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COVER NOTE

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Delegations will find attached document SWD(2022) 111 final part 3/5.

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EUROPEAN
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Strasbourg, 5.4.2022
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PART 3/5

COMMISSION STAFF WORKING DOCUMENT

IMPACT ASSESSMENT REPORT

Accompanying the documents

Proposal for a
DIRECTIVE OF THE EUROPEAN PARLIAMENT AND OF THE COUNCIL
amending

Directive 2010/75/EU of the European Parliament and of the Council of 24 November 2010 on industrial emissions (integrated pollution prevention and control) and Council Directive 1999/31/EC of 26 April 1999 on the landfill of waste

and

Proposal for a
REGULATION OF THE EUROPEAN PARLIAMENT AND OF THE COUNCIL
on reporting of environmental data from industrial installations and establishing an Industrial Emissions Portal

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Annex 8: Impact of Shortlisted Measures – Industrial Emissions Directive

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Overview

The retained external consultants' project team collected evidence and analysed the impacts of 43 measures that were retained for a more in-depth assessment (together with an additional 30 measures related to the E-PRTR – analysed separately).

The key economic, environmental, and social impacts of the policy measures across the core stakeholders – public authorities, industry (large and smaller businesses), citizens and workers, third countries – were identified, mapped, and screened. A rapid assessment of the expected absolute and relative magnitude of these impacts and their likelihood was carried out in line with Tool 19 of the EU's Better Regulation (EC, 2021). This process is described in more detail in Annex 4.

As a result of this screening of impacts, thirteen economic, environmental, and social impact categories were selected for an in-depth impact assessment. These categories are outlined in the Table below. A brief description of the specific impacts and proxy indicators considered in this assessment of options for the revision of the IED are also provided for clarity.

Table A8-1: Significant impacts for in-depth assessment and core indicators

Broad impact category	Specific impact category	Description
Economic impacts	Administrative burdens on businesses	Any administrative costs, enforcement costs and/or direct regulatory charges, including but not only through the permit application, derogation and BREF processes, monitoring and reporting, hosting inspections, etc.
	Operating costs and conduct of businesses	Substantive compliance costs, that is, the additional capital expenditure and/or operating expenditure (excluding administrative burden) that are required to comply with the policy measures' requirements. This may include upgrading installations and equipment, using alternative inputs of production, etc.
	Competitiveness of businesses	Comparative advantage of the industry in an international context and how this may be affected by changes to the costs of doing business in the EU; and any impacts on the level playing field in the EU.
	Position of SMEs	Overall costs of the measures on the industry across differences in business size; that is, whether the average administrative and compliance costs per employee are comparable across larger and smaller businesses or there is a significant difference in the impacts by size.
	Innovation and research	Level of investment in Research and Development and expected innovation outcomes that may result from the implementation of proposed measures.
	Public authority	Administrative, compliance and enforcement activity by public authorities

Broad impact category	Specific impact category	Description
	impacts	and other costs related to the BREF, permit-setting and derogation-granting processes; compliance assessments and inspections; and/or ensuring public access to permit procedures, among others.
Environmental impacts	Climate	Emissions of Greenhouse Gases into the atmosphere (tonnes of CO_2 equivalent)
	Air quality	Emissions of pollutants to air, which may include NOx/SOx, NMVOC, dust, NH_3, Hg, or any other pertinent pollutant.
	Water quality and resources	Releases of heavy metals (Cd, Hg, Pb, and Ni), N and P or any other pertinent pollutant to water.
	Soil quality or resources	Emissions of pollutants to soil, which may include Arsenic, Cadmium, Chlorides, Chromium, Copper, Halogenated Organic compounds, Lead, Mercury, Nickel, Polychlorinated Biphenyls, Total Phosphorus and Zinc.
	Waste production, generation and recycling	Volume of waste generated (tonnes) and recycled (tonnes).
	Efficient use of resources	Amount of energy consumed (TWh), volume of "virgin" water consumed (m^3) and volume of "re-cycled" water consumed (m^3).
Social impacts	Employment	Number of employees, in full-time equivalent, in industry and/or public authorities.

Across each of these specific categories, a diverse set of costs and benefits over a period of 20 years were considered, assessed and, where possible, quantified. These include administrative and enforcement costs, compliance costs and regulatory charges and other direct and indirect costs and benefits, in line with Tool 58 of the EU's Better Regulation Guidelines (EC, 2021), which may emerge as a result of the implementation of the shortlisted policy measures, when compared against the baseline.

In general, colour coding is used to summarise the qualitative assessment of impacts referring to the direction (positive or negative) and magnitude (small or large) of any expected impacts (see Table A8-2). A more detailed description of the qualitative assessment methodology and other analytical methods employed can be found in Annex 4.

Table A8-2: Coding used to present expected impacts

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Extremely negative	Strongly Negative	Weakly negative	"Zero": i.e. no or limited impact	Weakly positive	Strongly Positive	Extremely positive	"U": Unclear

The focus of the quantitative analysis has been to support the assessment of the proposed sectoral scope extensions for the IED (Problem Area #5). Further, the quantification of administrative burden on businesses and public authorities has also been prioritised. The table below outlines key and cross-cutting assumptions employed in the quantification of administrative burden based on the available evidence.

Table A8-3: Cross-cutting evidence-based assumptions employed in this report

Specific indicator	Evidence-based assumptions	Comments and sources
Number of existing IED installations in the baseline	**52 000**	Average of the latest three years of data available via the EU Registry
Number of new IED installations expected each year in the baseline, on average	**500**	Average based on baseline data analysis carried out for this report
Number of permit reconsiderations (and updates) every year in the baseline, on average	**5 200**	Average based on the assumption that permit reconsiderations and updates may take place at least once every 10 years, in line with the BREF cycle
Number of BREF reviews completed in a period of 20 years	**60**	Based on the assumption that a BREF occurs at least once every 10 years, thus each of 30 sectors will be reviewed at least twice in the 20-year period
BREF review costs for one sector-operators (2020 €)	**€1 million - €7 million**, with a central estimate of €2 million	Based on the recent IED Evaluation (Ricardo et al, 2020)
BREF review costs for one sector-public authorities (2020 €)	**€3 million - €14 million**, with a central estimate of €5 million	Based on the recent IED Evaluation (Ricardo et al, 2020)
One-off costs of issuing new permits -public authorities (2020 €)	**€3 250 - €35 000**, with a central estimate of €23 400	Based on evidence from the IED IA 2007 (EC, 2007), adjusted for inflation over the period (GDP Deflator sourced from the World Bank and Eurostat), and contrasted with evidence gathered through the recent IED Evaluation (Ricardo et al, 2020)

Specific indicator	Evidence-based assumptions	Comments and sources
One-off costs of issuing new permits -operators (2020 €)	**€10 000 - €62 250**, with a central estimate of €28 000	Based on data collected through stakeholder engagement for this report, the IED Evaluation in 2020 (Ricardo et al, 2020), and a study to analyse differences in costs of implementing EU policy (EC, 2015)
One-off costs of permit reconsiderations and updates - public authorities (2020 €)	**€1 600 - €17 500**, with a central estimate of €11 700	Based on an assumption employed in the IED IA 2007 (EC, 2007) that permit reconsiderations and updates costed around 50% of the permit issuance costs
One-off costs of permit reconsiderations and updates - operators (2020 €)	**€1 500 - €31 250**, with a central estimate of €14 000	Based on evidence provided by stakeholders engaged for this report, and complemented by evidence from the IED IA 2007 (EC, 2007).
Annual costs for managing information and systems - public authorities (2020 €)	**€100 - €3 000** with a central estimate of €2 000	Based on evidence provided by stakeholders engaged for this report and the recent IED Evaluation (Ricardo et al, 2020)
Annual monitoring and reporting costs-operators (2020 €)	**€150 - €12 000** with a central estimate of €8 000	Based on evidence provided by stakeholders engaged for this report and the recent IED Evaluation (Ricardo et al, 2020)
Inspection costs every two years -public authorities (2020 €)	**€500 - €12 000** with a central estimate of €9 600	Based on evidence provided by stakeholders engaged for this report and the recent IED Evaluation (Ricardo et al, 2020)
Inspection costs every two years -operators (2020 €)	**€125 - €5 000** with a central estimate of €4 000	Based on evidence provided by stakeholders engaged for this report and the recent IED Evaluation (Ricardo et al, 2020)
One-off applications for derogations or exemptions - public authorities (2020 €)	**€550 - €4 250**, with a central estimate of €850	Although the burden is primarily on operators to develop and submit the application, it is assumed that public authorities spend half as much effort reviewing and engaging in the process
One-off applications for derogations or exemptions - operators (2020 €)	**€1 100 - €8 550**, with a central estimate of €1 700	Based on evidence from IED IA 2007 (EC, 2007), suggesting applications for derogations could require between 40 to 300 worker hours
One-off baseline reports - public authorities (2020 €)	**€4 000 - €20 000**, with a central estimate of €10 000	Based on an assumption public authorities would engage with baseline reports provided by operators and spend around 20% of the effort
One-off baseline reports - operators (2020 €)	**€20 000 - €100 000**, with a central estimate of €50 000	Based on the recent IED Evaluation (Ricardo et al, 2020)
Average hourly labour costs in EU-27 (2020 €/h)	**€29/h**	Latest Eurostat statistics for EU-27 (Eurostat, 2021)

Other, more specific evidence-based assumptions were also employed in the assessment of impacts. These are captured, as relevant, in the following sections.

There are, however, limitations to the level of quantitative analysis that could be carried out in this report, primarily due to the nature of the IED. The BREF process results in BAT Conclusions that are to be considered through the IED permitting process across a wide range of sectors and industrial installations. Evidence on the techniques that may be selected as BAT is a very resource-intensive process and attempting to pre-empt these conclusions is complex and error prone. Quantifying substantive compliance costs and environmental impacts is, therefore, very challenging and potentially not proportionate. Nevertheless, the study team, working with the EC, has considered approaches to illustrate these impacts as quantitatively as possible, e.g. using a typical installation approach, where we consider how core aspects of each policy option could result in key changes in capital and operating requirements as well as environmental performance.

In addition, the assessment of social impacts and associated ratings focus on how the measures may affect employment levels across the EU. Public health and public health system impacts are linked to environmental impacts and, therefore, are captured within this category. Similarly, reductions in polluting emissions, especially by affecting public health, may also have impacts on labour productivity and other economic impact categories. These impacts, generally benefits, where directly related to the environment and captured as part of the monetisation of these environmental benefits through the use of damage cost functions, have been captured in the environmental impacts category and not considered in any other categories, primarily to avoid confusion with the qualitative analysis and the interpretation of the qualitative ratings.

The measures are structured into five problem areas. Each section ends with a summary table that provides a qualitative overview of the emerging conclusions from this analysis.

The abbreviations used in the report are listed below:

BATc	Best available technique conclusions
BAT-AELs	Best available technique associated emission levels
BREF	BAT reference document
EC	European Commission
ELV	(permit) emission limit value
GHG	Greenhouse gas(es)
GLS	Glass manufacturing (BREF)
LCP	Large Combustion Plant (BREF)
MS	Member State
NOx	Nitrogen oxides
WWTP	Waste water treatment plant

Problem area 1: The IED has not been as effective as it could be

There are sixteen measures shortlisted to address that the IED has not been as effective as it could be in terms of:

- Ensuring reduced pollutant emissions from industry, which includes issues such as BAT-AELs not being achieved, inconsistencies in implementation, and transboundary pollution remaining ineffectively addressed;
- Public access to information and participation;
- Coherence in implementation.

In particular, the policy measures were shortlisted to address these problems and shortcomings and to achieve a set of objectives. The objectives are:

1. Prevent or, when impractical, minimise emission of pollutants by large industrial and agro-industrial plants (including transboundary pollution between Member States)
2. Ensure access of private individuals and civil society organisations concerned to environmental information, participation in environmental decision making and access to justice, in relation to permitting, operation and control of large industrial and agro-industrial plants
3. Clarify and simplify the legislation and reduce unnecessary burden whilst establishing a level playing field across the EU for pollution prevention and control.

Each measure will be assessed individually, covering a more in-depth description of the measure, an outline of the requirements for implementation and an assessment of their Economic, environmental, and social impacts supported by evidence.

Measure 1: Introduce a time limit for derogations granted under Article 15(4).

Description of the measure and requirements for implementation

The proposed measure would introduce a time limit for derogations granted under Article 15(4).

Article 15(4) of the IED allows derogation from paragraph 3 of Article 15 of the IED, allowing competent authorities to issue less stringent permit limit values than BAT-AELs according to the following criteria:

"*Such a derogation may apply only where an assessment shows that the achievement of emission levels associated with the best available techniques as described in BAT conclusions 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

(b) *the technical characteristics of the installation concerned*."

The IED does not indicate whether derogations can be provided indefinitely nor does it indicate if there is an upper limit on a derogation period. No additional guidance on when a derogation can be applied has been provided. There are no mandatory time limits stipulated on the duration of the derogations. Consequently, this crucial aspect of the IED is open to interpretation to MS. Evidence has been identified of a wide range of durations of derogations granted by some Member States to operators. Evidence has also been identified suggesting that some derogations have been granted without specifying an end date of the derogation, and thus the date from which BAT-AELs would apply. Based on 2016 IED implementation reporting, at least two Member States have addressed this issue of time-limiting derogations in their national guidance for implementing the IED (Italy, Slovakia) (Ricardo, 2021).

As well as the reported information on derogations included in the EU Registry, information made publicly available by Member States on Article 15(4) derogations is generally reported at installation level and relate to permit documentation (Ricardo, 2021). Individual derogations are granted for individual BAT-AELs, such that there can be multiple derogations per installation.

Objectives:

The measure will aim to improve the effectiveness of the IED through accelerating compliance with BAT-AELs and levelling the playing field.

This measure will, therefore, contribute to the general ambition of zero-pollution in the EU and, more specifically, contributing towards preventing or minimising the emission of pollutants by large industrial and agro-industrial plants and levelling the playing field across the EU.

Implementation needs:

- The EU would amend the IED to introduce wording that provides a time limit in Article 15(4).
- Member States will need to transpose the new time limits into national legislation.
- EU (and/or public authorities) would develop guidance on the implementation of the proposed changes, including whether the rule change will apply retrospEUtively to derogations already granted or whether it would apply only to newly issued derogations. Depending on the date when the new rules would come into force, the number of derogations already granted and which remain in force and which have longer remaining durations than the suggested cut-off value would vary.

Assessing impacts

Economic impacts

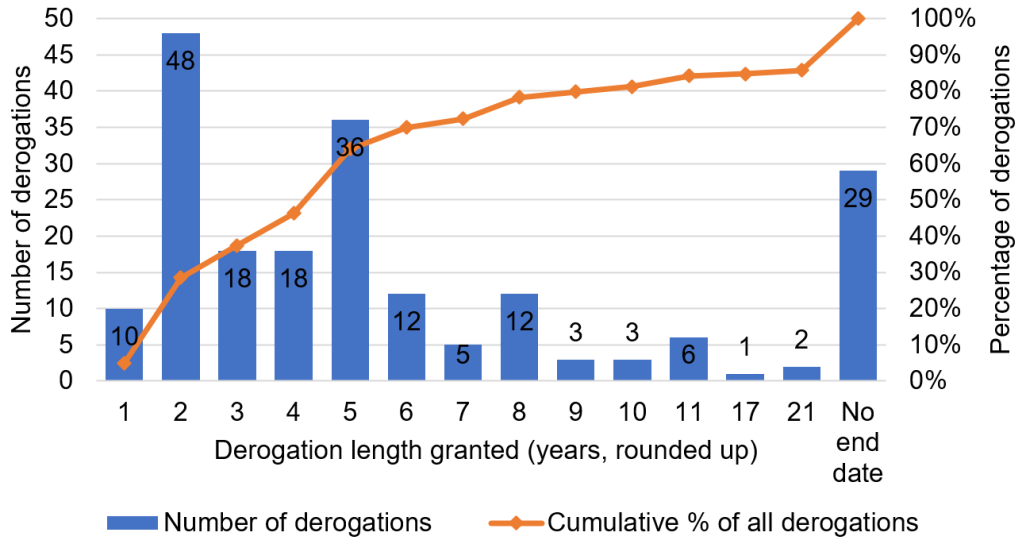
In summary, this measure is likely to have **limited to weakly negative Economic impacts**, characterised by highly localised financial implications for a small proportion of IED installations.

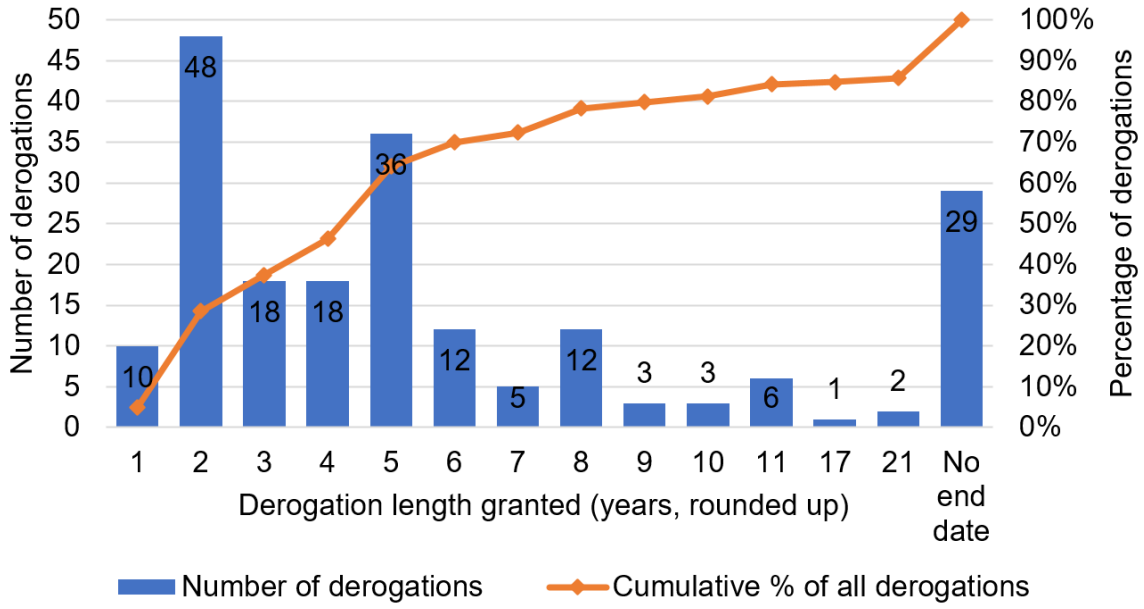
There are around 52 000 installations in the IED, and up to and including reporting for year 2019, 203 derogations were reported as having been granted to 130 installations. Therefore, 0.2 % of all IED installations received derogations.

After filtering these derogations for the derogations that could remain in place when this measure could take effect (assumed to be 2024), 38 installations (<0.1% of all installations) are reported in the EU Registry to have either unending derogations (29 derogations granted to 20 installations) or derogations with end dates beyond 2023 or longer than four years (27 derogations granted to 18 installations). The longest two derogations have been granted for 20 years.

The 2019 reported EU Registry data (without filtering for derogations that will cease by 2023) is illustrated in the figure below.

Figure A8-1: Distribution of derogations by length (2019 data).





It can be seen from this figure that, of the existing derogations granted: around one third (37%) were granted for periods of 3 years or less; around half (46%) were granted for periods of 4 years or less; and around two thirds (64%) were granted for five years or less. This distribution could be used by the EU to inform a view on what number of years could be an appropriate maximum duration.

Installations which currently hold unending or lengthy derogations are likely to require deep transformation to reach compliance with BAT conclusions, or are used for specific purposes(e.g., seasonally), which may make upgrading to BAT economically difficult. A small portion of installations which do not currently hold a lengthy or unending derogation may rely on issuance of a lengthy or unending derogation in the future. These installations may also require a deep transformation to maintain economically feasible operations. Deep transformation, particularly if it is not scheduled by an operator, may have significant economic impacts on installation operators (see measures 21 and 22 for more details on this). The number of derogations which will be affected by the measure depends on the time limit set for derogation, as outlined in

Table **A8-4**. As the time limit rises, more derogations and installations will be affected.

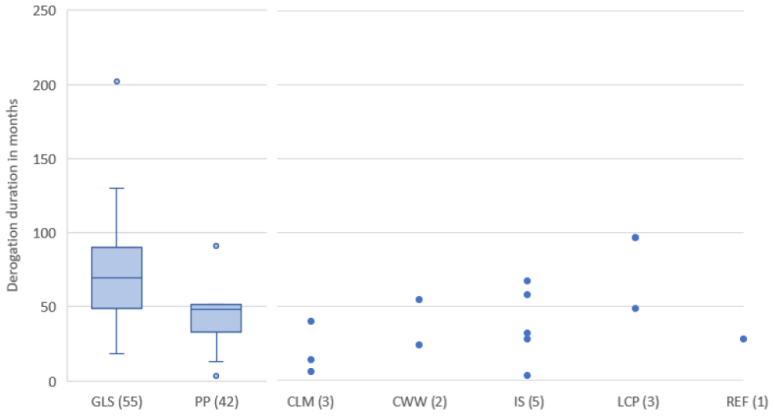
Table A8-4: Derogation time limit (between 1 and 6 years) and corresponding number of derogations affected based on 2019 derogations.

Derogation time limit (years)	Derogations affected
1	193
2	145
3	127
4	109
5	73
6	61

The measure's economic impacts are likely to be unevenly distributed between Member States. According to analysis of the EU Registry , a significant portion, 40%, of derogations were issued to installations in Sweden, while Czech Republic and Italy both accounted for 16% and the remaining 20 were divided between 12 other Member States (Ricardo, 2021) The more recent EU Registry data reported for 2019, after removing derogations that expire after 2023 suggests the distributional effect remains high, with 30% of the derogations granted to Swedish installations, 21% to Portuguese installations and 18% to Czech installations, and the remaining derogations divided among 7 Member States. Most reported derogations have been for installations for which the four-year implementation window following BATC adoption has ended. Furthermore, the distribution of derogations among Member States indicates the Economic impacts would not be evenly distributed, and would be concentrated in those Member States (Sweden, Portugal, and Czech Republic) with the highest number of derogations. Sweden reports that 76% of its derogations are time limited.

The measure's Economic impacts are likely to be unevenly distributed between sectors. The figure below demonstrates glass manufacturing (GLS) and pigs and poultry (PP) both received significantly more derogations than other sectors in the 2018 reporting. Furthermore, glass manufacturing installations received relatively long derogations. One example in GLS has been granted a derogation of over 200 months. It is however not possible to predict in which sectors more installations will be granted derogations; this depends on the stringency of the future BAT conclusions' BAT-AELs as well as the degree of national regulation already in force.

Figure A8-2: Box and scatter plot of durations for which Article 15(4) derogations apply, by BAT conclusions (GLS = Glass manufacturing, PP = pigs and poultry) (Ricardo, 2018).



Note: Box plots (with circular markers presenting outliers) for the GLS and PP BATC. Remaining BATCs with smaller sample sizes show each derogation granted by a single dot. Information reported by the 15 Member States where derogations have been granted. Number of derogations granted by BATC is in brackets along the x axis.
Source: (EEA, 2020)

Where measures are granted to businesses for extended periods of time, this measure could reduce the time allowed to reach compliance. Consequently, the measure would shift compliance costs (i.e. installing and/or operating additional techniques) closer to the present day than they would otherwise have been, and therefore, the measure would result in additional costs in the shorter-term (earlier transition to desired state as a result of the measure than in the baseline). For those installations with derogations set without an end date, this measure would introduce costs for those installations (if they chose to comply) or may lead to installation closure.

Question 22 of the Targeted Stakeholder Survey asked respondents ***"If you are supportive of introducing time limits for Article 15(4) derogations, what time limit would in your view be the most appropriate and effective? (express in years and months)".*** 91 stakeholders responded, 33 of whom indicated a maximum time limit for Article 15(4) derogations, broken down in the Table below, which shows 5 years was the most popular answer (13 of 33 responses), 8 years was the second most popular answer (7 of 33) and 4 years the third most popular response (5 of 33). In addition, 62 respondents provided an open text answer, most of which did not provide a specific time limit for derogations. The most popular argument (34 of 62 responses) was that time limits on derogations are not necessary and derogations should be assessed on a case by case basis. Another popular response stated "derogations are already time limited", which received 17 of 62 responses. Other responses included, time limits should not exist (4 of 62), derogations are already four years long (2 of 62), derogations should match BREF reviews cycles (2 of 62), remove derogations completely (2 of 62) and that derogations should be extended (1 of 62).

- Some position papers submitted by industry include responses related to Article 15(4) derogations. One response, from the International Association of Oil & Gas Producers (IOGP),

indicates that although very few derogations are applied to installations in their sector, those that have been granted derogations are for units which are used only in specific conditions and for specific reasons, such as, generating heat during severe frosts. The IOGP argue that adaptation of these types of installations to BAT conclusions (i.e. removal of an option of an unending derogation) would lead to higher costs than the environmental benefits gained, due to the low running hours of the plants.

Table A8-5: TSS: number of responses in favour of various derogation time limits.

Years	Count
1	1
3	1
4	5
5	13
6	2
8	7
10	3
15	1

- However, the example that was provided by the IOGP was concerning where a derogation had been sought for an offshore platform LCP[1], with the derogation sought for the installation's lifespan for NOx emissions. It was quoted that upgrades to meet the BREF BAT-AEL would have required modifications on the platform costing € 39m, and leading to NOx reductions of 60 t/year for one unit and 700 t/year for a second unit. These NOx reductions, if assumed to be in the North Sea, could be valued around €20 000/tonne[2], i.e. valuing the benefits to be around €15.2m per year. Hence, in this example provided by the industry of a plant for which long or unending derogations would be sought, it does not appear that the costs would outweigh the benefits after assuming operation of the installation for at least ~2.5 years.

[1] Of the six derogations listed in the 2019 reporting to the EU Registry as having been granted to LCPs, none appear to be for offshore platform LCPs based on the BAT numbers granted for. The LCP BAT conclusions four-year period for implementation finishes in 2021, so more derogations could yet be granted for this sEUtor than are currently reported in the EU Registry.

[2] ETC/ATNI Report 04/2020: Costs of air pollution from European industrial facilities 2008–2017

Administrative burden on businesses

This measure is likely to be **limited to weakly negative impacts** on administrative burden. The scale of this impact per installation affected depends on whether an installation currently holds an unending or lengthy derogation (and for these if the EU would wish to target these derogations retrospectively, or if an installation has not yet been granted a derogation. However, the number of installations affected will be small.

For installations which currently hold a derogation there is likely to be a small increase in administrative burden. The scale of this impact depends on the specific length of the time limit. The measure would require installations which currently hold a lengthy or unending derogation (~0.1% of installations) to review their derogation to adhere with the time limit introduced by this measure.

For installations which might require a derogation in the future, the measure would have a weakly negative impact on their administrative burden. Operators would still go through the same derogation application process and discussion with the competent authority. This process would also be happening in the counterfactual where the measure is not introduced.

The measure may have a limited impact on organisations which have currently been granted a derogation as well as organisations which might require a future derogation because it will cause a slight increase in the frequency with which businesses must review their derogation with the competent authority. If the measure introduces a time limit installations would foreseeably be required to review their derogation more often than in the counterfactual where the measure is not introduced. The impact the measure will have on administrative burden depends on the specific time limit set. According to the 2019 data, the average length of derogations with end dates was 3.4 years and the most common derogation length was 1 year or less (28% of all derogations). However, the average derogation length does not account for unending derogations; as illustrated earlier, 55% (111 of 203 derogations) of derogations granted are four or more years long. Therefore, if, for example, the time limit is set at four years, 55% of installations which held derogations in 2019 would be required to update their derogation more regularly than in the counterfactual where the measure is not introduced.

For those installations which currently hold an unending or lengthy derogation (i.e. already granted), the EU may seek to limit (or entirely avoid due to the possible uncertain legal feasibility) the number of cases where renegotiation would be needed on an existing granted derogation. If a renegotation were needed, the measure would incur an additional administrative burden where the operator must renegotiate their derogation with the competent authority. In the counterfactual where the measure is not introduced, these installations would not have been required to do any further paperwork on their derogation. Again, the proportion of existing derogations which would be affected in this way would depend on the specific time limit set. For example, using the 2019 data and excluding all derogations which end before 2023, a four-year time limit would mean 56 derogations across 38 operators would be reassessed earlier than in the counterfactual where the measure was not introduced.

Assuming this measure would affect around 50 installations, the additional administrative costs for businesses are estimated to be between €0.01m/yr and €0.8m/yr with a best estimate of €0.6m/yr.

Operating costs and conduct of business

The measure's overall impact on both the operating costs and conduct of businesses are likely to be **weakly negative**. Whether the measure will increase a business' operating costs and conduct of business depends on whether a business currently holds a derogation, and if that derogation is unending or set on a time limit or longer than the proposed time limit which could be introduced under this measure. There will be a significant increase in operational costs and changes to conduct of business for installations which rely on a future derogation, particularly installations which currently have an unending derogation. Operating costs for installations which have not yet been granted derogations will be higher if the measure is introduced because the length of derogation will not be granted for as long as they might previously have been in the counterfactual where the measure is not introduced. As discussed earlier, the scale of impact on operating costs and conduct of businesses depends on the specific time limit set for derogations.

- For those derogations which are unending or due to expire beyond 2023 introducing the measure will present completely new costs for these installations. Those operators with unending or very long derogations may have these derogations curtailed, which would bring costs forward or introduce new costs if the derogation was otherwise to the end of the Economic life of the installation. As mentioned above, the EU may seek to avoid addressing this measure at existing derogations.

Currently, it is unclear how the measure might affect business' behaviour. However, one foreseeable negative impact of the measure could be business' decision to close plants which may not be Economically feasible to transform even within an agreed period. This could occur in both the situations where businesses have not yet received derogations and in the situation where an installation currently holds a lengthy or unending derogation.

Competitiveness and level playing field

The proposed measure is likely to have a **weakly positive impact** on the level playing field. As discussed above in the section on 'Economic impacts' derogations are concentrated in certain sectors and Member States. Therefore, the measure will improve the consistency of derogation lime lengths across Member States and sectors. This will eliminate the possibility that certain Member States or sectors are granted longer derogations than installations in other states or sectors, thus removing the potential competitive advantage held in those states and sectors with longer derogations.

Position of SMEs

The impact of this measure on SMEs is **uncertain**. The level of impact depends on the size of the installations which rely on derogations. The size of installations is not known from the EU Registry data on derogations.

Innovation and research

The measure is **unlikely to impact** innovation and research. The measure is focused on tightening the conditions for derogations, which concern installations behind current BAT. Therefore, the measure is focused on incentivising uptake of existing BAT rather than encouraging research into advanced technologies. It is considered unlikely that step-changes in technology implementation might result from implementing this measure.

Public authority impacts

The measure is likely to have **limited to weakly negative impacts** on public authorities. Changing the conditions for existing derogation will incur some additional managerial or administrative tasks for public authorities concerned with issuing derogations. The measure is likely to change the frequency by which public authorities must assess and issue derogations. The measure will not impact public authorities because of changes to the process associated with achieving derogation. In addition to this change, the measure is also likely to require public authorities to write new guidance and communicate with operators to reflect the requirement of a time limit which may cause some small impact on public authorities.

Whether the measure will incur impacts on public authorities also varies between businesses which do not yet hold a derogation versus existing unending or lengthy derogations. There will be fewer impacts on public authorities which regulate businesses which do not yet hold a derogation than for public authorities which regulate businesses which have been granted unending or lengthy derogations. As discussed above in 'Administrative impact on businesses', the measure, depending on the specific time limit elected, is likely to mean public authorities will review derogations not yet granted more regularly than in the counterfactual where the measure is not introduced. For existing unending or lengthy derogations, the measure will create a short-term increase in work for public authorities. Public authorities will be required to reassess lengthy or unending derogations when the measure is introduced, thus incurring a short-term spike in workload for public authorities. As discussed in 'Economic impacts' this will be most severe for public authorities in Sweden, Portugal, and Czech Republic where the majority of derogations are concentrated.

Assuming this measure would affect around 50 installations, the additional administrative costs for public authorities are estimated to be between €0.02m/yr and €0.6m/yr with a best estimate of €0.4m/yr.

Environmental impacts

Overall, the environmental impacts of the measure are likely to be **weakly positive**. The measure is likely to cause a small overall reduction in IED installations' environmental impacts concentrated in a relatively small number of geographic areas. As noted earlier, the distribution of derogations implies introducing a time limit on derogations is likely to have a significant impact on a small proportion of IED installations.

Climate

The measure is likely to have **no impact** on greenhouse gas emissions.

Evidence: there were no derogations issued in 2019 which were relevant to climate impacts. The only type of derogation which may affect the climate are derogations for energy efficiency. The measure may have an impact on the climate if greenhouse gas emissions are brought within the scope of the IED.

The evidence is supported by views of stakeholders: 47% of respondents to the TSS believe the measure will have no impact on GHG emissions. There were significantly fewer responses in favour of the measure having at least a slight impact, which constituted 22% of responses.

Air quality

The measure is likely to have a **weakly positive impact** on air quality, more so than the other environmental issues concerned.

Evidence: In 2019 a total of 203 derogations were issued, out of which, 154 were for emissions to air and 49 for emissions to water. This implies the measure could have a more significant overall impact on emissions to air than emissions to water. Out of deorgations for emissions to air, there were 48 derogations for SO_2 emissions, 39 for NO_2 emissions and 38 for dust emissions. This indicates the measure's environmental impacts will be concentrated on reducing these pollutants. However, this approach does not account for disproportionately high environmental impacts caued by toxic pollutants, for example, mercury emissions. Out of the 154 derogations issued to emissions to air, 43 were unending or exceeded 2023. The most common pollutant with unending or lengthy derogations were dust emissions (15) and NO_2 (12). This suggests if the measure was introduced, these particualr existing derogations could be reassessed to reflect the time limit on derogations, leading to a reduction in emissions for installations in the areas local to the polluting installations.

The measure's impacts on air quality are possible to estimate. For example, according to Ricardo (2019) assessment of MS reports on IED implementation, the annual damage cost of dust and PCDD/F emissions in the iron and steel sector due to derogations was estimated to be €17m/year and €0.015m/year respectively[3]. For the glass sector, derogations for NOx, SOx and dust resulted

[3] Ricardo, 2019. Assessment and summary of Member States' reports for Modules 1, 3 and 4 of Annex II of Commission Implementing DEUision 2012/795/EU. Retrieved from: https://circabc.europa.eu/sd/a/e6a8f5a7-2b35-4bc5-a195-10acfaa49755/Final%20report.pdf

in associated damage costs of €19.5 m/year, €18.6 m/year and €3.6m/year respectively for the years the derogations were active. As discussed in 'Economic impacts', the number of derogations granted is particularly high in glass manufacturing. The high levels of additional emissions and annual damage costs for glass manufacture highlight the potential environmental value of introducing a time limit on derogations. If the measure is introduced, this will directly reduce emissions from lengthy or unending derogations. Derogations which have not yet been issued are likely to be, on average, shorter, implying there will be lower emissions than in the counterfactual where the measure is not introduced.

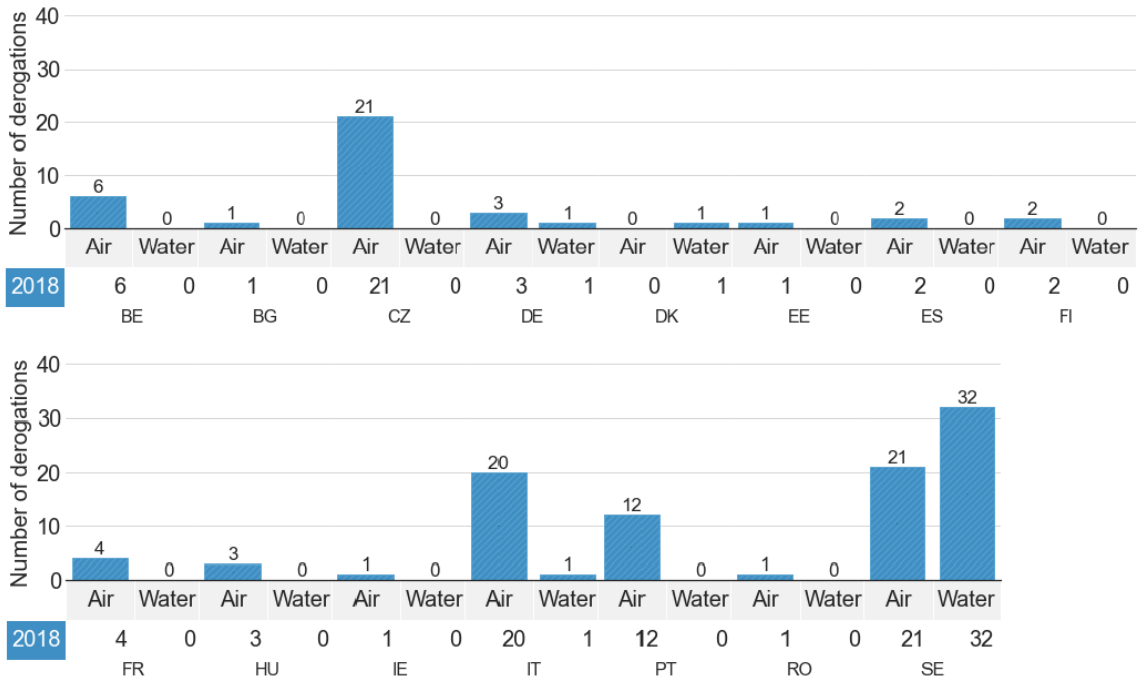
It is not possible to reliably predict the future benefit of future derogations for air pollutants, though the indications above suggest that the monetised benefits could be significant for the small number of derogations that would apply for long periods.

ClientEarth provided a case study on Article 15(4) derogations: In 2018 in Bulgaria, there was only one reported derogation which did not have an end date. However, 7 out of all 9 large coal power plants in Bulgaria have applied for derogations under Large Combustion Plant BATC. As of March 2021, 3 of these derogations have been granted[4]. Based on the granted derogation for the coal power plant TPP Maritsa East 2 EAD, this will allow the plant to operate for an indefinite period of time under the following conditions: a desulphurization rate of 97%-97.5%, which is equivalent to an emission limit value of 570 mg/Nm^3. For comparison: The general BAT-AEL range (without derogation) under the LCP BATC is 10-130 mg/Nm^3, so the granted value is between 4.4 to 57 times higher. With regards emissions of mercury, the permit limit value is 30 µg/Nm^3. The BAT-AEL range under the LCP BATC for mercury is 1-7 µg/Nm^3, so the granted value is 4.3 to 30 times higher.

The measure would not be expected to improve air quality equally across all Member States. As might be expected, those Member States who utilise derogation mechanisms proprtioanally rather more would benefit proportionallly most from the measure, regarding environmental/ health emissions and their effects, but with the corresponding "rectification" costs to reach the approppriate sectoral BAT-AEL ranges. Figure A8-3 shows, by Member State, that more derogations have been granted for BAT-AELs relating to emissions to air than for emissions to water with the exceptions of Sweden, Germany and Denmark (Ricardo, 2021). This suggests the measure is likely to have a more significant impact on air quality than water quality with the exception of the situations in the mentioned Member States, particularly Sweden.

[4] TPP Maritsa East 2 EAD (1602 MWe), TPP ContourGlobal Maritsa East 3 AD (908 MWe) and AES Maritsa East 1 EOOD (670 MWe)

Figure A8-3: Derogations by environmental medium, reported by Member States (except Slovakia) (Ricardo, 2021)



Source: (EEA, 2020)

Stakeholder input: According to the results of the TSS, 44% of respondents believe the measure will have at least a slight simpact on emissions to air versus 44% of respondents who believe the measure will have no impact at all.

Water quality and resources

The measure will have a **weakly positive impact** on water quality and a **limited impact** on use of water resources.

Evidence: As illustrated in Figure A8-3, the majority of derogations are relevant to emissions to air, not emissions to water with the exceptions of Sweden, Germany, and Denmark. Therefore, the measure will have inconsistent impacts on water quality across the Member States: most of the measure's impact will be concentrated in those three Member States. With regards the measure's impact on water resources, the measure's impact depends on whether the status of the IED's BAT-AEPLs are brought to have equal status with BAT-AELs.

In 2019 a total of 203 derogations were issued, out of which, 154 were for emissions to air and 49 for emissions to water. This implies the measure will have a more significant overall impact on emissions to air than emissions to water. Out of the derogations to water, the most derogations were granted for emissions of total suspended solids (17) followed by 6 derogations for total phosphate and the remainder were divided between 7 other pollutants. Out of the 49 derogations

issued to emissions to water, there were 10 derogations which were unending or exceeded 2023. Out of the unending or lengthy derogations, there were 4 derogations for total suspended solids and 2 for chemical oxygen demand. If the measure was implemented, these derogations may be reassessed, which would lead to an improvement in water quality in the areas local to the polluting installations.

Stakeholder input: The results of Question 21 A to the TSS show a high proportion of respondents believe the measure will have no impact on emissions to water (49%). Fewer responses support at least a slight impact (36%) on emissions to water. Only 14% of responses supported a "significant" impact on emissions to water. In comparison to the other environmental areas examined there was a relatively low proportion of responses to "N/A" (11%).

Soil quality or resources

The measure is likely to have a **limited to weakly positive impact** on soil quality or resources.

Waste production, generation, and recycling

The measure is likely to have **no impact** on waste production, generation, and recycling.

Evidence: Limit values and performance levels for waste production, generation, and recycling are not legally binding. Therefore, introducing a time limit for derogations will not have an impact on this environmental issue.

The results of the TSS show a high proportion of respondents believe the measure will have no impact on waste generation (57%), the highest proportion of responses in favour of "no impact" out of all the environmental measures examined. There were significantly fewer responses in support of the measure having at least a slight impact, accounting for only 26% of responses. Out of all the environmental areas examined in relation to the measure in question, waste generation received the fewest responses in favour of the measure carrying at least a slight impact and the highest level of confidence that the measure would have no impact.

Efficient use of resources

The measure is likely to have a **limited impact** on efficient use of resources. Currently, resource efficiency BAT conclusions do not have the same status as pollution abatement BAT conclusions in the IED. However, if BAT associated performance levels were legally binding, this measure would have a significant impact on the use of resources.

Social impacts

This measure is likely to have **limited negative impacts** on employment. As discussed in the Economic impacts section above, the measure will affect a small proportion of IED installations, some of which serve a unique function, for example, when electricity demand is at a peak. Therefore, if the measure contribute to leading to the closure of installations this would likely lead to job and Economic losses associated with plant closure. The evidence is limited and, therefore, these effects cannot be quantified.

Measure 2: Mandate the application of a standardised methodology for assessing the (dis)proportionality between costs of implementation of BAT conclusions and the potential environmental benefits for assessing applications for derogations under Article 15(4).

Description of the measure and requirements for implementation

- The proposed measure is to mandate the application of a standardised methodology for assessing the (dis)proportionality between costs of implementation of BAT conclusions and the potential environmental benefits for assessing applications for derogations under Article 15(4).

Objectives:

The measure will aim to improve the approach to assessing disproportionality between costs and benefits for the IED, raising standards in the Member States where this method is currently underdeveloped.

This measure will, therefore, contribute to the general ambition of zero-pollution in the EU and, more specifically, contributing towards preventing or minimising the emission of pollutants by large industrial and agro-industrial plants and levelling the playing field across the EU.

Implementation needs:

Article 15(4) of the IED permits derogation from where achievement of emission levels associated with BAT would lead to disproportionately higher costs compared to (a) environmental benefits due to the geographical location, the local environmental conditions, or (b) the technical qualities of the installation.

There are several options which could be followed to successfully implement this measure in the legislature:

- Article 15(4) could be amended to include reference to the universal methodology for assessing costs of implementation and environmental benefits.
- Sub paragraphs (a) and (b), could be removed to avoid confusion between the official methodology and individual interpretation of the legislation.
- The EU could provide a separate piece of guidance on how to carry out a standardised methodology for Member State authorities. EU may introduce guidelines / a standardised methodology could be appended to a section of Article 15(4)

The EU has confirmed the methodology would need to be developed by the EU first.

Effective implementation of this measure should be supported by guidance for competent authorities from the EU. MS would need to integrate the EU guidance into the national guidance documents and ensure operators understood the guidance and have the resources to implement the methodology. This would require study and analysis of existing methodologies and consultation among Member States on a draft methodology. It would need to address how cost

accounting would be done, how benefits accounting would be done, and some of these could build on previous work on methodologies carried out for the EU examining methodologies for estimating potential industrial emissions reductions and compliance costs (Ricardo, 2016).

The methodology could be developed as part of the revision of the reference document on Economics and Cross-Media effects (EUM). The existing EUM document reference document contains some information on how to carry out a cost assessment for BATs, but the document was published in 2006 and a more thorough cost benefit methodology could be included in a revised document. However this was intended as informing BREF process Economic assessment rather than individual installation level Economic assessment. This would have several benefits. The methodology developed by the EU could also benefit from the existing methodologies and guidelines currently used by Member States. The table below includes an overview of existing practices in 8 Member States.

Table A8-6: Summary of existing cost benefit methodologies in use in Member States and positions on regulating for the use of a standardised method according to Member State representatives.

Member State	Description of existing cost benefit analysis method	Comments from Member State authority representatives
Belgium (Flanders)	In Flanders, the guideline document, *Guideline for determining the Best Available Techniques at installation level* (2017) is a voluntary tool which can used by operators who wish to apply for an Article 15(4) derogation or more generally to assess employment of BAT. The guideline document provides a point of reference for the operator when there might be a need to investigate how to proceed with adopting BAT or applying for derogation. The guideline can also be used by those conducting company specific BAT studies, such as, research institutions. The guideline is based on experience gained in Flemish case studies, company-specific studies and BREFs.	According to a representative from the Environment Department of the Government of Flanders, most Article 15(4) applications do not use this guideline for the following reasons; it is not mandatory to use this guideline, other methodologies can be used and the guideline is not specific for article 15(4). The representative from Belgium Flanders argued they would welcome more guidance on the cost benefit analysis, specifically, which damage cost to use to quantify the benefits. However, the representative from the Belgian department for environment does not believe the methodology should be totally standardized for all Member States. The situation in each Member State is different. Discussions on which damage costs to use, which benefits to calculate/evaluate, with each Member State is not an efficient option. Moreover, this will not create a level playing field in the EU. To accommodate for differences between Member States as well as improving homogeneity, the EU could produce a framework/template on some of the key aspects. In addition INCITE could develop and keep updated a list of damage costs.

