



Case study: Monitoring and reporting approaches under the European Union Emission Trading Scheme (EU ETS)



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MRV
CAPACITY DEVELOPMENT
PROJECT - TURKEY

Overview

- Why is MRV important in the EU ETS
- Monitoring and Reporting Regulation (MRR)
- Overview of the compliance cycle
- Monitoring plan
- Monitoring approaches
- Selection of Tiers
- Sampling and lab analyses
- Reporting
- Summary

Attention: This presentation focuses on stationary installations!



Why is MRV important in the EU ETS

- MRV of emissions play a key role in the credibility of any emission trading system.
- Without MRV, compliance would lack transparency and be much more difficult to track, and enforcement compromised.
- It is the complete, consistent, accurate and transparent monitoring, reporting and verification system that creates trust in emissions trading.
- Only in this way can it be ensured that operators meet their obligation to surrender sufficient allowances.



Monitoring and Reporting Regulation (MRR)

- Following the revision of the EU ETS Directive in 2009, updated rules for monitoring and reporting have been laid down in an EU Regulation called the MRR
 - Applicable from 2013
 - The MRR replaces the Monitoring and Reporting Guidelines (MRG 2007)
- The MRR Regulation has been developed with view to enhancing EU-wide harmonisation of approaches
- Room for interpretation is reduced by a detailed set of guidance documents, templates and examples



Principles

- Completeness
- Consistency & comparability
- Transparency
- Accuracy
- Integrity and methodology
- Continuous improvement



