EUROPEAN COMMISSION
DIRECTORATE-GENERAL
CLIMATE ACTION
Directorate C - Climate strategy, governance, and emissions from non-trading sectors
CLIMA.C.2 - Governance & Effort Sharing

EU ETS Monitoring and Reporting (M&R) – **Training: Roadmap through M&R Guidance**

M&R Training Event of 26 November 2020

This document comprises training material for competent authorities related to Monitoring and Reporting of greenhouse gases emissions under the EU Emission Trading System (ETS)

Table of content

1. LEGAL BACKGROUND

The “old” Monitoring and Reporting Regulation (MRR), Regulation (EU) 601/2012, will be be repealed and replaced by Regulation (EU) 2018/2066, which will be the “new MRR” as of 2021. On 14 December 2020, the Commission Implementing Regulation (EU) 2020/2085 provided further amendments to the MRR applying from 1 January 2021 or 1 January 2022.

2. OBJECTIVE

The M&R training event of 26 November 2020 aimed at:

- Providing a “one day roadmap” through M&R guidance for stationary installations
- Providing an overview of the existing body of guidances, templates and tools and how they are linked together, by the means of specific examples, without going in every details
- Target audience:
  - New or medium-experienced staff members
  - Also advanced experts for specific aspects as well as to share their experience and applied practices

An additional objective for the training was to allow for further cascading to other Member State audiences based on this document.

3. SET-UP OF THE TRAINING EVENT

#	Time	Agenda point and details
1.	10:00 – 10:15	**Opening, welcome and introduction (DG CLIMA)**
2.	10:15 – 10:30	**Overview of M&R guidances, templates and tools** ● Brief overview and where to find the templates, tools and their guidances
3.	10:30 – 11:15	**MP Template** ● Walkthrough using examples ● Where to find information in Guidance Documents ● Q&A - CA questions and sharing experience
4.	11:15 – 11:30	*Coffee break*
5.	11:30 – 12:15	**AER Template** ● Walkthrough using examples ● The "user manual" and where to find information in Guidance Documents ● Expected changes in phase 4 and their timelines ● Q&A - CA questions and sharing experience
6.	12:15 – 13:15	*Lunch break*
7.	13:15 – 13:45	**IR Template** ● Walkthrough using examples ● The "user manual" and where to find information in Guidance Documents ● Expected changes in phase 4 and their timelines ● Q&A - CA questions and sharing experience
8.	13:45 – 14:45	**How to use the operator tools** ● Unreasonable costs ● Uncertainty assessment ● Risk assessment ● Frequency of analyses ● Q&A - CA questions and sharing experience
9.	14:45 – 15:00	*Tea break*
10.	15:00 – 15:50	**How to use the CA and tools** ● Checklist for assessing MPs ● The "AER Tool" ● Checklist for assessing AER and VR ● Risk-profiling tool ● Q&A - CA questions and sharing experience
11.	15:50 – 16:00	**Wrap-up and close of the meeting**

Annex: Presentation

EU ETS Monitoring and Reporting Regulation (MRR)

M&R Training Event

Christian.Heller@umweltbundesamt.at

26 November 2020

Introduction

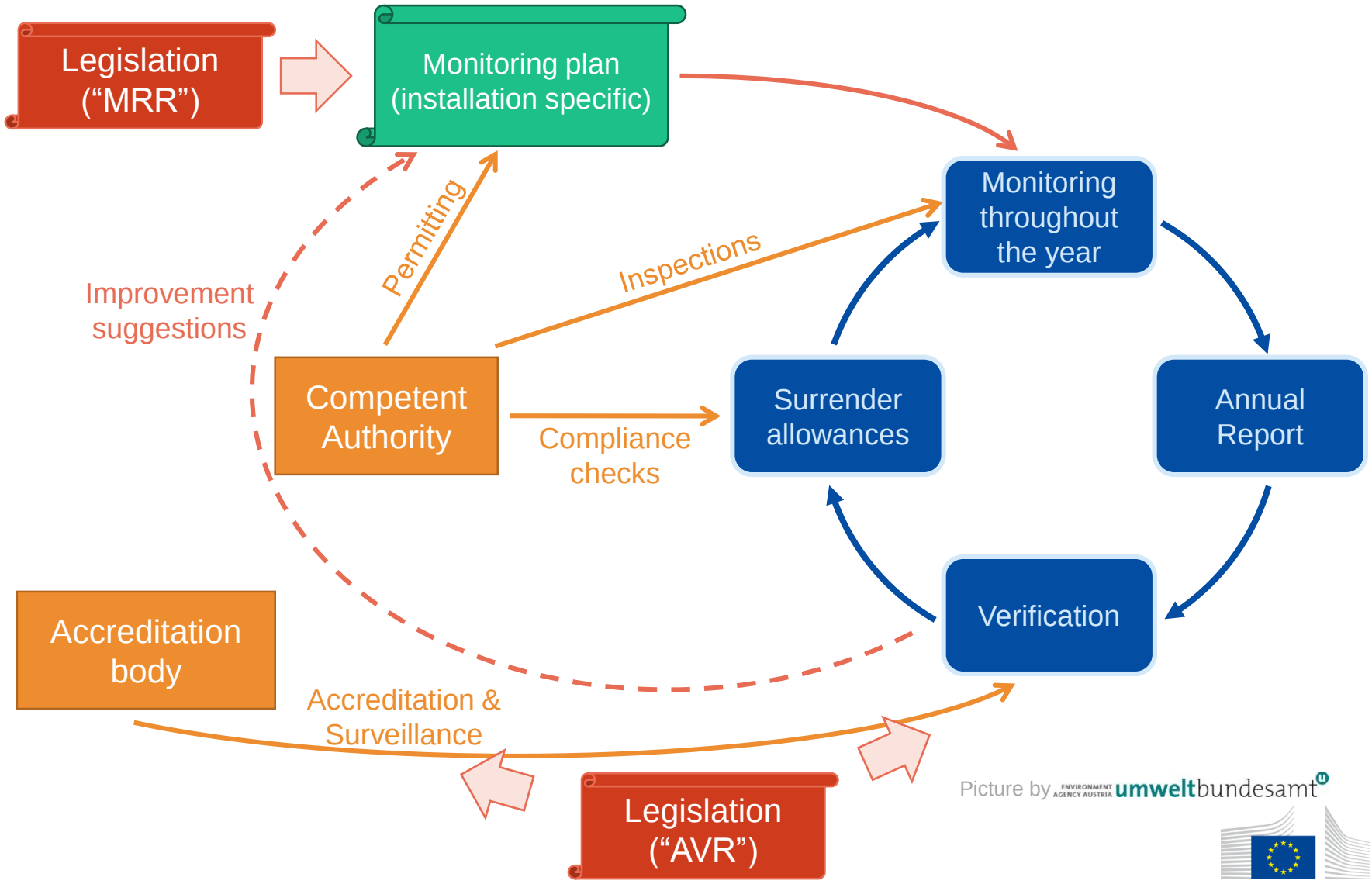
Set-up of the training

- One day **roadmap through M&R guidance** for stationary installations
- Provide an overview of the **existing body of guidances, templates and tools** and how they are linked together → **not go into much details**
- **Target audience:**
  - New or medium-experienced staff members
  - But, also advanced experts for specific aspects (e.g. tools in the afternoon) or to share their experience and applied practices

General housekeeping rules

- Keep your **microphones muted** please, unless requested to speak
- If you have a question or comment, you can write it **directly in the chat** to ‘everyone’, **or just mention your name** in the chat so that the trainer can give you the floor to ask the question orally.
- When requested to speak, please turn on your microphone and camera (if possible)
- **We are amongst “peers”!**
  → feel free to ask and answer questions and share your views and experience

Compliance Cycle



Picture by umweltbundesamt

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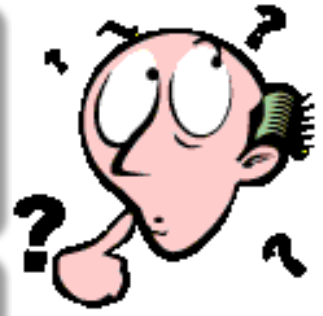
Where to start reading?

Quick guides

Templates for submission

Supporting tools and exemplars

Training material



Quick Guides

Operators | Aircraft operators | CAs | Verifiers | NABs

with hyperlinks to..

Guidance Document 1 – General guidance (stationary installations)

GD3 Biomass | GD4 Uncertainty | GD5 Sampling & Analysis | GD6 Data Flow, Control | GD7 CEMS

- T1 MP Template
  - Exemplar MP
  - Exemplar MP Update
  - Checklist MP
- T4 AER Template
  - AER user manual
  - Checklist AER
  - Paper on data gaps
    - Training material
- T7 IR Template
  - IR user manual
  - Exemplar IR
- Tool Unreas. Costs
  - Training material
- GD4a Exemplar UA
- Tool Uncertainty ass.
- Training material
- GD5a Exemplar SP
- Frequency Tool
- Training material
- GD6a Exemplar RA
- RA Tool

FAQs
- General issues
- GD-specific issues
- Template issues

Training
- "Round Robin" Test

Main suite of guidance

Where to start reading?

DG CLIMA's MRVA website:
https://ec.europa.eu/clima/policies/ets/monitoring_en#tab-0-1

Quick guides

Guidances, templates, tools,..

Quick Guides (to relevant responsibilities and supporting documents)

- 09/11/2017 - Quick guide for operators of stationary installations
- 09/11/2017 - Quick guide for aircraft operators
- 09/11/2017 - Quick guide for Competent Authorities
- 09/11/2017 - Quick guide for verifiers
- 09/11/2017 - Quick guide for National Accreditation Bodies

Monitoring and Reporting Regulation (MRR): Guidance and templates

- 27/11/2017 - Guidance document No. 1 - The Monitoring and Reporting Regulation – General guidance for installations
  - Template No. 1: Monitoring plan for the emissions of stationary installations
  - User Manual for the AER template
  - Template No. 4: Annual emissions report of stationary source installations

Existing M&R Guidance, template, tools

Item	Content	Related docs	MRR Art.
Quick guides	10 page documents for (Aircraft) Operator, verifier, CA, NAB		
Guidance Document 1	General guidance on the MRR (source streams, tier requirements,…) including overview of all aspects covered in the Guidance Documents below		
Guidance Document 3	Biomass issues, methods, tiers and sustainability criteria		Art. 38, 39
Guidance Document 4		GD4a Tool for uncertainty Training Events	Art. 12(1)(a), 28, 29
Guidance Document 5	Sampling & Analysis, Role of the sampling plan, Frequency of analysis, reasons for deviation, equivalence of non-accreditated labs	GD5a Training on sampling Tool freq. of analysis	Art. 32-35

Existing M&R Guidance, template, tools

Item	Content	Related docs	MRR Art.
Guidance Document 6	Data flow and control activities and risk assessment	GD6a Tool for RA	Art. 12(1)(b), 58-65
Guidance Document 7	Continuous Emissions Monitoring System (CEMS), Requirements in QAL1|2|3 (EN 14181), verification aspects		Art. 40-46, AVR
TF Paper on data gaps	Methodologies for closing data gaps	Training event	Art. 66
Guidance on CA making conservative estimates	Guidance for making conservative estimates if no (verified) annual emissions (or only a non-compliant one) has been submitted	TF Paper on data gaps	Art. 70

Existing M&R Guidance, template, tools

Item	Content	Related docs	MRR Art.
MP Template	Template for the monitoring plan, minimum content Annex I	Exemplar MP Exemplar MP Update Simplified MP (Art. 13) Tool unreasonable costs Checklist MP	Art. 11-12, Annex I
AER Template	Template for the annual emissions report, minimum content Annex X	User manual Guidance and Checklist AER/VR	Art. 68, Annex X
IR Template	Template for the improvement report pursuant to Art. 69	User manual Exemplar IR	Art. 69

Existing M&R Guidance, template, tools

Item	Content	Related docs	MRR Art.
FAQs	Contains further FAQs supporting the existing guidance documents		
Further training material	The “Round Robin Test” Training event is based on the Round Robin Test documents which included examples (including common mistakes) for an MP, AER, IR, uncertainty assessment, unreasonable costs calculation, risk assessment, sampling plan, etc.	All Round Robin Test documents (MP, AER, IR, Tools,…)	

Agenda

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		● Q&A - CA questions and sharing experience
4.	11:15 – 11:30	**Coffee break**
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		● Walkthrough using examples
		● The "user manual" and where to find information in Guidance Documents
		● Expected changes in phase 4 and their timelines
		● Q&A - CA questions and sharing experience
6.	12:15 – 13:15	**Lunch break**

#	Time	Agenda point and details
7.	13:15 – 13:45	**IR Template**
		● Walkthrough using examples
		● The "user manual" and where to find information in Guidance Documents
		● Expected changes in phase 4 and their timelines
		● Q&A - CA questions and sharing experience
8.	13:45 – 14:45	**How to use the operator tools**
		● Unreasonable costs
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		● Risk assessment
		● Frequency of analyses
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		● Checklist for assessing MPs
		● The "AER Tool"
		● Checklist for assessing AER and VR
		● Risk-profiling tool
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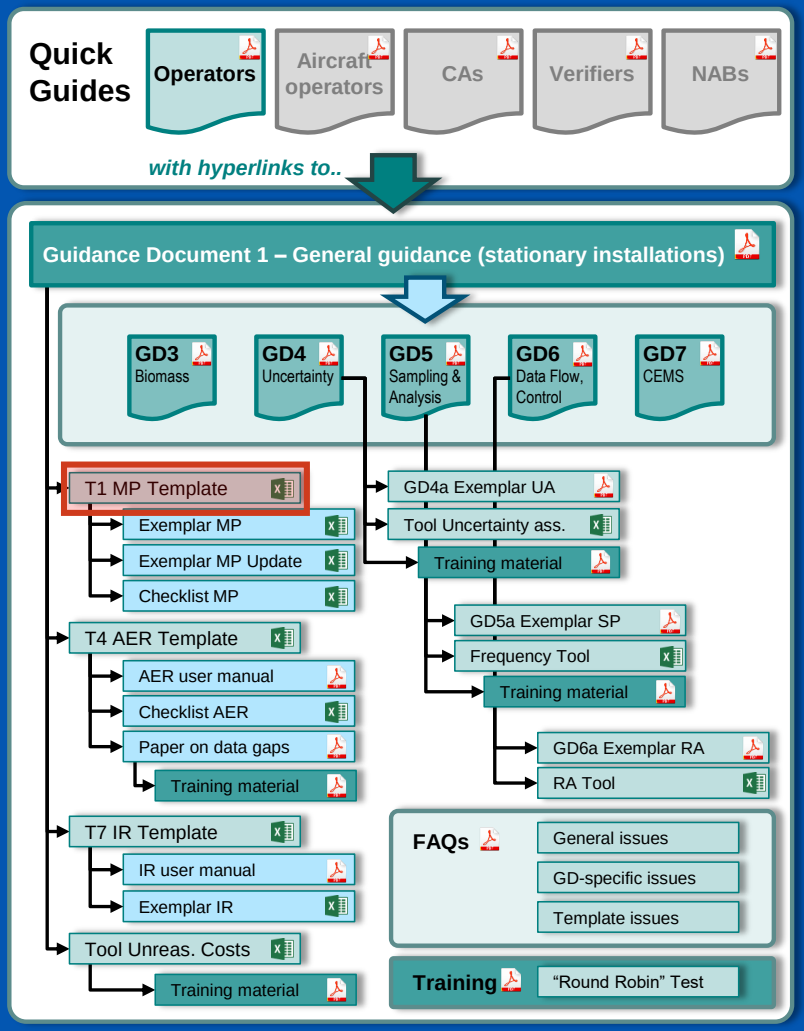
11.	15:50 – 16:00	**Wrap-up and close of the meeting**

The MP Template



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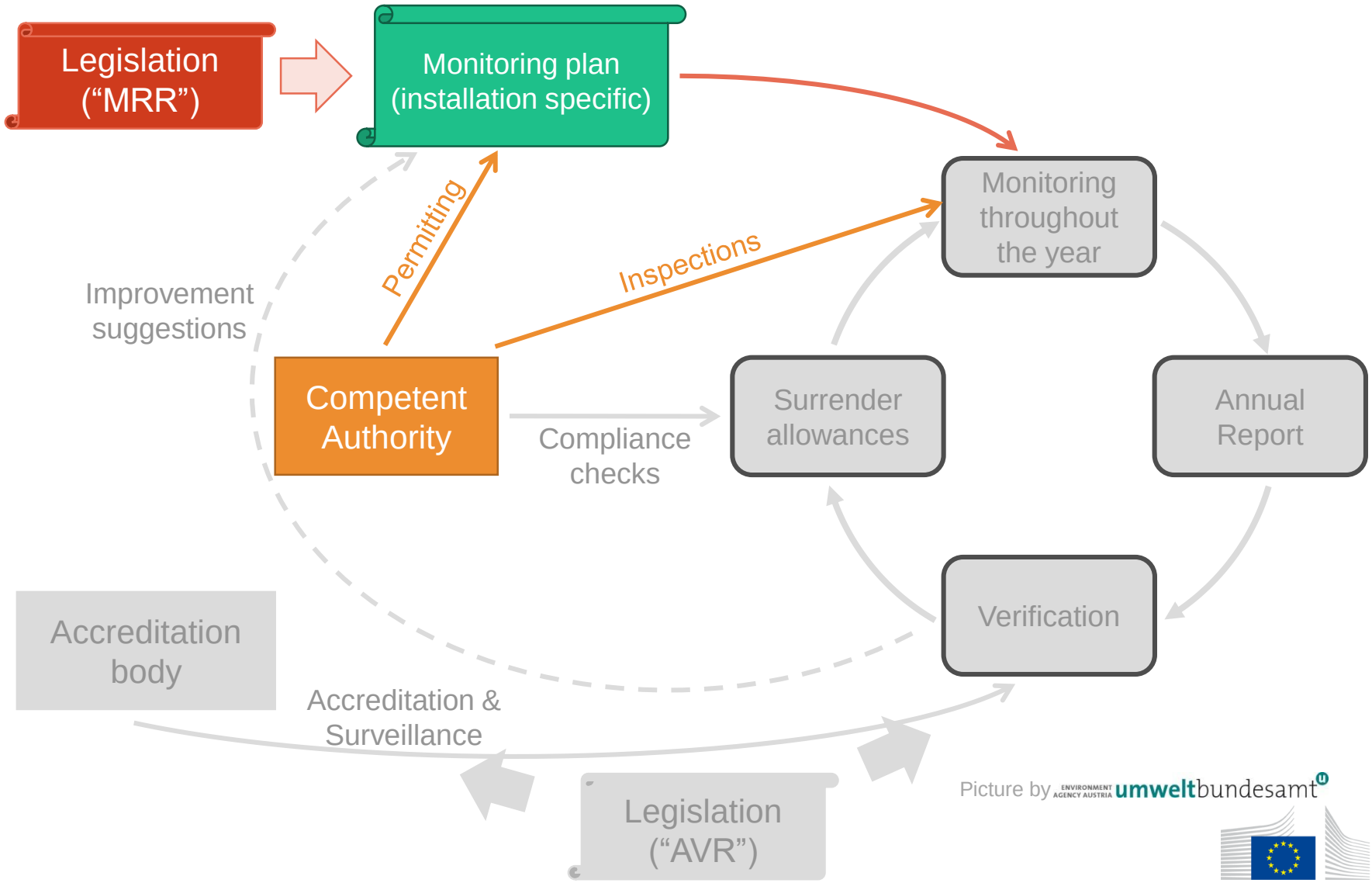
Compliance Cycle



Picture by umweltbundesamt

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Purpose of the MP

- Like a recipe in a cooking book or the management handbook for a certified quality management (QM) system
- The MP serves as manual for the operator's monitoring tasks
- Main basis for verification

- **Description has to prove completeness of the installation within the ETS**
  - No data gaps
  - No double counting
- **Attach map(s) of the installation including**
  - Site map, boundaries of the ETS installation (if not whole site is included)
  - Location of emission sources
  - Source streams going into and out of the installation
  - Location of metering equipment
  - Sampling points
  - Many procedures

Purpose of the MP

- Brief description of the site and the installation
- Description of the location of the ETS installation on the site
- Methodology to monitor GHG emissions
- Non technical summary of the activities
  - Fuels, raw materials, products, intermediate and by-products
  - Material flows
  - Process steps
  - Capacities
  - How is measuring done (internal, external)
  - Where do emissions occur

Purpose of the MP

- Description of technical units
- Description of parts which are not deemed to fall under the ETS and why
- Flow diagrams showing all relevant units, source streams, measurement instruments, sampling points covered by the scope of the ETS
- Inherent CO_2 transferred out of the installation

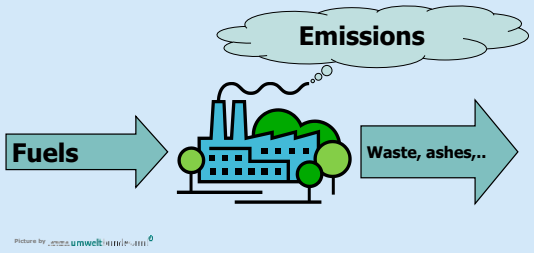
MP - What‘s new in phase 4 (main changes)?

- Distinction of process emissions:
  - Carbonate-only
  - Non-Carbonate carbon
  - Mixed
- Tiers for biomass content
- Procedures for sustainable biomass, biogas into the grid, and data gaps
- Transferred N_2O and CO_2 for PCC
- Feature for improvement report timelines

Calculation-based methodology (Emissions from source streams)

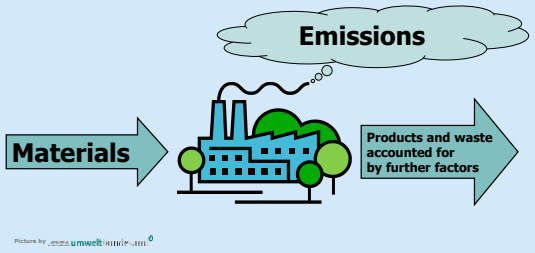
Combustion emissions

$$Em = FQ \cdot NCV \cdot EF \cdot OF$$



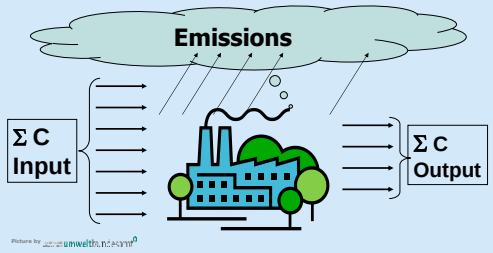
Process emissions

$$Em = AD \cdot EF \cdot CF$$



Mass balance emissions

$$Em = \sum_i \left(f \cdot AD_i \cdot CC_i \right)$$



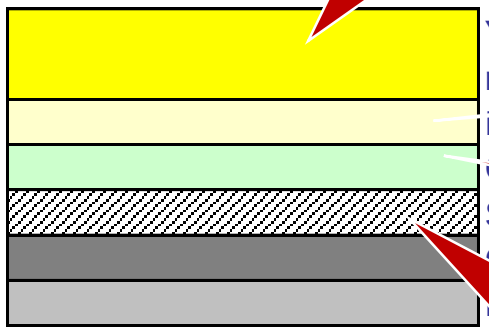
The templates

Mandatory inputs

Colour codes and fonts:

Black bold text:

Smaller italic text:



This is text provided by the

This text gives further expl MS specific versions of the template.

Yellow fields indicate n nt for the installation, no input is required.

Optional inputs

Light yellow fields indicate that an input is optional.

Green fields show automatically calculated results. Red text indicates error messages (missing data etc).

Shaded fields indi hat an input in another field makes the input here irrelevant.

Grey shaded are stomized version of the template.

grey areas

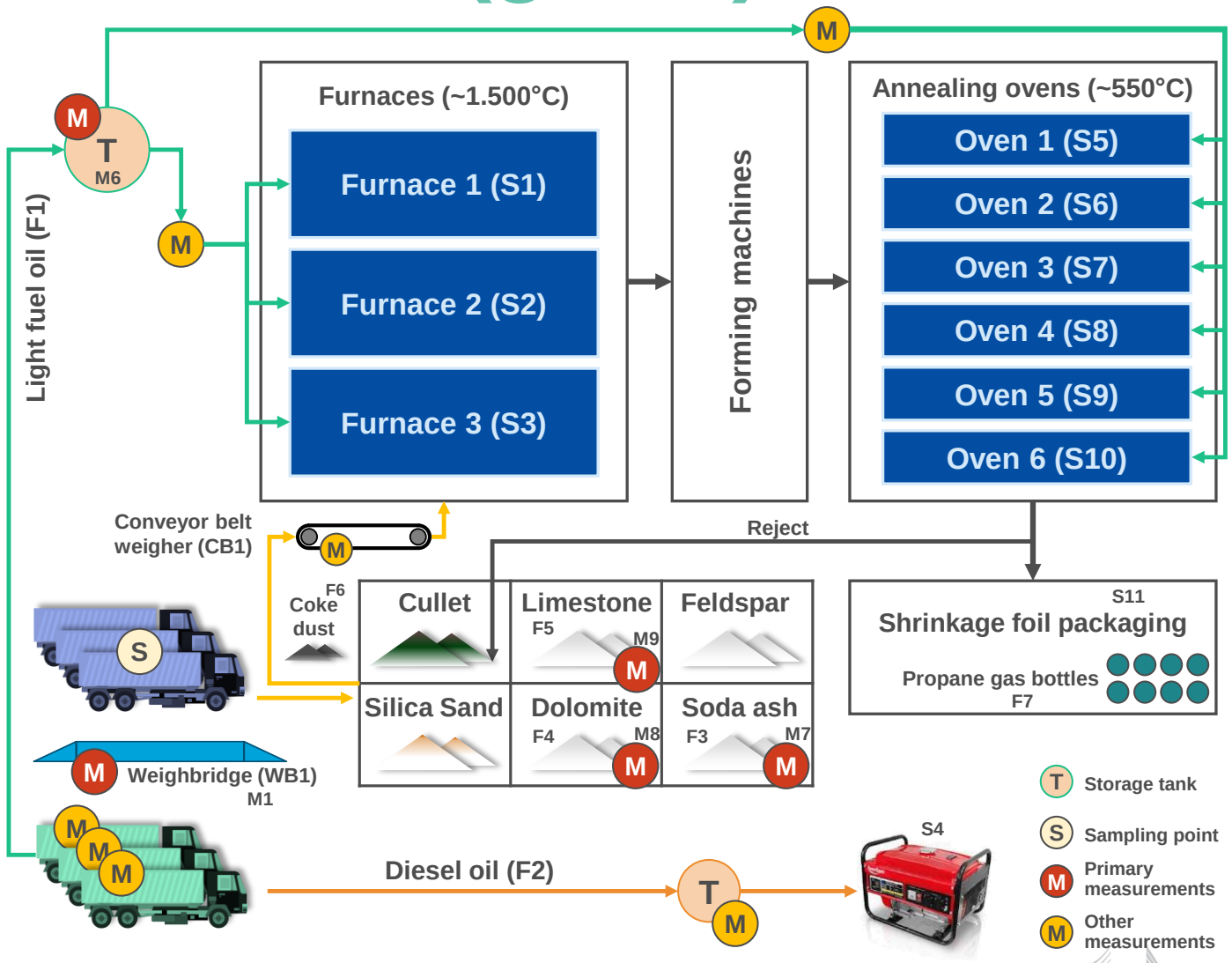
Automatic results

Conditionally greyed out, not relevant

Example installation – 1 (glass)

Category B installation producing container glass

Name	t CO2e
Light fuel oil	75.000
Diesel oil	1
Soda ash	5.500
Dolomite	4.000
Limestone	1.450
Coke dust	50



MP versions

A. MP Versions	Navigation area:	Table of contents	Previous sheet	Next sheet	Examples
	Top of sheet				
	End of sheet				

Click to hide/unhide examples

A. Monitoring Plan versions

1 List of monitoring plan versions

This sheet is used to identify the current version of the monitoring plan. Each version of the monitoring plan must have a unique version number that does not coincide with previous phase plans, and a reference date.

Depending on the requirements of the Member State, it is possible that the document is exchanged between competent authority and operator with various updates, or that the operator alone keeps track of the versions. In any case, the operator should keep in his files a copy of each version of the monitoring plan.

The status of the monitoring plan at the reference date should be described in the "status" column. Possible status types include "submitted to the competent authority (CA)", "approved by the CA", "working draft" etc.

Ple…n must always be carried out in accordance with the latest approved version of the monitoring plan, except in cases whe…CA and/or is pending approval. In accordance with Article 16(1), in such situations the monitoring must be carried out in p…ubmitted for approval.

In the "date o…column, the date as of which the monitoring methodology as described in the plan applies, if applicable.

For showing …g examples, press the "Examples" button in the navigation area.

Latest version number will be displayed on the front page

Version No	Reference date	Status at reference date	Date of application	Chapters where modifications have been made. Brief explanation of changes
1	17.11.2020	submitted to competent authority	01.01.2021	New monitoring plan for meeting the requirements of the M&R Regulation.

Information about this file:

This monitoring plan was submitted by:	Example Glass Industry Operator
Installation name:	Example Installation
Unique installation identifier:	1234
Version Number of this monitoring plan:	1

Installation Description

(c) List of activities pursuant to Annex I of the EU ETS Directive carried out at the installation:

Please provide the following technical details for each activity pursuant to Annex I of the EU ETS Directive carried out at your installation.

Please also provide the capacity of each Annex I activity relevant at your installation.

Please note that 'capacity' in this context means:

- *Rated thermal input (for activities whose inclusion in the EU ETS depends on the 20MW threshold), which is the rate at which fuel can be burned at the maximum continuous rating of the installation multiplied by the calorific value of the fuel and expressed as megawatts thermal.*
- *...ermines the inclusion in the EU ETS.*

Please make sure ... For further information please consult the relevant sections of the Commission's Gu...

http://ec.europa...

The list entered h... is required for the installation de...

For showing/hiding examples, p... button in the navigation area.

see "Guidance on Interpretation of Annex I of the EU ETS Directive" https://ec.europa.eu/clima/sites/clima/files/ets/docs/guidance_interpretation_en.pdf

New as of phase 4. Only relevant if not already stated as capacity

Activity Ref. (A1, A2...)	Annex I Activity	Total Activity Capacity	Capacity units	Rated thermal input in MW(th) (if capacity expressed in tonnes)	GHG emitted
A01	*Production of cement clinker*	*1500*	*tonnes per day*	*230*	*CO2*
A02	*Combustion of fuels*	*120*	*MW(th)*	*120*	*CO2*
A1	Manufacture of glass	600	tonnes per day	33	CO2
A2					

(d) Estimated annual emissions:

Please enter here the average annual emissions of your installation. This information is required for ... verified annual emissions of the previous trading period data OR if this data is not available, or is in ... excluding CO2 from biomass.

The resulting category is used for identifying minimum tier requirements in section 8 (Source...

Estimated annual emissions	**86.260**
Installation category in accordance with Article 19	**B**

(a) Monitoring approaches proposed to apply:

Please confirm which of the following monitoring approaches you propose to apply:

In accordance with Article 21, emissions may be determined using either a calculation based methodology ("calculation") or measurement based meth... use of a specific methodology is mandatory according to the provisions of the MRR.

Note: the operator may, subject to competent authority approval, combine measurement and calculation for different sources. The operator is required ... nor double counting of reportable emissions occurs.

Please make sure that you don't leave these fields empty, because inputs here will trigger conditional formatting, which guides you through

Calculation approach for CO2:	WAHR	Relevant sections: 6 (except d), 7, 8
Measurement approach for CO2:	FALSCH	
Fall-back approach (Article 22):	WAHR	Relevant sections: 12
Monitoring of N2O emissions:	FALSCH	
Monitoring of PFC emissions:	FALSCH	
Monitoring of transferred/inherent CO2 and CCS:	FALSCH	

Annex I activities

(c) List of activities pursuant to Annex I of the EU ETS Directive carried out at the installation:

Please provide the following technical details for each activity pursuant to Annex I of the EU ETS Directive carried out at your installation.

