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# Study visit Chile

# Monitoring and Reporting: Monitoring Plan

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E 2.2 Chemical Industry and Industrial Combustion Installations

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# Outline

- Why do we need a Monitoring Plan?
- Data Collection: Form-Management-System (FMS)
- Data Evaluation: Installation of Data Base (ADB)
- Assistance for Operators

# Why do we need a Monitoring Plan?

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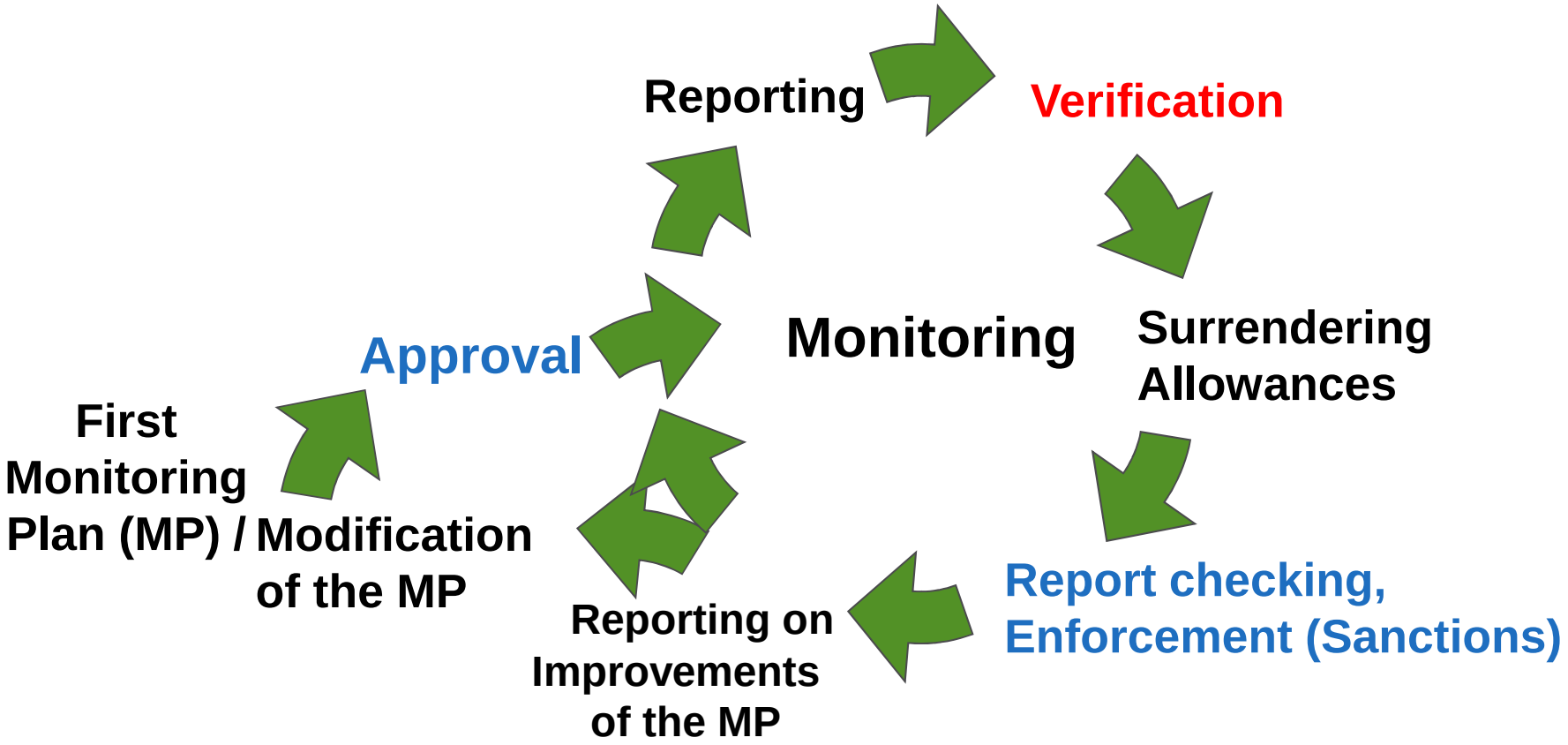
# EU ETS Compliance Cycle for Monitoring, Reporting and Verification




black: Operator's tasks
blue: Authority's tasks
red: Verifier's tasks



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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
  - e.g. all carbon containing input and output streams for chemical installations.
- For each source stream the expected emission amount has to be declared. The installations 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
  - Analysis frequency
  - Applied norms for analyses
  - Accreditaiton of laborities
  - Usage of standard factors
  - Conservative estimations

- The legal requirements base 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!

