HAZBREF

Interreg Baltic Sea Region

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Work Package 3, Activity 3.1

Analysis of the interfaces, possible synergies or gaps between Industrial Emission Directive, REACH Regulation, Water Framework Directive, Marine Strategy Framework Directive and the POP Regulation concerning hazardous substances

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EU STRATEGY FOR THE BALTIC SEA REGION FLAGSHIP

HAZBREF in Brief

This report is a product of the HAZBREF project *"Hazardous industrial chemicals in the IED BREFs"*. HAZBREF is funded by the EU Interreg Baltic Sea Region Programme and the implementation period is three years from October 2017 until the end of 2020.

The overall aim of HAZBREF is to increase the knowledge base of the industrial sources and the reduction measures of hazardous chemicals. HAZBREF will identify relevant chemicals used in industrial sectors, their use patterns, environmental characteristics and measures to prevent and reduce releases to environment.

On the EU level the main instrument to control industrial releases is the Industrial Emissions Directive (IED), particularly through the publication of BAT Reference documents (BREFs) and their key chapter: the BAT conclusions. However, these BAT conclusions in most cases do not address hazardous substances in a systematic and comprehensive way. HAZBREF aims to develop a systematic approach that will help to exchange and utilize the existing information about hazardous substances between different regulatory frameworks (IED, REACH, Water Framework Directive, Marine Strategy Framework Directive, EU provisions on Circular Economy, Stockholm POP Convention and HELCOM) in the preparation of BREFs.

When the use and risks of chemicals are better addressed in BAT Reference documents, the capacity to manage industrial chemicals will be enhanced among both authorities and operators. The information gathered in BREFs is also useful for the Baltic Marine Environment Protection Commission HELCOM in the development of actions to reduce the inputs of hazardous substances to the Baltic Sea. HAZBREF also promotes the circular economy by finding ways to include circular economy aspects in BREFs.

HAZBREF outputs target both the policy and the enforcement level. On the policy level the outputs will strengthen the links between different regulatory frameworks and their key players. On the enforcement level at industrial installations the project will identify and test model solutions for hazardous chemicals´ management.

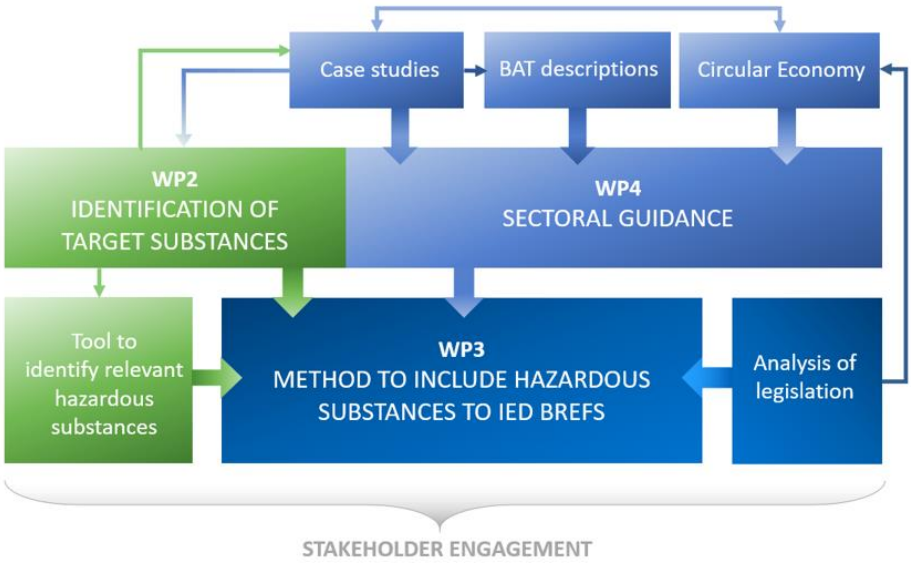
The activities will be carried out in four Work Packages:

- WP1 – Project management and administration (Lead Partner SYKE) including communication and dissemination of results
- WP2 – Identification of target substances (Lead by UBA) that include:
  - 2.1 Identification and selection of target substances
  - 2.2 Fate of substances during emission treatment
- WP3 – Policy improvement (Lead by UBA) that include:
  - 3.1 Strengthening links between regulatory frameworks on different levels
  - 3.2 Developing method to include substance information into BREFs, improve communication and data flow
- WP4 – Best practices in chemicals management in industry (lead by IETU) that include:
  - 4.1 Sectoral guidance for three IED sectors (chemicals, textile, surface treatment of metals and plastics)
  - 4.2 Case studies in selected installations
  - 4.3 BAT descriptions and model permits
  - 4.4 Circular economy aspects.

The HAZBREF partnership includes 5 organisations from the Baltic Sea region: Finnish Environment Institute (SYKE) (Lead partner), German Environment Agency (UBA), Swedish Environmental Protection Agency (SWEPA), Institute for Ecology of Industrial Areas (IETU) and Estonian Environmental Research Centre (KLAB).

In addition, 27 associated organisations and a wide range of other stakeholders will be involved in HAZBREF, such as ministries and governmental environmental and chemical agencies from several EU countries, permitting and supervision authorities as well as industries and environmental NGOs.

More information about HAZBREF can be found on our project website (www.syke.fi/projects/hazbref).



Overview of the design of the HAZBREF-project with its four work packages.

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Constructive and valuable comments were received from the following stakeholders:
the Association of the Chemical Industry (VCI), the Environment Agency Austria (UBA Austria), the European Chemicals Agency (ECHA), the European Chemical Industry Council (CEFIC), the European Environment Bureau (EEB), the European IPPC Bureau (EIPPCB), the Finnish Safety and Chemicals Agency (TUKES) and the French Ministry for Ecological and Solidary Transition.

Contents

Definitions and abbreviations

BAT	Best Available Technique
BAT-C	BAT-conclusion
BAT-AEL	BAT-associated emission level
BEP	Best Environmental Practice
BREF	Best Available Technique Reference Document
BSAP	Baltic Sea Action Plan
CBI	Confidential Business Information
CIS	Common Implementation Strategy
CLP Regulation	Classification, Labelling and Packaging Regulation
CLRTAP	Convention on Long-Range Transboundary Air Pollution
CMR Substances	Carcinogenic, Mutagenic and Reprotoxic substances
COMMPS	Combined Monitoring-based and Modelling-based Priority Setting
CSR	Chemical Safety Report
DG ENV	Directorate-General for Environment
EC	European Commission
ECHA	European Chemicals Agency
EEA	European Environment Agency
EIPPCB	European Integrated Pollution Prevention and Control Bureau
ELV	Emission Limit Value
EMEP	European Monitoring and Evaluation Programme
E-PRTR	European Pollutant Release and Transfer Register
E-PRTR	European Pollutant Release and Transfer Register
EQS	Environmental Quality Standards
EQSD	Environmental Quality Standards Directive
ES	Exposure Scenario
eSDS	Extended → SDS. Document of chemical safety that consists of a standard SDS, has more subsections than the general one and includes one or more exposure scenario(s) in an annex.
EU	European Union
HAZBREF	EU Interreg project "Hazardous industrial chemicals in the IED BREFs"
HBCDD	Hexabromocyclododecane
HCB	Hexachlorobenzene
HELCOM	Baltic Marine Environment Protection Commission – Helsinki Commission
IED	Industrial Emissions Directive, Directive 2010/75/EU of the European Parliament and the Council on industrial emissions
IMPEL	The European Union Network for the Implementation and Enforcement of Environmental Law
JRC	Joint Research Centre
KEI	Key Environmental Issue
MSFD	Marine Strategy Framework Directive
NAP	National Action Plan pursuant to Art. 6 of the POPs Regulation
NGO	Non-Governmental Organisation
PACT	Public activities coordination tool
PAHs	Polyaromatic hydrocarbons
PBDEs	Polybrominated diphenyl ethers
PBT	Persistent, bio-accumulative and toxic (cf. vPvB)
PCBs	Polychlorinated biphenyls
PCDD/F	Polychlorinated dibenzo-para-dioxins/furans
PFAS	Perfluoroalkylated substances
PFOA	Perfluorooctanoic acid
PFOS	Perfluorooctane sulphonate
PHS	Priority hazardous substances acc. to Directive 2013/39 /EU
PLC	Pollution Load Compilation
PoM	Programs of Measure
POPs Regulation	Persistent Organic Pollutants Regulation
POPRC	POP Review Committee under the Stockholm Convention
PS	Priority substances acc. to Directive 2013/39 /EU
RBMP	River Basin Management Plans
RBSP	River Basin Specific Pollutants
REACH	Registration, Evaluation, Authorisation and Restriction of chemicals, EC 1907/2006

SDS	Safety Data Sheet
SG-R	Sub group on Review of Priority Substance List
SPERCs	Special Environment Release Categories
STP	Sewage Treatment Plant
SVHCs	Substances of Very High Concern according to the Candidate list of substances of very high concern for authorisation
TAC	Technical Adaptation Committee on waste
TBT	Tributyltin
TFEU	Treaty on the Functioning of the European Union
TWG	Technical Working Group
UNECE	United Nations Economic Commission for Europe
vPvB	Very persistent and very bio-accumulative (cf. PBT)
WFD	Water Framework Directive, Directive 2000/60/EC of the European Parliament and of the Council of 23 October 2000 establishing a framework for Community action in the field of water policy
WG CHEM	Working Group Chemicals
WISE	Water Information System for Europe
WP	Work Package
WWT(P)	Wastewater Treatment (Plant)

Executive Summary

This report is the product of activity 3.1 of work package 3 "policy improvement" of the HAZBREF-project[1]. It considers the discussions held and comments received from the participants of the workshop held in September 2018 in Berlin and from a consultation round for this document during the last quarter of 2019. The more general proposals of this report will be used for developing more concrete proposals in the HAZBREF activity 3.2 "Development of a method to include information of hazardous substances into BREFs", to be published by the end of 2020.

This report analyses the interfaces, links and gaps between relevant pieces of EU legislations[2] and HELCOM[3] with regard to hazardous substances. Within this analysis, the Industrial Emission Directive (IED) – being the main EU instrument regulating pollutant emissions from industrial installations – is in the limelight. Analysing interfaces, possible synergies and gaps of the IED leads us necessarily to the examination of the process for determination of Best Available Techniques (BAT) because the IED for its part aims to reduce harmful industrial emissions across the EU in particular through better application of BAT. In order to determine and agree upon BAT and the BAT-associated emission levels (BAT AEL) at EU level, the Commission organises an exchange of information on BAT with experts from Member States, industry and environmental organisations. The **European IPPC Bureau** (EIPPCB) at the EU Joint Research Centre in Seville (Spain) co-ordinates this work (therefore the information exchange on BAT is also referred to as "Sevilla Process") that results in **BAT Reference Documents** (BREFs) including BAT conclusions. Once adopted by the Commission as Implementing Decisions, these BAT conclusions shall be the reference for setting the permit conditions. Because of its importance for the setting of actual permit conditions in the European industry, we see the European BAT information exchange as the heart and driver of the IED. Considering the legal provisions of the IED, the Sevilla Process and possibilities to better use available and relevant data on substances of concern generated by other EU legislations is therefore central to this analysis.

The report delivers proposals for better use of information on hazardous substances generated under key legal frameworks that are connected with the IED. The report also addresses how a better communication, interaction and data flow between the key actors of the respective regulations and the EIPPCB and the Technical Working Groups (TWG) could be established. The aim is to enrich the BREF reviews with information on hazardous substances relevant for the given sector and best practices to minimize their use and release from industrial installations.

HAZBREF proposals refer firstly to possibilities for improvement of the BREF-process itself in order to strengthen the identification of BATs for industrial chemicals in a systematic way. Furthermore, the proposals address possible synergies between IED and REACH, WFD and the POP Regulation. Some reflections on promotion of circular economy aspects in BREFs are also included. Since the HAZBREF project is funded by the European Regional Development Fund Interreg Baltic Sea Region, the analysis includes the major provisions of HELCOM with regard to hazardous substances.

[1] More information about HAZBREF can be found on our project website (https://www.syke.fi/projects/hazbref).

[2] Industrial Emission Directive 2010/75/EU, REACH-Regulation (EC) 1907/2006, the Water Framework Directive 2000/60/EC, the Marine Strategy Framework Directive 2008/56/EC, Waste legislation and the POP Regulation (EC) 850/2004.

[3] After the first draft of this report it became clear that the status of HELCOM regulations is different from that of the EU legislative frameworks. Therefore, the findings regarding HELCOM are presented in an annex of this report.

It is expected that once BREFs and BAT conclusions contain more information on the substitution, safe use and risk management of hazardous substances these specific BAT conclusions are transformed into permit conditions and supervision by competent authorities in the EU Member States. This will bring IED installations to use less hazardous substances and to reduce releases of hazardous substances to the environment. Interviews conducted with some EU Member States' authorities on how to improve BAT conclusions on hazardous substances complement the desk study and the results of these interviews are presented in Annex 2.[4]

The term *hazardous* generally refers to ecotoxicological or human toxicological properties of a substance – something like "poisonous". Depending on the legal context, this term may address different (and additional) substances properties. In EU regulations relevant for the context of this study the term *hazardous* is not used in a consistent way. Depending on the legal context, this term may address different (and additional) substances properties. The IED uses the term *hazardous* only for those substances that are used, produced or released at the site of the installation and that have a potential to contaminate soil and groundwater contamination (Art. 22). Other relevant substances and substance properties to be considered for determining BAT under the IED are referred to as *polluting substances* and they include groups of substances, hazard classes and substances properties (Annex II IED). In EU regulations connected to the IED there are negative listings, such as the WFD list of priority substances; other EU regulations list hazardous classes (e.g. CLP Regulation (EC) No 1272/2008 on the classification, labelling and packaging of substances and mixtures); others do not refer at all at the term *hazardous* (e.g. REACH); finally, other regulations refer to a positive authorised list of active substances (e.g. Regulation (EU) No 528/2012 concerning biocidal products).

The HAZBREF project initially refers to "hazardous" substances as those which are "released from industrial installations through discharges to waters, emissions to air and wastes and which have a harmful effect on the environment". This obviously addresses CMR and toxic substances, but according to the REACH Substances of Very High Concern (SVHC) definition, the release of PBT and vPvB substances from installations should be avoided, too. Hazardous in HAZBREF, which focusses BAT for industrial installations (IED), considers two aspects: (a) the potential to be released, or conversely, the ability to be eliminated (in the WWTP) – which qualifies a substance as "target substance", and (b), in addition, the intrinsic potential toxicity of the substance – which may qualify a substance as "relevant target substance". Both aspects have several degrees of importance, and the term *hazardous* should be reserved for *high potential to be released and/or significant toxicity*. It is more appropriate to talk of concerns and degrees of concern. This is why for HAZBREF *substances of concern* are synonymous *to target substances for consideration in BREFs*. Adding "relevant" to the target substance for BREFs would then mean that there is a particularly high concern for either persistency, mobility or toxicity, for example.

[4] An annex of this report summarizes also the findings of some 15 expert interviews carried out with representatives from local authorities in Member States (Estonia, Finland, Germany, Poland and Sweden) that work at the interface of IED permitting/supervision and the analyzed legal frameworks. Since the findings are not considered representative results are not presented in the main text.

Proposals for more systematic consideration of hazardous substances in BREF reviews and BAT conclusions[5]

The HAZBREF recommends that a more systematic consideration of the use of chemicals, potential substitution and the minimisation of hazardous substances should be a mandatory part of the BREF reviews. In practical terms, this can be achieved by focussing more on this subject already during the preparatory stages of BREF reviews (*frontloading*), e.g. by carrying out dedicated preparatory studies, search purposefully in ECHA databases, motivating Member States to conduct certain targeted measurements or to share practical experience and monitoring results. This kind of efforts undertaken early enough during the information exchange about BAT may lead to a better inclusion of BATs on hazardous substances. This report recommends a more structured approach and a systematic assessment that allow identifying BAT and measures on relevant target substances for BREFs The more detailed proposals will be delivered in the HAZBREF activity 3.2 "Development of a method to include information of hazardous substances into BREFs".

In recent years, the EIPPCB has used the term "Key Environmental Issue" (KEI) for addressing key pollutants or issues for BREF reviews. The carrying out of preparatory KEI studies during the frontloading phase of BREF reviews offers an opportunity to systematically categorise hazardous chemicals identified as KEI for a certain sector. This is definitively a step into the right direction and should be continued in future BREF reviews. However, there is room for improvement in the KEI studies and the identification process with regard to the following:

- The criteria applied are mostly unsuitable
  - the 4 criteria[6] for the selection of KEIs are mostly unsuitable for identifying permit-relevant aspects and in particular for chemicals developed or manufactured for use in industrial operations (industrial chemicals),
- The data sources used are too narrow
  - not only published literature but also information from the ECHA database should be used,
  - criteria for identifying target substances for BREFs are partially missing[7], and
- The conclusions drawn from the information gathered are incomplete.

The following figure 1 summarises in a simplified manner the approach HAZBREF project proposes for the development of BAT conclusions for hazardous chemicals in the BREF process.

[5] The draft report also received criticism that the proposal for a more structured and systematic approach concerning industrial chemicals are not supported by facts/evidence, i.e. it is not shown which hazardous substances precisely have been left out in the various BREFs. This criticism misjudges the character of this study. This report intends contributing to reducing the "grey area of ignorance" regarding many unknown substances released to the environment by proposing to consider potentially hazardous substances in a more systematic and comprehensive way. Not till then possibly overlooked specific polluting substances can be identified and proposed for consideration in BREF reviews.

[6] The 4 criteria are: 1) Environmental relevance of the pollutant; 2) Importance/significance of the activity (number of installations, geographical distribution, contribution to total industrial emissions in the EU); 3) Potential for BREF reviews to identify new emission-reducing technologies; 4) Determination of the potential of the BREF revision of BAT AELs to significantly improve the environmental situation. Only criterion 1 seems to us to be suitable in principle for determining KEIs (note: in the IE Directive there is no clear definition of "environmental relevance"). Significance criterion 2 partly contradicts the precautionary approach and underestimates the relevance of environmental impacts of the neighbourhood for permits. The reference to the entire EU is a too rough grid for the purpose of plant permits. Criterion 3 and 4 cannot be reliably determined before the start of the BREF revision.

[7] Work package 2 of the HAZBREF-project will deliver a proposal for criteria for the relevance of target substances for BREFs. Also, the report of activity 3.2 will describe more precisely which data sources are relevant and which criteria are considered appropriate for the determination of BAT.

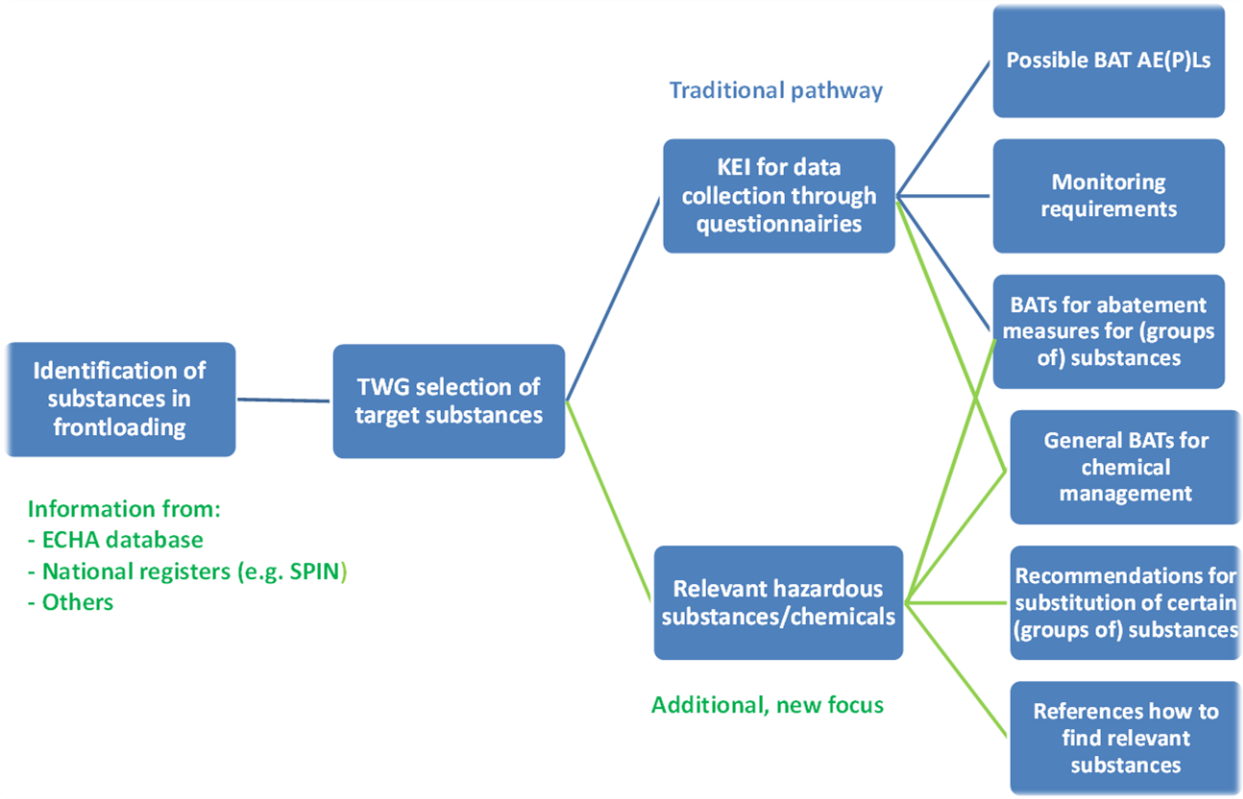

Figure 1. General approach for the development of BAT conclusions for hazardous chemicals in BREFs. Text and lines in green are new aspects.

HAZBREF proposes to complement the traditional pathway by an additional focus: If relevant hazardous substances/chemicals are used and/or emitted in a BREF sector, BAT conclusions should address always the following issues:

- general BATs for chemical management[8],
- recommendations for substitution of certain (groups of) substances[9],
- BATs for abatement measures for (groups of) substances, and
- references how to identify relevant target substances for BREFs that may negatively affect the high environmental protection objective of the IED.

However, for that purpose, i.e. in order to propose more environmentally friendly alternatives a new, more dynamic official tool such as a website complementary to published BREFs and BAT conclusions needs to be considered. This seems necessary because research on environmentally more friendly alternatives may go faster than the BREF review process and substance-related information may already be obsolete when the revised BREF is published.

Target substances relevant for BREFs may be determined by screening available information in databases such as the ECHA database or national registers (e.g. SPIN[10]). Such screenings should be

[8] As a positive recent example, Draft 1 of the revised Textile BREF (Dec. 2019) has incorporated text proposals from HAZBREF and ECHA to include chemicals management as BAT conclusion (see BAT #13 and #14 of the TXT BREF). It can be downloaded under: https://eippcb.jrc.ec.europa.eu/sites/default/files/2020-01/TXT_bref_D1_1.pdf). Now and then also other BREFs contain a BAT conclusion on chemicals management, but not systematically (see table 1).

[9] Again, Draft 1 of the TXT BREF (12/2019) is a positive example that mirrors already to a large extent what HAZBREF proposes. A few other BREFs that address substitution options are referenced in table 1. Addressing the need and options for substitution however seems coincidence in some BREF reviews. The EIPPCB did not follow an identifiable systematic approach that seeks to catch all relevant substances of concern used and potentially released in a given sector.

[10] SPIN is a database on the use of Substances in Products in the Nordic Countries. It is a public accessible database, which can be used free of charge. It contains information on the chemicals that are used in the Nordic countries. The information includes quantities, industries in which it is used (NACE and national) and the function it is used for (USE Category).

integrated into the preparatory studies on KEIs. The priority substances listed in WFD as well as the persistent organic pollutants regulated by the POPs Regulation should also be considered systematically in the preparatory studies. Including explicitly these two latter groups of pollutants in the elaboration of BATs allows addressing efficiently the provision of art. 14(1) a) IED, namely that permits shall include emission limit values for polluting substances listed in Annex II (list of polluting substances, Water, # 5 and # 13).

Proposals for better interaction between REACH and BREF reviews

The particular role of REACH in the interaction with the IED is the generation and communication of substance-specific information about:

- the hazards intrinsic to substances,
- the properties that determine the fate and behaviour of substances and
- the required conditions to ensure safe use along the supply chain.

The challenge is to combine the *substance-specific REACH information* and the *installation-specific approach of the IED* in an intelligent manner without too much additional burden on the BREF process.[11]

HAZBREF has identified synergies and positive interaction between REACH and BREF reviews in the following four areas:[12]

1. Identification of target substances relevant for BREF reviews

Data from the REACH registrations stored in the ECHA's public database[13] could facilitate the identification of relevant target substances for BREF reviews. However, the ECHA database currently does not directly deliver lists of substances of concern that are really used in a given industrial sector covered by BREFs. The problem is that information on uses is available only on a generic sector level, which is much broader than the scope of industrial sectors addressed by BREFs. Therefore, further assessment and filtering of data from ECHA is needed before relevant substances can be identified for BREF review purposes. HAZBREF recommends that such screening is performed during the preparatory frontloading phase of BREF reviews.

Ideally, target substances for BREFs and BAT conclusions should be identified based on a number of real industrial production processes (case studies). REACH and other prioritization schemes could then provide complementary information on the target substance properties in order to substantiate hazards[14]. Further, the current system should enable a better grouping of chemicals used and or produced in accordance to their intended technical functions in relevant BREF sectors. This way the identification of better alternatives for the same function could be delivered.

2. Consideration of substances already identified as hazardous[15] under REACH in BREF reviews

Under REACH, the identification of hazardous substances in a specific industrial sector could be facilitated by data from the registration process since usually all relevant hazard data should be included in the registration. From restriction or authorisation process more information on uses, exposure and risk management might be available. As well as information which uses are prohibited

[11] Statement "REACH information brings a **substances-focussed** dimension to safe use of chemicals that complements the **site-specific approach** taken under the IED" on page 12 of the above-mentioned REACH-Guidance that can be obtained via the ECHA-website at: https://echa.europa.eu/guidance-documents/guidance-on-information-requirements-and-chemical-safety-assessment.

[12] More concrete proposals on how to proceed will be delivered in the report of activity 3.2 "Development of a method to include information of hazardous substances into BREFs" of HAZBREF.

[13] The data needed for this purpose is partly available on the ECHA website: https://echa.europa.eu/information-on-chemicals/registered-substances.

[14] Such a "reality check" will be applied in in Work Package 4 of his project namely when case studies in 4 sectors are analysed.

[15] The REACH Regulation itself does not identify a substance as *hazardous* but refers for consideration of hazardous properties to the CLP Regulation. In this study (potential) hazardous substances include also those that are not hazardous under CLP but SVHCs under REACH (Art. 57).

or only allowed under restricted conditions or as authorized. The following data could be gathered: the use and potential release of substances placed on the candidate list (Art. 59 REACH), in the Annex XIV list of substances subject to authorisation and in the Annex XVII list of restriction and use of certain dangerous substances.

HAZBREF recommends that substances already identified as hazardous under REACH should be flagged during BREF reviews. For a limited number of substances of particular interest in a given sector, specific risk reduction measures tailored for the BREF-sector might be elaborated as BAT where the TWG sees a need and benefit for it. Information about occurrence and relevance of these substances for a given industrial sector should be investigated. However, information on technical viable alternatives and abatement measures related to specific substances of concern are not readily available. For that purpose, a subgroup on industrial chemicals consisting of sector experts, chemical and machinery suppliers, a few experienced operators need to be convened by the EIPPCB. These experts might be capable to gather knowledge on alternatives including non-regrettable substitution. If the assessment reveals that these hazardous substances are still in use in an industrial sector, the TWG supported by this subgroup should propose appropriate BATs to prevent and minimize emissions of these substances.

3. Identifying risk management measures for an appropriate use of a hazardous substance

The safety data sheets (SDS) required under REACH for supply chain communication (see Article 31) can be used as a first step for identifying techniques to be considered in the determination of BAT. The SDSs´ information about risk reduction measures could support the development of BAT conclusions in order to better manage the safe use of the respective hazardous substance in an industrial installation and to support implementation. The findings of HAZBREF, however, show that the information on techniques in the SDS are not always complete, do not always include all necessary hazard and physico-chemical information on ingredient substances and often do not include meaningful safe use advice regarding protection of the environment. Additional efforts will be necessary to describe more comprehensively risk reduction measures as part of BAT conclusions.

4. Development of substitution scenarios for relevant target substances

In order to bring the BAT criteria "use of less hazardous substances" to life (see Annex III IED), REACH data could support the development of substitution scenarios for hazardous or other target substances relevant for BREFs. For that purpose, data on substances placed on the candidate list (Art. 59 REACH), and authorisation list (Annex XIV REACH) could provide useful information on the substitutability of most concerning hazardous substances – so-called SVHC. Annex XIV REACH lists substances which should be replaced as soon as technically, and economically feasible alternatives are available.

HAZBREF recommends that the technical options for the use of alternatives with less concern could be further explored for a limited amount of substances during BREF reviews. For that purpose, the establishment of a TWG subgroup of independent sector experts, chemical and machinery suppliers, a few experienced operators might be a suitable platform in order to discuss and gather data on new trends concerning alternative solutions for SVHCs and other substances of concern and advise the TWG about new opportunities under development, or available on the market. Data directly from chemical suppliers may not be available on the internet but direct communication may rather open doors for such information. By highlighting less harmful alternatives in BREFs and BAT conclusions these alternative substances would thereby become part of the permitting and supervising process for those installations where they are in use.

The key challenge here remains to connect substance-related information generated in the REACH context (extractable from the ECHA database) with sector-specific information required for BREF reviews.[16]

[16] In the work package 2 of HAZBREF "selection of target substances for BREFs" and in work package 4 "industrial installation case studies" more experience will be gained and reported.

Proposals for a better use of WFD data during BREF reviews

The BREFs and BAT conclusions would be more useful and supportive for permit writers and operators if they would consider explicitly the relevant WFD priority substances used or released in the given industrial sectors. Sector-specific information for permit writers on the presence or absence of those priority pollutants may guide authorities and facilitate their work during drafting permit conditions for this issue. HAZBREF recommends that all BAT conclusions should clearly state if priority substances are used or potentially released in the scope of a given industrial sector and if so, define which BATs prevent or reduce their release.

Studies to identify WFD priority substances potentially used or released to the environment in the given industrial sector should be carried out for new priority substances as a routine in the frontloading phase in order to avoid overload of BREF reviews (for current priority substances, see footnote 81). As a result, this may lead to their inclusion as Key Environmental Issues.