Please also provide the capacity of each Annex I activity relevant at your installation.

Please note that 'capacity' in this context means:

- *Rated thermal input (for activities whose inclusion in the EU ETS depends on the 20MW threshold), which is the rate at which fuel can be burned at the maximum continuous rating of the installation multiplied by the calorific value of the fuel and expressed as megawatts thermal.*
- *ermines the inclusion in the EU ETS.*

Please make sure e. For further information please consult the relevant sections of the Commission's Gu

http://ec.europa

The list entered he is required for the installation de

For showing/hiding examples, p button in the navigation area.

see "Guidance on Interpretation of Annex I of the EU ETS Directive" https://ec.europa.eu/clima/sites/clima/files/ets/docs/guidance_interpretation_en.pdf

New as of phase 4. Only relevant if not already stated as capacity

Activity Ref. (A1, A2...)	Annex I Activity	Total Activity Capacity	Capacity units	Rated thermal input in MW(th) (if capacity expressed in tonnes)	GHG emitted
A01	*Production of cement clinker*	*1500*	*tonnes per day*	*230*	*CO2*
A02	*Combustion of fuels*	*120*	*MW(th)*	*120*	*CO2*
A1	Manufacture of glass	600	tonnes per day	33	CO2
A2					

Emission sources and points

(b) Emissions sources:

Annex I requires that monitoring plans include a description of the installation and activities to be carried out and monitored, including a list of emission sources and source streams. The information you provide in this template should relate to the Annex I activity(ies) comprised in the installation in question, and should relate to a single installation. Include in this section any activities carried out at your installation and exclude related activities carried out by other operators.

The activity reference in the last column relates to the activity referen… …ore than one activity, please enter "A1, A2" or "A1 - A3" or similar, as appropriate.

The list here will be available as a drop-down list at the following point… …urces is needed.

For showing/hiding examples, press the "Examples" button in the naviga…

See definition in GD1

Emission source ref. S1, S2,...	Emission source (name, description)	Activity Ref.
S01	*Cement clinker kiln (decarbonatisation of raw meal, combustion of fuels)*	*A1*
S02	*Coal fired boiler (combustion of fuels)*	*A2*
S03	*Coal fired boiler (decomposition of limestone for flue gas scrubbing)*	*A2*
S1	Melting furnace 1	
S2	Melting furnace 2	
S3	Melting furnace 3	
S4	Emergency generator	
S5	Annealing oven 1	
S6	Annealing oven 2	
S7	Annealing oven 3	
S8	Annealing oven 4	
S9	Annealing oven 5	
S10	Annealing oven 6	
S11	Shrink oven	

Click "+" to add more emissions sources

Add further emission sources

(c) Emission points and emitted GHGs:

Please list and briefly describe all relevant emission points (including d… …section 5(c) above). If more than one activity or emission source in concerned, please enter e.g. "A1, A2".

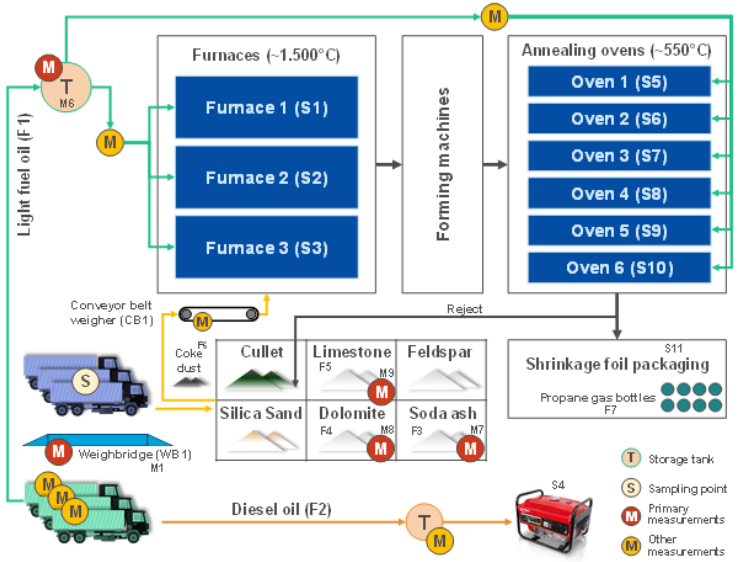
Please also select the Annex I activities, the emission sources and the…

The list here will be available as a drop-down list at the followi… …n point is needed.

For showing/hiding examples, press the "Examples" butto…

See definition in GD1

Emission point ref EP1, EP2,...	Emission point description	Activity Ref.	Emission source ref.	GHG emitted
EP01	*Stack 1 (coal fired boiler)*	*A02*	*S102, S03*	*CO2*
EP02	*Stack 2 (cement kiln)*	*A01*	*S01*	*CO2*



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Source Streams

(e) Relevant source streams:

relevant
Please enter data in this section

Please list here all source streams (fuels, materials, products,…) which are to be monitored at your installation using calculation based approaches (i.e. standard methodology or mass balance). For definition of the term "source stream" please see guidance document No. 1 ("General guidance for installations"). For definition of source streams for PFC, please see point 14(c) in sheet "I_PFC".

The source streams may be named like e.g. "natural gas", "heavy fuel oil", "cement raw meal",..

The source stream type is to be understood as a set of rules to be used according to the MRR. This classification is the basis for further obligations, e.g. tiers to be applied.

The drop-down list for selection of the Source stream type is based upon the activities selected in section 5(c) above. The entry there is required for determining the applicable minimum tier in sheet "E_SourceStreams".

For allowing the competent authority to fully understand the function… lists the Annex I activities, the emission sources and the emission points, which correspond which each sour… ned, please enter e.g. "A1, A2".

For showing/hiding examples, press the "Examples" button in the nav… ea.

See definition in GD1

Source Stream ref. F1, F2,...	Source stream Name	Source stream type	Activity Ref.	Emission source ref.	Emission point ref.
F1	Light fuel oil	Combustion: Commercial standard fuels	A1: Manufacture	S1 - S3, S5-S10	
F2	Diesel oil	Combustion: Commercial standard fuels	A1: Manufacture	S4: Emergency	
F3	Soda ash				
F4	Dolomite				
F5	Limestone				
F6	Coke dust				
F7	Propane gas				

Source Stream ref. F1, F2,...	Source stream full name (name + type)	Estimated emissions [t CO2e / year]	Possible category	Selected category
F1	Light fuel oil; Combustion: Commercial standard fuels	75.000	Major	Major
F2	Diesel oil; Combustion: Commercial standard fuels	1	De-minimis	De-minimis
F3	Soda ash; Glass and mineral wool: Process (method A): carbonate only	5.500	Minor	Major
F4	Dolomite; Glass and mineral wool: Process (method A): carbonate only	4.000	Minor	Minor
F5	Limestone; Glass and mineral wool: Process (method A): carbonate only	1.700	De-minimis	Minor
F6	Coke dust; Combustion: Solid fuels	50	De-minimis	De-minimis
F7	Propane gas; Combustion: Commercial standard fuels	10	De-minimis	De-minimis

Error message (sum of minor source streams):		
Error message (sum of de-minimis source streams):		
Error message (Total Emissions, difference to 5(d)):	0,0%	

…rts and activities not included in the EU ETS, if relevant:

…etails for any installation parts or activities not included in the EU ETS where fuel or materials used by …nce please consult points (b), (c) and (e) above.

…ing examples, press the "Examples" button in the navigation area.

Error messages if de-minimis, minor etc. thresholds are exceeded

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Measuring Instruments

(b) Specification and location of measurement systems for determining the activity data for source streams:

Ref	Type of measuring	location (internal ID)	Measurement range			Specified uncertainty	Typical use range	
			unit	lower end	upper end		lower end	upper end
MI1	Weigh bridge	WB1 (delivery area)	kg	0	25.000	0,6	10.000	30.000
				25.000	40.000	0,4		
MI2	Weigh bridge	WB Soda ash 1 (soda ash supplier 1)	kg	100	10.000	0,4	10.000	40.000
				10.000	60.000	0,2		
MI3	Weigh bridge	WB Soda ash 2 (soda ash supplier 2)	kg	500	10.000	0,2	5.000	30.000
				10.000	55.000	0,15		
MI4	Weigh bridge	WB Dolomite (dolomite supplier)	kg	500	80.000	0,3	5.000	50.000
MI5	Weigh bridge	WB Limestone (limestone supplier)	kg	500	50.000	0,3	1.000	30.000
MI6	Oil level gauge	Oil tank	t	0	1.400	5	0	1.400
MI7	Stock level meter	Soda ash silo	t	0	1.000	7,5	0	1.000
MI8	Stock level meter	Dolomite silo	t	0	1.000	3,75	0	1.000
MI9	Stock level meter	Limestone silo	t	0	600	7,5	0	600
MI10								

Click "+" to add more measurement instruments

Uncertainty calculations assessment document title and reference: RoundRobin_UncertaintyAss_version-3.pdf

You must provide evidence to demonstrate compliance with the applied tiers, in accordance with Article 12. Please list ref... uncertainty calculations and/or schematics in the box above.

Note that in accordance with Article 47(3), installation with low emissions do not have to s...

List of information sources for default values of calculation factors:

Further details and examples to be found in:

Laboratories

(d) List of information sources for default values of calculation factors:

Please list all relevant information sources, from which you derive default values for calculation factors according to Article 31.

These are usually static sources such as e.g. National Inventory, IPCC, MRR Annex VI, Handbook of Chemistry & Physics...).

Only where the default values change on an annual basis, the operator shall specify the authoritative applicable source of that value by means of a dynamic source, such as the CA's Website.

This list will be available as a drop-down in sheet E_SourceStreams (table (g) to reference the information sources to the relevant calculation factors of each source stream.

For showing/hiding examples, press the "Examples" button in the navigation area.

Information Source Ref.	Description of Information source
IS01	*National GHG Inventory, annually updated (see http:/Dummy.address.test). Most recent value published in 2011 is used.*
IS02	*Handbook of Chemistry and Physics, 92nd ed., http://www.hbcpnetbase.com/*
IS03	*NCV and EF analysis of source stream "heavy fuel oil" from August 2011*
IS1	National GHG Inventory, last updated September 2017 (see http://energyministry.address.gv.test)
IS2	Monitoring & Reporting Regulation (Annex VI)
IS3	Monitoring & Reporting Regulation (Annex IV)
IS4	
IS5	

Click "+" to add more information sources

(e) Laboratories and methods used for analyses for calculation factors:

Please list the methods to be used for analysing fuels and materials for the determination of all calculation factors where applicable due to the selected tier. Where the laboratory is not accredited according to EN ISO/IEC 17025, you have to provide evidence that the laboratory is technically competent in accordance with Article 34. For this purpose pleas... reference to an attached document.

Where online gas chromatographs or extractive or non-extractive gas analysers are used, the requirements of Article 32 shall be met.

This list will be available as a drop-down in sheet E_SourceStreams (table (g)) to reference the analytical methods to the relevant calculation factors of each source strea...

For showing/hiding examples, press the "Examples" button in the navigation area.

Lab Ref	Name of laboratory	Parameter	Method of analysis (include procedure reference and brief description of method)	Is lab EN ISO/IEC 17025 accredited for this analysis?	If no, reference the evidence to be submitted
L01	*Example lab*	*C-Content*	*EN 15104:2011. See procedure ANA-1233/UBA*	*WAHR*	
L02	*Example lab 2*	*Biomass content*	*EN 15440:2011 - some deviations regarding sample size and treatment. See procedure ANA-1234/UBA*	*FALSCH*	*Lab_competence.pdf, 2/3/2012*
L1	ACME lab	carbonates	EN ISO 12677 (XRF analyses of relevant alkali, earth	WAHR	

⇨ see GD4 on how to demonstrate equivalence of a non-accredited lab in case the use of an accredited lab incurs unreasonable costs

Procedures

(f) Description of the written procedures for analyses:

Please provide details about the written procedures for the analyses listed above in table 7(e). The description should

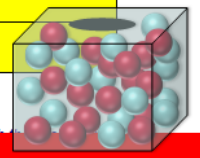
Where a number of procedures are used for a similar purpose but for different source streams or parameters, please p
common elements and quality assurance of the applied methods.

You may then either give here references to individual "sub-procedures", or you may provide details of each relevant p
button at the end of this sheet. However, please ensure that clear reference to the appropriate (sub-)procedure can be g

For showing/hiding examples, press the "Examples" button in the navigation area.

Examples for (summary) of procedures can found in GD1, Exemplar MP, "Round Robin" MP

Title of procedure	Analysis of input materials
Reference for procedure	Analysis_of_input_materials.docx
Diagram reference (where	n.a.
Brief description of procedure	XRF analysis of relevant alkali and earth alkali metals (Na, Mg, K, Ca) in external laboratory. This procedure is relevant for the source streams soda ash, dolomite and limestone.
Post or department responsible for the procedure and for any data	Head of laboratory department
Location where records are kept	\\example_installation\laboratory\external analyses\soda and magnesite analyses.xlsx (yearly copy stored at
Name of IT system used (where applicable).	n.a.
List of EN or other standards applied (where relevant)	EN 12677



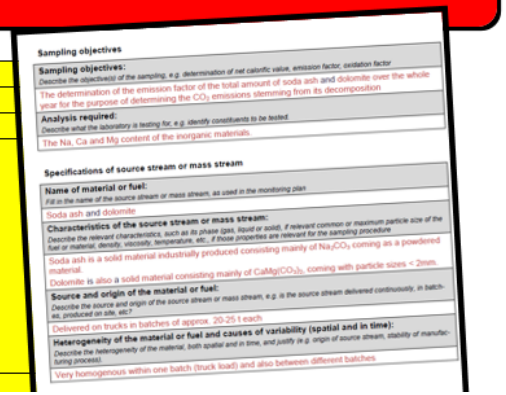
(g) Description of the procedure for the sampling plans for the analyses:

The procedures below should cover the elements of a sampling plan as required by Article 33. A copy of the procedure sh
plan.

Where a number of procedures are used for a similar purpose but for different source streams or parameters, please provi
common elements and quality assurance of the applied methods.

You may then either give here references to individual "sub-procedures", or you may provide details of each relevant proce
button at the end of this sheet. However, please ensure that clear reference to the appropriate (sub-)procedure can be given in section 8, table g

Further details and examples can be found in:
GD5 and GD5a, Training Event on Sampling, "Round Robin" test files


Sampling objectives

Sampling objectives:
Describe the objective(s) of the sampling, e.g. determination of net calorific value, emission factor, oxidation factor

The determination of the emission factor of the total amount of soda ash and dolomite over the whole year for the purpose of determining the CO_2 emissions stemming from its decomposition

Analysis required:
Describe what the laboratory is testing for, e.g. identify constituents to be tested

The Na, Ca and Mg content of the inorganic materials

Specifications of source stream or mass stream

Name of material or fuel:
Fill in the name of the source stream or mass stream, as used in the monitoring plan

Soda ash and dolomite

Characteristics of the source stream or mass stream:
Describe the relevant characteristics, such as its phase (gas, liquid or solid), if relevant common or maximum particle size of the fuel or material, density, viscosity, temperature, etc., if those properties are relevant for the sampling procedure

Soda ash is a solid material industrially produced consisting mainly of Na_2CO_3 coming as a powdered material.

Dolomite is also a solid material consisting mainly of $CaMg(CO_3)_2$, coming with particle sizes < 2mm.

Source and origin of the material or fuel:
Describe the source and origin of the source stream or mass stream, e.g. is the source stream delivered continuously, in batch-es, produced on site, etc?

Delivered on trucks in batches of approx. 20-25 t each

Heterogeneity of the material or fuel and causes of variability (spatial and in time):
Describe the heterogeneity of the material, both spatial and in time, and justify (e.g. origin of source stream, stability of manufac-turing process).

Very homogenous within one batch (truck load) and also between different batches

Title of procedure	Sampling plan for input materials
Reference for procedure	RoundRobin_SamplingPlan.doc
Diagram reference (where	n.a.
Brief description of procedure	• Increments are taken by an automatic sampling device from the conveyor belt with a rotating scoop after unloading before silo storage. • Responsible person checks functionality of sampling device on a regular basis. • Samples are homogenised and sub-sampled in installation´s laboratory according to the sub-sampling procedure • Quarterly composite samples are obtained by representatively mixing samples • Composite samples are sent to the accredited laboratory by responsible person • Samples are collected in tight containers marked with date and time, supplier ID, etc. • Samples are stored in room L78 (at room temperature) This procedure is relevant for the source streams soda ash, dolomite and limestone.
Post or department responsible for	Head of laboratory department

Procedures - Biomass

(k) Description of the procedure used to assess if biomass source streams comply with Article 38(5), if applicable.

This procedure is only relevant for biomass which is subject to the applicable sustainability and GHG savings criteria in the Renewable Energy Directive (2018/2001).

Title of procedure	n.a.
Reference for procedure	n.a.
Diagram reference (where	n.a.
Brief description of procedure	n.a.
Post or department responsible for the procedure and for any data	n.a.
Location where records are kept	n.a.
Name of IT system used (where applicable).	n.a.
List of EN or other standards applied (where relevant)	n.a.

Changes in Art. 38 and 39 compared to phase 3 will be addressed in the forthcoming update of GD3.

(l) Description of the procedure used to determine biogas quantities based on purchase records in accordance with Article 39(4), if applicable.

This procedure is only relevant where the operator wants to claim the use of biogas received from a (natural) gas grid.

Title of procedure	n.a.
Reference for procedure	n.a.

Source Streams

F1 Source Stream 1:

Source stream type:		
Method applicable according to MRR:		
Parameter to which uncertainty applies:		

Example Source Stream:	***Heavy fuel oil***	***Major***
Source stream type:	*Combustion: Other gaseous & liquid fuels*	
Method applicable according to MRR:	*Standard method: Fuel, Article 24(1)*	
Parameter to which uncertainty applies:	*Amount of fuel [t] or [Nm3]*	

The source stream name, the source stream type, and the category will be displayed automatically based on your entries in section 6.e in sheet C_InstallationDescription.

If you have not attributed the source stream to an applicable category (major, minor, de-minimis) there, the category which is automatically displayed in that section will be used. If this is the case, the template cannot correctly indicate below which tiers are to be applied. Therefore please make sure to select an applicable category correctly in the section mentioned above.

As the source stream type can be clearly assigned to a monitoring method applicable according to the MRR (Articles 24 and 25) and the parameters to which the uncertainty of the activity data applies (Annex II), this information is provided automatically based on the MRR.

Automatic guidance on applicable tiers:

Below in sections (c) and (f) the required tiers for activity data and calculation factors are displayed in the green fields based on your inputs in sectio
are the minimum tiers for major source streams in category C installations. However, lower requirements may be allowed. An appropriate guidanc
below, depending on the following points:

- *Reduced requirements apply to installations with low emissions in accordance with Article 47(2);*
- *The installation category (A, B or C) in accordance with Article 19;*
- *Reduced requirements apply to minor source streams and de-minimimis source streams as classified pursuant to Article 19(3).*

This message on applicable tiers is relevant for the activity data and for all calculation factors.

"Required tiers" displayed below always refer to major source streams in either category A or B/C installations.
Message in that box indicates any possible simplifications.

Example data:

Art. 26(1): The minimum tiers displayed below shall at least apply.
However, you may apply a tier up to two levels lower, with a minimum of tier 1, where you can show to the satisfaction of the competent authority that the tier required in accordance with the first subparagraph is technically not feasible or incurs unreasonable costs.

Source Streams

F1 Source Stream 1:	Light fuel oil	Major
Source stream type:	Combustion: Commercial standard fuels	
Method applicable according to MRR:	Standard method: Fuel, Article 24(1)	
Parameter to which uncertainty applies:	Amount of fuel [t] or [Nm3]	

(b) Measurement instruments used: MI1: Weigh | MI6: Oil level

Please select here one or more from the instruments which you have defined in section 7(b).

If more than 5 measurement instruments are used for this source stream, e.g. if the pT compensation is done using separate in description.

Comment / Description of approach, if several instruments used:

Please explain why and how more than one instrument are relevant, if applicable. E.g it may be the case that one instrument is Weighing instruments might be used alternatively, or for corroboration purposes, etc.

Delivered quantities are determined using MI1, stock changes are determined using MI6.

(c) Activity data tier level required:	4	Uncertainty shall not be more than ± 1,5%	
(d) Activity data tier used:	3	Uncertainty shall not be more than ± 2,5%	
(e) Uncertainty achieved:	1,97%	**Comment:**	see RoundRobin_Uncertain

(f) Applied tiers for calculation factors:

	calculation factor	required tier	applied tier	full text for applied tier
i.	Net calorific value (NCV)	2a/2b	2a	Type II default values
ii.	Emission factor (preliminary)	2a/2b	2a	Type II default values
iii.	Oxidation factor	1	1	Default value OF=1
iv.	Conversion factor	n.a.		
v.	Carbon content	n.a.		
vi.	Biomass fraction (if applicable)	1	n.a.	

Depending on the tier selected (default values or laboratory analysis), you are required to enter the following information for each

Where a default value is used, please enter the value, the unit and the literature source by reference to table 7(d) on the previous s time of notification of the monitoring plan.

Where a laboratory analysis is required, please enter analytical method/laboratory by reference to table 7(e) on the previous sheet, frequency to be applied.

(g) Details for calculation factors:

	calculation factor	applied tier	default value	Unit	source ref
i.	Net calorific value (NCV)	2a	41,7	GJ/t	IS1: National
ii.	Emission factor (preliminary)	2a	78	tCO2/TJ	IS1: National
iii.	Oxidation factor	1	100	%	IS3:

Source Streams

F3 Source Stream 3:	**Soda ash**					**Major**
Source stream type:	Glass and mineral wool: Process (method A): carbonate only					
Method applicable according to MRR:	Standard method: Process, Article 24(2)					
Parameter to which uncertainty applies:	Process input [t]					
(b) Measurement instruments used:	MI1: Weigh	MI2: Weigh	MI7: Stock			

Comment / Description of approach, if several instruments used:

Amounts from delivery slips (MI2 or MI3) are cross-checked with amounts weighed in on site (MI1) before transferring data into the IT system.
Any deviations outside tolerance limits are clarified with suppliers.

(c) Activity data tier level required:	2	Uncertainty shall not be more than ± 1,5%	
(d) Activity data tier used:	1	Uncertainty shall not be more than ± 2,5%	
(e) Uncertainty achieved:	1,55%	**Comment:**	see RoundRobin_UncertaintyAss_version-3.pdf

Calculation factors:

(f) Applied tiers for calculation factors:

	calculation factor	required tier	applied tier	full text for applied tier
i.	Net calorific value (NCV)	n.a.		
ii.	Emission factor (preliminary)	2	2	Laboratory analyses
iii.	Oxidation factor	n.a.		
iv.	Conversion factor	n.a.		
v.	Carbon content	n.a.		
vi.	Biomass fraction (if applicable)	n.a.		

(g) Details for calculation factors:

	calculation factor	applied tier	default value	Unit	source ref	analysis ref	sampling ref	Analysis frequenc
i.	Net calorific value (NCV)							
ii.	Emission factor (preliminary)	2				L1: ACME lab	RoundRobin	Quarterly
iii.	Oxidation factor							
iv.	Conversion factor							
v.	Carbon content							
vi.	Biomass fraction (if applicable)							

Comments and explanations:

(h) Comments and justification if required tiers are not applied:

The application of tier 2 for activity data would incur unreasonable costs (benefit: 20 €/t CO2 * 5 500 t CO2 * (1.55%-1.50%) = 55 €/year).
Any new measuring equipment would lead to costs exceeding those benefits and also 2 000 €/year.

Source Streams

F5 Source Stream 5:	Limestone	Minor
Source stream type:	Glass and mineral wool: Process (method A): carbonate only	
Method applicable according to MRR:	Standard method: Process, Article 24(2)	
Parameter to which uncertainty applies:	Process input [t]	

(b) Measurement instruments used: MI5: Weigh | MI9: Stock

Comment / Description of approach, if several instruments used:

Amounts from delivery slips (MI5) are cross-checked with amounts weighed on site (MI1) before transferring data into the IT system.
Any deviations outside tolerance limits are clarified with supplier.

(c) Activity data tier level required:	2	Uncertainty shall not be more than ± 1,5%	
(d) Activity data tier used:	No tier		
(e) Uncertainty achieved:	3,65%	**Comment:**	see RoundRobin_UncertaintyAss_version-3.pdf

Calculation factors:

(f) Applied tiers for calculation factors:

	calculation factor	required tier	applied tier	full text for applied tier
i.	Net calorific value (NCV)	n.a.		
ii.	Emission factor (preliminary)	2	2	Laboratory analyses
iii.	Oxidation factor	n.a.		
iv.	Conversion factor	n.a.		
v.	Carbon content	n.a.		
vi.	Biomass fraction (if applicable)	n.a.		

(g) Details for calculation factors:

	calculation factor	applied tier	default value	Unit	source ref	analysis ref	sampling ref	Analysi frequen
i.	Net calorific value (NCV)							
ii.	Emission factor (preliminary)	2				L1: ACME lab	RoundRobin	Quarterly
iii.	Oxidation factor							
iv.	Conversion factor							
v.	Carbon content							
vi.	Biomass fraction (if applicable)							

Comments and explanations:

(h) Comments and justification if required tiers are not applied:

Tier 2 and tier 1 for activity data would incur unreasonable costs (see attachment RoundRobin UnreasonableCosts version-2).
However, according to Art. 26(2) as a minimum tier 1 for activity data is required. Therefore a fall-back approach is applied (see section G).

Fall-back Approach

(b) Please provide a concise justification for the application of a fall-back approach to the above emission sources, in line with the provisions set out in Article 22.

You must be able to demonstrate that the overall uncertainty for the annual level of greenhouse gas emissions for the whole installation does not exceed 7.5% for category A, 5.0% for category B and 2.5 % for category C installations. Note: Your competent authority may request full details of your justification to demonstrate that application of a tiered calculation based method or measurement approach is technically not feasible or would lead to unreasonable costs.

If the description is too complex, e.g. complex formulas are applied, you may provide the description in a separate document using a file format acceptable for the CA. In this case please reference this file here, by using the file name and date.

Applying at least tier 1 under the calculation-based methodology for limestone would incur unreasonable costs (see stream F5 in section 8 and attachment
Furthermore applying a measurement-based methodology is even more expensive and would therefore also incur unreasonable costs.
See section c below for the yearly assessment of uncertainties and reporting thereof.
By applying this fall-back monitoring methodology, the overall uncertainty for the annual level of greenhouse gas emissions for the whole installation is 3.2 % (see calculation below) and thus is below the 5.0 % threshold for category B installations. (Figures in red colour indicate conservatively estimated uncertainties.)

Source stream	AD	NCV	EF	Emissions (Uncertainty)	Emissions t CO_2
LFO	0.97%	2.5%	2.5%	3.7%	75,000
Soda ash	1.55%		5%	5.2%	5,500
Dolomite	1.30%		5%	5.2%	4,000
Limestone	3.65%		5%	6.2%	1,700
Diesel	-	-	-	10%	1
Coke dust	-	-	-	10%	50
Propane	-	-	-	10%	10
TOTAL	-	-	-	-	86,260

$$u = \frac{\sqrt{(75{,}000 \cdot 3.7\%)^2 + \cdots + (10 \cdot 10\%)^2}}{86{,}260} = 3.2\%$$

Management & Control

(d) Improvement reports pursuant to Article 69(1) of the MRR

i. Any required tier not met or fall-back applied? WAHR

Select "TRUE" if for any parameter of a major or minor source stream or emission sources, either the required tiers are not met or a fall-back (Arti… …plied. If this is the case, the operator has to submit improvement reports regularly, pursuant to Article 69(1).

Please note that this section does not exempt operators from the obligation to submit an improvement report pursuant to Article 69(4…

⇨ see "Improvement Report Template" in the afternoon

ii. Deadline for the next improvement report pursuatn to Article 69(1), if relevant

This section is only relevant if the operator selected "TRUE" under point i. above.

The deadline for the improvement reports is every year for category C, every two years for category B and four years for category A installations.

However, the CA can extent that period to three, four, five years, respectively, if the operator can demonstrate to the CA that the reasons for unreasonable costs or for improvement measures being technically not feasible remain valid for a longer period of time.

2021	2022	2023	2024	2025	2026	2027	2028	2029	2030
n.a.	June								
	30.06.2022								

21 Data flow activities

(a) Please provide details about the procedures used to manage data flow activities in accordance with Article 58 of the MRR.

Where a number of procedures are used, please provide details of an overarching procedure which covers the main steps of data flow activities along with a diagram showing how the data management procedures link together (please reference this diagram below and include when submitting your monitoring plan). Alternatively please provide details of additional relevant procedures on a separate sheet.

Under "Description of the relevant processing steps", please identify each step in the data flow from primary data to annual emissions which reflect the sequence and interaction between data flow activities and include the formulas and data used to determine emissions from the primary data. Include deta… storage systems and other inputs (including manual inputs) and confirm how outputs of data flow activities are recorded.

Further details and examples to be found in GD6 and GD6a

Title of procedure	Management of ETS data flow activities
Reference for procedure	Management_of_data_flows.docx
Diagram reference (where	n.a.
Brief description of procedure	• Responsible person checks if necessary data is available, complete and accurate • Responsible person performs calculation of annual emissions (see "processing steps" below) • Responsible person stores results for compiling annual emission report • If annual verification identifies a need for update responsible person updates annual emission report

Management & Control

Further details and examples to be found in GD6 and GD6a

22 Control activities

(a) Please provide details about the procedures used to assess inherent risks and control risks in accordance with Article 59 of the MRR.

The brief description should identify how the assessments of inherent risks and control risks are undertaken when establishing an effective control system.

Title of procedure	Risk Assessment
Reference for procedure	RoundRobin_RiskAss_version-3.xls
Diagram reference (where	n.a.
Brief description of procedure	• Risk assessment covers whole data flow from primary data to final annual emissions report, including management and storage of data • For all relevant data flow steps identified risk sources are analysed according to the following parameters: probability that respective incident might occur, possible impact on emissions, risk, control activities to mitigate the risk, final risk • Thresholds for probabilty and impact levels set according to GD 6a and "Tool for operator risk assessment" • Responsible persons updates the risk assessement whenever the monitoring plan is significantly modified, and checks annually whether the risk
List of EN or other standards applied (where relevant)	n.a.

Further details and examples to be found in the "Working Paper on data gaps and non-conformities"

(g) Please provide details about the procedures used to close any data gaps in accordance with Article 66 of the MRR.

The brief description should identify how data gaps will be closed by the use of an appropriate estimation method for determining conservative s... period and missing parameter.

This procedure is only mandatory where relevant data is missing, but it is recommended to establish such a procedure in any case to ensure compliance even when data gaps occur.

Title of procedure	

(i) Please provide the reference to the documented results of a risk assessment that demonstrates that the control activities and procedures are commensurate with the risks identified in accordance with Article 12(1)(b) of the MRR. (Note: The requirement to submit the risk assessment to the CA does not apply to installations with low emissions, in accordance with Article 47(2) of the MRR)

Please reference the file/document containing the risk assessment in the box below.

RoundRobin_RiskAss_version-3.xls

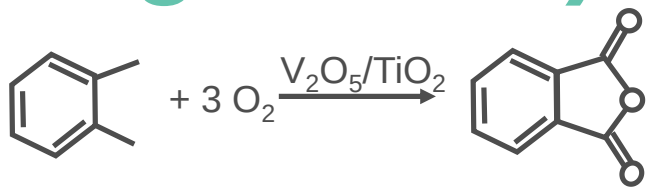
Further details and examples to be found in GD6 and GD6a.
⇨ see "Improvement Report Template" in the afternoon.