Overview of the compliance cycle

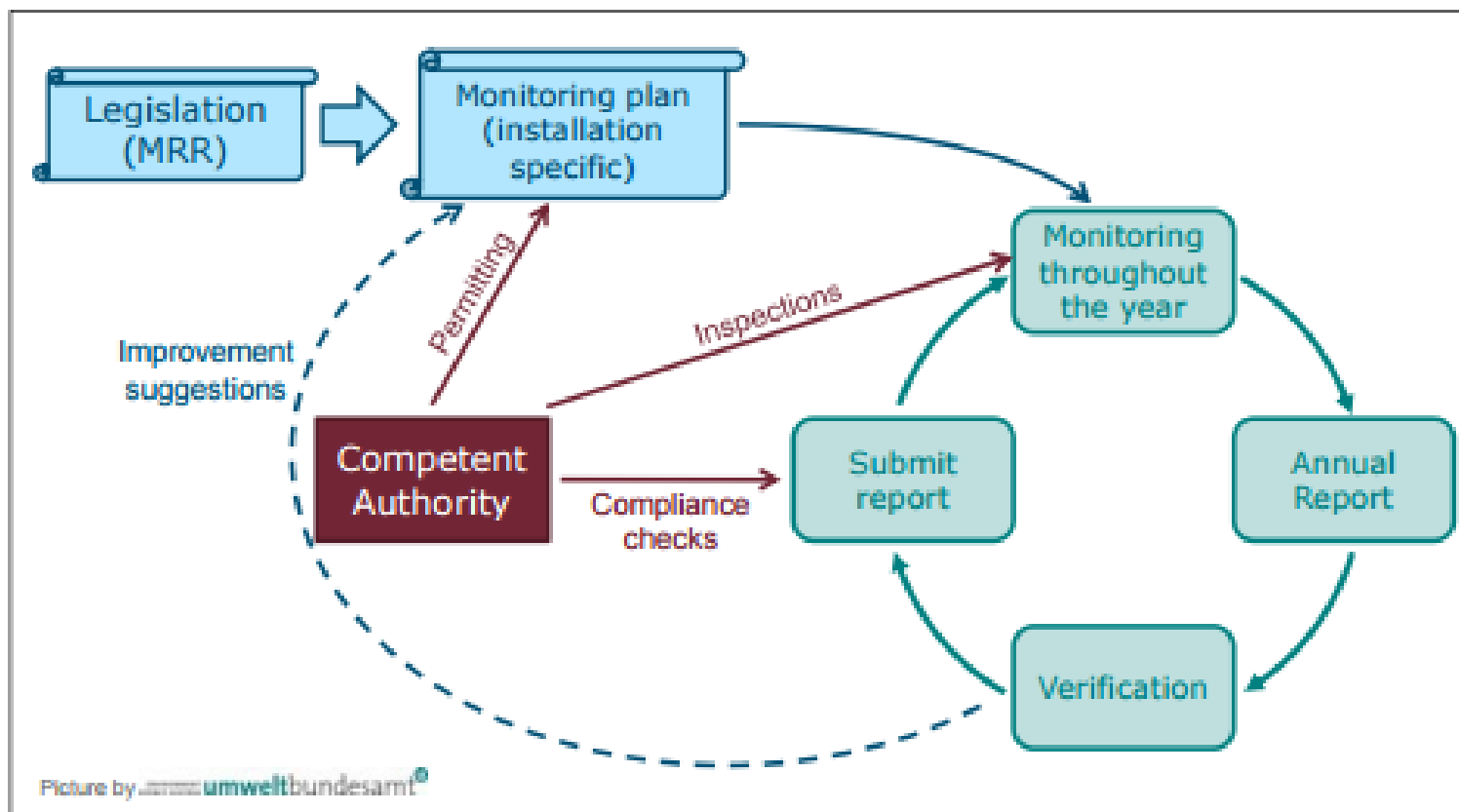
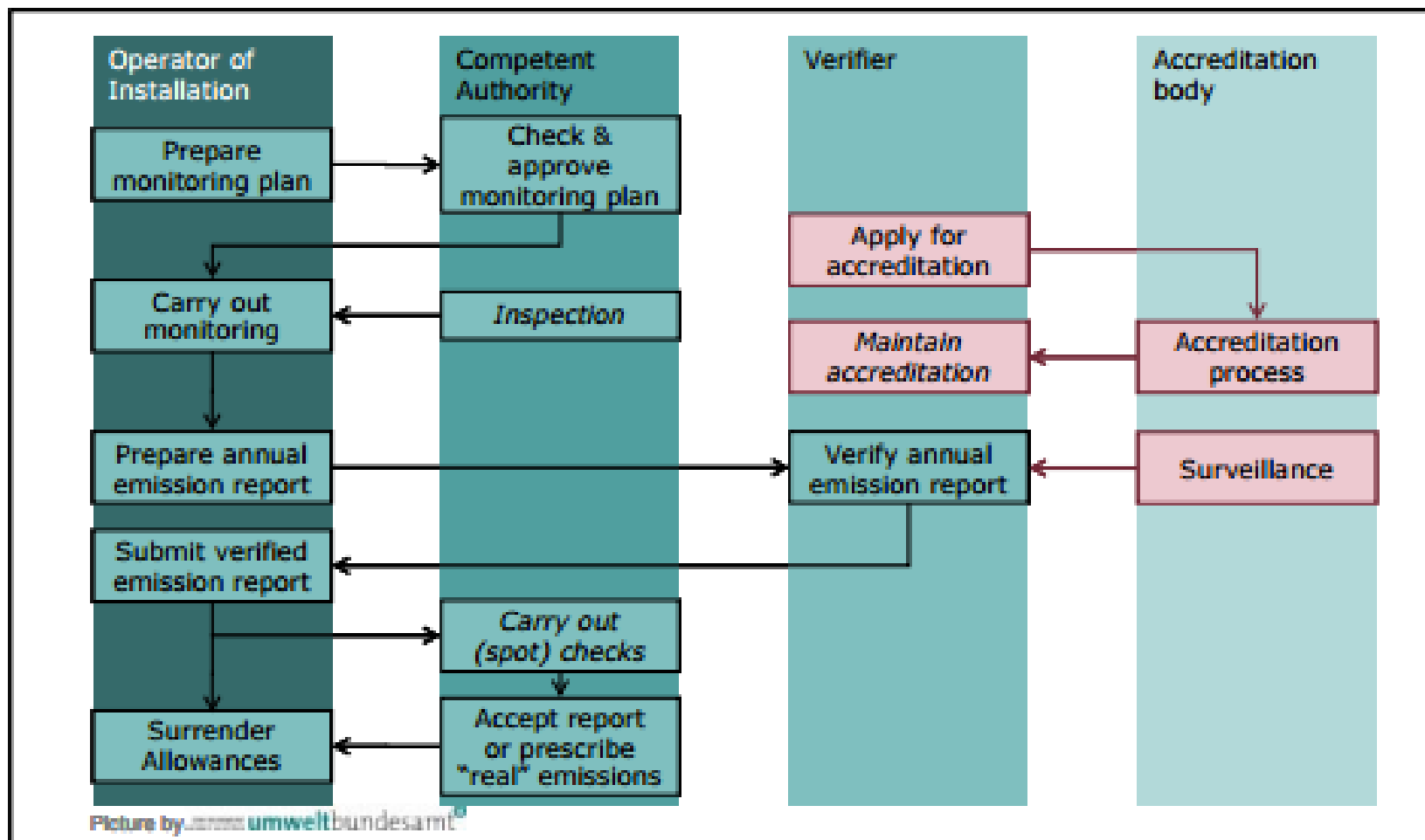


Figure 1: Principle of the EU ETS compliance cycle

Main actors in the EU ETS



Common timeline of the annual EU ETS compliance cycle for emissions in year N.