HAZBREF recommends that the following groups of substances should be considered in the BREF reviews as a routine procedure:

- Priority hazardous substances: BAT requirements for these substances should strive for achieving (almost) zero emissions in order to implement the phasing out target; additionally, it should be ensured that the emissions of facility do not cause exceedance of EQS in its recipient water;
- Priority substances: BAT requirements for these substances should aim at a minimisation of releases; in addition, it should be ensured that the emissions of one facility for itself does not exceed the EQS;
- Substances that may become prospectively EU priority substances, e.g. Watch list of substances for Union-wide monitoring in the field of water policy. BREF reviews should consider most relevant substances of this group;
- River Basin Specific Pollutants (RBSPs) identified in certain EU Member States and released from industrial installations, under certain conditions, should also become a key environmental issue for BREF reviews, e.g. if identified as RPSP in at least three Member States. A prerequisite would be a complete list of all RBSPs that is not yet available.
- Substances relevant for groundwater protection being subject to threshold value setting (GWD Annex II pollutants) should be considered in order to minimize introduction of these substances into water bodies via inter alia airborne pollutants or industrial discharges[17].

Proposals for promoting circular economy aspects in BREFs and BAT conclusions

Information on hazardous substances in wastes in the existing BREF documents is varying in terms of coverage and level of details. The regularly collected data under waste legislation based on the List of Waste is less useful for BREF reviews than data collected under the chemical's regime since data of the former does not provide detailed information on the content of specific hazardous substances in wastes at installation level.

The data generated under REACH can be used for the identification of substances that are relevant to follow up in the waste streams for certain production processes. BATs could be developed to enable or support the identification and traceability of hazardous substances in waste streams that could be used as secondary raw materials. The aim would be contributing to remove technical

[17] Recently a new category of pollutant – persistent mobile organic chemicals (PMOC) – has been identified as major concern by the Scientific Advisory Body in Health, Environmental and Emerging Risks of the European Commission (SCHEER), see: https://ec.europa.eu/health/sites/health/files/scientific_committees/scheer/docs/scheer_s_002.pdf (Section 4.7).

barriers for the recovery of secondary raw materials and especially preventing the accumulation of substances of concern throughout the successive recovery cycles. A closer look at circular economy and BREFs is taken in the HAZBREF report for promoting circular economy in BREFs in Work package 4.4 of the HAZBREF project[18].

Proposals for a better use of POPs Regulation data during BREF reviews

Within the EU the main control measures concerning the release of unintentionally produced POPs from stationary sources (industry) and substances subject to prohibitions are supposed to be developed in the context of the IED.

HAZBREF therefore recommends that Member States and the EIPPCB ensure that BAT conclusions consider systematically the reduction of emissions of the complete set of unintentionally produced POPs and of the few substances subject to prohibitions (e.g. PFOS, PFOA). Each BAT conclusion should clearly state that the occurrence of POPs has been assessed and that presented BATs normally cover all relevant aspects concerning this matter.

A comparison with reported emissions inventories per sector according to National Action Plans (NAP POP) could be a first step in the elaboration process of BREFs. Some NAPs may also contain proposed measures with regard to minimising POP releases from industrial plants that could be of interest when reviewing BREFs.

The permitting authorities would have a clear orientation and better justification to set ELVs or monitoring requirements in the BAT-based permit conditions if there would be complete requirements for monitoring-BATs or BAT-AELs for unintentionally emitted POPs in the BAT conclusions. In turn, this data could be an information source for Member States when reporting unintentionally produced POPs to the Stockholm Convention. This would also lead to more up-to-date emissions factors in the air emission inventories.

Existing BAT/BEP guidelines elaborated under the Stockholm Convention should be considered in the BREF process.

The BAT process could benefit to have from time to time joint meetings/workshops between IED and POPs experts to discuss experiences and brief each other on consecutive related work. It would be valuable for IED-experts to be informed about new POPs nominated to the Stockholm Convention by the EU[19]. Also, the background information for evaluation of a substance gathered before a new POP is proposed to the Convention could be useful in the BREF elaboration process. Furthermore, HAZBREF recommends that a routine exchange of information between the industry-related BAT-BEP working groups of the Convention and the TWGs of the European BAT-process takes place in order to ensure that the most recent information can be found in in both BAT-BEP and BAT documents.

Better communication between and coordination of different expert groups

With regard to a better communication and data exchange between expert groups from the different EU legal frameworks dealing with hazardous substances, the TWGs for BREF reviews and the EIPPCB could develop activities for integrating knowledge on hazardous substances from adjacent techno-scientific communities. This may include expertise from REACH (ECHA Fora), the WFD (WG Chemicals of the CIS process) or from the POPs Regulation (Committee and ECHA).

[18] The report has been recently published at the HAZBREF-website: https://www.syke.fi/en-US/Research__Development/Research_and_development_projects/Projects/Hazardous_industrial_chemicals_in_the_IED_BREFs_HAZBREF/Publications/Publications(50837).

[19] For the Stockholm Convention, every Party has nominated a National Focal Point and a Nationals Contact Point that should distribute and collect all relevant information. For the POPs regulation, every Member State has nominated a competent authority (CA). Ideally, these entities are the same or collaborate closely.

HAZBREF recommends to:

- Organise regular meetings with representatives from the identified institutions with the EIPPCB/selected TWG representatives to ensure a more lively exchange of knowledge about restrictions or substitutes for hazardous chemicals;
- Involve key actors directly as party concerned during the "frontloading"-stage of the BREF review process. This could be done by inviting key actors as experts at particular occasions to certain TWG meetings, e.g. experts from ECHA or from the WG Chemicals, or by inviting comments on so-called draft Background Papers used for organising the agenda and discussion items for kick-off meetings for BREF reviews.

Proposals for better interaction between HELCOM and IED

The analysis shows that the information produced by HELCOM which is usable in BREF processes is scarce, but in some cases the HELCOM assessments on the status and input of specific relevant hazardous substances to the Baltic Sea could be used as justification to include substances as Key Environmental Issues (KEIs) in the preparation of the BREF documents. The information relevant for IED purposes could be identified by the HELCOM PRESSURE Group when HELCOM assessments are published.

However, HELCOM could benefit utilising data collected and produced in the IED BREF process. One benefit would be to utilize BREF information for the updating the HELCOM recommendation "25/2 Reduction of emissions and discharges from industry by effective use of BAT" with information on relevant substances for the different industrial sectors. The information on specific substances could be combined with possible information of concern from Baltic Sea point of view from HELCOM assessments and pollution compilations.

The information provided by BREFs on the relevance of specific hazardous substances for the different industrial sectors could also be used to:

- update the list of HELCOM priority hazardous substances
- target actions of the HELCOM BSAP to reach the goal for hazardous substances
- elaborate specific regional actions in the national implementation programmes of the HELCOM BSAP concerning hazardous substances.

Accordingly, the information from EU BREFs on hazardous substances could be used to update the HELCOM indicators relevant to the industrial sectors that are of importance in the Baltic Sea region.

HELCOM PRESSURE could be the responsible group in HELCOM for updating the substance lists in the HELCOM "umbrella" recommendation 25/2 for the different industrial sectors based on data in EU BREFs.

1 Introduction

This report is the product of activity 3.1 of Work Package 3 "Policy Improvement" of the HAZBREF project[20]. It presents results of the analysis of the interfaces, linkages and gaps between key EU legislation concerning the use of chemicals and the reduction of release of hazardous substances respectively and some recommendations. Within this analysis of HAZBREF, the Industrial Emission Directive (IED) – being the main EU instrument regulating pollutant emissions from industrial installations – is naturally in the centre of interest. The IED aims to reduce harmful industrial emissions across the EU *in particular through better application of BAT*. Therefore, an analysis of possible synergies between EU legislations regulating the reduction of releases of hazardous substances to the environment needs to focus in particular the process for determination of Best Available Techniques (BAT). For the identification of BAT, the European Commission, EU Member States and representatives of European industry and environmental NGOs gather at the European Integrated Pollution Prevention and Control Bureau (EIPPCB). Together, they make up Technical Working Groups (TWG), which produce **B**AT **Ref**erence documents known as BREFs. BREFs include BAT conclusions. Once adopted by the Commission as Implementing Decisions, these BAT conclusions shall be the reference for setting the permit conditions. Because of its importance for setting permit conditions in the European industry, we see the European BAT information exchange ("Sevilla Process") as the heart of the IED. The Sevilla Process and its possibilities to better use available and relevant data on emitted substances of concern that are generated by provisions of other EU legislations is therefore central to our analysis. In contrast, it is not in the scope of this report to address gaps between EU legislation to be filled by REACH, WFD or the POP Regulation.

1.1 Background: The use of less hazardous substances in BAT conclusions

BAT conclusions are the reference for setting the permit conditions for the most relevant industrial installations in the EU. The use of less hazardous substances is one of the criteria for determining BAT (see No 2, Annex III IED), therefore it is, or should be, part of BAT and consequently a component of integrated IED permits for industrial installations. Nevertheless, during many conversations with staff from competent authorities it has been repeatedly stated that from their perspective the IED BAT conclusions seem to be sometimes incomplete with regard to the use of less hazardous substances and the reduction of associated emissions. So far, the BAT assessment carried out by EIPPCB led Technical Working Groups (TWG) only partially consider and incorporate relevant available information from other legislative frameworks concerning hazardous industrial chemicals when determining BAT. Often, the well-known hazardous substances that are expected to be emitted by a given sector are sufficiently addressed during BREF reviews. On the other hand, it is at least not visible that the EIPPCB follow a structured approach that makes sure that all relevant emissions of substances of concern are captured during BREF reviews. For example, the state of knowledge from the REACH-context about hazards intrinsic to substances, properties that determine the fate and behaviour of substances and the required conditions to ensure safe use along the supply chain may be important for industrial sectors and BREFs in which relevant amounts of industrial chemicals are used and released. This kind of data however has not been assessed for BREF reviews as HAZBREF started its work.

When designing the HAZBREF-project the following questions arose in this context: Are substance-related data generated under REACH useful when determining BAT under the IED? And if so, which type of data on chemicals gathered, e.g. in the ECHA-database and in (extended) Safety Data Sheets could support the work of TWGs when assessing BATs related to new developments in terms of chemical management in a given industrial sector? What type of knowledge and data on hazardous substances the TWG should gather before starting a BREF review of a given industrial sector? Is relevant information about priority (hazardous) substances generated in the context of the WFD

[20] More information about HAZBREF can be found on our project (https://www.syke.fi/projects/hazbref).

daughter directive easily accessible and systematically assessed in TWGs? Do the TWGs consider to the extent necessary the findings and provisions generated in the context of the POP Regulation? The BAT conclusion itself do not deliver a reliable answer to these questions since these documents do not say explicitly which assessments have been conducted during the drawing up of BAT conclusions, e.g. whether the emission of priority substances from a given sector have been thoroughly examined, exhaustively addressed or if so, considered as irrelevant.

The content of BREFs and their BAT conclusions are the result of the information shared between and assessed by experts of TWGs during the information exchange about BAT. This implies that issues for which no information is submitted by the TWG or no data gathered by the EIPPCB tend to be neglected or undervalued in BAT conclusions. This situation may only change if some routines in the preparatory phase of BREF reviews are amended, i.e. if a systematised approach that allows for capturing hazardous substances comprehensively is applied. A prerequisite for comprehensive BAT conclusions on the management of chemicals (i.e. selection and use of chemicals and the prevention and reduction of emissions of hazardous substances by substitution or application of appropriate barriers) is actually that relevant information is exchanged within the TWG at the right time.

Member State and environmental organisations often suffer a lack of staff and resources and have to put extra effort to actively comment and make proposals for very technical issues like the one on industrial chemicals. These chemicals include process and product auxiliaries, chemical products that range in different industrial applications, biocides, cleaning or disinfection agents, etc. Only if preparatory studies, monitoring results or practical experiences related to hazardous substances are shared well ahead to the kick-off meeting of a BREF review there is a chance to get along with this challenge.

The concept of this report evolved from regional and national competent authorities seeing a gap in the implementation of provisions from different EU legislation on hazardous substances at installation level (REACH, priority substances, POP-Regulation, BAT-based requirements, etc.). In particular, permit writers pointed out that it is hard for them to impose conditions if they are not addressed in BAT conclusions. Conversations with competent authorities from Finland, Poland and Germany suggests that concerning the selection, use and management of chemicals and the reduction of releases of hazardous substances for many of them the BAT conclusions are the main instrument for setting requirements in permits. It seems to be so that if the measures related to the use and possible release of chemicals are not sufficiently clearly and explicitly reflected in BAT conclusions, they are also in most cases very difficult to implement.

It is difficult to present already at this stage concrete gaps or shortcomings in IED BAT conclusions by listing missing pollutants or possible improvements with respect to BATs on better chemical management in industrial sectors. This evidence will be delivered later as a result from other HAZBREF Work Packages (e.g. identification and selection of target substances for BREFs, case studies, sector guidance).[21]

During the last 3 years the EIPPCB and DG ENV have taken more actively the challenge and started to invest more time and effort for including also hazardous substances in BREF reviews. For 4 pilot sectors (textile industry, ceramic industry, slaughterhouses and animal by-products and smitheries and foundries) studies have been commissioned by DG ENV in order to identify and propose so-called Key Environmental Issues (KEI). during the frontloading phase of BREF reviews[22] Although this preparatory work has proven its worth for BREF reviews (screening of relevant studies, literature reviews, listing of relevant pollutants mentioned in published documents) there is still room for improvement concerning hazardous substances. E.g. the pilot studies only use published literature for their analysis of the Key Environmental Issues, they do not search in the ECHA-database and they have not carried out interviews with experts from suppliers of chemicals or machinery in order

[21] A brief analysis of the content of BAT conclusions with regard to chemicals can be found in Section 2.1.4 of this report.

[22] The four pilot literature studies on KEIs the Commission has launched are carried out by the consultant Ricardo (see Section 2.1.5).

to identify new developments related to chemical auxiliaries. Furthermore, preparatory studies carried out by Member States concerning hazardous substances have become increasingly rare.

Compared to other EU legislation related to hazardous substances, the strength of the IED and its BAT conclusions is its implementation power: Being the reference for setting the permit conditions BAT conclusions are enforced by supervising authorities. Enforcement include routine environmental inspections and site visits. Compared other regulations related to possible emissions of chemicals or substances of concern enforcement of BAT under the IED-regime is strong. E.g. REACH places the burden of proof on companies and much less on control measures of authorities. To comply with REACH, companies must identify and manage the risks linked to the substances applied in industrial processes and have to demonstrate how the substance can be safely used. Suppliers must communicate the risk management measures to the users, i.e. in the HAZBREF-context to operators. This, REACH counts much more on the self-responsibility of operators.

Within this context, the concept of HAZBREF was developed in order to find answers to questions such as: Is the content of BAT conclusions comprehensive and specific enough with regard to the best practice for preventing and reducing emissions from the use of substances of concern? Is the information generated in the context of other regulatory frameworks on hazardous substances sufficiently reflected in BREFs and BAT conclusions? Do BAT conclusions use their potential with regard to addressing hazardous substances? How does the BREF elaboration and review process consider different information – such as identified substances of concern, thresholds, risk management measures, etc. – in order to reduce the emission of hazardous chemicals at installation level? In this spirit, the key question and aim of this analysis is whether and how BAT conclusions concerning the use and release of hazardous substances from industrial activities should and could be improved and whether and how BREF reviews can benefit from or take into account available information on hazardous substances generated in the context of other pertinent EU legislation.

1.2 Scope, focus and interest of this report

This report analyses the interfaces, linkages and gaps between key EU legislation concerning the use of industrial chemicals and the reduction of hazardous substances. The key EU-legislation in question include the Industrial Emission Directive (IED)[23], REACH Regulation (REACH)[24], Water Framework Directive (WFD)[25], Marine Strategy Framework Directive (MSFD) [26], Persistent Organic Pollutant Regulation (POP Regulation)[27]) and the regional sea convention of the Baltic Sea HELCOM[28].

The term *hazardous* generally refers to ecotoxicological or human toxicological properties of a substance – something like "poisonous". Depending on the legal context, this term may address different (and additional) substances properties. In EU regulations relevant for the context of this study the term *hazardous* is not used in a consistent way. Depending on the legal context, this term may address different (and additional) substances properties. The IED uses the term *hazardous* only

[23] Directive 2010/75/EU of the European Parliament and of the Council of 24 November 2010 on industrial emissions (integrated pollution prevention and control) Text with EEA relevance, OJ L 334/17.

[24] Regulation (EC) No 1907/2006 of the European Parliament and of the Council of 18 December 2006 concerning the Registration, Evaluation, Authorisation and Restriction of Chemicals (REACH), establishing a European Chemicals Agency, amending Directive 1999/45/EC and repealing Council Regulation (EEC) No 793/93 and Commission Regulation (EC) No 1488/94 as well as Council Directive 76/769/EEC and Commission Directives 91/155/EEC, 93/67/EEC, 93/105/EC and 2000/21/EC, OJ L 396/1, last amended by Commission Regulation (EU) 2018/675 of 2 May 2018 amending the Appendices to Annex XVII to Regulation (EC) No 1907/2006 of the European Parliament and of the Council concerning the Registration, Evaluation, Authorisation and Restriction of Chemicals (REACH) as regards CMR substances (Text with EEA relevance.), OJ L 114/4.

[25] Directive 2000/60/EC of the European Parliament and of the Council of 23 October 2000 establishing a framework for Community action in the field of water policy, OJ L 327/1, lastly amended by Council Directive 2013/64/EU of 17 December 2013, OJ L 353/8.

[26] Directive 2008/56/EC of the European Parliament and of the Council of 17 June 2008 establishing a framework for community action in the field of marine environmental policy (Marine Strategy Framework Directive) (Text with EEA relevance), OJ L 164/19.

[27] Regulation (EU) 2019/1021 of the European Parliament and of the Council of 20 June 2019 on persistent organic pollutants (recast).

[28] http://www.helcom.fi/about-us/convention

for those substances that are used, produced or released at the site of the installation and that have a potential to contaminate soil and groundwater contamination (Art. 22). Other relevant substances and substance properties to be considered for determining BAT under the IED are referred to as *polluting substances* and they include groups of substances, hazard classes and substances properties (Annex II IED). In EU regulations connected to the IED there are negative listings, such as the WFD list of priority substances; other EU regulations list hazardous classes (e.g. CLP Regulation (EC) No 1272/2008 on the classification, labelling and packaging of substances and mixtures); others do not refer at all at the term *hazardous* (e.g. REACH); finally, other regulations refer to a positive authorised list of active substances (e.g. Regulation (EU) No 528/2012 concerning biocidal products).

The HAZBREF project initially refers to 'hazardous' substances as those which are 'released from industrial installations through discharges to waters, emissions to air and wastes and which have a harmful effect on the Baltic Sea environment'. This obviously addresses toxic substances, but according to the REACH SVHC definition, the release of PBT and vPvB substances from installations should be avoided, too. Hazardous in HAZBREF, which focusses on BAT for industrial installations (IED), considers two aspects: (a) the potential to be released, or conversely, the ability to be eliminated (in the WWTP) – which qualifies a substance as 'target substance", and (b), in addition, the intrinsic potential persistency or toxicity of the substance – which may qualify a substance as "relevant target substance". Both aspects have several degrees of importance, and the term *hazardous* should be reserved for *high potential to be released and/or significant toxicity*. It is more appropriate to talk of concerns and degrees of concern. This is why for HAZBREF *substances of concern are synonymous to target substances for consideration in BREFs*. Adding "relevant" to the target substance for BREFs would then mean that there is a particularly high concern for either persistency, mobility or toxicity, for example.

The potentially large number of chemicals used in industrial processes, their varying intrinsic properties, their different abatement efficiencies and the overall concern they may cause suggests seeking certain target substances of particular relevance. *Target substances* in HAZBREF project are therefore chemicals or chemical groups, which might pose a danger due to their properties, and which might occur in industrial activities covered by Annex I of the IED. Any reading of word 'hazardous [chemical]' in the meaning of the IED includes substances classified under CLP (or fulfilling the classification criteria), persistent substances, substances and mixtures which have been proved to possess CMR properties, as well as SVHCs and substances restricted under REACH.

Figure 2 visualises the scope (EU legislations considered) and the focus (IED/BREFs/BATC) of this report. The centre of this analysis is the Industrial Emissions Directive (IED) which is therefore positioned in the middle of figure 2. The different EU regulations (mainly REACH, WFD and POPs Regulation) are arranged around this centre. Each of these legislative frameworks proposes different instruments for reducing the release of hazardous substances into the environment. Clarifying the interconnections between these EU regulations and describing the generated data and current data flows between them may help to better understand this relatively complex regulatory system, and to identify any gaps and weaknesses. Recommendations from the study may contribute to a more coherent approach and facilitate implementation, thus paving the way for further reducing emissions of hazardous substances into the environment.

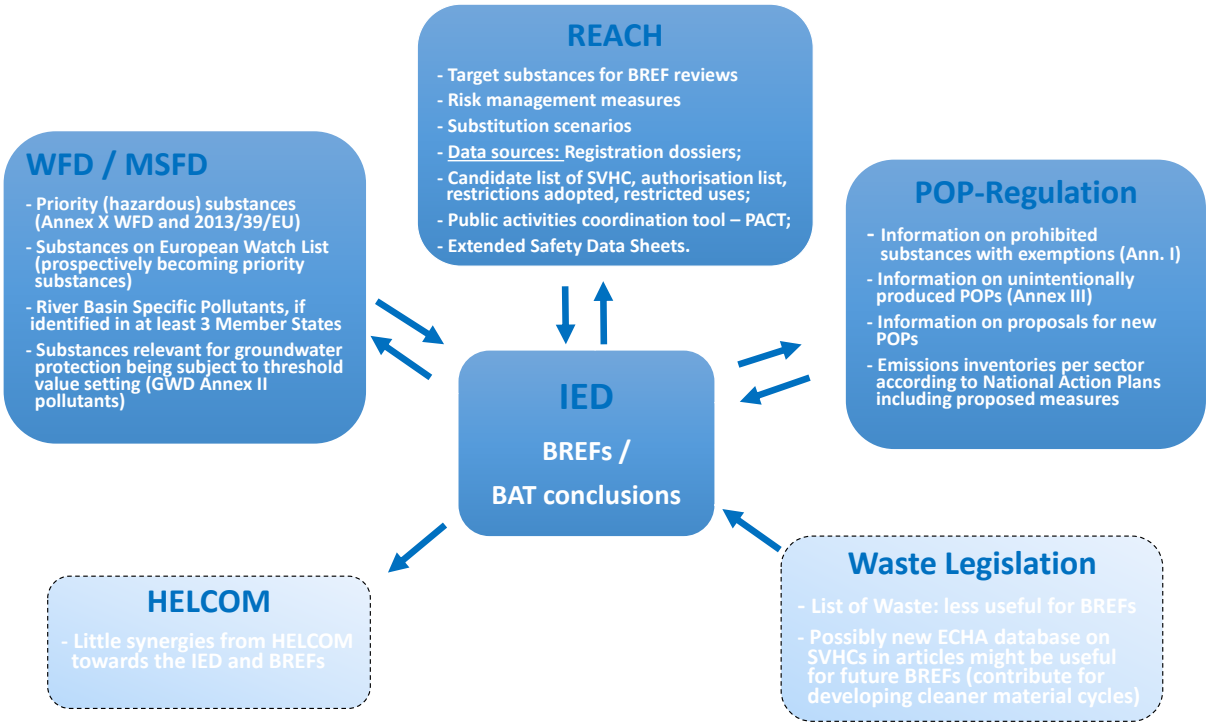

Figure 2. Scope of the report (considered regulations) and data sources relevant for BREFs (centre of analysis).

In Figure 2, the waste legislation and HELCOM are presented in a different colour and with a dotted line to thereby express that both are of minor relevance for this study. The waste legislation is briefly explained because its contribution to BREFs and BAT conclusions is minor and because it is further explored in another HAZBREF-activity (activity 4.4)[29]. HELCOM requirements have a different status compared to EU legal frameworks and therefore, the findings regarding HELCOM are presented in the annex of this report and not in the main text.

For the implementation of key provisions of the EU legislation different expert groups, committees and forums are established. They are key players or stakeholders for making the regulations work in practical terms. Expert groups often produce detailed information on hazardous substances, specific data on their characteristics and use patterns and may also propose measures to reduce the impact of hazardous substances to human health and the environment. The report includes a description of the involvement of these expert groups and committees, the data they generate and in general their major deliveries with regard to the subject of this report. The report includes recommendations how the expert communities could make better use of generated data and improve their cooperation.

The following figure 3 gives an overview about important expert groups and committees acting as advisory body for the Commission under the umbrella of the described EU legislations. The description in the main chapters includes the possible connection of different expert groups to the work carried out by EIPPCB when drafting BREFs. The EIPPCB and the TWGs are in charge of coordinating the work on the BREF reviews.

[29] Download of the published report, see footnote 18.

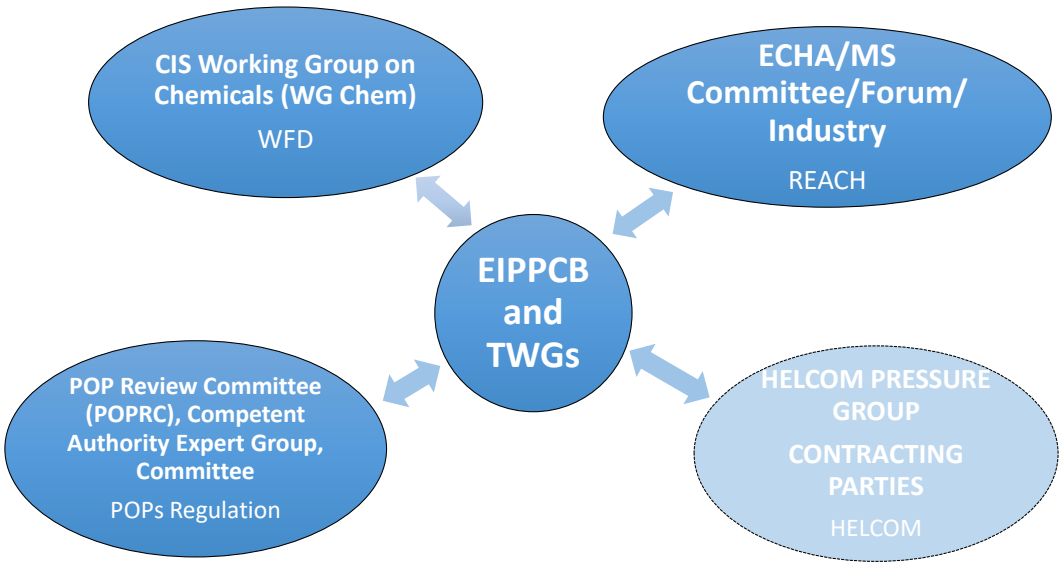

Figure 3. Expert groups with expertise on hazardous substances relevant for BREF reviews.

1.3 Structure of this report

The report consists of 5 sections:

- Section 2: Provisions of the Industrial Emission Directive (IED) regarding hazardous substances.
- Section 3: Provisions of the REACH Regulation regarding hazardous substances and other substances of concern.
- Section 4: Provisions of the Water Framework Directive and Marine Strategy Framework Directive regarding hazardous substances.
- Section 5: Provisions of the Waste Directive and circular economy aspects regarding hazardous substances. Since activity 4.4 of the HAZBREF-project dedicates an entire report for promoting circular economy in BREFs, this section is kept very short.
- Section 6: Provisions of the POP Regulation 2019/1021 regarding hazardous substances.

Each of these sections present (1) the key provisions of the respective EU legislation with regard to hazardous substances, (2) the key actors and possible data flow between these regulations, and (3) HAZBREF's proposals for better coordination and communication of the respective experts and stakeholders with the EIPPCB and the TWGs. The proposals include recommendations on the type of information that could be exchanged for BREF reviews.

The Annex 1 of the report includes a short analysis of interfaces between HELCOM and the EIPPCB/TWGs.

The Annexes 2 and 3 are based on interviews with experts of the five project partner countries, namely Estonia, Finland, Germany, Poland and Sweden. These 2 Annexes summarise the work practice of in total 15 permitting and supervising authorities at the interface of different EU regulations. Also, here the focus of the analysis is in the use of chemicals and reduction of releases of hazardous substances. As the results of this limited number of interviews do not claim representativeness but present some subjective views on expert level the summarised responses are not presented in the main text.

2 Provisions of EU key legislation regarding hazardous substances: Industrial Emission Directive (IED)

The Industrial Emission Directive (IED) establishes a general framework for the integrated pollution prevention and control of the main industrial activities in the EU (listed in Annex I of the Directive), giving priority to intervention at source, ensuring prudent management of natural resources and chemicals. Hence, the focus of the Directive is the *installation* (Art. 3 (3) IED).

This chapter firstly analyses key provisions and concepts of the IED concerning the consideration of hazardous substances in BAT Conclusions and integrated permits. Descriptions include a brief overview on how BAT conclusions and BREFs are elaborated and an assessment of the content of BAT conclusions with regard to chemicals. It explains then how hazardous substances are addressed as so-called Key Environmental Issue (KEI) during BREF reviews. In a brief section the communication and data exchange between key stakeholders are examined, both within the IED community itself and towards adjacent techno-scientific expert groups, e.g. from the context of REACH, WFD and POPs Regulation. The chapter concludes with proposals on how the information exchange on BAT could potentially be strengthened with respect to a more structured consideration of hazardous substances.

2.1 Provisions of the IED with respect to the reduction of release of hazardous substances

2.1.1 Objective and coverage of the IED concerning hazardous substances

Hazardous substances are one of many raw materials for which the Directive aims at their efficient use. Art. 3 (13) IED defines hazardous substances by referring to the CLP Regulation[30]. The use and emission of hazardous substances may be subject to the permit conditions if included in the BAT conclusions or otherwise explicitly required by the IED[31]. Art. 3 (2) IED defines "*pollution*" as "*introduction of substances into air, water or land which may be harmful to human health or the quality of the environment*" and thus indirectly refers to hazardous substances. The IED provisions on the general principles governing the basic obligations of the operator (Article 11 (a) – (c)) together with the content of application documents (Article 12 (b), (c) and (f)) imply that preventing and reducing the use/release of "substances that cause significant pollution" are part of the basic obligations of the operator since he has to take all appropriate preventive measures against pollution and to inform the permitting authority about the raw and auxiliary materials used in or generated by the installation as well as about the sources of emissions from the installation.

Art. 22 IED that deals with site closure directly refers to *relevant hazardous substances*. However, it focuses on the prevention of soil and groundwater contamination at the site under the perspective of the definitive cessation of the activity. Where the activity involves the use, production or release of relevant hazardous substances and having regard to the possibility of soil and groundwater contamination at the site of the installation, the operator shall prepare and submit to the competent authority a baseline report before starting operation of an installation or before a permit for an installation is updated for the first time (Art. 22 (2) IED). Furthermore, for installations using organic solvents Article 58 IED foresees a substitution obligation for substances or mixtures that are, because of their content of volatile organic compounds classified as carcinogens, mutagens, or toxic to reproduction. Hence, one specific sector has an explicit obligation to substitute certain types of *hazardous substances*, whereas for others the IED refers to the list of *pollutants* of Annex II IED that however also includes substances which have been proved to possess CMR properties.