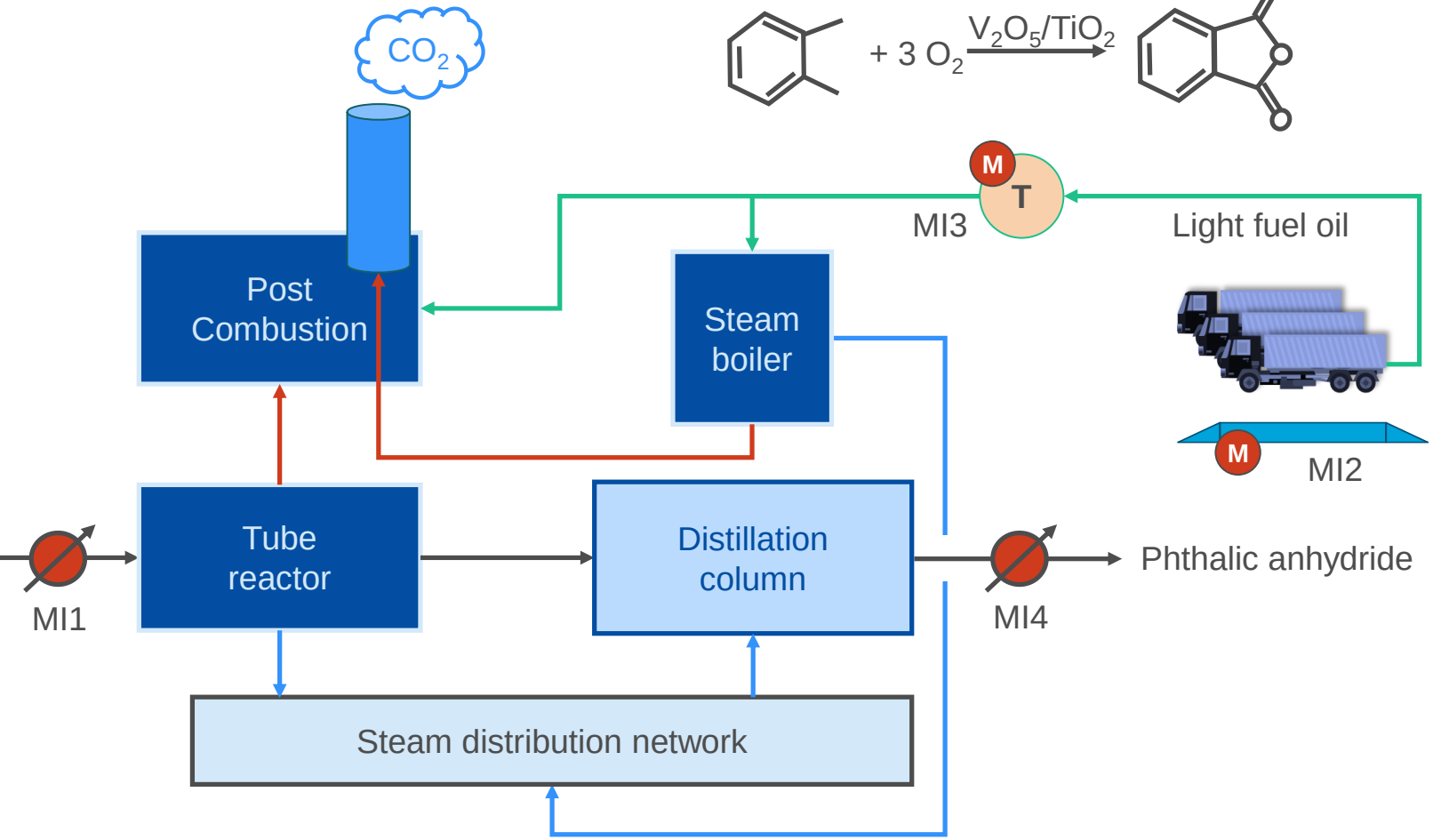
(j) Does your organisation have a documented environmental management system?

No.

Example installation – 2 (bulk org. chem.)

Category A installation producing phthalic anhydride





Name	t CO2e
Light fuel oil	4.400
o-Xylene	120.000
Phthalic anhydride	-93.500

Installation Description

(c) List of activities pursuant to Annex I of the EU ETS Directive carried out at the installation:

Please provide the following technical details for each activity pursuant to Annex I of the EU ETS Directive carried out at your installation.

Please also provide the capacity of each Annex I activity relevant at your installation.

Please note that 'capacity' in this context means:

- *Rated thermal input (for activities whose inclusion in the EU ETS depends on the 20MW threshold), which is the rate at which fuel can be burned at the maximum continuous rating of the installation multiplied by the calorific value of the fuel and expressed as megawatts thermal.*
- *Production capacity for those specified Annex I activities for which production capacity determines the inclusion in the EU ETS.*

Please make sure that the installation boundaries are correct and in line with Annex I of the EU ETS Directive. For further information please consult the relevant sections of the Commission's Guidance on Interpretation of Annex I. This document can be found under the following link:

http://ec.europa.eu/clima/policies/ets/docs/guidance_interpretation_en.pdf

The list entered here will be available as a drop-down list in the tables below where a reference to the activity is required for the installation description.

For showing/hiding examples, press the "Examples" button in the navigation area.

Activity Ref. (A1, A2_)	Annex I Activity	Total Activity Capacity	Capacity units	Rated thermal input in MW(th) (if capacity expressed in	GHG emitted
A1	Production of bulk chemicals	125	tonnes per day	5	CO2
A2					
A3					
A4					
A5					
A6					
A7					

(b) Emissions sources:

Annex I requires that monitoring plans include a description of the installation and activities to be carried out and monitored, including a list of emission sources and source streams. The information you provide in this template should relate to the Annex I activity(ies) comprised in the installation in question, and should relate to a single installation. Include in this section any activities carried out at your installation and exclude related activities carried out by other operators.

The activity reference in the last column relates to the activity reference in section 5(c) above. Where an emission source belongs to more than one activity, please enter "A1, A2" or "A1 - A3" or similar, as appropriate.

The list here will be available as a drop-down list at the following points below (c, d and e) where a reference to the relevant emission sources is needed.

For showing/hiding examples, press the "Examples" button in the navigation area.

Emission source ref. S1, S2,...	Emission source (name, description)	Activity Ref.
S1	Tube reactor	A1: Production of bulk
S2	Post combustion unit	A1: Production of bulk
S3	Steam boiler	A1: Production of bulk
S4		

(d) Estimated annual emissions:

Please enter here the average annual emissions of your installation. This information is required for categ average verified annual emissions of the previous trading period data OR if this data is not available, or is transferred CO2, but excluding CO2 from biomass.

The resulting category is used for identifying minimum tier requirements in section 8 (S

Estimated annual emissions	**30.900**	t CO2e
Installation category in accordance with Article 19	**A**	

Source Streams

(e) Relevant source streams:

relevant
Please enter data in this section

Please list here all source streams (fuels, materials, products,...) which are to be monitored at your installation using calculation based approaches (i.e. standard methodology or mass balance). For definition of the term "source stream" please see guidance document No. 1 ("General guidance for installations"). For definition of source streams for PFC, please see point 14(c) in sheet "I_PFC".

The source streams may be named like e.g. "natural gas", "heavy fuel oil", "cement raw meal",..

The source stream type is to be understood as a set of rules to be used according to the MRR. This classification is the basis for further obligations, e.g. tiers to be applied.

The drop-down list for selection of the Source stream type is based upon the activities selected in section 5(c) above. The entry there is required for determining the applicable minimum tier in sheet "E_SourceStreams".

For allowing the competent authority to fully understand the functioning of your installation, please select from the respective drop-down lists the Annex I activities, the emission sources and the emission points, which correspond which each source stream. If more than one activity or emission source in concerned, please enter e.g. "A1, A2".

For showing/hiding examples, press the "Examples" button in the navigation area.

Source Stream ref. F1, F2,...	Source stream Name	Source stream type	Activity Ref.	Emission source ref.	Emission point ref.
F1	Light fuel oil	Combustion: Commercial standard fuels	A1: Production of	S2, S3	EP1: Stack 1 (tube
F2	o-Xylene	Bulk organic chemicals: Mass balance methodology	A1: Production of	S1: Tube reactor	EP1: Stack 1 (tube
F3	Phthalic anhydride	Bulk organic chemicals: Mass balance methodology	A1: Production of	S1: Tube reactor	EP1: Stack 1 (tube
F4					

(f) Estimated emissions and source stream categories:

Please enter for each source stream (calculation-based method, including PFC) the estimated emissions, and select an appropriate source stream category.

Data for the source stream references and the source stream full name (source stream name and source stream type) will be taken from point (d) above automatically.

In case of source streams going out of a mass balance, the emissions must be entered as negative values.

Background: Pursuant to Article 19(3) you can categorise each source stream as "major", "minor" or "de-minimis".

- *"minor" source streams jointly correspond to less than 5 000 tonnes of fossil CO2 per year or to less than 10%, up to a total maximum contribution of 100 000 tonnes of fossil CO2 per year, whichever is the highest in terms of absolute value*
- *"de-minimis" source streams jointly correspond to less than 1 000 tonnes of fossil CO2 per year or to less than 2%, up to a total maximum contribution of 20 000 tonnes of fossil CO2 per year, whichever is the highest in terms of absolute value*
- *"major" source streams are all source streams not classified as "minor" or "de-minimis"*

For mass balance source streams the absolute values will be taken into account for the classification.

To help you selecting an appropriate category, the possible category will be displayed automatically for each source stream in the green field.

Please note that this automatic display only provides information about the possible category for each source stream as a stand-alone. If any of the thresholds explained above are exceeded, the possible categories will not change but an error message will occur. In that case please select at least a category one level higher.

After you have completed entering the estimated emissions for all source streams the sum will be compared to the total annual emissions entered under 5.d. above. If the sum of estimated emissions differs by more than 5% of total annual emissions an automatic error message will be displayed.

Source Stream ref. F1, F2,...	Source stream full name (name + type)	Estimated emissions (t CO2e / year)	Possible category	Selected category
F1	Light fuel oil; Combustion: Commercial standard fuels	4.400	Minor	Minor
F2	o-Xylene; Bulk organic chemicals: Mass balance methodology	120.000	Major	Major
F3	Phthalic anhydride; Bulk organic chemicals: Mass balance methodology	-93.500	Major	Major

Calculation Based Approach

(b) Specification and location of measurement systems for determining the activity data for source streams:

Ref	Type of measuring instrument	location (internal ID)	Measurement range			Specified uncertainty (+/-%)	Typical use range	
			unit	lower end	upper end		lower end	upper end
MI1	Coriolis meter	CM-1	kg/h	0	25.000	0,1	2.000	5.000
MI2	Weigh bridge	WB-1	kg	0 25.000	25.000 40.000	0,6 0,4	1.000	30.000
MI3	Oil level gauge	Oil tank	t	0	700	3	0	700
MI4	Big bag meter	BB-1	kg	0	1.500	0,4	500	700

(d) List of information sources for default values of calculation factors:

Please list all relevant information sources, from which you derive default values for calculation factors
These are usually static sources such as e.g. National Inventory, IPCC, MRR Annex VI, Handbook of
Only where the default values change on an annual basis, the operator shall specify the authoritative a

This list will be available as a drop-down in sheet E_SourceStreams (table (g) to reference the informa
For showing/hiding examples, press the "Examples" button in the navigation area.

Information Source Ref.	Description of Information source
IS1	Standard factors for commercial standard fuels (National GHG Inventory)
IS2	Analysis report example laboratory, No. 45672/2019
IS3	Monitoring and reporting regulation, Annex II

(e) Laboratories and methods used for analyses for calculation factors:

Please list the methods to be used for analysing fuels and materials for the determination of all calculation factors where applicable due to the selected tier. Where the laboratory is not accredited according to EN ISO/IEC 17025, you have to provide evidence that the laboratory is technically competent in accordance with Article 34. For this purpose please provide reference to an attached document.

Where online gas chromatographs or extractive or non-extractive gas analysers are used, the requirements of Article 32 shall be met.

This list will be available as a drop-down in sheet E_SourceStreams (table (g)) to reference the analytical methods to the relevant calculation factors of each source stream.

For showing/hiding examples, press the "Examples" button in the navigation area.

Lab Ref	Name of laboratory	Parameter	Method of analysis (include procedure reference and brief description of method)	Is lab EN ISO/IEC 17025 accredited for this analysis?	If no, reference the evidence to be submitted
L1	Example lab	C-Content	DIN ISO10694	WAHR	

Source Streams

E. Source streams	Navigation area:	Table of contents	Previous sheet
	Top of sheet	1	2
	End of sheet	4	5

F1 Source Stream 1: Light fuel oil

Source stream type:	Combustion: Commercial standard fuels
Method applicable according to MRR:	Standard method: Fuel, Article 24(1)
Parameter to which uncertainty applies:	Amount of fuel [t] or [Nm3]

(b) Measurement instruments used: MI2: Weigh | MI3: Oil level

Please select here one or more from the instruments which you have defined in section 7(b).

If more than 5 measurement instruments are used for this source stream, e.g. if the p/T compensation is done using separate ins description.

Comment / Description of approach, if several instruments used:

Please explain why and how more than one instrument are relevant, if applicable. E.g it may be the case that one instrument is n Weighing instruments might be used alternatively, or for corroboration purposes, etc.

Delivered quantities are determined using MI2, stock changes are determined using MI3.

(c) Activity data tier level required:	2	Uncertainty shall not be more than ± 5,0%	
(d) Activity data tier used:	2	Uncertainty shall not be more than ± 5,0%	
(e) Uncertainty achieved:	3,17%	**Comment:**	Uncertainty tool 1

(f) Applied tiers for calculation factors:

	calculation factor	required tier	applied tier	full text for applied tier
i.	Net calorific value (NCV)	2a/2b	2a	Type II default values
ii.	Emission factor (preliminary)	2a/2b	2a	Type II default values
iii.	Oxidation factor	1	1	Default value OF=1
iv.	Conversion factor	n.a.		
v.	Carbon content	n.a.		
vi.	Biomass fraction (if applicable)	1	n.a.	

Depending on the tier selected (default values or laboratory analysis), you are required to enter the following information for each ca

Where a default value is used, please enter the value, the unit and the literature source by reference to table 7(d) on the previous sh time of notification of the monitoring plan.

Where a laboratory analysis is required, please enter analytical method/laboratory by reference to table 7(e) on the previous sheet, a frequency to be applied.

(g) Details for calculation factors:

	calculation factor	applied tier	default value	Unit	source ref
i.	Net calorific value (NCV)	2a	41,7	GJ/t	IS1: Standard
ii.	Emission factor (preliminary)	2a	78	tCO2/TJ	IS1: Standard
iii.	Oxidation factor	1	100	%	IS3:
iv.	Conversion factor				

F2 Source Stream 2: o-Xylene — **Major**

Source stream type:	Bulk organic chemicals: Mass balance methodology
Method applicable according to MRR:	Mass balance method, Article 25
Parameter to which uncertainty applies:	Each input and output material [t]

(b) Measurement instruments used: MI1: Coriolis

Comment / Description of approach, if several instruments used:

Enter tier actually applied, not the required tier

(c) Activity data tier level required:	1	Unc…inty shall not be more than ± 7,5%	
(d) Activity data tier used:	4	Uncertainty shall not be more than ± 1,5%	
(e) Uncertainty achieved:	0,10%	**Comment:**	MPES of MI1

Calculation factors:

(f) Applied tiers for calculation factors:

Tier achievable? Pure substance?

	calculation factor	required tier	applied tier	fu…
i.	Net calorific value (NCV)		No tier	
ii.	Emission factor (preliminary)	n.a.		
iii.	Oxidation factor	n.a.		
iv.	Conversion factor	n.a.		
v.	Carbon content	2a/2b	3	Laboratory analyses
vi.	Biomass fraction (if applicable)	1	n.a.	

(g) Details for calculation factors:

	calculation factor	applied tier	default value	Unit	source ref	analysis ref	sampling ref	Analysis frequency
i.	Net calorific value (NCV)	No tier	39,87	GJ/t	IS2: Analysis			
ii.	Emission factor (preliminary)							
iii.	Oxidation factor							
iv.	Conversion factor							
v.	Carbon content	3				L1: Example	Sampling plan	Monthly

European Commission

Source Streams

F3 Source Stream 3:	Phthalic anhydride	Major
Source stream type:	Bulk organic chemicals: Mass balance methodology	
Method applicable according to MRR:	Mass balance method, Article 25	
Parameter to which uncertainty applies:	Each input and output material [t]	

i. Determination method: Batch

Reference to procedure used for determining stock piles at end of year: Procedure annual inventory V

ii. Instrument under control of: Operator

a. Please confirm that the conditions of Article 29(1) are satisfied:

b. Do you use invoices for determining the amount of this fuel or material?

c. Please confirm that the trade partner and the operator are independent:

(b) Measurement instruments used: MI4: Big bag

Comment / Description of approach, if several instruments used:

(c) Activity data tier level required:	1	Uncertainty shall not be more than ± 7,5%	
(d) Activity data tier used:	1	Uncertainty shall not be more than ± 7,5%	
(e) Uncertainty achieved:	0,40%	**Comment:**	MPES of MI4

Calculation factors:

(f) Applied tiers for calculation factors:

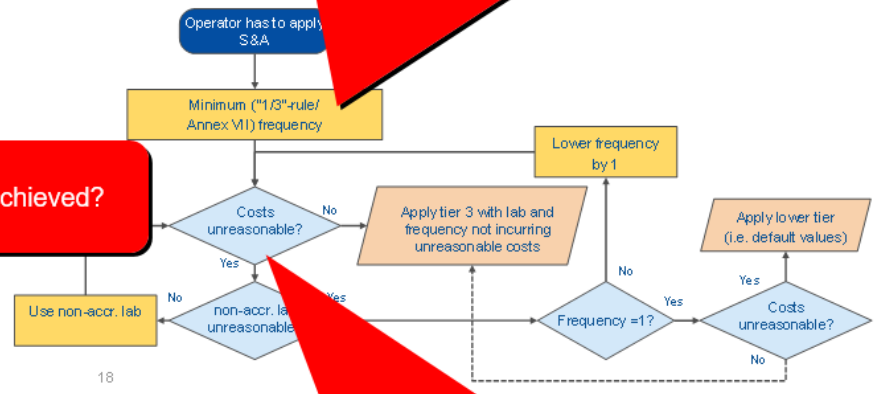
	calculation factor	required tier	applied tier	full text for applied tier
i.	Net calorific value (NCV)		No tier	
ii.	Emission factor (preliminary)	n.a.		
iii.	Oxidation factor	n.a.		
iv.	Conversion factor	n.a.		
v.	Carbon content	2a/2b	3	Laboratory analyses
vi.	Biomass fraction (if applicable)	1	n.a.	

(g) Details for calculation factors:

	calculation factor	applied tier	default value	Unit	source ref	analysis ref	sampling ref	Analysis frequency
i.	Net calorific value (NCV)	No tier	21,6	GJ/t	IS2: Analysis			
ii.	Emission factor (preliminary)							
iii.	Oxidation factor							
iv.	Conversion factor							
v.	Carbon content	3				L1: Example	Sampling plan	Monthly
vi.	Biomass fraction (if applicable)							

What if the required tier cannot be achieved?

Further details and examples to be found in:
GD5 and GD5a, Training Event on Sampling
⇨ see "Tool for frequency of analysis" in the afternoon

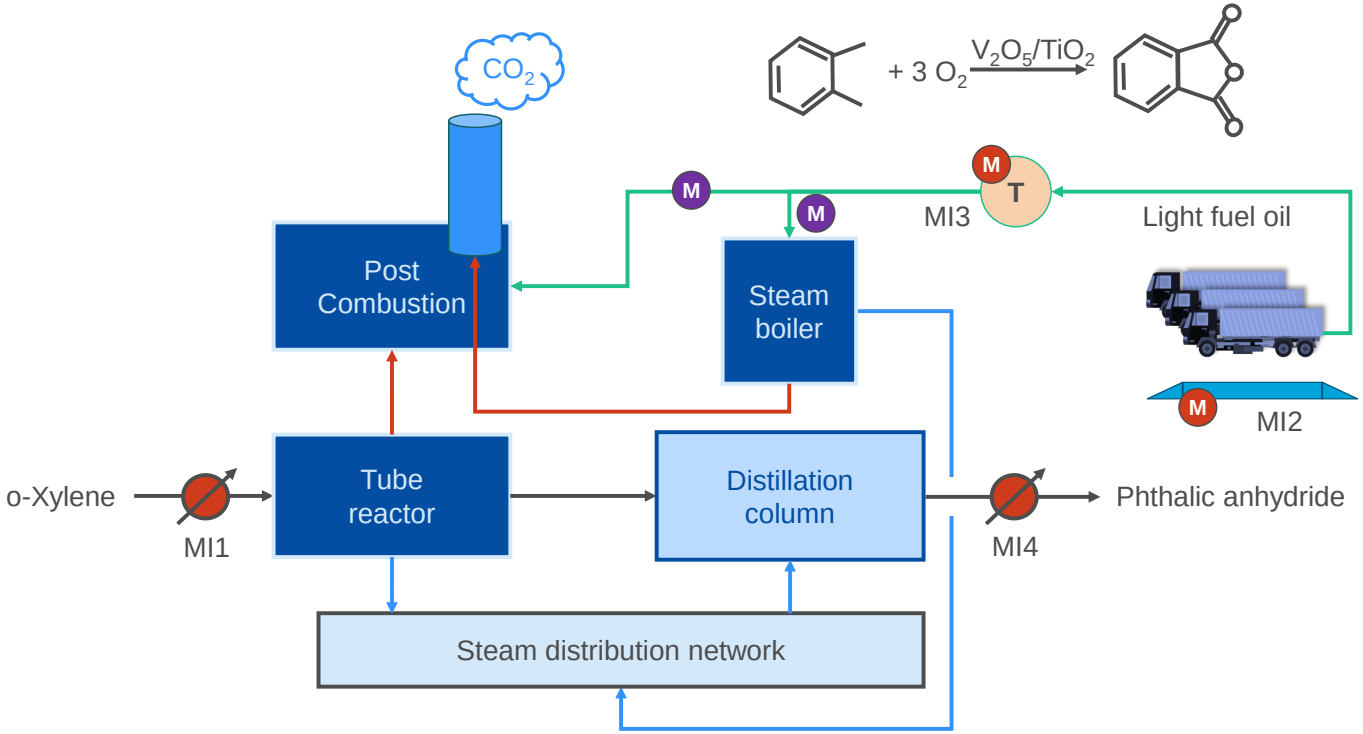


⇨ see "Tool for unreasonable costs" in the afternoon

Further details and examples to be found in:
GD5 and GD5a, Training Event on Sampling
⇨ see "Tool for frequency of analysis" in the afternoon

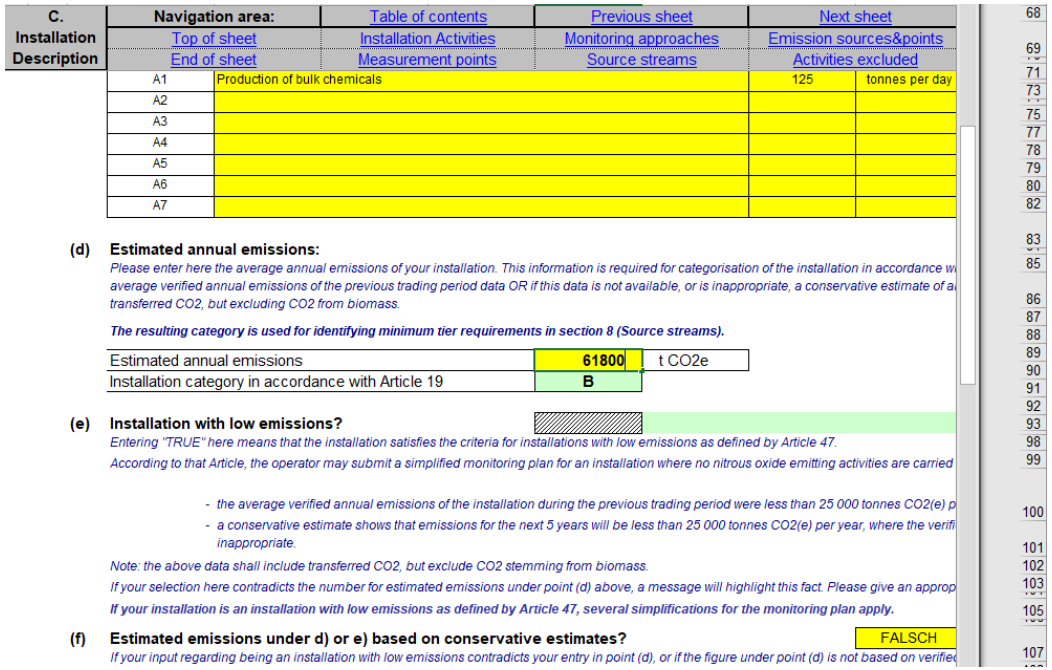
What if…

- …the installation were category B (or LFO major, minor, de-minimis)?
- …flow meters were installed for light fuel oil?



Model answer

- What if the installation were category B (or LFO major, minor, de-minimis)?
  - Installation has to comply with higher tiers unless unreasonable costs or technical infeasiblity can be demonstrated



C. Installation Description

Navigation area:	Table of contents	Previous sheet	Next sheet
Top of sheet	Installation Activities	Monitoring approaches	Emission sources&points
End of sheet	Measurement points	Source streams	Activities excluded

A1	Production of bulk chemicals	125	tonnes per day
A2			
A3			
A4			
A5			
A6			
A7			

(d) Estimated annual emissions:

Please enter here the average annual emissions of your installation. This information is required for categorisation of the installation in accordance w
average verified annual emissions of the previous trading period data OR if this data is not available, or is inappropriate, a conservative estimate of a
transferred CO2, but excluding CO2 from biomass.

The resulting category is used for identifying minimum tier requirements in section 8 (Source streams).

Estimated annual emissions	61800	t CO2e
Installation category in accordance with Article 19	B	

(e) Installation with low emissions?

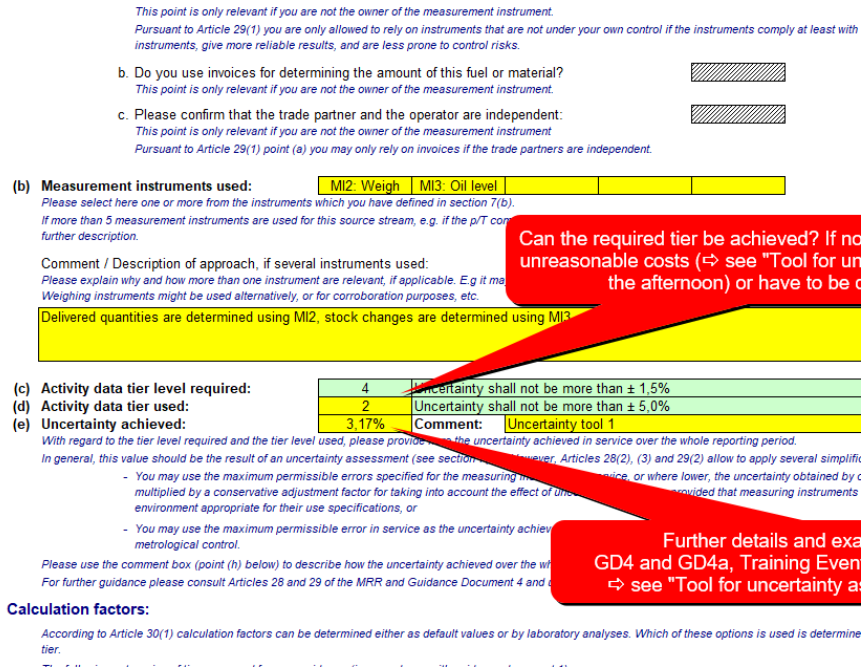
Entering "TRUE" here means that the installation satisfies the criteria for installations with low emissions as defined by Article 47.
According to that Article, the operator may submit a simplified monitoring plan for an installation where no nitrous oxide emitting activities are carried

- *the average verified annual emissions of the installation during the previous trading period were less than 25 000 tonnes CO2(e) p*
- *a conservative estimate shows that emissions for the next 5 years will be less than 25 000 tonnes CO2(e) per year, where the verifi inappropriate.*

Note: the above data shall include transferred CO2, but exclude CO2 stemming from biomass.
If your selection here contradicts the number for estimated emissions under point (d) above, a message will highlight this fact. Please give an approp
If your installation is an installation with low emissions as defined by Article 47, several simplifications for the monitoring plan apply.

(f) Estimated emissions under d) or e) based on conservative estimates? FALSCH

If your input regarding being an installation with low emissions contradicts your entry in point (d), or if the figure under point (d) is not based on verifie



This point is only relevant if you are not the owner of the measurement instrument.
Pursuant to Article 29(1) you are only allowed to rely on instruments that are not under your own control if the instruments comply at least with instruments, give more reliable results, and are less prone to control risks.

b. Do you use invoices for determining the amount of this fuel or material?
This point is only relevant if you are not the owner of the measurement instrument.

c. Please confirm that the trade partner and the operator are independent:
This point is only relevant if you are not the owner of the measurement instrument
Pursuant to Article 29(1) point (a) you may only rely on invoices if the trade partners are independent.

(b) Measurement instruments used: MI2: Weigh | MI3: Oil level

Please select here one or more from the instruments which you have defined in section 7(b).
If more than 5 measurement instruments are used for this source stream, e.g. if the p/T cor
further description.

Comment / Description of approach, if several instruments used:
Please explain why and how more than one instrument are relevant, if applicable. E.g it ma
Weighing instruments might be used alternatively, or for corroboration purposes, etc.

Delivered quantities are determined using MI2, stock changes are determined using MI3

(c) Activity data tier level required: 4 | Uncertainty shall not be more than ± 1,5%
(d) Activity data tier used: 2 | Uncertainty shall not be more than ± 5,0%
(e) Uncertainty achieved: 3,17% | **Comment:** Uncertainty tool 1

With regard to the tier level required and the tier level used, please provide [illegible] the uncertainty achieved in service over the whole reporting period.
In general, this value should be the result of an uncertainty assessment (see section [illegible]. However, Articles 28(2), (3) and 29(2) allow to apply several simplifi

- *You may use the maximum permissible errors specified for the measuring [illegible] device, or where lower, the uncertainty obtained by c multiplied by a conservative adjustment factor for taking into account the effect of [illegible] provided that measuring instruments environment appropriate for their use specifications, or*
- *You may use the maximum permissible error in service as the uncertainty achiev metrological control.*

Please use the comment box (point (h) below) to describe how the uncertainty achieved over the wh
For further guidance please consult Articles 28 and 29 of the MRR and Guidance Document 4 and

Can the required tier be achieved? If no unreasonable costs (⇨ see "Tool for un the afternoon) or have to be c

Further details and exa GD4 and GD4a, Training Even ⇨ see "Tool for uncertainty as

Calculation factors:

According to Article 30(1) calculation factors can be determined either as default values or by laboratory analyses. Which of these options is used is determine tier.

