



EUROPEAN COMMISSION

DIRECTORATE-GENERAL

CLIMATE ACTION

Directorate B - European & International Carbon Markets

Guidance Document n°3
on the harmonised free allocation methodology for the EU-ETS
post 2012

Data collection guidance

Final version issued on 14 April 2011 and updated on 29/06/2011

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Introduction

Status of the Guidance Documents

This guidance document is part of a group of documents, which are intended to support the Member States, and their Competent Authorities, in the coherent implementation throughout the Union of the new allocation methodology for Phase III of the EU ETS (post 2012) established by the Decision of the Commission 2011/278/EU on “Transitional community-wide and fully harmonised implementing measures pursuant to Article 10a(1) of the EU ETS Directive” (CIMs) and developing the National Implementation Measures (NIMs).

The guidance does not represent an official position of the Commission and is not legally binding.

This guidance document is based on a draft provided by a consortium of consultants (Ecofys NL, Fraunhofer ISI, Entec). It takes into account the discussions within several meetings of the informal Technical Working Group on Benchmarking under the WGIII of the Climate Change Committee (CCC), as well as written comments received from stakeholders and experts from Member States. It was agreed that this guidance document reflects the opinion of the Climate Change Committee, at its meeting on 14 April 2011.

The guidance papers do *not* go into detail regarding the procedures that Member States apply when issuing greenhouse gas emissions permits. It is acknowledged that the approach to setting the installation boundaries laid down in GHG emissions permits differ between Member States.

Background of the CIM Guidance Documents

Specific topics were identified within the CIMs which deserve further explanation or guidance. The CIM guidance documents intend to address these issues as specific and clear as possible. The Commission considers it necessary to achieve the maximum level of harmonisation in the application of the allocation methodology for phase III.

The CIM guidance documents aim at achieving consistency in the interpretation of the CIMs, to promote harmonisation and prevent possible abuse or distortions of competition within the Community. The full list of those documents is outlined below: In particular:

- Guidance document n. 1 – general guidance: this guidance gives a general overview of the allocation process and explains the basics of the allocation methodology.
- Guidance document n. 2 – guidance on allocation methodologies: this guidance explains how the allocation methodology works and its main features.
- Guidance document n. 3 – data collection guidance: this guidance explains which data are needed from operators to be submitted to the Competent

Authorities and how to collect them. It reflects the structure of the data collection template provided by the EC.

- Guidance document n. 4 – guidance on NIMs data verification: this guidance explains the verification process concerning the data collection for the National Implementation Measures¹.
- Guidance document n. 5 – guidance on carbon leakage: it presents the carbon leakage issue and how it affects the free allocation calculation.
- Guidance document n. 6 – guidance on cross boundary heat flows: it explains how the allocation methodologies work in case of heat transfer across the 'boundaries' of an installation.
- Guidance document n. 7 – guidance on new entrants and closures: this guidance is meant to explain allocation rules concerning new entrants as well as the treatment of closures.
- Guidance document n. 8 – guidance on waste gas and process emission sub-installation: this document provides for explanation of the allocation methodology concerning process emission sub-installation, in particular, concerning the waste gas treatment.
- Guidance document n. 9 – sector specific guidance: this guidance provides for detailed description of the product benchmarks as well as the system boundaries of each of the product benchmarks listed within the CIMs.

This list of documents is intended to complement other guidance papers issued by the European Commission related to Phase III of EU ETS, in particular:

- Guidance on Interpretation of Annex I of the EU ETS Directive (excl. aviation activities), and
- Guidance paper to identify electricity generators

References to Articles within this document generally refer to the revised EU ETS Directive and to the CIMs.

Use of the Guidance documents

The guidance documents give guidance on implementing the new allocation methodology for Phase III of the EU ETS, as from 2013: the Member States may use this guidance when they perform the data collection pursuant to Article 7 of the CIMs in order to define the complete list of installations as well as to calculate any free allocation to be determined for the National Implementing Measures (NIMs) pursuant to Article 11(1) of the Directive 2003/87/EC.

¹ Article 11 of Directive 2003/87/EC

Scope of this guidance document

This guidance document explains the process of data collection for the National Implementation Measures. In particular, the structure of the documents reflects the structure of the data collection template that the Commission provided to Member States according to Art. 7.5 of the CIMs in order to be regarded as a handbook to it. The guidance also provides for a list of the possible data sources as well as methodologies for evaluating measurable heat data.

Additional guidance

Next to the guidance documents, additional support to the Member State authorities is provided in the form of a telephone helpdesk, and the EC-website, with list of guidance documents, FAQs and useful references, http://ec.europa.eu/clima/policies/ets/benchmarking_en.htm .

Objective

Background to data collection

All Member States will (MS) need to send their National Implementation Measures (NIMs) to the European Commission (EC) by 30 September 2011. The Competent Authorities (CA) will therefore need to organize a data collection relating to each incumbent installation. Specific data collection timelines are subject to national legal obligations and will therefore vary from one MS to another, but the content of the NIMs should follow the allocation rules² in a harmonized way.

To help ensure this harmonization, the European Commission has developed a Data Collection Template, made available in all EU languages. MS can choose to make use of this template, or to develop their own, as long as all mandatory data is collected in a harmonized way.

During the data collection process, operators will need to provide the following reports:

- a. A baseline data report, including the operational data relating to their installation (using the data collection template provided by their CA)
- b. A baseline methodology report presenting how specific data was determined (a template is made available for this by the EC)
- c. A verification report, proving that the data has been verified and validated by a third-party (a template is made available for verifiers by the EC)

Some of the collected data may be commercially sensitive data: Member States should put in place protective measures necessary for ensuring that only persons that have a need to know have access to confidential information. They also need to assure that all the commercially sensitive documents that we will receive for the purpose of calculating allocations will be used only for that purpose and will be treated with the utmost care in order to protect the commercial interests of the concerned undertakings.

Link to data collection template and other documents

To facilitate the correspondence with the Data Collection Template, the content of this Guidance Document reflects the structure of the template. Each chapter presents the data that needs to be reported and where necessary provides guidance on this data and the way it should be determined. Whenever relevant, this document provides guidance to the use of the data collection template. In addition, whenever relevant,

² Commission Decision determining transitional Union-wide rules for the harmonized free allocation of emission allowances pursuant to Article 10a of Directive 2003/87/EC) Art. 10(6), available at the Documentation pages on http://ec.europa.eu/clima/policies/ets/benchmarking_en.htm

this document will refer to other documents including the CIMs, MRG and other guidance documents.

All references are shown in *italic*.

Relevance of different sections for different installations

Not all sections in this document (and correspondently the data collection template) are relevant for all installations. Table 1 indicates which sections of the template are relevant depending on the characteristics of the installation.

Each Member State will decide whether installations not eligible for free allocation should fill in the data collection template or not; if they are to fill it in, only sections I and II of sheet A will need to be filled in by them.

All installations eligible for free allocation need to fill the template. A schematic overview of the sections to be filled in is given in Table 1 below and relevant sections are identified by a cross in the first column of the table: the table is indicative.

Table 1: Relevant sections

Section in both this document and in the data collection template		To be filled in by all installations	In addition, check and fill the relevant sections for the installation under assessment in case ...						
			The installation contains any product benchmark sub-installations	The installation contains any product benchmark sub-installations that require a special methodology ¹	The installation contains any heat benchmark sub-installations	The installation contains any fuel benchmark sub-installations	The installation contains any process emissions sub-installations	Heat, waste gases, or CO ₂ is imported or exported to another installation or entity.	The installation consumes any waste gases produced outside a product benchmark sub-installation
A. General information	I - Identification of the Installation	X							
	II - Information on this baseline data report	X							
	III - List of sub-installations	X							
	IV - List of technical connections						X		
B. Source streams data: energy and process emissions	I - Guidance for Source Stream data		<p>These sections are only relevant if any of the statements below is true:</p> <ul style="list-style-type: none"> - Member States require this detailed information - Verified annual emission reports do not exist. <p>- Boundaries of installations have changed as a consequence of the increased scope of the ETS Directive from 2013 onwards therefore Verified annual emission reports do not exist.</p> <p>Section C.I Guidance for Source Stream data will help the reader of this document or user of the template assess whether these sections are relevant</p>						
	II - Fuels								
	III - Process emissions								
C. Source stream data: mass balances, CEMS, N ₂ O, PFC and transferred CO ₂	I - Mass balances								
	II - CEMS (Continuous Emission Monitoring Systems) for CO ₂ emissions								
	III - Nitrous Oxide Emissions (N ₂ O)								
	IV - Perfluorocarbons (PFC)								
	V - Transferred or stored CO ₂								
D. Attribution of emissions	I - Total Direct Greenhouse Gas Emissions and Energy Input from Fuels	X							
	II - Attribution of emissions to sub-installations					X ²			
	III - Waste gases							X	
E. Data on energy input, measurable heat and electricity	I - Energy input from fuels					X			
	II - Measurable heat			X					
	III - Electricity								
F. Sub-installation data relating to product benchmarks	I - Historic Activity levels and disaggregated production details		X						
G. Sub-installation data relating to fall-back sub-installations	I - Historic Activity levels and disaggregated production details			X	X	X			
H. Special data for some product benchmarks	All sub-sections I to IX			X					

¹ See names of sub-section H for a list of product benchmarks for which this applies.

² Section D.II.3 is also relevant if the operator wants to apply for the application of the special rule for heat export to private households (See Guidance Document 6 on CrossBoundary Heat Flows for more guidance on this topic)

MS-specific parameters in data collection template³

This section is only relevant for Member states that use the data collection template provided by the EC. Member States have the following possibilities to 'finetune' this template to their needs.

Options for Member States

Currently there are two sets of parameters:

a) Choices for the required level of detail (with default values):

MSconst_RequirePermitInfo	TRUE
MSconst_RequireConnectedInstContact	TRUE
MSconst_RequireAllYears	FALSE
MSconst_AllowSourceStreamTotals	FALSE
MSconst_AllowInstEmmisionTotals	FALSE
MSconst_RequireDetailedProductionData	TRUE
MSconst_RequireDetailesFallBack	TRUE
MSconst_RequireFulHeatBalance	TRUE

See below for the meaning of those parameters.

b) A list of fuel types

A short description for how to change this list is found directly in the template with the list.

3. The parameters in detail

MSconst_RequirePermitInfo: If set TRUE, the complete section A.I.1.g (Information on the Greenhouse gas emissions permit) becomes optional as indicated by the relevant color change.

MSconst_RequireConnectedInstContact: In section A.IV.b (Contact details for technically connected installations or entities) the default is that contact details are only mandatory if the connection relates to a non-ETS entity. However, competent authorities may choose to ask operators for all relevant contact details (including from ETS installations) by setting this parameter to TRUE.

MSconst_RequireAllYears: The default based on the CIMs is that operators can choose either 2005-2008 or 2009-2010 as baseline period. Member States may ask for data of both periods by setting this parameter to TRUE. This can be useful for plausibility

³ The section has been developed based on UBA accompanying note to the template.

checks over longer periods, e.g. for getting more realistic values for capacity utilisation factors. This parameter has an impact in all sheets where annual data is requested. The highlighting of input fields is a consequence.

MSconst AllowSourceStreamTotals: Source stream data (emissions and energy input from fuels and process materials etc.) can be entered in a detailed manner in accordance with the MRG (i.e. e.g. for fuels the activity data, NCV, emission factor, oxidation factor and biomass content have to be reported), from which emissions and energy content are calculated by the template.

Alternatively, one could argue that only the emissions and the energy input are relevant for allocation rules. Therefore Member States may decide to allow this shorter reporting by setting this parameter to TRUE.

MSconst AllowInstEmmisionTotals: If this parameter is set to TRUE, all the source stream related inputs are shown as optional, while the fields in D.I.2 change from “forbidden” to mandatory. In other words, operators no longer need to provide data for each source stream, but can enter totals only. If this parameter is set to FALSE (default) reporting totals only is still allowed under the condition that the installation has already handed in verified annual emission reports.

MSconst RequireDetailedProductionData: setting this option to TRUE means that for each product benchmark sub-installation the operator has to fill in detailed production data if several product (groups) are included in one benchmark definition (e.g. different types of refinery products, chemicals, steel or paper). This should enable the competent authority to decide if those products really fall under that product definition, and that neither double counting nor data gaps occur.

MSconst RequireDetailesFallBack: Similar to the previous option, but for fall-back sub-installations. For fall-back sub-installations it is particularly important to know related products, as the carbon leakage status of the products must be demonstrated to the competent authorities.

MSconst RequireFulHeatBalance: Sheet “E_EnergyFlows” offers both a simplified and a complex calculation tool for determining the heat amounts eligible under the heat benchmark sub-installation. If set FALSE, the simple tool will be used by default and the complex tool will only be needed in case of more complex situations (when which tool should be used is explained both in the template and in this guidance document) ing this parameter to FALSE. If set TRUE, the operator always has to fill in the complex tool (which in simple cases just means few data entries).

Process of data collection for operators

This Chapter provides guidelines for operators on steps to take before submitting a complete data collection template, the corresponding methodology report and the verification report.

Good practice	Description
<i>Before receiving data collection template</i>	
Become familiar with the allocation rules	The data collection cannot be completed unless the operator knows how the allocation rules apply to his/her installation. The operator should therefore become familiar with the allocation rules.
Foresee independent verification	Operators should contract a verifier following the rules set in the relevant national legislation and follow the rules that the relevant CA has set up relating to the necessary independent verification of the data, so that the completed data collection template and the corresponding methodology report can be verified. Especially for complex installations, it is advisable to foresee a two step approach for verification, including a preliminary step only aimed at checking the correctness of the split into sub-installations of the installation.
<i>After receiving data collection template, before submission</i>	
Become familiar with the data collection template and identify relevant sections	Have first estimations about number of sub-installations, look which product benchmarks could be applicable, ...
Make internal planning	Organise so that submission of data collection template to CA will be in time
Organize internal meeting(s) with relevant operators / technical experts	Operators may organize internal meetings with relevant operators and / or technical experts to discuss the availability and quality of data. Collect data sources of best available data.
Organize meeting(s) with technically connected installations (if relevant)	If an installation has relevant technical connections, it is recommended to align data of ingoing and outgoing streams with the technically connected installation.
Ask for clarification if needed	If certain points are unclear, operators should ask their national CA for clarification.

Process of filling in template

Question	Relevant section in template	Relevant section in Guidance Doc
<i>Determination of eligibility of free allocation</i>		
Is installation classified as “electricity generator”?	A.II.1	A.II.1
If yes, does it produce heat eligible for free allocation?	E.III	E.III
<i>Choose baseline period</i>		
Which baseline period is chosen? (<i>The choice of baseline period could significantly affect the historical activity levels and consequently the allocation. Operators are therefore advised to carefully assess which baseline period would lead to the highest allocation</i>)	A.II.2	A.II.2
<i>Determination of number of sub-installations</i>		
Is there a product benchmark sub-installation?	A.III.1	A.III.1
Is there a heat benchmark sub-installation?	A.III.2	A.III.2
Is there a fuel benchmark sub-installation?	A.III.2	A.III.2
Is there a process emissions sub-installation?	A.III.3	A.III.3
What is the CL-status of the products produced?	A.III	A.III
<i>Determination of relevant capacity changes</i>		
What is initial installed capacity per sub-installation?	A.III.3	A.III.3
Are there significant capacity changes per sub-installation?	A.III.3	A.III.3
<i>Determination of relevant technical connections</i>		
Which technical connections are relevant and to what extent?	A.IV	A.IV
<i>Determination of direct emissions and energy flows</i>		
How many direct emissions and direct input from fuels did occur?	B.II, B.III	B.II, B.III
How should direct emissions and/or fuels be attributed to sub-installations?	E.I, G.I	E.I, G.I
What is the heat balance of the installation?	E.II	E.II

<i>Determination of HAL product benchmarks</i>		
What is HAL of relevant product benchmark?	F	A.II, A.III, A.IV, C.II (if CEMS), C.III, C.IV, C.V, D.I, D.II, E.III, H
<i>Determination of HAL fall-back sub-installations</i>		
HAL heat benchmark sub-installation(s)	G.I.1-2	A.II, A.III, A.IV, C.II (if CEMS), C.V, D.I, D.II, E.II.2, DII
HAL fuel benchmark sub-installation(s)	G.I.3-4	A.II, A.III, A.IV, B.II, C.II (if CEMS), C.V, D.I, D.II, E.I
HAL proces emissions benchmark sub-installation(s)	G.I.5-6	A.II, A.III, A.IV, B.III, C.II (if CEMS), C.V, D.I, D.II, D.III

A General information

This section describes what data needs to be provided to identify the installation under analysis and its most important characteristics for the purpose of determining free allocation.

A.I Identification of the installation

This section is mandatory for all operators of installations falling within the scope of directive 2003/87/EC⁴, either if eligible for free allocation or not (unless the CA prescribes otherwise).