[30] Regulation (EC) No 1272/2008 of the European Parliament and of the Council of 16 December 2008 on classification, labelling and packaging of substances and mixtures, amending and repealing Directives 67/548/EEC and 1999/45/EC, and amending Regulation (EC) No 1907/2006 (Text with EEA relevance), OJ L 353/1, lastly amended by Commission Regulation (EU) 2018/669 of 16 April 2018 amending, OJ L 115/1.

[31] An example is Article 58 IED on the substitution of hazardous substances (organic solvents) with certain H phrases.

A prerequisite that operators and permitting authorities consider emissions of hazardous substances to the air, water or as part of waste is that BAT conclusions address them[32]. However, in practice, specific measures that prevent and reduce the release of relevant hazardous substances to the environment are only included in BAT conclusions if TWG members are aware of them before the kick-off meeting of a BREF review, claim their uptake as KEI and are in a position to provide supporting information for their consideration in BREF reviews (emission data providing evidence of their occurrence, abatement measures, etc.); obstacles that in case of hazardous substances often can be especially troublesome to be overcome. In the absence of a routine method that catches all relevant substance of concern during BREF reviews, it is very likely that these substances are not comprehensively covered by BAT conclusions. BAT conclusions often contain mainly generic requirements rather than precise measures regarding hazardous substances (e.g. BAT conclusions for the tanning of hides and skins include mainly generic requirements such as the careful selection and control of substances, input-output analysis with a chemical inventory including quantities and toxicological properties, minimisation of the use of chemicals to the minimum level required by the quality specifications of the final product).

The *integrated approach* of the IED that considers emissions into air, water and soil, to waste management, to energy efficiency and to accident prevention is one of the key concepts of the Directive. The selection, use, application, management of chemicals and the potential release of hazardous substances are part of it. Annex III of the IED supports this interpretation stipulating as one of the criteria to be considered for the determination of BAT, namely number 2 of that list, refers explicitly to the "*the use of less hazardous substances*". BAT on hazardous substances are thus clearly within the scope of the IED and consequently should be explicitly part of the BAT conclusions. The Directive stresses the dynamic nature of the BAT concept (Art. 19 IED). This means with regard to hazardous substances that the selection, use, application and potential release of industrial chemicals need a regular update. Finally, Article 13(2) IED requires the information exchange to address, in particular, emissions as well as "the consumption and nature of raw materials", which suggests that the chemical identity and hazardous properties of the raw materials are to be included in the BAT information exchange.

In order to ensure the prevention and control of pollution, each installation must hold a permit (Art. 4 IED). The permit should include all the measures necessary to achieve a high level of protection of the environment as a whole and to ensure that the installation is operated in accordance with the basic obligations of the operator. Besides emission limit values for polluting substances, the permit should include also necessary conditions for the selection, use and management of less hazardous substances. BATs are at the heart of the IED permit since permit conditions should be set based on best available techniques. For well-defined BATs it is therefore of utmost importance that they also include specific requirements for the use of less hazardous substances.

2.1.2 Key concepts of the IED: permits and basic obligations of the operator

As explained in the section above, the IED stipulates that no installation listed in Annex I of the Directive shall operate without a permit (Art. 4 (1) IED). It is the obligation of the operator to take all appropriate preventive measures against pollution and apply BAT so that no significant pollution is caused (Art. 11 IED). Member States are obliged to make sure that installations operate in accordance with this requirement.

The application documents for permits should include a description of the installation and its activities, the raw and auxiliary materials and other substances, the sources of emissions from the installation and the nature and quantities of foreseeable emissions from the installation into each medium as well as identification of significant effects of the emissions on the environment (Art. 12 (1) lit. b), c) and f) IED). This means that application documents should contain a list of all

[32] In a few Member States, next to and beyond the European BAT conclusions there are also some country-specific measures undertaken.

environmentally relevant chemicals used and in particular, potentially hazardous substances, their potential of being released and their expected effect in the environment.

As far as the permit content is concerned, the competent authority should make sure that the basic obligations of the operator are put into practice and adequately monitored and the environmental quality objectives are met (Art. 14 IED). Member States shall take the necessary measures to provide that installations take all the appropriate preventive measures against pollution and apply BAT. What BAT means is defined in documents called BAT conclusions.

According to Art. 3 (12) IED BAT conclusions are a "*document containing the parts of a BAT reference document laying down the conclusions on best available techniques, their description, information to assess their applicability, the emission levels associated with the best available techniques, associated monitoring (…)*".

Since BAT conclusions are the reference for setting the permit conditions (Art. 14 (3) IED), their content is of utmost importance. They determine to which extent permit conditions for the use of hazardous substances, their management and avoidance of releases are set for a given company.

2.1.3 Elaboration of BAT conclusions and BREFs by exchange of information about BAT

BAT conclusions are part of a larger document that is referred to as Best Available Techniques Reference Document (BREF). One chapter in BREF is titled "BAT conclusions". This chapter is published in a separate stand-alone document as implementing decision of the European Commission. Once adopted and published in the EU journal the BAT conclusions are legally binding. They are the reference for setting permit conditions.

BREFs and BAT conclusions are developed through an exchange of information with key stakeholders (Art. 13 IED). The information exchange is organized by the European IPPC Bureau (EIPPCB) and is often referred to as "*Seville process*" according to the location of the bureau. EIPPCB also draws up BREFs and BAT conclusions.

Participation in this BREF review is voluntary and the stakeholders are free to collaborate, participate actively and follow discussions. The experts involved in the information exchange are representatives from Member States, the industries concerned, non-governmental organisations promoting environmental protection and the Commission. Together they constitute the TWG for a given sector that is led by the EIPPCB. They have the task to make sure that information relevant for BAT is submitted at the right time during the elaboration of BREFs. The submitted information is then assessed by the EIPPCB and the TWG and possibly included in the BAT conclusions.

In 2012, the Commission has established guidance on the elaboration of BAT reference documents, the so-called BREF Guidance (2012/119/EU)[33]. If relevant and specific information on the selection, use and management of chemicals, and the prevention and reduction of release of hazardous substances is exchanged between stakeholders and assessed by the TWG during the Seville process, the BAT conclusions may also contain detailed requirements for this important issue.
The method of elaborating BREFs and BAT conclusions can be summarised as "*complex consensus-building exchange of information with numerous stakeholders and underpinned by sound techno-economic information*"[34].

It is essential that BAT conclusions also include the relevant and available information concerning the use and potential release of hazardous substances. Only in this case the IED may function as a

[33] 2012/119/EU: Commission Implementing Decision of 10 February 2012 laying down rules concerning guidance on the collection of data and on the drawing up of BAT reference documents and on their quality assurance referred to in Directive 2010/75/EU of the European Parliament and of the Council on industrial emissions (notified under document C (2012) 613) Text with EEA relevance, OJ L 63/1.

[34] Serge Roudier, 17 years of making BREFs – from the IPPCD to the IED. An example of how evidence-based scientific and technical support helps the implementation, of EU environmental legislation, presentation given at the Berlin Workshop on BAT information exchange 16/17.10.2014.

strong driver to put the knowledge on chemicals and the reduction of hazardous substances in industrial installations into practice.

2.1.4 Content of BAT conclusions with regard to industrial chemicals

The information exchange about BAT addresses in particular the performance of installations and techniques in terms of emissions, the consumption and nature of raw materials, water consumption, use of energy and generation of waste, the techniques used, and the BATs (Art. 13 (2) IED). 'BAT conclusions' define BATs and are the concentrate or summary of this information exchange recapitulating the key parts of the much more extensive BAT reference document. BAT conclusions include information on the applicability of these BATs, the emission levels associated with the BATs and associated monitoring.

The content of the BAT conclusions is the result of the information provided by experts of the TWG during the information exchange process. This means on the one hand that issues for which no information is provided to the EIPPCB tend to be ignored or undervalued in BAT conclusions. Substances of concern can hardly be included in the BAT conclusions without supporting information. On the other hand, this very open process provides also a unique platform where appropriate BAT with regard to the use of chemicals and the reduction of the use and release of hazardous substances could be elaborated. A prerequisite however is that relevant information is shared with the TWG at the right time. All members of a TWG usually assess information submitted by other stakeholders.

For each BREF review a sector-specific TWG is set up. Each TWG member has the right to comment and challenge information submitted by others and presented by the EIPPCB. This ensures a first quality check of submitted information. In this sense, BREFs and BAT conclusions contain validated or peer-reviewed information. However, experts from Member State organisations are not always in a position to assess very detailed and specific technical information like the ones related to chemicals and the reduction of hazardous substances. Often, they suffer a lack of staff and resources and have to put extra efforts into really commenting and making proposals for that issue. Only if studies, monitoring results or practical experiences related to hazardous substances are shared well ahead to the kick-off meeting of a BREF review (during the so-called *frontloading phase*) there is a chance to improve this challenging situation (see Section 2.1.5 of this report).

BAT conclusions may thus contain specific BATs with regard to the selection, use and management of chemicals, they may present options for substitution of hazardous substances or describe risk reduction measures and appropriate abatement techniques depending on the nature and amount of hazardous substances released by the operation. However, all this depends largely on the composition, knowledge, expertise, resources and in particular the early efforts of TWG members (*during the frontloading phase*). The EIPPCB together with DG ENV is the other player that also has a significant influence on the content of the BAT conclusions.

Table 1 shows the result of an assessment of 15 published BAT conclusions under the perspective whether they contain BAT on hazardous substances and to which extent. The rough analysis listed in table 1 reveals on the one hand, that BAT conclusions in most industrial sectors do address to some extent measures with regard to hazardous substances. On the other hand, it seems that BATs are often selective i.e. are sometimes incomplete or do not incorporate systematically all relevant available information on the use of less hazardous substances (data generated in the context of other legal frameworks, e.g. REACH, WFD, POPs Regulation). What can also be learned from table 1 is that for some industrial sectors BATs with regard to chemical management are rather generic and do not address emission reduction measures for specific substances of concern. These rather vague BATs are often difficult to implement and to be transformed into permit conditions respectively (e.g. BAT 8, FDM BAT conclusions). In these cases, measures of Good Housekeeping or the general task of operators to properly select chemicals are the main BAT. In other sectors BAT conclusions seem to be more complete. For most BAT conclusions, it remains unclear whether priority substances (WFD)

are fully considered. Their presence or absence is mostly not addressed explicitly in BAT conclusions.

Table 1. Consideration of management of chemicals in IED BAT conclusions published in the EU-Journal.

BAT Conclusions	**Date of publication**	**Consideration of the use of less hazardous substances, chemicals management and BATs concerning hazardous substances**
Manufacture of Glass (GLS)	08.03.12	No specific chemical management, possibly no further concerns. BAT 6: BAT is careful selection and control of all substances and raw materials entering the melting furnace, e.g. use of raw materials and external cullet with low levels of impurities (e.g. metals, chlorides, fluorides).
Iron and Steel Production (IS)	08.03.12	BAT 7: BAT is to select appropriate scrap qualities and other raw materials. Regarding scrap, BAT is to undertake an appropriate inspection for visible contaminants which might contain heavy metals (in particular Hg), or might lead to the formation of polychlorinated dibenzodioxins/furans (PCDD/F) and polychlorinated biphenyls (PCB). No further consideration of chemicals
Tanning of Hides and Skins (TAN)	16.02.13	No systematic approach applied. BAT 2: BAT is to apply the following techniques in combination: (i) careful selection and control of substances and raw materials (e.g. quality of hides, quality of chemicals); (ii) input-output analysis with a chemical inventory, including quantities and toxicological properties; (iii) minimisation of the use of chemicals to the minimum level required by the quality specifications of the final product. A few specific chemicals are addressed, e.g. BAT 5 f and g, BAT 6 b and c. Imported pollutants are addressed in BAT 8. BAT 9 addresses the minimisation of emissions of biocides in wastewater.
Production of Cement, Lime and Magnesium Oxide (CLM)	09.04.13	Various BATs: Carefully selecting and controlling of kiln inputs (raw materials and fuels), possibly no further concerns.
Production of Chloralkali (CAK)	11.12.13	No systematic approach applied. BAT 1: The mercury cell technique cannot be considered BAT under any circumstances. The use of asbestos diaphragms is not BAT. BAT 9: The use of carbon tetrachloride for the elimination of nitrogen trichloride or the recovery of chlorine from tail gas is not BAT. BAT 10: The use of refrigerants with a high global warming potential, and in any case higher than 150 (e.g. many hydrofluorocarbons (HFCs)), in new chlorine liquefaction units cannot be considered BAT.
Production of Pulp, Paper and Board (PP)	30.09.14	Key elements of chemical management are addressed. Many BATs are presented. E.g.: BAT 2: BAT is to use a combination of a) careful selection and control of chemicals and additives; b) input-output analysis with a chemical inventory, including quantities and toxicological properties; c) avoid the use of harmful substances (e.g. nonylphenol ethoxylate-containing dispersion or cleaning agents or surfactants) and substitution by less harmful alternatives. BAT 3: BAT is to reduce the release of not readily biodegradable organic chelating agents such as EDTA or DTPA from peroxide bleaching (3 specific techniques presented). BAT 48 e): Minimisation of release of chemical additives (e.g. grease-/waterproof agents) containing per- or polyfluorinated compounds or contributing to their formation. BAT 48 f: Switch to low AOX-containing product aids (e.g. to substitute use of wet strength agents based on epichlorohydrin resins). No systematic information on the release of priority substances.
Refining of Mineral Oil and Gas (REF)	28.10.14	The use of less hazardous substances is not addressed.

Wood-based Panels Production (WBP)	24.11.15	BAT 2: BAT is to apply good housekeeping principles applying a careful selection and control of chemicals and additives. BAT 19a und 21a: Select resins with a low formaldehyde content. Unclear whether BATs on chemicals are complete.
Common Waste Water and Waste Gas Treatment/ Management Systems in the Chemical Sector (CWW)	09.06.16	BAT 2: BAT is to establish and to maintain an inventory of waste water and waste gas streams that incorporates information about the characteristics of the waste water streams such as data on bioeliminability (e.g. BOD, BOD/COD ratio, Zahn-Wellens test, biological inhibition potential (e.g. nitrification)). BAT 11: Pre-treatment of waste water that contains pollutants that cannot be dealt with adequately during final waste water treatment. Since the CWW BREF is cross-sectoral, i.e. covers the entire chemical sector, no specific information on chemical management is presented.
Non-ferrous Metals Industries (NFM)	30.06.16	No information on the use of less hazardous substances. Relevance of the issue unclear.
Intensive Rearing of Poultry and Pigs (IRPP)	21.02.17	The use of less hazardous substances is not addressed. The relevance of chemical management in the sector however is unclear.
Large Combustion Plants (LCP)	17.08.17	BAT 9: BAT is to include the following elements in the quality assurance/quality control programmes for the fuels used (i) Initial full characterisation of the fuel used including at least the parameters listed below; (ii) regular testing of the fuel quality to check that it is consistent with the initial characterisation and according to the plant design specifications; (iii) subsequent adjustment of the plant settings as and when needed and practicable. No further BAT on used chemicals. BAT on chemicals is possibly less relevant in the sector.
Production of Large Volume Organic Chemicals (LVOC)	07.12.17	The use of less hazardous substances is not addressed. Relevance of the issue unclear.
Waste Treatment (WT)	18.08.18	Since the WT BREF deals with waste, priority is given to the incoming waste control and not to the chemicals used. Various techniques that deal with waste characterisation and pre-acceptance procedures, waste acceptance procedures, waste tracking system and an inventory and an output quality management system are BAT 2. BAT 3: BAT is to establish and to maintain an inventory of waste water and waste gas streams including data on bioeliminability (e.g. BOD, BOD to COD ratio, Zahn-Wellens test, biological inhibition potential (e.g. inhibition of activated sludge)). Also BAT 52 for the treatment of water-based liquid waste. BAT is to monitor the waste input as part of the waste pre-acceptance and acceptance procedures. Monitoring the waste input, e.g. in terms of: — bioeliminability (e.g. BOD, BOD to COD ratio, Zahn-Wellens test, biological inhibition potential (e.g. inhibition of activated sludge)).
Food Drink and Milk Industries (FDM)	04.12.19	Under the Section "General BAT conclusions" a dedicated sub-section titled "harmful substances" is presented for the first time (BAT 8). BAT is to reduce the use of harmful substances, e.g. in cleaning and disinfection. This includes the proper selection of cleaning chemicals and/or disinfectants. The BAT is rather vague and difficult to implement.

2.1.5 Addressing hazardous substances as Key Environmental Issue (KEI) for BREFs

At the beginning of the BREF review process, the parameters and pollutants to be considered for the review are defined by active TWG members together with the EIPPCB that leads the work. Normally, major environmental parameters to be considered are emissions to air and water, diffuse emissions, odour and noise emissions, water and energy consumption, and sometimes waste generation. In a few cases, also hazardous substances are explored more thoroughly.

As one of the first steps in BREF reviews, TWG members submit their initial positions before the kick-off meeting is organised by the EIPPCB. The EIPPCB assesses these initial positions and

proposes candidate key pollutants in the Background Paper (BP) that is prepared to support discussions at the kick-off meeting. The key parameters and pollutants are discussed and agreed upon at the kick-off meeting in Seville that normally lasts several days. Usually, a consensus on the key pollutants is achieved at the kick-off meeting. Based on these decisions a detailed questionnaire is designed by the EIPPCB in cooperation with the TWG to gather installation-specific data needed for deriving BAT AELs.

Nowadays the EIPPCB uses the term *"Key Environmental Issue" (KEI)* for addressing key pollutants and issues for BREF reviews. At the Article 13 IED forum meeting in 2015 the Commission presented criteria for defining KEIs and suggested KEI should be determined at the earliest possible stage of the information exchange for any BREF review. Although some Member States have argued against the need of KEIs and in particular against many of the proposed criteria for defining KEIs[35], the EIPPCB has taken up the KEI concept and applies it since that time. Also, the Environmental NGO delegation (EEB) has opposed the KEI approach, in particular the criteria used. In their view another criteria or approach should be used for the "focussed approach".

After introducing the concept of KEIs, the Commission launched a study for testing the proposed criteria in the BREF reviews of four pilot sectors: textile industry (TXT BREF), ceramic industry (CER BREF), slaughterhouses and animal by-products (SA BREF) and smitheries and foundries (SF BREF). In the *frontloading phase* of these BREF reviews, i.e. well before the kick-off meeting and before the TWG members submit their initial positions, the consultant Ricardo conducted a literature study on KEIs and shared it, once finished, with TWG members[36]. Data sources used as evidence to evaluate the criteria were publicly available materials only. Hazardous substances are considered in these KEI studies as far as they are addressed in available literature. E.g. for the textile sector substances of very high concern, priority hazardous substances and the POP list of substances subject to prohibitions were partly taken into account. For methodologic reasons, the proposals of this preparatory study are however limited to few substances, namely those well-known from literature. Then, EPRTR-data and a few permits where used to assess possible occurrence and release (limitations because of applied thresholds for PRTR-reporting). One of the main limitations of the PRTR is that it addresses only emissions / releases from a site. So, it will not bring information on the amount, type and purpose of use of various hazardous chemicals within industrial activities. Finally, it addresses mainly a set of traditional pollutants with thresholds. The conclusions drawn in the four pilot sector studies follow a risk-based approach rather than the precautionary principle of the IED (e.g. by applying criterion 2 for identification of KEI[37]).

From the HAZBREF-perspective, carrying out this kind of preparatory KEI studies in the frontloading phase of BREF reviews is a move to the right direction. The current four pilot cases offer an opportunity to identify hazardous chemicals as KEI for certain sectors. There is room for improvement in these KEI studies, especially in the criteria and data used and the conclusions drawn from the information gathered. The criteria applied are mostly unsuitable for identifying the permit-relevant aspects and criteria for the relevance of substances of concern for BREFs are partially

[35] The four criteria for defining KEI presented by the Commission are 1) environmental relevance of the pollution; 2) significance of the activity; 3) potential of BREF review for identifying new or additional techniques that would further significantly reduce pollution; 4) potential of BREF review to set BAT-AELs that would significantly improve the level of environmental protection.

[36] The methodology applied and the four case studies can be downloaded at the following link in CIRCABC: https://circabc.europa.eu/faces/jsp/extension/wai/navigation/container.jsp?FormPrincipal:_idcl=FormPrincipal:_id1&FormPrincipal_SUBMIT=1&id=33336634-65ed-4dcb-9a18-430825e073ee&javax.faces.ViewState=3vca%2BdS%2BxZ1bHFFXPSQ8yvRTxqZDKLY6Wg5jiTJ6CYz%2Fy5db9AzjmoCCPt%2BNoBU0072nNgx70W72mCZHsTaX2HZr6gvTwYQi%2BiG3pIorRopTkPg8iaQziXt6toeIQ2BlDUyNJxLySWU7A%2BO4GolqrRy1G4I%3D.

[37] In the methodology proposed by the Commission for determining Key Environmental issues criterion 2 is defined as "Criterion 2: Is the industrial process and its pollution and consumption a significant part of industrial pollution and consumption in the EU, currently or trending?"

missing[38]. The data sources used should include not only the published literature but also data from the REACH context.

The EIPPCB aims at a knowledge-based selection of KEIs. That means that normally only those KEIs that are supported with data will qualify for further data gathering and research. This is one of the key challenges or even bottlenecks for the systematic consideration of hazardous substances. Often, TWG members do not have sufficient data available and timely, i.e. preferably before the kick-off meeting, to support their wish to consider certain pollutants or hazardous substances. In those cases, these pollutants are mostly not included in the data collection because of the relatively strict time planning for BREF reviews. Time and staff constraints often lead to the decision not to further investigate certain hazardous substances during a BREF review (but maybe then in the next review). For the same reason, a systematic assessment of the use of hazardous substances taking into account data generated under REACH or WFD can often not be carried out.

2.2 Communication and data flow between key stakeholders

2.2.1 European key institutions, the EIPPCB and the supporting TWGs

DG Environment, the Art. 13 IED Forum and the Art. 75 Committee

The responsible unit for the IED and its implementation in the Directorate-General for Environment is Unit C4 "Industrial Emissions & Safety". This unit is in charge of organizing and carrying out the information exchange about BAT according to Art. 13 IED. However, DG ENV itself does not carry out the technical work but has commissioned the EIPPCB. The Seville-based EIPPCB is part of the Directorate B of the European Commission's Joint Research Centre (JRC) and works under the survey of DG Growth and Innovation. DG ENV is the key customer of the EIPPCB, guides its work and gives some orientation. E.g., there are yearly meetings between C4 and the EIPPCB staff in order to address expectations, give orientation and feedback on the Seville process and its outcome, the BREFs and BAT conclusions.

The C4 unit also invites for the Art. 13 IED Forum meetings. The Article 13 stipulates that the Commission shall establish and regularly convene a forum composed of representatives of Member States, the industries concerned and non-governmental organisations promoting environmental protection. The Forum meets to provide opinions on each final draft BAT conclusion of a sector. The Commission takes the opinion of the Forum into account when it elaborates the final version of the BAT conclusions that are later presented to and adopted by the Committee procedure (Art. 75 IED). The Forum has no decision power but rather performs an advisory function. The Art. 13 IED Forum is also in charge of discussing the practical arrangements for the exchange of information, of adopting the work programme for the exchange of information, to develop guidance on the collection of data and on the drawing up of BAT reference documents in general.
The Art.75 Committee is a committee to which the final BAT conclusions are presented for adoption. The Members of the Art. 75 Committee are representatives of the Member States only. They vote with qualified majority.

The European IPPC Bureau (EIPPCB) and the TWGs

The EIPPCB was established in the context of the implementation of the former IPPC Directive 96/61/EC and continues since 2010 in the context of the IED 2010/75/EU. The EIPPCB is set up to organise an exchange of information between Member States, the industries concerned and environmental NGOs, on BAT, associated monitoring and developments in them as required by

[38] Work package 2 of the HAZBREF project will deliver a proposal for criteria for the relevance of target substances for BREFs. Also, the report of activity 3.2 will describe more precisely which data sources are relevant and which criteria are considered appropriate for the determination of BAT.

Article 13 of the IED. The objective of the information exchange is to assist the efficient implementation of the Directive across the European Union.

For each BREF, the EIPPCB sets up a TWG to carry out the exchange of information on BAT. A TWG usually consists of 80 to 150 experts of the main stakeholders (according to Art. 13 IED). TWG members are representatives from national Ministries of Environment or Environment Agencies, representatives from the industry concerned (industrial associations, operators of companies), delegates from the European Environment Bureau (umbrella association for environmental NGOs) and the Commission services. Permit writers and scientist are rarely nominated as TWG members. Active Member States organise in their home countries often shadow BAT expert groups that accompany the entire BREF review process. The EIPPCB organises the work of the TWG, fosters the exchange of information, makes a scientific and technical analysis of the vast amount of information exchanged, proposes compromise solutions on issues where views of TWG members differ, and writes the BREF.

The procedure used to elaborate or review a BREF includes a few plenary meetings of the TWG, sometimes sub-group meetings, site visits, and submission of draft BREF for comments. Once it has been finalised, the EIPPCB presents each BREF to DG Environment and the Art. 13 IED Forum for opinions.

Figure 4 summarises in a simplified manner the relationships and the organisation of the information exchange about BAT:

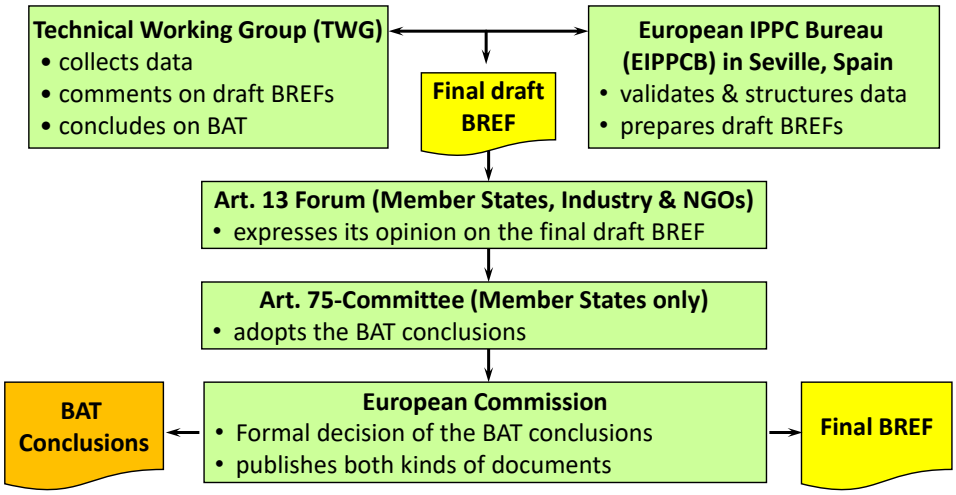

Figure 4. Organisation of the information exchange for producing IED BAT conclusions.

The Seville process provides a platform with numerous stakeholders where all relevant information on BAT for a given industrial sector may be exchanged and discussed. This applies also for data on the use of less hazardous substances or techniques for prevention or reduction of the release of these substances to environment. Data that is required for this purpose is sound techno-economic information that supports statements and positions. The hard currency of the Seville process is technical data that gives evidence for the TWG members that certain measures are relevant, proportionate and technically feasible.

By this means, the TWGs for BREF reviews have a large opportunity for bringing in relevant knowledge on hazardous substances from adjacent techno-scientific communities such as the REACH or WFD community (please refer to chapter 3 and 4 of this report).

2.2.2 Communication between EU institutions and supporting expert groups

As already mentioned further above, there are regular contacts and exchange between the unit C4 of DG ENV that is in charge of the IED and the EIPPCB. Regular staff meetings between the two institutions take place and staff members participate in respective meetings (TWG Meetings, Art. 13 IED Forum).

On the other hand, until recently there has been little direct exchange or coordination between the respective units of DG ENV (and the EIPPCB) and DG Growth that is responsible for the REACH regulation. So far, the EIPPCB did not collaborate with the Common Implementation Strategy (CIS) Working Group Chemicals (WG CHEM) in the WFD context. There has not been a systematic relationship of the EIPPCB with the DG ENV Unit C1 Clean Waters, which is in charge of the WFD and its daughter Environmental Quality Standards Directive. More details on these water protection experts' groups are described in Chapter 4.

With regard to the units responsible for REACH in DG Growth and DG Environment, during the Textile BREF review, the EIPPCB established contacts to colleagues from ECHA (see also next section). For example, an ECHA-expert has participated at the kick-off meeting for the Textile BREF review (TXT) where beside ECHA also an expert from DG Growth participated. This cooperation started at the request of the EIPPCB in autumn 2017[39] and included activities such as ECHA reviews of some draft documents provided by the EIPPCB, ECHA as observer in Technical Working Groups (TWGs) reviewing the BREFs, ECHAs participation in some TWG meetings and there are also ad-hoc ECHA/EIPPCB exchanges organised from time to time. The TXT BREF was a pilot project for the cooperation between ECHA and EIPPCB. The involvement of ECHA and its support of the BAT information exchange related to the safety of substances is foreseen in the temporally following BREF reviews (for ferrous metal processing (FMP), smitheries and foundries (SF) and ceramic industry (CER)).

From HAZBREF perspective this has been a step in the right direction. More details on ECHA and possible interfaces with BREF reviews are described in Chapter 3.

We are not aware of routinely exchange of information between EIPPCB experts and experts from the POPs Regulation (see Chapter 6) or HELCOM (see Annex 1).

2.3 Proposals for a more systematic consideration of hazardous substances in BAT conclusions

The polluting substances that are relevant for permits and BAT conclusions are listed in Annex II of the IED. Various pollutants on this list are not always sufficiently addressed during the BREF elaboration process though they should be taken into account as comprehensively as possible. The same applies to criteria #2 for determining BAT (see Section 2.1.1 and Annex III of IED), namely the "use of less hazardous substances".
The EIPPCB uses the term "*Key Environmental Issue" (KEI)* for the key pollutants or issues for BREF reviews. We think that the Commission should continue carrying out preparatory studies on KEIs for BREF reviews. This should happen in *the frontloading phase of BREF reviews*, i.e. well before the kick-off meeting, as in the four pilot studies carried out. This kind of study offers a good opportunity to identify hazardous chemicals as KEI for given industrial sector. However, we see room for improvement of these KEI-studies with regard to the 4 criteria applied (mostly unsuitable for identifying permit-relevant aspects), the data sources used (not only published literature but also data from the REACH context should be used; systematic search for and assessment of data from the

[39] The EEB has sent a letter to the Management Board of ECHA already on 15 December 2014 in order to call for systematic technical support by ECHA in relation to substance screening that could be relevant for any BREF review upcoming. This letter can be downloaded under:
http://eipie.eu/storage/files/REF00031%20Letter%20to%20ECHAMB%20on%20Strategy%20Chemicals%20in%20BREFs%20FINAL.pdf.

WFD context; criteria for the relevance of target substances for BREFs are partially missing[40]) and the conclusions drawn from the information gathered.

