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Directorate B – Fair and Sustainable Economy
Circular Economy and Sustainable Industry
European IPPC Bureau

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KICK-OFF MEETING
FOR THE DRAWING UP OF THE
BEST AVAILABLE TECHNIQUES (BAT)
REFERENCE DOCUMENT FOR THE
PRODUCTION OF LARGE VOLUME INORGANIC CHEMICALS
(LVIC BREF)

Hybrid meeting, 24 – 28 October 2022

MEETING REPORT

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ACRONYMS

General acronyms – Definitions

Acronym	Meaning
AN	Ammonium nitrate
AOX	Adsorbable organically bound halogens
BAT	Best Available Techniques (as defined in Article 3(10) of the IED)
BAT-AEL	Emission level associated with the BAT (as defined in Article 13(3) of the IED)
BAT-AEPL	BAT-associated environmental performance level (as described in Section 3.3 of Commission Implementing Decision 2012/119/EU). BAT-AEPLs include BAT-AELs
BATIS	BAT information system, accessible at https://eippcb.jrc.ec.europa.eu/batis/
BP	Background Paper
BREF	BAT Reference Document (as defined in Article 3(11) of the IED)
BREF Guidance	Commission Implementing Decision 2012/119/EU laying down rules concerning guidance on the collection of data and on the drawing up of BAT reference documents and on their quality assurance
CAK BREF	BAT Reference Document for the Production of Chlor-alkali (2014)
CAN	Calcium ammonium nitrate
CBI	Confidential Business Information
CN	Calcium nitrate
COD	Chemical oxygen demand
CWW BREF	BAT Reference Document for Common Waste Water and Waste Gas Treatment/Management Systems in the Chemical Sector (2016)
D1	First draft
ECHA	European Chemicals Agency
EFS BREF	BAT Reference Document on Emissions from Storage (2006)
EIPPCB	European IPPC Bureau within Directorate B of the Commission's Joint Research Centre
ELV	Emission limit value
ENE BREF	BAT Reference Document for Energy Efficiency (2009)
ETS	Emission trading scheme (established under Directive 2003/87/EC)
EU	European Union
FMP BREF	BAT Reference Document for the Ferrous Metals Processing Industry (2022)
ICS BREF	BAT Reference Document on Industrial Cooling Systems (2001)
IED	Industrial Emissions Directive (2010/75/EU)
IPPC	Integrated Pollution Prevention and Control
IPPC Directive	Integrated Pollution Prevention and Control Directive 2008/1/EC (repealed and replaced by the IED)
KEI	Key environmental issue (for this BREF drawing up process)
KoM	Kick-off Meeting
LCP BREF	BAT Reference Document for Large Combustion Plants (2017)
LVIC BREF	BAT Reference Document for the Production of Large Volume Inorganic Chemicals

LVIC-AAF BREF	BAT Reference Document for the Manufacture of Large Volume Inorganic Chemicals – Ammonia, Acids and Fertilisers (2007, adopted under the IPPC Directive)
LVIC-S BREF	BAT Reference Document for the Manufacture of Large Volume Inorganic Chemicals – Solids and Others Industry (2007, adopted under the IPPC Directive)
MCP Directive	Medium Combustion Plants Directive (2015/2193/EU)
MS	Member State (of the European Union)
N _{inorg}	Total inorganic nitrogen
NFM	Non-Ferrous Metal(s)
NO _x	The sum of nitrogen monoxide (NO) and nitrogen dioxide (NO ₂), expressed as NO ₂
NPK	Nitrogen-, phosphorus- or potassium-based fertilisers
PAHs	Polycyclic aromatic hydrocarbon(s)
PCC	Precipitated calcium carbonate
PM	Particulate matter
PM ₁₀	Particulate matter which passes through a size-selective inlet with a 50 % efficiency cut-off at an aerodynamic diameter of 10 µm
PM _{2.5}	Particulate matter which passes through a size-selective inlet with a 50 % efficiency cut-off at an aerodynamic diameter of 2.5 µm
REACH	Regulation (EC) No 1907/2006 concerning the Registration, Evaluation, Authorisation and Restriction of Chemicals, administered by ECHA
SCR	Selective catalytic reduction
SNCR	Selective non-catalytic reduction
SO _x	The sum of sulphur dioxide (SO ₂), sulphur trioxide (SO ₃), and sulphuric acid aerosols, expressed as SO ₂
TBD	To be defined
TOC	Total organic carbon
Total N	Total nitrogen
TSS	Total suspended solids
TWG	Technical Working Group
TXT	BAT Reference Document for the Textiles Industry (2023)
UAN	Urea ammonium nitrate
WFD	Directive 2000/60/EC of the European Parliament and of the Council establishing a framework for the Community action in the field of water policy
WGC BREF	BAT Reference Document for Common Waste Gas Management and Treatment Systems in the Chemical Sector (2023)
WI BREF	BAT Reference Document for Waste Incineration (2018)

Chemical formulas

As	Arsenic
Ca	Calcium
CaC ₂	Calcium carbide
CaCl ₂	Calcium chloride
Cd	Cadmium
CH ₄	Methane
Cl ₂	Chlorine
CO ₂	Carbon dioxide
CO	Carbon monoxide
Cr	Chromium
Cu	Copper
FeCl ₂	Ferrous chloride
H ₂ S	Hydrogen sulphide
H ₂ SO ₄	Sulphuric acid
HCl	Hydrogen chloride
HF	Hydrogen fluoride
Hg	Mercury
HNO ₃	Nitric acid
MgO	Magnesium oxide
Mn	Manganese
N ₂ O	Dinitrogen oxide (nitrous oxide)
NaCl	Sodium chloride
NH ₃	Ammonia
Ni	Nickel
NO _x	Nitrogen oxides
O ₂	Oxygen
P ₂ O ₅	Phosphorus pentoxide
Pb	Lead
S	Sulphur
SO ₂	Sulphur dioxide
SO ₃	Sulphur trioxide
Ti	Titanium
TiO ₂	Titanium dioxide
V	Vanadium
Zn	Zinc

Participants in the Kick-off Meeting

Acronym	Participant	Number of participants in the KoM
Member States		
AT	Austria	3
BE	Belgium	2
BG	Bulgaria	1
CZ	Czechia	2
DE	Germany	6
DK	Denmark	3
ES	Spain	10
FI	Finland	2
FR	France	3
IT	Italy	3
NL	Netherlands	2
PL	Poland	7
PT	Portugal	3
SE	Sweden	4
SK	Slovakia	3
Other countries		
NO	Norway	2
Environmental non-governmental organisations		
EEB	European Environmental Bureau	4
Industry associations		
CEFIC	European Chemical Industry Council	29
CEFIC (ICBA)	International Carbon Black Association	1
CEFIC (INCOPA)	European Inorganic Coagulants Producers Association	1
CEFIC (TDMA)	Titanium Dioxide Manufacturers' Association	2
EIGA	European Industrial Gases Association	2
EUROFER	European Steel Association	6
EUROMETAUX	European Non-ferrous Metals Association	6
EUROMETAUX (IZA)	International Zinc Association	2
EUROMINES	European Association of Mining Industries, Metal Ores & Industrial Minerals	1
Fertilizers Europe	Association representing the major fertiliser manufacturers in Europe	8
FuelsEurope	European Petroleum Refiners Association	2
IMA Europe	Industrial Minerals Association	5
European Commission		
DG ENV	Directorate-General for the Environment	2
JRC - EIPPCB	Joint Research Centre - European IPPC Bureau	10
Total		137

1 INTRODUCTION

1.1 Kick-off Meeting for the drawing up of the LVIC BREF

The Technical Working Group (TWG) for the drawing up of the Best Available Techniques Reference Document for the Production of Large Volume Inorganic Chemicals held its Kick-off Meeting (KoM), in a hybrid format, in the period from 24 to 28 October 2022.

TWGs are set up to facilitate the exchange of information under Article 13(1) of the [Industrial Emissions Directive \(2010/75/EU\)](#).

The drawing up process of the LVIC BREF started in November 2021 with the activation of the TWG by the EIPPCB. Subsequently, the EIPPCB sent out a call for initial positions on 18 February 2022, with a deadline for responses of 22 April 2022. A total of 23 stakeholder groups responded: 14 Member States (AT, BE, CZ, DE, ES, FI, FR, IT, NL, PL, PT, SE, SK and SI), 8 industry associations (CEFIC (including CEFIC sector groups), EIGA, EUROFER, EUROMETAUX (including IZA), Euromines, Fertilizers Europe, Fuels Europe, IMA Europe) and 1 environmental NGO (EEB). Based on these responses, a Background Paper (BP) was prepared by the EIPPCB to facilitate the discussion at the Kick-off Meeting. The BP lists the proposals of the EIPPCB made in the call for initial positions, summarises and assesses the initial positions of TWG members on those proposals, and presents the modified EIPPCB proposals. Following the assessment of initial positions, the BP identified items for discussion (BP Section 2) and not for discussion at the KoM (BP Section 3).

The EIPPCB uploaded the BP to BATIS on 15 July 2022 and organised the KoM, as a hybrid meeting, from 24 to 28 October 2022 (see Table 1).

The meeting agenda included presentations and discussions on, for example, scope, key environmental issues for emissions to air and to water as well as for consumption of energy, water, key raw materials and other items relevant for the drawing up of the LVIC BREF. In response to the reactions and comments on the BP received by 5 October 2022, it was decided to discuss at the KoM additional items that were originally proposed as not for discussion in the BP (see Table 1).

The Head of the EIPPCB and a permanent staff member of the EIPPCB chaired the KoM. The LVIC BREF co-authors (i.e. the LVIC BREF author team of the EIPPCB) introduced each topic and led the technical discussions. The TWG's agreement was sought on the following key items: 1) scope of the LVIC BREF, 2) interface with other BREFs, 3) key environmental issues, 4) confidentiality issues associated with the data collection and next steps for the drawing up of the LVIC BREF.

All items were discussed in a similar manner. First, the EIPPCB presented the original proposal or request for information as included in the call for initial positions. This was followed by an overview of the initial positions of TWG members and the subsequent assessment by the EIPPCB. Afterwards, the modified EIPPCB proposal was presented. TWG members then had the opportunity to discuss the proposal on the table, and reach a conclusion by consensus.