# Monitoring Example 2. Trading Period: Harry Heater

**No./Description of fuel or material stream:** 2 Mix of natural gas type H from grid and natural gas type L from the Netherlands

**Deviation from required tier level according to MRG applies because of...**

- O **Minor source stream (see specifications in Ch. 6.1)**
- O **De minimis source stream (see specifications in Ch. 6.1)**
- O **Pure biomass fuel or material (see specifications in Ch. 6.2)**
- O **Category B or C installations: Compliance with the highest tier level specified in Annexes II-XI MRG regarding one or several parameters is not feasible for technical reasons or would cause unreasonable high costs (please enclose reasons and evidence in a separate document to be enclosed with the monitoring plan).**
- O **Category A installations: Compliance with the tier level specified in Table 1 Annex I MRG regarding one or several parameters is not feasible for technical reasons (please enclose reasons and evidence in a separate document to be enclosed with the monitoring plan).**

| | Level specified in MRG | Level to be applied | Source of information or description of data collection method |
|---|---|---|---|
| ▪ Fuel/material stream[15] | 4 | 4 | Determination of natural gas consumption by supplier through officially verified turbine meter with volume corrector, documented in monthly delivery notices. Overall uncertainty for measurements: 1.7 %. Control measurements of incoming natural gas are also taken by the company using an officially verified ultrasonic meter with volume corrector. Overall uncertainty of measurements 1.6 %. For evidence of conformity with the selected accuracy requirements see chapter 7 of the monitoring plan. For possible discrepancies between either natural gas measuring systems see free text under *Additional information*. . |
| ▪ Net calorific value | 3 | 3 | DIN EN ISO 6976 (calculation calorific values) |
| ▪ Emission factor | 3 | 3 | DIN EN ISO 6976 (Determination of carbon content in the gas composition through process GC) |
| ▪ Composition data | --- | --- | --- |
| ▪ Oxidation factor | According to TEHG amendment of 07/08/2007; Annex 2, Part 1 no. 2 Oxidation factor = 1.0 | | |
| ▪ Conversion factor | | | |

... where applicable, add further source streams relevant to Activity 1 (by copying the shaded area)!

# Experiences with CEMS (Continuous Emissions Measuring) I

- CEMS can be interesting for installations
  - that have a lot of input and output source streams, which do not easily reach the required tiers or
  - where CEMS is already existing e.g. for determination of NOx

- 44 CEMS for $CO_2$
  - combustion, refinery and chemical installations
  - Only 16 meet the highest tiers

- 20 CEMS for $N_2O$
  - nitric acid and adipic acid installations
  - Only 11 meet the highest tiers

# Experiences with CEMS II

- Typical mistakes:
  - Default values are not in line with Art. 45 MRR
  - Exceeding of the relevant calibrating range
  - uncertainty of CEMS has been substracted from the estimated yearly concentration (this is permittet for CEMS used for Federal Immission Control Act, but not for CEMS used for MRR)
  - Missing quality assurance
  - No corroborating calculation

→ Operator needs a lot of knowledge about CEMS to comply with all MRR requirements