During the elaboration of the KEI studies, BREFs reviews should consider the knowledge on hazardous substances generated under REACH (registration dossiers, chemical safety report, safety data sheets). A closer cooperation between REACH and the IED may deliver useful results and help to complement the information on relevant hazardous substances in BREF sectors. However, it is not an easy task to use substance-related data from REACH for the sector-specific perspective of BREFs.

BAT conclusions may also strengthen the implementation of risk reduction measures required by REACH by determining and specifying available techniques to prevent and reduce emissions of hazardous substances. Currently, provisions for risk reduction measures described in extended Safety Data Sheets[41] are often vague and difficult to put in practice. By strengthening the interface between REACH and IED, BAT conclusions may support the determination and description of appropriate techniques including possible technical constraints or limitations for their applicability. For further proposals on how to strengthen the interface between REACH and IED, please refer to chapter 3 of this report[42].

Figure 5 summarizes in a simplified manner the approach proposed by this study for the development of BAT conclusions for hazardous chemicals in the BREF processes. It uses some of the terms introduced in Section 2.1.5. Text and lines in green are new aspects proposed by HAZBREF project.

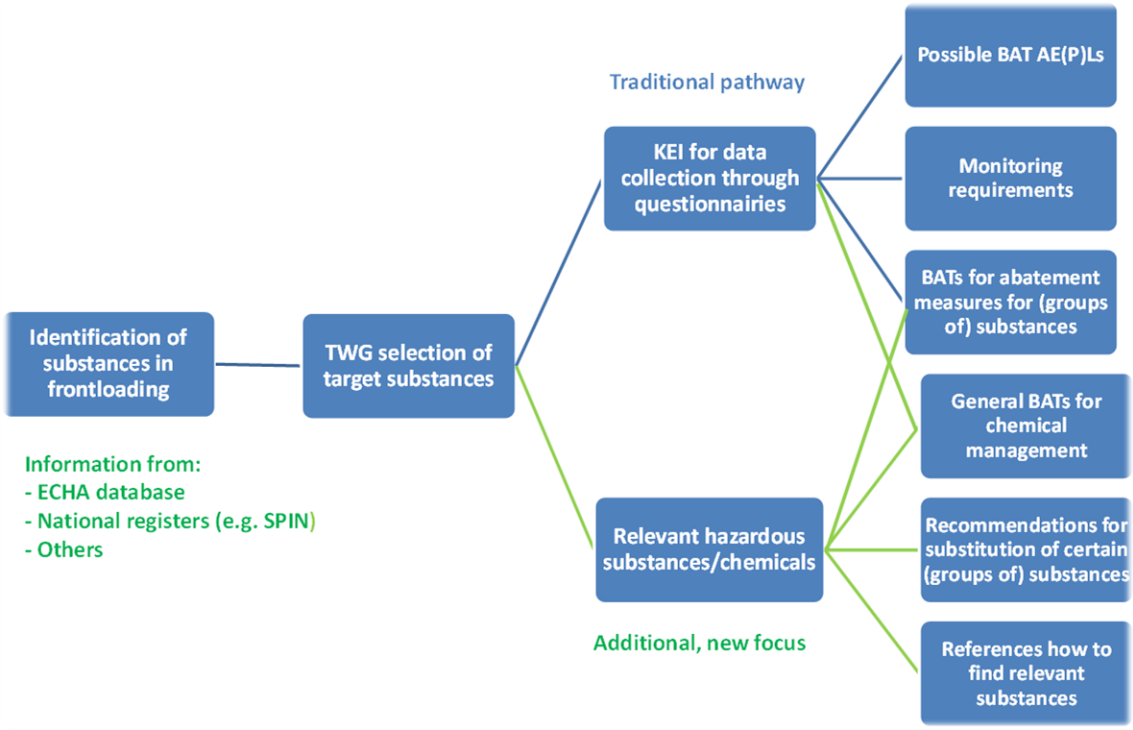

Figure 5. General approach for the development of BAT conclusions for hazardous chemicals.

[40] Work package 2 of the HAZBREF project will deliver a proposal for criteria for the relevance of target substances for BREFs. Also, the report of activity 3.2 will describe more precisely which data sources are relevant and which criteria are considered appropriate for the determination of BAT.

[41] A safety data sheet should be provided to downstream users for: (a) a substance or mixture that is classified as hazardous according to CLP; (b) a substance that is persistent, bioaccumulative and toxic (PBT) or very persistent and very bioaccumulative (vPvB), or (c) a substance that is included in the Candidate List of substances of very high concern (SVHCs).

[42] As far as emissions of pharmaceuticals to water are concerned, these pollutants may be considered as a possible Key Environmental Issue when reviewing the appropriate BREFs (e.g. the Organic Fine Chemicals BREF) in the future. This is also a planned action of the Commission mentioned in the recent Communication on a European Union Strategic Approach to Pharmaceuticals in the Environment, COM(2019) 128 final, 11.03.2019, page 8.

Usually, TWG members are asked to express their initial position on key environmental issues (KEIs) to be considered for a BREF review. The idea is that relevant issues are identified as early as possible to give orientation to the scope and extent of data-gathering needed for the derivation of BAT (so-called focused approach and frontloading of the information exchange).

Target substances relevant for BREFs will be identified by screening available information in databases such as the ECHA database, national registers or others. Information regarding fate and behavior of substances in WWT/STP can be a part of identification of KEIs[43]. Preferably, this activity would be integrated into the preparatory studies on KEIs for BREF reviews. DG ENV has commissioned such preparatory studies for 4 pilot sectors and hopefully these studies will be conducted in future BREF reviews. As during the four pilot studies carried out, this work should happen in the *frontloading phase of BREF reviews*, i.e. well before the kick-off meeting. The TWG then may discuss and seek an agreement on the KEIs at the kick-off meeting. Priority substances from the WFD context as well as POPs should also be considered systematically and as a routine at this stage.

HAZBREF proposes to complement the traditional pathway by an additional focus: In case that relevant hazardous substances/chemicals are used and emitted in a BREF sector, BAT conclusions should address the following issues:

- general BATs for chemical management44;
- recommendations for substitution for certain (groups of) substances;
- BATs for specific abatement measures for (groups of) substances and
- references how to identify relevant substances.

Since BAT conclusions shall be the reference for setting permit conditions, more specific provisions on hazardous substances based on a systematic approach should be developed during BREF reviews. The consideration of the use of chemicals and the reduction of hazardous substances should take place as a routine method during early stages of the BREF reviews ("*frontloading*") of BREF reviews, e.g. by carrying out a study or by motivating Member States to arrange certain targeted measurements. Efforts in this sense undertaken during the information exchange about BAT may lead to a better reflection of BATs on hazardous substances. Consequently, these BATs would be transformed into permit requirements. Thus, the level playing field also on this issue would be strengthened within the EU, ensuring simultaneously an appropriate level playing field and a high level of environmental protection as a whole. However, a new, more dynamic official website complementary to published BREFs and BAT conclusions needs to be developed for that purpose and incorporated to the EIPPCB website presence. As research on environmentally more friendly alternatives may go faster than the BREF review process, the information may already be obsolete when the revised BREF is published.

[43] This information can be obtained according to established and commonly used methods as outlined in the Reach Guidance on information requirements and Chemical Safety Assessment, Chapter R.16: Environmental exposure assessment. The fate of substances in WWTP/STP can be assessed in the SimpleTreat 4.0 model.

[44] See footnote 8 and 9.

3 Provisions of EU key legislation regarding hazardous substances: and other substances of concern: The REACH-Regulation

Chemicals used in the EU in industrial processes are registered, evaluated, authorised or restricted under REACH Regulation to ensure "safe use" of these chemicals. The industrial processes itself, including the reduction and substitution of uses of hazardous substances, are subject to the IED and the determination and application of best available techniques (BAT) (see previous Chapter 2). Hence, these two key EU legal frameworks may overlap, which leads to the question how REACH and the IED could benefit from each other or how they could best interact in a coherent manner.

This chapter first analyses the main elements of REACH Regulation, the key instruments the regulation provides, and the data generated within this context regarding hazardous substances that may be useful during BREF reviews. It then examines whether and how the information exchange on BAT in the context of the IED could potentially take advantage from information on hazard properties of substances generated under REACH.

3.1 Functioning of REACH with respect to the reduction of hazardous substances

REACH aims at the safe use and handling of substances and mixtures on the European market. For all substances produced in or imported to the European Union in quantities of one tonne or more per year, per company, information about uses and hazardous properties shall be provided in a registration dossier. REACH is based on the principle of placing greater responsibility on industry. That means, it is the task of manufacturers, importers or downstream users to ensure that they manufacture, place on the market or use substances so that the risks to the human health and the environment are controlled in an appropriate manner that no harm to them is caused. The rule is *"no data – no market"*[45]. This means that chemicals may not be placed on the market without registration.

REACH establishes five key mechanisms, which are supposed to ensure the safe use of chemicals:

- Registration procedure (Title II REACH),
- Dossier- and substance evaluation (Title VI REACH)
- Information in the supply chain (Title IV),
- Authorisation procedure (Title VII REACH),
- Restriction procedure (Title VIII REACH).

These instruments provide information, e.g. on hazards and exposure, obligations to substitute certain substances or risk management measures for the safe use of a substance. Using this information in the BREF elaboration process would strengthen implementation of measures via more complete BAT conclusions with respect to the reduction and safe use of substances of concern. By these means, the common objective of the IED and REACH–achieving a high level of protection of human health and of the environment–might be easier to reach.

In May 2018 the last batch of phase-in substances in the tonnage band 1-100 t/a were due for registration under REACH. Meanwhile, more than 22.600 unique substances are registered in Europe.[46] Nevertheless, the entire chemical universe is larger and much better represented by the

[45] This phrase only appears once in the REACH-text (Article 5). It does not read "not all data – no market", as the scores of incomplete dossiers and unjustified waivers demonstrate.

[46] Substances used as biocides are not registered under REACH if they are only used as biocides (their placing on the EU market and use is regulated by the Biocidal Products Regulation (BPR, Regulation (EU) 528/2012)). This is the case for quite a few of them. Biocides may be used in many industries regulated in the IED. As most biocides are hazardous chemicals and as biocide uses are not covered by REACH, it would seem appropriate not to turn a blind eye to biocides in BREF reviews. However, this regulation is outside the scope of the HAZBREF project application.

inventory of the Regulation (EC) No 1272/2008 for Classification, Labelling and Packaging (CLP) of substances and mixtures (Public Classification and Labelling (C&L) inventory with information coming from REACH registrations and CLP notifications).

Figure 6 gives an overview about the entire universe and the number of substances that are registered, evaluated and regulated (authorised or restricted)[47].

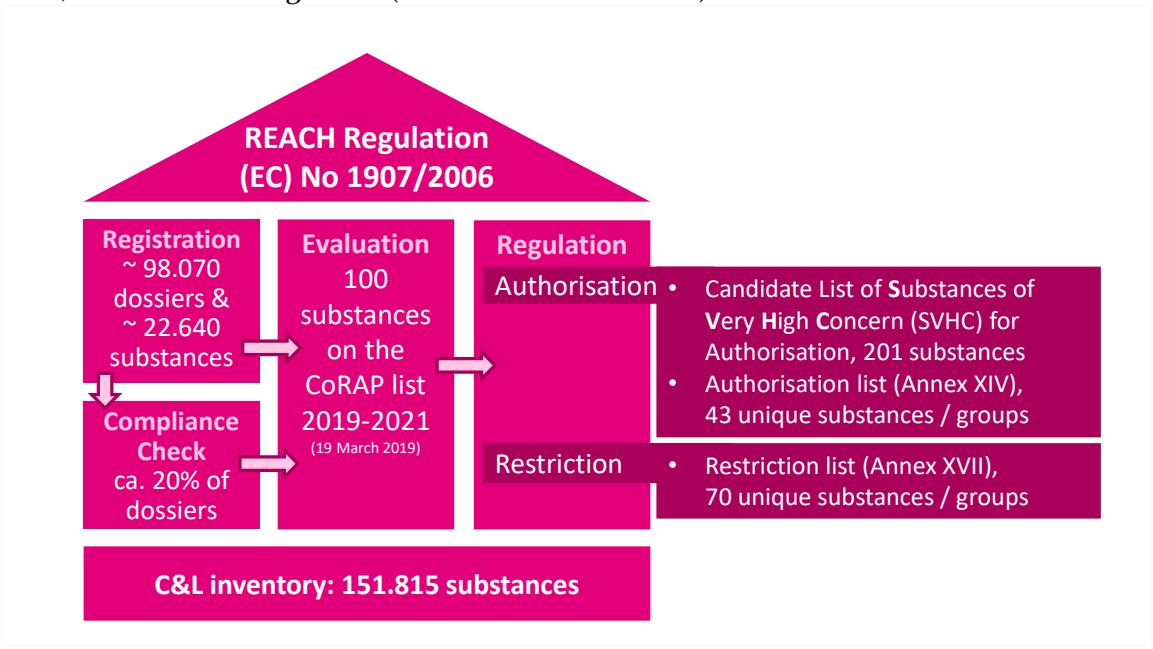

Figure 6. Overview about the number of substances that are registered, evaluated, and regulated under REACH Regulation (EC) No 1907/2006 (Source: ECHA statistics 10.01.2020).

One main difference between the REACH Regulation and the IED is that REACH covers the risk management *over the entire life cycle* of a chemical, while the IED perspective is on the use, production (e.g. OFC, LVOC BREF) and possible release of a substance in *industrial installations listed in Annex I of the IED (gate-to-gate approach)*.

In order to identify all substances of very high concern (SVHC)–a target for 2020–the European Chemicals Agency (ECHA) has developed ECHA's Integrated Regulatory Strategy that brings together the various REACH regulatory processes and sets the basis for the cooperation between authorities – ECHA, the European Commission and the Member States. The route to authorisation starts when a Member State or ECHA, at the request of the Commission, proposes a substance to be identified as an SVHC. ECHA regularly assesses the substances from the Candidate List to determine which ones should be included in the Authorisation List as a priority. The prioritisation is based on information on the intrinsic properties, wide dispersive use or high volumes that fall within the scope of the authorisation requirement[48]. For substances on the list of substances included in Annex XIV of REACH ("Authorisation List"), companies may apply for the authorisation of further use under specific conditions. The ultimate target is the progressive substitution of these SVHC.

So far, BAT conclusions for industrial sectors under the IED do not contain a list of SVHCs nor restricted substances (Annex XVII REACH) either, in case that they are used in a given industrial sector.[49] A mutual consideration of the information on substances is important, since Art. 62 (5 b) REACH mentions the following interface to other legislations: The application for authorisation may

[47] See the ECHA-statistic on registered substances: https://echa.europa.eu/information-on-chemicals/registered-substances (State: January 2020). Further useful links are: http://echa.europa.eu/regulations/reach/registration/registration-statistics; http://echa.europa.eu/information-on-chemicals/evaluation/community-rolling-action-plan/corap-table; http://echa.europa.eu/candidate-list-table; https://echa.europa.eu/information-on-chemicals/cl-inventory-database.

[48] Cf. https://echa.europa.eu/substances-of-very-high-concern-identification-explained (accessed in July 2020).

[49] See https://echa.europa.eu/candidate-list-table (State: July 2020) and https://echa.europa.eu/en/authorisation-list(State: June 2018).

include a justification for not considering risks to human health and the environment arising either from: (i) emissions of a substance from an installation for which a permit was granted in accordance with Directive 96/61/EC (today IED) or (ii) discharges of a substance from a point source governed by the requirement for prior regulation referred to in Article 11(3)(g) of WFD and legislation adopted under Article 16 the WFD (in particular Directive 2008/105/EC on Environmental Quality Standards).

Furthermore, REACH establishes a restriction procedure regarding the manufacturing, usage or placing on the market of substances, when there is an unacceptable risk to human health or the environment, arising from those substances, which need to be addressed on a Community-wide basis. Annex XVII includes substances, which are subject of a restriction.[50] Adopting new restrictions or developing current restrictions amends Annex XVII. Any such decision has to consider the socio-economic impact of the restriction, including the availability of alternatives (Art. 68 par. 1 REACH).

The existence of restrictions as regards a substance is an indication that it is of high concern. If a restricted substance is relevant for an industrial main activity according to Annex I IED (or a given BREF), it should be checked whether it qualifies as a *Key Environmental Issue* or not (see Section 2.1.5), and whether BAT conclusions should be developed for the uses still allowed. If relevant for a given industrial sector, BAT conclusions should consider BATs for the control of the use and possible release of these substances.

Once a substance or a substance group raises concern a regulatory management option analysis (RMOA) can help authorities to clarify whether regulatory action is necessary for a given substance and to identify the most appropriate measures to address a concern. An RMOA can conclude that regulatory action – for example, harmonised classification and labelling, inclusion in the Candidate List, restriction, or another EU-wide measure – is required for a substance, or that no regulatory action is required[51].

Besides different methods within the REACH Regulation to control risks, also possible risk reduction options within other legislations are evaluated. These options comprise for example measures under the concept of BAT under the IED, different product regulations, or also media-oriented regulations like in the context of the Water Framework Directive (see Chapter 4). In order to enable an effective interaction between IED and REACH, the knowledge about the various possibilities to regulate a substance as well as on the data available on substances of concern is crucial.
One option to improve the interaction between REACH and the IED is to assess as a matter of routine if substances of concern potentially used in industrial installations are actually used in important amounts, understand why they are used (technical function) and whether emitted; and finally, which measures are available to prevent and reduce their release. As a routine, the unit of DG ENV in charge of the IED (C4 Industrial Emissions & Safety) together with the EIPPCB should be informed about news on the various substance-listings by ECHA so that the substances are taken into account as Key Environmental Issue (KEI) in the BREFs review process (see Section 2.1.5).

3.2 Data generated under REACH that might be useful for BREF reviews

The manufacturers or importers of the chemicals provide substance data in the registration dossier, which is generated at the beginning of the registration procedure (*No data – no market*).For all hazardous substances or mixtures information necessary to ensure safe use of the substance, must be passed on within the supply chain, i.e. from the manufacturer or importer, via processors and intermediaries, to the final seller. The instrument to communicate this information is the Safety Data Sheet (SDS) (Annex II, Art. 31 lit. a)-c) REACH). The registration dossier comprises data such as the identity of manufacturer/importer and substance, information on uses, classification and labelling, guidance on safe use, study summaries on substance properties and hazard properties, and

[50] See https://echa.europa.eu/substances-restricted-under-reach, which contains a list of all current substances, restricted under REACH (State: June 2018).

[51] Cf. https://echa.europa.eu/understandng-rmoa.

exposure assessment for identified uses. Data on hazard properties are publicly available to a larger extent than data on uses and exposure, as some of the latter data may be claimed confidential business information. Unlike the substance data of the authorisation and restriction process, which the involved authorities assess and evaluate, data comprised in the registration dossier is based on data sources provided by the company. Normally, these data are not assessed or evaluated by independent or state institutions.

Many of the registration dossiers received by ECHA do not include all of the required information: in some cases provided information does not comply with all specifications, i.e. it does not include all the required data; or for registration below 10 t/y the information requirements are much less[52]. Nevertheless, the available REACH data may be used as a starting point for a characterisation of a substance in the BREF review context. The REACH data give valuable information on hazard properties of substances, on their uses and on possible risk management measures.

Sometimes the information in the registration dossier on uses of a substance is limited because the exchange between downstream user and the supplier of the chemical – the registrant – is often insufficient[53] (cf. Article 37 REACH). The *real* uses of a substance do not always correspond to the *potential* uses reported in the registration dossier. However, the substance information can be used in the frontloading phase of the BREF review process as a starting point. Whether a substance used on its own or in a mixture[54] is really used in a sector needs to be confirmed by sector experts or data gathered from industrial installations.

For substances with a manufacture or import volume of more than 10 t/year, a chemical safety report (CSR) assessing the safe use of a substance has to be submitted within the registration dossier. The CSR will remain confidential for the public. If the substance is classified or identified as PBT/vPvB, the CSR considers both hazard and exposure in order to assess the risk of a substance. In the case that a substance has a classification according to the CLP Regulation or is considered to be a SVHC, the CSR comprises an exposure assessment and a risk assessment.
The safety data sheets (SDS) are designed to transmit safety related information in the supply chain about hazardous chemicals without the need to access the confidential CSR. The SDS is a relevant data format, which can provide useful information to the BREF review process. As part of the chemical safety assessment for a substance, exposure scenarios are elaborated for identified uses, which are passed on as an appendix to the SDS in the supply chain. This data format is referred to as the "(extended) Safety Data Sheet (eSDS)". This data format includes identified uses of the respective substance and potentially use conditions (including risk management measures) to reduce emission to a "safe" level (Annex II lit. 1-2 REACH).

The extended SDSs can be used as a starting point in the BAT conclusion elaboration process to identify risk management measures and use conditions in order to achieve an adequate control and safe use of a substance, which is classified as hazardous. The data included in the SDS is also private data, i.e. information provided by the supplier of the substance. Permitting Authorities in charge of permitting industrial installations do not generally revise SDS. Thus, before processing this data during the elaboration and review of BAT conclusions, the data needs to be validated or reality-checked by the parties involved in the Seville process.

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[52] Cf. "ECHA may examine according to Article 41 of REACH any registration dossier at any time to verify if the information submitted by registrants is compliant with the legal requirements (= Compliance check). See https://echa.europa.eu/regulations/reach/evaluation/compliance-checks"; and: "By 2023 for all registrations in the tonnage bands over 100 tonnes/year and by 2027 for the tonnage bands 1-100 tonnes/year, ECHA will have screened all registration dossiers submitted by the 2018 deadline and performed a compliance check for all substances where data gaps prevent from concluding whether the Substance is of concern or whether it is of low priority for further regulatory action (= Dossier evaluation). See https://echa.europa.eu/dossier-evaluation".

[53] There is a lot of work on-going to improve this (see https://echa.europa.eu/communication-in-the-supply-chain).

[54] Many substances are used in mixtures, and SDS are particularly poor for mixtures.

Information about restricted substances, substances subject to authorisation and SVHCs are available in Annexes XVII and XIV of REACH and on the Candidate List, as well as reported in the SDS (in its section 15.1). The inclusion of a substance in the Candidate List results in immediate obligations for suppliers of the substance and for articles containing the substance above a concentration of 0.1% (w/w).[55]

For each future BREF review, it should be assessed as a routine if hazardous chemicals (in particular SVHCs, substances classified as acute toxic, CMR or classified as hazardous, PBT and vPvB substances, substances that are potentially be released (persistent or mobile, i.e. hardly degradable/eliminable) and are characterised by an intrinsic potential toxicity) are used in the industrial sector for which the BREF is updated.

This can be carried out by a search in the ECHA database on chemicals[56]. The screening of available may include the following elements for the BREF sector under review:

- the technical function of that substance
- a grouping of the substance according to hazard properties
- the approximate quantity of the substance used in a given BREF sector
- potential better alternatives from environmental perspective (substitutes)

However, this search cannot be done by a straightforward process. Currently installation-specific data on e.g. SVHCs are not readily accessible. It needs some development work within the ECHA database to gather this list of SVHC useable for BREF-reviews. The results of this assessment then should be part of the BAT conclusions. If restricted substances or substances from the Candidate List (SVHC) are identified to be in use in a given industrial sector (BREF), specific considerations about substitution and safe handling should be part of the BAT conclusions. For other identified potentially released industrial chemicals with intrinsic toxicity the assessment of BAT determination should aim to identify techniques to find better alternatives (substitution) or describe appropriate barriers that prevent and reduce their emission.

Table 2 summarises the type of information, the information source and aspects to consider in a nutshell.

[55] https://echa.europa.eu/candidate-list-table (State: January 2019).

[56] See https://echa.europa.eu/search-for-chemicals.

Table 2. Data generated in the REACH or CLP context that might be useful for BREF reviews.

Type of information	Source	Remarks on data quality
Classification and Labelling[57]	Harmonised classification in Annex VI CLP Regulation	Classification based on data evaluated by authorities; these data need to be used by all actors in the supply chain.
	Self-classification in REACH registration dossier >10 t/a	Classification based on data from the registration. Evaluation from the registrant is available in the CSR (for authorities)
	Self-classification in REACH registration dossier 1-10 t/a	Classification based on data from the registration.
	Self-classification separately from the REACH registration dossier	Classification based on unknown data; should only be used if no other information is available.
Use and exposure	Information from registration; SDS (if no registration is available)	Not checked by authorities. Information exchange between suppliers and downstream users needs improvement. Often limited information about downstream uses. Uses covered in the registration refers to *potential* uses (not *real* uses)[58]
Hazard properties	Information from registration; SDS	Not checked by authorities; publicly available
Technical function (of chemical) during use and subsequent service life, purpose of their use	Information from registration according to the ECHA use code manuals	Not checked by authorities; publicly available
Other properties like physico-chemical data and data on fate and behaviour in waste-water treatment and the environment	Information from registration SDS (if no registration is available)	Not checked by authorities; publicly available

Activity 3.2 of the HAZBREF project, namely "*Development of a method to include information of hazardous substances into BREFs*" will explore how to access those data and investigate which obstacles need to be overcome to use these data reasonably in the BREF context. For this purpose, also key lessons learnt from the case studies carried out in work package 4 and findings from work package 2, where a method to identify and select relevant target substances for BREF is developed, will be used.

3.3 Communication and data flow between key stakeholders

3.3.1 Key actors

DG Growth and DG Environment share the responsibility for the implementation of the REACH Regulation. DG Growth describes their role on their website as follows[59]: "The European Commission plays a key role in implementing REACH legislation and in taking decisions on a number of REACH processes. In particular, the Commission plays a key role in the authorisation process as it determines the substances subject to authorisation and decides whether to grant authorisation. It also adopts EU wide restriction [to deal with unacceptable risks of particular chemicals]". The Commission works closely with the ECHA and national authorities in the implementation of the REACH Regulation. DG Growth describes the key players on the mentioned website as follows: "The

[57] Based on CLP regulation.

[58] ECHA Guidance on the compilation of safety data sheets p. 34: (https://echa.europa.eu/documents/10162/23036412/sds_en.pdf/01c29e23-2cbe-49c0-aca7-72f22e101e20): "The SDS must include at least the identified uses of the substance or mixture relevant for the recipient(s) insofar as these are known. For registered substances for which a CSR is required this list of uses must be consistent with the uses identified in the CSR and exposure scenario." So, if the uses needed are not in the SDS, the SDS must be updated by the supplier.

[59] See https://ec.europa.eu/growth/sectors/chemicals/reach_en (State: September 2018).

European Chemicals Agency (ECHA) ensures the effective management of the technical, scientific, and administrative aspects of REACH. ECHA provides information on REACH to companies and the public. It also develops IT-tools and guidance documents to support industry and public authorities in fulfilling their obligations under REACH". A database covering hazardous properties, classification, and information on how to use registered substances safely is also publicly available.

National authorities[60] are responsible for enforcing REACH by establishing official controls and penalties for non-compliance. The focus is on legal requirements and not on technical details of the handling of substances on industrial sites. The national authorities exchange information and coordinate their enforcement activities through the *Forum of Exchange of Information on Enforcement*[61]**.** The Forum is a network of authorities responsible for the enforcement of REACH, CLP and PIC[62], POP and Biocidal Product Regulations in the EU, Norway, Island and Liechtenstein. Coordinated and harmonised enforcement among these regulations is a key factor in the success of the REACH and CLP regulation, but this does not include enforcement activities related to IED. In the different EU Member States (MS) the situation concerning enforcement varies. Anyway, it depends fully on the MS and the co-operation between different enforcement authorities within a given country. In many countries the enforcement of the above-mentioned legislations is under responsibilities of different authorities and the necessary co-operation does not exist. In other MS, environment authorities enforce IED and some parts, but not all parts of REACH[54].

3.3.2 Interfaces between BREF reviews and REACH

The IED does not directly refer to the REACH Regulation and the information on hazardous substances it provides, but for protection of groundwater and soil against pollution at the site of the installation it refers to the CLP Regulation. However, as already explained further above, for BREF reviews there is useful information available in particular at ECHA's public database.

In contrast, REACH explicitly addresses *'the prevention and control of emissions to the environment from industrial sites following the principles laid down in the IED and the BREFs'* (cf. Guidance on Information Requirements and Chemical Safety Assessment, Part D: Framework for exposure assessment, Version 2.0, August 2016, page 11 ff.). The particular role of REACH in the interaction with the IED is the generation and communication of *substance specific information* with regard to the hazards intrinsic to the substance, the properties determining the fate and behaviour of the substance and the required conditions to ensure safe use along the supply chain. REACH information brings *a substance-focussed dimension* to safe use of chemicals that complements *the site-specific approach* taken under the IED[63]. The challenge is to combine both approaches in an intelligent and less burdensome manner.

In theory, operators of industrial installations that apply BAT and follow the integrated approach of the IED use substance-specific information provided in exposure scenarios under REACH. Already when applying for the permit the operator has to provide information on (see Art. 12 Applications for permits IED):

- The substances used in or generated by the installation (Art. 12 (1) b IED);
- The sources, nature and quantities of foreseeable emissions from the installations into each medium and their effects on the environment (Art. 12 (1) c and f IED);
- The technology and other techniques for preventing or, if not possible, reducing emissions from the installation (Art. 12 (1) g IED).

[60] In Germany, the Federal States ("Länder") are responsible for enforcement of REACH obligations.

[61] Cf. https://echa.europa.eu/about-us/who-we-are/enforcement-forum.

[62] The Prior Informed Consent Regulation (PIC Regulation (EU) 649/2012) administers the import and export of certain hazardous chemicals and places obligations on companies who wish to export these chemicals to non-EU countries.

[63] Statement quoted from page 12 of the above-mentioned REACH-Guidance that can be obtained via the ECHA-website at: https://echa.europa.eu/guidance-documents/guidance-on-information-requirements-and-chemical-safety-assessment.

The real-world practice, e.g. findings from the case studies carried out in work package 4 (Best practices in chemicals management in industry) of the HAZBREF project, suggests however that operators often are not in a position to use systematically substance-specific data provided in REACH exposure scenarios for identifying the most relevant substances (in terms of hazard), their environmental fate and behaviour (potential to be released from the industrial WWT), and measures to prevent or reduce emissions. Reasons for that might be the complexity of the issue, difficulties to understand and put into practice all available information, shortages of data and gaps in the SDS/eSDS and weak enforcement[64]. That is one of the key motivations for the reflections and proposals of this report on how to strengthen the link between the two legislative frameworks (REACH and IED).

The list of polluting substances or substance groups covered by Annex II of the IED contains a broad catalogue of pollutants, however often without a specific indication of the related concern. Therefore, the term "pollutant" in the IED does not have an equivalent in REACH. For some of the pollutants covered by the IED, their presence or absence has not been systematically assessed so far and thus is unknown by the BAT community. Nevertheless, these pollutants have to be considered when setting emission limit values for polluting substances (Art. 14 par. 1 lit. a) IED). At this point, the elaboration process for BREFs could benefit from the knowledge on hazardous substances provided by REACH and the registration data in general. However, until recently there has only been some selective contacts between the EIPPCB and the ECHA experts. Also, co-motivated by the HAZBREF project this situation started to improve from the second half of 2017 onwards. As far as ECHA is concerned, since then more frequent contacts between ECHA experts and the EIPPCB staff seems to evolve.

