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Study Tour on ETS – Delegation from Mexico

Monitoring and Reporting

From the perspective of the operator

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E 2.3 Economic Aspects, Monitoring and Evaluation
E 2.2 Chemical Industry and Industrial Combustion Installations

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Outline

- Part I: Legal framework
- Part II: EU ETS Compliance Cycle for MRV;
  Main elements of Monitoring & Reporting
- Part III: Monitoring Plan Content;
  Data Collection; Typical Errors
- Part IV: Sanctions
- Part V: Lessons learnt

Legal framework

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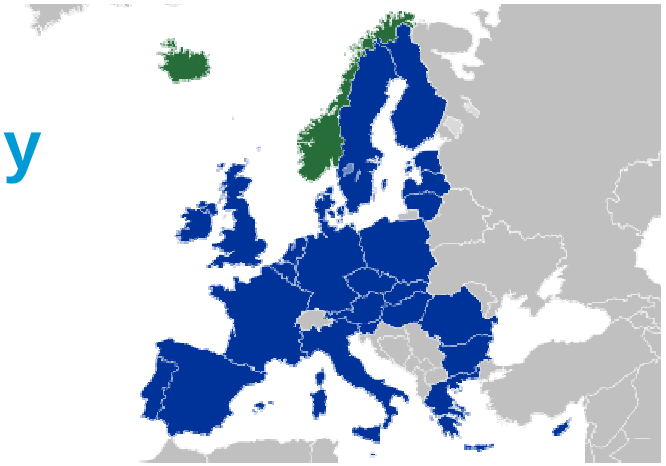
Legal Framework in EU and Germany



- EU ETS Directive 2003/87/EC
- **1st and 2nd trading period (2005-2012): Monitoring & Reporting Guidelines, first edition 2004, second edition 2007 with requirements for verification**: a framework for monitoring, reporting & verification of emissions
  - ➔ Need for more EU-wide harmonization!

- **3rd trading period (2013-2020):**
  - EU Monitoring and Reporting Regulation (2012)
  - EU Accreditation and Verification Regulation (2012)

- **National: GHG Emissions Trading Act** ("TEHG") – legal framework for implementation, e.g. competence distribution between authorities, deadlines, procedural aspects, rules for auctioning and free allocation, sanctioning and fines.

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Activities and GHG Gases under EU-ETS (Directive 2003/87/EC)

- All combustion installation with a total rated thermal input > 20 MW
  Exception:
  - Installation with exclusive combustion of dangerous or municipal waste
  - Installations using only biomass
- Industries like Refinery, Iron and Steel, Metal roasting and Sintering, Cement, Lime, Glas, Pulp and Paper, Ceramic, Non-ferrous metals, Gypsum, Chemicals

  with varying thresholds for each sectors (based on exceeding a certain capacity per day or hour)
- Aviation with threshold 10,000t CO_2 /year

  GHG Gases: CO_2 and
  - N_2O from chemical activities
  - PFC from production of primary aluminum

Scope

Installation category	Number of installations in Germany*	Total annual emissions*
Category C (>500 kt CO_2-eq/a)	146 (8 %)	357.7 million t CO_2-eq (82 %)
Category B (>50 kt CO_2-eq/a)	421 (23 %)	62.2 million t CO_2-eq (14 %)
Category A (≤ 50 kt CO_2-eq/a)	1266 (69 %)	17.7 million t CO_2-eq (4 %)
of which are low emitters < 25 kt CO_2-eq/a...]	993 (54.2 %)	8.3 million t CO_2-eq (1,9 %)
* total:	**1833**	**437.6** million t CO_2-eq

Based on Greenhouse Gas Emissions in Germany - Report 2017

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EU ETS Compliance Cycle for Monitoring, Reporting and Verification