A.I.1 General information

The operator should specify:

- a) Name of the installation: this is the name generally used on permits and other official documentation and should be consistent with previous communication with the competent authorities (if applicable);
- b) Member State in which the installation is situated. "Member State" means here: State which participates in the EU ETS, i.e. EU-27 and Iceland, Norway and Liechtenstein.
- c) If the installation has been included in the EU ETS before 1.1.2013
- d) Unique identifier code: this is usually the ID code used for the NAP II or any other ID issued by the competent authorities in accordance with Art 5 and 6 of the ETS Directive. For installations which will be included in the EU ETS only from 2013 onwards, operators are requested to contact the competent authority to receive such ID. Competent authorities must ensure to have a unique ID available before notifying any data to the European Commission.
- e) Identification code of the Installation in the Registry. This is usually a natural number, i.e. a code different from the Permit identifier used in the Registry, usually known as the installation ID. For installations which will be included in the EU ETS only from 2013 onwards, such ID might not yet be available. For them this input field is optional. Operators are requested to contact the competent authority or the Registry Administrator to receive such ID, according with the relevant legislation.
- f) Suggested unique ID for notification to the Commission, this is automatically derived and is an ID to be used with correspondence with the Commission;
- g) Permit information: here the operator should fill in the name of the competent authority responsible for handling the permit of that installation, the permit ID and the date of issue when the installation was included first in the EU ETS and

⁴ Please refer to the Guidance note N1 on General issues and on the eligibility for free allowances.

any other updates (i.e. re-issue dates and IDs) if applicable. Member States may make this information optional if the competent authority is in possession of this information already.

- h) Date of start of normal operation of the installation. This input is only relevant if the installation has started operation after the 1.1.2005.
- i) If the installation is an incumbent or a new entrant. A new entrant is an installation that has received a GHG permit after the 30 June 2011. An installation can be considered incumbent if it is operating before the 30th June 2011, if it has obtained or will obtain all relevant environmental permits by the 30th June 2011, or if it fulfils all other criteria defined in the national legislation to be entitled to receive a GHG emissions permit; *See Guidance Document 7 on New Entrants/Closures for more information on definitions of incumbents and new entrants. See also guidance document n.2.*
- j) Operator data: name, address and phone numbers. The operator is the person who operates or controls an installation or to whom decisive economic power over the technical functioning of the installation has been delegated⁵.
- k) Installation address

A.I.2 Contact persons

The operator should specify the contact details of the person(s) responsible for completing or overseeing this report in case clarifications or communication is needed, In particular: name, address, email and telephone number should be reported.

A.I.3 Verifier engaged for this baseline data report

The operator should specify:

- a) The details of the verification company, in particular: company name, address and country
- b) The person who carried out (or project managed) the verification, in particular: name, e-mail address and telephone number
- c) Information about the verifier's accreditation, in particular the Member States in which it is allowed to operate in and the registration number issued by the Accreditation body. The availability of such registration information may depend on the administering Member State's practice of accreditation / permitting of verifiers. In case that the Member State uses not accreditation but another way of recognising verifiers, the relevant information should be entered below as if it were accreditation.

A.I.4 Further installation data

The objective of this section is to further understand the activities carried out in the installation being assessed and to identify installations that may be opted-out of the EU ETS.

⁵ In accordance with Article 3(f) which gives the definition of an operator.

The operator is requested to specify:

- a) The activities carried out at the installation as defined in Annex I of the ETS Directive. If activities other than 'combustion of fuels' are carried out than, it is not necessary to indicate activity 'combustion of fuels'/ that specific activity is only relevant in case no other new 1 activity is carried out by the installation
- b) Activity code according to the NACE classification under which the operator reported value added for structural business statistics. In case of doubt, the operator is requested to contact the relevant national statistics office. Two NACE codes should be specified:
 - NACE ref. 1.1 code used for the year 2007
 - NACE ref. 2 code used for the year 2010
- c) The EPRTTR⁶ identifier, optional and if applicable. This information is useful for the competent authorities for consistency checks and alignment of environmental information sources (i.e. national GHG inventories).
- d) If the installation is a small emitter according to Art. 27(1) of the ETS Directive. According to the Directive small emitters are installations that have reported less than 25,000 tonnes of CO₂ equivalents and, where they carry out combustion activities, have a rated thermal input below 35MW, excluding emissions from biomass, in each of the years before the submission of the NIMs. *For guidance on how to determine the total thermal rated input of an installation, see Annex I to the ETS Directive and "Guidance on Interpretation of Annex I of the EU ETS Directive (excl. aviation activities)" published by the EC on 18 March 2010.*
- e) If the installation is a hospital

A.II Information on this baseline data report

A.II.1 Eligibility for free allocation

This section aims at understanding if the installation is eligible for free allocation or not. *For more information on the eligibility criteria please refer to section 3.2 of the Guidance Document 1 with General Guidance.* This section is mandatory for all installations eligible for free allocation as well as installations that are not eligible for free allocation (unless the CA prescribes otherwise).

The operator should specify:

- a) If the installation is an electricity generator pursuant to Art. 3(u) of the revised ETS Directive.⁷ *Art. 3(u) of the revised ETS Directive defines an electricity*

⁶ EPRTTR means European Pollutant Release and Transfer Register.

⁷ Installations have to be classified either as electricity generator or non-electricity generators. The "Guidance paper to identify electricity generators" of March 18 2010 is to be used for this purpose.

generator as “an installation that on or after 1 January 2005, has produced electricity for sale to third parties, and in which no activity listed in Annex I [of the revised ETS Directive] is carried out than the combustion of fuels. See “Guidance paper to identify electricity generators” discussed by the EC and the Member States on 18 March 2010 for guidance.

- b) If it is an installation for the capture and storage of CO₂ or if it is a CO₂ storage site
- d) Define if the installation produces any heat.

If the answer to (a) or (b) is positive and the answer to (d) is negative, then the installation is not eligible for free allocation. For installations that are not eligible, the rest of this document is in principle not relevant. The operator is however recommended to provide the data requested in section E ‘Data on energy input, measurable heat and electricity’ to ascertain that the status of the “electricity producer” is appropriately defined.

If the answer to (a) or (b) is positive and the answer to (d) is positive as well, then the installation might receive some free allocation (in case heat is delivered to non ETS entities or installations).

The operator should further:

- e) Confirm the non-eligibility of the installation for free allocation in case the answer to (a) or (b) is positive and the answer to question (d) is negative.*
- f) Confirm that the eligibility of the installation for free allocation in case the answers to both (a) and (b) are negative.*
- g) Confirm that the data contained in this file will be used by the competent authority for determining the free allocation pursuant to Article 10a of the EU ETS Directive. Furthermore these data will be notified to the European Commission in part or as a whole, if requested so, for the purpose of scrutinising the national implementation measures pursuant to Article 11(1) of the EU ETS Directive. The consent is necessary to make the submission of data complete.*

Important note

The answers to the questions in this section have no impact on the possible free allocation under Art. 10c of the ETS Directive which is about transitional free allocation for the modernisation of electricity production.

A.II.2 Baseline period chosen

In this section the baseline period is chosen and the following mandatory data are shown, according to the selections of the answers made by the operator.

The operator should:

- a) Select the baseline period chosen⁸. As described in Art 7.1 of the CIMs the operator can choose the baseline period 2005 to 2008 or 2009 to 2010. This applies also to installations that are operated only occasionally such as seasonal installations or back-up installations. The chosen baseline period applies to the whole installation: the same baseline period will be considered for all identified sub-installations within the installation concerned.
- b) Specify the years in which the installation was operating for at least one day in that calendar year. A calendar year is the period between 1 January and 31 December of the same year. Please answer 'yes' or 'no' for each year, including the ones not covered by the baseline period selected in (a). E.g. assuming the installation started in 2006, the answer for 2005 would be 'no' and the answer for the years 2006 to 2010 would be 'yes'.
- c) Specify if the installation is operated only occasionally. Installations are considered to operate only occasionally if:
- The operator can clearly demonstrate that the installation is used occasionally, in particular, operated regularly as standby or reserve capacity or regularly following a seasonal schedule.
 - The installation has all the relevant permits (GHG or other environmental permits, e.g. IPPC) required by its national legislation.
 - It is technically possible to start operations on short notice. In other words it is not out of order and therefore unable to operate.
 - Maintenance to the installation is carried out on a regular basis
 - The installation must obviously exceed the relevant thresholds concerning the inclusion within the scope of the directive 2003/87/CE⁹
- If the operator specifies that an installation is operated only occasionally then the operator needs to provide evidence of this to the competent authority.
- e) If the installation has been operating less than two calendar years in baseline period, meaning that it started operations 'late' in the relevant baseline period so that no sufficient data is available. If this is the case, then the historical activity level will be derived based on the initial installed capacity. *See section 6.3 of Guidance Document 2 on Allocation Methodologies for guidance on this topic.*

In practice, the historical activity levels will be based on the years in the selected baseline period in which the installation was operating (see (b)) unless the installation did not operate continuously (see (c)). In that case, all the years of the selected

⁸ Installations that started their operations in 2011 may have no data to report during both of the reference baseline periods 2005-2008 or 2009-2010. Still, the field concerning the choice of the baseline period is mandatory and shall be filled in. The following declaration in Table A.II.2.b and Table A.II.2.e concerning the years in which the installation was operating, then clarifies that no historical data are available.

⁹ Please refer to the Guidance Document 1 with General Guidance which gives clarifications on the scope.

baseline period are taken into account, following Article 9.8. *In the data collection template, these years are automatically specified under (d).*

A.III List of sub-installations

This section describes what data should be reported to identify the sub-installations present in the installation. This section is mandatory for all installations that are eligible for free allocation. *For more information on the eligibility criteria please refer section II.1 of this Guidance Document or to section 3.2 of the General Guidance Document 1 with General Guidance.*

More details on how to derive the sub-installations is given in the Guidance Document 2 on Allocation Methodologies.

A.III.1 Product benchmark sub-installations

The operator should specify all product benchmark sub-installations covered by the installation's permit. Products that are covered by the same product definition are aggregated in the same sub-installation and have the same product benchmark. *In the data collection template the operator can select the benchmark products in the drop down menu. For an overview of product benchmarks and associated product definitions and system boundaries see Annex I of the CIMs and for more guidance on the appropriate product definition see Guidance Document 9 with Sector Specific Guidance¹⁰*

The operator should also determine for each sub-installation whether it is deemed at a significant risk of carbon leakage. *In the data collection template, the carbon leakage exposure status will be determined automatically based on Commission Decision 2010/2/EU. Revisions of this Decision in the future are possible. For an overview of carbon leakage exposure statuses, see Annex I of the CIMs or Guidance Document 9 with Sector Specific Guidance*

In addition, the operator should specify if there have been any significant changes in capacity relevant to the sub-installation between 1 January 2005 and 30 June 2011. *Additional guidance on this topic is provided in section 6.4 of Guidance Document 2 on Allocation Methodologies.* More information about data collection in case of capacity changes is requested in section B.

¹⁰ Note that in some cases separate sub-installations can cover the same physical units, for example two benchmarked products can be manufactured from the same production line. This is not an issue as long as the activity levels for each product are well defined. For a practical example please refer to Guidance note N2 on Allocation Methodologies.

A.III.2 Sub-installations with fall-back approaches found at the installation

The operator should specify which heat benchmark, fuel benchmark, and process emissions sub-installations are covered by the installation's permit. Each installation can have a maximum of six sub-installations covered by fall-back approaches. See *Guidance Document 1 with General Guidance for a discussion on the maximum number of sub-installations covered by fall-back approaches.*

In addition, the operator should specify if there have been any significant changes in capacity relevant to the sub-installation between 1 January 2005 and 30 June 2011. *Additional guidance on this topic is provided in section 6.4 of Guidance Document 2 on Allocation Methodologies. More information about data collection in case of capacity changes is requested in chapter B.*

A.III.3 Data used for determining the initial installed capacity

This section is mandatory for all installations that are eligible for free allocation based on a product benchmark. The reported values will serve as a basis for the EC to determine the Standard Capacity Utilisation Factor (SCUF) for the production of the benchmarked product, once all NIMs have been submitted; the SCUF will then be used as a parameter in the determination of the allocation to new entrants. Sub-installations that have had a significant change in capacity will not be taken into account by the EC in the calculation of the SCUF. See *Guidance Document 7 on New Entrants and Closures for guidance on the use of the SCUF.*

For sub-installations covered by a fall back approach reporting is mandatory only if one or more significant changes of capacity have occurred across the period 01-01-2005 to 30-06-2011. See *section 6.4 of Guidance Document 2 on allocation methodologies for guidance on the determination of whether the capacity changes significantly.*

To determine the initial installed capacity the reference period is based on the years 2005, 2006, 2007 and 2008. The reference period is fixed to these years and should not be confused with the baseline period that operators can choose in the previous section. See *section 5 of Guidance Document 2 on allocation methodologies for guidance on the determination the initial capacity.*

The operator should specify for each relevant sub-installation:

- a) If feasible, the two highest monthly production volumes or activity data for the years 2005, 2006, 2007 and 2008. The monthly data to be provided are the actual calendar monthly data, without any further calculation or normalisation of the figure. This means that the monthly volume will take into account the operational patterns of the installation.

The production volumes or activity levels should not be corrected for changes in capacity. The production or activity data should be expressed in the correct units. If significant capacity changes are reported for a sub-installation, highest

monthly production data is only to be reported for the period BEFORE THE FIRST capacity change after 1 January 2005, taking as a reference the date of starting of changed operation. This is because that figure will be used in sheets F and G as the capacity before any capacity change. *The data collection template automatically lists the sub-installations with the appropriate units.*

- b) The initial capacity is calculated automatically and is based on the average of the two monthly productions specified under a). In case it is not possible to determine the initial installed capacity according to point (a), an experimental verification of the sub-installation's capacity has to be carried out. The procedure has to be supervised and approved by a verifier. *See Chapter 5 of Guidance Document 2 on allocation methodologies for more guidance on the determination of the initial capacity). The template collection template automatically provides a list of sub-installations with: capacities based on the input to a), capacity used, average production over 2005-2008 and capacity utilisation factors¹¹.*

A.IV List of technical connections

This section is only relevant for:

- installations where measurable heat, waste gases or CO₂ is transferred to or from another ETS installation or non-ETS entity
- installations where heat is consumed that was produced by a nitric acid installation, even if the nitric acid production is part of the same installation.

The data requested in this section is particularly relevant to ensure consistency of the data provided and to avoid double counting or missing of allocation data. The information on this section will be important for the treatment of cross boundary heat flows and waste gases. *For more information on these two issues please refer to Guidance Document note 6 on Cross Boundary Heat Flows and Guidance Document 8 on Waste Gasses.*

The operator should specify:

- a) Information relevant for identifying technical connections to the installation, in particular:
- Name of the ETS installation or non-ETS entity linked to the installation assessed. *In case heat is consumed that was produced as a result of nitric acid production within the same installation, than the name of the installation itself should be provided in the Data Collection Template.*
 - Type of entity: "Installation covered by the ETS", "Installation outside the ETS", "Heat distribution network", "Installation producing nitric acid". In the selection the identification is heat distribution network or nitric acid

¹¹ The capacity utilisation factors will be used by the EC to determine the Standard Capacity Utilisation Factor (SCUF) for the production of the benchmarked product, once all NIMs have been submitted.

installation proceeds over the identification as ETS installation or non-ETS entity. *The data collection template facilitates the selection by providing a drop-down menu.*

- Type of connection, e.g. is the connection due to an exchange of measurable heat, waste gas or CO₂?
 - Type of flow, e.g. is it import or export, specify where the flow comes from and to which sub-installation it goes to
- b) Additional information for connected ETS installations, in particular:
- The CITL installation ID; Installation ID is mandatory if the connected installation is covered by the EU ETS, and if it has already been covered by the EU ETS before 30.6.2011.
 - (Optional) The name and contact details of the operator at that installation so that any communication is facilitated.

B Source stream data: fuels and process emissions

This section aims to provide guidance on the collection of specifications on fuel combustion and process emissions as defined in the MRG¹². The definition of process emissions in the MRG differs from the one for the purpose of allocation in the CIMs. See section B.I for guidance on the relevance of this section and on data reporting.

B.I Guidance for source stream data

The discussion in this section is valid for all sections in chapter B and C.

Some Member States may allow operators to only report totals for the whole installation in section D.I. In that case, the other sections in this chapter can in principle be ignored. *In the data collection template, point (a) indicates whether the relevant Member State requires detailed information.*

The operator should specify if the installation already has delivered verified annual emissions reports for all relevant baseline years. *In the data collection template this should be done under point (b).* In that case, the operator only needs to report totals for the whole installation in section D.I and can in principle ignore other sections in this chapter.

In addition, the operator should specify whether the boundaries of the installations will be changed from 2013 onwards due to the changed scope of the EU ETS Directive, such as additional activities which have been introduced by the revision (Directive 2009/29/EC). *In the data collection template this should be done under point (c).*

Based on Member State requirements, availability of verified annual emissions reports as specified by the operator, and any changes in the boundaries of the installation from 2013 onwards, the data collection template under point (d) automatically indicates if the operator should report detailed emissions data.