The challenge remains to *approximate the substance-focussed data formats of the ECHA CHEM database with the installation-related perspective of BREF reviews*. Notwithstanding the above, it seems that a closer cooperation between the two key players has the potential to deliver useful results and may help to complement the sometimes still weak information on hazardous substances used in the information exchange about BAT these days.

Please note, that activity 3.2 "*Development of method to include information of hazardous substances into BREFs*" of HAZBREF will further explore this question and provide much more detailed proposals than presented in this report in order to come up with a feasible and more systematic approach how to identify and consider target substances for BREFs.

3.4 Proposals for better interaction between REACH and BREF reviews

3.4.1 Use of data generated under REACH/CLP for the BREF review process

The following section presents opportunities how the knowledge created under the umbrella of REACH could better support and enrich the review process of BREFs and BAT conclusions with respect to hazardous substances. However, as presented before, available information on substances provided together with the registration dossier is neither systematically quality/compliance-checked by ECHA nor validated by national authorities (except identified SVHC and substances assessed under CoRAP)[65]. Therefore, the available data on chemicals should only be considered as a starting point, i.e. first indication about potential risks of a given substance. Bearing in mind this limitation, REACH data may provide valuable basic information on hazardous properties of substances on top of the hazard information from CLP, on their uses and on possible risk management measures.

Figure 7 gives an overview of the key players of REACH and summarises in a box which information created under the umbrella of the REACH may be useful for the BREF review process:

[64] The causes for this situation are further analysed in work package 2 (Identification of relevant target substances) of HAZBREF.

[65] CoRAP (Community Rolling Action Plan): If a substance is on the substance evaluation list, it means that a Member State has evaluated or will evaluate it over the coming years. The list is called the **Co**mmunity **R**olling **A**ction **P**lan (CoRAP).

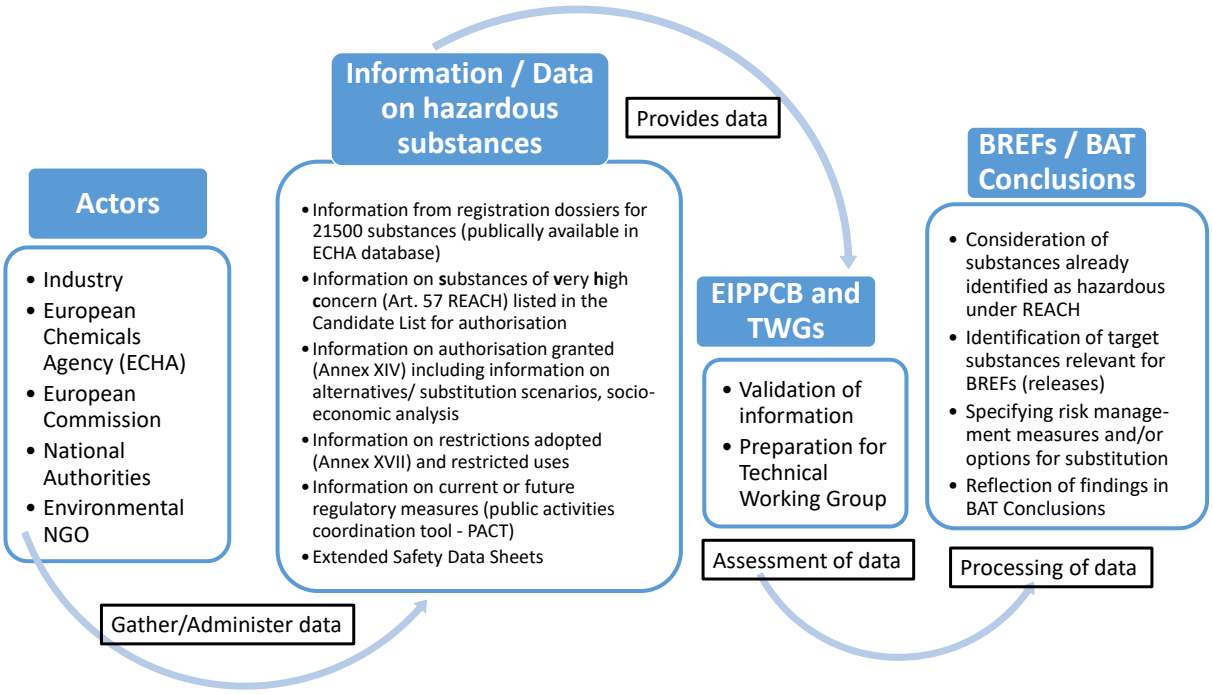

Figure 7. Data sources on target substances for BREF reviews.

The figure shows both the main data sources that contain information on hazardous substances and, for the purpose of BREF reviews and for the selection of substances considered as relevant for BREFS, the need that these data are validated, assessed and processed in the TWGs and by the EIPPCB during the information exchange on BAT. Substance data stored in the ECHA database are not available in a ready-for-use format for selection, validation, assessment and processing in the TWGs.

In the following, proposals for better interaction between REACH and IED are presented. They are written in a spirit that strives for making better use of available data (and complement data in case of obvious gaps) and not for increasing the burden for operators or competent authorities. Some of the proposals are still rather general. Concrete examples, more practical proposals and lessons learnt will be reported in activity 3.2 of HAZBREF: "*Development of a method to include information of hazardous substances into BREFs*" that will include findings obtained in other work packages of the HAZBREF project.

3.4.2 Identified synergies and positive interaction between REACH and BREF reviews

a) Identification of target substances relevant for BREF reviews

The potentially large number of chemicals used in industrial processes, their varying intrinsic properties, the different abatement efficiencies for preventing and reducing releases, and the overall concern they may cause suggest seeking certain target substances of particular relevance. *Target substances* in HAZBREF project *are chemicals, which may pose a danger due to their properties, and which occur in industrial activities* covered by Annex I of the IED.

It is important to keep in mind, that BAT apply only for chemicals used and produced at industrial installations. The whole field of consumer use and protection, releases during the post-industrial life-cycle, as well as waste issues outside the more limited scope of the permitted installation are so far not considered under the IED. This drastically reduces the relevance of many substances for consideration in BREFs, even if they show a widespread occurrence in the environment that results from professional and consumer use. Nevertheless, substances released during consumer use and end-of-life treatment have once been applied at industrial sites during the manufacturing of

products, e.g. in the case of textile products during the manufacture of textiles, and therefore cannot be ignored.

Data from the REACH registrations stored in the *ECHA database*[66] could facilitate the identification of relevant target substances for BREF reviews. However, the ECHA database currently does not directly deliver lists of substances that are really used in a given industrial sector covered by the scope of BREFs. Registrants may have registered certain uses of substances to be "on the save side" but have in the meantime replaced them or an expected use failed to materialise. The difficulty here is that information on uses is available only on a generic sector level, which is much broader than the scope of the BREFs. Therefore, further assessment and filtering of data from ECHA's public database is needed before relevant substances can be identified for BREF review purposes. HAZBREF recommends that such screening is performed during the preparatory front-loading phase of BREF reviews. Target substances for BREFs and BAT conclusions should be based on real production processes in industrial installations. REACH and other prioritisation schemes could then provide complementary information on the target substance properties in order to substantiate hazards. Such a reality check will be applied in this project when case installations in 4 sectors are analysed in Work Package 4 of HAZBREF.

Industry developed so-called *Specific Environment Release Categories (SPERCs)* to improve the exposure assessment under REACH, i.e. making them more real. SPERCs are described in factsheets, which give information on the factors that influence the proportion of a substance emitted into the environment during its application in processes. These factors are, e.g. operational conditions like the amount, duration or concentration of the substance that is used, the substance properties (e.g. volatility, solubility) or efficacy of risk mitigation measures such as on-site wastewater treatment. As these operational conditions and risk mitigation measures are sector-specific, SPERCs are derived for several industrial sectors. SPERC factsheets can be found on the industrial sector association websites[67]. Also, ECHA provides information on SPERCs. The European Chemical Industry Council CEFIC developed a standard factsheet document and guidance on the use of SPERCs in the environmental safety assessment for a substance. Information in SPERC factsheets may be a valuable source in the BREF process as they describe release conditions of certain potentially hazardous substances for available industrial application.

Another source of information for identifying target substance for BREF reviews is *the public activities coordination tool (PACT)* which is part of the ECHA website[68]. PACT provides an overview of the substance-specific activities by authorities under REACH and CLP in one single user-friendly table and thus makes authorities' work transparent. The information in the tool is updated every 48 hours and allows gathering updated information on presumably hazardous substances (substances of potential concern). If a substance appears in the PACT table, this means that a Member State or ECHA is examining the substance; it does not mean that the substance has in fact the suspected properties or that further regulatory risk management actions will be imposed. The early information on the PACT allows stakeholders to better predict which substances may be addressed by which formal risk management routes in the future. So, PACT facilitates seeing what's going on with a substance under REACH and CLP, delivers a quick summary of activities across several processes and provides easy access to process-specific data and documents.

[66] The data needed for this purpose is partly available on the ECHA website: https://echa.europa.eu/information-on-chemicals/registered-substances.

[67] If made available by industrial sectors, they are also collected in the ECHA website at: https://echa.europa.eu/csr-es-roadmap/use-maps/use-maps-library.

[68] See: https://echa.europa.eu/pact.

During the initial phase of Work Package 2 of HAZBREF, it became evident that the identification of BREF target substances has to start with a selection of registered substances in Europe[69] by focussing on their use in specific industrial sectors (i.e. textile industry, surface coating, polymers and fertiliser additives) while *considering also their intrinsic properties.* Such hazard and environmental fate information is available in the ECHA CHEM database but requires rather sophisticated search strategies and presupposes a considerable level of specific sector-knowledge.

For example, during the assessment of textile chemicals (since the textile sector is one of the case sectors of HAZBREF) the issue of unwanted impurities (e.g. less than 1% weight) arose, mainly those with human and environmental toxicological concern such as nonylphenolethoxylates. Some companies of the textile sector have already reacted by setting up a "Zero Discharge of Hazardous Chemicals Programme" (ZDHC) and by creating a conformity label that confirms that a defined list of restricted substances is not used in their processes. Nevertheless, although substances like nonylphenolethoxylates are not only on the ZDHC Manufacturing Restricted Substances List (MRSL) but also restricted under REACH with regard to consumer's exposure, they may still be used under certain industrial conditions[70]. In that case, industry has indeed to take care that these substances are not emitted from their sites – a matter of BAT.

It is one of the aims of HAZBREF to characterise substances with regard to properties, which determine their fate in wastewater treatment, i.e. water solubility, biodegradability, adsorptivity/mobility, and volatility. *Information regarding fate and behaviour of substances in WWT/STP can be obtained according to established and commonly used methods* as outlined in the Reach Guidance on information requirements and Chemical Safety Assessment, Chapter R.16: Environmental exposure assessment. The fate of substances in WWTP/STP can be assessed in the SimpleTreat 4.0 model.

In addition, substances with an eco-toxicological or human toxicological concern should be flagged during BREF reviews for additional risk reduction measures based on BAT. These properties determine the relevance of substances for BAT conclusions. However, in order to avoid an overload of operators with substance information on particular hazardous substances, HAZBREF has considered that within sectors for BREF reviews often generally acknowledged sector-specific substance lists shall be made available[71]. Therefore, *a first selection of target substances considers use categories or technical functions of chemicals or better lists of chemicals from real case studies* (i.e. a reality check).

While abatement techniques for release of substances to water focus on the wastewater treatment, it should be kept in mind that risk management is not limited to the end-of-the-pipe techniques, e.g. industrial WWTP. It may include process-integrated measures such as the reduction of amounts of chemicals used in certain process steps, optimised application of substances thus preventing losses, or cleaning of reaction containers and pipes to reduce chemical losses. Substitution of particularly critical substances is another measure at the source of pollution. All these risk reduction measures may be part of BAT conclusions, but they can only partly be developed within HAZBREF.

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[69] ECHA has created a mapping tool of all registered substances called the **chemical universe** in which each substance is assigned to a pool indicative of the regulatory actions already initiated or under consideration for that substance (News 4.12.2019: https://echa.europa.eu/fi/-/mapping-the-chemical-universe-list-of-substances-by-regulatory-action-published). It also identifies those substances for which the need for suitable regulatory actions still needs to be determined. https://echa.europa.eu/fi/universe-of-registered-substances.

[70] Nonylphenolethoxylate is not allowed to use in “textiles and leather processing” except for “processing with no release into waste water”, i.e. systems with special treatment where the process water is pre-treated to remove the organic fraction completely prior to biological waste water treatment (degreasing of sheepskin (https://echa.europa.eu/documents/10162/b91a8a69-f38e-4a35-ab7d-e475e5926988). The restriction for consumer use is not in applied until February 2021 (https://echa.europa.eu/documents/10162/7dcd73a4-e80d-47c5-ba0a-a5f4361bf4b1).

[71] Sector experts, chemical and machinery suppliers, a few experienced operators may dispose of listings of most relevant chemicals/chemical auxiliaries used in a given sector that also include data on their technical functions. Data on hazardous substances might be included in these lists, too. However, it remains a challenge to keep these listings up-to-date.

Nevertheless, risk reduction measures are based on the identification of concerns which result from substance properties, and this may be expressed in *'standard phrases of concern'* (e.g. a substance is not easily degradable) or *'phrases for standard abatement measures'* for the guidance of operators of installation.

b) Consideration of substances already identified as hazardous under REACH in BREF reviews

The term "hazardous" generally refers to eco-toxicological or human toxicological properties of a substance – something like "poisonous". Many listings, such as the WFD list of priority substances refer to these toxicological properties.

Under REACH, substances of very high concern (SVHC)[72] are described in Article 57 as substances with CMR-properties (Category 1A and 1B), PBT or vPvB substances[73], or substances with an equivalent level of concern, such as endocrine disrupting chemicals.[74] CMR clearly refers to *toxic properties* and is, in many cases, independent from doses. That means that exposure at a very low level may already cause an effect. On the other hand, persistence and bioaccumulation are substance-properties which relate to the *fate and behaviour of a substance in the environment* or inside of biota. Hazardous with regard to PBT and vPvB substances refers to "unwanted to occur in the environment". SVHCs are regulated under REACH with the intention to phase-out their use and to reduce exposure. Therefore, they need to be considered for emission minimisation or substitution under BREFs. On the other hand, there should be a flow of information from the REACH list of SVHC candidate substances to the BREFs[75] and to operators to make sure that appropriate measures are implemented and can easily be supervised by permit authorities.

The HAZBREF project initially refers to hazardous substances as those which are "released from industries through discharges to waters, emissions to air and wastes and which have a harmful effect on the Baltic Sea environment". This interpretation or approach covers harmful effects to the environment, as well as to humans via the environment and will be assessed against the provisions of the IED and the practice of drawing up BREFs. The BAT-based approach obviously addresses substances classified as acute toxic, CMR or classified as environmentally hazardous, but according to the REACH SVHC definition, the release of PBT and vPvB substances from installations should be avoided, too (cf. also Annex II IED: list of polluting substances to water # 5).

Data on identified hazard properties of a substance from CLP, from the REACH registration process, but also from the different evaluation processes or regulatory measures like the authorisation or restriction process under REACH could facilitate the identification of "hazardous" substances in a specific industrial sector. Namely, the use and potential release of substances classified und der CLP, placed on the candidate list (Art. 59 REACH), in the Annex XIV list of substances subject to authorisation and the Annex XVII restrictions on the manufacture, placing on the market and use of certain dangerous substances, mixtures and articles. BREF reviews should consider these substances already identified as hazardous under CLP or REACH and determine their relevance for a given industrial sector. If an assessment reveals that they are still in use in a given industrial sector, BAT conclusions should address them and present appropriate BATs to prevent and minimise emissions[76].

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[72] Please note that SVHC-listed substances are only a small fraction of the 'hazardous substances' (according to current ECHA data, less than 10%) as defined above, and that 'hazardous' and 'SVHC' should not be regarded as synonymous.

[73] **C**arcinogenicty, **M**utagenicity, **R**eproductive Toxicity; **P**ersistent, **Bi**oaccumulative and **T**oxic, **v**ery **P**ersistent and **v**ery **Bi**oaccumulative.

[74] It should be kept in mind that, according to REACH, there are many more substances that may be considered as hazardous in addition to SVHCs. Not at least, the criteria outlined in the CLP-regulation should be applied in an appropriate way.

[75] To meet this challenge, it is necessary to address the disconnect between the very different update cycles of the candidate list and BREFs. HAZBREF is going to propose in its report on activity 3.2 (Development of method to include systematically information of hazardous substances into BREFs) to set up and maintain a web-based platform within the existing EIPPCB-Website.

[76] In order to move toward this objective, it is necessary to address the disconnect between the very different update cycles mentioned in footnote 52. BREFs and BAT conclusions need to develop a more dynamic mechanism in that regard.

c) Identifying risk management measures for an appropriate use of a hazardous substance

The (extended) safety data sheets (eSDS) elaborated as part of the registration procedure under REACH can be used as a first step for identifying techniques to be considered in the determination of BAT. These techniques should address risk management measures and use conditions to achieve an adequate control and safe use of hazardous substances. SDSs provide risk data on the safe use and handling of a hazardous substance, as well as exposure control instruments (Annex II, Section 7 Handling and storage, Section 8 Exposure control/personal protection of REACH[77]). This information could support the development of BAT conclusions in order to better manage the safe use of the respective hazardous substance in an industrial installation and to support implementation.

d) Development of substitution scenarios for relevant target substances

REACH data could support the development of substitution scenarios for hazardous or other relevant target substances. For that purpose, substances placed on the candidate list (Art. 59 REACH), and Authorisation list (Annex XIV REACH)–substances, which should be replaced as soon as technically, and economically feasible alternatives are available–could provide useful information on the substitutability of hazardous substances. Later in the process, the assessment of alternatives section of the application for an authorisation (AoA) could provide information on potential alternative substances or technologies. Finally, the information on alternatives from the authorisation and restriction process could generate information on potential alternative substances.

3.4.3 Other proposals

Besides the above-mentioned proposals for better consideration of hazardous substances in BREF reviews, there are a few others of a more practical nature:

- In most cases, the typical data collection during the BREF review via questionnaires is not successful for gathering systematically data on target substances actually used. It is important to prepare the data gathering on the use and fate of target substances thoroughly since the number of chemicals is potentially too large to cover them all by the classical data collection exercise carried out as part of the Seville Process (via questionnaires). Clear indications where to look at is a prerequisite to gather data on BREF target substances systematically (see information sources, in particular SPERCs). Experience also suggests that questionnaires alone – a valid tool for gathering data for classical (mass) pollutants and well-known regulated substances – are not the appropriate tool for identifying hazardous substances and associated measures to prevent and reduce their release to environment. Experts with both sector-knowledge and knowledge on chemical properties and hazards need to be brought together in dedicated subgroups.
- So far, sector BAT conclusions do not contain a list of substances that are restricted, authorised or of very high concern in case that they are used in the given industrial sector. However, from today´s perspective the identification of SVHCs used in a given sector is still technically very complicated and challenging and needs development work. For each future BREF review, as a routine, it should be assessed if restricted, authorised or SVHC are used in a sector for which a BREF review is carried out. Also, substances classified as hazardous acc. to CLP are of interest for BREF reviews. The results of this assessment should be part of the BAT conclusions. If restricted substances or substances from the candidate list (SVHC) are identified to be (still) used in a given industrial sector (BREF), specific considerations about

[77] According to REACH, for substances over 10 ton per year and classified as dangerous, extended Safety Data Sheets (eSDS) are required. These eSDS include an Exposure Scenario (ES) (part of registration dossier) that is annexed to the safety data sheet (SDS). This makes REACH eSDS more comprehensive than traditional (M) SDS.

substitution and safe handling should be part of the BAT conclusions. This should also concern other substances that are meeting the properties of being hazardous as per the CLP classification criteria. For that purpose, the establishment of a subgroup of sector experts, chemical and machinery suppliers, a few experienced operators might be an option in order to discuss new trends concerning alternative solutions for SVHCs and advise the TWG about new opportunities under development or on the market.

- As a routine, the unit of the DG ENV in charge of the IED (C4 Industrial Emissions and Safety) together with the EIPPCB should be informed of the conclusions on restricted/authorised substances drawn by ECHA so that these substances are taken into account as Key Environmental issue (KEI) in the BREF review process. It remains a challenge to identify the industrial sectors where the substances are really used. It remains to be seen whether ECHAs data experts see a solution for this difficulty.
- The list of polluting substances (Annex II IED) to be considered when setting emission limit values for polluting substances (Art. 14 par. 1 lit. a) IED) contains a broad catalogue of pollutants the presence or absence of which are partially unknown by the BAT community. At this point, the elaboration process for BREFs could benefit from the knowledge on hazardous substances generated by the REACH-community. REACH stakeholders, especially ECHA, should be involved from the beginning of a BREF review, namely during the frontloading phase where preparatory work to identify key environmental issues takes place. Since the review of the textile BREF that began in 2017, a first collaboration between ECHA experts and EIPPCB has started. A formalisation of this collaboration could be beneficial since it may deliver the required continuity and mutual understanding of a rather complex issue. However, the problem how to identify the hazardous substances used in a given industrial sector could not yet been resolved.
- A close collaboration of the national authorities responsible for the enforcement of REACH (Title XIV, Art. 125) with authorities responsible for the IED enforcement (authorities in charge of permitting and supervision of industrial installations) might create positive synergies in the pursue of a shared objective, namely reducing the release of relevant target substances into the environment.
- Some general considerations about chemical management could be added as so-called "standard text"[78] to the BAT conclusion. Elements that describe a general best available technique for chemicals management may include:
  - an IT-based inventory of used substances that includes besides the list of substances itself information on their environmental properties (biodegradability, adsorption capacity, toxicity, mobility), their function and also risk management measures;
  - a system to check the different obligations for operators from applicable legislative frameworks dealing with the use of chemicals and their possible release to the environment.

[78] In the context of the Best Available Techniques Reference Documents (BREFs) "standard text" that contain pieces of texts used in various parts of the BREFs and BAT conclusions. Further information see: https://eippcb.jrc.ec.europa.eu/sites/default/files/inline-files/Standard_text_%28AFTER_FORUM_13%29.pdf.

3.4.4 How could REACH benefit from BAT conclusions?

While on the one hand, the information provided under REACH can be utilised in BREF reviews, on the other hand, REACH could also benefit from data gathered during BREF reviews and documented in BREFs (in particular the chapters "techniques to consider in the determination of BAT" or BREF annexes dedicated to the use of chemical substances in a sector) or BAT conclusions as far as the safe use and handling of hazardous substances is concerned.

The first level where BAT-based data gathered during BREF reviews could be useful is the elaboration/update of Safety Data Sheets and Chemical Safety Reports for hazardous substances. REACH obliges manufacturers, importers and downstream users of hazardous substances to elaborate SDSs. To fulfil these obligation manufacturers, importers and downstream-user may consider current BAT conclusions when elaborating new SDSs/CSRs and examine whether their existing data formats contain realistic assumptions.

In addition, BREFs should be considered when elaborating or reviewing SpERCs used under REACH. At least in a few cases, REACH processes such as restriction and authorisation processes, could benefit from a closer collaboration with the BREF review expert community (EIPPCB, TWGs). In some cases, information on BAT in BREFs/BAT conclusions may be useful during the authorisation process.

In a few cases, REACH stakeholders (e.g. manufacturers and importers of chemicals as responsible registrants, down-stream-users to ensure safe use) may also find support to comply with provisions of REACH by drawing upon future BAT conclusions. These BAT conclusions may include more systematic and complete BATs on the selection, application and reduction of emissions of hazardous and other relevant substances.

Finally, in principle so-called intermediates under strictly controlled conditions (SCC) that benefit from a reduced registration could be a field of co-operation between REACH and the IED. BAT could be developed to concretise such strictly controlled conditions for an industrial sector where a lot of substances are registered as intermediates under SCC[79]. However, this additional task would probably overload the Seville process. Furthermore, to meet this challenge it would be necessary to address the disconnect between the very different update cycles of the registered intermediates under strictly controlled conditions (SCC) and BREF reviews.

4 Provisions of EU key legislation regarding hazardous substances: Water Framework Directive and Marine Strategy Framework Directive

The purpose of this chapter is to examine the interaction between the knowledge on hazardous substances generated in the context of the WFD and BREF reviews under the IED seeking a more complete consideration of potentially hazardous substances in BREFs and BAT conclusions. This analysis intends to achieve mutual benefits, which may arise from a more efficient cooperation and a better information exchange between the WFD-community and the authorities and stakeholders responsible for the elaboration of BREFs and the implementation of BAT conclusions. This should ensure finally BREFs including more information on relevant hazardous WFD-related chemicals and a strengthened implementation of BAT conclusions regarding the prevention or reduction of emissions of priority substances to water bodies.

[79] Cf. https://echa.europa.eu/documents/10162/22816103/sccs_discussion_5_3_en.pdf/eb8fd877-0cad-4cbb-ab2b-374f1da31031.

4.1 Functioning of WFD/MSFD with respect to the reduction of emissions of hazardous chemicals

4.1.1 Objectives, good status for surface and groundwater and priority substances

(1) *Water Framework Directive (WFD)* (2000/60/EC)

The Water Framework Directive (WFD) was adopted to establish a new comprehensive regime for the protection of inland surface waters, transitional waters, coastal waters and groundwater. The WFD specifies the following objectives in relation to chemical pollutants:

- To prevent deterioration of surface and groundwater quality, and to achieve good status for surface water and groundwater by 2015 (with the possibility of applying exemptions then and in 2021, and a final deadline of 2027) through protection, enhancement and restoration of all surface water and groundwater bodies (Art. 4 par. 1 WFD). With regard to surface water, the good chemical and ecological status has to be achieved, with regard to groundwater the good chemical and quantitative status.
- To progressively reduce pollution from priority substances and cease or phase out emissions, discharges and losses of priority hazardous substances to surface waters within 20 years of the adoption of controls (Art. 4 par. 1 WFD).
- To reverse any significant and upward trend in the concentration of any pollutant resulting from the impact of human activity (Art. 4 par. 1 WFD).

The WFD thus requires achieving a good chemical status for surface water and for groundwater. However, the specific requirements concerning the good chemical status that have to be complied with are distinct for surface water and for groundwater. Moreover, the good ecological status of surface water bodies includes requirements for so-called River Basin-Specific Pollutants (RBSP). The characteristics of these are that they are not relevant throughout Europe but only in respective River Basins. In the following, these requirements are exemplified.

Good chemical status is achieved for a surface water body when all environmental quality standards for the priority substances and other pollutants listed in Directive 2013/39/EU[80], the so-called 'Daughter' Directive of the WFD, are complied with. This piece of legislation defines a European priority list of substances posing a threat to or via the aquatic environment with respective environmental quality standards (EQS). EQS in the WFD define the concentration of a substance in water, sediment or biota, which is regarded as safe for the environment and human health and which must therefore not be exceeded.

In 2018, Directive 2013/39 /EU listed 45 substances (or substance groups) to WFD Annex X (Annex of EU priority substances).

The European Commission reviews the list of priority substances every 6 years according to Art. 1 2013/39/EU. In practice, the list has been reviewed twice: in 2008 (2008/105/EC) and in 2013 (Directive 2013/39/EU) since the setting of the priority substance list for first time in 2001[81]. Art. 16 par. 2 WFD introduces a scientifically based methodology for selecting priority substances based on their significant risk to or via the aquatic environment. The methodology enables, as a most practical option, the application of a simplified risk-based assessment procedure based on scientific principles taking particular account of:

[80] Directive 2013/39/EU of the European Parliament and of the Council of 12 August 2013 amending Directives 2000/60/EC and 2008/105/EC as regards priority substances in the field of water policy, OJ L 226/1.

[81] Decision No 2455/2001/EC of the European Parliament and of the Council of 20 November 2001 establishing the list of priority substances in the field of water policy and amending Directive 2000/60/EC (Text with EEA relevance), OJ L 331/1.

- evidence regarding the intrinsic hazard of the substance concerned, and, in particular, its aquatic ecotoxicity and human toxicity via aquatic exposure routes,
- evidence from monitoring of widespread environmental contamination, and
- other proven factors which may indicate the possibility of widespread environmental contamination, such as production, use volume and use pattern of the substance concerned.

The final decision to amend the list has to be taken by the approval of a so-called daughter directive based on the common legislative procedures. Thus, the European Commission only submits a proposal in this regard.

With regard to these priority substances, Member States have to ensure that the environmental quality standards are not exceeded in all surface water bodies throughout Europe.

In addition: 21 substances (or substance groups) of the 45 priority substances have been nominated as priority hazardous substances[82]. Their discharges, emissions and losses should be phased out according to Article 16 WFD. This very strict regulation is due to the characteristics of these substances being toxic, persistent and bio-accumulative.

The substances have then been selected by the Common Implementation Strategy (CIS) Working Group Chemicals (WG CHEM) based on monitoring-supported exceeding of EQS and modelled data. There is evidence that these substances may pose a significant risk to the aquatic environment or human health. The selection of the substances is followed by a publicly open and transparent discussion with interested parties. To support the monitoring-based process, a watch list has been drawn up which is published every two years and contains around 10 substances suspected of exceeding EQS across Europe. The substances on the watch list are measured by all Member States and, if the proposed EQS is actually exceeded, may become candidates for the priority substances list (Art 8b Directive 2013/39/EC). Thus, concerning certain substances being listed on the watch list there is no direct obligation with regard to specific water management measures.

Besides the set of priority substances laid down in 2013/39/EU, which are regulated and monitored at EU level, the EU Member States need to identify pollutants of regional or local importance and provide environmental quality standards (EQS), monitoring schemes and regulatory measures for them. This means that Member States need to identify River Basin-Specific Pollutants (RBSP) and define specific EQS for them. RBSP are regulated under the biological status of water bodies in national legislation. This requires assessments of impacts as well as prioritisation efforts and strategic screening for substances possibly causing concern. While this is a matter of discretion for each of the Member States of concern, so far no harmonisation of the procedures exists. The number of RBSPs differs between Member States from a small two-digit number to a small three-digit number of substances, which in total amounts to around 300 pollutants throughout Europe. The legal consequences with regard to RBSP are that the respective EQS must be abided by in order to achieve the good ecological status.

For groundwater, the good chemical status is achieved if the threshold values of the Groundwater Directive (2006/1187EC as amended by Directive 2014/80/EU) are complied with. The Groundwater Directive determines such threshold values for nitrate and all pesticides and requires the Member States to determine such threshold values for a list of substances included in Annex II b. The direct introduction of hazardous substances into groundwater is prohibited.

