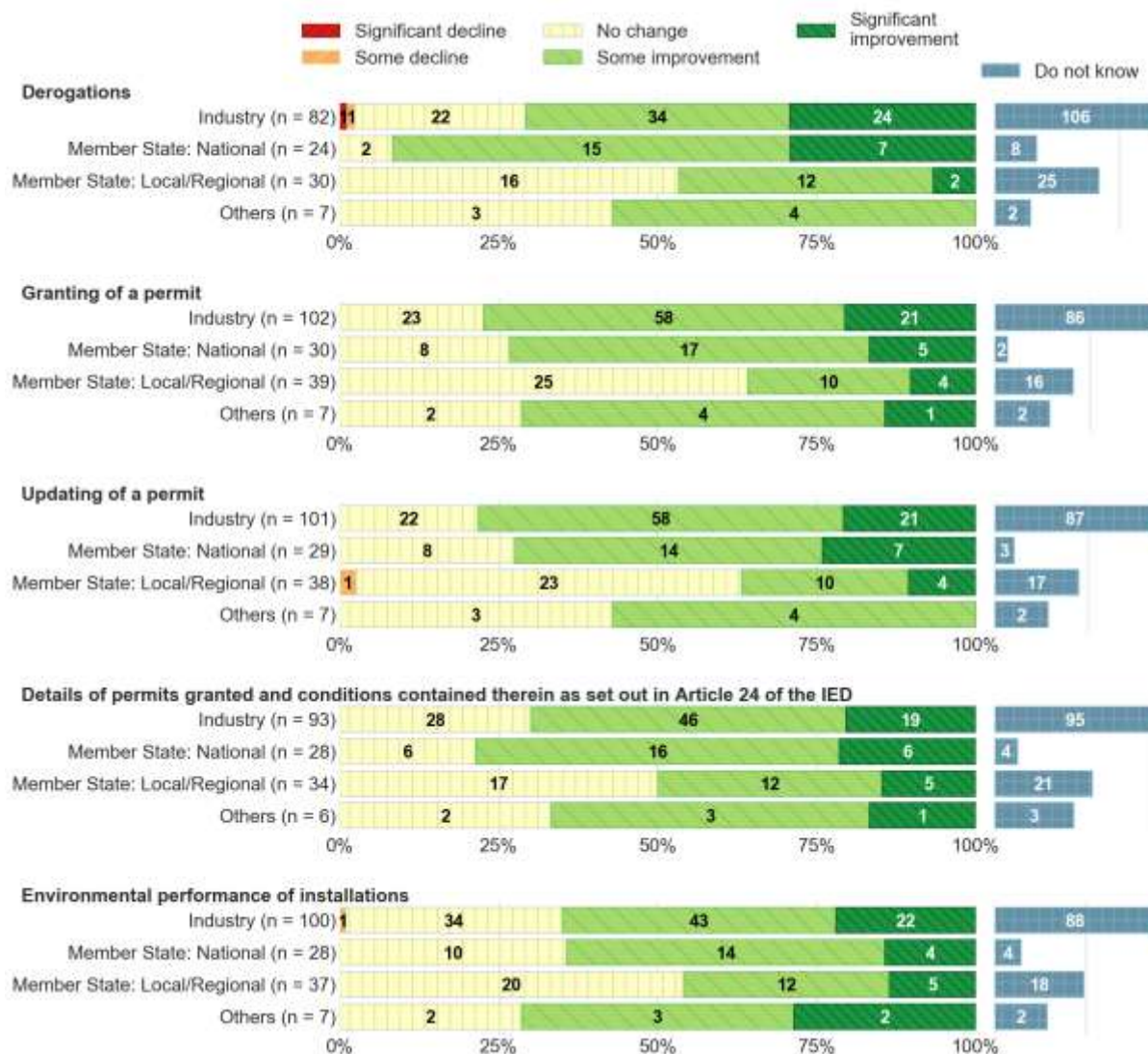


Source: Open Public Consultation

The final figure presented above from the OPC is interesting in that it attempted to understand from respondents whether the availability of information on emissions from industrial installations has changed in the last 5 years to try and understand whether the IED has had any impacts in this regard. Whilst a small proportion of respondents overall feel that it has stayed the same (30%) and an even smaller proportion that it has decreased somewhat or significantly (4% overall), the majority (around 66%) feel that it has increased somewhat or significantly. These overall results have been skewed by the level of responses from industry where more than 80% of respondents feel that the availability of information has increased somewhat or significantly in the last five years. For EU citizens (59%) and environmental NGOs (80%) the majority have indicated that it has stayed the same.

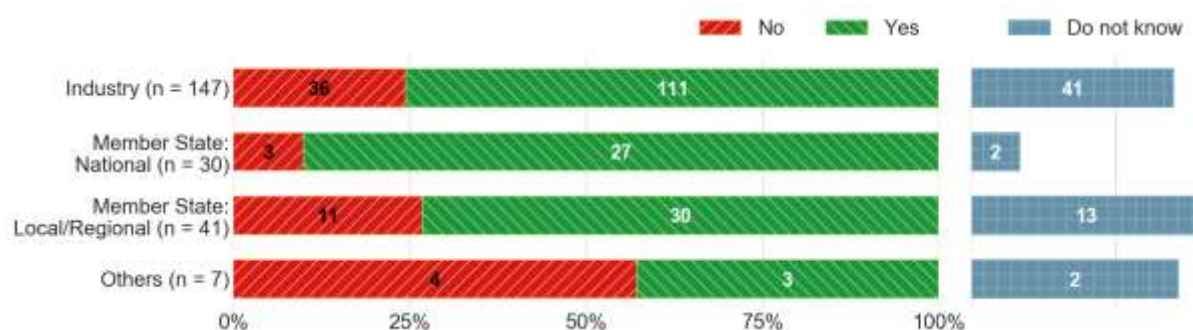
Supplementing the OPC analysis above, two questions were also included within the targeted survey related to public access to information. The overall analysis of responses is provided in the following figures with open text responses discussed further below.

Figure 7-26: Responses from the targeted survey to the question “To what extent has the IED improved public access to information on the following relative to the situation under the IPPC Directive?”



Source: Targeted stakeholder survey

The responses to this question show some interesting trends with very limited variability between the perceived public access to information relating to different elements of the implementation of the IED, permitting and performance of industrial installations. There are differences in perception between stakeholder groups although overall most stakeholder groups have expressed similar views except for local/regional Member State authorities where there is typically a more negative view on how things have changed or not (higher proportion of respondents indicated that there has been no change in public access to information). It is also worth noting that around half of industry respondents stated that they did not know how public access to information has changed under the IED. However, the requirements for public access to information sit with the competent authorities so this is perhaps not such a surprise.

Figure 7-27: Responses from the targeted survey to the question “Are permits easily accessible and available via the Internet?”

Source: Targeted stakeholder survey

The figure above is valuable as it asked respondents whether permits are easily accessible and available via the internet, a core requirement of the IED. Overall around a quarter of respondents stated “no” to this question, there were also a relatively high number of respondents who did not know although these were mainly from industry. Four out of seven “other” respondents felt that permits were not easily accessible and available whereas only 10% of Member State national level authorities responded the same way. Around 25% of industry and local/regional level competent authorities responded negatively.

In addition to the questions above, the targeted survey invited stakeholders to provide further information to justify their responses. A number of industry respondents indicated that the availability of permits for their plants varied considerably between Member States. Various stakeholders indicated that whilst permits are typically available, they can often be difficult to find and require knowledge of how some competent authority websites were structured and functioned to be able to locate the right information (in particular, where permitting is dealt with by local and regional authorities and permits are not held in a centralised database).

The EEB believe that public participation is too limited due to a narrow interpretation by some Member States of what is required by the IED, along with the Aarhus Convention (or simply not in line with the requirements). With respect to derogations, the EEB stated that certain countries inform the public concerned after a derogation decision has been granted or refrain from providing that information on time, when all options for decision-making are still open. The EEB have indicated that some Member States also consider that no public participation is required when the ELV setting is within the BAT-AEL ranges

In addition to the EEB study already discussed above and EU best practice examples, the EEB also provided other non-EU examples as illustrations of “best practice” and potential inspiration for the EU; these included the “Blue Sky” map⁶³, developed by IPE in China (real time maps at facility level are available on water quality, waste water, air emissions and air quality) and the US Air Markets Program Data system⁶⁴. Through this system, hourly averaged raw monitoring data can be downloaded at unit and monitoring location level, with various search filters and queries options (abatement techniques types, boiler or fuel types etc.). Online publication occurs just one day after submission to the US EPA.

Overall the review of evidence and feedback from stakeholders via the OPC and targeted survey has demonstrated that whilst there have been some improvements with respect to public access to information under the IED, there are still a number of gaps. These gaps include permits simply not being publicly available online or instances where some information is available online but is difficult to locate and/or interpret. The new EU

⁶³ <http://www.ipe.org.cn/>

⁶⁴ <https://ampd.epa.gov/ampd/>

Registry on Industrial Sites⁶⁵ may help to address some of these gaps. The EU Registry is a new reporting obligation under the IED aimed to capture information on the facilities, installations, and plants which are obliged to report under the European Pollutant Release and Transfer Register (E-PRTR) Regulation and the Industrial Emissions Directive (IED). The first reporting year is 2017, which was required to be reported by 30 June 2019. Submissions under this reporting obligation will be collated by the EEA and reviewed by the Commission. However, at this stage it is unclear if it will deliver on what is needed. The EEA has indicated that consolidating information should help rather than 5 yearly sectoral spotlights. They feel that there is a need for more frequent but potentially less detailed requirements. There is some resistance in countries to share the information and/or to make it useable e.g. EPRTR does not include activity data while the system allows for it on an optional basis since 2009.

7.1.9 Has the IED strengthened public access to justice?

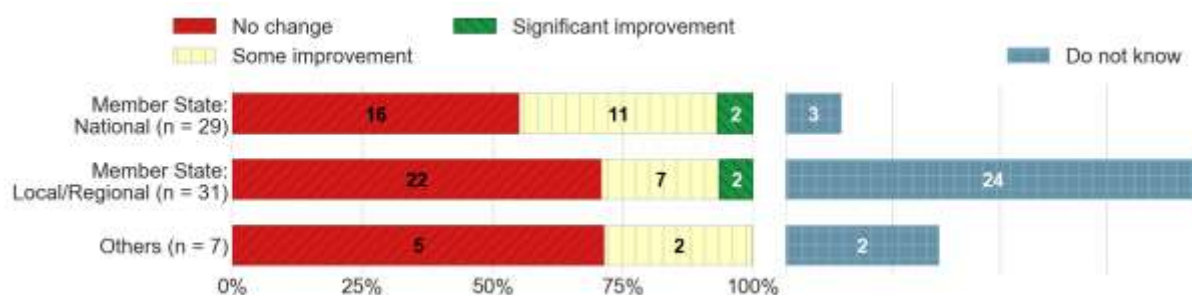
Article 25 of the IED sets out the requirements related to public access to justice. These requirements have not changed since the IPPCD (Article 16). However, as discussed in Section 7.1.8 some changes were made to improve and strengthen public access to information which in turn could be expected to lead to greater challenge from the public to new or revised permits and other issues. It was not explicitly considered within the IED IA so there is no information on what would have been anticipated with and without the IED.

The main indicators included in the evaluation matrix for this particular question were:

- Level of agreement among stakeholders that public access to justice has improved since adoption of the IED.
- Case study focus i.e. any examples of where public access to justice has been a challenge.

The targeted survey included one question related to public access to justice; the results of this are presented in the figure below.

Figure 7-28: Responses from the targeted survey to the question “To what extent has the IED improved access for the public to review procedures challenging decisions made to grant or update installation permits (Article 25 of the IED)?”



Source: Targeted stakeholder survey

Overall, the majority of respondents (64% excluding those answering “do not know”) indicated that there has been no change in public access to review procedures with most of the remaining responses (30%) indicating some improvement. The remainder (6%) indicated significant improvement. However, it is worth noting that a large number of respondents 29 out of 96 overall answered “do not know” to the question perhaps because they have not had any experience of such challenges. Respondents in the “others” group and local/regional Member State authorities responded along similar lines with around 70% of both groups indicating no change whereas for national level authorities this number

⁶⁵ <https://rod.eionet.europa.eu/obligations/721/overview>

was around 55% (and therefore more positive overall with the remainder of responses stating some or significant improvement).

Limited additional written feedback was received as part of the survey in relation to this question. In some Member States (e.g. Finland, Germany and Sweden) stakeholders indicated that they have answered "No change" simply because, in their view, access for the public to review procedures challenging decisions made to grant or update permits was already well established previously. This is in line with the fact that technically, the specific requirements on access to justice have not changed between the IPPCD and IED (although public access to information was changed so was expected to have knock on impacts). The EEB provided some examples for two Member States where they believe access to justice has been limited, primarily related to what can be challenged and how substantial versus non-substantial change is defined. In these particular Member States only cases of substantial change can be challenged and in many cases permit changes are classified as non-substantial. Examples were also provided of cases where, in the EEB's view, proceedings were wrongly classified as concerning a non-substantial change, in which an environmental organisation was denied the right to participate

In addition to the targeted survey, feedback was also received directly from ClientEarth based on their experiences working in this field across the EU. ClientEarth feel that there is some ambiguity within the IED itself, because it is not clear as to whether Article 25 applies only where Article 24 is not being complied with (about public participation) or whether it means there are substantive concerns regarding the legality of the decisions, acts and omission. ClientEarth's position is that the public should have a right to challenge all substantive decisions and omissions. Their experience is that in most cases it is at least in principle possible for the public to challenge decisions made by the competent authorities. However, limitations have been identified with respect to challenging omissions which can be important. An example given was in Romania where there were a number of plants operating without any permits at all and the public does not have a right to challenge this in court.

A common challenge they are seeing relates to the complexity of the IED and the fact that some courts simply don't understand some elements. Examples were provided of specific cases (e.g. UK refinery case where time had to be spent explaining terminology and some elements simply weren't understood) as well as more general points of confusion (e.g. interactions between chapters, differences between terms such as BAT and BATC).

Finally, the period of time that is available to challenge a permit before it is issued varies considerably across the Member States and can be prohibitive in terms of being able to provide a robust challenge. It is often not long enough for an expert to review the full permit and this can be further complicated by access to information (which is not always available). The level of information available and the timescales by which it may or may not be provided will vary considerably between installations and Member States.

7.1.10 Findings

To what extent has the IED contributed to reducing and (as far as possible) eliminating pollution arising from industrial activities? To what extent can the effects reasonably be credited to the IED?

16 BAT Conclusions have been adopted so far under the IED⁶⁶ and the four year implementation window has concluded for the first eight. Therefore, the impacts of the IED are ongoing and yet to be realised for some sectors so it is not feasible to quantify the

⁶⁶ Covering the following sectors (listed in order of the year of adoption): Iron and Steel Production (03/2012), Manufacture of glass (03/2012), Tanning of hides and skins (02/2013), Production of cement, lime and magnesium oxide (04/2013), Production of Chlor-alkali (12/2013), Production of pulp, paper and board (09/2014), Refining of mineral oil and gas (10/2014), Wood-based panels production (11/2015), Common Waste water and waste gas treatment / management systems in the Chemical Sector (06/2016), Non-ferrous metals industries (06/2016), Production of Large Volume Organic Chemicals (12/2017), Intensive Rearing of Poultry and Pigs (07/2017), Large Combustion Plants (07/2017), Waste Treatment (08/18), Food Drink & Milk (12/2019), Waste Incineration (12/2019) - <https://eippcb.jrc.ec.europa.eu/reference/>

full impacts of the IED and its first round of BREF reviews. This limitation is however inherent to the rolling nature of BREF reviews, so that at any point in time some sectors are more impacted than others.

Data show reported emissions to air of several pollutants from industrial activities have reduced relatively consistently over the past 10 years. The IED is very likely to have contributed to this but there may also be several other factors. Some assessments are available that demonstrate the impact that the IED has had, or is likely to have, on emissions to air. For emissions to water, the data is much less complete or robust making it even harder to judge how the IED has impacted on emissions. An additional complication results from the fact that a significant number of industrial installation discharge indirectly to the urban sewerage system. Such emissions are therefore part of the emissions from urban waste water treatment plants. As a result, it is more difficult to judge to what extent the IED has impacted emissions to water. Whilst this is a limitation in the evidence available, reductions are expected because BAT-AELs for emissions to water have been included in many sectoral BAT Conclusions which should lead to tightening of permit ELVs. There is little evidence on the IED's impacts on aspects such as energy use, raw materials and waste generation. The less binding nature of these aspects of BAT Conclusions could be expected to be one contributory factor towards the IED having less impact.

Whilst the IED appears to be fulfilling its objective of reducing pollution from industrial sources, some stakeholders have questioned the scale of such reduction and whether this is sufficient. This is discussed further as part of EQ2 in Section 7.2.

Stakeholder views were generally positive about the IED's impacts in reducing emissions (more for air than water) although some questioned whether the reductions are sufficient. This is discussed further in the context of the BREF process (EQ2) and how Member States set emission limit values in permits.

Are there any agro-industrial activities that fall outside of the scope of the IED (partially or fully) which generate high levels of pollution?

There are a relatively small number of industrial activities not captured within the scope of the IED that may be highly polluting. This includes various intensive livestock activities (cattle, mixed farms, poultry farms just below IED activity thresholds), mining and aquaculture. Some of these were assessed for inclusion in the IED previously but were excluded for specific reasons such as administrative burdens related to the full IED permitting process.

Stakeholders identified other industrial activities outside the scope of the IED but whether they generate 'high levels of pollution' requires further investigation. This includes some activities covered by the IED below the prescribed activity thresholds (e.g. smitheries, textiles installations).

Have there been any pollutants that have been omitted/fallen outside the scope of the Directive?

Annex II of the IED contains a limited list of pollutants. The BREF process is not limited to the list and has covered additional pollutants. Member State competent authorities are also obliged to establish emission limit values in permits where appropriate for any significant pollutants and this is neither limited to Annex II of the IED nor the list of pollutants with BAT-AELs in a BAT Conclusions.

Most feedback from stakeholders has referred to GHGs covered under the EU Emissions Trading System (ETS) and a need for better coherence of substances addressed with other EU legislation such as the Water Framework Directive and REACH.

Has the IED strengthened provisions on enforcement and environmental improvement?

Environmental inspections and a plan are required under the IED. These provisions are more explicit than under the IPPCD. Provisions relating to environmental permits have

also been strengthened – namely by establishing BAT Conclusions and the BAT-AELs, associated monitoring requirements and other aspects contained therein as the basis for setting permit conditions. Some information is contained in the 2013-16 IED monitoring report. More detailed information on inspections has been provided in recent reporting under Implementing Decision 2018/1135. Some uncertainty remains as to whether enforcement and inspections have improved as for example information on the numbers of inspections carried out prior to the IED and since its implementation, and on the frequency of non-compliance are not typically publicly available.

A majority of responses, across all stakeholder types, agree that the use of BAT Conclusions and permits has led to better control over environmental impacts relative to the IPPCD. Most stakeholders, except “others” (which includes NGOs), also agree that enforcement has been strengthened.

Has the Directive stimulated innovation in the prevention and control of pollution from industrial activities?

The IED has to some degree stimulated innovation through its provisions for identifying BAT, BAT-AELs and for identifying emerging techniques. The main impact has been deployment of BAT. The market for relevant techniques is larger in the EU than it would otherwise have been, and the market outside is also stimulated to the degree other jurisdictions copy aspects of the IED or BREFs. Emerging techniques are identified in the BREF process, and work is ongoing to better identify them through a pilot scale innovation observatory as part of frontloading efforts for the BREF process. This is expected to stimulate innovation further.

Stakeholders view the emerging techniques chapter of the BREF to have had less impact on innovation than other parts of the BREF process and IED. Some think innovation has not been stimulated to its maximum potential. This relates to the facts that (1) the BREF process for identifying techniques is ‘backwards looking’ at those already commercially in use, rather than on those not yet commercialised, leading to little information being included in the chapter on emerging techniques, and (2) the limited time period afforded to derogations from BAT-based permitting to test emerging techniques.

Has the IED led to simplification of the legislation and cut unnecessary administrative burden?

Seven Directives were repealed and replaced with one. The same requirements relating to a permit apply to installations in all sectors under the IED. Some aspects of the differences between the predecessor legislation remain in the IED. Despite this there remain aspects that are unclear. There are cases where installations are covered by the scope of BAT Conclusions as well as by specific chapters of the IED e.g. large combustion plants, waste incineration plants.

The majority of survey respondents agreed that the IED has contributed to simplification and clarification of the provisions relative to the previous regime. This was stronger for clarification than simplification.

Overall administrative burdens are considered under EQ7.

Has the IED strengthened public access to information? How does it compare to the previous situation?

Overall, whilst there has been improvement with respect to public access to information under the IED, there remain deficiencies. Some permits are not publicly available online, some information is available online but difficult to locate, in some Member States authorities have requested fees for access to permits.

Stakeholder responses to the survey indicate support for the view that access to information has improved for all stakeholder groups except for “others” (which includes NGOs) who believe there is insufficient information available and that the situation has not improved.

Has the IED strengthened public access to justice?

The IED did not include any specific new provisions on public access to justice. The changes made to improve and strengthen public access to information could be expected to lead to greater challenge from the public to new or revised permits and other issues. Public access to justice seems to be working, at least to some extent, where new permits are considered. The main limitation seems to be, at least in some Member States, the ability to challenge revisions to existing permits and interpretation of what constitutes 'substantial change' (and whether the public can challenge a decision that a change is declared a 'non-substantial change'). Other issues relate to omissions and the ability to challenge these e.g. where permits have not been issued for an installation. There are limitations in knowledge of the baseline.

More than half the survey responses indicate there has been no change, while the remainder mostly believe there has been some improvement compared to the preceding situation.

Evaluation sub-question	Finding(s)	Robustness of finding
To what extent has the IED contributed to reducing and (as far as possible) eliminating pollution arising from industrial activities? To what extent can the effects reasonably be credited to the IED?	The IED has contributed to reducing air pollution from industrial activities in its scope.	Strong
	The IED has contributed to reducing water pollution from industrial activities, but to a lesser extent than for air.	Medium
	The IED has not been used extensively to address resource efficiency and circular economy aspects.	Medium
Are there any agro-industrial activities that fall outside of the scope of the IED (partially or fully) which generate high levels of pollution?	There are a small number of agro-industrial activities that may generate high levels of pollution that are not covered by the IED	Strong
Have there been any pollutants that have been omitted/fallen outside the scope of the Directive?	The only pollutants specifically excluded from the scope of the IED are GHGs which are covered under the EU ETS. Other concerns relate to coherence with other EU legislation and Technical Working Group (TWG) choices of Key Environmental Issues (KEIs) for a BREF.	Strong
Has the IED strengthened provisions on enforcement and environmental improvement?	IED provisions are more explicit in relation to environmental inspections than under the IPPCD and provisions relating to environmental permits have been strengthened.	Strong
	Enforcement has been strengthened.	Weak
Has the Directive stimulated innovation in the prevention and control of pollution from industrial activities?	The IED has to some degree stimulated innovation in particular through provisions for identifying and deploying BAT and expansion of markets for BAT.	Strong
	The BREF process is inherently 'backwards looking' and its ability to stimulate innovation	Strong

Evaluation sub-question	Finding(s)	Robustness of finding
	has been limited in relation to emerging techniques.	
Has the IED led to simplification of the legislation and cut unnecessary administrative burden?	The merger of the predecessor Directives has clarified and simplified the requirements. Some complexities remain.	Strong
Has the IED strengthened public access to information? How does it compare to the previous situation?	Access to information has improved but there remain some failings in implementation by Member States.	Strong
Has the IED strengthened public access to justice?	There has been some improvement in access to justice but limitations remain.	Medium

7.2 EQ2 – How effective is the process of elaborating BREFs and BAT Conclusions?

7.2.1 Introduction

The BREFs and the BAT conclusions are core elements that underpin the IED. The outcomes of the BAT information exchange (the 'BREF process', or 'Seville process') – the BAT conclusions – are the documents that permit writers in the Member States need to refer to when considering the permit conditions for each installation regulated under chapter II of the IED. The BAT-AELs should be used as the basis for permitted emission limit values in installations' permits. Therefore, aside from the specific sectoral requirements under chapters III, IV, V and VI, how well the BREFs and the BAT conclusions manage to identify which techniques are considered as BAT – and what their associated emissions and performance levels are – directly related to the IED's objectives and affects the effectiveness of the IED.

Each BREF is developed by the EIPPCB and the Technical Working Group set up for each BREF, and the 'BREF Guidance' (Commission Implementing Decision 2012/119/EU) prescribes the process to be followed. The coordination of a large TWG and the identification of BAT and AELs/AEPLs is not a straightforward task. The EIPPCB has aimed for a process of continuous improvement, to try to increase the efficiency and effectiveness of the BREF process over the years. This was, at least in part, instigated in response to comments from stakeholders on the BREF process.

In 2014, a workshop was held in Berlin, jointly organised by DG Environment of the European Commission and the German Federal Ministry for the Environment, Nature Conservation, Building and Nuclear Safety, with the title '*BAT information exchange as the heart and driver of the IED*'. This workshop, attended by representatives of the Article 13 IED Forum (i.e. stakeholders from industry, Member States and NGOs), shared experiences and explored suggestions to further improve the process and its products i.e. BREFs and BAT conclusions. It covered experiences spanning 17 years of the BREF process from under the IPPCD to the IED, with a focus of the four years post-IED.

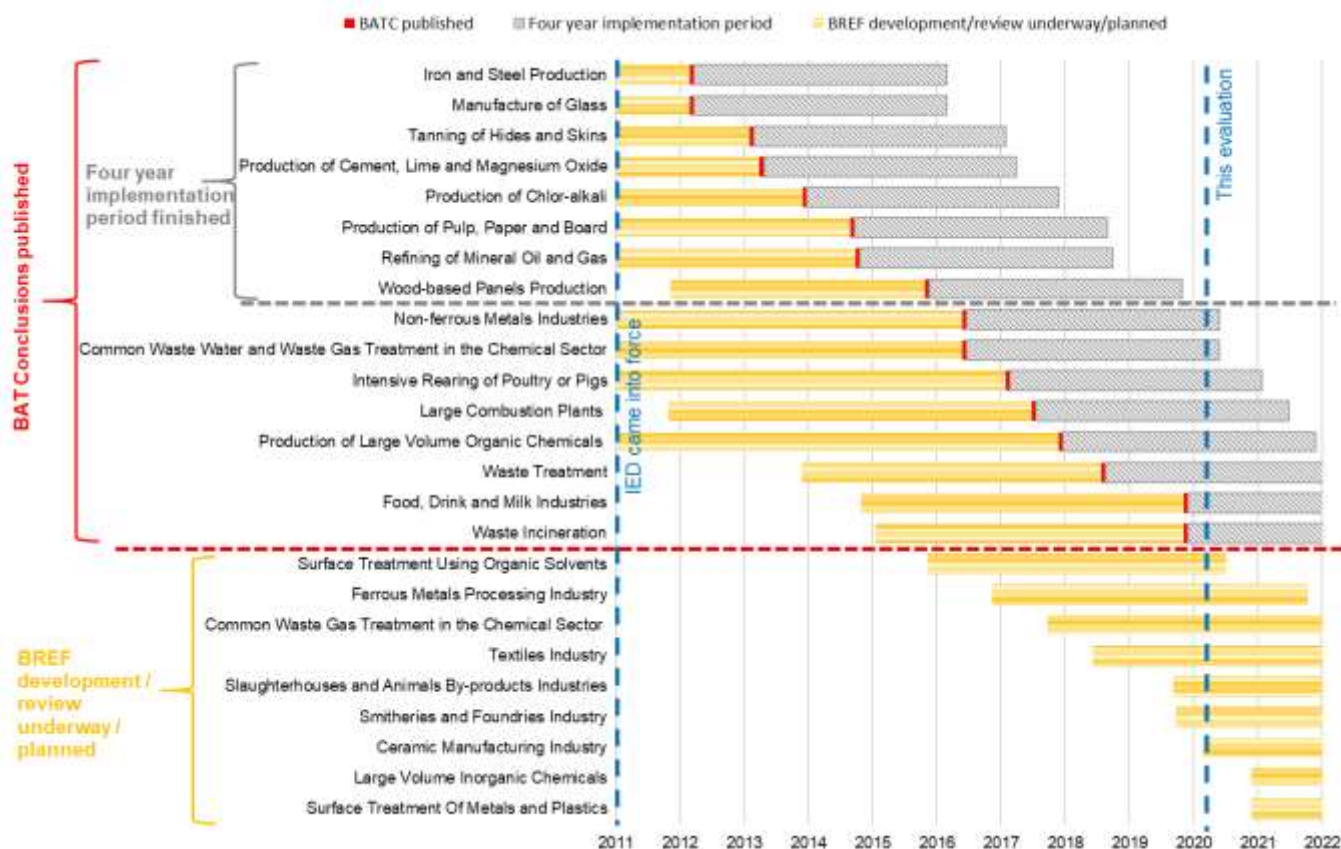
The topics that have previously been considered and/or implemented to try to improve the BREF process have been:

-
- Frontloading of information – early preparation for the information exchange, for example more targeted calls for stakeholders' initial positions.
 - A focussed approach – for example decisions on the key environmental issues for a sector made at TWG kick-off meetings.
 - Smarter working methods – the use of webinars to supplement in-person meetings.
 - Data collection and questionnaires – including intermediate workshops for data evaluation and for questionnaire design.
 - Establishment and management of subgroups – balanced composition, with either the EIPPCB or MS attending in addition to industry representatives.
 - Data confidentiality – use to be minimised.
 - Derivation of BAT-AE(P)Ls – the process and whether/how to standardise this.
 - Reducing the burden of final TWG meetings.
 - Separating the identification of emerging techniques to an external observatory.

So there has been an ongoing period of review and reflection on the BREF process for a number of years now. The 2014 Berlin workshop confirmed that improvements had already been made to the BREF process (or were underway), and that further improvements could still be envisaged for the information exchange process. No major comments on the structure of BREFs and BAT conclusions were made, which indicated broad agreement on these matters, aside from some minor improvements. Furthermore, the workshop acknowledged / recognised that the BREF process is somewhat unique among Commission-led processes, and it has created real cooperation and close interaction between public authorities, industry and NGOs.

In trying to judge the overall effectiveness of the process of elaborating BREFs and BAT Conclusions, the outputs of the process – i.e. the individual BREFs and BAT conclusions – are the products that can be assessed (in addition to the process itself). There are many of these however, and it is important to recognise that the effectiveness of each BREF and its BAT conclusions may vary.

To date (February 2020), the BREF process has resulted in the adoption of 16 BAT conclusions under the IED (Figure 7-29). A further six BREFs are under review or development, and three BREFs have not yet been reviewed under the IED. As can be seen from Figure 7-29, the implementation periods of all of the BREFs have not yet been reached or passed, which means that the judgement of how effective the BREF process has been for these BREFs would be premature.

Figure 7-29: Timeline of BAT conclusions published and four-year implementation periods, and BREF reviews and BREF development underway and planned

Source: Ricardo

As the EIPPCB's work programme to review all the BREFs under the IED (1st BREF review cycle) nears completion, the Commission is planning to hold a stakeholder workshop during 2020 to gather feedback on possible prioritisation for the 2nd BREF review cycle. From the latest update on the progress of the BREF reviews delivered to the Article 13 Forum in October 2019⁶⁷, the preliminary content for that workshop will be:

- Prioritisation of sectors/BREFs to start 2nd review cycle.
- Timing of the Emissions from Storage BREF (EFS) review.
- Merits of reviewing ENE, ICS and ECM (B)REFs.
- Fate of the chemical BREFs that will not be reviewed (LVIC-AAF, LVIC-S, OFC, SIC, POL).
- Possible consequences of input received from this IED evaluation.
- Impact of 'hot' policy themes: e.g. zero-pollution ambition, industrial transition, especially linked to decarbonisation and Circular Economy, water reuse, hazardous substances/chemicals.
- Link with other relevant policies: e.g. strategy on pharmaceuticals, antimicrobial resistance, non-toxic environment strategy.

Ultimately, it is not feasible to check if, for each and every BREF sector, additional or alternative techniques should have been identified as the most effective techniques for achieving a high level of environmental protection. To do so would require having in-depth knowledge of the state of the market at the time the BREF review was conducted. However, what can be judged to evaluate this question are the reflections of stakeholders

⁶⁷ <https://circabc.europa.eu/sd/a/1ac17986-df8a-452d-a9c4-c90a99d2a8f3/5.%20Work%20programme.pdf>

on the BREF process, previous assessments of the BREF process, implementation reporting, and example case studies where additional analysis at the BATC level has been conducted (large combustion plant, and iron and steel production sectors).

Based on the experiences that are available to date, this evaluation question covers the following operational questions:

- Whether the identification of techniques and their associated emission levels have been correctly identified to achieve a high level of environmental protection?
- Whether the BREF process has sufficiently considered both costs and benefits?
- The extent the IED supports Member States in implementing BAT-based permitting
- The degree of exceptions from BAT that have occurred in practice

Baseline: For this EQ it has been assumed that the BREF process as per under the IPPCD would have continued with no specific initiatives to further stimulate innovation, streamline or improve the process. Furthermore, the BREFs and BAT Conclusions contained therein would continue to be utilised in a variable / inconsistent manner across the EU i.e. uptake of BAT would be low and not uniform across all Member States. As with EQ1, the baseline is also based on the assumptions made in the limited specific studies that have assessed the actual or expected impacts of the BATC (LCPs, iron and steel), this includes the retention of the LCPD minimum emission limits and limited uptake of BAT under the IPPCD.

Information sources used:	Literature and data sources	Open Public Consultation	Targeted online survey	Interviews	Focus groups
	YES	NO	YES	YES	YES

7.2.2 To what extent does the BREF process identify the techniques that are the most effective techniques (and identify the most appropriate associated emission or performance levels) for achieving a high level of environmental protection?

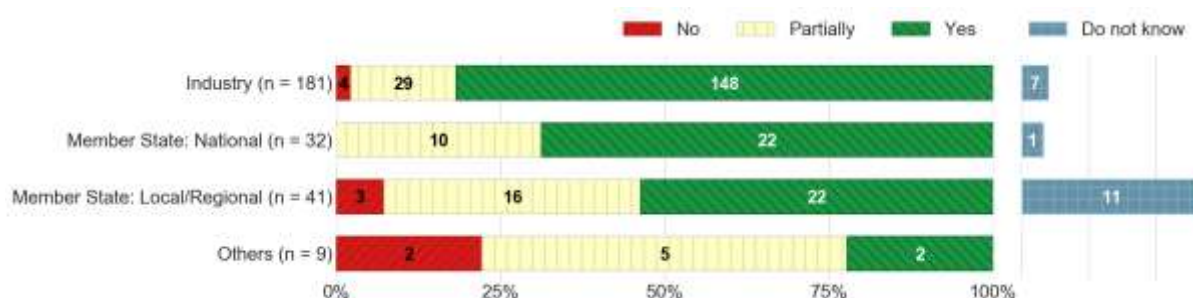
7.2.2.1 Whether the definition of BAT has maximised effectiveness

This question is related to the definition of BAT, in particular the word "best", which is in Article 3(10)(c) of the IED as "*most effective in achieving a high general level of protection of the environment as a whole*". The BREF process needs to identify those techniques which are not only "best" but are also "available", as defined in Article 3(10)(b) as "*those developed on a scale which allows implementation in the relevant industrial sector, under economically and technically viable conditions, taking into consideration the costs and advantages, whether or not the techniques are used or produced inside the Member State in question, as long as they are reasonably accessible to the operator*". In those cases where techniques which are "best" do not also meet the definition of "available", the TWGs must try to find a compromise and so identify those next best techniques which meet both these definitions.

In relation to the *definition of BAT*, around **82% of industry responses and 69% of Member State national authority responses to the targeted survey agreed that the definition of BAT has allowed the most effective techniques for achieving a high level of environmental protection to be identified** (Figure 7-30). In contrast, around one quarter of the responses from the "other" group of stakeholders agreed with this; one quarter disagreed and half partially agreed/disagreed. Not many comments were

received on the definition of BAT through the targeted survey. Some comments related to the definition of BAT highlighted that there are occurrences of permit limit values being set that are stricter than BAT-AELs, suggesting that the BAT may not have achieved the highest level of protection, or that tighter permit limits may have been set to meet local environmental quality standards that may be installation specific. No specific evidence was provided to support this feedback although it is supported by some of the Member State reporting under the IED for the Glass and Iron & Steel sectors (see Section 7.2.4) where there were some examples of ELVs being set at stricter levels than the BAT-AEL ranges.

Figure 7-30: Responses from the targeted survey to the question 'Is the definition of Best Available Techniques (BAT) as set out in the IED appropriate for identifying the techniques that are the most effective for achieving a high level of environmental protection?'



Source: Targeted stakeholder survey

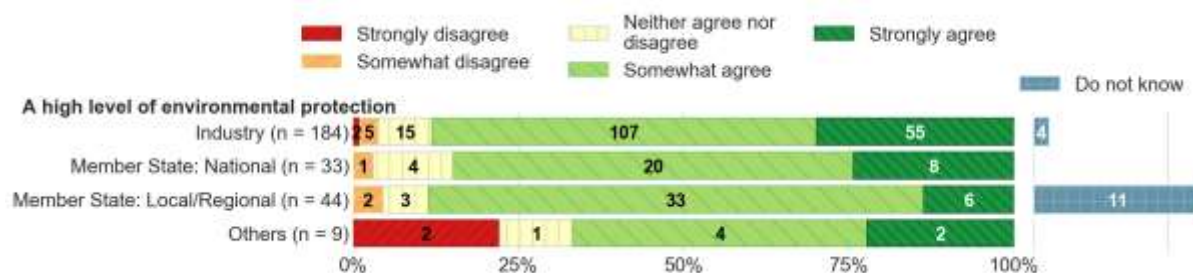
7.2.2.2 Whether the techniques identified are most effective

The IED provides for continual improvement of the BREF elaboration process in the Article 13 IED Forum. Procedural issues are also identified and discussed in specific BREF TWGs. There have also been specific workshops held on the topic (e.g. Berlin 2014).

Just over three quarters of the respondents to the open public consultation question "to what extent do you agree that the process to draw up and regularly review BREFs is effective in identifying techniques" either somewhat agreed or strongly agreed with the statement.

From the targeted survey **the majority of industry (88%) and Member State national authorities (85%) agreed (somewhat agree / strongly agree) that the BREF process identifies the BAT that are most effective for achieving a high level of environmental protection** (Figure 7-31). This is interpreted to mean that most of the BAT conclusions developed identify the most effective techniques. A large proportion of the Member State respondents however did not respond as positively, with 61% of those from Member State national authorities and 75% of those from local/regional authorities responding "somewhat agree", i.e. with some reservations. In contrast, two of the nine "other" stakeholders (including the EEB) strongly disagreed that the BREF process identifies the BAT that are most effective for achieving a high level of environmental protection.

Figure 7-31: Responses from the targeted survey to the question “To what extent do you think that the BREF process identifies the best available techniques that are the most effective techniques for achieving a high level of environmental protection?”



Source: Targeted stakeholder survey

The identification of techniques that are the most effective for achieving a high level of environmental protection relies upon the data collection within the BREF process yielding suitable and sufficient information on the performance and applicability of techniques. The collection of information under the BREF process has been subject to a number of improvements over time, implemented by the EIPPCB. However, some issues have been identified related to how data collection has been carried out in the BREF process. These issues relate to the complexity of the data collection questionnaires (burden), and the consistency (and representativeness) of the process for selecting example plants across Member States for the data collection.

Some challenges of the BREF process (other than data collection) have also been identified by stakeholders that they believe have led to not identifying the most effective techniques. The issues mostly relate to the dominance of industry representation in TWGs; not accounting sufficiently for the trade-offs between pollutants and cross-media effects; and the 'backwards looking' focus of the process i.e. techniques already being used and commercially available.

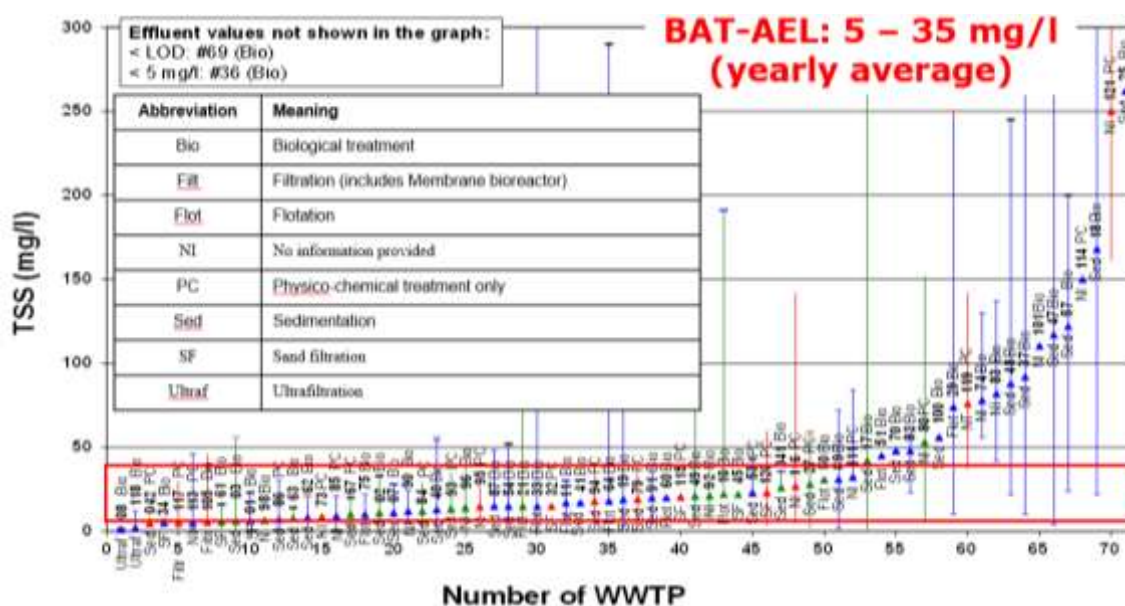
As noted in the introduction, the effectiveness of the BREF process has been indicated by stakeholders to have varied among BREFs. Some stakeholders cited specific BREFs that they considered were particularly good or bad examples (in their opinion).