If the boundaries of an installation have changed as a consequence of changes on scope of the ETS Directive from 2013 onwards, then the operator is always required to submit full detailed emissions data here.

Even if the operator is not required to deliver detailed data, then the data requested in the next sections could help to track irregularities and to understand energy and mass

¹² The Monitoring and Reporting Guidelines (MRG 2007). The consolidated version of the MRG 2007 can be found at:
http://eur-lex.europa.eu/Result.do?T1=V1&T2=2007&T3=589&RechType=RECH_consolidated&Submit=Search

flows and different origins of emissions. The data could be used to bottom-up calculate the total GHG emissions and energy input for the installation. These totals can be compared to the total emissions and energy input available from other data sources. Any deviations would indicate omissions or double counting. In general, the more detailed the reporting, the easier it is to track irregularities and to understand the energy and emissions flows.

In principle, operators only need to report data for the years in the baseline period chosen so either 2005-2008 or 2009-2010 (see section A.II.2). Member States may however require installations to provide data for both baseline periods.

In most cases, the data requested are annual values. Data can be derived from a range of data sources (see Annex I on data quality). Data should be provided in accordance with the MRGs. Member State specific reporting rules shall be taken into account (such as specific calculation factors, treatment of memo-items etc). Member State specific reporting rules shall be taken into account (such as specific calculation factors, treatment of memo-items etc).

Emissions reported in this sheet shall reflect the **complete DIRECT** emissions of an installation as they would be reported in the annual emissions report. This means that emissions are to be reported irrespective of their attribution to sub-installations. In particular also emissions related to electricity production and other flaring than safety flaring are to be reported.

B.II Fuels

This section describes how to report fuel consumption. Some Member States may allow operators to only report totals for the whole installation in section D.I. In that case operators do not have to provide data described in this section. Details of the installation's fuel consumption will however make it easier to track irregularities and to understand the energy, materials and emissions flows.

For each fuel type, the operator should specify:

- a) Fuel category: the fuel category corresponds to the fuel name as provided by Table 4 of the MRG. Possible fuel categories include waste gases derived for example from the production of coke in Iron and Steel installations that are further used in a combustion process. *In the data collection template, the selection of fuel category is facilitated by a drop-down menu which contains all possible fuel categories.* It is possible for Member States to change the reference table for the drop down list according to the national provisions implementing the MRGs

- b) Name of fuel: further specification of the fuel is needed if more than one type of fuel exists under the same fuel category. For instance, there are multiple types of heavy fuel oils and wastes
- c) Fuel Consumption data. Operators should specify the data described below. Some Member States may not require operators to provide the information specified under this item. In that case operators can suffice with reporting the data specified under (d). *Generally, relevant reference for filling in emissions from fuel data reference is to be made to Annex I and section 2.1.1.1 of Annex II of the MRG.*
- Annual fuel consumption in tonne per year for solid/liquid fuels or 1,000 Nm³ for gaseous fuels. *In the data collection template the unit of fuel consumption should be selected from the drop-down menu. Fuel consumption should be determined in compliance the MRG, in particular section 5.4 of Annex I.*
 - Net Calorific Value (NCV) in GJ per tonne for solid/liquid fuels or 1,000 Nm³ for gaseous fuels. *In the data collection template the proper unit of the NCV is automatically selected. The NCV is sometimes referred to as the lower heating value. The net caloric value is the amount of heat released during the combustion of the fuel, minus the energy required to vaporise water produced during combustion. NCVs should be determined in compliance the MRG, in particular section a2 of Annex II.*
 - Emission factor in tonne of CO₂ eq. per tonne or TJ fuel. For mixed fossil-biomass fuels, the emission factor should be expressed as if it were purely fossil. *In the data collection template the unit of the emission factor should be selected from the drop-down menu. Emission factors should be determined in compliance the MRG, in particular section 5.5 of Annex I.* Where only TJ or quantities of pure biomass (in tonnes or Nm³) are available, an emission factor equal to '0' shall be filled in the template. The cell must be filled in to let the formulae in the worksheet to function properly.
 - Oxidation factor in %. When a fuel is consumed, not all of the carbon in the fuel is oxidised to CO₂. Incomplete oxidation occurs due to inefficiencies in the combustion process that leave some of the carbon unburned or partially oxidised as soot or ash. Un-oxidised or partially oxidised carbon is taken into account via the oxidation factor which shall be expressed as a percentage. *Oxidation factors should be determined in compliance the MRG, in particular section 5.6 of Annex I.*
 - Biomass content in %. The biomass content is defined here as the proportion of the carbon content of the fuel which relates to biomass. For example if one tonne of fuel is burnt and 2 tonne of carbon are emitted, one tonne of which relates to the biomass content, 50% should be entered; *Biomass content should be determined in compliance the MRG, in particular section 13.4 of Annex I.*

- The fossil and biomass emissions in tonne of CO₂ equivalents per year calculated from in data above in accordance with the MRG, in particular section 5.1 of Annex I. *The data collection template automatically calculates the emissions.*
 - The energy input in TJ/year. *The data collection template automatically calculates these emissions based on the data specified above.*
- d) Total figures on fuel input and emissions. Some Member States may not require operators to provide the detailed information specified under (c). In that case operators can suffice with reporting the data specified below. *All data should be determined in compliance the MRG:*
- Emissions (from fossil fuels) in tonne CO₂ equivalents per year
 - Emissions from biogenic origin in tonne CO₂ equivalents per year
 - Energy input from fuels in TJ per year
- e) Data to be used in the determination of total emissions in section C.VIII. This should be the data provided under (c) if available. Otherwise, data provided under (d) should be used. *The data collection template automatically makes this selection.*

B.III Process emissions

This section describes how to report process emissions. This section is only relevant for installations that have process emissions according to the definition in the MRG:

“process emissions’ means greenhouse gas emissions other than combustion emissions occurring as a result of intentional and unintentional reactions between substances or their transformation, including the chemical or electrolytic reduction of metal ores, the thermal decomposition of substances, and the formation of substances for use as product or feedstock”(MRG, Annex I.2(b))

Note that this definition shall not be confused with the definition of process emissions sub-installation for the purpose of allocation as given in Art 3(h) of the CIMs. See *Guidance Document 2 on Allocation Methodologies and Guidance Document 8 on Waste Gases for discussions of that definition.*

Some Member States may allow operators to only report totals for the whole installation in section D.I. In that case operators do not have to provide data described data in this section. Details of the installation’s process emissions will however make it easier to track irregularities and to understand the energy, materials and emissions flows.

For each process emission source, the operator should specify:

- a) Process emission source category: this category should correspond with activity names as listed in Table I Annex I of the MRGs.

- b) Name of process emission source stream: If different materials or processes give rise to process emissions under the same process emissions source category (e.g. specific types of limestone), further details on the specific material need to be entered.
- c) Process emission data. Operators should specify the data described below. Some Member States may not require operators to provide the information specified under this item. In that case operators can suffice with reporting the data specified under (d).
- Amount of material consumed or produced in tonne per year. The relevant material is the material which gives rise to process emissions. *The amount of material should be determined in compliance the MRGs., in particular section 5.4 of Annex I, and relevant sections concerning the activities listed in Table 1 of the Annex I of the MRGs.*
 - Emission factor in metric ton CO₂ per ton material. The emission factor can be can be derived from a stoichiometric balance or given by the raw material supplier. For mixed fossil-biomass fuels, the emission factor should be expressed as if it were purely fossil. *Emission factors should be determined in compliance the MRG, in particular section 5.5 of Annex I, and relevant sections concerning the activities listed in Table 1 of the Annex I of the MRGs.*
 - Conversion factor in %. The conversion factor is conceptually similar to the oxidation factor for fuels and corresponds to the amount of raw material being converted into GHG emissions in percentage terms. *Conversion factors should be determined in compliance the MRG, in particular section 5.6 of Annex I, and relevant sections concerning the activities listed in Table 1 of the Annex I of the MRGs.*
 - Biomass content in %. The biomass content is defined here as the proportion of the emission factor of the material which relates to biomass. *Biomass content should be determined in compliance the MRG, in particular section 13.4 of Annex I.*
 - The fossil and biomass emissions in tonne of CO₂ equivalents per year calculated from in data above in accordance with the MRG, in particular section 5.1 of Annex I. *The data collection template automatically calculates the emissions.*
- d) Total process emissions. Some Member States may not require operators to provide the detailed information specified under (c). In that case operators can suffice with reporting the data specified below. *All data should be determined in compliance the MRG:*
- Process emissions from fossil origin in tonne CO₂ equivalents per year
 - Process emissions from biogenic origin in tonne CO₂ equivalents per year
- f) Data to be used in the determination of total emissions in section C.VIII. This should be the data provided under (c) if available. Otherwise, data provided

under (d) should be used. *The data collection template automatically makes this selection.*

C Source stream data: mass balances, CEMs, N₂O, PFC and transferred CO₂

This section aims to provide guidance on the collection of specifications on mass flows, continuous emission monitoring systems (CEMs), emissions of Nitrous Oxide and Perfluorocarbons, and transferred CO₂ from other installations used on site (and vice versa). Like in chapter B, data should be provided in accordance with the MRGs. Member State specific reporting rules shall be taken into account (such as specific calculation factors, treatment of memo-items etc). See section B.1 for guidance on the relevance of this chapter and data reporting.

C.1 Mass balances

This section describes how to report the carbon and energy related to relevant mass flows. This section is only relevant for installations where the GHG emissions are evaluated on the basis of a mass balance according to the MRGs.

For each mass component, the operator should specify:

- a) Mass balance component category. No predefined categories exist: CAs may implement the list. Unless guidance is provided by the Competent Authority, operators are invited to provide a category that adequately indicates the type of mass flow (e.g. iron scrap or blast furnace slag)
- b) Name of mass balance component fuel. The type of mass flow may be further specified if needed, e.g. by adding the quality or source of the material
- c) Mass balance data. Operators should specify the data described below. Some Member States may not require operators to provide the information specified under this item. In that case operators can suffice with reporting the data specified under (d).
 - Amount of material consumed or produced in tonne per year. The relevant material is the material which gives rise to process emissions. *The amount of material should be determined in compliance the MRG, in particular section 5.4 of Annex I.* In order to make the formula work properly, please ensure that carbon streams entering the installations are reported as positive values, while streams leaving the system are reported as negative. Other factors must always be positive. Negative values will always be marked in red. Values in red should therefore not be interpreted as faulty data entries.
 - Net Calorific Value (NCV) in GJ per metric ton material. Providing the NCV is only applicable if the mass flow contributes energy to the process: in all other cases insert '0' to make the emission calculation work. The NCV is sometimes referred to as the lower heating value. For mass flows other than fuels, the NCV can be understood as the energy

- content of the mass. *NCVs should be determined in compliance the MRG.*
 - Carbon content in mass %. Carbon content is the share of the mass that consist of carbon. *Carbon content should be determined in compliance the MRG.*
 - Biomass content in mass %. The biomass content is defined here as the proportion of the carbon in the material that is of biogenic origin. *Biomass content should be determined in compliance the MRG.* If it does not apply, insert '0' in the relevant cell to make the worksheet emission formula work.
 - The emissions from fossil origin in tonne of CO₂ equivalents per year calculated from in data above in accordance with the MRG, in particular section 5.1 of Annex I. *The data collection template automatically calculates the emissions.*
 - The energy flow in TJ/year. *The data collection template automatically calculates these emissions based on the data specified above.*
- d) Total figures on energy and carbon related to mass flows. Some Member States may not require operators to provide the detailed information specified under (c). In that case operators can suffice with reporting the data specified below. *All data should be determined in compliance the MRG:*
- Emissions from fossil origin in tonne CO₂ equivalents per year
 - Emissions from biogenic origin in tonne CO₂ equivalents per year
 - Energy input from mass flows in TJ per year
- e) Data to be used in the determination of total emissions in section C.VIII. This should be the data provided under (c) if available. Otherwise, data provided under (d) should be used. *The data collection template automatically makes this selection.*

C.II CEMs (Continuous Emission Monitoring Systems) for CO₂ emissions

This section describes how to report data from Continuous emission monitoring systems (CEMs). This section is only mandatory for installations fitted with such CEMs. CEMs method is only applicable when explicitly approved by the CA.

The data collection template allows operators to input information for one CEMs source. Aggregated data should be provided, if multiple sources are present in an installation. The operator should take Annex XII of the MRGs as a reference.

Operators should specify:

- a) Emission source: the name of the emission source; this may be a single stack, or an activity pursuant to Table 1 Annex I of the MRGs;
- b) CEMs data:
 - Emissions from fossil origin in tonne CO₂ equivalent per year
 - Emissions form biogenic origin in tonne CO₂ equivalent per year

- Energy input in TJ per year.

For CEMs, the MRG require that corroborating calculations are undertaken and that proxy data are reported for parameters not available from CEMs; this corroborating information should not be entered here, but included in the methodology report.

C.III Nitrous Oxide Emissions (N₂O)

This section describes how to report data related to emissions of Nitrous Oxide (N₂O). This section is only mandatory for installations with N₂O emissions that are covered by the EU ETS. *See Annex I of the revised ETS Directive for the list of activities for which N₂O emissions are included in the EU-ETS for phase 3. The operator should take Annex XIII of the MRGs as a reference.*

The data collection template allows operators to input information for one N₂O source. Aggregated data should be provided, if multiple sources are present in an installation.

Operators should specify:

- a) The name of the emission source; this may be a single stack, production line, or whole activity pursuant to Annex I of the EU ETS Directive;
- b) N₂O emissions data:
 - N₂O emissions in tonne of N₂O per year
 - GWP used: the Global Warming Potential (tCO₂e/t N₂O) is a standard value (i.e. 310), so no additional data is needed.
 - Emissions in tonne CO₂ equivalent per year. *The data collection template automatically calculates these emissions by multiplying the emissions by the GWP.*

C.IV Perfluorocarbons (PFC)

This section describes how to report data related to emissions of Perfluorocarbons (PFC). This section is only mandatory for installations with PFC emissions that are covered by the EU ETS. *See Annex I of the revised ETS Directive for the list of activities for which PFC emissions are included in the EU-ETS for phase 3. Relevant Annex of the MRGs shall be taken as a reference.*

The data collection template allows operators to input information for one PFC source. Aggregated data should be provided, if multiple sources are present in an installation.

Operators should specify:

For processes that emit perfluorocarbons (PFC), i.e. the production of primary aluminium, the following data should be entered:

- a) The name of the emission source; this may be a single stack, production line, or whole activity pursuant to Annex I of the EU ETS Directive;
- b) Monitoring method applied: the monitoring method which has been applied, i.e. slope method or overvoltage method. *In the data collection template, the selection of fuel category is facilitated by a drop-down menu.*
- c) PFC emission data:
 - Production of primary aluminium in tonne per year
 - The Slope Emission Factor (SEF) expressed as (Kg CF₄ / t Al) / (min/cell-day))
 - The Anode Effect Overvoltage (AEO) and the Current Efficiency (CE) to be expressed in mV
 - The overvoltage coefficient (OVC) expressed as (Kg CF₄ / (t Al mV)
 - The weight fraction of C₂F₆, expressed as metric ton C₂F₆ per ton CF₄
 - Emissions in tonne CO₂ equivalent per year. *The data collection template automatically calculates these emissions.*
- d) Total PFC emissions. Some Member States may not require operators to provide the detailed information specified under (c). In that case operators can suffice with reporting totals.
- e) Data to be used in the determination of total emissions in section C.VIII. This should be the data provided under (c) if available. Otherwise, data provided under (d) should be used. *The data collection template automatically makes this selection.*

C.V Transferred or stored CO₂

This section describes how to report data related to transfer of CO₂. This section is only mandatory for installations that transfer CO₂ to or from other installations or non-ETS entities, in particular in the case of ammonia production or for the purpose of carbon capture, transport and geological storage. *Annex I section 5.7 of the MRGs shall be taken into account as a reference.*

This section does not cover:

- Import of waste gases: import of waste gases is covered by section C.I on fuels
- Carbon bound in products: CO₂ in bound products (e.g. bulk organic chemicals or by-products of steel production) is covered by section C.III on mass balance.

Concerning production processes, such as the ammonia and soda ash, it shall be assumed that all CO₂ resulting from the production processes is emitted to the atmosphere, irrespective of any potential use of the CO₂ as feedstock in chemical production processes.

Operators should specify:

- a) Name of the CO₂ stream
- b) Identification of connected installations: this is the name of the installation with which CO₂ is exchanged (i.e. imported or exported)

- c) CO₂ transfer or storage data: relevant provisions in the MRGs shall be taken into account. *In the data collection template the CO₂ transfer the following data can be provided:*
- The amount of CO₂ from fossil origin that is transferred or stored in tonne of CO₂ per year
 - The amount of CO₂ from biogenic origin that is transferred or stored in tonne of CO₂ per year
 - Energy content in TJ per year of the substance transferred or stored (e.g. export of waste gases). This is only relevant if the CO₂ is transferred as (part of) a gas that has an energy content.