Table 1: Agenda of the LVIC TWG KoM

Item	BP Section #
Day 1: 24 October 2022	
Welcome, Meeting rules	–
Introductory presentation by DG ENV	–
Introductory presentation by the EIPPCB – The Sevilla process	–
Introductory presentation by the EIPPCB – Overview of the work carried out so far on the LVIC BREF drawing up, Structure of the meeting	–
Scope: <ul style="list-style-type: none"> • LVIC production processes to be covered • Other activities (independently operated treatment of waste water and combined treatment of waste water from different origins) • Interface with LCP BREF and MCP Directive • Process furnace/heaters 	2.1 2.1.2.2 – 2.1.3.1 – 2.1.3.2 – 2.1.1 – 2.1.2.1 2.1.3.3
Day 2: 25 October 2022	
Production of Ammonia/KEIs for emissions to air and water	2.2.3.4 – 2.2.4.4
Production of Hydrofluoric Acid/KEIs for emissions to air and water	
Production of Nitric Acid/KEIs for emissions to air and water	
Production of Phosphoric Acid/KEIs for emissions to air and water	
Production of Sulphuric Acid/KEIs for emissions to air and water	
Production of AN and CAN/KEIs for emissions to air and water	
Production of NPK and CN/KEIs for emissions to air and water	
Production of Superphosphates/KEIs for emissions to air and water	
Production of Urea and UAN/KEIs for emissions to air and water	
Day 3: 26 October 2022	
KEIs for emissions to air for process furnaces/heaters and drying processes	–
Production of Inorganic Phosphates/KEIs for emissions to air and water	2.2.3.4 – 2.2.4.4
Production of Soda Ash/KEIs for emissions to air and water	
Production of PCC/KEIs for emissions to air and water	
Production of Calcium Chloride/KEIs for emissions to air and water	
Production of Sodium Chlorate/KEIs for emissions to air and water	
Production of Calcium Carbide/KEIs for emissions to air and water	
Production of Carbon Black/KEIs for emissions to air and water	
Production of Titanium Dioxide/KEIs for emissions to air and water	
Production of Ferrous Sulphate/KEIs for emissions to air and water	
Production of Sodium Silicate/KEIs for emissions to air and water	
Production of Synthetic Amorphous Silica/KEIs for emissions to air and water	
Day 4: 27 October 2022	
Diffuse emissions to air	2.2.3.4
PFAS emissions to water	2.2.4.4
Waste water treatment including pre-treatment	2.2.4.1
Consumption of water and amount of waste water discharged	2.2.5
Consumption and selection of raw materials	2.2.6
Energy efficiency	2.2.7
Residues generation	2.2.8
Expression of BAT-AELs for emissions to air and water	2.3.1.1
Averaging periods for BAT-AELs for emissions to air and water	2.3.1.2 – 2.3.1.3
Environmental performance	2.3.1.4
Confidentiality issues	2.3.1.5
Day 5: 28 October 2022	
Additional production processes proposed to be included in the scope: <ul style="list-style-type: none"> • Potassium Sulphate • Nitrous Oxide 	–
Additional topics proposed for discussion: <ul style="list-style-type: none"> • Interface with ICS BREF • Clarification on EFS BREF, ICS BREF, ENE/EFS/ICS BREFs 	– 3.1.6 3.1.5, 3.1.6, 3.5.2

• Request 16: terms used (waste/residues, circular economy and industrial symbiosis)	3.2.5
Next steps	2.4
Site visits	–
Introduction to BATIS	–
Summary conclusions	–
Closure of the meeting	–

NB: Each working session was preceded by a 30-minute connection period for those participants attending the meeting remotely. BP Section 2 comprises items proposed for discussion and BP Section 3 comprises items not proposed for discussion at the KoM.

This document summarises the discussion at the KoM and presents all conclusions reached by the TWG. It does not list or repeat all interventions but instead provides a synthetic overview of the arguments put forward by TWG members in order to conclude on the proposals.

The following sections (2 – 8) first present the EIPPCB proposal, then a summary of the discussion, and finally the conclusions reached by the TWG. For transparency, all conclusions that were formally adopted by the TWG are shown in grey boxes. For brevity, the presentation of the EIPPCB proposal is omitted where it is similar to the final conclusions (as is generally the case for items not proposed for discussion in Section 3 of the BP).

All presentations given and conclusions reached at the KoM are available to TWG members and observers in BATIS.

As of 27 November 2022, the TWG consists of 210 members representing EU Member States and Norway, industry associations, an environmental NGO, and the European Commission as well as 2 observers from ECHA. Of these, 137 TWG members (56 from Member States plus Norway, 65 from industry, 4 from an environmental NGO and 12 from the European Commission) attended the KoM.

1.2 Introductory presentations

The Head of the EIPPCB opened the KoM and welcomed the TWG members. Following a short presentation on meeting rules, a representative of the Directorate-General for the Environment of the European Commission (DG ENV) gave a presentation: 1) recalling the overall context and legal framework under which the LVIC BREF drawing up process will take place, 2) emphasising new policy priorities towards decarbonisation, zero-pollution and circular economy under the European Green Deal and 3) informing the TWG of the Commission’s proposal for the revision of the IED, as well as on the current ‘chemical’ BREFs overview and the planned initiatives aimed at identifying the next ‘chemical’ BREFs review strategy.

Following the presentation, the TWG asked for some clarifications on certain aspects of the IED revision proposal (currently under interinstitutional discussion), including the estimated timeframe for implementation and potential interaction with the current LVIC BREF.

The EIPPCB gave a general introduction to the *Sevilla process* for drawing up and reviewing BREFs. The presentation highlighted the approach to derive BAT and BAT-associated environmental performance levels (BAT-AEPLs), which is a pragmatic and iterative process involving the whole TWG. In this process, the EIPPCB’s responsibility is to make concrete proposals on BAT and BAT-AEPLs to the whole TWG based on the information collected, especially based on the plant-specific data collected through questionnaires. The TWG is invited to comment on these proposals and to submit any evidence supporting alternative proposals. Decisions on BAT (including on BAT-AE(P)Ls) are taken by consensus by the whole TWG at the Final Meeting.

The work of the LVIC TWG will follow the BREF Guidance for the exchange of information under the IED as stated in [Commission Implementing Decision 2012/119/EU](#).

2 SCOPE OF THE LVIC BREF

2.1 Activities covered

The EIPPCB proposed to discuss the proposals included in BP Sections 2.1, 2.1.2.2, 2.1.3.1 and 2.1.3.2 together, given the correlation between the related contents (hereinafter provided).

In BP Section 2.1, the EIPPCB proposed the following:

- To include in the scope of the LVIC BREF the inorganic chemical production processes specified in the table below, falling under the categories of activities listed in points 4.2 (a), 4.2 (b), 4.2 (d), 4.2 (e) and 4.3 of Annex I to the IED.

List of inorganic chemical production processes proposed to be covered in the LVIC BREF

Inorganic chemical production processes	IED category of activities
Ammonia	4.2 (a)
Hydrofluoric acid	4.2 (b)
Nitric acid	4.2 (b)
Phosphoric acid	4.2 (b)
Sulphuric acid*	4.2 (b)
Inorganic phosphates	4.2 (d)
Sodium carbonate (i.e. soda ash)**	4.2 (d)
Sodium chlorate	4.2 (d)
Precipitated calcium carbonate	4.2 (d)
Calcium carbide	4.2 (e)
Carbon black	4.2 (e)
Titanium dioxide (and related products)***	4.2 (e)
Sodium silicate (water glass)	4.2 (e)
Synthetic amorphous silica	4.2 (e)
Ammonium nitrate and calcium ammonium nitrate	4.3
Nitrogen-, phosphorus- or potassium-based fertilisers (simple or compound fertilisers) and calcium nitrate	4.3
Superphosphates	4.3
Urea and urea-ammonium nitrate	4.3
* Including the production of sulphuric acid associated with various processes (e.g. NFM activities; coke ovens; manufacture of viscose) and physical reconcentration and/or purification of spent sulphuric acid when these processes are integrated with (directly associated with) the inorganic chemical processes listed in this table (such as titanium dioxide production).	
** Including the production of calcium chloride and refined sodium bicarbonate.	
*** Including the production of ferrous chloride, ferric chloride, ferrous sulphate (e.g. copperas and related products).	

- To exclude from the scope of the LVIC BREF the sulphuric acid recovery directly associated with the activities covered by the FMP BREF.
- To include in the scope of the LVIC BREF the following inorganic chemical production processes:
 - Production of calcium chloride produced via different process routes other than from soda ash manufacture, i.e. as a co-product of magnesia (MgO) production, through the acid-limestone production process.

Note:

The detailed structure and layout of the descriptive sections associated with the above-mentioned inorganic chemical processes will be decided when drafting D1, according to both the data and information collected.

In BP Section 2.1.2.2, the EIPPCB proposed the following:

- To cover in the LVIC BREF the electrolysis of brine for the production of sodium chlorate.
- To exclude the chemical activities covered by the CAK BREF from the scope of the LVIC BREF.

In BP Section 2.1.3.1, the EIPPCB proposed the following:

- To include the production of sulphuric acid based on SO₂ gases from NFM activities in the scope of the LVIC BREF.

In BP Section 2.1.3.2, the EIPPCB proposed the following:

- To include the production of sodium silicate (water glass) in the scope of the LVIC BREF.

The EIPPCB KoM proposals were generally supported by the TWG. However, specific comments were voiced by TWG members during discussion of the proposals. The specificities of some production processes, i.e. H₂SO₄ production through processing the flue-gas from NFM activities (information available in the NFM BREF which can be cross-referenced when appropriate) and coke ovens, synthetic amorphous silica production and ferric chloride production, were discussed.

The EIPPCB explained that the peculiarity of the LVIC production processes and related different process routes (e.g. as in the case of H₂SO₄ production) will be addressed in distinct subsections of the relevant descriptive chapters of the LVIC BREF (see Section 5.2). To avoid redundancy, information on techniques applied by the NFM installations and described in the NFM BREF may be cross-referenced where useful.

At the end of the discussion, after considering all the arguments, the consensus reached was as follows.

Conclusions reached by the TWG:

To include in the scope of the LVIC BREF the production processes of the following inorganic chemicals/fertilizers, falling under the categories of activities listed in point 4 of Annex I to the IED.

Ammonia
Hydrofluoric acid
Nitric acid
Phosphoric acid
Sulphuric acid*
Inorganic phosphates
Sodium carbonate (i.e. soda ash)**
Calcium chloride
Sodium chlorate
Precipitated calcium carbonate
Calcium carbide
Carbon black
Titanium dioxide (and related products)***
Sodium silicate (water glass)
Synthetic amorphous silica****
Ammonium nitrate and calcium ammonium nitrate
Nitrogen-, phosphorus- or potassium-based fertilisers (simple or compound fertilisers) and calcium nitrate
Superphosphates
Urea and urea-ammonium nitrate
* Including the production of sulphuric acid associated with various specific processes (e.g. NFM activities; coke ovens; manufacture of viscose) and physical re-concentration and/or purification of spent sulphuric acid when these processes are integrated with (directly associated with) the production processes of the inorganic chemicals listed in this table (such as titanium dioxide production).
** Including calcium chloride and refined sodium bicarbonate when these processes are integrated with (directly associated with) soda ash production.
*** Including ferrous chloride, ferrous sulphate (e.g. copperas and related products) when these processes are integrated with (directly associated with) titanium dioxide production.
**** The production of synthetic amorphous silica derived as a by-product from the production of aluminium fluoride is excluded.

- To exclude from the scope of the LVIC BREF the sulphuric acid recovery directly associated with the activities covered by the FMP BREF.
- To include in the scope of the LVIC BREF the following inorganic chemical production processes:
 - o Production of calcium chloride produced via different process routes other than from soda ash manufacture, e.g. as a co-product of magnesia (MgO) production, through the acid-limestone production process.
- To cover in the LVIC BREF the electrolysis of brine for the production of sodium chlorate.
- To exclude from the scope of the LVIC BREF the chemical activities covered by the CAK BREF.

Notes:

The detailed structure and layout of the descriptive sections associated with the aforementioned chemical processes will be decided when drafting D1, according to both the data and information collected.

The different process routes and peculiarities of the production processes will be addressed in the relevant chapters of the LVIC BREF.

To add in the KoM report that information collected in the context of other BREFs (e.g. NFM) will be cross-referenced in the LVIC BREF.

In BP Section 2.1, the EIPPCB proposed the following:

- To include in the scope of the LVIC BREF hydrogen production (e.g. by steam reforming, partial oxidation or electrolysis) directly associated with the production of ammonia.
- To organise a workshop to gather information and track advances on projects on renewable and low-carbon hydrogen technology planned and/or under construction with the aim of adding a descriptive section in the LVIC BREF.

The proposal was discussed in detail by the TWG.

One NGO stated that H₂ production, in general, is listed as an inorganic chemical process under the chemical industry activities in point 4 of Annex I to the IED and therefore should be included in the LVIC BREF.

Some MS provided information on the current situation in their territories regarding projects dealing with the production of H₂. Several aspects such as the production techniques (e.g. electrolysis), the production capacity and the type of plants (e.g. stand-alone, integral part of larger installations/sites) and the source and availability of energy were discussed. Also, the initiative to plan a workshop on the topic was broadly supported by the TWG, with one of the industry associations offering to organise it.

The EIPPCB reminded the TWG that some H₂ production processes and techniques are already covered by other BREFs (i.e. LVOC, REF, CAK and WGC BREFs) and efforts shall be made to avoid potential overlaps among BREFs.