[82] The Directive itself does not define criteria what priority hazardous substances actually are. Since the substances have been transferred from the 76/464/EG and the POP Regulation, criteria as given in the following text seem consistent.

(2) *Marine Strategy Framework Directive (MSFD)* (2008/56/EC)

The Marine Strategy Framework Directive (MSFD) establishes a framework for Community action in the field of marine environmental policy. The MSFD complements the Water Framework Directive, extending environmental protection into EU marine waters beyond the coastal waters.
The overall objective of the MSFD is to achieve or maintain good environmental status of the EU's marine waters by 2020. It aims at protecting human and animal health as it relates to pollution causing significant impacts on or risks to marine biodiversity.

The MSFD covers marine waters, including coastal waters, but only in so far as particular aspects of the environmental status of the marine environment are not already addressed through the Water Framework Directive or other EU legislation (Art. 3 Nr. 1 (b) MSFD). Thus, WFD and MSFD are complementary.

4.1.2 Main instruments and data sources of the WFD/MSFD against hazardous chemicals

(1) Water Framework Directive

The WFD applies a holistic planning approach based on management-cycles of 6 years. First, the status of all water bodies should be monitored and assessed in order to determine whether the good status is already achieved (Art. 8 WFD). Based on this assessment the Member States should adopt River Basin Management Plans (RBMP, Art. 13 2000/60/EC) that include an assessment of pressures from human activities like emissions and discharges of hazardous substances (i.e. emission inventory) (Art. 5 WFD, Art. 5 2008/105/EC) and elaborate Programmes of Measures (PoM) (Art. 11 WFD).

The WFD targets the entire drainage basin of a river to assure good water quality throughout, irrespective of administrative boundaries. Thus, WFD emphasizes the river catchment point of view, and not administrative boundaries set up by humans. For cross-border river basin districts laying within the Community, Member States are required to ensure coordination with the aim to elaborate a single international river basin management plan, if possible.

Competent authorities must review RBMP on a regular cycle of 6 years (Art. 13 par. 7 WFD, Art. 8 Directive 2013/39/EU). The first RBMPs were published in December 2009, setting out actions until 2015. The second RBMPs were published in December 2015, setting out actions until 2021.

Other potential information sources may contain information related to hazardous substances and priority substances respectively that may be useful for BREF reviews. First analysis indicate, however, that it is too difficult and time-consuming to extract relevant data from these sources and assess, prepare and process them for the focused use in BREF reviews. Considering the limitations in staff and resources in both the WFD and the IED community, preliminary analysis suggests that these sources are not useable for BREF reviews. However, for the sake of completeness, three potential sources of data are listed in the following:

- As part of the RBMPs pressures from human activities like emissions and discharges of hazardous substances are analysed in so-called emission inventories (Art. 5 2000/60/EC, Art. 5 2008/105/EC). In theory, the results of these emission inventories may be useful for identifying relevant target substances for BREF reviews. In practice, it does not seem feasible to use them for this purpose.
- According to Article 18 of the WFD, the Commission publishes assessment reports on the implementation of the Directive. For that, Member States submit information to the Commission by using electronic reporting formats that are fed into the Water Information System for Europe (WISE). Also, emission and recipient (aquatic environment) monitoring information is reported to WISE. The availability (or if it is extractable from there) and its usability for the use in the BREF review

process is not known. We estimate that it will not be practicable to use WISE to identify Key Environmental Issues for BREF reviews[83].

- Each RBMP has to contain Programmes of measures (PoMs) to achieve good water quality at river basin scale. The measures are divided into basic (Art. 11 par. 3, Annex VI Part A WFD) and supplementary measures (Art. 11 par. 4, Annex VI Part B WFD). Possibly, among the supplementary measures there are also data on certain sources of pollution or additional measures for discharges of pollutants. In theory, sharing these findings during the information exchange on BAT could also be beneficial. In practice, it does not seem realistic and feasible that TWG members or the Commission make them useable for BREF reviews.

(2) Marine Strategy Framework Directive

Each Member State (cooperating with other Member States and non-EU countries within a marine region) is required to develop strategies specific to each marine region or marine sub-region (Art. 5 par. 2 MSFD). Those strategies should contain:

- detailed assessment of the state of the environment (Art. 8 MSFD),
- definition of good environmental status at the regional level (Art. 9 MSFD),
- clear environmental targets and monitoring programmes (Art. 11 MSFD) and
- programme of measures designed to achieve or maintain good environmental status (Art. 13 MSDF).

The good environmental status at the regional level (Baltic Sea, Mediterranean Sea, etc.) is based on centrally agreed criteria and methodological standards. The Commission decision (EU) 2017/848[84] sets out the criteria and methodological standards on good environmental status in relation to the 11 qualitative descriptors of good environmental status laid down in MSFD, Annex I. Two of the 11 descriptors are related to contaminants, i.e. hazardous substances, which present a risk to or via the marine environment:

- Descriptor 8: concentrations of contaminants are at levels not giving rise to pollution effects;
- Descriptor 9: contaminants in fish and other seafood for human consumption do not exceed levels established by Community legislation or other relevant standards.

The qualitative description of the MSFD for determining good environmental status in relation to hazardous substances is that concentrations of contaminants are at levels not giving rise to pollution effects. Commission Decision (EU) 2017/848 sets out the criteria and methodological standards which Member States, in cooperation at EU and/or (sub)regional level, should use for determining and assessing, in a quantitative way, good environmental status in relation to contaminants. The criteria include concentrations of contaminants in the relevant matrix (biota, sediment, water), effects of contaminants on the health of species and conditions of habitats (termed biological effects of contaminants) including cumulative and synergetic effects, the spatial extent and duration of significant acute pollution events and their adverse effects on the health of species and the condition of habitats.

The contaminants as such are not explicitly defined by the MSFD. However, the Commission Decision (EU) 2017/848 refers, for determining good environmental status, to the priority substances

[83] A Swedish expert expressed an opposing view stating that it should be possible to extract useful information from WISE, at least with respect to information regarding water status depending on presence of hazardous substances.

[84] Commission Decision (EU) 2017/848 of 17 May 2017 laying down criteria and methodological standards on good environmental status of marine waters and specifications and standardized methods for monitoring and assessment, and repealing Decision 2010/477/EU, OJ 125/43.

and RBSP under the WFD and to additional contaminants such as from offshore sources. For them, Member States shall establish a list and determine threshold values through cooperation at regional level, i.e. HELCOM for the Baltic Sea[85]. The Commission Decision defines, in principle, contaminants as per the definition set by the WFD but allows equating "groups of substances" to a contaminant. Such groups are to be defined at EU level through the MSFD Common Implementation Strategy (CIS) process (under development with support from JRC). There are several other interfaces between the WFD and the MSFD.

Descriptor 8 considers mainly substances or groups of substances in coastal or territorial waters adjacent to the marine region or sub-region, which are listed as priority substances in Annex X to the WFD. This means that e.g. EQS from the WFD should be considered in above-mentioned waters.

In addition, the MSFD requires Member States to set specific and measurable environmental targets inter alia for the reduction of pressures and to do so, where possible and relevant in coordination at regional level (e.g. for transboundary or regional problems). For contaminants, targets may relate, e.g. to the reduction of emissions, waste water discharges and related inputs of contaminants into marine waters from land- and sea-based sources via rivers, transboundary flow or the atmosphere. Environmental targets are the basis for deducing measures required to achieve good environmental status. For contaminants, so far, no reduction targets have been agreed at HELCOM level.

In conclusion, the links of MSFD with IED and BAT are mainly the environmental targets and associated MSDF measures to reduce emissions and discharges of contaminants to achieve the good environmental status as well as threshold values for determining and achieving good environmental status. In the scope of BREFs (land-based installations), these contaminants are sufficiently covered by referring to the priority substances and RBSP under the WFD. No special consideration of the MSFD viewpoint is therefore necessary.

4.2 Communication and data flow between key stakeholders in the WFD context

4.2.1 Key players, their role and communication with the IED community

The relevant working group dealing with WFD priority substances under the WFD Common Implementation Strategy (CIS) is the Working Group Chemicals (WG CHEM) and its Sub group on Review of Priority Substance List (SG-R). The WG CHEM is one of the five Working Groups within CIS and currently led by Commission (DG ENV; Directorate C – Quality of Life; ENV.C.1 – Clean Water). The Joint Research Centre (JRC) in Ispra, Italy, is supporting DG ENV by leading the SG-R and doing the technical part in the prioritisation of chemicals. Additionally, a few Member States have participated to the SG-R subgroup.

The implementation of the WFD raises a number of shared technical challenges for the Member States, the Commission, the candidate and EEA Countries, stakeholders and NGOs. In addition, many of the European river basins are international, crossing administrative and territorial borders and therefore a common understanding and approach is crucial to the successful and effective implementation of the WFD. In order to address the challenges in a cooperative and coordinated way, the Member States, Norway and the Commission have agreed on a Common Implementation Strategy (CIS) for the WFD. The results of this work, for instance are guidance documents on different technical aspects related to WFD implementation. The CIS also supports the Commission in delivering its obligations for further policy development, e.g. on EU priority substances. More information on the overall CIS concept, the activities and the mandates of the Working Groups under the CIS is given in the Work Programmes agreed by the EU Water Directors.[86]

[85] For the example of the Baltic Sea, see the annex on HELCOM of this report. HELCOM started a detailed review in 2018 of regionally agreed contaminants, threshold values and methodological standards against the requirements of Commission Decision (EU) 2017/848.

[86] See the different Work Programmes from 2003-2018, https://circabc.europa.eu/faces/jsp/extension/wai/navigation/container.jsp.

It is interesting to note that the most recent CIS Work Programme 2019–2021 lists as one of the tasks for the WG CHEM the following issue: "*Exchanging information on other issues relevant to chemicals in surface waters, namely concerning the non-deterioration principle, new analytical methods and new monitoring techniques, links with other legislation on chemicals, such as the Industrial Emissions Directive and Reach (…)*".[87]

Until recently, there has been little direct communications between the unit of DG ENV responsible for WG CHEM and EIPPCB. This is also the case with the persons working with WFD and IED at the national level. According to our knowledge, so far there is no concept for the exchange of information between the respective units of the DGs in charge including possible coordination of certain activities or exchange of relevant data and information. We think that at least occasionally (e.g. during the frontloading exercise, or for discussing certain BAT conclusions relevant for water protection) representatives from the WG CHEM or at least a dedicated representative nominated for that purpose should be formally involved in the BREF review process, and vice versa. Relevant and commonly identified information should be routinely exchanged. A systematic reaching out to the WG CHEM should take place e.g. in the frontloading phase, prior or during the commenting periods of Formal Drafts and prior to the elaboration of the Background Paper for the Final Meeting in regards to the proposed BAT conclusion sections relevant to emissions to water (direct and indirect).

The institutional relationships between IED and WFD authorities may vary between member states. Regardless of how the responsibilities are organised, there is a need for more efficient collaboration between IED and WFD authorities. It is important to facilitate working methods (formal and/or informal) to ensure that the right information is shared between both frameworks and that this information exchange is timely. Coordination and cooperation at both Member State level and Commission level are key factors for success[88].

The WFD and its CIS Guidance Documents should be integrative with other connected Directives such as the IED. However, there are usually only limited references to the IED in this guidance and little examination of what is meant in practice by integrating the obligations of WFD and IED. As an exception is e.g. Technical Guidelines for the Identification of Mixing Zones (pursuant to Art. 4(4) of the Directive 2008/105/EC). It is recommended that new WFD guidance (or update of existing guidance) such as CIS Guidance Documents address the issue of interactions between WFD and IED in more detail, building on the experiences in the Member States.

4.3 Interfaces between WFD, IED-BREFs and BAT conclusions

The WFD and the IED are to a certain extent and for certain aspects complementary legislation. The WFD refers to the IED when it comes to reduce the pollution load from industry in order to reach the WFD objectives for water quality. However, until 2016 the WFD priority substances have not systematically been considered by TWGs and the EIPPCB for the BREF process, despite the explicit reference in IED Annex II. [89]When a substance is named in the older original IPPC-BREF, it is

[87] See Working Programme 2019–2021, Section 3.5 Working Group on Chemicals, page 9.

[88] Results of the IMPEL study "Linking the Water Framework Directive and IPPC Directive, Phase 1 (2010): https://www.impel.eu/wp-content/uploads/2016/09/Report-Linking-the-Water-Framework-and-the-IPPC-Directives.pdf and phase 2 (2011): https://www.impel.eu/wp-content/uploads/2016/09/impel-report-WFD-IPPC-final-report-07-December-2011.pdf can be downloaded from the IMPEL website.

[89] To change this situation, on behalf of the French Ministry of Environment INERIS has carried out a comprehensive monitoring study the result of which are compiled in a study report that connects priority substances with releases from industrial sectors. The title of the English translation of the report is: "*Hazardous substances for the aquatic environment in industrial waste water releases. National Action for Research and the Reduction of Releases of Hazardous Substances into Water Bodies (RSDE) by Classified Facilities – Second Phase"* (June 2016). The original French version of the documents is available on www.ineris.fr . The summary report of the monitoring results and its annexes /results by substance and by sector) can be downloaded in English under:
https://rsde.ineris.fr/doc/docs%20rsde/Rapport_RSDE_ICPE_INERIS-DRC-15-149870-12457C_VF_EN_FINAL_relu_modifacceptees_compilation.pdf ;
https://rsde.ineris.fr/doc/docs%20rsde/Rapport_Substances_UK_Compilation.pdf;
https://rsde.ineris.fr/doc/docs%20rsde/Rapport_Secteurs_UK_compilation.pdf. …

checked though by the EIPPCB if this substance is PS/PHS according to the Priority Substances Directive 2013/39/EC. Other substances such as those that may become prospectively EU priority substances, e.g. from the Watch list of substances for Union-wide monitoring in the field of water policy, or River Basin Specific Pollutants (RBSPs) identified in at least three Member States and released from industrial installations, are normally not proposed as key environmental issue for BREF reviews.

The IED permits for industrial installations are crucially important for the factual level of WFD implementation, as the permits finally are an instrument for WFD implementation concerning emission from point sources. Thus, if permits do not highlight WFD requirements concerning priority substances, the implementation of WFD will be much weaker as there will be less information and measures to reduce emissions.

In Finland and also in several other Member States[90], permitting authorities take usually WFD priority substances (Annex X substances but also *RBSPs*) into account during IED permitting. However, in a number of current BAT conclusions there is no reference whether their use and release are to be expected.

It is recommended that future BAT conclusions should, where relevant, include a section (not necessarily a long one) on the interaction with relevant WFD water issues. This is important for both competent authorities and operators.

Due to the shortage of information concerning the WFD substances in BREFs and BAT conclusions permit writers may not already comprehensively take into account WFD substances relevant for industrial installations concerning their monitoring and possible reduction measures (e.g. substitution with less hazardous chemicals). Proper consideration and clear indication of WFD substances in the permit conditions would also enhance the awareness of supervision authorities for this issue concerning both IED and WFD provisions.

It is clear that if relevant WFD substances are included and specified in BREFs and BAT conclusions, it is much more likely that BAT-based provisions are included in permit conditions. However, this requires after routinely scrutinising especially the use but also the release of specific WFD substances (name and CAS number, industrial sector where the chemical is used, how chemical is used, emissions) that possible reduction measures are systematically considered in the BREF review process. The monitoring of PH and PHS should be part of the monitoring BAT for a given sector, if releases are expected. The frequency of measurements may depend on the sources for these pollutants, the variation of emission over time, stability of the process and raw materials used, and the abatement measures applied.

Based on the findings of the INERIS monitoring study[91] emissions of PS and PHS are assessed since 2016 during the preparatory stage of BREF reviews where the KEIs are identified. However, the list of pollutants remains limited to the regulated substances (PS/PHS). And until today, BAT conclusions do not express explicitly whether and to which extent the presence or absence of these substances have been investigated and available measures proposed as BAT, if emissions are expected in a given sector.

... Not before the INERIS study was published in 2016, monitoring results on PS and PHS has been used in all BREF reviews that have started after this date (TXT, SA, SF and CER BREF). Since then the situation clearly improved. The INERIS-reports are now regularly looked at by the EIPPCB to prepare the call for initial positions when a BREF review is launched. The INERIS study is explicitly mentioned in the Background Papers and/or Call for Initial Positions of all of these BREFs.

[90] During the IMPEL project "Linking the Water Framework Directive and IPPC Directive, Phase 2 (2011)" it was found out: "IPPC regulators were asked if there are mechanisms in place or planned to review permit conditions to take account of the objectives of the water Directives. Some responded that there were not or referred to the statutory permit review period."

[91] See footnote 89.

The already mentioned list of polluting substances (Annex II of the IED) makes an explicit reference to the "*substances listed in Annex X to Directive 2000/60/EC*". These substances were selected from amongst those presenting a significant risk to or via the aquatic environment and published in the Directive on Environmental Quality Standards (Directive 2008/105/EC), which has been replaced by Directive 2013/39/EC) (EQSD), also known as the Priority Substances Directive, which sets environmental quality standards (EQS) for substances in surface waters. These substances have a clear connection to the BAT elaboration process with respect to the reduction of hazardous substances in the environment. A good chemical status is reached for a water body only when it complies with the EQS for all the priority substances and other pollutants listed in Annex I of the EQSD. Good ecological status is only achieved if no RBSP EQS are exceeded. As far as possible emissions from industrial installations are concerned, it seems clear that BREFs and BAT conclusions should systematically take into account the information on occurrence of priority substances and other key findings of the expert groups of the WFD community (e.g. WG CHEM).

The WFD in conjunction with its subsequent "daughter" directives determines Environmental Quality Standards whereas IED-BAT conclusions entail BAT associated emission levels that are used to establish permit conditions and to be transposed into emission limit values (ELVs). EQS values are applied to recipient surface waters, not to wastewater. The EQS determines the concentrations of certain chemical parameters, which must not be exceeded to ensure a good chemical status of both surface water and groundwater bodies. ELVs determine limits at the source that must be exceeded neither.

EQS values may give some guidelines in deriving BAT-AEL during the BREF review process in the sense that very low EQS often correspond to higher concerns of a substance. Emission levels associated with BAT as determined in the BREF process must ensure that firstly the EQS are not exceeded given that only one facility is established adjacent to a specific water body. Secondly, in the BREF process the described techniques to be considered in the determination of BAT shall lead to a minimization of emissions of these substances into water bodies. Such an approach seems to be justified given that often there is more than one industrial facility that discharges into the water body. Emissions of the sum of industrial facilities discharging to a given water body still shall not exceed the EQS.

Consequently, IED permits have to consider the EQS when setting possible ELVs. Competent authorities need to take EQS and the local environmental conditions into account in order to evaluate and calculate what ELVs or other means such as minimizing the use or substitution of specific chemical, should be applied to an installation concerned.

This fits with the so-called combined approach of the WFD (Article 10). This provision requires that first emissions controls on best available techniques or ELV have to be enforced. If nevertheless EQS are exceeded the competent authority has to ensure that the EQS are complied with.

This approach seems to be a reasonable for all substances for which the WFD determines EQS. Besides, WFD requires that discharges, emissions and losses of all priority hazardous substances have to be ceased or phased out within 20 years. With regard to the BREF process this requires that the BAT reference documents describe best available techniques that guarantee that no discharges, emissions or losses occur as of 2020.

Concerning the threshold values for groundwater stipulated by the WFD and its related groundwater directives there is also a link to ELVs as direct introduction from point sources are prohibited. Furthermore, with regard to the BREF process the minimization of the listed substances should be ensured in order to reduce inputs via inter alia the air (e.g. mercury emissions).

The key interlinks between the WFD and the BREF processes are the following:

- Relevant industrial substances in Environmental Quality Standards Directive (EQSD) should be considered for BREF reviews and the determination of BAT (e.g. ELVs in Article 14 lit. 1a) in connection with Annex II, List of polluting substances IED, Water, No. 13). Thus, the EQSD triggers requirements under IED with regard to permit requirements concerning Annex I substances (e.g. emission limit values (Art. 14 lit. 1a WFD) and monitoring of emissions (Art. 14 lit. 1c) WFD).
- IED permitting should not take into account only Annex I substances under EQSD, but also nationally selected RBSPs which exceed the EQS in more than 3 Member States[92] and which are industrial chemicals. The indication and information on RBSPs used by industry (e.g. name, CAS number, use information of chemical) in BREFs and/or BAT conclusions would significantly promote that industrial chemicals belonging to RBSPs are presented in permit conditions. IED permits have to consider the EQS when setting ELVs. Authorities need to take EQS and the local environmental conditions (e.g. RBSP) into account in order to evaluate and calculate what ELVs or other means such as minimizing the use or substitution of specific chemical, should be applied to an installation concerned.
- Watch list substances should be considered in the BREF process if it seems probable that for the respective substance an EQS will be determined in the near future. This seems to be justified since BREFs and BAT conclusions are normally not reviewed earlier than every 10 years.
- Threshold values for substances listed with regard to groundwater protection should be considered in order to minimize introduction via inter alia the air.

BREFs have provided an importance reference and assistance to regulators in addressing water issues, but they do not provide sufficient guidance to help in addressing water objectives derived from EU water law.

4.4 Proposals for a better use of WFD/MSFD data during BREF reviews

The BREFs and BAT conclusions would be more useful and supportive for permit writers and operators if they would take into account as a routine the relevant WFD priority substances used or released in a given industrial sectors. Each BAT conclusions should clearly state if priority substances are used or potentially released in a given industrial sector and what BATs are available to reduce their release.

Figure 8 show WFD/MSFD-related information that could provide important input to the BREF elaboration process in particular during the discussions on Key Environmental Issues (KEIs) and substance specific requirements:

[92] The exceedance of national River Basin-Specific Pollutants in more than 3 Member States is the definition of European relevance according to the WFD.

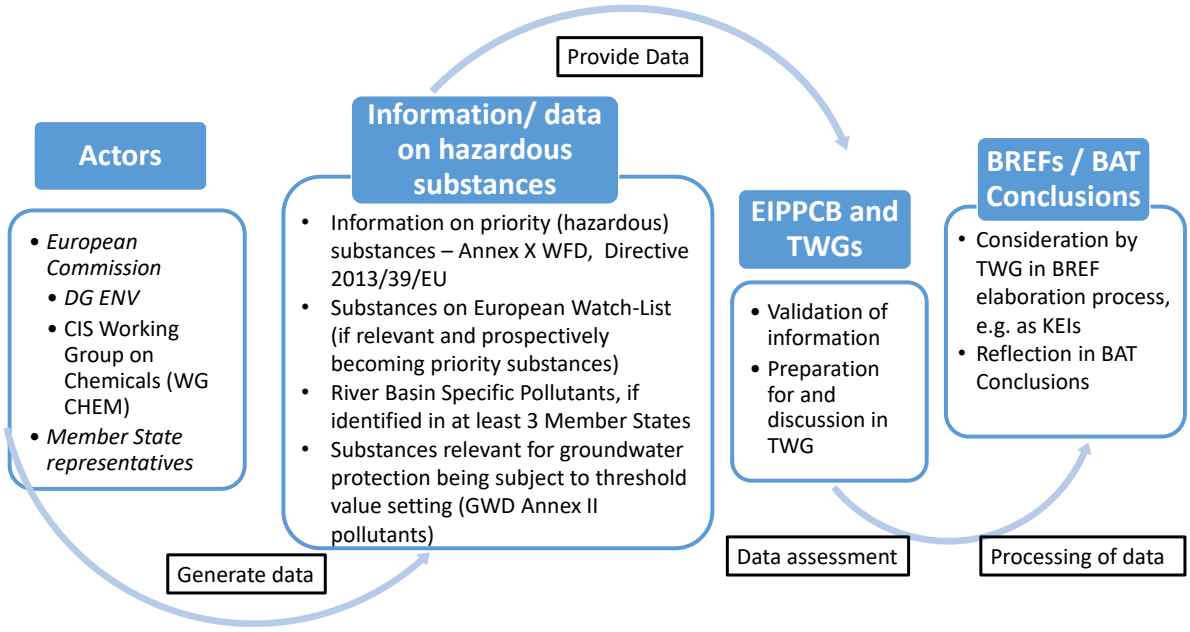

Figure 8. WFD-related data sources that could provide important input to BREF reviews and BAT conclusions.

The relevant key actors under the umbrella of the WFD could provide substantial information on priority hazardous substances and priority substances. Annex X WFD and Annex I of the EQSD determine priority hazardous substances and environmental quality standards for these substances, which have to be complied with in each Member State. The European Watch List may be another source that can provide information on substances of potential concern for the (aquatic) environment. This Watch List should be also on the "radar" of the EIPPCB and the TWGs while reviewing BREFs and drafting new BREFs. Also, River Basin Specific Pollutants and to certain extent substances relevant for groundwater protection being subject to threshold value setting (GWD Annex II pollutants) might be also a useful data source for the BREF elaboration and review process.

In order to avoid an overload of BREF reviews it must be ensured that during the early *frontloading phase of BREF reviews*, studies are carried out for the sector concerned whether the WFD priority substances are potentially used or released to the environment. As a result, this early and routinely investigation on WFD substances potentially used or released may lead to their inclusion as so-called Key Environmental Issues.

To achieve effective implementation of the WFD objectives concerning industrial point sources that are in the scope of the IED (Annex I activities) it seems reasonable to take actions on two levels:

1. Inclusion of the necessary WFD requirements to the BREFs and BAT conclusions concerning the relevant hazardous or priority substances in the sector (these requirements not necessarily must lead to additional BAT-AELs; information on relevant WFD substances for specific industrial sectors are very useful as such);
2. Implementation of the BREF/BATC requirements on WFD substances by permitting authority taking duly into account the status of the receiving water body.

The following groups of substances should be considered in the BREF reviews, if used in a given sector. As a routine procedure, the relevance of these substances in a sector of concern should be assessed during the frontloading phase of BREF reviews:

- Priority hazardous substances (Annex X WFD): BAT requirements for these substances should strive for achieving (almost) zero emission in order to implement the phasing out target; additionally, it should be ensured that the emissions of facility do not cause exceedance of EQS in its recipient water;
- Priority substances (Annex X WFD): BAT requirements for these substances should aim at a minimisation of releases; in addition, it should be ensured that the emissions of one facility for itself does not exceed the EQS;
- BREF reviews should consider those substances that may become prospectively EU priority substances; e.g. Watch list of substances for Union-wide monitoring in the field of water policy; this does not necessarily imply that BATs or BAT-AELs for those substances are derived;
- River Basin Specific Pollutants (RBSPs) identified in certain EU Member States and released from industrial installations, under certain conditions, could also become a key environmental issue for BREF reviews, e.g. if identified as RBSP in at least three Member States. A prerequisite would be to assemble a list of all RBSPs (not yet available).
- Substances relevant for groundwater protection being subject to threshold value setting (GWD Annex II pollutants) should be considered in order to minimize introduction of those substances into water bodies via inter alia airborne pollutants or industrial discharges.

The role of the BREF may aim to inform:

- how the discharge of those substances of high concern can be prevented and provide clarity as to which techniques can deliver the lowest technically achievable emission levels
- agree on a harmonised method to assess “toxicity” for water for direct discharge
- provide guidance as to proper implementation for achieving the relevant environmental quality standards (e.g. whole effluent approach, emerging contaminants, etc).

With regard to the improvement of communication and data flow the direct connection between WFD chemicals group (WG CHEM) and EIPPCB should be strengthened. The relevant national representatives as well as Commission staff in WG CHEM and EIPPCB should work together selectively for better BREFs. In practice, this can be done via improved communication and data/information flow between WG CHEM and EIPPCB but also via more active cross-participation to WG CHEM and EIPPCB meetings. Another option is that national members of the TWGs feed this information to the BREF processes. This requires better cooperation between both the WFD and IED experts on the Commission and national expert level.

5. Provisions of EU key legislation regarding hazardous substances: The Waste Directive and circular economy aspects

This chapter analyses shortly the legal provisions and available data on hazardous waste that can be used during BREF reviews and seeks some first answers whether BREFs and BAT conclusions could contribute further to circular economy. It considers only the aspect of the reduction of use of hazardous chemicals of this much wider context. The chapter is kept short because there is a specific activity within HAZBREF[93] that is dedicated to opportunities to the circular economy topic.

5.1 Main provisions and available data on hazardous waste

The main legislative act in waste management is the Waste Directive (98/2008/EC)[94]. Its main goal is to protect the environment and human health by preventing or reducing the adverse impacts of the generation and management of waste and by reducing overall impacts of resource use and improving the efficiency of such use.

The most relevant provision with regard to diminish the adverse effects of hazardous chemicals in the recovery of waste in industrial installations is the provision defining hazardous waste. The IED (Art. 3 lit. 37 and 38) refers directly to the definitions of "waste" and "hazardous waste" in the Waste Directive. In the EU waste legislation, hazardous substances are mainly controlled by the concept of hazardous waste. According to the Waste Directive, "hazardous waste" means "waste which displays one or more of the hazardous properties listed in Annex III"[95] (Art. 3 (2)).

The criteria for defining hazard characteristics of wastes are mostly based on EU chemicals legislation. However, certain modifications and simplifications were introduced to the applicable concentration limits and other criteria applied to the classification of hazardous chemicals in the CLP Regulation[96]. In addition, for many wastes the classification as hazardous or non-hazardous has been defined in the List of Waste established by Decision 2014/955/EU[97], and only for so-called "mirror-entries" (i.e. wastes for which there are both hazardous and non-hazardous waste entries) the hazardousness of waste is evaluated based on the concentration limits of hazardous substances and other classification criteria set in Annex III of the Waste Directive.[98] Due to the differences between the classification systems applied to wastes and chemicals, a mixture with a certain composition can be classified as a hazardous chemical but as a non-hazardous waste, and vice versa. This creates difficulties for the evaluation of the suitability of waste-derived materials as secondary raw materials.

Most of the EU provisions on waste require data collection on the production and/or treatment of the waste types the provision in question covers. Data on wastes is mainly collected by the EU List of Waste categories. For transboundary shipments of waste the data is collected based on the classification system used in the Waste Shipment Regulation (EU No. 1013/2016)[99]. The publicly available data is usually aggregated and cannot be allocated to certain industrial processes or

[93] As activity 4.4 of HAZBREF a "*report for promoting circular economy in BREFs*" will be produced. Another relevant source on this issue is the recently published Ricardo-Report for the Commission "IED contribution to the circular economy": https://circabc.europa.eu/sd/a/23fd890d-83f9-4372-8f26-669ff50e106a/IED%20contribution%20to%20Circular%20Economy%20report.pdf

[94] Directive 2008/98/EC of the European Parliament and of the Council of 19 November 2008 on waste and repealing certain Directives (OJ L 312, 22.11.2008, p. 3–30).

[95] As amended by Commission regulation (EU) No 1357/2014 and Council regulation (EU) 2017/997.

[96] See Fn. (30).