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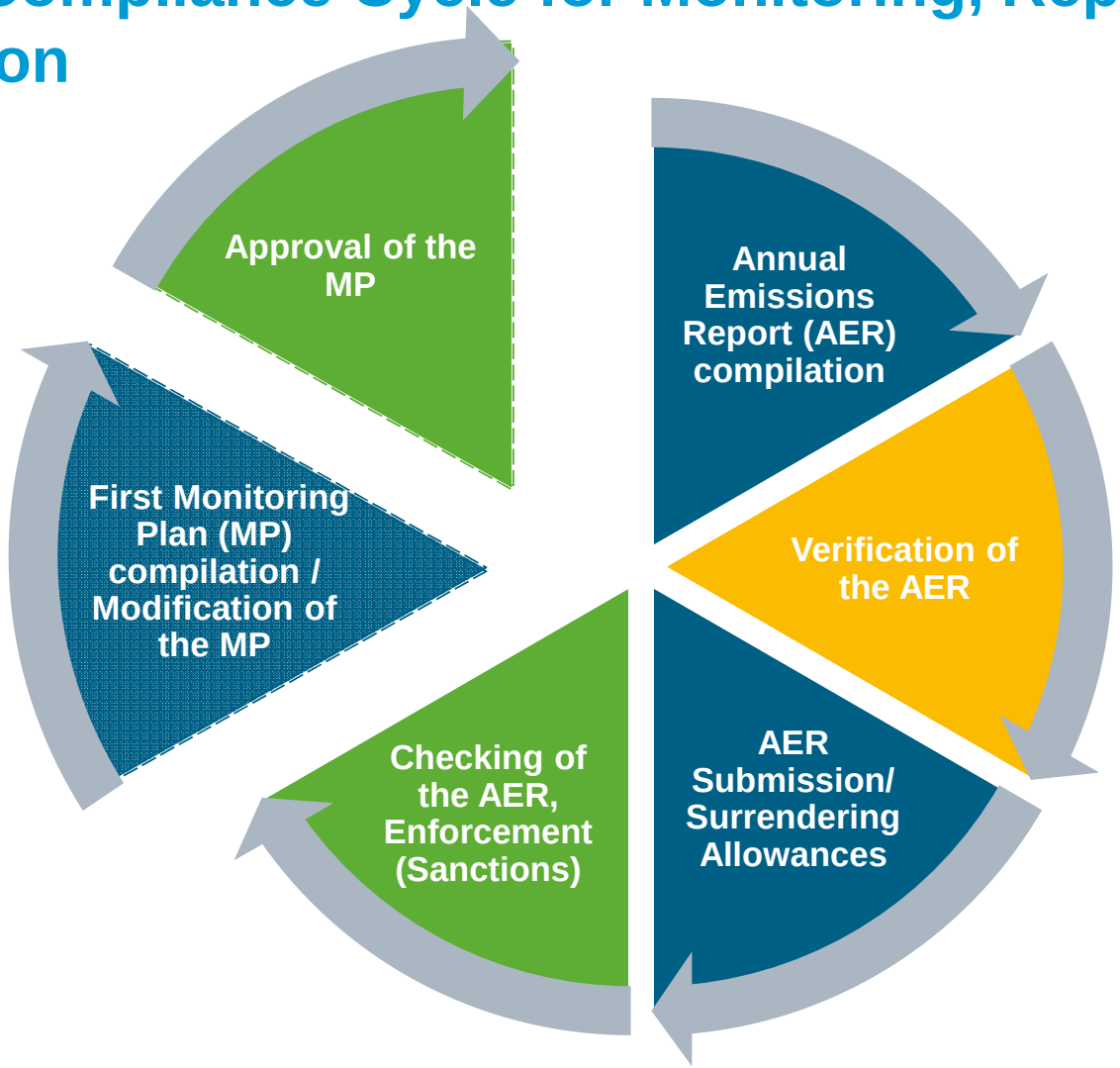
EU ETS Compliance Cycle for Monitoring, Reporting and Verification



Operator Authority Verifier

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Main elements of Monitoring & Reporting