The EIPPCB clarified that the proposal aimed at capturing the advancements in H₂ production technologies and associated key environmental aspects. To this end, information on, for example, scaling up, KEIs, maturity of projects should be collected from new/existing plants implementing these innovative projects. Considering the gradual evolution of this topic, it was proposed to agree on a dynamic approach, entailing a series of workshops to complement the bulk information collection, with the aim of exploring the state of art, facilitating the LVIC BREF discussions and potentially developing a specific illustrative chapter in the BREF. The details on the exchange of information will be addressed and discussed through this series of workshops.

Following the discussion and considering all the TWG positions, a consensus reached was as follows.

Conclusions reached by the TWG:

- To include in the scope of the LVIC BREF hydrogen production (e.g. by steam reforming, partial oxidation or electrolysis) directly associated with the production of ammonia and sodium chlorate.
- To gather information and track advances on stand-alone hydrogen production processes (e.g. electrolysis), other than those production processes addressed by other BREFs (e.g. stand-alone steam reforming plants covered by the WGC BREF), addressing in particular project and/or installation size, technology maturity and relevant key environmental aspects (e.g. water and energy consumption, energy source, critical raw materials use).
 - To organise workshop(s) to complement the bulk information collection, with the aim of adding a dedicated chapter in the LVIC BREF.
 - The TWG to decide at a later stage, based on the information and data collected, which hydrogen production processes will be reflected in the BAT conclusions.

2.2 Scope interface with other BREFs and legislation

2.2.1 CWW BREF

In BP Section 2.1.2.1, the EIPPCB proposed the following:

- To complement the CWW BREF.
- To focus on key substances/pollutants for emissions to water that are relevant to the inorganic chemical production processes covered by the LVIC BREF, as discussed in the BP.

The TWG broadly agreed with the EIPPCB proposal. During the KoM, several MS proposed to perform an extensive plant-specific data collection on performance levels for a broad range of water substances/pollutants, with the aim of addressing in the LVIC BREF issues not explicitly covered by the CWW BREF and related BAT conclusions.

The EIPPCB clarified that the aim of the proposal is to focus on issues of environmental relevance for water that are specific to the chemical production processes covered by the LVIC BREF (e.g. monitoring and releases of key substances/pollutants, pretreatment/final treatment techniques), by purposefully minimising any potential overlap between the LVIC BREF and the CWW BREF.

At the end of the discussion, the consensus reached was to confirm the EIPPCB proposal with a few minor editorial changes.

Conclusions reached by the TWG:

- To complement the CWW BREF.
- To focus on key substances/pollutants for emissions to water that are relevant to the production processes covered by the LVIC BREF.

Note:

To reflect in the KoM report the key considerations for the interface with the CWW BREF.

2.2.2 WI BREF

In BP Section 3.1.4, the EIPPCB proposed the following:

- To collect data and information on thermal treatment of gaseous effluents from the following inorganic chemical production processes:
 - o ammonia;
 - o calcium carbide;
 - o carbon black;
 - o hydrofluoric acid;
 - o nitric acid;
 - o phosphoric acid;
 - o sodium chlorate;
 - o synthetic amorphous silica;
 - o titanium dioxide and related products.

The proposal was not foreseen for discussion at the KoM. TWG members did not request to discuss it before or during the KoM and thus the EIPPCB proposal was adopted with a minor editorial change.

Conclusions reached by the TWG:

- To collect data and information on thermal treatment of gaseous effluents from the following production processes:
 - o ammonia;
 - o calcium carbide;
 - o carbon black;
 - o hydrofluoric acid;
 - o nitric acid;
 - o phosphoric acid;
 - o sodium chlorate;
 - o synthetic amorphous silica;
 - o titanium dioxide and related products.

2.2.3 EFS BREF

In BP Section 3.1.5, the EIPPCB proposed the following:

- To include emissions from the storage, transfer and handling of materials only where these are directly associated with the inorganic chemical production processes covered by the scope of the LVIC BREF.

The proposal was not foreseen for discussion at the KoM. TWG members did not request to discuss it before or during the KoM and thus the EIPPCB proposal was adopted with a minor editorial change.

Conclusions reached by the TWG:

- To include emissions from the storage, transfer and handling of materials only where these are directly associated with the production processes covered by the scope of the LVIC BREF.

2.2.4 ICS BREF

In BP Section 3.1.6, the EIPPCB proposed the following:

- To exclude emissions from cooling systems from the scope of the LVIC BREF.

The EIPPCB KoM proposal was broadly supported by the TWG. However, one MS proposed to consider to exclude emissions related to indirect cooling systems, in line with the WGC BREF.

Following the consistency-based approach proposed, the consensus reached was as follows.

Conclusions reached by the TWG:

- To exclude emissions from indirect cooling systems from the scope of the LVIC BREF.

2.2.5 LCP BREF and MCP Directive

In BP Section 2.1.3.3, the EIPPCB proposed the following:

- To exclude emissions from the combustion of fuels in plants covered by the LCP BREF or the MCP Directive from the scope of the LVIC BREF.
- To include in the scope of the LVIC BREF emissions from process furnaces/heaters with a total rated thermal input equal to or greater than 1 MW used in the inorganic chemical production processes covered by the LVIC BREF.

The TWG generally agreed with both proposals. During the KoM, two MS suggested to include in the scope of the LVIC BREF all types of process furnaces/heaters used in the inorganic chemical production processes covered by the LVIC BREF, by deleting the reference to the thermal input.

As a result of the discussion, the consensus reached was as follows.

Conclusions reached by the TWG:

- To exclude from the scope of the LVIC BREF emissions from the combustion of fuels in plants covered by the LCP BREF or the MCP Directive.
- To include in the scope of the LVIC BREF emissions from process furnaces/heaters used in the production processes covered by the LVIC BREF.

2.3 Independently operated WWTPs and combined treatment of waste water

In BP Section 2.1.1, the EIPPCB proposed the following:

- To include in the scope of the LVIC BREF the activity listed in point 6.11 of Annex I to the IED (i.e. independently operated treatment of waste water not covered by Directive 91/271/EEC) when the main pollutant load originates from the inorganic chemical production processes covered by the LVIC BREF.
- To include in the scope of the LVIC BREF the combined treatment of waste water from different origins provided that the main pollutant load originates from the inorganic chemical production processes covered by the LVIC BREF.

Some industry associations indicated that the term “main” associated with pollutant load can be subject to more than one interpretation. The EIPPCB reminded the TWG that this aspect will be further clarified in the data collection phase.

The TWG broadly agreed on both proposals. The EIPPCB proposals were confirmed with a few minor editorial changes.

Conclusions reached by the TWG:

- To include in the scope of the LVIC BREF the activity listed in point 6.11 of Annex I to the IED (i.e. independently operated treatment of waste water not covered by Directive 91/271/EEC) when the main pollutant load originates from the production processes covered by the LVIC BREF.
- To include in the scope of the LVIC BREF the combined treatment of waste water from different origins provided that the main pollutant load originates from the production processes covered by the LVIC BREF and that the waste water treatment is not covered by Directive 91/271/EEC.

2.4 Additional proposals for the scope of the LVIC BREF

Two industry organisations and one MS proposed to include in the scope of the LVIC BREF the production of potassium sulphate. Additional information, for example on number of plants, capacity, main production routes, was posted on [BATIS](#).

Another MS noted that potassium sulphate might also be a by-product from biofuel production and it was therefore suggested to identify in advance which type of installations should be covered by the scope of the LVIC BREF.

The EIPPCB clarified that, in line with the general context of the LVIC BREF, the focus should be on stand-alone chemical installations where the production of potassium sulphate is the primary product.

The requests of two different MS to include in the scope of the LVIC BREF the production of inorganic pesticides (Cu, Sn, S compounds), chromic acid, chromium salts and nitrous oxides (N₂O) were withdrawn during the KoM discussion.

At the end of the discussion, after considering all the arguments and information provided, the consensus reached was as follows.

Conclusions reached by the TWG:

- To include in the scope of the LVIC BREF the production of potassium sulphate, falling under the production of nitrogen-, phosphorus- or potassium-based fertilisers (simple or compound fertilisers).
- Not to include in the scope of the LVIC BREF the production of inorganic pesticides (Cu, Sn, S compounds), chromic acid and chromium salts.
- Not to include in the scope of the LVIC BREF the production of nitrous oxide (N₂O).

Note:

To add in the KoM report a reference to cases where potassium sulphate is a by-product of biofuel production.

3 EMISSIONS TO AIR AND TO WATER

3.1 Overview

A large part of the KoM was dedicated to discussing and agreeing upon the key environmental issues (KEIs) to be addressed in the drawing up of the LVIC BREF and the related substances/groups of substances/parameters to be included in the data collection through plant-specific questionnaires. It was also discussed in detail whether data on pollutants emitted to air and to water should be collected with the aim to derive BAT-associated emission levels (BAT-AELs) or with the aim to provide the TWG with evidence to decide at a later stage, based on the data collected, whether BAT-AELs should be derived. This section addresses emissions to air and to water. Parameters related to the consumption of energy, water, raw materials as well as to waste water discharge and residues generation are addressed in Section 4.

Unless specified otherwise, for substances/groups of substances/parameters that are not proposed as KEIs, no data will be collected via questionnaires and no BAT-AELs will be set. However, ‘bulk information’ on associated techniques can be collected by the TWG and may be considered for the drawing up of the LVIC BREF (see Section 7).

In total, nearly 50 substances/groups of substances/parameters, which might potentially be relevant when considering emissions to air and to water from LVIC installations, were included as KEIs, candidate KEIs and/or as contextual information in the BP.

These substances/groups of substances/parameters were assessed by the EIPPCB based on the initial positions provided by TWG members and on available scientific and technical information.

The EIPPCB assessment was based on the following four criteria:

1. the environmental relevance of a substance/group of substances/parameters;
2. the significance of an activity, i.e. its contribution to the overall (industrial) emissions in the EU;
3. the potential of the BREF review for identifying new or additional techniques that would further significantly reduce pollution;
4. the potential of the BREF review to set BAT-AELs that would significantly decrease current emission levels.

The KEI proposals were discussed process by process, reviewing for each production process the proposals for emissions to air and then for emissions to water. This approach was detailed in the BP (Section 2.2.3.4 for emissions to air and Section 2.2.4.4 for emissions to water, respectively) and in the EIPPCB presentation made at the KoM.

This document does not aim to report the detailed discussions at the KoM for each and every substance/group of substances/parameters. Instead, it focuses on the most important points. The list of KEIs included in the drawing up of the LVIC BREF is summarised in Table 2 and Table 3 (Sections 3.2 and 3.3).

3.2 Emissions to air

Following the proposals in BP Section 2.2.3 and the discussions that took place during the KoM for each production process, the conclusions on the KEI discussions for emissions to air are presented in Table 2 below.

During the KoM, the TWG discussions focused on the following:

- For each chemical production process:
 - to identify the substances/parameters to be included as KEIs;
 - to specify for which other substances/parameters the TWG will decide at a later stage, based on the data collected, if BAT-AELs should be derived.
- To include a general section on KEIs for emissions to air relevant to process furnaces/heaters and drying processes associated with the production processes within the scope of the LVIC BREF.
- To include particulate matter PM₁₀ and PM_{2.5} in any instance where dust was included as a KEI.