When?	Who?	What?
1 January N		Start of monitoring period
By 28 February N	CA	Allocation of allowances for free (if applicable) on the operator's account in the Registry
31 December N		End of monitoring period ¹⁶
by 31 March ¹⁷ N+1	Verifier	Finish verification and issue verification report to operator
By 31 March ¹⁸ N+1	Operator	Submit <i>verified</i> annual emissions report
By 31 March N+1	Operator / Verifier ¹⁹	Enter verified emissions figure in the verified emissions table of the Registry
March – April N+1	CA	Subject to national legislation, possible spot checks of submitted annual emissions reports. Require corrections by operator, if applicable. N.B. Subject to national legislation, there is no obligation for CAs to provide assistance or acceptance of operator reports either before or after 30 April).



Common timeline of the annual EU ETS compliance cycle for emissions in year N.

When?	Who?	What?
By 30 April N+1	Operator	Surrender allowances (amount corresponding to verified annual emissions) in Registry system
By 30 June N+1	Operator	Submit report on possible improvements of the MP, if applicable ²⁰
(No specified deadline)	CA	Carry out further checks on submitted annual emissions reports, where considered necessary or as may be required by national legislation; require changes of the emissions data and surrender of additional allowances, if applicable (in accordance with Member State legislation).



Importance of the Monitoring Plan

- All monitoring approaches to be laid down in monitoring plan
- Plan to be approved by competent authority – changes/updates require re-approval
- Typical elements:
 - Data collection (metering data, invoices, production protocols,...)
 - Sampling of materials and fuels
 - Laboratory analyses of fuels and materials
 - Maintenance and calibration of meters
 - Description of calculations and formulae to be used
 - Control activities (e.g. four eyes principle for data collection)
 - Data archiving (including protection against manipulation)
 - Regular identification of improvement possibilities.



Monitoring plan templates

- The MRR prescribes minimum contents of the monitoring plan
- EU Commission provides [template](#) (voluntary use)
- Many EU Member States have developed their own template

	B	C	D	E	F	G	H	I	J	K	L	M	N	O	AC
2		C.		Navigation area:		Table of contents		Previous sheet		Next sheet					
3		Installation		Top of sheet		Installation Activities		Monitoring approaches		Emission sources&points					
4		Description		End of sheet		Measurement points		Source streams		Activities excluded					
48		<p>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:</p> <p>http://ec.europa.eu/clima/policies/ets/docs/guidance_interpretation_en.pdf</p> <p>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.</p> <p>For showing/hiding examples, press the "Examples" button in the navigation area.</p>													
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(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 with Article 19 of the MRR. Use the average verified annual emissions of the previous trading period data OR if this data is not available, or is inappropriate, a conservative estimate of annual average emissions, including 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		t CO ₂ e
Installation category in accordance with Article 19		

(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.

Monitoring approaches

- There are various monitoring approaches:
 - Standard methodology
 - Mass balance approach
 - Measurement based approaches
 - Fall back-methodology
 - Combinations of approaches