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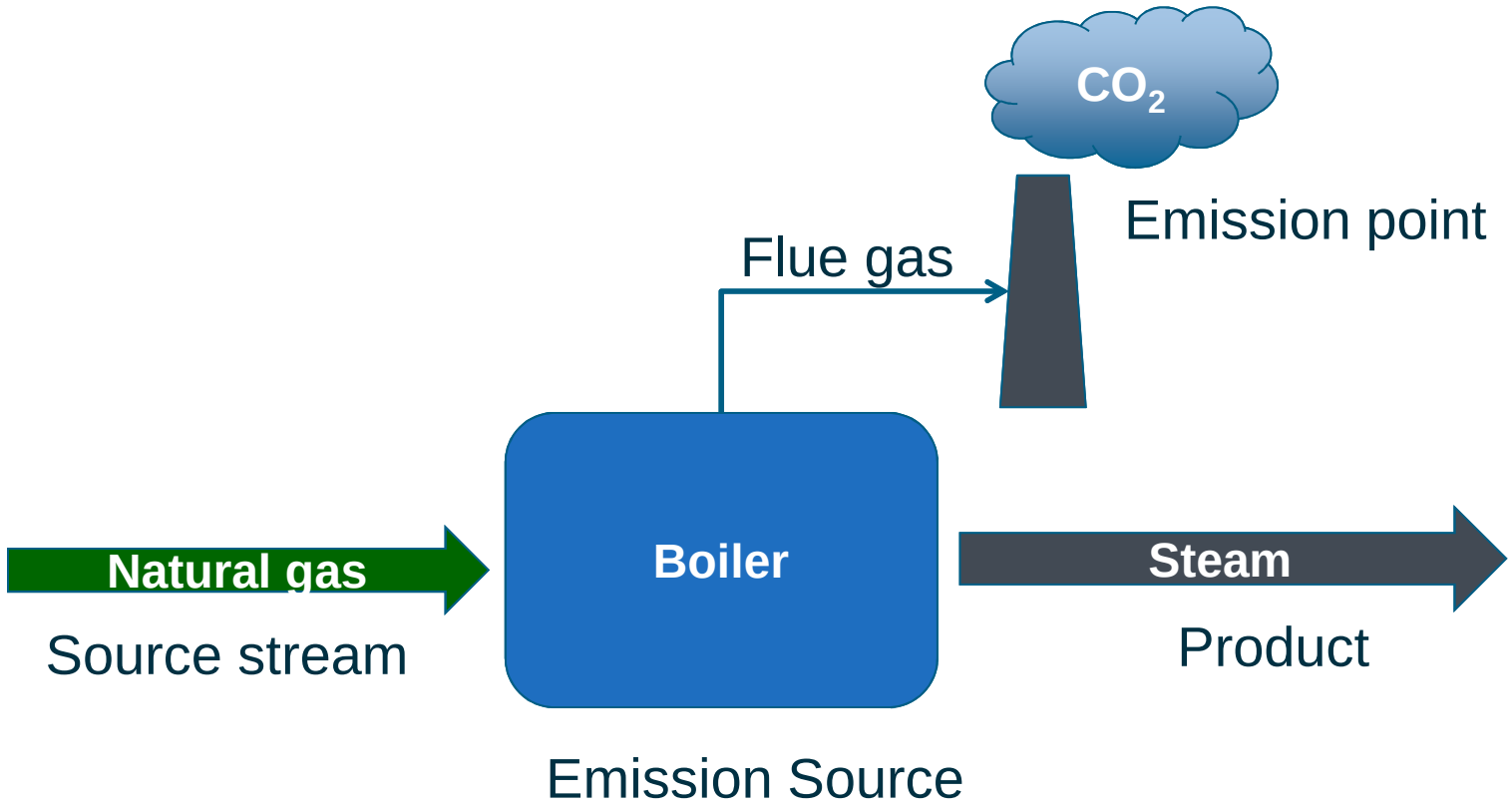
Explanation of terminology used in EU ETS