Member State	Description of existing cost benefit analysis method	Comments from Member State authority representatives
		Finally, this measure will not solve all the issues with the article 15(4) derogations.
Italy	According to a representative from the Italian Ministry for Ecological Transition, specific methodologies for conducting cost benefit analysis do not exist. In Italy, the representative believe, the cost-benefit analysis are evaluated by an expert judgement of the competent authorities.	The representative is in favour of defining a standardised methodology at EU level to promote homogenous application. However, the representative argues there are some risks associated with regulating for the use of a standardised methodology. For example, the representative local conditions should not be ruled out by a standardised methodology. As a result, the representative suggests a trial period to test the regulation and allow interested parties to practice using a standardised tool.
Denmark	Denmark uses technology descriptions and associated financial calculations to help operators identify BAT for agricultural installations. On the basis of technology descriptions, standard conditions are set on the size of the required emissions reduction. The methodology is currently under review. A document shared by a representative of the Danish Ministry of Environment provides a detailed overview of the processes used to evaluate.	
Poland	In Poland, BAT and derogations for ***emissions to air*** released by IED installations is informed by the European Environment Agency report *Costs of air pollution from European industrial facilities 2008-2012*. A Ministry of Environment handbook supports operators and competent authorities to implement the approach (Ministerstwo Srodowiska, 2017). In addition, there is an excel file to support calculations (Ministerstwo Srodowiska, 2021). The handbook and excel are developed specifically for Large Combustion Plants. However, certain parts of the guide are universal and can therefore be used as a guide for other types of installations. The manual is not designed to be prescriptive or exhaustive and other methods can justify a request for a derogation. Regarding emissions to water, the representative from Poland states Poland has not developed	According to a representative from Poland's Ministry of Climate and Environment, the impact of standardising a cost benefit methodology depends on how the method is delivered. For example, if a "standardised" method is translated through a *guidance document* this could be easily delivered by the relevant ministry in Poland. This is a similar process to existing methods for informing cost benefit analysis. However if "standardised" referred to a legally binding method this would be significantly more challenging to implement (more so when regulating emissions to air than water). The regulation would have to be very detailed, explaining each element of the procedure (including definition of disproportion of costs compared to the environmental benefits). Delivering this kind of legislation would be further complicated by political developments.

Member State	Description of existing cost benefit analysis method	Comments from Member State authority representatives
	guidelines for this. The recommended approach has been communicated directly to the competent authorities. The methodology used to regulate emissions to water is based on qualitative assessment where the environmental impact considers the quality of the receiving water body, properties of pollutants concerned, and the impact of given installation on the identified state of water body. As a priority, the government avoids providing derogation where priority pollutants are concerned.	
Finland	The Finnish government have produced a handbook *BAT-päästötasoja lievempien raja-arvojen hyötyjen ja haittojen arvioinnin hyvät käytännöt* (BAT emission levels advantages and disadvantages of limit values good evaluation practices), which outlines good practices for the application and assessment of derogations on emission limit values based on best available techniques in the environmental permit process of installations under the Industrial Emissions Directive (2010/75/EU, art. 15(4) derogations). The guidance provides recommendations for operators and authorities to adapt to the following: 1. Costs of emission reductions based on net present values 2. Monetised environmental benefits 3. Lost environment benefits caused by atmospheric emissions should be monetised 4. No commonly accepted methodologies available on the EU level for evaluation of environmental damage to water bodies. The report rEUommends a first step to dermine whether harm can be monetised might be caused by excess emissions. 5. As a prerequisite to derogation the costs of investment should exceed the enviromnmental benefits	-
Portugal	Portugal's environmental permitting unit has developed a method for application based on theBREF on Economics and Cross-Media Effects. The guide is designed for cases when there is not an obvious conclusion or a broad agreement on	A represenative of Portugal's Department of Environmental Permitting unit believes there is margin for improvement but at least there is a baseline for all operators.

Member State	Description of existing cost benefit analysis method	Comments from Member State authority representatives
	the preferred option to be implemented. The guide is based on the fundamental principles of the IPPC Directive; a method which allows for a transparenet assessment of the costs of implementing BAT, requirements that mst be considered in analysis of Economic viablility. The guide is also supported with an excel sheet to support operators to make calculations.	
France	The French Ministere Ministère de la Transition écologique et solidaire has a methodology, produced in collaboration with the public technical institute Ineris (Ineris, 2017) and a spreadsheet to support operators with calculations (Ineris, 2017b). Regarding environmental aspect, to government request an update of the impact assessment regarding the incidence of concern (if the incidence is important, competent authority can ask to include a propEUtive health risk assessment, "Evaluation des Risques Sanitaires" in French, and/or an assessment of the environmental state of media, "Etude sur l'interprétation de l'état des milieux"). The goal is to quantify the impact. Regarding the cost, the analysis takes into account OPEX and CAPEX. Competent authorities can also ask for proof and information about the last investment regarding the source of the incidence. In addition, the French government is currently working on a methodology to identify and cover better incidences which are not currently covered or are partially covered by BREFs according to Article 14(6).	The representative for France's Ministère de la Transition écologique et solidaire states that cost-benefit calculation is a core aspect of BAT. Therefore, harmonised guidance for cost-benefit analysis in the EU to support a level playing field and a high level of enviornmental protection is crucial.
Sweden	Sweden's Naturvardsverket does not have a standardised cost benefit methofd for assessing the proportionality between costs of implementing BAT conclusions and potential environmental benefits. Instead, assessments are made by competent authorities on a case by case basis. Sweden assessed the proportionality between costs of implementing BAT conclusions and potential environmental benefits before the IED entered into force. The Swedish Environmental Code includes so-called 'General Rules of Consideration'. These are among others: Burden	-

Member State	Description of existing cost benefit analysis method	Comments from Member State authority representatives
	of proof principle, Proportionality principle, PrEUautionary principle, Best Possible Techniques Principle, Knowledge requirement. These rules stipulate that all activities and measures that may affect human health or the environment must be carried out in a way that any inconveniences or risks for inconveniences are prevented or limited. These rules apply as long as they are not unreasonable (Proportionality principle) which means that application should be environmentally justifiable and financially reasonable in each case.	
Spain	The Catalonian cost benefit methodology aims to determine environmental effects, and to establish which option has the best cost-benefit ratio (Departament de Medi Ambient i Habitage, 2007).	-

Assessing impacts

Economic impacts

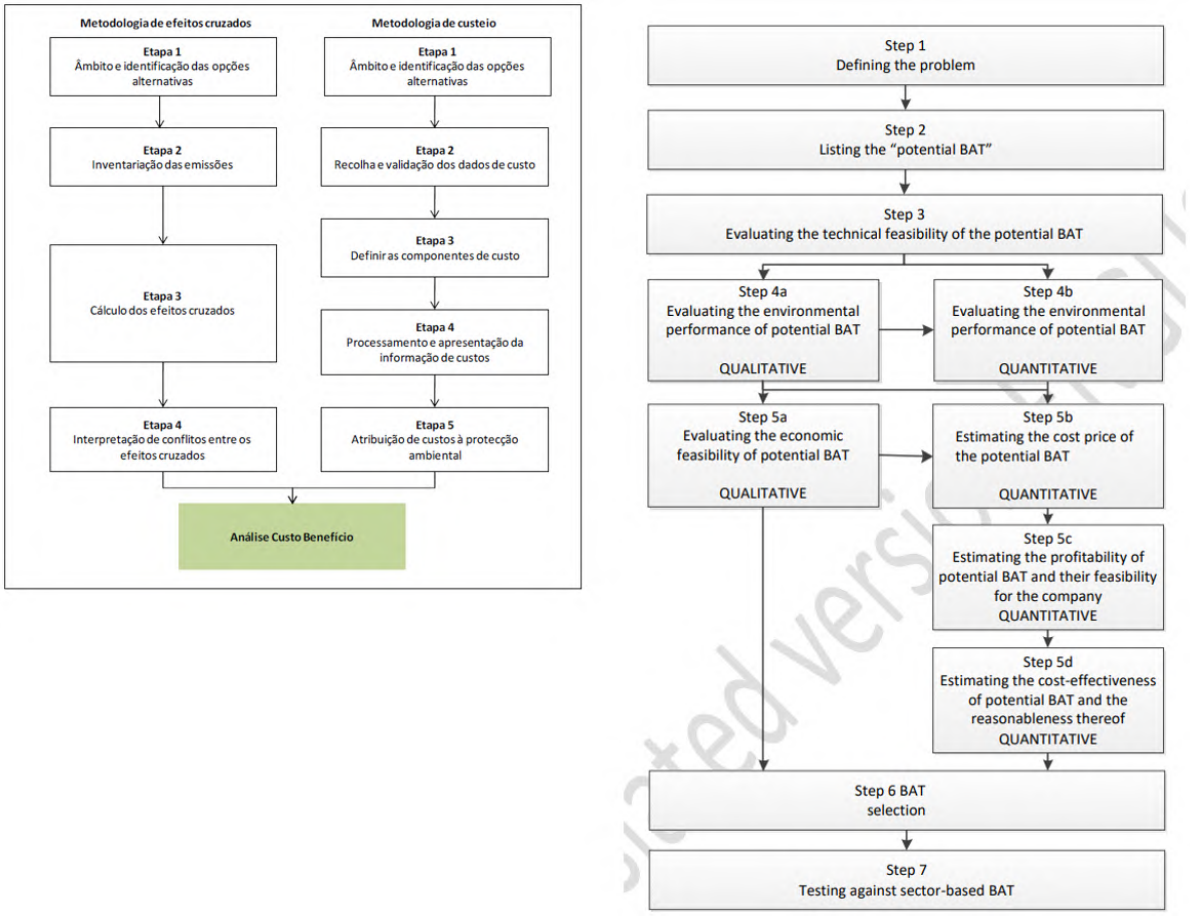
In summary, the Economic impacts of mandating the application of a standardised cost benefit methodology on both competent authorities and operators are likely to be **weakly negative**.

A small proportion of installations receive derogations from competent authorities, therefore, the potential overall economic impact of increasing the standardisation of the method is low. As indicated for measure 1, there were approximately 200 derogations for 130 of 52 000 IED installations as of 2019 reporting. In 2019, 65 derogations were issued and 5 200 permit reviews were conducted. Therefore, the most significant Economic impacts of this measure would be limited to <0.0025% of IED installations or 1.25% of annual permits reviews. However, there remains the potential for localised Economic impacts where installation operators expect to rely on derogations to help the installation more financially viable. Increasing the standardisation of the cost benefit methodology might have a negative Economic impact on operators which apply for derogations in the future, where standardisation increases the stringency of the application process. Whether the measure will increase the stringency depends on the quality and consistency of existing cost benefit methodologies employed by competent authorities to issue derogations.

In addition, this measure could potentially have Economic impacts for Member State authorities. The measure would require authorities to produce, share and provide operators with guidance on how to use the methodology. The existing cost benefit methods employed by competent authorities are summarised in **Table A8-6** and comments from Member State representatives on the value of introducing a standardised method. Currently, Member State national level

authorities are varied, and none are mandatory. Therefore, requiring the use of a standardised cost benefit methodology will change existing practices. A significant change in practices could also have an Economic impact on operators by increasing the administrative burden on businesses (discussed below) and in some cases may introduce an increased stringency that increases the difficulty of successfully demonstrating to a competent authority that an operator requires a derogation. Whether the measure will mean it is more challenging for operators to successfully gain a derogation depends on whether the new methodology is more strict than existing methodologies. Inconsistency between the measures currently used means Economic impacts will vary based on in which Member State(s) a business operates.

Figure A8-4: Schematic diagrams of steps to be taken when carrying out an installation-level cost benefit analysis. Right, Belgium (Flanders) (Vito, 2017) and left, Portugal (iSBS Consultancy, APA, IP, 2013).



Administrative burden on businesses

The measure is likely to have a **limited to weakly negative impact** on business' administrative burden. Existing cost benefit methodologies are inconsistent. This has been confirmed by the responses to the TSS. Therefore, if a standardised methodology to assess the costs and benefits of derogations were developed, it is likely this will increase operator's administrative burden in most cases. However, this conclusion assumes a standardised methodology implemented by the Member State authorities would be more detailed or stringent than the existing practices, which remains uncertain at this stage. Assuming that this measure would increases the costs of a derogation process by around 25% on average for operators, and that over the 20 year period 400 installations would make derogations applications, the additional administrative cost for business is estimated to be between €0.1m/yr and €0.9m/yr, with a best estimate of €0.2m/yr.

Operating costs and conduct of business

The measure is likely to have a **weakly negative impact** on business' operating costs and conduct. As discussed above in the "Economic impacts", it is possible the measure will make it more difficult for operators to apply for derogations, as a result of an increase in the stringency or level of detailed required to work with the standardised methodology.

Competitiveness and level playing field

This measure is likely to have **positive impacts on the level playing field**. The cost benefit methodologies which are currently used by Member States and regional competent authorities are inconsistent. Therefore, there is significant potential for the measure to **improve the level playing field** both within Member States and between Member States by introducing a more uniform process to assess the costs and benefits of derogation.

Position of SMEs

The measure's impact on SMEs is **unclear**.

Innovation and research

The measure is **unlikely to have an impact** on innovation and research.

Public authority impacts

The measure is likely to have **limited and negative short-term impacts** on public authority resources across the EU. However, the measure may have **limited and positive long-term impacts** on all public authorities' operational systems as a result of streamlining currently separate/disparate approaches. Assuming that this measure would increase the costs of a derogation process for public authorities to the level of half the cost of operators, and that over the 20 year period 400 installations would make derogations applications, the additional administrative cost for authorities is estimated to be between €0.06m/yr and €0.4m/yr, with a best estimate of €0.09m/yr.

Short-term impacts on public authority resourcing will apply to high level European and national level authorities. The measure will require the EU to develop a methodology and provide guidance for operators and competent authorities on how to use the methodology. As illustrated in the examples in Figure A8-2, none of the MS examined have a dedicated tool to cover Article 15(4) derogations across all sectors or pollutants which are regulated by the IED. Furthermore, out of the tools which MS have produced, they are all voluntary. Therefore, most MS authorities will have to either implement a new methodology or methodologies or adapt an existing methodology to comply with the measure. MS will also need to produce guidance or offer support to operators and competent authorities to support their use of the methodology. In the grand scheme of public authority actions, creating and implementing the tool will have a relatively limited demand on Member State resources. Furthermore, the initial investment is likely to be somewhat offset by the marginal logistical benefits gained through streamlining.

If a more stringent cost benefit methodology is introduced, it is foreseeable that public authorities in Member States which grant a relatively high number of derogations would be most affected. As discussed above in 'Economic impacts', Sweden, Portugal and the Czech Republic are the Member States with the most derogations. In the answers submitted to the Targeted Stakeholder Survey questionnaire the representative from Sweden's Naturvårdsverke stated they were supportive of introducing time limit for derogations. The representative also stated it is necessary and important to conduct assessments which are specific to the installation, sector, and technological development in question. This indicates that Sweden, the Member State which grants the most derogations in EU, does not believe the measure would have any significant negative impacts on their operations, on the condition a standardised methodology has flexibility to accommodate for different installations, sectors and technologies.

The representatives from Italy and Denmark's environment ministries both suggested the EU could produce information to support development of a standardised methodology, specifically relating to damage costs. Therefore, if this measure is implemented, the EU could consider provide MS with guidance to support MS to implement the measure. Effective guidance could lessen the measure's administrative burden on public authorities and increase the homogeneity of the tools produced across Member States, thus improving the level playing field within the EU.

Environmental impacts

Generating a more standardised methodology that is applied across the MS should harmonise how benefits and costs are calculated. When a derogation is being considered by an authority, they will have a more comprehensive assessment to use to know whether to grant a derogation. If the methodology is more comprehensive, with greater support provided in how to value benefits and how to standardise the quantification of costs, this could mean fewer derogations are granted. If fewer derogations are granted, or are granted on stricter terms, this may result in **limited to weakly positive impacts on the environment** overall. In particular, this is expected to be the case for the environmental issues most commonly within scope of Article 15(4) derogations: emissions to air and emissions to water.

Climate

The measure is likely to have **no impact** on greenhouse gas emissions.

Evidence: there were no derogations reported in 2019 which were relevant to climate impacts. The only type of derogation which may affect the climate are derogations for energy efficiency. The measure may have an impact on the climate if GHG emissions are brought within the scope of the IED (see measures in problem area 4).

The evidence is supported by views of stakeholders: 44% of respondents to the TSS believe the measure will have no impact on GHG emissions. There were significantly fewer responses in favour of the measure having at least a slight impact, which constituted 27% of responses.

Air quality

This measure is likely to have **weakly positive impacts** on air quality.

As identified for measure 1, the majority of derogations granted to date have been for emissions to air. The use of a standardised methodology may lead to reduced numbers of derogations or derogations granted with more stringent limits. Hence weakly positive impacts may occur in these cases, though no benefits would accrue if derogations continue to be granted.

The evidence is supported by views of stakeholders: a high proportion of respondents believe the measure will have no impact on emissions to air (47%). There were slightly fewer responses in favour of the measure having **at least a slight impact,** which constituted 41% of responses. In comparison to the responses to the other environmental fields examined, this was the joint-highest level of support alongside emissions to water.

Water quality and resources

This measure is likely to have **weakly positive impacts** on water quality.

As identified for measure 1, a minority of derogations granted to date have been for emissions to water. The use of a standardised methodology may lead to reduced numbers of derogations or derogations granted with more stringent limits. Hence weakly positive impacts may occur in these cases, though no benefits would accrue if derogations continue to be granted.

The results of the targeted survey support the evidence found on releases to water. In comparison to air quality, a high proportion of respondents believe the measure will have no impact on emissions to water (46%). There were slightly fewer responses in favour of the measure having **at least a slight impact**, which constituted 41% of responses. In comparison to the responses to the other environmental fields examined, this was the joint-highest level of support alongside emissions to air.

Soil quality or resources

The measure is likely to have a **limited impact** on soil quality or resources.

Evidence: very few derogations granted appear to affect releases to soil.

The results of the targeted survey support the conclusion reached using data on permits for releases to soil: a high proportion of respondents believe the measure will have no impact on emissions to soil (48%). There were significantly fewer responses in favour of the measure having **at least a slight impact**, which constituted 31% of responses. This could reflect the view held among many that in its current state the IED does not do much to regulate emissions to soil. Therefore, without broader changes to the IED, this measure alone would have a limited impact on emissions to soil.

Waste production, generation, and recycling

The measure is likely to have **no impact** on waste production, generation, and recycling.

Evidence: Limit values and performance levels for waste production, generation, and recycling are not legally binding, and derogations have not been granted for these topics.

The results of the targeted survey support the conclusion reached based on the nature of limit values and performance values for waste production: a high proportion of respondents believe the measure will have no impact on waste generation (52%), the highest proportion of responses in favour of "no impact" out of all the environmental measures examined. The responses in favour of the measure having **at least a slight impact** was half the number of responses in favour of the measure having no impact, accounting for only 26% of responses. Alongside resource use of other materials, waste generation received the lowest level of support from stakeholders in the measure having an impact.

Efficient use of resources

The measure is likely to have a **limited impact** on efficient use of resources.

Evidence: Currently, resource efficiency BAT conclusions do not have the same status as pollution abatement BAT conclusions in the IED, and derogations have not been granted for these topics.

The results of the targeted survey support the conclusion reached based on the nature of limit values and performance values for waste production: a high proportion of respondents believe the measure will have no impact on energy use (51%), water use (50%) and use of other materials or resources (48%). There were significantly fewer responses in favour of the measure having **at least a slight impact** on energy use (28%), water use (27%) and use of other materials or resources (26%) of responses.

Social impacts

This measure is likely to have **limited impacts** on employment. Where public authorities operated a less rigorous or stringent methodology to calculate the cost of compliance against environmental benefit, this measure may reduce the number of derogations issued to businesses. With reduced derogations, businesses will be forced to invest in implementing new techniques. This could have some positive impacts in terms of the employment impacts to install to

techniques, and/or some negative impacts if the business' ability to employ the same number of FTEs is affected by reduced margins.

Measure 3: Amend Article 15(1) to introduce an explicit requirement that indirect releases of polluting substances to water shall be assessed and evidence must be provided to demonstrate that such releases would not lead to an increased load of pollutants in receiving waters when compared to a scenario where the IED installation applies BAT and meets AELs for direct releases

Description of the measure and requirements for implementation

This measure would amend Article 15(1) to introduce an explicit requirement that indirect releases of polluting substances to water shall be assessed and evidence must be provided to demonstrate that such releases would not lead to an increased load of pollutants in receiving waters when compared to a scenario where the IED installation applies BAT and meets AELs for direct releases.

Under the existing IED legislation, the first paragraph of Article 15(1) states that emission limit values apply at the point when the pollution leaves the installation and clarifies that the effect of any processes which dilute the final emission should be disregarded:

> *"The emission limit values for polluting substances shall apply at the point where the emissions leave the installation, and any dilution prior to that point shall be disregarded when determining those values."*

However, the second paragraph of Article 15(1) makes an exception for emissions assessment in the context of water pollution. This exception allows for consideration of the treatment processes in a water treatment plant when evaluating limit values on final emissions. Pollution in all other circumstances cannot consider the effect of "any dilution prior to that point". The text in question, paragraph two of Article 15(1), states:

> *"With regard to indirect releases of polluting substances into water, the effect of a water treatment plant may be taken into account when determining the emission limit values of the installation concerned, provided that an equivalent level of protection of the environment as a whole is guaranteed and provided this does not lead to higher levels of pollution in the environment."*

- Therefore, the suggested measure would remove or adjust the exception in Article 15(1) for water treatment plants and indirect water pollution more generally. Consequently, emission limit values in the context of releases to water would be assessed based on BAT. The 2nd paragraph of 15(1) currently allows for the effects of waste water treatment plants (WWTP) to be accounted for. The measure is to strengthen this, to say if a WWTP is used [i.e., indirect releases] that would not lead to an increased load of pollutants in the final release environment compared

to if no WWTP was used and the installation applied BAT and meets the BAT-AELs for direct releases. According to this approach, it would be necessary to show that using a WWTP would not lead to a worse result than if BAT was applied directly. Other conditions which could be considered include, released pollutants do not impede the operation of the WWTP (e.g. they are not toxic to the biological process) and the receiving WWTP is designed to abate these pollutants.

Objectives:

The measure aims to reduce industrial indirect releases to water bodies. This measure will, therefore, contribute to the general ambition of zero-pollution in the EU and, more specifically, contributing towards preventing or minimising the emission of pollutants by large industrial and agro-industrial plants and levelling the playing field across the EU.

Implementation needs:

- EU to amend IED legislation
- MS to transpose legislation onto the national legal frameworks
- EU/MS to provide guidance or communication for operators on the changing of practice
- Operators to implement requirements to monitor, assess and provide evidence on indirect releases to water.

Assessing impacts

Economic impacts

In summary, the measure has potential to have **weakly negative** Economic impacts on installations which release emissions to water indirectly. Therefore, including indirect emitters within the scope of the Directive will require operators to demonstrate equivalence with BAT. Two factors are examined to estimate the Economic impact of the measure on operators: the nature of the BAT conclusions and the sectors and types of installations which would be affected by the measure.

The majority of existing BREFs for water emissions do not include changes to manufacturing processes technologies. This implies the measure will not have significant Economic impacts of in the short term. According to a 2018 study of the IED's potential contribution to broader water policy, most techniques included in the BREFs for water emission reductions include abatement or managerial techniques (Ricardo, 2018). A small proportion of techniques aim to change or select a given primary manufacturing process that leads to lower emissions to water. In the BREFs reviewed under the IED for the same study, 80% of BAT conclusions related to water emission topics do not contain a BAT-AEL. Most techniques inside the BAT conclusions documents do not contain BAT-AELs. The most common generic conclusions on water topics included in the BREFs since 2011 (IED) are environmental management systems, monitoring of emissions to water, and wastewater strategies.

The Economic impacts of this measure are likely to be unevenly distributed between installations based on their size. Emissions to water from small industrial installations are more often classed as indirect releases to water than large installations (Ricardo, 2018). Economic impacts of the measure are also likely to be unevenly distributed between sectors, whereby some sectors are more responsible for emissions to water than others (Ricardo, 2018). For example, the chemicals sector is responsible for most fluorine emitted to water and is one of the top IED emitters of nitrogen while the pulp, paper and board industry emits three times the quantity of TOC than the second largest polluter (organic chemical production) (Ricardo, 2018).

The number of installations estimated to be affected has been taken from the number of EU27 facilities reporting pollutant transfers in water in E-PRTR in 2018: 1 056 facilities, assumed to be 1 056 installations.

The measure will have a limited Economic impact on installations which currently use independently operated WWTPs to treat their waste water. Independently operated WWTPs are normally plants dedicated to the treatment of industrial waste water which serve several installations located in proximity to each other. For certain industrial waste water effluents this can be a more efficient option compared with treatment onsite, as EUonomies of scale and synergies between waste water types can be exploited (EEA, 2018). According to E-PRTR data from 2017, there are 74 independently operated WWTPs in Europe which are regulated by the IED. Independently operated waste water treatment plants are more likely to be able to filter out harmful pollutants due to their Specialist design. Therefore, it is unlikely installations which are served by independently operated WWTPs would release fewer indirect emissions into the receiving body of water if they implemented BAT at the plant level. However, since a small proportion of installations are served by independently operated WWTPs, the measure is still likely to have, overall, a negative Economic impact on installations.

The position papers submitted by CEFIC, an association for the EU chemicals industry, and by Verband Der Chemischen Industrie (VCI), an association for German chemical companies, argue a centralised system for treatment of waste water is the most Economically efficient approach (no quantitative evidence provided). The papers note that decentralised and additional treatment plants focus on selected substances, at the expense of overall efficiency.

The position paper from industry stakeholder IOGP notes that while there already exists well-established and clear waste water legislation which serves to regulate indirect water discharge to water bodies via treatment plants, they "urge careful consideration of the potentially detrimental effects that may stem from a lack of efficiency if each installation covered by the IED had to conduct its own waste water treatment [and] underline the need for a pragmatic approach in all the circumstances."

Administrative burden on businesses

- The measure will have **weakly negative impacts** on the administrative burden on businesses. Environmental management systems, monitoring of emissions to water, and waste

water strategies are all frequent requirements in BAT conclusions concerned with water quality (Ricardo, 2018). The need to introduce and comply with environmental strategies and monitoring would be one of the driving forces increasing business' administrative burden. In addition, the IED operator and the WWTP operator would need to cooperate closely, including, communicating what its pollution load is and what is the reference load to be complied with (i.e. corresponding to BAT-AEL for direct discharge).

- In comparison to the total costs in the baseline, this measure is expected to require additional resource from operators, assumed at around an additional 5% in costs during permit reviews, inspections and monitoring and reporting activities. Over a 20-year period, therefore, it is estimated that operators may incur an additional €0.01m/yr to €0.8m/yr, on average, with a central estimate of €0.6m/yr.

Operating costs and conduct of business

The measure is likely to have **negative impacts** on the operating cost of businesses.

It is however difficult to quantify the impact of this measure. The likely consequence is that some IED installations would need to install their own WWTP in the cases where they would not be able to prove they were able to meet the demands of the revised Article 15(1) text. The additional costs for WWTP could be rather significant CAPEX and OPEX. However, whether a WWTP would be required would be specific to each installation, based on the quantities released, and the local situation with the existing receiving WWTP. This is impossible to predict the number of installations that may incur the costs. The possible level of costs for one installation is quoted by one source[5] for large industrial WWTP to be between $20 000 and $40 000 per cubic meter per hour (m^3/h), with a central estimate at $25 000 /$m^3/h$ for capital costs, and with operating costs principally due to additional chemical consumption to be $3/$m^3$.

A paper provided by CEFIC argues that large-scale waste water treatment plants can remove pollutants more effectively than decentralised systems. Therefore, the organisation argue that this measure is not an efficient way of reducing emissions to water.

Competitiveness and level playing field

The measure is likely to have **limited to weakly negative impacts** on competitiveness, resulting from significant increase in the costs of conducting business. The measure is also likely to **improve the level playing field** across the EU on how indirect releases are monitored and managed across the EU.

Current BAT-AELs for pre-treatment are fixed, but implementation varies among Member States. Furthermore, due to the non-binding nature of BAT-AEPLs (Art. 14(3) of the IED) only a few Member States implement these values as intended. Clarifications on setting and interpreting BAT-AELs for waste water discharge is needed, and specifically, where technically reasonable

[5] https://www.watertEUhonline.com/wastewater/article/14183810/industrial-wastewater-treatment-print. No cost data were identified in the CWW BREF.

and justified, BAT-AELs should be derived separately for direct and indirect discharge. An updated BREF Guidance (Implementation Decision 2012/119/EU) could be used to stipulate pre-treatment as binding.

There is limited further evidence to support the assessment of this measure. The remaining assessment is from stakeholder consultation:

- ClientEarth (Environmental NGO) suggests that the monitoring of indirect releases is likely to result in a **slight** improvement in the harmonisation between sectors and Member States.
- Jernkontoret and VCI (national industry associations) in contrast do not expect the monitoring of indirect releases to improve harmonisation between sectors and Member States. VCI argue that this measure would lead to a more than 15% decrease EU competitiveness.
- EUROCOAL (EU industry association) request the effects of waste water treatment plants should be taken into account (rather than Article 15(1) 'may be') when determining permit ELVs, to support the integrated approach. Euracoal note that "*often, Special water treatment plants are better suited for removing pollutants, rather than installations within the site boundaries of IED-regulated plants*".

Position of SMEs

The measure will likely have **weakly negative impacts** on SMEs. According to (Ricardo, 2018) most installations responsible for indirect releases of pollutants are small-scale. Therefore, the measure is likely to disproportionally affect SMEs than larger organisations.

Innovation and research

The measure will likely have **no impact** on innovation and research.

Public authority impacts

In the short-term, this measure is likely to result in **weakly negative impacts** on public authorities to engage with and review the evidence provided by operators on how indirect releases are being managed. Analysis of the implications of this measure and associated costs is ongoing.

The measure would create additional burden for public authorities in permit reviews, inspections and information management. In comparison to the total costs in the baseline, this measure is expected to require additional resource from public authorities , assumed at around an additional 5% in costs during permit reviews, inspections and monitoring and reporting activities. Over a 20-year period, therefore, it is estimated that public authorities may incur an additional €0.02m/yr to €0.5m/yr, on average, with a central estimate of €0.4m/yr.

Member States which have not yet implemented Article 15(1) may be left behind if the measure is implemented. The existing legislation requires competent authorities to assess how indirect emissions are abated in the WWTP. This implies competent authorities which are currently

implementing measures will have experience and knowledge in calculating indirect emissions to water and examining how effective WWTPs are in abating indirect emissions. The findings of a Ricardo study indicate there are at least six Member States which do not currently implement Article 15(1) will have more work to do to successfully implement the measure (Ricardo, 2020b).

The measure includes the requirement to understand whether indirect releases of polluting substances to water do not lead to an increased load of pollutants in receiving waters. **Estimating the impact of an installations' indirect emissions on the receiving body of water is technically challenging** (Ricardo, 2020b). Special conditions such as dilution or synergistic effects need to be considered by the competent authorities. When mixed streams occur, a case-by-case approach is necessary to account for the specific circumstances of each installation. Successfully implementing the measure requires competent authorities to compare emissions between scenarios where the installation applies BAT in comparison to relying on the WWTP to abate emissions. Therefore, **the measure would be challenging for authorities to implement** which are unfamiliar with the technologies and approaches to measure emissions where pollutants are mixed in the waste water stream.

Mixing of waste water streams presents a technical challenge for implementing this measure for public authorities. The measure relies on the public authority's capability to estimate the quantity and severity of indirect emissions, which can be amplified or reduced by the synergistic effects following mixing waste water streams. Existing practices to tackle mixed waste water streams are employed in a handful of Member States (Ricardo, 2020b). Belgium (Flanders) uses additional monitoring requirements where necessary (e.g. monitoring of the individual streams) to enable a complete assessment of mixed streams. This testing has allowed competent authorities in Belgium to identify examples of a positive effects of mixing waste water streams, including neutralisation resulting from the mixing of basic and acidic waste water and the use of waste water with a high TOC value as a carbon source for biological treatment. In Austria, Belgium (Flanders) and Sweden (as well as Norway), ELVs are established individually for each waste water stream before their confluence. This is useful where at least one stream presents a high risk for humans or the environment. In Austria, Belgium (Flanders), Germany, Poland and Portugal, exceptions are also possible for substances that do not present a high risk. In such cases, the substances can be treated either at a WWTP or, where separate treatment is not possible, a mixing rule can be applied to establish a combined ELVs for emissions after treatment in the WWTP. Therefore, successfully implementing this measure will require public authorities to have the technical expertise to account for the impacts of waste water mixing..

In question 26 of the Targeted Stakeholder Survey, respondents were asked if their Member State had implemented or is planning to implement measures to set ELVs for indirect releases of polluting substances to water when taking into account the effect of a waste water treatment

plant. 15 Member States plus Norway[6] answered "yes" and 7 Member States answered "no"[7]. Out of the Member States which answered "yes", some Member States described how they set ELVs for indirect releases of polluting substances to water, and some MS expanded on their answers to explain they are working in compliance with Article 15(1) to set ELVs for indirect releases considering the effect of a WWTP.

Environmental impacts

There are excessive releases of pollutants to water bodies in the EU (European Commission, 2020b). Data on direct and indirect releases reported by IED industry, which are reported separately under the E-PRTR, show that direct releases have been significantly reduced, especially heavy metals, but that indirect releases going to centralised waste water treatment plants including urban waste water treatment plants have remained rather stable over the last 10 years (European Commission, 2020b). Reporting of indirect water releases is however rather incomplete. Competent authorities have difficulty in applying the existing legislation, and there are inconsistencies in the joint implementation of the IED and the Urban Waste Water Treatment Directive (European Commission, 2020b). Therefore, there may be a need to change the existing legislation to reduce emissions to water at source.

The measure will encourage more installations to comply with existing BAT conclusions on releases to water (as opposed to devolving clean-up to off-site WWTP). Implementing existing BAT conclusions on emissions to water can have a **significant impact on reduction of water pollution**. BAT-AELs may be useful for indirect discharges of pollutants for which municipal waste water treatment plants are generally not designed (e.g. substances that are difficult to degrade/not degradable, heavy metals, AOX, volatile substances, stubborn substances). For example, those BAT conclusions forcing higher monitoring frequencies will normally lead to better water effluent management and thus lower emissions to water, but the absolute impact is highly uncertain. The potential emission reductions of key pollutants due to BAT-AELs vary by BATc. In some sectors' processes emissions could be reduced by up to 80% while there might be negligible reductions in other processes. For example, in the production of pulp, paper and board, there would be significant reductions in high quantity pollutants such as chemical oxygen demand and Total Nitrogen to meet lower BAT-AELs, as well as reasonable reductions to meet the upper BAT-AELs as well.

Climate

This potential impacts of this measure on the climate are **uncertain**. The position paper submitted by the business association for the chemical industry highlights that WWTPs are major consumers of power. The considered measure may result in additional waste water processing on site at the installation, which would be expected to be an increase in power

[6] Belgium, Finland, Netherlands, Sweden, Austria, Denmark, Estonia, France, Germany, Italy, Latvia, Malta, Norway, Portugal, Romania, and Spain

[7]Sweden, Croatia, Cyprus, CzEUhia, Poland, and Slovenia

consumption compared to the utilisation of a combined offsite waste water treatment plant. This would increase greenhouse gas emissions in Member States where fossils fuels are still a core part of the energy mix.

Air quality

This measure is likely to have **limited impacts** on air quality, at least directly.

The application of BAT to control water pollutant loads from industrial installations is not expected to have an impact on air pollutant releases.

48% of TSS respondents think the measure will have no impact on emissions to air. The next largest proportion were 7% of respondents that think the measure will have a slight impact on emissions to air.

Water quality and resources

The measure will have **weakly positive to positive impacts** on emissions to water, although this is highly uncertain due to the unknown number of installations that may need to fit WWTP.

Table A8-7 provides an overview of the key indirect water pollutant releases from main IED activities which the measure would affect. The table has been compiled using 2018 E-PRTR EU-27 data on transfers and releases to water. The table estimates (final column) the possible benefit of this measure from the difference in the average emission rate per installation between reported transfers and reported releases. Activity/pollutant combinations where the average emission release per installation was higher than the average emission transfer are excluded. The analysis is based only on quantities of emissions from IED activities with at least 10 installations reporting to the E-PRTR in an attempt to identify the main polluters / key environmental issues. Therefore, the results are underestimates. Furthermore, the analysis is limited by installation reporting to E-PRTR being limited by the reporting thresholds, and thus is a further underestimate. From the very approximate results, the sector with the largest quantity of releases are plants for the pre-treatment or dyeing of fabrics and textiles, which release over 200 thousand tonnes of total organic compounds indirectly to water per year in 2018.

Table A8-7: Emissions to water by IED activity which the measure would affect, based on E-PRTR

E-PRTR activity code	E-PRTR Activity	Pollutant	Estimated emission reduction of measure (tonnes/year)
1(c)	Thermal power stations and other combustion installations	TOC	750
2(f)	Installations for surface treatment of metals and plastic materials using an electrolytic or	Cr and compounds	20

E-PRTR activity code	E-PRTR Activity	Pollutant	Estimated emission reduction of measure (tonnes/year)
	chemical process	Zn and compounds	10
4(a)(ii)	Chemical installations for the production on an industrial scale of basic organic chemicals: Oxygen-containing hydrocarbons such as alcohols, aldehydes, ketones, carboxylic acids, esters, acetates, ethers, peroxides, epoxy resins	TOC	1 210
4(e)	Installations using a chemical or biological process for the production on an industrial scale of basic pharmaceutical products	TOC	510
5(a)	Installations for the recovery or disposal of hazardous waste	Phenols	60
5(c)	Installations for the disposal of non-hazardous waste	Ni and compounds	10
5(d)	Landfills (excluding landfills of inert waste and landfills, which were definitely closed before 16.7.2001 or for which the after-care phase required by the competent authorities according to Article 13 of Council Directive 1999/31/EU of 26 April 1999 on the landfill of waste has expired)	Cr and compounds	10
		Hg and compounds	10
		Phenols	20
6(b)	Industrial plants for the production of paper and board and other primary wood products (such as chipboard, fibreboard and plywood)	TOC	23 790
7(a)(ii)	Installations for the intensive rearing of pigs with 2,000 places for production pigs (over 30 kg)	TOC	1 510
8(a)	Slaughterhouses	TOC	10 910
8(b)	Treatment and processing intended for the production of food and beverage products.	TOC	9 670
		Total phosphorus	30
8(b)(i)	Treatment and processing intended for the production of food and beverage products from animal raw materials (other than milk)	TOC	1 070
8(c)	Treatment and processing of milk	Total nitrogen	610

E-PRTR activity code	E-PRTR Activity	Pollutant	Estimated emission reduction of measure (tonnes/year)
		Total phosphorus	90
9(a)	Plants for the pre-treatment (operations such as washing, bleaching, mercerisation) or dyeing of fibres or textiles	TOC	208 980
		Total nitrogen	90
		Total phosphorus	20
		Zn and compounds	10

In the response to the consultation, Question 21 A and B of the TSS asked stakeholders to estimate the environmental impacts of the proposed measure. As would be expected, a large proportion of stakeholders believe the measure's **largest potential positive impact will be on emissions to water**. A relatively high proportion of respondents, 40% believe the measure will have at least a slight impact on emissions to water, divided between significant (13%), moderate (9%) and slight (18%). However, 39% of stakeholder responses considered this measure may have no impact on emissions to water.

Environmental NGO EEB expect a lower pollution load to enter into the WWTP input waste water stream and hence a lower discharge into the receiving water if pre-treatment is applied prior to indirect emissions release to UWWTP. EEB support this measure or a more stringent interpretation of prohibiting all indirect releases of waste water, and they consider it should be BAT to monitor emissions from both direct and indirect discharges.

Soil quality or resources

This measure is likely to have **limited impacts** on soil quality, at least directly.

44% of TSS respondents think the measure will have no impact on emissions to soil. The next largest proportion were 7% of respondents that think the measure will have a slight impact on emissions to soil.

Waste production, generation, and recycling

This measure is likely to have **no impact** on waste production, generation and recycling.

55% of TSS respondents think the measure will have no impact on waste generated. The next largest proportion were 7% of respondents that think the measure will have a slight impact on waste generated.

Efficient use of resources

The measure is likely to have **no impact** on resource efficiency.

The application of BAT to control water pollutant loads from industrial installations is not expected to have an impact on water use.

53% of TSS responses believe the measure will have "no impact" on water use. 17% of respondents believe the measure will have at least a slight impact on water use, divided between significant (2%), moderate (8%) and slight (8%).

Social impacts

The social impacts of this measure are **uncertain.**

Measure 4: Amend Article 18 to require that stricter ELVs are set in permit conditions in the case that environmental quality standards cannot be met by implementing existing BAT conclusions

Description of the measure and requirements for implementation

This measure would amend Article 18 to require that stricter ELVs that go beyond current BAT shall be set in permit conditions in the case that environmental quality standards cannot be met by implementing existing BAT conclusions.

As part of the IED evaluation some stakeholders suggested that current wording of Article 18 is not specific enough with regard to concrete actions that have to be carried out. Currently Article 18 states that:

> *"Where an environmental quality standard requires stricter conditions than those achievable by the use of the best available techniques, additional measures shall be included in the permit, without prejudice to other measures which may be taken to comply with environmental quality standards."*

The existing legislation does not specify what 'additional measures' should be prescribed by competent authorities in the case that BAT do not meet environmental quality standards. The revision proposed by this measure would clarify that permit ELVs need to be set below the lower end of BAT-AEL range (or in the cases where the BAT-AEL lower range is not specifed, and instead a "<" sign is used, to be towards the lower end of the BAT-AEL range) where the environmental quality standards are not met by setting ELVs in line with BAT-AEL range. This revision would therefore contribute to a higher level of environmental protection.

Objectives:

The measure aims to clarify the intention of Article 18 and contribute to ensuring that environmental quality standards are met. This measure will, therefore, contribute to the general ambition of zero-pollution in the EU and, more specifically, contributing towards preventing or

minimising the emission of pollutants by large industrial and agro-industrial plants and levelling the playing field across the EU.

Implementation needs:

- EU to update Article 18 of the IED.
- EU and Member States to issue guidance for competent authorities and businesses which experience a change in practice as a result of the rule change.
- Competent authorities and installation operators to update permits.
- Installation operators may lead to changes related to additional techniques deployed.

Assessing impacts

In general, very few permit conditions have been reportedly set to date that are more ambitious than those achievable by the use of BAT. For reporting year 2018, only Sweden and Germany reported setting stricter ELVs in permit conditions, in relation to Article 18 (to meet Environmental Quality Standards; stricter conditions set in 5 cases).[8] This information was reported in Ricardo (2021), and the latest reporting for 2019 does not materially change this (6 installations are mentioned, when considering reporting years 2018 to 2019). Further conditions may still be reported by Member States as further BATC are implemented though. The 5 cases reported in the IED registry for 2018 represents 0.01% of all installations. Analysis in Ricardo (2021) suggests that this lower level of reporting of Article 18 uptake compared to previous IED implementation reporting (against Commission Implementing Decision 2012/795) reflects an improvement from previous misunderstanding among some Member State competent authorities. The conclusion from the reported data is that competent authorities rarely set stricter permit requirements that are below the lower end of the BAT-AEL range, particularly in relation to Article 18 of the IED.

However, based on limited information provided during the stakeholder workshop held in July 2021, German authorities indicated that "*Environmental Quality Standards in Germany often trigger stricter conditions than those based on BAT only*", and the approach followed is to first apply BAT and then check if this allows meeting EQSs; if not, stricter conditions are applied. However, these occurrences have not been reported within the IED reporting mechanism but they do exist.

The Eunomia reports[9] on the distribution of ELVs in relation to BAT-AEL ranges do nevertheless concur that the overriding majority of permit ELVs are set at upper BAT-AEL levels. It is concluded that the number of installations setting permit conditions related to Article 18 must be very low.

Furthermore, the installations that are the subject of this measure are already some of the lowest environmental performers, by definition.

[8] In addition, 16 cases of stricter permit conditions related to Article 14(4) (to achieve greater emission reductions than those achievable by the use of BAT in the adopted BATC) were reported for year 2018.
[9] E.g. Eunomia Research & Consulting (2019), "An Assessment of IED Permitting Stringency"

All impacts related to implementation of this measure are, therefore, **expected to be very limited**.

Economic impacts

The measure will have very **limited Economic impacts** overall.

Administrative burden on businesses

The measure will have **very limited negative impacts** on the administrative burden on business. A very small number of installation operators may need to negotiate an updated permit.

Operating costs and conduct of business

The measure will have **very limited negative impacts** on the operating costs and conduct of business. A very small number of installation operators may need to change installation operation to meet stricter ELVs.

Competitiveness and level playing field

The measure will have **limited to no impact** on competitiveness or the level playing field.

Position of SMEs

The measure will have **no additional impacts** on the position of SMEs.

Innovation and research

The measure will have **no impact** on innovation and research.

Public authority impacts

The measure will have a **very limited negative impact** on the competent authorities which apply emission limit values that are stricter than the BAT-AELs. Authorities may have to adjust the processes used to issue stricter permit conditions with ELVs, incurring some small administrative changes.

Environmental impacts

The measure will have very limited environmental impacts.

Climate

The measure will have **no impact** on greenhouse gas emissions.

Air quality

The measure will have **very limited positive impact** on air quality, for those installations where the stricter ELVs lead to lower emissions to air.

Water quality and resources

The measure will have **very limited positive impact** on water quality, for those installations where the stricter ELVs lead to lower emissions to water.