Table 2: KoM conclusions on discussions regarding KEIs for emissions to air

Production process	KoM Conclusions
Ammonia	<p>To include the following KEIs for emissions to air for the production of ammonia:</p> <ul style="list-style-type: none"> • NO_x (for steam reforming, partial oxidation); • for partial oxidation: SO₂, H₂S and dust including data on PM₁₀ and PM_{2.5}, if available; • NH₃ (associated with NO_x reduction technologies SNCR/SCR). <p>To collect data for CO emissions as contextual information to identify mitigating techniques, to assess the thermal process/combustion efficiency and to update the descriptive section of the BREF.</p> <p>For production processes, to collect data on emissions to air of ammonia, alcohols (including methanol), MDEA and methane. The TWG to decide at a later stage, based on data collected through the questionnaires, whether BAT-AELs for emissions to air should be derived.</p>
Hydrofluoric acid	<p>To include dust including data on PM₁₀ and PM_{2.5} (if available), fluorine and inorganic compounds (as HF), and sulphur oxides (SO_x) as KEIs for the production of hydrofluoric acid.</p>
Nitric acid	<p>To include ammonia (NH₃ - associated with NO_x reduction technologies, e.g. SNCR/SCR) and nitrogen oxides (NO_x) as KEIs for the production of nitric acid.</p> <p>To collect data on nitrous oxide (N₂O) emissions and abatement techniques. The TWG to decide at a later stage, based on the data collected through the questionnaires, whether BAT/BAT-AE(P)Ls should be derived.</p> <p>Note: To reflect in the KoM report the individual positions expressed on this issue.</p>
Phosphoric acid	<p>To include HF and dust including data on PM₁₀ and PM_{2.5} (if available) as KEIs for the production of phosphoric acid.</p>

Sulphuric acid	<p>To include the following KEIs for emissions to air for the production of sulphuric acid: SO₂ and SO₃/H₂SO₄.</p> <p>To collect data, for the various sulphuric acid production routes, on dust including data on PM₁₀ and PM_{2.5} (if available), PCDD/Fs, nitrogen oxides (NO_x), ammonia (NH₃) and metals (associated with the raw materials used in the process, including Hg) via plant-specific questionnaires. The TWG to decide at a later stage, based on the data collected through the questionnaires, whether BAT-AELs for emissions to air should be derived.</p>
AN and CAN	<p>For AN and CAN, to include dust including data on PM₁₀ and PM_{2.5} (if available) and ammonia (NH₃) as KEIs.</p> <p>For CAN (i.e. nitrophosphate process), to collect data for HF. The TWG to decide at a later stage, based on the data collected through the questionnaires, whether BAT-AELs for HF emissions to air should be derived.</p>
NPK and CN	<p>To include dust including data on PM₁₀ and PM_{2.5} (if available), ammonia (NH₃), HF and nitrogen oxides (NO_x) as KEIs.</p> <p>For NPK, to include HCl as a KEI.</p> <p>For NPK (i.e. nitrophosphate production route), to collect data for N₂O. The TWG to decide at a later stage, based on the data collected through the questionnaires, whether BAT/BAT-AE(P)Ls for N₂O for emissions to air should be derived.</p> <p>To collect data for SO₂ and SO₃/H₂SO₄. The TWG to decide at a later stage, based on the data collected through the questionnaires, whether BAT/BAT-AE(P)Ls for SO₂ and SO₃/H₂SO₄ for emissions to air should be derived.</p>
Superphosphates	<p>To include dust including data on PM₁₀ and PM_{2.5} (if available), ammonia (NH₃), HF, HCl as KEIs for the production of superphosphates.</p> <p>To collect data for odour emissions. The TWG to decide at a later stage, based on the data collected through the questionnaires, whether BAT/BAT-AE(P)Ls for odour emissions should be derived.</p>
Urea and UAN	<p>To include dust including data on PM₁₀ and PM_{2.5} (if available) and ammonia (NH₃) as KEIs for the production of Urea and UAN.</p> <p>To collect data for methanol and formaldehyde emissions (i.e. in the case of granulation). The TWG to decide at a later stage, based on the data collected through the questionnaires, whether BAT/BAT-AE(P)Ls for emissions should be derived.</p>
Inorganic phosphates	<p>To include dust including data on PM₁₀ and PM_{2.5} (if available) and phosphate equivalent (P₂O₅) as KEIs for the production of inorganic phosphates.</p> <p>To collect data on HF, HCl, H₂S and TVOC emissions. The TWG to decide at a later stage, based on the data collected through the questionnaires, whether BAT/BAT-AE(P)Ls should be derived.</p>
Sodium carbonate	<p>To include dust including data on PM₁₀ and PM_{2.5} (if available), and ammonia (NH₃) as KEIs for emissions to air for the production of sodium carbonate (i.e. soda ash).</p> <p>To collect data on H₂S. The TWG to decide at a later stage whether BAT-AELs should be derived.</p>
Precipitated calcium carbonate	<p>To collect data on dust emissions including data on PM₁₀ and PM_{2.5} (if available) for emissions to air from the production of precipitated calcium carbonate. The TWG to decide at a later stage, based on the data submitted through the questionnaires, whether BAT-AELs should be derived.</p>

Calcium chloride	To include dust including data on PM ₁₀ and PM _{2.5} (if available) and HCl) as KEIs for the production of calcium chloride.
Sodium chlorate	To include dust including data on PM ₁₀ and PM _{2.5} (if available), and gaseous chlorine (Cl ₂) as KEIs for the production of sodium chlorate.
Calcium carbide	To include dust including data on PM ₁₀ and PM _{2.5} (if available) as a KEI for the production of calcium carbide. To collect data for CO and PAH emissions as contextual information. The TWG to decide at a later stage, based on the data collected through the questionnaires, whether BAT/BAT-AELs should be derived. To collect information on the type of furnaces used (e.g. open/closed).
Carbon black	For processes other than process furnaces/heaters and drying, to include dust as a KEI for the production of carbon black. To collect data regarding emissions of PAHs. The TWG to decide at a later stage, based on the data collected through the questionnaires, whether BAT-AELs should be derived. To collect information on the type of combustion processes used.
Titanium dioxide - chloride route	For process furnaces/heaters and drying, to include gaseous chlorine (Cl ₂) as a KEI. For processes other than process furnaces/heaters and drying, to include dust including data on PM ₁₀ and PM _{2.5} (if available) and HCl as KEIs for the production of titanium dioxide. For processes other than process furnaces/heaters and drying, to collect data regarding emissions of CO as contextual information.
Titanium dioxide - sulphate route	For processes other than process furnaces/heaters and drying, to include dust including data on PM ₁₀ and PM _{2.5} (if available) and sulphur oxides (SO _x) as KEIs for the production of titanium dioxide. To collect data on hydrogen sulphide (H ₂ S) emissions. The TWG to decide at a later stage, based on the data collected through the questionnaires, whether BAT-AELs should be derived. To collect information on the type/composition of ores used as contextual information.
Ferrous sulphate	To include dust including data on PM ₁₀ and PM _{2.5} (if available) as a KEI for the production of ferrous sulphate. To include gaseous chlorine (Cl ₂) as a KEI for the production of iron chlorosulphate.
Sodium silicate	For processes other than process furnaces/heaters and drying, to include dust including data on PM ₁₀ and PM _{2.5} (if available) as a KEI for the production of sodium silicate.
Synthetic amorphous silica	For processes other than process furnaces/heaters and drying, to include dust including data on PM ₁₀ and PM _{2.5} (if available) as a KEI for the production of synthetic amorphous silica. To include gaseous chlorine (Cl ₂) and HCl as KEIs for the production of pyrogenic synthetic amorphous silica.

The notable elements regarding KEIs for emissions to air are summarised below:

- Nitric acid production
 - An extensive discussion on adding N₂O as a KEI took place in terms of its inclusion in the EU-ETS, existing ELVs in MS, techniques applied and data availability. It was highlighted that N₂O is currently a KEI in the LVIC-AAF BREF, where specific BATs and BAT-AELs are identified. It was also discussed that the rationale behind this could in part be related to the exception to include direct greenhouse gas emissions where it is necessary to ensure that no significant local pollution is caused.
 - An industry association, supported by another industry association, stated that N₂O is regulated through the EU-ETS and proved to be effective for the fertiliser sector (e.g. leading to a N₂O emission reduction of > 90 %) over the years.
 - A different industry association emphasised the need to avoid overlaps between IED and ETS regulation.
 - One MS mentioned that including N₂O as a KEI could be justified through Article 9 (1) of the IED and referred also to Article 9 (4) and the possibility that nitric acid plants could be excluded.

As a result of the discussion, the TWG concluded to collect data on N₂O emissions and abatement techniques, in order to decide at a later stage, based on the data collected through the questionnaires, whether BAT/BAT-AE(P)Ls should be derived.

- Titanium dioxide (TiO₂) production via the chloride route
 - A question was raised regarding CO₂ emissions specifically coming from the chlorination step and whether that is covered by the EU-ETS. DG CLIMA was contacted to clarify this aspect. Looking at the chemistry, the chlorination step (which is an exothermic reaction at 1 000 °C) can be understood as combustion (where the fuel is coke and the oxidiser is TiO₂, even though chlorine is added for the reaction to take place). This was confirmed by DG CLIMA. Additionally, the industry association concerned confirmed that TiO₂ plants (both chloride and sulphate routes) have reactors which are typically above 20 MW and subsequently fall under the ETS.
- Superphosphates
 - One industry association mentioned that odours can be generated depending on the phosphate rock origin/composition. One MS reported to have available data on odour emissions from at least one installation.

The TWG concluded to collect data on odour emissions and to decide at a later stage, based on the data collected through the questionnaires, whether BAT/BAT-AE(P)Ls should be derived.

- Urea and UAN production
 - One MS stated that it has available data on methanol and formaldehyde emissions. One industry association mentioned that formaldehyde may appear in the case of the granulation step only.

In addition to the specific points listed above, the topics of diffuse emissions and process furnace/heaters and drying processes were discussed.

The main TWG reactions focused in particular on the identification of the KEIs associated with the process furnaces/heaters and drying processes in relation to the specificity of the production route (e.g. direct/indirect heating, type of fuels) followed in the processes covered by the LVIC BREF.

Following the discussion, a consensus was reached by the TWG as presented in Table 3.

Table 3: KoM conclusions on discussions regarding horizontal topics related to KEIs for emissions to air

Topic	KoM Conclusions
<p>Process furnaces/heaters and drying processes</p>	<p>Depending on the specific production route (e.g. direct/indirect heating, types of fuels), to include the following KEIs for emissions to air of process furnaces/heaters and drying processes directly associated with the production processes covered by the LVIC BREF:</p> <ul style="list-style-type: none"> • NO_x; • SO_x; • Dust; • Metals; • HF; • HCl; • PCDD/Fs; • TVOC. <p>In the case of De-NO_x (SCR, SNCR), to include NH₃ as a KEI.</p> <p>To collect data for CO emissions and O₂ reference content as contextual information.</p>
<p>Diffuse emissions</p>	<p>To collect information on the techniques used to prevent/reduce diffuse (fugitive and non-fugitive) dust and NH₃ emissions and their performance (where monitoring practices are in place), for the production processes covered by the scope of the LVIC BREF.</p> <p>To collect information on diffuse CH₄ emissions when associated with the relevant production processes covered by the scope of the LVIC BREF other than CH₄ supply and distribution systems.</p>

3.3 Emissions to water

Following the proposals in BP Section 2.2.4 and the discussions during the KoM, the conclusions on the KEI discussions for emissions to water are presented in Table 4 below.

During the KoM, the TWG discussions focused in particular on the following:

- For each chemical production process:
 - to identify the substances/parameters to be included as KEIs;
 - to specify for which other substances/parameters the TWG will decide at a later stage, based on the data collected, if BAT-AELs should be derived.
- To include ‘Total inorganic nitrogen’ and ‘Total nitrogen’ as valid parameters for assessing the impact of inorganic components in waste water discharges for the relevant production processes covered by the LVIC BREF.