D Attribution of emissions

This section aims to obtain an overview of the origins of emissions in the installation. This section is mandatory for all installations that are eligible for free allocation.

Unless specified otherwise, operators only need to report data for the years in the baseline period chosen so either 2005-2008 or 2009-2010 (see section A.II.2). Member States may however require installations to provide data for both baseline periods.

In most cases, the data requested are annual values. Data can be derived from a range of data sources (see Annex I on data quality).

Emissions related to transferred or stores CO₂ must obviously be subtracted from the amount of emissions when coming to the attribution to the relevant sub-installations.

D.1 Total Direct Greenhouse Gas Emissions and Energy Input from Fuels

This section describes how to report total direct GHG emissions and energy input from fuels. Total GHG emissions and energy input from fuels are needed in the determination of free allocation.

Some Member States may not require operators to provide the detailed information specified in the sections B and C. In that case operators can suffice with reporting the data in this section.

Operators should specify the data listed below. The data should be checked or calculated from the data provided in sections B and C. *In case operators use the data collection template, they may not need to provide this data. See end of this section for further guidance regarding the use of the data collection template.*

- Total CO₂ emissions in tonne of CO₂ per year
- Total CO₂ emissions from biogenic origin in tonne of CO₂ per year
- Total N₂O emissions in tonne of CO₂ equivalent per year
- Total PFC emissions in tonne of CO₂ equivalent per year
- Total direct GHG emissions in tonne of CO₂ equivalent per year. This is the sum of the emissions specified above
- Total energy input from fuels in TJ per year. Obviously this value should reflect the total net energy input if any of the source streams of the installation is evaluated on the basis of a mass balance

Guidance on the use of the data collection template:

- *Section D.1.1: In this section the data collection template automatically calculates data listed above from data from the previous sections.*

- *Section D.1.2: Some Member States may not require operators to provide the detailed information specified in the sections B and C. In that case operators can suffice with reporting the data in this section. Also in case operators have provided data in sections B and C they are encouraged to provide total data in this section as to allow checks on omissions and double counting*
- *Section D.1.3: In this section the data collection template automatically selects the data to be used in sheets “E_EnergyFlows”. This will be the data provided in section D.1.2 if available. Otherwise, data calculated in section D.1.1 will be used.*

D.II Attribution of emissions to sub-installations

For the purpose of allocation operators are required to attribute the total emissions to one or more sub-installation(s). This section is mandatory for all installations that are eligible for free allocation.

D.II.1 Total emissions at installation level

The total annual emissions at installation level as provided in section D.I are taken as the amount that needs to be attributed to different sub-installations. *In the data collection template, these emissions are automatically copied from sheet ‘C.SourceStreams’ so that the relevant information is available at a glance.*

D.II.2 Attribution to sub-installations

This section allows the attribution of emissions to the different sub-installations. It is possible to insert either percentages or absolute values, based on the choice made in cell I58. The section is mandatory.

The free allocation to process emissions sub-installations is directly based on the emissions attributed to in this section: the relevant cells are marked in bold. Emissions are attributed to other origins to determine the total amount of emissions eligible for free allocation with the EU ETS and for the purpose of consistency checks.

The operator should indicate either the shares or absolute values of emissions listed below. The total should add up to 100%. Both shares and absolute values shall be referred to the tonne of CO2 equivalent unit. *See end of this section for more guidance on the use of the data collection template:*

- Direct emissions of the installations within the boundaries of a product benchmarks. *See Guidance document 9 with sector-specific guidance for guidance on system boundaries of product benchmarks.* These emissions include:
 - Direct emissions from the combustion of fuels consumed by production processes in the installation covered by product benchmarks.

- Direct emissions from the production of measurable heat consumed by processes in the installation within the boundaries of the product benchmark. Note that since only the emissions from the installation are considered here, emissions related to the production of imported heat should not be included. *See section 2.2 of Guidance Document 6 on Cross Boundary Heat Flows, for a description of how to determine the emissions related to heat production from a CHP unit.*
 - Process emissions as defined by the MRG within the boundaries of the relevant benchmarked product¹³.
- Emissions due to the production of measurable heat that is not consumed inside the boundaries of product benchmark sub-installations present at the installation. The emissions should exclude the emissions related to onsite electricity production. Note that since only the emissions from the installation are considered here, emissions related to the production of imported heat should not be included. Because heat import is not considered, the emissions under this bullet may not completely conform to emissions related to heat benchmark sub-installations. *See section 2.2 of Guidance Document 6 on Cross Boundary Heat Flows, for a description of how to determine the emissions related to heat production from a CHP unit.*
 - Emissions from the combustion of fuels consumed by production processes in the installation not covered by the product benchmarks. These emissions relate to fuel benchmark sub-installations. These emissions exclude the emissions due to the production of measurable heat and electricity.
 - Emissions related to a process emissions sub-installation deemed to be exposed to a significant risk of carbon leakage. *See Guidance Document 5 on Carbon Leakage for more information about carbon leakage.*
 - In case no waste gases are produced in the installation, these emissions are equal to the process emissions as the process emissions defined in Article 3(h) of the CIMs. *See guidance document 8 of waste gases for guidance on the definition of waste gases.* Note that this definition is different from the one in the MRG.

¹³ It is of utmost importance of not confusing the process emissions as referred to in the MRGs and the process emission sub-installation that is relevant for allocation purposes. E.g. emissions from flue gas cleaning are “process emissions” according to Annex II MRG, but not eligible for free allocation according to Art. 3 h) of the Decision. Therefore emissions from flue gas cleaning are reported in the sheet “B_SourceStreams” according to the provisions in Annex II (2.1.2) MRG, but they have to be part of “other emissions (non-eligible)” in the sheet “D_Emissions” in the template and shouldn’t be related to a process emissions sub-installation. Please refer to guidance n.2 for further clarifications, in particular to table 2.

- This amount should be increased in case of consumption of waste gases that were produced outside the boundaries of a product benchmark sub-installation. This topic is discussed in more detail further in this section.
- o Emissions related to a process emissions sub-installation not deemed to be exposed to a significant risk of carbon leakage. See previous item for additional clarification.
- o Other emissions not eligible for free allocation. These are emissions related to the production of electricity or to flaring (except safety flaring and related pilots) and other emissions that are not eligible. *See guidance document 8 of waste gases for guidance on the distinction between safety flaring and other flaring. Note that this definition is different from the one in the MRG.*

Heat may be produced both for consumption within product benchmark sub-installations and outside product benchmark sub-installations (e.g. heat export, consumption of production processes not covered by product benchmarks, electricity production). In that case shares of the total emissions related to the heat production should be attributed to different origins (see above for different origins)

A production process may be involved in the production of both products covered by a product benchmark and of products not covered by a product benchmark. In that case shares of the total emissions related to that production process should be attributed to product benchmark sub-installations on the one side and to heat production and other fuel use outside the product benchmark sub-installations on the other side. This attribution should be made on a fair basis (such as shares of operating time or production volumes combined with specific fuel input related to different products and emission factors of that fuel input). The operator should separately consider the attribution of emissions related to consumption of measurable heat and of emissions from direct fuel use. The sum of the emissions attributed to different origins should be equal to the total emissions, both on an installation level and a production process level. The operator should report in detail on the way that the attribution of emissions was made. In case of uncertainty, the attribution should be biased such that more emissions are attributed to the product benchmark sub-installation. In general, the attribution of emissions as described in this section should be consistent with the attribution of fuel input to different uses as discussed in section E.I.1 (only if that section is relevant for the installation under consideration).

In calculating the emission attributed to product benchmark sub-installations and heat production and fuel consumption by processes outside product benchmark sub-installations, the emissions from the combustion of waste gases deserves special attention. For waste gases produced outside the boundaries of a product benchmark sub-installation, the total amount of emissions from the combustion of waste gases are distributed over process emissions sub-installation on the one side and the waste

gas consuming production process on the other side. The amount attributed to the process emissions sub-installation is calculated in section D.II.j. The amount attributed to the waste-gas consuming production processes is calculated in D.III.i. These latter emissions should be attributed to the waste gas consuming production processes on the basis of the shares of consumption. Hence if 50% of the waste gases is used in a production process covered by a product benchmark sub-installation and 50% by a production process not covered by a product benchmark sub-installation, then the split of emissions over these processes is 50/50.

In the data collection template, the operator should

- a) Choose the method for the attribution of the emissions to the sub-installations (a) which can be via a percentage or via absolute value. The choice will then be automatically entered in section (b) where the actual attribution is made.*
- b) Enter the split of emissions per type of sub-installation. The emissions not eligible for free allocation are calculated automatically as the difference between total emissions from the sub-installations and the total direct emissions of the installation.*
- c) For control purposes, the inputs are displayed as well in the unit that was not selected in (a)*

D.II.3 Emissions related to private households

This section describes how to report on emissions related to heat export to private households. The emissions related to heat export to private households need to be specified explicitly, in case the operator wants to apply for the special provision referred to in Article 10.3 of the CIMs. *For more information about definition of private households and the allocation in case of heat export to private households refer to section 2.3 of Guidance Document 6 on Cross boundary heat flows.*

Operators need to specify the annual direct emissions that are related to the production of heat exported to private households, in case they wish to apply for the application of the relevant provision. Data should be provided for the years 2005-2008 even if the chosen baseline period is 2009-2010: Depending on the input method specified in section II.2 the operator should indicate either shares or absolute values of emissions. The total should add up to 100%. Both shares and absolute values shall be referred to the tonne of CO₂ equivalent unit.

In combined heat and power (CHP) installations, the emissions associated with electricity production are not eligible and therefore have to be excluded from this share. *For more information about the calculation of emissions related to heat production to private households in case of CHP installations refer to section 2.3 of Guidance Document 6 on Cross boundary heat flows.*

Operators should check that the emissions attributed to the production of heat exported to private households is not greater than the emissions related to the production of measurable heat that is not consumed inside the boundaries of product benchmark sub-installations present at the installation (see section D.1.2, second bullet)

D.III Waste gases

The objective of this section is to help operators calculating the emissions that should be attributed to process emissions sub-installations in case of waste gas production **outside the boundaries of a product benchmark**. This section is only relevant for installations that **consume** such waste gases. It does not matter whether these waste gases were produced in the same ETS installation that consumes the waste gases. *See section 2 of Guidance Document 8 on Waste Gases for a definition of production processes that produce waste gases outside the boundaries of a product benchmark.*

According to the definition in Article 3(h), combusted waste gases are considered to be process emissions if they are produced outside the boundaries of a product benchmark and only to the extent that they exceed the emissions from the combustion of an amount of natural gas with an equivalent amount of technically useable energy content. *For more information on allocation in case of the production and consumption of waste gases please refer to Guidance Document 8 on Waste Gases.*

The operator should specify the following data separately for a process emissions sub-installation deemed to be exposed to carbon leakage and not deemed to be exposed to carbon leakage. Because both possible sub-installations can be concerned in one installation, or because different waste gases can occur, the "waste gas tool" exists twofold in the data collection template. The data for the two sub-installations together should add up to the totals for the installation. *Under item a), the data collection template requests the operator to first specify the type of process emissions sub-installation concerned (exposed or non-exposed) and under item b) to confirm that the installation consumes waste gases. See section 4.2 of Guidance Document 8 on Waste Gases for calculation of the Historical Activity Level for process emissions sub-installations.*

- c) Type of waste gas. The operator should describe the waste gas and the process that produces it, for example the description can include the production process where the waste gas originated from, the composition of the gas (e.g. contents of CO, CO₂, NO_x, SO₂, ect), or a description of the where it is efficiently combusted. In case there are several waste gases streams, the operator should provide data for the different steams separately. *When using the data collection template, the operator should provide separate files for which this section is filled in for different steams. The rest of the file can be left empty*

- d) Process emissions in tCO₂-eq per year at the installation disregarding waste gases plus the emissions due to the consumption of waste gases for purposes other than flaring taking into account the relevant carbon leakage status. The definition of process emissions to be used is the definition according to Article 3(h) of the CIMs and not according to the MRG. *See guidance document 8 of waste gases for guidance on the definitions process emissions of waste gases.* Note that this definition is different from the one in the MRG.
- e) emissions from the combustion of waste gases in tCO₂-eq per year for other purposes than flaring taking into account the relevant carbon leakage status. The field is optional and is meant for cross checking.
- f) Consumption of waste gases (in thousand Nm³ /y or t/y) produced outside of the product benchmark installations and combusted for other purposes than flaring taking into account the relevant carbon leakage status. *The data collection template facilitates the selection of unit by providing a drop-down menu.* It does not matter whether the waste gases were produced in the same ETS installation as the one consuming the waste gases.
- g) Net calorific value (NCV) of the consumed waste gas, The net caloric value is the amount of heat released during the combustion of the fuel, minus the energy required to vaporise water produced during combustion. NCVs should be determined in compliance the MRG, in particular section a2 of Annex II. The NCV should be expressed in GJ/1000Nm³ or GJ/t depending on the unit chosen under item d). *The data collection automatically selects the proper unit based on the selection under d).*
- h) Reference efficiencies in %. *See section 4.2 of Guidance Document 8 on Waste Gases for guidance on the reference efficiencies.*
- i) Emissions in tCO₂-eq per year to be subtracted from the amount specified in e) to obtain the process emissions related to the process emissions sub-installation.
- j) The process emissions related to waste gas consumption in metric ton CO₂ per year. This quantity is defined as the difference between the emissions specified under e) and i). *The data collection template automatically performs the calculation.*

E Data on energy input, measurable heat and electricity

E.I Energy input from fuels

This section describes how to report on the attribution of fuel input to the different sub-installations. This section is only mandatory for installations where the fuel benchmark sub-installations are relevant

Unless specified otherwise, operators only need to report data for the years in the baseline period chosen so either 2005-2008 or 2009-2010 (see section A.II.2). Member States may however require installations to provide data for both baseline periods.

In most cases, the data requested are annual values. Data can be derived from a range of data sources (see Annex I on data quality).

E.I.1 Overview and split into use categories

This section describes how to report on the attribution of emissions to different uses. The free allocation to fuel benchmark sub-installations is directly based on the fuel input attributed in this section. Fuel input is attributed to other uses for the purpose of consistency checks.

The operator should indicate the fuel input attributed to different usage types of fuel input. The total should be equal to the total annual fuel input at installation level in section D.I. An exception to this rule exists in situations where the mass balance approach is used according to MRG. In that case, the energy content of the share of the output source stream should be subtracted from the fuel input. *In the data collection template, fuel input is automatically copied from sheet 'C.SourceStreams' so that the relevant information is available at a glance. See end of this section for more guidance on the use of the data collection template:*

- Fuel input for the production of electricity in TJ per year
- Fuel input for the production of measurable heat outside the boundaries of product benchmarks. This should exclude fuel input related to electricity production. Note that since only the fuel input to the installation is considered here, fuel input related to the production of imported heat should not be included. Because heat import and export is not considered, the fuel input under this bullet may not completely conform to fuel input related to heat benchmark sub-installations.

- Fuel input used within the boundaries of product benchmarks. *See Guidance document 9 with sector-specific guidance for guidance on system boundaries of product benchmarks.* The fuel input includes:
 - Fuels input to production processes in the installation covered by product benchmarks. This excludes fuel input for to the production of measurable heat that is consumed by production processes covered by product benchmarks.
 - Fuel input for the onsite production of measurable heat consumed by production processes in the installation covered by the product benchmark. Note that since only the fuel input to the installation is considered here, fuel input related to the production of imported heat should not be included.

Because heat import and export is not considered, the fuel input under this bullet may not completely conform to fuel input related to product benchmark sub-installation.

- Fuel input within the boundaries of a fuel benchmark sub-installation deemed to be exposed to a significant risk of carbon leakage. *See Guidance Document 2 on Allocation Methodologies for guidance on which fuel is consumed within the boundaries of a fuel benchmark sub-installation.* This excludes fuel input for to the production of measurable heat and electricity. The fuel benchmark sub-installation covers the use of waste gases as fuel. For waste gases that were produced outside the boundaries of a product benchmark sub-installation, this sub-installation also covers safety flaring (so no other flaring). If part of the carbon in the fuel leaves the product benchmark sub-installation as part of a waste gas, then the energy content of the share of the waste gas that originates from the fuel should be subtracted from the fuel input. *See Guidance Document 8 on Waste Gases for additional guidance on this topic.*
- Fuel input within the boundaries of a fuel benchmark sub-installation not deemed to be exposed to a significant risk of carbon leakage. The guidance for this sub-installation is identical as the guidance at the previous bullet.
- Fuel input used for other purposes in TJ per year. *The data collection template automatically calculates this amount as 'Rest'.*

Heat may be produced both for consumption within product benchmark sub-installations and outside product benchmark sub-installations (e.g. heat export, consumption of production processes not covered by product benchmarks, electricity production). In that case shares of the total fuel use related to the heat production should be attributed to different uses of the heat (see above for different uses).