→ Adding of MRV requirements to the national administrative instruction for CEMS

# Data Collection:
# Form-Management-System (FMS)

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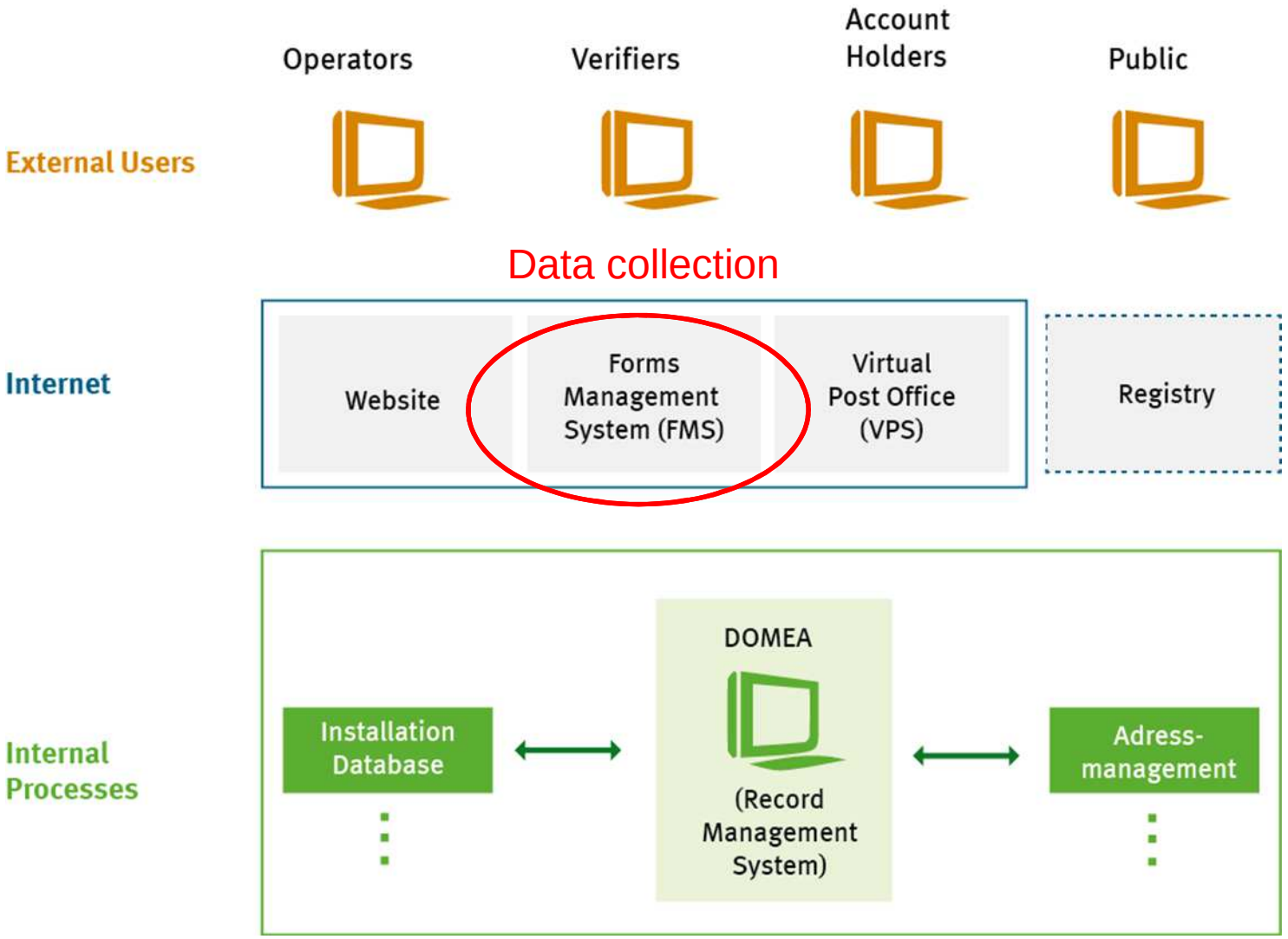
# IT-Structure DEHSt

