

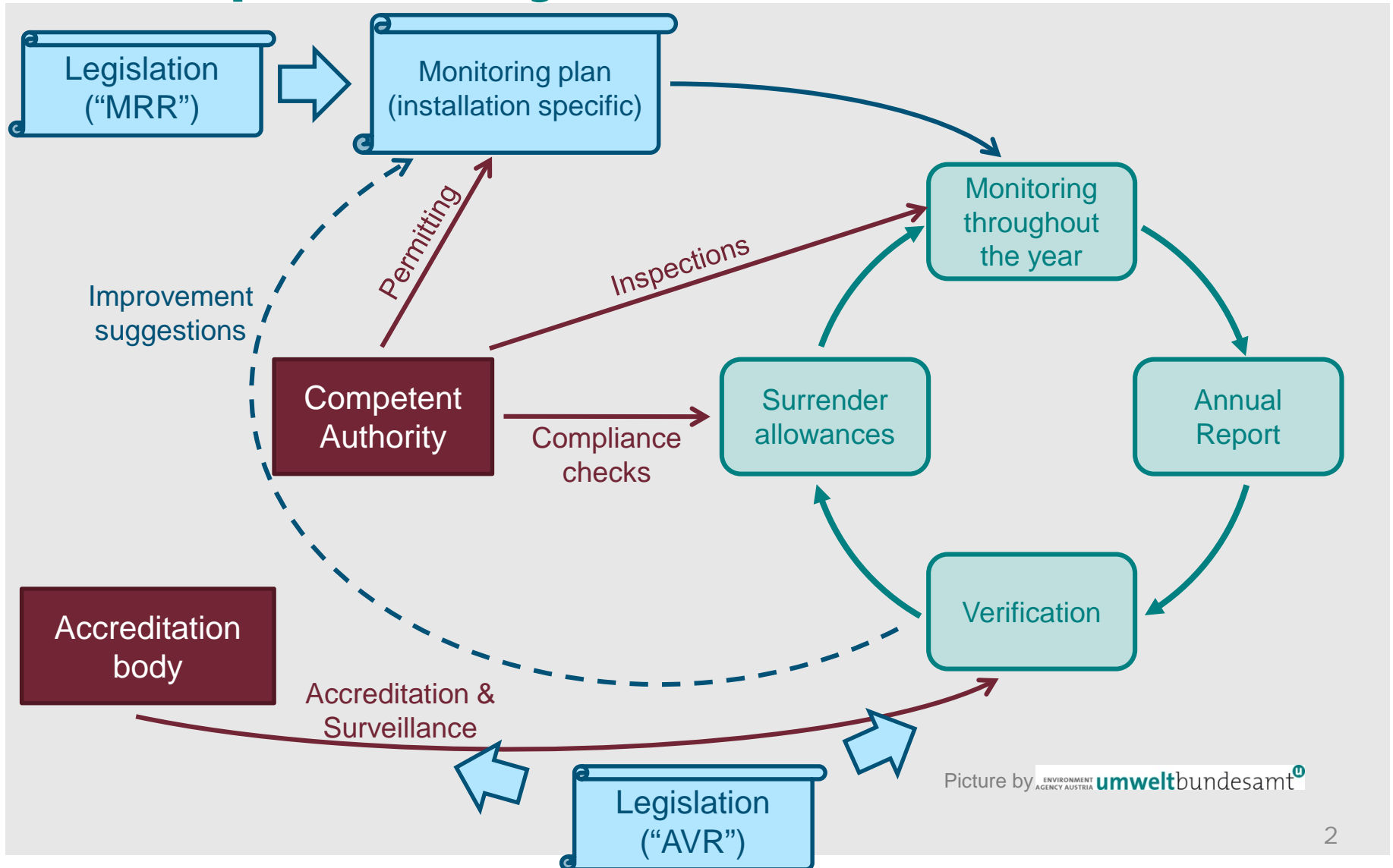


Operator preparing a monitoring plan

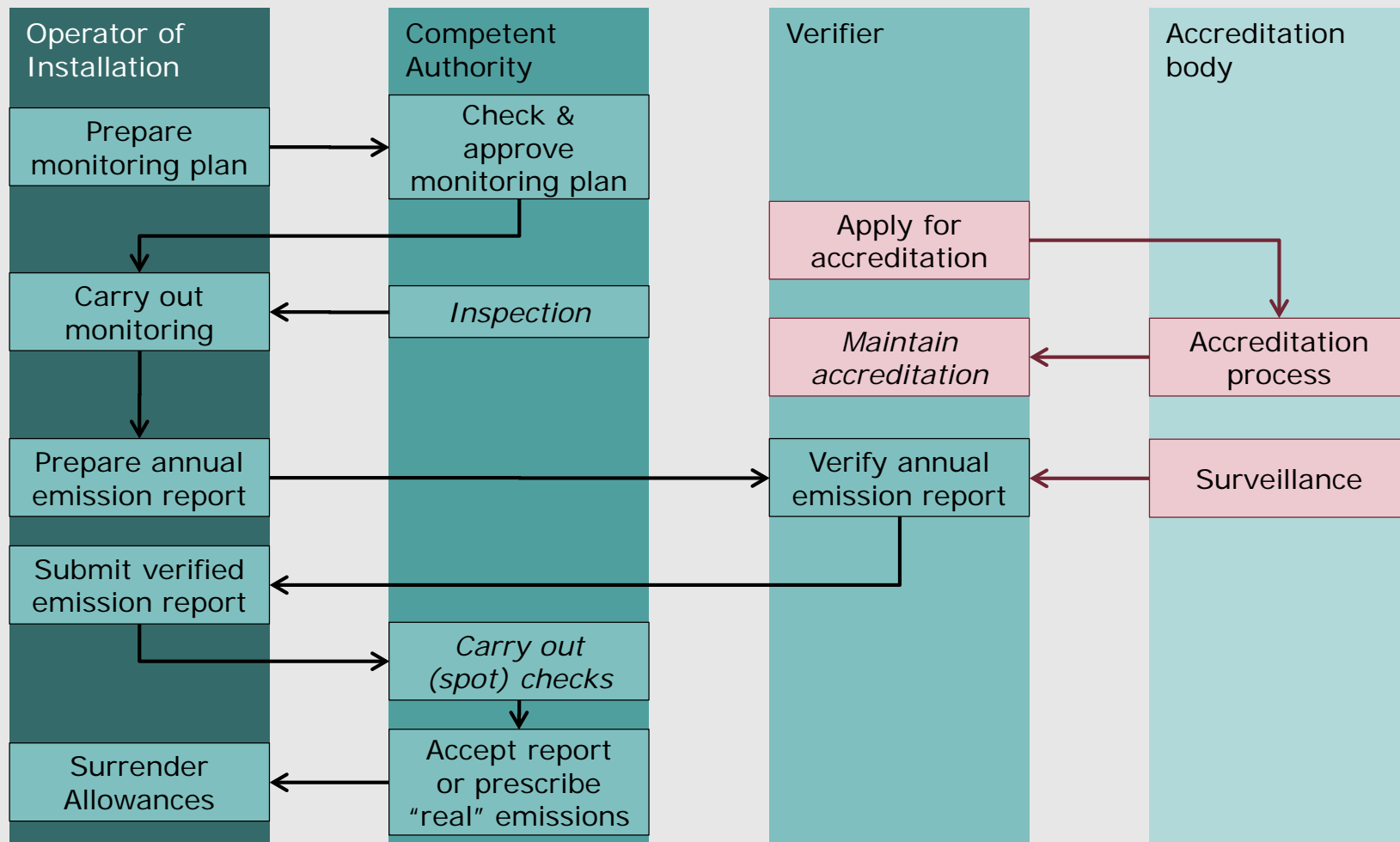
Scope, Activities, Categorisation

Christian Heller

Compliance cycle



Compliance cycle





Scope of the EU ETS & Concept of installation

- „Annex I“ activities
- Step-by-step approach
- Example

Activities included (3rd phase of EU ETS)

- Combustion of fuels > 20 MW
- Refining of mineral oil
- Production of coke
- Metal ore roasting or sintering
- Prod. of pig iron or steel >2,5t/h
- Production or processing of ferrous and non-ferrous metals (>20MW)
- Prod. of primary aluminium (PFC!)
- Prod. of cement clinker >500 (50) t/d
- Prod. of lime/dolime/magnesia >50t/d
- Prod. of glass 20 t/d
- Prod. of ceramics by firing >75 t/d
- Prod. of mineral wool > 20 t/d
- Gypsum & plaster boards (>20 MW)
- Prod. of pulp
- Prod. of paper or cardboard >20t/d
- Prod. of carbon black >20 MW
- Production of nitric acid (N₂O!)
- Production of adipic acid (N₂O!)
- Prod. of glyoxal, glyoxylic acid (N₂O!)
- Production of ammonia
- Prod. bulk organic chemicals >100t/d
- Prod. of H₂ and synthesis gas >25 t/d
- Prod. of Na₂CO₃ and NaHCO₃
- Capture of CO₂
- Transport of CO₂ by pipelines
- Geological storage of CO₂ as permitted under Directive 2009/31/EC

Step by step approach



1. Define (broadest) installation boundaries
2. Are any activities of Annex I carried out and above threshold?
 - a) Yes → List the activities and associated units in the permit
 - b) Proceed with the units not yet covered with point 3
3. List all combustion units (including their waste gas treatment) except units for incineration of hazardous and municipal waste
4. Temporarily exclude units <3MW thermal input and units using exclusively biomass
5. Are the remaining units in total >20MW thermal input?
 1. **If yes:** Activity „combustion of fuels“ is relevant in this installation. Include this activity in the permit, and also include units <3MW
→ **whole installation is in the ETS**
 2. **If no:** If also point 2 is „no“ → **installation is not in the ETS**