A production process may be involved in the production of both products covered by a product benchmark and of products not covered by a product benchmark. In that case

shares of the total fuel input related to that process should be attributed to product benchmark sub-installations on the one side and to heat production and fuel benchmark sub-installations on the other side.

This attribution of fuel input should be made on a fair basis (such as shares of operating time or production volumes combined with specific fuel input related to different products). The operator should separately consider the attribution of fuel use related to consumption of measurable heat and direct fuel use. The sum of the fuel inputs attributed to different uses should be equal to the total fuel input, both on an installation level and a production process level. The operator should report in detail on the way that the attribution of fuel use was made. In case of uncertainty, the attribution should be biased such that more fuel input is attributed to the product benchmark sub-installation. In general, the attribution of fuel input as described in this section should be consistent with the attribution of emissions to different uses as discussed in section D.II.2 (only if that section is relevant for the installation under consideration).

In the data collection template, the operator should

- *Choose the method for the attribution of fuel input (b) which can be via a percentage or via absolute value. The choice will then be automatically entered in (c) where the actual attribution is made.*
- *Enter the split of fuel input per usage type in (c). The template automatically calculates the share of fuel input that was not attributed to any specified usage type.*
- *For control purposes, the inputs are displayed as well in the unit that was not selected in (b)*

E.II Measurable heat

This section describes how to report on heat production, consumption, import and export. This section is only mandatory for installations that contain heat benchmark sub-installations. See Annex II for guidance on how to determine amounts of net measurable heat.

E.II.1 Simplified attribution to heat benchmark sub-installations

If the heat benchmark sub-installations are relevant, and if the determination of historic activity levels is relatively simple, only data specified in this section is required. For more complex cases, or if the Member State requires more detailed information, the complete heat balance (section E.II.2) must be specified. More complex cases are in particular installations which have:

- Imports from ETS installations and/or production of measurable heat within the installation, AND heat import from installations or entities not covered by the ETS,

- Consumption of measurable heat for several sub-installations including product-benchmarks and/or electricity production
- Export heat to different users, including installations covered by the EU ETS as well as entities or installations not covered.
- Combinations of the situations listed above.
- Changes of the heat supply structure at the site have occurred, i.e. if the installation has started during in the baseline period to produce its own heat instead of importing it, or it has started importing instead of using own heat, or if it has started supplying an external ETS installation which it didn't before, or if it has stopped such supply.

The data collection template facilitates determining if a simplified distribution can be made.

In case the attribution can be made in a simple manner, the operator should specify:

- e) Total net amount of measurable heat produced within boundaries of the installation in TJ per year. This includes the measurable heat production from all sources, e.g. CHP units, boilers, recovered heat, etc. *See introduction to Guidance Document 6 for explanation of the definition of measurable heat.*
- f) Net measurable heat import from installations covered by the ETS specified per ETS installation in TJ per year. The operator should check that these installations are also on the list of technical connections described in section A.IV.
- g) Total measurable heat available in the installation in TJ per year. This is the sum of the amount of measurable heat produced (a) and the net imported measurable heat from ETS installations (b). *The data collection template automatically calculates this quantity.*

Next, the operator should attribute the measurable heat under item g) to the following heat benchmark sub-installations. *See below for more guidance on the use of the data collection template.*

- A heat benchmark sub-installation deemed to be exposed to a significant risk of carbon leakage. The measurable heat to be attributed to this sub-installation is equal to the heat that is consumed by production processes deemed to be exposed to a significant risk of carbon leakage (in TJ per year).
- A heat benchmark sub-installation not deemed to be exposed to a significant risk of carbon leakage. The measurable heat to be attributed to this sub-installation is equal to the heat that is consumed by production processes not deemed to be exposed to a significant risk of carbon leakage (in TJ per year).

The operator should check that the sum of the measurable heat attributed to the two sub-installations is equal to the amount of measurable heat calculated under c).

In the data collection template, the operator should

- Choose the method for the attribution of heat (f) which can be via a percentage or via absolute value. The choice will then be automatically entered in (q) where the actual attribution is made.
- Enter the split of heat (g).
- For control purposes, the inputs are displayed as well in the unit that was not selected in (f)

E.II.2 Complete balance of measurable heat at the installation

To calculate the amount of heat that is eligible for free allocation under a heat benchmark sub-installation, the operator should first obtain a complete balance of the measurable heat at the installation. For that purpose, the operator should specify:

- a) Total net amount of measurable heat produced within boundaries of the installation in TJ per year. This includes the measurable heat production from all sources, e.g. CHP units, boilers, recovered heat, etc. *See introduction to Guidance Document 6 for explanation of the definition of measurable heat.*
- b) Net measurable heat import from installations covered by the ETS specified per ETS installation in TJ per year. The operator should check that these installations are also on the list of technical connections described in section A.IV.
- c) Net measurable heat import from non-ETS entities specified per non-ETS entity in TJ per year. The operator should check that these installations that these entities are also on the list of technical connections in described in section A.IV.
- d) Total measurable heat available in the installation in TJ per year. This is the sum of the amount of measurable heat produced (a), the net imported measurable heat from ETS installations (b) and non-ETS entities (c). *The data collection template automatically calculates this quantity.*
- e) Ratio of “ETS heat” to “Total heat” in %. “ETS heat” is the sum of the measurable heat produced in the installation (a) and the measurable heat imported from other ETS installations (b). “Total heat” is the measurable heat specified under (d). *The data collection template automatically calculates this quantity.* This ratio is only needed in case it is not feasible to clearly earmark which shares of individual heat flows are produced within and outside the boundaries of ETS installations.

Next the operator needs to assess which part of the measurable heat could in principle be eligible for free allocation under a heat benchmark sub-installation. *See Guidance Document 2 on Allocation Methodologies for guidance on this topic.*

- f) The operator should specify:
 - i. Measurable heat used for electricity production in TJ per year.
 - ii. Amount of this heat that is provided by non-ETS sources in TJ per year. If because of the configuration of the installation, it is not possible to determine this amount, than by default the share determined under e)

should be used: so (f.i multiplied by e) *The data collection template automatically performs this calculation under f.ii.*

- iii. There's the optional possibility for overriding data calculated in f.ii, where necessary
- g) Further the operator should specify:
 - i. The heat consumed within product benchmark sub-installations in TJ per year. The operator should check this amount for plausibility by comparing it to the total amount of heat from non-ETS sources in product benchmark sub-installations as requested in section F.d and to the total heat import from non-ETS entities (point c). *The data collection template facilitates the plausibility check by automatically showing the non-ETS heat consumption in product benchmark sub-installations based on the answers given in F.d. (under point ii), by comparing the amounts in points g.i, g. ii and c)*

In relatively complex installations, it will not be straightforward to assess how much heat is used in electricity production, product benchmark sub-installations and other sub-installations. A production process consuming heat may for instance be used to produce both product benchmarked and not-products-benchmarked products. In such cases, the attribution of heat consumption to different uses should be made on a fair basis (such as shares of operating time or production volumes combined with specific heat use related to different products). The operator should report to the CA in detail on the way that the attribution of heat use was made, based on the methodology report. In case of uncertainty, the attribution should be biased such that more heat is attributed to the product benchmark sub-installation. In general, the attribution of heat use should be consistent with the attribution of emissions and fuel use to different uses as discussed in section D.II.2 and E.1 respectively (only if those sections are relevant for the installation under consideration).

- h) Heat export to each ETS installations in TJ per year. The operator should check that these installations are also on the list of technical connections in described in section A.IV. The amount of heat export should not be greater than the total amount of measurable heat available in the installation (see section E.II.1.d).

Next, the operator needs to calculate the amount of measurable heat which is part of a heat benchmark sub-installation. *See Guidance Document 2 on Allocation Methodologies for guidance on this topic.* The operator should perform the calculation described in items i to j. *The data collection template automatically performs the calculation below.*

- i) Determine the heat that potentially could belong to heat benchmark sub-installations, split in a share eligible by origin and not eligible by origin, so more specifically:

- i. Determine the amount of heat available in the installation (item d), not used for electricity (item f), not used in product benchmark sub-installations (item g) and not exported to other ETS installations (item h); so d-f-g-h.
- ii. Determine the heat eligible by origin in TJ per year. The calculation of the amount of heat not eligible is specified under iii. The amount of heat that is eligible is the difference between i and iii.
- iii. Determine the heat not-eligible by origin in TJ per year. This amount is equal to the sum of heat imported from non-ETS installations (c.iv) minus the amount of non-ETS heat used for electricity production (f.iii) minus the amount of non-ETS heat used in product benchmarks (g.ii)..
- j) Determine the eligibility ratio in %. This is equal to $i.ii/i.i$ (see above)

Next the operator should provide:

- k) The net amount of heat consumed within the installation in TJ per year outside the boundaries of product benchmarks and not for electricity production.
- l) The heat exported to each non-ETS entities (e.g. district heating networks) in TJ per year. In case heat is exported to complex heating networks, the network itself may be regarded as non-ETS entity. *See Guidance Document 6 on Cross-Boundary heat flows for more guidance to allocation in case of complex heat networks.* The data specified here should be consistent with the list of technical connections in section A.IV.
- m) The heat losses in TJ per year and as a fraction of the available heat under d). *The data collection template automatically determines this amount and share.*
- n) Total amount of measurable heat potentially part of a heat benchmark sub-installation in TJ per year. This amount is the sum of the quantities specified under k and l. *The data collection template performs this calculation automatically.*
- o) The measurable heat attributable to the heat benchmark sub-installation in TJ per year. This amount is equal to the amount calculated under k) times the share calculated under h). *The data collection template performs this calculation automatically.*

Finally, the operator should attribute the measurable heat under item o) to the following heat benchmark sub-installations. *See below for more guidance on the use of the data collection template.*

- p) The operator should first select the input method (either percentages or absolute quantities) and then go for completing the attribution
- q) Attribution heat sub-installations to carbon leakage exposure:
 - i. A heat benchmark sub-installation deemed to be exposed to a significant risk of carbon leakage. The measurable heat to be attributed to this sub-installation is equal to the:
 - The measurable heat not used for electricity production or in product benchmark sub-installations (see k) that is consumed by production

processes deemed to be exposed to a significant risk of carbon leakage (in TJ per year).

PLUS

- The heat export to non-ETS entities that are deemed to be exposed to a significant risk of carbon leakage¹⁴ (in TJ per year).

TIMES

- The share of heat eligible for free allocation calculated under j)

ii. A heat benchmark sub-installation not deemed to be exposed to a significant risk of carbon leakage

- The measurable heat not used for electricity production or in product benchmark sub-installations (see k) that is consumed by production processes not deemed to be exposed to a significant risk of carbon leakage (in TJ per year).

PLUS

- The heat export to non-ETS entities that are deemed to be exposed to a significant risk of carbon leakage¹⁴ (in TJ per year).

TIMES

- The share of heat eligible for free allocation calculated under i)

The operator should check that:

- The sum of the measurable heat attributed to the two sub-installations is equal to the amount of measurable heat calculated under o).
- The sum of the heat export to non-ETS entities is equal to the sum of the amounts specified under l).
- The sum of the consumed measurable heat not used for electricity production or in product benchmark sub-installations is equal to the amount specified under k).

In the data collection template, the operator should

- *Choose the method for the attribution of heat (p) which can be via a percentage or via absolute value. The choice will then be automatically entered in (q) where the actual attribution is made.*
- *Enter the split of heat (q).*
- *For control purposes, the inputs are displayed as well in the unit that was not selected in (p)*

¹⁴ Non-ETS entities are by default deemed not exposed to carbon leakage. The carbon leakage exposure factor for carbon leakage exposed sectors can only be used if the heat exporter provides satisfactory evidence that it exports heat to a non-ETS entity that is exposed to a significant risk of carbon leakage: the operator will for example provide a list of his customers consuming the heat, along with the NACE codes of these customers and the amounts of heat delivered to them.

E.II.3 Summary of heat sub-installations

This section of the template automatically reports data based on data entered in sections II.1 or II.2. In case data is entered in both sections, the operator must specify which data is to be used. Apart from that, no data entry is required. The template shows:

- a) The automatic selection of the tool used
- b) The overall final results for the HAL for the heat benchmark sub-installations, depending on the inputs in section E.II.1 and (a) of this part of the template, either the values of E.II.1.g (simple tool) or E.II.2.q (complex tool) will be displayed.

E.II.4 Heat for private households

The allocation in respect of heat export to private households is calculated according to a specific methodology. However, it is not mandatory to apply such methodology: the template formatting reflects that.

To apply this methodology, the operator should specify the amount of heat delivered to private households in TJ per year for the years 2005 -2008. *See below for more guidance on the use of the data collection template.*

The relevant emissions needed to apply the rule for heat export to households should be specified according to the description in section D.II.3 for these years even if the chosen baseline period is 2009-2010: *See Guidance Document 6 on Cross Boundary Heat Flows, for a description of the methodology to allocate installations that export heat to private households and for a description of how to determine the emissions related to heat production from a CHP unit.*

In the data collection template, under item a) the total heat export to non-ETS entities is automatically copied from E.II.1.j. The operator should:

- b) Choose the reporting input for heat export to private households, which can be either of the following*
 - Amounts of heat delivered to private households in each year of the baseline period. If this option is selected, the operator should only consider items c) and d and ignore item e).*
 - Ratio between the heat delivered to private households and the total HAL of the non-CL heat benchmark sub-installation as it is calculated in section G.I.2.o. In this case the method of calculation must be described in the methodology report. If this option is selected, the operator should only item e) and ignore items c) and d).*
- c) (In case the operator selected the first option under b)) Choose the input method for determining the amount heat export to private households which can be via an absolute value or via percentage of the total heat export to non-*

ETS entities (shown under item a)). The choice will be automatically entered in (d) where the actual attribution is made.

- d) (In case the operator selected the first option under b) Enter the heat export to private households in the unit selected under (c).*
- e) (In case the operator selected the second option under b) Enter the Ratio between the heat delivered to private households and the total HAL of the non-CL heat benchmark sub-installation as it is calculated in section G.1.2.o.*

E.III Electricity

E.III.1 Complete balance of electricity at installation

This section describes how to report on electricity production and consumption. Despite electricity production is not eligible for free allocation, this section is relevant for two reasons:

- it ensure that a plausibility check can be carried out on the classification of the installation being electricity generator or not;
- it ensures that the issue of exchangeability between fuel and electricity is addressed appropriately.

This section is only mandatory for installations that produce a product listed in Annex I.2 to the CIMs. For these products, the allocation is based on a product benchmark and corrected to account for exchangeability of fuel and electricity. *See Guidance Document 2 for the background of the correction and Guidance Document 9 for application of the correction in determining the free allocation for specific products benchmark sub-installations.*

The operator should specify:

- a) Net Electricity production from fuels (both fossil fuels and biomass) and electricity generated by other technologies: e.g. hydropower, wind power and solar power. The sum of both should be equal to the total electricity production with the installation. Electricity production should be expressed in net MWh produced per year.
- b) Total net electricity imported from the grid or from other installations in MWh per year.
- c) Total net electricity exported to the grid or to other installations in MWh per year.
- e) Total net electricity consumed in the installation in MWh per year. *For comparison, the data collection shows the total electricity available for use in the installation. This is equal to generation (a) + import (b) - export (c)*

The operator should check if the sum of electricity consumption reported in c) of sections F.I to F.IV is lower than the amount of electricity consumption specified above under e).

F Sub-installation data relating to product benchmarks

F.1 Historical Activity Levels and disaggregated production details

This section describes what data should be reported for product benchmark sub-installations. The operators should only report data on sub-installations that are present in the installation. This section is not relevant for installations that do not contain product benchmark sub-installations.

Unless specified otherwise, operators only need to report data for the years in the baseline period chosen so either 2005-2008 or 2009-2010 (see section A.II.2). Member States may however require installations to provide data for both baseline periods.

In most cases, the data requested are annual values. Data can be derived from a range of data sources (see Annex I on data quality).

In the data collection template, the name of the product benchmark sub-installation is automatically displayed based on the inputs in sheet 'InstallationData'

The operator should specify:

- a) Annual historical activity levels. Operators always need to provide data for the years 2005-2008 even if the baseline period 2009-2010 was chosen in section A.II.2. This is because of the need to determine the standard average utilisation factor in accordance with Art. 18(2) of the CIMs. *See Guidance Document 2 on Allocation Methodologies for more Guidance on this topic.* Operators need to provide data for 2009-2010 as well, if the chosen baseline period is 2009-2010 or if the relevant Member State requires operators to provide data for the years 2005-2010.