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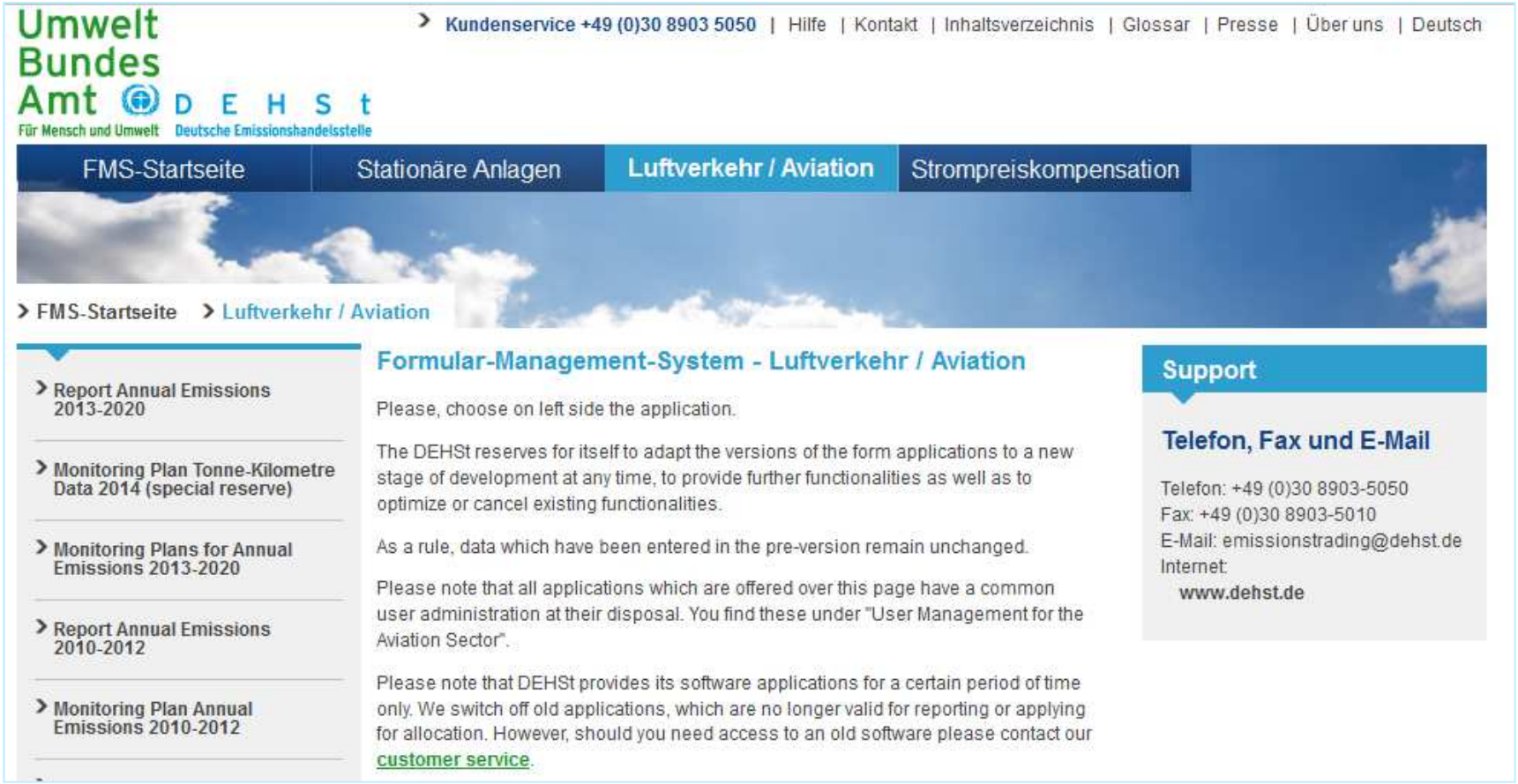
# Form-Management-System (FMS) is available via the DEHSt Website




www.formulare.dehst.de

(For stationary installations only in German. Aviation in English)