Standard Methodology: Energy and Process Emissions

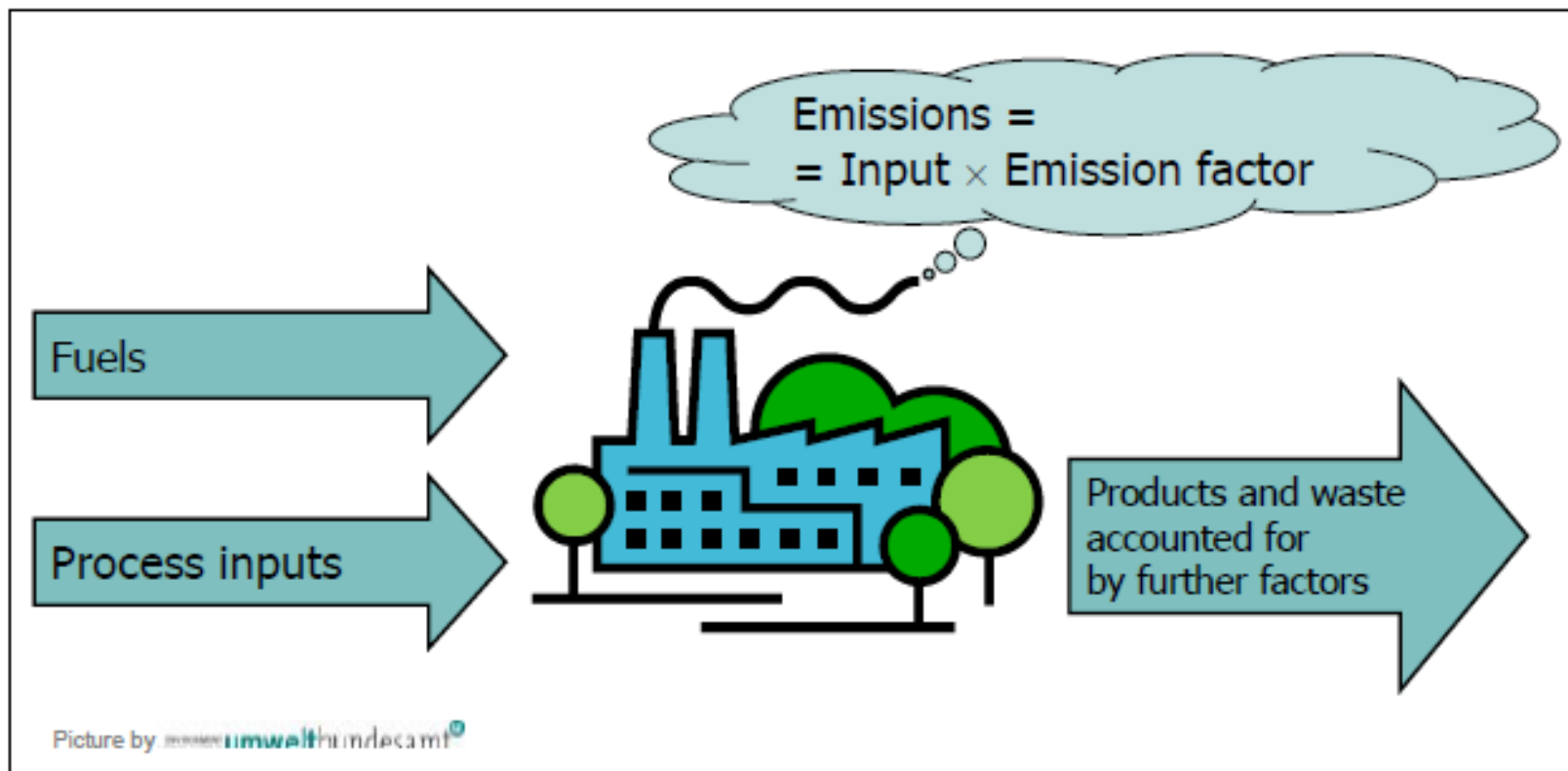


Figure 4: Principle of the standard methodology for calculating emissions



Calculation Formulae for the Standard Methodology

Energy Emissions

$$Em = AD \cdot EF \cdot OF$$

Where:

Em Emissions [t CO₂]

AD Activity data [TJ, t or Nm³]

EF Emission factor [t CO₂/TJ, t CO₂/t or t CO₂/Nm³]

OF Oxidation factor [dimensionless]

Process Emissions

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

Where:

Em Emissions [t CO₂]