7.2.2.3 Whether the most effective AE(P)Ls have been identified

As well as the identification of the most effective techniques for achieving a high level of environmental protection, there is also the question of whether, once having identified BAT, whether the BREF process has been able to establish the most appropriate BAT associated emission levels (BAT-AELs) or BAT-associated environmental performance levels (BAT-AEPLs).

The process for deriving BAT-AELs has been discussed extensively within TWGs for specific BREFs and some changes have been implemented as a result. Many of these previous discussions have addressed topics raised by stakeholders during this evaluation.

Part of the process that the TWG follows for identifying BAT and BAT-AELs includes plotting data per pollutant collected from example installations on to a graph (ranked in order of emissions concentration) together with an understanding of which technique(s) the installations use to control emissions of that pollutant. An example output of this is shown in Figure 7-32 from the chemical sector for releases of total suspended solids to water. The BAT-AEL was decided by the TWG to be 5-35mg/l, and it can be observed on the graph how this range includes most of the data points (~52 out of ~72) collected from installations. The large range between minimum and maximum likely reflects, among other aspects, variation in operating practices (and variation in implementation), with average values considered most representative for informing the BAT-AEL range.

Figure 7-32: Example of analytical output from the EIPPCB for total suspended solids (TSS) emitted to water from the chemical sector

Source: EC presentation at IED evaluation workshop, 20 May 2019

This process is carried out for each pollutant across each media, and overall generates a very large number of BATs, BAT-AELs across pollutants, as indicated in Table 7-3.

Table 7-3: Numbers of BATs and BAT-AELs in recent selected BAT conclusions

BREF	Number of BATs	Number of techniques	Number of BAT-AELs - Air	Number of BAT-AELs - Water	Number of BAT-AEPLs - Energy	Number of other conclusions
CAK	17	90	1	1	0	2
CWW	23	91	0	11	0	0
LCP	75	320	267	15	81	15
WBP	28	118	16	3	0	0
WT	53	199	15	51	0	0
FDM	37	148	17	9	0	30

Source: EC presentation at IED evaluation workshop, 20 May 2019

The study conducting an ex-post cost benefit analysis of the impacts of the BAT conclusions on the iron and steel industry sector (Ricardo, 2018d) analysed what proportion of the installations in the EU have been affected by the BAT conclusions. The study concluded that only a small share (~20%) of processes in the sector were impacted by the BATC. This implies either that a high level of environmental protection was already being achieved or that there might have been room for BAT-AELs to be set at a more stringent level. The latter of these possible conclusions should be considered together with the analysis of the derogations granted in this sector, see Section 7.2.5. Furthermore, the findings of the cost-benefit analysis from this study were that the benefits resulting from implementing⁶⁸ the BAT conclusions were around ten times the costs. This suggests that effective techniques as BAT and their associated BAT-AELs were identified.

In contrast to (Ricardo, 2018d), an ex-ante assessment for large combustion plants (LCPs) over 300 MW_{th} firing solid fuels (Ricardo, 2017) found that the BAT Conclusions for LCPs

⁶⁸ As implemented, i.e. at the level of upper BAT-AELs, or more stringent, if that is what was put in place in the permit.

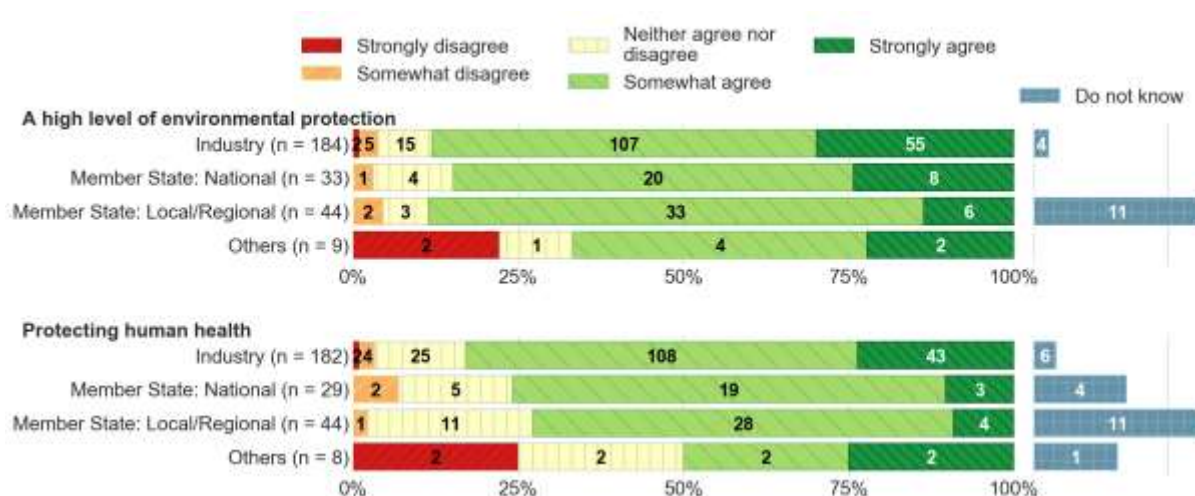
are likely to be effective in leading to emission reductions at a large proportion of plants (affecting about 72% of the plants). Specifically, this study identified:

- Around half (136/264) of plants expected to still be operational in 2025 were estimated to need to fit additional (complementary) techniques to those already fitted to meet the IED ELVs.
- Around 20% of plants (53/264) were estimated to need to fit different techniques to comply with the upper BAT-AELs than those techniques they already had fitted to meet the emission limit values in the IED. The fact that the techniques were *different* to those already fitted rather than *additional* means these plants were considered as possible candidates for applications for time-limited derogations under IED Article 15(4).
- The remainder of plants (75/264) were judged to already comply with the BAT conclusions upper BAT-AELs.

This suggests that the BAT conclusions for LCPs, for the scope of the LCPs considered in (Ricardo, 2017) are likely to be effective in addressing a large proportion of plants.

Stakeholders broadly agreed the BREF process has identified the most appropriate AE(P)Ls – and this agreement is stronger with respect to achieving a high level of environmental protection compared to the protection of human health (87% and 79% respectively of all stakeholders somewhat/strongly agree). However, a large proportion of those stakeholders indicated they only agreed “somewhat” with this statement (Figure 7-33).

Figure 7-33: Responses from the targeted survey to the question ‘To what extent do you think that the BREF process identifies the most appropriate associated emission or performance levels for achieving a high level of environmental protection and protecting human health?’



Source: Targeted stakeholder survey

Some feedback was provided on the BAT-AEL derivation process and whether it is systematic / transparent enough. This topic has been discussed extensively in specific BREF TWGs and raised at the IED Forum. Further stakeholder feedback on why the AE(P)Ls have not been the most appropriate related to the process for identifying KEIs; to not having sufficient monitoring data (particularly long-term averages); and to the need to have taken economics and/or cross-media effects into account.

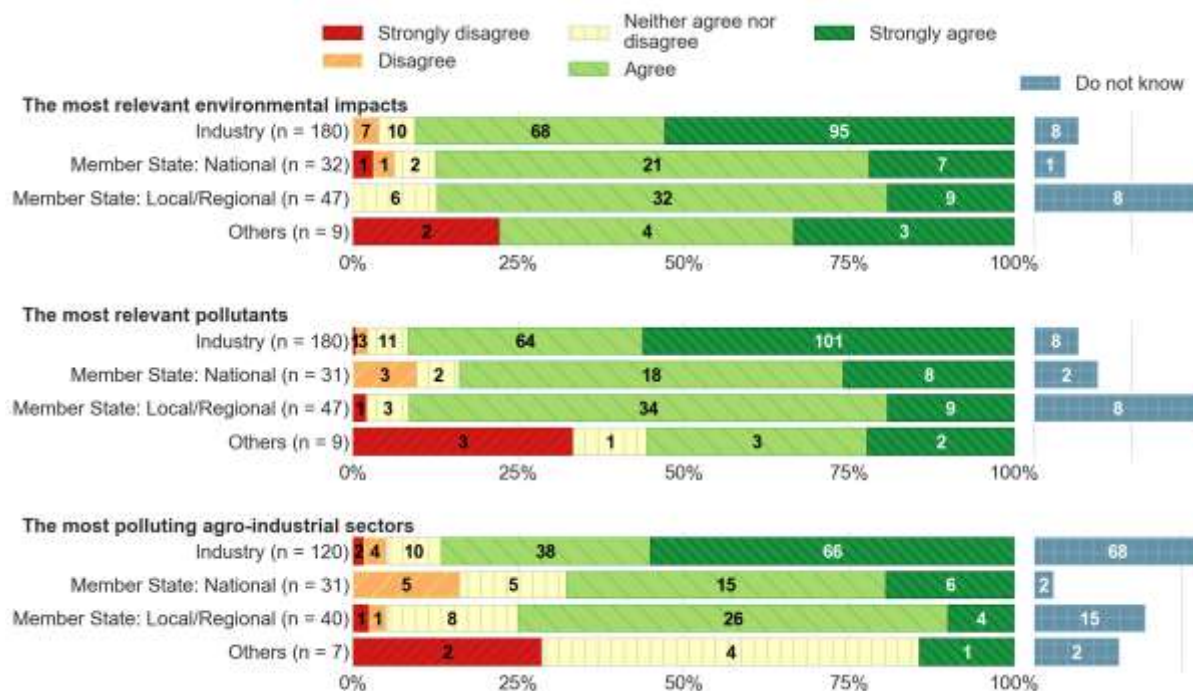
7.2.2.4 Whether the BREF process has targeted the relevant environmental issues, pollutants and sectors

The European Commission proposed a set of four criteria to use to determine key environmental issues (KEIs) in 2015. These were developed further into a methodology

(Ricardo, 2018a) and put into practice for the preliminary determination of KEIs for early consideration at the kick-off meetings for the TXT, SA, SF and (forthcoming) CER BREFs.

The BREF process (and IED as a whole) has generally been viewed by most industry and Member State stakeholders to have been effective in its scope of addressing the most relevant pollutants, the most relevant environmental impacts, and the most polluting agro-industrial sectors (Figure 7-34 for the BREF process; see also EQ1 in Section 7.1 for the IED as a whole). Regarding the coverage of pollutants, 83% to 93% of industrial and Member State stakeholders either agreed or strongly agreed with the pollutant coverage. Five out of nine of the “other” respondents agreed or strongly agreed that the most relevant pollutants are addressed.

Figure 7-34: Responses from the targeted survey to the question ‘To what extent do you think that the process to draw up and regularly review BREFs addresses the most relevant pollutants, environmental impacts and agro-industrial sectors?’



Source: Targeted stakeholder survey

The main topics or issues that stakeholders have raised in relation to these points are:

- **Sectors** – the BREFs do not cover all the activities listed in Annex I of the IED (see also EQ1)
- **Environmental impacts** – The process for identifying KEIs has improved in recent years, but there remain some concerns related to available data and bias to existing parameters. More could be done to fully address wider / cross-media issues (e.g. energy, resources, waste, climate, water, hazardous substances) in the context of integrating objectives from across EU policy areas.

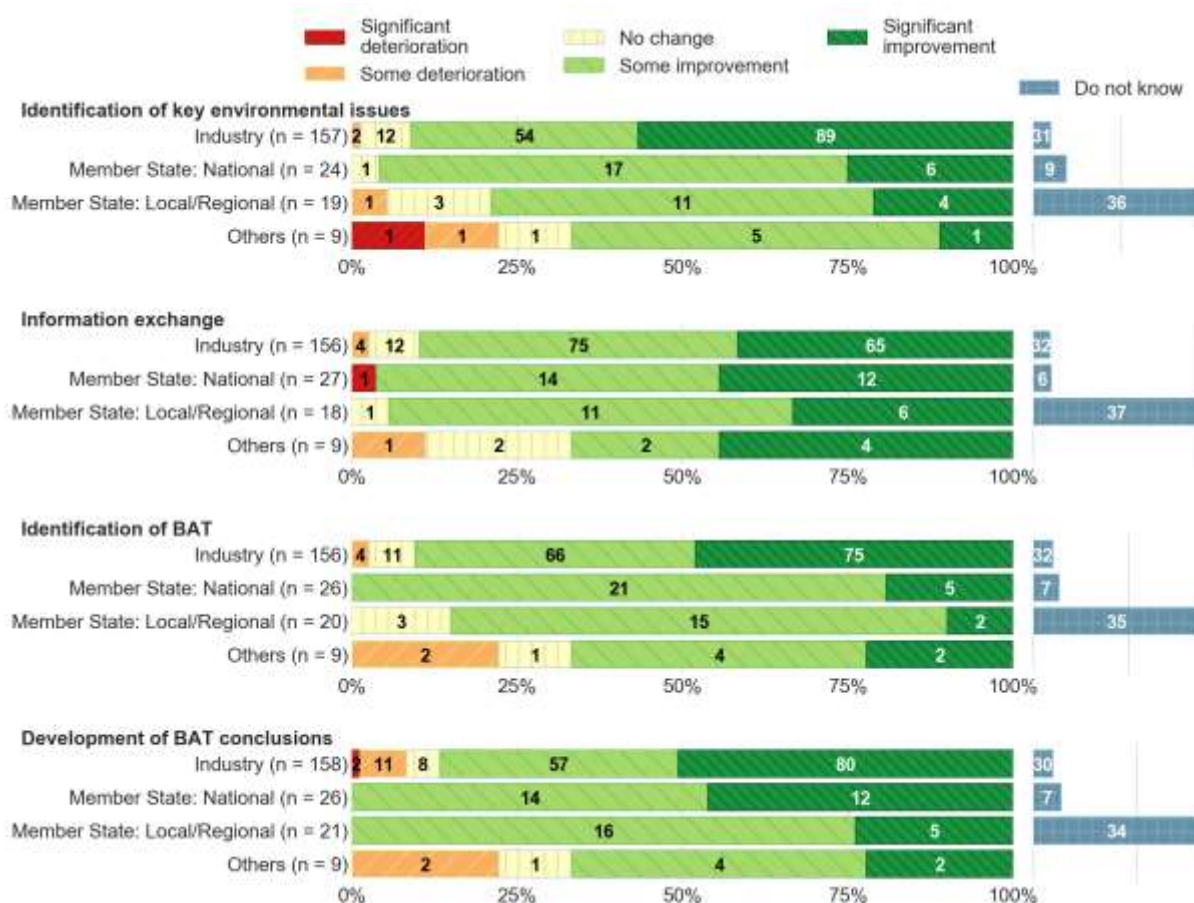
The backstop (guarantee of environmental protection) provided by Member State competent authorities in their permitting role was recognised by some stakeholders (MS authorities, and EU industry in focus groups) for the cases where the BREF process is unable to derive BAT-AE(P)Ls for certain pollutants. This is in particular guaranteed by Article 18(4) of the IED.

The large majority of stakeholders that responded to the targeted survey consider that there has been some or significant improvement in the elements of the BREF process (Figure 7-35) compared to under the IPPC Directive of:

- The identification of key environmental issues
- The information exchange
- The identification of BAT
- The development of BAT conclusions

The “others” stakeholder group was less positive, and some of this group (including the EEB) indicated there has been a deterioration in these processes.

Figure 7-35: Responses from the targeted survey to the question ‘How do you think that the following elements of the BREF process have changed under the IED (compared to under the IPPC Directive) and are in line with the guidance set out in Commission Implementing Decision 2012/119/EU?’



Source: Targeted stakeholder survey

Stakeholders were also asked about the length of the BREF process. Recent BREFs have ranged in duration from just over 3 years (Wood-Based Panels) to more than 5 years (Large Combustion Plants) (Figure 7-36). Figure 7-37 suggest that, overall, a majority of stakeholders indicated the length of the BREF process, whilst long, is about right, with similar proportions indicating it is too long or too short. Within this, a larger proportion of industry stakeholders consider the process to be too short and a larger proportion of the stakeholder groups of Member State authorities and “others” consider the BREF process to be too long.

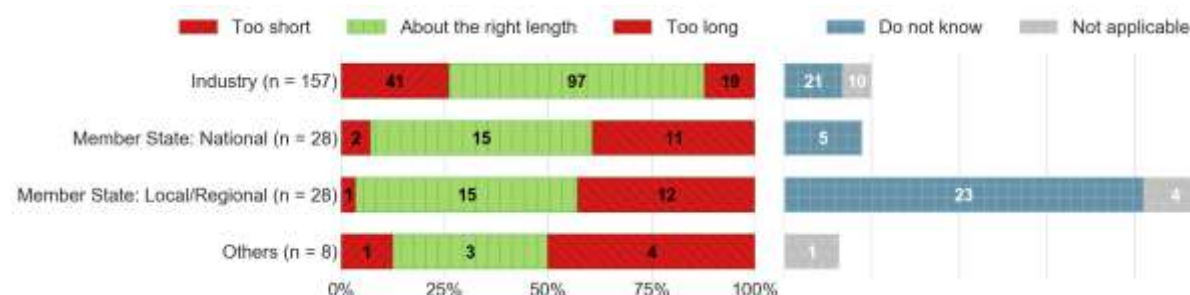
Figure 7-36: Timelines of selected recent BREFs



Source: EIPPCB, May 2019

Abbreviations: IP Initial Positions | BP Background Paper | KoM Kick-off Meeting | Q Questionnaire | D1 Draft 1 | FM Final Meeting

Figure 7-37: Responses from the targeted survey to the question 'How appropriate is the duration of the process for developing and reviewing BREFs - which is set out in guidance as Commission Implementing Decision 2012/119/EU - for the production of effective BAT conclusions?'

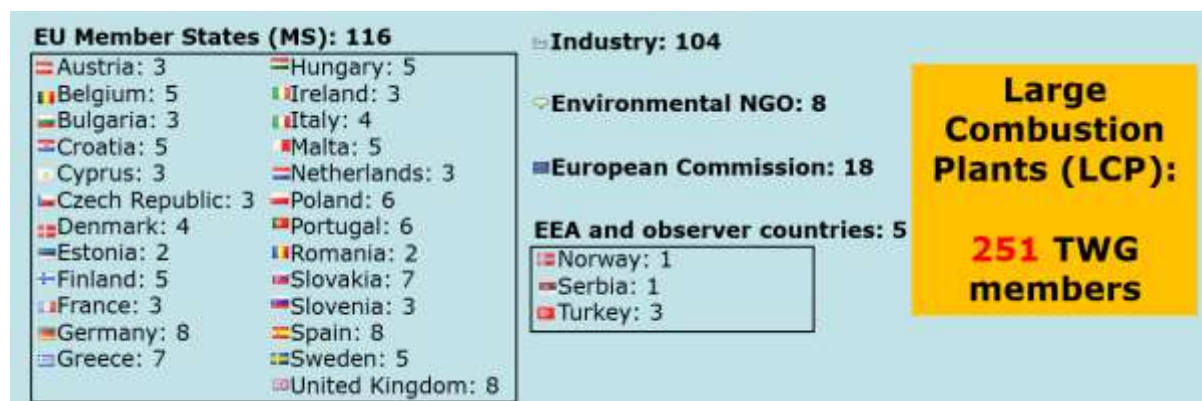


Source: Targeted stakeholder survey

7.2.2.5 Whether the composition of the TWGs are appropriate

The TWGs are assembled by the EIPPCB. The TWGs are made up of representatives of EU Member States, industry, environmental NGOs, the European Commission, and the EEA and observer countries. The number of people in the TWGs ranges from (approximately) 60 to more than 250. An example composition was shown by the EIPPCB to the IED evaluation workshop in May 2019 (Figure 7-38); this example is at the larger end of the range of typical TWG sizes.

Figure 7-38: Example composition of a Technical Working Group



Source: EIPPCB

However, as identified in (ICF, 2015), participation in the information exchange process is not limited to TWG members only, because there are additional ways to participate and contribute (submit information) such as shadow groups and subgroup meetings, as well as contributions from individual organisations that are collated and combined with others before being provided to the BREF authors.

Previous assessment of the streamlining of the process for identifying emerging techniques (ICF, 2015) identified several findings related to the TWG composition for five BREFs (GLS, IS, REF, PP, CLM). The key findings were:

- Little variability among the composition of the BREF TWGs. Most BREF TWGs have a similar quota of stakeholders, with MS representatives comprising around 40% of membership.
- In most BREF TWGs the industrial installation operators make up ~40% of the TWG, who are represented via industry associations. This can vary among sectors as it depends on how sectors are organised at EU level and on the level of homogeneity of the sector.
- Participation of technique developers is low: 4% on average but with high variability amongst BREFs.
- There is no participation from communities that bridge research and commercial technique deployment, such as technology platforms, public-private partnerships.

It is important to note that these findings from ICF (2015) were applicable to the BREFs assessed then, and that the study was conducted primarily in 2013 to 2014. Based on those findings, ICF (2015) concluded that there is a clear need to involve additional stakeholders and sources of information in the information exchange process on emerging techniques. This included direct contributions by industrial installation operators rather than indirectly via their representation by industry associations. It was also acknowledged that the motivation of technique developers to contribute to the information exchange may be hampered by their devotion to existing customer relationships.

These findings from ICF (2015) related to identifying future BAT, i.e. emerging techniques, are supported by the findings from the stakeholder survey. The survey asked about whether the TWG composition was appropriate to help stimulate innovation. For this question (Figure 7-39) the survey respondents were less positive (more neutral and more negative) compared to their responses about whether the TWG was appropriate for identifying KEIs, BAT and for developing effective BAT conclusions. For these latter questions, the survey responses are very positive, with over three quarters of respondents considering the TWG composition to be appropriate.

For those responses that were no or neutral, the following suggestions for participation levels were made by respondents to the survey:

Table 7-4: Open text responses from targeted stakeholder survey from respondents who were neutral or negative to the question "Is the composition of the Technical Working Group (TWG) established for each BREF appropriate for the following: [list of four options]"

Additional participation from	Less participation from
<ul style="list-style-type: none"> • Research institutions (including universities) • Equipment suppliers • Other European Commission DGs than just DG ENV • Industrial operators (directly, not via associations) 	<p>Industry associations. MS authority, BE: "In some TWGs, MS representatives are vastly outnumbered by industry representatives. Sometimes, this gives the impression during meetings (and especially final meetings) that a 'majority' of the TWG is in favour of a certain option, but this is mainly caused by the number of industry representatives."</p>

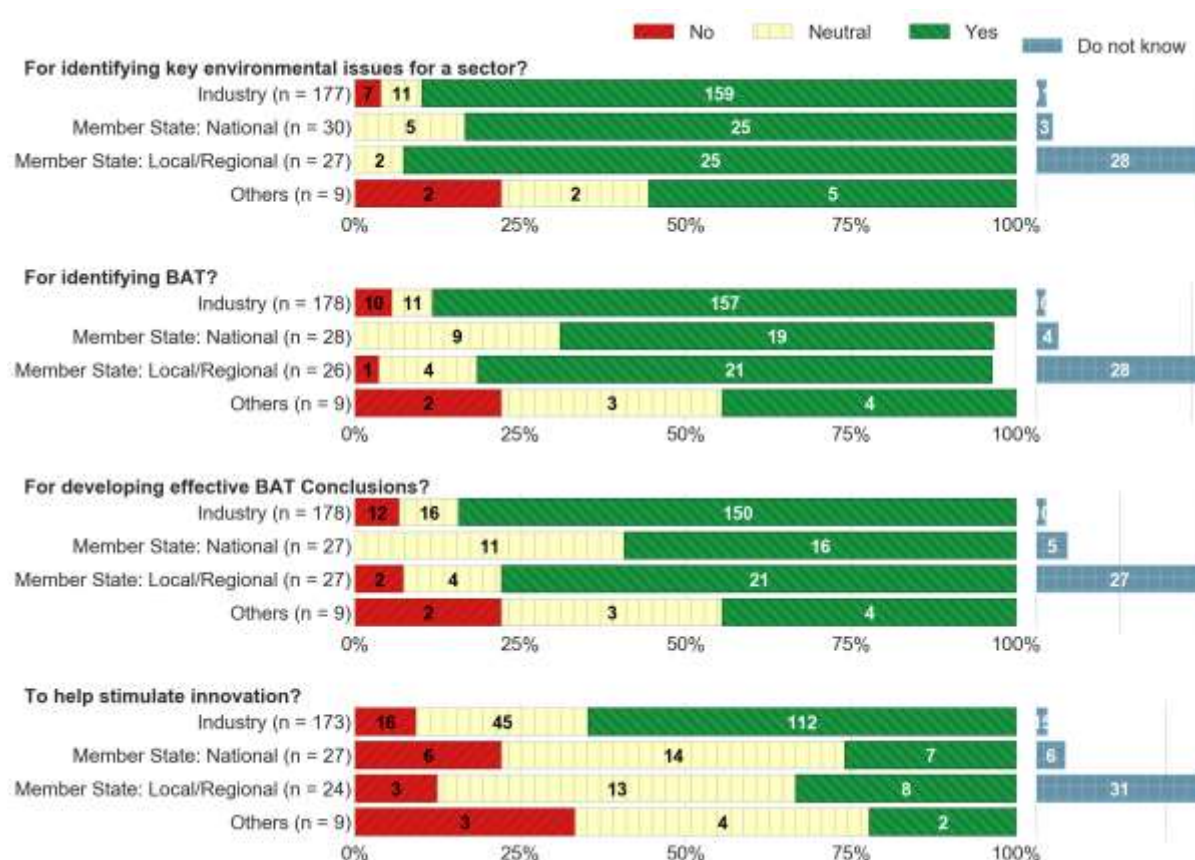
Additional participation from	Less participation from
<ul style="list-style-type: none"> Member States from Eastern and South Eastern Europe (providing best performing plants) Smaller companies Sectoral (medium) experts, (water, waste, etc.) Economists A mediator that can help bring opposing views together Representation of civil society (environmental NGOs) 	<p><i>(This is also the case for the survey responses to this IED evaluation questionnaire – the responses are dominated by the number of industry responses.)</i></p>

Source: Targeted stakeholder survey

The main points raised as part of the open text responses were the following:

- To take better account of how representative the statements are, e.g. apply less weight to statements from a Member State if they have few/no relevant installations.
- Emerging techniques should be linked to EU terminology / tools relevant to innovation (Cohesion Fund, LIFE programme etc.).
- Member States should not be represented by third parties (industry or consultants), as this could be biased.

Figure 7-39: Responses from the targeted survey to the question 'Is the composition of the Technical Working Group (TWG) established for each BREF appropriate for the following?'



Source: Targeted stakeholder survey

The wider discussion of the contribution of the IED and BREF process to stimulate innovation is included in Section 7.1.6.

7.2.3 Does the BREF process sufficiently consider both costs and benefits in identifying the best available techniques?

7.2.3.1 Costs

Cost is a relevant factor in the identification of BAT and TWG members are invited to submit cost data associated with techniques as part of the information exchange. However, there have been challenges with getting cost data from industrial operators as part of the BREF process. Where the TWG provides appropriate cost data it is included in the BREF; the standardised '10 heading format' includes a section marked 'economics', which is used to describe costs of techniques. This can then be taken into account, amongst other factors, for the identification of BAT, although no systematic assessment of costs (or benefits) is undertaken for individual techniques in the process. In principle, where techniques are operated in existing plants these are assumed to be economically viable without the need for further assessment by the TWG.

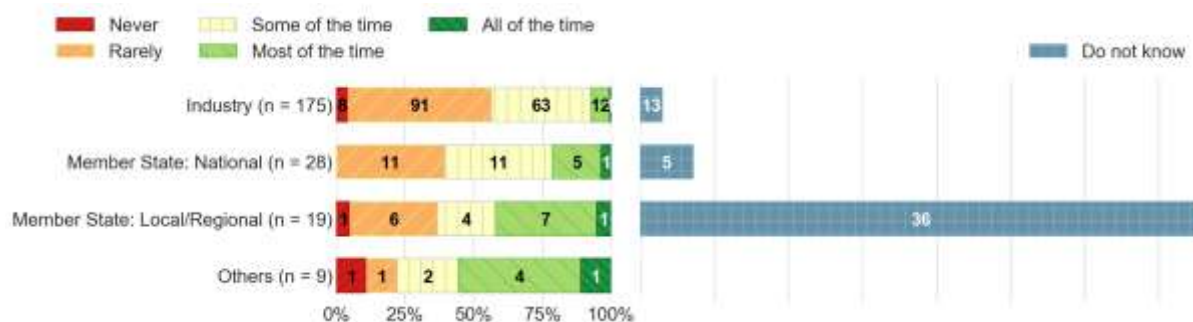
A small number of studies have been conducted to try to estimate the costs and benefits of meeting the BAT conclusions. These have covered the Iron and Steel Production (Ricardo, 2018d), and large combustion plant (Ricardo, 2017) sectors. These studies have, in their estimations of costs of BAT conclusion compliance, to a large degree utilised cost data from the BREFs, complemented by other data sources. This suggests, for this rather limited subset of sectors, that there has been sufficient information presented in BREFs on the costs of the main techniques that have either been foreseen as needed to comply with the BAT conclusions (ex-ante) or have been implemented in practice (ex-post); i.e. that the BREF process has been sufficiently effective in gathering cost data for the most important techniques.

However, there is more detail in these studies which suggests the BREF process has not been fully effective in gathering cost data. The Ricardo (2018d) study, for example, was unable to monetise several of the impacts of the BAT that were identified (e.g. upgrading electrostatic precipitators at sinter strands): in the absence of data collected during that study, the intention was to utilise cost data from the BREF but this was not always available. In other cases, the study did quantify capital costs from data collected, but did not find data in the BREF to estimate operating costs, which suggests a gap in the BREF.

These methodological studies (Ricardo, 2016), (Ricardo, 2017), (Ricardo, 2018d), identify variations in approaches to calculating costs of compliance and operational costs, which may not have a standardised approach across all BREFs. For example, with variation in: the discount rate applied to capital costs in order to annualise them (which may reflect the public versus private view of the costs); the lifetimes of equipment over which costs should be amortised; the currency used; the base year of the original data and uplifting to a standardised year; which cost components are included; and whether secondary cost impacts are included.

For the survey results for the question '*does the BREF process sufficiently consider the compliance and operational costs associated with techniques when identifying the best available techniques?*' a little over half of industry respondents (99/175) considered the BREF review process has rarely or never sufficiently considered costs of techniques. A majority of 'Other' respondents (5/9) thought costs were sufficiently considered most or all of the time. Member State responses were in between the two: around 40% (11/28) of the national Member State authorities responded that costs have been sufficiently considered some of the time, a further 40% (11/28) thought costs were rarely sufficiently considered, and around one fifth considered costs were sufficiently considered either most or all of the time. As can be expected, the majority of the local or regional Member State authorities, who are unlikely to have been directly involved in the BREF reviews, answered 'do not know' to this question.

Figure 7-40: Responses from the targeted survey to the question 'Does the BREF process sufficiently consider the compliance and operational costs associated with techniques when identifying the best available techniques?'



Source: Targeted stakeholder survey

The survey results in Figure 7-40 have elaborated on in the open text responses to the survey, and in the focus groups, and reflect the opposing views from the different stakeholder groups. The main issues raised related to cost data were that cost data are often not available or provided (particularly operating costs); that this may be a result of, or related to, the lack of equipment suppliers among TWG memberships; and about the potential sensitivity of providing or handling cost data.

7.2.3.2 Benefits

The BREFs and BAT Conclusions do not include quantification of total avoided emissions or avoided damage costs at a sectoral level. However, the benefits of individual BAT conclusions are considered as changes in emission concentrations or load or reduction in another parameter such as energy use.

Previous CBA studies (Ricardo, 2017), (Ricardo, 2018d) have assessed the benefits from implementing the BAT conclusions for certain large combustion plants and for the iron and steel production industry respectively. The findings from these studies on benefits were that the benefits were high, and under sensitivity analysis⁶⁹ remained robustly larger than costs, even though not all health/environmental impacts of pollutants were included in the damage costs. The benefits were in these instances valued using damage cost functions from the European Environment Agency (2014), which vary by pollutant and Member State. However, the monetisation of benefits has been limited to emissions to air, and it has not been possible to monetise any other benefits.

Other studies (Ricardo, 2018c), (Ricardo, 2019b) have assessed the contribution of the IED to water policy and the circular economy respectively. These studies have looked at specific aspects of the BREF reviews and BAT conclusions on resource consumption, waste generation etc. Ricardo (2018c) found that the BREFs have had, and are likely to continue to have, positive impacts for both reducing emissions to water and, perhaps to a lesser extent, reducing water usage. Specific findings from the study on both water consumption and water emissions are discussed in more detail in the Coherence evaluation question EQ12 in Section 7.12.

The survey results for the question 'Does the BREF process sufficiently consider the benefits (e.g. emission reductions, improvements in resource use, reduced waste generation) associated with techniques when identifying the best available techniques?' (Figure 7-41) show the majority of industry respondents (124/175, 71%) think the BREF process has sufficiently considered the benefits of techniques either most or all of the time. Around half of the Member State responses, and just less than half of those from 'Other' respondents, considered the BREF process has sufficiently considered the benefits of techniques either most or all of the time (industry were most positive, then the Member

⁶⁹ Valuation of benefits can be +/-50%, when considering the two main approaches of valuing statistical life (VSL) and valuation of a life year (VOLY).

States and then NGOs and others). Around 10% of the national Member State and industry respondents think that benefits are only rarely or never sufficiently considered. Around 50% of the local or regional Member State authorities answered 'do not know' to this question.

Figure 7-41: Responses from the targeted survey to the question 'Does the BREF process sufficiently consider the benefits (e.g. emission reductions, improvements in resource use, reduced waste generation) associated with techniques when identifying the best available techniques?'



Source: Targeted stakeholder survey

A key point related to benefits raised by stakeholders in the survey and focus groups was that benefits (e.g. for an installation) are not quantified (monetised) in the BREF process in a way that makes them comparable with costs, although the difficulty of doing so was noted.

7.2.3.3 Cross-media impacts

No quantitative evidence was identified on the scale of any cross-media impacts associated with specific BREFs and BATC. Where identified as part of the information exchange, cross-media impacts associated with specific techniques are documented in the BREFs.

The survey results for the question 'Does the BREF process sufficiently consider cross-media impacts (i.e. impacts on other environmental issues) in identifying the best available techniques?' show overall **the majority of the industry and Member State respondents think the BREF process has sufficiently considered the cross-media impacts of BAT only 'some of the time'** (98/170 for industry; 14/27 for national Member State authorities), with similar proportions (around one fifth) answering 'rarely' and 'most of the time'. Again, a large number of the local/regional Member State authorities answered 'do not know'. The national Member State authorities were slightly more positive in their assessment, with 9 out of 27 respondents indicating cross-media impacts had been sufficiently considered most of the time. "Other" respondents were more polarised in their responses to this question: on the one hand one response indicated that cross-media impacts were never taken into account, and on the other hand over half of responses (5/9) thought that cross-media impacts were sufficiently considered in the BREF process most of the time.

Figure 7-42: Responses from the targeted survey to the question 'Does the BREF process sufficiently consider cross-media impacts (i.e. impacts on other environmental issues) in identifying the best available techniques?'



Source: Targeted stakeholder survey

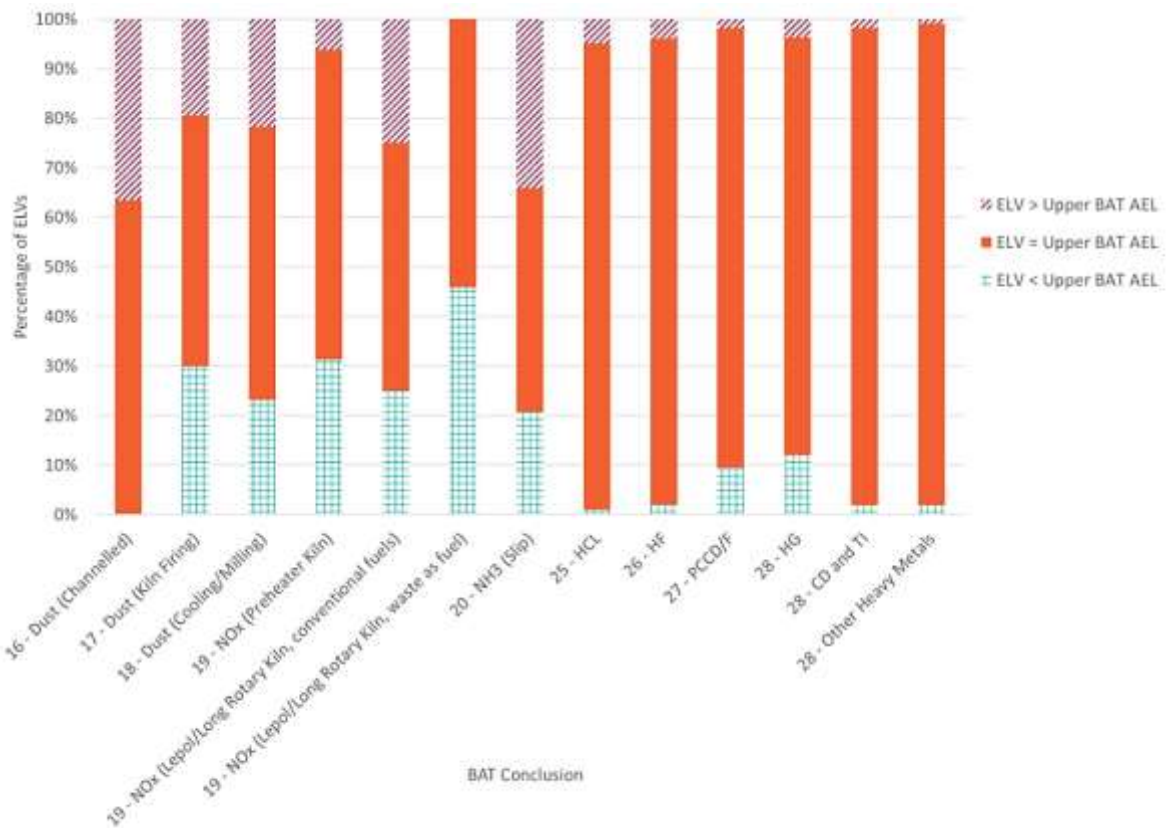
A central tenet of the IED is that it takes an integrated approach. However, the accounting for cross-media impacts within the BREF process has been indicated to have been insufficient in many cases (and various examples were provided by stakeholders to illustrate this point although not verified as part of this evaluation). There appears to be common agreement across stakeholder groups on this point. This may be due to poor data availability (noting that stakeholders can bring relevant cross-media information to the TWG for a specific BREF), but it has also been suggested that it is a result of a strong focus in the BREF process to effectively reduce all key pollutants. The rather neutral and split responses to the survey question shown in Figure 7-42 were elaborated on in the open text responses to the survey. The main views expressed were that a more integrated approach is sought that better accounts for cross-media effects, as well as trade-offs between pollutants emitted to the same medium. Supplementing specific examples that were cited, stakeholders considered that it has been detrimental to set the lowest possible AEL for every pollutant individually rather than holistically identifying what pollutant levels are achievable for all relevant pollutants simultaneously. Concerns were also raised that the focussed approach towards KEIs may have led to a less integrated approach among all pollutants and their cross-media impacts.

7.2.4 To what extent has the IED supported Member States in implementing BAT-based permitting?

Permit emission limit values must be based on BAT-AELs set in the BATC under the IED. The tendency appears to have been for permit emission limit values to be set on the basis of upper BAT-AELs more commonly than lower BAT-AELs (and this has been set out in national guidance in some Member States). Evidence from sampling of permits across the EU for two sectors shows that a proportion (about 15%) of ELVs are set at levels above the upper BAT-AEL (although these are likely to have been derogations). This is shown for a large sample of cement sector permits (Figure 7-43) and for a small sample of steel sector permits (Figure 7-44).

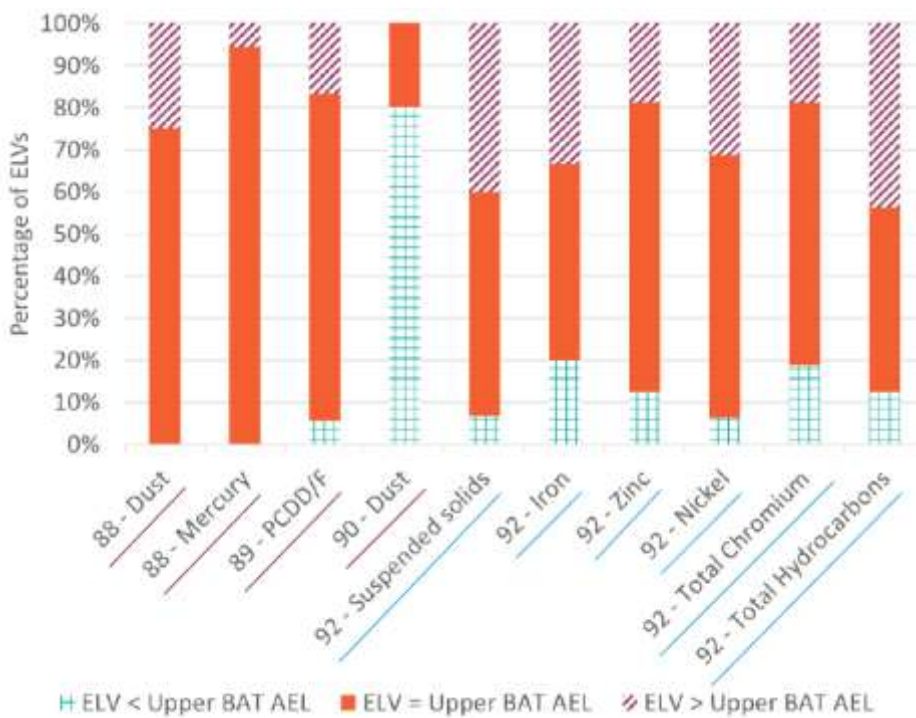
In relation to BAT-AEPLs other than BAT-AELs, there appears to be variation in implementation across the Member States regarding whether the AEPLs are interpreted as binding or not (and as a result whether they are included in permits or not) although there is limited evidence on their usage. This contributes to an unlevel playing field.