The European Commission's Staff Working Document on the Water Framework Directive Fitness Check[10] indicated in its Section 3.1 on *State of European waters* that surface water status was more problematic than groundwater status, and that for surface waters, industrial releases made a 3% contribution (emphasis added below):

- Surface water:
    - *For surface waters, good chemical status is determined by limits (environmental quality standards) on the concentrations of certain pollutants found across the EU, known as priority substances. In the second RBMPs, 38% of surface water bodies had good chemical status, while 46% had not achieved good chemical status and for 16% their status was unknown.*
    - *The most common pressure for surface water bodies is hydromorphology, which affects 40% of surface water bodies, followed by diffuse source pollution (38%), atmospheric deposition (38%),* ***point source pollution (18%)*** *and abstraction (7%).*
    - *Diffuse source pollution is mostly due to excessive emissions of nutrients (nitrogen and phosphorus) and chemicals such as pesticides, as well as deposition of some persistent substances from the atmosphere. For surface waters, agricultural production is a major source of diffuse pollution (25%). Other drivers include rural dwellings (emissions from households not connected to sewerage systems (11%), and run-off from urban areas (3%) and forested land (4%).*
    - *The point source pressures on surface waters relate mostly to effluent discharges of pollutants from urban waste water (12%), followed to a lesser degree by discharges from storm water overflows (4%),* ***industrial sites (3%)*** *and aquaculture.*
- Groundwater
    - *With respect to groundwater, 74% and 89% of the area of groundwater bodies had good chemical and quantitative status respectively.*
    - *The primary impact on groundwater is from chemical pollution (22% of groundwater body area), followed by nutrient pollution (18%).*
    - *The point source pressures affecting groundwater relate more to the leaching of hazardous substances from landfills and contaminated sites, including industrial sites, waste disposal sites, and mining areas, together with urban waste water.*

This suggests that, in terms of making a greater contribution to environmental quality standards, the potential contribution to reduction from industrial installation water pollution is limited.

[10] https://EU.europa.eu/info/sites/default/files/swd_2019_0439_en.pdf

The measure will have **no impact** on water resources.

Soil quality or resources

The measure will have **no impact** on soil quality.

Waste production, generation, and recycling

The measure will have **no impact** on waste production, generation, and recycling.

Efficient use of resources

The measure will have **no impact** on the efficient use of resources.

Social impacts

The measure will have **no social impacts**.

Measure 5: Clarify Article 15(3)(a) by specifying that when setting emission limit values that do not exceed the BAT-AELs, the starting point is the lower limit of the BAT-AEL range, unless the operator demonstrates to the satisfaction of the competent authority that applying BAT techniques as described in BAT Conclusions only allows meeting a higher ELV within the BAT-AEL range.

Description of the measure and requirements for implementation

The measure would seek to introduce a process that encourages the setting of emission limit values (ELVs) at the lower end of the BAT-AEL range as default, through implementation guidance and/or legislative amendments in Article 15(3). To deviate, the operator would need to demonstrate why the ELV cannot be set at this level during the permitting and/or permit reconsideration processes.

Under Article 14(1)a of the IED, permits must include emission limit values for polluting substances, or equivalent parameters, or technical measures (Article 14(2)) and conditions should be set based on best available techniques (Article 14(3)). However, this mechanism does not specify or encourage a default emission limit value, allowing competent authorities to determine the emission limit value based on individual circumstances within the constraints of Article 15(3).

The intention of the IED is to provide a high level of protection for the environment as a whole through the use of BAT. In practice, however, installations permitted under the IED typically have ELVs set at the upper end of the range that represents BAT. Therefore, this measure is intended to redress this shortcoming by requesting that competent authorities use the lower end of BAT-AEL ranges as the starting point for discussions with operators for the setting of permit ELVs, given that this represents a potentially significant opportunity to contribute towards the

zero-pollution ambition. The aim by adopting this measure is that more installation permits will end up with lower ELVs than they would do if continuing with the status quo.

The measure is not foreseen as a means to make the lower end of BAT-AEL ranges mandatory, but rather to encourage a reflection by the authorities when setting and reviewing permit ELVs and, where operators seek to set ELVs that are higher than the lower end of BAT-AEL ranges, operators shall demonstrate why more ambitious ELVs are not possible despite having been judged as achievable with BAT. Competent authorities can use the evidence supplied by operators during permitting issuance or permit reconsideration processes to make decisions on a case-by-case basis, continuing to account for local environmental conditions and the technical characteristics of the installation, i.e. allowing for the possibility to set ELVs towards or at the upper end of the BAT-AEL range.

- However, there are times when the lower BAT-AEL is not feasible, for various reasons and national bodies and inspectors would have a difficult time if the values are too restrictive, hence the retention of the flexibility of the BAT-AEL range is important. There would be risk however that this measure may increase administrative burdens (without necessarily leading to lower permit ELVs and hence environmental benefits) and could lead to discrepancy between best and worst performing Member States.

There is potential for positive synergies with other policy measures such as the introduction of a standardised cost-benefit methodology (measure #2). Setting the lower limit value as a default will increase the discussion between competent authorities and operators. A standardised methodology will improve the consistency and quality of discussions between competent authorities and operators, particularly important this measure increases the frequency and detail of these discussions.

Objective(s):

This measure will encourage a tightening of the emission limit values or increase in ambition in permit conditions for installations across the EU. This measure will, therefore, contribute to the general ambition of zero-pollution in the EU and, more specifically, contribute towards preventing or minimising the emission of pollutants by large industrial and agro-industrial plants as well as levelling the playing field across the EU.

Implementation need(s):

- EU to make minor changes to the BREF process. BREFs would need to be adjusted to provide clearer information on the emission levels associated with each technique. This could be achieved by providing clearer information on which techniques are associated with lower BAT-AELs or by identifying more AEL ranges to better reflect process configurations and techniques used. Since the BREF process already gathers this information through the existing data collection, no major change would be foreseen. However, minor increases in the efforts to analyse the collected data may be needed. This measure may also increase the emphasis on the combination of techniques rather than

individual techniques. The constraining of the upper BAT-AEL in the BAT Conclusions will continue to represent a very important approach to providing minimum standards (excepting of cases of derogations) and provides a mitigation against the possibility that this measure only leads to additional discussion between authorities and operators without any lowering of permit ELVs and their associated environmental benefits.

- EU to decide whether the measure should apply to both new and existing permits or only to new permits.
- EU to consider introducing a method to "police" the measure, for example, considering a role for INCITE, or alternatively to tighten implementation checks at the Joint Research Centre or overall European Commission level. Introducing a new body to police the measure would need to be resourced.
- EU to make legislative change to the IED: The measure could be implemented via a legislative change through a change to the wording of e.g., Article 15(3)(a):

  "… (a) setting >> *emission limit values at the lowest level possible associated with the best available techniques (lower BAT-AEL), or at the very least setting* << emission limit values that do not exceed the emission levels associated with the best available techniques."

Other legislative amendments could be envisaged. Implementing a legislative change to the IED would provide more clarity and certainty of the change but would also lead to a transposition requirement for the Member States to implement. This could also be complemented as a guidance document from the Commission/ EU, confirming their interpretation.

Further consideration of baseline

Member States from three public authorities (Belgium (Flanders), the Netherlands and Sweden) returned with information on their permitting process.

- The Flanders Government of Belgium use the upper AEL as default. When permits are reassessed, lower AELs are considered. The Flemish authorities do not check permits individually on a regular basis. The lower AEL is not considered for political reasons. In some cases, local legislation mandates the lower AEL or value close to the lower AEL.
- In the Netherlands, the approach is to apply the lower BAT-AEL for new installations. For existing installations, they use the information from BATIS about performance of 30 reference plants set ELVs at 30% above the lower AEL. If the operator believes implementing an ELV 30% above the lower AEL would lead to costs outweighing the benefits, the operator must demonstrate why it is not possible to the competent authority. In this approach, not every ELV set is a discussion.
- In Sweden, permits are primarily allocated based on best available technologies. The IED limit values and Economic considerations are secondary. A representative from Sweden's

Environmental Protection Agency stated that implementing the measure would require a significant overhaul of the approach to permitting in Sweden.

The existing approaches employed by Member State public authorities to determine appropriate emission limit values vary. Therefore, the measure could harmonise the approach Member States take to set emission limit values in permits.

Assessing impacts

Economic impacts

This measure could have **limited to weakly negative Economic impacts**, although this is highly uncertain and depends on the extent to which the measure would lead to installations adopting new practices to meet lower emission limit values, and whether the measure will apply to both new and existing permits or only to new permits. The difference between existing upper and lower limit values is also a determining factor for the measure's Economic impacts. A larger difference between upper and lower limit values will require larger reductions in emissions, potentially requiring more advanced techniques or alternative processes to reduce emissions which would result in higher Economic impacts for operators. Secondly, the distribution of existing permit emission limit values will indicate the proportion of installations which will need to reduce their emissions.

Additional evidence is expected in a forthcoming study currently being conducted for the Commission entitled "Assessment of BAT Conclusions Implementation in Permits".

Administrative burden on businesses

This measure will have **negative impacts** on the administrative burden for the regulated industries. By making the lower BAT-AELs the default option for discussions when agreeing permit ELVs, operators will need to engage in more discussions with the competent authority and there will be an increase in resources devoted to developing and exchanging information in the BREF process.

These additional administrative efforts will build upon the baseline permitting processes, both issuing new permits as well as reconsidering and updating existing ones. There are around 52 000 existing IED installations which may undergo permit reconsiderations and updates at a frequency of once every 10 years (in line with the BREF review cycle). It is assumed that this measure could require around 10% of additional effort from operators that undergo a permit reconsideration and update. In addition, evidence available and analysis suggests that there might be 500 new permits issued every year, on average, which would require additional effort from operators assumed at around 5% of baseline costs. In summary, this measure would add between €1.0m/yr and €17.8m/yr of additional burden each year, on average, over a 20-year period, with a central estimate of around €8.0m/yr (2020 euros).

Operating costs and conduct of business

This measure's impact on the operating costs and conduct of business are **likely to be negative to strongly negative**, although the degree of how negative this will be is highly uncertain and depends on several interacting factors.

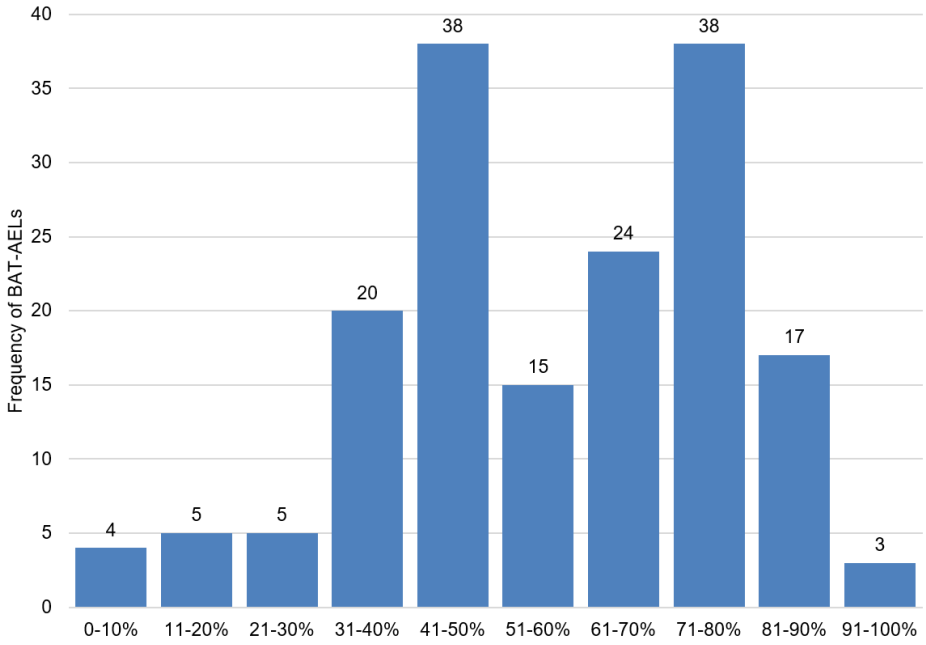
The measure's impact on the operating cost on businesses are uncertain as it is difficult to predict how stakeholders will respond, and because the details of the measure are uncertain (e.g. whether this would apply retrospectively. If the measure is implemented, operators who wish to prove the lower limit value would lead to an imbalance of costs and benefits for their installation must submit evidence to the competent authorities. Operators would weigh up the administrative costs of submitting evidence against the costs of changing practices or technology. Based on insight gained through interviews with representatives of Member State ministries for environment, it is likely the majority of operators would submit evidence rather than electing to change production practices. Once an operator has submitted evidence to the competent authority, the competent authority would judge whether the evidence proves setting the permit ELV at the lower BAT-AEL would lead to an imbalance of costs and benefits.

The overall outcome of this decision will be strongly influenced by the method Member States use. There is potential for synergy with proposed measure #2 "standardised cost-benefit methodology". Implementing a consistent and rigorous method could result in issuing of permits which are stricter. If this is the case, the operating costs and conduct of business could be strongly negatively impacted. Stricter ELVs may require different techniques to be fitted at installations to achieve lower emission levels. The different techniques will still be recognised as BAT, and the identification of BAT through the BREF process accounts for the Economic aspects of techniques and uses examples of commercial deployment of the techniques, which ensures that even if alternative techniques were needed, this should still be economically viable.

Examining the baseline for BAT-AEL ranges can also be used to estimate the measure's impacts on operating costs for business.

The difference between the upper and lower ends of a BAT AEL range will determine how significant the change will be. Using the Commission's BAT-AEL tool (EC, 2020), it is possible to provide an overview of the percentage decrease from the upper to the lower BAT-AELs, as outlined for the glass manufacturing BREF in Figure A8-5. The GLS BREF shows the majority of the decreases from the upper to the lower BAT AEL are between 40% and 80%. This demonstrates the difference between BAT AELs is relatively high, implying the measure has the potential for significant environmental improvements as well as economic costs for operators required to change production practices, depending on the level of implementation of this measure which is not mandatory.

Figure A8-5: Histogram of % reduction of the lower BAT-AEL from the upper BAT AELs for the glass manufacturing sector



The number of installations which currently operate with ELVs around or at the lower BAT-AEL will influence the number of installations affected by the measure. In the most detailed comprehensive *ex-post* assessment of BAT conclusion compliance carried out, which assessed the impacts of the Iron and Steel Production BAT conclusions, no installations were identified with ELVs at the lower end of the BAT-AEL ranges. Furthermore, no information was available from operators when consulted in that study on what techniques they would have fitted if the ELVs applicable at their installations had been at the lower BAT-AEL range (Ricardo, 2018). That study confirmed that, to carry out a robust assessment of the impacts of BAT conclusions, a very high-level of effort is needed and extensive stakeholder engagement as well as dedicated data sources.

One 2019 study by Eunomia, *An Assessment of IED Permitting Stringency* examines the emission limit values for 117 permits for European cement installations and 24 electric arc furnaces (Eunomia, 2019). The results are outlined in the tables below for cement installations and electric arc furnaces. The results indicate that most installations have ELVs set in line with the upper BAT-AEL (79%), while a minority have derogations (9%, i.e. above the upper BAT-AEL) or were set at the lower BAT-AEL (11%). When the pollutants with no AEL range (BAT16, BAT25, BAT26, BAT28 (all)) are removed from calculations, 64% of installations have permit ELVs set at the upper BAT-AEL, 18% are set at the lower BAT-AEL and 18% have ELVs above the upper BAT-AEL. **This indicates that most installations in the cement sector**

(82%) would need to change or upgrade their practices to comply with the lower BAT-AEL. The following BATs relevant to the cement industry and examined in the Eunomia study, BAT16, BAT25, BAT26, BAT28 (all) do not contain ranges.

Out of the nine BATs for electric arc furnaces examined, only BAT90 contains a BAT AEL with a range, which itself was only relevant to 5 of the 24 furnaces examined. Therefore, the electric arc furnace data from the Eunomia study is not able to deliver much information relating to the Economic impacts of this measure.

Table A8-8: Permit limit values according to Eunomia (2019) and BAT AELs according to the BREF for Cement, Lime and Magnesium Oxide industries (European Union, 2013).

Pollutant	Number permits examined	BAT-AELs	Installations incompliant with upper BAT-AEL	Installations compliant with upper BAT-AEL	Installations compliant with lower BAT-AEL
BAT16 – Dust (channelled)	47	<10 mg/Nm^3	2	10	NA
BAT17 – Dust (kiln firing)	74	<10 – 20 mg/Nm^3	7	48	19
BAT18 – Dust (cooling/milling)	69	<10 – 20 mg/Nm^3	10	43	16
BAT19 – NO_X (preheater kiln)	91	<200 – 450 mg/Nm^3	50*	31	10
BAT19 – NO_X (long rotary)	5	<400 – 800 mg/Nm^3	0	5	0
BAT20 – NH_3 (slip)	74	<30 – 50 mg/Nm^3	16	42	16
BAT21 – SO_2**	95	<50 – 400 mg/Nm^3	8	62	25
BAT25 – HCL	90	<10 mg/Nm^3	0	90	NA
BAT26 – HF	92	<1 mg/Nm^3	0	92	NA
BAT27 – PCDD/F	94	<0.05 – 0.1 ng PCDD F I-TEQ/Nm^3	0	94	7
BAT28 – Hg	96	<0.05 mg/Nm^3	0	96	NA
BAT28 – Sum of Cd & TI	95	<0.05 mg/Nm^3	0	95	NA
BAT28 – Sum of As, Co, Cr, Cu, Mn, Ni, Pb, Sb, V	94	<0.5 mg/Nm^3	0	94	NA

** All 50 which are incompliant with the upper BAT-AEL for combustion of fuels are compliant with the ELV used when plants burn waste materials*

*** It was not possible to differentiate between permits where plants burnt waste or fuels, which prescribe different limit values (lower limit value for waste, higher limit value for fuels)*

Table A8-9: Permit limit values according to Eunomia (2019) and BAT AELs according to the BREF for iron and steel production (European Union, 2012).

Pollutant	Number permits examined	BAT-AELs	Installations incompliant with upper BAT-AEL	Installations compliant with upper BAT-AEL	Installations compliant with lower BAT-AEL
BAT88 – Dust emissions to air (primary and secondary dedusting)	24	<5 mg/Nm^3	6	18	NA
BAT88 – Hg, emissions to air (primary and secondary dedusting)	18	<0.05 mg/Nm^3	1	17	NA
BAT89 – PCDD/F, emissions to air (primary and secondary dedusting)	18	<0.1 ng I-TEQ /Nm^3	3	15	NA
BAT90 – Dust, emissions to air (on-slag processing)	5	<10 – 20 mg/Nm^3	0	1	4
BAT92 – Suspended solids, emissions to water (continuous casting machines)	15	<20 mg/l	6	15	NA
BAT 92 – Fe, emissions to water (continuous casting machines)	15	<5 mg/l	5	10	NA
BAT 92 – Zn, emissions to water (continuous casting machines)	16	<2 mg/l	3	13	NA
BAT 92 – Total Chromium, emissions to water (continuous casting machines)	16	<0.5 mg/l	3	13	NA
BAT 92 – Hydrocarbons, emissions to water (continuous casting machines)	16	<5 mg/l	7	9	NA

Comparing the permit conditions between the examined installations in the cement sector highlights that there are some pollutants where ELVs are relatively consistent, for example, BAT19 NO_X (preheater kiln) and PCDD/F, while there is considerable variation in permit conditions in other BATs such as BAT21 SO_2 and BAT20 NH_3, illustrated in Figure A8-6. This indicates that introducing a measure to make the lower end of BAT AEL ranges the default option will not have an even Economic impact across installations.

Figure A8-6: Variation between permit conditions across permits for cement sector installations examined by Eunomia (2019).
(The red dotted lines indicated the BAT-AELs. In the lower two diagrams, measurements above the lines indicate non-compliance. Top left BAT19 NOX (preheater kiln) and top right BAT27 PCDD/F examples with relatively low variation. Bottom left BAT21 SO2 and BAT20 NH3 (slip) examples with relatively high variation.)



A detailed *ex-ante* assessment of the possible impacts of BAT conclusions was carried out for selected plants under scope of the LCP BAT conclusions. This found that, for the largest plants (>300MW_{th}) firing solid fuels, there was an appreciable increase in the expected compliance costs to comply with lower BAT-AELs for SO_2, NO_X, dust and Hg compared to if the upper BAT-AEL was met (Ricardo, 2017). The estimates from that study were total annualised costs

of €0.6bn/year for meeting upper BAT-AELs, rising 10 times to €5.7bn/year for meeting lower BAT-AELs (two thirds of this higher cost was estimated to be due to fitting high efficiency SO_2 reduction measures), i.e. around 10 times the cost of meeting upper BAT-AELs. These estimates included the assumption that existing LCPs would have needed to comply with minimum standards (IED Annex V ELVs) prior to achieving BATC compliance (and this existing compliance was accounted for in the estimation of costs). This latter point is important to note due to it being specific to this sector and because it leads to increases in estimated compliance costs due to a proportion of the costs being stranded assets. The specificities of this sector's situation mean that it would be inappropriate to assume the findings from this single information source could be extrapolated to other sectors.

In Q4 2020 the EC launched a contract to further assess how BAT conclusions are implemented within permits - "Assessment of BAT conclusions implementation in IED Permits"[11]. This benefitted from the experience of previous pilot projects and focused on four IED sectors: glass, pulp and paper, non ferrous metals and wood based panels. Pre-final estimations show that, overall, **75-85%** of ELVs in permits are based on the upper level of BAT-AEL range (or are above), ith variations by sector and pollutant. This project also showed that the access to the permits as well as permits quality is various across member states.

Despite these uncertainties and as a partial illustration of the potential scale of impact, it is assumed that around 10% of existing 52 000 installations and 5% of 500 new installations every year over a period of 20 years may increase their environmental ambitions as a result of this policy measure IED#5. This means that around 5 700 installations could require additional (and/or earlier) capital investments over the period. Based on expert input, these investments could be at least €0.5 million for each installation. Thus, additional (and/or earlier) capital costs could be at least €2 850 million over the 20-year period or an equivalent annual cost of around €210 million per year over the period.

Competitiveness and level playing field

This measure is likely to have **weakly negative impacts on** the competitiveness of EU industry internationally, for those sectors that compete with international businesses. Further tightening environmental standards in the EU will increase capital and operational costs, with the consequence of making products less competitive (purely based on price) with products imported from nations with lower environmental standards. There could also be negative impacts within the EU on intra-EU trade, if there is variation in implementation between the Member States on the degree to which operators are pushed to accept permit ELVs at lower BAT-AELs (and hence the potential importance of standardised methodologies for cost-benefit analysis, similar to measure 2).

The measure is likely to have **weakly positive impacts** on the level playing field, particularly for those MS which currently set lower emission levels than the upper BAT-AEL. Findings on the regulatory baseline indicate there is substantial variation between Member States approaches to

[11] Terms of reference available at: Circabc (europa.eu)

setting ELVs in permits. Therefore, there is scope to increase the consistency by which Member States allocate permits. Consequently, this would improve the level playing field for operators working in different Member States. There would be risk however that this measure may increase administrative burdens (without necessarily leading to lower permit ELVs and hence environmental benefits) and could lead to discrepancy between best and worst performing Member States, manifest as an unlevel playing field.

Position of SMEs

The measure's impacts on SMEs are **uncertain**.

Innovation and research

The measure is likely to have a **positive impact** on innovation and research. If the lower end of BAT-AEL ranges are adopted as ELVs by more operators, there will be incentives to increase investment in research, development and demonstration to make complying with more stringent environmental standards more cost-effective.

Public authority impacts

This measure will have **negative impacts** on the administrative burden for Member State competent authorities.

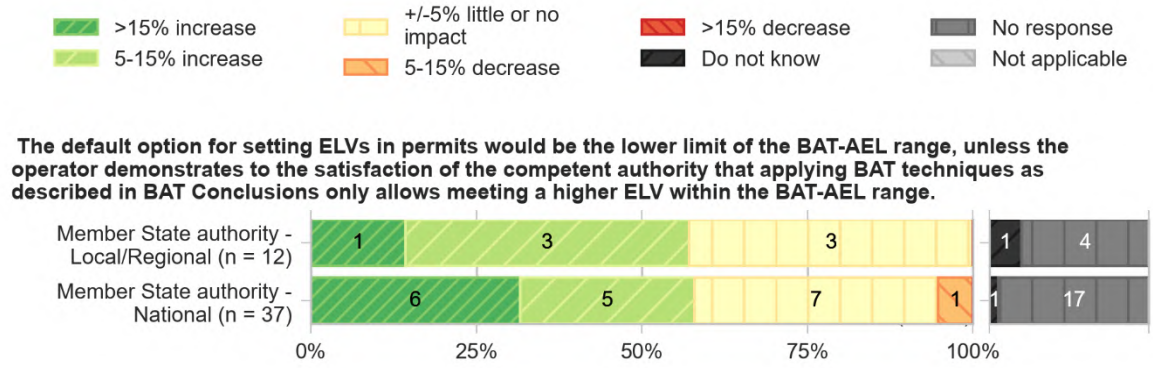
In setting or reconsidering and updating permit conditions, competent authorities need to assess each installation individually to consider the appropriate ELVs that should be included in said conditions, except if General Binding Rules are used for which no case-by-case approach is taken. This measure will not change the ability to use General Binding Rules. However, it will require additional effort for authorities to consider evidence provided by operators in a new context where the lower end of BAT-AEL ranges are set as default for consideration in the permitting processes.

These additional administrative effort will build upon the baseline permitting processes, both issuing new permits as well as reconsidering and updating existing ones. There are around 52 000 existing IED installations which may undergo permit reconsiderations and updates at a frequency of once every 10 years (in line with the BREF review cycle). It is assumed that this measure could require around 10% of additional effort from public authorities when engaging with permit reconsiderations and updates. In addition, evidence available and analysis for this study suggests that there might be 500 new permits issued every year, on average, which would require additional effort from public authorities assumed at around 5% of baseline costs. In summary, this measure would add between €0.9 million and €10 million of additional burden each year, on average, over a 20 year period, with a central estimate of around €6.7 million (2020 euros).

On the assumption that operators may try to bring more evidence to the authorities to show why they cannot meet lower BAT-AELs, this may increase the time needed for competent authorities to assess the evidence provided by operators. This is a concern raised by authorities in the

response to the TSS for this study. The results, illustrated in the figure below show that, with one exception, all public authority respondents believe that making the lower limit values of BAT-AEL ranges the default option will increase their administrative tasks. On average, the respondents expect a medium impact, in fact, their responses are distributed evenly between a little or no impact (+/-5% increase) medium impact (5-15% increase) and large impact (>15% increase) on administrative costs.

Figure A8-7: Distribution of responses to question 25 to the targeted stakeholder survey: "*To what extent would you expect the following options to impact on annual administrative costs i.e. related to permitting, compliance, inspection and enforcement (relative to existing annual costs)?*"



Environmental impacts

This measure is likely to have **positive impacts** on the environment overall, although this is uncertain and will depend on the number new installations that set ELVs at the lower end of BAT-AEL ranges and existing installations that tighten their ELVs as part of permit reconsiderations and updates.

The evidence gathered by Eunomia (2019) (and included above) indicates setting the lower limit value as default would have **positive environmental impacts** if the measure encourages operators and public authorities to consider whether the environmental benefits of adopting the lower limit value outweigh the costs. The data on ELVs in permits for cement sector installations shows 64% of permits examined are compliant with the upper limit value. This suggests the measure will lead to discussions with a large proportion of installations' operators. By increasing the number of discussions between the public authorities and operators it is likely some proportion of the discussions will translate into stricter ELVs for companies which previously had permits ELVs set at the upper BAT-AEL.

Analysis of the typical difference between upper and lower BAT-AELs (Figure A8-5) also confirmed that a potentially significant drop in emissions would be expected after dropping ELVs from the level of upper to lower BAT-AELs.

Some BAT-AELs do not include ranges of emissions, which means these standards would not be affected by this measure unless the BREFs are updated to refine such ranges.

The position paper for the European Environmental Bureau (EEB) highlights that this measure would not affect all environmental issues as some BAT Conclusions do not necessarily cover the environmental issue, such as, substitution of the production of chemicals of high concern in the LVOC BREF and further use of treated waste in the Water Treatment BREF.

According to a position paper from the business associations European Federation of Intelligent Energy Efficiency Services, Business Europe, International Association of Oil & Gas Producers and Euro Heat and power, the measure could have a detrimental effect on the IED's effectiveness as a tool to reduce environmental impacts in an integrated approach. The position papers make the argument that BAT-AEL ranges are crucial to accommodate for interactions between pollutants. The papers highlight as an example that CO_2 and NO_X emissions are interlinked (an abatement in NO_X emissions would lead to an increase in waste or CO_2 emissions). Therefore, the argument goes that making the lower limit value the default for NO_X emissions, CO_2 emissions would rise, creating a trade-off between air quality and global warming.

The position paper from ClientEarth highlights the interaction between this measure and measure 1, which focuses on implementing a strict and clear regime to manage derogations. The paper argues that the environmental impacts of implementing this measure are dependent on whether an improved regime to implement derogations is introduced.

Climate

The measure is likely to have a **limited impact** on climate change because, in its current state, GHGs are not in scope of the IED such that permit ELVs are not set for GHGs.

According to responses to the TSS, 40% of participants believe the measure will have no impact. Respondents who believe the measure will have an impact on GHG emissions were divided between slight, moderate or significant, with 11%, 8% and 7% of responses respectively. More respondents answered "I don't know" for the measure's impacts on greenhouse gas emissions than for the other emissions; 24% in comparison to 10%, 9% and 16%.

The relatively high proportion of respondents answering "I don't know" could reflect uncertainty relating to whether greenhouse gas emissions are within the IED's scope. If the measure reduced energy usage this could have an indirect impact on greenhouse gas emissions where energy is produced using non-renewable sources.

Air quality

The measure is likely to have a **positive impact** on air quality.

Figure A8-6 demonstrates most installations are compliant with the upper limit value for the emissions to air examined (PCDD/F, NOx, SO_2, NO_3). This demonstrates the measure would force discussion between the operator and public authorities on the costs and environmental benefits of issuing a permit with lower emission limit values. The environmental impacts are

challenging to quantify. It is unclear how many discussions between public authorities and operators could translate into a stricter ELV than before.

Figure A8-8 demonstrates the % decrease from the upper to the lower BAT-AEL for dust emissions across all BATC. The data shows % decrease from upper to lower BAT-AEL is relatively high. If the measure encourages public authorities to consider issuing permits at the lower limit value or closer to the lower limit value, the emissions reduction for dust emissions would be significant.

Figure A8-9 demonstrates the % reduction from the upper to the lower BAT-AELs for emissions to air of NOx. The figure shows the range of differences between the upper and lower BAT-AELs for NOx is slightly different to dust emissions. This indicates the measure will have an uneven impact across the different emissions to air which the IED regulates.

Figure A8-8: Histogram of % reduction from the upper to the lower BAT-AEL for dust emissions

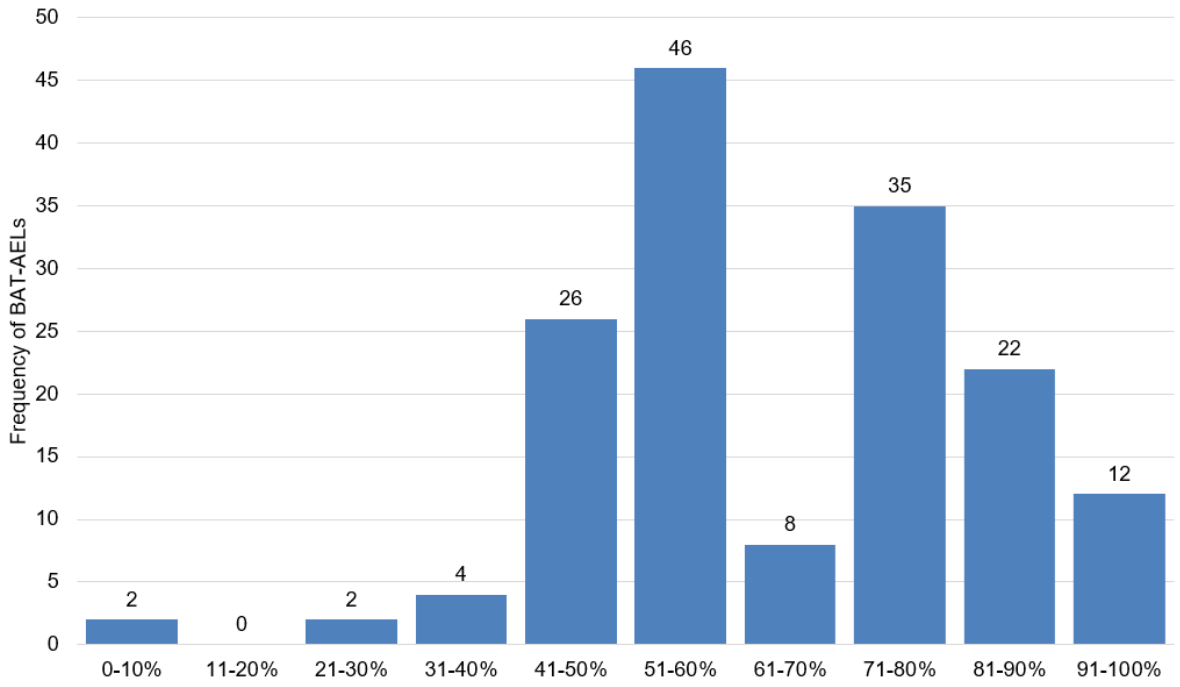
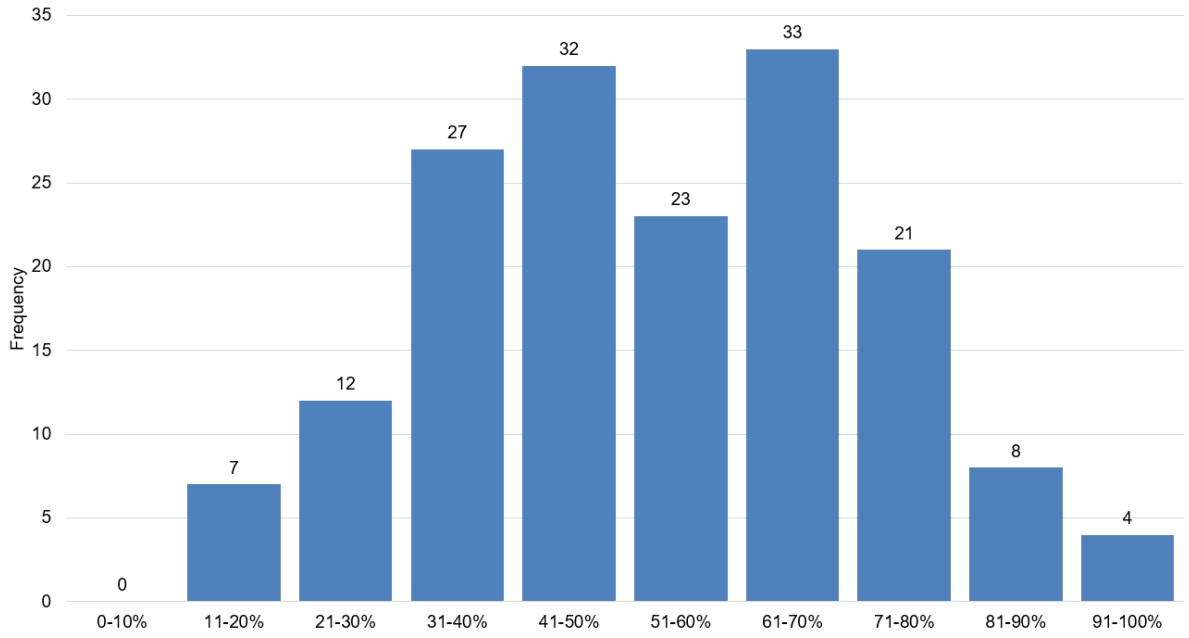


Figure A8-9: Histogram of % reduction from the upper to the lower BAT-AEL for NOx emissions to air for all BATC



NOx, as one of the key air pollutants which also happens to be a key environmental issue for several sectors, is taken as an illustration of the possible scale of impacts of policy measure IED#5. It is noted of course that this is an illustration only of partial impacts of this measure and is not a comprehensive assessment of impacts. In

Table **A8-10**, BAT-AELs for emissions of NOx to air are examined by sector to estimate the potential percentage emissions reduction if the measure was introduced. The percentages were calculated by taking an average of the percentage reductions from the upper to the lower BAT-AEL across all the sectors' BAT-AELs (for varying processes) and multiplying by 10% (the estimated proportion of existing installations that might set an ELV at the lower BAT-AEL as a result of this measure). To complement this, the sectoral NOx emissions for 2019 were extracted from E-PRTR to estimate the very approximate hypothetical NOx emission reductions of this measure. Together with the damage cost of NOx (taken from Schuchte et al. (2019)), this has allowed an estimate of the monetised value of these hypothetical emissions reductions. This shows that, for five sectors, the monetised NOx emission reductions could range between €0.9bn and €2.8bn per year.

Table A8-10: Potential reduction of NOx emissions to air across selected BATC which include BAT-AELs for releases of NOx to air, and their range of monetised impacts

BREF	Reductions from measure 5 (%)	E-PRTR NOx emissions (2019) (kt/year)	NOx emission reductions of measure (kt/year)	Damage cost (€/t)		Monetised emission reduction €m/year	
				low	high	low	high
CLM	7%	163 (1)	11.4	16 767	54 815	191	625
GLS	7%	27	1.9			31	102
LCP	8%	391	31.3			525	1716
PP	8%	56	4.5			75	244
REF	5%	43	2.1			36	118
Total		**679**	**51.2**			**858**	**2 805**

(1) NB emissions from cement sector only, excluding lime and magnesium production

The total benefits for this measure would sum the impacts across all environmental issues. A brief assessment for SO_2 emissions to air of the reductions from upper to lower BAT-AELs identified broadly similar average percentage reductions as those identified for NOx in

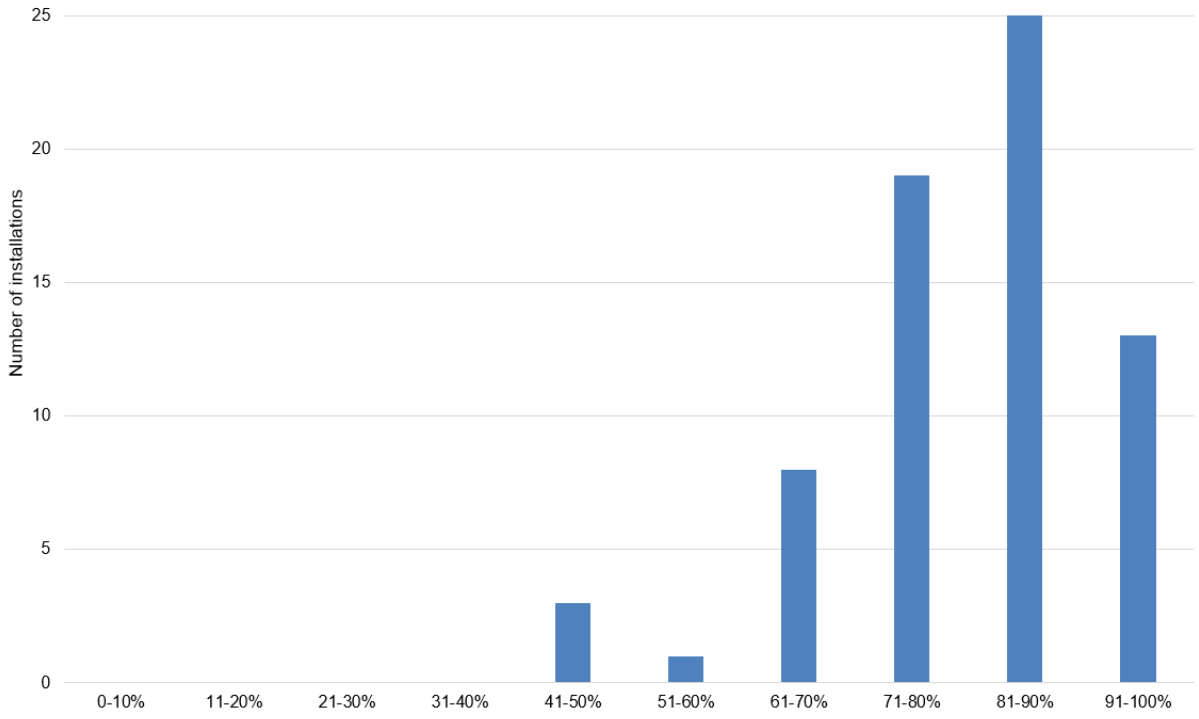
Table **A8-10**. Overall, these would be expected to be in the tens of €billions per year.
Drawing on previous evidence, Ricardo (2017) estimated for large solid fuelled LCPs the benefits and costs of reaching lower BAT-AELs compared with upper BAT-AELs. The findings were that benefits still outweighed costs at the lower BAT-AEL levels, although by a smaller margin (benefit-cost ratio around 2 at lower BAT-AEL rather than around 5 at upper BAT-AEL). Given this finding, it would be presumed that the monetised air pollutant impacts of this measure would exceed the costs of the measure.

According to responses to the TSS, 48% of respondents believe the measure will have at least a slight impact on emissions to air, which is the highest proportion of respondents out of all the environmental areas examined. In particular, this is split into slight, moderate, or significant, with 16%, 16% and 17% of responses respectively. The rest, 37% of participants, believe the measure will have no impact on emissions to air.

Water quality and resources

The measure is likely to have a **positive impact** on water quality, and **unclear impacts** on water resources as BAT-AEPLs are not currently mandatory. Figure A8-10 demonstrates the % reduction of the lower BAT-AEL from the upper BAT-AEL for emissions of metals to water. The figure demonstrates the difference between the upper and lower values is relatively high in comparison to emissions to air for dust for example. This indicates the measure could have significant positive impacts on emissions to water.

Figure A8-10 Histogram of % reduction of the lower BAT-AEL from the upper BAT-AELs for emissions of metals[12] to water



Similar to the analysis on NOx emissions,

[12] Arsenic, Cadmium, Chromium, Copper, Iron, Lead, Nickel, Silver, Tin and Zinc

Table **A8-11** examines BAT-AELs for heavy metal emissions to water, by sector. The percentage of emissions reduction that could result from the introduction of the measure has also been estimated. These percentages were calculated by taking an average of the percentage reduction from the upper to the lower BAT-AEL, multiplying by 85% (the rough proportion of installations that are issued at the upper limit value) and then multiplying by 10% (the proportion of existing installations which are assumed to potentially set EVLs closer to the lower end of BAT-AEL ranges as a result of this measure). The analysis suggests the difference between the lower and upper limit values is greater in BAT-AELs for emissions to water, than for emissions to air. **This would imply that the measure could have a significant positive impact on emissions to water.**

Table A8-11: Potential percentage reduction of heavy metal emissions to water across selected BATC which include BAT-AELs for heavy metal releases to water

BREF	% emission reduction for existing installations subject to permit reconsiderations, assuming 10% of existing installations are affected by measure IED#5
CWW	9%
LCP	9%
TAN	9%
WI	9%
WT	8%

Some Member States have implemented or are exploring ways to issue lower limit values for water BAT-AELs (Ricardo, 2020b). For example, authorities in Germany, Belgium (Flanders) and Bulgaria have issued recommendations on the application of BAT and the setting of ELVs. In 2018, Finland was considering introducing daily average values is being considered when setting ELVs to clarify permit controls (Ympäristöministeriö, 2018). This approach would establish a threshold under which the daily average ELV would be compliant (e.g., where over 80% of the daily operating conditions during a calendar year fall below the ELV and where an individual sample does not exceed the limit by more than 100%). The approach may also set a maximum load per installation, e.g., on an annual basis (kg p.a.), to avoid any adverse effects that might result from high cumulative emissions. The evidence collected by Ricardo indicates existing practices to issue lower limit values are in the minority and are inconsistent between Member States. Therefore, although the measure may have less of an impact in the mentioned Member States (Germany, Belgium (Flanders), Bulgaria, and Finland) the measure is likely to have a positive impact on overall water quality.

Responses to the TSS indicate that more than 40% of respondents believe this measure will have at least a slight impact on emissions to water, which is the second highest proportion of respondents out of all the environmental areas examined. 39% of participants believe the measure will have no impact on emissions to water.

Soil quality or resources

The measure is likely to have a **limited to weakly positive** impact on soil quality and resources.

This is due to the limited BAT-AELs specifically targeting releases to soil. That said, the reductions for releases to water may have knock on positive impacts on eventual releases to soil.

Responses to the TSS indicate that a third of respondents believe the measure will have at least a slight positive impact on emissions to soil. However, 46% of participants believe the measure will have no impact on emissions to soil. Additional analysis is ongoing to illustrate the potential impacts of this measure on soil quality.

Waste production, generation, and recycling

The measure is likely to have a **weakly positive impact** on waste production, generation and recycling.

Responses to the TSS indicate that a quarter of respondents believe the measure will have at least a slight impact on waste generation.

Efficient use of resources

The measure is likely to have **weakly positive impacts** on efficient use of resources. If BAT-AEPLs are made mandatory this measure could also have additional positive impacts on energy, water, material consumption and on waste generation.

Responses to the TSS indicate that a fifth of respondents believe the measure will have at least a slight impact on energy use, water use, use of other resources and waste generation. For energy use, water use, use of other resources and waste generation, respectively 24%, 23%, 24% and 21% believe the measure will have at least a slight impact on the efficient use of resources. On the other hand, 43%, 60%, 41% and 48% respectively believe the measure will have no impact. Additional analysis is ongoing to illustrate the potential impacts of this measure on the use of resources.

The position paper from the European Environmental Bureau argues that the impact of the measure on efficient use of resources depends on whether the Commission gives BAT-AEPLs an equal legal status as BAT-AELs, as well as noting that if the measure was applied to BAT-AEPLs, the measure would need to be inverted. This inversion is needed becuase in the context of efficient use of resources, the upper limit corresponds with the improved performance level.

Social impacts

The measure's social impacts are **uncertain**.

Measure 6: Allow Member State Competent Authorities to suspend non-compliant installations in cases where non-compliance (Article 8) causes significant environmental degradation until compliance is restored.

Description of the measure and requirements for implementation

This measure would amend Article 8 to allow Member State Competent Authorities to suspend non-compliant plants in cases where non-compliance causes significant environmental degradation until compliance is restored.

In the responses to the TSS, a potential issue with Article 8 of the IED (and potentially the same article of the MCPD) was further elaborated. It has been stated that in some Member States, even if the competent authority suspends the Economic activity of an operator due to a serious breach, this suspension can itself be suspended. This could be as the result of the operator challenging the sanction decision in the court. It has been argued in the responses to the TSS that such a challenge would effectively and immediately suspend the sanction previously applied until the court case is settled. This process can take several years meaning that the operator can continue its operation until the final decision has been made.