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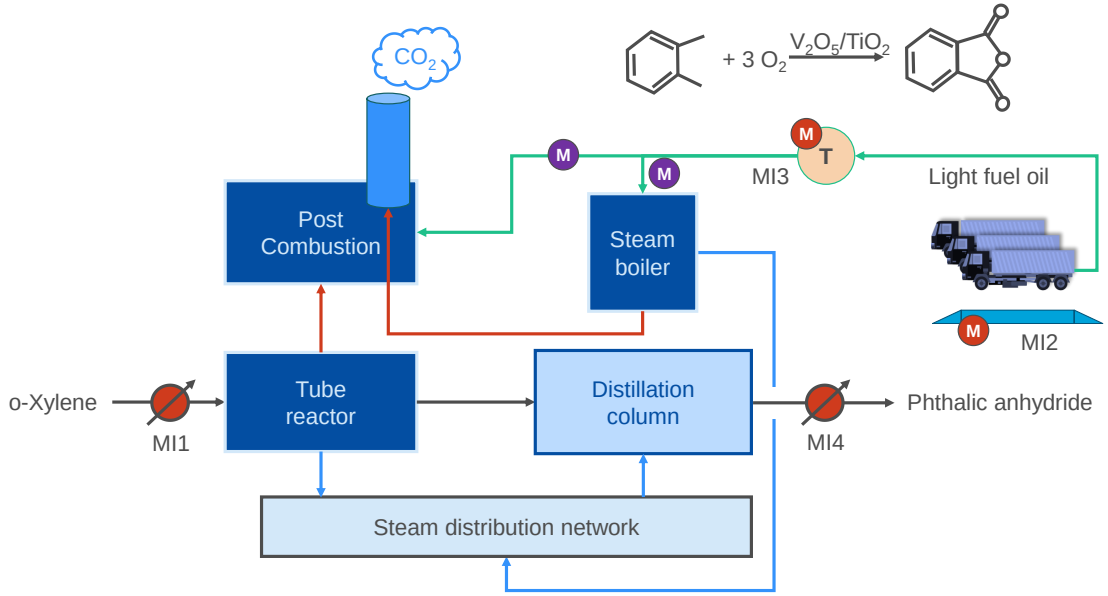
Model answer

- What if flow meters were installed for light fuel oil?
  - Operator should evaluate whether this alternative allows to comply with higher tiers (→ see “uncertainty assessment” in the afternoon session)
  - Even if this alternative only serves plausibility checking, it helps to lower the risk for misstatements (→ see “risk assessment” in the afternoon session)



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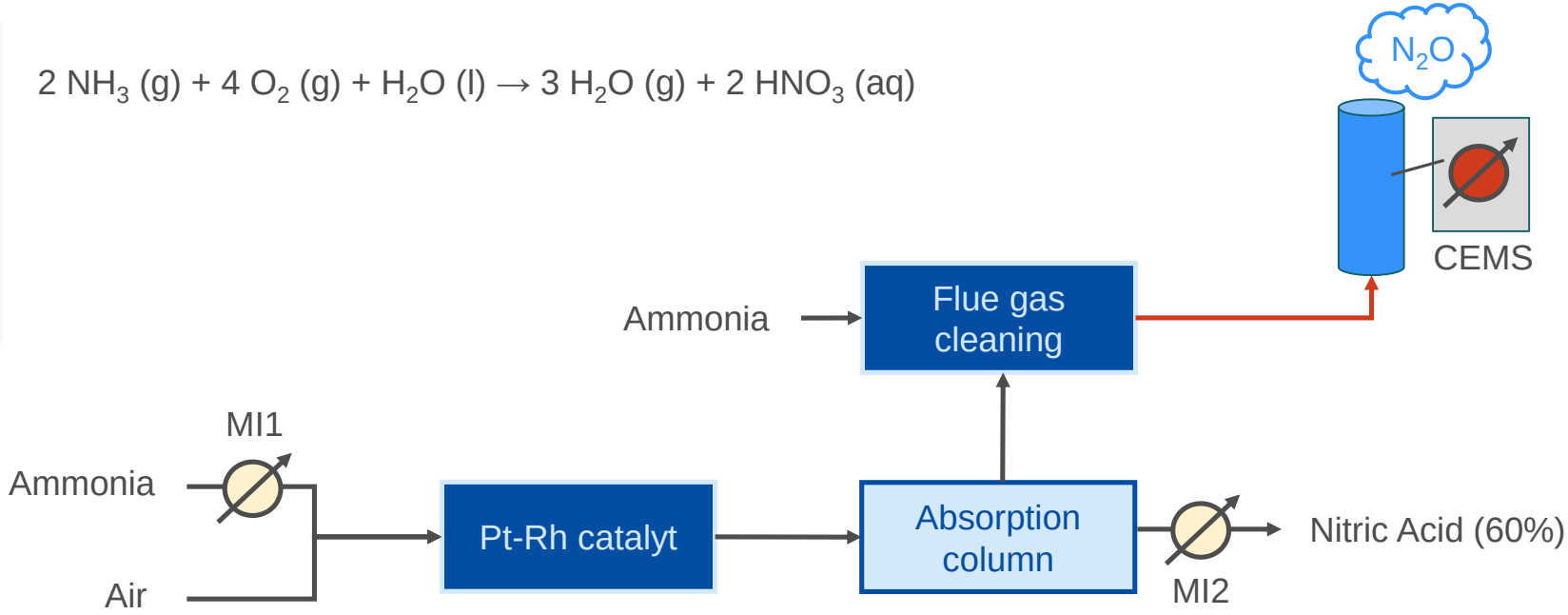
Example installation – 3 (nitric acid)

Category B installation producing nitric acid

Name	t CO2e
N2O (CEMS)	52.000

$2\ NH_3\ (g) + 4\ O_2\ (g) + H_2O\ (l) \rightarrow 3\ H_2O\ (g) + 2\ HNO_3\ (aq)$



Nitric acid

- **4 NH_3 (g) + 5 O_2 (g) → 4 NO (g) + 6 H_2O (g)**
  - Side reaction: 4 NH_3 (g) + 4 O_2 (g) → 2 **N_2O** (g) + 6 H_2O (g)
- 2 NO (g) + O_2 (g) → 2 NO_2 (g)
- 4 NO_2 (g) + O_2 (g) + 2 H_2O (l) → 4 HNO_3 (aq)
- Overall reaction is strongly exothermic ($\Delta H = -740.6$ kJ/mol)

List of Annex I activities

(c) List of activities pursuant to Annex I of the EU ETS Directive carried out at the installation:

Please provide the following technical details for each activity pursuant to Annex I of the EU ETS Directive carried out at your installation.

Please also provide the capacity of each Annex I activity relevant at your installation.

Please note that 'capacity' in this context means:

- *Rated thermal input (for activities whose inclusion in the EU ETS depends on the 20MW threshold), which is the rate at which fuel can be burned at the maximum continuous rating of the installation multiplied by the calorific value of the fuel and expressed as megawatts thermal.*
- *...ermines the inclusion in the EU ETS.*

Please make sure ... For further information please ...
Guidance on Inte...
http://ec.europa...
The list entered h... is required for the installation ...
For showing/hiding examples, pr... button in the navigation area.

see "Guidance on Interpretation of Annex I of the EU ETS Directive" https://ec.europa.eu/clima/sites/clima/files/ets/docs/guidance_interpretation_en.pdf

New as of phase 4. Only relevant if not included in capacity

Activity Ref. (A1, A2...)	Annex I Activity	Total Activity Capacity	Capacity units	Rated thermal input in MW(th) (if capacity expressed in tonnes)	GHG emitted
A01	*Production of cement clinker*	*1500*	*tonnes per day*	*230*	*CO2*
A02	*Combustion of fuels*	*120*	*MW(th)*	*120*	*CO2*
A1	Production of nitric acid	550000	t HNO3 (100%) per year	-	CO2 & N2O
A2					

Measurement based approach

F. Measurement Based Approaches — relevant

Please enter data in this section

9 Measurement of CO2 and N2O emissions

Note: This section is to be completed for continuous measurement of CO2 emissions as well as N2O emissions.
Furthermore some of the information required for the monitoring of transferred CO2 and N2O, as well as inherent CO2 is to be reported here.

(a) Description of the measurement based approach

Please provide a concise description of the measurement approach used to determine your annual CO2 or N2O emissions in the text box below. If N2O is measured, include the approach for converting these emissions into CO2(e) data.

Your description should include the type of instrument(s) used, whether measurements are carried out under wet or dry conditions; the formulae for applying correction factors (p, T, O2 and H2O). Where EN 14181 is applied, the calibration factors required for QAL2 procedures should be given. If flue gas volume i… method for determination of the flue gas volume.

Please describe how annual emissions are determined based on concentration and flue gas flow data, taking into account the freque… gas flow. Include also how data is substituted where no valid hour of data can be determined.

If applicable, please describe also the methodology by which emissions from biomass are determined (using a calculation approach)…

This description should provide the linking information which is needed to understand, how the information given in other parts of this template are us… …ating the emissions. It may be as short as the given example in sheet D_CalculationBasedApproaches, section 7(a).

QAL1,2,3 EN 14181 (concentration), EN 15259 (reference) and EN ISO 16911-2 (flow) to be applied. Further details and examples to be found in GD7.

	QAL1	QAL2	QAL3	AST
When?	Before installation of the CEMS	Installation and calibration	During operation	Starting one year after QAL2
Frequency	Once	At least every five years	Continuously	Annually
Who?	Operator	Accredited laboratory	Operator	Accredited laboratory
Relevant standards	EN 14181, EN ISO 14956, EN 15267-3	EN 14181, EN 15259	EN 14181	EN 14181, EN 15259

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Measurement systems

(c) Specification and location of measurement systems for measurement points:

Please describe the specification and location of the measurement systems to be used for each emission source where emissions are determined by measurement, and for measurement points for transfer of CO2.

Include also instruments for auxiliary parameters, such as e.g. O2 content and moisture, and in case of indirect measurements, also concentration measurement instruments for other constituents of the gas than CO2.

Under "Location" you should specify where the meter is found in the installation, and how it is identified in the process flow chart.

All instruments used must be clearly identifiable using a unique ID (such as the serial number of the instrument). However, exchange of instruments (e.g. necessary as consequence of a damage) will not constitute a significant change of the monitoring plan within the meaning of Article 15(3). The unique identification should therefore be documented separately from the monitoring plan. Please make sure that you establish an appropriate written procedure for this purpose.

For each measuring instrument please enter the specified uncertainty, including the range this uncertainty is related to, as given in the manufacturer's specification. In some cases an uncertainty may be specified for two different ranges. In that case please enter both of them.

The typical use range refers to the range the relevant measuring instrument is usually used in your installation.

"Type of measuring instrument": Please select the appropriate type from the drop-down list, or enter a more appropriate type.

The list of instruments entered here will be available as a drop-down list for each emission source in section 10 below, where the relevant measuring ins
referenced.

In case of gas flow meters please refer to Nm³/h if the p/T compensation is implemented into the instrument and relate to m³ in operating state if the p/T
separate instrument. In the latter case please also list those separate instruments.

The measurement frequency should indicate the frequency of data points produced by the instrument before the data is aggregated to give hourly aver

Separate measurements for concentration and flow. Often two or more CEMS are used to cover different ranges (e.g. abated and unabated operation mode)

Ref	Type of measuring instrument	location (internal ID)	Measurement range			Specified uncertainty (+/-%)	Typical use range		...asurement frequency
			unit	lower end	upper end		lower end	upper end	
MM1	N2O concentration (IR)	IR 1	ppm	0	497	0,6	10	60	0,5 per second
MM2	Flue gas flow meter	GFM 1	Nm3/h	0	101278	0,3	65.000	80.000	1 per second
MM3									

Measurement points

M1 Measurement Point 1:	continuous N2O concentration measurement and continuous	N2O
(a) Operation type:	Typical and non-typical operation	Major

Please select here if this measurement point is an emission/measurement point during typical operation or non-typical operation (during restrictive and transition phases, including breakdown periods or commissioning phases).

The information in the green fields is taken automatically from point 6(d) in sheet C_InstallationDescription.

Automatic guidance on applicable tiers:

Below in the green fields the required tiers for measurement based approaches are displayed based on your inputs in sections 5(d), and 6(d). Those are the minimum tiers for major emission sources. However, lower requirements may be allowed. An appropriate guidance will be displayed in the green text box below, depending on the following points:

- *Reduced requirements apply to emission sources which emit less than 5 000 tonnes of CO2(e) per year, or which contributes less than 10% of the total annual emissions of the installation, whichever is higher pursuant to Article 41(1).*

Major emission source: The minimum tier displayed below shall apply.
However, you may apply a tier one level lower, with a minimum of tier 1, where you can show to the satisfaction of the competent authority that the tier required in accordance with the first subparagraph is technically not feasible or incurs unreasonable costs.

Instruments and tier levels:

(b) Measurement instruments used:	MM1: N2O	MM2: Flue gas			

Please select here one or more from the instruments which you have defined in section 9(c) above.

If more than 5 measurement instruments are used for this measurement point, please use the comment box below for further explanation.

Comment / Description of approach, if several instruments used:

(c) Tier level required:	3	Uncertainty shall not be more than ± 5,0%
(d) Tier used:	3	Uncertainty shall not be more than ± 5,0%
(e) Uncertainty achieved:	3,60%	**Comment:**

With regard to the tier level required and the tier level used, please provide here the overall [illegible] achieved for over the whole reporting period.

In general, this value should be the result of an uncertainty assessment (see section 7(c)).

Please use the comment box (point (h) below) to describe how the uncertainty achieved over the whole period is determined.

Uncertainty obtained by QAL2 (incl. flue gas flow) to be compared to tier requirements in the Regulation

$$u_{av\ hour\ emissions} = \sqrt{u_{GHG\ concentration}^{2} + u_{flue\ gas\ flow}^{2}}$$

Standards and procedures:

(f) Applied standards and of any deviations from those standards

Please use references to table 9(e) above as appropriate.

EN 14181, EN ISO 16911-2, EN 15259

Procedures for N_2O monitoring

H. N2O emissions — relevant

Please enter data in this section

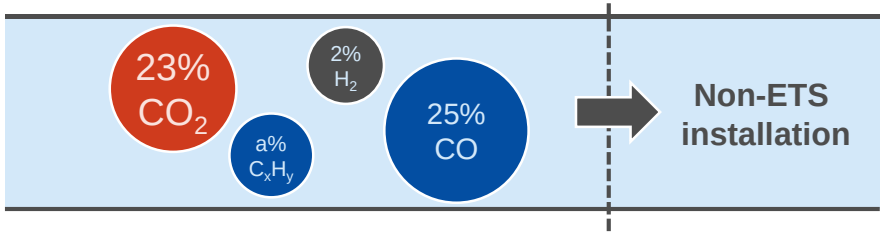
13 Management and procedures for monitoring N2O emissions

Note: this section is to be completed for determination of N2O emissions from specified production activities at an installation. N2O emissions from combustion of fuels are not covered. Please make sure that the information on your measurement system is entered in sheet F_MeasurementBasedApproaches as appropriate.

In this sheet only requirements are to be laid down which are not relevant to CO2 monitoring.

(a) Please provide details about the written procedure which describes the method and parameters used to determine the quantity of materials

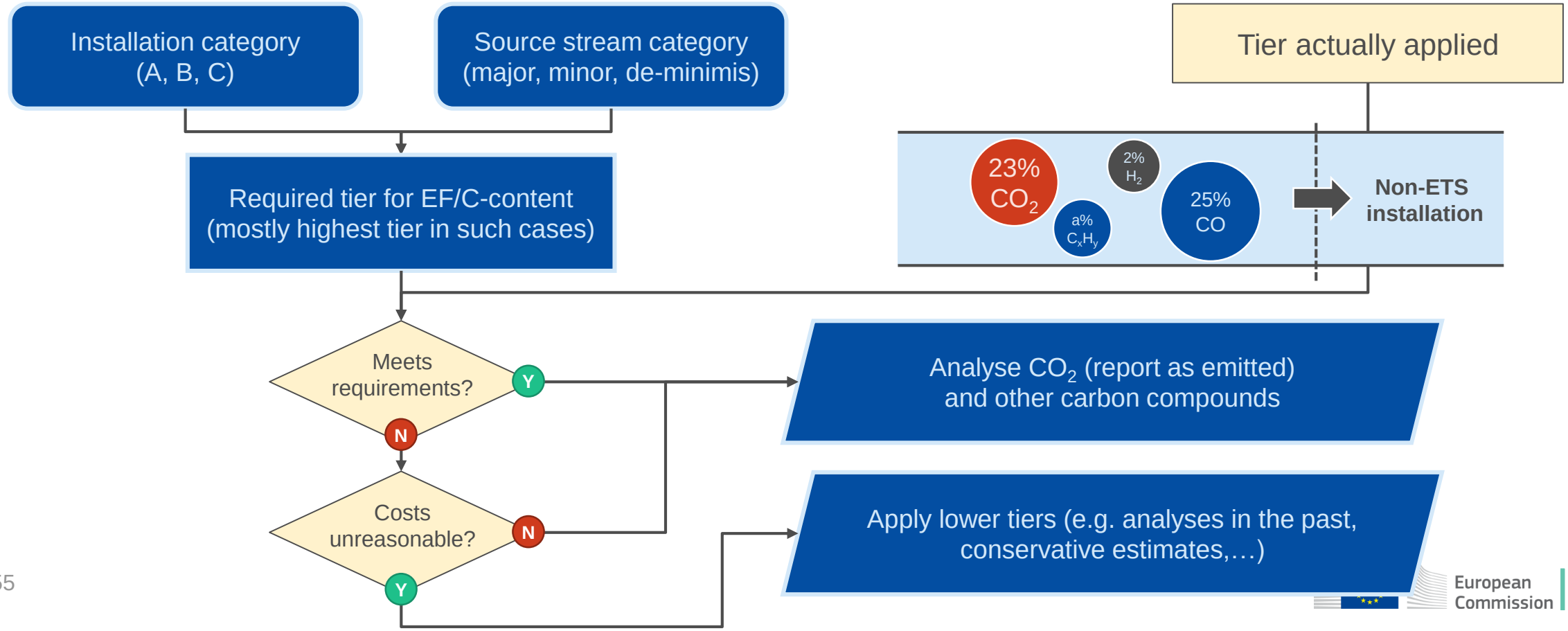
Questions



- An integrated iron&steel plant exports waste gases (e.g. blast furnace gas) to an installation not covered by the EU ETS. How are emissions to be reported?
- The uncertainty of the determination of the activity level of a source stream changes (e.g. after calibration, changes in consumption levels). Under which circumstances should this be reported to the CA? Should MP be updated?
- Are all combustion units to be listed in section C.5.c of the MP as activity "*combustion of fuel*" even if combined those units are below 20MW thresholds or rather those units should be reported as a source stream under other specific activities such as "*production of cement clinker*" or any others as all activities allow to add combustion source streams?

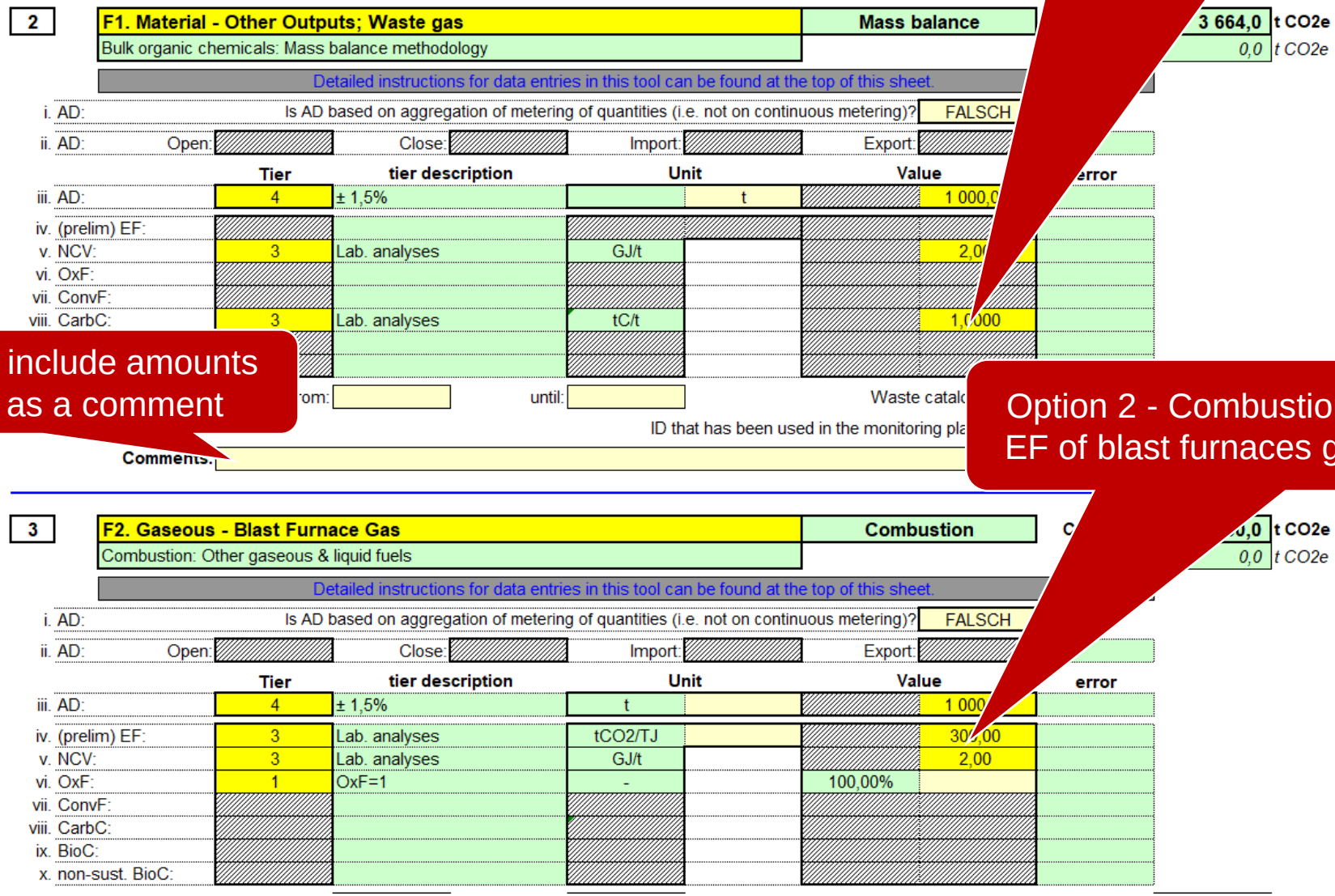
Model answers

Art. 48(2): inherent CO_2 exported to non-ETS to be reported as emitted by the producing installation



Model answer

Option 1 - Mass Balance: include all carbon other than CO_2 in CarbC



2	F1. Material - Other Outputs; Waste gas	Mass balance	3 664,0 t CO2e
	Bulk organic chemicals: Mass balance methodology		0,0 t CO2e

Detailed instructions for data entries in this tool can be found at the top of this sheet.

i. AD: Is AD based on aggregation of metering of quantities (i.e. not on continuous metering)? FALSCH

ii. AD: Open: Close: Import: Export:

	Tier	tier description	Unit		Value	error
iii. AD:	4	± 1,5%		t	1 000,0	
iv. (prelim) EF:						
v. NCV:	3	Lab. analyses	GJ/t		2,0	
vi. OxF:						
vii. ConvF:						
viii. CarbC:	3	Lab. analyses	tC/t		1,0000	

rom: until: Waste catalo

ID that has been used in the monitoring pla

Comments:

The operator may include amounts of inherent CO_2 as a comment

Option 2 - Combustion: include all CO_2 in the EF of blast furnaces gases combusted onsite

3	F2. Gaseous - Blast Furnace Gas	Combustion	C	0,0 t CO2e
	Combustion: Other gaseous & liquid fuels			0,0 t CO2e

Detailed instructions for data entries in this tool can be found at the top of this sheet.

i. AD: Is AD based on aggregation of metering of quantities (i.e. not on continuous metering)? FALSCH

ii. AD: Open: Close: Import: Export:

	Tier	tier description	Unit		Value	error
iii. AD:	4	± 1,5%	t		1 000	
iv. (prelim) EF:	3	Lab. analyses	tCO2/TJ		30[illegible],00	
v. NCV:	3	Lab. analyses	GJ/t		2,00	
vi. OxF:	1	OxF=1	-		100,00%	
vii. ConvF:						
viii. CarbC:						
ix. BioC:						
x. non-sust. BioC:						

Model answer

- The uncertainty of the determination of the activity level of a source stream changes (e.g. after calibration, changes in consumption levels). Under which circumstances should this be reported to the CA? Should MP be updated?
    - Update of MP only necessary if applied tier changes, otherwise no need to report anything.

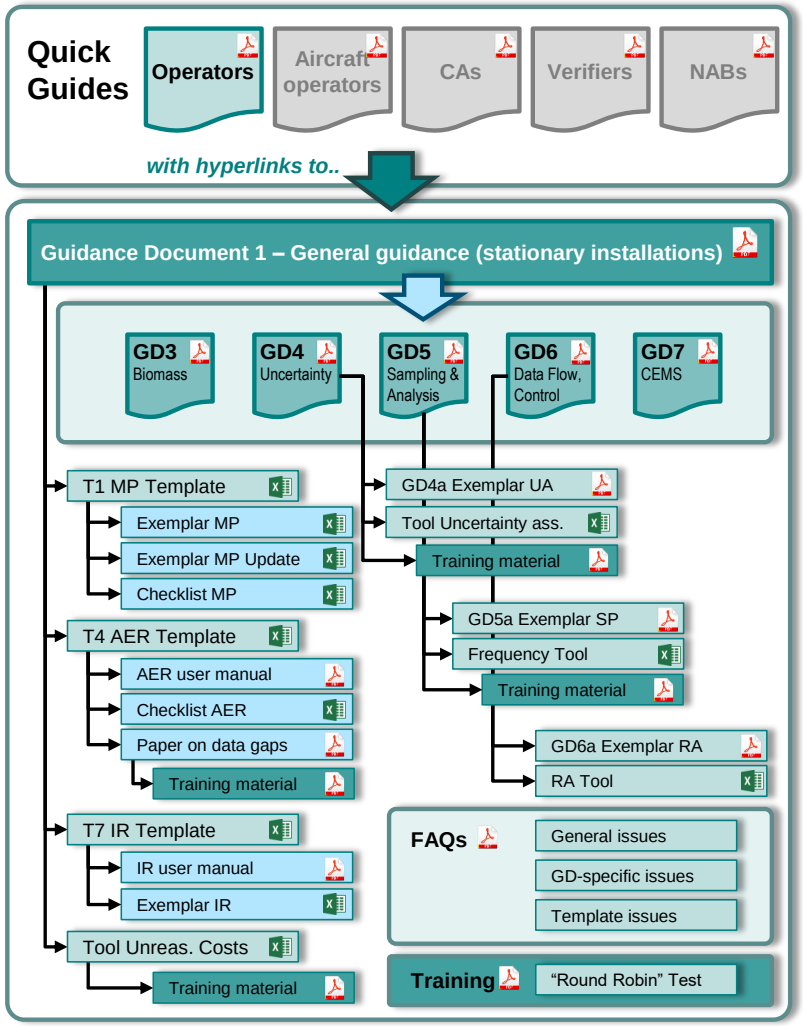
Model answer

Activity Ref. (A1, A2…)	Annex I Activity	Total Activity Capacity	Capacity units	Rated thermal input in MW(th) (if capacity expressed in tonnes)	GHG emitted
A01	*Production of cement clinker*	*1500*	*tonnes per day*	*230*	*CO2*
A02	*Combustion of fuels*	*120*	*MW(th)*	*120*	*CO2*
A1					
A2					
A3					
A4					
A5					
A6					
A7					

- Are all combustion units to be listed in section C.5.c of the MP as activity "*combustion of fuel*" even if combined those units are below 20MW thresholds or rather those units should be reported as a source streams under other specific activities such as "*production of cement clinker*" or any others as all activities allows to add combustion source streams?
  - Annex I Directive, clause 4: If a unit serves an activity for which the threshold is not expressed as total rated thermal input, the threshold of this activity shall take precedence for the decision about the inclusion in the EU ETS
  - Annex I Directive, clause 5: "When the capacity threshold of any activity in this Annex is… exceeded…all units in which fuels are combusted, other than units for the incineration of hazardous or municipal waste, shall be included…"
  - See Guidance on interpretation of Annex I https://ec.europa.eu/clima/sites/clima/files/ets/docs/guidance_interpretation_en.pdf

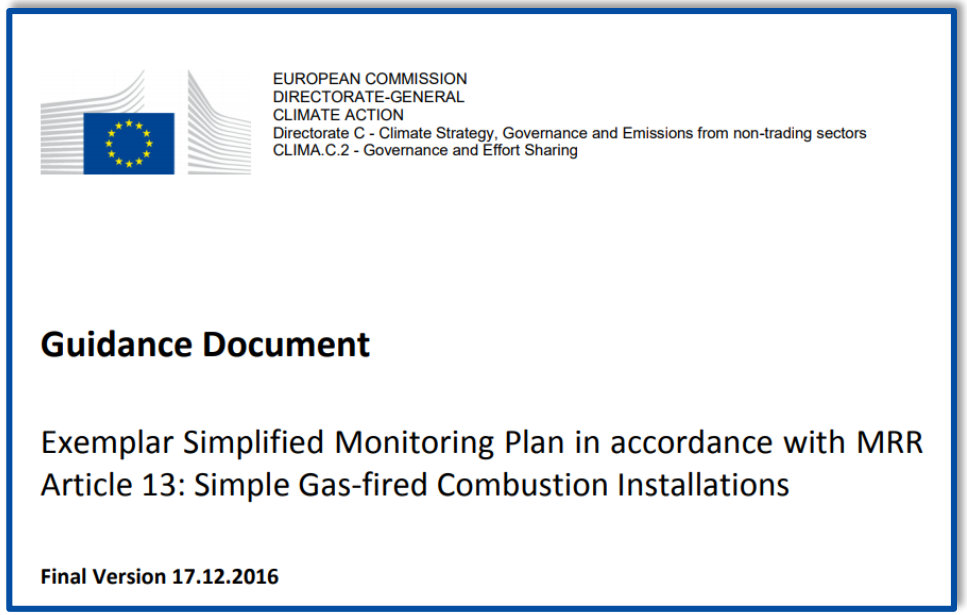
Useful sources of guidance

- **Uncertainty assessment**
  - GD4, GD4a, Training Events on Uncertainty assessment
  - Tool for “uncertainty assessment” → see in the afternoon
- **Unreasonable costs**
  - GD1, Training Events on Uncertainty assessment
  - Tool for “unreasonable costs” → see in the afternoon
- **Sampling and analysis**
  - GD5, GD5a, Training Events on Sampling
  - Tool for “Frequency of analysis” → see in the afternoon
- **Risk assessment**
  - GD6, GD6a, Training Events on Uncertainty assessment
  - Tool for “risk assessment” → see in the afternoon
- **Biomass issues:** see (forthcoming update of) GD3
- **Continuous emissions monitoring systems (CEMS):** see GD7



Useful sources of guidance

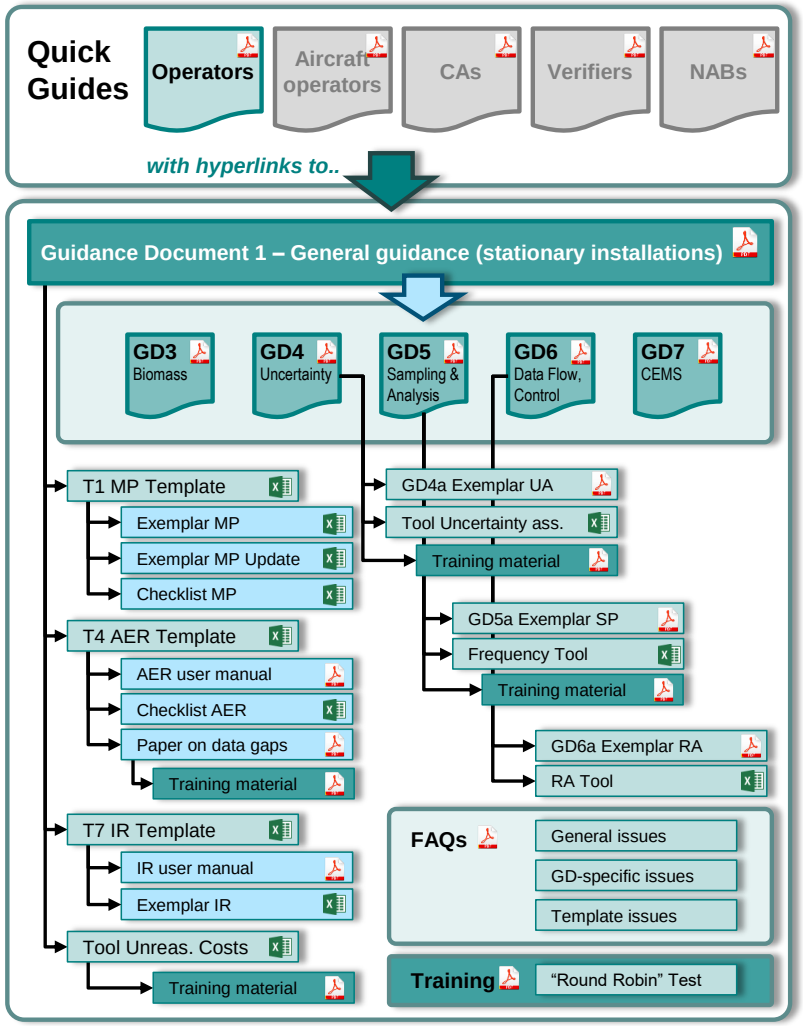
- **Exemplar MP**
- The **“Round Robin test”** MP file and Training event
  https://ec.europa.eu/clima/sites/clima/files/ets/monitoring/docs/training_round_robin_test_en.pdf
- **Exemplar simplified MP** (Art. 13)