[97] Commission Decision 2014/955/EU of 18 December 2014 amending Decision 2000/532/EC on the list of waste pursuant to Directive 2008/98/EC of the European Parliament and of the Council, OJ 370/44.

[98] European Commission, 2018. Commission notice on technical guidance on the classification of waste, OJ 2018/C, 124/01. 9 April 2018.

[99] Regulation (EU) 2016/1013 of the European Parliament and of the Council of 8 June 2016 amending Regulation (EC) No 184/2005 on Community statistics concerning balance of payments, international trade in services and foreign direct investment, OJ L 171/144, lastly amended by Regulation (EC) No 184/2005 of the European Parliament and of the Council of 12 January 2005, OJ L 35/23.

installations. Waste code specific data may be obtained from national competent authorities upon request.

There are currently no requirements for systematic data collection based on the content of hazardous substances in the waste. Individual hazardous waste entries in the List of Waste or the classification of the Waste Shipment Regulation may refer to certain hazardous substances or groups of substances (such as PCB, hydrofluoric acid or organic halogenated solvents) but more often the entries only have a reference "containing hazardous substances" without further elaboration on which substance(s) would trigger the hazard classification. For wastes that are classified as non-hazardous, there is no information on their possible content of hazardous substances. Currently, the information gathering on specific hazardous substances in waste streams is dependent on the conditions and reporting obligations set in the permits of the facilities as well as information produced in individual research projects and possible national monitoring programs. Member States may also have national databases that are used to collect information on hazardous substances in waste streams.[100]

5.2 Interfaces between Waste Directive and the BREFs for possible promotion of circular economy aspects

Possible hazardous substances in waste are one obstacle for the suitability of waste as secondary raw material. The IED and the guidance on the drawing up of BAT reference documents (2012/119/EU) provide the framework and possibility to include measures on preventing or reducing waste generation and its harmfulness in BREFs. However, the information on hazardous substances in wastes in the existing BREF documents is varying in terms of coverage and level of details. There is no systematic approach in the BREF process for considering the quality of wastes from the perspective of their suitability as secondary raw materials. Relying solely on the classification of waste as hazardous in accordance with the current waste legislation is not sufficient to control hazardous substances in recyclable materials and ensuring that they fulfil the requirements for placing on the market as secondary raw materials.[101]

The regularly collected data under waste legislation based on the List of Waste is less useful than the data collected under the chemicals regime as input in the BREF process since the regularly collected data under waste legislation does not provide detailed information on the content of specific hazardous substances in wastes.

When it comes to developing cleaner material cycles, the BREF reviews could benefit from using the more systematically collected REACH data on hazardous substances management instead of the data collected under waste legislation (see also chapter 3 on REACH). The data generated by REACH can be used for the identification of substances that are relevant to follow in the waste streams of certain production processes or BATs. BATs could be developed for the identification and traceability of hazardous substances in waste streams that are used as secondary raw materials. The aim is to remove technical barriers for the recovery and prevent the accumulation of hazardous substances throughout the successive recovery cycles. This is connected to promoting circular economy, and especially non-toxic material cycles, through the BREF procedure. This requirement of non-toxic material cycles is an implicit BAT criterion as per Annex III point 3 "the furthering of recovery and recycling of substances generated and used in the process and of waste, where appropriate ".

[100] To tackle the lack of information on the existence of SVHC substances in wastes the Waste Directive (as amended in June 2018 by Directive 2018/851/EU) gives a new task to ECHA to set up a database on substances of very high concern in articles by 5 January 2020. The database will be publicly accessible (upon request).

[101] See COM(2018) 32. Communication on the implementation of the circular economy package: options to address the interface between chemical, product and waste legislation.

5.3 Proposals for better use of data on waste quality during BREF reviews

The information and data collected under the waste directive regime on the quality of the waste regarding hazardous substances is of minor importance for the IED BREFs. Therefore, strengthened links between the Waste Directive and the IED from this perspective are not needed.

Systematically collected REACH data on hazardous substances is probably better suited in terms of identification and traceability of hazardous substances in waste-based materials for the aim of promoting non-toxic material cycles.

However, there is little potential to promote non-toxic material cycles through better information on the quality of waste in the BREF process. Actions are needed prior to waste being generated. Promotion of non-toxic material cycles and Circular Economy will probably require an overarching systematic change with regard to different legislations and practices.

A closer look at circular economy and BREFs will be taken in the report of Work package 4.4 of the HAZBREF project[102].

6 Provisions of EU key legislation regarding hazardous substances: POPs Regulation[103]

Persistent organic pollutants (POPs) are chemical substances that persist in the environment, bio-accumulate, and pose a risk of causing adverse effects on human health and/or the environment. These pollutants are transported across international borders far away from their sources, even to regions where they have never been used or produced.

This chapter first describes the main elements of the EU POPs Regulation, the key instruments the regulation provides and then the substances that should be considered during BREF reviews.

6.1 Functioning of the POPs Regulation

The POPs Regulation 850/2004 is the EU's tool for regulating the substances listed in the Stockholm Convention[104] on Persistent Organic Pollutants (POPs) (entered into force in 2004) and in the POPs Protocol under the Convention on Long-Range Cross-Border Air Pollution (CLRTAP)[105]. The POPs regulation is applicable in all EU Member States.

The persistent organic pollutants in the Stockholm Convention today comprise 14 pesticides[106], 15 industrial chemicals[107] and seven unintentionally produced POPs. Annex C of the Convention lists those POPs which are formed and released unintentionally from anthropogenic sources (uPOPs). These substances together with some polyfluorinated compounds (PFAS) are most relevant for BREF reviews. The substances Perfluorooctanoic acid (PFOA), its salts[108] and PFOA-related compounds and dicofol which were adopted by the parties to the Stockholm Convention 10 May 2019 will be incorporated into the POPs Regulation before December 2020.

In April 2004, the European Union published Regulation (EC) 850/2004, a comprehensive piece of legislation for the management of POPs. This regulation prohibits or restricts the production, placing on the market and use of internationally regulated substances which are particularly

[102] This report has recently be published, see footnote 18.

[103] https://eur-lex.europa.eu/legal-content/EN/TXT/PDF/?uri=CELEX:32019R1021&from=EN

[104] See for the text of the Convention: http://chm.pops.int/TheConvention/Overview/TextoftheConvention/tabid/2232/Default.aspx (State: August 2018).

[105] See for the text of the protocol: http://www.unece.org/env/lrtap/pops_h1.html(State: August 2018).

[106] http://www.pops.int/Implementation/PesticidePOPs/tabid/5359/Default.aspx

[107] http://www.pops.int/Implementation/IndustrialPOPs/tabid/5360/Default.aspx

[108] These substances have already been SVHCs (among others for PBT) under REACH since 2013.

problematic due to their health and environmental hazards. The regulation also contains provisions on unintentionally formed substances, waste management and environmental monitoring.

There are five Annexes in the POPs Regulation comprising the regulated POPs:

- Annex I 'List of substances subject to prohibitions'.
- Among the Annex I POPs subject to prohibition (with specific exemptions) on manufacturing, placing on the market and use, in particular 'perfluorooctane sulfonic acid and its derivatives (PFOS)' might be relevant for BREFs.
- Annex II 'List of substances subject to restriction'. So far, no entries.
- Annex III 'List of substances subject to release reduction provisions'. The list comprises unintentionally produced POPs such as PCDD/F, HCB, PAH[109], PeCB, and PCB. Member States are required to develop National Action Plans that cover all sources for POPs. The Action Plan identifies the release of substances listed in Annex III. The action plans are reviewed every five years including strategies and their success in meeting the obligations. It also covers the development and maintenance of source inventories and release estimates. Thus, the plan also includes an inventory of the releases of chemicals listed in the Annex.
- Annex IV 'List of substances subject to waste management provisions set out in Art. 7'. Recycling of waste contaminated by POPs is only permissible if the concentrations are below the limits laid down in this Annex. Otherwise, the POP content has to be irretrievably destroyed in an environmentally sound manner.
- Annex V 'Waste management'
  - Part 1 'Disposal and recovery under Article 7(2)'
  - Part 2 'Wastes and operations to which Article 7(4)(b) applies'

6.1.1 Recasting of the POPs Regulation

On June 25, 2019 the EU published Regulation (EU) 2019/1021 recasting the POPs Regulation ('POPs Recast Regulation') [110]. This new law contains several important changes. These include, inter alia, the following:

- Using consistent language for certain definitions and terminologies with those in Regulation (EC) 1907/2006 'Registration, Evaluation, Authorization and Restriction of Chemicals' (REACH) and Directive 2008/98/EC (Waste Framework Directive) for better clarity.
- Strengthening of the EU's processes and procedures with the support of the European Chemicals Agency (ECHA) for listing new POP chemicals.
- Ensuring effective coordination and management of technical and administrative aspects between the ECHA and Member States, including activities and the exchange of information in the Forum for Exchange of Information on Enforcement under REACH.
- Expanding the number of POPs in Annex III from five to seven: PCN (polychlorinated naphthalines) and HCBD (hexachlorbutadiene) have been included.
- Completely new entry for Deca-BDE as part of the PBDE family under Annex IV.

[109] For the purpose of the emission inventories, the following four compound indicators shall be used: benzo(a)pyrene, benzo(b)fluoranthene, benzo(k)fluoranthene and indeno(1,2,3-cd) pyrene.

[110] https://eur-lex.europa.eu/legal-content/EN/TXT/PDF/?uri=CELEX:32019R1021&from=EN

When pentabromodiphenyl ether (penta-BDE) and perfluorooctane sulfonic acid and its derivatives (PFOS and its derivatives) were added to the POPs Regulation, their entries were subsequently deleted from Annex XVII of REACH by legislation. By listing Deca-BDE under the POPs Recast Regulation, Deca-BDE under entry 67 to Annex XVII of REACH is expected to be deleted officially.

The POPs Recast Regulation repealed the former POP Regulations and entered into force on July 15, 2019.

6.1.2 POPs Regulation and its connection with IED BAT Conclusions

As previously mentioned, the POPs regulation has several annexes. Annexes I to IV contain POPs that are subject to special provisions. One of the major goals of the POPs regulation is to continue to minimize and, where feasible, ultimately eliminate the unintentionally produced POPs listed in Annex III. Member States are required to identify, characterize, quantify and prioritize sources of releases of unintentionally produced POPs, and develop strategies with concrete measures, timelines and goals to minimize or eliminate these releases.

To reduce the total releases of POPs derived from anthropogenic sources, Member States are also required to implement best available techniques (BAT) and best environmental practice (BEP) for the unintentional releases. One reference to facilitate implementation of BAT and BEP at national level are the detailed state-of the-art guidelines on BAT and guidance on BEP elaborated under the umbrella of the Stockholm Convention.[111] For industrial installations that fall under the scope of the IED, the key reference documents are BREFs and their corresponding BAT conclusions.[112]

The most relevant Annex of the POPs Regulation for BREF reviews is Annex III, which contains seven unintentionally produced POPs. In table 3 below these substances are listed together with the sectors (BREFs) that are relevant for these unintentionally emissions. Some of them are already addressed in recently adopted BAT conclusions, such as dioxins and furans. For others it is not proven if they are relevant or emitted, or not, and properly considered in BREFs. The EIPPCB follows here the position that for these other POPs listed in Annex III not addressed in BREFs, it would be needed to know first if they are relevant for a given industrial sector. This information must be submitted by TWG members so that they can find their way into BREFs.

Table 3. POPs substances that could be relevant for BREFs.

POPs listed in Annex III	**Relevant BREFs (abbreviations)**
PCDD/PCDF	LCP, WI, CLM, NFM, SF, IS, WT, LVOC, WBP*
HCB	WI, CLM, NFM, IS
PAH	IS, NFM, WPC, WT, WI, FMP, SF
PeCB	LCP, WI; IS
PCB	NFM, CLM, CAK, WI, WT
HCBD	CWW, WGC, LVOC
PCN	WI, NFM, IS
* BAT # 14 – monitoring in the Wood-Based Panel BREF: PCDD/F has to be monitored at least once per year if contaminated recovered wood is used as fuel".	

From the 16 BAT conclusions (BATC) so far published in the EU Journal under the IED regime 10 BATC contain BAT requirements for prevention and control of unintentionally produced POPs

[111] For information concerning to the BAT/BEP please refer to the website that includes guidance documents published under the Stockholm Convention: http://www.pops.int/Implementation/BATandBEP/Guidance/Overview/tabid/5121/Default.aspx.

[112] All BREFs and BAT conclusions published in the EU Journal can be downloaded under: https://eippcb.jrc.ec.europa.eu/reference/.

(uPOPs) or from the list of substances subject to restriction. The other 6 industrial sectors are not supposed to be relevant regarding POPs emissions, see the following table 4[113].

Table 4. Overview about the consideration of unintentionally produced POPs in IED BREFs.

BAT conclusion	**Date of publishing**	**BAT-number that deals with uPOPs**	**Remarks**
Iron and Steel Industry	08.03.2012	BAT 7, 11, 15, 22, 24, 25, 89,	Narrative BATs, monitoring, BAT AELs POPs extensively addressed
Glass Industry	08.03.2012	None	Not considered a relevant source for POPs
Tanneries	16.02.2013	BAT 8	Narrative BAT, control of pesticides in raw hides
Cement and Lime Industry	09.04.2013	BAT 5, 27,	Narrative BATs, monitoring, BAT AELs, POPs extensively addressed
Chlor-alkali	11.12.2013	None	Unclear whether the process is a relevant source for POPs.
Pulp and Paper Industry	30.09.2014	None	Not considered a relevant source for POPs since there is no chlorine bleaching of pulps within the EU
Mineral Oil and Gas Refineries (REF)	28.10.2014	BAT 4, 28	Narrative BATs, monitoring
Wood-Based Panels	24.11.2015	BAT 14	PCDD/F monitoring if contaminated recovered wood is used as fuel
CWW Chemical Industry	09.06.2016	None	Not considered a relevant source for POPs since the scope mainly covers waste water discharge only
Non-Ferrous Metals	30.06.2016	BAT 10, 48, 83, 99, 123, 146, 159	Narrative BATs, monitoring, BAT AELs POPs extensively addressed
Intensive Rearing of Poultry and Pigs	21.02.2017	None	Not considered a relevant source for POPs
Large Combustion Plants	17.08.2017	BAT 4, 59, 71	Narrative BATs, monitoring, BAT AELs POPs extensively addressed
Large Volume Organic Chemicals	07.12.2017	BAT 2, 66, 67, 76, 77	Narrative BATs, monitoring, BAT AELs
Waste Treatment	17.08.2018	BAT 3, 8, 25, 26, 42, 51, 47 (marginal reference only)	Narrative BATs, monitoring for mechanical treatment in shredders of metals waste, for the re-refining of waste oil and for the decontamination of equipment containing PCBs
Waste incineration	03.12.2019	BAT 4, 5, 6, 8, 25, 30, 34	Narrative BATs, monitoring, BAT-AELs
Food, Drinks and Milk Industries	04.12.2019	None	Not considered a relevant source for POPs

[113] A comparison with Annex C part II and III to the Stockholm Convention that lists the industrial source categories that have potential for formation and release of these substances to the environment, may be useful: http://www.pops.int/Portals/0/Repository/conf/UNEP-POPS-CONF-4-AppendixII.5206ab9e-ca67-42a7-afee-9d90720553c8.pdf#Annex%20C.

When evaluating the quality and completeness of these BAT conclusions regarding POPs issue it appears that in principle the issue has been addressed. On the other hand, it remains unclear whether the occurrence of unintentionally produced POPs has been assessed comprehensively. A possible gap might exist e.g. in the BAT conclusions for the Mineral Oil and Gas Refineries (REF) since there are no BATs on PCB emissions. A search in the E-PRTR data base demonstrate that the main contributor of PCB releases to water is the mineral oil and gas refineries sector. So, this could be an area that the EIPPCB and TWG could explore further during the next REF BREF review. In general, it could be beneficial for covering unintentionally produced POPs more completely to carry out a comparison of the amount of reported emissions per sector in the National Action Plans of the Member States and of emissions reported from installations in the context of BREFs reviews (possibly via questionnaires).

Out of the substances listed in Annex I and IV a few of them might be of relevance to the BREF process as there are exemptions for their use that are explicitly linked to industrial activities listed in Annex I of the IED. One clear example for such a substance is PFOS that is listed in Annex I of the POPs Regulation. The use of PFOS remains permitted as mist suppressant in non-decorative hard chromium (VI) plating in closed loop system as long as BAT according to the IED is applied. Hard chromium (VI) plating is part of the activities covered by point 2.6 of Annex I ′Categories of activities′ of the IED[114]. So, there is a clear mandate for the EIPPCB and the respective TWG to address the use of PFOS during the review of the STM BREF (Surface Treatment of Metals and Plastics) and derive appropriate BAT conclusions.

6.1.3 Challenges concerning POPs within the EU

In order to be able to take the relevant actions, it is important to have good inventories of persistent organic substances released into air, water and land and up-to-date emission factors for calculating POP emissions. There is a requirement for the Member States to draw up such inventories of the substances listed in Annex III as stipulated in Article 6.1 of the POPs Regulation.

To uphold a release inventory based on good quality data for unintentionally produced POPs is a challenge since an important data source for this purpose, the European Pollutant Release and Transfer Register (E-PRTR)[115], has a relatively high threshold for reporting emissions of these substances. If monitoring BATs for potentially relevant POPs of a given industrial sector and BAT-AELs respectively are lacking in BAT conclusions it will be difficult to maintain rather complete release inventories for POPs.

At its 9th meeting in April/May 2019 the Parties to the Stockholm Convention agreed to list PFOA and its salts, PFOA-related compounds and dicofol in Annex A. Dicofol will be listed without exemptions. For the use of PFOA, its salts and PFOA-related compounds a few exemptions will be granted, e.g. for the manufacturing of oil- and water-repellent textiles as long as no alternatives are available. This is already mirrored by the current review of the TXT BREF in so far as the TWG has agreed to assess alternatives for C8-based oil- and water-repellent finishes including fluorocarbon-free solutions as possible candidate BATs[116].

To reduce the total releases of POPs derived from anthropogenic sources, Parties are required under the Stockholm Convention to implement BAT and best environmental practice (BEP) for the unintentional releases.[117] Consequently, if unintentional produced POPs are potentially released from an industrial activity listed in Annex I of the IED, these POPs should be addressed as completely as

[114] https://eur-lex.europa.eu/LexUriServ/LexUriServ.do?uri=OJ:L:2010:334:0017:0119:EN:PDF

[115] Information on E-PRTR facilities can be found at the EEA-Website: https://prtr.eea.europa.eu/#/home.

[116] See page 30 of the Kick-Off Meeting Report for the TXT BREF review (12.-15.06.2018): https://eippcb.jrc.ec.europa.eu/sites/default/files/2019-11/TXT_KoM_meeting_report_Sept18.pdf.

[117] Annex C, Part II and III: http://www.pops.int/Portals/0/Repository/conf/UNEP-POPS-CONF-4-AppendixII.5206ab9e-ca67-42a7-afee-9d907205553c8.pdf.

possible in BAT conclusions to ensure that BAT is implemented throughout the European Union to minimise or stop the unintentional release.

6.2 Key players and their role, communication and data flow

Previously, the European Commission was supported by each Member States Competent Authority (CA) which were responsible for the administrative tasks and enforcement of the POPs Regulation. The tasks of this CA meetings included the implementation of the Stockholm Convention, the POP Protocol under the CLRTAP and the POPs Regulation, the nomination of new chemicals that exhibit POP characteristics, exchange of information on occurrence and elimination of POPs and data gathering via reporting obligations under the POPs Regulation.

However, the CA meetings did not take place as a representation of an official body laid down in the Regulation 850/2004 – like the Committees for general matters according to Art. 16 were – and thus did not have a formal role in the decision making. Whereas CA meetings could agree on e.g. guidance documents or a Manual of Decisions, these decisions always remained legally non-binding. The main tasks of the CA meeting were to ensure an exchange of information between CAs and the Commission and to discuss common issues related to the day-to-day implementation of the POPs Regulation.

The CA meetings were also not the forum to prepare EU positions for international negotiations concerning POPs as this is under the responsibility of the European Council Working Party meetings. However, the CA meetings gave technical input to the Council discussions. Furthermore, CA meetings were not supposed to identify or review new POP candidates. In fact, it exchanged general information on Member States and Commission activities in this field. The CA meetings were held twice each year and discussed and exchanged information on implementation of the Stockholm Convention and the POPs Regulation, discussed topics held at the POP Review Committee (POPRC) meetings under the Stockholm Convention. The meetings also discussed preparations for upcoming COP meetings, POPs waste issues, reporting, etc.

For the implementation of the recently adopted POPs Regulation, the European Commission will be supported by a Committee in accordance with article 20 of POPs regulation. The first Committee meeting is scheduled to be held November 2019.

Regarding POPs-containing waste the European Commission is also supported by the Committee for the Adaption to Scientific and Technical progress and implementation of the directives on waste.

When it comes to nominating new potential POPs, the EU is a party to the Stockholm Convention and, on behalf of the EU countries, has the exclusive right to submit proposals on substances. ECHA assists to identify and propose new POPs from the EU to the Stockholm Convention. The scientific POP Review Committee of the Convention discusses scientific recommendations on measures on a scientific basis. With the support of these recommendations, the parties to the Convention decide on measures. The Convention holds party meetings every two years.

From submission of a proposal to the Stockholm Convention, it takes at least four years for the substance to be listed in the EU's POPs Regulation. In some cases, the rules in the POPs Regulation are more far-reaching than the requirements of the Stockholm Convention. Currently, new POPs have been nominated for evaluation by the POP Review Committee under the Stockholm Convention, see table 5. The European Member States contribute to that process through nominated experts. The evaluation that is conducted when a new substance is nominated to the Convention, could be useful in the BREF elaboration process.[118]

[118] The Stockholm Convention expert committee, the POPs Review Committee (PORC), evaluates each substance that is nominated to the Convention by the EU or a Party. It carries out a comprehensive study regarding, e.g. production data, uses and releases, hazard assessment, environmental fate, before making its final recommendation to the Parties.

Table 5. POPs substances evaluated by the POPs Review Committee (POPRC) under Stockholm Convention.

Chemical/group name	Status	Submitter
Dechlorane plus	Proposal submitted to the POPRC	Norway
Methoxychlor	Proposal submitted to the POPRC	Commission on behalf of the EU
Dicofol	Listed under the Stockholm Convention	Commission on behalf of the EU
Perfluorohexane sulfonic acid (PFHxS), its salts and PFHxS-related compounds	Risk management evaluation under development	Norway

With the new task for ECHA to assist the Commission to identify and propose new POPs, a stronger link between actors working with the POPs Regulation and the IED may be expected since ECHA has started to become more involved in the BREF elaboration process.

6.3 Proposals for a better coordination between the POPs Regulation and BREF reviews

Within the EU, concerning the release of unintentionally produced POPs from stationary sources of industrial installations or the restricted use of few substances of Annex I (e.g. PFOS), the main control instrument is still the IED (2010/75/EU). It is therefore important that Member States and the EIPPCB ensure that BAT conclusions consider systematically also the reduction of emissions of POPs.

The European BREFs and in particular its BAT conclusions could be an important tool to facilitate the implementation of article 4 'Exemptions from control measures', 6 'Release reduction, minimisation and elimination' and 7 'waste management' of the current POPs Regulation 2019/1021. From our analysis the following measures are recommended:

- In upcoming BREF reviews, emissions of unintentionally produced POPs, including their potential transfer to other media and their presence in waste, should be systematically considered (the complete set of POPs listed in Annex III) and BAT conclusions derived where considered suitable.
- BATs should be developed for the use of substances still permitted under limited conditions and listed in Annex I of the POPs Regulation.
- Each BAT conclusion should clearly state that the occurrence of POPs has been assessed and that presented BATs cover all relevant aspects concerning this matter. Then, TWGs and the EIPPCB in charge of BREF reviews could possibly conclude that the commitments from the POPs Regulation for a given industrial sector have been fulfilled when drawing up the BAT conclusions of a given sector.
- The data on the occurrence and emission sources of POPs collected for the National Implementation and Action Plans under the Stockholm convention by EU Member States and other countries could be useful in the justification for selection of Key Environmental Issues for the different IED sectors. This data should be provided to the BREF process by the national TWG members in the frontloading phase.
- NAPs may also contain an evaluation of the efficacy of national policies and strategies for meeting the obligations of the POPs Regulation including proposed measures with regard to minimising POP releases from industrial plants. These sections may be of interest when reviewing BREFs. E.g., the Austrian NAP POP

2017[119] proposes measures with regard to the co-incineration in industrial plants as follows:

  - Limitation of POP contaminated waste/residues in co-incineration plants and industrial plants. Representative sampling of individual batches of POP contaminated waste/residues is necessary before using them as input material;
  - Avoid/inhibit highly contaminated waste/residues in co-incineration plants;
  - Before treating POP contaminated waste/residues in industrial plants, test runs (including monitoring of POP emissions) have to be conducted;
  - If POP contaminated waste/residues are used as input materials in industrial plants, regular/continuous monitoring of POP emissions is necessary. If a destruction of these POPs cannot be ensured in the industrial plant, the POP residues/waste must not be used as input material;
  - If there are any changes in the process involving POP contaminated waste/residues, test runs (including monitoring of POP emissions) have to be conducted

- The POP regulation requires adequate monitoring data of POPs for facilities using processes that release substances listed in Annex III to the POPs Regulation. Better highlighting of POPs and setting of monitoring requirements for relevant POPs in BAT conclusions would therefore improve the implementation of the POPs Regulation as well.
- If the BAT-AELS and monitoring requirements of unintentionally emitted POPs were more complete in BAT conclusions, the permitting authorities would have a clear mandate to set ELVs or monitoring requirements in permit conditions. The subsequent monitoring data could then be an information source for the Member States when reporting on unintentionally produced POPs to the Stockholm Convention.
- It continues to be important that the experts working on BAT and BEP and the Toolkit for Identification and Quantification of Releases of Dioxins, Furans and Other Unintentional Persistent Organic Pollutants under the Stockholm Convention consider the findings of recent BREFs that are developed under the IED. Conversely, existing BAT-BEP guidelines elaborated under the Stockholm Convention should be assessed regarding their relevance for installations in the EU during BREF reviews.
- Existing BAT-BEP guidelines elaborated under the Stockholm Convention should be considered in the BREF process. The Convention also promotes BAT and develops guidelines for the implementation of BAT/BEP[120], which could be useful in the European BREF process and vice versa. Information from BREFs is already (and might be even more systematically) used at the global level of the Stockholm Convention.
- The BAT process could benefit to have from time to time joint meetings/workshops between the IED and POPs experts to discuss experiences and brief each other on consecutive related work.

[119] See Austrian National Action Plan, p. 165: http://www.umweltbundesamt.at/fileadmin/site/publikationen/REP0633.pdf.

[120] See footnote 63.

- It would be valuable for IED experts to be informed about new POPs nominated to the Stockholm Convention by the EU[121]. IED experts should also be informed about the updates on specific exemptions of Annex I and II POPs.
- Also, the background information for evaluation of a substance gathered before a new POP is proposed to the Convention could be useful in the BREF elaboration process.
- Furthermore, a routine exchange of information between the industry-related BAT-BEP working groups of the Convention and the TWGs of the European BAT process is advisable in order to ensure that the most recent information can be found in either of the documents.

Figure 9 gives an overview which aspects of the POPs Regulation could provide important input to the BREF elaboration process in particular during the discussions on Key Environmental Issues and the elaboration of corresponding candidate BATs:

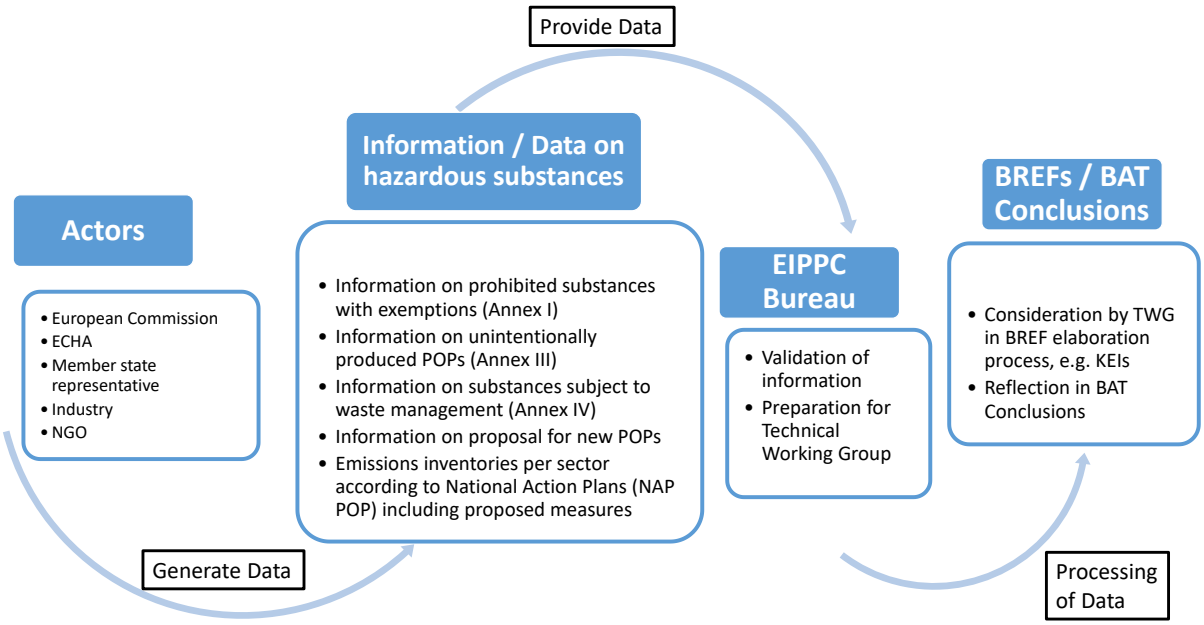

Figure 9. POPs-related data sources that could provide input to BREF reviews and BAT conclusions.

[121] For the Stockholm Convention, every Party has nominated a National Focal Point and a Nationals Contact Point that should distribute and collect all relevant information. For the POP-regulation, every Member State has nominated a competent authority (CA). Ideally, these entities are the same or collaborate closely.

Annexes

Annex 1: HELCOM

Introduction

Since the HAZBREF project is funded by the European Regional Development Fund Interreg Baltic Sea Region, the analysis includes the major provisions of HELCOM with regard to hazardous substances. It is placed in the annex because there are almost no synergies from HELCOM towards the IED and BREFs.

HELCOM (Baltic Marine Environment Protection Commission – Helsinki Commission) is the governing body of the Convention on the Protection of the Marine Environment of the Baltic Sea Area, known as the ***Helsinki Convention***. The Contracting Parties are Denmark, Estonia, the European Union, Finland, Germany, Latvia, Lithuania, Poland, Russia and Sweden.