Table 4: KoM conclusions on discussions regarding KEIs for emissions to water

Production process	KoM Conclusions
Ammonia	To include ‘Total inorganic nitrogen’ and/or ‘Total nitrogen’ as a KEI for emissions to water for the production of ammonia.
Hydrofluoric acid	To include fluorides as a KEI for emissions to water for the production of hydrofluoric acid. To collect data for Total Suspended Solids (TSS), sulphates and metals (e.g. Hg, Cd, Cr, Ni, Cu, Zn, As, Mn, Pb, Ti, V). The TWG to decide at a later stage, based on the data collected through the questionnaires, whether BAT-AELs for emissions to water should be derived.
Nitric acid	Not to include ‘Total inorganic nitrogen’ and/or ‘Total nitrogen’ as a KEI for emissions to water for the production of nitric acid.
Phosphoric acid	To include the following substances/parameters as KEIs for emissions to water for the production of phosphoric acid: <ul style="list-style-type: none"> • Total phosphorus; • Fluorides. • To collect data for Total Suspended Solids (TSS) and metals (e.g. As, Cr, Cu, Ni, Zn, Hg, Cd). The TWG to decide at a later stage, based on the data collected through the questionnaires, whether BAT-AELs on TSS and metals for emissions to water should be derived.
Sulphuric acid	To collect data, for the relevant sulphuric acid production routes and plant configurations, on Total Suspended Solids (TSS), sulphates and metals (e.g. Hg, Cd, Cr, Cu, Ni, Zn, As, Mn, Pb, Ti, V, Co, Se). The TWG to decide at a later stage, based on the data collected through the questionnaires, whether BAT-AELs on TSS, sulphates and metals for emissions to water should be derived. Note: To reflect in the KoM report the discussion related to emissions to water from an installation in BE.
AN and CAN	To include ‘Total inorganic nitrogen’ and/or ‘Total nitrogen’ as a KEI for emissions to water for the production of AN and CAN.

NPK and CN	<p>To include the following substances/parameters as KEIs for emissions to water for the production of NPK and CN:</p> <ul style="list-style-type: none"> • Chlorides (as total); • Total phosphorus; • ‘Total inorganic nitrogen’ and/or ‘Total nitrogen’; • Metals (e.g. Cr, Cu, Ni, Zn, Hg, Cd). <p>To collect data for Total Suspended Solids (TSS), fluorides, TOC/COD and total uranium. The TWG to decide at a later stage, based on the data collected through the questionnaires, whether BAT/BAT-AE(P)Ls for emissions to water should be derived.</p> <p>Note: To reflect in the KoM report the discussion related to the link between chlorides emissions and the quality of the receiving water body.</p>
Superphosphates	<p>To include the following substances/parameters as KEIs for emissions to water for the production of superphosphates:</p> <ul style="list-style-type: none"> • Total phosphorus; • ‘Total inorganic nitrogen’ and/or ‘Total nitrogen’; • Metals (e.g. Hg, Cd, As, Mn, Pb, Ti, V). <p>To collect data on Total Suspended Solids (TSS), fluorides, TOC/COD and total uranium. The TWG to decide at a later stage, based on the data collected through the questionnaires, whether BAT/BAT-AE(P)Ls for emissions to water should be derived.</p>
Urea and UAN	<p>To include ‘Total inorganic nitrogen’ and/or ‘Total nitrogen’ as a KEI for emissions to water for the production of urea and UAN.</p>
Inorganic phosphates	<p>To include total phosphorus as a KEI for emissions to water for the production of inorganic phosphates.</p> <p>To collect data for TOC/COD, Total Suspended Solids (TSS), fluorides, AOX, total uranium and metals (e.g. As, Cr, Cu, Ni, Zn, Hg, Cd). The TWG to decide at a later stage, based on the data collected through the questionnaires, whether BAT-AELs for emissions to water should be derived.</p>
Sodium carbonate	<p>To include the following substances/parameters as KEIs for emissions to water for the production of sodium carbonate (i.e. soda ash):</p> <ul style="list-style-type: none"> • Metals:, e.g. Cr, Ni, Cu, Zn, Hg, Cd, As, Mn, Pb, Ti, V; • ‘Total inorganic nitrogen’ and/or ‘Total nitrogen’; • Total Suspended Solids (TSS); • Chlorides (as total). <p>To collect data for the following substances/parameters. The TWG to decide at a later stage, based on the data collected through the questionnaires, whether BAT-AELs for emissions to water should be derived:</p> <ul style="list-style-type: none"> • Total phosphorus; • Sulphates.
Precipitated calcium carbonate	<p>To include Total Suspended Solids (TSS) as a KEI for emissions to water for the production of precipitated calcium carbonate.</p>
Calcium chloride	<p>To collect data for Total Suspended Solids (TSS). The TWG to decide at a later stage, based on the data collected through the questionnaires, whether BAT-AELs should be derived.</p>
Sodium chlorate	<p>To collect data on Cr (VI) emissions. The TWG to decide at a later stage, based on the data collected through the questionnaires, whether BAT/BAT-AELs for emissions to water should be derived.</p>

Calcium carbide	<p>To include the following substances/parameters as KEIs for emissions to water for the production of calcium carbide:</p> <ul style="list-style-type: none"> • Cyanides; • Sulphites. <p>To collect data on Total Suspended Solids (TSS) as contextual information.</p>
Carbon black	<p>Not to include any KEIs for emissions to water for the production of carbon black. To collect data on Total Suspended Solids (TSS) as contextual information.</p>
Titanium dioxide	<p>To include the following substances/parameters as KEIs for emissions to water for the production of titanium dioxide:</p> <ul style="list-style-type: none"> • Metals, e.g. As, Cd, Cr, Cu, Fe, Hg, Mn, Ni, Pb, Ti, V, Zn; • Total Suspended Solids (TSS); • Chlorides (as total) (chloride process route only); • Sulphates (sulphate process route only). <p>To collect data on PCDD/Fs emissions (chloride route). The TWG to decide at a later stage, based on the data collected through the questionnaires, whether BAT/BAT-AELs should be derived.</p>
Ferrous sulphate	<p>To refer to the KEIs for emissions to water for the production of titanium dioxide via the sulphate process route:</p> <ul style="list-style-type: none"> • To include the following substances/parameters as KEIs for emissions to water for the production of titanium dioxide: <ul style="list-style-type: none"> ○ Metals, e.g. As, Cd, Cr, Cu, Fe, Hg, Mn, Ni, Pb, Ti, V, Zn; ○ Total Suspended Solids (TSS); ○ Sulphates.
Sodium silicate	<p>Not to include any KEIs for emissions to water for the production of sodium silicate.</p>
Synthetic amorphous silica	<p>To include chlorides (as total) as a KEI for emissions to water for the production of pyrogenic synthetic amorphous silica. To collect data on sulphates and Total Suspended Solids (TSS) emissions for the production of synthetic amorphous silica using the wet process route. The TWG to decide at a later stage, based on the data collected through the questionnaires, whether BAT/BAT-AELs for emissions to water should be derived.</p>

The notable elements regarding KEIs for emissions to water are summarised below:

- Sulphuric acid
 - A preliminary exchange of technical views on the potential type/sources of emissions to water from the sulphuric acid production process took place.
 - One industry association highlighted the issue of the waste water arising from the cleaning processes of metallurgical off-gases (i.e. from NFM installations) entering a sulphuric acid plant.
Moreover, the same industry association indicated that the production of sulphuric acid with a single-contact system may, in some exceptional cases, entail the treatment of tail gas, with possible production of waste water.
 - An industry association stated that, for one installation in BE, the emissions to water from the production of sulphuric acid do not seem to be relevant.
 - At the end of the discussions, the TWG agreed to identify clear plant configurations and process boundaries in the questionnaire template to be used for the plant-specific data collection.

- NPK and CN
 - The type and quality of the receiving water body (e.g. if saline or not) are key contextual information to be considered for understanding the environmental relevance of chlorides emission levels in water discharges.
 - One MS and one industry association mentioned that TOC and uranium emissions might be related to phosphate rock from different geographies (e.g. Morocco) and sedimentary rock in general.
- Urea and UAN
 - An industry association stated that there is no waste water in the case of stand-alone UAN production units. Therefore, no data collection would be applicable.

At the end of the KEI discussions for emissions to air and water, different industry associations shared a general point of concern on the LVIC BREF data collection and analysis coinciding with the estimated timeframe for the implementation of the revised IED.

Table 5 lists the horizontal topics regarding KEIs for emissions to water discussed during the KoM and the conclusions reached by the TWG.

Table 5: KoM conclusions on discussions regarding horizontal topics related to KEIs for emissions to water

Topic	KoM Conclusions
PFAS	To collect data and information on PFAS for the LVIC production processes covered by the LVIC BREF, with the aim to gather information on their uses, their usage quantities, their emissions and their substitution with less harmful (e.g. fluorine-free) alternatives. The TWG to decide at a later stage, based on the data collected through the questionnaires, whether BAT/BAT-AELs for PFAS emissions to water should be derived.
Waste water treatment (including pretreatment)	To collect performance data on waste water treatment techniques including pretreatment (where relevant) used in the production processes covered by the scope of the LVIC BREF. The TWG to decide at a later stage, based on the data collected through plant-specific questionnaires, whether and how BAT/BAT-AE(P)Ls should be derived (i.e. of a generic type or specific for the production processes covered by the scope of the LVIC BREF).

The TWG members discussed the proposal on PFAS emissions in detail. The main reactions focused on PFAS restriction according to REACH, on PFAS as priority substances for the WFD and on the potential issues of double regulation. Limitations on PFAS data availability and on how emission data and information would be collected were also debated. In addition, firefighting foam containing PFAS was mentioned as a possible source of PFAS water contamination.

In relation to the proposal on waste water treatment, the TWG exchanges focused in particular on:

- the general understanding of the diversity of the waste water collection and treatment systems adopted by the chemical production sites;
- the need for gathering information (e.g. flow rate, pollutant load, removal/abatement efficiency) on selective pretreatment (at the source and/or in combined streams) of waste water streams, if a final treatment is carried out on site and/or depending on type of discharge (i.e. if direct or indirect);
- the type of information to be collected on techniques applied.

Finally, the circularity of water resources in the production processes covered by the LVIC BREF and the way it is implemented was mentioned as an aspect to be further explored.

4 CONSUMPTION, ENERGY EFFICIENCY, WATER DISCHARGE AND RESIDUES GENERATION

4.1 Energy efficiency

In BP Section 2.2.7, the EIPPCB proposed the following:

- To include specific energy consumption as a KEI for the energy-intensive production processes of the inorganic chemicals identified below:
 - ammonia (including hydrogen production);
 - calcium carbide;
 - carbon black;
 - nitric acid;
 - sodium carbonate (soda ash);
 - urea and urea ammonium nitrate (UAN).
- To collect data on specific energy consumption at plant and process level through plant-specific questionnaires.
- The TWG to identify the contextual information (e.g. applied energy efficiency techniques, type of processes, type of energy used (including fuel types), methods used for monitoring and calculation, plant configuration and boundaries defined, level of aggregation of consumption data) needed to understand and compare the data collected through plant-specific questionnaires.
- The TWG to decide at a later stage, based on the data collected through the questionnaires, whether BAT-AEPLs on the specific consumption of energy should be derived.

The TWG discussed the proposal in detail. The TWG reactions mainly focused on system boundaries and confidential business information. One industry association suggested to organise a workshop focused on energy aspects to help design the related section(s) of the plant-specific questionnaire.

One MS indicated that hydrofluoric acid and sulphuric acid (also requested by an industry association) production processes shall be included. On the other hand, another industry association pointed out that energy consumption for sulphuric acid production installations should not be a KEI since the process is exothermic. A different MS supported the proposal to include the specificities related to the sulphuric acid production and suggested to also add TiO₂ production in the list. The proposals were supported by other MS and an environmental NGO. Furthermore, one MS proposed to mention the cross-media effects related to the use of abatement techniques (e.g. in terms of energy consumption required) among the data to be considered. The proposal was supported by an industry association and an environmental NGO.

Based on the different positions and the nuances of each specific production process, the EIPPCB agreed that it would be beneficial for the whole TWG to foresee a specific session on energy issues within the workshop dedicated to the identification of the contextual information and key data features needed for the questionnaire development.

The EIPPCB proposed not to explicitly include the reference to cross-media effects, as these are factors expected to be extensively described together with the applicability of the various techniques.

To accommodate these comments, the EIPPCB revised the proposal and presented the revisions to the TWG for discussion, including the reference to ensuring an exchange on energy issues within the organisation of a workshop at the initial stage of the questionnaire development.