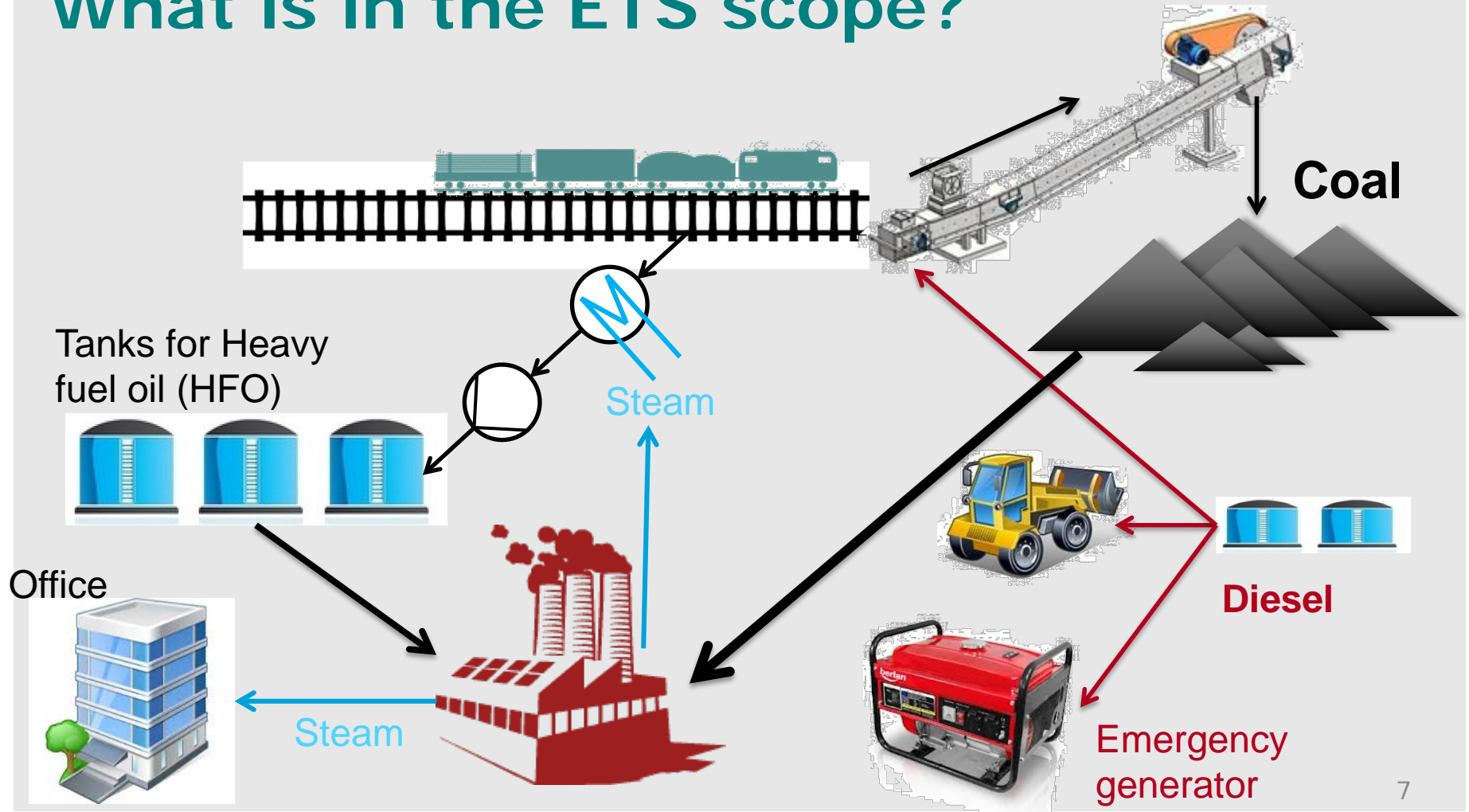
Example

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Power plant HFO + Coal

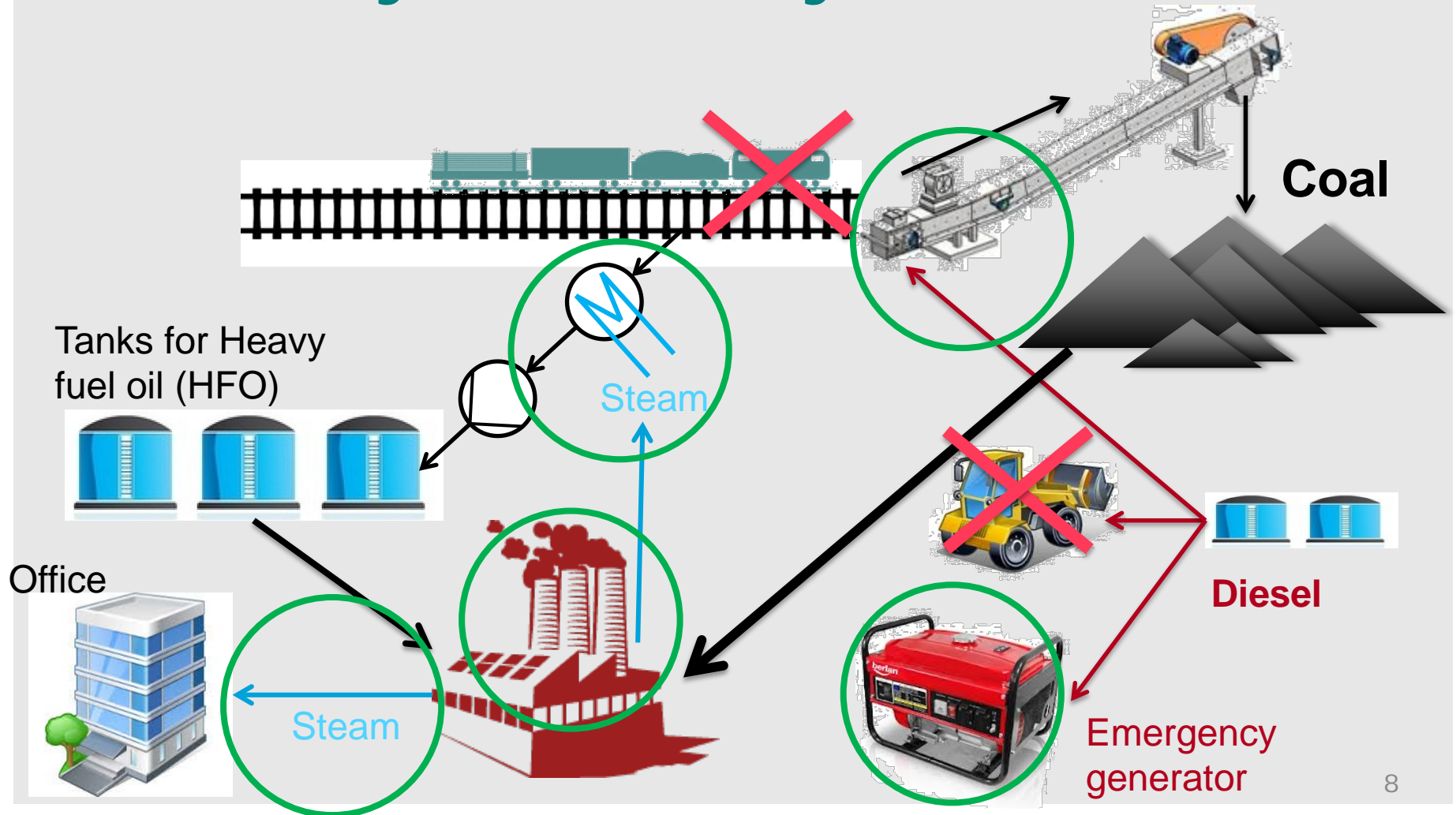
What is in the ETS scope?



In the scope of ETS:

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Stationary, technically connected