Objectives:

The measure is expected to bring legislative certainty with regards to non-compliant plants.

Implementation needs:

Under this measure, the competent authorities are allowed to suspend operation of non-compliant plants. This is drawing on experience with MCPD Article 8(3) whereby in cases that "non-compliance causes a significant degradation of local air quality, the operation of the medium combustion plant shall be suspended until compliance is restored".

Assessing impacts

Economic impacts

The measure is expected to have very **limited negative impacts** on the administrative burden on businesses, especially as this is expected to affect a relatively small number of the IED installations.

Based on the limited evidence available and expert input, it is assumed that around 0.05% of the baseline number of (52 000) IED installations could be affected by enforcement of this measure or around 26 installations. This figure is based on a personal communication with the European Commission reference in the IED evaluation report that expects only a few tenths of a percent of all the IED installations may be taken to court as the result of uncooperative operators or very serious pollution incidents.

There has also been an indication in the responses to the TSS that a number of IED installations, including several coal power plants, such as CET Govora, Turceni, Paroşeni and Mintia, all situated in Romania, could be affected as the result of introducing more stringent enforcement mechanisms within the IED.

The operators of these installations would be affected by some additional limited administrative burden to gather evidence, particularly through further monitoring campaigns. These costs have been estimated to be €0.004m/year to €0.3m/year, with a central estimate of €0.2m/year. In addition, these operators would also experience substantive compliance costs arising from losses from closing their operations. These costs would depend upon the type of installation affected and this is uncertain. However, given that it is expected that only a few installations would be

affected by this measure, the EU-level effects on the conduct of business or compliance costs are unlikely to be significant.

This measure is also **likely to establish a more level playing field** between different Member States, although this is also unlikely to be a significant impact.

The majority of respondents (95 out of 112) to the TSS from industry expected no to slight improvement to the implementation of the IED as the result of allowing competent authorities to suspend operation of non-compliant plants. On the other hand, the majority of respondents from the Environmental NGOs (7 out of 7), Local/Regional (6 out of 9) and National (9 out of 17) MSCAs and other (8 out of 8) contributors to the survey expected that the suspension of the operation of non-compliant plants could result in moderate to significant improvement in the IED implementation.

Environmental impacts

The measure aimed at enhancing enforcement of the IED, which could result indirectly in improved compliance with the Directive. Therefore, a **limited positive impacts** on climate, air quality, water quality and resources, soil quality or resources, waste production, generation and recycling as well as efficient use of resources could be expected as the result of implementation of this measure. There is limited evidence available, however, which does not allow for a more thorough evaluation of the extent to which these impacts could affect the environment.

Social impacts

The measure's social impacts are **likely to be negligible,** although it could lead to some limited increases in unemployment.

Measure 7: Introduce common rules for assessing compliance with emission limit values under Chapter II of the IED.

Description of the measure and requirements for implementation

This measure would introduce common rules for assessing compliance with emission limit values under Chapter II of the IED.

The evaluation of the IED concluded there was variation in compliance assessment approaches for Chapter II installations, (as well as variation in interpretation of the compliance assessment elements of IED Annexes V and VI for Chapter III and Chapter IV plants respectively). These elements are important to redress due to the continued need to achieve a high level of protection of the environment as a whole (i.e. avoiding cases where interpretation of the legislation is not achieving the intended environmental benefits) as well as to continue to level the playing field for commercial entities operating across the EU27 bloc.

Special provisions for Large Combustion Plants and Waste Incinerators are included in Chapters III and IV, respectively, and Annex V/Annex VI for the calculation of validated limit values for

compliance assessment by the subtraction of measurement uncertainty. While mandatory for LCP and WI sectors, this topic is also relevant to Chapter II installations in other IED sectors. In work previously undertaken (Ricardo, 2018), Member States provided examples of other flexibilities implemented for compliance assessment of Chapter II installations. This has demonstrated the variation across Member States and the potential for benefit in levelling the playing field. Some areas where a common approach to the assessment rules would be beneficial have been identified in previous studies[13]. These include further clarifications on the role of measurement uncertainties in determining compliance with ELVs and also a more structured approach towards compliance with ELVs for combined waste water streams from different processes or installations.

Different application of measurement uncertainty in compliance assessment leads to an inconsistent assessment of environmental performance, and in some cases the underestimation of actual emissions at an installation.

A separate study requested by the European Commission that is currently underway (as at August 2021) will provide more information and/or evidence to support the assessment of this measure.

Objective(s):

The measure will improve legal certainty and eliminates varied interpretation of enforcement and insufficient guidance. It will aim to help level the playing field and lead to emission reductions in those cases where currently less stringent compliance assessment practices are deployed.

Implementation need(s):

- EU to develop and publish (e.g. as a Commission Decision) the compliance assessment rules based on the to the relevant consultations with Member States
- EU to develop additional guidance and supporting mechanisms to aid implementation of the measure across Member States
- Member States to enact on the proposed new approaches to be considered in their national laws

Assessing impacts

Economic impacts

The overall economic impacts of this measure are **uncertain**. There are some weakly negative impacts on administrative burdens on operators and authorities, and some weakly positive impacts on improvement of the level playing field.

This measure is likely to **limited impacts on operating costs and conduct of business, on SMEs, and on innovation and research.**

[13] Ricardo. (2020). Assessment of compliance with Emission Limit Values under the Industrial Emission DirEUtive.

Administrative burden on businesses

This measure is likely to have, overall, **negative impacts** on business administrative burden.

This measure would be expected to lead to, in the short term, for one or two years, additional monitoring and reporting costs for businesses. Based on the assumption that there are around 48 000 installations which are not subject to LCP or WI compliance assessment rules (as there are approximately 4 000 LCPs and WI plants), and that 50% of the installations would need to change their currently adopted compliance assessment approach, and assuming that for the two years after implementation this measure would lead to an additional 20% administrative burden for operators in their monitoring and reporting obligations, this measure is estimated to have weakly negative impacts from €0.1m/year to €5.8m/year with a central estimate of €3.8m/year for the EU27.

For those operators with installations in different Member States that are currently needing to deploy multiple approaches to compliance assessment, this measure would be expected to provide weakly positive benefits, as centralisation of compliance assessment following a standard approach would be possible. The possible effect on this has been approximately quantified based on limited evidence as part of measure #16 and is not reproduced here to avoid double counting.

Competitiveness and level playing field.

This measure is expected to have a **weakly positive impact on creating a more level playing field** for the businesses. The overall impact of the measure is expected to be weakly positive.

Given there has been evidence provided by Member States that varying approaches to compliance assessment are used across Member States, having a single harmonised approach for assessing the compliance of Chapter II installations would be expected to help level the playing field across the EU, with particular positive impacts on the transnational operators.

Industry stakeholders who contributed to the TSS provided a mixed response to the question as to what extent would introduction of common rules for ELVs compliance assessment under Chapter II of the IED contribute to a level playing field in terms of inspection and enforcement of environmental permits for their sector across the EU Member States. The most popular response was that there would be a slight improvement (33% of those who provided a response), with the remaining responses fairly evenly spread between the other options available.

Public authority impacts

This measure is expected to have a **negative impact** on public authority burdens.

In terms of Economic impacts on public authorities, there will be additional costs for the development of the harmonised methodology. The costs could be assumed to be equivalent to those for developing one-off guidelines for introducing common rules for assessing compliance. The one-off cost of developing such common rules could be estimated to be between €0.3m and €0.4m and, therefore, not likely to be significant. This estimate is based on a similar case where

the EU is commissioning a project for "Developing of a Guidance Document on the Impact of Water Treatment Processes" in 2021 with a proposed budget of around €0.2m, on top of which the costs for the EU and other public authority stakeholder input would be sought, which is estimated to add 50%-100% costs.

This measure would also be expected to lead to, in the short term for one or two years, additional inspection costs for authorities. Based on the assumption that there are around 48 000 installations which are not subject to LCP or WI compliance assessment rules (as there are approximately 4 000 LCPs and WI plants), and that 50% of the installations would need to change their currently adopted compliance assessment approach, and assuming that for the two years after implementation this measure would lead to an additional 20% administrative burden for authorities in their inspection obligations, this measure is estimated to have negative impacts from €0.2m/year to €5.8m/year with a central estimate of €4.6m/year for the EU27.

Environmental impacts

Although the measure itself is aimed at more homogenised approach towards enhancing enforcement of the IED, this could also result in minor benefits for environmental impacts for those Member States where the new standardised compliance assessment methodology would in effect provide a more stringent interpretation of complying with ELVs in permits, and hence lead to small environmental benefits in the cases where operators need to reduce their emissions to comply with slightly more stringent rules. Therefore, a **weakly positive impact on** environmental impacts that typically have ELVs set in permits (**air quality, water quality**) could be expected as the result of implementation of this measure.

The measure would likely have only **limited impacts on remaining environmental impacts** (climate, soil quality or resources, waste production, generation and recycling as well as efficient use of resources).

There is limited evidence available to date on the extent of variation in compliance assessment methodologies among Member States which limits any further detailed assessment of environmental impacts. This evidence gap may be filled by a separate study underway for the Commission.

The majority of respondents (80 out of 105) to the TSS from Industry expected no to slight improvement to the implementation of the IED as the result of introducing common assessment rules with emission limit values under Chapter II of the IED. This was against the expectations of the majority of respondent from the Environmental NGOs (6 out of 6), Local/Regional (4 out of 7) and National (17 out of 18) MSCAs and other (6 out of 7) contributors to the survey expecting the introduction of such common compliance assessment rules to result in moderate to significant improvement in the IED implementation.

Measure 8: Require Member States, in determining the penalties under Article 79, to give due regard to the nature, gravity, extent and duration of the infringement as well as the impact of the infringement on achieving a high level of protection of the environment.

Description of the measure and requirements for implementation

This measure will require Member States authorities to take into account the nature, gravity, extent and duration of infringements of the IED, as well as the impact of the infringement on achieving a high level of protection of the environment, for determining the penalties that they lay out in their national transposition of the IED.

The current text of Article 79 is as follows:

> *"Member States shall determine penalties applicable to infringements of the national provisions adopted pursuant to this Directive. The penalties thus provided for shall be effective, proportionate and dissuasive. Member States shall notify those provisions to the Commission by 7 January 2013 and shall notify it without delay of any subsequent amendment affecting them."*

As can be seen from the existing text of the IED, Article 79 requires MS to notify provisions to the Commission related to penalties. No centralised register of the penalties has been assembled. The IED evaluation indicated significant variation across Member States on the type and scale of penalties that may be imposed under IED Article 79.

There have been arguments stated by some of the respondents to the TSS, that the current penalties for non-compliance with the IED's provisions are regulated in a broad and generic manner under Article 79. While Member States are under the obligation to ensure the effective, proportionate and dissuasive implementation of penalties under national law, the lack of detail may result in a lack of compliance with this obligation in certain Member States. This is then argued to lead to arbitrary and contradictory results among different Member States.

For this measure, given the purpose is to ensure that Member States, when setting penalties, give due regard to the nature, gravity, extent and duration of the infringement as well as the impact of the infringement on achieving a high level of protection of the environment, it could be expected that some guidance from the Commission may be sought by Member States for implementing this measure.

Objectives:

The measure will limit varied interpretation of enforcement across Member States. The aim is to ensure that penalties sufficiently account for the environmental impacts, and hence that, where the penalties form a deterrent against infringement of requirements, higher compliance rates will ensue, leading to a higher level of protection of the environment.

Implementation need(s):

- EU to develop guidance to Member States on how to account for ensuring the penalties reflect the impact on achieving a high level of protection for the environment
- Member States to re-assess their existing penalties for whether the penalties give due regard to the nature, gravity, extent and duration of infringements and whether they account for the impacts of infringements on achieving a high level of protection of the environment, and adjust the penalties if needed.
- There is currently no monitoring/central register of penalties imposed on non-compliant installations. Therefore, a system for monitoring the penalties/new requirements would need to be set up by the EU as part of implementing this measure.
- The monitoring and enforcement responsibilities would also be on the EU.

Assessing impacts

Economic impacts

This measure is likely to have **limited negative** Economic impacts.

This measure will likely have **limited impact on administrative burden on businesses**. More stringent penalties may result in greater administrative burden on businesses, although this is uncertain and depend on current practices across Member States. On the other hand, this measure will have **no direct impacts on the costs of doing business** as it does not introduce additional requirements for operators.

Under the proposed measure, public authorities would be responsible for reviewing and potentially updating the relevant penalties being imposed on non-compliant installations (and communicating the outcomes to the Commission). This measure is, therefore, likely to lead to **very limited negative impacts on public authorities**. The implementation of the measure would require setting up an online platform for monitoring/central register of penalties imposed on non-compliant plants. Therefore, the European Commission would also be affected by a very small additional burden associated with design, deployment and maintenance of the online platform as well as training of staff and authorities for using the platform.

Member State authorities would need to harmonise their approaches for determining penalties that result in effective, proportional and dissuasive outcomes. This could be achieved by sharing the relevant evidence and the outcome of such decisions with the EU through a central register. A register would require retrieving information from the permit documentation and other relevant evidence and summarising it effectively into a new uniform template. Based on evidence from the 2007 IED IA[14] and expert input, it is assumed that this might require 8-60 hours of labour at €29/hour per non-compliant installation. The available information suggests that there might annually be court cases affecting less than a few tenths of a percent of all IED

[14] EU (2007); Summary of the Impact Assessment accompanying the proposal for a DirEUtive of the European Parliament and of the Council on industrial emissions; 2007 impact assessment (IA) reports - Impact Assessment - European Commission (europa.eu)

installations[15]. Additional average annual costs over a 20-year period could, therefore, range between €0.01m to €0.09m per annum, with a best estimate of €0.05m/year.

The measure is expected to have a **weakly positive impact on establishing a more level playing field** between different Member States, although these are not likely to be significant.

Environmental impacts

The measure is aimed at enhancing enforcement of the IED, which could indirectly result in improved compliance with the Directive. **Limited positive impacts** could be expected on climate, air quality, water quality and resources, soil quality or resources, waste production, generation and recycling as well as efficient use of resources could be expected as the result of implementation of this measure, with the most significant of these being air and water quality.

Measure 9: Add a new provision in or linked to Article 26 for requiring effective multidisciplinary cooperation among competent national administrative, law enforcement and judicial authorities in cases of transboundary pollution, and for Member States receiving a request for cooperation to respond within three months of receipt.

Description of the measure and requirements for implementation

This measure would introduce an obligation in Article 26, for the Member States receiving a request, to respond within three months of receipt. To complement this, the European Commission will produce guidance for horizon scanning for potential issues and the development of a Watch List for pollutants of potential concern for transboundary emissions through the BREF and other IED processes.

The IED evaluation highlighted that the monitoring and control of emissions had been implemented in a variable way, and such potential cumulative impacts from facilities emitting to environment in neighbouring States could cause build-ups of materials within the same environmental sinks.

IED Article 26 relies on the receiving state to identify a problem and source in order to investigate. There are variable resources and regulatory zeal to carry out such identifications.

Furthermore, bilateral co-operation between MS on transboundary issues tend to be more limited. Best examples relate to water and some of the larger water systems (i.e. Rivers Danube and Rhine) where co-operation is necessary.

Objective(s):

The measure is aimed at increasing the cooperation between the relevant competent authorities in order to further limit the impact of transboundary emissions.

[15] Ricardo, Support to the evaluation of the Industrial Emissions DirEUtive (DirEUtive 2010/75/EU), 2020

Implementation need(s):

- Further harmonisation in the implementation of the IED in different Member States (e.g. as the result of implementing measures 6 and 7) is expected to enhance the effectiveness of this measure.
- EU to develop guidance for horizon scanning of potential transboundary pollution issues and development of a watch list for pollutants of concern.
- Member States to enhance capabilities to allow for timely and effective cooperation with neighbouring Member State authorities with regards to tackling transboundary pollution.

Assessing impacts

Economic impacts

This measure is likely to have **limited negative economic impacts,** which would depend on the number of IED installations that would require such transboundary cooperation between authorities. This is uncertain and the evidence is limited.

Competent authorities would, however, be required to respond to the reported cases within 6 months of the receipt of the complaint. Assuming that the respond from Member States would require additional effort, assumed at 10% over the baseline, in checking compliance, maintaining systems to make information available and engaging with permit reconsiderations and updates.

It is also assumed, based on expert input, that around 520 installations or 1% of the existing IED installations (52 000) may be affected over a period of 20 years. Thus, additional burden to public authorities could range, on average, between €0.02 to €0.5 million each year over a 20-year period, with a central estimate of €0.4 million per annum.

The respective costs for the operators include providing monitoring reports, accommodating site visits by inspectors and reporting changes in their operation. Additional burden to businesses could range, on average, between €0.01 to €1 million each year over a 20-year period, with a central estimate of €0.6 million per annum.

Environmental impacts

This measure is likely to have **limited positive impacts** on the environment by improving cooperation across countries.

Climate related pollution is a transboundary issue in itself and, therefore, any environmental performance related improvement as the result of more effective implementation of the IED can have a positive impact on climate. Therefore, the **impacts of the measure on climate is expected to be weakly positive**.

The measure is expected to have **weakly positive impact on air, water and soil quality**. It is unlikely that the measure impacts the waste production, generation and recycling and efficient use of resources.

The relevant stakeholders, including Environmental NGOs, Industry, MACAs and others were asked to contribute to the TSS to express their views on the extent to which improved cooperation between neighbouring Member States would impact on transboundary environmental pollution from (agro-) industrial plants. The Environmental NGOs were shown to be split (3 votes for each side of the argument) on the matter, whilst the majority of the rest of the participants believed improved cooperation to have slight to no impact on transboundary pollution. The split for Industry was 56 out of 92 for slight to moderate improvement. The local/regional MSCAs voted for 6 out of 9 in favour of slight to moderate improvements. The national MSCAs share was 10 out of 14 in favour of slight to moderate improvements. This figure was 7 out of 9 for slight to moderate improvement.

Measure 10: Require that information from Member States' monitoring of the impact of Article15(4) derogations is made publicly available

Description of the measure and requirements for implementation

Article 15(4) permits derogations where the costs of employing BAT are greater than the potential environmental benefits. The regulation includes the following subparagraph:

"The competent authority shall document in an annex to the permit conditions the reasons for the application of the first subparagraph including the result of the assessment and the justification for the conditions imposed."

However, the regulation does not contain any reference to whether public authorities should make the environmental impacts of derogations available in the public domain. According to:

- Article 24(2f), authorities must publish the rationale for granting derogations, and
- Article 24(3), authorities must make public the results of emission monitoring as required under the permit conditions held by the competent authority.

Nevertheless, the IED does not require public authorities to publish the environmental impact of granted derogations.

Therefore, this measure requires that this information is made available and thus provides interested individuals, researchers, and NGOs with access to new information relating to the impact that Article 15(4) has on the IED's ability to protect the environment.

In 2018, 133 Article 15(4) derogations are reported for 98 installations across 15 Member States (Ricardo, 2021).. Furthermore, there are cases where derogations have been granted for installations where the information reported to the EU Registry indicates BAT conclusions are not yet adopted (Ricardo, 2021).

Objectives:

This measure will aim to improve public access to information relating to the IED and increase the public's ability to scrutinise the practices of competent authorities and the effectiveness of the IED.

This measure will, therefore, contribute to the general objective of empowering private individuals and civil society organisations to exercise their rights with regard to scrutinising the impacts of industrial emissions, and more specifically, ensure access of private individuals and civil society organisations concerned to environmental information, participation in environmental decision making and access to justice, in relation to permitting, operation and control of large industrial and agro-industrial plants.

Implementation needs:

- EU to add a paragraph to legislation establishing new requirements to make information available e.g. Article 15 (4) or Article 24 (2).
- EU to share guidance or best practice with public authorities on making information open access and provide some oversight to ensure MS implement the requirement consistently.
- MS authorities and operators to pull together any additional information that may be required and make this public.

Assessing impacts

Economic impacts

This measure is likely to have **limited negative Economic impacts** by adding burden onto public authorities, primarily.

Administrative burden on businesses

This measure will have **limited to no impacts** on the administrative burden on businesses. IED installation operators already report emissions monitoring data; however, this need not necessarily be at the depth required to make this information publicly available. Even if so, there is only a small number of operators with derogations and emissions monitoring data are likely readily available. The additional direct costs to businesses would, therefore, be marginal at most. Indirectly, this measure could lead to further scrutiny that may put the derogation in question. This could have higher costs to the operators affected. This is, however, uncertain and cannot be estimated with the evidence available.

Operating costs and conduct of business

This measure will have **no direct impacts** on the costs of doing business as it does not introduce additional significant requirements for operators. In the case that making data open access reveals that derogations are causing significant environmental harm, it is possible that these operators will come under increased public pressure to improve their environmental practices. Consequently, operators would need to take action that may results in additional capital and operating expenditures. This would only affect a small number of operators overall and,

therefore, it would be marginal at most. Further, these costs are uncertain and cannot be estimated with the available evidence.

Competitiveness and level playing field

This measure will have **no impacts** on competitiveness or the level playing field. The measure is unlikely to affect the costs of doing businesses in any significant way and, therefore, the operators' capacity to innovate or the comparative advantage of industry in an international context would not be affected either. There is no evidence to suggest that this measure would affect the level playing field.

Position of SMEs

This measure will have **no additional impacts** on the position of SMEs.

Innovation and research

This measure will have **no impact** on innovation and research.

Public authority impacts

This measure is likely to lead to **limited to weakly negative impacts** on public authorities. These authorities will be responsible for retrieving the information submitted by operators, pulling together and making it public. According to the recent study by Ricardo (Ricardo, 2021), nine Member States have functioning URLs to all the installations where derogations have been approved[16], and seven do not have a set of functioning URLs to derogations[17].

In addition, where information is provided by Member States, the information made publicly available via the URLs and its relevance is often limited. The use of central permit repositories to publish site-visit reports facilitates access to the reports at installation level (Austria, Bulgaria, Czech Republic and Denmark), as does the use of a common report template (Austria, Czech Republic, Romania, and some regions in Spain).

This suggests that this measure will require at least seven Member States and likely more to update and continue to service their URLs on existing derogations. This is unlikely to have a significant administrative burden on public authorities across the EU.

Based on the evidence available, we assume that there are around 130 15(4) derogations, of which around 50% have information available to the public in an open-access format. Competent authorities would need to retrieve information submitted by operators and pull it together before making it public. This would primarily have labour costs as well as some marginal IT costs.

Building on evidence from the 2007 IED IA (EC, 2007), adjusted for inflation and based on expert input, it is assumed that this may require around 8-60 hours of labour (or around 20% of the worker input required to manage the derogation process) at a labour cost of €29/hour or a total one-off cost of €230 - €2 700. In total, therefore, the measure would have additional one-off

[16] Belgium, CzEUhia, Denmark, Estonia, Finland, France, Portugal, Romania, and Sweden

[17] Bulgaria, Germany, Hungary, Ireland, Italy, Slovakia, and Spain

costs of €15 000 - €110 000 in the shorter to medium term, that is, negligible average annual costs over a 20-year period.

Environmental impacts

This measure is likely to have **indirect and limited positive environmental impacts**. This measure would ensure that public authorities make the derogations' emissions monitoring data open access. As a result, the public will have improved information on the impacts of derogations on the environmental performance of IED installations and would be empowered to make a more evidenced case for change as required. This could indirectly influence the level of investment and environmental performance for those installations with derogations.

Social impacts

This measure is likely to have **no impacts** on employment. The measure will, however, have other social impacts by improving transparency on permitting and emissions monitoring. For example, this would allow researchers and concerned organisations and citizens to make informed criticisms and requests relating to the state of industrial emissions.

Measure 11: Widen public participation in permitting as requested by the Aarhus Convention Committee and facilitate access to justice and redress in case of damages relates to non-compliance.

Description of the measure and requirements for implementation

This measure seeks to widen the scope of public participation under the permitting procedures based on the findings and recommendations by the Aarhus Convention Compliance Committee (ACCC), made under case ACCC/C/2014/121, and facilitate access to justice and redress in case of damages related to non-compliance.

The ACCC recommended that:

> *"The Party concerned [European Union] put in a place a legally binding framework to ensure that, when a public authority in a Member State of the Party concerned reconsiders or updates permit conditions pursuant to national laws implementing article 21 (3), (4) and (5) (b) and (c) of the Industrial Emissions Directive, or the corresponding provisions of any legislation that supersedes that Directive, the provisions of article 6 (2)–(9) [of the Convention] will be applied, mutatis mutandis and where appropriate, bearing in mind the objectives of the Convention."*
>
> Article 21(3),(4) of the IED concerns the reconsideration or update of permits in accordance with BAT conclusions, typically according to a 4-year timeframe.
>
> Article 21 (5)(b) and (c) refers to other conditions where permit reconsideration or update may be necessary, such as the need to comply with an environmental quality standard introduced under Article 18.

Article 6 (2)-(9) references the text of the Aarhus Convention, which in turn lays out provisions to ensure the public participate in the governance of environmental information. These provisions are similar to the provisions of Article 24, which lay out the IED's means of public participation.

These provisions, especially those set out in Article 24, would need to be amended to include the processes laid out under Article 21 (3), (4) and (5) (b) and (c), which will require competent authorities to facilitate further public participation than in the baseline.

Such widening of public participation inreases the possibilities to accessjustice. Furthermore, jurisprudence of the Court of Justice of the EU[18] requires making clear that, based on the objective of ensuring 'wide access to justice', standing shall not be made conditional on the role the public concerned may or may not have played during a possible participatory phase of the decision-making procedures under this the IED. In addition, acces to justice should provide adequate and effective remedies, including injunctive relief as appropriate, and be fair, equitable, timely and not prohibitively expensive.

Objectives:

This measure will aim to widen public participation and access to justice and redress mechanisms in IED permitting and other procedures. This measure will, therefore, contribute to the general objective of empowering private individuals and civil society organisations to exercise their rights with regard to scrutinising the impacts of industrial emissions, and more specifically, ensure access of private individuals and civil society organisations concerned to environmental information, participation in environmental decision making and access to justice and redress, in relation to permitting, operation and control of large industrial and agro-industrial plants.

Implementation needs:

- EU to adjust IED provisions, e.g. Articles 24 and 25, and provide implementation guidance/ advice; and introduce a new provision on redress.
- MS authorities to adjust their processes to increase the capacity and accommodate wider public participation and provide adequate and effective remedies, including injunctive relief as appropriate, and be fair, equitable, timely and not prohibitively expensive.
- The public to participate in permitting and other relevant IED procedures and seek access to justice and redress, as appropriate.

[18] Judgment of 15 October 2009, Djurgården-Lilla Värtans Miljöskyddsförening, C–263/08; and Judgment of the Court (First Chamber) of 14 January, LB and Others, 2021C–826/18. See also Commission Notice on access to justice in environmental matters (2017/C 275/01).

Assessing impacts

Economic impacts

This measure is likely to have **limited to weakly negative Economic impacts** by adding burden onto public authorities, primarily.

Administrative burden on businesses

This measure will have **no direct impacts** on the costs of doing business as it does not introduce additional requirements for operators. This is because under current IED provisions:

- Public authorities are responsible to facilitate public participation and acces to justice.
- Operators are already required to submit to public authorities all the information that is needed.

Operating costs and conduct of business

This measure will have **no direct impacts** on the costs of doing business as it does not introduce additional significant requirements for operators. However, enhancing public participation and access to justice could increase the environmental ambition exercised under the IED permitting and other processes. Consequently, operators may need to take further action that may results in additional capital and operating expenditures. These costs are uncertain and cannot be estimated with the available evidence. Furthermore, effective redress may require financial compensation from individual operators.

Competitiveness and level playing field

This measure will have **no impacts** on competitiveness. The measure is unlikely to affect the costs of doing businesses in any significant way and, therefore, the operators' capacity to innovate or the comparative advantage of industry in an international context would not be affected either. There is no evidence to suggest that this measure would affect in a direct manner the level playing field, although better compliance with IED requirements would reinforce the general contribution of the IED to establishing a more level playing field.

Position of SMEs

This measure will have **no additional impacts** on the position of SMEs.

Innovation and research

This measure will have **no impact** on innovation and research.

Public authority impacts

This measure is likely to lead to **negative impacts** on public authorities. These authorities will be responsible for facilitating a wider public participation and acces to justice for requirements and/or processes detailed in Article 24(1) and Article 25 and, as a result, will incur costs. Most costs incurred would relate to wider public participation that concerns a large number of

procedures, compared to only occasional judicial procedures. The scale of these costs is uncertain.

It is assumed that public participation activities during the permitting processes account for no more than 25% of the current administrative costs incurred by public authorities. This measure envisages doubling the criteria for public participation, although this may not result in a doubling of participation activities or associated costs. it is, therefore, assumed that this could lead to a 30% increase in the public participation activity and associated costs based on expert input.

Based on the data available and expert input, 500 new permits are issued and around 5 200 permit reviews and/or updates are carried out every year. In this the case, annual costs to public authorities from additional public participation in IED permitting and other processes could range from €0.8 to €8 million each year, on average, over a period of 20 years and across sectors and countries in the EU, with a central estimate of around €5.5 million per year on average.

Environmental impacts

This measure is likely to have **indirect and weakly positive environmental impacts**. With public participation and acces to justice extended to new provisions in the IED, there are more and better opportunities to challenge the 'substantive or procedural legality of decisions, acts or omissions subject to Article 24' under Article 25, which is the legal review procedure available to the public concerned and notably NGOs. These challenges would likely influence and/or ensure that higher environmental standards would be maintained than otherwise, for example, in the case of compliance with BAT conclusions via permit conditions.

Social impacts

This measure is likely to have **no impacts** on employment.

Measure 12: Introduce a requirement for a uniform permit summary to be made public.

Description of the measure and requirements for implementation

This measure would introduce a requirement for a uniform permit summary to be made public by public authorities across the EU.

The 'uniform permit summary' shall include an overview of the ELVs regulated and monitoring frequency and the timings for permit reconsideration or reviews. This would serve to summarise the information within the permit, aiding accessibility for the purposes of public engagement activities under Article 24(2) of the IED.

A reference to a template of the uniform permit summary could be added to IED provisions, notably Article 14, so that at least the format and content requirements of the permit summary are uniform across the EU. Certain considerations will need to be given to the availability of the permit in a given language.

The uniform permit summary must be available in a common IT format to enable database searching via meta-crawling etc initially by the European Commission, the EEA, ESTAT and other EU bodies, and then rolled out to enable access to all interested party entities, according to Aarhus access rules (see below).

Objectives:

This measure will aim to ease the access to information for the public concerned, including NGOs, therefore enhancing public engagement towards permits, and in turn support the objectives of the Aarhus Convention, to which the EU is a party.

This measure will, therefore, contribute to the general objective of empowering private individuals and civil society organisations to exercise their rights with regard to scrutinising the impacts of industrial emissions, and more specifically, ensure access of private individuals and civil society organisations concerned to environmental information, participation in environmental decision making and access to justice, in relation to permitting, operation and control of large industrial and agro-industrial plants.

Implementation needs:

- EU to develop a permit summary template that is compatible amongst Member States. This may require engagement with Member State competent authorities as well as representatives of the public concerned, such as NGOs.
- MS authorities to make the permit summary templates publicly available.
- MS to introduce a process through which permit summaries are reviewed and updated as required. This could be, for example, via the periodic review of the permit URLs submitted to the EU Registry on Industrial Sites, if the permit summary is connected or within the same document as the detailed permit, or more sophisticated searching and cross-comparisons.

Assessing impacts

Economic impacts

This measure is likely to have **limited to weakly negative Economic impacts** by adding burden onto public authorities, primarily.

Administrative burden on businesses

This measure will have **no direct impacts** on the administrative burden for operators. This is because under the proposed measure public authorities would be responsible for maintaining and publishing the uniform permit summary. This process may, nevertheless, require some engagement between public authorities and operators. Such costs are likely to be marginal.

Operating costs and conduct of business

This measure will have **no direct impacts** on the costs of doing business as it does not introduce additional significant requirements for operators.

Competitiveness and level playing field

This measure will have **no impacts** on competitiveness and **limited to weakly positive impacts** on the level playing field. The measure is unlikely to affect the costs of doing businesses in any significant way and, therefore, the operators' capacity to innovate or the comparative advantage of industry in an international context would not be affected either.

The measure will, however, contribute to levelling the playing field by ensuring that all permits are summarised and accessible regardless of the complexity of the installation regulated, and that such information is presented in a relatively consistent manner.

Position of SMEs

This measure will have **no additional impacts** on the position of SMEs.

Innovation and research

This measure will have **no impact** on innovation and research.

Public authority impacts

This measure is likely to lead to **weakly negative impacts** on public authorities. EU and MS authorities would need to develop, populate and make public a uniform permit summary. The bulk of this work would be additional and it would require retrieving information from the permit documentation and summarising it effectively into the new uniform template. Based on data collected for the IED IA 2007 (EC, 2007), this work may require between 8-60 hours of work by public authority officials and some minor checks or engagement with operators. If the hourly labour costs are around €29 (Eurostat, 2020), each summary could cost around €225 - €1 700.

In the shorter to medium term, permit summaries should be produced for around 52 000 installations at least once and updated during permit reconsiderations, although requirements for ongoing updates are uncertain at this stage. Further, 500 new permits are expected to be issued each year in the EU, and these would also need to be accompanied by the production of these summaries. In total, this may imply a total cost to authorities of €12 million to €90 million. Public authorities may be given time to produce and publish these permit summaries. Average annual costs over a period of 20 years could range from €1 to €10 million each year, with a central estimate of €2.0 million per annum.

Total administrative costs are likely to be closer to the lower bound estimate as public authorities, working with operators, will find efficiencies in producing these permit summary over time.

Environmental impacts

The environmental impacts of this measure will be **indirect and likely marginal** across these categories. Where currently, ease of access to permit information is weakened by permit presentation, this measure would seek to make such information more accessible. This in turn

would facilitate a more active public participation within IED processes. Where there is sufficient concern or interest, such ease of access may aid the legal review procedure described in Article 25 of the IED, which in turn may result in high environmental standards than otherwise expected. However, these effects are likely to be marginal.

Social impacts

This measure is likely to have **no impacts** on employment.

Measure 13: Amend legislation to state that 'the competent authority shall make available to the public by publishing open-access on the internet' the information requirements listed in Article 24 (2) free of charge and without restricting access to registered users

Description of the measure and requirements for implementation

IED's Article 24 states that:

"The competent authority shall also make available to the public, including via the Internet at least in relation to point:

a) *the results of emission monitoring as required under the permit conditions and held by the competent authority relevant information on the measures taken by the operator upon definitive cessation of activities in accordance with Article 22*
b) *the results of emission monitoring as required under the permit conditions and held by the competent authority."*

The existing regulation requires competent authorities to publish information. However, the existing regulation does not specify how the public should be able to access the information. Public access to information across Member States is, therefore, inconsistent at present.

This measure will seek to clarify that information should be open access, for example, removing the possibility that competent authorities require some form of payment to access the data. This could be done by amending Article 24 to state that 'the competent authority shall make available to the public by publishing open-access on the internet' (i.e. free of charge and without restricted access to registered users).

Objectives:

This measure will aim to improve access to information for all, especially the public, stakeholders and NGOs. These adjustments would support the objectives of Directive 2003/4/EU on access to environmental information, in addition to the Aarhus Convention, of which the EU is a party.

This measure will, therefore, contribute to the general objective of empowering private individuals and civil society organisations to exercise their rights with regard to scrutinising the

impacts of industrial emissions, and more specifically, ensure access of private individuals and civil society organisations concerned to environmental information, participation in environmental decision making and access to justice, in relation to permitting, operation and control of large industrial and agro-industrial plants.

Implementation needs:

- EU to develop and issue guidance in publishing open access data, using experience from other sectors to reduce any inefficiencies and support MS competent authorities.
- EU to monitor compliance across Member States.
- MS authorities to make information publicly available and open access on the internet.

Assessing impacts

Economic impacts

This measure is likely to have **limited to weakly negative economic impacts** by adding burden onto public authorities, primarily.

Administrative burden on businesses

This measure will have **no direct impacts** on the costs of doing business as it does not introduce additional requirements for operators. This is because:

- Public authorities would be responsible to pulling together and publishing the information.
- Operators are already required to submit to public authorities all the information that is needed.

Indirectly, however, in the case that making data open access reveals inaccuracies and gaps and reported data, it is possible that operators will come under increased public pressure to improve their environmental monitoring and reporting practices. This could result in additional albeit likely marginal increases in total compliance costs for industry.

Operating costs and conduct of business

This measure will have **no direct impacts** on the costs of doing business as competent authorities will be responsible for pulling together and sharing these data. Indirectly, however, in the case that making data open access reveals inaccuracies and gaps and reported data, it is possible that operators will come under increased public pressure to improve their environmental monitoring and reporting practices. This could result in additional albeit likely marginal increases in total compliance costs for industry.

Competitiveness and level playing field

This measure will have **no impacts** on competitiveness and **limited to weakly positive impacts** on the level playing field. The measure is unlikely to affect the costs of doing businesses in any significant way and, therefore, the operators' capacity to innovate or the comparative advantage of industry in an international context would not be affected either.

The measure will, however, contribute to levelling the playing field by ensuring that all competent authorities are required to publish open access data. This will also imply that industries across the EU may be subject to similar levels of scrutiny by concerned citizens and NGOs for their compliance and environmental footprint.

Position of SMEs

This measure will have **no additional impacts** on the position of SMEs.

Innovation and research

This measure will have **no impact** on innovation and research.

Public authority impacts

This measure is likely to lead to **limited to weakly negative impacts** on public authorities.

Ricardo carried out a horizontal assessment of Member State reporting recently (Ricardo, 2021), including on public access to information.

- For access to permit documentation, central permit repositories are available and fully updated at the national level in 20 Member States[19]. There are also regional permit repositories in five Member States[20]. However, repositories do not exist for all regions in the Member States that use this approach.
- Emissions monitoring data is available in 13 Member States[21] (Ricardo, 2021), although the data made available has some limitations. In a few cases[22], databases have been established, providing access to the data, while in most cases, the information is available via annual reports (often published in PDF format and in national languages). No valid URLs / relevant information was reported by 13 Member States [23].
- There are seven Member States which have incomplete or partially functioning databases[24].

In addition, challenges with reporting to the EU Registry have been flagged by Member States. Where URLs have been reported for individual installations, Member States have raised concerns about URLs becoming outdated between reporting years (in such cases, there is a risk that the reported URLs may appear as a broken link in subsequent years).

[19] Austria, Belgium, Bulgaria, Croatia, Cyprus, Czechia, Denmark, Estonia, Finland, Germany, Greece, Ireland, Latvia, Lithuania, Luxembourg, Malta, Portugal, Slovenia, Slovakia (some uncertainty relating to the veracity of the database), and Sweden

[20] Belgium, Germany, Netherlands, Poland, and Spain

[21] Austria, Bulgaria, Czechia, Estonia, Finland, Germany, Greece, Italy, Latvia, Luxembourg, Portugal, Romania and Sweden

[22] Austria and Czechia

[23] Belgium, Croatia, Cyprus, Denmark, France, Hungary, Ireland, Lithuania, Malta, Netherlands, Poland, Slovenia and Spain

[24] Cyprus, Hungary, Italy, Netherlands, Poland, Romania and, Spain

Therefore, all competent authorities may require some additional work to address gaps in the information they currently share publicly, and at least seven or a quarter of competent authorities would be expected to incur additional administrative burden to update and publish the relevant documentation.

It is assumed that data for around 13 500 IED installations has not been made public yet (over a quarter of a 52 000 baseline). Pulling together the information and publishing would primarily have labour costs as well as some marginal IT costs. Building on the 2007 IED IA (EC, 2007), adjusted for inflation and based on expert input, this may require around 8-60 hours of labour at €29/hour per installation or a total one-off cost of €225 - €1 700. In total, therefore, the measure would have additional costs over the period of €3 to €23 million, or an average of €0.2 to €1 million each year over a period of 20 years, with a central estimate of €0.2 million. These costs are likely to be incurred over a period of time agreed for MS to complete this task of publishing information open access.

Issuing any guidance on publishing this information open access is likely to marginal costs, especially if this is something that has already been done before.

Environmental impacts

This measure is likely to have **indirect and marginal environmental impacts** across these categories. Where public authorities do not currently make environmental data open access, this measure would improve public access to information. The public, with improved information and understanding of shortcomings in environmental reporting could be empowered to make evidenced cases for and spur improved environmental standards, or increased enforcement of existing standards or permits.

Social impacts

This measure is likely to have **no impacts** on employment. The measure will, however, have other social impacts by improving transparency on permitting and emissions monitoring. For example, this would allow researchers and concerned organisations and citizens to make informed criticisms and requests relating to the state of industrial emissions.

Measure 14: Amend the legislation to clarify the scope of coverage of the IED pertaining to gasification, liquefaction, and pyrolysis plants as well as to biogas plants.

Description of the measure and requirements for implementation

This measure is being considered in parallel via a contract on the "Impact of the biogas plants and of gasification, liquefaction and pyrolysis of wastes on the environment". An initial assessment is outlined in this section, primarily of qualitative nature.

The current implementation of the IED with regards to gasification, liquefaction and pyrolysis plants as well was with biogas plants has challenges.

- Firstly, some aspects of the IED are tailored to pyrolysis to produce syngas to be used for the production of energy, and not more modern uses that produce syngas as an intermediate for production of chemicals. The IED's Article 42 defines that two conditions must be met: (1) if the process delivers end of waste, and (2) if its emissions are lower than combustion of natural gas. There is currently a shift in the industry, where sites are burning syngas to generate power on site less frequently, and instead they are converting their products (i.e. Syngas or Syn-oil) into chemicals/fertilisers that do not generate direct emissions compared to natural gas post-combustion exhausts. Therefore, the Article 42 clause on emissions lower than natural gas may become irrelevant in the near term, or of difficult application.

- Secondly, there is a lack of clarity around the IED's current coverage of gasification, liquefaction and pyrolysis. Descriptions of several activities in Annex I are worded in a way that may exclude these processes. For example, the definition of Activity 4 specifies "the production on an industrial scale by chemical or biological processing of substances or groups of substances listed in points 4.1 to 4.6." This, as written, excludes thermal treatments, including liquefaction and pyrolysis. There is a need to revise those descriptions. Further, the IED's Annex I does not make reference to pyrolysis as a process. Although not all common processes are described in this annex, it would be beneficial to amend to include pyrolysis to provide clarity to operators and competent authorities that they are within the scope.

Concerning the production of biogas, this activity may be covered by point 5.3 or point 6.5 of Annex I of the IED.

Article 3.1 of Regulation 1069/2009 laying down health rules as regards animal by-products and derived products not intended for human consumption8 defines animal by-products (ABP) as follows: *entire bodies or parts of animals, products of animal origin or other products obtained from animals, which are not intended for human consumption, including oocytes, embryos and semen*. The concept of 'animal by-products' has replaced the former terminology of 'animal waste', however the latter is still used e.g. in point 6.5 of Annex I IED.

In addition, Member states may interpret the provisions of Annex I of the IED in various ways, i.e. that plants processing manure and slurry can fall under either point 5.3 or 6.5 of this Annex. The above mentioned activities are associated with different capacity thresholds as well as with different BAT Conclusions. The following approaches would address these issues:

- Develop syngas quality criteria to support end of waste principle for syngas
- Develop alternative quality criteria for Article 42 instead of the natural gas emissions clause, to capture those that generate products or feedstocks, and which are aligned with EU climate targets
- Revision of Annex I activities to include a reference to pyrolysis.
- Clarification of points 5.3 and 6.5 of Annex I of the IED as to the production of biogas.

An initial research exercise found some data that suggests there is a general absence of reliable information for the gasification, liquefaction and pyrolysis sector, on the technology adopted, application and any relevant parameter related to emissions, plant thermal input and output products. The lack of a clear definition for the processes, fuel characterisation and cataloguing and details on the production sites and overall common metric to measure plant capacity creates overall uncertainty. Most importantly, it is not possible to identify plants, which have gasification, liquefaction and pyrolysis units as secondary or auxiliary activity (i.e. Manufacturing waste minimisation or energy recovery). Other issues include:

a) Plants may have been identified as Incineration or Co-incineration activities
b) Plants are part of a larger manufacturing site, therefore their emissions are catalogued under a different manufacturing activity.

Objectives:

The measure will amend Annex I to clarify the scope of coverage of the IED pertaining to gasification, liquefaction, and pyrolysis plants as well as to biogas plants.

This measure will, therefore, contribute to the general and specific objectives of ensuring proportionately of EU law and keeping the burden on businesses and public authorities at the lowest possible level.

Implementation needs:

- The EU would amend the IED
- Participants of the BREF review process to gather more data on these processes and their current usage, environmental performance and applied techniques/BAT.

Assessing impacts

Economic impacts

- There are potentially impacts on operators and Member State authorities relating to administrative burden. Clarifications to Article 42 for non-incineration activities as well as clarity on what to categorise activities as under the IED may lead to **limited positive impacts** through reducing administrative burden by creating clarity and removing confusion.

Environmental impacts

- An update to Article 42, which captures non-incineration applications of gasification and pyrolysis can ensure that these plants are regulated effectively, and a revision of the wording in Annex I can also create certainty around which activities are regulated, potentially also improving the effectiveness of existing environmental regulation. There are, therefore, **limited positive impacts** on the environment that could be expected from this measure.

Social impacts

This measure is expected to have **no impact** on employment.

Measure 15: Delete Annex II of the IED "List of polluting substances".

Description of the measure and requirements for implementation

The list of polluting substances in Annex II can potentially be limiting and become outdated in the consideration of KEI addressed in the BREF review process. The BREF review process can consider a list of environmental issues and pollutants that is wider than that in IED Annex II, including but not only new and emerging environmental issues and pollutants.

Objectives:

The measure will delete Annex II in order to ensure that the BREF KEIs considers all environmental issues including new and emerging issues and pollutants.

This measure will, therefore, contribute to the general and specific objectives of ensuring proportionately of EU law and keeping the burden on businesses and public authorities at the lowest possible level.