Figure 7-43: Assessment of 114 permits for the cement sector across 27 MSs to identify stringency of permit emission limit values



Source: Eunomia (2019) – the underlying data are currently being updated.

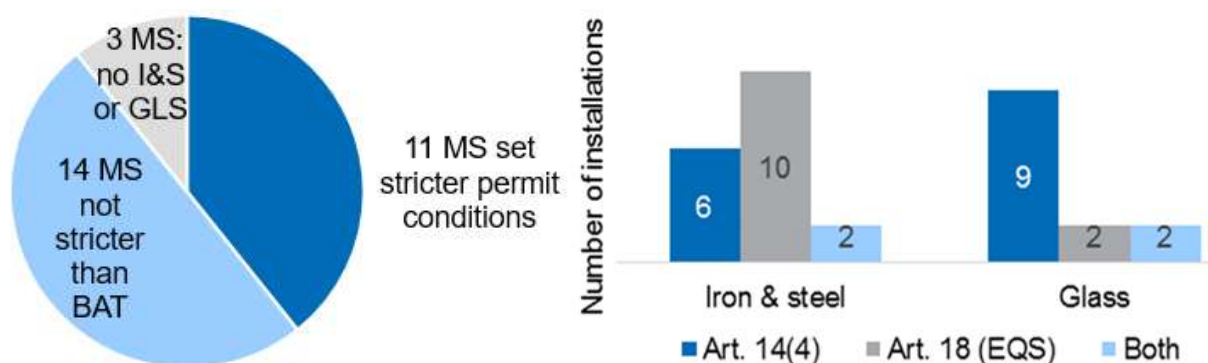
Figure 7-44: Assessment of 24 permits for electric arc furnaces in steelworks across 18 MSs to identify stringency of permit emission limit values



Source: Eunomia (2019) – the underlying data are currently being updated.

Even if a national practice is to adopt upper BAT-AELs by default, the local permitting approach should take account of local site conditions, and this can lead to more stringent emission controls, including limits below the lower end of the BAT-AEL range. This is supported by the understanding gained from Ricardo (2019d) which reported on the uptake of more stringent controls than BAT in permits under Articles 14(4) and 18 of the IED for the Glass and Iron and Steel sectors. The study found that approximately similar numbers of Member States did set and did not set stricter conditions than BAT (Figure 7-45). Even if the permit limit values are set at the upper BAT-AEL, the normal operating conditions of the installations may often be at a level below the upper BAT-AELs, with fluctuations in emission levels up to the upper BAT-AEL.

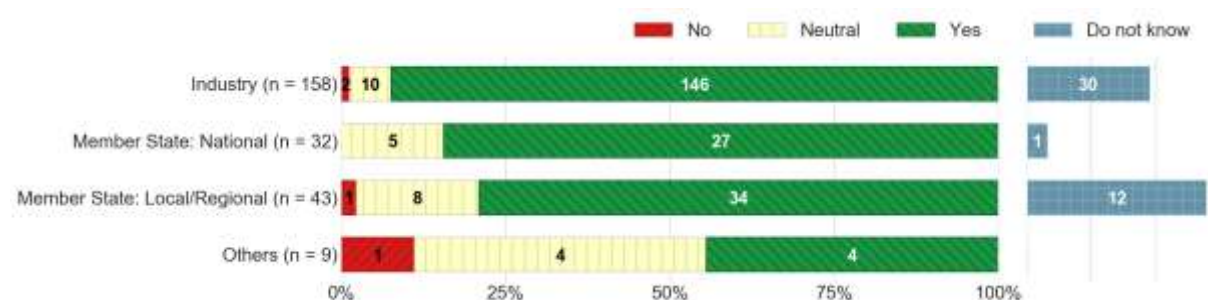
Figure 7-45: Member State IED implementation reporting covering 2013-16; 'sectoral spotlight' on I&S and GLS BATC – uptake of permit conditions stricter than BAT



Source: (Ricardo, 2019d)

The vast majority of survey respondents agreed that the IED and BAT conclusions have enabled Member States to implement BAT-based permitting (Figure 7-46) and that this has increased in relation to the IPPCD (Figure 7-47).

Figure 7-46: Responses from the targeted survey to the question 'Has the IED and BAT Conclusions enabled Member States to implement BAT-based permitting?'



Source: Targeted stakeholder survey

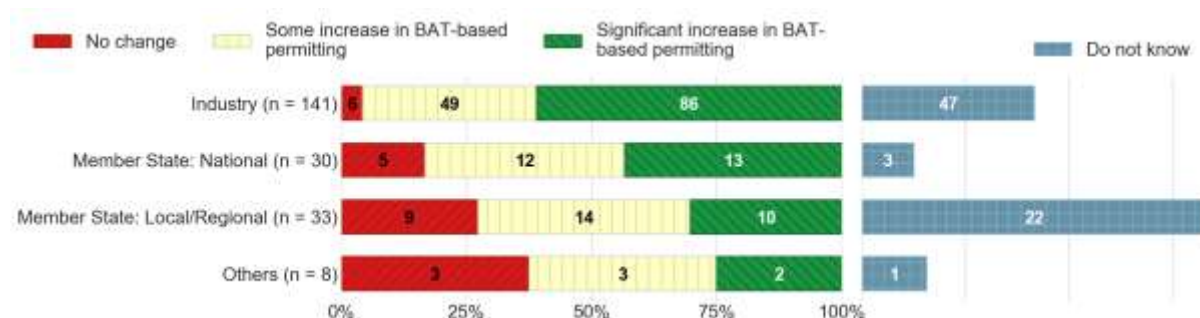
Around 87% (27/32) of the national level Member State authorities agreed, and 80% (34/43) of the local and regional authorities that responded to the survey (predominantly from Sweden and Finland) agreed. The survey sought to tease out the nuance about whether the Member State would have been implementing BAT-based permitting anyway as a matter of course had the IED not been introduced. The two further follow-on questions were asked:

- How has the situation changed relative to that under the IPPC and sectoral Directives? (Figure 7-47)
- (for Member State stakeholders only) If the IED had not been introduced, would your Member State have implemented BAT-based permitting anyway? (Figure 7-48)

Respondents that answered “no” or “neutral” to the question of whether the IED and BAT conclusions enabled the implementation of BAT-based permitting, then mostly indicated in these follow-on questions that no change occurred relative to under IPPCD and that BAT was already being implemented in permits. Nevertheless, a large proportion of the stakeholders (189/212, 89%) indicated that some or a significant increase in BAT-based permitting has occurred relative to under the IPPC Directive. Some responses to the survey have indicated that permitting under the IED has become more challenging both for installation operators as well as Member State authorities due to the increase in BAT-based permitting.

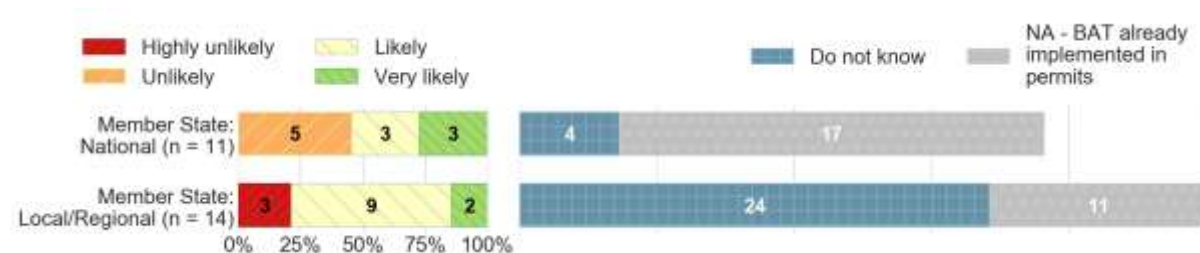
Figure 7-48 suggests that most national Member State authorities (23/32) would have implemented BAT-based permitting anyway without the IED, either because it was already in place, or otherwise. Some Member States such as Germany and Sweden already had well-developed BAT-based permitting systems through e.g. General Binding Rules prior to the IED coming into force. Of the remainder, 4/32 are unclear whether BAT-based permitting would have occurred, and another 5/32 consider it unlikely. This suggests the IED hasn’t added much value here, but the following points should be kept in consideration: (1) because the IED has had an impact in those Member States that weren’t already implementing BAT, this has led to a more level playing field; and (2) the binding nature of BAT-AELs under IED, compared to under IPPCD, has strengthened BAT-based permitting including the levels at which permit conditions have been set.

Figure 7-47: Responses from the targeted survey to the question ‘How has the situation changed relative to that under the IPPC and sectoral Directives?’



Source: Targeted stakeholder survey

Figure 7-48: Responses from the targeted survey to the question ‘If the IED had not been introduced, would your Member State have implemented BAT-based permitting anyway?’

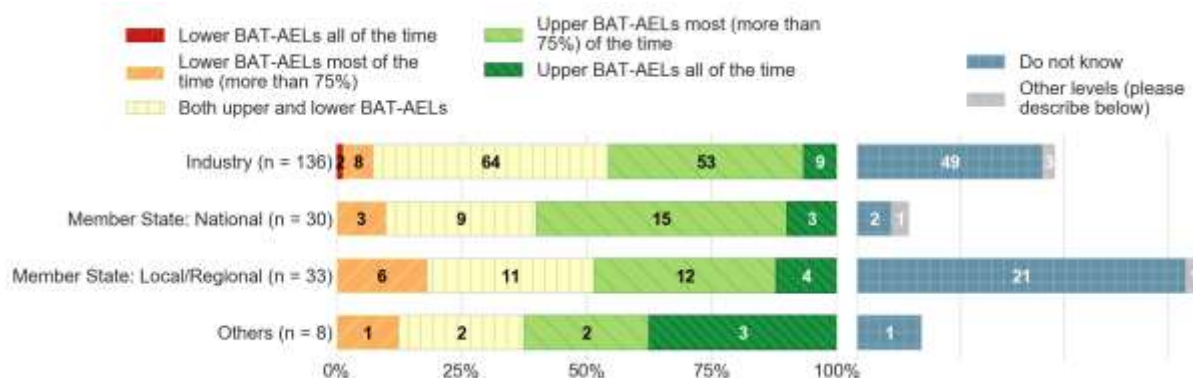


Source: Targeted stakeholder survey

The strong reliance on upper BAT-AELs for setting permit ELVs has also been the view provided during interviews and focus groups, and is borne out in the survey results which are shown in Figure 7-49. The figure shows that roughly 50% (101/207) of stakeholders find permit limit values are based either mostly or exclusively on upper BAT-AELs; a further 40% (86/207) said permit limits were based on both upper and lower BAT-AELs. The approach adopted varies by Member State, based on the feedback received. For example, in Sweden the existing alternative approach for the use of best practicable techniques in many cases tends towards the lower BAT-AELs.

While some parts of industry see the variation in application of lower or upper BAT-AELs as a reason that it hasn't created as much of a level playing field across the bloc as could have been achieved, it is acknowledged that ranges are needed in order to accommodate variations in plant technical characteristics and site specific conditions. Furthermore, as discussed under EQ4 most stakeholders (including industry) agree that the IED has contributed to a level playing field across the EU for industry environmental standards.

Figure 7-49: Responses from the targeted survey to the question 'Based on your experience, are emission limit values (ELVs) in permits typically based on upper or lower BAT-AELs (emission levels associated with BAT) or levels in between?'



Source: Targeted stakeholder survey

7.2.5 To what degree are exceptions taken up that result in permits not being based on BAT?

The effectiveness of the BAT conclusions depends on the way that regulators set ELVs in permits for industrial installations. Permit writers must set the permit emission limit values on the basis of the BAT-AELs (Article 15(3)a). Permit writers have the possibility to set permit limit values exceeding BAT-AEL, but with an obligation on the competent authority to check at least annually that emissions have not exceeded BAT-AELs (Article 15(3)b). Information on the uptake of exceptions under Article 15(3)b are limited to one study which analysed implementation reporting from Member States under the IED (Ricardo, 2019d). In this study it was identified that a small number of occurrences permit limit values having been set according to Article 15(3)b.

Installation operators have the possibility to apply for a derogation from applying BAT in the following situations:

1. The installation cannot apply BAT if it would lead to disproportionately higher costs compared to the environmental benefits (Article 15(4)).
2. The installation is to test emerging techniques rather than apply BAT (Article 15(5)).

Overall there have been several instances of derogations under Article 15(4) granted, and very few under Article 15(5).

The workshop held by the Commission in Berlin in 2014 to review the BREF process identified that the use of footnotes to tables of BAT-AE(P)Ls is a way to recognise installation variability to avoid the need to use IED Article 15(4) derogations.

7.2.5.1 Article 15(4) derogations

As the motivation for granting Article 15(4) derogations depends on costs relative to benefits, the decision-making by competent authorities needs to rely on a methodology for assessing costs and benefits. These methods vary across the Member States (Amec Foster Wheeler, 2018), particularly in relation to operating costs and monetising benefits. There is no EU level guidance for Article 15(4) derogations. Several Member States have developed their own guidance to support the derogations process. Some Member States

base their approach on a common methodology (and tool) developed by the UK (Amec Foster Wheeler, 2018).

The first report on the use of derogations was (Amec Foster Wheeler, 2018). Here it was identified that a total of 105 derogation *requests* had been reported by 2017 by Member States, spread across the sectors of glass (40), cement (30), and iron and steel (15).

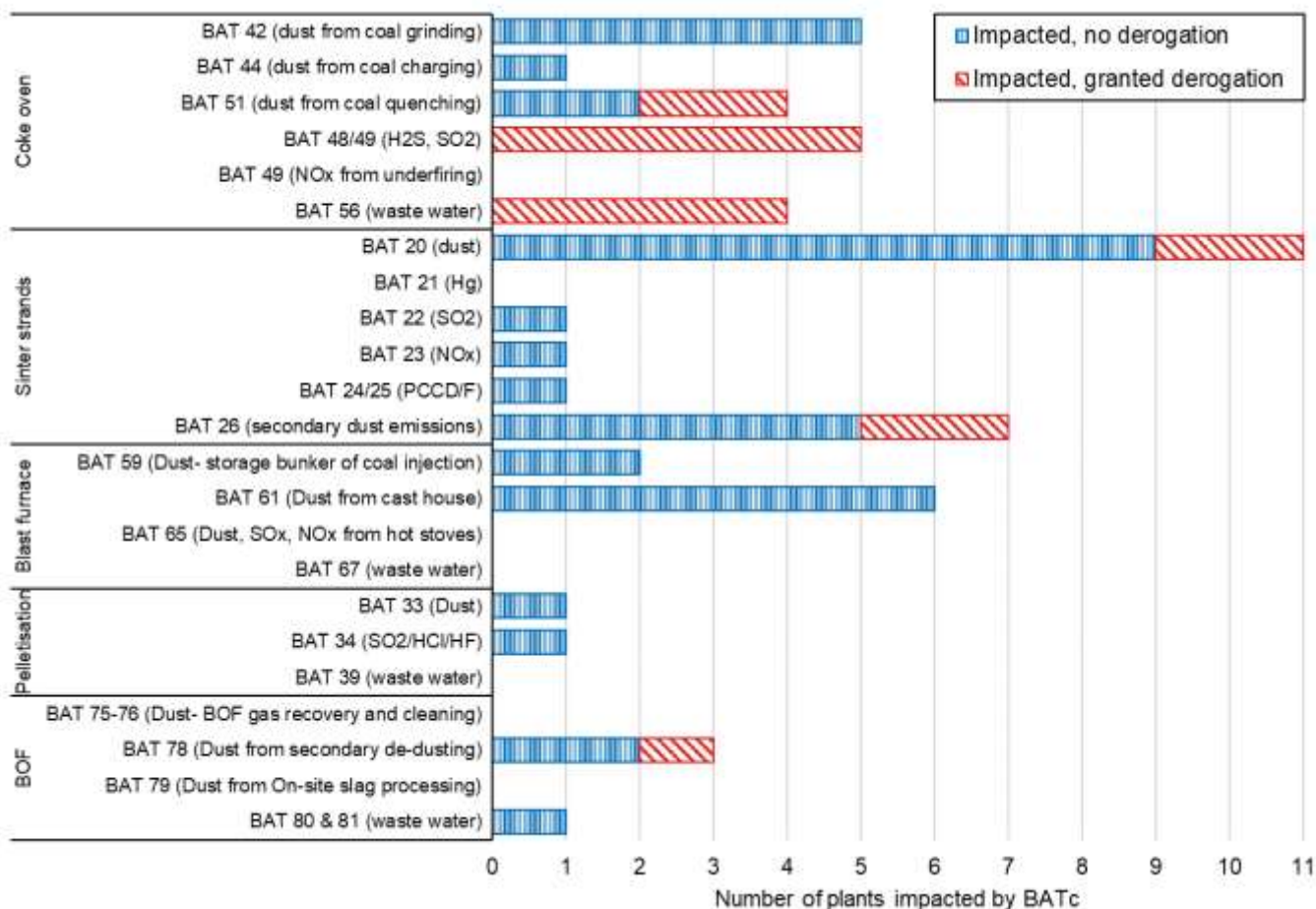
More recent information has been assembled based on Member State IED implementation reporting (Ricardo, 2019d) which has looked in depth into two IED sectors for whom the four year implementation period had concluded: glass and iron and steel. The derogations have been granted for only a limited number of specific BAT conclusions (and of these two sectors, mostly for glass manufacturing for awaiting the next scheduled furnace cold-repair), i.e. suggesting that most of the BAT conclusions were not problematic for installations to meet. For these sectors, it has been reported that 15 Member States have granted 82 derogations in these sectors out of a total of around 780 installations, i.e. just over 10% of installations (and in many instances for single BAT Conclusions). This suggests that the BAT conclusions may have been appropriately set for the majority of installations. However, it should be noted that, the Iron & Steel BAT Conclusions have been estimated to have only impacted (i.e. required some change in operation) about 20% of processes in that sector, suggesting that of those impacted, a large proportion have received derogations.

For only a very small proportion of the derogated installations, additional information was reported in (Ricardo, 2019d) on the environmental impact of these derogations (i.e. the additional emissions beyond the BAT-AEL): for the main pollutants the additional emissions from these installations represented up to 10% of the total sector emissions as listed in E-PRTR, and for a limited number of the installations the missed (lifetime) benefits were monetised as ~€316m.

Additional detail on the derogations applied in the iron and steel sector were identified in (Ricardo, 2018d). This study found:

- The proportion (Figure 7-50) of those processes impacted by the BATC that had been granted derogations varied by process, from 0% to 100%, with the largest proportions for coke ovens. Since derogations are generally understood to represent special cases, the large proportion of derogations for coke ovens suggests that the BAT conclusions for these plants may not have been effective.
- The limited findings available for derogated plants suggested that for sinter strands with derogations, the benefits estimated in (Ricardo, 2018d) still exceeded costs (with a lower benefit-cost ratio of 2.1 than those that hadn't been granted derogations with benefit/cost ratio of 4.5), and for coke oven plants, the costs and benefits were similar.
- Installations that have applied for derogations under Article 15(4) have generally more information documented on the costs and benefits for that installation to comply with BAT than those installations that have not applied.
- The reasons for granting derogations have included to delay investment.

Figure 7-50: Proportion of integrated steelworks processes impacted by the Iron and Steel Production BAT conclusions for each BAT, and split by whether Article 15(4) derogations have been granted



Source: (Ricardo, 2018d)

Evidence from sampling of cement kiln permits across the EU indicates that a proportion (about 15%) of ELVs are set at levels above the upper BAT-AEL. This was shown earlier in Figure 7-43. These instances may be Article 15(4) derogations.

Feedback from the surveys and follow-up interviews in relation to Article 15(4) derogations found that stakeholders are generally supportive of the derogations process as a useful flexibility, but had some concerns over variability in approaches between Member States and timescales granted (potentially leading to an unlevel playing field). The stakeholder responses suggest that the derogations can improve effectiveness (e.g. to account for cross-media effects) and can improve efficiency (e.g. avoiding disproportionate costs). Many stakeholders reported that as the implementation period is ongoing for several BAT conclusions, so too are the derogations process for several installations.

7.2.5.2 Article 15(5) derogations

Only three cases have been identified across the EU for the sectors that have had detailed reporting - glass and iron and steel. Feedback from stakeholders has indicated that a likely reason for the low take up of this flexibility mechanism has been the short length of time allowed for this derogation (9 months), compared to the expected length of time needed in practice for implementing and testing emerging techniques (indicated by Member State authorities in the evaluation focus groups to be 3 to 4 years).

Whilst the results of the survey indicated that around half of respondents thought that the flexibility afforded by Article 15(5) has been utilised to allow the testing and use of emerging techniques, it became clear during follow-up interviews with stakeholders that

many stakeholders had interpreted this question to be regarding the Article 15(4) derogations rather than about Article 15(5). The survey result for this question is not shown here as a result.

Overall therefore, it is considered that the low uptake of Article 15(5) derogations will not have affected the effectiveness of the IED.

7.2.6 Findings

Overall, the BREF process is considered to be currently effective for what is a very difficult task, bringing together large groups of stakeholders often with diverging interests. The main task of the BREF process is to identify BAT and BAT-AELs that are effective in achieving the IED's objectives. Existing efforts to improve the BREF process instigated by the Berlin workshop of 2014 have improved its effectiveness (and efficiency) since the IED came into force.

However, some specific areas were identified that have made it less effective than it could have been. Some of these shortcomings have common ground among stakeholders, and others are only supported by certain stakeholder groups. The shortcomings are related to the consideration of cross-media effects in the BREF process; the approach for identifying KEIs, whilst improved, still has further room for improvement in terms of applying the precautionary approach and avoiding the KEI approach driving discussion on BAT-AELs rather than BAT; and confirming which techniques can be used to achieve the lower end of the BAT-AEL ranges.

Evaluation sub-question	Finding(s)	Robustness of finding
To what extent does the BREF process identify the techniques that are the most effective techniques (and identify the most appropriate associated emission or performance levels) for achieving a high level of environmental protection?	The definition of BAT has allowed the most effective techniques for achieving a high level of environmental protection to be identified in general, but with some limitations.	Medium
	The BREF process identifies in general the BAT that are most effective for achieving a high level of environmental protection.	Medium
	The effectiveness of BAT has varied by BREF.	Weak
	Accounting for cross-media impacts has been limited in the BREF process	Medium
	The approach for identifying KEIs and BAT-AELs for these issues may be limiting the consideration of cross-media impacts.	Medium
	The limited ex-post assessment for the Iron and Steel sector found that overall only a small proportion of the industry was affected by the BAT Conclusions, but that the majority of these plants received Article 15(4) derogations.	Strong
	The BREF process is considered to identify appropriate BAT-AE(P)Ls but again with some limitations identified, including on whether it has always targeted the most relevant environmental issues and pollutants.	Medium

Evaluation sub-question	Finding(s)	Robustness of finding
Does the BREF process sufficiently consider both costs and benefits in identifying the best available techniques?	BAT are inherently considered economically viable. The BREF process provides sufficient opportunity to provide and consider costs in identifying best available techniques, but cost data have not been systematically provided in practice.	Strong
	Whilst the BREF process doesn't itself quantify human health and environment benefits of implementing BAT, the separate assessments that have been carried out concluded the benefits significantly exceeded costs.	Strong
To what extent has the IED supported Member States in implementing BAT-based permitting?	BAT-based permitting has increased under the IED. Emission Limit Values in permits appear to be set in line with BAT conclusions, predominantly set at upper BAT-AELs.	Strong
	There is variation between Member States as to whether or not the BAT-AEPLs (i.e. other than BAT-AELs) from the BAT Conclusions are included within permits.	Weak
To what degree are exceptions taken up that result in permits not being based on BAT?	Article 15(4) derogations allow more cost effective implementation. There is a limited proportion of installations granted derogations. There is some variability in approaches across the EU.	Medium

7.3 EQ3 - How effective is the emissions monitoring and reporting process?

7.3.1 Introduction

In order to answer this evaluation question, we have examined the following set of operational questions, as these have been identified in the evaluation matrix:

- To what extent does the emissions monitoring and reporting system facilitate the assessment of compliance under IED, and of the quantity of released emissions?
- Are the monitoring and reporting requirements fit for purpose?

This evaluation question overlaps and links with EQ7 ("To what extent has administrative burden been reduced with respect to initial expectations?") under the evaluation of efficiency and, in particular, the operational question EQ7c ("How timely and efficient is the process for reporting and monitoring?").

Baseline: Under the baseline, requirements set out in the IPPCD and sectoral Directives would have remained in place although approaches to permitting (including operator monitoring and reporting requirements) would vary by competent authority. Reporting requirements concerning installations under the scope of the IPPCD, LCPD,

SED, WID, and E-PRTR would continue to run in parallel while, in each instance, reporting would need to comply with the INSPIRE Directive.

Information sources used:	Literature and data sources	Open Public Consultation	Targeted online survey	Interviews	Focus groups
	YES	NO	YES	YES	NO

7.3.2 To what extent does the emissions monitoring and reporting system facilitate the assessment of compliance under IED, and of the quantity of released emissions?

Emissions monitoring of relevant permit parameters and reporting to competent authorities forms the basis, along with environmental inspections, for assessing compliance under the IED. According to Article 14(1) of the IED, permits should include:

"(c) suitable emission monitoring requirements specifying:

(i) measurement methodology, frequency and evaluation procedure; and

(ii) where Article 15(3)(b) is applied [setting of emission limit values that are different to those in the BAT Conclusions], that results of emission monitoring are available for the same periods of time and reference conditions as for the emission levels associated with the best available techniques;

(d) an obligation to supply the competent authority regularly and at least annually, with:

(i) information on the basis of results of emission monitoring referred to in point (c) and other required data that enables the competent authority to verify compliance with the permit conditions; and

(ii) where Article 15(3)(b) is applied, a summary of the results of emission monitoring which allows a comparison with the emission levels associated with the use of best available techniques."

Article 14(1)(e) also specifies *"...appropriate requirements concerning the periodic monitoring of soil and groundwater in relation to relevant hazardous substances likely to be found on site and having regard to the possibility of soil and groundwater contamination at the site of the installation"*.

Article 16 of the IED further elaborates on Article 14(1)(c) and include the following:

"1. The monitoring requirements referred to in Article 14(1)(c) shall, where applicable, be based on the conclusions on monitoring as described in the BAT conclusions.

2. The frequency of the periodic monitoring referred to in Article 14(1)(e) shall be determined by the competent authority in a permit for each individual installation or in general binding rules.

Without prejudice to the first subparagraph, periodic monitoring shall be carried out at least once every 5 years for groundwater and 10 years for soil, unless such monitoring is based on a systematic appraisal of the risk of contamination."

Finally, Chapters III (Large combustion plants), IV (Waste incineration and co-incineration plants), V (Solvent using activities) and VI (Titanium dioxide production) set out specific monitoring requirements linked to the emission limit values and other parameters that are included in the IED for these activities. These were taken directly from the relevant sectoral Directives in force previously.

In addition to the IED itself, a Reference Report on Monitoring (ROM) has been developed by the EIPPCB⁷⁰. The document summarises information on the monitoring of emissions to air and water from IED installations and is intended to provide practical guidance for the application of BAT Conclusions on monitoring in order to help competent authorities to define monitoring requirements in the permits of IED installations. It is also intended to support the TWGs for specific BREFs and the development of BAT Conclusions.

Whilst the IPPCD included much of the specific monitoring and reporting requirements set out above (excluding those in Chapters III to VI which were in the sectoral Directives), they have been further elaborated in the IED with more detail on the obligations of operators to report to the competent authorities on monitoring and the frequency of such reporting (regularly and at least annually for emissions monitoring, periodically and at least once every 5 or 10 years for groundwater and soil, respectively). Furthermore, the IED specifies that monitoring requirements should be based on those described in the BAT Conclusions (where applicable) in line with the broader changes made in the IED making the link to the BAT Conclusions much more explicit for setting permit conditions. Finally the IED includes more explicit requirements related to periodic monitoring of soil and groundwater.

The IED impact assessment did find that 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 conditions. Insufficient reporting was expected to result in a lack of confidence and knowledge about compliance with permit conditions. It also prevents situations of non-compliance to be identified quickly and actions taken. The IED impact assessment did not anticipate any additional significant administrative costs for operators related to these changes (and wider BAT Conclusion changes) as no major new information obligations on operators would be added compared to the business as usual. Furthermore, administrative costs were expected to be further decreased by developing and applying appropriate IT tools in order to facilitate reporting.

The changes included on monitoring and reporting within the IED relative to the IPPCD would have been expected to both improve consistency within and between Member States and improve the assessment of compliance with better quality data being made available. This should lead to environmental benefits although these were not quantified in the impact assessment due to uncertainties over the scale of non-compliance and potential impacts of a change in monitoring and reporting requirements. A further benefit of improved monitoring and reporting would be more accurate data being gathered for the information exchange process for the BREFs, thus helping to improve their quality and usefulness. Finally, improved monitoring and reporting was anticipated to lead to higher public confidence regarding environmental pollution control.

The following indicators were included in the evaluation matrix for this evaluation question (both operational questions):

- Views on suitability of emissions monitoring techniques and frequency, as presented in the BAT Conclusions.
- Views on suitability of the reporting, distinguishing the different objectives – reporting to Competent Authorities, to the European Commission and to the EEA for E-PRTR data management.

7.3.2.1 Literature and data sources

A survey undertaken in late 2018 for an ongoing IED implementation support study for the Commission asked Member States what challenges they were facing with

⁷⁰ <https://eippcb.jrc.ec.europa.eu/reference/mon.html>

implementing the Directive. 11% of the challenges raised related to monitoring, reporting and inspections and in particular measurements – representativeness, uncertainty and monitoring below detection limits. Considering all of the other challenges raised (e.g. implementing the BAT Conclusions), this is clearly an important issue for the Member States and something that is an ongoing challenge.

A recent review of the Member States' IED implementation reports covering 2013-2016 included a 'sectoral spotlight' on the implementation of the I&S and GLS BAT Conclusions (Ricardo, 2019d). Part of the questionnaire and subsequent analysis covered monitoring frequencies relative to the requirements from the BAT Conclusions or IED for air, water, groundwater and soil emissions and whether they differ or not. The results showed that the BAT Conclusions and/or IED are generally the most frequently used for establishing monitoring frequencies for emissions to air and water, but less so for groundwater, soil and other parameters. In a small number of cases, one or more Member States have reported monitoring frequencies that are longer than those required by the BAT Conclusions. Some Member States reported practical difficulties in implementing the I&S and Glass BAT conclusions and in particular assessing compliance with the BAT-AELs although no further details were provided as to the specific issues encountered.

As described in Section 7.1.8, the EEB has undertaken a study on public access to information under the IED. As well as looking at the availability of permits, the study assessed the extent to which inspection and compliance reports are publicly available plus additional information like emissions monitoring data. Figure 7-21 summarises the overall findings and shows that very limited information was publicly available on these reports and monitoring data.

A common issue that has been flagged in the targeted survey and in other studies relates to the assessment of compliance and how measurement uncertainties are taken into account. There is limited information on the scale of the issue and exact approaches by each Member State but it is clear that there is some variability across the EU which can lead to quite significant differences in implementation and compliance with permit conditions. The ROM REF indicates that for emissions to air, the most common approach across the Member States is to subtract the measurement uncertainty from the result and to use the resulting value for further assessment.

Information on how different Member States approach compliance assessment has been gathered via interviews undertaken for this evaluation with permitting authorities, written feedback received from stakeholders and a survey undertaken as part of an ongoing IED implementation support contract for the Commission. The different Member State approaches can broadly be split into two main categories: (i) real measurement uncertainty is subtracted; and (ii) fixed, maximum percentage of the measured value or ELV is subtracted irrespective of the actual measurement uncertainty. Approach (i) leads to the best outcome for the environment as it is more accurate and representative of reality. This approach is adopted by Germany, Italy and the Netherlands (and possibly more). Approach (ii) appears to be used by Czechia (20-30% of measured value), Belgium Flanders (30% of ELV), the United Kingdom (20% of measured value), Poland, Spain, and France (20% of ELV when measured value is above it).

An example of how different approaches can lead to different outcomes has been provided in the table below based on different approaches employed by Member States across the EU. It shows how variations in the ways in which Member States treat confidence intervals can lead to significant differences in potential levels of emissions. Annex V, Part 3(9) of the IED sets out the percentages that the values of the 95% confidence intervals of a single measured value should not exceed. For NO_x, this is 20%. When applied to an emission limit value of 100 mg/Nm³ using different approaches in selected Member States then the maximum value to comply can vary from 105 mg/Nm³ (in Member States where the approach is to subtract the actual equipment measurement uncertainty from all measured results) to 125 mg/Nm³ (in Member States where the approach is to subtract the full confidence interval value of 20% in this case from the measured value).

Table 7-5: Illustrative calculations of impacts of different approaches to dealing with confidence intervals

Measured value	90		100		110		120		Max measured value to comply
	Reported value	Value subtracted	Reported value	Value subtracted	Reported value	Value subtracted	Reported value	Value subtracted	
20% of measured value	72	18	80	20	88	22	96	24	125
Uncertainty of the actual equipment (assume 5%)	85.5	4.5	95	5	104.5	5.5	114	6.0	105.3

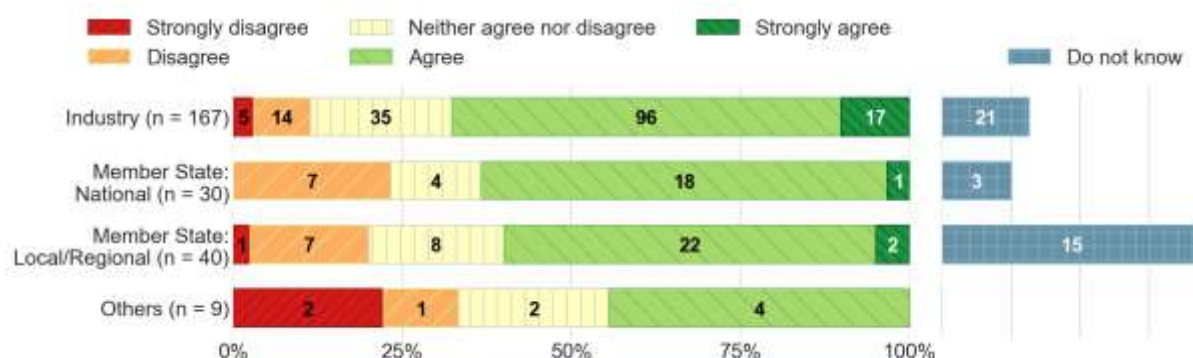
Source: Analysis for this contract

Whilst evidence has been identified (and presented above) with respect to how monitoring requirements are being included within the BAT Conclusions (and any gaps and/or limitations) and challenges being faced, very limited evidence has been identified with respect to the extent to which these requirements support compliance checking or verification at a local, regional or national level. At an EU level, the EEA has indicated (personal communication) that the data they receive is very weak and doesn't allow for checking compliance. Permit conditions require detailed concentration data and the data received at EU level cannot be used for compliance.

Stakeholder feedback provided as part of the recent E-PRTR evaluation was mixed with respect to whether it should be improved to aid its use as a tool to gauge industry performance e.g. with respect to the BAT Conclusions. More data would be required to be reported (e.g. production outputs, size/age of installations, abatement technology used) for E-PRTR to be used for this purpose. The current emissions reporting thresholds and other data quality issues were also highlighted as reasons for barriers in making the E-PRTR more effective.

7.3.2.2 Stakeholder views

The targeted survey asked stakeholders the extent to which they believe that the BAT conclusions are explicit and clear on monitoring requirements, the results of which are presented in the figure below.

Figure 7-51: Responses from the targeted survey to the question "To what extent do you think that the BAT conclusions are explicit and clear on monitoring requirements?"

Source: Targeted stakeholder survey

Overall, around 65% of respondents have indicated that they agree (57%) or strongly agree (8%) that the BAT Conclusions are clear on the monitoring side. A further 20% were neutral and the remainder disagreed (12%) or strongly disagreed (3%). Industry and Member State respondents provided fairly similar responses close to the overall picture although the former were slightly more positive overall. For the "other" category respondents were less positive overall with 4 out of 9 respondents agreeing and a further two responding "neither agree nor disagree". The remaining three respondents disagreed or strongly disagreed with the statement.

Additional written feedback was provided by stakeholders to support their answer to the above question. A general point raised by a number of stakeholders is that the monitoring requirements are not always given sufficient attention during the BREF process as the focus is primarily on the BAT-AELs and the levels at which they are set. However, this appears to have improved in recent BREFs but was somewhat lacking for some of the early IED BREFs e.g. I&S BREF. A number of industry stakeholders have flagged measurement uncertainties as an issue that has not been sufficiently addressed in the BREFs and BAT Conclusions (in general as well as for specific BREFs) including the availability of suitable monitoring methods. This has left some issues for Member States and industry to resolve in implementation. The EEB have indicated that whilst the measurement frequencies are typically clear in the BAT Conclusions, there can often be footnote derogations that provide unclear and vague conditions for monitoring. Often the measurements frequency can be reduced where "emissions are sufficiently stable" but it is unclear what is meant by this term. In some cases, periodic measurements can be used in place of more accurate continuous monitoring systems.

In summary, the more recent BREFs and BAT Conclusions are considered to be much clearer in terms of BAT conclusions on monitoring. Furthermore, Member State competent authorities appear to be using these elements when establishing monitoring requirements in permits. There appear to still be some gaps and uncertainties with respect to monitoring under the IED. In particular, measurement uncertainties and how they are applied for compliance assessment seems to be quite variable across the EU leading to differences between Member States. There are also some data gaps in terms of whether the IED and BREFs monitoring and reporting requirements have improved compliance. Information is typically not published in a lot of Member States so it is unclear if it is being reported consistently and used for compliance assessment.

7.3.3 Are the monitoring and reporting requirements fit for purpose?

The monitoring requirements and conclusions in the IED and BATC are intended to both support compliance and improve public access to information on how industrial installations are forming.

As there are some evidence gaps with respect to whether or not the monitoring and reporting requirements of the IED facilitate the assessment of compliance, it is challenging to determine whether or not these requirements are fit for purpose. Furthermore, measurement uncertainty and its application in compliance assessment may not be sufficiently addressed in the IED or BAT Conclusions leading to some differences (potentially significant) in interpretation across the Member States. In addition, as set out in Section 7.1.8 there are clearly still some gaps across the EU in relation to public access to information on industrial installations.

7.3.3.1 Literature and data sources

The monitoring of emissions to air and water for compliance assessment purposes of IED installations is largely based on EN standards. Detailed provisions apply in Member States to ensure a high quality of the measured data (e.g. through the accreditation of testing laboratories and/or the certification of automated measurement systems for the measurement of emissions to air). Emissions from large sources are usually measured continuously whereas for many others it is carried out periodically. It is rare for real-time monitoring information to be available to competent authorities. The IED requires that the results of emissions monitoring as required under the permit conditions and held by the competent authority shall be made available to the public on request. While the public can request these emission monitoring results, there can be challenges as the results are rarely made available to the public via the internet.

Information provided by the EEB and described in Section 7.1.8 illustrates two examples from the US (US Air Markets Program Data system which provides access to hourly averaged raw continuous monitoring data) and China ("Blue Sky" map where near real time information on performance of around 9,000 industrial installations is made publicly available). In addition to these examples, the following countries have also implemented, or are in the process of implementing, more advanced reporting systems for industrial installations (OECD, 2018):

- **Korea:** Korea adopted an Act on the Integrated Control of Pollutant-Discharging Facilities, or the 'IPPC Act', in 2015 aiming to integrate content from existing legislation. It entered into force in January 2017. Continuous air and water emissions monitoring data are reported digitally through the SmokeStack Tele Monitoring System (STMS) and the Water Tele Monitoring System (WTMS)⁷¹. The STMS constantly measures air pollutants emitted by major industrial emitters through remote automatic sensing equipment. Automatic sensors installed in smokestacks continuously measure seven types of air pollutants (dust, SO₂, NO_x, NH₃, HCl, HF, and CO) to produce data every 5 minutes and 30 minutes. The WTMS covers five water pollutants (BOD, COD, SS, T-N and T-P) monitored hourly and every three hours.
- **India:** The Central Pollution Control Board (CPCB) has recently established the Continuous Emission Monitoring System (CEMS) and Continuous Effluent Quality Monitoring Systems (CEQMS) for real-time pollution monitoring and reporting for 17 highly polluting industries, including aluminium, cement, chlor-alkali, copper, distilleries, dye and dye-intermediates, fertilisers, iron and steel, oil refineries, pesticides, petrochemical, pharmaceutical, power plant, pulp and paper, sugar, tanneries and zinc (OECD, 2018). Selected other industries and common pollution treatment facilities have also been required to undertake real-time monitoring. The CPCB and respective State Pollution Control Boards (SPCBs) receive real-time monitoring data directly to their control rooms. If the concentration of pollutants exceeds the discharge/emission limit, the operator receives an SMS alert. If they exceed a certain number of alerts then they will be subject to an inspection by the CPCB and/or SPCB.

⁷¹ <http://eng.me.go.kr/eng/web/index.do?menuId=221>

Finally, it should be noted that already within the EU there are examples of such monitoring and reporting including the following examples (European Commission, first IED evaluation workshop presentation):

- **Lombardy Region (Italy):** Since 2010 obligation for 82 large installations to install CEMS. Raw CEMS data are sent to the authority's servers (35 million data points / day). The data is not public and is used to analyse environmental performance, and possibly also the contribution of industry to air quality standards
- **Madrid Region (Spain):** 17 installations with provisions in permit to measure on a continuous basis pollutants in one or more stacks. Averaged data uploaded daily to an FTP server of the Ministry and used to monitor compliance with ELVs in permits.
- Some **specific installations and companies within the EU** make their emission monitoring data available online e.g. Taranto Steel Works (Italy), A2A (Italy), Moorburg / Vattenfall (Germany), Ebenhausen / GSB (Germany).