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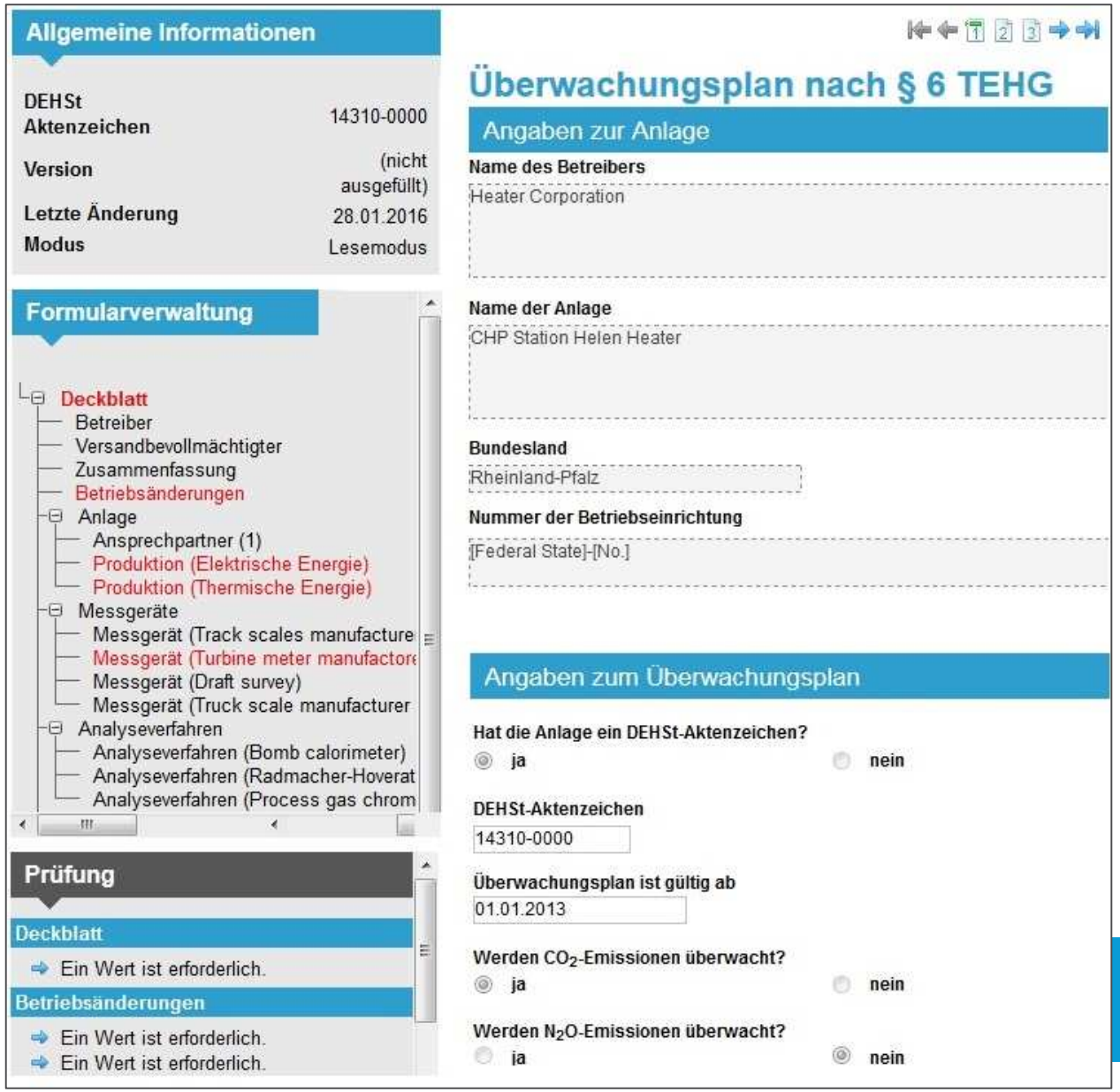
# FMS is an Electronic Form to provide Installation´s Data



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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 | 121,547.5 | t | |
| Tiers according to the Monitoring Guidelines (target-tier) | 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.* |



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# FMS guides the Operator through the Application

- Set of forms plus some special selectable forms depending on the type of installation
  → Guides the operator through the system
  → Helps to give all obligatory information

- Automated checks and information on missing or implausible data (forms with missing data are written in red letters)
  → Helps to give all obligatory and plausible information

- Operator and verifier have different access rights
  → Both work on the same data set, but with different write protection
  → No transfer of data necessary