Implementation needs:

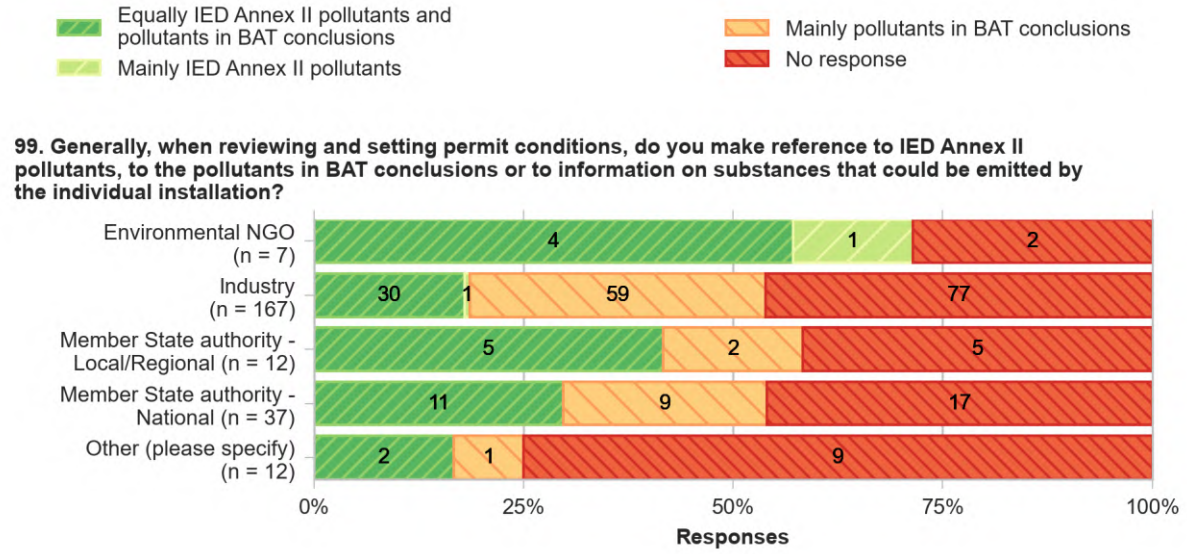
- The EU would amend the IED
- Participants of the BREF review and permitting processes to disregard Annex II's list of polluting substances

Assessing impacts

The scale of impact from implementing this measure depends on the extent to which permit writers currently refer to the Annex II list of pollutants when reviewing and setting permit conditions. The evidence on this is limited.

In the TSS for this study, the majority (66%) of industry stakeholders indicated that they primarily refer to the BAT conclusions when reviewing and setting permit conditions, while 33% indicated that they refer to the BAT conclusions and Annex II equally (Figure A8-11). In summary, 42% of respondents have indicated that they refer equally to Annex II and the BAT Conclusions when setting permits OR mainly to Annex II when reviewing and setting permit conditions. Almost no stakeholders (1 out of 167 industry stakeholders) indicated that they refer only to the Annex II pollutants.

Figure A8-11: TSS responses related to the use of IED Annex II



Economic impacts

There are expected to be **weakly positive impacts** on administrative burden caused by the deletion of Annex II. This is because permit writers would not need to refer to both the BAT Conclusion and Annex II, leading to very small improvements in administrative efficiency. This administrative efficiency has been assumed to affect around 40% of the existing installations covered by the IED (or over 22 000) and pertinent public authorities, and benefit these with a reduction of 0%-5% of their permit reconsideration and/or update costs, with a central estimate of around 2% reduction.

These **administrative savings to operators** would range from €0 to €3 million per annum, on average, over a period of 20 years, with a central estimate of €0.6 million. Similar **savings may also accrue to public authorities**, and these have been estimated at €0 to €2 million per year, on average, over the period, with a central estimate of €0.5 million.

Environmental impacts

The main environmental impacts are as described above, in the future BREF revisions, ensuring that reference is not made to the outdated Annex II, and includes new and emerging environmental issues. Therefore, there are expected to be **limited impacts** on the environment from ensuring an optimal BREF review process.

Social impacts

This measure specifically is expected to have **no impact** on employment.

Measure 16: Introduce a provision in Chapter II of the IED that sets out that the compliance assessment rules for Chapter II installations take precedent over other compliance assessment provisions for those installations.

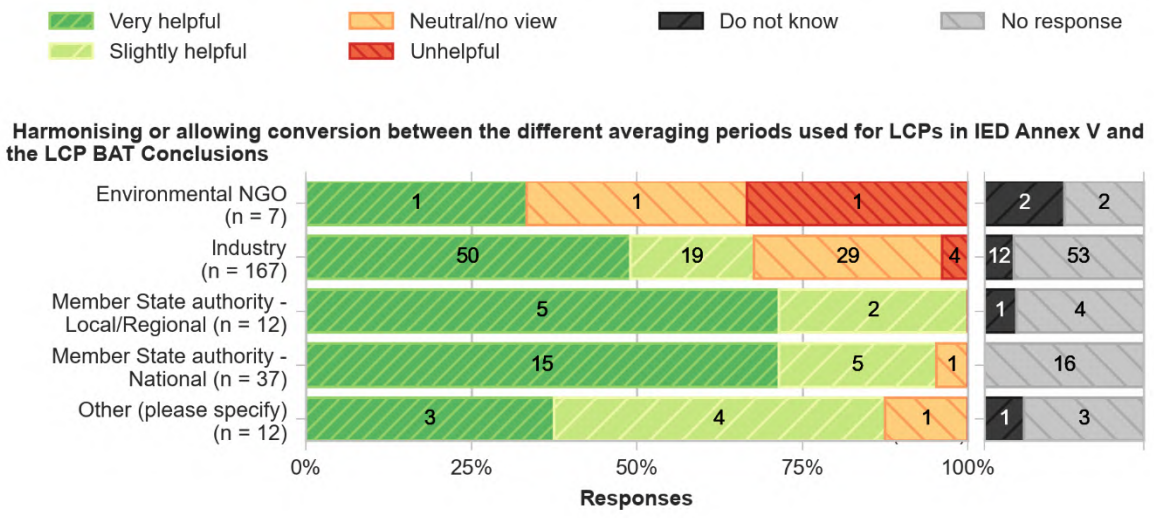
Description of the measure and requirements for implementation

There are currently issues caused by discrepancies in emission limit values set out for combustion plants in the IED under Annex V and VI, and requirements set out in the Large Combustion Plant (LCP) and Waste Incineration (WI) BAT Conclusions . This includes differences in averaging periods, leading to operators and Member State authorities needing to assess compliance for the same pollutants and processes multiple times, which causes unnecessary administrative burden.

Measure #7 proposes the introduction of a new set of Chapter II compliance rules. This measure proposes that these Chapter II rules take precedence over existing Annex V and VI provisions, i.e. leading to increased efficiency from the harmonisation of compliance assessment rules for Chapter II installations. ELVs contained in Annex V and VI can still be an important environmental backstop for combustion plants that have received an Article 15(4) derogation, as such plants would not be required to comply with BAT-AELs. The measure would, therefore, instil a provision that gives the new Chapter II rules a clear precedent for compliance assessment, whilst retaining the "safety net" of ELVs from Annex V and VI, to ensure that there is no development of gaps in coverage.

Stakeholders were asked how helpful the harmonising of averaging periods for LCPs in Annex V would be (Figure A8-12), with the majority responding that this would be very or slightly helpful.

Figure A8-12: TSS responses to the question asking how helpful the harmonising of averaging periods for LCPs in Annex V would be



Objectives:

The measure will aim to clarify compliance assessment by introducing wording that ensures Chapter II compliance assessment rules take precedent over Annex V provisions retaining the Annex V provisions as safety net ELVs.

This measure will, therefore, contribute to the general and specific objectives of ensuring proportionate implementation of EU law and keeping the burden on businesses and public authorities to the lowest optimal level.

Implementation needs:

- EU to introduce new text that sets out the precedent of Chapter II provisions

Assessing impacts

Economic impacts

Administrative burden on businesses

This measure is likely to have **weakly positive impacts** on administrative burden on businesses. A positive impact is expected as a result of the harmonised averaging periods for LCPs, which could reduce administrative burden. This is uncertain, and the evidence to identify the potential savings that could accrue as a result of this measure is limited.

It is assumed that operators reconsider and/or update the permits once every ten years (in line with the baseline BREF cycle), in general, or 2 times in a period of 20 years. Further expert input suggests that around 10% or 5 000 installations may be affected by the proposed amendment to the IED, by benefitting from lower administrative burden when compared to the baseline. The extent to which baseline costs for operators would be reduced is uncertain. Drawing primarily on the outputs of the TSS, an assumption has been made that savings could range from 0% to 5%, with a central estimate for this reduction of 2%. This would mean that on average over 20 years, savings to operators would range between €0 to €0.8 million each year, with a central estimate of €0.1 million per year.

Stakeholder input via the TSS suggests that the reduction in administrative burden from these amendments to the IED could range between 0%-15% of the permit review costs when compared to the baseline, whilst the vast majority of stakeholders have indicated little (+/- 5%) or no impact is expected. The central estimate for this reduction is, therefore, around 2% when compared to the baseline.

Operating costs and conduct of business

This measure is likely to lead to **limited to no impacts** on the costs of doing business, as no substantial changes in the operation and or investment decisions of operators or other businesses would be expected as a result of this measure.

Competitiveness and level playing field

This measure is likely to lead to **limited to no impacts** on competitiveness, and a **weakly positive impact** on levelling the playing field. A harmonised approach to compliance assessment for LCPs and WI from the introduction of Chapter II compliance assessment rules can lead to an improved level playing field by ensuring approaches and associated administrative costs for operators are similar.

Position of SMEs

This measure is likely to lead to **no impacts** on the position of SMEs. This measure focusses on large combustion plants and, therefore, will not affect SMEs.

Innovation and research

There is **no impact** expected on innovation and research.

Public authority impacts

This measure is expected to have **weakly positive impacts** on public authorities. A positive impact is expected as a result of the harmonised averaging periods for LCPs and WI, which could reduce administrative burden. This is uncertain and the evidence to identify the potential savings that could accrue as a result of this measure is limited.

It is assumed that operators reconsider and/or update the permits once every ten years (in line with the baseline BREF cycle), in general, or 2 times in a period of 20 years. Further expert input suggests that around 10% or 5 000 installations may be affected by the proposed amendment to the IED. The extent to which baseline costs for public authorities would be reduced is uncertain. Drawing on the outputs of the TSS, an assumption has been made that savings could range from 0% to 15%, with a central estimate for this reduction of 5%. This would mean that on average over 20 years, savings to public authorities would range between €0 to €1 million each year, with a central estimate of €0.3 million per year.

A third of national authorities and a quarter of local authorities responding to the TSS indicated that a 5%-15% decrease in administrative costs could result from the harmonised averaging periods for Chapter II. For public authorities, stakeholder input via the TSS suggests, therefore, that the reduction in administrative burden from these amendments to the IED could range between 0%-15% of the permit review costs when compared to the baseline, whilst the majority of stakeholders have indicated little (+/- 5%) or no impact is expected. The central estimate for this reduction is, therefore, around 5% when compared to the baseline.

Environmental impacts

The environmental impacts of the measure are likely to be limited, although they **remain uncertain**. The primary aim of this measure is to improve the efficiency of the compliance assessment processes, whilst the ambition of these processes will remain as is. Unifying

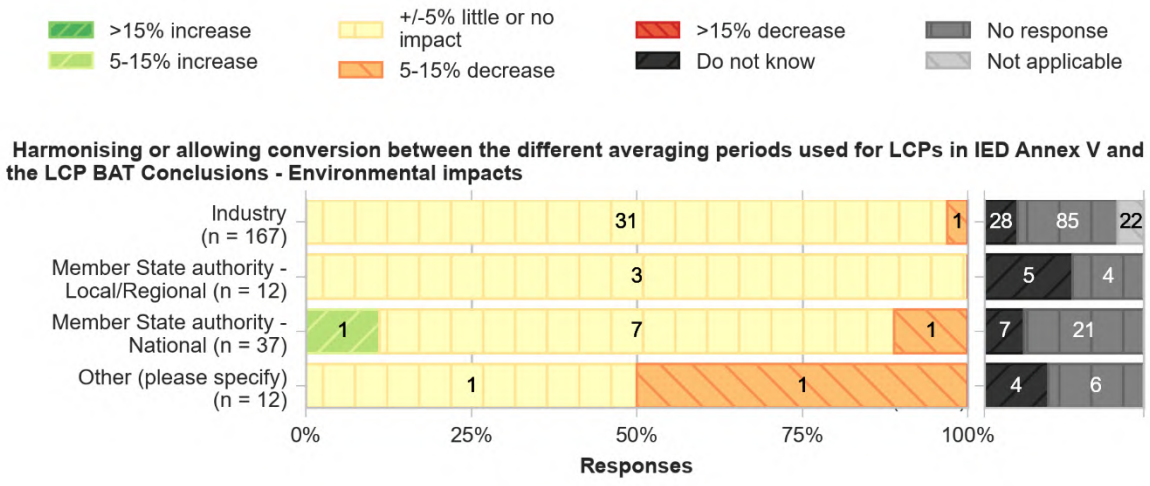
averaging periods may have some impacts on air quality due to longer averaging periods being more tolerant of periods of elevated emissions.

Should the use of the Annex V ELVs as a safety net be retained solely for those installations that have secured derogation(s) from the Chapter II requirements (i.e. Annex V ELVs would not apply to installations that have not received a derogation) it should be noted that this does potentially increase the risk of elevated air quality impacts over shorter duration averaging periods.

[For example, one could consider the hypothetical case of a 250 MWth coal-fired power station, operating with hourly averaged NOx emissions of 450 mg/Nm^3 for 5% of the year, and hourly averaged emissions of 170 mg/Nm^3 for the remaining 95% of the time. In this case, the annual average level of emission (184 mg/Nm^3) would be compliant with the Chapter II annual average BAT-AEL (200 mg/Nm^3) but would exceed the Annex V hourly average ELV (400 mg/Nm^3). However, since both averaging periods are required for compliance assessment currently, it is not expected that changes will lead to a change in environmental performance.]

Note that, as show in Figure A8-13, the majority of stakeholders that participated in the TSS indicated that there would be little or no impacts on the environment from the harmonisation of averaging periods (measure #7) that would take precedence as a result of the proposed measure (#16). Nearly all (97%) of industry stakeholders who responded to this question indicated that there would be +/-5%, i.e. little or no impact, via harmonising averaging periods.

Figure A8-13: TSS responses on the perceived environmental impacts of harmonising or allowing conversion between averaging periods for LCPs



Social impacts

This measure specifically is likely to result in a **limited to no impacts** on employment.

Summary of problem area 1 measures

For the measures presented in problem area 1, Table A8-12 summarises the Economic, environmental and social impacts of the measures using the qualitative ratings. Overall, these policy measures would yield weakly negative Economic impacts in the shorter to medium term, positive environmental impacts and limited social impacts. These impacts have been assessed using a qualitative scoring approach. The measures that are likely to have most significant impacts within this problem area are measures #3 and #5, although all of them expected to be effective in addressing issues identified with the IED during the recent evaluation.

Table A8-12: Summary of Economic, environmental and social impacts for measures in problem area 1

Policy measure	Economic impacts	Environmental impacts	Social impacts (employment focus)
#1	×	✓	O
#2	O	✓	O
#3	××	✓	O
#4	O	✓	O
#5	××	✓✓	O
#6	×	✓	×
#7	×	✓	O
#8	O	✓	O
#9	×	✓	O
#10	×	O	O
#11	×	✓	O
#12	O	O	O
#13	O	O	O
#14	✓	✓	O

Policy measure	Economic impacts	Environmental impacts	Social impacts (employment focus)
#15	✓	O	O
#16	✓	O	O

Table A8-13 similarly uses qualitative ratings to summarise costs and benefits for measures in problem area 1, with central estimates of administrative costs for businesses and public authorities also shown. Overall, expected costs and benefits associated with the measures retained to improve the effectiveness of the IED, improve transparency and reduce unnecessary regulatory burden. The benefits are often uncertain, however, these appear to be generally likely to outweigh costs.

Table A8-13: Summary of costs and benefits for measures in problem area 1, with central estimates of administrative costs for businesses and public authorities shown

Policy measure	Administrative costs – businesses (€m/yr)	Administrative costs – public authorities (€m/yr)	Overall costs	Overall benefits
#1	0.6	0.09	✗	✓
#2	0.2	0.4	✗	✓
#3	0.6	0.4	✗✗	✓
#4	No/limited	No/limited	**O**	✓
#5	8.0	6.7	✗✗	✓✓
#6	0.2	No/limited	✗	✓
#7	3.8	4.6	✗	✓
#8	No/limited	0.05	✗	✓
#9	0.06	0.4	✗	✓
#10	No/limited	No/limited	✗	**O**
#11	No/limited	5.5	✗	✓
#12	No/limited	2.0	✗	✓
#13	No/limited	0.2	✗	✓
#14	No/limited	No/limited	**O**	✓
#15	-0.6 (benefit)	-0.5 (benefit)	**O**	✓
#16	-0.1 (benefit)	-0.3 (benefit)	**O**	✓

Problem area 2: The IED is not dynamic enough and does not support the rapid deployment of innovative technologies

There are six policy measures shortlisted to address the problems, drivers and consequences associated with this problem area. For example, the static character and backwards-looking nature of the BREF process restricts innovation and, as a result, the IED has not been dynamic enough to support the rapid deployment of innovative technologies.

We have structured these measures based on the specific problems they are trying to tackle and provide a description, outline the requirements for implementation and a rapid assessment of their impacts. Following this, we provide an overview of the Economic, environmental, and social impacts supported by evidence.

Measure 17: Introduce legislative amendments to facilitate the development and testing of emerging techniques over a longer period.

Description of the measure and requirements for implementation

This measure would introduce a period during which IED installation operators are exempt from meeting BAT-AELs for pertinent sources of emissions whilst testing and/or developing Emerging Techniques. This period could be introduced by amending IED provisions such as Article 15(5).

This exemption period is yet to be defined. We have considered extending the period to 24-36 months. Evidence collected during the recent IED evaluation showed that this exemption has been used by very few IED installations.

During a focus group for this study, France confirmed that this is also the case in their installations. Austria explained that they offer exemptions for up to 36 months subject to explicit boundary conditions.

Further, a technology provider (Accessa) stated that "granting more time is unlikely to be a sufficient incentive for operators to take the risk (e.g. of meeting lower AELs). A more direct support and reward system would be more effective".

Objectives:

The measure will aim to to promote the testing and/or development of Emerging Techniques that could deliver higher environmental protection (or similar protection levels at lower operating costs). This measure will, therefore, contribute to the general objective of stimulating a deep industrial and agro-industrial transformation through deployment of breakthrough technologies and, more specifically, ensure that the IED is fit for permitting and reviewing of permits of large industrial and agro-industrial installations for the upcoming transformation.

Implementation needs:

- EU to clarify and establish a proposal for the exemption period, including the required justification. The period of exemption may only be for the commissioning or start-up period or longer, as required. During consultation activities for this study, public authorities suggested that a more tailored approach could be used where justification is provided to ensure the exemption period was effective in encouraging testing and development of emerging techniques.
- Competent authority to introduce and manage applications for temporary derogations.
- Operators to engage with the derogation process and use this to test and develop emerging techniques.
- EU to issue rules covering legal redress and the default position if the longer period with a temporary exemption does not produce positive results, to avoid the measure being subject to abuse by operators, causing excess pollution.

Assessing impacts

Economic impacts

Overall, this measure is likely to have **limited economic impacts** when compared to the baseline, although this will depend upon the take up of this exemption by operators.

Administrative burden on businesses

This measure is likely to have **limited to weakly negative impacts** on the administrative burden on businesses, depending on the number of sites engaged in this process.

Evidence on derogations currently possible for IED installations in the glass and the iron and steel sectors, outlined in the recent evaluation, shows that over 10% of installations may have been granted an exemption (on article 15.4 derogations) but only three cases on innovation (article 15.5) derogations. Given this, and evidence gathered, it is to be expected hat only a limited set of installations may decide to ask for this temporary derogation over a period of 20 years. This is assumed at 5%-10% of all existing installations (i.e., of a total of around 52 000), as they may be interested in seeking this new exemption when reviewing their permits and/or otherwise, and a similar percentage of installations seeking new permits (assumed at around 500 each year). This will generate some additional administrative costs for operators associated with developing the request for derogation and engaging with public authorities.

There is limited direct evidence available on the costs to businesses of developing an application for this type of derogation. The evidence available and summarised earlier in this Annex suggests that applications for exemptions may require between 40 to 300 hours for IED operators to complete, submit and iterate with public authorities. That is, an operator that seeks an extension from meeting BAT-AELs whilst testing and/or developing emerging technique may spend between €1 100 and €8 550 in administrative costs, assuming an hourly labour cost of around €29 (Eurostat, 2020).

Over a 20-year period, therefore, it is assumed that between 155 and 310 installations may seek this exemption each year, on average, over and above the baseline. This would imply an average

of €0.2 to €3 million in additional costs each year spread across the EU, with a central estimate of around €0.4 million each year. These costs are, therefore, unlikely to be significant, although it will depend on the number of installation operators that finally decide to seek a derogation.

Operating costs and conduct of business

This measure is likely to lead to **limited to no impacts** on the costs of doing business at the EU level. The measure does not require investments to comply with regulations. Further, this measure may lead to investments on Emerging Techniques, which in some cases may have higher overall costs. However, these are only likely for a very small number of installations, based on the evidence collected so far. For example, in a focus group for this study, Eurofer stated the proposed exemption period remains relatively short to lead to widespread changes in the way operators make investment decisions. Actual capital and operating costs incurred as a result of these exemptions would depend upon the emerging techniques that are being tested, and there is uncertainty as to what operators across sectors may take forward.

Competitiveness and level playing field

This measure is likely to lead to **limited to no impacts** on competitiveness or the levelling the playing field. This measure provides a possible exemption to implement BAT Conclusions. In this regard, businesses may take decisions to invest in techniques that could lead to improvements in their competitiveness. This measure should also have limited to no impacts on the level playing field, although it could lead to differential outcomes across countries and sectors depending on how they may be incentivised to take up this derogation.

Position of SMEs

This measure is likely to lead to **limited to no impacts** on the position of SMEs. There is a very large list of candidate emerging techniques that are applicable to small and large plants in any sector. This measure is not generating a different or disproportionate impact on smaller installation operators.

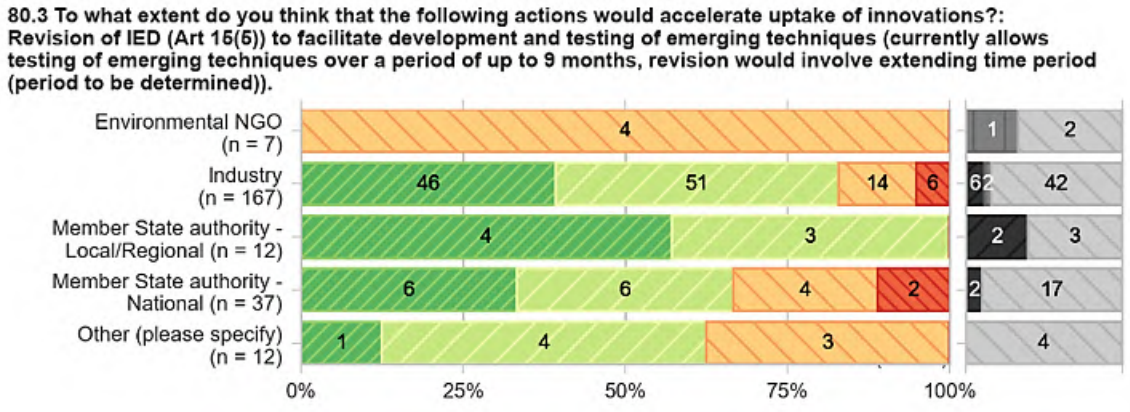
Innovation and research

This measure is likely to have **limited to weakly positive impacts** on innovation and research. The measure would likely encourage a smaller number of industrial operators to invest in research and development and testing of novel techniques in lieu of implementing BAT Conclusions for a period of time. It is possible, however, that this measure would encourage the adoption of existing knowhow (IP) from a supplier based in the EU or other industrial regions (USA or China). This would also generate opportunities for revenue generation for the industrial research and development sector. These uncertainties limit our ability to estimate the potential impacts on innovation and research.

Respondents of the TSS for this study have suggested that it is likely that these measures may lead to significant to moderate contributions towards research and development (Figure A8-14).

This conclusion supports the likelihood that this measure leads to weakly positive impacts; although, again, these are unlikely to be widespread and thus limited at the EU-level.

Figure A8-14: TSS responses



Public authority impacts

This measure is likely to have **limited to weakly negative impacts** on public authorities. As outlined earlier for administrative burden on businesses, evidence available suggests that only a limited set of installations may apply for this temporary derogation. This will generate some additional administrative costs for public authorities, primarily associated with reviewing any requests for derogation and considering the validity of the proposed justification.

The burden of proof during this administrative process is on IED operators. However, public authorities also need to engage with the 'applications for the exemption' from IED operators. Based on the evidence available, a broad assumption was developed that public authorities would incur up to 50% of the time spent by operators in considering these applications and engaging in the process, that is, between 20 to 150 worker hours at an hourly labour cost of €29 (Eurostat, 2020).

As noted earlier (see administrative burden on businesses), it is assumed that over a 20-year period between 155 and 310 installations may seek this exemption each year, additional to the baseline. This would imply an average of €0.1 million to €1 million in additional costs each year spread across public authorities in the EU, with a central estimate of around €0.2 million each year. These costs are, therefore, unlikely to be significant, although it will depend on the number of IED operators that finally decide to seek this exemption.

Further, public authorities may also establish a procedure and template for these specific derogations. They may build on existing infrastructure and resources linked to current derogation procedures; however, this may result in some additional one-off costs. These costs are also unlikely to be significant.

Environmental impacts

Overall, this measure is likely to have **limited to weakly positive impacts on the environment** when compared to the baseline, although these will depend upon the take up of this exemption by operators and the technologies or techniques deployed, potentially earlier than otherwise expected in the baseline.

Climate

This measure is likely to have **limited to no impacts** on the climate, especially in the shorter term. This is because emerging techniques are likely to have a focus on reducing pollution in scope of the current IED (such as NO_X) and, therefore, unlikely to focus on GHG emissions. Novel techniques do not often include improvements in GHG emission performance, although this may change in the medium to longer term if measures are introduced to adjust the scope of the IED.

Air quality and other environmental impacts

This measure is likely to lead to **limited to weakly positive impacts** on air quality; water quality and resources; soil quality or resources; waste production, generation and recycling; and, the efficient use of resources.

The overall environmental impact across these categories will be mainly driven by the number of installation operators that finally decide to seek a derogation. The specific scale of impact per installation with a successful derogation will depend upon the selected emerging techniques, although any of these techniques would be expected to result in additional contributions to reducing industrial polluting emissions.

Social impacts

This measure is likely to result in **limited to no impacts** on employment across the EU. The measure may create jobs in research and development and engineering and constructions sectors. However, the expected low take-up of this measure would lead to a very small knock-on effect across these sectors, and overall employment impacts across the EU are not likely to be significant.

Measure 18: Amend requirements to allow more time (6 to 8 years) for operators to implement emerging techniques with Technology Readiness Level (TRL) 8-9 or stricter long-term Emerging Techniques Associated Emission Levels (ET-AELs) reflecting the expected environmental performance of emerging techniques. Applicable to Key Environmental Issues only.

Description of the measure and requirements for implementation

This measure would allow more time (6 to 8 years) for operators to implement emerging techniques with Technology Readiness Level (TRL) 8-9 or stricter long-term Emerging

Techniques Associated Emission Levels (ET-AELs) reflecting the expected environmental performance of these techniques. The measure would be applicable to Key Environmental Issues only could be introduced by amending IED provisions such as Article 21(3).

The industrial installation permit will be updated reflecting an ELV that is equal or lower to the ET-AELs after the operator has finalised the construction and commissioning of the emerging technique. This will lead to lower environmental impacts than using an article 15.5 derogation (where operator permit would go back to BAT-AEL reference after testing period).Operators have concerns related to data (e.g. on emissions) underlying emerging techniques, as there might be high uncertainty. This could result in challenges associated with deriving legally binding indicators such as ET-AELs. Past experience from BREF reviews shows that when these techniques are likely to have been used only in a few sites, then the adoption in BREF may be done with a long list of caveats (numerous applicability restrictions such as "this might not be applicable in plants of type X"). The EEB suggests that the data to derive a regulatory value/ performance standard should be more flexible (e.g. check the US MACT standard)[25].

Along these lines, in an interview with ESWET, they have shared concerns that "performance should be proven, not expected. The promise of extraordinary performance can be a source of [risk] if made mandatory by authorities. [For example,] in the case of waste management…there is no one-size-fits-all technology and the "best" option for a specific waste stream is not necessarily the best for another waste stream. In the case of non-recyclable waste treatment, several technologies actually rely on pre-sorted feedstock (e.g. gasification) while others do not (e.g. incineration) and they play different roles. Thus, the recognition of emerging techniques and resulting processes should not lead to imposing a restricted number of options which would disrupt the proper functioning of waste management systems". This feedback will be considered to mitigate any unintended consequences and retain the technology neutral principles whilst acknowledging advances with research and innovation.

Objectives:

The measure will aim to promote disruptive or significant achievements on environmental protection (rather than marginal improvements). This measure will, therefore, contribute to the general objective of stimulating a deep industrial and agro-industrial transformation through deployment of breakthrough technologies and, more specifically, ensure that the IED is fit for permitting and reviewing of permits of large industrial and agro-industrial installations for the upcoming transformation.

Implementation needs:

- Public authorities to establish a clear process for considering requests to have more time to implement emerging techniques. Public authorities will also need to consider other implementation challenges e.g. by definition, emerging techniques can deliver the same

[25] The Maximum Achievable Control Technology (MACT) standard in the USA is a level of control that was introduced by Title III of the 1990 Clean Air Act Amendments.

performance at lower costs and/or enhanced performance. Therefore, these ET-AELs might be expressed using ranges to cope with uncertainty, which may lead to overlaps with baseline BAT-AEL ranges.

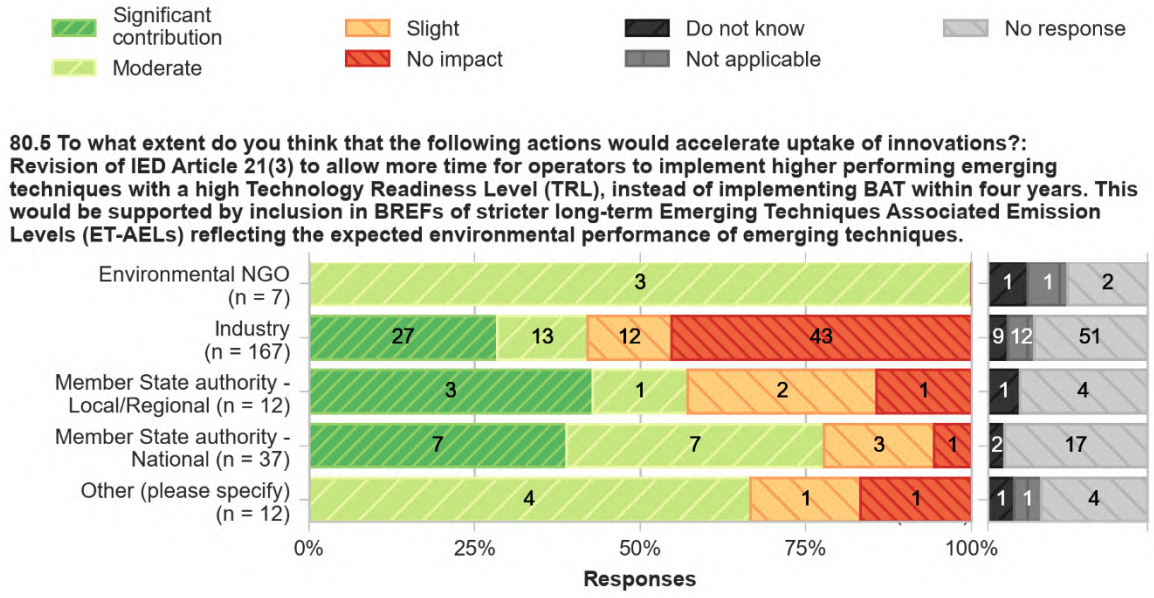
- Operators to provide a full justification report for requiring more time to implement emerging techniques.
- Public authorities and/or INCITE to contribute to reviewing these requests and reaching a decision. Member States (France and Spain) noted as part of a focus group that they would be keen for INCITE to support with reviewing these requests.

Assessing impacts

The economic, environmental and social impacts will depend on whether the measure leads to an increase in the uptake of emerging and innovative techniques by IED operators that may improve their enviornmental performance. This is uncertain.

The majority of stakeholders responding to the TSS perceived that at least moderate impacts on technology uptake by installations covered by the IED should be expected (Figure A8-15).

Figure A8-15: TSS responses.



Economic impacts

Overall, this measure is likely to have **weakly negative economic impacts** when compared to the baseline, although this will depend upon the uptake of emerging techniques by IED

operators, and whether this would require earlier or higher capital investments and operating costs when compared to the baseline.

Administrative burden on businesses

This measure is likely to lead to **weakly negative impacts** on the administrative burden on businesses, especially because businesses will need to provide a full justification for requiring more time to implement emerging techniques and update their permits accordingly. Details associated with implementing this measure are to be defined; however, we assume that IED operators will have to engage with some application process, similar with a permit review and/or a derogation application.

The evidence available and summarised earlier in this Annex suggests that applications for exemptions may require between 40 to 300 hours for IED operators to complete, submit and iterate with public authorities. That is, an operator that seeks an extension from meeting BAT-AELs whilst testing and/or developing emerging technique may spend between €1 100 and €8 550 in administrative costs, assuming an hourly labour cost of around €29 (Eurostat, 2020).

Although uncertain, based on the project team's expert opinion and consultation with stakeholders, it has been assumed that 5% - 10% of the installations may seek time allowance to implement emerging techniques, or between 2 600 - 5 200 IED installations every eight years (around a similar timetable of the BREF review process). This would include new and/or existing installations.

Over a 20-year period, therefore, between 260 and 520 installations may seek this derogation or time allowance each year, over and above the baseline. This would imply an average of €0.3 to €4 million in additional costs each year spread across the EU, with a central estimate of around €0.6 million each year.

Operating costs and conduct of business

This measure is likely to lead to **limited to weakly negative impacts** on the costs of doing business. The measure would not have a direct impact (requirement) on companies to invest more or less to comply with requirements. Rather, operators would seek an allowance to have more time to implement emerging techniques that best suit their installations whilst improving their environmental performance. We would expect that many of these techniques may have at least higher capital requirements although this is uncertain and would depend on a case-by-case basis.

Competitiveness and level playing field

This measure is likely to lead to **limited to no impacts** on competitiveness or the levelling the playing field. This measure provides flexibility to operators to take more time to invest on the relevant emerging technologies that are best suited to improve environmental protection at lowest cost for a given installation. Further, the carbon border adjustment mechanism may

mitigate any impacts on competitiveness resulting from carbon costs. In addition, this measure is unlikely to have any significant impacts on the level playing field in the EU.

Position of SMEs

This measure is likely to lead to **limited to no impacts** on the position of SMEs. Sectors with larger sites (and larger companies) such as chemicals or combustions units (power) might be more likely to seek more time to invest in emerging techniques.

Innovation and research

This measure is likely to lead to **weakly positive impacts** on innovation and research. The measure would likely encourage a smaller number of industrial operators to invest in research and development and testing of novel techniques in lieu of implementing BAT Conclusions for a period of time. It is possible, however, that this measure would encourage the adoption of existing knowhow (IP) from a supplier based in the EU or other industrial regions (USA or China). This would also generate opportunities for revenue generation for the industrial research and development sector.

Public authority impacts

This measure is likely to lead to **weakly negative impacts** on public authorities, especially for engaging in the review of requests from operators for time to implement emerging techniques. Detail associated with implementing this measure are to be defined; however, we assume that public authorities (MS competent authorities and/or INCITE) will have to engage with some process, similar with a permit review and/or a derogation application.

The burden of proof during this administrative process is on IED operators. However, public authorities also need to engage with the 'applications for the exemption' from IED operators. Based on the evidence available, a broad assumption was developed that public authorities would incur up to 50% of the time spent by operators in considering these applications and engaging in the process, that is, between 20 to 150 worker hours at an hourly labour cost of €29 (Eurostat, 2020).

As noted earlier (see administrative burden on businesses), it is assumed that over a 20-year period between 260 and 520 installations may seek this exemption each year, additional to the baseline. This would imply an average of €0.1 to €2 million in additional costs each year spread across public authorities in the EU, with a central estimate of around €0.3 million each year. These costs are, therefore, unlikely to be significant, although it will depend on the number of IED operators that finally decide to seek this exemption.

Other, potentially lower costs may be incurred earlier on to develop and establish a clear and consistent process for considering these requests across the EU.

Environmental impacts

Overall, this measure is likely to have **weakly positive impacts on the environment** when compared to the baseline, although these will depend upon the take up of this derogation by operators and the emerging techniques deployed, potentially earlier than otherwise expected in the baseline.

Climate

This measure is likely to lead to **limited positive impacts** on the climate, especially if GHG are included in the scope of the IED and BREFs. The scale of these impacts will depend upon the number of operators that seek these time allowance to implement emerging techniques and research and development trends.

Air quality and water quality

This measure is likely to lead to **weakly positive impacts** on air quality. The scale of these impacts will depend upon the number of operators that seek these time allowance to implement emerging techniques and research and development trends. However, the selected emerging techniques as part of these BREFs are likely to have higher environmental performance standards especially for emissions to air and water, than those identified in the baseline at any one point in time, thus leading to some reduction in polluting industrial emissions upon the implementation of BAT Conclusions.

Other environmental impacts

This measure is likely to lead to **weakly positive impacts** on soil quality or resources; waste production, generation and recycling; and the efficient use of resources. The scale of environmental impact across these categories will depend upon the number of operators that seek these time allowance to implement emerging techniques and research and development trends. Having said this, the selected emerging techniques as part of these BREFs are likely to have higher environmental performance standards than those identified in the baseline at any one point in time, thus leading to some reduction in polluting industrial emissions upon the implementation of BAT Conclusions.

Social impacts

This measure is likely to result in a **limited to weakly positive impact** on employment. The measure might create jobs in research and development, the engineering and constructions sectors, and regulatory affairs -to engage with any process seeking time allowances to implement emerging techniques-. However, expected increases in costs of doing business may put pressure on operators to identify efficiencies including but not only by reducing employment.

Measure 19: Establish shorter, up to 5-year BREF cycles focussed on defining stricter BAT-AELs based on recent innovations.

Description of the measure and requirements for implementation

This measure would design an agile BREF review process based on the same principles as the existing process, whilst incorporating changes to tools (e.g. digital, remote) and formats that facilitate faster and targeted revisions that are complementary to the baseline BREF process. This shorter process might be triggered by significant innovation and/or technological progress in a given sector and may be focused on a specific scope, e.g., only covering the most relevant KEIs.

This measure would establish shorter, up to 5-year BREF cycles, especially to target new installations and/or any major refurbishments or retrofits. Otherwise, that is, for the majority of baseline installations, the measure would not trigger a mandatory permit review.

Evidence suggests that there are not many greenfield or new sites. Therefore, the proposed measure is likely to have limited scope and/or potential impact, mostly linked to installation operators that may be considering significant transformation plans. A precise definition of 'significant' will need to be derived, potentially based on the fact that installation changes primary techniques (manufacturing paths/processes).

During a focus group for this study, Member States (Austria) and NGO representatives mentioned that this measure would be most effective if quicker BREF updates were to focus on Key Environmental issues.

Objectives:

The measure will aim to promote quicker adjustments to BAT-AEL based on recent ongoing innovation (by avoiding long periods with same standards) for new installations. This measure will, therefore, contribute to the general objective of stimulating a deep industrial and agro-industrial transformation through deployment of breakthrough technologies and, more specifically, ensure that the IED is fit for permitting and reviewing of permits of large industrial and agro-industrial installations for the upcoming transformation.

Implementation needs:

- EU (and MS authorities) to clarify, coordinate and establish an adjusted and quicker BREF process; the focus on key environmental issues or otherwise; and whether the process would trigger permit reviews and how.
- Operators to engage with BAT Conclusions only if they are considering major refurbishments and retrofits and/or investing in new installations.

Assessing impacts

Economic impacts

Overall, this measure is likely to have **weakly negative economic impacts** when compared to the baseline, although this will depend on how the more rapid BREF review process

complements the existing BREF cycle and the number of installations that may be affected -e.g. new permits as well as major refurbishments only-.

Administrative burden on businesses

This measure is likely to lead to **weakly negative impacts** on the administrative burden on businesses as a result of being involved in more frequent BREF reviews and more frequent permit reviews and updates when compared to the baseline.

A BREF review process for one sector may cost a total of between €3.5 and €21 million based on the data provided in the recent IED evaluation, and around 30% of these costs would be incurred by operators. Marginal and additional costs would be expected from increased frequency of BREFs; however, focusing on key environmental issues would reduce the cost of a single review and it is likely that operators would be less involved and more focussed.

If a complementary and more frequent BREF process were to be introduced, this could mean that there would be an additional BREF cycle for each sector in a period of 20 years, or 50% more BREF reviews at any point in time (e.g., if we assume that 60 BREF reviews are carried out in 20 years, we would expect this adjustment to lead to an additional 30 BREFs in this period). Total costs for operators would increase, therefore, by a maximum of 50% across the EU on average, although this is likely to be an upper bound, especially if synergies are identified. Alternatively, these rapid BREF reviews do not completely substitute the existing BREF schedule, but rather complement it when technological progress across sectors may warrant an update. In this case, these reviews may be very focussed or targeted and require lower input from stakeholders and thus, may be lower cost. There are uncertainties around the administrative implications of this measure. Given these options considered, it has been assumed that the BREF review costs that would be additional to the baseline over this period would range from 10% - 50%, with a central estimate of around 25% additional administrative burden.

This measure is targeting new installations and/or major refurbishments. It is unlikely that this measure would lead to any additional administrative costs associated with issuing new permits. However, this measure may require additional and/or more detailed permit reviews for those major refurbishments, assumed at a 40% of the baseline costs. The number of installations that will require major refurbishments, and thus may be affected by this measure is uncertain. In this context and based on the information available, it is assumed that around 10% of the baseline installations or 5 200 may be affected by this measure over 20 years, i.e., an average of 260 each year.

In total, this would mean around €0.4 to €13 million in additional costs each year, spread across IED installation operators in the EU, and a central estimate of around €3.2 million. These estimates depend on how the more rapid BREF review process complements the existing BREF cycle and the number of installations that may be affected.

Operating costs and conduct of business

This measure is likely to lead to **negligible impacts** on the costs of doing business, especially given that it is expected that only new installation operators or operators considering major refit/ retrofitting actions may require to review their permits as a result of updated BAT Conclusions through the proposed, quicker BREF process. For these relatively few installations, however, higher capital and operating costs would be expected when compared to the baseline, especially if quick BREF reviews lead to stricter or lower BAT-AELs. These are uncertain and would depend on the outcome of the BREF reviews and the number of installations that may be in scope.

Competitiveness and level playing field

This measure is likely to lead to **negligible impacts** on competitiveness and **no impact** on the levelling the playing field. This measure might slightly reduce the competitiveness of new industrial operators as it may result in marginally higher cost for environmental protection. These are unlikely to be significant in a global context and would likely be mitigated to some extent by the carbon border adjustment mechanism. This measure has no impact on level-playing field across EU.

Position of SMEs

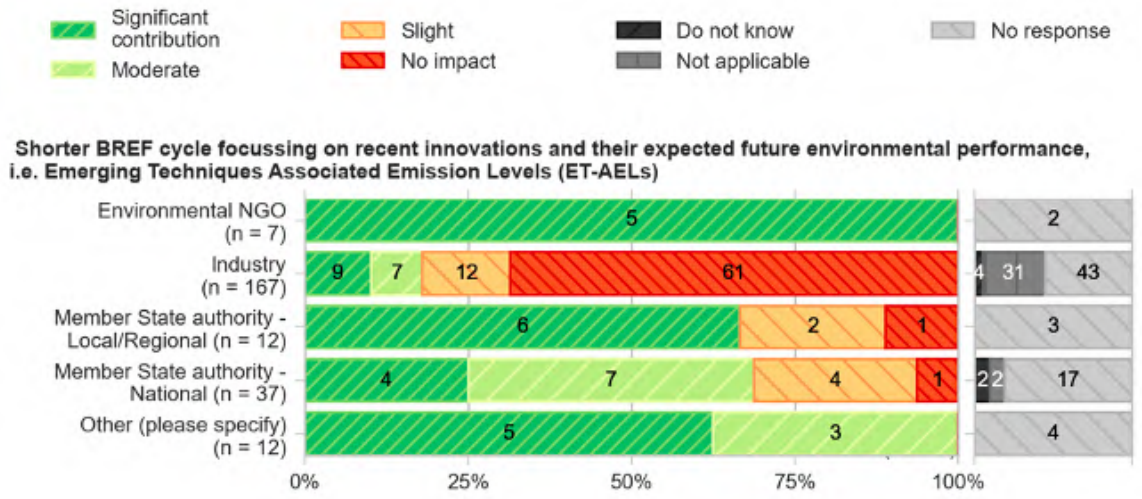
This measure is likely to have **no impacts** on the position of SMEs. In fact, if anything, some sectors with larger installations (and larger operators) such as chemicals or combustions units may be affected relatively more by this measure than others with smaller installations (and smaller operators).

Innovation and research

This measure is likely to lead to **limited to weakly positive impacts** on innovation and research. The measure would likely encourage a smaller number of industrial operators to invest in research and development and testing of novel techniques in lieu of implementing BAT Conclusions for a period of time. It is possible, however, that this measure would encourage the adoption of existing knowhow (IP) from a supplier based in the EU or other industrial regions (USA or China). This would also generate opportunities for revenue generation for the industrial research and development sector.

Non-industry respondents to the TSS for this study expect significant to moderate contributions towards innovation and research from the implementation of this measure (Figure A8-16). However, the majority of industrial stakeholders expect no impacts on innovation and research from this measure.

Figure A8-16: TSS responses



Public authority impacts

This measure is likely to lead to **weakly negative impacts** on public authorities as a result of being involved in more frequent or more demanding BREF processes when compared to the baseline.

A BREF review process for one sector may cost a total of between €3.5 and €21 million based on the data provided in the recent IED evaluation, and around 70% of these costs would be incurred by public authorities across the EU. Marginal and additional costs would be expected from increased frequency of BREFs; however, it is likely that they would be less involved and more focused. There is limited evidence to consider these synergies at this stage. Given these options considered (see administrative burden on businesses), it has been assumed that the BREF review costs that would be additional to the baseline over this period would range from 10% - 50%, with a central estimate of around 25% additional administrative burden.