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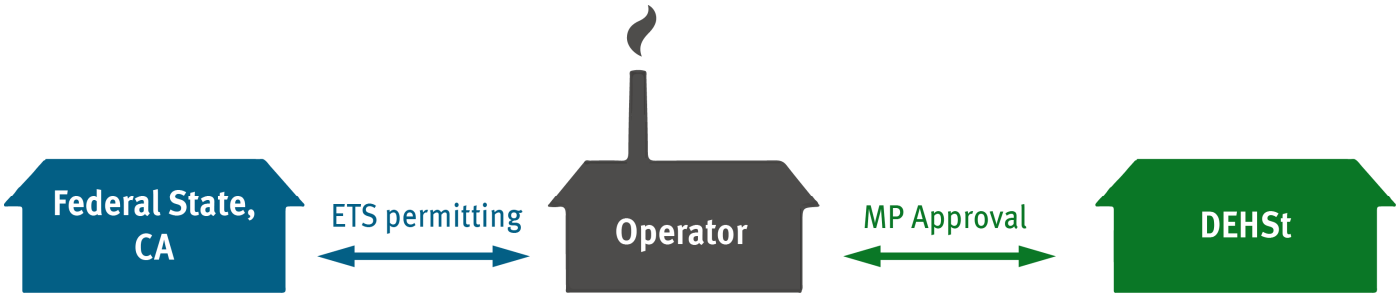
Installation boundaries – What belongs to an EU ETS installation? (German implementation)

All parts covered by the GHG permit identify installation's boundaries

- All installations within the scope of Emissions Trading Act (TEHG) require an emissions permit, which includes:
  - all parts under the control of the operator and,
  - which are necessary for running the installation's activities, e.g. At least all potential emission sources listed in Annex IV MRR, e.g. furnaces, kilns, flares, etc. But, excluding mobile machinery (e.g. forklifts)
- Competent Authority (CA) of Federal States issuing the permit, where
- DEHSt approves installation-specific Monitoring Plan (MP)



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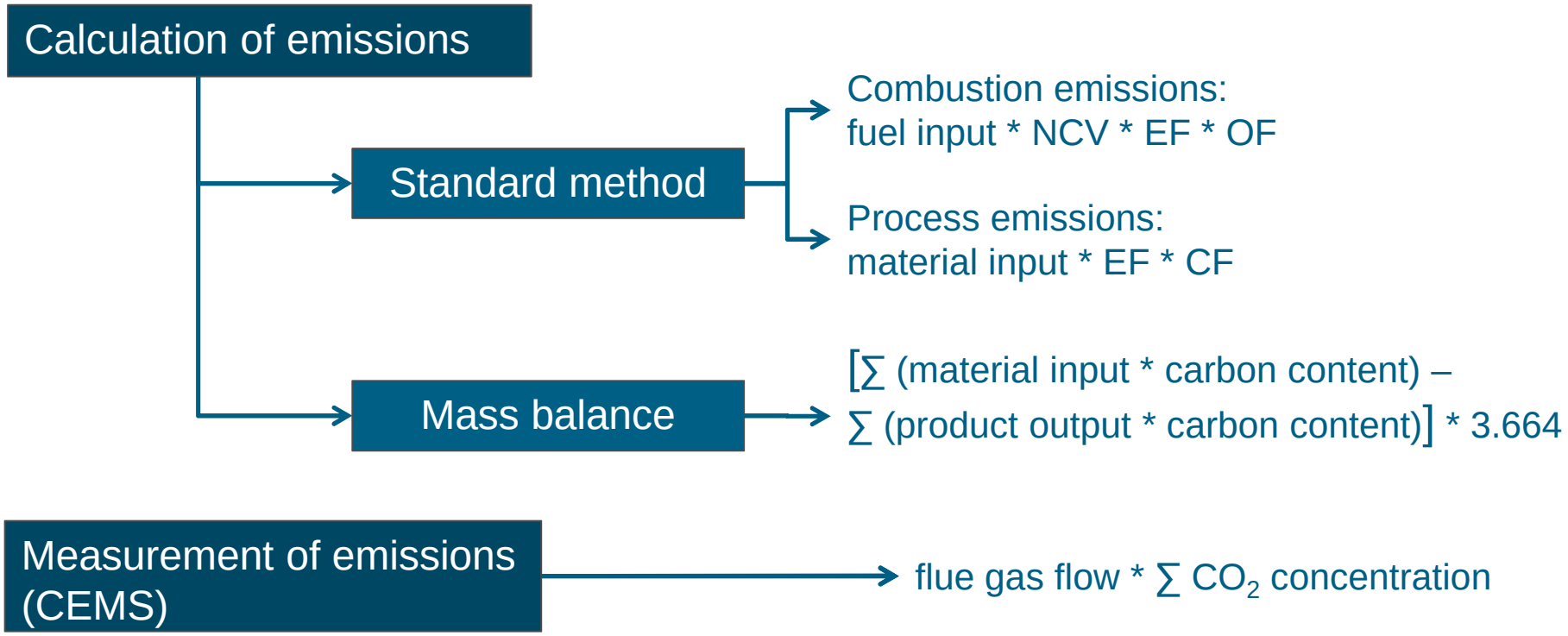
Principle methods for determination of emissions