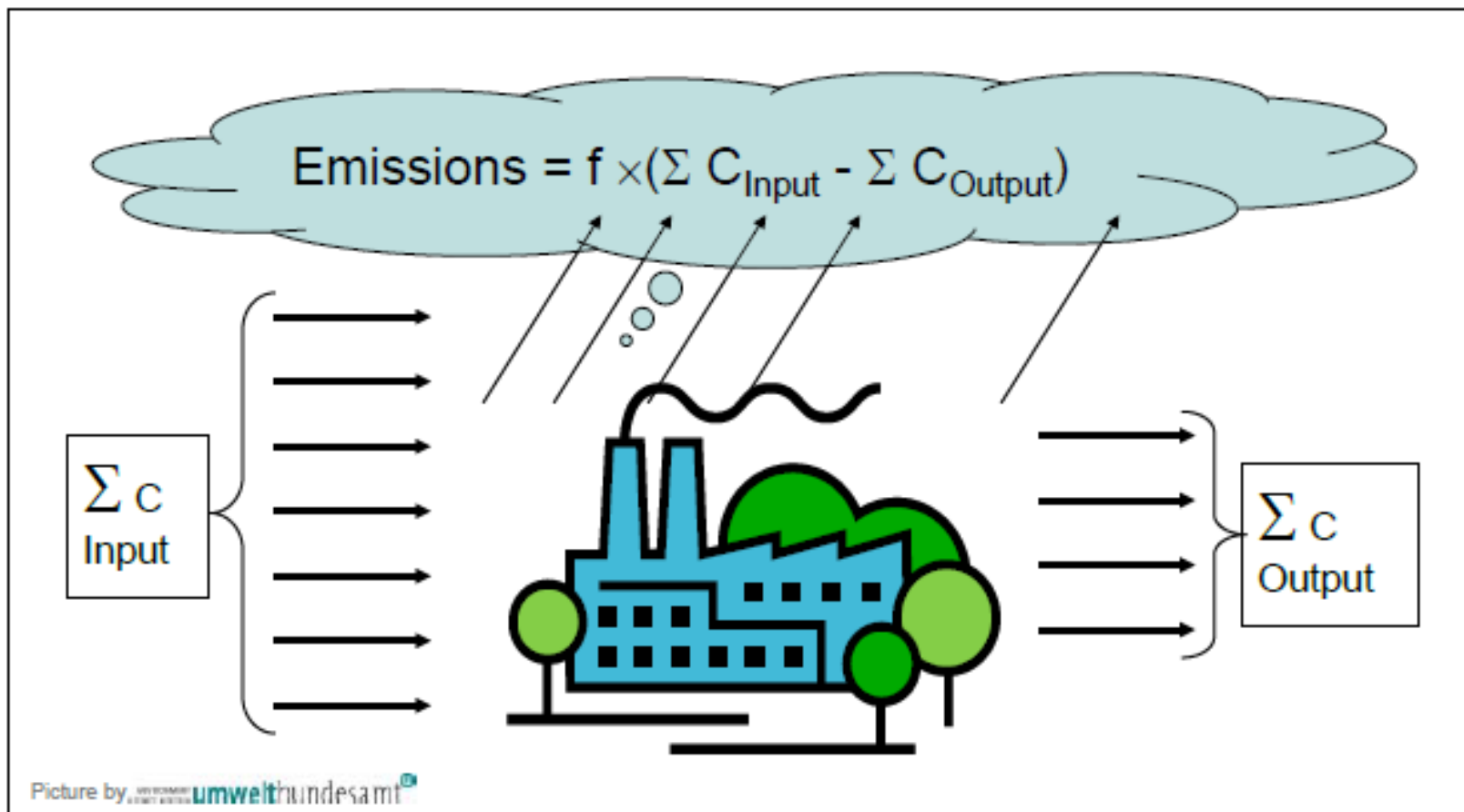
AD Activity data [t or Nm³]

EF Emission factor [t CO₂/t or t CO₂/Nm³]