7.3.3.2 Stakeholder views

The EEA believe that we are currently using a system that is not fit for the needs and possibilities for today (personal communication). They have a near real time system for ambient air quality and question whether it is feasible to have the same for IED installations (although technically there are real differences between ambient air quality monitoring and monitoring of industrial emissions). The IED improved provisions on permits and all information should now be published (although this is not the case yet as discussed above) but the EEA question whether it could be consolidated at an EU level. Whilst the EU Registry should be a step forward it will not necessarily solve the issue. The EEA have stated that whilst there is lots of data being gathered it is not necessarily being used so future data collection should be prioritised on what is most important.

Some feedback received from the targeted survey of relevance to this question indicates that digitalisation could improve the quality of monitoring and reporting. It would also aid quicker identification and rectification of any instances of non-compliance. With this in mind it is relevant to consider how other countries around the world are dealing with this issue as well as where it has already been utilised within the EU to demonstrate what is feasible with current technology.

7.3.4 Findings

More recent BAT Conclusions contain consistent approaches to specifying BAT for monitoring. Member State reporting shows that monitoring frequencies are respected in permit conditions. This has helped to improve transparency and consistency. There are some data gaps in terms of whether the IED and BAT conclusion monitoring and reporting requirements have improved compliance (not least as there are data gaps on levels of compliance). Information is typically not publicly available in a lot of Member States so it is unclear if it is being reported consistently and used for compliance assessment. Data reported at an EU level does not allow for easy checking of compliance e.g. through EPTR reporting. Limited information is also currently known on the approaches used for compliance assessment. However, based on the evidence that is available, the differing application of compliance assessment rules risks creating distortions. Stakeholders have indicated that the monitoring requirements are mostly clear. More recent BREFs and BAT Conclusions are considered to be much clearer with respect to monitoring aspects.

A number of countries outside the EU as well as some EU regions and companies have real time monitoring and reporting of emissions monitoring and some make such information publicly available. Such approaches could potentially improve overall efficiency, ease of checking compliance and public access to information.

Findings	Robustness
Member States draw on the BREFs and BAT Conclusions when setting monitoring requirements in permits. There is a sound system of monitoring emissions from IED installations and monitoring techniques are cutting-edge, providing good information on emissions for assessing compliance.	Strong
There is variation in compliance assessment across the EU.	Strong
The reporting systems exist and are useful but are not cutting-edge and monitoring data is generally not publicly available via the internet; real-time reporting is only exceptionally used.	Strong

7.4 EQ4 – Are there significant differences between Member States and sectors in implementation?

7.4.1 Introduction

The IED is intended to establish an integrated and consistent approach across Member States to prevention and control of emissions to air, water and soil, waste management, energy efficiency and accident prevention. Establishing a common approach is expected to contribute to a level playing field across the EU and between sectors by aligning environmental performance requirements for industrial installations. The Directive also enables some flexibility to ensure that Member States can take into account site specific factors including the geographical location and local environmental conditions

In order to answer this evaluation question, we have examined the following set of operational questions, as these have been identified in the evaluation matrix:

- Are there significant differences between Member States or between different sectors (including social costs as a consequence of poor implementation)?
- What is causing any differences and do they affect the costs or benefits of the IED?
- Has the IED contributed to creating a level playing field?

The indicators included within the evaluation matrix are as follows:

- Number/proportion of each of exceptions, general binding rules, flexibilities and derogations per sector per Member State
- Indicators on costs/benefits as mentioned in EQ5

Baseline: The IPPCD system of integrated environmental permitting according to Best Available Techniques (BAT) reference documents (BREF) and non-legally binding BATC would continue with variable uptake of BAT across the EU. Permitting would be guided by a broad structure and a set of principles but ultimately approaches to permitting would vary by competent authority (as regards emission limit values, monitoring and reporting requirements, enforcement, etc.). Member States would continue to be afforded flexibility to apply permit conditions according to local factors (i.e. taking into account the technical characteristics of the installation, its geographical location and the local environmental conditions) with varying approaches between Member States.

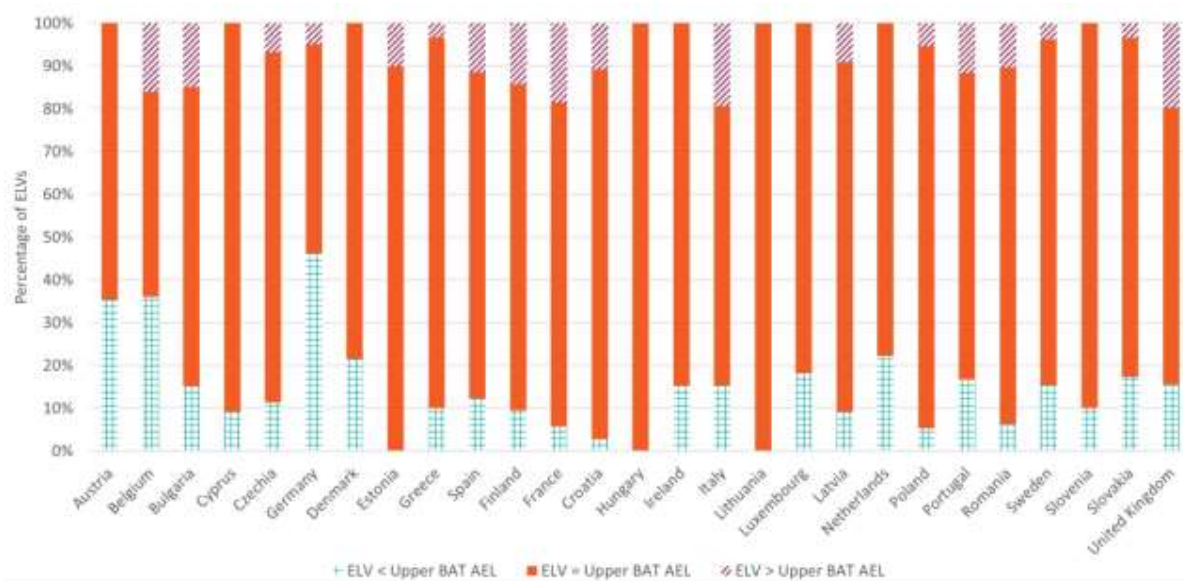
Information sources used:	Literature and data sources	Open Public Consultation	Targeted online survey	Interviews	Focus groups
	YES	NO	YES	YES	NO

7.4.2 Are there significant differences between Member States or between different sectors (including social costs as a consequence of poor implementation)

7.4.2.1 Literature and data sources

Review of literature and relevant data sources in EQ2 in Section 7.2 considered the extent to which the BREFs and BAT Conclusions have supported Member States with implementing BAT based permitting. Figure 7-43 and Figure 7-44 showed the variation in setting ELVs within the cement and I&S sectors across specific BAT conclusions. Figure 7-52 and Figure 7-53 shows the same data but broken down by Member State. For the cement sector (112 installations in sample) there is broad consistency across all the Member States on the proportion of ELVs set at the different levels. The outliers to this are Austria, Belgium and Germany with a larger proportion of ELVs below the upper BAT-AEL and Italy, France and the UK with a larger proportion over the upper BAT-AEL (assumed to relate to Article 15(4) derogations). Broadly speaking, while there is some difference between the setting of ELVs in different Member States they are, for the most part, consistent.

Figure 7-52: ELVs set in the cement sector (112 installations in sample) compared to BAT-AELs in EU27 (excluding Malta)

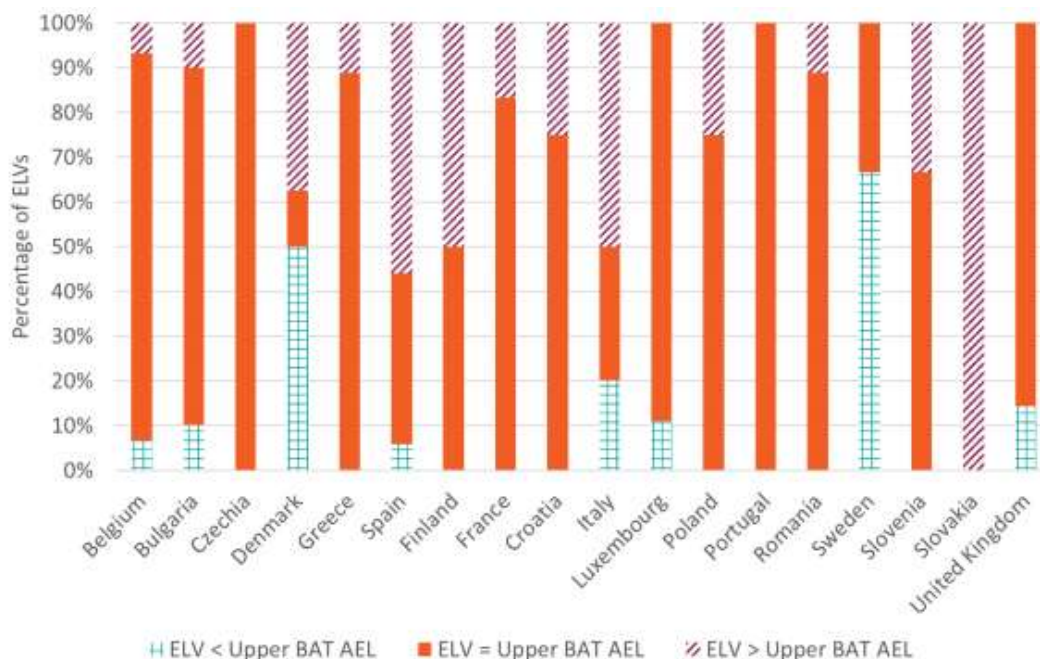


Source: (Eunomia, 2019) – the underlying data are currently being updated

Figure 7-53 shows the permit limits relative to the BAT-AELs for a small sample of electric arc furnaces (20) across 18 Member States. Here we see a greater divergence in the responses by Member States. Denmark and Sweden are the only Member States to set a significant percentage of their ELVs below the upper BAT-AEL. Whereas for Slovakia, Spain, Finland and Italy over 50% of their installations have permit limits set above the upper BAT-AEL. Overall, we see a much greater variability in where the ELV will be set (in reference to the BAT-AEL) compared to in the cement sector although it should be noted that the sample size is much lower so more sensitive. While these figures only represent

two sectors, they do show that there are some differences between how permit conditions are set between Member States and sectors.

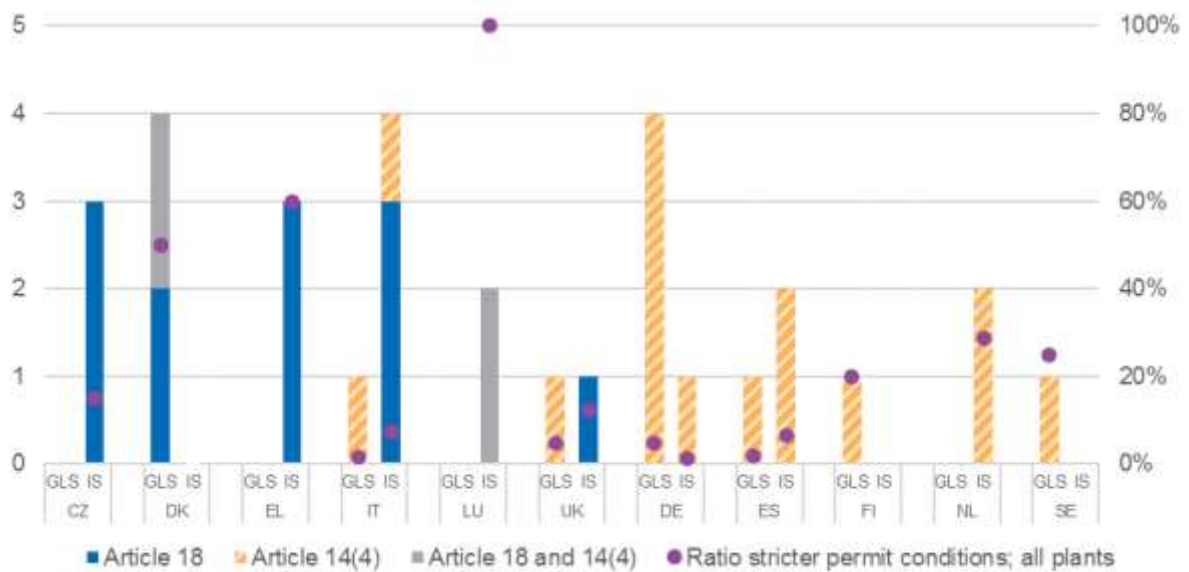
Figure 7-53: ELVs set in the iron and steel sector (20 electric arc furnaces in sample) compared to BAT-AELs



Source: (Eunomia, 2019)

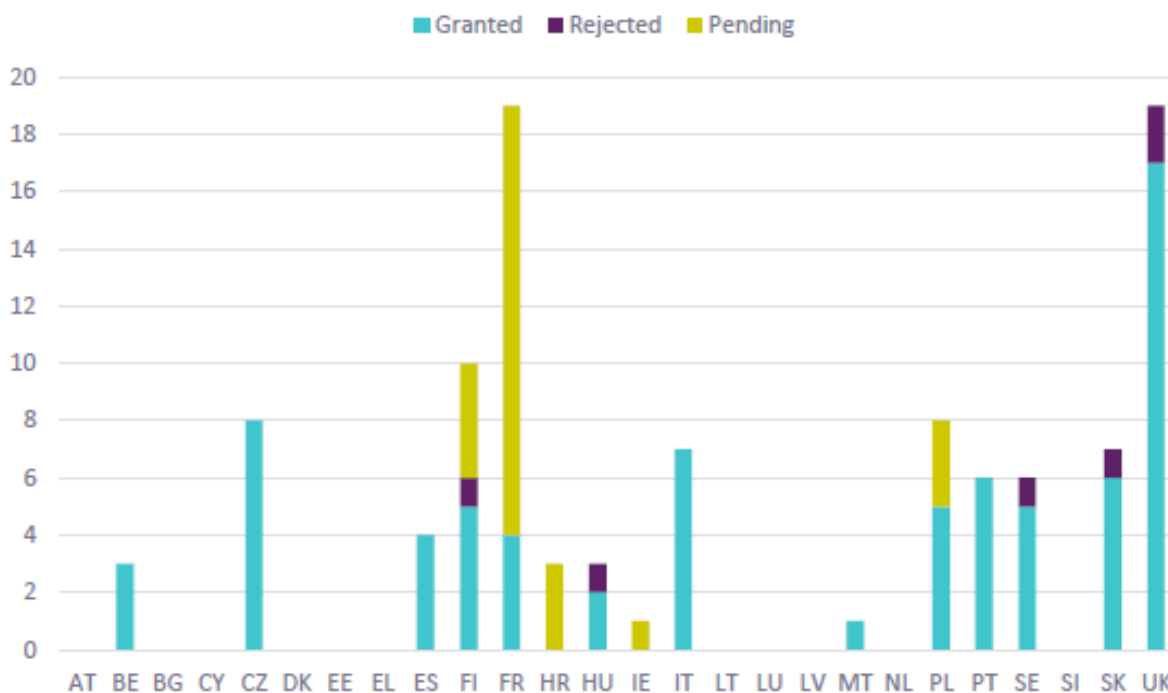
Information from Member State implementation reporting for the period 2013-2016 included a sectoral spotlight for the iron & steel and glass sectors. It indicated that stricter permit conditions are set in the context of meeting EQS (Article 18) and for setting stricter permit conditions reported under Article 14(4). Reasons for setting stricter conditions (than the BAT-AELs) included reducing nuisance and risks to human health and the environment, adapting to the local situation, protecting sensitive environments and achieving the objectives of other national and local plans and programmes as well as international conventions. The number of installations where stricter permit limits have been set (compared to those set out in the BAT Conclusions) due to environmental quality standards (Article 18) or other situations (Article 14(4)) broken down by Member State are summarised in Figure 7-54, below. The specific additional measures set are tighter ELVs expressed as concentrations, with the exception of one Member State that set an annual emissions ceiling on emissions to air. This shows the variation across the EU with respect to setting tighter standards. It is important to note that the provisions within the IED for setting tighter standards are to ensure compliance with local environmental quality standards as well as for other reasons i.e. to account for local circumstances.

Figure 7-54: Number of installations which required stricter permit conditions due to environmental quality standards (Article 18) or other situations (Article 14(4))



Source: (Ricardo, 2019d)

Some variation between Member States is apparent with the granting of derogations under Article 15(4). Amec Foster Wheeler (2018) documented ~75 derogations that had been awarded by 2017 (and 105 requested in total) across the EU as summarised in the figure below (Amec Foster Wheeler, 2018). This shows that some Member States have granted a much higher number of derogations than others (Member States with no derogations are excluded from the within and between Member States). However, it should be noted that the total number of installations (overall and in specific sectors) varies significantly between Member States. Amec Foster Wheeler (2018) also considered how many derogations had been requested relative to the number of installations covered by each BAT Conclusion. This showed that generally the number of derogations requests came from 11% or typically much less of the total number of installations.

Figure 7-55: Number of derogations requested (applications at installation level) in EU Member States (MS with no information provided are not shown on the graph).

Source: (Amec Foster Wheeler, 2018)

As described under EQ2 in Section 7.2.5, (Ricardo, 2019d) looked in depth into two IED sectors for whom the four year implementation period had concluded: glass and iron and steel. The derogations have been granted for only a limited number of specific BAT conclusions i.e. suggesting that most of the BAT conclusions were not problematic for installations to meet. For these sectors, it has been reported that 15 Member States have granted 82 derogations out of a total of around 780 installations, i.e. just over 10% of installations (and in many instances for single BAT Conclusions). The most derogations were granted in the UK (18) followed by Italy (14), Germany (10) and the Czech Republic (7). Romania had the smallest number of reported derogations, reporting only one derogation.

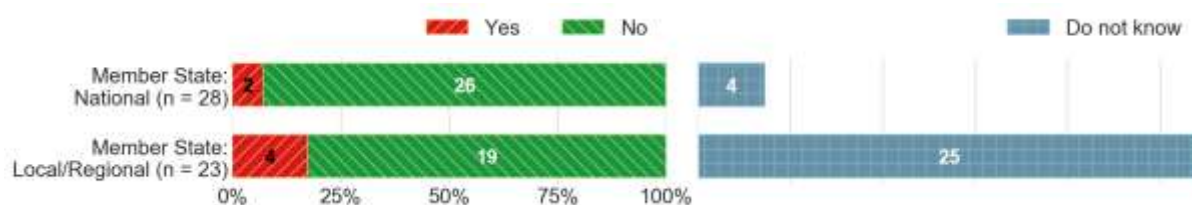
As the adoption of the BAT Conclusion and implementation timetables differ between sectors (and many are still ongoing) this is an ongoing implementation issue. Examples of guidance and good practice with the granting of derogations are apparent. However, differences are emerging between Member States regarding the application of this provision – with two in the energy sector resulting in the involvement of the European Court of Justice (see Section 6). (Amec Foster Wheeler, 2018) developed principles to support Member States with their application of Article 15(4). It is too soon to judge what effect, if any, this may have had on Member State approaches.

A few differences in implementation have been observed relating to the use of GBR (Article 6) and inspection plans. Implementation reporting by Member States showed that in 2013, 10 Member States have adopted GBR based on BATCs which have been transposed to national legislation, and 24 have drawn up inspection plans (as required under Article 23). The extent to which the use of GBR has led to differences between sectors is expected to be small. The greater number of Member States with inspection plans under the IED is expected to have reduced differences between Member States. Under the IPPCD very few Member States had established inspection plans and accordingly, the disparity between the frequency of inspections ranged between 1 (reported by 10 Member States) and 6 (by Slovenia only) (Amec Foster Wheeler, 2016). Thus, it is expected that frequency and scope of inspections will be more balanced under the IED now that a larger number of Member States have established inspection plans.

7.4.2.2 Stakeholder views

Member State competent authorities are generally of the opinion that there are no significant differences in IED implementation between sectors in their respective Member States (as evidence in Figure 7-56).

Figure 7-56: Responses from the targeted survey to the question: "Are there significant differences in IED implementation between sectors in your Member State?"

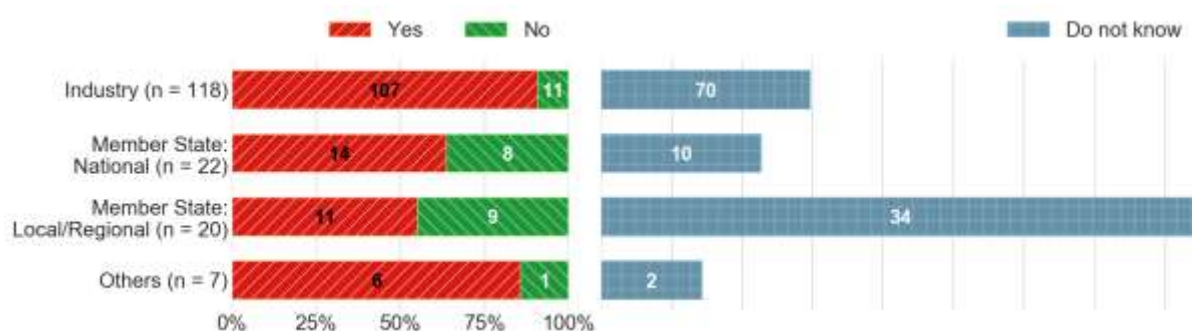


Source: Targeted stakeholder survey

Competent authority opinion on this matter is supported by the fact that the transposition of the IED requirements to national legislation has been uniform (Ricardo, 2019d). All permit conditions should be set in accordance with BATCs (Article 14).

The legally binding nature of the BATC was intended to address differences between Member States and BAT uptake that existed under the IPPCD. The use of BATC is intended to ensure uniformity between Member States when setting ELVs, associated monitoring requirements and other environmental performance requirements. Member State reporting on the transposition of IED requirements to national legislation shows that all permits are to be set in accordance with the BATCs. However, in practice, most stakeholders across all stakeholder groups are of the opinion that there are significant differences in IED and BATC implementation between Member States (Figure 7-57). Industry responses also indicate that there are sector specific differences in IED and BATC implementation.

Figure 7-57: Responses from the targeted survey to the question: "Are there significant differences in IED and BATC implementation between Member States?" (where industry has responded, this is asking for their opinion on their sector only)



Source: Targeted stakeholder survey

Evidence for the opinions expressed in the above figures may be found in the setting of permit conditions and the application of derogations as discussed previously.

7.4.3 What is causing them; and do these differences affect the costs or benefits of the IED?

As set out above, the main cause of the differences identified is implementation of the BATC and the levels at which permit conditions are set. Whether the lower or upper end of the BAT-AEL ranges from the BAT Conclusion are set in permits (or levels in between) can have significant impacts on overall costs and benefits. For example, an ex ante cost-benefit assessment for the LCP BAT Conclusions (for large solid fuelled plants) found the following:

- Benefits of meeting upper BAT-AELs (€3.4 billion per year) around six times the compliance costs (€0.59 billion per year) for EU as a whole.
- Lower BAT-AEL estimated to still have benefits (€14.2 billion per year) exceed costs (€5.7 billion per year), but lower benefits to costs ratio (2.5x).

7.4.4 Has the IED contributed to creating a level playing field?

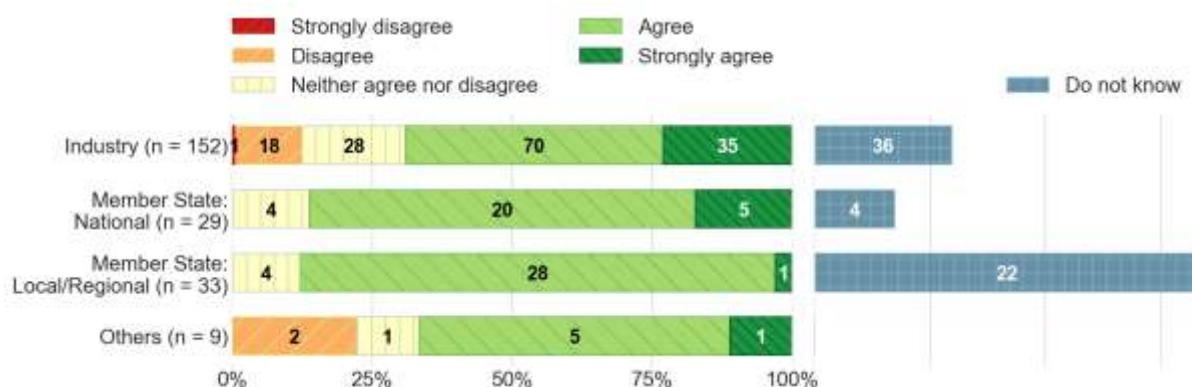
Permit conditions are largely being set according to the BAT Conclusions – at least for BAT-AELs – which has led to a much more uniform approach between Member States than under IPPCD. ELVs are generally found to be set according to the upper end of the BAT-AEL range. While this may reduce the effectiveness of ELVs to prevent industrial pollution, the approach taken is generally consistent between most Member States and sectors, thus contributing to a level playing field. Differences between Member State approaches to conducting inspections have been improved under the IED with greater establishment of inspections plans.

An ex-post assessment of the costs and benefits from implementing BAT under the IED (Ricardo, 2018d) found that only a minority of installations were impacted by the adoption of the Iron and Steel (I&S) BATC (in terms of the share of processes impacted). However, it can be expected that the BATC has contributed to a level playing field as the other installations were already operating at a comparable level.

Generally, where Member States have applied ELVs according to the lower end of the BAT-AEL range (e.g. in the case of Austria and Sweden), no negative effect on a level playing field is reported (Ricardo, 2019c). The Netherlands however, reported that the stricter permit conditions required for the IPRR sector on livestock farming and housing has led to an unfair disadvantage to its industry. However, these higher standards have been set in order to meet EU nature-related regulations (Ricardo, 2018b). Thus, this Member State difference could be attributed to external factors to the IED.

Stakeholders are largely of the opinion that environmental performance requirements are better aligned under the IED compared to under the IPPCD and that this has contributed to a more level playing field. Only 9% of respondents (excluding “do not know”) disagreed that the IED has contributed to creating a level playing field (see Figure 7-58). Alongside the responses gathered, a relatively large share replied that they did not know (62 out of 285 in total).

Figure 7-58: Responses from the targeted survey to the question: “To what extent do you think that the IED has contributed to achieving a level playing field in the EU for IED sectors by aligning environmental performance requirements for industrial installations (compared to the previous legislative regime of the IPPC Directive and sectoral Directives)”



Source: Targeted stakeholder survey

7.4.5 Findings

Are there significant differences between Member States and sectors in implementation?

There is some (limited) variation in terms of the levels at which permit conditions have been set within the BAT-AEL range. Some Member States appear to have granted a greater number of derogations than others and some don't allow them. Stricter permit conditions than the BAT Conclusions appear to be rarely applied. Differences in the levels at which permit conditions are set based on the BAT-AEL range can impact on company costs. There appear to be differences in compliance assessment.

What is causing the differences; and do these differences affect the costs or benefits of the IED?

The main cause of these differences is the implementation of the BAT conclusions. While the directive has been implemented uniformly, the conclusions provide the ability to take in to account local factors including legislations and other limiting factors (such as location). There is evidence that this can have an impact on the costs and benefits associated with the permits.

Has the IED contributed to creating a level playing field?

Stakeholders are of the opinion the IED has contributed to a more level playing field compared to the IPPCD and sectoral Directives (i.e. the baseline). Whilst differences still remain, there will always be some variation due to the flexibility that is an integral part of the Directive i.e. enabling Member States to take into account site specific factors. Permit conditions are largely being set according to the BAT Conclusions – at least for BAT-AELs – which has led to a much more uniform approach between Member States than under IPPCD. Differences between Member State approaches to conducting inspections have been improved under the IED with greater establishment of inspections plans.

Finding(s)	Robustness
The IED has contributed to a more level playing field compared to under the IPPCD, mainly through a reduction in differences in stringency of permit ELVs between Member States. However, there remain variations in implementation among Member States, particularly on compliance assessment, the granting of derogations, and on setting permit ELVs at lower versus upper BAT-AELs.	Strong

Efficiency

7.5 EQ5 - The extent to which the costs are justified, given the impact of the IED and the benefits it has delivered?

7.5.1 Introduction

The introduction of the IED has brought with it some changes in processes, some of which may incur additional costs and others not. The changes that have occurred compared to the IPPC Directive and its sectoral Directives include:

- **Implementation of the IED** itself as a piece of legislation requires work by national Member State authorities to transpose the Directive into national legislation, and to also set up additional guidance required to help local/regional authorities with its implementation.
- The **BREF process** requires input (resources) in order to develop the revised BREFs and BAT conclusions. Due to the additional legislative weight applied to the concept of BAT and the BAT conclusions, it is to be expected that the BREF process has required additional effort per BREF under the IED compared to BREFs developed under IPPCD.
- **Baseline reports** are a new requirement in the IED compared to the IPPCD. Whilst these have costs associated with them, they bring benefits in understanding the environmental conditions that should prevail at an industrial site should the installation cease and close.
- **Permitting**: with the bringing together of sectoral Directives' requirements into the IED, some simplification of permitting is expected. The publication of each BAT conclusions is expected to lead to the triggering of reviews of existing integrated environmental permits, to update them as needed to ensure they reflect the revised conclusions on BAT-AELs. It is known however that this process can take longer than the four year period, with around one quarter to one third of permits for the iron and steel and glass sectors respectively not being updated within the four year period (Ricardo, 2019d).
- **Compliance** costs and benefits: with each agreed BAT conclusions, and its four year implementation timetable, there is expected to be additional impacts (costs and benefits) when operators change operations/add pollution abatement techniques to comply with BAT-based permitting. These investments have both one-off costs and ongoing costs; ongoing benefits also accrue when considered against a baseline of inaction. There can also be reduced costs for waste treatment.
- **Monitoring** requirements may differ for a sector in the revised BAT conclusions compared to the previous IPPC era BREF. These are ongoing costs.
- **Inspection** requirements may differ for a sector in the way Member States conduct the inspections for IED-permitted installations. These are ongoing costs.

The operational questions covered in this evaluation question are divided into two topics:

1. What are the costs and benefits (monetary and non-monetary) associated with the implementation of the IED in each Member State, and in the EU as a whole?
2. Have the benefits been achieved in a cost-effective manner?
To what extent are the costs justified, given the impact of the IED and the benefits it has delivered?

How proportionate were the costs for different stakeholder groups, taking into account the benefits achieved?

Baseline: The baseline for this EQ assumes that the requirements of the IPPCD and sectoral Directives would have remained in place. Costs associated with compliance with the minimum requirements of the sectoral Directives would have continued to be incurred with variable impacts associated with the IPPCD and BREFs due to the non-mandatory nature of the BAT conclusions and variable use of them by competent authorities when setting permit conditions. As with EQ1, the baseline is also based on the assumptions made in the limited specific studies that have assessed the costs and benefits of the BATC (LCPs, iron and steel), this includes the retention of the LCPD minimum emission limits and limited uptake of BAT under the IPPCD.

Information sources used:	Literature and data sources	Open Public Consultation	Targeted online survey	Interviews	Focus groups
	YES	YES	YES	YES	YES

7.5.2 What are the costs and benefits (monetary and non-monetary) associated with the implementation of the IED in each Member State, and in the EU as a whole?

A limited amount of evidence is available to assess the costs and benefits impacts of the BAT conclusions. There are no literature sources that have carried out an assessment of the full IED costs and benefits, i.e. covering all sectors, all Member States. A limited number of pieces of literature are available that assess the situation for specific sectors. However, the targeted stakeholder survey included relevant questions on this topic.

7.5.2.1 Literature sources

Case studies have been conducted ex-ante for part of the large combustion plant sector (Ricardo, 2017), and ex-post for all of the iron and steel production sector covered by the IS BATC (Ricardo, 2018d). The latter assessment, which was titled '*Ex-post assessment of costs and benefits from implementing BAT under the Industrial Emissions Directive*' developed estimates of compliance costs and benefits for the steel industry, but also provided conclusions on the process for estimating costs and benefits of implementing the BAT conclusions. The detailed assessment of impacts was carried out in a bottom-up manner, i.e. considering the actual reported and estimated impacts at each individual process and plants across the EU based on the techniques that were fitted or changes made in order to comply with the BAT conclusions.

The findings on the costs and benefits (Table 7-6) were that overall as a total for the different processes (and representing around 2/3 of the capacity of the sector), the total annualised compliance costs across the EU of implementing the BAT conclusions were around €90m/year, most of which was from techniques implemented at sinter strands. In comparison, the health and environmental benefits of the resulting reductions in emissions of dust, SO₂, NO_x and dioxins/furans were estimated for the EU to be around €930m/year, again with most of this benefit arising from secondary pollutants reduced from techniques fitted to sinter strands. The overall ratio of benefits to costs was around 10:1, which suggested that the conclusion that benefits exceeded costs was robust to sensitivity analysis of how costs and benefits could vary based on different assumptions.

Table 7-6: Estimated compliance costs and benefits of implementing the iron and steel BAT conclusions for approximately 2/3 of the steel sector

Process	Number of processes impacted / in sample / in EU total	Total annualised costs (€/yr)	Benefits (€/yr) of BATC compliance			Benefit-cost ratio
			Processes with reported emissions	Remaining processes (estimated emissions)	Total for all processes impacted	
Sinter strands	13 / 23 / 38	45.9	242	402	644	14.0
Pelletisation plants	1 / 6 / 7	7.7	6.8	-	6.8	0.9 (Note 1)
Coke ovens	13 / 26 / 53	17.1	154	1	155	9.0
Blast furnaces	8 / 43 / 71	4.7	3.3	12.5	15.8	3.3
BOF	3 / 19 / 32	12.2	45.5	-	45.5	3.7
EAFs	40 / 125 / 197	2.0	2.1	63.4	65.5	33
TOTAL	-	89.6	453	479	932	10.4

Note 1: The results for pelletisation plants reflect a single Swedish installation. The benefit-cost ratio here is thus particularly sensitive to the PM damage cost for Sweden, which is about one quarter of the EU average.

Source: (Ricardo, 2018d)

In addition to the quantitative findings, (Ricardo, 2018d) also made wider conclusions about the process to carry out detailed bottom-up assessments of the impacts of BAT conclusions. The findings from this, in relation to a sector with overall a relatively small number of large installations across the EU, were:

- It is resource intensive to obtain the data needed to make the assessment from operators and competent authorities. Even then, it is not possible to obtain all the data needed, leading to extrapolating from a limited number of estimates.
- It is difficult for operators to attribute investments costs solely to BAT conclusions compliance as the operators also make investment decisions for other reasons.
- It is difficult for operators to indicate retrospectively what changes would have been made under a hypothetical 'counterfactual' scenario without the BAT conclusions.

The difficulties encountered for this sector suggest it would be impractical to incorporate such detailed assessment into the BREF process. The findings also imply that conducting similar cost benefit analyses for other sectors would be even more challenging, for example for sectors with a larger number of smaller installations, and if no BAT-level dataset showing processes in use at each installation (which was available for this iron and steel sector assessment).

A further case study has been conducted of solid fuel-fired large combustion plants with rated thermal inputs greater than 300MW_{th} (Ricardo, 2017). The study modelled, in a bottom-up manner (i.e. per plant) across the EU, the expected **compliance** impacts of the LCP BAT conclusions. The modelling was conducted using a least-cost algorithm approach to predict, based on knowledge of existing techniques installed at the plants and their existing emission levels, what techniques would be needed to comply with the BAT conclusions, per the final draft of the BAT conclusions in June 2016. Given that these LCPs also had to have met the requirements of the IED Annex V emission limit values, the study looked at the marginal incremental impacts (including consideration of stranded assets – see EQ6 in Section 7.6) from compliance with the IED to complying with the BAT conclusions BAT-AELs for SO₂, NO_x, dust and mercury for these plants. Costs were the compliance costs of techniques, and benefits were estimated from the accrued reductions

in pollutant emissions based on their health and environmental impacts. The findings of this study, shown in Figure 7-59 at EU level were that:

- The benefits for the EU of meeting **upper BAT-AELs**, at €3.4bn/year, were more than five times the compliance costs (€0.59bn/year). This analysis also found that for all Member States bar one (Ireland), the benefits of emission reductions were estimated to outweigh the costs of the techniques needed to reduce emission levels to upper BAT-AELs. The Member States estimated to have the largest impacts (costs and benefits) were Poland, Spain, Germany, United Kingdom and Czech Republic.
- Achieving **lower BAT-AELs** leads to significantly more costs (€5.7bn/year) than the upper BAT-AELs, but the benefits (€14.2bn/year) were still estimated to exceed the costs, but by a lower ratio (benefits/costs ratio of 2.5). This difference was still positive (i.e. benefits exceeding costs) under sensitivity analysis testing. The benefit-cost ratios were found to vary among the Member States from 4.5:1 for the UK to 0.1:1 (i.e. costs 10 times benefits) for Portugal.

Figure 7-59: Findings of the annualised costs and benefits at EU level for >300MWth solid fuel LCPs meeting the LCP BAT conclusions in 2025; units: €bn/year



Source: (Ricardo, 2017)

The limited evidence compiled on the environmental benefits of the IED and the BATC suggests that the benefits are much greater than the compliance costs. But do the benefits still substantially outweigh the costs when costs other than compliance costs are factored in?

For the only complete assessment of the impacts of a BATC – for the iron and steel sector – the benefits (limited to the monetisation of air pollution reduction measures) were estimated at around €930m/year. The costs to be compared against this have been introduced above and examples of units costs have been taken from the targeted survey results where stakeholders were invited to provide evidence of the compliance, administrative, monitoring and reporting costs, that are associated with implementing the IED's requirements (in addition to those that would have occurred under the previous legislative regime of the IPPC Directive and the sectoral Directives). These unit costs have not been given further scrutiny and would particularly benefit from having studies carried out to more fully ascertain the costs (and the extent to which they are real additional costs compared to existing practice under the IPPCD). The unit costs have, as a first indication with conservative assumptions, been multiplied by the numbers of installations in the iron and steel sector (differentiating between the more complex integrated steelworks from the electric arc furnaces (EAFs)) to provide an approximate understanding of how the limited monetisation of benefits compares against the sum of possible costs. The non-compliance costs are small relative to the compliance costs.

These very approximate figures suggest that even adding non-compliance related costs together with the compliance costs, the benefits still exceed the costs significantly, a conclusion that would likely remain robust against large variation in the cost estimates. This suggests that the costs for this iron and steel sector are justified by the benefits

accrued. Other sectors may see different ratios between costs and benefits, depending on the pollutants emitted, the relative stringency of the BAT conclusions compared with existing mitigation practice, and the number and scale of plants and their pollutant loads.

Table 7-7: Estimated costs of implementing the iron and steel BAT conclusions for the steel sector

Cost component	Source / based on	Estimated costs
National implementation	Survey response (MS authority, DK) Scaled up to EU based on number of EU MS with steelworks (22)	€5.5m/year
BREF process	Administrative burden assessment in EQ7	€7.9m (one off)
Compliance costs	(Ricardo, 2018d), uplifted by factor 1.5 to cover whole sector	€134m/year
Baseline reports	Survey responses (various) <ul style="list-style-type: none"> 50 integrated steelworks, assume €200,000 each 197 electric arc furnaces, assume €50,000 each 	€19.9m (one off)
Permitting	Assumptions difficult based on the survey responses provided. <ul style="list-style-type: none"> 50 integrated steelworks, assume €100,000 each 197 electric arc furnaces, assume €50,000 each 	€14.9m (one off)
Monitoring costs	Survey responses (various) <ul style="list-style-type: none"> 50 integrated steelworks, assume €50,000 each/year 197 electric arc furnaces, assume €15,000 each 	€5.5m/year
Inspection costs	Survey responses (various) <ul style="list-style-type: none"> 50 integrated steelworks, assume €30,000 each/year 197 electric arc furnaces, assume €15,000 each 	€4.5m/year
Totals	Costs	€43m one off, €149m /year
	Benefits	€932m /year

Source: various, as shown in the table; own calculations.

7.5.2.2 Stakeholder views

The targeted survey asked respondents to provide evidence of the compliance, administrative, monitoring and reporting costs, and of the benefits, for installations, sector or Member State that are associated with implementing the IED's requirements which go beyond those that would have occurred under the previous legislative regime of the IPPC Directive and the sectoral Directives. These have been taken into account in the cost estimations presented in the previous section.

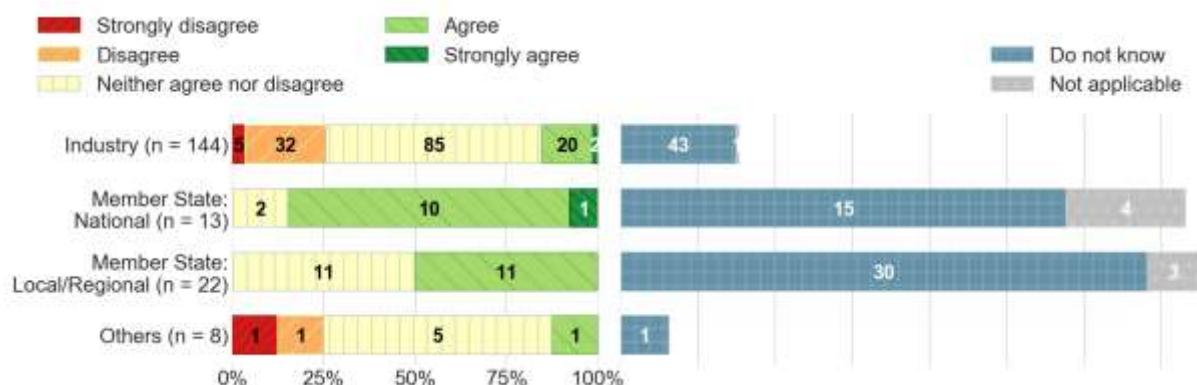
EQ7 considers administrative burden in more detail.