EUROPEAN COMMISSION
DIRECTORATE-GENERAL
CLIMATE ACTION
Directorate C - Climate Strategy, Governance and Emissions from non-trading sectors
CLIMA.C.2 - Governance and Effort Sharing

Guidance Document

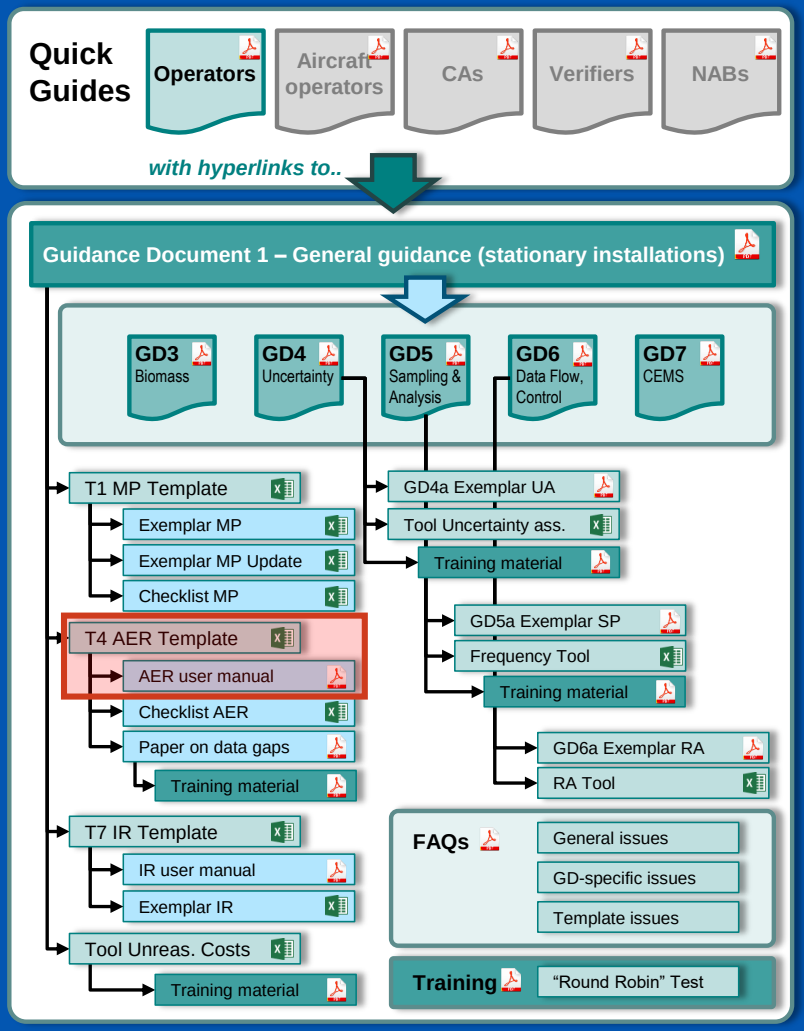
Exemplar Simplified Monitoring Plan in accordance with MRR Article 13: Simple Gas-fired Combustion Installations

Final Version 17.12.2016



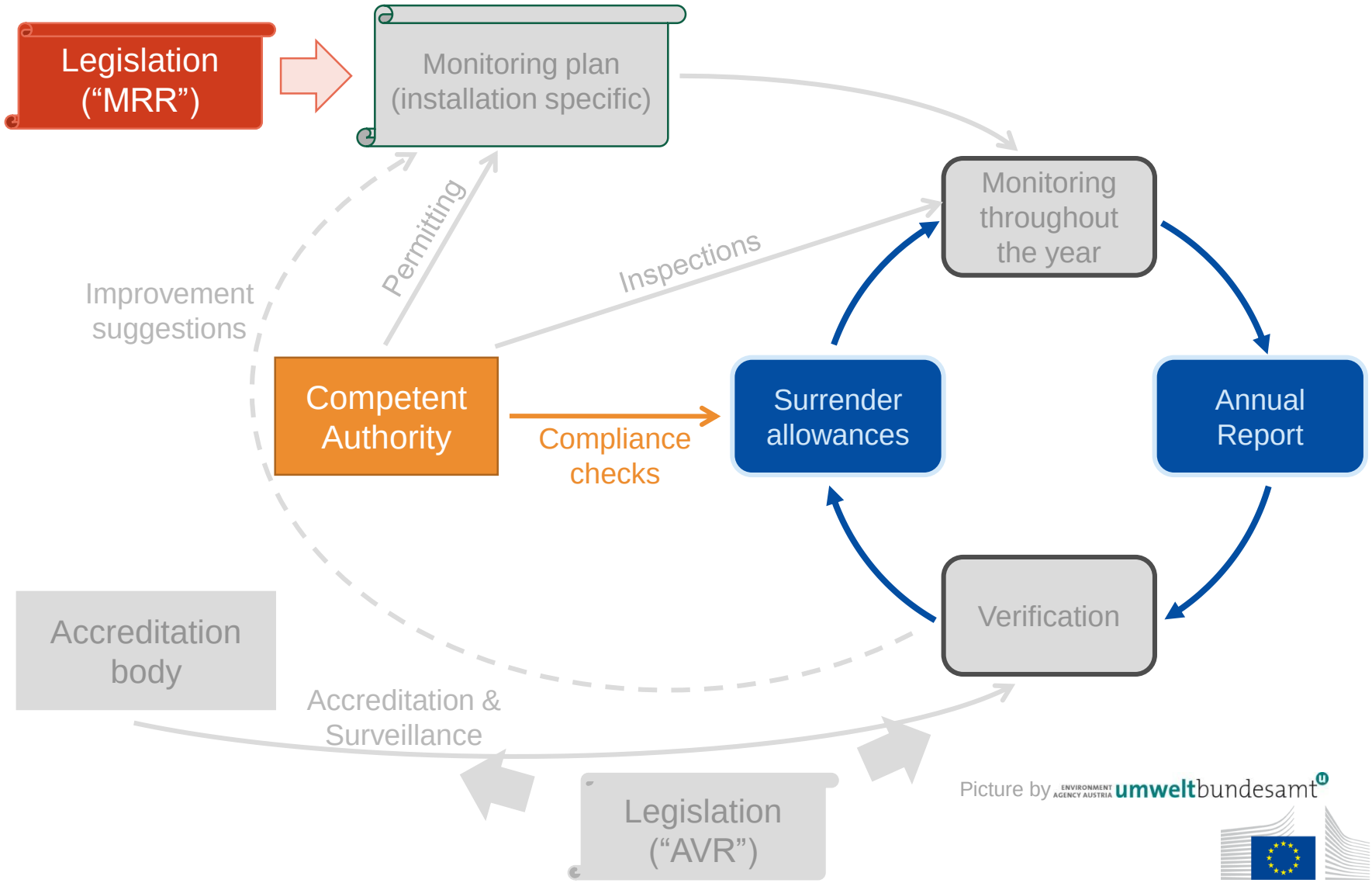
Do you have any questions?

The AER Template



European Commission

Compliance Cycle

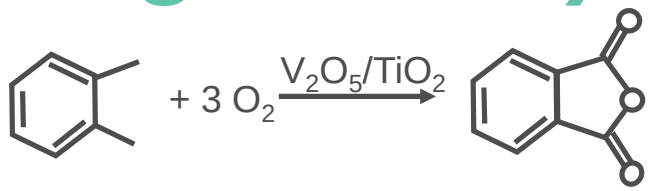


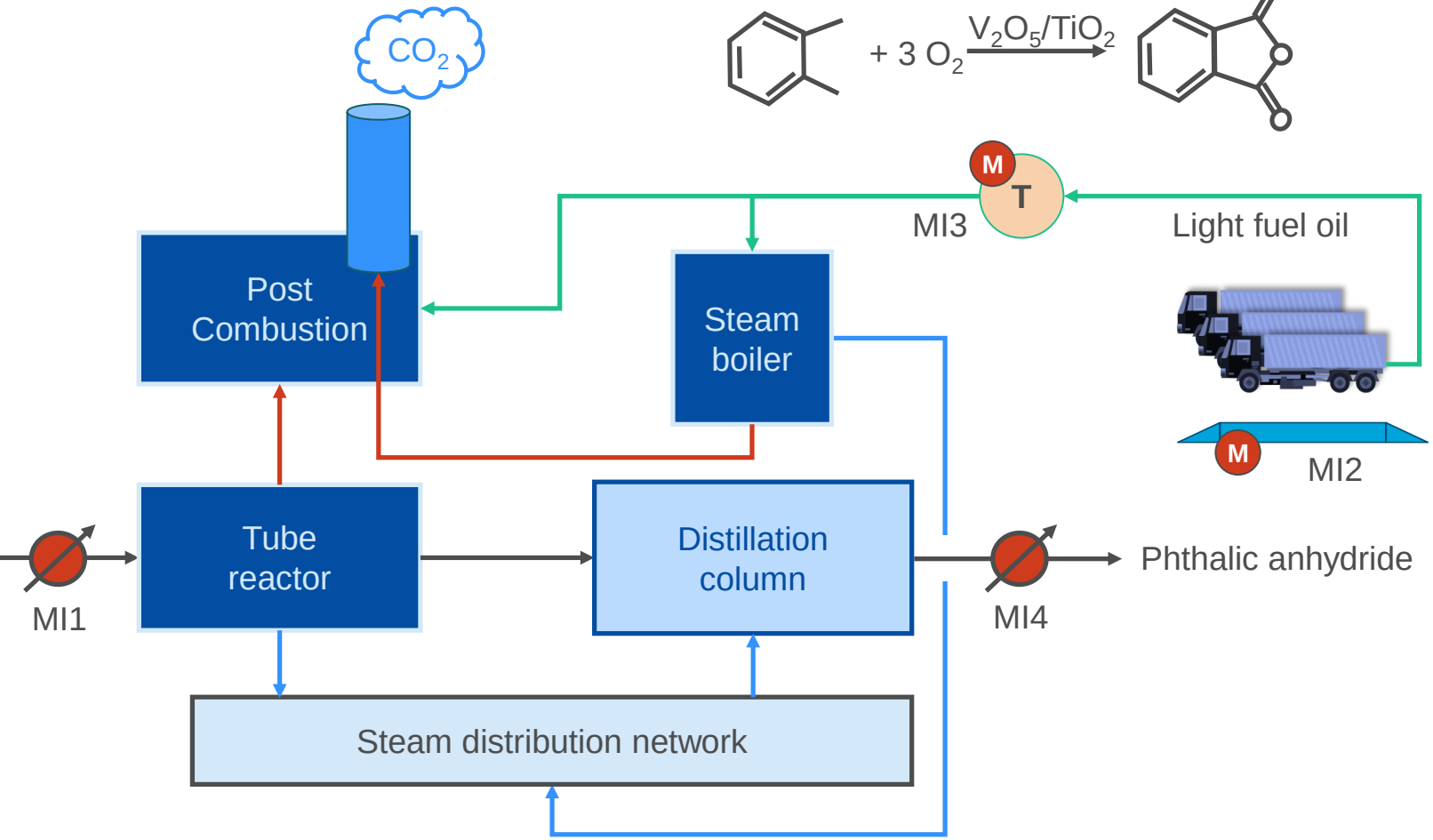
Picture by umweltbundesamt

European Commission

Example installation – 2 (bulk org. chem.)

Category A installation producing phthalic anhydride





Name	t CO2e
Light fuel oil	4.400
o-Xylene	120.000
Phthalic anhydride	-93.500

Source Streams

(b) Relevant Source Streams:

relevant
Please enter data in this section

Please list here all source streams (fuels, materials, products,…) which are monitored at your installation using calculation based approaches (i.e. standard methodology or mass balance). For definition of the term "source stream" please see guidance document No. 1 ("General guidance for installations").

Each source stream should be identified by the following steps:

1. *Choose a source stream type from the drop-down list*

   The source stream type is to be understood as a set of rules to be used according to the MRR. This classification is the basis for further obligations, e.g. tiers to be applied.

   The drop-down list for selection of the source stream type is based upon the activities selected in section 6 above.

   Please be aware that based on the Annex I activities entered in section 6 activity-specific source stream types may have become relevant and are available in the drop-down list "source stream type".

   Those activity-specific source stream types may be related to process emissions or mass balance approaches to be applied, if relevant.

2. *Choose a source stream category from the drop-down list*

   The source stream category depends on the source stream type chosen and may be like e.g. "gaseous - natural gas", "liquid - heavy fuel oil", "material - raw meal",..

   Important! Please note that there will always be "other" fuels or material available in the drop-down list. For consistency reasons please make sure that those "others" are only selected if there really is no suitable

3. *Enter*

   If the … aggregate fu… by enteri…

   Depe… be mandator…

Important! For consis… e same ord… rder and…

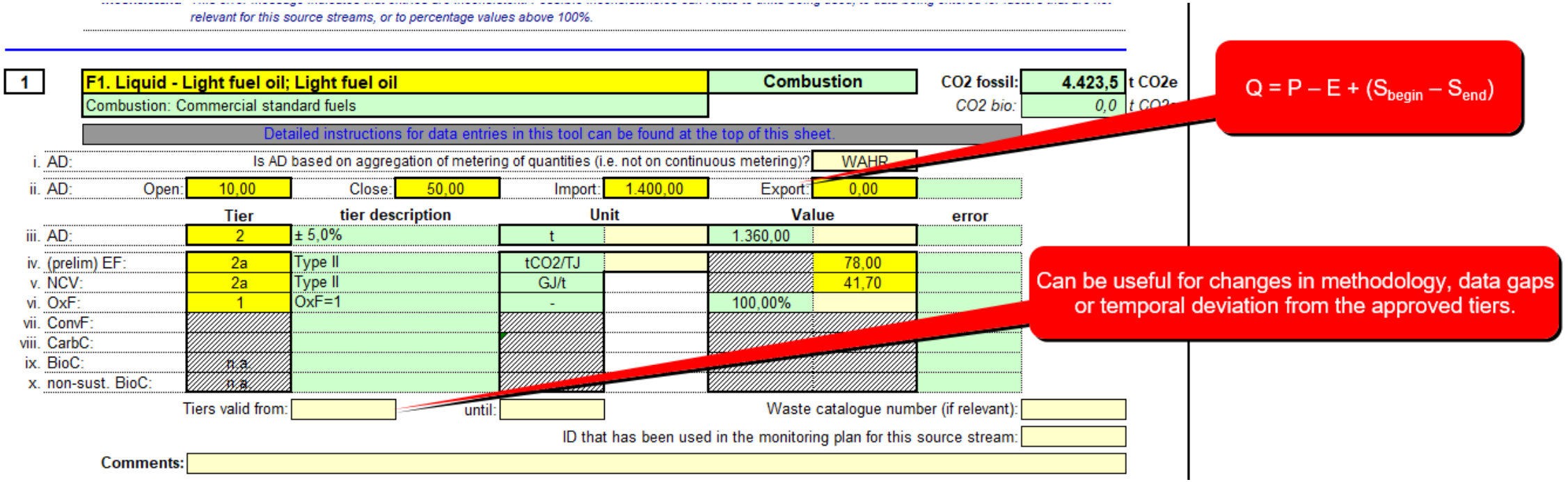
Conditional drop-down depending on Annex I activities

Conditional drop-down depending on source stream type ⇨ see sheet MSParameters

Can be made conditionally optional. ⇨ see sheet MSParameters

ID	Source stream type	Source stream category	Source stream Name	error
F01	Cement clinker: Kiln input based (Method A)	Raw meal		
F02	Combustion: Other gaseous & liquid fuels	Heavy fuel oil		
F03	Combustion: Other gaseous & liquid fuels	Other gases	Process waste gas	
F04	Iron & steel: Mass balance	Scrap Iron		
F1				

Source Steams - LFO



relevant for this source streams, or to percentage values above 100%.

1	F1. Liquid - Light fuel oil; Light fuel oil	Combustion	CO2 fossil:	4.423,5	t CO2e
	Combustion: Commercial standard fuels		CO2 bio:	0,0	t CO2

Detailed instructions for data entries in this tool can be found at the top of this sheet.

i. AD: Is AD based on aggregation of metering of quantities (i.e. not on continuous metering)? WAHR

ii. AD: Open: 10,00 Close: 50,00 Import: 1.400,00 Export: 0,00

	Tier	tier description	Unit		Value		error
iii. AD:	2	± 5,0%	t		1.360,00		
iv. (prelim) EF:	2a	Type II	tCO2/TJ			78,00	
v. NCV:	2a	Type II	GJ/t			41,70	
vi. OxF:	1	OxF=1	-		100,00%		
vii. ConvF:							
viii. CarbC:							
ix. BioC:	n.a.						
x. non-sust. BioC:	n.a.						

Tiers valid from: until: Waste catalogue number (if relevant):

ID that has been used in the monitoring plan for this source stream:

Comments:

$Q = P - E + (S_{begin} - S_{end})$

Can be useful for changes in methodology, data gaps or temporal deviation from the approved tiers.

Source Streams - Materials

2	F2. Material - Other Inputs; o-Xylene	Mass balance	CO2 fossil:	122.065,4	t CO2e
	Bulk organic chemicals: Mass balance methodology		*CO2 bio:*	*0,0*	*t CO2e*

Detailed instructions for data entries in this tool can be found at the top of this sheet.

i. AD:	Is AD based on aggregation of metering of quantities (i.e. not on continuous metering)?					FALSCH		
ii. AD:	Open:		Close:		Import:		Export:	
	Tier	**tier description**		**Unit**		**Value**		**error**
iii. AD:	1	± 7,5%		t			37.037,00	
iv. (prelim) EF:								
v. NCV:	3	Lab. analyses		GJ/t			39,87	
vi. OxF:								
vii. ConvF:								
viii. CarbC:	3	Lab. analyses		tC/t			0,8995	
ix. BioC:	n.a.							

3	F3. Material - Phthalic acid anhydride; PA	Mass balance	CO2 fossil:	-92.614,1	t CO2e
	Bulk organic chemicals: Mass balance methodology		*CO2 bio:*	*0,0*	*t CO2e*

Detailed instructions for data entries in this tool can be found at the top of this sheet.

i. AD:	Is AD based on aggregation of metering of quantities (i.e. not on continuous metering)?					WAHR		
ii. AD:	Open:	0,00	Close:	0,00	Import:	0,00	Export:	39.055,60
	Tier	**tier description**		**Unit**		**Value**		**error**
iii. AD:	1	± 7,5%		t		-39.055,60		
iv. (prelim) EF:								
v. NCV:	No tier			GJ/t			21,60	
vi. OxF:								
vii. ConvF:								
viii. CarbC:	3	Lab. analyses		tC/t			0,6472	

European Commission

What if…?

- **…a data gap occurred?**
  - **Example:** Operator fails to read storage tank level at the end of the year. Last reading was on 20 Dec. Operator proposes to conservatively close data gap based on specific energy consumption
- How can this be reported in the AER?
- What are the implications on verification?

Model answer

- **What if a data gap occurred?**

4	F1. Liquid - Light fuel oil; LFO	Combustion	CO2 fossil:	133,4	t CO2e
	Combustion: Commercial standard fuels		*CO2 bio:*	*0,0*	*t CO2e*

Detailed instructions for data entries in this tool can be found at the top of this sheet.

i. AD: Is AD based on aggregation of metering of quantities (i.e. not on continuous metering)?

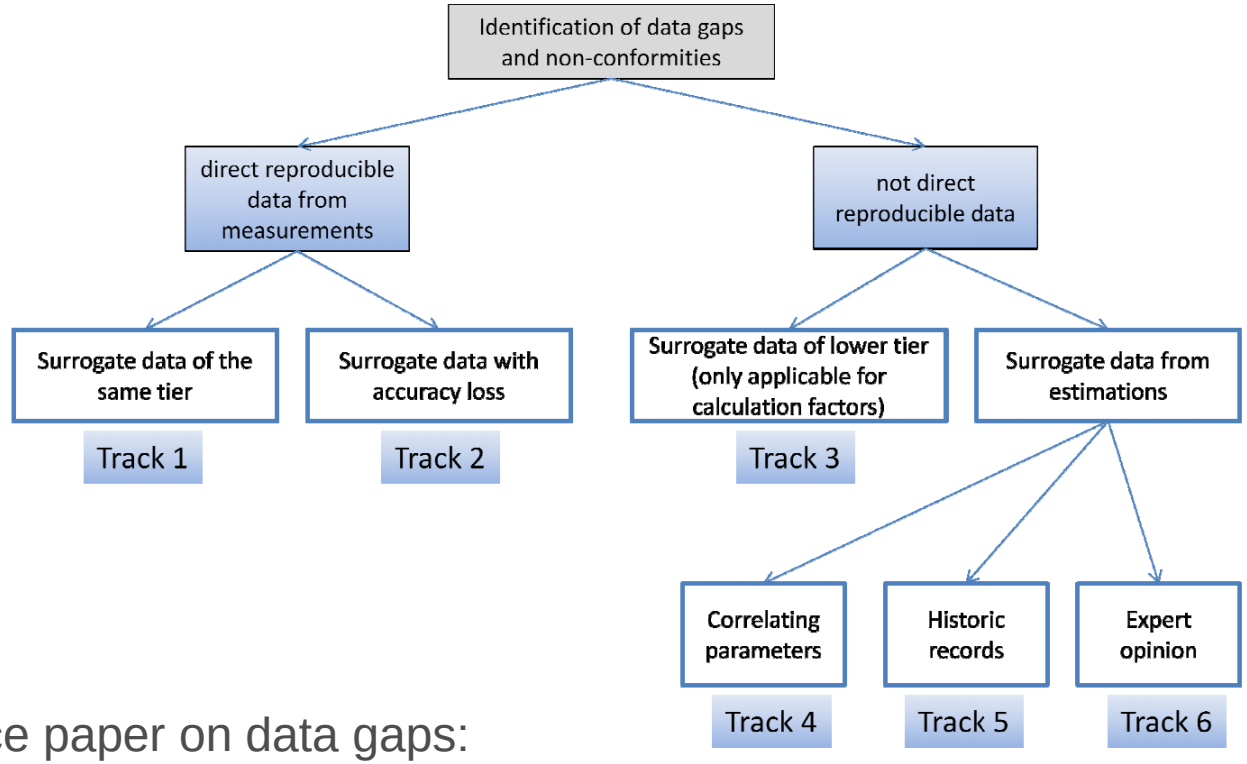
ii. AD: Open: | Close: | Import: | Export:

	Tier	tier description	Unit		Value		error
iii. AD:	No tier		t			41,00	
iv. (prelim) EF:	2a	Type II	tCO2/TJ			78,00	
v. NCV:	2a	Type II	GJ/t			41,70	
vi. OxF:	1	OxF=1	-		100,00%		
vii. ConvF:							
viii. CarbC:							
ix. BioC:	n.a						
x. non-sust. BioC:	n.a						

Tiers valid from: 20.12.2019 until: 31.12.2019 Waste catalogue number (if relevant):

	Source stream name or other ID	from	until	Description, reasons and methods	Estimated emissions (t CO2e)
1	F1. Liquid - Light fuel oil; Light fuel oil	20.12.19	31.12.19	Failed to read stock level at the end of the year	133
2					

Model answer



Task Force paper on data gaps:
https://ec.europa.eu/clima/sites/clima/files/ets/monitoring/docs/data_gaps_en.pdf

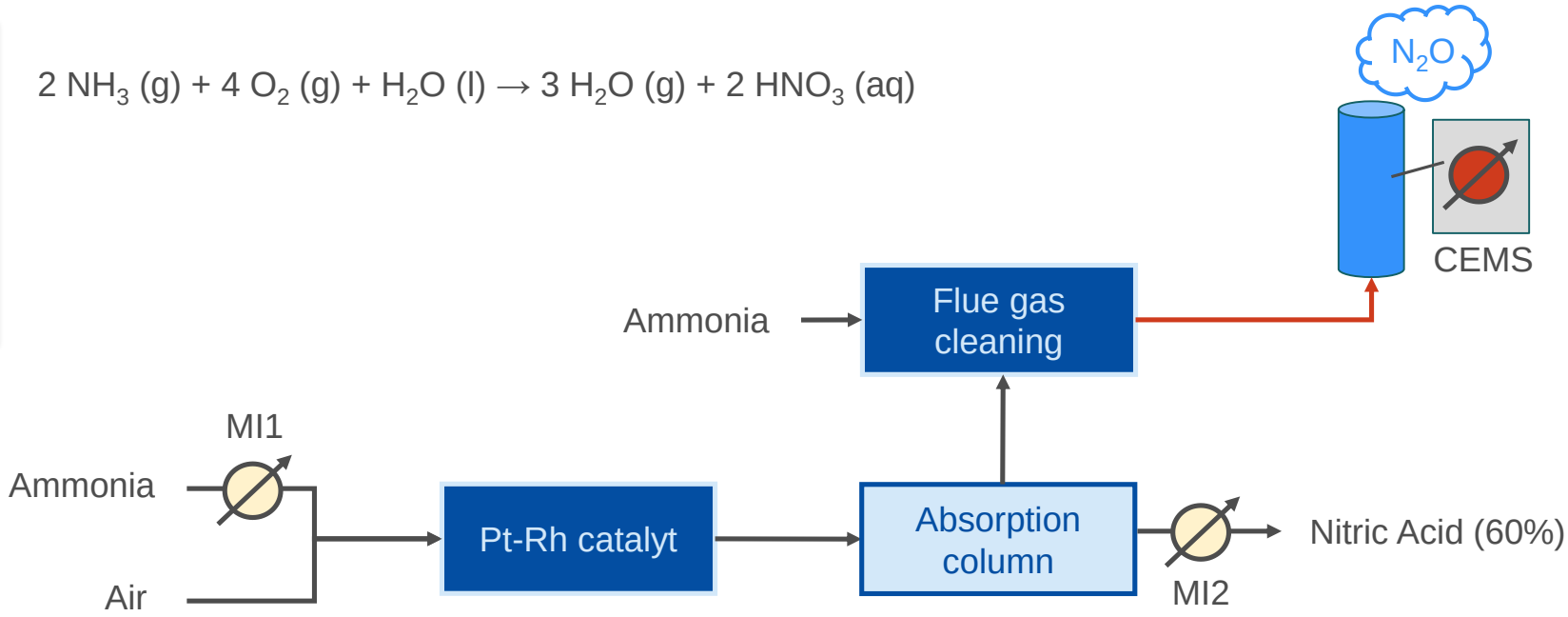
- **What are the implications on verification?** → see “IR Template”

Example installation – 3 (nitric acid)

Category B installation producing nitric acid

Name	t CO2e
N2O (CEMS)	52.000

$2\ NH_3\ (g) + 4\ O_2\ (g) + H_2O\ (l) \rightarrow 3\ H_2O\ (g) + 2\ HNO_3\ (aq)$



Measurement based approach

Ref.	Annex I Activity	CRF Category 1 (Energy)	CRF Category 2 (Process emission)	Total Activity Capacity	Capacity units	GHG emitted
A01	*Production of cement clinker*	*1A2f - Energy - Other industries*	*2A1 - Process - Cement Production*	*1500*	*tonnes per day*	*CO2*
A02	*Combustion of fuels*	*1A1a - Energy - Public Electricity*		*120*	*MW(th)*	*CO2*
A1	Production of nitric acid	1A2c - Energy - Chemicals	2B2 - Process - Nitric Acid	550000	t HNO3 (100%)	CO2 & N2O

Calculation approach for CO2:	FALSCH	
Measurement approach for CO2:	WAHR	Relevant sections: 7(c), 9
Fall-back approach (Article 22):	FALSCH	
Monitoring of N2O emissions:	WAHR	Relevant sections: 7(c), 9
Monitoring of PFC emissions:	FALSCH	
Monitoring of transferred/inherent CO2 and CCS:	FALSCH	

1	N2O	M1. continuous N2O concentration measurement

Total fossil emissions:	53.193,0	t CO2e
Total biomass emissions:	*0,0*	*t CO2e*
Total fossil energy content:		TJ
Total energy content from biomass:		TJ

(a) Calculations

Reference to the relevant source streams, if applicable:

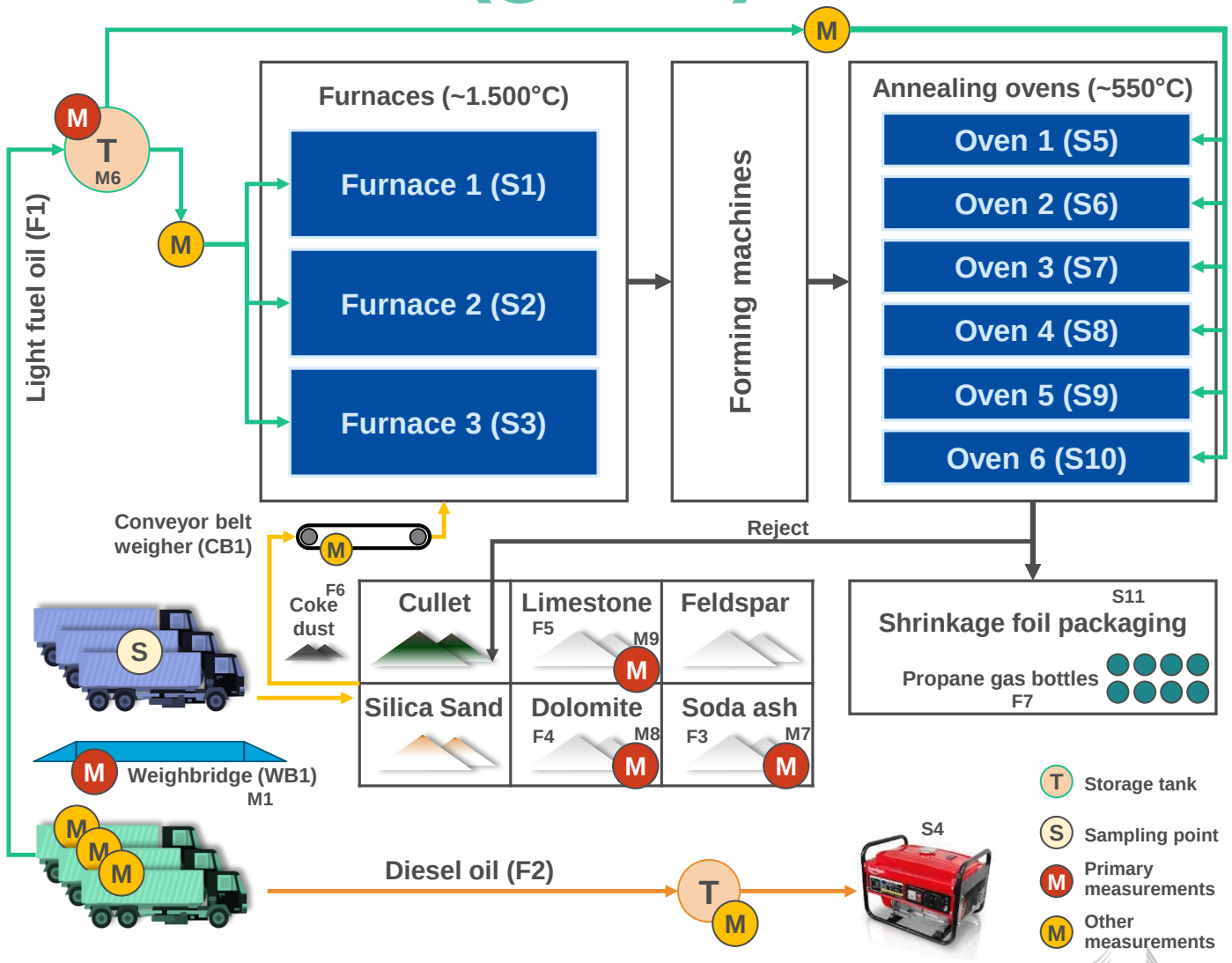
Result of corroborating calculation (fossil):
Result of corroborating calculation (biomass):

			Unit	
Tier used:	3	i. GHG concentration (annual hourly average):	g/Nm3	0,1200
	± 5,0%			
		ii. Biomass fraction:	-	0,00%
		iii. non-sust. biomass fraction:	-	0,00%
GWP:	298	iv. Hours of operation:	h/year	8.500
(t CO2e/t GHG)		v. Flue gas flow (annual hourly average):	1000Nm3/h	175,00
		vi. Flue gas flow (annual total):	1000Nm3/year	1.487.500
		vii. Annual fossil amount of GHG	t	179

Example installation – 1 (glass)

Category B installation producing container glass

Name	t CO2e
Light fuel oil	75.000
Diesel oil	1
Soda ash	5.500
Dolomite	4.000
Limestone	1.450
Coke dust	50



MSParameters

- Hidden sheet in the AER Template (→ see AER user manual)
- Add default values (tier 1 or 2a) for fuels and materials (e.g. NCV, EF,…)
- Set default status to fossil/non-fossil
- Set detailed name to mandatory/optional
- Add fuels/materials, e.g. as ‘commercial standard fuels’ pursuant to Art. 31(4)

	Tier 1										Tier 2a							
	Factors according to Annex VI MRR										Factors for Articles 31 (b) and (c)							
el/material type description		Unit AD	EF		NCV		CarbC				AD	NCV		EF		OxF	ConvF	C
		Unit	Value	Unit	Value	Unit	Value	Unit			Unit	Value	Unit	Value	Unit	Value (-)	Value (-)	Value
MSPara_SourceStreamCategory	Source	ctivityData_Unit	EF_Value_1	EF_Unit_1	NCV_Value_1	NCV_Unit_1	CarbC_Value_1	CarbC_Unit_1	MSPara_Nam	MSPara_IsF	ctivityData_Unit	NCV_Value_2	NCV_Unit_2	EF_Value_2	EF_Unit_2	OxF_Value_2	ConvF_Value_2	CarbC_Value_
quid - Crude Oil	Annex VI MRR	t	73,3	tCO2/TJ	42,3	GJ/t	n.a.	n.a.	FALSCH	WAHR	n.a.	n.a.	n.a.	n.a.	tCO2/TJ	1	1	n.a.
quid - Orimulsion	Annex VI MRR	t	77	tCO2/TJ	27,5	GJ/t	n.a.	n.a.	FALSCH	WAHR	n.a.	n.a.	n.a.	n.a.	tCO2/TJ	1	1	n.a.
quid - Natural Gas Liquids	Annex VI MRR	t	64,2	tCO2/TJ	44,2	GJ/t	n.a.	n.a.	FALSCH	WAHR	n.a.	n.a.	n.a.	n.a.	tCO2/TJ	1	1	n.a.
quid - Motor Gasoline	Annex VI MRR	t	69,3	tCO2/TJ	44,3	GJ/t	n.a.	n.a.	FALSCH	WAHR	n.a.	n.a.	n.a.	n.a.	tCO2/TJ	1	1	n.a.
quid - Kerosene	Annex VI MRR	t	71,9	tCO2/TJ	43,8	GJ/t	n.a.	n.a.	WAHR	WAHR	n.a.	n.a.	n.a.	n.a.	tCO2/TJ	1	1	n.a.
quid - Aviation gasoline (AvGas)	Annex VI MRR	t	70	tCO2/TJ	44,3	GJ/t	n.a.	n.a.	WAHR	WAHR	n.a.	n.a.	n.a.	n.a.	tCO2/TJ	1	1	n.a.
quid - Jet gasoline (Jet B)	Annex VI MRR	t	70	tCO2/TJ	44,3	GJ/t	n.a.	n.a.	WAHR	WAHR	n.a.	n.a.	n.a.	n.a.	tCO2/TJ	1	1	n.a.
quid - Jet kerosene (jet A1 or jet A)	Annex VI MRR	t	71,5	tCO2/TJ	44,1	GJ/t	n.a.	n.a.	WAHR	WAHR	n.a.	n.a.	n.a.	n.a.	tCO2/TJ	1	1	n.a.