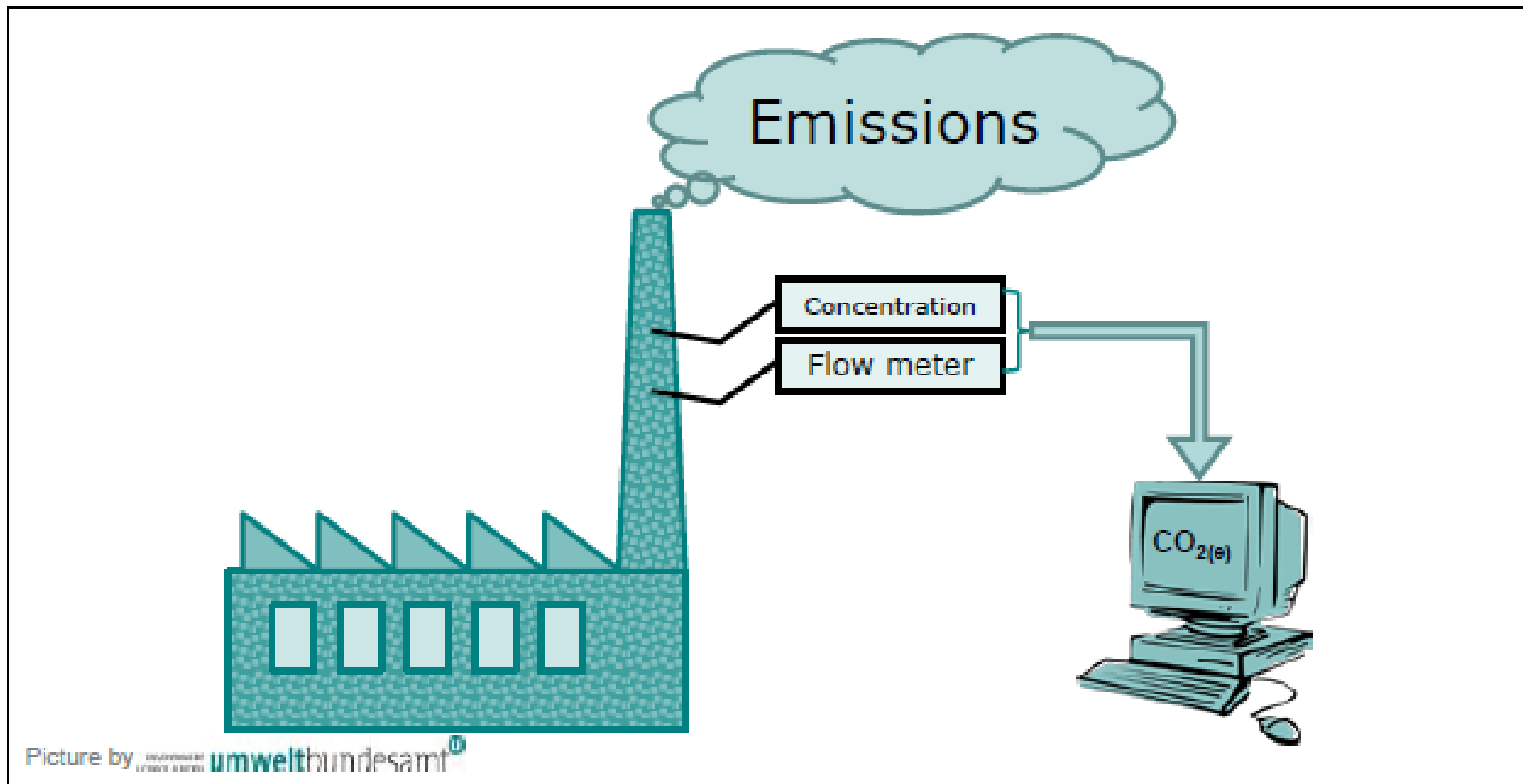
CF Conversion factor [dimensionless].