Conclusions reached by the TWG:

- To include energy consumption as a KEI for the energy-intensive production processes of the inorganic chemicals/fertilisers identified below:
 - ammonia (including hydrogen production);
 - calcium carbide;
 - carbon black;
 - nitric acid;
 - sodium carbonate (soda ash);
 - urea and urea ammonium nitrate (UAN);
 - hydrofluoric acid;
 - sulphuric acid taking into account the specificities of the process;
 - titanium dioxide.
- To collect data on specific energy consumption at plant and process level through plant-specific questionnaires.
- The TWG to identify the contextual information (e.g. applied energy efficiency techniques, type of processes, type of energy used (including fuel types), methods used for monitoring and calculation, plant configuration and boundaries defined, industrial symbiosis options, level of aggregation of consumption data) needed to understand and compare the data collected through plant-specific questionnaires. This will be dealt with in a workshop at the initial stage of the questionnaire development.
- The TWG to decide at a later stage, based on the data collected through the questionnaires, whether BAT-AEPLs on the specific consumption of energy should be derived.

Furthermore, in BP Section 3.2.3, the EIPPCB proposed the following:

- The TWG to provide information on the type of energy sources, techniques to increase energy efficiency and monitoring of energy consumption as an input to collect data through plant-specific questionnaires.

The proposal was not foreseen for discussion at the KoM. The original EIPPCB proposal was adopted without any change.

Conclusions reached by the TWG:

- The TWG to provide information on the type of energy sources, techniques to increase energy efficiency and monitoring of energy consumption as an input to collect data through plant-specific questionnaires.

4.2 Consumption of water and waste water discharge - Water mass balance

In BP Section 2.2.5, the EIPPCB proposed the following:

- To include specific water consumption and specific waste water discharge as KEIs and to collect data through plant-specific questionnaires.
- The TWG to identify the contextual information (e.g. applied techniques, type of processes, product specifications, methods used for monitoring and calculation, plant configuration and boundaries defined, level of aggregation of consumption data, water recycling rate) needed to understand and compare the data collected through plant-specific questionnaires.
- The TWG to decide at a later stage, based on the data collected through the questionnaires, whether BAT-AEPLs on specific water consumption and/or on waste water discharge should be derived.

In general, the TWG supported the EIPPCB proposal. The TWG reactions focused mainly on data collection, cross-media effects and water balance.

One industry association expressed concerns regarding the derivation of BAT-AE(P)Ls due to the unknown nature of the information to be collected and the need to be precise on the type of this information.

The EIPPCB reminded the TWG that the proposal to collect information on the use of water mass balances as a tool for water management is associated with Request 10 in BP Section 3.2.1 (see below).

Following the discussion, the proposal was presented with minor changes and the consensus reached by the TWG was as follows.

Conclusions reached by the TWG:

- To include water consumption and waste water discharge as KEIs and to collect data through plant-specific questionnaires.
- The TWG to identify the contextual information (e.g. applied techniques, type of processes, product specifications, methods used for monitoring and calculation, plant configuration and boundaries defined, level of aggregation of consumption data, water recycling rate) needed to understand and compare the data collected through plant-specific questionnaires.
- The TWG to decide at a later stage, based on the data collected through the questionnaires, whether BAT-AEPLs on specific water consumption and/or on waste water discharge should be derived.

Furthermore, in BP Section 3.2.1, the EIPPCB proposed the following:

- The TWG to provide information on techniques to reduce water consumption and waste water discharge in the LVIC production processes to update the LVIC BREF.
- To collect information on the use of water mass balances (and associated contextual information) as a tool for water management.

The proposals were not foreseen for discussion at the KoM. The original EIPPCB proposals were adopted without any changes.

Conclusions reached by the TWG:

- The TWG to provide information on techniques to reduce water consumption and waste water discharge in the LVIC production processes to update the LVIC BREF.
- To collect information on the use of water mass balances (and associated contextual information) as a tool for water management.

4.3 Decarbonisation

In BP Section 3.2.4, the EIPPCB proposed the following:

- The TWG to provide information on development and application of any decarbonisation, carbon capture, utilisation and storage (CCUS) and/or electrification technique(s) to be included in the subsections associated with each LVIC production process in the LVIC BREF (where relevant).

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- The TWG to collect information on techniques adopted to control, monitor and minimise diffuse emissions (where relevant) from natural gas distribution pipelines/systems associated with the LVIC production processes covered by the LVIC BREF.

The proposals were not foreseen for discussion at the KoM. The original EIPPCB proposals were adopted without any changes.

Conclusions reached by the TWG:

- The TWG to provide information on development and application of any decarbonisation, carbon capture, utilisation and storage (CCUS) and/or electrification technique(s) to be included in the subsections associated with each LVIC production process in the LVIC BREF (where relevant).
- The TWG to collect information on techniques adopted to control, monitor and minimise diffuse emissions (where relevant) from natural gas distribution pipelines/systems associated with the LVIC production processes covered by the LVIC BREF.

4.4 Consumption and selection of raw materials

In BP Section 2.2.6, the EIPPCB proposed the following:

- To include raw materials consumption as a KEI.
- The TWG to define a list of relevant raw materials for each LVIC production process based on a review of the information included in the LVIC-AAF and LVIC-S BREFs.
- To collect data (at plant level) on specific raw materials consumption through plant-specific questionnaires.
- The TWG to identify during the questionnaire development phase the contextual information (e.g. applied techniques, type of processes used, product specifications, plant configuration and definition of boundaries, level of aggregation of consumption data) needed to understand and compare the data collected through plant-specific questionnaires.

The TWG discussed the proposal in detail. The TWG reactions focused on potential pretreatment, market availability of materials, raw materials definition, main raw materials used in the processes and materials balance. One industry association stated that raw materials consumption is not relevant to all processes (referring in particular to the sulphuric acid production process).

Following the discussion, a revised proposal was presented to accommodate the comments raised and the consensus reached by the TWG was as follows.

Conclusions reached by the TWG:

To include raw materials consumption as a KEI.

- The TWG to define a list of relevant raw materials for each LVIC production process (where relevant) based on a review of the information included in the LVIC-AAF and LVIC-S BREFs.
- To collect data (at plant level) on the specific consumption of key raw materials through plant-specific questionnaires. Key raw materials will be identified during the questionnaire development.
- The TWG to identify during the questionnaire development phase the contextual information (e.g. applied techniques, type of processes used, product specifications, plant configuration and definition of boundaries, level of aggregation of consumption data) needed to understand and compare the data collected through plant-specific questionnaires.
- The TWG to decide at a later stage, based on the data collected through the questionnaires, whether BAT-AEPLs on specific raw material consumption should be derived.

Furthermore, in BP Section 3.2.2, the EIPPCB proposed the following:

- The TWG to provide information on techniques to reduce specific raw materials consumption used in the LVIC production processes as an input to collect data through the plant-specific questionnaires.

The proposal was not foreseen for discussion at the KoM. The original EIPPCB proposal was adopted without any change.

Conclusions reached by the TWG:

- The TWG to provide information on techniques to reduce specific raw materials consumption used in the LVIC production processes as an input to collect data through the plant-specific questionnaires.

4.5 Residues generation, circular economy and industrial symbiosis

In BP Section 2.2.8, the EIPPCB proposed the following:

- To include generation of residues/wastes as a KEI and to collect data (at plant level) and contextual information on waste/residue types, specific quantities and management (e.g. recovery, reuse, recycling and/or disposal) for the following production processes:
 - inorganic phosphates;
 - soda ash;
 - calcium chloride;
 - ferrous chloride;
 - ammonia;
 - acids (HNO₃, H₂SO₄);
 - carbon black;
 - fertilisers (NPK and CN, superphosphates);
 - soda ash;
 - sodium silicate;
 - titanium dioxide and related products (CaCl₂, FeCl₂, FeCl₃).
- The TWG to decide during the questionnaire design which relevant detailed (contextual) information will be collected for those LVIC processes.

The TWG discussed the proposal in detail. One industry association proposed to simply refer to “residues generation”, recalling that the terms “residues” already includes both “waste and by-products”, according to the waste legislation. One environmental NGO brought the attention of the TWG to other production processes (i.e. HF, calcium carbide and PCC) for which waste generation seems relevant according to the existing LVIC-AAF and LVIC-S BREFs, proposing to add these processes to the list. For the same reason, one MS also proposed to include phosphoric acid to the list. Another MS proposed to combine soda ash (unintentionally repeated) with calcium chloride and to delete the production processes in brackets related to the titanium dioxide. Also, an industry proposed to associate soda ash with sodium bicarbonate.

Following the discussion, a revised proposal was presented to accommodate the comments raised and the consensus reached by the TWG was as follows.

Conclusions reached by the TWG:

- To include generation of residues as a KEI and to collect data (at plant level) and contextual information on residue types, specific quantities and management (e.g. recovery, reuse, recycling and/or disposal) for the following production processes:
 - inorganic phosphates;
 - soda ash including calcium chloride and sodium bicarbonate;
 - calcium carbide;
 - calcium chloride;
 - ammonia;
 - acids (HNO₃, HF, H₃PO₄);
 - carbon black;
 - fertilisers (NPK and CN, superphosphates);
 - sodium silicate;
 - titanium dioxide and related products;
 - PCC.
- The TWG to decide during the questionnaire design which relevant detailed (contextual) information will be collected for the above-mentioned LVIC processes.

Furthermore, in BP Section 3.2.5, the EIPPCB proposed the following:

- The TWG to collect information on applied techniques for the reduction of generated waste/residues and for the promotion of circularity of LVIC production processes.
- To collect information on techniques that promote industrial symbiosis.

The proposal was not foreseen for discussion at the KoM. However, one industry association asked to clarify the information expected in relation to the promotion of circularity and industrial symbiosis, highlighting the need to also gather relevant complementary information on potential cross-media effects (if any), in order to evaluate and assess the full impacts of the circularity practice.

Therefore, the TWG decided to adopt the EIPPCB proposal with the deletion of the term “waste” for consistency with other KoM conclusions, and noting that the type and content of the information that will be requested in relation to the promotion of circularity and industrial symbiosis will be clarified during the questionnaire development stage.

Conclusions reached by the TWG:

- The TWG to collect information on applied techniques for the reduction of generated residues and for the promotion of circularity of LVIC production processes.
- To collect information on techniques that promote industrial symbiosis.

Note:

The type and content of the information that will be requested in relation to the promotion of circularity and industrial symbiosis will be clarified during the questionnaire development stage.

5 INFORMATION AND DATA COLLECTION

5.1 General

5.1.1 Expression of BAT-AELs for emissions to air/water

In BP Section 2.3.1.1, the EIPPCB proposed the following:

- To generally express BAT-AELs for channelled emissions to air and to water in concentrations, and/or, if deemed appropriate, coupled with abatement efficiencies.
- To clearly define (during the drafting of the questionnaire(s)) all relevant information influencing emission concentrations or abatement efficiencies (e.g. techniques used, reference conditions, type and quantity of products/raw materials, boundaries of the process/system, direct/indirect waste water discharge, sources and characteristics of waste gases and waste waters, specific operating conditions associated with the LVIC production processes).

The TWG broadly supported the EIPPCB proposal. During the KoM, the TWG reactions focused mainly on the potential use of specific loads to also express BAT-AELs for emissions to air and water and the availability of production volume data.

One MS expressed concerns regarding the use of abatement efficiency, due to a possible lack of information on concentration data for raw gas and water streams. Another MS proposed to delete the word ‘generally’ in the first bullet point.

One MS expressed concerns regarding the number of KEIs and the future work to develop and validate the questionnaires. Also, it noted the need to ensure the representativeness of the data collected (in terms of its quality and quantity).

The EIPPCB clarified that the word ‘generally’ would ensure flexibility and recognised the effectiveness of assessing abatement efficiency data when concentration levels for raw gas and water streams are available. Following the discussion, a consensus was reached to slightly amend the EIPPCB proposal as follows.