➔ Operator has the choice to combine all methods
(subject of approval by CA)

NCV – net calorific value
EF – emission factor
OF – oxidation factor
CF – conversion factor

Tier approach

Tier = means a set requirement used for determining activity data, calculation factors, annual emissions and annual average hourly emission, as well as for payload (MRR, Art.3 (8))

Activity data (source stream amount)	**Calculation factors**
Tier 1 = ± 7,5 %	International **standard value** (e.g. IPCC)
Tier 2 = ± 5 %	National **standard value** (e.g. from national inventories, literature values agreed with CA)
Tier 3 = ± 2,5 %	Individually determined by **analysis**
Tier 4 = ± 1,5 %	---

- Sector specific deviations possible

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Categorizations of Installations and Source Streams

Category B (> 50,000 t CO_2/yr) and C installations (> 500,000 t CO_2/yr):

- must generally meet highest tiers

Category A installations (≤ 50,000 t CO_2/yr):

- must meet minimum tier requirements

In general, lower tiers are allowed for

Minor (jointly < 5 kt CO_2 or 10 %, max. 100 kt CO_2/year) and
de-minimis source streams (jointly < 1 kt CO_2 or 2 %, max. 20 kt CO_2)

Small emission source (< 5 kt CO_2 or 10 % installation's emissions/year)

source streams with **biomass fraction ≥ 97 %**

Commercial standard fuels

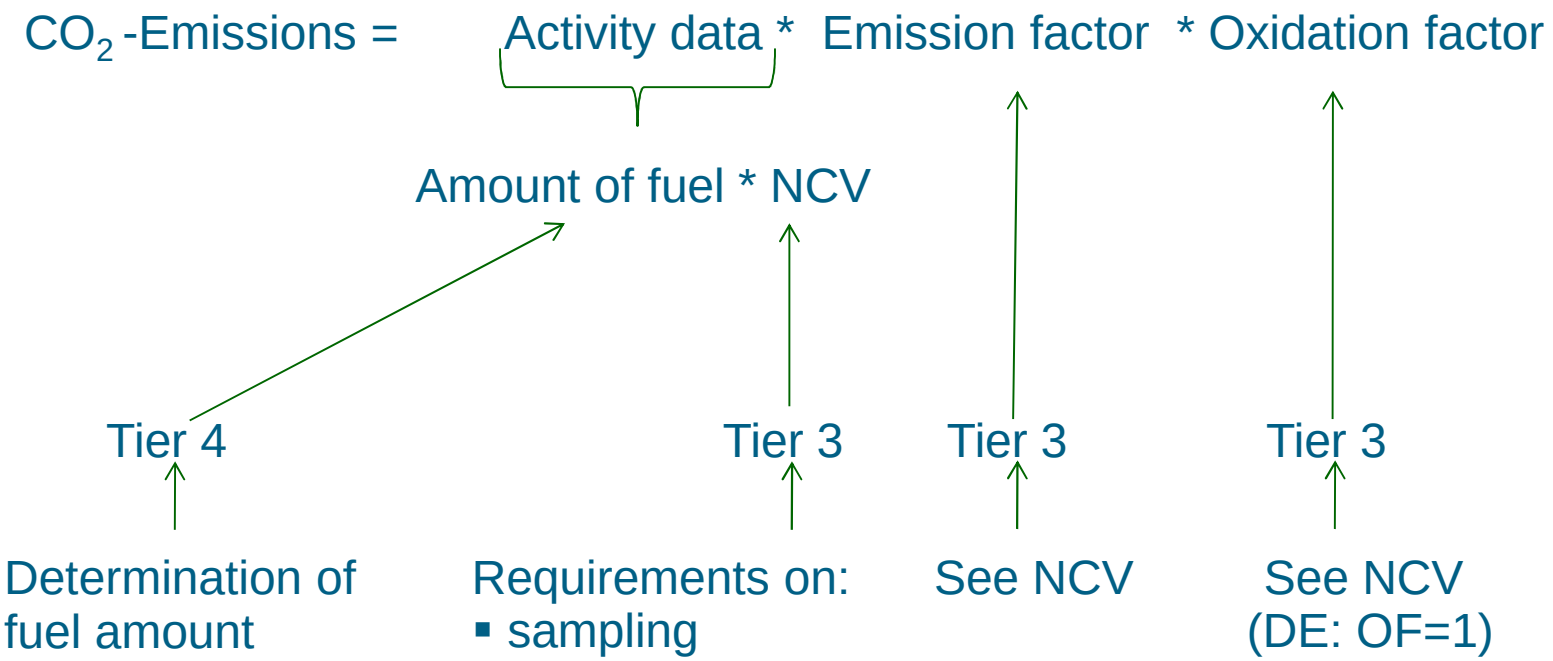
All other classify as **Major source stream** *and must meet highest tiers*