The annual historical activity levels for product benchmark sub-installations is the annual production of the product as defined in Annex I to the CIMs. For some product benchmark sub-installations the historical activity level needs to be calculated according to a special methodology. *In the data collection template, the need to follow a special methodology is automatically shown* These methodologies are specified in Annex III to the CIMs. See also item (b). *For more guidance on product definitions, unit of production and special methodologies, see Guidance Document 9 with Sector Specific Guidance. See section H in this document for guidance on data collections for special methodologies. In the data collection template, the historical activity levels according to special methodologies should be calculated in section H, it is then automatically copied in this sheet.*

More guidance on the determination of the historical activity level in case the installation has been operating less than two calendar years in the baseline period is provided after item d). *See also section 6.3 of Guidance Document 2 on Allocation Methodologies*

The annual historical activity levels should take into account any significant change in capacity in the period 1 January 2005 and 30 June 2011. More guidance on the determination of the historical activity level in case of significant change in capacity is provided after item h). *See also section 6.4 of Guidance Document 2 on Allocation Methodologies.*

c) *Fuel and heat exchangeability*

The data needed to apply a correction for the exchangeability of fuel and electricity. This correction is only relevant for products listed in Annex I.2 to the CIMs. *The data collection template automatically indicates the need for such a correction. See Guidance Document 2 for the background of the correction and Guidance Document 9 for application of the correction in determining the free allocation for specific products benchmark sub-installations.* More specifically, the operator should specify:

- Direct emissions¹⁵ attributed to the sub-installation in metric ton CO₂ per year. *See Annex I.2 of the CIMs for formal definitions of system boundaries and Guidance document 9 with sector-specific guidance for additional guidance*
- Net measurable heat import from both ETS installations and non-ETS entities in TJ per year. *See introduction to Guidance document 6 on Cross-Boundary heat for additional guidance on the definition of net measurable heat import.*
- Relevant electricity consumption of the sub-installation. *See Annex I.2 of the CIMs for formal definitions of system boundaries and Guidance document 9 with sector-specific guidance for additional guidance.*

From the data listed above, the data collection template automatically calculates the correction factor. The way to calculate this factor is given in Art. 14 of the CIMs and further explained in Section 4.1 of Guidance Document 2 on Allocation Methodologies.

d) The consumption of measurable heat produced by non-ETS entities. Heat import from non-ETS entities is not eligible for free allocation. Pursuant to Art. 13 to the CIMs, an amount of free allocation therefore has to be deducted in case of heat import from non-ETS entities. To allow this deduction, the operator should specify the net measurable heat import defined as the

¹⁵ When filling in the value it is important to stress that concerning production processes like the one producing ammonia, it shall be assumed that all CO₂ resulting from the production processes is emitted to the atmosphere, irrespective of any potential use of the CO₂ as feedstock in chemical production processes

consumed measurable heat produced outside the scope of the EU ETS in TJ per year. *See introduction to Guidance document 6 on Cross-Boundary heat flows for additional guidance on the definition of net measurable heat import.*

If feasible, this amount should be specified based on the configuration of the steam system. If this is not feasible, it should be obtained by multiplying the measurable heat consumption of the product benchmark sub-installation times the ratio of “ETS heat” to “Total heat” as determined in section E.II.2.e

The operator should check if the provided quantity is not greater than the net measurable heat import provided under item c) and section E.II.1. *The data collection template automatically performs these checks and calculates the reduction in allocation. See Guidance Document 6 on Cross-Boundary heat flows for more guidance on allocation in case of heat import from non-ETS entities.*

Less than two calendar years of operation during the baseline period

If the sub-installation has been operating less than two calendar years in the baseline period, then the historical activity level will be based on the initial installed capacity and on the Relevant Capacity Utilisation Factor. *See section 6.3 of Guidance Document 2 on Allocation Methodologies for guidance on this topic.* Earlier in section A.II.2.e the operator was requested to specify whether this is relevant for the sub-installation under consideration. *At item e) of this section, the data collection template automatically shows the answer given in section A.II.2.e.* If this is the case, then the operator should specify:

- f) Information to determine the initially installed capacity, in particular:
 - The two highest monthly production volumes in the appropriate unit of production within the months of operation in the period 1st January 2005 to 31st December 2008. The average of these 2 values will be taken as the initial monthly capacity of the sub-installation. The initial installed capacity of the sub-installation will be this value multiplied by 12 months.
 - In case the above is not possible, the initial capacity as experimentally verified.

Based on the requested data, the data collection template automatically determines the initial capacity. See section 5 of Guidance Document 2 for more guidance on the determination of the initial capacity.

- g) The operator will provide the relevant capacity utilization factor (RCUF) a % of the capacity. *See section 6.3 of Guidance Document 2 for additional guidance on the determination of the RCUF*

Significant changes in capacity

This part of this section describes provides guidance on what data needs to be collected if the product benchmark sub-installation has had significant change(s) in capacity in the period 1 January 2005 and 30 June 2011. This section is only relevant for sub-installations that had such change(s) in capacity. Earlier in section A.III.3.b the

operator was requested to specify whether this is relevant for the sub-installation under consideration. *At item i) of this section, the data collection template automatically shows the answer given in section A.III.3.b.* If this is the case, the operator should specify:

- g) The following details for every capacity change. *See section 6.4 of Guidance Document 2 on Allocation Methodologies for additional guidance on this topic.*
 - The starting date, i.e. the date of start of changed operations
 - Indication whether the change in capacity is significant
 - Short description of the physical changes to the sub-installation that led to a change in capacity.
 - The two highest monthly production volumes or activity data within the first 6 months after the start of changed. The average of these 2 values will be the new monthly capacity of the sub-installation. To determine the new annual capacity, is multiplied by 12 months. *The data collection template automatically performs this calculation.*
 - The change in capacity. *The data collection template automatically determines the change in capacity from the capacity before and after the change.*
- h) Where possible, the activity level related to the initial installed capacity shall be entered according to section 6.4 (Step 3) of guidance paper n. 2 on allocation methodologies. The field is mandatory unless it is not possible to determine the annual activity levels.
- k) Where it is not possible to know the activity level of the sub-installations without taking into account the added capacity and therefore it is not possible to fill table j, the historical capacity utilisation factor (HCUF) shall be filled in order to apply methodology described in Guidance document n. 2. *See section 6.4 of Guidance Document 2 for additional guidance on the determination of the RCUF*

Once either j or k is filled, the template performs the calculations automatically.

The data collection template helps determining the historical activity level in case of capacity changes from the data specified above. Further guidance on the determination of the historical activity level can be found in section 6 of Guidance Document 2 on Allocation Methodologies:

Production details

Annex I to the CIMs lists the formal definitions of the products covered by a product benchmark sub-installation. *See Guidance Document 9 with Sector Specific Guidance for more guidance on product definitions.* These definitions may however encompass multiple products or product groups. The operator should therefore specify the following information. Depending on the member state, providing this information can be optional or mandatory:

- o) Details regarding the products or product groups produced within the boundaries of the product sub-installation. In particular:
 - The names of products and product groups. In case, the names are not self-explanatory, the operator should provide additional descriptions.
 - The relevant PRODCOM 2007 code for the products. The PRODCOM codes may be used to verify the inclusion of the product within the product benchmark sub-installation.
 - (Optional) The relevant PRODCOM 2008 code (see previous bullet)
- p) Furthermore:
 - The unit of production (i.e. tonne, etc.)
 - Production in the relevant years

G Sub-installation data relating to fall-back sub-installations

G.I Historic Activity Levels and disaggregated production details

This section describes how to report on disaggregated production details for fall-back approaches. These sub-installations can be only 6 in total: 3 deemed to be exposed to the risk of carbon leakage and 3 deemed not exposed. The 3 sub-installations being defined by the heat benchmark, the fuel benchmark and the process emissions allocation methodologies. *See Guidance Document 1 with general guidance for a discussion on the maximum number of sub-installations with fall-back approaches. For more information on how to define sub-installations please refer to Guidance Document 2 on Allocation Methodologies.*

The operators should only report data on sub-installations that are present in the installation.

Unless specified otherwise, operators only need to report data for the years in the baseline period chosen so either 2005-2008 or 2009-2010 (see section A.II.2). Member States may however require installations to provide data for both baseline periods.

In most cases, the data requested are annual values. Data can be derived from a range of data sources (see Annex I on data quality).

In the data collection template, each section in this chapter starts with an overview of historical activity levels taken from the sheet 'EnergyFlows'.

G.I.1 Fall-Back Sub-installation 1, heat benchmark carbon leakage

This section covers sub-installations covered by a heat benchmark and deemed exposed to carbon leakage. The first part of this section describes what data should be provided if the sub-installation has been operating less than two calendar years. The second part of this section provides guidance on what data needs to be collected if the fall back sub-installation has had significant change in capacity in the period 1 January 2005 and 30 June 2011. In the last part of this section data is requested on the production processes or services, the sub-installation relates.

Less than two calendar years of operation during the baseline period

If the sub-installation has been operating less than two calendar years in the baseline period, then the historical activity level will be based on the initial installed capacity and on the Relevant Capacity Utilisation Factor. *See section 6.3 of Guidance Document 2 on Allocation Methodologies for guidance on this topic.* Earlier in section A.II.2.e the operator was requested to specify whether this is relevant for the installation under consideration. *At item b) of this section, the data collection template automatically*

shows the answer given in section A.II.2.e. If this is the case, than the operator should specify:

- c) Information to determine the initially installed capacity, in particular:
 - The two highest monthly activity levels in TJ of measurable heat within the months of operation in the period 1st January 2005 to 31st December 2008. The average of these 2 values will be taken as the initial monthly capacity of the sub-installation. The initial installed capacity of the sub-installation will be this value multiplied by 12 months.
 - If the above is not possible, the initial capacity as experimentally verified. *Based on the requested data, the data collection template automatically determines the initial capacity. See section 5 of Guidance Document 2 for more guidance on the determination of the initial capacity.*
- d) The operator will provide the relevant capacity utilization factor (RCUF) as a % of the capacity, representing the maximum production possible for the sub-installation, based on the equipment and design foreseen performance. This percentage will be based on detailed data on planned operation (e.g. production projections in business plan based on evidence related to the targeted market segment). The calculation will be verified by an independent third party.

Significant changes in capacity

This part of this section describes provides guidance on what data needs to be collected if the sub-installation has had significant change in capacity in the period 1 January 2005 and 30 June 2011. This section is only relevant for sub-installations that had such a change in capacity. Earlier in section A.III.3.b the operator was requested to specify whether this is relevant for the sub-installation under consideration. *At item e) of this section, the data collection template automatically shows the answer given in section A.III.3.b.* If this is the case, the operator should specify:

- f) The following details for every capacity change. *See section 6.4 of Guidance Document 2 on Allocation Methodologies for additional guidance on this topic.*
 - o The starting date, i.e. the date of start of changed operations
 - o Indication whether the change in capacity is significant
 - o Short description of the physical changes to the sub-installation that led to a change in capacity.
 - o The two highest monthly production volumes or activity data within the first 6 months after the start of changed. The average of these 2 values will be the new monthly capacity of the sub-installation. To determine the new annual capacity, is multiplied by 12 months. *The data collection template automatically performs this calculation.*
 - o The change in capacity. *The data collection template automatically determines the change in capacity from the capacity before and after the change.*
- g) Where possible, the activity level related to the initial installed capacity shall be entered according to section 6.4 (Step 3) of guidance paper n. 2 on allocation

methodologies. The field is mandatory unless it is not possible to determine the annual activity levels.

- h) Where it is not possible to know the activity level of the sub-installations without taking into account the added capacity and therefore it is not possible to fill table g, the historical capacity utilisation factor (HCUF) shall be filled in order to apply methodology described in Guidance document n. 2

Once either g or h is filled, the template performs the calculations automatically.

The data collection template helps determining the historical activity level in case of capacity changes from the data specified above. Further guidance on the determination of the historical activity level can be found in section 6 of Guidance Document 2 on Allocation Methodologies

Production details

The operator should specify to which production processes or services, the sub-installation relates. These should to the extent feasible defined by physical units and processes. More specifically the operator should specify:

- l) Information regarding the type of activity, in particular:
 - Use type: The different types are: “production of goods”, “production of mechanical energy”, “heating” and “cooling” for all uses except for the production of electricity; In some case the sub-installation covers installations or parts of an installation that are outside the boundaries of the installation being assessed. In this case it is possible that the use of the measurable heat in the external installation is not known, in this case the operators should specify the type as “unknown”. from the drop-down menu. *The data collection template facilitates the selection of type by providing a drop-down menu.*
 - Whether the heat is consumed within the installation or exported to a non-ETS entity. Note that heat export to an ETS installation can by definition not be included in a heat benchmark sub-installation. *See Guidance Document 6 on Cross-boundary heat flows for more guidance on this topic.*
 - The product in respect of which the heat is consumed or whether the heat is used for district heating.
 - The relevant PRODCOM 2007 code (optional 2010) for the activity related to the heat consumption or heat export to non-ETS entities. NACE codes can be used instead of PRODCOM codes if several similar products within the same NACE sector are covered. The PRODCOM/NACE codes should be used to verify the carbon leakage status of activities within the sub-installation. Note that in case of heat export to non-ETS entities, the carbon leakage exposure factor for carbon leakage exposed sectors can only be used if the heat exporter provides satisfactory evidence that it exports heat to a non-ETS entity that is exposed to a significant risk of carbon leakage: the operator will for example provide a list of his customers consuming the

heat, along with the NACE codes of these customers and the amounts of heat delivered to them.

- (Optional) The relevant PRODCOM 2010 code (see previous bullet)
- m) Unit and production levels of each of the products or the amount of heat exported.

G.I.2 Fall-Back Sub-installation 2, heat benchmark non-carbon leakage

This section covers sub-installations covered by a heat benchmark but not deemed exposed to carbon leakage. For this sub-installation, operators need to provide the same data as for the sub-installation discussed in section G.I.1.

Operators should be careful and ensure that only activities not deemed to be exposed to a significant risk of carbon leakage are included in this sub-installation.

G.I.3 Fall-Back Sub-installation 3, fuel benchmark carbon leakage

This section covers sub-installations covered by a fuel benchmark and deemed exposed to carbon leakage.

In case the sub-installation has been operating less than two calendar years, the operator should provide the same data as specified under section G.I.1., sub-heading 'Less than two years of operation during the baselining period'. Only in this case production and capacity should be expressed as TJ of fuel consumed.

In case the sub-installation has had a significant change in capacity in the period 1 January 2005 and 30 June 2011, the operator should provide the same data as specified under section G.I.1., sub-heading 'Significant changes in capacity'. Only in this case production and capacity should be expressed as TJ of fuel consumed.

Finally, the operator should specify to which production processes or services, the sub-installation relates. These should to the extent feasible be defined by physical units and processes. More specifically the operator should specify:

- m) Information regarding the type of activity, in particular:
 - Use type: The different types are: "production of goods", "production of mechanical heat", "heating" and "cooling" for all uses except for the production of electricity; *The data collection template facilitates the selection of type by providing a drop-down menu.*
 - The product in respect of which the fuel is consumed
 - The relevant PRODCOM 2007 code for the activity related to the fuel consumption. NACE codes can be used instead of PRODCOM codes if several similar products within the same NACE sector are covered. The

PRODCOM/NACE codes should be used to verify the carbon leakage status of activities within the sub-installation.

- (Optional) The relevant PRODCOM 2010 code (see previous bullet)

n) (optional) Production levels of each of the products.

G.I.4 Fall-Back Sub-installation 4, fuel benchmark non-carbon leakage

This section covers sub-installations covered by a fuel benchmark and not deemed exposed to carbon leakage. For this sub-installation, operators need to provide the same data as for the sub-installation discussed in section G.I.3.

Operators should be careful and ensure that only activities deemed not to be exposed to a significant risk of carbon leakage are included in this sub-installation.

G.I.5 Fall-Back Sub-installation 5, process emissions carbon leakage

This section covers process emissions sub-installations¹⁶ deemed exposed to carbon leakage.

In case the sub-installation has been operating less than two calendar years, the operator should provide the same data as specified under section G.I.1., sub-heading 'Less than two years of operation during the baseline period'. Only in this case production and capacity should be expressed as tCO₂ of process emissions.

In case the sub-installation has had a significant change in capacity in the period 1 January 2005 and 30 June 2011, the operator should provide the same data as specified under section G.I.1., sub-heading 'Significant changes in capacity'. Only in this case production and capacity should be expressed as tCO₂ of process emissions.

Finally, the operator should specify to which production processes or services, the sub-installation relates. These should to the extent feasible defined by physical units and processes. More specifically the operator should specify:

- l) Information regarding the type of activity, in particular:
 - Process emissions type: The different types are: "N₂O", "PFC", "CO₂ (waste gas corrected)", "reduction of metals compounds", "removal of

¹⁶ It is of utmost importance of not confusing the process emissions as referred to in the MRGs and the process emission sub-installation that is relevant for allocation purposes. E.g. emissions from flue gas cleaning are "process emissions" according to Annex II MRG, but not eligible for free allocation according to Art. 3 h) of the Decision. Therefore emissions from flue gas cleaning are reported in the sheet "B_SourceStreams" according to the provisions in Annex II (2.1.2) MRG, but they have to be part of "other emissions (non-eligible)" in the sheet "D_Emissions" in the template and shouldn't be related to a process emissions sub-installation. Please refer to guidance n.2 for further clarifications, in particular to table 2

impurities”, “decomposition of carbonates”, “chemical synthesis”, “carbon containing materials”, “reduction of metalloids and non-metals”. *The different types of process emissions are defined in Art 3(h) of the CIMs. The data collection template facilitates the selection of type by providing a drop-down menu.*

- The product related to the process emissions occurs
- The relevant PRODCOM 2007 code for the activity related to the process emissions. NACE codes can be used instead of PRODCOM codes if several similar products within the same NACE sector are covered. The PRODCOM/NACE codes should be used to verify the carbon leakage status of activities within the sub-installation.
- (Optional) The relevant PRODCOM 2010 code (see previous bullet)

m) (optional) Production levels of each of the products.