Further guidance

- User manual
  https://ec.europa.eu/clima/sites/clima/files/ets/monitoring/docs/aer_user_manual_en.pdf

EUROPEAN COMMISSION
DIRECTORATE-GENERAL
CLIMATE ACTION
Directorate C – Climate Strategy, Governance and Emissions from non-trading sectors
Unit C.2 – Governance and Effort Sharing

User Manual

The Monitoring and Reporting Regulation –
Annual Emissions Report Template

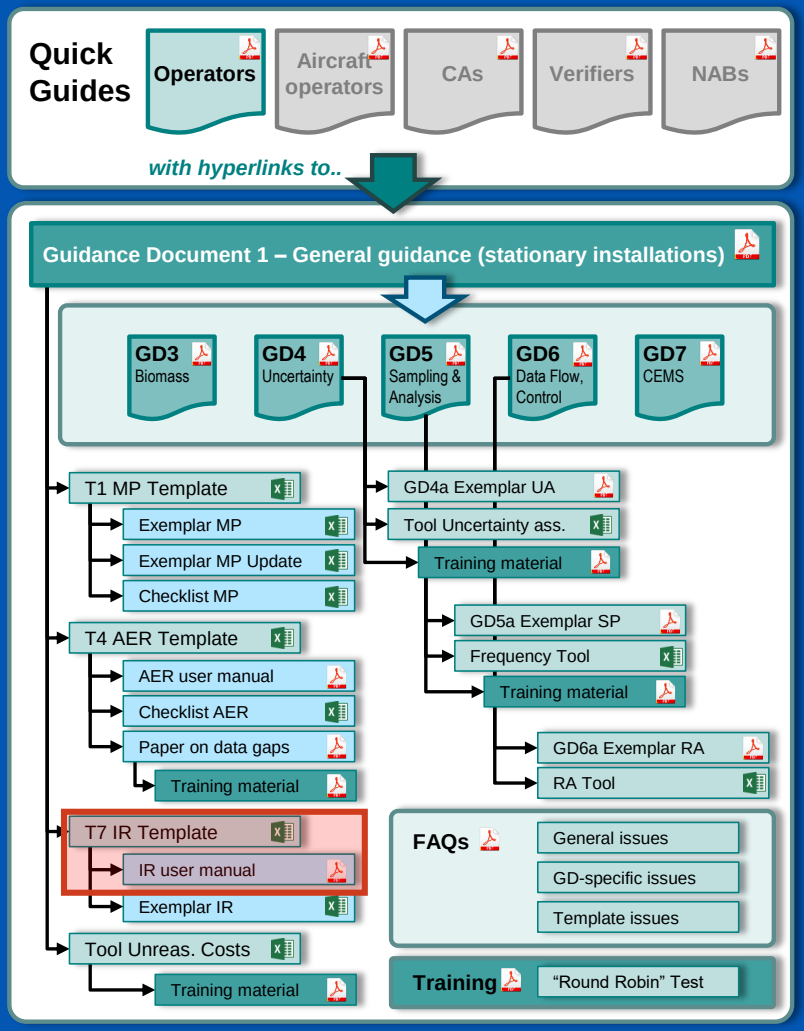
24 April 2017

Update for phase 4

- Updated tier definitions
  - Biomass fraction
  - Process emissions
  - Minor updates to sector-specific requirements (Annex IV)
- Reporting of (non-)sustainable biomass, if changes are even necessary
- Updated GWPs
- Planned for Q1 of 2021

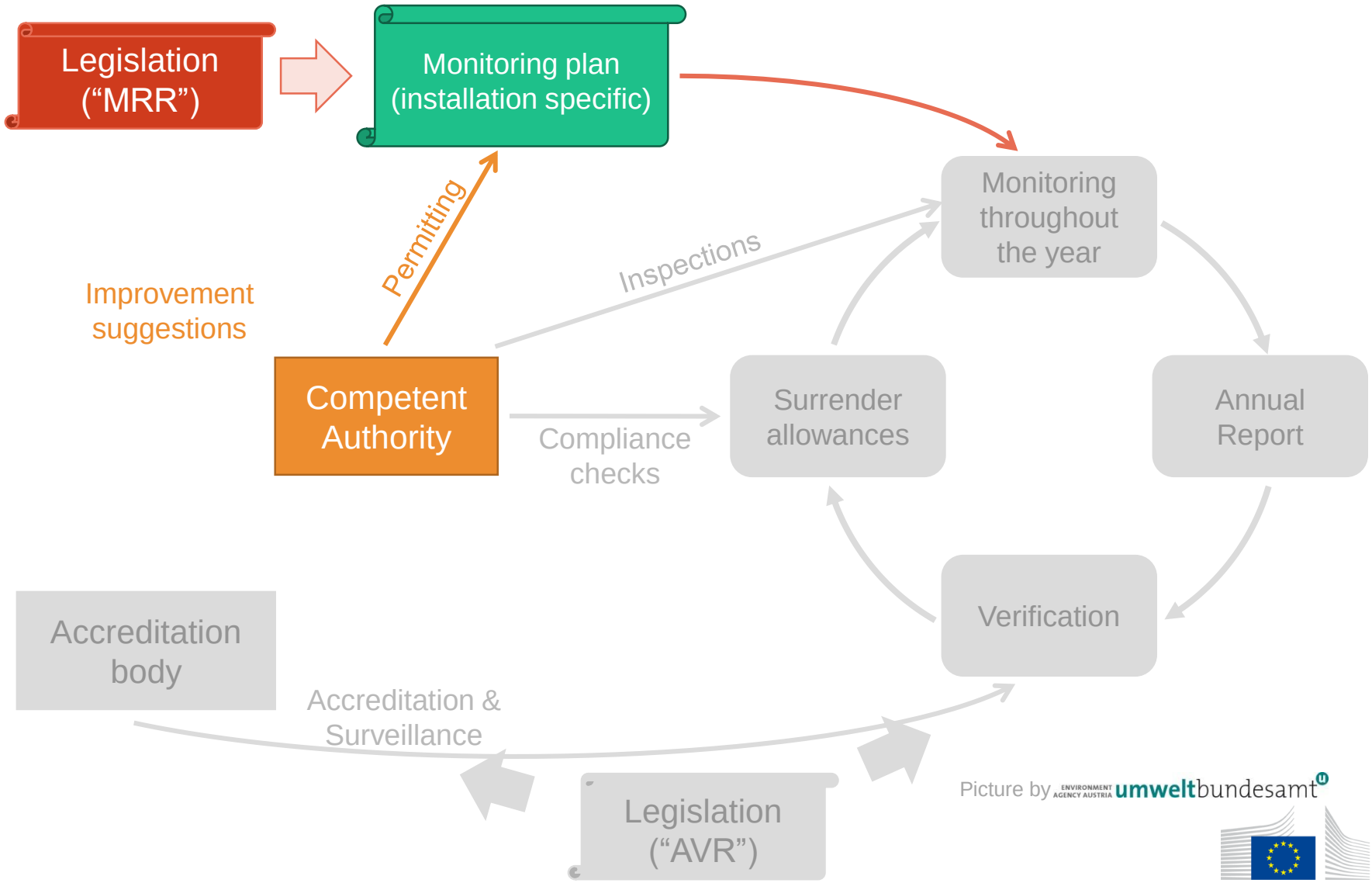
Do you have any questions?

The IR Template



European Commission

Compliance Cycle



Picture by umweltbundesamt

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Background

Two types of improvement reports:

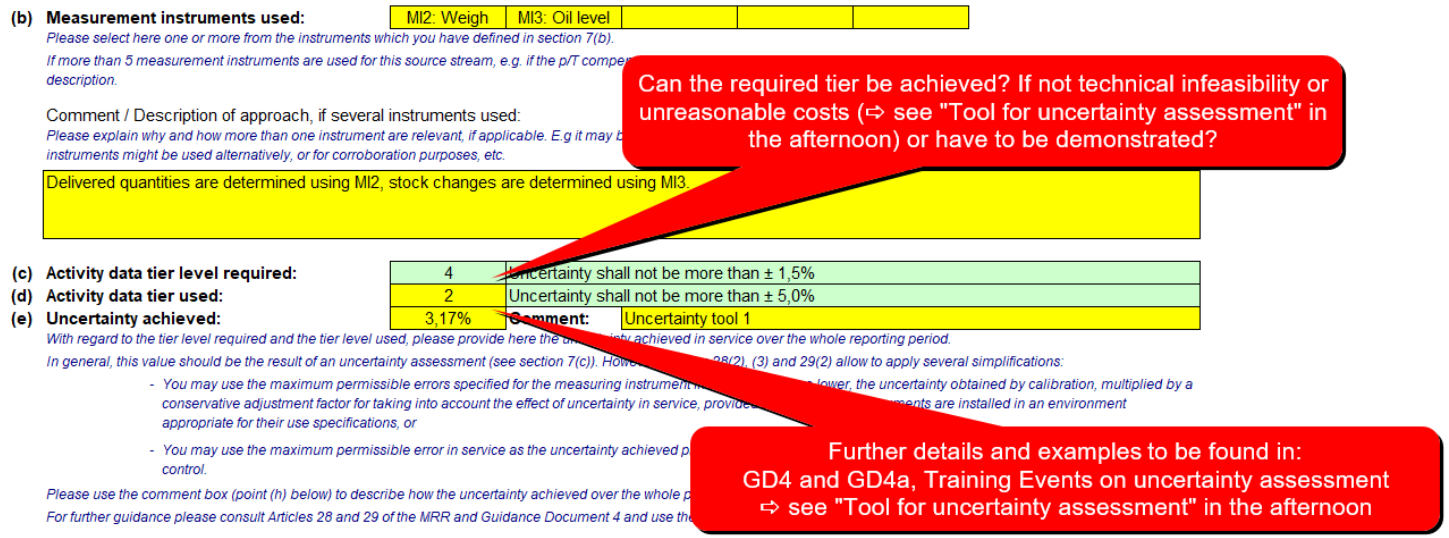
- **Art. 69(1) MRR**: “An operator of an installation shall submit to the competent authority for approval a **report** containing the information referred to in paragraph 2 or 3, [...]” if the following situations are relevant:
  - Art. 69(2) MRR: “[...] operator does not apply **at least the tiers required** pursuant to the first subparagraph of Article 26(1) to major source streams and minor source streams and pursuant to Article 41 to emission sources,[…]”, OR
  - Art. 69(3) MRR: “[…] operator applies a **fall-back monitoring methodology** [...]”
- **Art. 69(4) MRR**: “Where the **verification report** [...] states outstanding **non-conformities** or **recommendations for improvements** […]”

Improvement reports – Art. 69(1)

- Operator has to submit an Improvement Report to the Competent Authority for approval by 30 June in regular intervals, if the required tiers are not met:
  - **Category A** installation, every **4 years** (CA may extend it to **5 years**)
  - **Category B** installations, every **2 years** (CA may extend it to **4 years**)
  - **Category C** installations, every **1 year** (CA may extend it to **3 years**)

Storyline for the example

- PA producing installation:
  - Category B instead of A and cannot meet the highest tier for AD of LFO



  - A data gap occurred (see example for AER)
    → verifier reported an outstanding non-conformity
  - Verifier recommended improvements for the operator's sampling procedures

Improvement description

1 Reporting of improvements related to non-conformities and recommendations in accordance with Article 69(4) MRR

i.	Does the verification report state non-conformities?	WAHR	Relevant sections: C_VerRepNonConformities (section 8)

Non-conformities (verification report) *Where the verification report established in accordance with Regulation (EU) No 600/2012 states any non-conformities, the operator shall submit to the competent authority an improvement report for approval. This report has to be submitted by 30 June of the year in which that verification report is issued by the verifier.*

i.	Does the verification report contain recommendations for improvements?	WAHR	Relevant sections: D_VerReplmprovements (section 9)

Recommendations (verification report) *Where the verification report established in accordance with Regulation (EU) No 600/2012 states recommendations for improvements (pursuant to Article 30(1) of that Regulation) , the operator shall submit to the competent authority an improvement report for approval. This report has to be submitted by 30 June of the year in which that verification report is issued by the verifier.*

Installations with low emissions (i.e. installations with < 25,000 t CO2e per year) are exempted from the requirement to submit improvement reports in response to verifier's recommendations for improvements (Article 47(3)). Please note that this does not exempt installations with low emissions from considering verifiers' recommendations: a verifier is required to check whether an operator has implemented recommendations the following year and to assess the risk of misstatements and non-conformities (Article 30(2) of Regulation (EU) No 600/2012).

2 Reporting of improvements in accordance with Article 69(1) MRR

ii.	Do you have to report improvements related to specific source streams?	WAHR	Relevant sections: 7(1), E_SourceStreams (section 10)

1 Source Streams:

relevant

Please enter data in this section

Please list here all source streams for which

- *not at least the tiers required pursuant to the first sub-paragraph of Article 26(1) of the MRR are applied for activity data or for any calculation factor.*
- *improvements related to the quality of data but with no direct impact on tiers, e.g. increased frequency of analyses, will be reported here [optional].*

You do not need to enter information on source streams which already comply with the tiers required by the MRR.

Please select ID numbers and enter names consistent with the latest approved monitoring plan.

ID	Source stream type	Source stream name	Category	Error?
F1	Combustion: Commercial standard fuels	Light fuel oil	Minor	

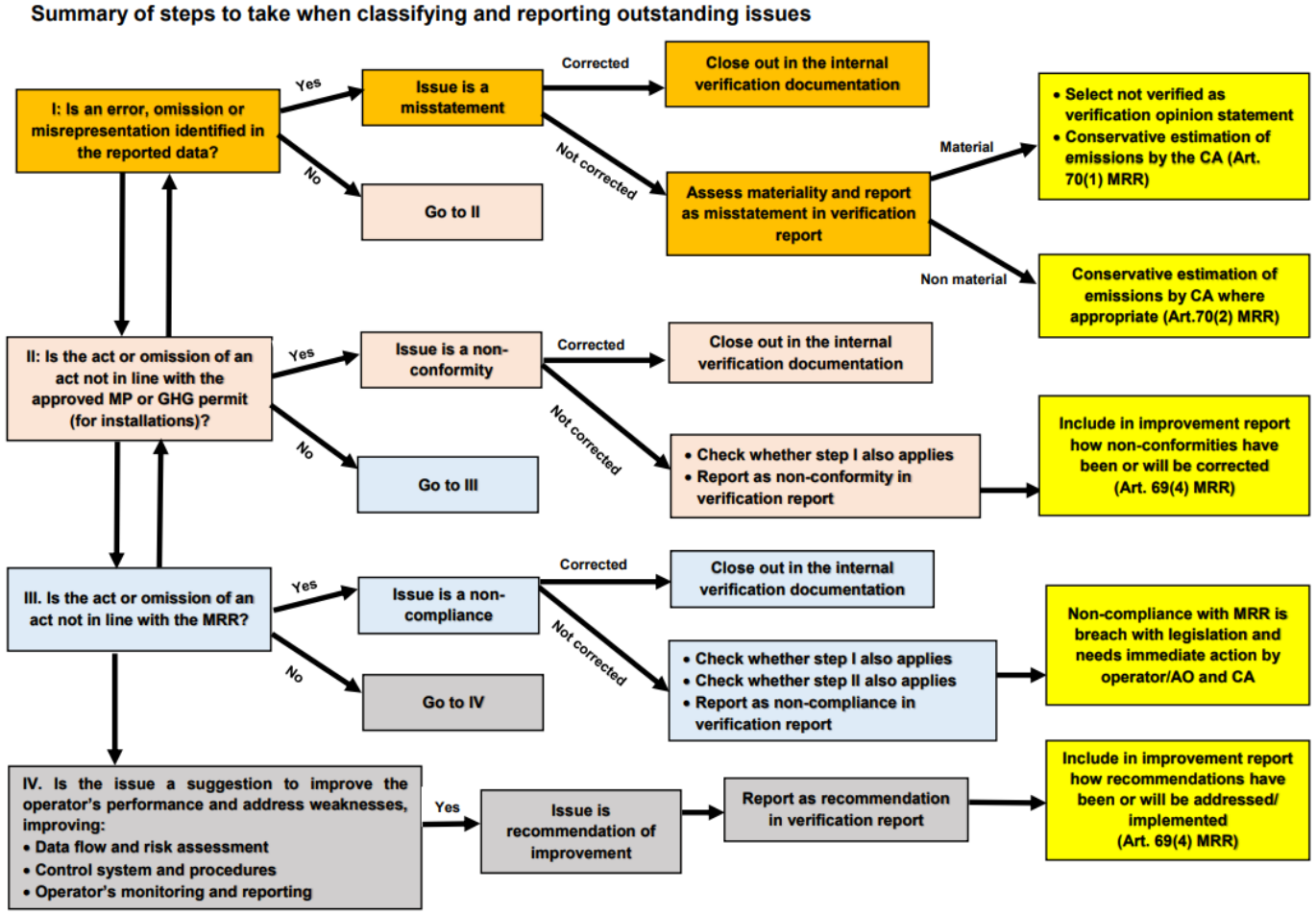
Not in conformity with the approved MP

Verifier's recommendations for improvement

Tiers not met or fall-back (Art. 22) applied

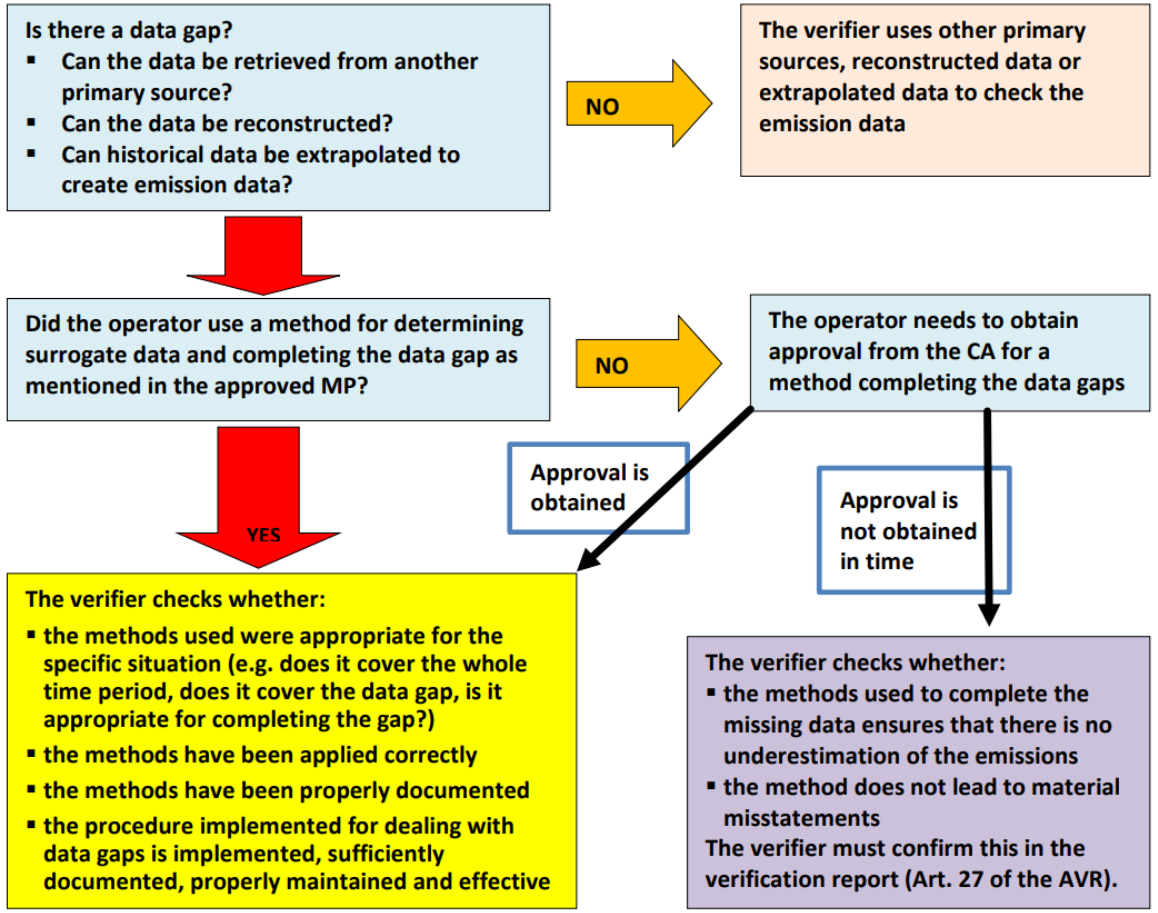
Only list source streams that do not meet tiers

Some insights into verification



AVR Guidance: Reporting outstanding issues
https://ec.europa.eu/clima/sites/clima/files/ets/monitoring/docs/avr_classification_reporting_issues_en.pdf

Some insights into verification



AVR Guidance: KGN II.3 on process analysis
https://ec.europa.eu/clima/sites/clima/files/ets/monitoring/docs/kgn_3_process_analysis_en.pdf

Non-conformities

8 Statements related to non-conformities

Article 69(4) of the MRR states that the verification report established in accordance with Regulation (EU) No. 600/2012 may contain statements related to outstanding non-conformities.

If such statements or recommendations are contained in the verification report, the operator shall submit a report by 30 June of the year the verification report has been issued by the verifier, describing how and when the non-conformities have been rectified or are planned to be rectified.

Please reference here the relevant statements in the verification report, describe what kind of measures those are and the timeline of their implementation.

If information required here has already been reported in another section of the template, you may just reference that section.

IMPORTANT! Improvements reported here do not automatically update the monitoring plan. Whenever improvements require modifications of the monitoring plan (see Article 15 of the MRR), a revised monitoring plan must be submitted to the CA via the normal route according to administrative practice, subject to the CA's approval.

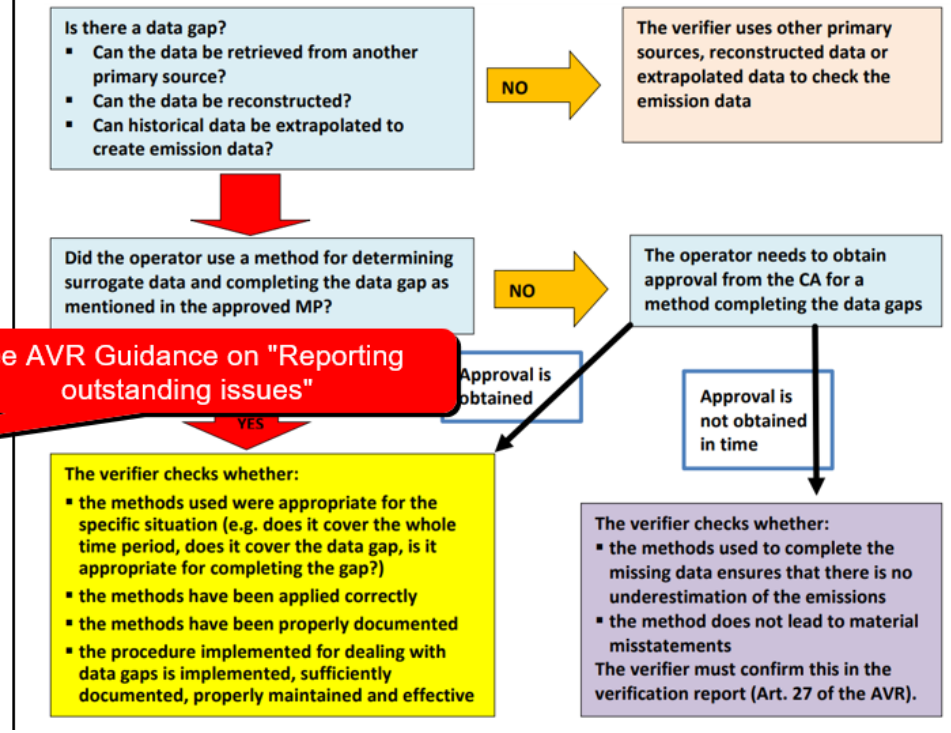
1	i. Measures will be/have been taken:	WAHR	When?	01.02.2020	

ii. Description:

In case you require more space for the description you may also use external files and reference those here.

Title:	Missed reading of the oil level gauge at the end of the year
Description:	Due to the absence of the responsible staff member, the stock level at the end of the year has not been read until 10 January. The resulting data gap was closed by starting from the level reading taken at 20 Dec and conservatively estimating consumption levels by using the specific energy consumption per tonne multiplied with production levels. Conservative estimation was ensured by using the upper 95% level of the specific energy consumption obtained from historic data of this relationship. An updated MP which includes this procedure pursuant to Article 66 of the MRR (data gaps) was submitted to the CA for approval on 1 February.

see AVR Guidance on "Reporting outstanding issues"



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Recommendations for improvement

1	i. Measures will be/have been taken:	WAHR	When?	01.06.2021	
	If measures will not be taken, why not?				

ii. Description:

In case you require more space for the description you may also use external files and reference those here.

Title:	Manual steps during sampling
Description:	Verifiers recommendation: The sampling procedure for determining the carbon contents involves a lot of manual steps. Options should be explored to lower the risk of errors, e.g. automatise process steps as much as possible. Manual transfer of data between files will be automatised. Any automatic sampling system would however incur unreasonable costs (see attached document demonstrating such).

Verifier has to refrain from providing consultancy.

Source streams

1	F1. Light fuel oil	Combustion
	Combustion: Commercial standard fuels	Minor

Detailed instructions for data entries in this tool can be found at the top of this sheet.

	Activity Data or Calc. Factor:	Tier required:	Reason for deviation in the past:	Impact on tiers?	Measures taken:	When?	Tier applied:	
i.	Activity Data	4	Unreasonable costs	WAHR	FALSCH			
ii.								
iii.								

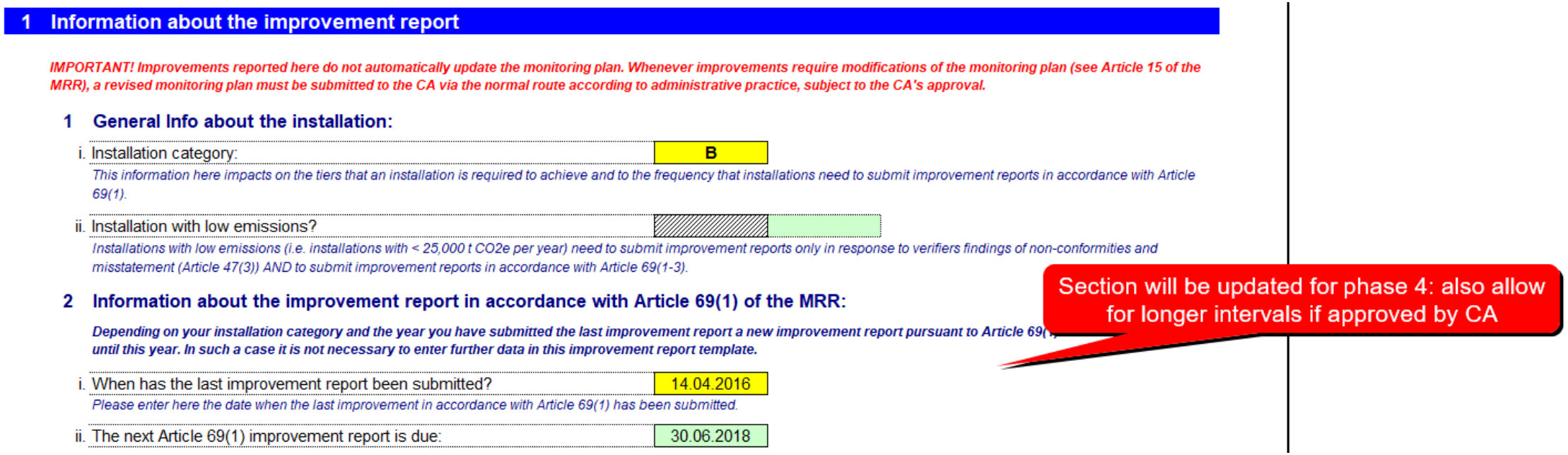
vi. **Description**

In case you require more space for the description you may also use external files and reference those here.