# Data Evaluation:
# Installation of Data Base (ADB)

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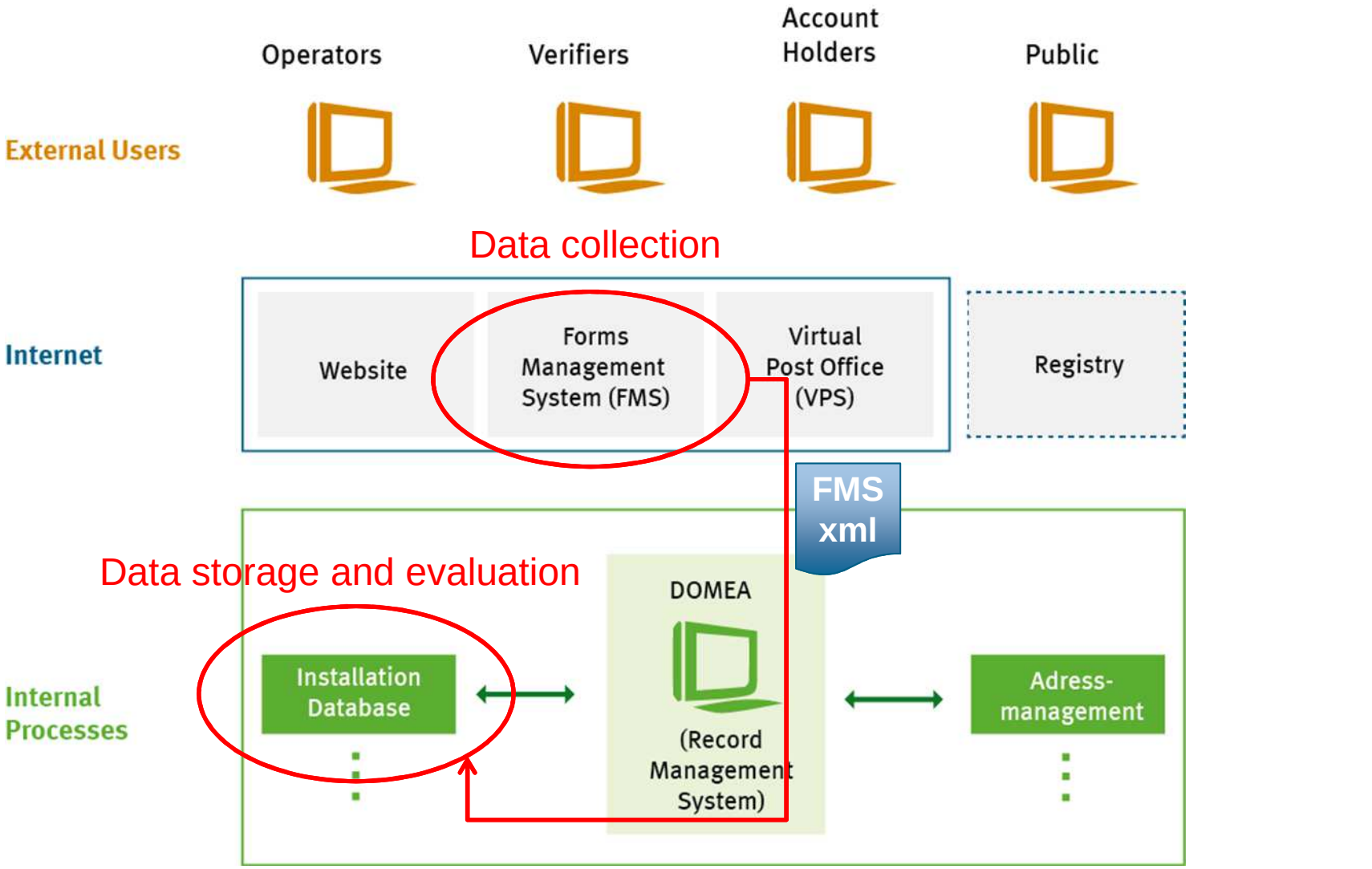
# IT-Structure DEHSt