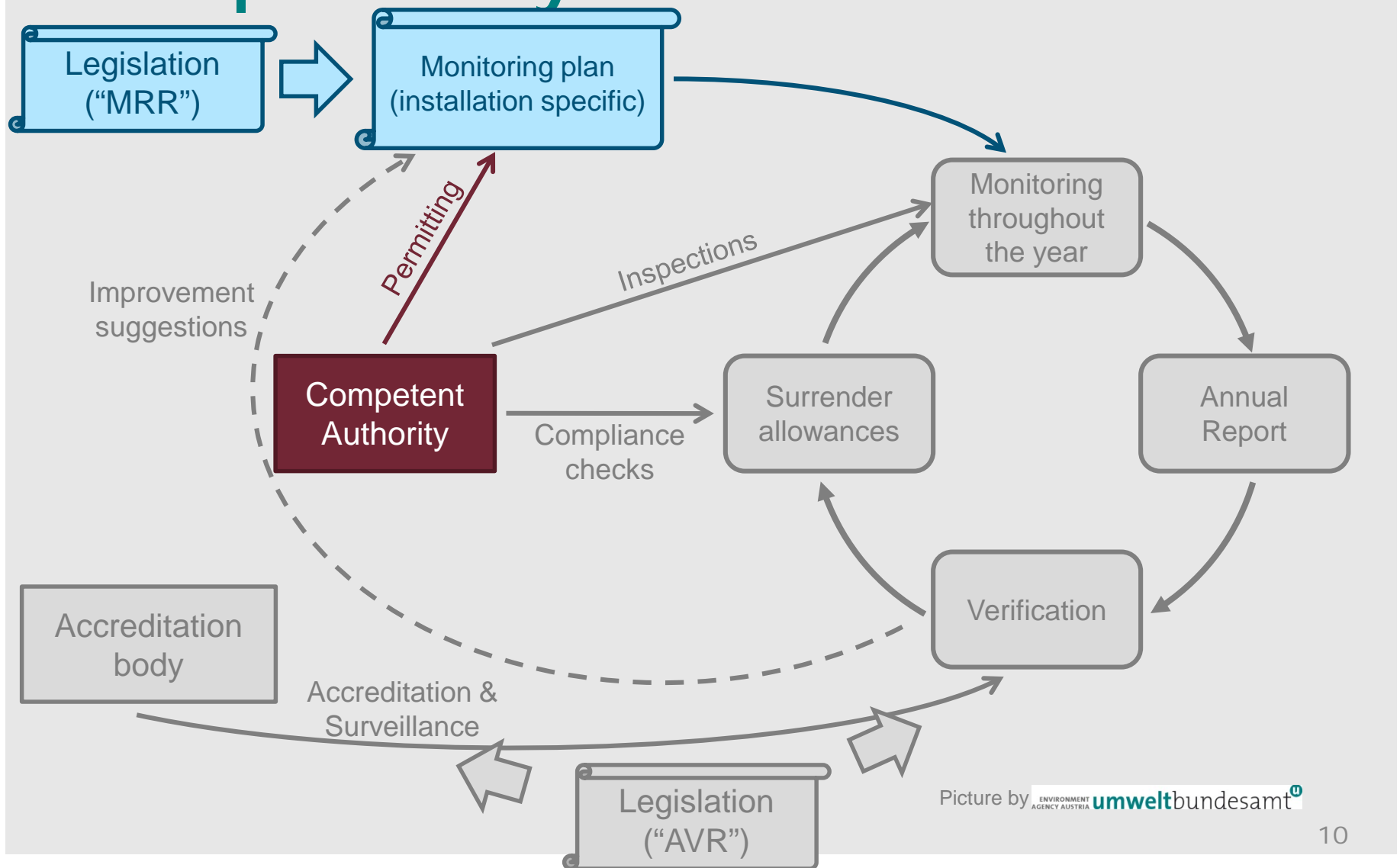




Operator preparing a monitoring plan

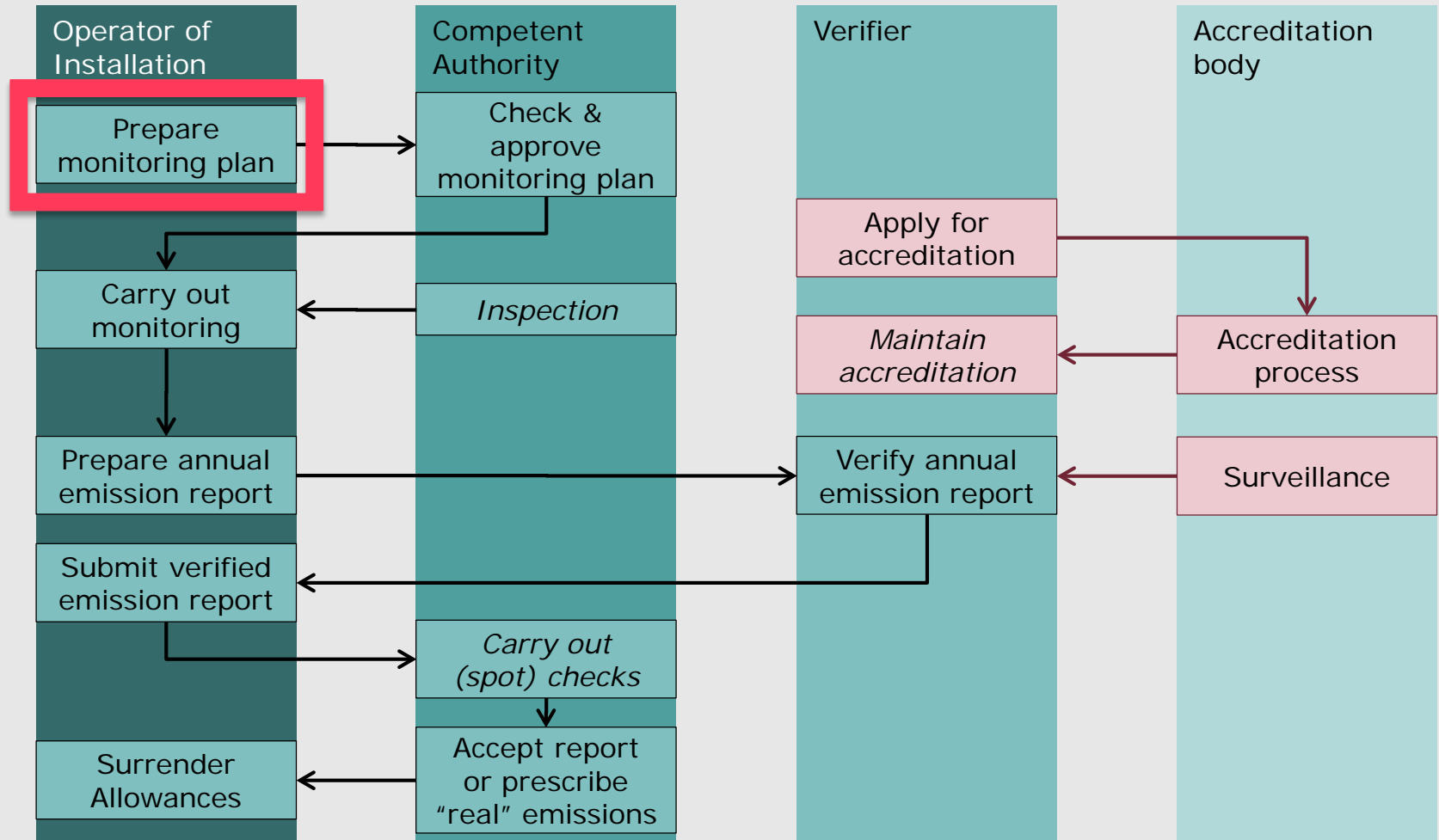
- Step 1: Description of the installation and its activities
- Step 2: Categorisation of installations
- Step 3: Emissions sources, source streams and their categorisation