7.5.3 Have the benefits been achieved in a cost-effective manner? To what extent are the costs justified, given the impact of the IED and the benefits it has delivered? How proportionate were the costs for different stakeholder groups, taking into account the benefits achieved?

As identified in the previous section, the limited evidence identified to date suggests that the benefit-cost ratios of compliance with BAT conclusions have been high, i.e. the benefits have been achieved cost-effectively.

The targeted survey asked stakeholders 'to what extent do you think that the benefits that the IED has achieved have been achieved in a cost-effective manner?' The results of this survey question are presented in Figure 7-60. The results show that industry organisations and "others" to a large degree are relatively equally split between agreeing and disagreeing with the statement, with 90 out of 152 (59%) responses indicating 'neither agree nor disagree', and a further 39 (26%) and 23 (15%) responses disagreeing and agreeing respectively. Member State authorities on the other hand largely agree that the benefits achieved are cost effective. It must be noted that a large number of the responses have indicated 'do not know'. Stakeholders have indicated that to a large degree, many of the costs are unknown as only limited studies have been undertaken on the overall costs and benefits, so it makes it difficult to judge.

Figure 7-60: Responses from the targeted survey to the question 'To what extent do you think that the benefits that the IED has achieved have been achieved in a cost-effective manner?'



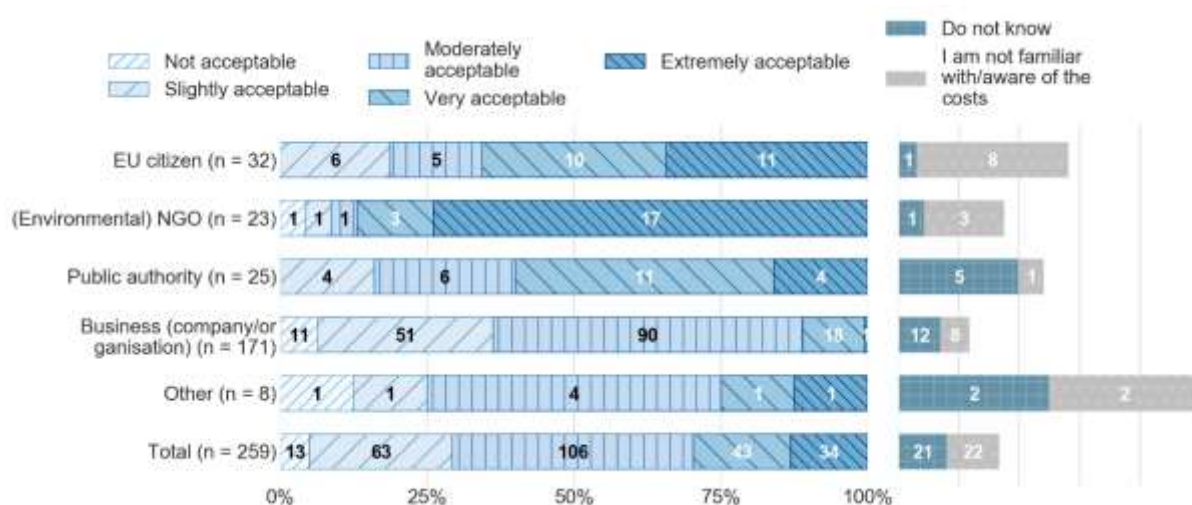
Source: Targeted stakeholder survey

The main points expressed by stakeholders through the survey were:

- The BREF process requires a large resource effort from across Member States, industry and civil society representation, such that there is interest in trying to reduce future efforts for the second round of BREF reviews.
- Stakeholders have provided some examples where they claim certain BAT conclusions (i.e. particular BAT numbers) have been less cost-effective (although with limited supporting evidence). Regarding LCPs, operators had to comply in 2016 with IED Chapter III and Annex V requirements, and now have obligations from 2021 for compliance with the LCP BAT conclusions. Some stakeholders claim this overlap, together with different timetables imposed from other obligations (climate and energy), has increased cost.
- There are several aspects of the IED which lead to costs other than compliance costs that should be considered when assessing cost effectiveness. Some of the issues stakeholders reported concerned variations in Member State implementation leading to variations in cost effectiveness.
- Various flexibilities provided for by the IED have improved cost effectiveness.

The OPC asked for responses on the topic 'To what extent is the cost to industrial installations of complying with permit conditions based on the use of BAT acceptable in view of the benefits?'. The results from this are reproduced in Figure 7-61. They show that most public authorities, EU citizens, and environmental NGOs (53 out of 80) consider the costs to have been either very or extremely acceptable, in view of the benefits. On the other hand, responses from businesses are less positive, with a large proportion (141/171) indicating that the costs were either only slightly or moderately acceptable in view of the benefits. These differences between the stakeholder groups are perhaps not surprising as the costs accrue mostly to business organisations, and the benefits accrue to civil society. Of course, one of the purposes of the legislative intervention of the IED is to account for the environmental externalities which may well otherwise get neglected in the absence of legislation.

Figure 7-61: Responses from the OPC to the question 'To what extent is the cost to industrial installations of complying with permit conditions based on the use of BAT acceptable in view of the benefits?'



Source: Open Public Consultation

7.5.4 Findings

There has been overall a limited set of evidence available to identify the costs and benefits of the IED. A limited number of BAT Conclusion benefit and cost assessments have been undertaken, and these have identified, for the sectors assessed, that benefits from compliance with the BAT Conclusions overall significantly exceeded compliance costs, and that these conclusions were robust to sensitivity analysis of assumptions made. The BREF process itself does not undertake any cost-benefit analysis of BAT or BAT-AEL selection, and based on the findings of the cost-benefit analyses that have been conducted, it is rather unlikely that further such assessments will be carried out due to their cost and the difficulties in obtaining the data needed on BAT-process level to complete them.

Some examples were provided of particular cases where certain BAT conclusions have not been as cost effective as others. Particular concerns were raised for the large combustion plant sector on efficiency. This highlighted that the sector recently had to comply with the IED Chapter III and Annex V requirements (in 2016), and as well as this has obligations imposed from 2021 for compliance with the LCP BAT conclusions. This overlap, together with different timetables imposed on the sector from its obligations from other (climate and energy) policy areas can make for a reduction in efficiency.

The IED mechanisms for derogations reduce compliance costs, as do the transitional arrangements for LCPs under Chapter III. It is not clear whether the use of these flexibilities leads to better efficiency in terms of costs per unit of environmental improvement.

Our own limited assessment of compiling costs of IED implementation for one sector, as provided by survey respondents, suggest that even adding non-compliance related costs together with the BATC compliance costs, the benefits still exceed the costs significantly.

That said, there are views expressed that the BREF process requires a large resource effort from across Member States, industry and civil society representation, such that there is interest in trying to reduce future efforts for the second round of BREF reviews.

Evaluation question	Finding(s)	Robustness of finding
The extent to which the costs are justified, given the impact of the IED and the benefits it has delivered?	There has been overall a limited set of evidence available to identify the costs and benefits of the IED.	Strong
	The limited number of assessments of the impacts of BAT conclusions that have been undertaken identified, for the sectors assessed, that benefits overall significantly exceeded compliance costs, and that these conclusions were robust to sensitivity analysis of assumptions made.	Strong
	The IED mechanisms for derogations reduce compliance cost, as do the transitional arrangements for LCPs under Chapter III.	Medium
	There may have been a reduction in efficiency for the LCP sector.	Medium
	The benefits still exceed the costs significantly after adding non-investment costs related to compliance together with the BATC compliance costs.	Medium
	The costs overall are justified in view of the benefits achieved by the IED.	Medium

7.6EQ6 – Could efficiency have been improved?

7.6.1 Introduction

The IED came into force in 2011, but provided a later date for the provisions on LCPs to come into force. There were several transitional arrangements for certain LCPs, some of which extend to beyond the date when the four year implementation period of the LCP BAT conclusions expire in 2021. The IED also consolidated the requirements from the Waste Incineration Directive into chapter IV of the IED; in addition, waste incineration plants are also subject to the requirements of meeting BAT-AELs under the waste incineration BAT conclusions.

For the BREF process, the most recent BREFs of WI and FDM have been conducted in a shorter period (3 to 4 years) compared to other IED BREFs, and have achieved unanimous votes in favour by Member States for the adoption of the BAT conclusions. This is seen as a positive reflection of the processes implemented for these BREFs to improve efficiency (see also EQ2), which mark the latest status of the approach for continuous improvement in the BREF process, with increased front-loading particularly for KEIs determination, additional data assessment workshops, smoother data collection process and the setting of BATs and BAT-AELs after taking into account all the other related/relevant BREFs. For the latter point, there is a particularly large effort internally in the EIPPCB on ensuring consistency with other BREFs finalised under the IED. The BREF authors have to continue

to adjust the draft BATs / BAT-AELs to account for the developments of the BREFs that are being drafted in parallel – this is a large effort to review all the other BREFs for consistency, but it aims at achieving a more robust consensus in a more efficient way.

The operational question covered in this topic is:

- What factors could have improved efficiency by strengthening delivery of the objectives while minimising unnecessary costs?

Baseline: No specific baseline was considered for this EQ as it considers whether efficiency could have been improved with the implementation of the IED.

Information sources used:	Literature and data sources	Open Public Consultation	Targeted online survey	Interviews	Focus groups
	YES	NO	YES	YES	YES

7.6.2 What factors could have improved efficiency by strengthening delivery of the objectives while minimising unnecessary costs?

Meetings of the IED Article 13 Forum and TWGs discuss aspects of the BREF process, which has itself already been (and continues to be) subject to a process to improve its efficiency. This effort appears to have paid dividends to date, but more could potentially be done to improve efficiency (see EQ2).

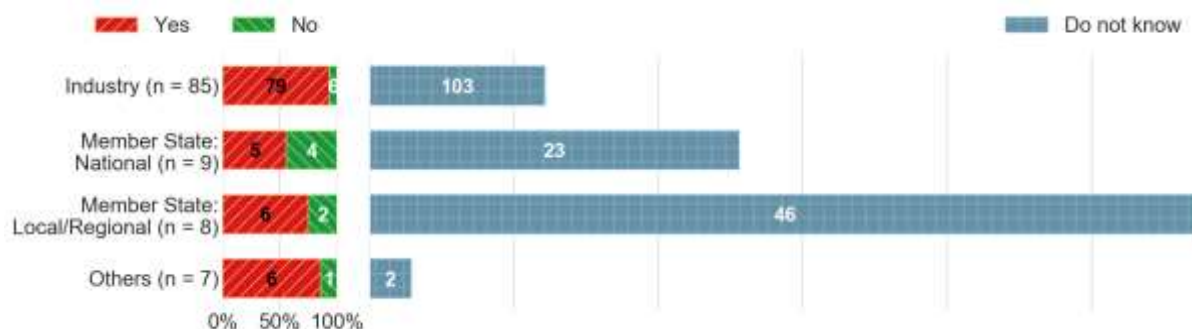
The study on the LCP sector (Ricardo, 2017) quoted earlier also mentioned that it accounted for stranded costs. The IED limit values for LCPs largely came into force in 2016, except in cases where transitional arrangements were in place. The LCP BAT conclusions were agreed and published in 2017 meaning that the requirements to meet the LCP BAT conclusions comes into force in 2021, five years after the deadline for compliance with the IED ELVs. It was estimated in (Ricardo, 2017), which covers only part of the LCP sector, that a proportion of the compliance costs were estimated to relate to stranded assets – those techniques with remaining economic life but which would be necessary to change to meet the more stringent limits of the LCP BREF. That study estimated that the compliance costs for meeting upper BAT-AELs comprised €0.32bn/year plus a further €0.27bn/year of which up to €0.16bn/year might be stranded costs. Whilst the benefits still outweigh the costs regardless of the position about stranded costs, this does suggest that the benefits are not necessarily going to be achieved for this sector in the most cost-effective way possible. This point is supported by LCP industry views from the survey that indicated that greater alignment of compliance timelines with that of the key dates from the climate and energy policy framework would have led to greater cost-efficiency, i.e. improved on the suboptimal IED and BATC implementation timelines.

Similarly to the overlap pointed out for LCPs between the IED chapter III and the BAT conclusions, stakeholders have indicated that consideration should also be given to the additional benefits offered by the waste incineration BAT conclusions over and above the requirements for such plants in Chapter IV of the IED, and whether this diverts attention from addressing more substantive issues such as climate change, land use change and lack of sustainable consumer products.

The survey asked stakeholders whether the IED could have been implemented more efficiently whilst still delivering its environmental objectives and minimising unnecessary costs. The results from this question are shown in Figure 7-62. **Around two thirds of stakeholders answered “do not know” to the survey question on whether the IED could have been implemented more efficiently whilst still delivering its**

objectives and minimising unnecessary costs. Most of the remainder indicated that efficiency could have been improved. One cause of this is that the stakeholders do not have information on how efficient the IED currently is, as limited analysis has been carried out to date.

Figure 7-62 Results from the targeted survey to the question: "Could the IED have been implemented more efficiently whilst still delivering its overall objectives and minimising unnecessary costs?"



Source: Targeted stakeholder survey

Several suggestions have been made by stakeholders to help deliver the IED’s environmental objectives whilst improving efficiency. Many of these relate to making changes to the BREF process (e.g. streamlining of questionnaire development and data gathering; or increasing the use of more efficient software tools for analysis of data gathered in the BREF process). Others include targeting the reduction of pollutants at source rather than downstream and introducing applicability thresholds of BAT-AELs.

7.6.3 Findings

Several suggestions have been made by stakeholders to help deliver the IED’s environmental objectives whilst improving efficiency (e.g. targeting the reduction of pollutants at source rather than downstream; applicability thresholds of BAT-AELs; increasing the use of new more efficient software tools for analysis of data gathered in the BREF process). Many of the suggestions relate to the BREF process, which has itself already been (and continues to be) subject to a process to improve its efficiency. This effort appears to have paid dividends to date, but more could be done to improve efficiency. A specific concern is the risk of stranded assets among LCPs due to obligations from 2021 for compliance with the LCP BAT Conclusions following on from the need to comply with the IED Chapter III and Annex V requirements from 2016.

Finding(s)	Robustness
The BREF process has already been (and continues to be) subject to a process to improve its efficiency. Whilst successful, several suggestions were made by stakeholders to further improve efficiency.	Medium
For one sector (Large Combustion Plant, LCPs), the risk of stranded assets due to obligations from 2021 for compliance with the LCP BAT Conclusions following on from the need to comply with the IED Chapter III and Annex V requirements from 2016, suggests that efficiency could have been improved.	Medium

7.7 EQ7 – To what extent has administrative burden been reduced with respect to initial expectations?

7.7.1 Introduction

As introduced earlier in Section 7.1.7, one goal for the IED was to reduce, where possible, the administrative burden of compliance, in alignment with 2012 goal of reducing these burdens by 25% from 2007, though the 'Action Programme for Reducing Administrative Burdens'⁷². Section 7.1.7 considered whether the IED has simplified the legislation and cut any *unnecessary* administrative burden. This section takes a broader view, and reflects on whether the IED as a whole was able to reduce costs to stakeholders and contribute successfully to the 2012 target of reducing the total administrative burden.

The adoption of the IED was expected to enable some simplification of the environmental standards for industrial sectors under a common framework, by reducing the number of Directives that permits have to take into account, and the number of different monitoring systems linked to those permits.

The operational questions covered in this topic is:

- What are the administrative costs to the Member States, Commission, and IED operators?
- What are the administrative costs of the BREF process?
- How timely and efficient is the process for reporting and monitoring?
- Taking account of the objectives and benefits of the IED is there evidence that the costs have caused unnecessary or excessive administrative burden?

Baseline: Under the baseline, requirements set out in the IPPCD and sectoral Directives would have remained in place. Reporting requirements concerning installations under the scope of the IPPCD, LCPD, SED, WID, and E-PRTR would have continued to run in parallel with some overlapping / unnecessary administrative burdens.

Information sources used:	Literature and data sources	Open Public Consultation	Targeted online survey	Interviews	Focus groups
	YES	NO	YES	YES	NO

7.7.2 What are the administrative costs to the Member States, Commission, and IED operators?

The Commission defines administrative costs as "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 is not the whole of this cost, but only the part of this cost that would not have occurred in absence of the regulation.

7.7.2.1 Review of literature and relevant datasets

A full quantification of the administrative cost of implementing the IED is a difficult and complex undertaking. In the IED IA Annex 8, the main categories of administrative costs and burdens of the permitting, monitoring and reporting process are identified for plant operators and regulators (summarised below in Table 7-8). The table shows that for most

⁷² https://ec.europa.eu/info/sites/info/files/action-programme-for-reducing-administrative-burdens-in-the-eu-final-report_dec2012_en.pdf

activities, the costs borne by the regulators are entirely due to the regulation, whereas for operators, usually the burden is not the same as the total cost for the activity, as some of the information gathered (such as emission levels) would already need to be collected, for example to ensure safe operation of the plant.

Table 7-8: Summary of conclusions on overall administrative cost and burden from IED IA Annex 8

Category of activity causing a cost to stakeholders:	Admin cost?	How much of this is a burden?
Permit procedure for new installations	Operator application	Yellow
	Regulator processing application	Orange
Permit procedure for existing installations	Operator application	Yellow
	Regulator processing application	Orange
Release monitoring data and submission requirements	Operator monitoring cost	Yellow
	Regulator processing data	Orange
Changes in operation	Operator communicating changes to regulator	Yellow
	Regulator processing information	Orange
Reconsideration of permits	Operator update submitted information	Yellow
	Regulator re-processing application	Orange
Compliance checking	Operator providing information	Orange
	Regulator undertaking inspections	Orange
Data on emission limit values	Cost to Regulator of compiling/ submitting data	Yellow
Implementation reports	Cost to Regulator of drafting reports	Yellow

Yellow	Burden is less than cost, as some activity would have been carried out anyway	Orange	Burden is same as cost, activity is only initiated to comply with regulation
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Furthermore, in the IA an assessment is made of the administrative costs and burdens associated with the IPPC directive, taking a broad view of the overall costs of updating permits, and how the overall burden of this on all installations that fall within the IED's remit would change. Based on the proposals suggested in 2007, the expectation on what the IED could contribute to a reduction in administrative burden is shown in Figure 7-63. The most significant decrease of burden was expected as a result of actions to reduce unnecessary administrative burdens at Member State level (estimated to decrease burdens by €150 to 300 million per year). This was based on anticipated efficiencies due to integrated permitting (i.e. rather than separate permits under the IPPCD and the sectoral Directives) and increased use of General Binding Rules.

Figure 7-63: Expectation of changes in administrative costs and unnecessary administrative burden of the changes to the IPPC Directive as part of the creation of the IED.

4. Summary of changes in overall administrative burdens as a result of the proposals

Proposal	Administrative burden (per year)		
	<u>Increase of NECESSARY</u> burden (million €)		<u>Decrease of UNNECESSARY</u> 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 €		

Source: (European Commission, 2007)

No further studies or evidence are available that compare the figures presented above to make a direct quantitative comparison to this expectation, so there is no detailed data available to quantify whether the burdens for operators and regulators has changed. It should also be noted that, from the changes mentioned in Figure 7-63, not all of the extensions of the scope of the directive have been carried out. The figure mentions €37 million in potential additional burdens from extending the scope of the directive, which would be from integration of the 20 – 50 MW class of medium combustion plants (MCPD developed as a separate instrument), and inclusion of more intensive livestock under the IED's remit (not included).

7.7.2.2 Stakeholder views

The targeted survey asked stakeholders various questions on the impacts of the IED on reducing unnecessary administrative burden and simplification of regulation. The results from these questions are summarised already in Section 7.1.7. As discussed, that section focuses only on whether the IED has led to a reduction in *unnecessary* burden, and concluded that while stakeholders felt that the IED has generally led to a simplification and clarification of the IPPC provisions (see Figure 7-19), over 50% of stakeholders still thought that the IED did not reduce unnecessary administrative burden (see Figure 7-20).

From this answer shown in the latter figure, it can be reasoned that overall the stakeholders did not feel that the IED reduced the burden in line with the expectations as set out in the IA. Many stakeholders highlighted specific cases where the burden increased. The general reasons for this were:

- Increased complexity on reporting and permitting requirements mean Member State authorities spend more time developing guidance and discussions with company on technical details of permits.
- Industry spends more resources monitoring more types of pollutants, in some instances when those pollutants have no BAT-AEL in specific BATC.
- An industry campaign identified the requirement of baseline reports as a significant increase, though many Member State representatives recognized the need for them and did not see them as an additional unnecessary burden.

7.7.3 What are the administrative costs of the BREF process?

To answer this question, an estimate of the total costs has been made using data obtained from the following sources:

- EIPPCB interview notes and data, on the length of a typical BREF process and the time spent in full-time equivalent (FTE low, average and high), based on experience in the drafting of 5 BREFS (WI, FDM, WT, WBP and LCP).
- Figures on number of people involved from various stakeholders in the technical working groups including small and large BREF processes (verified by EIPPCB) combined with estimates of time spent. Note that assumptions are made on the cost of labour using Eurostat and OECD wage data as no direct data sources were available for industry and Member State representatives. The results of this exercise is shown in Table 7-9.

Table 7-9: Average low, average and high cost scenarios for the drafting of a sectoral BREF document including BAT conclusions and transposition into law.

Stakeholder group	Cost scenarios (€)		
	Low	Average	High
EIPPCB	780,975	1,381,725	1,982,475
Other (non-EIPPCB) EC Staff	222,803	500,714	850,625
Member State representatives	841,311	1,512,567	4,588,542
Industrial representatives	772,259	2,082,629	6,317,892
NGO's	0	75,628	275,313
Industry responders to information requests	164,400	219,200	328,800
Shadow group members	772,259	2,082,629	6,317,892
Total	3,554,007	7,855,093	20,661,538

The results show that there is a large variation in cost between BREFs, which is expected as some sectors are much smaller and/or cover a lower variety of activities. Looking at the sample of BREFs on which the EIPPCB data is based (WT, WI, FDM, LCP and WBP), the LCP and FDM BREF took significantly more effort, with many more stakeholders in the TWG, resulting in a higher cost. This is in contrast with, for example, the WBP (Wood-based panels) BREF, where drafting only took 3.3 years.

To put these figures in context, a comparison can be made to the total compliance costs and monetary benefits of the Iron & Steel BREF, as shown in Table 7-6 and Table 7-7. The total benefits of the regulation for this sector (932 million) are much larger than the initial investment and even the implementation costs among Member States.

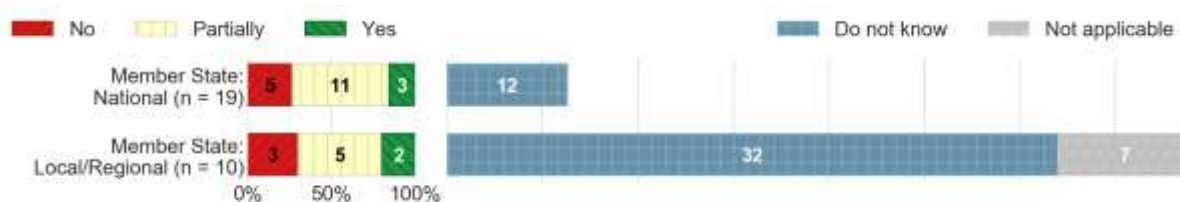
7.7.4 How timely and efficient is the process for reporting and monitoring?

The effectiveness of the monitoring and reporting processes under the IED are considered under EQ3 in Section 7.3. On the efficiency of reporting and monitoring, the evaluation focused on two recent developments in the reporting requirements for Member States; Implementing decision 2018/1135 of 10 August 2018 establishing the type, format and frequency of information to be made available by the Member States for the purposes of reporting on [implementation of the IED]”, and the expected impact of the EU Registry.

As these are relatively recent, no literature on these specific requirements was identified and the evaluation of this specific operational question is led by stakeholder views only.

Member State authorities were asked whether reporting under the IED has been streamlined with other reporting requirements of Union law, in particular the E-PRTR. Most respondents indicated they did not know whether this was the case, especially among local/regional Member State authorities, where only 20% of respondents provided a yes/no/partial answer. This may be because these different reporting requirements are fulfilled at different levels of government i.e. national level.

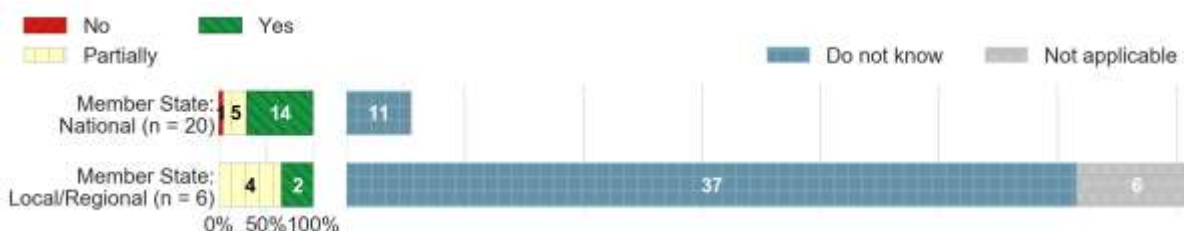
Figure 7-64: Responses to targeted survey to the question: "Has the reporting of data according to Article 72 of the IED and Implementing Decision 2018/1135 been streamlined with the other requirements of Union law, and in particular Regulation (EC) No. 166/2006 concerning the establishment of a EPRTR?"



Source: Targeted stakeholder survey

Similarly, the Member State survey respondents generally did not know whether or not the new EU Registry would be beneficial for Member State reporting under the IED. Given that the first year of reporting was due in June 2019⁷³, it is expected that only a few of the responders have experience with the EU Registry and would feel qualified to answer on it. Of those respondents who did indicate a response, the majority is positive (62%) to partially positive (35%) with only 1 negative response from a national authority.

Figure 7-65 Responses to targeted survey to the question: "Will the move to the new EU Registry further streamline Member State reporting under the IED?"



Source: Targeted stakeholder survey

7.7.5 Taking account of the objectives and benefits of the IED is there evidence that the costs have caused unnecessary or excessive administrative burden?

Taking into account the evidence and survey responses from stakeholders in the previous sections, as well as evidence from Section 7.1.7 (EQ1), the following evidence of unnecessary administrative burden is identified:

- Revised permits to reflect updated IED requirements from the IPPC situation may not always remove outdated provisions that are based on previous EU or national legislation that is already covered by the IED. This could lead to unnecessary monitoring requirements.
- Inconsistencies between the BREFs (WI, LCP is mentioned) and the provisions in chapter IV and Annexes of the IED, related to different averaging periods in the

⁷³ <https://rod.eionet.europa.eu/obligations/721>

two different documents and associated legislation. This leads to different legislative regimes applying to the same sector from the same regulation.

Beyond that no further evidence has been identified indicating that the costs have caused unnecessary or excessive burden.

7.7.6 Findings

Limited evidence has been identified to quantify overall administrative costs associated with the IED (in particular how this may have changed relative to under the previous legislation).

The administrative costs of the BREF process have been estimated to range from €3.5 to €20 million for the drafting of a BREF, including costs to all relevant stakeholders, with an average of €7.9 million. This is considerably lower than the scale of compliance costs and overall benefits for those sectors where a detailed cost-benefit analysis has been undertaken (Iron & Steel, LCPs).

More than half of respondents indicated that compared to the previous situation administrative costs to Member States and operators has increased under the IED. When asked whether the implementation of the IED has led to a reduction in unnecessary administrative burden for operators and/or Member State competent authorities, the respondents were generally negative to neutral. A number of industry stakeholders highlighted that requiring baseline reports represented a significant additional administrative burden. No evidence has however been provided to demonstrate that this is an unnecessary requirement as they are an IED requirement introduced to address a gap in the IPPCD.

A number of industry responders (as part of a co-ordinated response) feel that burden has increased due to increased monitoring requirements under the IED, for example where monitoring is now required for pollutants for which no BAT-AELs have been set. The derogations process was also reported to have increased administrative burdens for Member States (justified by reduced compliance costs for industry).

Survey respondents were generally positive about the process for reporting and monitoring, though as the systems are in flux and the EU Registry is still being rolled out, not enough information and experience is available at this stage to judge this properly.

Inconsistencies between the BREFs and the provisions in Chapters III and IV and associated Annexes of the IED were flagged by some stakeholders as potential unnecessary administrative burden related to different averaging periods used in the different documents. Beyond this point no further evidence has been identified indicating that the costs have caused unnecessary or excessive burden.

Finding(s)	Robustness
Compared to under the IPPCD, some additional administrative costs have been incurred for additional requirements under the IED (such as baseline reports); these are not 'unnecessary'. There is limited evidence of any change in overall administrative costs.	Medium

7.8 EQ8 - Has implementation of the IED supported or hampered EU competitiveness in the global economy; Has the implementation of the IED improved or been detrimental to economic, social and environmental sustainability?

7.8.1 Introduction

In order to answer this evaluation question, we have examined the following operational questions, as these have been identified in the evaluation matrix:

- a. How has the IED affected the competitiveness of the EU industry?
- b. Has the implementation of the IED improved or been detrimental to economic, social and environmental sustainability?

Baseline: The baseline for this EQ assumes that the requirements of the IPPCD and sectoral Directives would have remained in place. Costs associated with compliance with the minimum requirements of the sectoral Directives would have continued to be incurred with variable impacts associated with the IPPCD and BREFs due to the non-mandatory nature of the BAT conclusions and variable use of them by competent authorities when setting permit conditions. There is limited evidence as to what the impacts may have been for competitiveness under the predecessor legislation although it appears to have been limited. However, the variable application of BAT across the EU may have led to some distortions between companies.

Information sources used:	Literature and data sources	Open Public Consultation	Targeted online survey	Interviews	Focus groups
	YES	NO	YES	YES	NO

7.8.2 How has the IED affected the competitiveness of the EU industry?

7.8.2.1 Review of literature and relevant data

Eurostat data shows that overall industry environment compliance costs remain broadly constant between 2006 and 2018. Expenditure on environmental protection has increased slightly between 2006 and 2018 however as a percentage of GDP this value has fallen⁷⁴ More in-depth analysis by DG Environment (to be published) has shown that the environmental protection capital expenditure of industry was around €20 billion a year at EU level before the economic crisis (2008) but had decreased to €17 billion by 2014 and 2016. By policy areas this was mainly spent on air/climate protection and waste water (around €6-7 billion a year each) while waste management was €1.5-2 billion a year. Within manufacturing (€5.5-6.0 billion a year), the greatest environmental Capex is spent in chemicals (17% of the above total), basic metals (13%), food, beverages and tobacco (10%), coke and petroleum (8%), non-metallic minerals, motor vehicles and the paper industry (around 5% each).

These figures can be understood in relation to the decoupling of emissions to air and water, to industry GVA (see Figure 7-66 and Figure 7-67), broadly suggesting that EU industry

⁷⁴ National expenditure on environmental protection, EU-28, 2006–2018 Available from: [https://ec.europa.eu/eurostat/statistics-explained/index.php?title=File:National_expenditure_on_environmental_protection,_EU-28,_2006%E2%80%932018_\(EUR_million_and_%25_of_GDP\).png](https://ec.europa.eu/eurostat/statistics-explained/index.php?title=File:National_expenditure_on_environmental_protection,_EU-28,_2006%E2%80%932018_(EUR_million_and_%25_of_GDP).png)

has been able to continue reducing emissions and grow while not increasing their expenditure on environmental protection.

In 2006 the Institute for Economic Research studied the impact of the IPPC on global competitiveness and concluded that “many plants with a strong environmental performance were able to use this as a competitive strength, infrequently was environmental performance considered a competitive disadvantage”⁷⁵. These findings were broadly supported by a 2001 Commission study which assessed the impact of specific BATs on the competitiveness of EU industry (Hitchens, et al., 2002).

Other studies have found “mixed results” when considering the impact of environmental legislation, several, for instance, have found that private costs imposed by environmental legislation does impair competitiveness, while others, spearheaded by work by the OECD and Porter showed that the same legislation produced a “win-win” situation, reducing pollution and increasing productivity through a first mover advantage; developing environmental legislation which benefits European firms as third party countries later adopt tighter environmental legislation (see Annex VI of the IPPC Impact Assessment). Further evidence suggested that implementing abatement measures can have a knock-on effect, improving productivity and performance in addition to reducing emissions⁷⁶.

Moreover, in the paper and pulp sector, analysis of other international plants found that European legislation was driving environmental improvements in plants in other locations outside the EU (particularly in Canada and Brazil where this study was carried out). While it was reported that these plants did have competitive advantages, such as lower labour and material costs, environmental legislation was not one of the factors.

Moreover, reports that highlighted the costs of environmental legislation on global competitiveness stressed that these were generally a small factor in influencing global competitiveness, with other factors, such as labour and energy costs in other non-EU large economies exerting a significantly larger degree of pressure on European manufacturers and producers. When the costs were quantified in the petroleum refining sector, it was found that the increase in cost observed “can be considered proportionate relative to the benefit achieved (European Commission, 2016).”⁷⁷

Contrary evidence was partially supplied through a number of Cumulative Cost Assessments carried out for various industrial sectors. Within the CCA for the chemical sector, the emissions and industrial process package accounts for 33% of all regulatory costs. However, this includes multiple large regulatory frameworks, including the Emission Trading System, the Water Framework Directive, in addition to the Industrial Emissions Directive. Nevertheless, between 2004 and 2014, compliance with EU legislation cost the industry €9.5 billion. No information was included within any CCA on how much of this can be associated to compliance with the IED (or IPPC).

Nevertheless, it was found that the competitive position of EU producers could be improved with the introduction of more stringent regulation in currently less tightly regulated economies (IFO, 2006). Since the subsequent introduction of the IED several major competitor economies have sought to emulate the regulator style of the IED producing a more level playing field and increasing the global competitiveness of EU businesses⁷⁸.

The IPPC Impact Assessment does not reach a conclusion on the impacts on competition however does make specific reference to two studies commissioned by the European Commission (Hitchens, 2002 and IFO, 2006). Both of these concluded that there had been

⁷⁵ EC, IPPC IA p133

⁷⁶ EU Joint Research Centre, Hitchens D., Farrell. F., Lindblom, J., Triebswetter, U., (2002) *The Impact of Best Available Techniques (BAT) on the Competitiveness of European Industry* Report EUR 20133 EN: Brussels

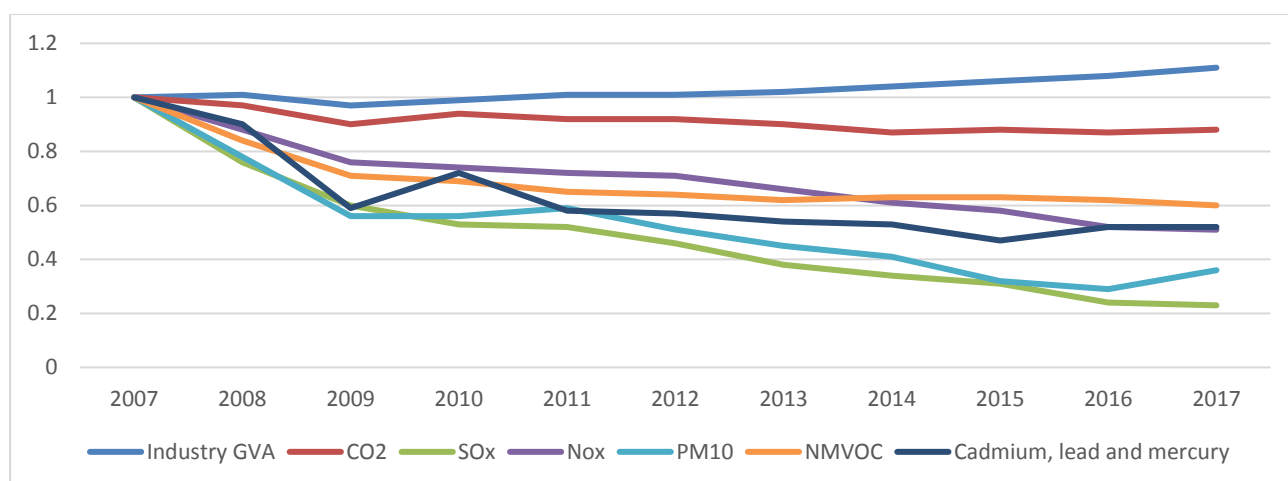
⁷⁷ This study considered a broad range of legislation impacting the petroleum refining sector, not just environmental legislation.

⁷⁸ OECD (2018) Best available techniques for controlling and preventing pollution; activity 2 approaches to establishing BAT around the world

no significant impact of the IPPCD on competitiveness in a large majority of sectors and sub-sectors analysed.

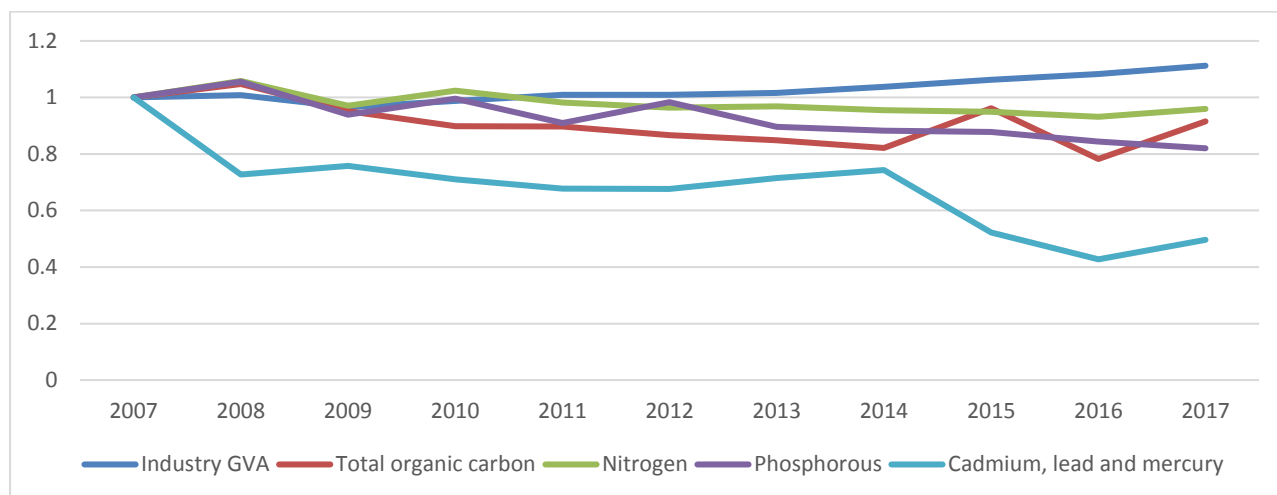
Figure 7-66 and Figure 7-67 show the emissions to air and water alongside GVA (Gross Value Added) for the 33 countries inside the European Economic Area and are relevant to the first indicator in the evaluation matrix. The figures show that while GVA has grown over the period 2007 – 2017, emissions have either stayed constant or significantly decreased during the same period, signalling a decoupling between value added and emissions. Moreover, it shows that businesses have still been able to grow and maintain competitive position while simultaneously reducing emissions, suggesting that, on aggregate, the IED has not significantly impacted global competitiveness⁷⁹.

Figure 7-66: Release of air pollutants and gross value added for industry



Source: (EEA-33)⁸⁰

Figure 7-67: Release of water pollutants and gross value added for industry



Source: (EEA-33)⁸¹

On the whole, the literature (particularly the IED Impact Assessment) reported that while costs of compliance may seem high, they did not have a significant impact on

⁷⁹ This is particularly important given that the IED was implemented during this period, which implemented binding ELVs, unlike the IPPC. It's worth noting that this takes a very high level approach and may hide situations where compliance has hindered competitiveness.

⁸⁰ EEA (2019) *Industrial Pollution in Europe*, Available from: <https://www.eea.europa.eu/data-and-maps/indicators/industrial-pollution-in-europe-3/assessment>

⁸¹ EEA (2019) *Industrial Pollution in Europe*, Available from: <https://www.eea.europa.eu/data-and-maps/indicators/industrial-pollution-in-europe-3/assessment>

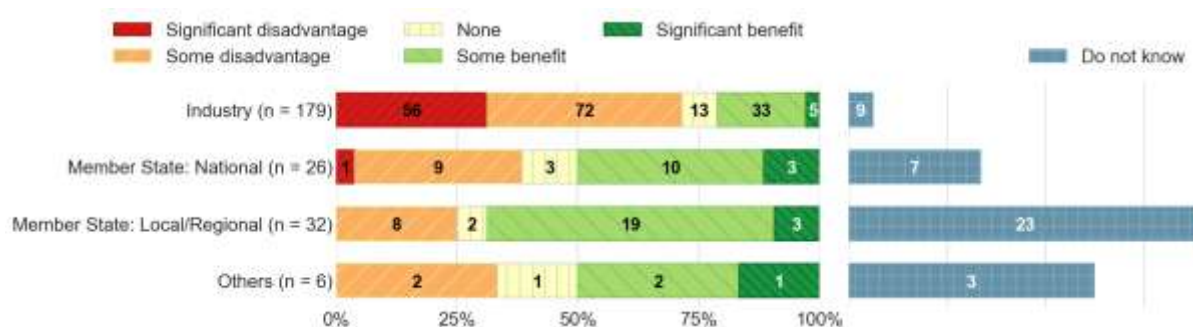
competitiveness, given the number of other factors at play here, such as the costs of labour and goods, which are more significant.

Moreover, several sources, in the survey and the literature have stated that operating to tighter environmental standards can be economically beneficial and can be a 'competitive strength' on the world stage.

7.8.2.2 Stakeholder views

The targeted survey included one question related to competitiveness; the results of this are presented in the figure below.

Figure 7-68: Responses from the targeted survey to the question "What impact do you think the IED has had on the overall competitiveness of the EU industry" (where industry members have responded, this is specific to their industry)



Source: Targeted stakeholder survey

There were mixed views amongst stakeholder groups as to whether or not the IED has reduced competitiveness with countries outside the EU due to higher compliance costs. A majority of industry respondents believe that the IED causes some or significant disadvantages compared to major competitors on the global market who do not have to comply with similar legislation. On the other hand half or more of Member State and other respondents believe that there has been an overall benefit to the competitiveness of EU industry.