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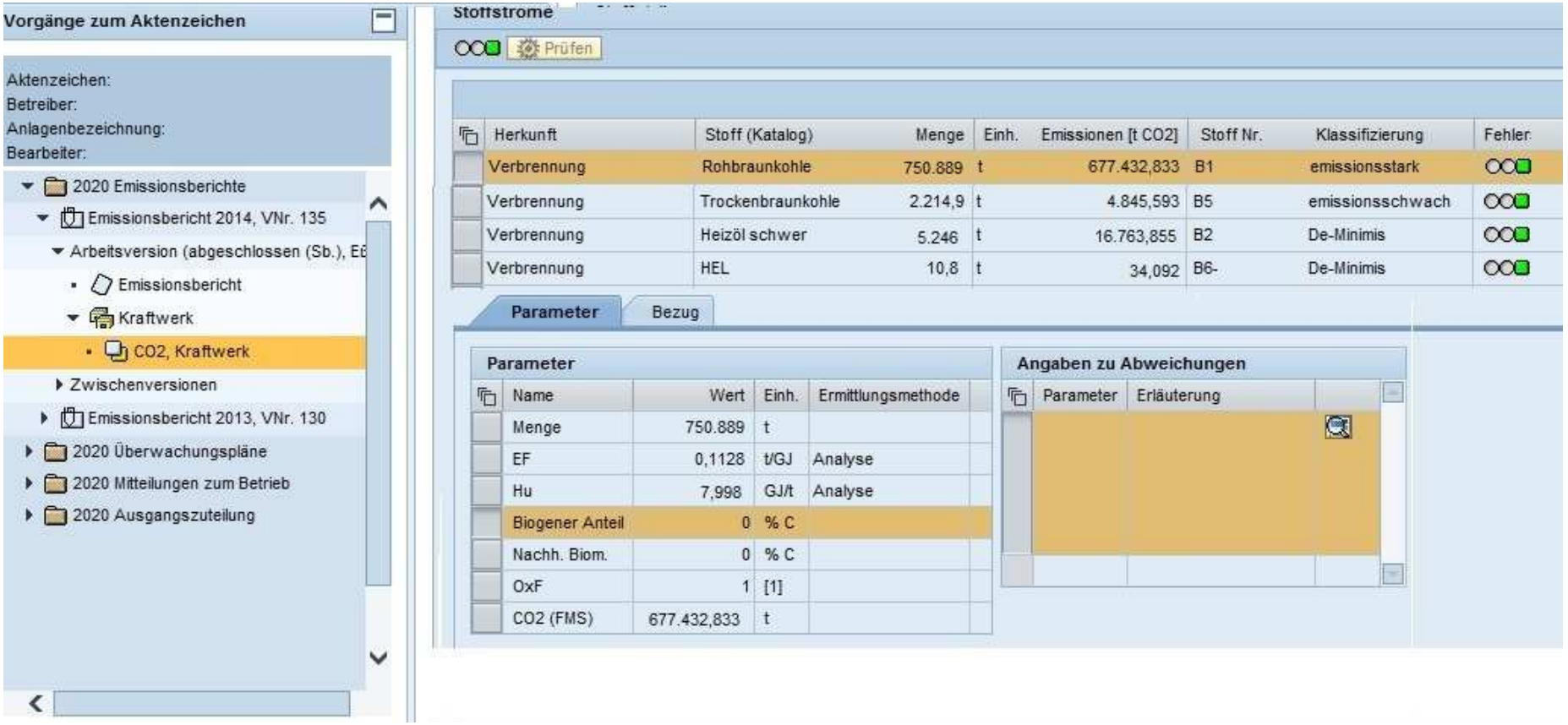
# ADB is a helpful Tool for Data Evaluation

- Internal administration of all installations
- Used for different processes, e.g. checking monitoring plans, validation/checking of emissions reports, calculation of allocation

- Offers functions for checking data consistency, completeness and plausibility

  → Statistical analysis (e.g. source stream parameters)

# ADB is a helpful Tool for Data Evaluation




„ADB“ is the German abbreviation for installation data base.



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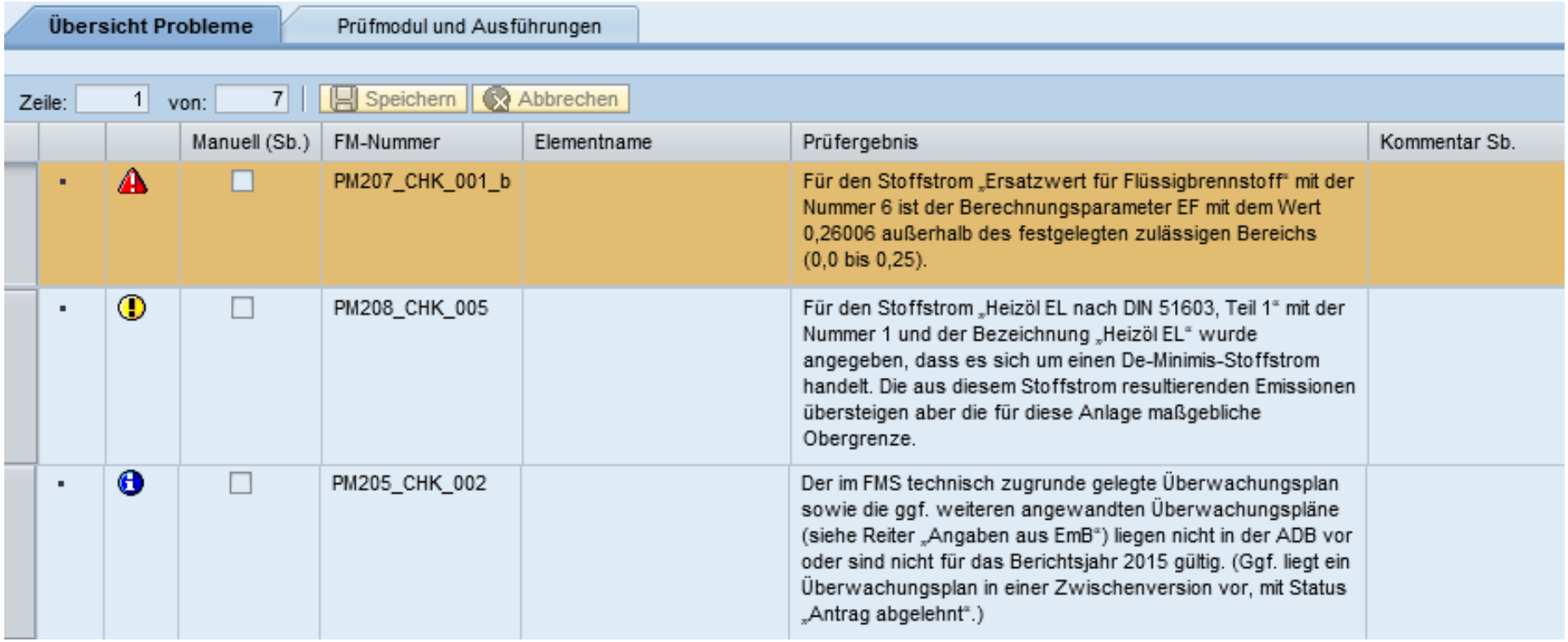
# Automated Checks are implemented in the ADB