Compliance cycle



Picture by ENVIRONMENT AGENCY AUSTRIA **umwelt**bundesamt^U

Compliance cycle



Installation

- ❑ **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, metering equipment, sampling points
 - Source streams going into and out of the installation (e.g. Sankey diagram)

Installation

❑ Description should include:

- Brief description of the site and the installation
- Non technical summary of the activities
 - Fuels, raw materials, (intermediate/ by-)products
 - Material flows
 - Process steps
 - Description of technical units and their capacities
 - How is measuring done (internal, external)
- Description of parts which are not deemed to fall under the ETS and reasons why
- Inherent CO₂ transferred out of the installation

- ✓ *The description has to prove completeness to CA and Verifier*
- ✓ *For complex installations attach a detailed description including maps of the installation*



Operator preparing a monitoring plan

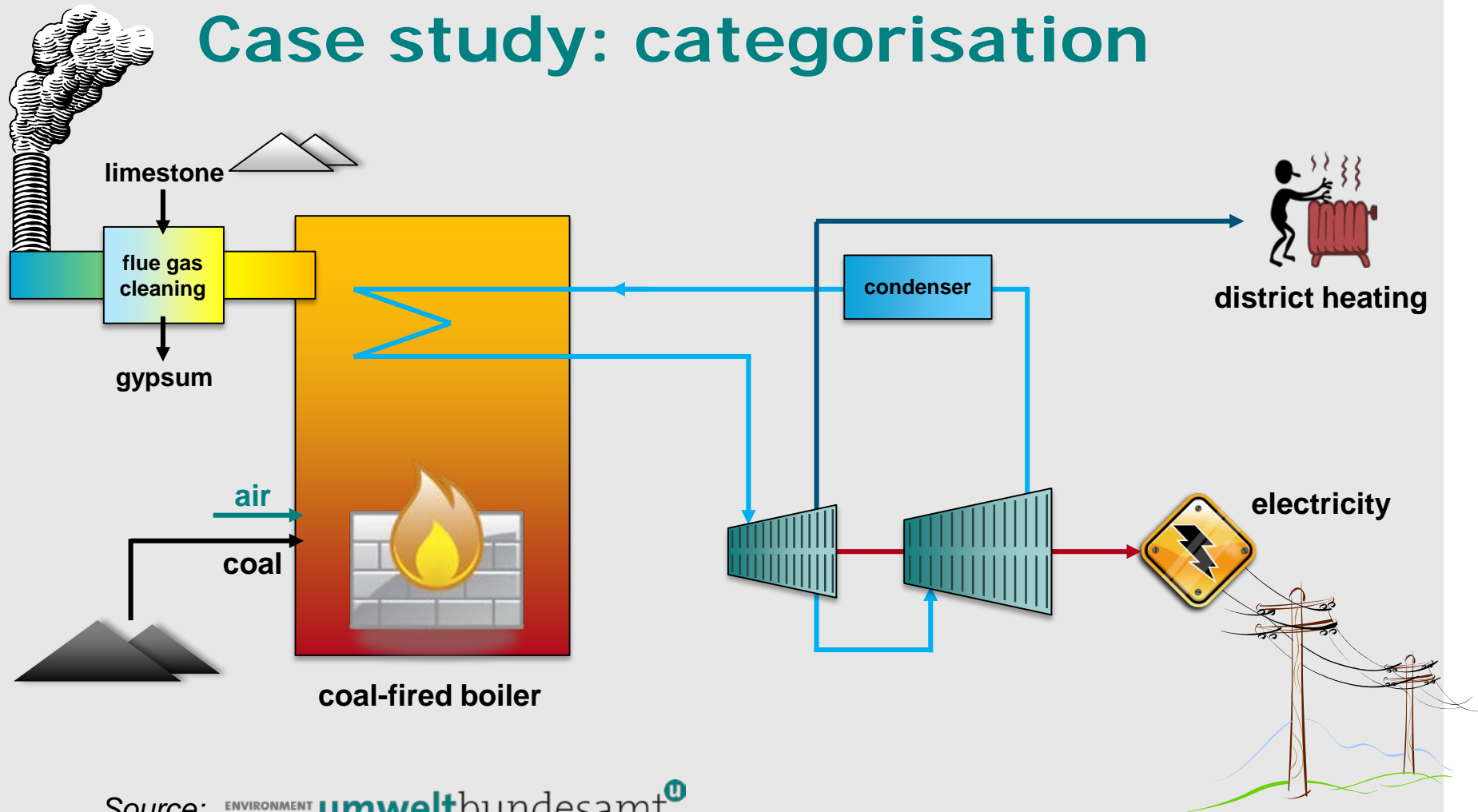
- Step 1: Description of the installation and its activities
- Step 2: Categorisation of installations
- Step 3: Emissions sources, source streams and their categorisation