The overarching themes of the open text responses mirrored these views. The vast majority of industry responses commented that while the IED successfully creates an internal level playing field, companies suffer costs to comply with environmental legislation that their major competitors on the global market do not, particularly in Brazil, India and China.

Further feedback received from industry associations highlighted that there are several sectors (such as the non-ferrous metals industry) where prices are set on global exchanges. Prices, therefore, cannot be increased to reflect additional costs, this greatly disadvantages industries in locations with higher compliance costs, such as the EU. When industries move as a result of these costs, it results in an investment leakage in addition to a carbon, or emissions leakage.

On the contrary the EEB commented that they did not believe there was a competitive disadvantage to operating within the EU compared to outside and were confident that performance and emissions limits were defined in such a way that protected the environment and human health while also EU industry to continue producing and to grow. Moreover, their comments implied that the regulations within the IED do not create an unlevel playing field, although no specific evidence to support this was provided.

While some Member States did acknowledge there was a competitive disadvantage to firms operating on the global market due to the price of complying with legislation, others took a more long term view, highlighting that it benefits the EU as a whole in the long run and that as many countries seek to emulate European environmental regulation, it may place these firms at a competitive advantage in the future.

7.8.3 Has the implementation of the IED improved or been detrimental to economic, social and environmental sustainability?

The IPPC Impact Assessment set out that any future policy on Industry Emissions should follow the overall objectives of the Lisbon Strategy and “allow the EU to make structural changes needed for long term sustainability”⁸². Long term sustainability, in the economic, environmental and social understanding, were therefore key tenants of the IED when it succeeded the IPPC.

Sustainability in this context incorporates economic, social and environmental sustainability, as set out in the evaluation matrix. Economic sustainability relates to the previous sub-question and looks at ensuring a level playing field within the EU and that it does not unduly hamper competitiveness with other markets i.e., allowing businesses to remain profitable while reducing emissions. Social sustainability ensures that industrial legislation does not negatively impact people and communities, for example impacts associated with firms moving and job loss. Environmental sustainability is concerned with the long term impact of the IED on the environment.

There are no specific indicators included within the evaluation matrix for this question. It is primarily based on stakeholder feedback from a question in the targeted survey related to environmental, social and economic sustainability.

7.8.3.1 Review of literature and relevant data

Environmental impacts of the regulated sectors are decreasing. This is beneficial for their environmental sustainability. Since assessments show the benefits exceed the costs this means the resulting health benefits also bring overall economic and social benefits. The economic and social benefits are less obvious since they will be indirect.

A Ricardo (2018) study concluded that the IED may not yet be contributing towards long term environmental sustainability as it does not give sufficient concern or consideration to the sustainability or use of water resources. Only 20 BAT conclusions, out of a total of 850 address water usage reduction or water reuse.

Various Cumulative Cost Assessment studies have been published looking at the economic impact of EU legislation including the cost of environmental legislation. High compliance costs are one way in which the IED could impact the economic sustainability of companies. A brief analysis, within the context of environmental costs impacting EU competitiveness has been provided in Section 7.8.2.

Enforcing upgrades and installation of abatement provides certainty for the operations in to the future and may increase the economic sustainability of these operations. However, these short term air quality compliance targets and the resulting economic sustainability may hide the fact that many of these plants contribute negatively to the EU’s climate targets as well as legitimise these plants continued operations as it does not include the effects of the 2030 climate and energy framework⁸³.

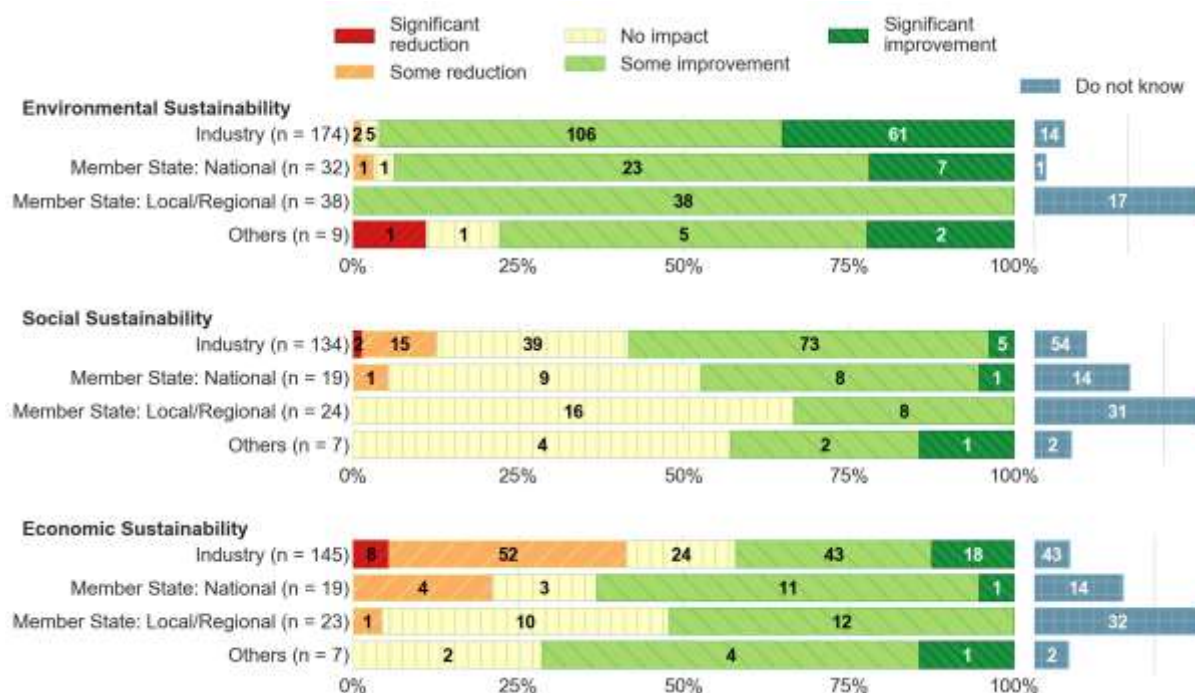
7.8.3.2 Stakeholder views

The targeted survey asked stakeholders what impact the IED has had on environmental, social and economic sustainability.

⁸² COM (2005) 24 Final from IPPC Impact Assessment p15

⁸³ Technical support for developing the profile of certain categories of Large Combustion Plants regulated under the Industrial Emissions Directive (Ricardo, 2017)

Figure 7-69: Responses from the targeted survey to the question: “Compared to the previous situation under the IPPC Directive and the sectoral Directives, what impact do you think the IED has had on the following?”



Source: Targeted stakeholder survey

There was strong agreement across all stakeholder types that there has been an improvement in environmental sustainability since the implementation of the IED. There was much less certainty in the positive effects of the IED with respect to social sustainability. While around half of respondents indicated that there has been some or significant improvement, around a third claimed that there had been no impact. Similarly, there was less certainty in the positive improvements in the IED with respect to economic sustainability. Around a half of respondents believed that there has been some or significant improvement since the implementation of the IED with mixed views between stakeholder types (a majority of MS authorities (national and regional) and others believe there have been improvements in economic sustainability; industry less so).

A more detailed understanding of how the IED has impacted economic, environmental and social sustainability can be found in the open text responses. On the whole industry members felt that economic and social sustainability fell outside the scope of the IED and therefore could not be considered. A similar response was echoed by the EEB who said there has been no overall impact on economic or social sustainability and no evidence to evaluate this. Moreover, the EEB was also critical of the notion that the IED supports environmental sustainability due to the number of sectors not covered by the Directive.

On the other hand, several others commented that maintaining and improving economic sustainability was primarily seen by industry members as ensuring a level playing field. While many responses noted this is the case in Europe, they also highlighted that higher environmental standards were not creating a level playing field across other markets, where they are disadvantaged, it is therefore not economically sustainable.

7.8.4 Findings

How has the IED affected the competitiveness of the EU industry?

Eurostat data shows that overall industry environment compliance costs remain relatively constant. The IED impact assessment reported several studies that showed that environmental legislation does not impair economic competitiveness and was in many

cases considered a competitive advantage. Costs associated with environmental legislation were generally a small factor in global competitiveness, with other costs, such as labour and goods being much more influential.

The Iron and Steel BAT conclusions assessment has indicated likely total annualised compliance costs of ~€134m per year. In comparison the sector's annual turnover is reported to be €123bn and its annual investment is €3.9bn. It seems unlikely that an additional cost of 0.1% will have a significant impact on competitiveness. Nevertheless, a number of industry respondents have highlighted the 'Cumulative Cost Assessment' studies although the approach only considers costs and not benefits and the IED is typically included with the costs of other emissions legislation. No other specific supporting evidence was provided.

There were mixed views amongst stakeholder groups as to whether or not the IED has reduced competitiveness with countries outside the EU due to higher compliance costs. A majority of industry responses believe this is the case as major competitors on the global market do not have to comply with similar legislation while more than half Member States and NGOs believe there is a benefit.

Has the implementation of the IED improved or been detrimental to economic, social and environmental sustainability?

Environmental impacts of the regulated sectors are decreasing which is beneficial for their environmental sustainability. Since assessments show the benefits exceed the costs this means the resulting health benefits also bring overall economic and social benefits. The economic and social benefits are less obvious since they will be indirect.

There was strong agreement across all stakeholder types that there has been an improvement in environmental sustainability since the implementation of the IED. There was much less certainty in the positive effects of the IED with respect to social sustainability. While just over half of respondents indicated that there has been some or significant improvement, around a third claimed that there had been no impact. Similarly, there was less certainty in the positive improvements in the IED with respect to economic sustainability. Just under a half of all respondents believed that there has been some or significant improvement since the implementation of the IED with mixed views between stakeholder types (a majority of MS authorities (national and regional) and NGOs and others believe there has been improvements in economic sustainability; industry less so).

Evaluation sub-question	Finding(s)	Robustness of finding
How has the IED affected the competitiveness of the EU industry?	The IED both supports EU competitiveness in the global economy (e.g. driving environmental improvements outside the EU leading to export of EU expertise and clean technologies) and hampers EU competitiveness (e.g. additional compliance costs in EU compared to elsewhere). There is no evidence these impacts are significant; overall the IED has not significantly impacted global competitiveness.	Medium
Has the implementation of the IED improved or been detrimental to economic, social and environmental sustainability?	The IED has improved environmental sustainability. It is less clear if the IED has improved social and economic sustainability.	Medium

Relevance

7.9 EQ9 – To what extent do the IED objectives still correspond to the needs of the EU?

7.9.1 Introduction

In order to answer this evaluation question, we have examined the following set of operational questions, as these have been identified in the evaluation matrix:

- Has the IED addressed the most relevant environmental impacts and pollutants?
- Has it set relevant standards and obligations to protect human health and the environment?
- How relevant is the IED for the different stakeholders and to EU citizens in particular?

The response to this question should be considered in conjunction with the answers to EQ1 (To what extent has the IED achieved its objectives?) and EQ2 (How effective is the process of elaborating BREFs and BAT Conclusions?).

Baseline: No specific baseline has been considered for this EQ as it considers whether the current IED objectives are still relevant for the needs of the EU.

Information sources used:	Literature and data sources	Open Public Consultation	Targeted online survey	Interviews	Focus groups
	YES	YES	YES	YES	NO

7.9.2 Has the IED addressed the most relevant environmental impacts and pollutants?

7.9.2.1 Literature and data sources

This question has been addressed to a large extent as part of EQ1. EQ1a shows that emissions have reduced over time (in particular for air emissions and to a lesser extent for water) and continue to. However, some stakeholders have challenged the scale of the reductions and whether this should / could be greater. The impacts of the IED are still ongoing with BREFs still being reviewed and BATC still being implemented so the full impacts have not yet been realised. EQ1b has assessed the extent to which the IED has addressed the most relevant industrial activities i.e. those considered highly polluting. Stakeholders have identified a small number of activities that could be a gap in terms of IED coverage but overall coverage is fairly comprehensive. Finally EQ1c has looked at the coverage of pollutants and identified some potential gaps linked to GHGs and coherence with the pollutant coverage of other EU legislation.

Some of these issues have then been considered further under EQ2 focused on the BREF process and development of BAT Conclusions. This includes the levels at which BAT-AELs have been set and whether the BAT Conclusions and BREFs have targeted the most appropriate activities, pollutants and environmental impacts.

EQ2 (and EQ12) includes a summary of the findings of two studies that have looked at the contribution of the IED to water (Ricardo, 2018c) and circular economy policy (Ricardo, 2019b). For water, the study found that whilst the BREFs have had, and are likely to continue to have, positive impacts for both reducing emissions to water they have had much less focus on reducing water usage. Water use is generally not identified as a key

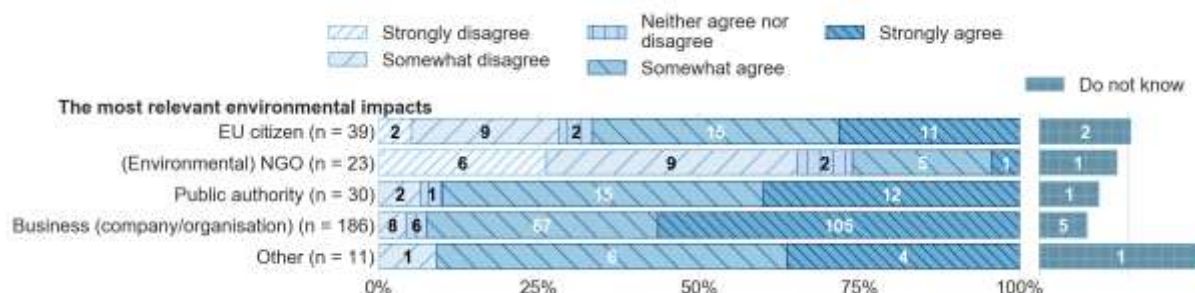
environmental issue within the BREF process and as a result only 20 BATCs out of 850 promote water use reductions. Only one example was identified (TAN) of BAT-AEPL on water use, which may lead to demonstrable reduced water use. For circular economy, analysis was undertaken of the number of BATs identified in the BATC developed under the IED, split out into four circular economy topics of energy, materials, waste and hazardous chemicals. Energy is the circular economy topic area most covered by BATC and also has the highest proportion of quantitative BATs. The quantitative energy sector BATs are particularly concentrated in the LCP and FDM sectors, which also have a large number of BATs specific to certain processes and sources rather than generic sector-wide measures. The fact that LCP and FDM are recently reviewed BREFs may indicate there is a shift in the Sevilla process towards more quantitative and process-specific BATs for energy. Energy-related BATs are mostly focused on process optimisation and energy/heat recovery. Waste generation is the second most commonly covered topic area in the IED BREFs, with the most in the LVOC, NFM and IS sectors. There are, however, almost no quantitative BATs relating to waste.

Finally, the IED installations are important in view of the European Green Deal Communication and the Zero Pollution ambition. While they are responsible for a significant share of EU greenhouse gas (GHG) emissions, the majority of these fall under the scope of the EU ETS. The IED sectors' CO₂ emissions not covered by the ETS represent about 3% of EU emissions, while the other GHGs these installations emit, and which are not covered by the ETS, account for about a further 1% of all EU GHG emissions (European Commission analysis, personal communication). The IED sectors will need to contribute to achieving the objectives outlined in the Green Deal Communication.

7.9.2.2 Stakeholder views

Whilst EQ2 has touched upon wider environmental impacts aside from just emissions to air and water to some extent, they are considered further here i.e. has the IED addressed them? Both the OPC and targeted survey asked stakeholders if the IED addressed the most relevant environmental impacts; the results of these questions are presented in the figures below.

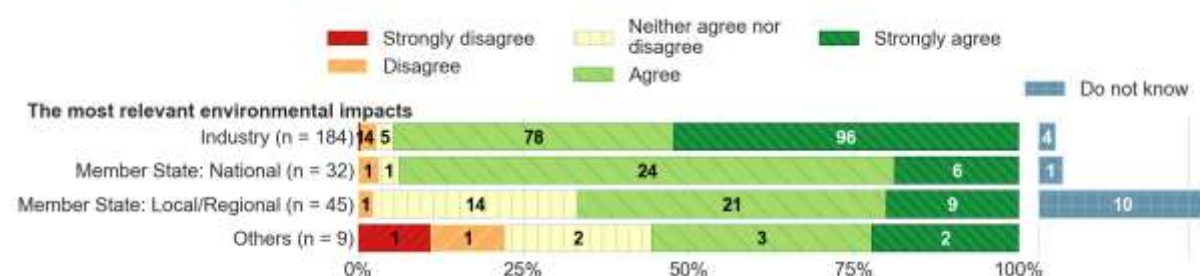
Figure 7-70: Responses from the OPC to the question "To what extent do you agree that the IED addresses the following?"



Source: Open Public Consultation

The responses show that there are similar levels of (somewhat/ strong) agreement from business and public authorities (around 90%) and a lower, but still more than 60%, level of agreement from EU citizens. Environmental NGOs have expressed more than 60% somewhat/ strong disagreement with the statement.

Figure 7-71: Responses from the targeted survey to the question “To what extent do you think that the IED addresses the following”

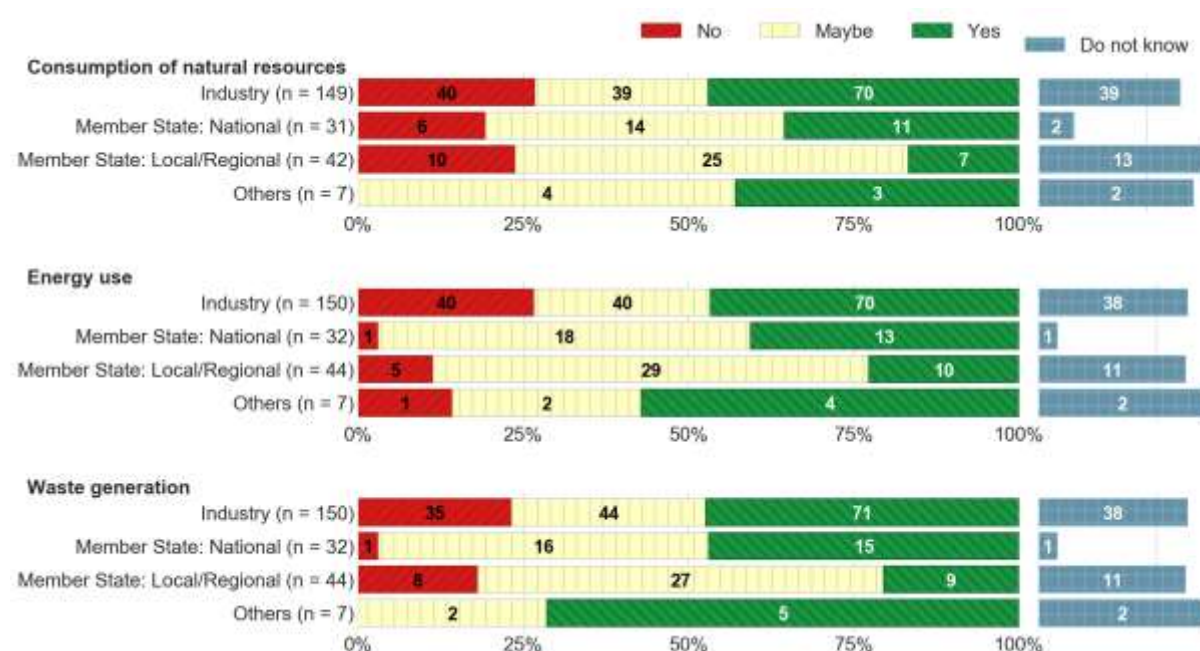


Source: Targeted stakeholder survey

A large majority of both industry and national level Member State authorities agree / strongly agree that the IED addresses the most relevant environmental impacts. Other and local/regional Member State authorities were slightly less positive but still more than 50% to 65%, respectively, of respondents agreed / strongly agreed.

Finally, stakeholders were asked as part of the targeted survey to indicate whether they felt the IED was the appropriate instrument for controlling wider environmental impacts.

Figure 7-72: Responses from the targeted survey to the question “In your opinion, is the IED the appropriate instrument for controlling the following for agro-industrial activities?”



Source: Targeted stakeholder survey

A fairly similar picture to an earlier question on the extent to which respondents consider that the IED has contributed to reducing wider environmental impacts for agro-industrial activities (Figure 7-6) can be seen with the above figure. Overall, less than 50% of all stakeholders feel that the IED is definitely the right instrument for tackling natural resources, energy and waste. However, a significant proportion of respondents indicated “maybe” to the question (36-38% depending on impact) and a small proportion (19-25%, primarily industry respondents) stated “no”. Most stakeholders expressed similar responses except “others” (tending to be most positive) and local/regional Member State authorities (least positive).

Open text responses accompanying this question help to illustrate why stakeholders have responded this way. A major issue that some stakeholders (Member States, industry and

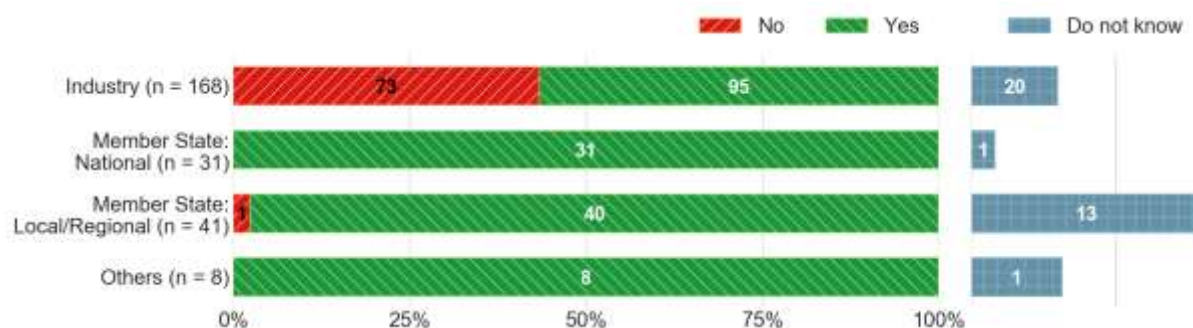
EEB) have raised is that whilst some BAT Conclusions include requirements for natural resources, energy and waste, as they are not legally binding in the same way as the BAT-AELs then they are (a) not being given as much attention during the BREF process and (b) are then not necessarily being implemented in practice. Confidentiality constraints for developing BAT Conclusions on these parameters has also been flagged as an issue reducing transparency and comparisons.

Some industry stakeholders feel that these elements should not be covered by the IED as they have their own EU legislation which is better placed to address them e.g. EU ETS, Waste Framework Directive. Concerns have been raised about overlaps and inconsistencies between legislation. Other stakeholders (Member States and EEB) feel that the IED is appropriate to ensure an integrated approach. The EEB indicated that the IED sets the legal requirement to control resource consumption, energy use and waste generation. However, in practice it is not happening due to – in the EEB’s opinion – the wrong setup of Annex I IED as well as the current BREF approach (KEI method, unwillingness to have a more comprehensive approach on BREF boundaries, lack of ambition).

CAN Europe (personal communication) also indicated that – in their view – the IED has fallen short of truly contributing to the climate and energy agenda for the EU as there are no binding targets / levels for energy efficiency and the Directive does not target GHG emissions (through emissions performance standards).

As part of the targeted survey, stakeholders were also asked whether the issues being tackled by the IED still continue to require action at the EU level. The results of this are summarised in the figure below.

Figure 7-73: Do the issues tackled by the IED (for example, preventing, reducing and eliminating as far as possible, pollution arising from industrial activities) continue to require action at the EU level?



Source: Targeted stakeholder survey

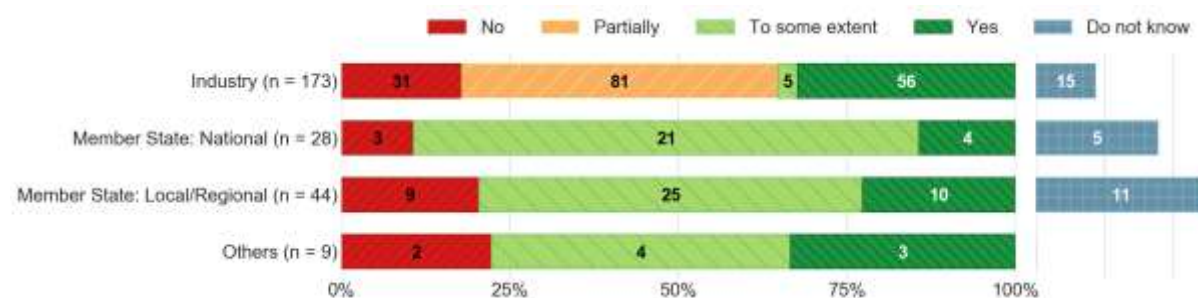
Around 70% of the total number of respondents to the targeted survey (174 out of 248) indicated that action is still needed. However, 43% (73 out of 168) of industry respondents stated that continued EU action is not needed. In comparison, with the exception of one local/regional authority, all authorities and all other stakeholders that responded considered that action is still needed at the EU level.

However, rather than questioning the need for maintaining action at EU level, most comments among industry representatives that gave a negative answer focused on the need of additional action beyond what is currently in place. A number of industry stakeholders commented that additional action (i.e. in the form of further regulation or adoption of more stringent requirements) is not needed and not considered appropriate. They did not question the ongoing need for EU action in the form of the IED and they did not advocate for its removal. Thus, their actual position did not seem to differ from those industry representatives that were supportive of future EU action and stressed the ongoing need to ensure a level playing field through the adoption of harmonised procedures for setting industrial emissions targets while still reflecting the local conditions. National and

regional authorities focused on the need for EU action to continue to ensure a more harmonised, consistent and effective application of the IED and its provisions (including the BREF process and enforcement).

Finally, stakeholders were invited to feedback on whether the IED remained relevant in view of the need for industry to rapidly adapt to a zero carbon economy by 2050. The results from the targeted survey are summarised in the figure below.

Figure 7-74: Responses from the targeted survey to the question “Does the IED remain relevant in view of the need for industry to rapidly adapt to a zero-carbon economy by 2050?”



Source: Targeted stakeholder survey

Overall the feedback from stakeholders on this question has been mixed. Member State authorities and NGOs are generally positive about the IED and its relevance for a zero-carbon economy with more than 75% of respondents (89% for national level authorities) responding “to some extent” or “yes” to the question. Industry is much less positive overall with 18% of respondents disagreeing and a further 47% answering “partially”.

The open text feedback received alongside this question helps to understand the reasoning behind the answers above. A number of stakeholders who have agreed with the statement feel that climate and energy actions need to be dealt with in an integrated way with other environmental issues hence why the IED is appropriate (in combination with a range of other policies such as EU ETS, circular economy, eco-design, energy policy etc.). Cross-media impacts of tackling different environmental issues need to be properly considered and addressed. Other stakeholders (from industry) have indicated that the objectives of the IED are not to contribute to a zero carbon economy and it is not the right instrument for doing so (others are already in place to tackle this e.g. EU ETS).

The EEB believe that the IED remains very relevant in the view of moving to a zero-carbon economy as it regulates the most carbon-intensive parts of the economy. The IED would be more relevant if it included GHG emission limits and if energy efficiency standards (BAT-AEELs) included in BAT Conclusions were binding.

A Member State authority is of the view that the IED does not seem to be well prepared for new low-carbon industrial processes. Articles 15(5) and 27 of the IED are mainly focused on emerging techniques to reduce emissions and not on completely new processes that are presumably required for zero-carbon economies. Their implementation is likely to need a longer implementation period than 9 months. This is important as the “*Masterplan for a Competitive Transformation of EU Energy-intensive Industries Enabling a Climate-neutral, Circular Economy by 2050*”⁸⁴ states the following in relation to the IED: “*The Industrial Emissions Directive permitting process should be adapted to support GHG abatement measures in energy-intensive installations throughout the transition. The low carbon emission technologies under development should be assessed as potential emerging techniques during the BREF drawing and reviewing process.*”

The EU ETS remains the central policy pillar addressing CO₂ emissions from the most energy-intensive industries that the IED covers, as confirmed by the recent speech of the

⁸⁴ <https://ec.europa.eu/docsroom/documents/38403>

Commission President-elect. The IED must therefore operate in a complementary fashion to the EU ETS. It can also be noted that the EU ETS is being exported to other countries and regions. Some options for additional scope of the IED and BREF process to address decarbonisation whilst remaining complementary to the EU ETS were suggested by stakeholders to be:

- Making BAT-AEPLs (at least those on energy efficiency) binding as currently they are non-binding.
- Introducing BAT-AELs for non-CO₂ greenhouse gases such as N₂O (BAT-AELs for N₂O emissions were set in the LVIC-AAF BREF for nitric acid production under the IPPC regime since the ETS was not yet in place. This will not be possible for the upcoming new LVIC BREF under the IED), methane and F-gases.

The above options would entail an increased scope of the BREF process, which would lead to a higher workload to draw up/review BREFs.

7.9.3 Has it set relevant standards and obligations to protect human health and the environment?

7.9.3.1 Literature and data sources

EEA (2014)⁸⁵ has estimated the scale of impacts associated with emissions to air from industrial activities, estimated to be between €329-1,053 billion over the period 2008-2012 (an updated version of the report should be published in early 2020). The total damage costs per year has slowly declined over the assessment period reflecting the fact that emissions from industrial activities have steadily declined over the past 10-15 years and continue to with the IED requirements and implementation of BAT Conclusions (EQ1). Whilst emissions have declined, they still remain high enough to require further action and any reductions can be significant for human health and the environment (as well as the economy).

Whilst very few specific studies have been undertaken looking at the human health and environmental benefit of specific BAT Conclusions, the two examples discussed previously for both LCPs and the I&S sector have shown the significant benefits that have been or are expected to be realised (based on the application of damage cost functions):

- For the LCP assessment (large solid fuelled LCPs), the benefits associated with the reduction of emissions are expected to be in the order of €3.4 to 14.2 billion per year (depending on whether the upper or lower BAT_AELs are implemented in practice).
- For the I&S ex-post assessment, the benefits were estimated to be valued at more than €900m per year.

Other studies such as EEA (2019) have demonstrated the impacts that EU industrial emissions legislation has had in driving down emissions from LCPs.

7.9.3.2 Stakeholder views

Some stakeholders have flagged concerns that the BAT Conclusions and BAT-AELs are not ambitious enough. Furthermore, it appears that most Member States tend to apply the upper values of the BAT-AEL ranges meaning that the benefits are not as significant as they could be.

⁸⁵ <https://www.eea.europa.eu/publications/costs-of-air-pollution-2008-2012>

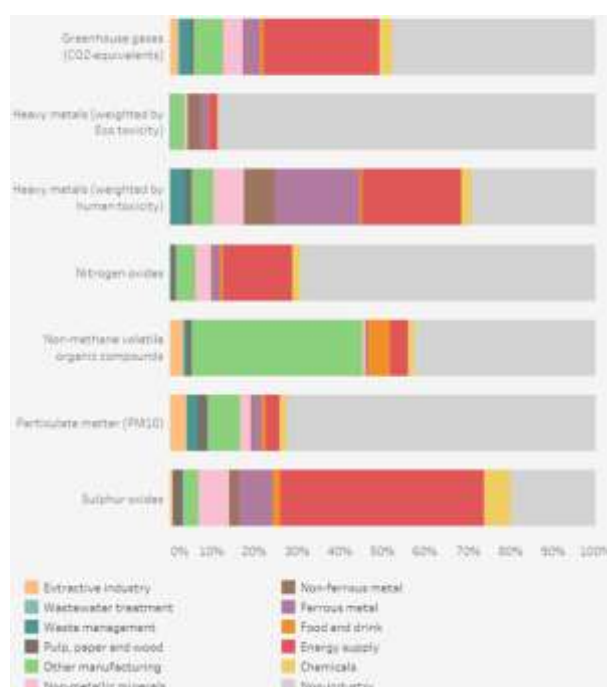
7.9.4 How relevant is the IED for the different stakeholders and to EU citizens in particular?

7.9.4.1 Literature and data sources

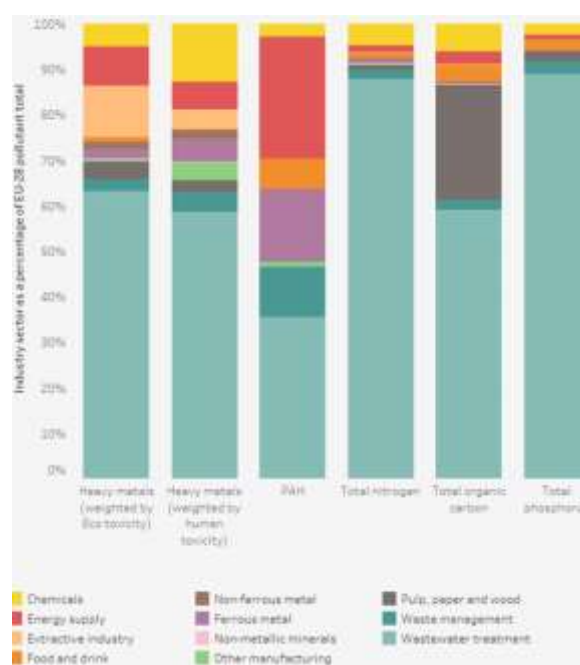
The figures below show the contribution that industry makes to total emissions to air and water for all sources based on 2017 data⁸⁶. These demonstrate that despite the significant reductions seen to date in emissions from industrial activities for both air and, to a lesser extent, water emissions, they still contribute a significant proportion of total EU emissions for some important pollutants. Considering the impacts that such emissions can have (air pollution impacts discussed in the previous section), the IED remains relevant for the EU from a health and environmental perspective (and this is supported by stakeholders as indicated in Figure 7-73).

Figure 7-75: Industrial air and water emissions as a percentage of total EU28 pollution by sector, 2017

Air emissions



Water emissions



Source: EEA EU-28 – Industrial pollution profile 2019

7.9.4.2 Stakeholder views

Furthermore, as set out in EQ1 the majority of stakeholders believe that the IED is the appropriate instrument for tackling environmental impacts from industrial activities. Linked to this, the IED remains relevant for all stakeholders for the following additional reasons:

- For EU citizens and NGOs the IED provides the framework for ensuring public access to information on the environmental performance of industrial activities (see EQ1 and Section 7.1.8) and access to justice to challenge permitting issues (see EQ1 and Section 7.1.9). Whilst some limitations have been identified, the IED has led to improvements on both points relative to the IPPCD.
- For industry and Member States, the IED plays an important role in delivering a level playing field with respect to environmental regulation (see EQ4 and Section

⁸⁶ <https://www.eea.europa.eu/themes/industry/industrial-pollution/industrial-pollution-country-profiles-2019/eu28>

7.4). Stakeholder feedback on this point has been very positive although some concerns have been raised about differences in implementation of the BAT Conclusions between the Member States. However, the change in the IED to mandatory consideration of the BAT Conclusions has been considered positive and helped to improve the situation.

7.9.5 Findings

Based on the review of evidence and feedback from stakeholders it is clear that the IED objectives still correspond to the needs of the EU. The steady decline in pollutant emissions from industrial activities (particularly to air) demonstrates that the IED and its predecessor legislation are having positive impacts and therefore standards are being set that are helping to protect human health and the environment. However, it is clear that industrial activities overall still contribute significantly to emissions of some pollutants (to air and water) resulting in significant health and environmental impacts hence the IED remains relevant to continue to address these impacts.

As well as the overall health and environmental impacts, the IED remains relevant for all of the different stakeholder groups including industry (creating a level playing field), Member States and EU citizens (health, public access to information and justice).

Stakeholders are of the view that the IED has generally addressed the most relevant environmental impacts although there are some limitations with respect to energy use, raw materials and waste generation as requirements for these included within the BAT Conclusions are not binding in the IED in the same way as BAT-AELs. Some stakeholders feel that the standards are not ambitious enough, impacted to some extent by the fact that most Member States have tended to apply the upper ends of the BAT-AEL ranges. Permitting authorities consider releases to water to require more stringent approaches to meet EU water quality objectives.

Finally, stakeholders were invited to comment on whether the IED remained relevant in view of the need for industry to rapidly adapt to a zero carbon economy in 2050. Feedback from the survey was mixed with industry much less certain compared to NGOs and Member States, as the former raise concerns about double regulation and overlaps with EU climate and energy policy. However, some stakeholders feel it is essential that all impacts are dealt with under the IED in an integrated manner.

Finding	Robustness
The IED remains relevant to the needs of the EU within its objectives.	Strong

7.10 EQ10 – Is the IED able to respond to new or emerging environmental issues?

7.10.1 Introduction

In order to answer this evaluation question, we have examined the following operational question, as identified in the evaluation matrix:

- a. Has the IED been flexible enough to respond to new or emerging issues?

The response to this question should be considered in conjunction with the answers to EQ1 (To what extent has the IED achieved its objectives?) and EQ2 (How effective is the process of elaborating BREFs and BAT Conclusions?).

Baseline: Under the baseline it is assumed that the BREF process and variable timescales as per under the IPPCD would have continued with no changes. The IPPCD and sectoral Directives would have remained in force. It is unclear whether the predecessor legislation and BREF process under the IPPCD was able to respond to new

or emerging environmental issues so the baseline for this EQ and subsequent assessment is based largely on the analysis for other questions and stakeholder feedback.

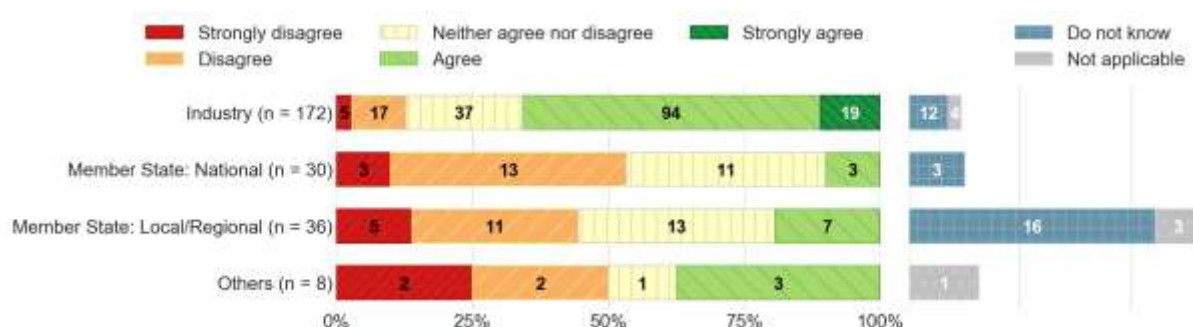
Information sources used:	Literature and data sources	Open Public Consultation	Targeted online survey	Interviews	Focus groups
	YES	NO	YES	YES	YES

7.10.2 Has the IED been flexible enough to respond to new or emerging issues?

The response to EQ1 has considered whether the IED has the right pollutant (Section 7.1.4) and sector (Section 7.1.3) coverage. Furthermore, EQ2 (Section 7.2) has considered how effective the BREF process is. This has included an evaluation of the extent to which the BREF process identifies the most effective techniques for achieving a high level of environmental protection. Whilst some limitations have been identified with respect to the pollutant coverage within Annex II of the IED, the BREF process and BAT Conclusions have subsequently included other pollutants in some instances. However, some stakeholders have flagged that the IED and BREF process have not been able to keep up with developments in other policy areas (e.g. REACH) where pollutant / substance coverage is dynamic with updates being made on a regular basis to deal with emerging issues.

The targeted survey asked stakeholders whether they agree or not that the BREF process has been flexible and fast enough to respond to new or emerging environmental issues; the results of this question are presented in Figure 7-76.

Figure 7-76: Responses from the targeted survey to the question “To what extent do you think that the BREF process has been flexible and fast enough to respond to new or emerging environmental issues?”



Source: Targeted stakeholder survey

There were some large differences in responses between stakeholder groups with industry generally much more positive (66% agree / strongly agree) and national level Member State authorities the least positive (only 10% agree). Around half of the Member State authorities and “other” respondents disagreed with the statement.

Additional feedback received from stakeholders via the survey included the view that the lengthy timescales of some BREFs and the gaps between reviews has been highlighted by some stakeholders (Member States and industry) as a barrier to tackling emerging issues. These stakeholders stated that the review cycle is too long and the process is not dynamic enough to address emerging issues, particularly around the use of specific chemicals.

Furthermore, the KEI selection process prevents a flexible approach in addressing new / emerging environmental issues. The listing of a given pollutant / issue is subject to existing data monitoring requirements (e.g. PRTR) or ‘relevance’ criteria, so is based on the

available data with thresholds. If a given pollutant is not monitored, then the conclusion is that there is no issue / pollution occurring (which is not necessarily correct). Some industry stakeholders provided examples of where the BREF process has been able to react quickly to an emerging issue e.g. inclusion of emission monitoring requirements for mercury in WI BREF and micro plastics in the WT BREF.

Regarding whether the BREF process could cover new and emerging issues such as emissions of micro-plastics and antibiotics, the EIPPCB indicated that because the BREF process is backwards looking, i.e. data-driven, it is better placed to generate conclusions on topics for which there is/are available data/information. Thus, the way the BREF process is currently implemented is by design not very flexible or fast to respond to new or emerging environmental issues, unless frontrunners plants/installations somewhere in the world tackled the issue with adequate techniques. Nevertheless, there is an opportunity in the process (e.g. Kick-off Meeting of the SA BREF) to allow TWG members to share their views and arguments or evidences on these matters. For example, new monitoring approaches could be described or suggested in the BAT conclusions. Similar views were also expressed as part of the Focus Group discussion on the BREF process.

Additional feedback on the ability of the IED to respond to new or emerging environmental issues was provided during the two focus groups held in Brussels in October 2019 as part of this evaluation. These broadly mirrored the feedback received via the survey, namely that the time and process for the identification of KEIs was not sufficient to ensure that new and emerging issues have been picked up and ensure that it is not just the typical pollutants that are considered. The EEB and a number of Member States indicated that the current practice for determining KEIs focuses on the main environmental issues for which data are already available. However, this leads to the exclusion of emerging issues for which there is often less/no data.