Conclusions reached by the TWG:

- To generally express BAT-AELs for channelled emissions to air and to water in concentrations, coupled with abatement efficiencies if concentration data for raw gas and water streams are available.
- To clearly define (during the drafting of the questionnaire(s)) all relevant information influencing emission concentrations or abatement efficiencies (e.g. techniques used, reference conditions, type and quantity of products/raw materials, boundaries of the process/system, direct/indirect waste water discharge, sources and characteristics of waste gases and waste waters, specific operating conditions associated with the LVIC production processes).

5.1.2 Averaging periods for BAT-AELs for emissions to air/water

5.1.2.1 Averaging periods for BAT-AELs for emissions to air

In BP Section 2.3.1.2, the EIPPCB proposed the following:

- For channelled emissions to air, to generally express BAT-AELs as short-term averages, e.g. as hourly or daily averages (for continuous measurements) or as averages over the sampling period (for periodic measurements).

The TWG generally supported the proposal. A few general reflections regarding the possibility to use longer averaging periods were shared. At the end of the short exchange, the original EIPPCB proposal was adopted by the TWG without any change.

Conclusions reached by the TWG:

- For channelled emissions to air, to generally express BAT-AELs as short-term averages, e.g. as hourly or daily averages (for continuous measurements) or as averages over the sampling period (for periodic measurements).

5.1.2.2 Averaging periods for BAT-AELs for emissions to water

In BP Section 2.3.1.3, the EIPPCB proposed the following:

- For emissions to water, to generally express BAT-AELs in the case of continuous discharges as daily averages, obtained via 24-hour flow-proportional composite samples, and in the case of batch discharges as average values over the release duration, obtained via flow-proportional composite samples. The TWG to decide at a later stage which other sampling techniques could be considered appropriate.

The TWG generally supported the proposal. The original EIPPCB proposal was adopted without any change.

Conclusions reached by the TWG:

- For emissions to water, to generally express BAT-AELs in the case of continuous discharges as daily averages, obtained via 24-hour flow-proportional composite samples, and in the case of batch discharges as average values over the release duration, obtained via flow-proportional composite samples. The TWG to decide at a later stage which other sampling techniques could be considered appropriate.

5.1.3 Environmental performance levels

In BP Section 2.3.1.4, the EIPPCB proposed the following:

- To collect data on the specific energy consumption of the processes/plants as the ratio of the respective energy consumption divided by a suitable activity rate figure and expressed as yearly averages.
- To collect data on the specific water consumption of the plants as the ratio of the total water consumption divided by a suitable activity rate figure and expressed as yearly averages. These data may be complemented by data on specific water discharge (as the ratio of the total waste water discharged divided by a suitable activity rate figure, expressed as yearly averages).
- To collect data (as contextual information) on the water recycling rate of the plants as a percentage and expressed as yearly averages.
- To collect data on the specific consumption of the key raw materials (to be identified during the drafting of the questionnaire) as the ratio of the total consumption at plant level divided by a suitable activity rate figure and expressed as yearly averages.
- To collect data on the specific quantity of waste reused/recycled/sent for disposal as the ratio of the total waste quantity reused/recycled/sent for disposal, divided by a suitable activity rate figure and expressed as yearly averages.

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- To collect data on the waste recycling rate of the plants as a percentage and expressed as yearly averages.
 - The TWG to decide at the initial stage of the questionnaire development phase on key data features, e.g. suitable activity rate units, operating parameters.

The TWG generally supported the proposal. During the KoM, one MS voiced its concerns on the proposal to express the specific energy consumption as a yearly average. The EIPPCB recalled that the average period proposed is in line with the approach used in other recent BREFs. The EIPPCB proposal was adopted by the TWG without any change.

Conclusions reached by the TWG:

- To collect data on the specific energy consumption of the processes/plants as the ratio of the respective energy consumption divided by a suitable activity rate figure and expressed as yearly averages.
- To collect data on the specific water consumption of the plants as the ratio of the total water consumption divided by a suitable activity rate figure and expressed as yearly averages. These data may be complemented by data on specific water discharge (as the ratio of the total waste water discharged divided by a suitable activity rate figure, expressed as yearly averages).
- To collect data (as contextual information) on the water recycling rate of the plants as a percentage and expressed as yearly averages.
- To collect data on the specific consumption of the key raw materials (to be identified during the drafting of the questionnaire) as the ratio of the total consumption at plant level divided by a suitable activity rate figure and expressed as yearly averages.
- To collect data on the specific quantity of waste reused/recycled/sent for disposal as the ratio of the total waste quantity reused/recycled/sent for disposal divided by a suitable activity rate figure and expressed as yearly averages.
- To collect data on the waste recycling rate of the plants as a percentage and expressed as yearly averages.
- The TWG to decide at the initial stage of the questionnaire development phase on key data features, e.g. suitable activity rate units, operating parameters.

5.2 Selection of plants

5.2.1 EU installations carrying out the inorganic chemical production processes covered by the LVIC BREF

In BP Section 3.3.1, the EIPPCB proposed the following:

- To collect data from well-performing plants carrying out the inorganic chemical production processes permitted under the relevant activities of points 4 and 6.11 of Annex I to the IED, as discussed in Section 2.1.

The proposal was not foreseen for discussion at the KoM. The original EIPPCB proposal was adopted with a few minor editorial changes to ensure consistency with the other conclusions reached by the TWG (i.e. deletion of “inorganic chemicals” and modification of the latter part of the sentence).

Conclusions reached by the TWG:

- To collect data from well-performing plants carrying out the production processes permitted under the relevant activities of points 4 and 6.11 of Annex I to the IED which are covered by the scope of the LVIC BREF.

5.2.2 Selection of plants/installations for the plant-specific information and data collection

In BP Section 3.3.2, the EIPPCB proposed the following:

- The TWG to submit or complete proposals of well-performing (including best-performing) plants/installations to be involved in the data collection.

The proposal was not foreseen for discussion at the KoM. The original EIPPCB proposal was adopted without any change.

Conclusions reached by the TWG:

- The TWG to submit or complete proposals of well-performing (including best-performing) plants/installations to be involved in the data collection.

5.3 Questionnaire for gathering plant-specific information and data

5.3.1 Data collection procedure

In BP Section 3.3.3.1, the EIPPCB proposed the following:

- To follow the established BREF process for the collection of plant/installation-specific data via questionnaires including the following:
 - the preparation of the draft questionnaire - including sector-specific worksheets - by the EIPPCB followed by the commenting of the whole TWG, if necessary in several iterations;
 - the organisation of a questionnaire workshop to finalise the questionnaire - including sector-specific worksheets;
 - the testing of the draft final questionnaire - including sector-specific worksheets - by a selected (small) number of plants/installations;
 - the preparation of the final questionnaire by the EIPPCB;
 - the distribution of the final questionnaire through Member States' representatives;
 - the filling in of the questionnaires by the plants/installations;
 - the collection of the filled-in questionnaires by Member States' representatives;
 - the quality check of the filled-in questionnaires by Member States' representatives (possibly) with the help of a checklist that the TWG and the EIPPCB could have developed;
 - the submission of the quality-checked questionnaires to the TWG by Member States' representatives:
 - for the non-confidential version: submission to the TWG via BATIS;
 - for the confidential version: submission to the EIPPCB via email;
 - the TWG decides on the content and format of the questionnaire - including sector-specific worksheets – during the preparation as described above;
 - to collect data for the reference years 2022, 2021, 2020, 2019 and possibly 2018 (if data are more representative than for 2020 and 2021 due to the COVID pandemic) or, if such data are not available, for the last 3 years for which data are available.

The proposal was not foreseen for discussion at the KoM. The original EIPPCB proposal was adopted without any change.

Conclusions reached by the TWG:

- To follow the established BREF process for the collection of plant/installation-specific data via questionnaires including the following:
 - the preparation of the draft questionnaire - including sector-specific worksheets - by the EIPPCB followed by the commenting of the whole TWG, if necessary in several iterations;
 - the organisation of a questionnaire workshop to finalise the questionnaire - including sector-specific worksheets;
 - the testing of the draft final questionnaire - including sector-specific worksheets - by a selected (small) number of plants/installations;
 - the preparation of the final questionnaire by the EIPPCB;
 - the distribution of the final questionnaire through Member States' representatives;
 - the filling in of the questionnaires by the plants/installations;
 - the collection of the filled-in questionnaires by Member States' representatives;
 - the quality check of the filled-in questionnaires by Member States' representatives (possibly) with the help of a checklist that the TWG and the EIPPCB could have developed;
 - the submission of the quality-checked questionnaires to the TWG by Member States' representatives:
 - for the non-confidential version: submission to the TWG via BATIS;
 - for the confidential version: submission to the EIPPCB via email;
 - the TWG decides on the content and format of the questionnaire - including sector-specific worksheets - during the preparation as described above;
 - to collect data for the reference years 2022, 2021, 2020, 2019 and possibly 2018 (if data are more representative than for 2020 and 2021 due to the COVID pandemic) or, if such data are not available, for the last 3 years for which data are available.

5.3.2 Collection of data at plant/process level

In BP Section 3.3.3.2, the EIPPCB proposed the following:

- The TWG to decide during the questionnaire drafting phase if data and contextual information will be collected at process level and for which LVIC production processes, based on the foreseen data availability.

The proposal was not foreseen for discussion at the KoM. The original EIPPCB proposal was adopted without any change.

Conclusions reached by the TWG:

- The TWG to decide during the questionnaire drafting phase if data and contextual information will be collected at process level and for which LVIC production processes, based on the foreseen data availability.

5.3.3 Confidentiality issues

In BP Section 2.3.1.5, the EIPPCB proposed the following:

- To design the questionnaire in a way that avoids requesting data considered CBI as much as possible so that all data provided by operators can be posted directly onto BATIS by Member States' representatives and thus shared with the whole TWG.
- The TWG to decide during the questionnaire development phase about the type and format of potentially confidential information that needs to be collected.
- In the event that certain data are considered CBI:
 - The Member States' representatives in the TWG to: i) submit the versions of the questionnaires containing the confidential information directly to the EIPPCB via email, and ii) post the versions of the questionnaires containing the non-confidential information onto BATIS.
 - The TWG to agree on specific measures (e.g. confidentiality agreements, approval of plant operators, code of conduct) on how data collected as CBI can be discussed and analysed, e.g. in closed physical and/or web-based TWG meetings, so as to ensure the largest possible participation of TWG members, while protecting the legitimate economic interests of plant operators and minimising the risk of disclosure.

The TWG broadly agreed with the proposal. One MS and one environmental NGO underlined the importance of associating justifications with any confidentiality claims (as laid down in the BREF Guidance, Section 5.3). Another MS referred to the data collection exercise and reflected whether the IED revision may affect the data collection process. Two industry associations anticipated that some data to be collected are considered sensitive information and supported the CBI handling procedure as outlined in the EIPPCB proposal.

In response, the EIPPCB recalled to the whole TWG the general data collection process as outlined in Section 5.3.1 (item not foreseen for discussion at the KoM and adopted without any change), explaining the well-established procedure to handle and protect CBI according to Sections 5.2 and 5.3 in the BREF Guidance and based on the experience gained during the drafting/reviewing of recent BREFs (e.g. FMP, TXT, WGC).

The EIPPCB proposal was adopted without any change.

Conclusions reached by the TWG:

- To design the questionnaire(s) in a way that avoids requesting confidential data as much as possible so that all data provided by operators can be posted directly onto BATIS by Member States' representatives and shared with the whole TWG.
- The TWG to decide during the questionnaire development on the type and format of potentially confidential information that needs to be collected.
- In the event that certain data are considered CBI:
 - Member States' representatives in the TWG to: i) submit the versions of the questionnaires containing the confidential information directly to the EIPPCB via email, and ii) post the versions of the questionnaires containing the non-confidential information onto BATIS.
 - The TWG to agree on specific measures (e.g. confidentiality agreements, approval of plant operators, code of conduct) on how data collected as CBI can be discussed and analysed, e.g. in closed physical and/or web-based TWG meetings, so as to ensure both the largest possible participation of TWG members, while protecting the legitimate economic interests of plant operators and minimising the risk of disclosure.