- Automated checks of data plausibility (e.g. in the emissions report)
  - Comparing data from different years
  - Comparing data of similar installations

➔ Very useful assistance for our daily work!

➔ But: **Database can only check single data!**
Some checks are only possible with technical understanding of the installations/manpower (e.g. completeness of the source streams)

# ADB has Automated Checks to support the person in charge of reviewing the installation



Übersicht Probleme | Prüfmodul und Ausführungen

Zeile: 1 von: 7 | Speichern | Abbrechen

| | | Manuell (Sb.) | FM-Nummer | Elementname | Prüfergebnis | Kommentar Sb. |
|---|---|---|---|---|---|---|
| ▪ | ⚠ | ☐ | PM207_CHK_001_b | | Für den Stoffstrom „Ersatzwert für Flüssigbrennstoff“ mit der Nummer 6 ist der Berechnungsparameter EF mit dem Wert 0,26006 außerhalb des festgelegten zulässigen Bereichs (0,0 bis 0,25). | |
| ▪ | ! | ☐ | PM208_CHK_005 | | Für den Stoffstrom „Heizöl EL nach DIN 51603, Teil 1“ mit der Nummer 1 und der Bezeichnung „Heizöl EL“ wurde angegeben, dass es sich um einen De-Minimis-Stoffstrom handelt. Die aus diesem Stoffstrom resultierenden Emissionen übersteigen aber die für diese Anlage maßgebliche Obergrenze. | |
| ▪ | i | ☐ | PM205_CHK_002 | | Der im FMS technisch zugrunde gelegte Überwachungsplan sowie die ggf. weiteren angewandten Überwachungspläne (siehe Reiter „Angaben aus EmB“) liegen nicht in der ADB vor oder sind nicht für das Berichtsjahr 2015 gültig. (Ggf. liegt ein Überwachungsplan in einer Zwischenversion vor, mit Status „Antrag abgelehnt“.) | |

# Assistance for Operators

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# Assistance for Operators by DEHSt

- Guidelines for Creating a Monitoring Plan and an Emissions Report
- Tools as assistance for Creating a Monitoring Plan e.g.
  - for Calculating the Minimum Analysis Frequency
  - Example of a Sampling Plan
  - Example of a Monitoring Plan
  - Presentations held by DEHSt-Staff
- Guidelines for obligatory Software (Form-Management-System, Virtual Post Office,…)
- Customer Service (Requests via e-mail or phone)

# Assistance for Operators by EU KOM

- Templates for e.g. …
  - Creating a Monitoring Plan
  - Determining Unreasonable Costs
  - Assessing Monitoring Plans by Competent Authority or Operator

- Guidances for e.g. …
  - General Aspects of Monitoring Plans
  - Uncertainty Assessment of Measuring Devices
  - Sampling and Analysis

- Relevant Homepage of EU KOM:
  https://ec.europa.eu/clima/policies/ets/monitoring_en#tab-0-1

# Thank you for your attention!

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