Mass Balance Approach

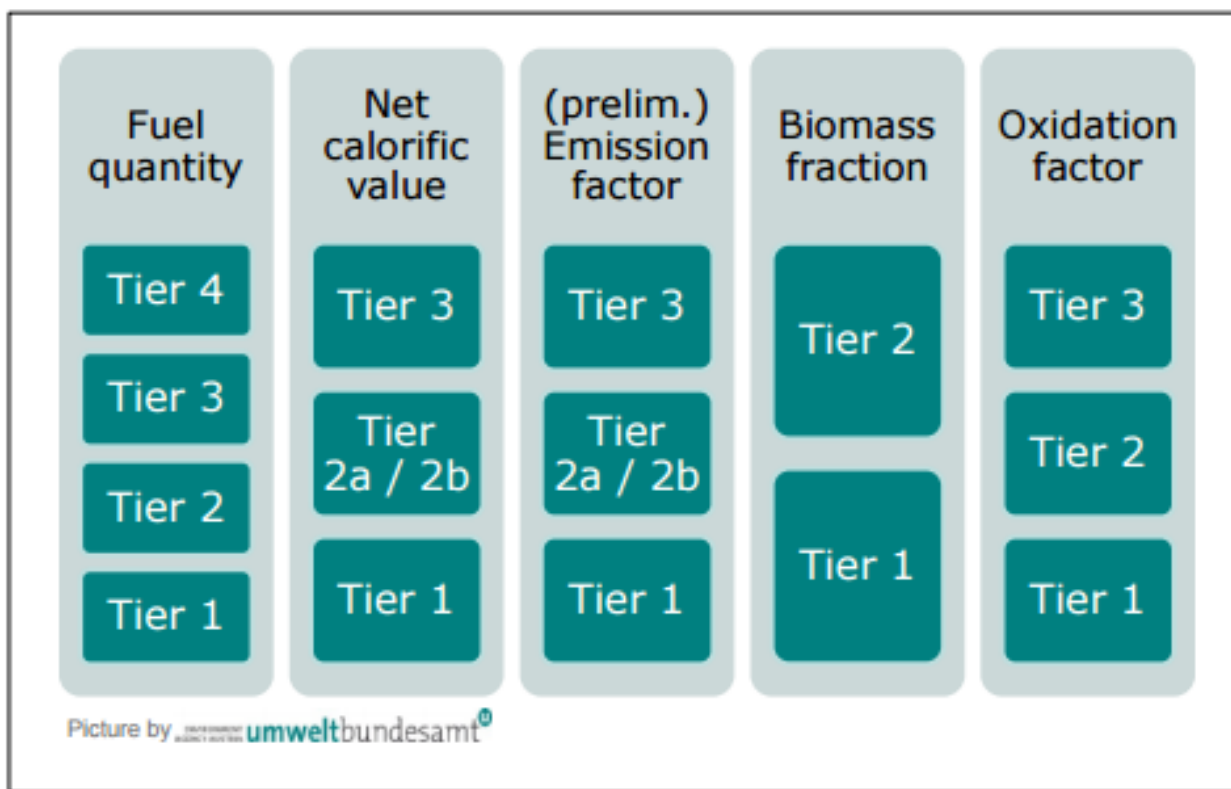


Continuous Emission Measurement Approach



The Tier System

- Illustration of the tier system for calculation based approaches (combustion emissions).



Fallback Methodology and Combination of approaches

Fallback Methodology

- Only allowed where a tier 1 approach is not feasible due to unreasonable costs
- Individual methodology complying with overall uncertainty limits:
 - 7.5% for Category A
 - 5% for Category B
 - 2.5% for Category C
- Justification has to be provided, operator has to check whether Tier approach becomes feasible over time

Combination of approaches

- Operator may combine approaches, e.g. calculation + continuous emission measurement

Tier Selection – Higher accuracy for installations and sources with higher emissions

Source stream	Category A	Category B	Category C
Major	Annex V	Highest	Highest
Major, but technically not feasible or unreasonable costs	up to 2 tiers lower with a minimum of tier 1	up to 2 tiers lower with a minimum of tier 1	1 tier lower with a minimum of tier 1
Major, but still technically not feasible or unreasonable costs; improvement plan (max. 3 year transition)	Minimum tier 1	Minimum tier 1	Minimum tier 1
Minor	highest tier technically feasible and without unreasonable costs (minimum tier 1)		
De-minimis	Conservative estimation, unless a defined tier is achievable without additional effort		

- **Category A:** Emissions ≥ 50 kt CO₂-eq. p.a.
- **Category B:** Emissions > 50 kt CO₂-eq. ≤ 500 kt CO₂-eq p.a.
- **Category C:** Emissions > 500 kt CO₂-eq. p.a.
- **De-minimis sources:** Jointly less than 1kt CO₂-eq p.a. Or 2% of total, up to 20 kt CO₂-eq p.a
- **Minor sources:** Jointly less than 5kt CO₂-eq p.a. Or 10% of total, up to 100 kt CO₂-eq p.a
- **Major sources:** all others

Installations with annual emissions ≤ 25 kt CO₂-eq can use simplified approaches



Cost-effectiveness - Unreasonable costs

- Monitoring approach to be cost-effective: Cost of moving to a higher tier must be commensurate with benefit in accuracy:
- $\text{Benefit} = \text{Allowance price (20 EUR)} * \text{Improved Uncertainty} * \text{Annual Emissions}$
- Cost: E.g. Higher operational costs of improved data management, investment costs for new metering equipment over depreciation period



Uncertainty Assessment

- Uncertainty used as measure of data quality
- Uncertainty assessment to be submitted with monitoring plan, e.g. Evidence for
 - Uncertainty of measurement equipment for activity data
 - Uncertainty related to their calibration
 - Uncertainty of continuous emission measurement equipment
 - Overall uncertainty calculation for fall-back approach



Sampling

- Lab analyses required for highest tiers, e.g. to determine carbon content and net calorific value of fuel
- Sampling plan with frequencies and sampling approach required to ensure comparable sampling approaches and representative sampling
- Sampling plan to be approved as part of monitoring plan
- [Exemplary sampling plan:](#)

Sampling objectives:

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

The determination of the (weighted average) net calorific value and the (weighted average) emission factor of the total amount of heavy fuel oil over the whole year for the purpose of determining the CO₂ emissions stemming from its combustion.