6 STRUCTURE OF THE LVIC BREF AND ITS BAT CONCLUSIONS

In BP Section 3.4, the EIPPCB proposed the following:

- To use the structure (and contents) presented below for drawing up the LVIC BREF.

Section	Heading	Subheading
	Preface	
	Scope	
1	Background information	LVIC as part of the chemical industry Economic trends in LVIC
2	Generic LVIC production process	TBD
3	Hydrogen	General information Applied processes and techniques Current emission and consumption levels Techniques to consider in the determination of BAT Emerging techniques
4	Ammonia	
5	Hydrofluoric acid	
6	Nitric acid	
7	Phosphoric acid	
8	Sulphuric acid	
9	Inorganic phosphates	
10	Soda ash, calcium chloride ^(*) and refined sodium bicarbonate	
11	Sodium chlorate	
12	Precipitated calcium carbonate	
13	Calcium carbide	
14	Carbon black	
15	Titanium dioxide, ferric chloride, ferrous chloride and ferrous sulphate	
16	Sodium silicate (water glass)	
17	Synthetic amorphous silica	
18	Ammonium nitrate and calcium ammonium nitrate	
19	Nitrogen-, phosphorus- or potassium-based fertilisers (simple or compound fertilisers) and calcium nitrate	General BAT conclusions Product/Process-specific BAT conclusions Description of the techniques
20	Superphosphates	
21	Urea and urea ammonium nitrate	
22	Best Available Techniques (BAT) conclusions for Large Volume Inorganic Chemicals	
23	Concluding remarks and recommendations for future work	
	Glossary	
	References	
	Annexes	

(*) This includes the description of production of calcium chloride produced via different process routes other than from soda ash manufacture, i.e. as a co-product of magnesia (MgO) production, through the acid-limestone production process.

Note:

The detailed structure and layout of the descriptive subsections associated with each LVIC production process will be decided when drafting D1, according to the plant-specific data and bulk information collected.

The proposal was not foreseen for discussion at the KoM. However, in line with the conclusions reached by the TWG on the scope of the LVIC BREF (see Section 2), the EIPPCB proposal needed to be revised as follows.

Conclusions reached by the TWG:

- To use the structure (and contents) presented below for drawing up the LVIC BREF.

Section	Heading	Subheading
	Preface	
	Scope	
1	Background information	LVIC as part of the chemical industry Economic trends in LVIC
2	Generic LVIC production process	
3	Hydrogen	General information Applied processes and techniques Current emission and consumption levels Techniques to consider in the determination of BAT Emerging techniques
4	Ammonia	
5	Hydrofluoric acid	
6	Nitric acid	
7	Phosphoric acid	
8	Sulphuric acid	
9	Inorganic phosphates	
10	Soda ash (including calcium chloride and refined sodium bicarbonate)	
11	Calcium chloride (*)	
12	Sodium chlorate	
13	Precipitated calcium carbonate	
14	Calcium carbide	
15	Carbon black	
16	Titanium dioxide, ferric chloride, ferrous chloride and ferrous sulphate	
17	Sodium silicate (water glass)	
18	Synthetic amorphous silica	
19	Ammonium nitrate and calcium ammonium nitrate	
20	Nitrogen-, phosphorus- or potassium-based fertilisers (simple or compound fertilisers) and calcium nitrate	
21	Superphosphates	
22	Urea and urea ammonium nitrate	
23	Potassium sulphate	
24	Best Available Techniques (BAT) conclusions for the production of Large Volume Inorganic Chemicals	General BAT conclusions Product/Process-specific BAT conclusions Description of the techniques
25	Concluding remarks and recommendations for future work	
	Glossary	
	References	
	Annexes	

(*) This includes the description of production of calcium chloride produced via different process routes other than from soda ash manufacture, e.g. as a co-product of magnesia (MgO) production, through the acid-limestone production process.

Note:

The detailed structure and layout of the descriptive subsections associated with each LVIC production process will be decided when drafting D1, according to the plant-specific data and bulk information collected.

7 TECHNIQUES TO CONSIDER IN THE DETERMINATION OF BAT AND EMERGING TECHNIQUES

7.1 Applied processes and techniques

In BP Sections 3.5.1 and 3.5.3, the EIPPCB proposed the following:

- To take into account the preliminary feedback received for the drafting of the plant-specific data collection questionnaire and the drafting of the LVIC BREF regarding the ‘Techniques to consider in the determination of BAT’ for the sector-specific chapters.
- The TWG to provide any relevant updates using the standard 10-heading template (see Section 2.4 for a tentative timeline).

The proposal was not foreseen for discussion at the KoM. The original EIPPCB proposal was adopted without any change.

Conclusions reached by the TWG:

- To take into account the preliminary feedback received for the drafting of the plant-specific data collection questionnaire and the drafting of the LVIC BREF regarding the ‘Techniques to consider in the determination of BAT’ for the sector-specific chapters.
- The TWG to provide any relevant updates using the standard 10-heading template (see Section 8 for a tentative timeline).

7.2 Generic techniques in the ENE, EFS and ICS BREFs

In BP Section 3.5.2, the EIPPCB proposed the following:

- To refer to ‘horizontal’ BREFs for generic techniques, namely:
 - the ENE BREF for generic techniques related to energy efficiency;
 - the EFS BREF for generic techniques to reduce emissions from the storage, transfer and handling of materials;
 - the ICS BREF for generic techniques associated with indirect cooling with water;

and to include in the LVIC BREF only techniques that are specific to the LVIC production processes.

The proposal was not foreseen for discussion at the KoM. The original EIPPCB proposal was adopted without any change.

Conclusions reached by the TWG:

- To refer to ‘horizontal’ BREFs for generic techniques, namely:
 - the ENE BREF for generic techniques related to energy efficiency;
 - the EFS BREF for generic techniques to reduce emissions from the storage, transfer and handling of materials;
 - the ICS BREF for generic techniques associated with indirect cooling with water;

and to include in the LVIC BREF only techniques that are specific to the LVIC production processes.

7.3 Additional techniques

In BP Section 3.5.3, the EIPPCB proposed the following:

- To take into account all the available information for the drafting of the LVIC BREF.
- The TWG to provide information on any additional techniques relevant for the LVIC production processes covered by the LVIC BREF, using the standard 10-heading template (see Section 2.4 for a tentative timeline).

The proposal was not foreseen for discussion at the KoM.

Conclusions reached by the TWG:

- To take into account all the available information for the drafting of the LVIC BREF.
- The TWG to provide information on any additional techniques relevant for the LVIC production processes covered by the LVIC BREF, using the standard 10-heading template (see Section 8 for a tentative timeline).

8 NEXT STEPS TO BE TAKEN AFTER THE KICK-OFF MEETING

The EIPPCB presented a tentative timeline for the next steps of the LVIC BREF drawing up process. Following the discussion, the TWG agreed on the timeline shown in Table 6 and Figure 1.

Table 6: Next steps – tentative timeline of the LVIC BREF drawing up process

Step	Tentative time
Workshop(s) on Hydrogen	TBD
Workshop for the contextual information and key data features needed for the questionnaire development (including a session on energy)	TBD
EIPPCB to issue the first draft questionnaire template	End of February 2023
TWG feedback on the first draft questionnaire	End of March 2023
EIPPCB to issue the second draft questionnaire	End of April 2023
TWG feedback on the second draft questionnaire – Workshop on the questionnaire finalisation	End of May 2023
TWG to provide proposals of well-performing plants for the data collection via questionnaire	End of May 2023
EIPPCB to compile the list of well-performing plants and to check its completeness; if necessary, EIPPCB to ask TWG members to amend/complete the list	June 2023
EIPPCB to issue the third draft questionnaire	End of June 2023
Questionnaire testing	Early July 2023
EIPPCB to issue the final questionnaire to the TWG and distribution to the participating plants through the Member States' representatives	July 2023
TWG to provide bulk information in order to draw up the LVIC BREF, namely information on applied processes and techniques, on the techniques to consider for the determination of BAT and on emerging techniques	June 2023
Submission of filled-in questionnaires in BATIS	November 2023
1 st data assessment workshop	End of 1 st quarter of 2024
First formal draft of the LVIC BREF (D1)	2 nd quarter of 2024
TWG comments on D1	4 th quarter of 2024
2 nd data assessment workshop	2 nd quarter 2025
Final TWG Meeting	3 rd quarter of 2025
Final draft of the LVIC BREF delivered to the IED Article 13 Forum	3 rd quarter of 2026
BAT conclusions vote at an IED Article 75 Committee meeting	4 th quarter of 2026
Publication of the BAT conclusions in the Official Journal of the European Union	1 st quarter of 2027
Publication of the BREF on the EIPPCB website	2 nd quarter of 2027

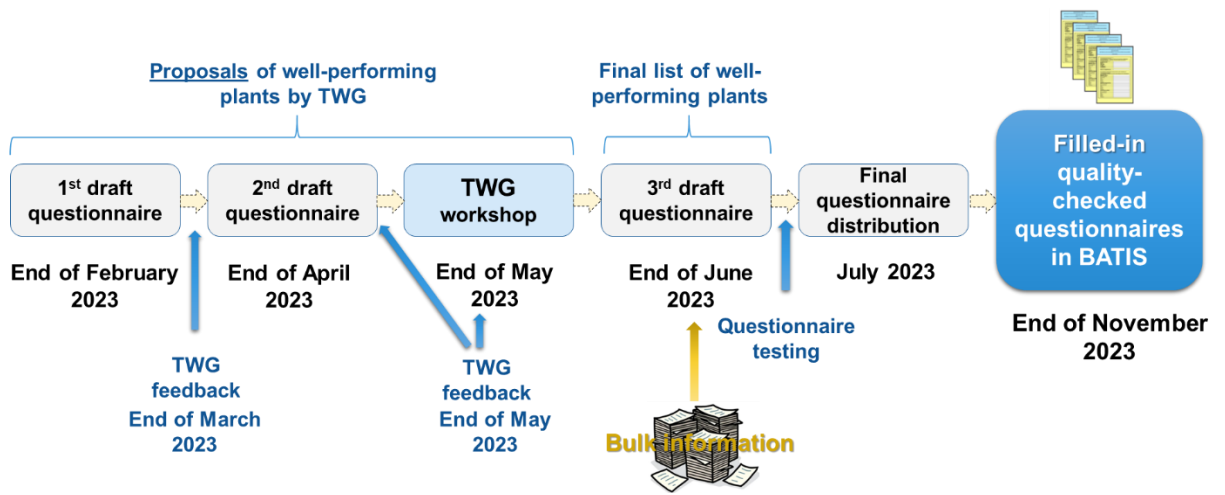


Figure 1: Next steps – tentative timeline of the data collection for the LVIC BREF drawing up process

8.1 Site visits

The EIPPCB explained the objectives and modalities of site visits according to Section 4.4.4 of the BREF Guidance. Site visits constitute an important part of the LVIC BREF drawing up process. They provide an insight into the production/techniques of the chemical sectors covered in the LVIC BREF; visited sites should also participate in the data collection.

There was a joint proposal, from an industry association and Belgium, to visit Belgian installations in March 2023. Another industry association mentioned that it could already suggest a number of sites to visit. Also, four different MS expressed their willingness to arrange site visits.

The EIPPCB welcomed all the preliminary announcements, inviting participants to provide information on the type/characteristics of the production sites and possible planning.

9 INTRODUCTION TO BATIS

The EIPPCB introduced the new version of BATIS – the Best Available Techniques Information System, a web-based software to facilitate the exchange of information for the drawing up and review of BREFs. More specifically, BATIS is used to manage the list of TWG members and observers and to make all data and information collected in the BREF drawing up process available to the TWG.

The EIPPCB provided hands-on guidance on basic BATIS features, e.g. obtaining and changing login credentials, reviewing and adapting personal information, the basic structure of LVIC BREF folders, and adding new posts, uploading and downloading documents.

The TWG was invited to contact the EIPPCB for further technical questions or comments.