Categorisation of installations



- ❑ Installations shall be classified by operators (Art. 19 MRR)
 - **Category A** $\leq 50.000 \text{ t CO}_{2(e)} / \text{year}$
 - **Category B** $> 50.000 \text{ t CO}_{2(e)} / \text{year} \leq 500.000 \text{ t CO}_{2(e)} / \text{year}$
 - **Category C** $> 500.000 \text{ t CO}_{2(e)} / \text{year}$
 - Installation with **low emissions** $< 25.000 \text{ t CO}_{2(e)} / \text{year}$
 - Based on verified emission reports from last trading period
 - If not available or no longer applicable – conservative estimation
 - **Exclusion of emissions from biomass**
 - **Before subtraction of transferred CO₂**

Case study: categorisation



Source: ENVIRONMENT
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Categorisation of installations: Example installation

- ❑ Installation is a 300 MW coal-fired CHP power plant
- ❑ Equipped with a flue gas desulphurisation unit using limestone
- ❑ Key parameters:
 - Annual fuel input from coal: 8,000 TJ / year
 - Limestone consumption: 3,400 t / year
 - Electricity production: 800 GWh / year (2.880 TJ /year)
 - District heat production: 2,800 TJ / year
 - **Emissions from coal: 760,000 t CO₂ / year**
 - **Emissions from limestone: 1,496 t CO₂ / year**
 - **Total annual emissions: 761,496 t CO₂ / year**

Categorisation of installations

❑ Installations shall be classified by operators (Art. 19 MRR)

- **Category A** $\leq 50.000 \text{ t CO}_{2(e)} / \text{year}$
- **Category B** $> 50.000 \text{ t CO}_{2(e)} / \text{year} \leq 500.000 \text{ t CO}_{2(e)} / \text{year}$
- **Category C** $> 500.000 \text{ t CO}_{2(e)} / \text{year}$ **(761.496 t CO₂ / year)**
- Installation with **low emissions** $< 25.000 \text{ t CO}_{2(e)} / \text{year}$
- Based on verified emission reports from last trading period
- If not available or no longer applicable – conservative estimation
- **Exclusion of emissions from biomass**
- **Before subtraction of transferred CO₂**



Operator preparing a monitoring plan

- Step 1: Description of the installation and its activities
- Step 2: Categorisation of installations
- Step 3: Emissions sources, source streams and their categorisation