G.I.6 Fall-Back Sub-installation 6, process emissions non carbon leakage

This section covers process emissions sub-installations¹⁷ not deemed exposed to carbon leakage. For this sub-installation, operators need to provide the same data as for the sub-installation discussed in section G.I.5.

Operators should be careful and ensure that only activities deemed not to be exposed to a significant risk of carbon leakage are included in this sub-installation.

¹⁷ It is of utmost importance of not confusing the process emissions as referred to in the MRGs and the process emission sub-installation that is relevant for allocation purposes. E.g. emissions from flue gas cleaning are “process emissions” according to Annex II MRG, but not eligible for free allocation according to Art. 3 h) of the Decision. Therefore emissions from flue gas cleaning are reported in the sheet “B_SourceStreams” according to the provisions in Annex II (2.1.2) MRG, but they have to be part of “other emissions (non-eligible)” in the sheet “D_Emissions” in the template and shouldn’t be related to a process emissions sub-installation. Please refer to guidance n.2 for further clarifications, in particular to table 2

H Special data for some product benchmarks

For some product benchmark sub-installations the historical activity level or allocation needs to be calculated according to a special methodology. This section gives guidance on the data collection required to apply these special methodologies. The methodologies are specified in Annex III to the CIMs. *For more guidance on special methodologies, see Guidance Document 9 with Sector Specific Guidance. In the data collection template, the historical activity levels determined in this section are automatically copied to sheet F.*

H.I Refinery products

This section gives guidance to data collection for refinery sub-installations. This section is only relevant for installations that contain sub-installation. *The data collection template automatically shows whether this section is relevant based in the data collected according to section A.II.1 (sheet "InstallationData of the data collection template. See Chapter 36 of Guidance Document 9 with Sector Specific Guidance for more information about refinery sub-installations)*

The operator should specify the relevant throughput in the relevant unit for each CWT function. See Annex II.1 to the CIMs for definitions of CWT functions and definitions of throughput for each function. *See Chapter 36 of Guidance Document 9 with Sector Specific Guidance for additional guidance to these definitions and to data quality.*

Next the operator should calculate and report the annual Historical Activity Level in CWT (in tonne) per year from the specified throughputs of the different functions. This should be done according to the part of the formula in Annex III to the CIMs point 1 before determining the median value. See Annex II.1 to the CIMs for values of CWT factors. *The data collection template automatically performs the required calculation. See Chapter 36 of Guidance Document 9 with Sector Specific Guidance for guidance on the calculation of the annual historical activity levels of a refinery sub-installation. Note: for most CWT functions reporting is done in ktonne whereas annual historical activity level should be defined in tonne. This is not explicitly mentioned in Annex III to the CIMs.*

In the data collection template, the historical activity levels determined in this section are automatically copied to sheet F.

H.II Lime

This section gives guidance to data collection for lime sub-installations. This section is only relevant for installations that contain sub-installation. *The data collection template automatically shows whether this section is relevant based in the data collected according to section A.II.1 (sheet "InstallationData of the data collection*

template). See Chapter 26 of Guidance Document 9 with Sector Specific Guidance for more information about lime sub-installations)

The operator should specify:

- b) The lime production in tonne of lime without correction for the composition
- c) The calcium oxide (CaO) content of the lime in %; *See Chapter 26 of Guidance Document 9 with Sector Specific Guidance for more guidance on data to be used.*
- d) The magnesium oxide (MgO) content of the lime in %; *See Chapter 26 of Guidance Document 9 with Sector Specific Guidance for more guidance on data to be used.*

From the specified data, the operator should calculate and report the annual historical activity level in metric ton standard pure lime per year. This should be done according to the part of the formula in Annex III to the CIMs point 2 before determining the median value. *The data collection template automatically performs the required calculation. See also Chapter 26 of Guidance Document 9 with Sector Specific Guidance.*

In the data collection template, the historical activity levels determined in this section are automatically copied to sheet F.

H.III Dolime

This section gives guidance to data collection for dolime sub-installations. This section is only relevant for installations that contain sub-installation. *The data collection template automatically shows whether this section is relevant based in the data collected according to section A.II.1 (sheet "InstallationData of the data collection template). See Chapter 13 of Guidance Document 9 with Sector Specific Guidance for more information about dolime sub-installations)*

The operator should specify:

- b) The dolime production in tonne of lime without correction for the composition
- c) The calcium oxide (CaO) content of the dolime in %; *See Chapter 13 of Guidance Document 9 with Sector Specific Guidance for more guidance on data to be used.*
- d) The magnesium oxide (MgO) content of the dolime in %; *See Chapter 13 of Guidance Document 9 with Sector Specific Guidance for more guidance on data to be used.*

From the specified data, the operator should calculate and report the annual historical activity level in metric ton of standard pure dolime per year according to the part of the formula in Annex III to the CIMs point 3 before determining the median value. *The*

data collection template automatically performs the required calculation. See also Chapter 13 of Guidance Document 9 with Sector Specific Guidance.

In the data collection template, the historical activity levels determined in this section are automatically copied to sheet F.

H.IV Steam cracking

This section gives guidance to data collection for steam cracking sub-installations. This section is only relevant for installations that contain sub-installation. *The data collection template automatically shows whether this section is relevant based in the data collected according to section A.II.1 (sheet "InstallationData of the data collection template). See Chapter 44 of Guidance Document 9 with Sector Specific Guidance for more information about steam cracking sub-installations)*

The operator should specify:

- b) The total production of high value chemicals in tonne per year without any corrections; *See Chapter 44 of Guidance Document 9 with Sector Specific Guidance for the definition of high value chemicals*
- c) Supplemental feed of hydrogen in tonne of hydrogen per year
- d) Supplemental feed of ethylene in tonne of ethylene per year
- e) Supplemental feed of high value chemicals other than hydrogen and ethylene in tonne of high value chemicals per year

From the specified data, the operator should calculate and report the annual historical activity level in metric ton of net high value chemicals per year. This should be done according to the part of the formula in Annex III to the CIMs point 2 before determining the median value. *The data collection template automatically performs the required calculation. See also Chapter 44 of Guidance Document 9 with Sector Specific Guidance.*

In the data collection template, the historical activity levels determined in this section are automatically copied to sheet F.

The preliminary allocation to steam cracking sub-installations is determined according to Article 11 of the CIMs. See also Chapter 44 of Guidance Document 9 with Sector Specific Guidance. The preliminary allocation can be determined from the reported data. The data collection template calculates allocation correction.. No action is required from the operator.

H.V Aromatics

This section gives guidance to data collection for sub-installations that produce aromatics. This section is only relevant for installations that contain sub-installation. *The data collection template automatically shows whether this section is relevant based in the data collected according to section A.II.1 (sheet "InstallationData of the data collection template). See Chapter 5 of Guidance Document 9 with Sector Specific Guidance for more information about sub-installations that produce aromatics)*

The operator should specify the relevant throughput in the relevant unit for each CWT function. See Annex II.2 to the CIMs for definitions of CWT functions and definitions of throughput for each function. *See Chapter 5 of Guidance Document 9 with Sector Specific Guidance for additional guidance to these definitions and to data quality.*

Next the operator should calculate and report the annual Historical Activity Level in CWT (in tonne) per year from the specified throughputs of the different functions. This should be done according to the part of the formula in Annex III to the CIMs point 5 before determining the median value. See Annex II.2 to the CIMs for values of CWT factors. *The data collection template automatically performs the required calculation. See Chapter 5 of Guidance Document 9 with Sector Specific Guidance for guidance on the calculation of the annual historical activity levels of a aromatics sub-installation.*

Note: for most CWT functions reporting is done in ktonne whereas annual historical activity level should be defined in tonne. This is not explicitly mentioned in Annex III to the CIMs.

In the data collection template, the historical activity levels determined in this section are automatically copied to sheet F.

H.VI Hydrogen

This section gives guidance to data collection for hydrogen sub-installations. This section is only relevant for installations that contain sub-installation. *The data collection template automatically shows whether this section is relevant based in the data collected according to section A.II.1 (sheet "InstallationData of the data collection template). See Chapter 22 of Guidance Document 9 with Sector Specific Guidance for more information about hydrogen sub-installations)*

The operator should specify:

- b) The hydrogen production in 1000 Nm³ per year without any corrections for purity; norm cubic meters refer to the volume at 0°C and 101.325 kPa
- c) Production volume fraction of pure hydrogen in % at 0°C and 101.325 kPa

From the specified data, the operator should calculate and report the annual historical activity level in metric ton of 100% pure hydrogen per year. This should be done according to the part of the formula in Annex III to the CIMs point 6 before determining the median value. *The data collection template automatically performs the required calculation. See also Chapter 22 of Guidance Document 9 with Sector Specific Guidance.*

In the data collection template, the historical activity levels determined in this section are automatically copied to sheet F.

H.VII Synthesis gas

This section gives guidance to data collection for synthesis gas sub-installations. This section is only relevant for installations that contain sub-installation. *The data collection template automatically shows whether this section is relevant based in the data collected according to section A.II.1 (sheet "InstallationData of the data collection template). See Chapter 47 of Guidance Document 9 with Sector Specific Guidance for more information about synthesis gas sub-installations)*

The operator should specify:

- b) The synthesis gas production in 1000 Nm³ per year without any corrections for hydrogen content; norm cubic meters refer to the volume at 0°C and 101.325 kPa
- c) Production volume fraction of pure hydrogen in % at 0°C and 101.325 kPa

From the specified data, the operator should calculate and report the annual historical activity level in metric ton per year of synthesis gas with a standardized hydrogen content of 47%. This should be done according to the part of the formula in Annex III to the CIMs point 7 before determining the median value. *The data collection template automatically performs the required calculation. See also Chapter 47 of Guidance Document 9 with Sector Specific Guidance.*

In the data collection template, the historical activity levels determined in this section are automatically copied to sheet F.

H.VIII Ethylene oxide/glycols

This section gives guidance to data collection for ethylene oxide/glycols sub-installations. This section is only relevant for installations that contain sub-installation. *The data collection template automatically shows whether this section is relevant based in the data collected according to section A.II.1 (sheet "InstallationData of the data collection template). See Chapter 18 of Guidance Document 9 with Sector Specific Guidance for more information about ethylene oxide/glycols sub-installations)*

The operator should specify:

- Ethylene oxide production in tonne per year
- Monoethylene glycol production in tonne per year
- Diethylene glycol production in tonne per year
- Triethylene glycol production in tonne per year
- Sum of productions specified above in tonne per year. *The data collection template automatically calculates this sum*

From the specified data, the operator should calculate and report the annual historical activity level in metric ton per year ethylene oxide/glycols. This should be done according to the part of the formula in Annex III to the CIMs point 8 before determining the median value. *The data collection template automatically performs the required calculation. See also Chapter 18 of Guidance Document 9 with Sector Specific Guidance.*

In the data collection template, the historical activity levels determined in this section are automatically copied to sheet F.

H.IX Vinyl chloride monomer (VCM)

This section gives guidance to data collection for vinyl chloride monomer (VCM) sub-installations. This section is only relevant for installations that contain sub-installation. *The data collection template automatically shows whether this section is relevant based in the data collected according to section A.II.1 (sheet "InstallationData of the data collection template). See Chapter 52 of Guidance Document 9 with Sector Specific Guidance for more information about vinyl chloride monomer (VCM) sub-installations)*

The operator should specify:

- b) Production of VCM in tonne per year. Note that this production was also requested in section F.1.a
- c) Emission related data, in particular:
 - Direct emissions attributed to this sub-installation in tCO₂ per year
 - Net measurable heat imported in TJ per year
 - Measurable heat consumption from H₂ combustion in TJ per year
 - Total direct emissions in tCO₂ per year. *This is equal to the direct emissions attributed to the sub-installation (first bullet) plus the net measurable heat import (second bullet) times 62.3 tCO₂/TJ. The data collection template automatically performs this calculation*
 - Hydrogen related emissions in tCO₂ per year. *This is equal to the measurable heat consumption from H₂ combustion (third bullet) times 56.1 tCO₂/TJ. The data collection template automatically performs this calculation*

From the specified data, the operator should calculate and report the factor for allocation corrected as described in Article 12 of the CIMs. This factor is equal to the direct emissions divided by the sum of direct emissions and emissions related to hydrogen combustion. *The data collection template automatically performs the required calculation. See Chapter 52 of Guidance Document 9 with Sector Specific Guidance for more guidance to the calculation of allocation for VCM sub-installations.*

Annex I Data sources

An important principle for data collection and the verification is that the process should be transparent; whenever data may be tracked to its source and where results can be reproduced by independent observers, it is common consensus that the data can be shown to be true. The whole process of data collection should be performed in a spirit of transparency. Data used should be the ones of *highest achievable accuracy*.

The following non-exhaustive list of methods/ sources for data determination gives an indication of what may be considered *highest achievable accuracy* :

1. Data is produced under an approved monitoring plan and independently verified.
2. Financial data (invoices) and data from operational protocols can be used, especially for production and heat purchase/supply data:
 - Data produced for commercial or legal purposes is considered to be of high quality data; for example, where the financial interests of a secondary party, or legal requirements ensures a certain data quality (data used for invoicing, taxation and customs declarations);
 - Data which has already been subject to independent (financial) audits is also considered to be of the highest quality;
 - Data reported for use by statistical offices is considered to be useful, especially for the determination of product categories (NACE / PRODCOM). In case of doubt over the classifications, confirmation from the statistical office should be sought. Quantitative data reported to the statistical office should preferably only be used for corroboration purposes. If the statistic data are the only available source of information, the CA should ensure that some verification or quality control of the data was carried out;
 - Data from operation protocols and similar can also be used if no other data sources are available. However, only protocols which have been transparently documented should be used and that should be cross-checked by a second person;
3. Data which can only be made available indirectly, with a calculation based on known correlations. In such cases, it may be necessary to determine the correlation factors by experimental test over short periods; tests over at least three months are advisable for such estimations. This data is not considered to be of the highest quality and should only be used where better data is not available;

4. It may be possible to determine a correlation between historical data and data needed for reporting without further experimentation. The quality of data which this produces depends on the quality of the directly available data and any assumptions which may be necessary;
5. In case of missing parameters, such as the characteristics of a material which has previously been used, but analysis is no longer possible (e.g. biomass, NCV, emission factor, or carbon content), estimation methodologies must be used. These should be based on the most recent scientific and technical knowledge. Methodologies from CEN, ISO, national, or draft standards are preferred, but commonly accepted approaches (industry best practice) may be used where these are not available;

The methods/sources may be combined to check the results and choose the most suitable one in order to get the *highest achievable accuracy* data.

Where data has to be attributed to sub-installations, the installation's total figures may need to be split. In this circumstance it is preferable to subtract data for the sub-installation with the best available data from the total for the installation, instead of applying estimation methods of lower quality to each sub-installation. For minor installations, the estimations will often be sufficient.

If there is no sufficient historical data for the calculation of the HAL available, data gaps should be filled through conservative estimations, meaning estimations that would not lead to overestimate the allocation, providing then for the highest achievable accuracy. For example, when several benchmarked products can be identified, it might not be possible to determine the shares of each product, i.e. colored and colorless glass in the past. In that case, estimates should be carried out leading the lower value of the production volumes related with the product with the lowest product BM, in that case colored glass. The higher BM for colourless glass should only be considered if there is verified evidence of historical production data.

Annex II Determination of net measurable heat production/consumption

All specified amounts of heat should always refer to "net amount of measurable heat" (i.e. heat content of heat flow to user minus heat content of the return flow), regardless of the entity that is entitled to receiving the allocation (either the consumer or the producer, see *guidance document n.6 on cross boundary heat flows* .

In this Annex, some methods are described that can be used to determine amounts of net measurable heat.

In assessing the appropriate method, the guiding principle should always be that the *highest achievable accuracy* is pursued and overestimation of heat production/consumption is avoided. The choice of the method should result from the questions:

- which method is in compliance with the principle of *highest achievable accuracy*?
- which method can be considered to be reliable and therefore avoids any overestimations/overallocation?

The operator is highly recommended to apply the different methods and to duly justify in a transparent manner why the method eventually chosen (and being the basis for the data collection) is in line with the principle of the *highest achievable accuracy*

All methods, assume that all the condensate is returned. In reality this may not be the case.