This measure is targeting new installations and/or major refurbishments. It is unlikely that this measure would lead to any additional administrative costs associated with issuing new permits. However, this measure may require additional and/or more detailed permit reviews for those major refurbishments, assumed at a 40% of the baseline costs. The number of installations that will require major refurbishments, and thus may be affected by this measure is uncertain. In this context and based on the information available, it is assumed that around 10% of the baseline installations or 5 200 may be affected by this measure over 20 years, i.e., an average of 260 each year.

In total, this would mean around €1 to €22 million in additional costs each year, spread across public authorities in the EU, and a central estimate of around €5.3 million. These estimates

depend on how the more rapid BREF review process complements the existing BREF cycle and the number of installations that may be affected.

Environmental impacts

Overall, this measure is likely to have **weakly positive impacts on the environment** when compared to the baseline, although these will depend upon outcomes of the more rapid BREF review process and the number of installations that are affected by the resulting, likely stricter environmental requirements over time.

Climate

This measure is likely to lead to **limited to weakly positive impacts** on the climate, especially if GHGs are included in the scope of the IED and BREFs. The scale of these impacts will depend upon the BREF outcomes and research and development. This scale would also be limited by the triggers associated with the shorter BREF cycles, likely to focus primarily on new installations or those after major transformation.

Air quality and other environmental impacts

This measure is likely to lead to **limited to weakly positive impacts** on air quality; water quality and resources; soil quality or resources; waste production, generation and recycling; and the efficient use of resources.

The scale of environmental impact across these categories will depend upon the BREF outcomes and research and development. This scale would also be limited by the triggers associated with the shorter BREF cycles, likely to focus primarily on new installations or major refurbishments. Having said this, the selected emerging techniques as part of these BREFs are likely to have higher environmental performance standards than those identified in the baseline at any one point in time, thus leading to some reduction in polluting industrial emissions upon the implementation of BAT Conclusions.

Social impacts

This measure is likely to result in **limited impacts** on employment. The measure might create jobs in research and development and engineering and constructions sectors. However, the expected low take-up of this measure would lead to a very small knock-on effect across these sectors, and overall employment impacts across the EU are not likely to be significant.

Measure 20: Establish the INnovation Centre for Industrial Transformation & Emissions (INCITE) to monitor the Technology Readiness Level (TRL) and environmental performance (BAT-AEPLs) of emerging and breakthrough techniques. Recognition by INCITE of advanced techniques with TRL 8-9 (or improved environmental protection) would suggest an update of BAT conclusions.

Description of the measure and requirements for implementation

This measure would establish the INnovation Centre for Industrial Transformation & Emissions (INCITE) to monitor the Technology Readiness Level (TRL) and environmental performance of emerging and breakthrough techniques.

INCITE would identify candidate novel techniques and gather evidence on degree of maturity for advanced techniques with TRL 8-9 (or improved environmental protection). INCITE would suggest, where pertinent, an update of BAT conclusions upon approval from the relevant Technical Working Group.

This measure would also target all installations, new and existing. INCITE would be expected to have some powers to trigger a BREF review or update of BAT conclusions where pertinent. Nevertheless, these more frequent BREF reviews or BAT conclusion updates would likely affect a minority of installations at least in the shorter term.

Most stakeholders believe that the final design and resources assigned to INCITE will have an impact on its performance. The pilot project (innovation observatory) revealed that technology suppliers had no incentives or drivers to devote time, people or resources to its activities. Further, respondents to the TSS for this study also suggested that a wide range of stakeholders should be involved.

Eurofer stated that they would like to participate in INCITE, although industry participants shared concerns on the potential loss of technology neutrality. INCITE, however, should be expected to respond to ongoing innovation rather than focus on specific technologies and, therefore, it is expected that the principle of technology neutrality would be retained.

Participants of a focus group for this study (Eurofer and FuelsEurope) suggested that INCITE should not derive legally binding documents. The current measure proposed would provide INCITE with some powers to trigger a BREF review or update of BAT conclusions where pertinent. To this effect, FuelsEurope suggested that mid-term reviews should be justified by substantial evidence, and that identifying a small number of novel techniques may not be sufficient to warrant said reviews.

Objectives:

The measure will aim to accelerate the adoption, by operators, of lower emission standards (lower BAT-AELs) or lower cost for similar emission standards in a faster way (sooner than the next BREF review) by converting novel or emerging techniques into candidate BATs. This

measure will, therefore, contribute to the general objective of stimulating a deep industrial and agro-industrial transformation through deployment of breakthrough technologies and, more specifically, ensure that the IED is fit for permitting and reviewing of permits of large industrial and agro-industrial installations for the upcoming transformation.

Implementation needs:

- EU to establish INCITE and clarify membership, resources, focus (including sectoral and/or whether this would only apply to key environmental issues) and the process for validation of environmental performance of emerging techniques and triggering permit reviews.
    - Member states (Austria) and NGOs mentioned at a focus group the need to focus these additional reviews solely on Key Environmental impacts.
    - Member States (Spain) suggested at a focus group that ETV system could provide support on validating environmental performance.
    - FuelsEurope suggested that mid-term reviews should be justified by substantial evidence and identifying a small number of novel techniques may not be sufficient to warrant said reviews.
- EU and MS authorities to clarify definitions of novel and emerging techniques as well as TRL status.
- Operators, technology providers and other stakeholders to participate in INCITE.
- Operators to take appropriate action as a result of changes to BAT conclusions.

Assessing impacts

Economic impacts

Overall, this measure is likely to have **weakly negative Economic impacts** when compared to the baseline, although this will depend on how the number of BREF reviews triggered by INCITE and/or BAT Conclusion updates, as well as the number of installations that may be affected; e.g. new permits as well as major refurbishments only.

Administrative burden on businesses

This measure is likely to lead to **weakly negative impacts** on the administrative burden on businesses, especially from:

- More frequent and/or adjusted BREF reviews.
- More frequent permit reviews and updates to comply with new legally binding requirements.
- Annual administrative costs associated with operators' support to INCITE.

A BREF review process for one sector may cost a total of between €3.5 and €21 million based on the data provided in the recent IED evaluation, and around 30% of these costs would be incurred by operators. Marginal and additional costs would be expected from increased

frequency of BREFs; however, focusing on key environmental issues would reduce the cost of a single review and it is likely that the role of operators would be more focussed.

If a complementary and more frequent BREF process is triggered based on the outputs of the work carried out by INCITE, this could mean that additional BREF cycles for the pertinent sectors may be taken forward. In comparison to measure #19, a BREF review and/or update of BAT Conclusions would not take place periodically, but only when INCITE identifies a significant opportunity. That is, INCITE would provide a mechanism through which additional, more rapid and/or adjusted BREF reviews would only really take place if significant opportunities are identified. In this case, the project team experts considered that the additional workload resulting from this may range from 10% to 20% of the baseline, with a central estimate of around 15%. This is because only a few sectors are likely to have relevant ETs to trigger quicker, targeted and complementary BREF reviews. The measure would not have a narrow scope as it would target all installations; nevertheless, it is expected that the majority of sectors and associated installations are likely to continue to work within the baseline framework.

It is unlikely that this measure would lead to any additional administrative costs associated with issuing new permits. However, this measure may require more involved and/or detailed permit reviews for installations working in sectors targeted by INCITE, which is expected to cover around 15% of the existing installations or around 7 800 over a period of 20 years. This is uncertain. Permit reconsiderations and updates for these installations are assumed to be around 40% of the baseline costs, as these are expected to be significantly more targeted.

In total, this would mean around €0.5 to €9 million in additional costs each year, spread across IED installation operators in the EU, and a central estimate of around €3.2 million. These estimates depend on the outcomes of INCITE's work, how any BREF reviews that are triggered complement the existing BREF cycle and the number of installations that may be affected.

Additional annual costs to contribute to INCITE are expected to be significantly lower than this.

Operating costs and conduct of business

This measure is likely to lead to **weakly negative to negative impacts** on the costs of doing business. The measure is likely to require earlier and higher investment by operators to comply with new candidate BATs and potentially lower BAT-AELs. Specifics would be dependent upon INCITE's work, updates of BAT, the number of operators affected, and subsequent action by operators. Therefore, it is challenging to estimate the additional capital and operating costs that may be incurred by IED installation operators.

Any estimation would require an understanding of the number of installations that would be required to invest earlier, more frequently and at higher cost in these new BAT (or BAT-AELs). This measure will likely impact 'heavy' industry (Iron & steel, organic chemicals or oil and gas refineries). Food and agricultural (e.g. IRPP) sectors do not often develop technologies so fast and thus is rather unlikely that INCITE would promote faster BREF cycles on those sectors.

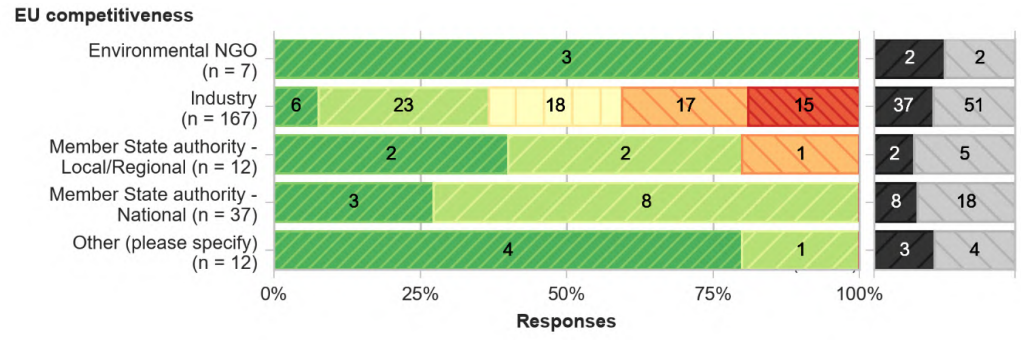
Additional capital expenditure (CAPEX) and operating expenditure (OPEX) will depend upon the selected novel technologies. Heavy industry affected by this measure is likely to require retrofits to existing installations (green field sites are not probable). Investments in these industrial installations are likely to be relatively higher than in other sectors (such as IRPP) can range from €0.5 to €200 million euro per site, based on expert opinion.

Competitiveness and level playing field

This measure is likely to lead to **unclear impacts** on competitiveness and **limited to no impacts** on levelling the playing field. On the one hand, this measure may reduce the competitiveness of EU industrial/ manufacturing companies by leading to substantial increases in the cost of doing business relative to competitors in the global context. The carbon border adjustment mechanism may mitigate impacts that are related with higher CO_2 emission abatement. In addition, other evidence would suggest that these changes could put the EU's industry in the front-foot of transformation, potentially gaining first-mover advantage.

These latter positive impacts may have been considered by stakeholders when responding to the TSS for this study (Figure A8-17). There is consensus amongst the Environmental NGOs and 'Other' stakeholders that strong contributions towards competitiveness should be expected from the implementation of this measure. In contrast, there are mixed views from industry.

Figure A8-17: TSS responses on EU competitiveness impacts of this measure



This measure is not expected to affect the EU's level playing field. There might be a few exemptions such as use of biobased fuels in EU as ETs since those have different prices and availabilities across European regions.

Position of SMEs

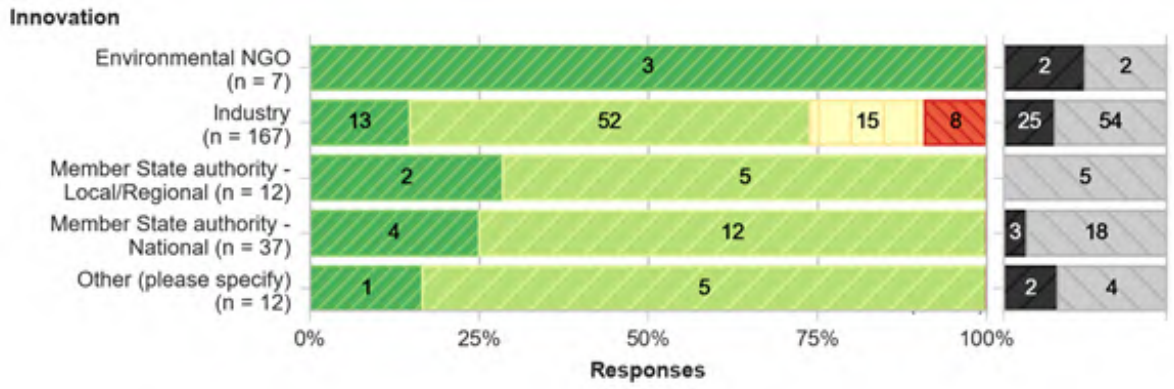
This measure is likely to lead to **limited to no impacts** on the position of SMEs. In fact, if anything, some sectors with larger installations (and larger operators) such as chemicals or combustions units may be affected relatively more by this measure than others with smaller installations (and smaller operators) such as food or slaughterhouses, where technology might develop at slower pace.

Innovation and research

This measure is likely to lead to **weakly positive impacts** on innovation and research. The measure would likely encourage a smaller number of industrial operators to invest in research and development and testing of novel techniques in lieu of implementing BAT Conclusions for a period of time. It is possible, however, that this measure would encourage the adoption of existing knowhow (IP) from a supplier based in the EU or other industrial regions (USA or China). This would also generate opportunities for revenue generation for the industrial research and development sector.

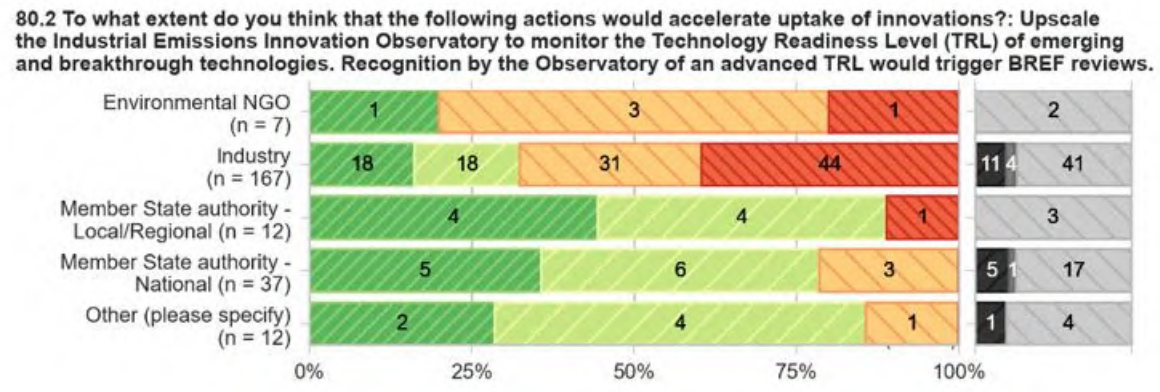
Stakeholders responding to the TSS for this study agree that a moderate contribution to innovation and research from establishing INCITE should be expected. Environmental NGOs believe that it will have a strong impact on innovation (Figure A8-18). A minority in the other stakeholder groups agree with this statement while the majority of stakeholders expect to see a moderate contribution to research and development across the EU. Only a very small number of industry stakeholders responded with no impact from this measure.

Figure A8-18: TSS responses



In addition, the majority of responses to the TSS (over 80%) support the measures considered herein are likely to lead to weakly positive impacts on research and innovation (Figure A8-19).

Figure A8-19: TSS responses



Public authority impacts

This measure is likely to lead to **weakly negative impacts** on public authorities, especially from:

- More frequent and/or adjusted BREF reviews.
- More frequent permit reviews to comply with new legally binding requirements.
- One-off and annual administrative costs associated with the set up and management of INCITE

A BREF review process for one sector may cost a total of between €3.5 and €21 million based on the data provided in the recent IED evaluation, and around 70% of these costs would be incurred by public authorities across the EU. Marginal and additional costs would be expected from increased frequency of BREFs; however, focusing on key sectors and environmental issues would reduce the cost of a single review and it is likely that the roles of public authorities would be more focussed.

If a complementary and more frequent BREF process is triggered based on the outputs of the work carried out by INCITE, this could mean that additional BREF cycles for the pertinent sectors may be taken forward. In comparison to measure #19, a BREF review and/or update of BAT Conclusions would not take place periodically, but only when INCITE identifies a significant opportunity. That is, INCITE would provide a mechanism through which additional, more rapid and/or adjusted BREF reviews would only really take place if significant opportunities are identified. In this case, the project team experts considered that the additional workload resulting from this may range from 10% to 20% of the baseline, with a central estimate of around 15%. This is because only a few sectors are likely to have relevant ETs to trigger quicker, targeted and complementary BREF reviews. The measure would not have a narrow scope as it would target all installations; nevertheless, it is expected that the majority of sectors and associated installations are likely to continue to work within the baseline framework.

It is unlikely that this measure would lead to any additional administrative costs associated with issuing new permits. However, this measure may require more involved and/or detailed permit reviews for installations working in the sectors targeted by INCITE, which is expected to cover around 15% of the existing installations or around 7 800 over a period of 20 years. This is uncertain. Permit reconsiderations and updates for these installations are assumed to be around 40% of the baseline costs, as these are expected to be significantly more targeted.

Costs for the Commission to set up INCITE

Additional costs to set up and manage INCITE are expected to be notable albeit lower than these.

Set up costs would depend on the approach to establishing INCITE. Costs could range from €0.5 million to €10 million (from setting up a virtual team within an existing organisation, to establishing an independent organisation with an address).

Operation costs would also vary.

Experience with the pilot project (innovation observatory)[26] shows that 75 person-days are required over two years to monitor innovation progress for one BREF (IED sector) and publish the relevant information.

The envisaged up-scaled INCITE will cover all current as well as new IED sectors rather than focus only on sectors for which the BREF is under review. Considering that there is a total of about 30 BREFs/IED activities and given economies of scale, this suggests a need for up to 1125 person-days per year (including overheads). This translates into five full-time equivalents.

Costs of the external contractor to run the pilot observatory were €160 000. We estimate a mark-up of 25%-50%, or €40 000 - €80 000, to capture additional costs incurred by public authorities as they contributed to the work carried out the contractors. This would imply total costs of €200 000 - €240 000 over three years and covering two sectors. These costs would increase more or less proportionately to the number of sectors that INCITE would be expected to monitor/ cover each year or over the 10 year period.

As a result, in total, this would mean around €1 to €11 million in additional costs each year, spread across public authorities in the EU, and a central estimate of around €4.5 million. These estimates depend on the outcomes of INCITE's work, how any BREF reviews that are triggered complement the existing BREF cycle and the number of installations that may be affected.

Environmental impacts

Overall, this measure is likely to have **weakly positive to positive impacts on the environment** when compared to the baseline, although these will depend on how the number of BREF reviews triggered by and/or BAT Conclusion updates, as well as the number of installations that may be affected -e.g. new permits as well as major refurbishments only.

Climate

This measure is likely to lead to **limited to no impacts** on the climate unless it is combined with other policy measures that enlarge/focus IED activity and BREF reviews on decarbonisation processes. Emerging techniques in the shorter term will target environmental performance associated with core IED pollutants (NO_X, dust, etc.). Co-benefits in the form of GHG emissions reduction are possible, but not every/many techniques to reduce IED pollutants do also reduce GHG. In addition, the scale of these impacts will depend upon the outcomes of the work by INCITE and any more frequent BREF reviews or actions triggered otherwise, as well as research and development.

Air quality and other environmental impacts

This measure is likely to lead to **positive impacts** on air quality, water quality and resources and soil quality or resources; and **weakly positive impacts** on waste production, generation and recycling; and the efficient use of resources.

[26] Assessment of the functionality and effectiveness of a novel techniques 'Innovation Observatory' to support concrete BREF review processes; Ricardo et al. (2020)

The scale of environmental impact across these categories will depend upon the outcomes of the work by INCITE and any more frequent BREF reviews or actions triggered otherwise, as well as research and development. Having said this, the selected emerging techniques as part of these BREFs are likely to have higher environmental performance standards than those identified in the baseline at any one point in time, thus leading to some reduction in polluting industrial emissions upon the implementation of BAT Conclusions.

Social impacts

This measure is likely to result in a **limited to weakly positive impacts** on employment. The measure might create jobs in research and development, the engineering and constructions sectors, and regulatory affairs -to engage effectively with permit reviews-. However, expected increases in costs of doing business may put pressure on operators to identify efficiencies including but not only by reducing employment.

Measure 21: Amend requirements to allow operators to have more time to implement BAT conclusions where deep transformation of industrial sectors is required. "Deep transformation" would refer to the adoption of completely different process routes and/or primary process techniques that facilitate a significant reduction in the emissions of pollutants and/or the use of energy, raw materials (i.e. secondary, or 'end-of-pipe' techniques would not qualify as 'deep transformation').

Description of the measure and requirements for implementation

This measure would provide more time (e.g. up to six years) to implement BAT conclusions, where deep transformation of industrial sectors is required, which could be introduced by amending IED provisions such as Article 21(3).

"Deep ,transformation" would refer to the adoption of completely different process routes and/or primary process techniques that facilitate a significant reduction in the emissions of pollutants and/or the use of energy, raw materials (i.e. secondary or 'end-of-pipe' techniques would not qualify as "deep transformation").

Industrial federations (e.g. Eurofer) that represent businesses that require deep transformation over the next 10 or more years find this policy measure attractive. In particular, they find that the transformation needs need to be considered and supported rather than hampered by the IED, and this measure could go some way in ensuring this. They also note that this measure could materialise in e.g. "the time extension of the current permit and/or continue with the existing BAT-AEL requirements for a certain period (in consistency with the timing indicated in the transition roadmap for the sector)".

Objectives:

The measure will aim to promote faster BAT-AEL reductions (and avoid having long periods with the same standards) for installations seeking a deep transformation, without imposing the need for widespread permit updates. This measure will, therefore, contribute to the general objective of stimulating a deep industrial and agro-industrial transformation through deployment of breakthrough technologies and, more specifically, ensure that the IED is fit for permitting and reviewing of permits of large industrial and agro-industrial installations for the upcoming transformation.

Implementation needs:

- EU (and MS authorities) to clarify, coordinate and establish a process to consider time allowances where deep transformation may be required. This may include the EU providing guidance as to how to approve/ justify these requests, especially given that permit writers may already be unclear as to when they need to update each permit. This guidance could provide ETS views on which processes can deliver significant GHG reductions.
- Operators to engage in a process with public authorities to provide proof that deep transformation may be required, thus warranting more time to implement BAT conclusions.
- Operators to take forward deep transformation plans.
- European Commission to establish rules to avoid abuse of this system by operators, including legal redress measures and the process requiring a "default to lower range of BAT-AEL" in any case, within a set period.

Assessing impacts

Economic impacts

Overall, this measure is likely to have **weakly negative economic impacts** when compared to the baseline, although this will depend upon the number of successful applications for derogation from IED operators, and whether these derogations would facilitate the deep transformation of their industrial processes, which may require earlier or higher capital investments and operating costs when compared to the baseline.

Administrative burden on businesses

This measure is likely to lead to **weakly negative impacts** on the administrative burden on businesses, especially associated with the process of seeking more time to implement BAT conclusions when a deep transformation is required by a given operator. The process would have to be defined more concretely; we would expect that a justification report supported by evidence would have to be developed by operators, similar in some ways to a permit review/ update.

The evidence available and summarised earlier in this Annex suggests that applications for exemptions may require between 40 to 300 hours for IED operators to complete, submit and

iterate with public authorities. That is, an operator that seeks an extension from meeting BAT-AELs where deep transformation is required may spend between €1 100 and €8 550 in administrative costs, assuming a hourly labour cost of around €29 (Eurostat, 2020).

Although uncertain, based on the project team's expert opinion and consultation with stakeholders, it has been assumed that 5% - 10% of the installations may seek time allowance to implement transformation change within their operations, or between 2 600 - 5 200 IED installations every eight years (around a similar timetable of the BREF review process). This would include new and/or existing installations.

Over a 20-year period, therefore, between 260 and 520 installations may seek this derogation each year, over and above the baseline. This would imply an average of €0.3 to €4 million in additional costs each year spread across the EU, with a central estimate of around €0.6 million each year.

Operating costs and conduct of business

This measure is likely to lead to **limited to no impacts** on the costs of doing business. Minor, new plants would need to invest on environmental protection (regardless of this regulatory change).

Competitiveness and level playing field

This measure is likely to lead to **weakly negative impacts** on competitiveness and **no impacts** on levelling the playing field. This measure provides flexibility to operators to take more time to adopt BAT conclusions whilst they implement deep transformative actions that seek to address longer term climate and environmental challenges and align with EU general objectives. Further, the carbon border adjustment mechanism may mitigate any impacts on competitiveness resulting from carbon costs. In addition, this measure is unlikely to have any significant impacts on the level playing field in the EU.

Position of SMEs

This measure is likely to lead to **limited to no impacts** on the position of SMEs. Sectors with larger sites (and larger companies) such as chemicals or combustions units (power) might be more likely to seek more time to invest in emerging techniques.

Innovation and research

This measure is likely to lead to **weakly positive impacts** on innovation and research. The measure would likely encourage a smaller number of industrial operators to invest in research and development and testing of novel techniques in lieu of implementing BAT Conclusions for a period of time. It is possible, however, that this measure would encourage the adoption of existing knowhow (IP) from a supplier based in the EU or other industrial regions (USA or China). This would also generate opportunities for revenue generation for the industrial research and development sector.

Public authority impacts

This measure is likely to lead to **limited to weakly negative impacts** on public authorities, especially associated with the process of reviewing and assessing applications from operators that seek more time to implement BAT conclusions when a deep transformation is required. The process would have to be defined more concretely; we would expect that a justification report supported by evidence would have to be developed by operators and reviewed and assessed by public authorities.

The burden of proof during this administrative process is on IED operators. However, public authorities also need to engage with the 'applications for the exemption or derogation' from IED operators. Based on the evidence available, a broad assumption was developed that public authorities would incur up to 50% of the time spent by operators to consider these applications and engaging in the process, that is, between 20 to 150 worker hours at an hourly labour cost of €29 (Eurostat, 2020).

As noted earlier (see administrative burden on businesses), it is assumed that over a 20-year period between 260 and 520 installations may seek this exemption each year, additional to the baseline. This would imply an average of €0.1 to €2 million in additional costs each year spread across public authorities in the EU, with a central estimate of around €0.3 million each year. These costs are, therefore, unlikely to be significant, although it will depend on the number of IED operators that require deep transformation and finally decide to seek this exemption.

Other, potentially lower costs may be incurred earlier on to develop and establish a clear and consistent process for considering these requests across the EU.

Environmental impacts

Overall, this measure is likely to have **weakly positive impacts on the environment** when compared to the baseline, although these will depend upon the take up of this derogation by operators and the type and depth of the transformation of their industrial processes, potentially earlier than otherwise expected in the baseline.

Climate

This measure is likely to lead to **weakly positive impacts** on the climate. The scale of these impacts will depend upon the number of operators that seek to delay their implementation of BAT consultations whilst they focus on deep transformation.

Air quality and other environmental impacts

This measure is likely to lead to **limited to weakly positive impacts** on air quality; water quality and resources; soil quality or resources; waste production, generation and recycling; and the efficient use of resources.

The scale of environmental impact across these categories will depend upon how whether deep transformation yields co-benefits across these environmental dimensions and the extent to which

the delay in implementing BAT conclusions is used to identify even more cost-effective industrial techniques.

Social impacts

This measure is likely to result in a **limited to weakly positive impact** on employment. The measure might create jobs engineering and constructions sectors, and regulatory affairs -to engage with any process seeking more time or derogation to implement BAT conclusions to focus on deep transformation-. However, expected increases in costs of doing business may put pressure on operators to identify efficiencies including but not only by reducing employment.

Measure 22: Establish a permit review obligation by 2030 that focusses on the capacity of the installations to operate in accordance with the EU's general zero pollution, circular economy and climate objectives.

Description of the measure and requirements for implementation

This measure would require operators of IED installations to produce Transformation Plans for consideration as part of this permit review process. The outputs of this review would be written into the updated permit. As an alternative, Transformation Plans could be integrated in the Environmental Management System (without the permit review), which would be audited without the engagement of public authorities.

The ambition is for this measure to encourage sharing information and planning actions that would contribute towards achieving the EU's general objectives, especially for climate. As part of the permit review process expected by 2030, some or all of the transformation plan will be entered into the permit.

For example, an operator of an IED installation proposes as part of its transformation plan to move from using gas-fired to renewable electricity by 2040. This would, therefore, be entered into the updated permit. This updated permit would provide a legal anchor and allow competent authorities to hold businesses accountable through monitoring, reporting and enforcement activities, increasing therefore the likelihood of implementation of the proposed measures.

The nature of the transformation plans is expected to change significantly by sector and installation. Therefore, there is no ambition to provide a detailed, one-size fits all template or even requirements. Rather, the intention is to promote the development of tailored plans that can increase the likelihood of operators taking actions that would contribute towards 2050 targets and avoiding a cliff-edge scenario in the late 2040's.

Some sectors, such as livestock production/ pigs and poultry, may be exempt from this measure as their contribution to direct decarbonisation are expected to be limited in comparison to other sectors.

Objectives:

The measure will encourage IED installations to align further with EU's general objectives, especially in relation with zero-pollution and decarbonisation. This measure will, therefore, contribute to the general objective of achieving carbon neutrality in the EU, and more specifically, support the decarbonisation of the (agro-)industrial sectors covered by the IED.

Implementation needs:

- The EU to clarify the requirements and process for setting and considering transformation plans e.g. via a Commission Decision addressing aims, objectives and expected contents possibly around 2030.
- Operators to develop, within a five-year timeframe, a transformation plan, seeking to align with and contribute to achieving EU general objectives.
- Competent Authorities and Operators to engage with the permit review process or Operators integrate Transformation Plans in EMS – without engaging public authorities.

Assessing impacts

Economic impacts

Overall, this measure is likely to have **negative economic impacts** when compared to the baseline, although this will depend upon the number of permit reviews that are additional to the baseline, the extent to which operators and public authorities bring forward their efforts to transform IED operations, both in terms of planning and implementation, and any additional monitoring, reporting and enforcement requirements.

Administrative burden on businesses

This measure is likely to lead to **negative impacts** on administrative burden on businesses. Annual administrative costs for operators of IED installations are associated with:

- Engaging with the permit review.
- Producing the transformation plans (by most if not all operators). Whilst it is expected that a large number of sites will produce plans as a matter of business as usual, the timing of those plans is unclear and, to date, there is progress in developing sectoral roadmaps but there are a limited number of plans at installation level.
- Carrying out additional monitoring, reporting and enforcement activities.

This measure is focussed on existing installations, with the exception of the IRPP farming sites (which numbered approximately 20 000 [2015 figures], but is anticipated to grow if IED Measures 31-33 are adopted). Thus, around 32 000 IED installations (non-IRPP) of the present total 52 000 installations would require to review their permits and produce transformation plans by 2030. There is an uncertainty as to how many of these installations would already engage in a permit review during this period and, therefore, these costs would not be additional to the baseline in every case. It is, therefore, assumed that between 40%-100% of these costs could be additional to the baseline, although these may represent an upper bound.

Transformation Plans are likely to yield one-off administrative costs. These costs would depend upon the level of preparation by IED operators in the baseline. It is likely that some operators already have developed plans and/or have started considering how they might need to transform to adhere to the EU's environmental objectives. It has been assumed that producing a plan could require between 40 to 300 worker hours, in line with other activities that require effort from operators to produce and present evidence to public authorities. That is, operators may spend between €1 100 and €8 550 in administrative costs to produce these plans, assuming an hourly labour cost of around €29 (Eurostat, 2020). These additional costs would affect 32 000 installations and could, therefore, range between €3 million to €22 million each year, on average, over the period of 20 years, with a central estimate of €4 million.

Further, these plans would bring additional effort required for operators in activities such as monitoring and reporting and hosting inspections. The scale of this additional effort is uncertain, however, an additional 5% over the baseline is assumed.

As a result of this additional burden from the additional permit reviews and updates, producing the transformation plans, increasing effort on monitoring and reporting and inspections, this measure could imply an additional cost of €5 million to €140 million each year, on average, over the 20-year period, and a central estimate of around €50 million. These estimates are highly dependent on the extent to which these administrative activities are partially or completely to the baseline, especially for producing transformation plans and carrying out the permit reviews.

The alternative, i.e. integration of the Transformation Plans with the EMS would result in significant reduction in administrative costs – while costs of preparing the plans will remain stable (€4 million/year), operators will not need to face the permit review process. Monitoring, data management and inspection costs will be integrated with the EMS obligations, leaving the total admin costs for the operators at the €20 million/year.

Operating costs and conduct of business

This measure is likely to lead to **weakly negative impacts** on the costs of doing business. Operators of IED installations are already committed to transforming their business under the climate neutrality plan. However, these plans may encourage more ambition and/or the earlier introduction of transformative measures, which could require bringing forward higher levels of capital and operating expenditure. This is, however, uncertain and dependent upon technological progress and other exogenous factors.

Competitiveness and level playing field

This measure will likely lead to **limited to no impacts** on competitiveness, and **weakly positive impacts** on levelling the playing field. This measure alone is unlikely to lead to such significant costs that would impair the competitiveness of businesses in a global context, although it would depend to a large extent on the ambition of the transformation plans. The measure will result in a more consistent approach across the EU when compared to the baseline, although a tailored (and thus differential) approach in developing and implementing these plans is expected.

Position of SMEs

This measure is likely to lead to **weakly negative impacts** on the position of SMEs. Transformation plans are expected to be tailored to the installations' circumstances; however, producing these plans will have fixed costs that may be disproportionately affect SMEs when compared to larger businesses (i.e., costs per employee may be significantly higher for SMEs than larger businesses). This remains uncertain.

Innovation and research

This measure is likely to have **limited direct impacts** on research and development, even though developing transformation plans may encourage businesses to consider new and innovative techniques for deployment.

Public authority impacts

This measure will likely lead to **negative impacts** on public authorities. Competent Authorities would engage with the permit reviews, which would include the review and consideration of the transformation plans developed by IED operators, and potentially more resources may be devoted to inspection and other compliance activities that would check that the transformation plans are being implemented by operators in line with the established plans.

As noted earlier (see administrative burden on businesses), this measure is focussed on existing installations, assumed at 52 000, all of which would require to review their permits and produce Transformation Plans by 2030. There is an uncertainty as to how many of these installations would already engage in a permit review during this period and, therefore, these costs would not be additional to the baseline in every case. It is, therefore, assumed that between 40%-100% of these costs could be additional to the baseline, although these may represent an upper bound.

Operators would be required to produce transformation plans and increase their monitoring and reporting efforts. Public authorities would need to engage with this increase in information exchange and compliance requirements. The impact on costs is uncertain, but it is assumed that an additional 10% over baseline costs is likely, especially for managing the information received, maintaining systems and leading inspections.

As a result of this additional burden from the additional permit reviews and updates, reviewing transformation plans and managing the additional information received from operators and leading more complex inspections, this measure could imply an additional cost of €4 million to €90 million each year, on average, over the 20-year period, and a central estimate of around €50 million. These estimates are highly dependent on the extent to which these administrative activities are partially or completely to the baseline, especially for producing transformation plans and carrying out the permit reviews.

The alternative, i.e. integration of the Transformation Plans with the EMS would leave public authorities with no costs as they will be relieved from the permit review task. Verification and compliance with the Transformation Plans will be left to the EMS auditors.

Environmental impacts

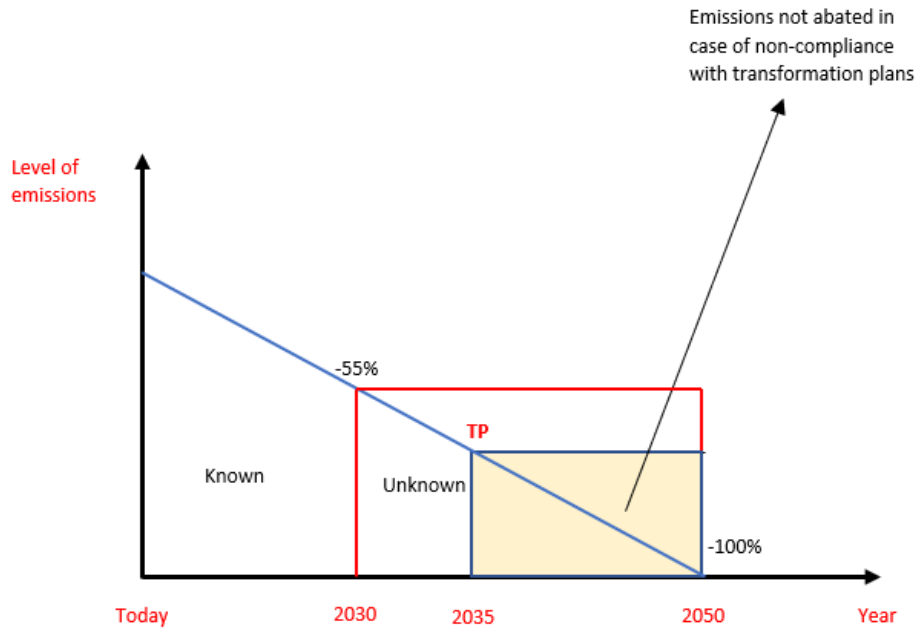
Overall, this measure is likely to have **positive impacts on the environment** when compared to the baseline, although these will depend on the ambition of the transformation plans and how rapid these lead to positive changes in the way businesses operate and their environmental performance.

Climate

This measure will likely lead to **weakly positive to positive impacts** on climate. Assessing the scale of impact is, however, complex given the uncertainty inherent to tailored transformation plans.

The E-PRTR data provides a starting point for GHG emissions so far. Further, the fit for 55 programmes developed by DG CLIMA[27] provide a projection for how emissions may evolve into the future. Figure A8-20 illustrates how transformation plans may contribute towards achieving the EU's climate objectives.

Figure A8-20: Emissions reductions via Transformation Plans



The level of emissions is set on the y-axis, while the years are represented on the x-axis. The graph thus shows how the level of greenhouse gas emissions is expected to change over the years, considering the EU climate obligations to be delivered through the 'EU Fit for 55' package of proposals[28]. The emissions' reduction target of 55% by 2030 with respect to 1990

[27] The fit for 55 programmes

[28] https://EU.europa.eu/info/sites/default/files/chapeau_communication.pdf

levels considered in the EU ETS inception IA[29] is 'known', and the 2050 climate neutrality target is added. The remainder 45% of emissions ('unknown') are to be addressed ahead of 2050 and, therefore, transformation plans could play a part in contributing to emissions reductions in the (agro-)industry. The yellow square would, therefore, represent the upper bound of greenhouse gas emissions that would not be abated if industry were not to comply with the transformation plans.

Evidence from previous policy targets suggests that without multiple actions that would contribute to achieving them, including in this case the requirement to produce and implement transformation plans by IED installation operators, it is possible that Member States are unable to reach the established targets.

This measure would, therefore, contribute to increasing the likelihood that the EU's climate objectives are indeed achieved. The measure is not expected, however, to reduce emissions against a Fit For 55 baseline, but rather reduce the risk of not reaching the targets.

For example, seven MS failed to comply with air quality pollution legislation[30] (roughly ¼ of EU). The project team is considering how this evidence may be used to forecast emissions that may not abated in the absence of transformation plans – the yellow section in the figure above.

Further indirect benefits may be expected from the information exchange and process of developing the content of the plan, such as identifying trends and gaps in different sectors. For example, this information could be used to urge countries lagging behind to take further action.

Air quality

This measure is likely to result in a **weakly positive to positive impact**s on air quality, by complementing existing (EU ETS) market incentives thus contributing to further reductions in GHG emissions from the (agro-) industrial activities. The extent to which further GHG emission reductions would accrue will depend on the transformation plans and associated ELVs.

Other environmental impacts

This measure will likely have a **weakly positive to positive impacts** on water quality and resources; soil quality and resources; waste production, generation and recycling; and the efficient use of resources, as transformation plans will be produced in accordance with the EU's general zero pollution, circular economy and climate objectives.

Social impacts

This measure specifically is likely to result in a **limited to weakly positive impacts** on employment. Even though Member State Competent Authorities would face additional review obligations, this is not expected to require significant changes to employment when compared to the baseline.

[29] https://EU.europa.eu/info/law/better-regulation/have-your-say/initiatives/12660-Climate-change-updating-the-EU-emissions-trading-system-ETS-_en

[30] https://eeb.org/half-of-eu-governments-fail-to-deliver-a-plan-to-cut-air-pollution/

Summary of Problem Area 2 measures

For the measures presented in problem area 2, **Table A8-14** summarises the Economic, environmental and social impacts of the measures using the qualitative ratings. Overall, these policy measures would yield limited to negative economic impacts in the shorter to medium term, positive environmental impacts and limited social impacts. These impacts have been assessed using a qualitative scoring approach and a summary is provided below. This suggests that, as a response to these policies, IED operators may incur some direct economic costs to improve their environmental performance through the development, testing and implementation of more innovative techniques and technologies and/or transformative measures.

Table A8-15 similarly uses qualitative ratings to summarise costs and benefits for measures in problem area 2. Overall, it appears that expected costs and benefits associated with the six measures retained to encourage the adoption of innovative techniques appear are balanced. The benefits are largely uncertain as they depend on the outcomes of technical processes and investment decisions by operators. In this case, the analysis primarily qualitative.

Table A8-14: Summary of economic, environmental and social impacts-measures in Problem Area2

Policy measures	Economic impacts	Environmental impacts	Social impacts (employment focus)
#17	×	✓	O
#18	×	✓	O
#19	×	✓	O
#20	×	✓✓	✓
#21	×	✓	O
#22	××	✓✓✓	✓
#22 alternative	×	✓✓✓	✓

Finally, measure #20 is likely to be more balanced than measure #19, especially as it could be more efficient in delivering additional environmental protection. Measure #22 is considered an alternative to measure #21, and it is not only likely to be more favourably balanced but also the scale of the potential positive impacts that this measure could have are likely to be significantly higher than for measure #21.

Table A8-15: Summary of costs and benefits for measures in problem area 2, with central estimates of administrative costs for businesses and public authorities shown

Policy measure	Administrative costs – businesses (€m/yr)	Administrative costs – public authorities (€m/yr)	Overall costs	Overall benefits
#17	0.4	0.2	✗	✓
#18	0.6	0.3	✗	✓
#19	3.2	5.3	✗	✓
#20	3.2	4.5	✗	✓✓
#21	0.6	0.3	✗	✓
#22	50	50	✗✗	✓✓✓
#22 alternative	20	0	✗	✓✓✓

Problem Area 3: The IED has not been effective at addressing the use of hazardous chemicals, resource efficiency or the circular Economy

There are four measures shortlisted to address the problems, drivers and consequences associated with this problem area. For example, the IED's design and implementation to date have not prioritised resource efficiency and, as a result, the IED has not been effective in contributing to improving resource efficiency and the circular Economy.

We have structured these measures based on the specific problems they are trying to tackle and provide a description, outline the requirements for implementation and a rapid assessment of their impacts. Following this, we provide an overview of the economic, environmental, and social impacts supported by evidence.

Measure 23: Introduce an option for Technical Working Group (TWG) to set either binding resource efficiency and circular economy BAT-AEPLs or indicative performance levels.

Description of the measure and requirements for implementation

The binding nature of BAT-AELs is specified in IED Article 15(3):

> *The competent authority shall set emission limit values that ensure that, under normal operating conditions, emissions do not exceed the emission levels associated with the best available techniques as laid down in the decisions on BAT conclusions referred to in Article 13(5) through either of the following:*
>
> *(a) setting emission limit values that do not exceed the emission levels associated with the best available techniques. Those emission limit values shall be expressed for the same or shorter periods of time and under the same reference conditions as those emission levels associated with the best available techniques; or*
>
> *(b)(b) setting different emission limit values than those referred to under point (a) in terms of values, periods of time and reference conditions.*
>
> *Where point (b) is applied, the competent authority shall, at least annually, assess the results of emission monitoring to ensure that emissions under normal operating conditions have not exceeded the emission levels associated with the best available techniques.*

This is complemented by a possibility for derogation in cases of disproportionately higher costs compared to the environmental benefits due to the geographical location or the local environmental conditions of the installation concerned; or the technical characteristics of the installation concerned, in Article 15(4).

The measure proposed here intends to bring the status of the BAT-AEPLs (other than BAT-AELs)[31] in line with this of BAT-AELs, i.e. to set the same requirements for associated consumption, reuse/recovery/recycling, level of substitution of primary materials and fuels by secondary sources/renewables, and other environmental performance levels. It would be made possible for the BREF TWG to determine binding BAT-AEPLs, to be transposed into respectively consumption limit values, reuse/recovery/recycling limit values, substitution limit values or environmental performance limit values in the permits or in the general binding rules. This could be done, e.g. by amending article 15(3) to include (all) environmental performance levels associated with BAT.

However, similar to emission KEIs covered by BREFs, there is a possibility to set indicative resource efficiency and circular Economy levels, e.g. when there is large variability in the data due to important differences in products manufactured, or when one KEI is much more important than another (like in the case for NO_X and CO emissions in many processes). That is, it is a decision of the BREF TWG, case by case per individual KEI, to either determine a BAT-AEPL that is binding, or determine a non-binding indicative/target level.

The inclusion of BAT-AEPLs in Article 15(3) would raise the question whether BAT-AEPLs would be subject to a derogation procedure such as contained in Article 15(4) also apply to BAT-AEPLs.

Concerning the existing BAT-AEPLs derived under the IED (or under the IPPCD), there are two main options to consider, the first one being preferred:

1. Similar to the BAT-AELs derived under the IPPCD, when this directive was replaced by the IED, the existing IED BAT-AEPLs would not be given this explicitly binding status (in the same manner as BAT-AELs). Only a review of a BREF and its BAT conclusions would render the BAT-AEPLs binding.
2. Existing BAT-AEPLs would become binding in the same manner as BAT-AELs via the update of the IED, immediately (4 years after publication of the BAT conclusions), or after a certain transition period.

Objectives:

- More circular resources (i.e. renewables and secondary raw materials).
- More level playing field, more consistent/homogeneous implementation.
- Increased importance of BAT-AEPLs other than BAT-AELs.

This measure will, therefore, contribute to the general objective of transforming the EU into a circular Economy and, more specifically, contributing towards the transition to a more circular Economic model for the EU in the short-to-medium term.

Implementation needs:

[31] From here on, when discussing the consideration if binding BAT-AEPLs, it is implied that this concerns those other than BAT-AELs, except where otherwise mentioned.