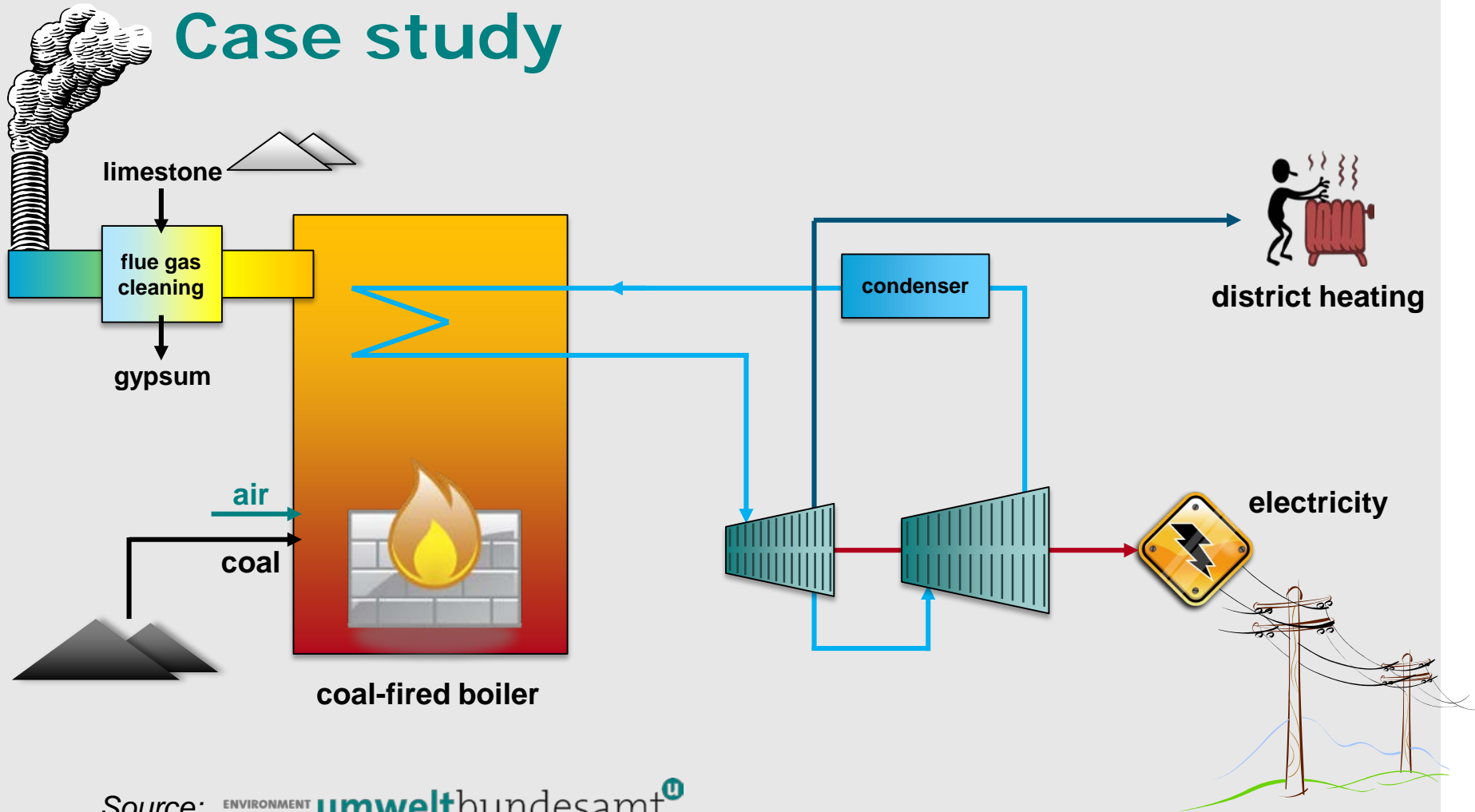
Definition – Emission source



- ❑ **Art 3(4) of the MRR**
- ❑ **Emission source** means a separately identifiable part of an installation or a process within an installation, from which relevant greenhouse gases are emitted
- ❑ **Examples**
 - Coal-fired boiler
 - VOC incinerator
 - Steam reforming reaction