Temporary or individual deviations are allowed for

- technical or economic reasons (subject to approval)

Example

Gas-fired power plant with total emissions of > 50,000 t CO_2/yr
→ highest tiers have to be met



Why do we need a Monitoring Plan?

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Reasons for a Monitoring Plan (MP)

- MP is the first step in the compliance cycle
  → the better the MP the better the emissions report (ER)

- An approved MP guarantees legal security for the operator; assures that the monitoring methods are ok and can be used for creating an ER

- An approved MP binds the operator to the described monitoring methods
  → the competent authority has checked the determination of e.g. calculation factors before the emissions report is created

Content of a Monitoring Plan (I)

MP describes all relevant data and monitoring methods for the installation

- Installation boundaries (description, flow chart)
- Technical processes of the installation (combustion, production of chemicals,…)
- List of all source streams

  That means

  - all fuels in case of combustion installations or
  - all carbon containing input and output streams for chemical installations.
- For each source stream the expected emission amount has to be declared. The installation‘s emissions are relevant for the category of the installation and therefore for the requirements for each single source stream.
- For each source stream the operator has to describe how the amount and the relevant calculation factors are estimated.

Content of a Monitoring Plan (II)

- For each source stream the operator has to describe how the amount and the relevant calculation factors are estimated:

  Source stream amount:

  - Measuring devices inclusive quality control and uncertainty assessment
  - Conservative estimations

  Calculation Factors (net calorific value, emissions factor, biomass content,…):

  - Sampling plan
  - Analyses frequency
  - Applied norms for analyses
  - Accreditation of laborities
  - Usage of standard factors
  - Conservative estimations

- The legal requirements based upon the amount of installations emissions: the more GHG are emitted, the higher are the requirements

Experience of DEHSt with first approval of MPs

- Approximately 1.900 installations in Germany

- In around 50 % of all MPs the operator was asked
  - to correct mistakes in the MP or
  - to give more information (necessary evidences or clarifications).

- Many MPs had to be corrected by the operator more than one time.

- Many administrative orders of the MPs contain collateral clauses.

→ The quality of the MP defines the quality of the emissions report!