Whenever referring to efficiency for heat measurement, 'useful efficiency' according to directive 92/42/EC is to be meant:

'useful efficiency (expressed in %): the ratio between the heat output transmitted to the [...] water and the product of the net calorific value at constant fuel pressure and the consumption expressed as a quantity of fuel per unit time'.

Method 1: Using measurements

The heat content of a flow can be calculated using a number of commonly measured conditions.

The measured temperature and pressure, and the state (saturated, superheated etc), of the heat transfer medium can be used to determine the enthalpy (kJ/kg) and

specific volume (m^3/kg) of the fluid by using literature values (e.g. steam tables¹⁸) or engineering software.

The mass flow rate of the heat transfer medium should be calculated using the measured volumetric flow rate (m^3/s) and the specific volume, as follows:

$$\dot{m} = \frac{\dot{V}}{\nu}$$

Where,

- \dot{m} is the mass flow rate in kg/s
- \dot{V} is the volumetric flow rate in m^3/s
- ν is the specific volume in (m^3/kg)

As the mass flow rate is considered as the same at the flow and the return of a boiler, it is possible to calculate the heat flow rate using the difference in enthalpy between the flow and the return, as follows:

$$\dot{Q} = (h_{\text{flow}} - h_{\text{return}}) \times \dot{m}$$

Where,

- \dot{Q} is the heat flow rate in kJ/s
- h_{flow} is the enthalpy of the flow in kJ/kg
- h_{return} is the enthalpy of the return in kJ/kg. Condensate may not be returned, or it may not be feasible to estimate the enthalpy of the returned condensate. In such cases, h_{return} should be calculated based on a temperature of 90°C
- \dot{m} is the mass flow rate in kg/s

The annual measurable heat should then be calculated by multiplying the heat flow rate by the amount of time the system is operating in the calendar year.

This method requires an integral evaluation of the relevant parameters (flow rate, enthalpy, temperatures, pressures) over each year.

Method 2: Using documentation

The amounts of net measurable heat is based on documents providing sufficient evidence on (estimated) amounts of heat imported or exported, such documents may be used if they are based on a sound and transparent methodology. Such documents may be the invoices to users of the heat, or where the users belong to the same company, documents providing evidence how the operation costs of the heat producing unit are attributed to different business units or products.

¹⁸ Steam tables of thermodynamic data for water/steam; any steam table of sufficient quality and accuracy can be used. Care should be taken that unit conversion is performed correctly.

Method 3: Calculating a proxy based on measured efficiency

The amounts of net measurable heat is based on the fuel input and the measured efficiency related to the heat production:

$$Q = \eta_H \cdot E_{IN}$$
$$E_{IN} = \sum AD_j \cdot NCV_j$$

Where:

$HAL_{H,i,proxy}$	is expressed as TJ
E_{In}	is the fuel input in TJ
AD_j	is consumption of fuel j (in t or Nm ³)
NCV_j	is the net calorific value (in TJ/t or TJ/Nm ³) of fuel j
η_H	is the measured efficiency for heat production based on suitable measurements ¹⁹ carried out as verified by the verifier which should refer to technical documentation of the installation, specifically the specific part load curve ²⁰²¹ of the devices concerned . The efficiency should be based on a situation in which all condensate is returned even if this is not the case. In case of the latter, a temperature of 90°C should be assumed for the returned condensate.

Method 4: Calculating a proxy based on the reference efficiency

This method is identical to method 3, but in this method a reference efficiency of 0.7 is used ($\eta_{Ref,H} = 0.7$) in the formula above.

Example 1

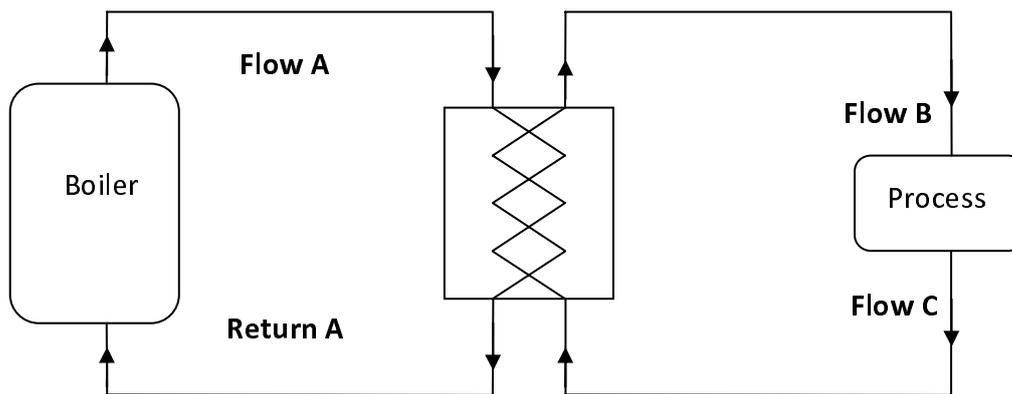
A boiler produces heat that is delivered by a process via a heat exchanger (see schematic below). This example shows the calculation of the amount of net heat produced by a boiler (A).

Schematic

¹⁹ If proved through technical documentation, efficiency measurements on technically identical devices carried out by the suppliers of the heat producing device are also acceptable.

²⁰ Part load efficiency curves define efficiencies against load. Those curves may be found in technical documentation given by the supplier.

²¹ The reference annual load should be evaluated as the Load Factor $L_F = E_{in} / E_{in_max}$ has to be calculated. E_{in} is the amount of fuel input in a time period (a year) and E_{in_max} is the amount of fuel that could have been used in the boiler assumed that it would have been running over the time period at 100 % load



Data

	State	Temperature (°C)	Pressure (MPa)
Flow A	Saturated steam	180	1
Return A	Water	85	

Volumetric flow rate of flow A (\dot{V}_A) = 9600 l/h = 0.0027 m³/s
 Operating for 8520 hours per year

Calculation

From steam tables:

	Enthalpy (h) (kJ/kg)	Specific volume (v) (m ³ /kg)
Flow	2781	0.19405
Return	356	

$$\text{Mass flow rate of flow A } (\dot{m}_A) = \dot{V}_A / v = 0.0027 / 0.19405 = 0.0139 \text{ kg/s}$$

$$\text{Heat flow rate of flow A } (\dot{Q}_A) = (h_{\text{Flow,A}} - h_{\text{Return,A}}) \cdot \dot{m}_A = (2781 - 356) \times 0.0139 = 33.7 \text{ kJ/s}$$

$$\begin{aligned} \text{Net annual heat production } (Q_A) &= \dot{Q}_A \cdot \text{time} = 33.7 \times (8520 \times 3600) = \dots \\ &= 1,033,646,400 \text{ kJ} = 1.03 \text{ TJ} \end{aligned}$$

The net heat consumption of the process is calculated in the same way from the properties of flow B and flow C (flow rate and enthalpy difference). For calculating the heat consumption, the properties of the flow B at the entrance of the process and of flow C at the exit of the process should be used:

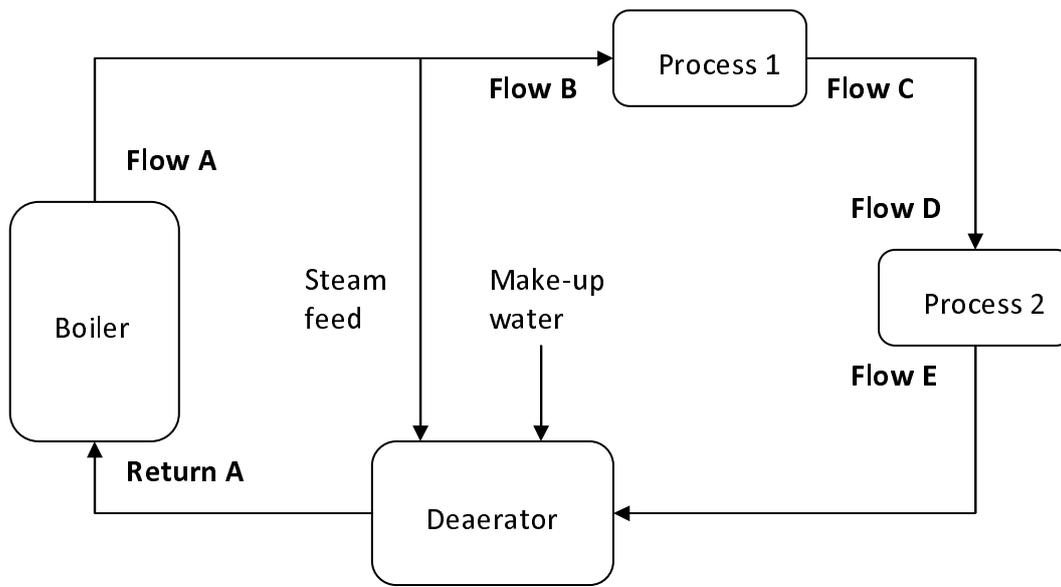
$$\text{Heat flow rate through process } (\dot{Q}_B) = (h_{\text{Flow,B}} - h_{\text{Return,C}}) \cdot \dot{m}_B$$

$$\text{Net annual heat consumption of process } (Q_B) = \dot{Q}_B \times \text{AnnualOperationTime}$$

Example 2

A boiler produces heat that is delivered to two processes (see schematic below).

Schematic



Data

	State	Temperature (°C)	Pressure (MPa)
Flow A	Saturated steam	180	1
Return A	Water	105	

Volumetric flow rate = $0.6 \text{ m}^3/\text{s}$

Operating for 5000 hours per year

Calculation

From steam tables:

	Enthalpy (kJ/kg)	Specific volume m^3/kg
Flow A	2781	0.19405
Return A	440	

Mass flow rate of flow A (\dot{m}_B) = $\dot{v}_A / v = 0.6 / 0.19405 = 3.09 \text{ kg/s}$

Heat flow rate of flow A $= (h_{Flow,A} - h_{Return,A}) \cdot m_A = (2781 - 440) \times 3.09 = 7234 \text{ kJ/s}$

Net annual heat production (Q_A) $= Q_A \cdot \text{time} = 7234 \times (5000 \times 3600) = 1.3 \times 10^{11} \text{ kJ} = 130 \text{ TJ}$

The net heat consumption of process 1 is calculated in the same way from the properties of flow B and flow C (flow rate and enthalpy difference).

Heat flow rate through process 1 (Q_{Process1}) $= h_{Flow,B} \cdot m_B - h_{Return,C} \cdot m_C$

Net annual heat consumption of process 1 (Q_{Process1}) $= Q_{Process1} \times \text{AnnualOperationTime}$

The net heat consumption of process 2 is calculated in the same way from the properties of flow D and flow E (flow rate and enthalpy difference).

Heat flow rate through process 2 (Q_{Process2}) $= h_{Flow,D} \cdot m_D - h_{Return,E} \cdot m_E$

Net annual heat consumption of process 2 (Q_{Process2}) $= Q_{Process2} \times \text{AnnualOperationTime}$

If processes 1 and 2 are part of the same heat benchmark sub-installation then there is no need to determine the net heat consumption of both processes separately and the net heat consumption of both processes together can be calculated from the properties of flow B and flow E (flow rate and enthalpy difference).

The deaerator is part of the steam generation system as it is accounted for in the value for heat benchmark. Therefore it cannot be considered as a separate heat consumer. Note that the value of the heat benchmark is irrespective of the presence of a deaerator in a steam system.

Example 3

The energy content of the steam is expressed by its enthalpy H (T, P) in GJ/tonnes (or equivalent). The steam enthalpy is a function of its temperature T and pressure P and can be obtained from steam tables or from specific software programs.

Steam is transported through pipe lines into a heat benchmark sub installation. The steam flow rate out of the 'steam house' is F_s [tonnes/year] and its enthalpy H_s(T_s, P_s) [GJ/ton]. In the heat benchmark sub installation steam is: (see diagram below)

1. Evacuated to the atmosphere in case of imbalances on the steam network, planned blow offs or losses (F1)
2. Injected in process vessels or steam jets as live steam in which case the heat of the condensate is usefully consumed without condensate return to the boiler house (F2)

3. Consumed in back pressure steam turbines (F3) used for driving compressors or pumps. In this case only part of the enthalpy is consumed. The steam leaving the turbine has an enthalpy H_3 (GJ/ton) and is further consumed in other parts of the sub installation (see 1) or in a product benchmark sub installation (flow rate F5 with enthalpy H_5)
4. Used in heat exchangers or other equipment (F4) in which the steam is condensed. For the condensate there are two possibilities:
 - it returns to the boiler house (F6)
 - it is sewered (F7)

The temperature of the condensate returning to the 'steam house' is T_c and its enthalpy $H_c(T_c, P_c)$ in GJ/ton. There is no need to know the condensate flow rate of the condensate, as it is not used in the HAL calculation.

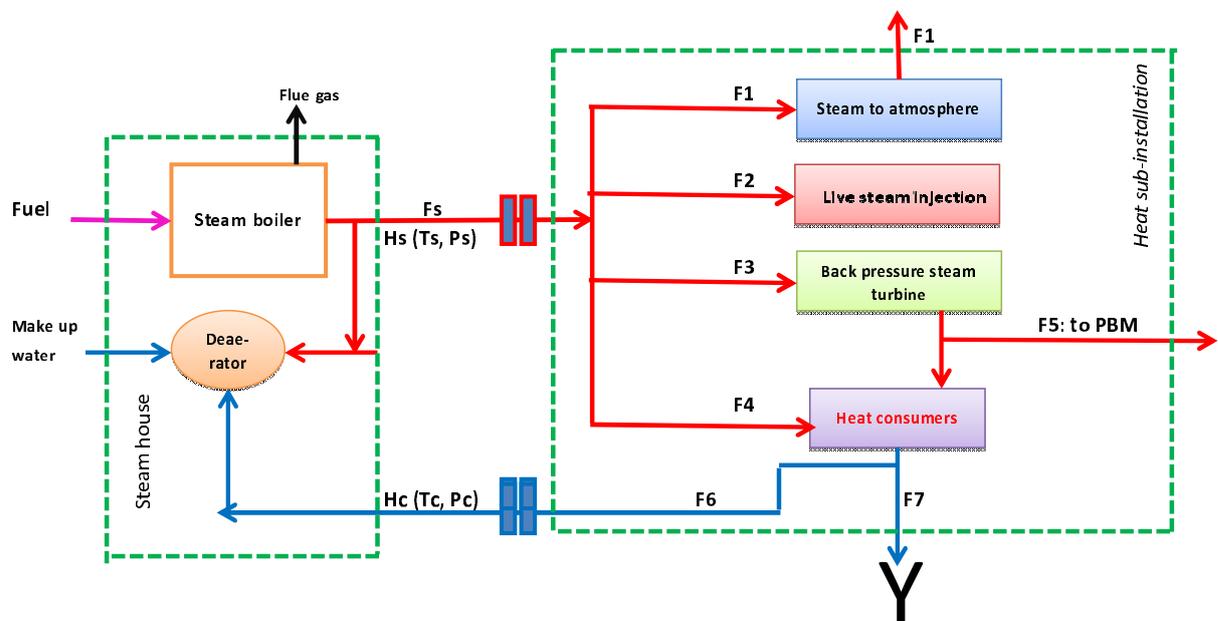


Diagram 1

In order to calculate the it is assumed that all condensate is returned to the boiler. Where no condensate returns, then enthalpy H_c should be calculated at a default temperature T_c of 90°C.

Referring to diagram 1

- Base: HAL_1 (in GJ/year) = $F_s * (H_s - H_c)$
- Heat delivered to and consumed by a product benchmark sub-installation is subtracted:

$$HAL_5 = - F_5 * (H_5 - H_C) \text{ (GJ /year)}$$

- In case of live steam also the enthalpy of condensate is usefully consumed. Therefore the HAL is increased with $HAL_2 = F_2 * H_C \text{ (GJ/Year)}$
- In case steam is lost the HAL figure is reduced with $HAL_1 = - F_1 * (H_S - H_C) \text{ (GJ/year)}$

The net preliminary annual allocation in EUAs is the sum of HAL_1 till HAL_4 times 62.3 divided by 1000

$$\{ F_S * (H_S - H_C) - F_5 * (H_5 - H_C) + F_2 * H_C - F_1 * (H_S - H_C) \} * 62.3/1000$$

Notes:

1. The calculation of HAL of the heat benchmark sub-installation delivers the same result in case an operator returns all condensate to the boilers or none. However, in the latter case there is more fuel required to generate F_5 ton of steam with enthalpy H_S , so that an operator who recovers less or none condensate must surrender more emission rights than one who recovers it.
2. If still part of the heat out of the returning condensate is used in the process, the average temperature T_C of the returning condensate decreases. This way this heat use is taken into account and no additional correction is required
3. The deaerator is part of the steam generation system as it is included in the efficiency of 90%. Therefore It cannot be considered as a separate heat consumer.
4. Steam used for heating buildings of personnel responsible for producing products can be considered as part of the heat benchmark sub installation.