HELCOM works as an environmental policy maker for the Baltic Sea area by developing common environmental objectives and actions according to the specific needs of the Baltic Sea. The actions developed are of its own or supplementary to measures imposed by other international organisations. Since all Contracting Parties, except Russia are EU members the coordination of the HELCOM work with EU strategies and Directives is important and during the last decade a lot effort is put on streamlining the HELCOM work with work in EU and other international fora.

Instruments of HELCOM with regard to the protection against hazardous chemicals

The most relevant provisions concerning hazardous substances in the HELCOM framework are included in:

- The Helsinki Convention[122]
- HELCOM Recommendation 31E/1 implementing HELCOM's objective for hazardous substances[123]
- HELCOM Baltic Sea Action Plan (BSAP)[124]
- HELCOM recommendations for land-based pollution[125]

BSAP, adopted by all the coastal states and the EU in 2007, provides the main framework for the actions to be taken in order to reach a good ecological status of the Baltic Sea by 2021. For hazardous substances the goal is to have a Baltic Sea undisturbed by hazardous substances. The BSAP is to be updated regularly based on scientific knowledge and innovative management methods. The BSAP is set to come to an end in 2021 and will be updated as the objectives of the BSAP haven't yet been reached.

The BSAP includes currently eleven substances of specific concern (HELCOM List of Priority Hazardous Substances)[126], which were selected and prioritized on the basis of their hazardous properties, their likelihood to reach the marine environment to a significant degree, their effects to human health or the environment, and their presence in the Convention Area.

[122] See the text of the Convention http://www.helcom.fi/about-us/convention.

[123] The text can be found under: http://www.helcom.fi/Recommendations/Rec%2031E-1.pdf.

[124] See for the Baltic Sea Action Plan: http://www.helcom.fi/baltic-sea-action-plan (State: August 2018).

[125] http://www.helcom.fi/helcom-at-work/recommendations/land/

[126] List of Priority Hazardous Substances (of HELCOM BSAP): 1. Dioxins (PCDD), furans (PCDF) & dioxin-like polychlorinated biphenyls, 2a. Tributyltin compounds (TBT), 2b. Triphenyltin compounds (TPhT), 3a. Pentabromodiphenyl ether (pentaBDE), 3b. Octabromodiphenyl ether (octaBDE), 3c. Decabromodiphenyl ether (decaBDE), 4a. Perfluorooctane sulfonate (PFOS), 4b. Perfluorooctanoic acid (PFOA), 5. Hexabromocyclododecane (HBCDD), 6a. Nonylphenols (NP), 6b. Nonylphenol ethoxylates (NPE); HELCOM status indicators (hazardous substances): 1. Diclofenac, 2. Metals (Cadmium, Lead, mercury), 3. PAHs, 4. PCB, dioxins and furans, 5. TBT and imposes, 6. HBCDD, 7. PFOS, 8. PBDEs.

The current priority substances are mostly obsolete and the working group on reduction of pressures from the Baltic Sea catchment area (HELCOM PRESSURE) agreed to launch such a revision in 2018 but this has not been realised. The review should take into account the results from other ongoing processes, and so reflect latest changes in global, European and regional approaches to hazardous substances.

Most of the current BSAP priority substances are covered under the WFD and REACH. The substances not yet totally covered in these frameworks are Medium-Chained Chlorinated Paraffins (MCCP) and Perfluorooctanoic acid (PFOA). However, both of these substances are currently assessed under REACH.

Detailed industry or product related requirements are specified in almost 30 HELCOM Recommendations[127], addressing both concrete industrial branches, products as well as providing a general capping for harmonization of requirements with EU law provisions (HELCOM Recommendation 25/2, see also below). Most of these recommendations are quite old. Hence, the value of these HELCOM recommendations for the IED BREFs is minor.

The reason for HELCOM to have stopped in practice elaborating and reporting of specific industrial recommendations is that 8 out of 9 Contracting states are EU members for which IED requirements apply. Furthermore, also Russia has recently adopted national legislation similar to the IED provisions and under which Russian BREF documents are prepared for different industrial sectors. Therefore, the permitting of large-scale industrial installations in the Baltic Sea countries has become more focused on setting permit requirements such as emission limit values based on BAT. As the BREFs are very comprehensive documents containing the state-of-art information on BAT for the different industrial sectors there is less need to do Baltic Sea regional work to elaborate similar requirements concerning the techniques to be used. However, the scope and focus for elaboration of the HELCOM Recommendations has differed from the EU BREFs and also the new Russian BREFs. Therefore the work on specific industrial sectors was decided to continue by elaborating a so-called "Umbrella Recommendation" (HELCOM Recommendation 25/2) with the intention to utilise the BREF information to pinpoint relevance of specific hazardous substances for different sectors.

All the HELCOM actions and targets developed are based on the HELCOM assessments about the status and pressures on the marine environment as well as the efficiency of measures to protect the Baltic Sea. HELCOM regularly produces a Pollution Load Compilation (PLC)[128], which compiles and assesses the data collected by the Contracting Parties on total air and waterborne inputs of nutrients and some hazardous substances to the Baltic Sea. However, with regard to hazardous substances the compilations are rather general and even incomplete. The PLC reports to water do not include installation specific information on releases of hazardous substances, except mainly for some data on heavy metals. However, sometimes targeted information on discharges concerning pollutants are collected through specific campaigns, which could potentially provide useful information for the IED BREF process on industrial sources for specific hazardous substances.

For the recent holistic assessment "State of the Baltic Sea", HELCOM has adopted 8 core indicators for hazardous substances, which cover substances of specific concern to the Baltic Sea. The indicators are hexabromocyclododecane (HBCDD), polybrominated dipehenyl ethers (PBDEs), non-dioxin-like polychlorinated bipehenyls (PCBs), dioxin-like PCBs, dioxins and furans, polyaromatic hydrocarbons (PAHs) and metabolites, perfluorooctance sulphonate (PFOS), metals (cadmium, mercury, lead) and tributyltin (TBT). These indicators, which are aligned with the MSFD are assessed against regionally agreed threshold values. The assessment shows that environmental health of the Baltic Sea is not sufficient, and does not meet the objectives of the Baltic Sea Action Plan. Levels of contaminants are elevated and continue to give cause for concern. However, the

[127] http://www.helcom.fi/helcom-at-work/recommendations/land/

[128] See for the Pollution Load Compilation http://www.helcom.fi/baltic-sea-trends/pollution-load-compilations.

number of improving trends outweighs the number of deteriorating trends in the monitored hazardous substances.

The assessment of airborne hazardous substances' emissions and depositions to the Baltic Sea include also some PAHs (benzo(a)pyrene) and POPs, such as, PCBs and PCDD/Fs. These assessments are mainly based on data from the European Monitoring and Evaluation Programme (EMEP).[129] (See recommendations in section IV)

Key actors in HELCOM

The HELCOM PRESSURE Working Group, consisting of experts from the HELCOM Contracting parties as well as observers, is the relevant technical group within the HELCOM framework, which (as one of the issues) deals with reduction of hazardous substances. The PRESSURE group with its associated expert networks and correspondence groups provide the necessary technical basis to the work on inputs of hazardous substances from both diffuse and point sources on land. The group focuses on developing solutions to the policy-relevant questions and needs. PRESSURE will guide and utilize the results of HELCOM work on pollution load compilations in ad hoc structures, e.g. in order to orientate these towards more policy usable reports and products. Members of PRESSURE are not necessarily experts on hazardous substances, but working papers are often distributed to a wider expert network in the Contracting Parties.

Identified interactions and synergies between HELCOM and IED/BAT conclusion

- There are no official interfaces between the HELCOM and the EU BAT process under the Industrial Emissions Directive (IED).
- Most of HELCOM recommendations for industry are quite old. The HELCOM PLC reports to water do not include installation specific information on releases of hazardous substances, except mainly for some data on heavy metals.
- There is probably little information collected under the HELCOM framework in recommendations and PLCs that could directly be used in elaboration of IED BREFs on regular basis concerning, e.g. techniques or relevance of specific substances in different sectors.

Hence, the current HELCOM Recommendations and assessments are of minor value for the IED BREFs.

Currently, there are eight core indicators for hazardous substances, which cover substances of specific concern to the Baltic Sea as described in the BSAP. These indicators, which are aligned with the MSFD, are assessed against regionally agreed threshold values. The indicators are based on data from the HELCOM monitoring programme and are regularly updated to periodically produce thematic and holistic HELCOM assessments. Most of these HELCOM indicator substances are not indicators for (direct) industrial emissions to the Baltic Sea. Overall, the HELCOM assessments have focused on heavy metals and a limited number of "historic" substances (e.g. PCBs, PBDEs) or unintentionally produced substances such as dioxins and PAHs.
The current HELCOM indicators are not significantly relevant concerning information for the EU BREFs.

It is unlikely that very detailed information on the sources of Baltic Sea relevant substances will be available for a large number of different substances and the information produced by HELCOM relevant for BREFs is assessed to be quite scarce. However, sometimes targeted information on discharges concerning pollutants are collected through specific campaigns, which could potentially provide useful information for the IED BREF process on industrial sources for specific hazardous substances.

[129] http://www.emep.int/ (State: August 2018).

The relevance of the information from HELCOM monitoring campaigns depends on the issue tackled and which hazardous substances are addressed in the thematic assessments.

Proposals on how HELCOM data could be used for EU BREFs

The analysis shows that there is scarce information produced by HELCOM which is usable in BREF processes, but in case that more interaction is considered important the following proposals could be considered:

- The HELCOM assessments on the status and input of specific relevant hazardous substances to the Baltic Sea could in some cases be used as justification to include substances as Key Environmental Issues in the preparation of BREF documents for the different sectors.
- The information relevant for IED purposes could be identified by the HELCOM PRESSURE Group when HELCOM assessments are published. The HELCOM secretariat could send the relevant information directly to the EIPPCB. Alternatively, the possible HELCOM information could be fed into the BREF process through national TWG members taking part in the BREF processes.

Proposals on how HELCOM could benefit from use of data in EU BREFs (and HAZBREF project)

HELCOM could benefit from updating regularly the HELCOM recommendation "25/2 Reduction of emissions and discharges from industry by effective use of BAT" with information on relevant substances for the different industrial sectors by utilising data collected and produced in the IED BREF process. The information on specific substances could be combined with possible information of concern from Baltic Sea point of view from HELCOM assessments and pollution compilations**.**

The information provided by BREFs (and HAZBREF) on the relevance of specific hazardous substances for the different industrial sectors could also be used to:

- Update the list of HELCOM priority hazardous substances.
- Target actions of the HELCOM BSAP to reach the goal for hazardous substances.
- Elaborate specific regional actions in the national implementation programmes of the HELCOM BSAP concerning hazardous substances.

Accordingly, the information from EU BREFs and the HAZBREF project on hazardous substances relevant for different industrial sectors could be used to update the HELCOM indicators. It would be worthwhile to include indicators of relevance to the industrial sectors that are of importance in the Baltic Sea region. Hence, the information from monitoring the progress in status in the sea and pollution loads would be better connected to industrial sources in the Baltic Sea region than currently.

The information on industry relevant substances would also be helpful to enforcement authorities in the Baltic Sea countries when setting requirements for industry concerning specific substances.

HELCOM PRESSURE could be the responsible group for updating the substance lists in the HELCOM Recommendation 25/2 for the different industrial sectors based on data in EU BREFs. This could be handled by inserting a regular point to the meeting agenda of HELCOM PRESSURE to remind on the need to look at recently published BREFs/BAT conclusions. HELCOM could possibly also use directly the tool to be developed in HAZBREF to find relevant substances for the different industrial sectors.

Annex 2: Work practice of Member State authorities

In this annex of the report, the results of 15 interviews with administrative authorities from project partner countries (DE, EE, FI, PL, SE) are summarized. The interviews aim at analysing the permitting and supervising activities of industrial installations at the interface of different EU legislation regarding hazardous substances. The findings are indicative but not necessarily representative for whole country.

1. The implementation of IED BAT conclusions and REACH Information in different Member States

a) Implementation of IED BREFs on Administrative Level during Permitting and Supervision Processes

On administrative level the practical use of IED BREFs and its BAT conclusions differ from Member State to Member State. Differences are mainly caused by the institutional and legal approach followed. Very few Member States transpose BAT conclusions first into general binding rules in accordance with articles 6 and 17 IED and only then implement BATs via permit requirements. In contrast, the majority of Member States use BAT conclusions directly when setting permit conditions. These two different approaches in the EU influence also the statements gathered in the interviews.

In **Germany** BAT conclusions need to be transposed into national legislation in order to become mandatory. Before that they can only be regarded as source of information. For a number of reasons, such as the complexity of the German federal institutional set-up, the relatively slow legislative procedure, and regular attempts of lobby groups influencing the transposition process, the transposition of BAT conclusions into subordinate technical regulations cannot always be finished in the scheduled year after publication of the BAT conclusions. In the meantime this may lead to legal uncertainties and inefficiencies both on administrative and operator levels. Transposition in national legislation is carried out either by administrative provisions (e.g. Technical Instructions on Air Quality Control – "*Technische Anleitung zur Reinhaltung der Luft, TA Luft*") or mostly by directly binding Ordinances/Statutory Order (e.g. *BImSchV, Abwasserverordnung*). In most cases only the provisions created via national transposition of BAT conclusions are used for the assessment and update of permit conditions by competent authorities. BAT conclusions can be imposed directly after transposition in the permitting process. Legal technical provisions are normally referred to in application documents. There, a statement of the applicant how to comply with BAT conclusion requirements is required. BAT conclusions transposed by statutory order/ordinances have to be complied with by the operators directly; BAT conclusions transposed by administrative provisions, such as TA Luft updates, have to be imposed by order of the permitting authority to become effective.

In **Finland** the implementation and usage of BAT conclusions concerning hazardous substances in permitting and supervision procedures depends on the respective authority. Whereas the Finish Safety and Chemical Agency (TUKES) does not use BAT conclusions but concentrates on national law during its permitting activities, the Regional Centres for Economic Development, Transport and the Environment (ELY) rely on the information given by BAT conclusions within its supervising process especially regarding the use, handling and storage of hazardous substances. Furthermore, the State Administrative Agencies (AVI) use BAT conclusions as the main document for setting requirements in the environmental permits.

In **Estonia** the BAT conclusions are transposed directly into Estonian law and then used during permitting and supervisory activities by the competent authorities.

Polish authorities, especially the Marshal Offices of Voivodship are using BAT conclusions and the baseline report from the operator during the permitting and supervision process of IED installations. However, due to the fact that the BAT conclusions are often not related to the concrete management of hazardous substances used within or released by an installation, it is difficult to use BAT

conclusions when defining required actions and measures to minimize the risk of these substances for soil and water environment. In the prescriptive part of the permit, BAT conclusions regarding the management of hazardous substances do not play a decisive role.

In **Sweden** the BAT conclusions are implemented as general binding rules. For each new BAT conclusion document, a couple of articles are added to an ordinance[130], which gives the BAT conclusion document the status of a Swedish legislative act. Of this follows, that the Swedish language versions of the BAT conclusions apply as they are written. In the Industrial Emission Regulation (Industriutsläppsförordningen) it is laid down that the BAT-AEL upper values apply as ELVs. When the 4-year period has passed, it is the responsibility of the operator to fulfil the ELVs (i.e. BAT-AEL upper values), or to have received a decision from the Competent authority on a derogation according to (the article in Industriutsläppsförordningen which implements) article 15.4 of the IED.

In parallel to this, the permit procedure and the environmental permit legislation (which is part of the Environmental Code, the Swedish overarching environmental law) runs on untouched, as it has done since 1969. The conditions in the permits, and the ELVs, are actually quite often set stricter than the BAT-AEL upper values.

b) Implementation of IED BREFs by Operators

All countries stated that operators of installations are familiar with BAT conclusions as they are the key requirements in the permitting and supervision process in every country.

As stated above, in **Germany** operators are required to hand in application documents in the course of the permitting process. Thereby, operators must provide evidence that they comply with the requirements of the BAT conclusion and how this is done. Regarding supervision processes– depending on the way of transposition into national law–the operators either have to comply directly with the BAT-based requirements or in accordance with the administrative orders given by the supervising body. Both options are controlled during IED inspections. In case of delayed national transposition of BAT conclusions it is sometimes hard to keep the 4-year-target (acc. to Art. 21 (3) IED) for adapting the installations.

In **Estonia**, BAT conclusions are commonly used by Estonian consultants that support operators during the application for an integrated environmental permit. During the permit application operators must fill in an annex of their application where they reveal how they comply with the requirements of the BAT conclusion.

Polish industrial permits contain BAT conclusions in the descriptive section of the permit, which leads to requirements imposed by the permitting authorities. In **Finland** operators have to fill in an annex in their application where they reveal how they comply with the requirements of the BAT conclusion.

In **Sweden** companies are obligated to set up and update a list, which contains all chemicals and hazardous substances used during operation. This data is publicly accessible and controlled by the Swedish Chemical Agency and it contains information on every substance used in each company. Through this, it can be checked whether the restrictions placed on a substance or a group of substances are in compliance with the provisions set out by Government decrees or regulations by the Swedish Chemical Agency.

Operators very seldom use BREFs or BAT conclusions as a source of additional information and measures to restrict or diminish the use and release of hazardous substances. BREFs and BAT conclusions are generally not considered on their own if this is not required by the governmental authorities.

[130] Industriutsläppsförordningen 2013:250 at http://www.riksdagen.se/sv/dokument-lagar/dokument/svensk-forfattningssamling/industriutslappsforordning-2013250_sfs-2013-250.

c) Implementation of REACH Information

In this section the use of information from safety data sheets (SDS) as well as information gained by the authorisation and restriction process or proposed risk reduction measures from the REACH context during the permitting and supervision process is briefly outlined.

In **Germany,** SDSs regularly need to be handed in as part of the application documents in permitting processes for installations. They are a valuable document for competent authorities when assessing the composition of used substances and mixtures particularly if the substances are referred to under trade names. The information contained in SDSs assist giving a first insight of ecotoxicological and physical-chemical parameters, occupational safety measures and potential incident impacts. If considered relevant, these aspects have to be assessed in more detail using additional information sources. SDSs are well known and used by most operators.

Information from authorisation and restriction processes in the REACH context generally are not taken into account in permitting processes for installations and not demanded as part of the application documents, although several of the interview partners have spontaneously regarded this being a possible deficit. Additional REACH information might be considered concerning substances not fully regulated in European or German legislation. In supervision processes there are huge differences between the Federal States of Germany regarding the fact whether REACH information is assessed during IED-inspections or not, or whether there are separate REACH inspections.

Estonian authorities do not use the information gathered by SDSs in the permitting process albeit SDSs have to be handed in together with the permit application. In Estonia, operators have to educate their workers in order to fulfil the safety requirements for handling and use of hazardous substances by using data from SDSs. Furthermore, operators have to ensure that the handling of hazardous substances is in line with the information provided in the SDS.

In **Poland,** there is no legal obligation to use data from the REACH context during the permitting or supervision process of industrial installations neither by authorities nor by operators. The information gained by the SDSs are however used by the operator at the stage of preparing the baseline reports (Art. 22 (2) IED). In Poland, SDSs are commonly available at industrial installations where hazardous substances are used and stored in order to guarantee workers' safety.

Also, in **Finland** it is not legally binding for authorities to use data from the REACH context. However, it depends on the awareness of the staff granting the permit e.g., if the SDSs are used as a source of information. During supervision of installations, the compliance with REACH requirements such as the requirement from authorization and restriction process is usually checked. Nevertheless, data gained from the REACH registration dossier or risk reduction measures are rarely used neither in the permitting nor in the supervision procedure. In order to harmonize this system of different data formats, Finland is elaborating an electronic tool (KemiDigi) in order to assist the supervision of REACH requirements. Finnish operators use SDSs for worker's safety only.

In **Sweden,** REACH related information, data from restriction and authorisation process as well as from SDSs are frequently used in the permitting process, although provisions from the REACH Regulation is not a legal basis when elaborating permit conditions by the Swedish authorities. Swedish companies mainly use SDSs for reasons of occupational safety and less for meeting environmental standards or proper handling of environmentally hazardous substances.

2. The enforcement of the Water Framework Directive (WFD), the Marine Strategy Framework Directive (MSFD), and HELCOM Recommendations during permitting and supervision of industrial installations

Water Framework Directive (WFD) priority substances and HELCOM recommendations could also play an important role in permitting and supervising. In practice, the relevance in enforcing their provisions differs between interviewed competent authorities.

In **Germany,** the provisions concerning the reduction and control of WFD priority substances are transposed into national law (Regulation for Surface Waters – OGewV) and considered in permitting and supervision processes of industrial installations. During permitting of waste water discharge the technical departments that fix technical permit conditions do this in cooperation with the water quality and water protection department. In some Federal States, *e.g.* in North Rhine-Westphalia, there are lists of River Basin Specific Pollutants that comprise more priority substances to be considered and met during permitting of discharges than those regulated on European (Directive 2013/39/EU) or national level (OGewV).

As far as HELCOM recommendations are concerned, they are not directly applied in permitting or supervision processes. The competent authorities responsible for installations located at the shore might have a different practise but this could not be further explored in the scope of this report.

In **Estonia,** the environmental quality standards laid down in the EQSD Directive for priority substances of the WFD (Directive 2013/39/EU), which has been transposed almost literally into the Estonian Water Act, are considered when setting emission limits in permits for waste water discharge. During the permitting process, operators have to reveal which substances they use from the "list of priority substance" which according to the Estonian Water Act contains the substances listed in the WFD EQS Daughter Directive plus 16 additional substances included by Estonia. The HELCOM recommendations are not considered in the permitting and supervision procedure in Estonia.

In **Finland,** the WFD requirements concerning priority substances are a key element considered by permitting authorities when setting Emission Limit Values (ELVs) for an IED installation. In case that the EQS from Directive 2013/39/EU are supposed to be exceeded when (only) applying BAT-AEL from BAT conclusions, the ELVs finally fixed are lower than the BAT-AEL range or move at least to the lower end of that range. However, in permit situations the information on the occurrence of WFD priority substances is often missing. In case priority substances are addressed in permit conditions for an installation, Finnish authorities also supervise the emissions of these priority substances and the compliance of ELVs. Finnish authorities do not use HELCOM recommendations in permitting of industrial installations.

Poland's authorities do not take HELCOM recommendations related to hazardous substances into account when permitting and supervising industrial installations. Based on the Environmental Protection Law, integrated permits set conditions for discharge of waste water into water bodies since 2018. This law does however not contain a full list of priority substances in accordance with the WFD.

In **Sweden,** authorities do consider priority substances of the WFD/EQSD in the permission and supervision process of industrial installations. Companies are obliged to ensure the compliance of the set emission limit values of priority substances in water bodies or biota. HELCOM recommendations are not considered, due to the fact that they are relatively outdated.

3. Consideration of Circular Economy aspects in permits

In **Germany** waste streams are controlled [131] by the waste management authorities. Authorities also carry out controls of waste mixing restrictions that apply if mixing prevent recycling options or lead to enrichment of hazardous substances in the recycled material (see § 9 KrWG). Reducing hazardousness of waste is also of interest of operators since disposal costs increase significantly according to hazard characteristics of waste.

[131] §§ 49 – 55 "Gesetz zur Förderung der Kreislaufwirtschaft und Sicherung der umweltverträglichen Bewirtschaftung von Abfällen" (Kreislaufwirtschaftsgesetz – KrWG, engl.: German Waste Management and Product Recycling Act) in connection with: "Verordnung über die Nachweisführung bei der Entsorgung von Abfällen" (Nachweisverordnung – NachwV, engl.: Ordinance on Waste Disposal and Recovery Records).

Except **Swedish** and **Finnish** authorities, who are treating aspects of circular economy in permit procedures, hardly any of the interviewed authorities responded that circular economy aspects play a relevant role in permitting and supervising of industrial installations. It seems to be a rather new topic for integrated permits or at least partially out of the scope of permitting (gate-to gate approach; other steps of the value chain).

4. Difficulties and Challenges

Regarding the implementation of provisions for hazardous substances for industrial installations, the interviewed authorities agreed on the main challenges and shortcomings. Problems were seen concerning enforcement and the often incomplete content of BAT conclusions regarding hazardous substances.

a) Enforcement difficulties

The interviewed experts from competent authorities mentioned as a key challenge the lack of sufficient and qualified staff together with the lack of time during the permitting process. Insufficient knowledge of substance-related issues within the permitting authorities as well as the missing of detailed measures regarding the management and handling of hazardous substances in BAT conclusions may lead to enforcement difficulties. Furthermore, poor cooperation and exchange between the different competent authorities involved in the assessment may create obstacles and inefficiencies for operators concerned.

b) Difficulties because of incomplete BAT conclusions regarding hazardous substances

Many interviewed experts stated a lack of clearly defined links and connections between regulations regarding the management and handling of hazardous substances. These difficulties were mainly seen on a legislative level due to inconsistent provisions set up by different legislative frameworks and, specifically, the often weak integration of concepts and approaches prescribed in the different legislations on hazardous substances. Due to the fact that the BAT conclusions are one of the main legal source based on which authorities grant permissions, authorities expressed the wish to dispose of more complete BAT conclusions concerning the issue of hazardous substances. What is not addressed in BAT conclusion often is very hard to be defended by authorities against operators in case that they question requirements on hazardous substances.

According to the interviewed experts, BAT conclusions are often drafted too generic. They are often not specific enough regarding the use and handling of hazardous substances and alternatives for substitution. BAT conclusions are mainly concentrating on process-integrated or end-of-pipe techniques rather than on the use, application and prevention of release of hazardous substances itself. This makes it more challenging for competent authorities to fix appropriate, ambitious and innovative permit conditions with respect to the reduction of the use and release of hazardous substances. It is difficult for authorities to discourage the use of certain target chemicals that are regulated under one regulation while the use of the same substance is still accepted in accordance with another legal framework.

BAT conclusions mainly focus on emission levels and technical measures whereas REACH and WFD regulations apply primarily the perspective of effect concentrations for human health and the environment. One of the interviewed experts found it difficult to define an ELV in the permit decision when the associated BAT levels are presented as a range instead of a distinct value. The current political framework in most Member States leads to difficulties when trying to set any other emission limit value than the upper end of the BAT-AEL-range. Recently, even a decision of a scientific panel on German Federal State level that recommended a lower value than the upper BAT-AEL range was not accepted by the Administrative Court and refused as unjustified[132].

[132] VG Aachen, Urteil vom 11. Oktober 2017 – 6 K 996/16 –, Achim Halmschlag, juris PR-UmwR 1/2018 Anm. 3 (Anmerkung), Stefan Altenschmidt, Johannes Stickel, I+E 2018, 67-72 (Entscheidungsbesprechung).

Annex 3: Proposals from local authorities on how to improve BAT conclusions on hazardous chemicals

The following proposals on how to improve BAT conclusions on hazardous chemicals are derived from various interviews, which were carried out during the elaboration phase of this report with permitting and supervising authorities of IED installations of five project partner countries (DE, EE, FI, PL, SE). The proposals do not necessarily give a representative picture of the situation in the EU but are rather highlighting some aspects that were considered relevant by the respondents.

It has been stressed that there is a variety of European legislation dealing with certain aspects of hazardous substances which makes the work of the Member States authorities and operators more difficult and challenging when it comes to implementation. All interviewed partners recommended to *enrich the BAT conclusions with key information on hazardous substances* by better linking provisions from other European legislation/regulations such as REACH, WFD, and the POPs Regulation with the permit conditions of integrated IED-permits. This was not a statement for copying and pasting provisions that already exist in other EU regulations into BAT conclusions. Instead, BAT conclusions could raise awareness on relevant substances-related issues spotted elsewhere and present techniques and options to prevent and reduce the release of hazardous substances. Often, provisions from other regulatory frameworks are not precise enough at the level of measures to facilitate implementation. Here, BAT conclusions could play a role. However, the level for integrating all the relevant provisions should remain on the national or the regional/local permitting level.

Although France did not participate in the interviews carried out (since France is not a project partner country), it shared an interesting practice that tries to bring together the variety of European legislation concerning hazardous substances. France has published a national guidance for drafting integrated permits, and in this guidance there are also provisions regarding chemicals (examples):

- An inventory of all chemicals (substances and mixtures) that are stored on site has to be kept available to the enforcement authorities.
- All SDS have to be available and, if relevant, authorisations for biocidal products.
- Provisions on labelling of containers, pipes, etc. according to CLP Regulation.
- Operators have to make sure that the use of substances and products present on site are not prohibited according to the chemicals regulations (REACH, biocides, etc.). In case that a substance is used for which an exemption is granted, the justification shall be kept available to the enforcement authorities.
- Operators must dispose of an updated list of substances used as far as included on the candidate list for authorisation. This list shall be easily available to the enforcement authorities.
- Operators must inform the enforcement authorities if one of the substances is included in Annex XIV in a specific period of time. In this case, operators have to explain how compliance with REACH-provisions will be met (e.g. substitution, application for an authorisation).
- If an operator benefits from an authorisation, a copy shall be available to the enforcement authorities, including the risk management measures that are foreseen.
- Operators have to keep available to the enforcement authorities all the risk management measures that are implemented including monitoring results of substances releases into the environment.

This kind of guidance document drafted at European level could possibly assist regional/local competent authorities when drafting permit conditions on chemicals or hazardous substances.

The interviews revealed a diverse situation: On the one hand, there is a wish of some authorities to receive *guidance* on the implementation and application of different legal frameworks that address hazardous substances during their IED permitting and supervision activities. This may also contribute to a more comparable quality of the permits and level playing field within the EU. However, there was no clear view whether such a guidance/further recommendations could be best elaborated on national or EU level. As mentioned earlier, France already has a national guidance to draft the permits that include provisions on chemicals. In France, it is the same enforcement authority which drafts the permits, controls compliance and enforces the chemicals regulations (concerning environmental aspects). In other Member States, also opposed, overlapping or fragmentary permitting and supervising practice at regional level has been reported. Sometimes a lack of communication and exchange between different permitting and supervising authorities dealing with the use, management and release of hazardous substances is observed. Maybe for these cases European guidance might be helpful.

Additionally, it was proposed that BAT conclusions should contain key requirements for hazardous substances that are often used and possibly released from a given industrial sector. Furthermore, the inclusion of proposals for (less dangerous) substitutes of substances could lead to promote the overall aim of reducing hazardous substances. Another proposal was to make BAT conclusions more precise and specific, e.g. by integrating mandatory measures on the safe use and avoidance of release of priority substances.

Integration of REACH information into BREFs and BAT conclusions was considered helpful regarding restrictions, limited use and substitution possibilities of hazardous substances. The focus here is the level where BREFs can contribute to assist the implementation of REACH (available techniques, alternatives, appropriate abatement techniques) or be complementary to REACH provisions. Duplication of provisions from different regulation should be avoided.

Many interviewed partners recommended the setting of distinct emission levels (with the option of limited exceptions in case of being disproportionate in the specific cases) instead of the current practice of setting a (sometimes relatively wide) range of BAT associated emission levels. This could also increase harmonisation of technical standards throughout Europe.

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