Analysis required:

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

The net calorific value and the carbon content which is needed for calculating the emission factor³

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

Heavy fuel oil

Minimum Frequency of Analyses

Fuel/material	Minimum frequency of analyses
Natural gas	At least weekly
Other gases, in particular synthesis gas and process gases such as refinery mixed gas, coke oven gas, blast-furnace gas, convertor gas	At least daily — using appropriate procedures at different parts of the day
Fuel oils (for example light, medium, heavy fuel oil, bitumen)	Every 20 000 tonnes of fuel and at least six times a year
Coal, coking coal, petroleum coke, peat	Every 20 000 tonnes of fuel/material and at least six times a year
Other fuels	Every 10 000 tonnes of fuel and at least four times a year
Untreated solid waste (pure fossil or mixed biomass/fossil)	Every 5 000 tonnes of waste and at least four times a year
Liquid waste, pre-treated solid waste	Every 10 000 tonnes of waste and at least four times a year
Carbonate minerals (including limestone and dolomite)	Every 50 000 tonnes of material and at least four times a year
Clays and shales	Amounts of material corresponding to 50 000 tonnes of CO ₂ and at least four times a year
Other materials (primary, intermediate and final product)	Depending on the type of material and the variation, amounts of material corresponding to 50 000 tonnes of CO ₂ and at least four times a year'

Laboratory Analysis

Requirements ensuring quality of the analysis:

- Laboratory to be accredited for EN/ISO IEC 17025 with regards to the analysis procedure to be carried out
- Where justification can be provided this is technically not feasible or would lead to unreasonable costs, laboratories meeting equivalent requirements can be used
- Evidence has to be provided requirements are met
- Equivalent requirements include among other:
 - Management of competence of staff for analysis process
 - Accomodation and environmental conditions
 - Selection of analytical methods and relevant standards
 - Management of sampling, sample preparation, ensuring sample integrity
 - Uncertainty estimation
 - Quality assurance for calibration and test results



Reporting

- The MRR prescribes minimum content of annual emission reports
- As with the monitoring plan, the EU Commission provides a reporting template
- Many EU Member States have developed own reporting templates, a number are software-based

	B	C	D	E	F	G	H	I	J	K	L	M	N	O
2		A.		Navigation area:		Table of contents		Previous sheet		Next sheet				
3		OperatorInst		Top of sheet		Reporting year		Operator		Installation				
4		ID		End of sheet		Contact details		Verifier details						

A. Identification of the Operator, Installation and Verifier

1 Reporting year

Please note that - subject to the administrative practice in the Member State - changes regarding the name or identity of the operator, the name of the installation or other information relevant for the permit will require a formal notification to the competent authority pursuant to Article 7 of the EU ETS Directive.

Reporting of such changes in this sheet will usually not be sufficient. However, the most recent data has to be filled in here.

Include any Member State specific guidance

2 About the operator

(a) Competent Authority for reporting

(b) Member State

(c) Emissions trading permit number

member state/CA prefix

(d) Operator data:

The operator is the [natural or legal] person who operates or controls an installation or, where this is provided for in national legislation, to which decisive economic power over the technical functioning of the installation has been delegated.

i. Operator Name:

ii. Street, Number:

iii. Post code:

iv. City:

Summary

- Detailed provisions for monitoring and reporting laid down in MRR
- Complemented by guidance, templates, examples
- MRR requirements driven by principles
- All monitoring approaches to be laid down in monitoring plan to be approved by competent authority and updated as necessary
- MRR aims to balance data quality and cost-effectiveness, e.g.
 - More rigorous monitoring required for larger emitters and larger sources
 - Simplifications for smaller emitters
 - Concept of unreasonable costs requires benefit of improved monitoring balances increased costs



Thank you for your attention!

Any Questions?



On behalf of:



Federal Ministry
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