- EU to introduce changes, e;g. to article 15(3) of the IED legislation, to include similar requirements for BAT-AEPLs other than BAT-AELs, see description above. This will require monitoring and reporting of other environmental performance levels in the same manner as for the emission levels.
- EU to produce guidance for competent authorities and installation operators on how to interpret and implement BAT-AEPLs other than BAT-AELs, where necessary.
- All stakeholders to continue, and potentially increase attention, for data collection and analysis on consumption, reuse/recycling, and other environmental performance levels during the information exchange.
- There may also be a prerequisite to expand the IED operator obligations in article 11 −currently referring to pollution, waste and energy efficiency−, with water and materials efficiency. Furthermore, requirements for resource efficiency and environmental performance limit values could be added to the current permit conditions in article 14(1).

Assessing impacts

Economic impacts

Overall, this measure is likely to have **weakly negative economic impacts** when compared to the baseline, although this will depend upon the take up of binding BAT-AEPLs.

Administrative burden on businesses

This measure is likely to lead to **weakly negative impacts** on administrative burden on businesses. IED operators are likely to be affected by increased administrative burden from more elaborate data monitoring and reporting, collection and validation within the BREF process, in preparation of permit reconsiderations and/or updates and engaging with inspection activities.

For example, this may include more compliance monitoring to prove that the installation operates within quantitative boundaries of the permit (environmental performance limit values such as resource consumption limit values or substitution levels of primary raw materials and non-renewables) and more reporting to feed into the BREF information exchange and/or national and EU databases on industrial resource consumption.

These increases in burden will be marginal. This is because the BAT-AEPLs set in BAT conclusions are already the reference for setting the permit conditions according to article 14(3), and because, generally, recent BAT conclusions already include specific plans to monitor and manage resource efficiency of water, energy and certain materials (including chemicals) that are relevant for the sector.

Other measures or initiatives that aim to lighten the administrative burden through more harmonized and user-friendly reporting requirements and tools (e.g. more coherence between E-PRTR and BREF information exchange) could also limit the increase in administrative burden.

No significant changes in long term (2050 vs. 2025) to be expected: once introduced, monitoring and reporting obligations will remain similar.

These additional administrative activities would generally make existing processes more resource intensive, thus increasing their unit costs. It is challenging to make a quantitative estimate of this additional burden. This depends on:

- The burden per binding BAT-AEPL set, but also on the number of BAT-AEPLs for an activity/sector, which can vary between sectors. The mere introduction of binding BAT-AEPLs itself could also change the number of BAT-AEPLs set, due to increased importance of, and thus interest in, resource efficiency data and quantitative information on the use of renewable and secondary resources.
- The baseline of installations located in a country/region where BAT-AEPLs are already implemented as binding is unclear. Responses to the TSS indicate that in many MSs they are used as (non-binding) benchmark values. Even in the latter case, here will be little to no additional administrative burden because the information collection and sharing with the competent authority is already part of the permitting process.
- The baseline of installations that have resource efficiency and circular Economy performance that is within the range of already set BAT-AEPLs. The 'Assessment of BAT conclusions implementation in IED Permits' study commissioned by DG ENV might provide better insight in this.
- The administrative burden associated with any derogation procedure will presumably be at least as significant than that of the permitting itself.

Expert-based assumptions, developed through engaging with stakeholders, suggests that in the baseline:

- 40% of operators are already subject to a binding implementation of BAT-AEPLs by competent authorities, or there is no BAT-AEPLs for their activities, meaning there is no increase in administrative burden for these businesses;
- 40% of operators are currently subject to permit conditions for which the BAT-AEPLs were used as benchmark/target values, meaning there would be only a minor increase in administrative costs due to increased permit application, compliance reporting and inspection;
- 20% of operators are currently either not subject to any permit conditions based on the BAT-AEPLs, or would need to apply for an article 15(4)-like derogation, meaning the increase in administrative costs could be significant.

Based on this evidence, it is assumed that at least 25% of the IED operators or around 13 000 operators may consider setting BAT-AEPLs as part of their baseline permit reviews, that is, no additional permit reviews would be expected. Nevertheless, these permit reviews and associated

sectoral BREF reviews may require more effort from operators as a result of this measure. Further, when permit conditions are set based on BAT-AEPLs, effort from operators on monitoring, reporting and compliance-related activities may also increase.

It is assumed that when these 13 000 operators engage in permit reviews, they would be doing so in an environment where the status of the BAT-AEPLs (other than BAT-AELs) is more aligned with this of BAT-AELs and the additional effort required would be 5% more than in the baseline. Similarly, the contribution of operators to the BREF process may also increase around 5%, and an additional 5% of administrative costs may also be incurred due to more demands on monitoring, reporting and supporting public authority-led inspections.

As a result, additional administrative costs could reach between €0.3 million and €11 million each year, on average, with a central estimate of around €7 million each year over a period of 20 years. These costs are estimated to be an upper bound and highly uncertain, as they generally depend on the final number of IED installations affected by binding BAT-AEPLs over the baseline.

Industry responses to the TSS suggest that a one-size-fits-all approach would not be welcome and point to the complexity of implementation and compliance, increasing administrative costs. Respondents also pointed to the IED Article 9 exemptions, to a court ruling that inhibits energy efficiency requirements to be set in permits to avoid double regulation, and to voluntary energy efficiency agreements at national level.

Finally, in the TSS, industry was also asked about the impact of binding BAT-AEPLs on employment, consumer prices, EU competitiveness, EU market share and trade with third countries. More than 75% of industry indicated a significant reduction or reduction for these parameters (and increase for consumer prices). This could be due to increased administrative costs or, rather, to additional operating costs. The latter seems more probable.

Operating costs and conduct of business

This measure is likely to lead to **weakly negative impacts** on the costs of doing business. For those cases where BAT-AEPLs other than BAT-AELs are, at this time, not implemented as binding in the same way as BAT-AELs, often additional investments would be needed to ensure complete compliance (i.e. without any exception, apart from OTNOC) to these BAT-AEPLs.

Because these investments are mainly aimed at resource efficiency, they might sometimes lead to reductions in operational costs. It can be expected that some of the techniques used/installed to meet the BAT-AEPLs will pay back over time, within their Economic lifetime. However, this might not be the case for the substitution of fossil and primary resources by renewable and secondary ones.

The long-term trend is hard to anticipate. This will depend in large part on whether the investment costs decline due to technological advances, and the evolution of resource costs. This may be relevant for long-term comparison, e.g. if the cost of water were to double by 2050,

techniques saving water would pay back much quicker. For example, the total cost of the energy system per unit of final consumption is expected to increase 2,0% per year between 2010 and 2030, and 0,8% per year between 2030 and 2050. On the other hand, if costs of primary resources and materials typically used in infrastructure (steel, cement, polymers, etc.) go up, the investment cost would rise more than the potential operational savings.

A quantitative assessment would require a clear understanding of the share of installations that exceed BAT-AEPLs, and what number of BAT-AEPLs they exceed. Combined with information on average investment costs and operational costs or gains. These can vary widely, and there is no reliable data on the specific costs related to binding BAT-AEPLs, as compared to non-binding BAT-AEPLs. It would not be accurate to extrapolate costs associated with the historic change of the BAT-AEL status, because much more than emissions, resources already come at a cost to operators, which causes them to already limit their consumption to a certain extent.

Industry was asked in the TSS about the impact of binding BAT-AEPLs on employment, consumer prices, EU competitiveness, EU market share and trade with third countries. More than 75% of industry indicated a significant reduction or reduction for these parameters (increase for consumer prices). This could be due to increased administrative costs or, rather, to additional operating costs. The latter seems to be more probable.

Competitiveness and level playing field

The implementation of this measure is likely to have **limited to no impacts** on competitiveness. The cost of doing business might, in some cases, go up (see 'operating costs and conduct of businesses (industry)' above). However, there is no strong indication this would have a significant effect on competitiveness. On the contrary, if one compares with the (absent) effect of the binding BAT-AELs under the IED on competitiveness, it could be expected that there will be no or only a limited impact from the updated BAT-AEPL status. What distinguishes BAT-AEPLs on resource consumption is that they limit resource consumption, and therefore operational costs for these resources. This might, however, probably not be the case for the substitution of fossil and primary resources by renewable and secondary ones,

This measure is likely to have **limited to weakly positive impacts** on levelling the playing field. The measure is primarily aimed at promoting a more level playing field in the EU, so there will be a positive impact for this aspect. This is further emphasized by the many responses from all stakeholder groups that point to the oft-occurring cross-media effects between emission control and resource consumption. One could argue that there is currently a risk that a level playing field is not respected, when only emission levels are binding, and thus implemented similarly, while resource efficiency levels are not.

Position of SMEs

This measure is likely to lead to **weakly negative impacts** on the position of SMEs. Although the increased administrative burden for industry will be larger for large and complex installations in absolute terms, relative to the number of employees or turnover, the increased burden will be

larger for SMEs. This is because the additional administrative and operational impacts, including but not only associated with monitoring and reporting, demonstrating compliance, and achieving permit limit values include a significant shared of fixed effort.

Innovation and research

This measure may have a **weakly positive impact** on research and development. The IED evaluation concluded that the IED, BREFs and BAT conclusions have stimulated innovation, the BAT conclusion being indicated as the most important driver (more so than requirement to hold permit, monitoring and reporting requirements, enforcement, and the emerging techniques chapters of BREFs). Similar to the effect caused by the strictly binding BAT-AELs set under the IED, an updated strictly binding status of BAT-AEPLs would further drive innovation efforts. However, the magnitude of this impact is uncertain, not only because BAT-AEPLs are already implemented in this way in some Member States.

Public authority impacts

This measure is likely to have a **weakly negative impact** on public authorities. There are some cases where BAT-AEPLs other than BAT-AELs are presently not implemented as binding in the same way as BAT-AELs. Thus, for these cases, additional administrative efforts by public authorities would be needed for setting environmental performance levels in general binding rules or in individual permits that do not exceed the BAT-AEPLs, enforcing them, collecting and checking data during the BREF process.

If the possibility of derogations is included in the legislation, this could also lead to additional derogations, meaning more administrative efforts from public authorities as well. The administrative costs associated with derogations are assumed to be at least as significant as that of the permitting itself.

As set out earlier (see administrative burden on businesses), it is assumed that at least 25% of the IED operators or around 13 000 operators may consider implement measures for operators to achieve the required BAT-AEPLs as part of their baseline permit reviews, that is, no additional permit reviews would be expected. Nevertheless, these permit reviews and associated sectoral BREF reviews may require more effort from operators as a result of this measure. Further, when permit conditions are set based on BAT-AEPLs, effort from operators on monitoring, reporting and compliance-related activities may also increase.

Based on this evidence, it is assumed that when these 13 000 operators engage in permit reviews, they would be doing so in an environment where the status of the BAT-AEPLs (other than BAT-AELs) is more aligned with this of BAT-AELs and the additional effort required from public authorities would be 5% more than in the baseline. Similarly, the contribution of public authorities to the BREF process may require around 5% more effort, and an additional 5% of administrative costs may also be incurred due to more demands on maintaining information and systems, and leading and managing inspections.

As a result, additional administrative costs could reach between €0.7 million and €8 million each year, on average, with a central estimate of around €6 million each year over a period of 20 years. These costs are estimated to be an upper bound and highly uncertain, as they generally depend on the final number of IED installations affected by binding BAT-AEPLs over the baseline.

The responses to the TSS also indicate that competent authorities expect an increase in administrative costs from clarifying the status of BAT-AEPLs. On a scale of -1 to 1 (reflecting answers ranging from >15% decrease to >15% increase), the score for compliance, enforcement and inspection are between 0.4 and 0.5 for national authorities, while between 0 and 0.2 for local/regional authorities. The score for permitting is between 0.2 and 0.3 for both national and local/regional authorities.

Environmental impacts

Overall, this measure is likely to have **limited to weakly positive impacts on the environment** when compared to the baseline, although these will depend upon the additional take up of binding BAT-AEPLs and the associated ambitions.

Climate

This measure may result in a **weakly positive impact** on climate. For those cases where BAT-AEPLs other than BAT-AELs are at this time not implemented as binding in the same way as BAT-AELs, tightening the provisions in the IED will cause that a larger part of installations stay within the BAT-AEPL ranges.

Only derogations that meet the criteria of Article 15(4) or 15(5) will potentially lead to lower environmental performances. Mainly BAT-AEPLs on energy consumption and on consumption of materials with inherently large ecological footprint will have an indirect impact on emissions of GHGs. This is true especially in longer term if energy and materials consumption AEPLs are derived for more sectors.

Air quality

This measure is likely to result in a **limited to no impact** on air quality. The implementation of this measure will have no significant impact on air quality. There may be indirect benefits from reduced consumption of energy or materials.

Water quality and resources

This measure is likely to result in a **limited to no impact** on water quality. A significant impact on water quantity is expected. The report 'Summary on IED contribution to water policy' (Ricardo, 2018) describes a number of water consumption or effluent AEPLs derived under the IPPCD or IED. Making the AEPLs binding in future revisions will impact water consumption. This is true especially in longer term if water consumption AEPLs are derived for more sectors. However, this is not taken into account for the effect and robustness below, because this aspect is already covered by the area 'Efficient use of resources' below

Soil quality or resources

There is **no significant impact** on releases to soil from the implementation of this measure.

Waste production, generation, and recycling

This measure may lead to **weakly positive impacts** on waste production, generation, and recycling. For those cases where BAT-AEPLs other than BAT-AELs are at this time not implemented as binding in the same way as BAT-AELs, tightening the provisions in the IED will cause that a larger part of installations stay within the BAT-AEPL ranges. Only derogations that meet the criteria of Article 15(4) or 15(5) will potentially lead to lower environmental performances.

Mainly BAT-AEPLs on waste generation or material reuse/recycling will have an impact. This is true especially in longer term if waste generation or recycling/reuse AEPLs are derived for more sectors. Furthermore, at the Economy level, impacts on waste production, generation and recycling is closely linked to impacts on efficient use of resources. Reducing, recycling or reuse of waste or by-products in the own installation or sector, or in another installation or sector, improves material resource efficiency at the Economy level. Impacts for individual installations or even sectors can however vary significantly.

Efficient use of resources

This measure is likely to have **weakly positive to positive impacts** on the efficient use of resources. For those cases where BAT-AEPLs other than BAT-AELs are at this time not implemented as binding in the same way as BAT-AELs, tightening the provisions in the IED will cause that a larger part of installations stay within the BAT-AEPL ranges. Only derogations that meet the criteria of Article 15(4) or 15(5) will potentially lead to lower environmental performances (e.g. higher resource consumption, lower level of substitution of primary materials and fossil energy sources).

As highlighted previously (see administrative burden on businesses), resource efficiency measures are likely to have been implemented by operators for Economic reasons. This was also stated by many industry respondents in the TSS. On the contrary, specifically for water consumption, evidence provided by an NGO stakeholder suggested that there is potential for improvement, highlighting that cooling in energy generation using around 18% of total water consumed in Europe. Furthermore, industry consumes large amounts of electricity (35%-40%), which puts additional pressure on water resources both directly and indirectly (Use of freshwater resources in Europe — European Environment Agency (europa.eu)). The NGO stakeholder also reported a lack of water fees for the coal industry in a number of Member States, thereby lacking incentives for the efficient water use.

In addition, this measure may have an impact on the substitution of fossil and primary resources by renewable and secondary ones, which does not appear as advanced in the baseline. An important restriction for setting (ambitious) binding BAT-AEPLs or resource substitution is that

availability of secondary resources, i.e. by-products or (former) waste, changes over time. If BAT-AEPL ranges are too high or too narrow, compliance would become an issue if insufficient alternative recovered, recycled or renewable materials are available on the market. For example, in the cement focus group, it was highlighted that it is expected that availability of by-products both from iron and steel blast furnaces and from coal-fired power plants will sharply decrease due to decarbonisation trends.

The BAT-AEPLs other than BAT-AELs are in the BREF process already derived in the same manner as the BAT-AELs, although not all of the resources consumed were considered KEI in all BREFs, and fewer BAT-AEPLs have been derived per BREF/sector, compared to BAT-AELs. In longer term, it can be expected that improved monitoring and reporting and data collection efforts will lead to more BAT-AEPLs on specific resource consumption or substitution of primary or fossil resources.

The evidence available to quantify these impacts is limited. In fact, there is no reliable data on the share of primary, natural resources used by (heavy) industry covered by BAT-AEPLs. However, it is expected that in most/all sectors there are either no BAT-AEPLs, or only one or a few BAT-AEPLs which are typically restricted to specific processes and materials or types of residues/waste, or to water or energy efficiency, as described in the reports 'IED Contribution to the circular Economy' and 'Summary on IED contribution to water policy'. It is, therefore, assumed that this share is low, and a high-level estimate based on expert judgment would suggest that binding BAT-AEPLs could reduce energy consumption levels on average by up to 20% for those processes/resources covered by BAT-AEPLs. This would mean that the BAT-AEPLs could reduce energy consumption by heavy industry by up to 10%.

Similarly for water, consumption levels would decrease on average by up to 20% for those processes/resources covered by BAT-AEPLs, and thus by up to 4% overall for IED industry. For material consumption and waste generation, this is too difficult to estimate based on available data, but it could be assumed that the improvements are smaller compared to energy and water because of a higher diversity. These impacts can vary significantly per sector, depending on the share of resource consumption covered by BAT-AEPLs, and on the untapped potential for lowering the specific resource consumption or increasing substitution or primary or fossil input. As mentioned above, the long term impact may be larger, due to a possible increase in BAT-AEPLs and benchmark levels derived because of better data monitoring and reporting.

In the TSS, depending on the type of natural resource, 75%-80% of industry responded that binding BAT-AEPLs would not impact resource management, while 80%-100% of Environmental NGOs responded that they would lead to a significant improvement. Public authorities' responses were in between, about half of them expecting a moderate to significant improvement. Respondents from all stakeholder groups refer to the non-binding implementation in many cases, some pointing absence from article 15(3) requirements, the article 9 exemptions, to a court ruling that inhibits energy efficiency requirements to be set in the permit to avoid double regulation, and to voluntary energy efficiency agreements at national level.

Social impacts

This measure is likely to result in a **limited to no impact** on employment. In general, progression towards a more circular Economy causes sectors that produce and process raw materials to decline in size, while the recycling and repair sectors will experience additional growth. The overall effect on employment across all sectors is unclear/ambiguous, but the effect for IED installations, which typically belong to sectors that produce and process raw materials will be negative.

Measure 24: Introduce an option for Technical Working Group (TWG) to set resource efficiency and circular economy benchmark levels, in addition to binding BAT-AEPLs and indicative levels.

Description of the measure and requirements for implementation

This measure expands on measure #23, an alternative, with the inclusion of a definition of 'benchmark levels' in the IED. An IED article will require that the operators' EMS shall address (at least) those KEIs for which benchmark levels have been derived. This includes monitoring of the installation's performance, comparing to and checking against the benchmark levels, and setting up actions for continuous improvement of the performance. The requirements for such EMS, and more specifically for its provisions on a RE & CE plan and a CMS, are described in measure (25).

Compared to measure #23, this provides a BREF TWG more options, to derive either:

- BAT-AEPLs, which would be binding through permit conditions or general binding rules;
- Benchmark levels (associated with BAT), for which the inclusion in the EMS is obligatory. These can be chosen e.g. when there is large variability in the data due to important differences in products manufactured, or when one KEI is much more important than another;
- 'indicative' resource efficiency and circular Economy levels, which should be the least preferred option for a TWG because their legal status would not be set in the IED or the BREF guidance.

The introduction of benchmark levels creates an opportunity to improve implementation of past BAT-AEPLs derived under the IED, or possibly even under the IPPCD. They can, retroactively, be assigned the status of benchmark levels, meaning it would become obligatory to address them in the EMS, which would incentivise operators to investigate further improvement potential. Any review of a BREF and its BAT conclusions could then either reconsider and update the benchmark levels, or convert them into binding BAT-AEPLs if this is deemed preferable by the TWG.

Objectives:

- More circular resources (i.e. renewables and secondary raw materials).
- More level playing field, more consistent/homogeneous implementation.
- Increased importance of BAT-AEPLs other than BAT-AELs and of benchmark levels.

This measure will, therefore, contribute to the general objective of transforming the EU into a circular Economy and, more specifically, contributing towards the transition to a more circular Economic model for the EU in the short-to-medium term.

Implementation needs:

- EU to introduce changes to article 15(3) of the IED legislation to include similar requirements for BAT-AEPLs other than BAT-AELs, see description above. This will require monitoring and reporting of other environmental performance levels in the same manner as for the emission levels.
- EU to produce guidance for competent authorities and installation operators on how to interpret and implement BAT-AEPLs other than BAT-AELs, where necessary.
- EU to introduce an article in the IED setting the legal status of benchmark levels (associated with BAT), and their obligatory inclusion in the operator EMS.
- EU to update the BREF guidance to include benchmark levels (associated with BAT).
- All stakeholders to continue, and potentially increase attention, for data collection and analysis on consumption, reuse/recycling, and other environmental performance levels during the information exchange.
- There may also be a prerequisite to expand the IED operator obligations in article 11 −currently referring to pollution, waste and energy efficiency−, with water and materials efficiency. Furthermore, requirements for resource efficiency and environmental performance limit values could be added to the current permit conditions in article 14(1).

Assessing impacts

Economic impacts

Overall, this measure is likely to have **weakly negative economic impacts** when compared to the baseline, although this will depend upon the take up of binding BAT-AEPLs and the additional number of operators that would now have benchmark levels (associated with BAT) included in their EMS.

Administrative burden on businesses

This measure is likely to lead to **weakly negative impacts** on administrative burden on businesses. Similar to measure #23, IED operators are likely to be affected by increased administrative burden from more elaborate data monitoring and reporting, collection and

validation within the BREF process, in preparation of permit reconsiderations and/or updates and engaging with inspection activities.

The additional administrative activities would generally make existing processes more resource intensive, thus increasing the burden. A similar magnitude of administrative costs for operators would be expected when compared to measure #23, although there might be differences in terms of how the operators would be affected. Compared to measure #23:

- There would be no or only a negligible difference in permit review costs, because both BAT-AEPLs and benchmark levels would be part of a permit review following a new or reviewed BREF. The introduction of benchmark levels would not significantly increase or decrease the unit administrative cost compared to BAT-AEPLs.
- There would be a minor increase in the costs of reviewing BREFs or developing a new BREF. The degree of information collection will approximately be the same for BAT-AEPLs and benchmark levels, but there will be an increase in TWG exchanges to discuss whether a BAT-AEPL or a benchmark level is the most appropriate.
- Inspection costs would remain similar, or there might be a minor increase. Demonstrating compliance with benchmark levels is similar to BAT-AEPLs, but a larger effort may be required to demonstrate continuous improvement (e.g. when a benchmark level is not achieved).
- Costs for managing information and reporting would remain similar, or there might be a minor increase. It is expected that the level of CBI issues and requirements will be similar for BAT-AEPLs and benchmark levels.
- It can, however, be expected that this option of benchmark levels (measure #24) will lead to a larger share of natural resources being covered by either benchmark levels or BAT-AEPLs, compared to the option of only having BAT-AEPLs (measure #23). This will require additional effort and, thus, result in higher costs.

These differences translate into a relatively higher unit burden, when compared to measure #23. In particular, additional costs incurred by operators during permit reconsiderations and updates, BREF reviews, monitoring and reporting, and engaging with inspections could add 7% to the baseline. In addition, a higher number of installations are likely to be affected as a result of having introduced a more flexible approach to addressing resource efficiency, instead of the all or nothing approach of measure #23. It is assumed that around 40% of the existing installations, or 20 800, may be affected over a period of 20 years.

As a result, additional administrative costs when compared to the baseline could reach between €0.6 million and €25 million each year over the 20-year period, on average, with a central estimate of around €16 million each year. These costs are estimated to be an upper bound and highly uncertain, as they generally depend on the final number of operators affected by this measure.

Finally, other measures or initiatives that aim to lighten the administrative burden through more harmonized and user-friendly reporting requirements and tools (e.g. more coherence between E-PRTR and BREF information exchange) could also limit the increase in administrative burden.

Operating costs and conduct of business

This measure is likely to lead to **weakly negative impacts** on the costs of doing business. For those cases where BAT-AEPLs other than BAT-AELs are, at this time, not implemented as binding in the same way as BAT-AELs, often additional investments would be needed to ensure complete compliance (i.e. without any exception, apart from OTNOC) to these BAT-AEPLs. Because these investments are mainly aimed at resource efficiency, they might sometimes lead to reductions in operational costs. It can be expected that some of the techniques used/installed to meet the BAT-AEPLs will pay back over time, within their Economic lifetime. However, this might not be the case for the substitution of fossil and primary resources by renewable and secondary ones. Benchmark levels would also trigger additional investments in many cases, though these might be smaller and more balanced compared to those for binding BAT-AEPLs.

The long-term trend is hard to anticipate. This will depend in large part on whether the investment costs decline due to technological advances, and the evolution of resource costs. This may be relevant for long term comparison, e.g. if the cost of water had doubled in 2050, techniques saving water would pay back much quicker. For example, the total cost of the energy system per unit of final consumption is expected to increase 2.0% per year between 2010 and 2030, and 0.8% per year between 2030 and 2050. On the other hand, if costs of primary resources and materials typically used in infrastructure (steel, cement, polymers, etc.) go up, the investment cost would rise more than the potential operational savings.

A quantitative assessment would require a clear understanding of the share of installations that exceed existing and future BAT-AEPLs and future benchmark levels, and what number of BAT-AEPLs or benchmark levels they exceed; Combined with information on average investment costs and operational costs or gains. These can vary widely, and there is no reliable data on the specific costs related to binding BAT-AEPLs and benchmark levels, as compared to non-binding BAT-AEPLs. It would not be accurate to extrapolate costs associated with the historic change of the BAT-AEL status, because much more than emissions, resources already come at a cost to operators, which causes them to already limit their consumption to a certain extent.

Industry was asked in the TSS about the impact of binding BAT-AEPLs on employment, consumer prices, EU competitiveness, EU market share and trade with third countries. More than 75% of industry indicated a significant reduction or reduction for these parameters (increase for consumer prices). This could be due to increased administrative costs or, rather, to additional operating costs. The latter seems to be more probable.

Competitiveness and level playing field

The implementation of this measure is likely to have **limited to no impacts** on competitiveness. The cost of doing business might, in some cases, go up (see ‘operating costs and conduct of

businesses (industry)' above). However, there is no strong indication this would have a significant effect on competitiveness. On the contrary, if one compares with the (absent) effect of the binding BAT-AELs under the IED on competitiveness, it could be expected that there will be no or only a limited impact from the updated BAT-AEPL status, nor from the benchmark levels. What distinguishes BAT-AEPLs and benchmark levels on resource consumption is that they limit resource consumption, and therefore operational costs for these resources. This might however probably not be the case for the substitution of fossil and primary resources by renewable and secondary ones.

This measure is likely to have a **limited to weakly positive impact** on levelling the playing field. The measure is primarily aimed at promoting a more level playing field in the EU, so there will be a positive impact for this aspect. This is further emphasized by the many responses from all stakeholder groups that point to the often occurring cross-media effects between emission control and resource consumption. One could argue that there is currently a risk that a level playing field is not respected, when only emission levels are binding, and thus implemented similarly, while resource efficiency levels are not. However, compared to the measure with only the option of binding BAT-AEPLs (measure #23), the positive impact on the level playing field might be smaller or less certain in case the TWG chooses more often for benchmark levels instead of binding BAT-AEPLs.

Position of SMEs

This measure is likely to lead to **weakly negative impacts** on the position of SMEs. Although the increased admin burden for industry will be larger for large, complex installations in absolute terms, in terms relative to the number of employees or turnover, the increased burden will be larger for SMEs. The reason is that there monitoring and reporting, to support the permit limit values or inclusion in the EMS and to demonstrate compliance, includes a certain fixed amount of effort.

Innovation and research

This measure may have a **weakly positive impact** on research and development. The IED evaluation TSS showed that a majority of stakeholders (>75%) somewhat or strongly agree that the IED, BREFs and BAT conclusions have stimulated innovation, the BAT conclusion being indicated as the most important driver (more so than requirement to hold permit, monitoring and reporting requirements, enforcement, and the emerging techniques chapters of BREFs). Similar to the effect caused by the strictly binding BAT-AELs set under the IED, an updated strictly binding status of BAT-AEPLs would further drive innovation efforts, as would inclusion of benchmark levels in the EMS. However, it has to be kept in mind that in certain Member States, the BAT-AEPLs are already implemented as binding.

Public authority impacts

This measure is likely to have a **weakly negative impact** on public authorities. For those cases where BAT-AEPLs other than BAT-AELs are at this time not implemented as binding in the

same way as BAT-AELs, additional administrative efforts by public authorities would be needed for either i) setting environmental performance levels in general binding rules or in individual permits that do not exceed the BAT-AEPLs, enforcing them, collecting and checking data during the BREF process; or ii) enforcing the inclusion of benchmark levels in the EMS and collecting and checking data during the BREF process.

If the possibility of derogations is included in the provision, it is expected that this would lead to additional derogations, however less than would be the case when there would only be an option for binding BAT-AEPLs (measure 23), meaning more administrative efforts from public authorities as well. Indeed, where it is not possible to derive BAT-AEPLs that could be implemented in the permits without frequent derogations, the TWG would be expected to opt for setting benchmarks. Similar to the administrative burden for businesses, the administrative costs per derogation will presumably be at least as significant as that of the permitting itself.

These additional administrative activities would generally make existing processes more resource intensive, thus increasing the burden. A similar magnitude of administrative costs for public authorities would be expected when compared to measure #23, although there might be differences in terms of how the public authorities may be affected (see administrative burden on businesses, as these differences would be analogous).

At a high-level, these differences translate into a relatively higher unit burden, when compared to measure #23. In particular, additional costs incurred by public authorities during permit reconsiderations and updates, BREF reviews, monitoring and reporting, and engaging with inspections could add up to 7% to the baseline. In addition, a higher number of installations are likely to be affected as a result of having introduced a more flexible approach to addressing resource efficiency, instead of the all or nothing approach of measure #23. It is assumed that around 40% of the existing installations, or 20 800, may be affected over a period of 20 years.

As a result, additional administrative costs for public authorities when compared to the baseline could reach between €1 million and €17 million each year over the 20-year period, on average, with a central estimate of around €12 million each year. These costs are estimated to be an upper bound and highly uncertain, as they generally depend on the final number of operators affected by this measure.

The TSS indicates that competent authorities expect a significant increase in administrative costs from binding BAT-AEPLs. On a scale of -1 to 1 (reflecting answers ranging from >15% decrease to >15% increase), the score for compliance, enforcement and inspection are between 0.4 and 0.5 for national authorities, while between 0 and 0.2 for local/regional authorities. The score for permitting is between 0.2 and 0.3 for both national and local/regional authorities.

Environmental impacts

Overall, this measure is likely to have **limited to weakly positive impacts on the environment** when compared to the baseline, although these will depend upon the additional take up of

binding BAT-AEPLs and the inclusion of benchmark levels in the EMS, as well as their environmental ambitions.

Climate

This measure may result in a **weakly positive impacts** on climate. For those cases where BAT-AEPLs other than BAT-AELs are at this time not implemented as binding in the same way as BAT-AELs, tightening the provisions in the IED will cause that a larger part of installations stay within the BAT-AEPL ranges, or work on continuous improvement in case of benchmark levels. Only derogations that meet the criteria of Article 15(4) or 15(5) will potentially lead to lower environmental performances. Mainly BAT-AEPLs and benchmark levels on energy consumption and on consumption of materials with inherently large ecological footprint will have an indirect impact on emissions of GHGs. This is true especially in longer term if energy and materials consumption BAT-AEPLs and benchmark levels are derived for more sectors.

Air quality

This measure is likely to result in a **limited impacts** on air quality. The implementation of this measure may have indirect benefits on air quality resulting from reduced consumption of energy or materials.

Water quality and resources

This measure is likely have **limited to weakly positive impacts** on water quality and resources. The report 'Summary on IED contribution to water policy' (Ricardo, 2018) describes a number of water consumption or effluent BAT-AEPLs derived under the IPPCD or IED. Making the BAT-AEPLs benchmark levels or making these binding in future revisions will impact water consumption. This is true especially in longer term if water consumption BAT-AEPLs are derived for more sectors.

Soil quality or resources

There is **no significant impact** on releases to soil from the implementation of this measure.

Waste production, generation, and recycling

This measure may lead to **weakly positive to positive impacts** on waste production, generation, and recycling. For those cases where BAT-AEPLs other than BAT-AELs are at this time not implemented as binding in the same way as BAT-AELs, tightening the provisions in the IED will cause that a larger part of installations stay within the BAT-AEPL ranges, or work on continuous improvement in case of benchmark levels. Only derogations that meet the criteria of Article 15(4) or 15(5) will potentially lead to lower environmental performances.

Mainly BAT-AEPLs and benchmark levels on waste generation or material reuse/recycling will have an impact. This is true especially in longer term if waste generation or recycling/reuse BAT-AEPLs and benchmark levels are derived for more sectors. Furthermore, at the economy level, impacts on waste production, generation and recycling is closely linked to impacts on

efficient use of resources. Reducing, recycling or reuse of waste or by-products in the own installation or sector, or in another installation or sector, improves material resource efficiency at the economy level. Impacts for individual installations or even sectors can however vary significantly.

Efficient use of resources

This measure is likely to have a **weakly positive to positive impact** on the efficient use of resources. For those cases where BAT-AEPLs other than BAT-AELs are at this time not implemented as binding in the same way as BAT-AELs, tightening the provisions in the IED will cause that a larger part of installations stay within the BAT-AEPL ranges. Only derogations that meet the criteria of Article 15(4) or 15(5) will potentially lead to lower environmental performances (e.g. higher resource consumption, lower level of substitution of primary materials and fossil energy sources).

As highlighted previously (see administrative burden on businesses), resource efficiency measures are likely to have been implemented by operators for Economic reasons. This was also stated by many industry respondents in the TSS. On the contrary, specifically for water consumption, evidence provided by an NGO stakeholder suggested that there is potential for improvement, highlighting that cooling in energy generation using around 18% of total water consumed in Europe. Furthermore, industry consumes large amounts of electricity (35-40%), which puts additional pressure on water resources both directly and indirectly[32]. The NGO stakeholder also reported a lack of water fees for the coal industry in a number of Member States, thereby lacking incentives for the efficient water use.

In addition, this measure may have an impact on the substitution of fossil and primary resources by renewable and secondary ones, which does not appear as advanced in the baseline. An important restriction for setting (ambitious) binding BAT-AEPLs or resource substitution is that availability of secondary resources, i.e. by-products or (former) waste, changes over time. If BAT-AEPL ranges are too high or too narrow, compliance would become an issue if insufficient alternative recovered, recycled or renewable materials are available on the market. For example, in the cement focus group, it was highlighted that it is expected that availability of by-products both from iron and steel blast furnaces and from coal-fired power plants will sharply decrease due to decarbonisation trends.

The BAT-AEPLs other than BAT-AELs are in the BREF process already derived in the same manner as the BAT-AELs, although not all of the resources consumed were considered KEI in all BREFs, and fewer BAT-AEPLs have been derived per BREF/sector, compared to BAT-AELs. In longer term, it can be expected that improved monitoring and reporting and data collection efforts will lead to more BAT-AEPLs on specific resource consumption or substitution of primary or fossil resources.

[32] Use of freshwater resources in Europe — European Environment Agency (europa.eu

The evidence available to estimate these impacts in a quantitative manner is limited. In fact, there is no reliable data on the share of primary, natural resources used by (heavy) industry covered by BAT-AEPLs. However, it is expected that in most/all sectors there are either no BAT-AEPLs, or only one or a few BAT-AEPLs which are typically restricted to specific processes and materials or types of residues/waste, or to water or energy efficiency, as described in the reports 'IED Contribution to the circular Economy' and 'Summary on IED contribution to water policy'. It is therefore assumed that this share is low, and a high-level estimate based on expert judgment would suggest that binding BAT-AEPLs could reduce energy consumption levels on average by up to 20% for those processes/resources covered by BAT-AEPLs. This would mean that the BAT-AEPLs could reduce energy consumption by heavy industry by up to 10%.

Similarly for water, consumption levels would decrease on average by up to 20% for those processes/resources covered by BAT-AEPLs, and thus by up to 4% overall for IED industry. For material consumption and waste generation, this is too difficult to estimate based on available data, but it could be assumed that the improvements are smaller compared to energy and water because of a higher diversity. These impacts can vary significantly per sector, depending on the share of resource consumption covered by BAT-AEPLs, and on the untapped potential for lowering the specific resource consumption or increasing substitution or primary or fossil input. As mentioned above, the long term impact may be larger, due to a possible increase in BAT-AEPLs and benchmark levels derived because of better data monitoring and reporting.

In the TSS, depending on the type of natural resource, 75%-80% of industry responded that binding BAT-AEPLs would not impact resource management, while 80%-100% of Environmental NGOs responded that they would lead to a significant improvement. Public authorities' responses were in between, about half of them expecting a moderate to significant improvement. Respondents from all stakeholder groups refer to the non-binding implementation in many cases, some pointing absence from article 15(3) requirements, the article 9 exemptions, to a court ruling that inhibits energy efficiency requirements to be set in the permit to avoid double regulation, and to voluntary energy efficiency agreements at national level.

Social impacts

This measure is likely to result in a **limited to no impact** on employment. In general, progression towards a more circular economy causes sectors that produce and process raw materials to decline in size, while the recycling and repair sectors will experience additional growth. The overall effect on employment across all sectors is unclear/ambiguous, but the effect for IED installations, which typically belong to sectors that produce and process raw materials will be negative.

Measure 25: Require operators to incorporate a Resource Efficiency and Circular Economy Plan and Chemical Management System at the installation level as separate sections of their Environmental Management System. Expand the scope of monitoring and reporting to cover resource efficiency techniques, indicators and performance levels, as well as the use of hazardous chemicals and the level of substitution for safer alternatives.

i. Resource Efficiency and Circular Economy Plan

Description of these components of the measure and requirements for implementation

This measures proposed that a Resource Efficiency and Circular Economy plan is developed by installation operators to manage and continuously improve their installation's performance. The plan would be a section/chapter of the (through IED or BAT conclusions) imposed EMS. It would consider:

(i) Operator's measures that improve in-house resource efficiency (water, materials and energy consumption and use); this would include monitoring of specific consumption levels, recovery/re-use rates, and other relevant indicators/parameters.

(ii) Choices made by the operator of an IED installation that demonstrably affect environmental performance:

- upstream, reducing the environmental footprint associated to the plant's feedstock and resources, and/or
- downstream, reducing the environmental impacts associated with the treatment of the plant's waste and the use of by-products of the production process, in the same or in other sectors.

In the BAT conclusions, a number of BATs (in particular, but not necessarily limited to, those without binding quantitative levels) could be earmarked as being implementable through the RE/CE plan (or the EMS in general), making these BATs operational and ensuring the continuous improvement for the KEIs that the BAT addresses. Not being able to meet an indicative benchmark could be a trigger to consider the KEI in the plan, explaining why the benchmark cannot be met, and a range of actions with quantitative targets for continuous improvement.

To support the monitoring and reporting of the in-house resource efficiency, article 14(1) would be amended to include monitoring and reporting to the competent authority on (primary, renewable and secondary) resource consumption.

Objectives:

The measure will aim to improve the effectiveness of the IED in contributing to resource efficiency and the circular economy and incentivising operators to reflect on their supply chain environmental impacts. This measure will, therefore, contribute to the general objective of

transforming the EU into a circular economy and, more specifically, contributing towards the transition to a more circular economic model for the EU in the short-to-medium term.

Implementation needs:

The EMS is already a standard requirement (BAT 1) in all BAT conclusions and is tailored to each industrial sector. The requirement for an installation operator's RE & CE plan can be part of such EMS.

Reporting on measures for improving internal resource efficiency in relation to their expected environmental benefits, and on environmentally sound choices on plant's feedstock and wastes or by-products, is not as straightforward as reporting emissions (concentrations or loads). Therefore, generic, horizontal provisions could be laid down in the Directive itself to include EMS targets and ambitions as part of the permit conditions and, therefore, become legally binding for operators for all IED activities (or for a selection, when 'light' tailored permitting procedures would be introduced for certain activities such as livestock farming). Moving the EMS requirement to the IED itself would make it more prescriptive, compared to BAT conclusions (for individual sectors), as the BAT conclusions are a reference for setting permit conditions and leave some flexibility in implementation. Such provisions could include, for instance, previously identified harmonised indicators on resource efficiency and specific consumption, which would serve as a basis of comparison between installations from a same sector. These generic provisions could then further be specified in the BATCs for each sector of activity.

The measure's practical and formal implementation could be approached in a way that allows for flexibility in terms of promoting the inclusion of operator's measures proposed to realise both voluntary pledges and mandatory commitments with respect to resource efficiency and the substitution of primary and non-renewable resources. The plan could start from a basis of a series of voluntary measures and strategies to improve an installation's resource efficiency performance. These measures should cover previously agreed domains that were identified as being key for increasing a sector's performance with respect to resource efficiency and the use of secondary and renewable resources, for which harmonized indicators have been identified, proportionality of costs has been verified, and potential environmental gains have been demonstrated to be significant. Operators could be allowed to propose relevant parameters to be monitored and reported, or to select such parameters from a sector-specific list. After approval of the proposed or selected parameters by the permitting authorities, their monitoring and reporting on progress and outcomes could become mandatory, as under IED Art. 14 (1)(d). The parameters that operators may be able to report to competent authorities should be clarified, taking into account potential concerns over CBI.

Assessing impacts

Economic impacts

Overall, this measure is likely to have **weakly negative Economic impacts** when compared to the baseline, although this will depend upon the number of operators that would introduce the proposed chapters into their EMS and the extent to which this is additional to the baseline.

Administrative burden on businesses

This measure is likely to lead to **negative impacts** on administrative burden on businesses. The introduction of an operator RE/CE Plan under the EMS requires efforts to elaborate and submit such plan, implement the corresponding mandatory and/or voluntary reporting and monitoring requirements, and to obtain more specific insights in, and knowledge of the complete production chain of which the installation's activities form part.

The scale of these costs would vary according to the installation's context and sectoral priorities with respect to resource efficiency, and the extent to which this is already being considered. In fact, recent BAT conclusions already include specific plans to monitor and manage in-house resource efficiency of water, energy and certain materials (including chemicals) that are relevant for the sector.

Based on the evidence available expert input, it is assumed that between 40 to 200 hours may be required to develop an RE/CE plan, maintain it and monitor and report on it once every two years. This is broadly equivalent to up to 10% of an FTE or spending between €1 150 and €5 700 every two years.

It is assumed that around 20% of the IED installations or 10 400 could be targeted by this measure. As a result, this would imply that the additional administrative costs would range from €6 million to €30 million each year, on average, over a 20-year period, with a central estimate of €9 million. This is uncertain and depends upon the number of installations affected and their level of preparedness in the baseline.

In the TSS, 75% of industry responded that establishing a RE/CE plan would increase administrative costs by more than 5%, about 35% even see an increase of more than 15%, around 20% expects no impact, and a few % of industry respondents even expect a decrease. While in the TSS around 75% of industry were against a mandatory monitoring and reporting on measures and choices that improve resource-efficiency (75% of public authorities and 85% of NGOs were in favour), some industry respondents (particularly in the chemicals sector) mentioned that resource management in-house, whether or not through certified EMS schemes, is already common practice in industry/their sector. Some mention that their EMS also includes operator choices that have an upstream or downstream impact. Reporting of this information to public authorities seems much less common. Some respondents express their concerns of leaking CBI because of the proposed reporting requirements, and state that reporting should be only towards public authorities, and not in the public domain. Requiring a more formal RE/CE plan would

thus in some sectors likely not lead to a significant increase in administrative burden (varying by sector). Reporting to public authorities on the other hand, could increase the administrative burden.

Operating costs and conduct of business

This measure is likely to lead to **weakly negative impacts** on the costs of doing business. The measure of extending the scope of monitoring and reporting to cover resource efficiency improvements is meant to lead to the voluntary and/or mandatory implementation of initiatives that allow decreasing the consumption of resources per unit of production output, both in-house and upstream or downstream of the production chain. Even in case the measure is conceived as a merely indirect incentive to improve resource efficiency, all available resource efficiency optimization strategies are likely to increase operating costs (at least in short term due to required investments) and change conduct of business at plant level. In the TSS responses, there were no clear links made between an RE/CE plan and increase of operating costs.

The substantive compliance costs are expected to vary greatly according to the installation's specific context and the proposed sectoral priorities with respect to resource efficiency.

Competitiveness and level playing field

This measure would likely lead to **unclear impacts** on competitiveness of businesses. On the one hand, operating costs and conduct of business are affected negatively, that is, it becomes more costly to conduct business in the EU-27. On the other hand, increased transparency on resource efficiency performance generates confidence, facilitates cross-sectoral and cross-value chain collaboration, and might lead to efficiency-based cost reductions. There are concerns in certain sectors that sharing of data that is considered to be CBI (e.g. amounts and types of products, specificities of production processes) can negatively impact competitiveness. These concerns were also echoed in the TSS responses. If procedures and practices to monitor and report on RE/CE, while protecting legitimate CBI claims, are further developed and strictly maintained and controlled, the overall direction of the impact might be(come) more positive.

This measure would likely lead to **weakly positive impacts** on levelling the playing field. Increased transparency on resource efficiency performance generates confidence, facilitates cross-sectoral and cross-value chain collaboration, and might lead to efficiency-based cost reductions. Sectors mainly consisting of SMEs (e.g. IRPP, SF, galvanizing sector of FMP), might be disproportionally affected by resource efficiency strategies and requirements that are cost and/or capital intensive.

If CBI issues can be solved satisfactorily and all industrial sectors in the EU that are part of global, resource-intensive production chains have been included into the expanded scope of the IED, a more level playing field with respect to industrial resource efficiency strategies can be secured, increasing opportunities for best players

Position of SMEs

This measure is likely to lead to **weakly negative impacts** on the position of SMEs. Sectors mainly consisting of SMEs (e.g. IRPP, SF, galvanizing sector of FMP), might be disproportionally affected by resource efficiency strategies and requirements that are costly and/or capital intensive. The introduction of an operator RE/CE Plan under the EMS requires effort to elaborate and submit such plan, to implement the corresponding mandatory and/or voluntary reporting and monitoring requirements, etc. The undertaking of such efforts might have a substantial fixed component thus becoming disproportionally challenging for SME's. In fact, 78% of SMEs cite complex administrative procedures as the biggest obstacle to operating in the Single Market. That said, 25% of EU SMEs work on green products or services, and might particularly benefit from increased resource efficiency and circular Economy measures by (potential) industrial clients.