7.10.3 Findings

BREFs have addressed additional pollutants to those listed in Annex II as well as new issues. Since the IED in principle covers all environmental impacts and it is for the TWG to agree the scope of the BREF, it seems clear that the framework is able to respond to any new environmental issue. One major challenge in responding to emerging issues relates to timings; in particular the length of the BREF process and the time in between reviews.

The targeted survey offered a mixed response to the question with industry generally agreeing that the IED and BREF process was able to respond to new or emerging issues while Member State authorities or "others" either disagreed or did not know.

Some concerns were raised by stakeholders about the process for identifying key environmental issues constraining the ability to identify emerging issues. A reliance on complete data and tendency to focus on the same substances as the existing BREF was considered to make it harder to tackle new, emerging issues as data is available for pollutants that are already regulated. This raises the question of where data may come from if new pollutants are to be included. In future, this may require the involvement of additional actors such as those responsible for standards and equipment manufacturers and/or targeted research studies to gather new data specifically for the process.

Multiple stakeholder groups stated that the length of the BREF process and time between reviews made it harder to deal with emerging issues. Several industry stakeholders have provided examples of when the BREF process has quickly responded to an emerging issue.

Finding(s)	Robustness
The IED is able to respond to new or emerging environmental issues through the BREF process. But there are some limitations in relation to the length of the BREF process, the time between reviews, and the need	Strong

for the BREF process to have monitored data on pollutants which leads to mainly covering existing rather than emerging pollutants.	
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Coherence

7.11 EQ11 – To what extent is the IED internally consistent and coherent?

7.11.1 Introduction

The IED is a recast of seven Directives controlling pollution arising from industrial activities. Such recast was carried out in the interest of clarity due to a number of inconsistencies between these Directives which made the overall body of law difficult to understand and caused unnecessary administrative cost to both operators and Member State authorities⁸⁷. It is therefore relevant to identify the extent to which the IED nowadays is internally consistent and coherent. This section also examines if there are any identified cases of overlaps, contradictions or other inconsistencies in terms of the provisions / requirements, and considers whether the provisions of the IED are coherent with the objectives.

Baseline: The baseline assumes that the IPPCD and sectoral Directives would have remained in place. The inconsistencies identified between the predecessor legislation (as part of the IED IA) would have continued.

Information sources used:	Literature and data sources	Open Public Consultation	Targeted online survey	Interviews	Focus groups
	NO	YES	YES	YES	NO

7.11.2 To what extent is the IED internally consistent and coherent, in particular among its different chapters?

The different chapters of the IED can be considered coherent, although it appears that inconsistencies can be found in the interpretation. This could highlight the need for greater guidance, especially at EU level.

Business respondents to the OPC were significantly more positive than other groups of stakeholders, with 68% of these respondents replying that the IED is either very or extremely consistent, while only 10% of (environmental) NGOs responded this way. Indeed, of all respondents who answered that the IED is not consistent, 56% identified as representing an (environmental) NGO.

The targeted survey respondents had more negative views on internal coherence. Again, "other" respondents were significantly more negative, with only 33% responding that it is very consistent (none considered it extremely consistent). Local/regional Member State respondents were also marginally more negative compared to the average. Only industry respondents reported that the IED is extremely consistent.

In general, similar comments were made by all respondents to the targeted survey, who considered that overlaps, contradictions or inconsistencies exist. Several industry and Member State stakeholders stated that the IED seems like a juxtaposition of several Directives rather than a coherent whole – for example Chapters III and IV are somewhat outdated when compared to Chapter II.

The stakeholder comments also identified various instances where misinterpretations have been observed:

⁸⁷ See for example the impact assessment of the Commission IED proposal

- the interaction between the general requirements of Chapter II and the sectoral provisions of Chapter III) and Chapter IV on waste incineration,
- the relationship between Chapters II and III, especially Chapter III definitions, derogations, and provisions,
- Chapters II and IV, regarding the way in which BAT-AELs under the former and ELVs under the latter are evaluated,
- The confidence interval referred to in points 9 and 10 of Annex V, Part 3.

The EEB also identified specific inconsistencies:

- In Article 14(1)(a) it is not clear whether all Annex II pollutants are subject to an Emission Limit Value where an emission of that pollutant occurs,
- The interaction between Article 21(3) and Articles 14(3)/15(3) might be misinterpreted. Some Member States treat updates before the end of a 4-year period as not needing to comply with the revised BATC.

7.11.3 To what extent do provisions match the objectives of the Directive?

The provisions can be considered coherent with the objectives of the Directive, although the EEB considered that the current framework for the BAT elaboration process is not optimal in terms of reaching the IED objectives of ensuring “a high level of protection of the environment as a whole” and ensuring that “no significant pollution is caused” (Recital 16). They argue the current scope of Annex I is not consistent with the overall objectives, as it does not allow for consideration of different fuels and technologies to be used, with respect to their environmental impacts. This, according to the EEB, is especially in cases where there are competing solutions with various environmental and human health footprints.

7.11.4 What, if any, are the inconsistencies, contradictions, unnecessary duplication, overlap or missing links between provisions and activities listed in Annex I?

Coherence between the provisions and the activities listed in Annex I can be considered generally coherent, although there are some exceptions. Responses from the targeted survey corroborated this. Most industry respondents considered there are no inconsistencies, and a smaller majority of Member State respondents also shared this view, although a majority of local/regional Member State respondents (73%) replied that they did not know.

Several of the stakeholders pointed to the lack of clarity and possible overlaps between the scopes of BREFs. Small and medium installations are subjected to the same requirements as large ones, and there are also cases where an industry’s main activity is not listed as ‘chemical industry’ in Annex I, but which produces by-products which are marketable as chemicals. The EEB, on the other hand, noted that the scope of Annex I should be re-defined to enable the IED/BREFs to take a different approach: setting BAT for best ratio environmental impact of industrial activity versus public service provided.

7.11.5 Are the boundaries of the activities in Annex I clear and appropriate?

Respondents to the targeted survey were also asked “Are the boundaries of the activities in Annex I clear and appropriate?”. A majority of industry respondents answered positively. The perception was evenly balanced among all Member State respondents, although respondents from local/regional level were slightly more negative.

Industry respondents mentioned the potential overlap between BREFs and also warned against the widening of the scope of activities in the context of the BREF elaboration

process. The EEB noted that the scope of the IED (Annex I) is not well designed for the transition of the industry to sustainable industrial production.

7.11.6 Findings

Overall, there appear to be no major issues of internal coherence under the IED. At the same time, it is clear that there are some issues identified by stakeholders:

- The IED seems like a juxtaposition of several Directives rather than a coherent whole.
- In some instances, definitions and/or interactions are not clear and could benefit from further guidance
- Potential discrepancy between the way in which BAT-AELs under Chapter II and ELVs under Chapter IV are evaluated.
- Some sectors (e.g. chemical industry) do not have thresholds consistent with other sectors
- Some definitions and scopes can be considered ambiguous.

Finding(s)	Robustness
The IED is overall largely internally coherent and consistent although several elements could be further clarified.	Strong

7.12 EQ12 – To what extent is the IED is coherent with other EU environmental and wider EU policies, and with market based instruments?

7.12.1 Introduction

The IED aims to protect the environment as a whole by addressing the issue of pollution in an integrated way, i.e. through the reduction of emissions into air, water, and land, and the prevention of the generation of waste, odour, and noise, all through more efficient use of resources. The IED also applies to major GHG emitter installations, thus making it relevant to energy and climate policy.

This section is thus broken into three main parts:

- Analysis of the IED coherence with wider EU policies like climate and energy, and market-based instruments, as well as the circular economy and the sustainable use of resources
- Analysis of the IED coherence with specific environmental policies on water, air, chemicals, and waste.
- Analysis of the IED coherence with the European Pollutant Release and Transfer Register (E-PRTR).

Baseline: The baseline assumes that the IPPCD and sectoral Directives would have remained in place. Wider legislation would have continued to be developed as per the current situation. The IA reported that there were inconsistencies between the IPPCD and sectoral Directives with other Community legislation owing to the fact that they have been enacted at different times with different approaches, definitions and standards. These inconsistencies would have remained under the baseline.

Information sources used:	Literature and data sources	Open Public Consultation	Targeted online survey	Interviews	Focus groups
	YES	YES	YES	YES	NO

7.12.2 To what extent is the IED coherent with wider EU policies?

This section examines the interactions between climate and energy policies and market-based instruments, in particular the scheme for greenhouse gas (GHG) emission allowance trading within the EU (EU ETS). It also covers the circular economy and the sustainable use of resources, which lack specific legislation but are nonetheless important within EU environmental policy.

7.12.2.1 Climate and energy

The IED governs installations that contribute to energy production or use energy for production purposes, and information on the energy used in or generated by the installation must be included in applications for permits (Article 12(1)(b)). Energy efficiency is also one of the general principles governing the basic obligations of the operator (Article 11) and one of the criteria for determining BAT (Annex III).

Literature found that energy use by industry has decreased and improvements have been made in industrial energy efficiency since the adoption of the IED and its predecessor legislation (Ricardo, 2019b)⁸⁸. However, it is unclear whether some of the changes can be attributed to the IED and/or IPPCD, to other legislation targeting industrial energy use or to other factors. Energy was also identified as the topic area most covered by BATCs, and the highest proportion of quantitative BATs (Ricardo, 2019b)⁸⁹.

At the same time, potential incoherence issues are highlighted in the BREFs, specifically those for Waste Incineration and Large Combustion Plants. The latter BREF especially highlights that certain techniques to reduce NO_x emissions may present trade-offs with energy efficiency, noting that one approach is to aim for the lowest NO_x emissions while accepting a fuel efficiency penalty and possibly higher CO and hydrocarbon emissions. The BREF on waste incineration also highlights that procedures such as selective catalytic reduction flue-gas cleaning requires additional energy, and that "It is necessary to consider the additional energy requirements imposed by applying lower ELVs". It is also stated that retro-fitting existing plants will generally require tail-end gas cleaning equipment, which will use more energy.

Almost 75% of business stakeholders responded to the OPC that energy and climate policies are very or extremely coherent with the IED, while fewer than 25% of Member State authority respondents answered the same way. EU citizens and (environmental) NGOs were significantly more negative, with more than 75% of the latter answer that climate and energy policies are not coherent with the IED. In the targeted survey, the majority of respondents (industry and Member State authorities) did not report any overlaps or inconsistencies, although "other" respondents were less positive. Some industry respondents suggested that in some sectors/facilities, inconsistency with the climate and energy policy frameworks regarding implementation and compliance timelines has increased uncertainty for operators and their investment decisions.

The targeted survey also asked respondents the extent to which the IED contributes to the achievement of the objectives of energy policy. Most respondents (industry, Member State authority, and "other" respondents) consider there to be at least some positive contribution from the IED to energy policy. IED contributions to climate change objectives were considered less positive (fewer than half of Member State and "other" respondents

⁸⁸p. 16.

⁸⁹p. 13.

considered there to be at least some positive contribution), although industry stakeholders were still notably much more optimistic than other respondents.

Industry respondents to the targeted survey noted that the IED has been successful because of its integrated approach, considering energy and climate. Furthermore, some industry and Member State respondents suggested that the IED is contributing positively to enhanced mitigation of CO₂ and energy reduction.

Industry stakeholders also identified coherence issues between the IED and EU climate and energy policies. Some noted that the IED requires certain abatement measures and/or process changes which can increase energy consumption, countering the objectives of EU climate and energy efficiency policies. In some circumstances, compliance with BAT-AELs may conflict with techniques which are more climate or energy efficiency friendly, such as the use of biomass. The EEB, amongst others, also noted that the optional nature of energy efficiency performance benchmarks and the exclusion of GHGs under the IED are counter-productive to promote the climate change and resource efficiency agendas.

7.12.2.2 EU ETS

The IED and the EU ETS Directive (Directive 2003/87/EC) cover some similar categories of activities or sources of emissions. Furthermore, both Directives foresee a permitting and monitoring system.

The EU ETS Directive, as amended in 2018, established a system for GHG emission allowance trading within the EU to reduce emissions (Article 1). The EU ETS Directive applies to emissions from the activities listed in its Annex I and GHGs listed in its Annex II. Article 8 of the EU ETS Directive states that Member States must take the necessary measures to ensure that, where installations carry out activities that are included in Annex I to the IED, the conditions and procedure for the issue of a GHG emissions permit are coordinated with those for the issue of a permit provided for in that Directive.

The IED also considers the EU ETS Directive, especially in Article 9 on GHG emissions. In order to avoid duplication of regulation, Article 9(1) of the IED provides that where emissions of a GHG from an installation are specified in Annex I to the EU ETS Directive in relation to an activity carried out in that installation, the permit shall not include an emission limit value for direct emissions of that gas, unless necessary to ensure that no significant local pollution is caused or, pursuant to Article 9(4), where an installation is temporarily excluded from the EU ETS. Furthermore, Member States may choose not to impose requirements relating to energy efficiency in respect of combustion units or other units emitting carbon dioxide on the site for activities listed in Annex I to the EU ETS Directive (Article 9(2)). At the same time, Recital 10 of the IED explicitly states that the IED does not prevent Member States from maintaining or introducing more stringent protective measures, for example GHG emission requirements, provided that such measures are compatible with the Treaties and the Commission has been notified.

In their 2015 statement, the International Emissions Trading Association (IETA) claimed that the IED affects the EU ETS by influencing performance standards of combustion plants. Additional interactions between the EU ETS and the IED arise from specific derogations contained in the IED, such as exemptions from the new standards⁹⁰.

During the targeted survey, a number of industry stakeholders viewed the IED and the EU ETS as coherent, although they emphasised the importance of avoiding “double regulation”. Furthermore, some respondents claimed the IED is insufficient to properly incentivise GHG emission and energy consumption reductions, so in this context, the EU ETS remains the most appropriate tool to control GHG emissions. Concerns were also raised regarding additional administrative burdens for reporting on GHGs.

⁹⁰ IETA, *Overlapping Policies with the EU ETS*, July 2015, p. 6.

7.12.2.3 EU action plan for the Circular Economy

The EU Action Plan for the Circular Economy (EU Action Plan) (European Commission, 2015b) lists actions at EU level to transition the EU to a more circular economy, where the value of products, materials, and resources is maintained in the economy for as long as possible, and minimise the generation of waste in the EU. The IED predates the Circular Economy Plan, and there is therefore no mention of the phrase in the IED. However, under the EU Action Plan, the Commission has included guidance on best waste management and resource efficiency practices in various industrial sectors in BREFs and associated BATC, as part of the regular planned reviews.

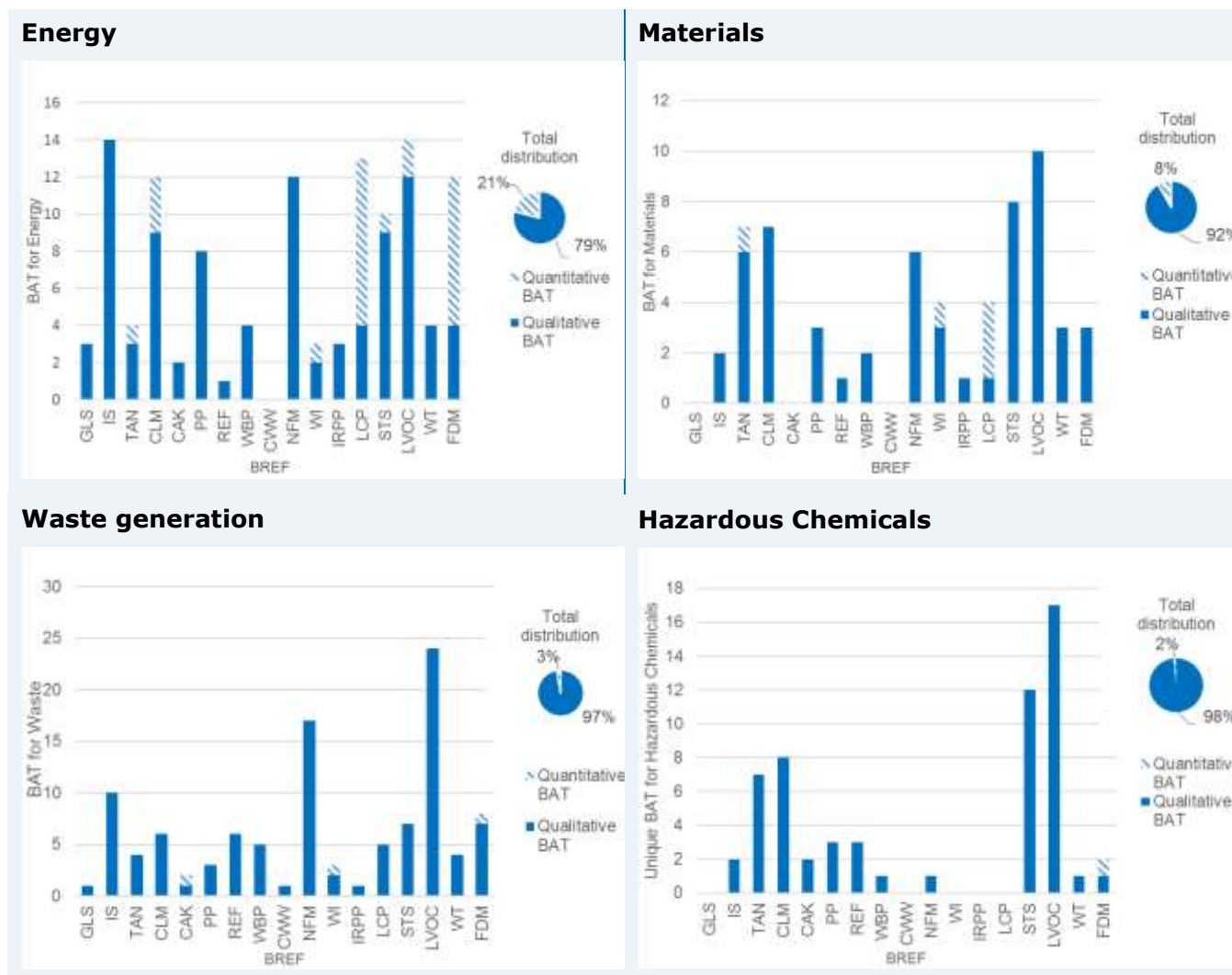
Figure 7-77 taken from (Ricardo, 2019b) shows an analysis of the number of BATs identified in the BAT conclusions developed under the IED, split out into four circular economy topics of energy, materials, waste and hazardous chemicals. Energy is the circular economy topic area most covered by BATC (117 energy related BATs across sectors) and also has the highest proportion of quantitative BATs. The quantitative energy sector BATs are particularly concentrated in the LCP and FDM sectors, which also have a large number of BATs specific to certain processes and sources rather than generic sector-wide measures. The fact that LCP and FDM are recently reviewed BREFs may indicate there is a shift in the Sevilla process towards more quantitative and process-specific BATs for energy. Energy-related BATs are mostly focused on process optimisation and energy/heat recovery. Waste generation is the second most commonly covered topic area in the IED BREFs, with the most in the LVOC, NFM and IS sectors. There are however almost no quantitative BATs relating to waste (3% of waste generation related BATs). (Ricardo, 2019b) also found that, in relation to the BREF review process:

- Data collected from operators during the BREF process rarely covers circular economy topics.
- BATs on materials use, hazardous chemicals use and industrial symbiosis are not systematically included across the BAT conclusions. This could be addressed by deriving BAT for each circular economy topic that is identified as KEI. Hazardous chemicals use was rarely referred to in the description of KEIs in the BREFs.
- Where BATs are included on the common cross-media themes of energy, materials, waste, they are often not given quantitative targets and are not explicitly mentioned as aiming to meet circular economy objectives and strategies.

(Ricardo, 2019b)⁹¹ found that the IED has a generally low contribution to achieving a circular economy. Firstly, because the IED was adopted and implemented before the EU formalised its latest circular economy policies, and secondly, because the IED's aim is different from that of EU circular economy policy. The study therefore concludes it is not unsurprising that the IED has not been the ideal instrument to deliver circular economy objectives.

⁹¹p. v.

Figure 7-77: Number of BATs covering circular economy topic areas in the 17 reviewed IED BREFs



Source: (Ricardo, 2019b)

The guidance document from MiW and IMPEL (MiW and IMPEL, 2019) acknowledged that innovative waste recovery may be difficult to categorise when trying to align with Annex I of the IED. On the other hand, the IED can contribute to the circular economy as resource efficiency and proper waste prevention/management are core requirements for IED installations. Regulators can thus be proactive approach and discuss with the operator possibilities to produce or use more or by-products. In addition, the IED also contains a provision which allows a nine-month exemption period of BAT to test Emerging Techniques, which can serve as another incentive to explore circular innovations⁹², however, it seems this time period is too short to be considered feasible (see EQ2).

The OPC asked respondents the extent the IED is coherent with circular economy policies. Eighty-four percent of business stakeholders replied that the IED is at least moderately coherent with circular economy polices, followed by 83% of public authorities. (Environment) NGOs were significantly less positive, with less than 19% answering this way. In the targeted survey, respondents were asked if there are any cases of overlaps, contradictions, or other inconsistencies between the objectives and provisions/requirements of the IED and the circular economy. Most industry and Member State respondents replied that there are no overlaps. Furthermore, 44% of Member States,

⁹² p. 29

80% of industry stakeholders and 12.5% of “other” stakeholders held the view that the IED positively contributes to the achievement of the objectives of the EU circular economy policy. For 7% of Member States and 1% of industry stakeholders, the IED has some negative contribution towards these objectives while 12.5% of “other” stakeholders thought that the IED has some significant negative contribution towards these objectives. Around half of Member States respondents, 19% of industry stakeholders and 75% of “other” stakeholders answered that the IED does not contribute to the EU circular economy policy.

Several industry stakeholders pointed out that the IED may not be the best vehicle for the circular economy, and could in some instances hinder the implementation of the EU circular economy policy, for example with regard to recovery and recycling of waste. Some industry stakeholders stressed that the IED concerns only a specific moment in the cycle (e.g. manufacturing) rather than the full life cycle (which would include use of products, recycling and eventual disposal). The IED may not accurately capture other potential uses of materials that would contribute to the circular economy, if these uses fall under sectors not covered by the BREF. This would suggest that the IED does not have the scope to effectively contribute to the circular economy.

7.12.2.4 Sustainable use of resources

The sustainable use of resources falls under several overarching policies, including the circular economy. It is also covered by the resource-efficient Europe flagship initiative, part of the Europe 2020 Strategy. In addition, the Roadmap to a resource efficient Europe is one of the main building blocks of the resource efficiency flagship initiative.

Business respondents to the OPC were significantly more optimistic about coherence between the IED and the sustainable use of resources, with only 20% of (environmental) NGOs answering it is at least moderately coherent. For the targeted survey, Member State respondents answered most positively that there are no overlaps, contradictions or other consistencies with the objectives of the sustainable use of resources. With regard to IED contribution to the sustainable use of resources, 61% of Member States, 86% of industry stakeholders and 33% of “other” stakeholders responded positively. Only 2% of Member States and industry stakeholders considered that there has been some negative contribution while 11% of other stakeholders thought this.

One industry respondent pointed out that increasing the effectiveness of a BAT may require the use of more resources which goes against EU objectives to curb electricity use and reduce waste, and more generally, industry stakeholders stressed that the IED regulates the emissions of pollutants, and thus environmental topics such as raw materials or climate change are outside its scope. Other stakeholders noted that the IED regulates the emissions of pollutants, and thus environmental topics such as raw materials or climate change are outside its scope.

7.12.3 Does the IED adequately contribute to the achievement of the specific EU environmental policy objectives and targets?

The IED aims to protect the environment as a whole by addressing the issue of pollution emissions in an integrated way. The IED therefore plays also a major role in achieving the objectives and targets under the specific EU environmental policy on water, air, chemicals, and waste.

The specific environmental policies analysed in this section are those that are directly covered by the IED, and include:

- Water management
- Air management
- Waste management
- Chemical risk and hazards

7.12.3.1 EU Water policy

There are a number of water-related policies in place at EU level, with several directly concerned with emissions:

- The Water Framework Directive (WFD), 2000/62/EC, which requires management plans to be put in place to either improve or maintain water quality in ground and surface water,
- The Urban Waste Water Treatment Directive (UWWTD), 91/271/EEC, which has the objective of protecting the environment from the adverse effects of urban waste water discharges and discharges from certain industrial sectors.
- The Nitrates Directive, 91/676/EEC, concerning the protection of waters against pollution caused by nitrates from agricultural sources.

The WFD/Floods fitness check (Trinomics, 2019) found that the WFD and IED are relatively coherent but identified some examples of challenges with respect to implementation⁹³. The fitness check also referred to the 2019 EEA study on industrial waste water. The study stated that while in certain BREFs, BAT-AELs only focused on limit values and technologies related to direct releases to water bodies, newer BREFs more systematically specify levels for indirect releases, which may work to remove pollutants currently discharged into sewers which cannot accommodate such pollutants⁹⁴. The Fitness Check for the UWWTD also concluded that although there is coherence overall between the IED and the UWWTD, some issues were identified, for example exactly how to differentiate activities covered by the UWWTD (as these are not covered by Annex I of the IED), even as some sectors overlap.

(Ricardo, 2018c) found that the IED and BREFs have had positive impacts for both reducing emissions to water and, to a lesser extent, reducing water usage (including increasing water reuse). It found that a large number of the BAT conclusions aim at minimising emissions to water from industrial activities and most BREFs include techniques to minimise relevant emissions to water. There are far fewer conclusions on water usage than there are on emissions to water, and of those that exist, 95% of the techniques related to water usage do not contain an associated BAT-AEPL. The same study also found that some BREFs and BATC are expected to result in at least some positive impact on emissions of all priority substances through uptake of BAT for emissions to water monitoring and/or abatement techniques. A number of additional BREFs had specific BAT-AELs targeting priority substances or chemical groups into which priority substances fall.

The fitness check of the WFD and the Floods Directive (Trinomics, 2019) found that 20% of the OPC respondents replied that the IED is not coherent with the WFD/Floods Directive. EU citizens and NGOs responded the most positively, while business associations and company/business organisations responded most negatively.

In the OPC for this evaluation, the vast majority of industry and public authority respondents replied that the IED is at least moderately coherent with water policies, while fewer than a quarter of (environmental) NGOs replied the same way. In the targeted survey, 99% of industry stakeholders and 78% of "other" stakeholders expressed the view that the IED has at least some positive contribution towards the achievement of the objectives of EU water quality policy. Only 7% of Member States and 1% of industry stakeholders thought that the IED negatively contributes towards these objectives while 22% of "other" stakeholders answered that the IED makes no contribution or makes a negative contribution towards EU water quality objectives.

Industry stakeholders suggested that there are some overlaps and inconsistencies between the IED and other water legislation for instance, where a permit would have been approved under the IED, but not under the WFD. In addition, under the IED pollution may still be discharged into water sources, even if it is prohibited by the WFD, contradicting EU

⁹³ p. 201

⁹⁴ p. 14

water policy as a whole, and in particular Article 7(3) of the WFD. Several stakeholders noted that the regulatory boundary between the IED and the UWWTD is unclear, particularly with respect to waste water sludge management and its onward uses.

The EEB noted that the IED states in Article 15(4) that any derogation from the BAT-AELs should be “without prejudice” to the achievement of an EQS, yet there is no clear implementing mechanism in place on how that is to be ensured on the long run. The EEB also referred to Article 18, which requires Member States to provide for additional measures in the permit, in order to ensure compliance with the EQS, noting that it is not clear what concrete actions should be carried out.

7.12.3.2 EU Air Policy

Both Directive 2008/50/EC on ambient air quality and cleaner air for Europe (Air Quality Directive) and its daughter Directive, Directive 2004/107/EC of the European Parliament and of the Council relating to arsenic, cadmium, mercury, nickel and polycyclic aromatic hydrocarbons in ambient air, concern the objectives set out in the IED. Furthermore, Directive 2016/2284 on the reduction of national emissions of certain atmospheric pollutants (NEC Directive) interacts with the IED. For instance, Member States must use BAT in accordance with the IED with regard to the emission reduction measures they must include in their national air pollution control programmes (Article 6(2)).

The recent Fitness Check of the EU Ambient Air Quality Directives found EU air quality legislation coherent with the IED⁹⁵. The IED was found to play an important role in achieving the goals established by the AAQ Directives, most but not all pollutants covered by the IED are also in the AAQ. It was also noted that the revisions of the IED clarified and strengthened the concept of BAT and revised the minimum emissions limit values for large combustion plants. Industry respondents to the targeted survey conducted during the Air Quality fitness check noted that flexibility mechanisms under the IED have allowed several Member States to postpone the introduction of more stringent BAT requirements (COWI and Milieu, 2019)⁹⁶.

The OPC for the IED evaluation showed that IED coherence with air quality is considered the most coherent of all environmental policies covered, with even 88% of (environmental) NGOs considering the IED at least moderately coherent. In the targeted survey for the IED evaluation, all Member State respondents, 99% of industry stakeholders and 78% of “other” stakeholders held the view that the IED has some positive or significant positive contribution towards the achievement of the objectives of EU air quality policy. Local/regional Member State respondents were slightly less positive, compared to national Member State respondents. On the other hand, 11% of “other” stakeholders thought that such contribution was significantly negative while 11% of “other” stakeholders answered that that the IED does not contribute to the realisation of EU air quality objectives.

7.12.3.3 EU Chemical management policy

REACH addresses the production and use of chemical substances, and their potential impacts on both human health and the environment and can interact with the IED. The evaluation of REACH⁹⁷ did not identify any incoherence between the IED and REACH, especially as the IED does not concern the whole life cycle of the chemicals after production. Similarly, it was noted by Ricardo (Ricardo, 2019b) that hazardous chemicals use was rarely referred to in the description of KEIs in the BREFs.

An interview with DG ENV noted that there have been discussions on how the BAT/BREF process could be considered in the registration process of substances under REACH, especially since the IED has been referenced in some decisions on authorisations, whether

⁹⁵p. 14.

⁹⁶p. 128.

⁹⁷ https://ec.europa.eu/growth/sectors/chemicals/reach/review_en

the thresholds have been more or less stringent. However, the candidate list of substances of very high concern being developed under REACH is not linked to the IED.

Article 58 of the IED Directive also refers to the Regulation for Classification, Labelling and Packaging (the CLP Regulation), however, an interviewee from DG ENV noted that it is unclear if there is any dynamic link between the IED and the CLP. They pointed out that Annex 6 of the CLP is reviewed annually, with substances systematically added. This could lead to a gap between the IED and CLP. The interviewee claimed there are no attempts to harmonise the substances and pointed out that the IED is focused on known issues, rather than investigating such emerging issues.

The draft final report for the HAZBREF project, activity 3.1 (HAZBREF, 2019b) also looked at the relationship between hazardous chemicals and the IED. It noted that BAT conclusions in most industrial sectors do address measures with regard to hazardous substances, however, the use of less hazardous substances is lacking in many cases. The report noted that the BATC are the main instrument for setting permit conditions and therefore more specific provisions on hazardous substances based on a systematic approach should be included. At the same time, the report acknowledged a general lack of knowledge surrounding hazardous chemicals, noting that "normally only those KEIs that are supported with data will qualify for further data gathering and research". With regard to REACH, the report noted that there is a need to strengthen the link between REACH and the IED, aligning "substance-focussed data formats" of the ECHA CHEM database with the "installation-related perspective of BREF reviews" – pointing out that until recently there has only been some selective contact between EIPPCB and ECHA experts.

In the targeted survey, 77% of all Member States, 89% of industry stakeholders and 63% of "other" stakeholders responded that the IED has at least some positive contribution towards the achievement of the objectives of EU chemical risks and hazards policy, National Member State respondents were slightly more positive than local/regional respondents. Only 23% of all Member States and 11% of industry stakeholders responded that the IED has some negative contribution towards these objectives while 25% of "other" stakeholders responded that the IED has some negative contribution and one "other" respondent responded that the IED has a significantly negative contribution.

Several respondents called for better alignment between REACH and the IED, however, one industry stakeholder cautioned strongly against the automatic inclusion of new substances in the IED while another industry respondent gave the example of double regulation for the collection and treatment of industrial emissions from chemical/pharmaceutical plants which are covered by both REACH and IED. At the same time, several industry respondents were less concerned about an overlap in scope, noting that there are no links between REACH and IED, except that the environmental permit needs to disclose the use of hazardous chemicals.

7.12.3.4 Waste Management

The Waste Framework Directive (2008/98/EC) sets the basic concepts and definitions related to waste management and lays down waste management principles such as the "polluter pays principle" or the "waste hierarchy". Both of these concepts are important in the context of the IED, especially as the waste hierarchy sets out waste disposal methods from the most favourable to least favourable, based on, including many other things, emissions into the environment.

(Ricardo, 2019b) found that the IED contribution to meeting circular economy objectives in relation to waste generation is low⁹⁸, although waste generation is the second most commonly covered topic area in the IED BREFs, with the most in the production of large volume organic chemicals, non-ferrous metals industries and the iron and steel production

⁹⁸p. v.

sectors. However, there are almost no quantitative BATs relating to waste (Ricardo, 2019b)⁹⁹.

In the OPC, 88% of business respondents replied that the IED is at least moderately coherent with the IED. This was significantly more positive than the responses, especially (environmental) NGOs (only 20% answered this way). In the targeted survey, 82% of all Member States, 90% of industry stakeholders and 56% of “other” stakeholders thought that the IED has some positive or significant positive contribution to the realization of the objectives of EU waste management policy. National Member State respondents were slightly more positive than local/regional Member State stakeholders. Only 18% of all Member States and 10% of industry stakeholders thought that the IED has some negative contribution towards these objectives while 33% of “other” stakeholders thought this. No respondents thought there was no contribution.

Respondents to the targeted survey highlighted that if pollutants are not emitted, they must be transformed into solid waste, which conflicts EU objectives to reduce waste. Pollutants (such as mercury) previously emitted might now be mixed with solid waste, leading to formally “green” waste to be reclassified as hazardous.

7.12.4 To what extent is the IED coherent with the E-PRTR?

The European Pollutant Release and Transfer Register (E-PRTR) is closely linked to IED as both measures concern the release of pollutants. This section considers the extent to which the IED is coherent with the E-PRTR, how objectives, provisions and implementation compare, and the possible gaps, overlaps and inconsistencies.

The IED and the E-PRTR each apply to similar types of installations, and Recital 38 of the IED states that in order to simplify reporting and reduce unnecessary administrative burden, the Commission should identify methods to streamline the way in which data are made available pursuant to this Directive with the E-PRTR.

The 2017 E-PRTR evaluation¹⁰⁰, a review on the implementation of the E-PRTR (ICF, 2020) and a 2018 EEA report (EEA, 2019c) all highlighted similar findings:

- ELVs in IED permits may not cover all E-PRTR pollutants (monitoring done under the IED may not be sufficient to fulfil E-PRTR requirements)
- activities falling under each instrument may not align (attributed to requirements of the UN-ECE Kiev Protocol, which is implemented at EU level by E-PRTR)
- there is not an exact alignment in definitions between E-PRTR 'facilities' and IED 'installations'
- Operators carrying out more than one type of activity report total aggregated facility emissions under E-PRTR, rather than activity-specific emissions required for the IED.
- Data collected under each instrument is not always compatible with the other (including collection methodologies).

In addition, the review (ICF, 2020) suggested changes in E-PRTR to ensure greater coherence with the IED, specifically, lowering capacity thresholds for combustion plants and waste water treatment plants, adding pollutants to the E-PRTR pollutant list, and lowering reporting thresholds for certain air and water pollutants¹⁰¹.

On the other hand, most respondents in the public consultation of the E-PRTR evaluation viewed the coherence as strong. The results of the targeted survey for the evaluation of the IED found that a large number of respondents did not know about gaps and inconsistencies between the two instruments – more than a third of all respondents.

⁹⁹pp. iii-iv.

¹⁰⁰ Amec Foster Wheeler et al., *Supporting the evaluation of Regulation (EC) No 166/2006 concerning the establishment of a European Pollutant Release and Transfer Register and its triennial review*, 2017

¹⁰¹ P. xi

The respondents of the IED evaluation targeted survey echo these concerns, with calls for an alignment of activities and thresholds. The need for alignment of several other terms – such as ‘facility’, ‘installation’, ‘operator’, ‘site’ and ‘off-site transfer’ – was also highlighted. Respondents also noted that emissions can be calculated for the E-PRTR, whereas they must be measured for the IED, and one Member State respondent remarked that the IED mainly concerns emission concentrations, while E-PRTR applies to emission amounts.

At the same time, an industry respondent did note that the E-PRTR can be a very efficient tool to be used in order to assess the contributions of the different sectors pollutant by pollutant.

7.12.5 What progress has been made for streamlining reporting activities?

The Fitness check evaluation on Member State environmental reporting and monitoring (European Commission, 2017b)¹⁰² also identified monitoring inconsistencies, concluding that there is scope for simplifying E-PRTR reporting obligations. As a result, the European Commission proposed several options, including a better streamlining of Member State E-PRTR and IED reporting by annulling Annex III of the E-PRTR Regulation and using the Article 19 Comitology procedure to define the type, format and frequency of Member State reporting.

Efforts to streamline reporting activities under the E-PRTR and the IED led to the creation of an EU Registry on Industrial Sites, a coherent database of industrial entities that release emissions centralising existing mechanisms for the collection of administrative data. The first two reporting years were 2017 and 2018, which were reported in 2019. From here, Member States are to report information from the previous year.

The targeted survey asked the extent that Industry/Member State reporting activities have been simplified under the IED compared to the situation under the IPPC and sectoral Directives. A lot of respondents either did not answer, did not know, or neither agreed nor disagreed with the statement. Half of the industry respondents replied that they (strongly) disagree, although Member State, both national and local/regional, respondents were less negative (27%). The national Member State respondents were even less negative, with only 18% (strongly) disagreeing.

Interviewed industry stakeholders noted an increase in the quantity of information they were required to report over time. One stakeholder suggested that the efficiency of the BREF process could improve if the E-PRTR data reporting concerned not only emissions, but also contextual information needed for the BREFs.

7.12.6 To what extent does the IED complement or interact with key EU funding programmes (e.g. ESIF, LIFE, H2020)

At EU level there are a number of funding programmes that could be potentially complimented by the IED. A question in the targeted survey asked non-industry respondents about the extent to which the IED drives the use of regional funds, LIFE, and Horizon2020 funding. A large number of respondents replied that they do not know (three quarters of all Member State respondents), and only seven respondents strongly agree that regional funds and “other” funds are driven by the IED. A slightly larger number somewhat agree, mostly favouring regional funds and “other” funds. This result could be interpreted that the respondents are not aware of the funds, perhaps because they are not relevant to their day-to-day job, however, it could also be an indication that these funds are indeed not relevant to the IED.

Only 10 respondents (nine Member State respondents) provided further information. They noted that there is very little emphasis on developing technologies under the Climate Action Programme or H2020, although there are certain exceptions. Several other

¹⁰² P. 114

respondents also noted that LIFE was less relevant, as it concerns investment for nature protection, rather than investments in industrial infrastructure, and emerging technologies are not often funded by either LIFE or H2020 projects. It was noted that the funding programmes could be more useful if there was more information and facilitation from the European Commission, especially with regard to feedback on projects. Another respondent suggested that emerging techniques should be linked to EU terminology / tools relevant to innovation (Cohesion Fund, LIFE programme etc.).

On the other hand, one respondent noted that LIFE programmes have indeed been considered in BREF processes while another noted that it is thanks to LIFE that certain tanneries have achieved environmental improvements.

7.12.7 To what extent does the IED comply with the international regulatory framework?

Very little information was found regarding international regulatory frameworks. However, one interviewee from an institution noted that the use of mercury cells for Chlor-Alkali production has been fully achieved thanks to the implementation of the CAK BATC, in advance of the Minamata Convention implementation Framework.

A study on the implementation of the E-PRTR (ICF, 2020) addressed the United Nations Minamata Convention, which aims to reduce and eliminate mercury use and emissions. The IED, along with the Minamata Regulation (EU 852/2017), implements the requirements, and activities with the highest mercury emissions potential are covered by the IED and BAT conclusions and by the E-PRTR Other sectors, also contributing to mercury emissions to a smaller extent, are also covered by the IED and BATC. Despite this evidence for coherence, the study identified a sector not covered by the IED but with potential high mercury emissions: gypsum manufacturing, which means that this omission may lead to an incoherence issue between the objectives of the Convention and the IED.

The EEB also highlighted the draft findings of the Aarhus Compliance Committee (ACCC, 2019) who found that a lack of public participation with regard to reconsiderations and updates under Article 21 (3), (4), (5)(b) and (5)(c) of the IED, fails to comply with Article 6(10) of the Convention. The Committee states that there indeed should be public participation unless the reconsideration or update is "not capable of significantly changing the basic parameters of the activity and will not address significant environmental aspects of the activity".

7.12.8 Findings

Findings suggest that the IED is mostly coherent with wider EU policies as well as other environmental policies, including the E-PRTR. The objectives are consistent, as all the policies considered aim to protect the environment from pollution, and at least to some extent the IED is support the delivery of the objectives of other EU policies. However, several problems were identified by interviewees and survey respondents:

- Substances and their associated threshold levels in environmental policies (especially water and chemicals) may not align with the IED.
- BATs established to minimise emissions may lead to greater waste generation or resource use (e.g. energy and raw materials).
- BATs may stifle innovation (e.g. in the fields of energy and water reuse).
- IED scope might encroach on the scope of specific environmental legislation, which may be better suited to address the problem (mixed views with some stakeholders feeling that the IED took an integrated approach so was the right tool for tackling wider issues such as GHG emissions and energy)
- There is room to align the IED more closely with both specific environmental policies and wider environmental objectives, however, it should not be assumed that the

IED is the most suitable tool to achieve all objectives of these instruments (for example, the circular economy).

- The IED and E-PRTR have strong overlaps, however, there are still mismatches, especially in terms of the activities and pollutants/thresholds.
- Funding mechanisms and international commitments are not familiar topics among survey or interview respondents.