Issues to consider in MP

- Forgotten source streams (fuels & materials)
  - Fuel combustion => e.g. pilot gas, Volatile Organic Compound (VOC)
  - Iron and steel => e.g. iron ore, ferro alloys
  - Chemical Industry => e.g. sour gases of Sulphur recovery plants
- Forgotten fossil fractions in biogenous fuels/materials
- Insufficient description of data management and control procedures
- Transfer of CO_2
  - Iron and Steel => waste gases transferred to power plants
  - Chemical Industry => processes which use an oxidation with oxygen creates a waste gas streaming containing CO_2 that is transfer to a central power plant, e.g. steamcracker, acetylene-installations, formaldehyde-installations

Data Collection:
Form-Management-System (FMS)

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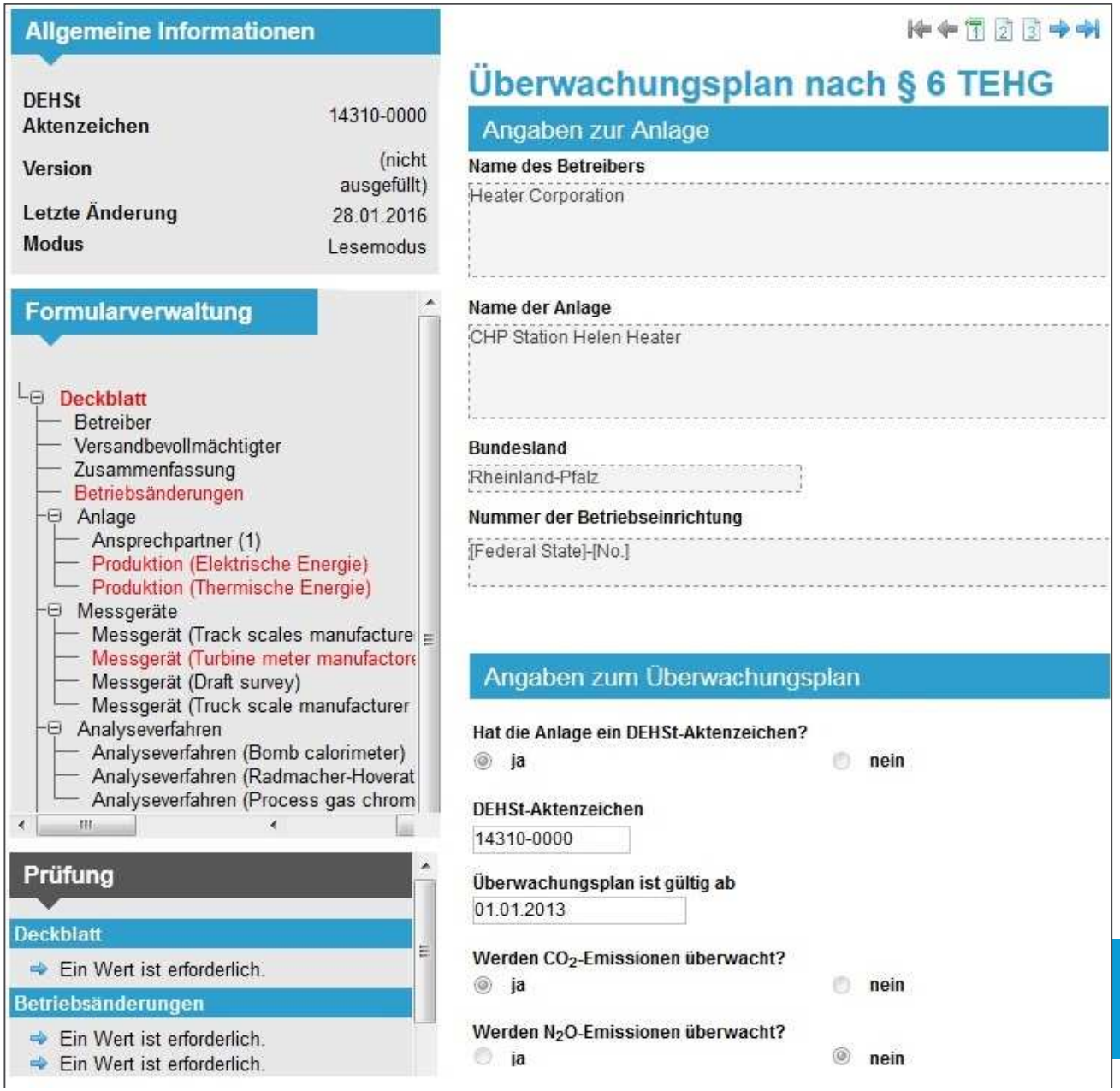
FMS is an Electronic Form to provide Installation´s Data for MP and AER