Innovation and research

This measure may have a **positive impact** on research and development. Strategies for increasing resource efficiency that consider process technologies, ecodesign and cross-sectoral collaboration (e.g. industrial symbiosis) strongly rely on innovation and research.

Public authority impacts

This measure will likely have **negative impacts** on public authority. The management of CBI issues and the evaluation and control of RE/CE plans of EU industrial installations will impact administrative, compliance and enforcement activities. The public authority impacts could be limited somewhat by private auditing companies contracted by the operators which perform the evaluation of the RE/CE plans, similar to existing practices in IED installations which currently have a 'BAT 1' EMS or a more elaborate certified EMS. This would be checked by public authorities.

The scale of these costs would vary according to the installation's context and sectoral priorities with respect to resource efficiency, and the extent to which this is already being considered. In fact, recent BAT conclusions already include specific plans to monitor and manage in-house resource efficiency of water, energy and certain materials (including chemicals) that are relevant for the sector.

Based on the evidence available expert input, it is assumed that between 40 to 200 hours may be required to develop an RE/CE plan, maintain it and monitor and report on it once every two years. This is broadly equivalent to up to 10% of an FTE or spending between €1 150 and €5 700 every two years.

It is assumed that around 20% of the IED installations or 10 400 could be targeted by this measure. As a result, this would imply that the additional administrative costs would range from €6 million to €30 million each year, on average, over a 20-year period, with a central estimate of

€9 million. This is uncertain and depends upon the number of installations affected and their level of preparedness in the baseline.

In addition, authorities might be required to define and identify priority domains and key parameters that determine a sector's performance with respect to resource efficiency, and to analyse the significance of the potential, corresponding environmental gains.

The responses are similar to administrative costs for industry, but even more outspoken, although only a small number of public authority responses actually answered this question, 5 out of 12 for local/regional authorities, and 16 out of 37 for national authorities. More than 75% see an increase of more than 5% administrative costs, 20% (local/regional) – 45% (national) even see an increase above 15%. No respondents expect a decrease of 5% or more.

Environmental impacts

Overall, this measure is likely to have **weakly positive to positive environmental impacts** when compared to the baseline, although this will depend upon the number of operators that would introduce the proposed chapters into their EMS and the extent to which this is additional to the baseline.

Climate

This measure will likely have **positive impacts** on climate. The RE & CE plans aim to decrease the consumption of resources per unit of production output, both in-house and upstream or downstream of the production chain. These resources include fossil energy carriers that give rise to GHG emissions. Whilst the IED does not have an explicit focus on emissions of GHGs (owing to provisions made in Article 9 of the IED), it is likely that adopting resource efficiency-oriented measures will have knock-on impacts towards GHG emissions. This will affect particularly industrial installations of which the GHG emissions represent a significant share of total emissions from the most energy-intensive production chains. On the other hand, even assuming that no improvements are achieved regarding to the levels of resource consumption, the substitution of primary, fossil and other non-renewable resources by secondary raw materials or renewables can potentially bring considerable environmental benefits, including on climate change. However, proposals for substitution should consider the risks and cross-media effects associated to the use of renewables and of secondary raw materials, waste or by-products.

Air quality

This measure is likely to result in a **limited to no impact** on air quality. The RE & CE plans mainly target the consumption of primary resources per unit of production output, rather than end-of-pipe emissions. Reduced resource consumption will only indirectly affect air quality. Initiatives of substitution of primary, fossil and non-renewable resources can affect other environmental aspects such as air quality both positively and negatively, and should be accompanied by solid evidence on the effects on air quality.

As an example, in the focus group on the cement sector, it was mentioned that there are cases with increased heavy metals emissions to air which could be linked with waste feedstock quality in some cases, even with unchanged quantities/shares of waste as feedstock, while in other cases further investigation to show such link would be needed. During the focus group, it was mentioned that a RE/CE plan could improve air emissions because it can address the trade-off between resource efficiency or use of secondary raw materials and emissions or energy efficiency.

Further information was retrieved from the report 'Abfallströme Zur Verbrennung' by the Austrian UBA (2021) which identifies, based on analysis of emissions from 2009 to 2018, that waste incineration plants, which incinerate the largest proportion of waste (around 70 %), contribute least to the pollutant loads emitted, compared to co-incineration and cement plants. A possible explanation given in the report for the low emissions from waste incineration plants is that the emissions from these plants are effectively reduced due to efficient flue gas treatment systems. In the cement plants, relevant pollutant emissions may also result from the raw materials used, but no information on their pollutant content was available at the time of the evaluation. Emissions of cadmium and thallium were found to be higher in co-incineration plants where relevant amounts of sewage sludge and paper fibre residues are burned. Increased mercury levels have been observed in some cement plants where large quantities of substitute fuels are used. However, based on the available data, it was not possible to determine whether there was a causal link. The composition of waste streams under the same code numbers can sometimes vary a great deal.

Water quality and resources

This measure is likely to result in a **limited to no impact** on water quality and resources. The RE & CE plans mainly target the consumption of resources per unit of production output, including water. However, this is not taken into account here, because this aspect is already covered by the area 'Efficient use of resources' below. Reduced water consumption will positively impact the availability of water resources but is not likely to affect water quality.

Soil quality or resources

This measure is likely to result in a **weakly positive impact** on soil quality and resources. The RE & CE plans mainly target the consumption of resources per unit of production output, rather than end-of-pipe emissions to soil. Reduced resource consumption will only indirectly affect soil quality or resources.

Waste production, generation, and recycling

This measure may lead to **positive impacts** on waste production, generation, and recycling. The introduction of RE & CE plans aims to decrease the consumption of resources per unit of production output, both in-house and upstream or downstream in the production chain. This includes material resources. The use of materials can be:

(i) minimized, by producing less waste per unit of production output
(ii) eliminated, referring particularly to the use of toxic and hazardous substances, which might reduce the hazardousness and increase the recyclability of the installation's production residues
(iii) substituted, e.g. by recycled, waste-based, or less resource intensive materials, or
(iv) better managed, by implementing measures that reduce material losses over the production process.

These strategies will particularly affect industrial installations where material use represents a significant share of total raw material footprint of the most material-intensive production chains.

Efficient use of resources

The implementation of this measure will likely result in **positive impacts** on the efficient use of resources. The measures of introducing RE & CE plans specifically targets resource efficiency, both in-house and upstream or downstream of the production chain. During the cement focus group, it was also mentioned that RE & CE plans should address trade-offs between material resource efficiency or use of secondary raw materials and energy efficiency. The impact on efficient use of resources was not directly addressed in the TSS. Some products manufactured by IED installations are strictly regulated by product regulations, limiting the potential for actions that improve downstream impact. The example of fertilising products was mentioned in a TSS position paper.

It is difficult to quantitatively assess the impact, certainly on a global level. Fragmented and anecdotal evidence exists on impacts of specific case studies of industrial symbiosis, use of waste as a feedstock and resource efficiency improvements, for example in the 'IED Contribution to the circular Economy report' and in industrial symbioses case study databases. The former also describes the untapped potential. It is however difficult to extrapolate the information from case studies to the overall industry potential and estimate to what degree obligatory RE/CE plans (in addition to already existing EMS schemes) and related reporting to competent authorities would contribute to this potential. Initiatives of substitution of primary, fossil and non-renewable resources can affect the efficient use of resources both positively and negatively and should be accompanied by solid evidence on the environmental effects.

In certain sectors, a significant share of energy or material input is currently already provided by secondary resources. An example is the cement sector, where the share of energy and material input is generally high, but according to the focus group and literature, varies strongly dependent upon local availability of secondary resources, restrictions in permits on types of wastes or secondary resources allowed, process characteristics and end product requirements. At the EU level, substitution rate by alternative fuels is 48% of thermal energy needed for clinker production.

Social impacts

The potential impacts of introducing RE and CE plans on employment are likely to be **mixed or unclear**. Sectors that produce and process primary raw materials are at risk to decline in size under circular Economy strategies, while the recycling and repair sectors might find opportunities to experience additional growth.

ii. Chemical Management Systems

Description of this component of the measure and requirements for implementation

The obligation would require the development of a chemical management system (CMS) as part of BAT conclusions. This obligation could be introduced as an addition to the existing requirements under BAT 1 for an environmental management system (EMS). Developing a CMS would mean that IED regulated operators would need to use available tools for chemical risk assessment made available by ECHA and report regularly on progress and outcomes, e.g. under IED Art. 14 (1)(d).

There would be basic and advanced components of the CMS, for consideration:

- Basic components would include: an up to date inventory of substances[33], risk assessments and periodic reporting and auditing; and
- Advanced components would include: Routine assessment of alternatives for hazardous substances, commitment to substitute as soon as practical, and the justification of continued use where the review of substitutes identifies viable alternatives.

This measure may also include the introduction of a web-based database populated by operators for improved reporting and transparency. This could be aligned with pre-existing databases / reporting requirements as part of permit requirements.

The database could include a list of chemicals for consideration as part of the development of the CMS that are subject to related legislation such as the Annex I and III substances of the POP Regulation, substances classified as SVHC, including the listings under Annex XIV and XVII of REACH or as priority substances under the Water Framework Directive. Additionally, the CMS should follow the PDCA-cycle (Plan-Do-Check-Act) approach.

Finally, an industry respondent at a focus group for this study highlighted their concern that this CMS-type measure may be considered an attempt to fix the lack of proper implementation under REACH, and efforts could be spent instead on ensuring that there is an effective implementation of existing obligations for operators. One NGO respondent agreed with the position that the elements of the CMS (both the basic components and advanced components) are broadly in line with the existing obligations under REACH. On this basis, there are elements of the CMS that do not represent an increase in scope, but rather a way to strengthen the coherence between REACH

[33] E.g., covering hazardous chemicals, REACH registration data, SVHCs, priority substances, thresholds stipulated in environmental permits as well as reference to monitoring data

and IED, and to provide data regarding processes for REACH, which would enhance implementation.

It is also noted that industrial accidents do not only take place in establishments falling under the Directive 2012/18 on major industrial accident prevention (Seveso Directive) and therefore such risks have to be given adequate attention. For example a dramatic accident occurred during this impact assessment in the Czech Republic in an IED installation, not falling under the Seveso Directive, where 3 people were killed because of a toxic leak. Appropriate management of risks of use of chemicals through a Chemical Management System would better address safety issues in installations and contribute in preventing that accidents with important consequences occur.

Objectives:

The measure will aim to improve the understanding, management and substitution of chemicals of concern by the IED-regulated industry and to enhance transparency for citizens. This measure will, therefore, contribute to the general objective of achieving a non-toxic environment in the EU, and more specifically, prevent or, when impracticable, minimise emission of hazardous chemicals by large industrial and agro-industrial plants.

Implementation needs:

- The CMS could be added to the EMS requirements stipulated under BAT 1 for each industry sector or the CMS requirements could be included in the IED permit conditions (Art. 14) directly.
- The CMS will have flexibility so that it can be adjusted for each industrial sector.
    - In an interview, the EIPPCB commented that flexibility is required as there are industry sector-specific issues. This was especially based on discussions around implementation of CMS during the update of the textiles BREF document.
    - The Hazbref report[34] also provides further examples related to paper pulp, ferrous metals, and food, drink and milk industries where sector-specific issues would affect how a CMS was implemented, particularly around material flows, numbers of chemicals in use, and de novo chemicals.
- Creating synergies/avoiding duplication with regard to already existing reporting systems such as E-PRTR.
    - Multiple reporting requirements under different but closely related legislation, should a centralised database be needed for reporting, due care is needed to harmonise as far as possible to avoid duplication and undue burden.
    - There are also data confidentiality issues, this is already an issue for EMS, with key feedback from the focus group on EMS/CMS providing conflicting

[34] Interreg, 2021, 'Method to include information on hazardous and other substances of concern more systematically into BREFs', Hazbref report under Work Package 3, Activity 3.2.

arguments around quality and availability of data (including public availability of data), how it is reported and who has access to it.

Assessing impacts

Economic impacts

Overall, this measure is likely to have **weakly negative to negative economic impacts** when compared to the baseline, although this will depend upon the number of operators that would introduce the proposed chapters into their EMS and the extent to which this is additional to the baseline.

Administrative burden on businesses

This measure is likely to lead to **negative impacts** on administrative burden on businesses. The responses regarding adoption of a CMS are mixed. This is in part because a form of CMS has been a concept for some time, with different types of CMS already implemented to a greater or lesser degree by different Member States.

Table A8-16 summarises the responses by industry and competent authorities that participated in the TSS and a further mini-survey sent to the members of the competent authority working group for IED, to a query whether a CMS was in use and mandatory as part of the environmental permit. 13 MSs (plus Norway) stated that a form of CMS was in use, and 70 (out of 167) industry respondents commented that they already make use of a CMS (for inventory and reporting purposes), while only 20 (out of 167) said they do not use a CMS.

Table A8-16: Overview of the TSS responses for CMS and feedback from MSCAs*

Country	Form of CMS in place	CMS covers a form of inventory	CMS covers data on hazards and risks	CMS is used for tracking regulatory evolution	CMS reporting is part of IED permit requirements
Austria	Yes	Yes	Yes	Yes	Yes
Belgium	Yes	Yes	Yes	Yes	N/A
Bulgaria	N/A	N/A	N/A	N/A	N/A
Croatia	N/A	N/A	N/A	N/A	No
Cyprus	Yes	N/A	N/A	N/A	No
Czech Republic	Yes	N/A	Yes	N/A	No
Denmark	No	N/A	N/A	N/A	No
Estonia	Yes	Yes	Yes	No	Yes
Finland	Yes	Yes	Yes	Yes	Yes
France	Yes	Yes	Yes	Yes	No
Germany	Yes	Yes	Yes	Yes	No
Greece	No	N/A	N/A	N/A	N/A
Hungary	No	N/A	N/A	N/A	No
Ireland	No	N/A	N/A	N/A	No

Country	Form of CMS in place	CMS covers a form of inventory	CMS covers data on hazards and risks	CMS is used for tracking regulatory evolution	CMS reporting is part of IED permit requirements
Italy	Yes	Yes	Yes	Yes	No
Latvia	N/A	N/A	N/A	N/A	No
Lithuania	Yes	Yes	Yes	No	No
Luxembourg	No	N/A	N/A	N/A	No
Malta	N/A	N/A	N/A	N/A	N/A
Netherlands	Yes*	Yes*	Yes*	No	No
Poland	No	N/A	N/A	N/A	No
Portugal	No*	N/A	N/A	N/A	No
Romania	N/A	N/A	N/A	N/A	N/A
Slovakia	Yes	Yes	Yes	Yes	N/A
Slovenia	N/A	N/A	N/A	N/A	N/A
Spain	No	N/A	N/A	N/A	No
Sweden	Yes*	Yes	Yes	Yes	No

* The MSCAs highlighted that "CMS" is not a defined term under IED, and therefore the full scope of the CMS as set-out within the measure may not be included, but components of it are. Particularly the basic components for inventories of substances and risk assessments, although implementation varies. Responses from the Netherlands, Portugal, and Sweden highlighted that the basic components of the CMS are likely to be implemented on a case by case basis, with certain sectors more likely than others to require such components.

Alongside the TSS, the second mini-survey to the MSCAs for IED sought to seek further clarity on the role and function of a CMS within environmental permitting. Responses from 11 MS were received (Estonia, Finland, Hungary, Ireland, Lithuania, Luxembourg, Netherlands, Poland, Portugal, Spain and Sweden). The main feedback from the MSCA responses was that the term 'CMS' is not yet defined within IED and therefore the scope of the requirements can vary. A number of MS implement other national legislation which requires the development of inventories of hazardous chemicals and risk assessment, not directly under the umbrella of IED or environmental permits, but closely related. While others highlighted that the requirements may be managed on a case-by-case basis, with certain sectors more likely to be required to have a chemicals inventory.

In addition, the Hazbref report (2021) illustrates that discussions around CMS, mass-flow of substances and control of chemical hazards has been a talking point across multiple BREF updates with calls for a more systematic harmonised approach across all operators. The report does, however, recognise that sector specific issues may affect how the CMS is implemented.

A rapid literature review has been completed, alongside expert judgement to support an understanding of the potential costs of a CMS. One caveat is that the nature and scale of the CMS required will be sector specific (as indicated) as well as varying depending on the size and complexity of the facility and number of substances used in a given process. On that basis, no

attempt has been made to estimate EU-wide costs to industry, but rather indicative costs for a single facility.

In terms of the basic components covering an inventory of chemicals in use. A range of software packages are available ranging for the most basic €85 to more comprehensive software (including mass balance) €5 000[35]. There are also examples of bespoke systems for more complex situations which cost €100 000+ to develop[36]. This covers the cost of the software only.

Populating and maintaining the inventory will require chemical audits and assessment of the processes in use. For sectors / facilities which use far fewer chemicals (e.g., less than five) the audit could be expected to take only a few hours. At the other end of the scale, the example provided by the University of Hampshire, the audit and initial set-up of the inventory required 0.5 FTE for an experienced hazardous materials supervisor, plus 1.5 FTEs in other supporting staff. Once established the annual maintenance and update of the system required 0.25 FTE for management staff plus IT support to maintain the audit system.

In practice most operators are likely to fall somewhere between these two extremes. These are described in the Table below.

Table 17: Overview of basic components of a CMS (inventory of hazardous chemicals, uses, risk assessments, reporting and auditing)

Costs associated with setting up and maintaining the basic components of a CMS	Benefits of having a CMS[37]
• Cost of CMS software (varies from €85 to €5 000. Bespoke systems could cost €100 000+) • Audit of hazardous chemical substances to populate CMS (varies from a few hours in simple cases with few substances to 0.5FTE senior staff + 1.5 FTE supporting staff) • Maintaining CMS – update of substances (varies from a few hours per annum to 0.25FTE per annum + IT support of up to 1 FTE) • Risk assessments (already part of standard processes under REACH) • Training of staff for H&S (already part of standard processes under REACH) • Reporting of CMS outputs (should be automated would expect a few hours per annum <0.1 FTE)	• Greater control and visibility of chemicals in use, which would lead to the following benefits: • Better management of storage of chemicals (frees up floor space) • More effective use of chemicals leading to less waste and potentially lower usage of hazardous chemicals. • Better evidence base, to support innovation and identification of safer alternatives. • Greater control of risks to manage chemical safety. • Greater control and visibility over the chemicals in use leading to less risk of compliance issues with related legislation. • Level playing field given CMS is already in use for many MS.

Based on the evidence available expert input, it is assumed that between 40 to 400 hours may be required to populate and maintain the CMS every two years. This is broadly equivalent to up to 0.25 FTE or spending between €1 150 and €11 400 every two years.

[35] https://labcollEUtor.com/lims-flexible-hosting-pricing/?_ga=2.65404782.1594292501.1626773919-89232714.1626773917&_gl=1*1x7nvqg*_ga*ODkyMzI3MTQuMTYyNjc3MzkxNw..*_ga_S4X1ENVXBF*MTYyNjc3MzkxNS4xLjEuMTYyNjc3MzkzNS4w

[36] University of new Hampshire, 2003, 'Chemical Environmental Management System (CEMs), publication from the chemical strategies partnership.

[37] https://cen.acs.org/sponsored-content/taking-stock.html

It is assumed that around 50% of the IED installations or 26 000 could be targeted by this measure. As a result, this would imply that the additional administrative costs would range from €15 million to €150 million each year, on average, over a 20-year period, with a central estimate of €37 million. This is uncertain and depends upon the number of installations affected and their level of preparedness in the baseline.

The advanced components of the CMS require periodic assessment for safer alternatives to the hazardous chemicals identified, a commitment to transition to safer alternatives as soon as practical, and justification of continued use where the review of substitutes identifies viable alternatives. As with the above section these issues are highly substance specific, and would vary in complexity depending on the specific situation. More-over the assessing of alternatives can require a specialist skillsets not necessarily present within the operators' personnel. Use of consultants to carry out such assessments is fairly common. Based on experience of such assessments under REACH Authorisation and Restriction assessment of alternatives could cost between €20-50K per substance in consultancy fees, this is equivalent to between 25-60 days of staff, if completed internally.

Updates to the original audit would likely be less costly than the original study, but could still be time consuming depending on developments. The substitution to safer alternatives, could incur significant costs depending on whether the alternative was a drop-in replacement, or required a change in process wanting new equipment and training. Even with drop-in replacements significant amount of research and development costs could be expected to amend and perfect existing processes. This could also include costs associated with reduced production output depending on how changes are implemented.

In terms of the existing situation and level playing field the baseline appears to be mixed, with at least some implementation of the basic requirements considered for the CMS (directly or indirectly) to date across 13 Member States and possibly more. Standardising requirements for the basic components as a minimum may lead to some weakly negative increases in administrative burden on businesses during harmonisation (see table above), although noting that for those operators that have not used a CMS so far, the development and first population of the requirements may have more considerable impacts.

A CMS with more advanced requirements would look to address substitution more comprehensively. Some TSS respondents suggest that this is already addressed as part of REACH. At a focus group for this Study, one NGO highlighted that the advanced parts of the CMS are broadly in line with the requirements under REACH and, therefore, would not be an expansion of scope, but rather strengthen the implementation and coherence between REACH and the IED. Stakeholders from industry, however, were more concerned about the potential additional burden that could be created by the CMS, particularly for SMEs and certain Economic sectors with less capacity to absorb any additional costs within their operating margins.

At a focus group for this Study, NGO respondents also commented that, for an operator to run an IED regulated facility successfully, they would need to have a strong and clear understanding of

which chemicals are used, for what purposes and what quantities within specific parts of the installation or facility. However, feedback from one competent authority respondent highlighted that they had visited many IED regulated facilities where this was not the case. In particular, participants in this focus group suggested that it was not uncommon for SME operators to have less visibility on the full and complete audit trail chemicals used in their operations. Other respondents commented that the CMS would need to extend beyond simply intentional chemical substances, as impurities and substances formed de novo as by-products present serious challenges for wastewater and waste sectors. A complete material flow including consideration of these other elements was reported as being necessary.

The competent authority respondents also commented that in order to complete the basic components of a CMS it will be necessary to develop and provide tools and guidance to help operators in developing an audit trail of all chemicals used or created as part of industrial processes. Currently, those tools are not in place or freely available at EU-level.

Operating costs and conduct of business

This measure is likely to lead to **weakly negative impacts** on the costs of doing business. This is uncertain and varies greatly across operators.

Stakeholders that responded to the TSS for this study suggest that there might be some increases in both operating (i.e. staff time, etc.) and capital costs (i.e. equipment costs, etc.).

- For operating costs, the majority (>70%) of respondents expect an increase in costs as a result of the proposed measure. In more detail, 43% (36 of 82 responses) commented that there would be significant impact >15% increase in costs; 29% of responses (24 out of 82) expect a 5-15% increase in costs; limited impacts (+/- 5%) from 26% of respondents (21 out of 82 responses); and a <15% decline in costs from one respondent.
- For capital costs, the majority (>70%) of respondents also expect an increase in capital expenditure. In particular, 44% (35 out of 79) stated there would be a >15% increase in their annual capex costs; 27% (22 out of 79) of respondents indicated a 5-15% increase in costs; 27% (21 out of 79), only limited impact of +/- 5%; and one respondent indicated that a 5-15% decrease in costs could be expected.

Further responses from the TSS highlighted that integrated management systems (which include CMS) are commonplace within chemical industry sectors, but possibly less so in other IED-regulated industry sectors. The primary concern raised by industry responses was the level of effort required to assess hazardous substances and possible substitution, with some highlighting a risk of overlaps with REACH.

Competitiveness and level playing field

This measure is likely to lead to **limited to no impacts** on competitiveness and **positive impacts** on levelling the playing field. Although the costs of business could increase marginally, there is already a widespread implementation of some form of CMS (particularly for the basic

components) and, therefore, we would not expect that standardisation of the requirements would lead to a significant impact on the competitiveness of EU businesses in the global context.

However, the results of the TSS and discussions with ECHA, EIPPCB and a focus group highlighted an opportunity to level the playing field. A form of CMS (covering the basic components) is already in use across many Member States, with variations in how the CMS is implemented, what it covers, and how it is managed. This in itself represents an uneven playing field. All but one participant of the focus group run for this study conceded that there was a need for greater harmonisation in how the existing situation works, and that a clear CMS with details of what is expected and what it includes would be beneficial. The scope of the CMS and far it should go towards promoting or actively channelling transition to safer alternatives, was a more datable point, with less clear agree. However, the analysis makes clear that the potential benefits of a harmonised approach would have strong benefits for a level playing field.

Position of SMEs

Overall, this measure is likely to lead to **mixed or unclear impacts** on the position of SMEs. There are both positives and negatives with how a CMS could help SME operators and/or result in a disproportionate increase in administrative costs for them.

A focus group undertaken for this Impact Assessment, together with results from the TSS, highlighted that forms of CMS are already in use, but with patchy distribution, both in terms of industry sector and between larger and SME-sized companies. The TSS results, in particular, suggested that companies that have to meet obligations under REACH and SEVESO are more likely to make use of integrated management systems, which would include a CMS (at least for the audit trails of substances and reporting).

One competent authority delegate at the focus group commented that they had visited many IED regulated facilities which entirely lacked a CMS, with SMEs being more likely to fall into this category. This may mean that a greater proportion of SMEs would be faced with both the set-up costs and maintenance of the CMS. Although the argument can also be made that SMEs may be likely to have fewer hazardous substances and so a simpler CMS may be needed. The positive impacts here would relate to the right-hand column of the table on the previous example. Effectively greater knowledge and control of the processes in place, leading to less waste, less use of hazardous chemicals, less likely to have chemical compliance issues because of improved knowledge base, and better potential for innovation from a more informed position.

The issue of sector-specific sensitives was also raised by the focus group on EMS and CMS, Some delegates at the focus group highlighted that different industry sectors make more or less use of chemicals, and therefore may be less likely to encounter hazardous chemicals, meaning a more simplified version of CMS might be warranted.

Data on the proportion of IED regulated SME operators with / without CMS systems has not been identified. It is therefore assumed as a worst case scenario that this category may be significantly more likely not to have a CMS or technical/Economic capacity to meet the full

(basic and advanced) requirements of the CMS measure and care may be needed to implement such an approach in a tailored fashion as part of BAT conclusions.

Innovation and research

This measure is likely to lead to **weakly positive impacts** on innovation and research. The justification of the use and the substitution check could improve the innovation process in the longer-term.

In an interview with the EIPPCB, representatives highlighted their experience with the most recent BREF document update for ceramics (which commenced in February 2021). In particular, the EIPPCB stated that based on previous BREF exercises, it can sometimes be challenging for industry to fully respond as it is not always known which chemicals are in use, and furthermore any by-products. A CMS would, therefore, support in addressing these gaps and allow industry stakeholders to have a more informed discussion around substitution and safer alternatives, including consideration of where negative BAT could be applied. Therefore, requiring a CMS could facilitate knowledge-sharing and indirectly encourage innovation and research.

Public authority impacts

This measure is likely to lead to **negative impacts** on public authority. The CMS would improve the compliance check for competent authorities on the permit installations' obligations and would streamline information on hazardous chemical substances from different legislations such as REACH, the WFD and the POPs Regulation. This would create synergies in the shorter term.

It is unclear, however, whether local competent authorities would require additional technical resources to assess the CMS data that operators would provide. The CMS would indeed provide valuable information on substances that are currently not considered during the BREF process such as SVHC although this would lead to an expansion in the scope of the BREF process and, therefore, could lead to increasing public authority burden, at least in the shorter term.

Based on the evidence available expert input, it is assumed that these efforts would require between 20 to 200 hours from public authorities every two years (50% of the costs incurred by operators). This is broadly equivalent to up to 10% of an FTE or spending between €550 and €5 700 every two years.

It is also assumed that around 50% of the IED installations or 26 000 could be targeted by this measure. As a result, this would imply that the additional administrative costs would range from €7 million to €74 million each year, on average, over a 20-year period, with a central estimate of €19 million. This is uncertain and depends upon the number of installations affected and their level of preparedness in the baseline.

Responses from the TSS by competent authorities suggest that negative impacts should be expected, although these are likely to be relatively small. The majority or 63% (12 out of 19) of respondents expect only limited negative impacts (+/-5% of cost impact). Other responses included a 5-15% increase in costs (3 out of 19 responses) and >15% increase in costs (4 out of

19 responses). As a further means of comparison, the IED impact assessment from 2007[38] provides details of administrative costs for permitting, including reviewing data for granting environmental permitting and audits for compliance. Under Annex 8 of the impact assessment an estimate of 3-10 days of staff time per permit at a cost of €8 700 - €14 500 was estimated. Depending on the complexity of the CMS and whether it included only the inventory of hazardous substances or further information on alternatives, could broadly fit within similar levels of staff effort.

Environmental impacts

Overall, this measure is likely to have **weakly positive environmental impacts** when compared to the baseline, which will depend upon the number of operators that would introduce a CMS into their EMS and the extent to which this is additional to the baseline.

Climate

This measure is likely to have **weakly positive impacts** on climate. The CMS would provide greater clarity over uses of chemicals, and therefore it is assumed would provide a more informed basis for selection of safer alternatives. However, note that 'safer' would be a broad term covering all environmental aspects. This can mean a chemical with a lower human health hazard profile has other less desirable environmental impacts (e.g., a higher GWP or water and resource demand). These issues are highly substance and site-specific meaning it is challenging to comment on the overall impacts. This said, this measure is intended to form a component part of the EMS and it is, therefore, expected that any actions under CMS will be considered with other activities and objectives, such as reducing the greenhouse gas emissions footprint of the industrial sectors.

Air quality

This measure is likely to result in a **weakly positive impact** on air quality. The CMS could fill the gap of tracking and reporting pollutants that are currently not covered by the E-PRTR such as SVHCs, substances listed in Annex I and III of the POPs Regulation and pollutants from industry sectors that do not report under the E-PRTR. The focus group on EMS and CMS also highlighted that an inventory of hazardous chemicals should go beyond those commercially purchased and include hazardous chemicals formed de novo during the process and any by-products. This would be of high importance for waste management, but could also help identify air emissions of chemicals of concern. The absolute environmental impact (% emission reduction) cannot be quantified as the impacts of the CMS such as increased awareness and potential reduction and/or substitution of hazardous chemicals would vary among the installations. The CMS would have more of an impact in the medium to longer term as new BATC have to be transposed into national legislation within four years.

[38] European Commission, 2007, 'Staff working document for impact assessment of the industrial emissions dirEUtive', COM(2007)844

Water quality and resources

This measure is likely to result in a **positive impact** on water quality and resources. The discussions with the focus group on EMS/CMS highlighted that the CMS would place harmonised obligations on operators to document and quantify chemical substances produced de novo during production processes as well as commercially acquired chemicals used and, therefore, would enable a proportionate and robust response to manage pollution, especially of water bodies through industrial releases and waste. It is expected that the CMS could have a significant positive impact on water quality, although similar to the expected impacts on air quality, the absolute environmental impact (% emission reduction) cannot be quantified as the impacts would vary among installations.

Soil quality or resources

This measure is likely to result in a **weakly positive impact** on soil quality and resources. Similar to air and water emissions, tracking and reporting priority substances, particularly those formed de novo at the facility. The absolute environmental impact (% emission reduction) cannot be quantified as the impacts would vary among the installations.

Waste production, generation, and recycling

This measure may lead to **weakly positive impacts** on waste production, generation, and recycling. In a similar aspect to the water component, generation of chemical substances (as by-products) can have implications for waste, and recycling. Greater understanding of the mass-balance and flow of material would help identify options to minimise the creation of harmful wastes and make existing waste flows easier to recycle. However, as with the other environmental categories quantifying specific benefits is challenging as it would industry sector and potential facility specific.

Efficient use of resources

This measure is likely to lead to **limited to no impact** on the efficient use of resources. There will be possible indirect benefits from greater visibility and understanding of the regulatory acquis.

Social impacts

This measure specifically is likely to result in some **impacts on employment, although the direction is unclear.** The preceding sections have highlighted that a form of CMS is already in use across many EU MS, with the specific details varying both by country and industry sector. However, a harmonised approach with clearly set-out expectations would help strengthen a level playing field and provide additional information that could support further innovation. It would also have the positive impact of raising confidence in the EU to tackle specific pollution issues, and strengthening the overall coherence between IED and its most closely related chemicals and environmental legislation.

The improved level playing field would have positive impacts in terms of business and employment. It would also further help identify where a transition to safer alternatives is needed, to both protect human health and the environment. However, the counter-factual to this position is illustrated by the TSS results and concerns raised by industry in the TSS and at the focus group for the EMS/CMS. Development of an inventory of hazardous chemicals is still not undertaken by many operators, particularly SMEs, and tools to help complete such an inventory are not in place and freely available at EU-level. This could represent significant additional costs, which may have an impact on employment.

The greater point of concern relates to the advanced components of the CMS, in particular work to undertake analysis of alternatives for hazardous substances, and where substitution might be possible. Many industry respondents indicated that this may represent significant effort and cost which could have consequences for employment. This being case, however, the NGO respondents at the focus group meeting also highlighted that such requirements are broadly in line with what is already expected and obligated under REACH, and that the full CMS requirements do not represent an expansion of scope, but rather additional support to the coherence between REACH and IED, including proper implementation of the Regulation and Directive respectively.

Measure 26: Require Member States' national authorities (or delegated competent authorities) to establish a national plan to promote industrial symbiosis.

Description of the measure and requirements for implementation

This measure entails the introduction of a requirement in the IED for Member States' national authorities (or delegated competent authorities) to establish a national plan to promote industrial symbiosis. Because this is a cross-cutting, cross-sectoral topic, the IED itself is a more suitable instrument than the individual BREFs. An IED article (or an Annex) would list a number of obligatory elements (e.g. financial support, regulatory facilitation, facilitation of information exchange, capacity building…), criteria or minimum quality standards for each of these national plans. To date, no specific information is available on which criteria would be fit for this purpose.

Inclusion of information in the BREFs and locally available information on types of IED (or non-IED) activities and their location, would support and feed information to these national industrial symbiosis plans.

On a second level, this could be complemented with an obligation for Member States to report on the progress/results of their national industrial symbiosis plans. For this, a harmonized set of indicators needs to be developed on the EU level.

An obligation to establish national plans to promote industrial symbiosis could be considered within the IED itself, as is proposed in this measure, but it could also be considered to be

included in other policy domains or instruments (e.g. related to CE or other policies within the EU Industrial Strategy). Indeed, there will be many instances were a (potential) industrial symbiosis relation will involve no (or not only) IED installations. Next to that, it is important to note that a main facilitating factor for industrial symbiosis is geographical proximity (which cannot be legally enforced), and that local rather than sectoral conditions and issues are important drivers. This might make the IED not the most suited instrument for promoting industrial symbiosis implementation. As an alternative to national plans, an EU coordinated plan or strategy could also be considered.

Objectives:

The measure will aim to increase the emphasis on industrial symbiosis and the circular management of resources in IED industrial sectors, whilst levelling the playing field. This measure will, therefore, contribute to the general objective of transforming the EU into a circular Economy and, more specifically, contributing towards the transition to a more circular Economic model for the EU in the short-to-medium term.

Implementation needs:

- On EU level, modification of IED legislation (if IED is chosen as the instrument)
- On Member State level:
    - regulation transposing the IED requirements
    - nomination of responsible body, human resources
    - policy documents and instruments
- Exchange of implementation practices/issues (e.g. through IMPEL network)

Assessing impacts

Economic impacts

Overall, this measure is likely to have **limited direct Economic impacts** when compared to the baseline, as these will largely depend on how national plans are established by public authorities and their ambitions.

Administrative burden on businesses

There are **no direct impacts** on businesses expected following the implementation of this measure. Indirect impacts are highly dependent on how national plans are established by public authorities.

Around half of the respondents to the TSS answered that there are existing national measures promoting industrial symbiosis. Evidence suggests that this may be an overestimate. Where these are plans already in place, there will likely be no or only a weakly negative impact on indirect costs.

Only a quarter of industry respondents (22) to the TSS were aware of national initiatives specifically for their sector. Around 40% of the respondents also confirmed that they refer to the sector's feedstock or wastes or by-products (15 and 14 respectively). However, the sample responding to these questions was very limited.

Operating costs and conduct of business

There are **no direct impacts** on businesses expected following the implementation of this measure. The scale and direction of indirect impacts are highly uncertain and dependent on how national plans are established by public authorities. However, it is unlikely that national plans will have a command and control nature, given the large diversity in industrial processes and in possible industrial symbiosis matches.

Competitiveness and level playing field

There are **no direct impacts** on competitiveness expected following the implementation of this measure. There are potential **limited indirect (positive) impacts** on level playing field due to EU level harmonized criteria/quality requirements for a national plan to promote industrial symbiosis.

Position of SMEs

There are **no direct impacts** on businesses expected following the implementation of this measure.

Innovation and research

This measure may have a **limited to no impact** on research and development. The national plans themselves may drive further innovation in (technologies for) matching residues from one activity with feedstock from another activity. Strategies for increasing resource efficiency that consider process technologies, ecodesign and cross-sectoral collaboration (e.g. industrial symbiosis) strongly rely on innovation and research.

Public authority impacts

This measure is likely to result in **weakly negative impacts** on public authorities. This obligation to develop national plans will require additional administrative efforts from public authority administrations, except for those cases (if any) were there is already an established national plan that meets the envisaged criteria/standards. In order for the measure to have a substantial environmental effect, public authorities would have to secure the development and putting in place of policies, mechanisms and measures, as well as their aligning with identified sector-specific roles of industrial installations in cross-sectoral collaboration

Costs of plans and initiatives to promote industrial symbiosis vary widely, given that there is no single standard for such initiatives, and they are therefore very different in the components they include, and the level of depth on each component. Some examples of development costs for IS

initiatives, often collaborations between multiple companies and national or local authorities, are:

- Life M3P project. Project budget of 1.5 M€, of which 60% was co-funded by the EU, "will study and implement an on-line platform to promote exchanging of industrial waste among the companies of manufacturing districts"
- H2020 Scaler project. Project budget of ca. 1 M€, funded by EU; "the project will develop a set of best practices, tools and guidelines, helping businesses and industrial sites work together to ensure sustainable resource use".
- H2020 Sharebox project. Project budget 5.9 M€, of which EU contribution 5.4 M€, "will develop a secure ICT platform (SHAREBOX) for the flexible management of shared process resources that will provide plant operations and production managers with the robust and reliable information that they need in real-time in order to effectively and confidently share resources (plant, energy, water, residues, and recycled materials) with other companies in a symbiotic ecosystem. A suite of new analysis and optimisation tools for flexible energy use and material flow integration will be developed for optimising symbiosis among companies. These tools will be based on input- output (IO) modelling for resource (waste and energy) supply-demand matching and process efficiency analysis (to understand physical and technological conditions), game theoretical (GT) approach for integrating company behaviour in cost-, benefit-, and resource-sharing (to understand Economic conditions), and agent-based modelling (ABM) for designing the (Economic, environmental, and social) optimal symbiotic network (to have the holistic optimum)"

There are also commercially available (international) IS-facilitating platforms and services provided by private for-profit enterprises, for which clients pay regular or service-based fees, as well as ad hoc/local collaborations/clusters, sometimes governed by a coordinating body.

About half of the respondents to the TSS for this study answered that there are existing national measures promoting industrial symbiosis. This is likely to be an overestimate. Nevertheless, where these plans are already in place, there will likely be no or only a weakly negative impact on public authority costs.

Environmental impacts

Overall, this measure is likely to have **limited direct environmental impacts** when compared to the baseline, as these will largely depend on how national plans are established by public authorities and their ambitions.

Climate

This measure will likely result in a **limited positive impacts** on climate. Although there is little evidence, and although the potential for industrial symbiosis is very much dependant on local conditions, such as proximity of potential matches, it should be expected that, in general, national plans increase the uptake/implementation of industrial symbiosis, which will benefit emissions of GHGs compared to the separately conducted, individual industrial activities. It is

important to demonstrate that potentially negative (cross-media) effects of an increased use of renewables, waste, by-products or secondary resources (either in absolute volume or as relative share), will not outweigh the, mostly direct, positive environmental effects. On the potential CO2 savings, see also 'Efficient use of resources' below.

Air quality

This measure is likely to result in a **limited positive** impacts on air quality. It is unclear if the increased uptake of industrial symbiosis will overall lead to lower or higher emissions of air pollutants (if any change at all). However, a national plan could focus on/promote those matches that have a beneficial effect on pollutant air emissions (or a relatively low negative effect compared to the amount of resources saved). It is important to demonstrate that potentially negative (cross-media) effects of an increased use of renewables, waste, by-products or secondary resources (either in absolute volume or as relative share), will not outweigh the, mostly direct, positive environmental effects.

Water quality and resources

This measure is likely to result in a **limited positive impacts** on water quality and resources. It is unclear if the increased uptake of industrial symbiosis will overall lead to lower or higher emissions of water pollutants (if any change at all). However, a national plan could focus on/promote those matches that have a beneficial effect on pollutant water emissions (or a relatively low negative effect compared to the amount of resources saved). It is important to demonstrate that potentially negative (cross-media) effects of an increased use of renewables, waste, by-products or secondary resources (either in absolute volume or as relative share), will not outweigh the, mostly direct, positive environmental effects.

Soil quality or resources

This measure is likely to result in a **limited to no impact** on soil quality and resources. It is unclear if the increased uptake of industrial symbiosis will overall lead to lower or higher emissions of soil pollutants (if any change at all). A national plan could focus on/promote those matches that have a beneficial effect on pollutant soil emissions (or a relatively low negative effect compared to the amount of resources saved), but it is unlikely that any industrial by-product matchmaking will impact these emissions to soil.

Waste production, generation, and recycling

This measure may lead to **weakly positive impacts** on waste production, generation, and recycling. While there is little evidence (see also 'Efficient use of resources' below) and although the potential for industrial symbiosis is very much dependant on local conditions – such as proximity of potential matches – it should be expected that in general national plans increase the uptake/implementation of industrial symbiosis. This will avoid waste generation compared to the separately conducted, individual industrial activities.

Efficient use of resources

This measure may lead to **weakly positive impacts** on the efficient use of resources. There is little evidence of impact of industrial symbiosis on efficient use of resources at the Economy level. The COWI report 'Economic analysis of resource efficiency policies' (2011) estimates, based on an extrapolation of the NISP results to Europe, that an investment of €250 million (as operating costs of the programme) would generate environmental benefits of 52 million tonnes of landfill diversion and 46 million tonnes of CO_2 reduction. The report 'Cooperation fostering industrial symbiosis: market potential, good practice and policy actions' by University College London, Technopolis Group and Trinomics (2018) estimates cost avoidance linked to waste prevention and landfill diversion of €73 billion, and value generated by secondary materials in a range of €7 billion to €13 billion.

Although the potential for industrial symbiosis is very much dependant on local conditions, such as proximity of potential matches, it is expected that, in general, national plans may lead to an increase in the uptake/implementation of industrial symbiosis, which will decrease consumption of resources compared to the separately conducted, individual industrial activities.

The report further refers to a particularity of the Basque country's approach, in which they use the knowledge of IPPC activities to promote regional synergies. According to the publication on this approach '36 Circular Economy demonstration projects in the Basque country. Results from business initiatives[39] . The report 'IED contribution to the circular Economy' (Ricardo and VITO, 2019), contains a number of case studies with their resource savings and other environmental and financial benefits, and several other reports and databases are available.

However, with the information available at this stage, it is not possible to estimate the potential that could be realised by requiring national authorities to establish national plans. The reports and studies identified suggest that evidence available is limited and fragmented, and that IS activity may be unreported.

Stakeholders participating in the TSS were asked about the untapped potential of IED actions for the following categories: Water use efficiency & water reuse; Choice of primary/ secondary feedstock and fuels; Waste reduction and recycling; Energy use; and Improved environmental performance over the supply chain. One of these IED actions was 'Promotion of industrial symbiosis by Member States/regions/intra-sector and inter-sector local systems'. Overall, industry stakeholders and national authorities expected the lowest and similar levels of untapped potential across categories (mostly around -0.4 on a scale from -1 to 1), whilst they had higher expectations for the potential across waste reduction and recycling. Local and regional authorities (mostly +0.4, but +0.2 for water) and Environmental NGO (mostly +1.0, but +0.25 for energy) expected higher levels of potential across all categories.

[39] (Ihobe, 2016) "In a successful outcome, the projEUts estimate potential savings of 276,000 tonnes of materials per year, a turnover of 38.7 million euros annually and the creation of 156 new jobs"

Social impacts

This measure has **unclear impacts** on employment.

Summary of problem area 3 measures

For the measures presented in problem area 3, Table A8-18 summarises the Economic, environmental and social impacts of the measures using the qualitative ratings. Overall, these policy measures would generate limited to negative Economic impacts, positive environmental impacts and limited social impacts at least in the shorter to medium term. This suggests that, as a response to these policies, IED operators may incur some Economic costs to improve their energy, water and materials efficiency through implementation of measures that would facilitate such efficiency improvements. The analysis primarily qualitative, and the benefits are especially uncertain as they depend on the outcomes of technological advances and investment decisions by operators.

Table A8-18: Summary of Economic, environmental and social impacts for measures in problem area 3

Policy measures	Economic impacts	Environmental impacts	Social impacts (employment focus)
#23	✗	✓	O
#24	✗	✓✓	O
#25	✗	✓✓	O
#26	✗	✓	U/O

Table A8-19 similarly uses qualitative ratings to summarise costs and benefits for measures in problem area 3. Overall, expected benefits associated with measures 23, 24 and 25 to increase energy, water and materials efficiency through implementation of measures that would facilitate such improvements are likely to outweigh costs. There is uncertainty, however, associated with the cost and benefit balance of introducing national symbiosis requirements (#26).

Table A8-19: Summary of costs and benefits for measures in problem area 3, with central estimates of administrative costs for businesses and public authorities shown

Policy measure	Administrative costs – businesses (€m/yr)	Administrative costs – public authorities (€m/yr)	Overall costs	Overall benefits
#23	7	6	✖	✓
#24	16	12	✖	✓✓
#25	46	23	✖✖	✓✓✓
#26	No/limited	Not estimated	✖	✓