At the same time, it should be noted that overlaps are to be expected, given the similar objectives of the policies addressed in this section, and indeed several respondents noted that overlaps between the IED and the specific environmental policies are inevitable, and not necessarily a bad thing. One industry stakeholder noted that the inconsistencies are because of other regulations or how some authorities interpret the role of the IED. However, it seems, at least in certain instances, work can be done to ensure the BREFs and BATs align better with wider EU policy objectives, especially with regard to how often (and easily) they are updated, keeping in mind the need for considering the environment as whole and adopting a more integrated approach.

Finding(s)	Robustness
The IED is largely coherent with other EU environmental and wider EU policies and at least to some extent the IED is supporting the delivery of the objectives of other EU policies. However, there is potentially scope for greater contribution in some areas.	Strong

EU added value

7.13 EQ13 – What is the added-value from the IED, compared to what is likely to have been achieved by Member States in its absence?

7.13.1 Introduction

In answering this evaluation question on the specific EU added value coming the IED we examined the following aspects:

- The degree that the EU intervention (in the context of the IED) has enabled Member States and their competent authorities to take action to improve beyond what would have been possible without EU action?
- The extent that the IED and its means of implementation have created synergies leading to improved effectiveness or efficiency or whether, in contrast, there are overlaps with other Community objectives that have had a negative impact.
- How has the distribution of responsibilities between EU, Member State, regional and local levels impacted on the management of environmental impacts?

As agreed with the Commission services, in the case of the analysis of the EU added value the analysis has a broader scope. It should examine what has been the added value in comparison to the absence of any EU intervention (IED or earlier legislation). Thus, we have examined what has been the value of the EU intervention on industrial pollution control over and above what Member State actions could have delivered.

Baseline: The baseline for this EQ assumes no EU action on industrial pollution control including the IPPCD and sectoral Directives and no BREF process. Only Member State level actions would have applied.

Information sources used:	Literature and data sources	Open Public Consultation	Targeted online survey	Interviews	Focus groups
	YES	YES	YES	NO	NO

7.13.2 To what degree has the IED enabled Member States and their competent authorities to take successful action to improve beyond what would have been possible without EU action?

In order to answer this sub-question we have examined the extent that EU action has contributed to the following aspects:

- Whether the requirements adopted from the EU intervention exceed what may have been anticipated at a national level?
- Whether the presence of EU intervention has made action at national level more effective?
- Whether the EU intervention has ensured a level playing field for industry across the EU?
- Whether there has been any other benefits arising from action at EU level?

7.13.2.1 Review of literature and relevant data

The analysis of previous evaluation questions has already pointed to a number of benefits that have arisen from the adoption of action at EU level.

The presence of EU action in the form of mandatory BAT-based permitting under the IED has ensured that requirements on industrial emissions are largely consistent across Member States and sectors with relatively small deviations across the EU (see EQ4). As a result, it has helped raise standards in some Member States that were lagging behind contributing both to an overall reduction of industrial emissions (see also analysis in EQ1) while also ensuring a level playing field. The analysis of the national profiles on industrial emissions (Ricardo, 2018b) shows that the IED enabled certain countries with polluting installations to strengthen their standards on industrial pollution. While some European countries already had similar stringent regulations, the IED, and the IPPCD and sectoral Directives before it, appear to have led to more challenging regulations for other countries. Thus, in terms of added value it can be claimed that EU level action has contributed to increasing the standards of a number of Member States and ensuring that these are much more harmonised than what would have been the case in the absence of the EU framework.

In that respect, EU action on the basis of the IED has gone further than what had been achieved on the basis of the IPPC Directive. The IPPC, through the BREF process, had already provided a central reference point that was taken into account by Member States and permitting authorities when determining permit conditions (European Commission, 2013b). However, it did not ensure a consistent use of BAT and, as a result, did not achieve benefits as high as could have potentially been realised.

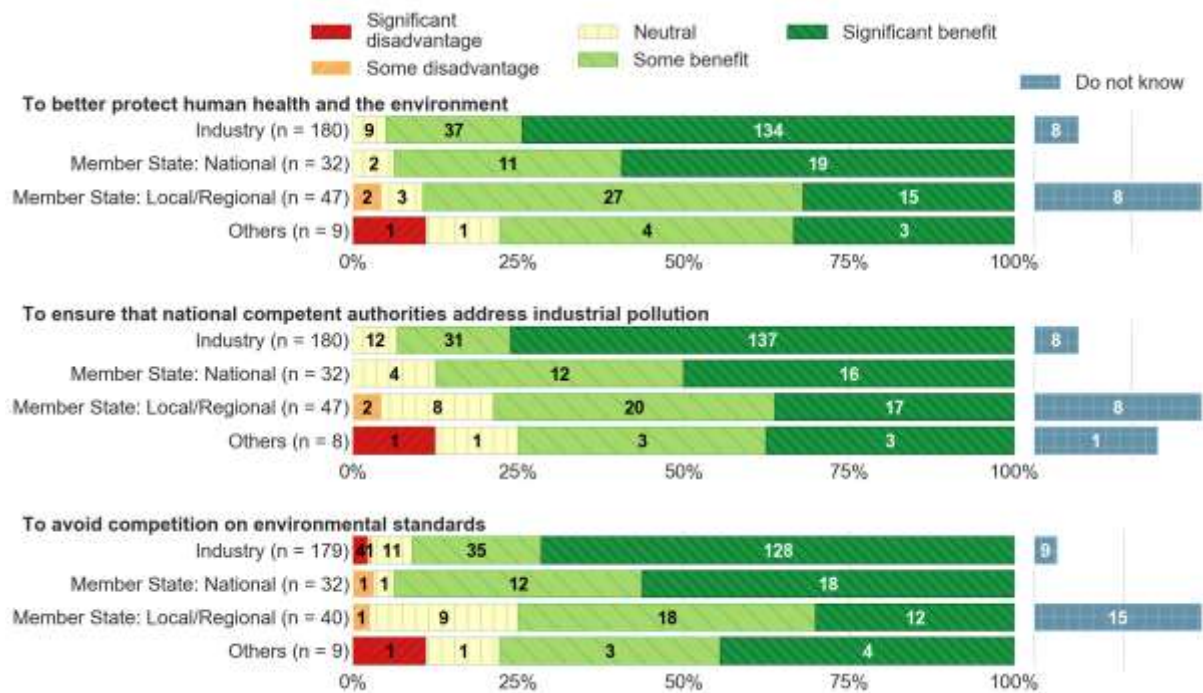
The analysis has also shown that the presence of the EU framework has also contributed to a more consistent and systematic monitoring and enforcement of permit conditions than what would have been possible in the absence of EU action and only on the basis of national measures.

In contrast, the analysis did not point to any specific cost savings and efficiency gains resulting from the implementation of the IED action at EU level. However, it can be concluded from the analysis that coordinated action at EU level was essential for the development of the BREFs and BAT Conclusions and that it would not be possible to deliver the same results (in terms of efficiency, quality of inputs, analysis and outputs) on the basis of action at national level (EQ2).

7.13.2.2 Stakeholder views

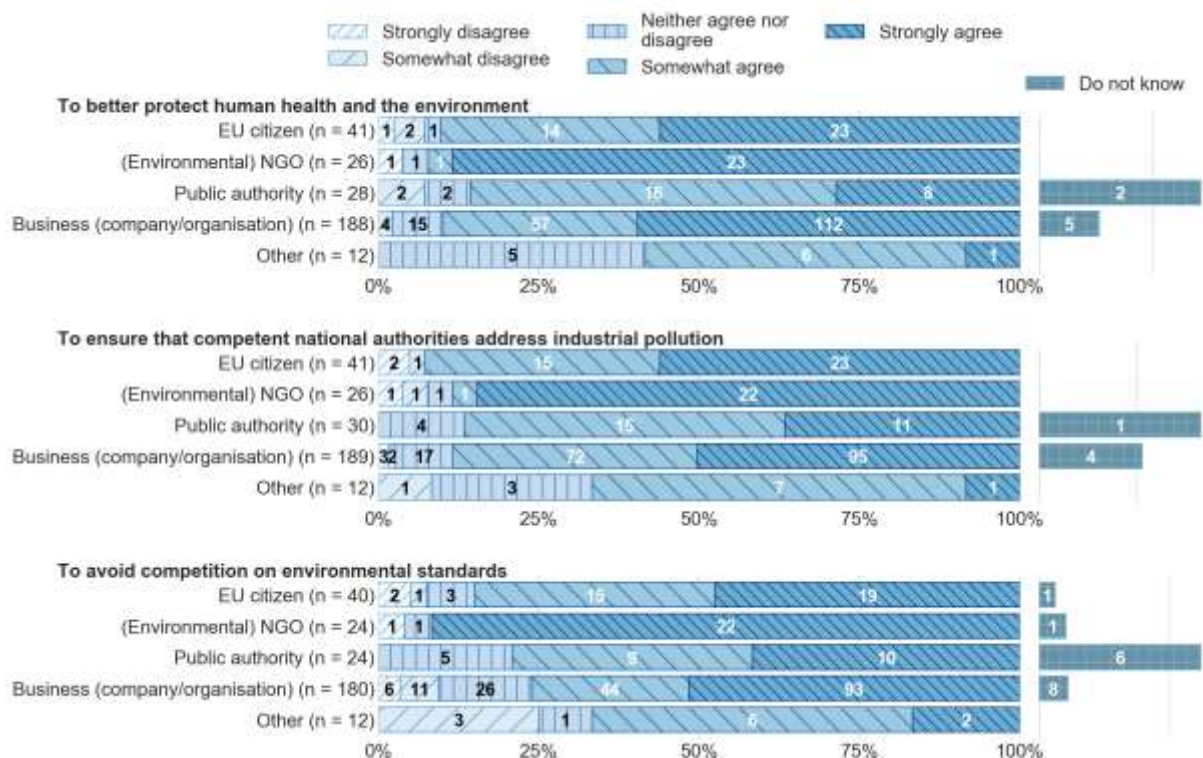
Input from stakeholders supports most of the above conclusions. The large majority of respondents to the targeted survey and the OPC considered that EU action has brought some benefit or significant benefit beyond what would have been possible via action at national level (see Figure 7-78 and Figure 7-79). Their responses refer both in relation to the achievement of the overall objectives of the intervention (i.e. of ensuring the protection of human health and the environment) but also in terms of ensuring that the action taken at the national level is more effective and coordinated by ensuring that national authorities do address industrial pollution and that there is not competition on environmental standards (i.e. contributing to a level playing field).

Figure 7-78: Responses from the targeted survey to the question “To what extent do you think that legislation to regulate environmental impacts of large industrial installations at the EU level, as opposed to action solely at the national level, helps the following?”



Source: Analysis of responses to targeted stakeholder survey

Figure 7-79: Responses from OPC to the question “To what extent do you agree that legislation to regulate environmental impacts of large industrial installations at the EU level, as opposed to national level, helps the following?”



Source: Open Public Consultation

Elaborating further on the positive role of EU action, the EEB considered that EU action has considerably increased the level of ambition regarding regulation of large industrial installations, compared to what would happen if left solely to national authorities. They referred to evidence that, in their view, support their conclusion that if left to their own devices, (some) Member States would prefer to regulate installations in a manner that provides less protection for human health and the environment, and that national authorities would do less to address industrial pollution:

- The increasingly strict ELVs and pollution abatement requirements included in permits for industrial installations across the EU compared to the limits in permits prior to IED implementation.
- The resistance of some Member States (sometimes also reflecting the views of national industry) to particular BAT conclusions and attempts to water them down could be seen as evidence of the fact that national action would have led to less demanding standards in some countries with greater divergence. EEB specifically referred to Poland's action seeking annulment of the LCP BAT conclusions (ECJ Case T-699/17) as supporting evidence of this.
- The number of infringement procedures commenced by the European Commission regarding IED implementation, including procedures publicly announced on 25 July 2019¹⁰³.

While no specific evidence was provided, EEB suggested that EU environmental regulation is the main (and often the only) initiator of any progress in the field of protection of human health and the environment in some countries. Some Member State authorities considered that EU action puts pressure on countries that have not come so far in their own legislation and that it pulls standards upwards.

Inputs from the majority of industry representatives in the context of both the OPC and targeted survey focused primarily on the role of EU action in ensuring a level playing field. Thus, comments from several industry representatives at both EU and national level supported the view that the IED was the right tool to ensure a level playing field across the EU, even though some also suggested that the IED requirements do not ensure a level playing field at the global level. A few industry representatives that were not supportive of the current situation focused on the fact that implementation at national level is still not consistent and, as a result, does not ensure the level playing field expected. Nonetheless, such a position is still in line with the overall idea that action at EU level was necessary to achieve a level playing field.

In addition to the analysis of the added value so far, we also examined the need for maintaining the EU action in its form. Figure 7-73 in Section 7.9.2 presents the responses to the targeted survey on the ongoing need for EU action. In general, the feedback provided by all categories of stakeholders suggests that this is indeed the case.

Overall, most stakeholder input provided seems to support the findings that the presence of EU intervention has brought added value in the form of contributing towards a level playing field by a more consistent and harmonised approach in the setting of the relevant requirements while also raising environmental standards and protection across the EU. While there are still weaknesses and limitations identified which may limit the added value of the intervention, there is no fundamental questioning of the need for action at EU level.

7.13.3 Does the IED and its means of implementation create synergies or overlaps with other Community objectives?

In relation to the second aspect of EU added value, the analysis presented in EQ12 on coherence concluded that the IED, BREF process and the development of BAT Conclusions

¹⁰³ These include procedures against Greece, Romania (see https://ec.europa.eu/commission/presscorner/detail/en/inf_19_4251).

have been shown to take into consideration the objectives of related policies including water, air and waste management. However, it found that there is still some room for better and closer alignment of the IED and its requirements with related policies and the wider environmental objectives.

The analysis pointed to overlaps between the IED and other pieces of EU legislation and EU strategies. Input from stakeholders identified overlaps of the IED provisions with the water legislation (Water Framework Directive, Drinking Water Directive), chemical legislation (REACH), waste management (Waste Framework Directive) and climate and energy related policy (e.g. EU ETS). Overall, there was general consensus that while the IED was broadly consistent with other EU environmental policies there were occasions where the two pieces of legislation did not fully align or when the IED created competing priorities in different sectors.

Having said that, there are also relevant synergies with these sectoral policies and objectives. According to the analysis by Ricardo (2018c), while there is room for the IED limited to be more ambitious, there are still important synergies with the Water Framework Directive especially in local situations. The IED based actions resulting from the BREFs contributed to meeting the WFD standards on limiting the environmental concentrations of priority substances.

7.13.4 How has the distribution of responsibilities between EU, Member State, regional and local levels impacted on the management of environmental impacts?

The IED provides the overall framework for the regulation of industrial activities including provisions for permitting, monitoring, reporting and enforcement. Whilst it places various obligations on the Member States, it is up to the Member States themselves to implement the Directive within their administrative structures respecting the subsidiarity principle. Member State reporting on the implementation of the IED has demonstrated that Member States have implemented the IED differently depending upon their national circumstances. This includes some where it is implemented and enforced at a national level and others where local and regional authorities are responsible. The IED also enables / requires permitting authorities to take into account the local circumstances of each installation in the setting of permitting conditions.

At this stage there is limited evidence available to suggest either positive or negative impacts on the management of environmental impacts resulting from the distribution of responsibilities between EU and Member State authorities at a national, regional and local level under the IED. The review of implementation and the feedback from different regulatory authorities has not highlighted any concerns or issues with the different roles and responsibilities. Section 6 of this report and the Ricardo study on the implementation of the IED (2019d) describe several implementation issues reported by Member States however none of these were a result of the distribution of responsibility to different levels of government.

7.13.5 Findings

To what degree has the IED enabled Member States and their competent authorities to take successful action to improve beyond what would have been possible without EU action?

There are a number of important benefits arising from action at EU level in comparison to action taken at national level only. EU action has ensured a more consistent approach in the adoption of industrial emission standards with relatively limited deviation among Member States. There is some evidence to suggest that in the absence of EU action – initially under the IPPCD and then the IED – standards would have remained less demanding and, as a result, the level of emissions would have been greater. EU action has also ensured a more consistent approach in the monitoring and enforcement of the

requirements across the EU. Finally, the BREF process would not be feasible to replicate at a Member State level to the same degree. All of these elements have helped to contribute towards a level playing field.

In addition, while the concept of BAT is also used in multilateral environmental agreements related to industrial pollution, there is evidence of similar concepts based on the EU system emerging in third countries, including the Russian Federation and Korea. The EU BREFs are also used as benchmarks within other systems e.g. in India. This is adding value at a global level.

This was supported by the majority of stakeholders when directly asked to indicate whether there are specific benefits arising from EU action.

Does the IED and its means of implementation create synergies or overlaps with other Community objectives?

There are a number of synergies and positive overlaps with other EU policies, particularly other environmental policies such as the Water Framework Directive, REACH and the Waste Framework Directive. However, a number of stakeholders have reported that some overlaps have resulted in inconsistencies in implementing legislation as it does not directly align with the IED.

How has the distribution of responsibilities between EU, Member State, regional and local levels impacted on the management of environmental impacts?

There is no specific evidence to suggest a positive or negative impact on the management of environmental impacts arising from the distribution of responsibilities at different levels.

Finding(s)	Robustness
There is significant added value of EU action.	Strong

8 Conclusions

8.1 Results of the assessment against the evaluation criteria

The sections below set out the overall conclusions of the evaluation against each of the criteria: effectiveness, efficiency, relevance, coherence and EU added value.

8.1.1 Effectiveness

The IED aims to reduce and (as far as possible) eliminate pollution arising from industrial activities. 16 BAT Conclusions have been adopted so far under the IED¹⁰⁴ and the four year implementation window has concluded for the first eight. Therefore, the impacts of the IED are ongoing and yet to be realised for some sectors so it is not feasible to quantify the full impacts of the IED and its first round of BREF reviews. This limitation is however inherent to the rolling nature of BREF reviews, so that at any point in time some sectors are more impacted than others.

The IED has contributed to reducing air pollution from industrial activities in its scope. The IED has contributed to reducing water pollution from industrial activities, but to a lesser extent than for air.

Reported emissions to air of several pollutants from industrial activities have reduced relatively consistently over the past 10 years. The IED is very likely to have contributed to this but there may also be several other factors. Some assessments are available that demonstrate the impact that the IED has had, or is likely to have, on emissions to air. For emissions to water, the data is much less complete or robust making it even harder to judge how the IED has impacted on emissions. An additional complication results from the fact that a significant number of industrial installations discharge indirectly to the urban sewerage system. Such emissions are therefore part of the emissions from urban waste water treatment plants. As a result, it is more difficult to judge to what extent the IED has impacted emissions to water. Whilst this is a limitation in the evidence available, reductions are expected because BAT-AELs for emissions to water have been included in many sectoral BAT Conclusions which should lead to tightening of permit ELVs. For emissions to soil, there is very limited data available but this does appear to show a reduction in emissions. Whilst the IED appears to be fulfilling its objective of reducing pollution from industrial sources, some stakeholders have questioned the scale of such reductions and whether they are sufficient.

The IED has been less effective in addressing resource efficiency and circular economy aspects.

There is little evidence on the IED's impacts on aspects such as energy use, raw materials and waste generation. The less binding nature of these aspects of BAT Conclusions could be expected to be one contributory factor towards the IED having less impact.

There are a small number of agro-industrial activities that may generate high levels of pollution that are not covered by the IED

There are a relatively small number of industrial activities not captured within the scope of the IED that may be highly polluting. This includes various intensive livestock activities (cattle, mixed farms, poultry farms just below IED activity thresholds), mining and

¹⁰⁴ Covering the following sectors (listed in order of the year of adoption): Iron and Steel Production (03/2012), Manufacture of glass (03/2012), Tanning of hides and skins (02/2013), Production of cement, lime and magnesium oxide (04/2013), Production of Chlor-alkali (12/2013), Production of pulp, paper and board (09/2014), Refining of mineral oil and gas (10/2014), Wood-based panels production (11/2015), Common Waste water and waste gas treatment / management systems in the Chemical Sector (06/2016), Non-ferrous metals industries (06/2016), Production of Large Volume Organic Chemicals (12/2017), Intensive Rearing of Poultry and Pigs (07/2017), Large Combustion Plants (07/2017), Waste Treatment (08/18), Food Drink & Milk (12/2019), Waste Incineration (12/2019) - <https://eippcb.jrc.ec.europa.eu/reference/>

aquaculture. Some of these were assessed for inclusion in the IED previously but were excluded for specific reasons such as administrative burdens.

The only pollutants excluded from inclusion in an environmental permit under the IED are GHGs which are covered under the EU ETS.

Annex II of the IED contains a limited list of pollutants. The BREF process is not limited to the list and has covered additional pollutants. Member State competent authorities are also obliged to establish emission limit values in permits where appropriate for any significant pollutants and this is not limited to those in Annex II of the IED or the list of pollutants with BAT-AELs in specific BAT Conclusions. However, Article 9 of the IED states that "Where emissions of a greenhouse gas from an installation are specified in Annex I to Directive 2003/87/EC in relation to an activity carried out in that installation, the permit shall not include an emission limit value for direct emissions of that gas, unless necessary to ensure that no significant local pollution is caused". Stakeholders had mixed views as to whether or not GHGs should be fully captured under the IED or not. Stakeholders have also highlighted a need for better coherence of substances addressed with other EU legislation such as the Water Framework Directive and REACH.

IED provisions are more explicit in relation to environmental inspections than under the IPPCD and provisions relating to environmental permits have been strengthened. It is unclear if enforcement has been strengthened in practice.

Environmental inspections and a plan are required under the IED. These provisions are more explicit than under the IPPCD. Provisions relating to environmental permits have also been strengthened – namely by establishing BAT Conclusions and the BAT-AELs, associated monitoring requirements and other aspects contained therein as the basis for setting permit conditions. Some uncertainty remains as to whether enforcement and inspections have improved as, for example, information on the numbers of inspections carried out prior to the IED and since its implementation, and on the frequency of non-compliance are not typically publicly available. Most stakeholders agreed that the use of BATC and permits has led to better control over environmental impacts relative to the IPPCD and that enforcement has been strengthened.

The IED has to some degree stimulated innovation in particular through provisions for identifying and deploying BAT, expansion of markets for BAT, and identification of emerging techniques.

The main impact has been deployment of BAT. The market for relevant techniques is larger in the EU than it would otherwise have been, and the market outside is also stimulated to the degree other jurisdictions copy aspects of the IED or BREFs. However, BAT are inherently 'backwards looking' and their ability to stimulate innovation has been limited. Emerging techniques are identified in the BREF process, and work is ongoing to better identify them through a pilot scale innovation observatory as part of frontloading efforts for the BREF process. This is expected to stimulate innovation further.

The merger of the predecessor Directives has clarified and simplified the requirements. Some complexities remain.

Seven Directives were repealed and replaced with one. The same requirements relating to a permit apply to installations in all sectors under the IED. Some aspects of the differences between the predecessor legislation remain in the IED. Despite this there remain aspects that are unclear. There are cases where installations are covered by the scope of BAT Conclusions as well as by specific chapters of the IED e.g. large combustion plants, waste incineration plants. The majority of survey respondents agreed that the IED has contributed to simplification and clarification of the provisions relative to the previous regime. This was stronger for clarification than simplification.

Access to information has improved under the IED but there remain some failings in implementation by Member States. There has also been some improvement in access to justice but limitations remain.

Overall, whilst there has been improvement with respect to public access to information under the IED, there remain deficiencies. Some permits are not publicly available online, some information is available online but difficult to locate, in some Member States authorities have requested fees for access to permits.

Public access to justice seems to be working, at least to some extent, where new permits are considered. The main limitation seems to be, at least in some Member States, the ability to challenge revisions to existing permits and interpretation of what constitutes 'substantial change' (and whether the public can challenge a decision that a change is declared a 'non-substantial change'). Other issues relate to omissions and the ability to challenge these e.g. where permits have not been issued for an installation. There are limitations in knowledge of the baseline.

Overall, the BREF process is considered to be effective for what is a very difficult task, bringing together large groups of stakeholders often with diverging interests.

The main task of the BREF process is to identify BAT and BAT-AELs that are effective in achieving the IED's objectives. Existing efforts to improve the BREF process in recent years have improved its effectiveness (and efficiency) since the IED came into force. However, some specific areas were identified that have made it less effective than it could have been. Some of these shortcomings have common ground among stakeholders, and others are only supported by certain stakeholder groups. The shortcomings are related to the consideration of cross-media effects in the BREF process; the approach for identifying KEIs, whilst improved, still has further room for improvement in terms of applying the precautionary approach and avoiding the KEI approach driving discussion on BAT-AELs rather than BAT; and confirming which techniques can be used to achieve the lower end of the BAT-AEL ranges.

The BREF process provides sufficient opportunity to provide and consider costs in identifying best available techniques, but cost data have not been systematically provided in practice. Whilst the BREF process doesn't itself quantify human health and environment benefits of implementing BAT, the separate assessments that have been carried out concluded the benefits significantly exceeded costs.

There is a sound system of monitoring emissions from IED installations and monitoring techniques are cutting-edge, providing good information on emissions for assessing compliance.

The monitoring of emissions to air and water for compliance assessment purposes of IED installations is largely based on EN standards. Detailed provisions apply in Member States to ensure a high quality of the measured data (e.g. through the accreditation of testing laboratories and/or the certification of automated measurement systems for the measurement of emissions to air). Emissions from large sources are usually measured continuously whereas for many others it is carried out periodically.

Member States draw on the BREFs and BAT Conclusions when setting monitoring requirements in permits. There is variation in implementation across the EU, in particular in relation to compliance assessment.

More recent BAT Conclusions contain consistent approaches to specifying BAT for monitoring. Member State reporting shows that monitoring frequencies are respected in permit conditions. This has helped to improve transparency and consistency. There are some data gaps in terms of whether the IED and BAT conclusion monitoring and reporting requirements have improved compliance. Information is typically not publicly available via the internet in a lot of Member States so it is unclear if it is being reported consistently and used for compliance assessment. Based on the evidence that is available, the differing application of compliance assessment rules risks creating distortions.

The reporting systems exist and are useful but are not cutting-edge and monitoring data is generally not publicly available via the internet.

A number of countries outside the EU as well as some EU regions and companies have real time monitoring and reporting of emissions monitoring and some make such information publicly available. Such approaches could potentially improve overall efficiency, ease of checking compliance and public access to information.

The IED has supported Member States in implementing BAT-based permitting.

BAT-based permitting has increased under the IED. Permit emission limit values must be based on BAT-AELs set in the BATC under the IED. The tendency appears to have been for permit emission limit values to be set on the basis of upper BAT-AELs more commonly than lower BAT-AELs (and this has been set out in national guidance in some Member States). There is some evidence available that indicates variation across the EU as to whether or not the BAT-AEPLs (i.e. other than BAT-AELs) from the BAT Conclusions are included within permits although this is only known for some Member States. Article 15(4) derogations allow more cost effective implementation. There is a limited proportion of installations granted derogations although there is some variability in approaches across the EU.

The IED has contributed to a more level playing field compared to under the IPPCD, mainly through a reduction in differences in stringency of permit ELVs between Member States.

However, there remain variations in implementation among Member States, particularly on compliance assessment, the granting of derogations, and on setting permit ELVs at upper BAT-AELs versus lower values within the AEL range. Some Member States appear to have granted a greater number of derogations than others and some don't allow them. Stricter permit conditions than the BAT Conclusions appear to be rarely applied. Differences in the levels at which permit conditions are set based on the BAT-AEL range can impact on company costs (and benefits). Differences between Member State approaches to conducting inspections have been improved under the IED with greater establishment of inspections plans.

8.1.2 Efficiency

A limited number of BATC assessments have been undertaken, and these have identified, for the sectors assessed, that benefits from compliance with the BATC overall significantly exceeded compliance costs

The assessments have also shown that these conclusions were robust to sensitivity analysis of assumptions made. Furthermore, our own limited assessment of compiling the full costs of IED implementation for the iron and steel sector (i.e. including administrative burdens for operators and regulators), suggests that even adding non-investment costs related to compliance together with the BATC compliance costs, the benefits still exceed the costs significantly.

There has been overall a limited set of evidence available to identify the costs and benefits of the IED. The BREF process itself does not undertake any cost-benefit analysis of BAT or BAT-AEL selection, and based on the findings of the cost-benefit analyses that have been conducted, it is rather unlikely that further such assessments will be carried out due to their cost and the difficulties in obtaining the data needed on BAT-process level to complete them. Some examples were provided by stakeholders of particular cases where certain BATC have not been as cost effective as others. Particular concerns were raised for the large combustion plant sector on efficiency. This highlighted that the sector recently had to comply with the IED Chapter III and Annex V requirements (in 2016), and as well as this has obligations imposed from 2021 for compliance with the LCP BAT conclusions. This overlap, together with different timetables imposed on the sector from its obligations from other (climate and energy) policy areas can make for a reduction in efficiency.

The IED mechanisms for derogations reduce compliance costs, as do the transitional arrangements for LCPs under Chapter III. It is not clear whether the use of these

flexibilities leads to better efficiency in terms of costs per unit of environmental improvement.

The BREF process has already been (and continues to be) subject to a process to improve its efficiency. Whilst successful, more could be done to further improve efficiency.

Several suggestions have been made by stakeholders to help deliver the IED's environmental objectives whilst improving efficiency (e.g. targeting the reduction of pollutants at source rather than downstream; applicability thresholds of BAT-AELs; increasing the use of new more efficient software tools for analysis of data gathered in the BREF process). Many of the suggestions relate to the BREF process, which has itself already been (and continues to be) subject to a process to improve its efficiency. This effort appears to have paid dividends to date, but more could be done to improve efficiency. The BREF process requires a large resource effort from across Member States, industry and civil society representation, such that there is interest in trying to reduce future efforts for the second round of BREF reviews.

Compared to under the IPPCD, some additional administrative costs have been incurred for additional requirements under the IED (such as baseline reports); these are not 'unnecessary'. There is limited evidence of any change in overall administrative costs.

Limited evidence has been identified to quantify overall administrative costs associated with the IED (in particular how this may have changed relative to under the previous legislation). The administrative costs of the BREF process have been estimated, including costs to all relevant stakeholders, and are considerably lower than the scale of compliance costs and overall benefits for those sectors where a detailed cost-benefit analysis has been undertaken (Iron & Steel, LCPs).

More than half of respondents indicated that compared to the previous situation administrative costs to Member States and operators have increased under the IED. A number of industry stakeholders highlighted that requiring baseline reports represented a significant additional administrative burden. No evidence has however been provided to demonstrate that this is an unnecessary requirement as they are an IED requirement introduced to address a gap in the IPPCD.

Stakeholders were generally positive about the process for reporting and monitoring, though as the systems are in flux and the EU Registry is still being rolled out, not enough information and experience is available at this stage to judge this properly.

Inconsistencies between the BREFs and the provisions in Chapters III and IV and associated Annexes of the IED were flagged by some stakeholders as potential unnecessary administrative burdens related to different averaging periods used in the different documents. Beyond this point no further evidence has been identified indicating that the costs have caused unnecessary or excessive burden.

There is no evidence that the IED has materially impacted global competitiveness.

The IED both supports EU competitiveness in the global economy (e.g. driving environmental improvements outside the EU leading to export of EU expertise) and hampers EU competitiveness (e.g. additional compliance costs in EU compared to elsewhere). Eurostat data shows that overall industry environment compliance costs remain relatively constant. The IED impact assessment reported several studies that showed that environmental legislation does not impair economic competitiveness and was in many cases considered a competitive advantage. Costs associated with environmental legislation were generally a small factor in global competitiveness, with other costs, such as labour and goods being much more influential. There were mixed views amongst stakeholder groups as to whether or not the IED has reduced competitiveness with countries outside the EU due to higher compliance costs.

The BATC assessment for one sector identified likely total annualised compliance costs of ~€134m per year, this equates to 0.1% of its annual investment. It seems unlikely that an additional cost of this level will have a significant impact on competitiveness.

The IED has improved environmental sustainability, it is less clear if it has improved social and economic sustainability.

Environmental impacts of the regulated sectors are decreasing which is beneficial for their environmental sustainability. Since assessments show the benefits exceed the costs this means the resulting health benefits also bring overall economic and social benefits. The economic and social benefits are less obvious since they will be indirect.

There was strong agreement across all stakeholder types that there has been an improvement in environmental sustainability since the implementation of the IED. There was much less certainty in the positive effects of the IED with respect to social sustainability. Similarly, there was less certainty in the positive impacts of the IED with respect to economic sustainability.

8.1.3 Relevance

The IED remains relevant to the needs of the EU within its objectives.

The steady decline in pollutant emissions from industrial activities (particularly to air) demonstrates that the IED and its predecessor legislation are having positive impacts and therefore standards are being set that are helping to protect human health and the environment. However, it is clear that industrial activities overall still contribute significantly to emissions of some pollutants (to air and water) resulting in significant health and environmental impacts. Hence the IED remains relevant to continue to address these impacts. The IED remains relevant for all of the different stakeholder groups including industry (creating a level playing field), Member States and EU citizens (health, public access to information and justice).

Stakeholders are of the view that the IED has generally addressed the most relevant environmental impacts although there are some limitations with respect to energy use, raw materials and waste generation as requirements for these included within the BAT Conclusions are not binding in the IED in the same way as BAT-AELs. Some stakeholders feel that the standards are not ambitious enough, impacted to some extent by the fact that most Member States have tended to apply the upper ends of the BAT-AEL ranges. Permitting authorities consider releases to water to require more stringent approaches to meet EU water quality objectives.

Finally, stakeholders were invited to comment on whether the IED remained relevant in view of the need for industry to rapidly adapt to a zero-carbon economy in 2050. Feedback from the survey was mixed with industry much less certain compared to NGOs and Member States, as there are concerns about double regulation and overlaps with EU climate and energy policy. However, some stakeholders feel it is essential that all impacts are dealt with under the IED in an integrated manner.

The IED is able to respond to new or emerging environmental issues through the BREF process but there are some limitations.

BREFs have addressed additional pollutants to those listed in Annex II as well as new issues. Since the IED in principle covers all environmental impacts and it is for the TWG to agree the scope of the BREF, it seems clear that the framework is able to respond to any new environmental issue. One major challenge in responding to emerging issues relates to timings; in particular the length of the BREF process and the time between reviews. However, some industry stakeholders have provided examples of when the BREF process has quickly responded to an emerging issue. Some concerns have also been raised by stakeholders about the process for identifying key environmental issues within the BREF process constraining the ability to identify emerging issues. A reliance on complete data

and tendency to focus on the same substances as the existing BREF were considered to make it harder to tackle new, emerging issues.

8.1.4 Coherence

The IED is overall largely internally coherent and consistent although several elements could be further clarified.

Overall, there appear to be no major issues of internal coherence under the IED, and around half of the respondents to the targeted survey indicated that the IED is very or extremely consistent. At the same time, it is clear that there are some issues that have been identified; these include the following:

- The IED seems like a juxtaposition of several Directives rather than a coherent whole.
- In some instances the interaction between the general requirements of Chapter II on provisions for activities listed in Annex I and the sectoral provisions of Chapter III (e.g. regarding Large Combustion Plants) and Chapter IV on waste incineration is unclear.
- Potential discrepancy between the way in which BAT-AELs under Chapter II and ELVs under Chapter IV are evaluated.
- Some sectors (e.g. chemical industry) do not have thresholds consistent with other sectors.
- Some definitions and scopes set out in the IED can be considered ambiguous.

The IED is largely coherent with other EU environmental and wider EU policies and at least to some extent the IED is supporting the delivery of the objectives of other EU policies. However, there is potentially scope for greater contribution in some areas.

The evaluation has identified both synergies and potential gaps or overlaps. While the BREFs and BATs have contributed to the achievement of environmental objectives set out in wider EU policies, some areas are covered more comprehensively than others. A review of previous fitness checks and evaluations concluded that generally there are few inconsistency issues, although there are some exceptions. The IED and E-PRTR, for example, have strong overlaps, however, there are still mismatches, especially in terms of the activities and pollutants/thresholds covered.

At the same time, the IED has clearly contributed to certain environmental policies, especially air and water policy. On the contribution of the IED to water policy, it was found that the BREFs have had, and are likely to continue to have, positive impacts for both reducing emissions to water and, perhaps to a lesser extent, reducing water usage. On the contribution of the IED to the circular economy, it was found that the BREF process does not systematically include BATs on circular economy topic areas. However, it should not be assumed that the IED is the most suitable tool to achieve all objectives of the instruments considered (for example, the circular economy).

The results of the targeted survey show that overall respondents do not think there are any major overlaps or inconsistencies. However, some potential issues of incoherence were identified by stakeholders including misalignment of substances and associated threshold levels between the IED and other policies, cross-media impacts of certain BATs to reduce emissions, overlaps in scope between policies and potential for greater alignment.

8.1.5 EU added value

There is significant added value of EU action.

There are a number of important benefits arising from action at EU level in comparison to action taken at national level only. EU action has ensured a more consistent approach in the adoption of industrial emission standards with relatively limited deviation among Member States. There is some evidence to suggest that in the absence of EU action – initially under the IPPCD and then the IED – standards would have remained less demanding and, as a result, the level of emissions would have been greater. EU action has also ensured a more consistent approach in the monitoring and enforcement of the requirements across the EU. Finally, the BREF process would not be feasible to replicate at a Member State level to the same degree. All of these elements have helped to contribute towards a level playing field. This was supported by the majority of stakeholders when directly asked to indicate whether there are specific benefits arising from EU action.

In addition, while the concept of BAT is also used in multilateral environmental agreements related to industrial pollution, there is evidence of similar concepts based on the EU system emerging in third countries, including the Russian Federation and Korea. The EU BREFs are also used as benchmarks within other systems e.g. in India. This is adding value at a global level.

8.2 Summary of issues identified and areas for further action

Table 8-1 summarises the main issues and challenges related to the implementation of the IED that have been identified as part of this evaluation. These issues may help to identify areas where any future actions may be taken.

Table 8-1: Summary of issues identified broken down by theme

Theme	Issue / challenge
Administrative burden	Limited evidence has been identified to quantify overall administrative costs associated with the IED (in particular how this may have changed relative to under the previous legislation). However, around 50% of respondents to the targeted survey feel that the IED has not led to a reduction in unnecessary administrative burdens (although baseline reports commonly referred to in open text responses which is not considered unnecessary).
BREF process	"Backwards-looking" exercise so main impacts of innovation are deployment of BAT.
BREF process	Some specific areas were identified in the evaluation that have made it less effective than it could have been. Some of these shortcomings have common ground among stakeholders, and others are only supported by certain stakeholder groups. The shortcomings are related to the consideration of cross-media effects in the BREF process; the approach for identifying KEIs, whilst improved, still has further room for improvement in terms of applying the precautionary approach and avoiding the KEI approach driving discussion on BAT-AELs rather than BAT; and confirming which techniques can be used to achieve the lower end of the BAT-AEL ranges.
Coherence	Some coherence issues remain with E-PRTR.
Coherence	Some aspects of the differences between the predecessor legislation remain in the IED. Despite this there remain aspects that are unclear. There are cases where installations are covered by the scope of BAT Conclusions as well as by specific chapters of the IED e.g. large combustion plants, waste incineration plants.
Coherence	Some differences or overlaps in scope, definitions and objectives between IED and other EU policy.
Cross-cutting	Data on impacts on water emissions is much less complete or robust (compared to emissions to air) making it harder to judge how the IED has impacted on water emissions.
Cross-cutting	Setting ELVs for indirect emissions to water: some Member States have reported challenges with setting emission limit values for emissions to water which is being transferred off-site for treatment in the urban or independently operated waste water treatment plants. A significant number of industrial installations discharge indirectly to the urban sewerage system. Such emissions are therefore part of the emissions from urban waste water treatment plants and not captured under the IED.
Cross-cutting	There is little evidence on the IED's impacts on aspects such as energy use, raw materials and waste generation. BAT-AEPLs in BATC are not binding in the same way as BAT-AELs so there are inconsistencies in their use across the EU.
Enforcement	Variation in the way in which Member States undertake compliance assessment leading to differences across the EU.
Monitoring & reporting	The reporting systems exist and are useful but are mostly not cutting-edge and monitoring data is generally not publicly available via the internet; real-time reporting or monitoring is only exceptionally used.

Theme	Issue / challenge
Permitting	Member States tend to most often apply the upper value of the BAT-AEL ranges when setting permit conditions.
Permitting	Some Member States have granted a greater number of derogations than others. Variability in approaches across the EU.
Permitting	Challenges with implementation of BATC for specific sectors: the sectors most commonly mentioned by the Member States were Intensive Rearing of Poultry and Pigs and Waste Treatment.
Permitting	Issues related to the definitions in the IED: main difficulties concern definitions of installation, directly associated activities, Other Than Normal Operating Conditions. Lack of coherence with definitions used in other legislation applicable to industrial sites has also been reported
Public access to information	Failings in implementation of IED requirements across some Member States.
Public access to justice	Variation in practices across the EU with challenges in some Member States.
Scope	Some activities which may be highly polluting are not within the scope of the IED.
Scope	GHGs within the scope of the EU ETS are not required to be included in permits under the IED.

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Annexes

Annex 1: Procedural information

Annex 2: Consultation synopsis

Annex 3: Methods and tools used in preparing the analytical support documents and/or underpinning analysis

Annex 4: Intervention logic

Annex 5: Evaluation matrix

Annex 6: Bibliography and evidence base

Annex 7: Open public consultation

Annex 8: Targeted stakeholder engagement – online survey

Annex 9: Targeted stakeholder engagement – interviews

Annex 10: Targeted stakeholder engagement – focus groups

Annex 11: Stakeholder workshops

Annex 12: Implementation / state of play

Annex 13: Analytical support document – effectiveness

Annex 14: Analytical support document – efficiency

Annex 15: Analytical support document – relevance

Annex 16: Analytical support document – coherence

Annex 17: Analytical support document – EU added value

All Annexes are in a single, separate document apart from Annexes 2, 4, 6-8 and 13-17 which are in further separate documents.

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