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Example of an Emissions Report made by an Operator

FUEL STREAM (EMISSION FACTOR RELATED TO CALORIFIC VALUE)

Is there any deviation from the tier of the Monitoring Guidelines (target-tier)?	No.		
Consumed fuel			
Quantity			
Tiers according to the Monitoring Guidelines (target-tier)	121,547.5	t	
	4		
Tiers according to the monitoring plan (chosen tier)	4		
Net calorific value			
Value	28.3380	GJ/t	Default value 28.3000
Tiers according to the Monitoring Guidelines (target-tier)	3		
Tiers according to the monitoring plan (chosen tier)	3		
Emission factor			
Value	0.0925	t/GJ	Default value 0.0930
Biomass percentage	00	%	
Tiers according to the Monitoring Guidelines (target-tier)	3		
Tiers according to the monitoring plan (chosen tier)	3		
Oxidation factor	1.0		
CO_2-emissions	318608.208	t CO_2	

The material data is ...	X	*appropriate.*	*not appropriate.*
The information about the tiers is...	X	*appropriate.*	*not appropriate.*
The report was carried out according to the chosen tier?	X	*Yes.*	*No.*

Typical errors and examples of non-compliance

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Typical Errors

… Remember: No Underestimation of Emissions!

- Calculation, rounding and typing errors
- Incorrect calculation factors (NCV, carbon content etc.)
- Estimations not conservative
- Deviations between monitoring practices and descriptions in MP
- Insufficient sampling and analyses frequency and quality

Example – Wrong Calculation Factor

Fuel	Reported & verified	Revised after DEHSt-check
Hard coal South Africa	EF 0.09407 t/GJ	EF 0.09593 t/GJ
Hard coal Colombia	EF 0.08446 t/GJ	EF 0.09412 t/GJ
Emissions in total	1,958,363 t CO_2	1,968,608 t CO_2

- EF for coal Colombia suspiciously low
- Inspector requested analyses protocols (also for other sorts of coal)
- Laboratory mixed up some analysed figures
- Result: operator surrendered 10,245 allowances too little

Example – Same factor value as last year in spite of analyses

- Operator used same value for natural gas type H as last year
- Method: Analyses
- Attracted attention by automated hint in ADB
- Correct factor lead to conservative estimation (smaller than last year)
- Resulted in a positive difference of 1,947 t CO_2

Sanctions

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Form of sanctions under Emissions Trading Act (TEHG)

- **Account locking -** If an operator has failed to submit an emissions report for the previous calendar year by 31 March
- **Sanctions for violation of surrender obligation –** 100€ / 1t CO_2 + surrendering required obligations (deadline 30 April))
- **Imposition of fines in a range of max. 50 thous. € to max. 500 thous. €, if**
    - An operator who has not reported correctly and thus fails to specify the emissions caused in accordance with the approved monitoring plan
    - If an operator fails to submit a monitoring plan for the trading period or fails to submit it to DEHSt by the specified deadlines
    - If an operator hinder DEHSt in performing their duty, for example if they refuse to provide information or submit documents requested

Lessons learnt

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Ensuring MRV Compliance

Preparation of operators

- IT templates for MP & AER
  - mapping legally required content
  - diverse automated checks for completeness & correctness
- guidance on compiling MP & AER
- FAQ
- mailings
- annual workshops
- permanent helpdesk

Lessons learnt

What can the operator improve:

- Transparency of used operation and monitoring procedures
- Proof of achieved uncertainty of monitoring
- Limited proof for compliance of supplier data
- Representativeness of sampling

Thank you for your attention!

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