The costs for installating a measurement equipment that would achieve tier 4 is still unreasonable (see unreasonable costs tool)

Update for phase 4

- Minor updates expected, e.g. interval extensions in Art. 69
- Planned for Q2 of 2021



1 Information about the improvement report

IMPORTANT! Improvements reported here do not automatically update the monitoring plan. Whenever improvements require modifications of the monitoring plan (see Article 15 of the MRR), a revised monitoring plan must be submitted to the CA via the normal route according to administrative practice, subject to the CA's approval.

1 General Info about the installation:

i. Installation category: **B**

This information here impacts on the tiers that an installation is required to achieve and to the frequency that installations need to submit improvement reports in accordance with Article 69(1).

ii. Installation with low emissions?

Installations with low emissions (i.e. installations with < 25,000 t CO2e per year) need to submit improvement reports only in response to verifiers findings of non-conformities and misstatement (Article 47(3)) AND to submit improvement reports in accordance with Article 69(1-3).

2 Information about the improvement report in accordance with Article 69(1) of the MRR:

Depending on your installation category and the year you have submitted the last improvement report a new improvement report pursuant to Article 69( ) until this year. In such a case it is not necessary to enter further data in this improvement report template.

i. When has the last improvement report been submitted? 14.04.2016

Please enter here the date when the last improvement in accordance with Article 69(1) has been submitted.

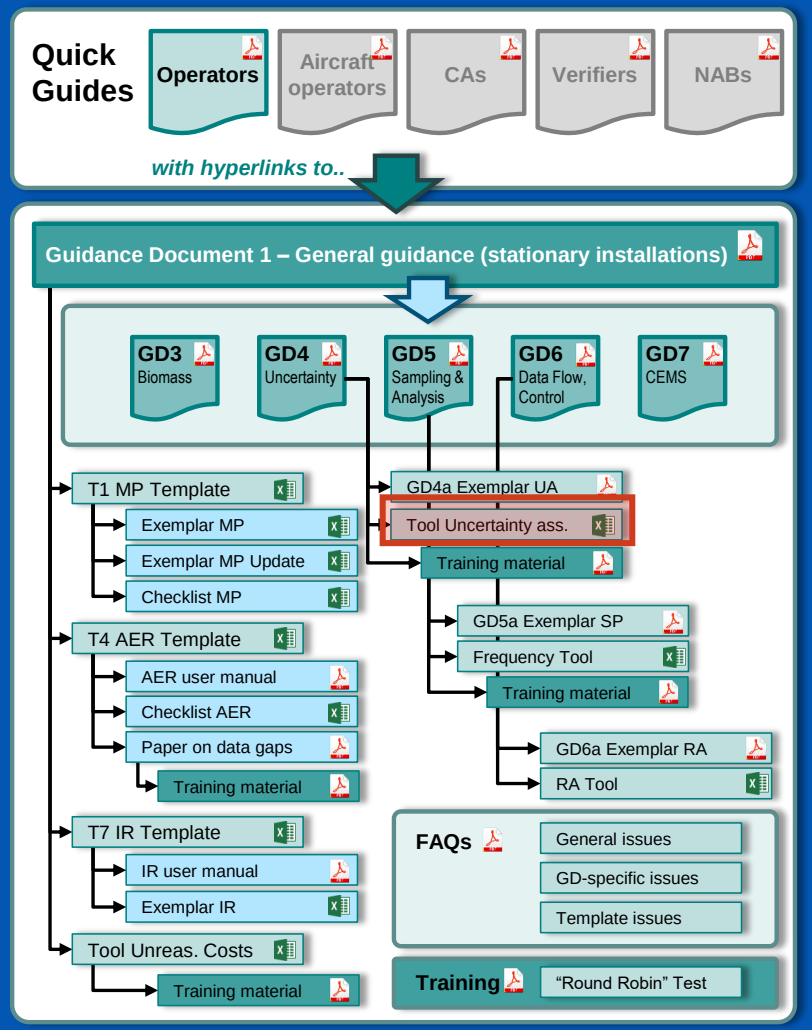
ii. The next Article 69(1) improvement report is due: 30.06.2018

Section will be updated for phase 4: also allow for longer intervals if approved by CA

Do you have any questions?

Tools for operators

Uncertainty assessment



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Background

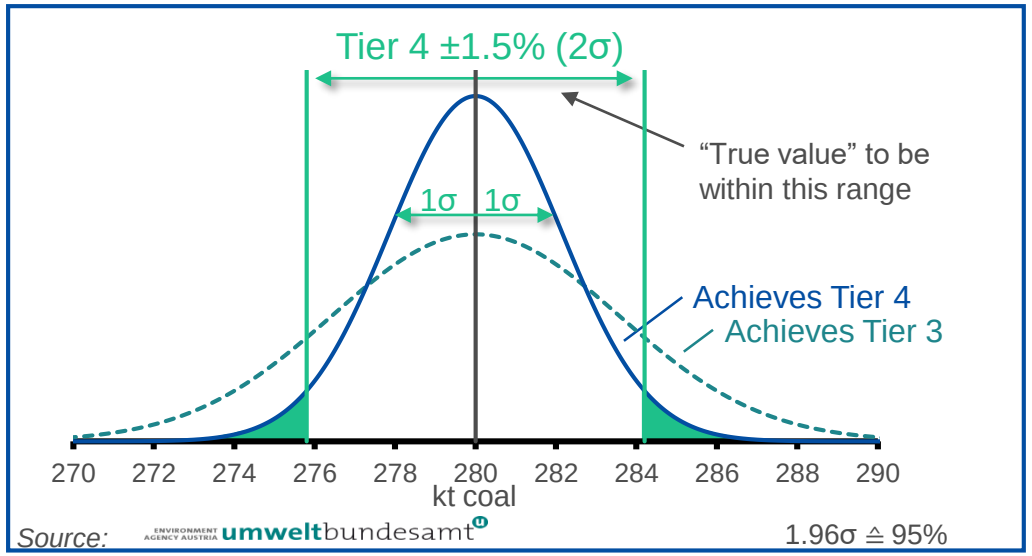
- **Article 12(1) MRR** requires the operator to submit to CA an uncertainty assessment as supporting document to the MP that should contain the following information:
  - Evidence for **compliance** with **uncertainty thresholds for activity data**
  - Evidence for **compliance** with uncertainty required for calculation factors, if applicable
  - Evidence for **compliance** with uncertainty requirements for **measurement based methodologies**, if applicable
  - If a **fall-back methodology** is applied, an uncertainty assessment for the total emissions

Uncertainty – What it means

Example: Category C installation consumes **280 kt coal**

- **Tier 4** is required for the determination of the fuel quantity **(Uncertainty: ±1.5%)**

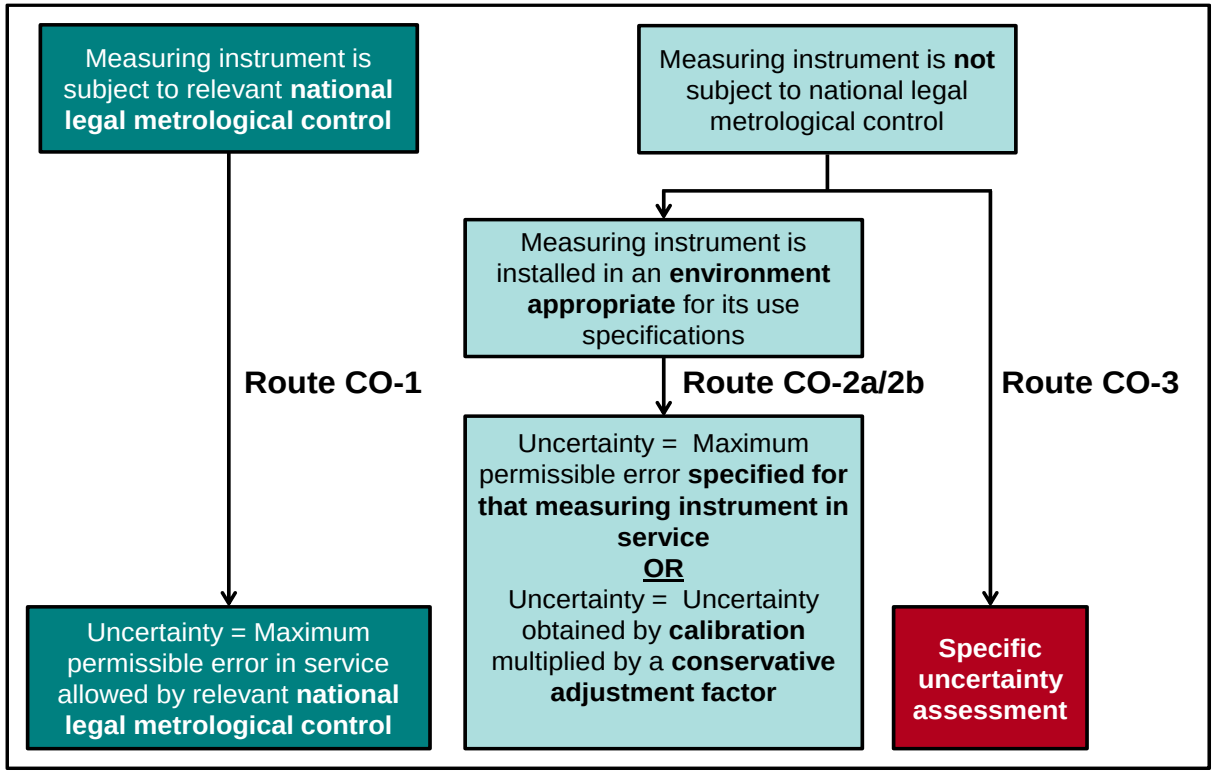
*This means that the measurement system needs to provide results that allow the "true value" to be within **280 ± 4.2 kt** (±1.5%) at the **95% (2σ) confidence level**.*



Simplifications

- Uncertainty assessment is not necessarily very demanding
  → many simplifications apply

- **BUT**: in reality some of the resulting uncertainties will need to be „combined“ (→ see next slide)



Source: EC Guidance Document 4

Example – Step-by-step approach

3. How does that impact the uncertainty of the total quantity?

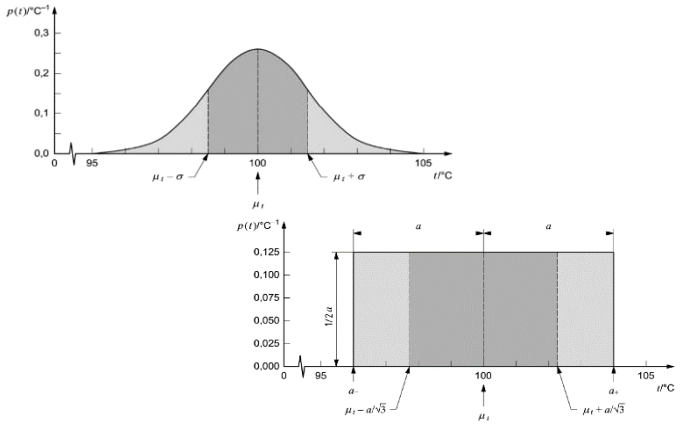
1. Let‘s say simplification CO-1 applies (NLMC)

- **Step 1:** Mathematical relationship **$Q = P - E + (S_{begin} - S_{end})$**
- **Step 2:** Determine <u>standard</u> uncertainty “in service” for each input quantity
  - Route 1: MPES from manufacturer‘s specification for P (NMLC)
    → MPES usually rectangular distribution → convert to standard uncertainty

$$u_{Pi} = \left(\frac{MPES}{\sqrt{3}}\right)$$

  - Route 2b: Calibration for $S_{begin,\ end}$ (e.g. standard u = ±5%)
- **Step 3:** Check for any correlation between input quantities (e.g. all P_i correlated because they are measured on the same instrument)
- **Step 4:** Combine uncertainties $u_Q = \frac{\sqrt{2 \cdot (U_S)^2 + (U_P)^2}}{Q}$
- **Step 5:** Calculate <u>expanded</u> uncertainty **$u_{(95\%,\ k=2)} = 2 * u_Q$**

2. Let‘s say simplification CO-2a/b applies (installed in an appropriate environment)



Useful sources of guidance

- Guidance and many examples can be found in:
  - GD4 & GD4a
  - Training events
    https://ec.europa.eu/clima/sites/clima/files/ets/monitoring/docs/uncertainty_assessment_training_material_en.pdf
    https://ec.europa.eu/clima/sites/clima/files/ets/monitoring/docs/uncertainty_assessment_en.pdf
  - **Tool for uncertainty assessment**

Tool for uncertainty assessment

- Similar functioning as tool for “unreasonable costs”
- Contains guidance based on GD4/GD4a
- Contains further guidance on how to proceed if a parameter is unknown (e.g. type of distribution)→ conservative values applied

a. Amount of fuel or material imported to/consumed within the installation

	Quantity (Import, Consumption,..)	Quantity per measurement [e.g. t or Nm³]	Annual number of measurements	Annual quantity [e.g. t or Nm³]	Uncertainty related to each measurement	Type of distribution	Standard or expanded uncertainty?	Value "in service"?	Conversion factor to "in service"	Correlated or uncorrelated?
i.	Import from supplier XY	25	400	10 000	1,23%	normal	standard	not in service	2,0	uncorrelated
ii.										
iii.										
iv.										
v.										

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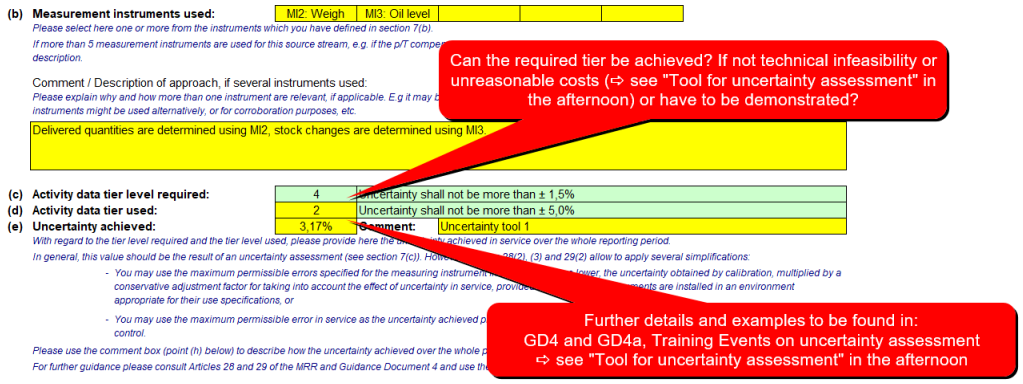
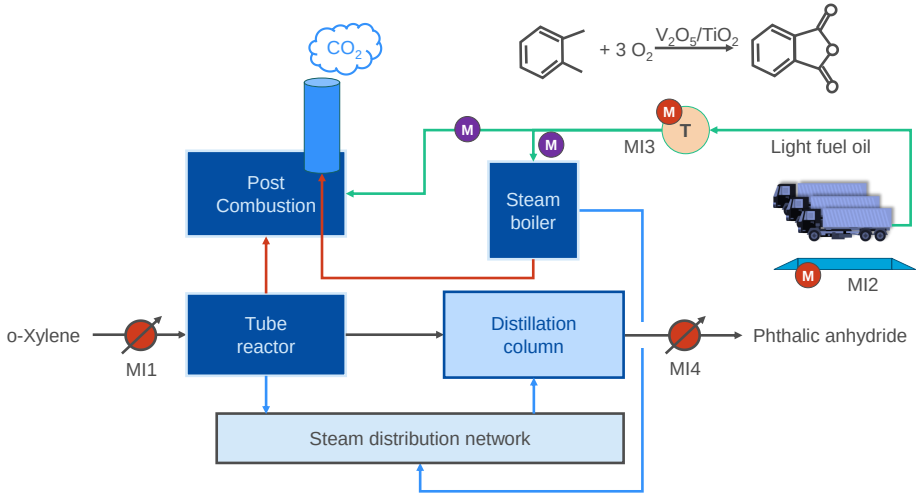
Tool for uncertainty assessment - Example

- Example: Bulk organics (PA) producer n the morning session





Set-up 1: Purchased amounts + stock level readings

- **Purchases:**
  - Annual quantity: 1 350 t
  - Uncertainty: 0,53% (MPES)
- **Storage tank:**
  - Capacity: 700 t
  - Uncertainty: 3% (calibration)

Set-up 2: Separate flow meters

- **Flow meter 1:**
  - Annual quantity: 1 200 t
  - Uncertainty: 2% (calibration)
- **Flow meter 2:**
  - Annual quantity: 150 t
  - Uncertainty: 1% (calibration)

Model answer

a. Amount of fuel or material imported to/consumed within the installation

	Name or brief description	Quantity per measurement [e.g. t or Nm³]	Annual number of measurements	Annual quantity [e.g. t or Nm³]	Uncertainty related to each measurement	Type of distribution	Standard or expanded uncertainty?	Value "in service"?	Conversion factor to "in service"	Correlated or uncorrelated?
i.	Weigh bridge (Light fuel oil)	25	54,0	1 350	0,53%	rectangular		in service		correlated
ii.										
iii.										
iv.										
v.										

b. Amount of fuel or material exported from the installation

	Name or brief description	Quantity per delivery [e.g. t or Nm³]	Annual number of deliveries	Annual quantity [e.g. t or Nm³]	Uncertainty related to each measurement	Type of distribution	Standard or expanded uncertainty?	Value "in service"?	Conversion factor to "in service"	Correlated or uncorrelated?
i.										
ii.										
iii.										
iv.										
v.										

c. Storage capacity for the fuel or material in the installation

Name or brief description	Storage capacity [e.g. t or m³]		Storage capacity [e.g. t or m³]	Uncertainty related to each measurement	Type of distribution	Standard or expanded uncertainty?	Value "in service"?	Conversion factor to "in service"	Correlated or uncorrelated?
Oil level gauge	700		700	3,00%	normal	expanded	in service		correlated

d. Storage levels at the begining and the end of the year

Name or brief description	Stock level [e.g. t or m³]		Stock level [e.g. t or m³]
Beginning of the year			
End of the year			

e.	**Average annual quantity consumed [e.g. t or Nm³]**	1 350	
f.	**Total uncertainty (k=1, 1σ, 68%)**	1,59%	
g.	**Total uncertainty (k=2, 2σ, 95%)**	**3,17%**	

...ty (share of annual quantity): 51,9%

This is the uncertainty to be checked against tier thresholds for compliance!

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Model answer

a. Amount of fuel or material imported to/consumed within the installation

	Name or brief description	Quantity per measurement [e.g. t or Nm³]	Annual number of measurements	Annual quantity [e.g. t or Nm³]	Uncertainty related to each measurement	Type of distribution	Standard or expanded uncertainty?	Value "in service"?	Conversion factor to "in service"	Correlated or uncorrelated?
i.	Meter to distillation unit	1.200	1	1.200	2,00%	normal	expanded	not in service	2,0	uncorrelated
ii.	Meter to post-combustion	150	1	150	1,00%	normal	expanded	not in service	2,0	uncorrelated
iii.										
iv.										
v.										

e. Average annual quantity consumed [e.g. t or Nm³] 1.350

Storage capacity (share of annual quantity): 0,0%

<5%

The annual quantity is calculated by deducting exported amounts under b) from amounts imported/consumed under a, as well as the stock level changes under d.

f. Total uncertainty (k=1, 1σ, 68%) 1,78%

g. Total uncertainty (k=2, 2σ, 95%) 3,56%

This is the overall uncertainty associated with the annual quantity. The value displayed here is the uncertainty which has to be compared with the threshold of the required tier to check compliance.

Further guidance

- Exemplar Improvement report
- User manual
  https://ec.europa.eu/clima/sites/clima/files/ets/monitoring/docs/ir_user_manual_en.pdf

EUROPEAN COMMISSION
DIRECTORATE-GENERAL
CLIMATE ACTION
Directorate C – Climate Strategy, Governance and Emissions from non-trading sectors
Unit C.2 – Governance and Effort Sharing

User Manual

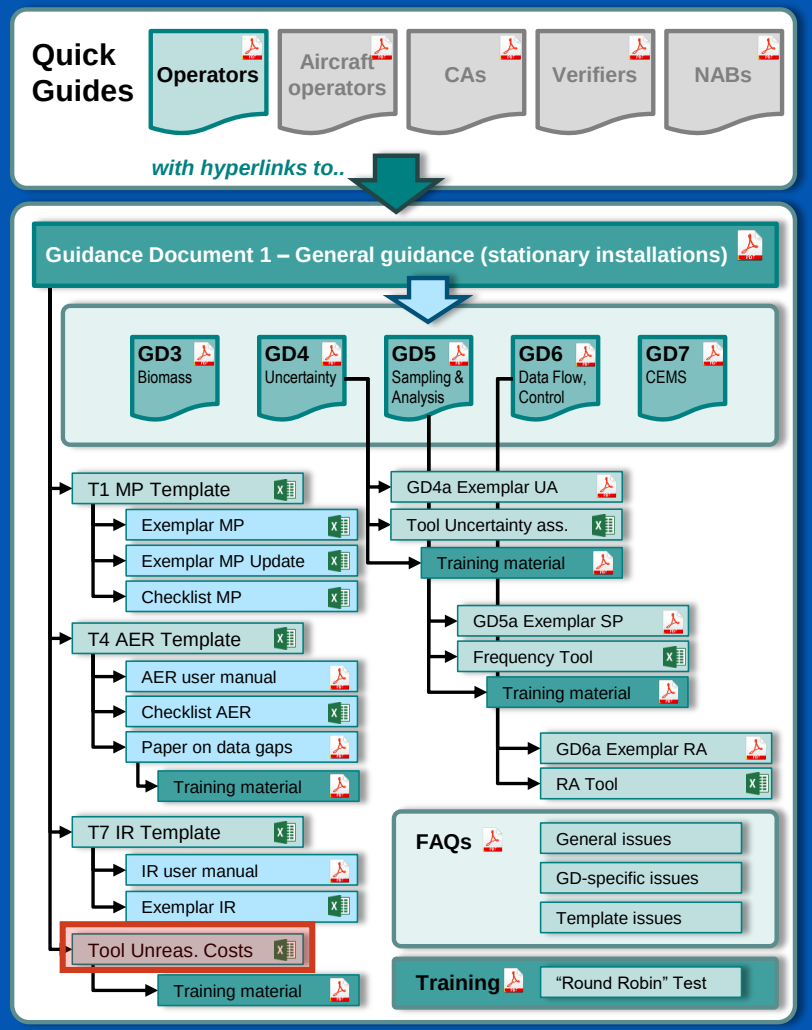
The Monitoring and Reporting Regulation –
Improvement Report Template

16 December 2016

Do you have any questions?

Tools for operators

Unreasonable costs



European Commission

Background

- MRR allows to deviate from applying the required tiers or methodologies if the operator can either demonstrate technical infeasibility (Article 17) or **unreasonable costs** (Article 18)
- Costs to be taken into account:
  - Investment costs
  - O&M costs
  - Other costs, e.g. costs for analyses
- IMPORTANT! Only costs which are additional and can be clearly attributed to the improvement measures can be taken into account → no double counting

Costs are considered unreasonable, where the "costs exceed the benefit"!

Benefit

$$Benefit = P \cdot AEm \cdot IF$$

P specified allowance price = 20 € / t CO_2(e)

AEm Average emissions from related source stream(s) [t CO_2(e)/year]

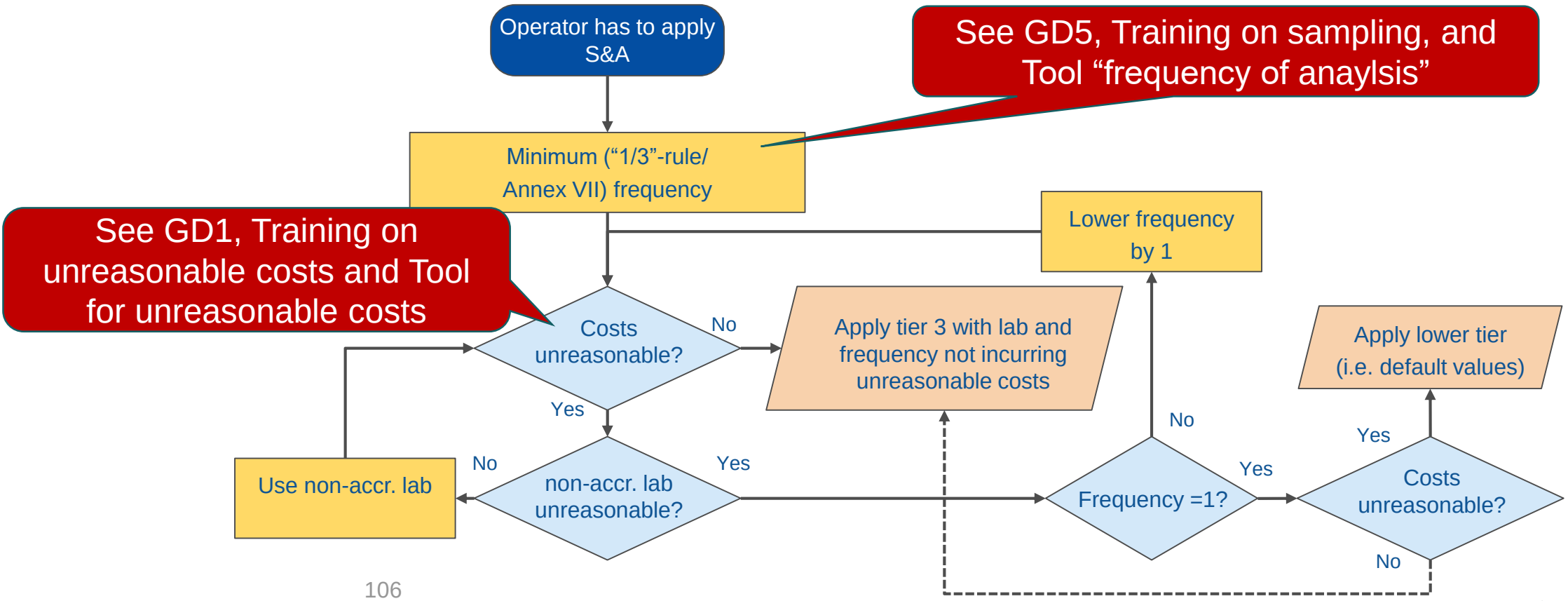
IF Improvement factor

Improvement factor:

- for AD: “Uncertainty achieved – Uncertainty required”
- for improvements not related to AD: 1%

Unreasonable cost – Example

How to proceed if Articles 32 to 35 incur unreasonable costs?

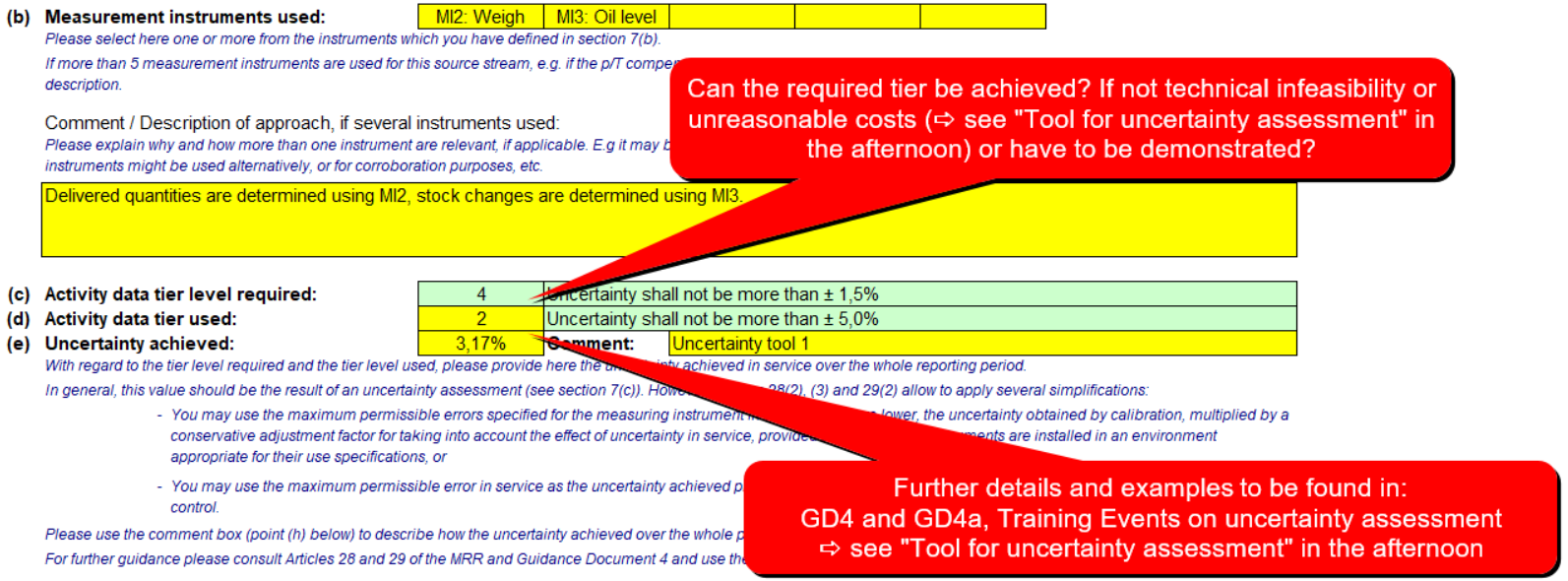


Useful sources of guidance

- Guidance and many examples can be found in:
  - GD1
  - The “Round Robin test” Training event https://ec.europa.eu/clima/sites/clima/files/ets/monitoring/docs/training_round_robin_test_en.pdf
  - Training events https://ec.europa.eu/clima/sites/clima/files/ets/monitoring/docs/unreasonable_costs_en.pdf
  - **Tool for unreasonable costs**

Tool for unreasonable cost - Example

- Example: Bulk organics (PA) producer in the morning session



(b) **Measurement instruments used:** MI2: Weigh | MI3: Oil level

Please select here one or more from the instruments which you have defined in section 7(b).

If more than 5 measurement instruments are used for this source stream, e.g. if the p/T compe… description.

Comment / Description of approach, if several instruments used:

Please explain why and how more than one instrument are relevant, if applicable. E.g it may b… instruments might be used alternatively, or for corroboration purposes, etc.

Delivered quantities are determined using MI2, stock changes are determined using MI3.

(c) **Activity data tier level required:**	4	Uncertainty shall not be more than ± 1,5%
(d) **Activity data tier used:**	2	Uncertainty shall not be more than ± 5,0%
(e) **Uncertainty achieved:**	3,17%	**Comment:** Uncertainty tool 1

With regard to the tier level required and the tier level used, please provide here the u… …nty achieved in service over the whole reporting period.

In general, this value should be the result of an uncertainty assessment (see section 7(c)). How… …28(2), (3) and 29(2) allow to apply several simplifications:

- *You may use the maximum permissible errors specified for the measuring instrument i… …lower, the uncertainty obtained by calibration, multiplied by a conservative adjustment factor for taking into account the effect of uncertainty in service, provide… …ments are installed in an environment appropriate for their use specifications, or*
- *You may use the maximum permissible error in service as the uncertainty achieved p… control.*

Please use the comment box (point (h) below) to describe how the uncertainty achieved over the whole p…

For further guidance please consult Articles 28 and 29 of the MRR and Guidance Document 4 and use th…

Can the required tier be achieved? If not technical infeasibility or unreasonable costs (⇨ see "Tool for uncertainty assessment" in the afternoon) or have to be demonstrated?

Further details and examples to be found in:
GD4 and GD4a, Training Events on uncertainty assessment
⇨ see "Tool for uncertainty assessment" in the afternoon

- **New gauge meter (allows tier 4):**
  - Cost: 15 000 €
  - Deprecation period: 8 years
- **Existing gauge:**
  - O&M: 500 €/year (same as for new one)

Model answer

1 *This is an optional tool for calculating whether costs can be considered as unreasonable.*

(a) **Direct impact on accuracy?** WAHR

Uncertainty currently achieved: 3,17%
Uncertainty related to the tier required: 1,50%

(b) **Types of costs**

i. Current or reference costs

Brief description	Investment costs			O&M costs [€/year]	Other costs [€/year]	Annual costs [€]
	Investment costs [€]	depreciation period [years]	interest rate [%]			
Existing gauge				500,00	0,00	500,00
				Sum	=	**500,00**

ii. Costs of the new equipment or new measures

Brief description	Investment costs			O&M costs [€/year]	Other costs [€/year]	Annual costs [€]
	Investment costs [€]	depreciation period [years]	interest rate [%]			
New gauge	15 000,00	8	4	500,00	0,00	2 727,92
				Sum	=	**2 727,92**

(c) **Annual costs (Sum of all "additional" costs)** = **2 227,92**

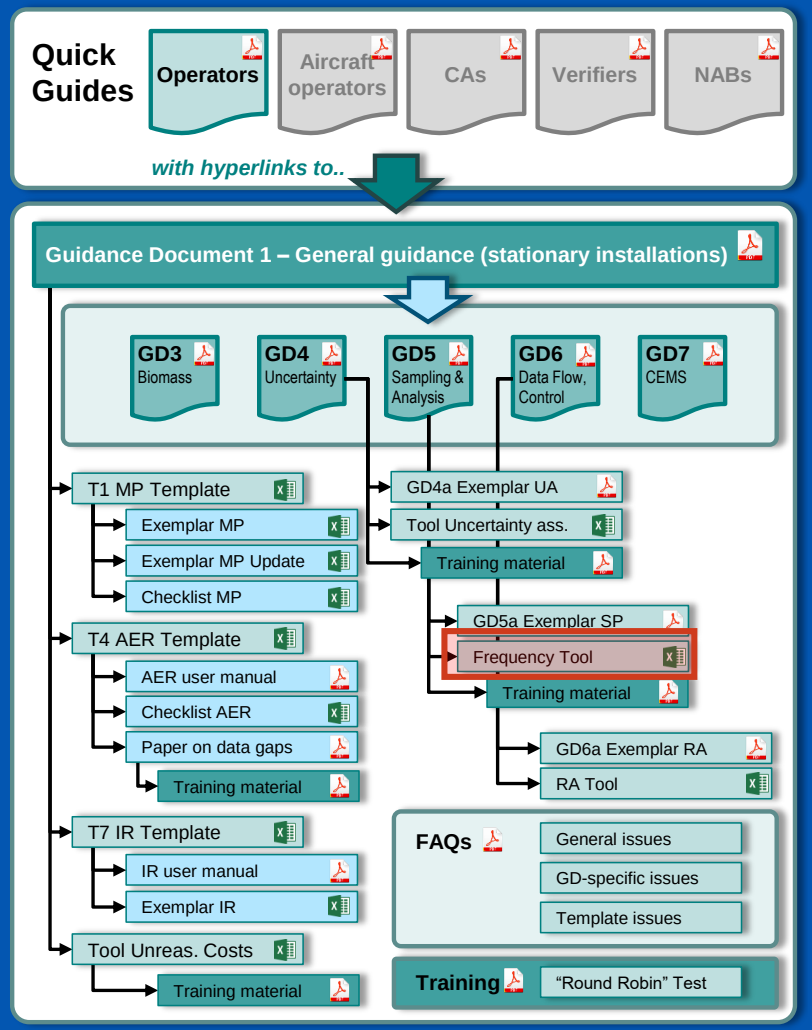
		EUA price [€/t CO2e]		Average annual emissions		Improvement factor		
(d)	**Annual Benefits**	20	x	4 400	x	1,67%	=	**1 469,60**

(e) **Costs are unreasonable?** WAHR

Do you have any questions?

Tools for operators

Frequency of analysis



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Background

- When sampling & analysis is required (EF, NCV, C-content,..), the provisions in Articles 32 to 35 have to be applied (sometimes not in full, e.g. where the tiers refers to ‘industry best practices’)
- Article 35: Minimum frequencies as listed in Annex VII MRR to be applied
- Reasons for derogation:
  - A frequency based on **analytical variation** of results that is no more than **1/3 of the uncertainty value** of the corresponding activity data tier
  - Unreasonable costs

Tool for frequency of analysis - Example

- A category B installation is firing heavy fuel oil
- Annex VII requires a frequency of analysis of ≥ 6 times per year
- Can the operator lower the frequency due to the 1/3 rule given the monthly analysis results from the previous year?

# of sample	NCV [GJ/t]
1	42.28
2	42.41
3	42.35
4	42.68
5	42.44
6	42.40
7	42.68
8	42.60
9	42.02
10	42.33
11	42.41
12	42.20

The “1/3” rule

- **Step 1:** Determine the uncertainty of the analytical results. This could be the expanded standard deviation of the m analytical values using the Student’s t-factor ($t_{95\%,m-1}$)

$$u_i = t_{95\%,m-1} \cdot \text{StDev}$$

- **Step 2**: Determine 1/3 of the tier required for the activity data of that same source stream

$$u_{total} = \frac{AD\ tier\ threshold\ \%}{3}$$

- **Step 3**: determine n as the minimum frequency of analysis

$$n = \frac{u_i^2}{u_{total}^2}$$

→ Those steps can be performed by the “frequency of analysis” tool

Model answer

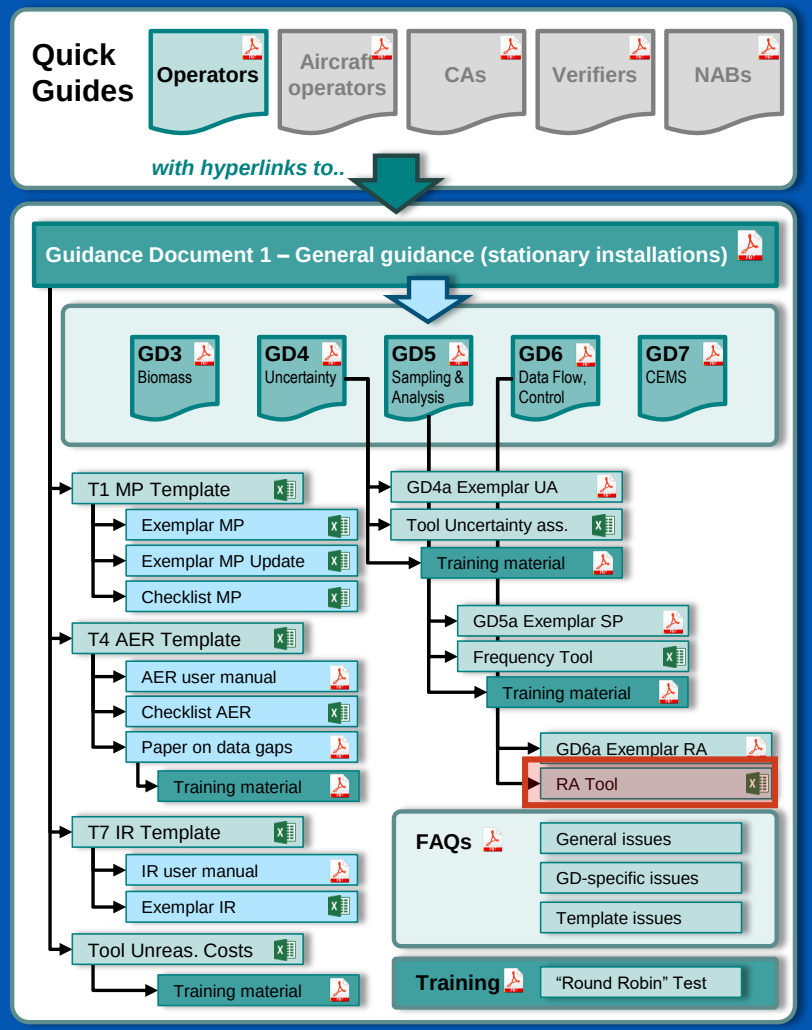
Statistical distribution		
- Emission factor	42,400	kg/GJ
- Standard deviation	0,192	kg/GJ
- Uncertainty	0,422	kg/GJ
Average		
- Number of samples	12	
- Emission factor	42,400	kg/GJ
- Actual uncertainty in average value	0,29%	
Uncertainty requirement	0,50%	
- Minimum number of samples	4	
- Advise for measurement frequency	Once per 3 month	

Number	Date	Emission factor	Units
1		42,28	kg/GJ
2		42,41	kg/GJ
3		42,35	kg/GJ
4		42,68	kg/GJ
5		42,44	kg/GJ
6		42,4	kg/GJ
7		42,68	kg/GJ
8		42,6	kg/GJ

Do you have any questions?

Tools for operators

Risk assessment



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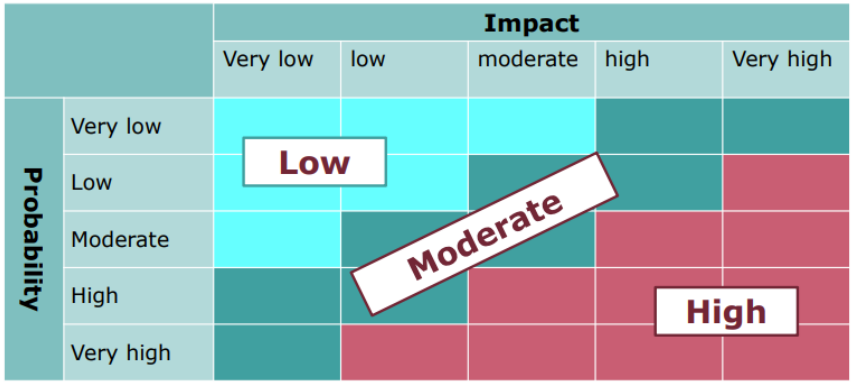
Background

- Article 12(1)(b) requires operators to submit the results of a **risk assessment** to show that the control measures are appropriate for the identified ‘inherent risks’ and ‘control risks’
- **Inherent risk**: Risk for (material) misstatements in the data flow before any control activities
- **Control risk**: Risk for (material) misstatements in the data flow not prevented or detected and corrected on a timely basis by the control system
- Articles 58 and 59 require **procedures** for data flow and control activities

What is risk?

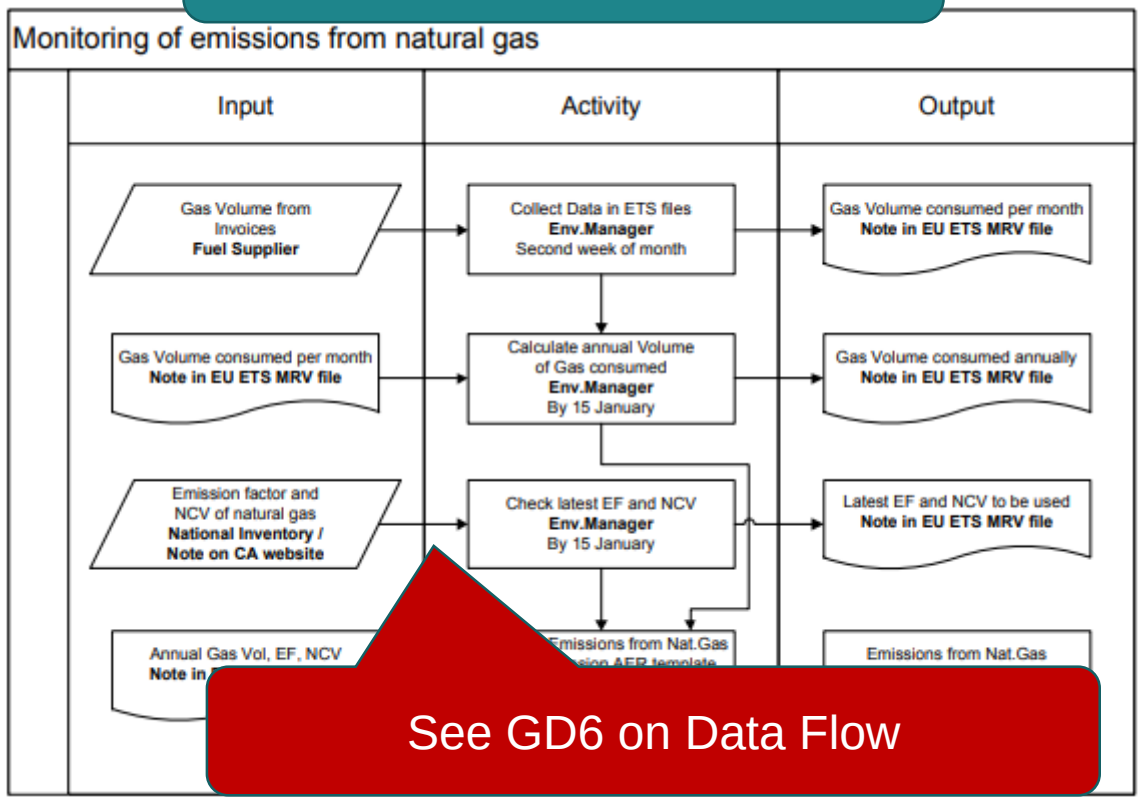


Risk [t CO_2 per year] = **Probability** [%] x **Impact** [t CO_2 per year]

- **Example:**
  - If a meter fails every five years (i.e. 20% probability in a certain year) and the meter is only read once per year, one whole year‘s data is lost, at worst.
  - If the associated emissions are, e.g. 20.000 t CO_2 per year, 4.000 tCO_2 per year are at risk, on average.
- **How can you lower the risk?**
  - E.g. install a redundant meter → lowers the probability to 4%
  - E.g. read the meter more often, such as monthly → lowers the impact to 1/12

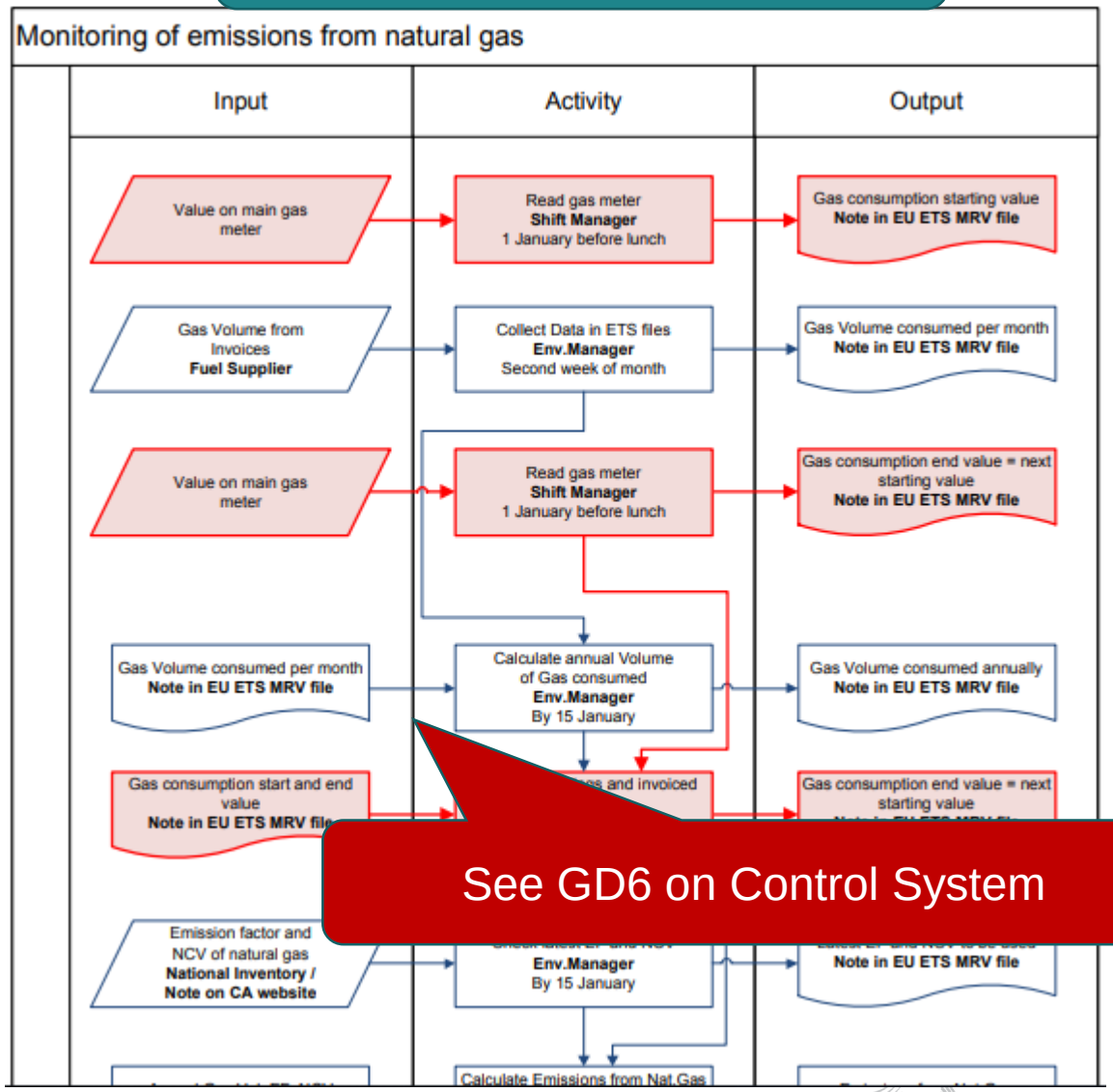
Data flow and control system

Data flow ↔ Inherent risk



See GD6 on Data Flow

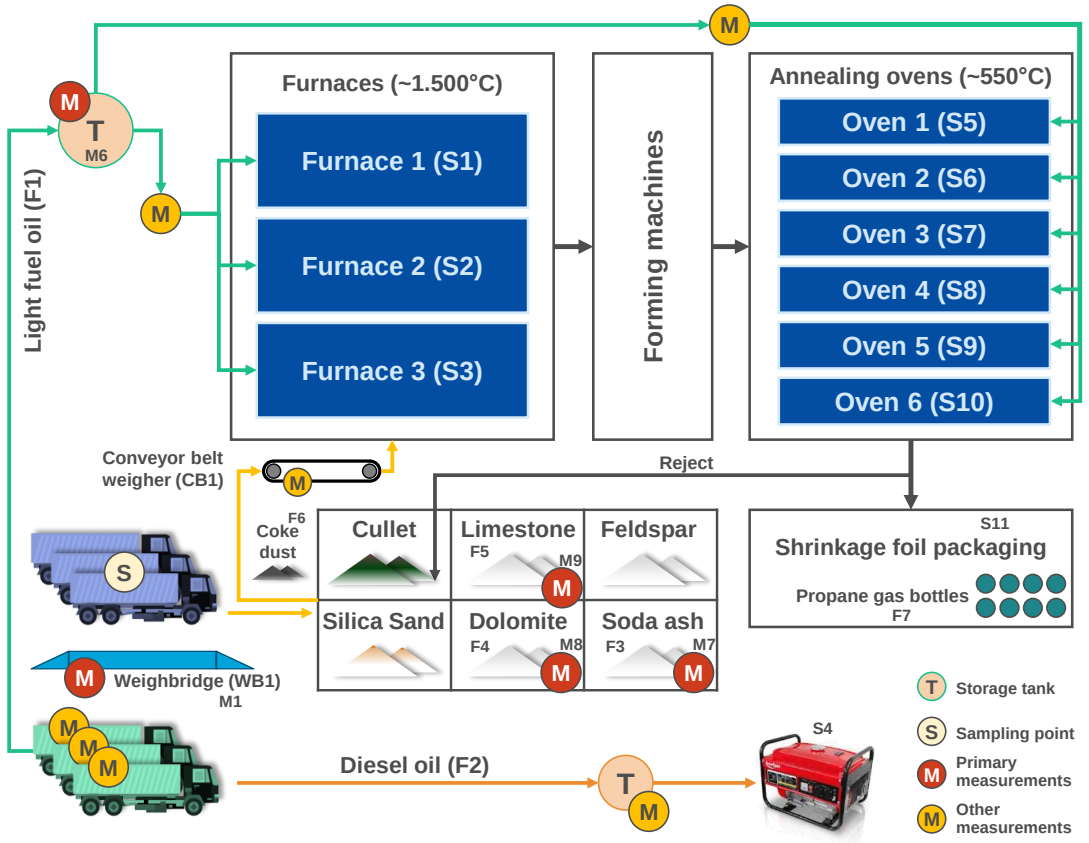
Control activities ↔ Control risk



See GD6 on Control System

Tool for risk assessment – Example

- Glass producer (“Round Robin” files)
- → see tool



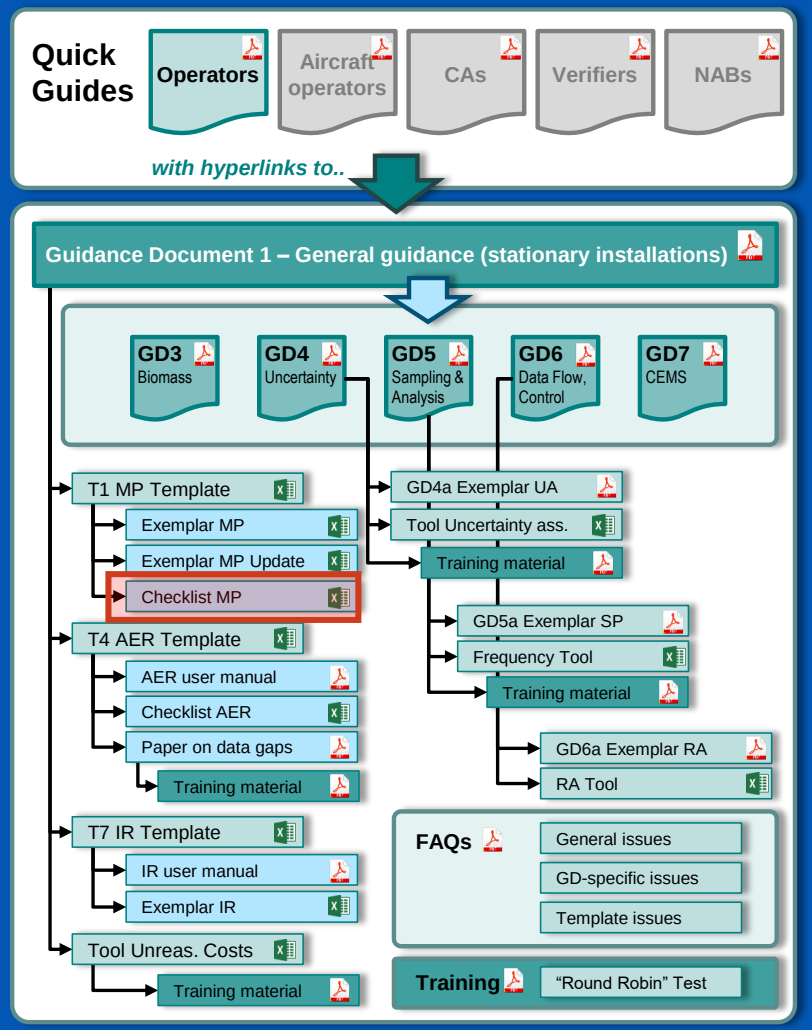
Model answer

Process/Activity	Incident	Type of risk	Inherent Risk				Inherent Risk x Control Risk				
			P	I	Risk		Control Measure(s)	P	I	Risk	
Weigh bridge WB1 (LFO)	Gross failure	Activity data lost or inaccurate	2	5	172,0	HIGH	Temporary use of invoices as data sources; cross checks with furnace flow meters and production data; procedure for corrective actions; procedure for quality assurance and control of measuring equipment	1	3	4,3	LOW
Weigh bridge WB1 (LFO)	Meter malfunction	Activity data lost or inaccurate	3	2	43,0	MED	Cross check with invoices (supplier's metering data) cross checks with furnace flow meters and production data; procedure for corrective actions; procedure for quality assurance and control of measuring equipment	2	1	0,4	LOW
Weigh bridge WB1 (LFO)	Meter maloperation (truck not fully placed on weigh bridge or not at standstill)	Activity data incorrect	4	2	86,0	MED	Plausibility checks; cross check with invoices, with furnace flow meters and production data	2	1	0,4	LOW
Weigh bridge WB1 (LFO)	Display error or misreading, typos when entering data into IT system	Activity data incorrect	4	3	172,0	HIGH	Cross check with supplier's metering data (invoices), furnace flow meters and production data; recheck of entered data by responsible person; automatic plausibility check of data entered into IT system; independent review by 2nd person	3	1	4,3	LOW
Weigh bridge WB1 (LFO)	Not appropriate for the operating conditions or not appropriately installed	Activity data incorrect	2	4	43,0	MED	Checklist comparing conditions applied and manufacturer's specification; personnel regularly educated (see procedure for managing ETS responsibilities); cross checks with invoices	1	1	0,2	LOW
Weigh bridge WB1 (LFO)	Missing or incorrect calibration	Activity data incorrect	4	3	172,0	HIGH	Procedure for quality assurance and control of measuring equipment; cross check with invoices, furnace flow meters and production data	2	2	4,3	LOW
Stock changes (LFO)	Forgetting to determine stocks at beginning	Activity data of reporting year incorrect (but no error over a long	4	2	86,0	MED	Procedure for the determination of stock changes (monthly reminder in calendar of responsible person); cross checks with	2	2	4,3	LOW

Do you have any questions?

Tools for CA

MP Checklist



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MP Checklist

CHECKLIST FOR ASSESSING
EU ETS MONITORING PLANS FOR INSTALLATIONS

Section 3 - Calculation-Based (1/2) - General and Source Streams

		Number of:	Major	Minor	de-minimis
What type of source streams are relevant?	Standard combustion?	Yes: ☐ No: ☐			
	Process emissions?	Yes: ☐ No: ☐			
	Mass balances?	Yes: ☐ No: ☐			
	PFC emissions?	Yes: ☐ No: ☐			

	Task	Yes/No	Notes	Completed?
D.7.a	Does the description mention all source streams, calculation factors, formulae, etc.?	Yes: ☐ No: ☐	if No:	☐
D.7.b	Are all meters for all source streams included in Measurement Devices Table?	Yes: ☐ No: ☐	if No:	☐
D.7.b	Are all parameters (uncertainty, used range,..) for all meters provided?	Yes: ☐ No: ☐	if No:	☐
C.6.f	Are sum of minor and de-minimis emissions below thresholds?	Yes: ☐ No: ☐	if No:	☐
E.8	Are all required tiers for all source streams applied?	major source streams Yes: ☐ No: ☐ / minor source streams Yes: ☐ No: ☐ / estimation for de-minimis source streams OK? Yes: ☐ No: ☐		☐
nt		National legal metrological control (Route 1) Yes: ☐ No: ☐		☐

Tools for CA

The “AER” Tool

AER Tool

Tool for checking the integrity of AER Templates and for aggregating AER data

Provided by Umweltbundesamt GmbH for DG CLIMA (27 March 2015)

Central file list for batch operations

Last update of this list: 23.11.2020 22:10

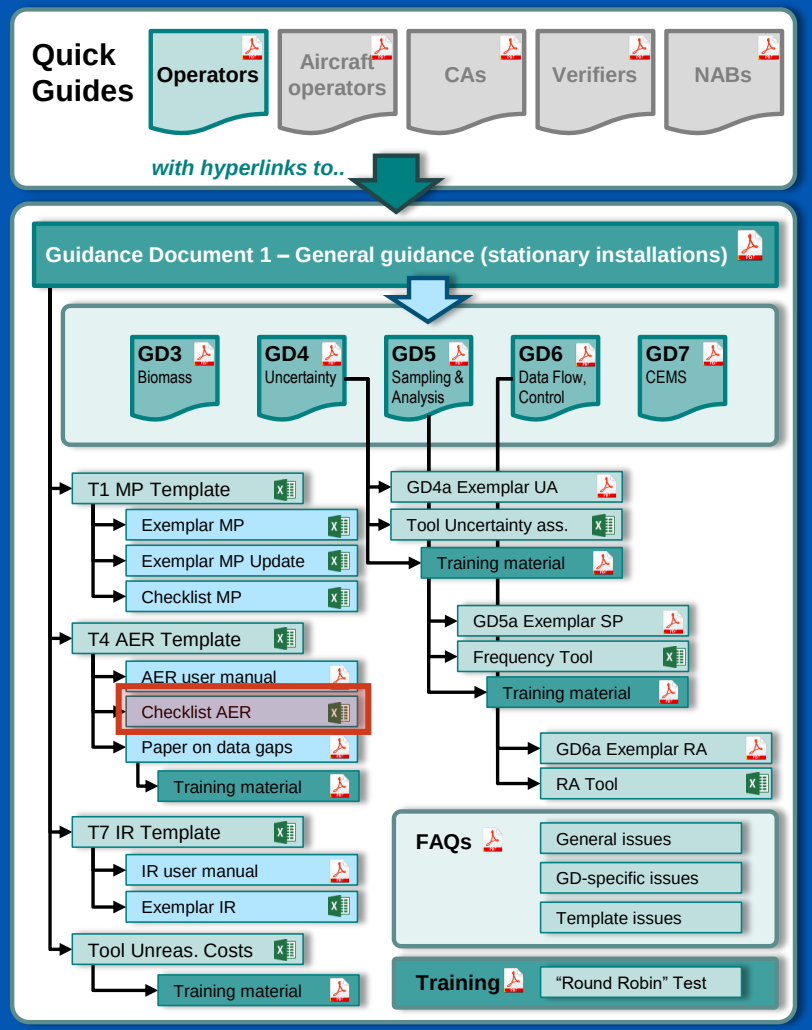
umweltbundesamt

Filename	File Date	Checking date	Reference filename	Errors found	Unique ID	Installation
3-2a AER_PA - with data gap.xls	23.11.2020 20:52	23.11.2020 22:10	P3 Inst AER_COM_en_16	OK	AT-1234	Phthalic anhy
3-4 AER_HNO3.xls	19.11.2020 23:05	23.11.2020 22:11	P3 Inst AER_COM_en_16	OK	AT-5555	Nitric acid
3-5 AER_Glass.xls	23.11.2020 22:09	23.11.2020 22:11	P3 Inst AER_COM_en_16	1	AT-9876	Example Inst

- Similar to tools for free allocation: NIMs Tool, ALC Tool, NE&C Tool,…
- Integrity checking of operator‘s AER files
- Aggregation into an Excel database → allows for automatic checking
- Tool not published on website → contact us in case you do not have it

Tools for CA

AER/VR Guidance and Checklist



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AER & VR Checklist

CHECKLIST FOR ASSESSING EU ETS EMISSIONS AND VERIFICATION REPORTS FOR INSTALLATIONS
Section 1 - Overview

Reporting year:	
Site Reference:	
Inst. Name:	
Unique ID:	
Site Name:	
Operator:	
Verifier:	

Category:	A ☐	B ☐	C ☐
Low emitter:		Yes: ☐	No: ☐
included before:		Yes: ☐	No: ☐
excluded (Art. 27):		Yes: ☐	No: ☐

Tools for CA

Risk-profiling tool

Risk-based profiling tool

- Risk-based selection for spot checking installations
  - For inspections
  - For detailed MP/AER/VR checking (annually)

Ranking	#	Inst. Code	Installation Name	Points scored (%)	Emissions	Result (risk)
						Weighted by CO2e
1	1	AT001	CCGT CHP plant	15,78%	1 500 000	236 719
2	8	AT008	Integrated steel plant1	4,84%	3 500 000	169 511
3	7	AT007	Integrated steel plant	2,79%	3 500 000	97 649
4	2	AT002	CCGT CHP plant2	5,13%	1 500 000	77 006
5	9	AT009	Nitric acid	5,75%	160 000	9 203
6	10	AT010	Nitric acid2	3,61%	75 000	2 708
7	3	AT003	Ceramic plant	2,70%	15 000	405
8	4	AT004	Ceramic plant2	2,70%	15 000	405
9	5	AT005	District heating plant	1,92%	7 000	135
10	6	AT006	District heating plant2	0,36%	7 000	25
11	11					

Do you have any questions?

European Commission

Thank you for your attention

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