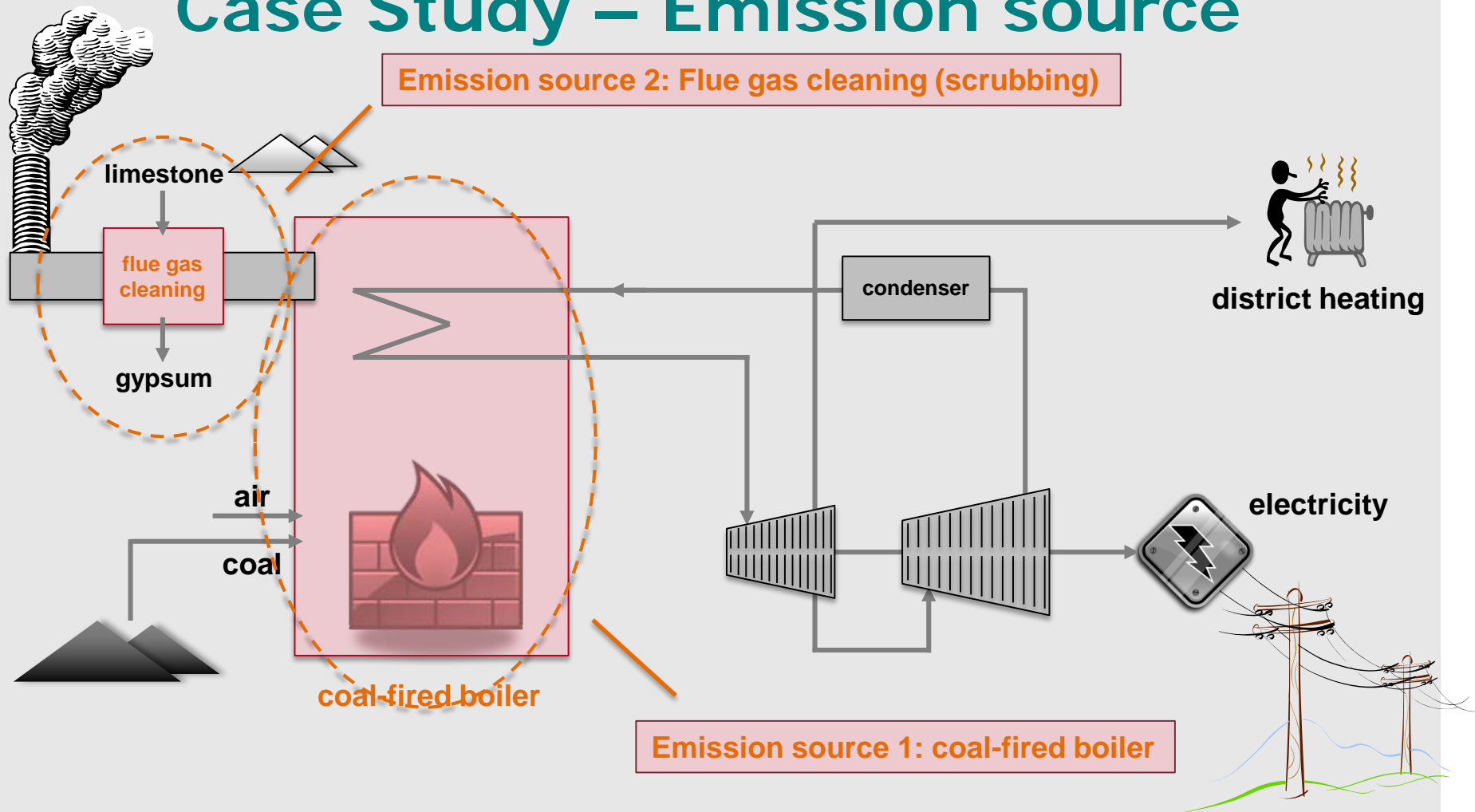
✓ *‘Emission source’ can be either a (physical) part of the installation, or rather a virtual construction which defines the system boundaries of a process which leads to emissions.*

Case study



Source: ENVIRONMENT
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Case Study – Emission source



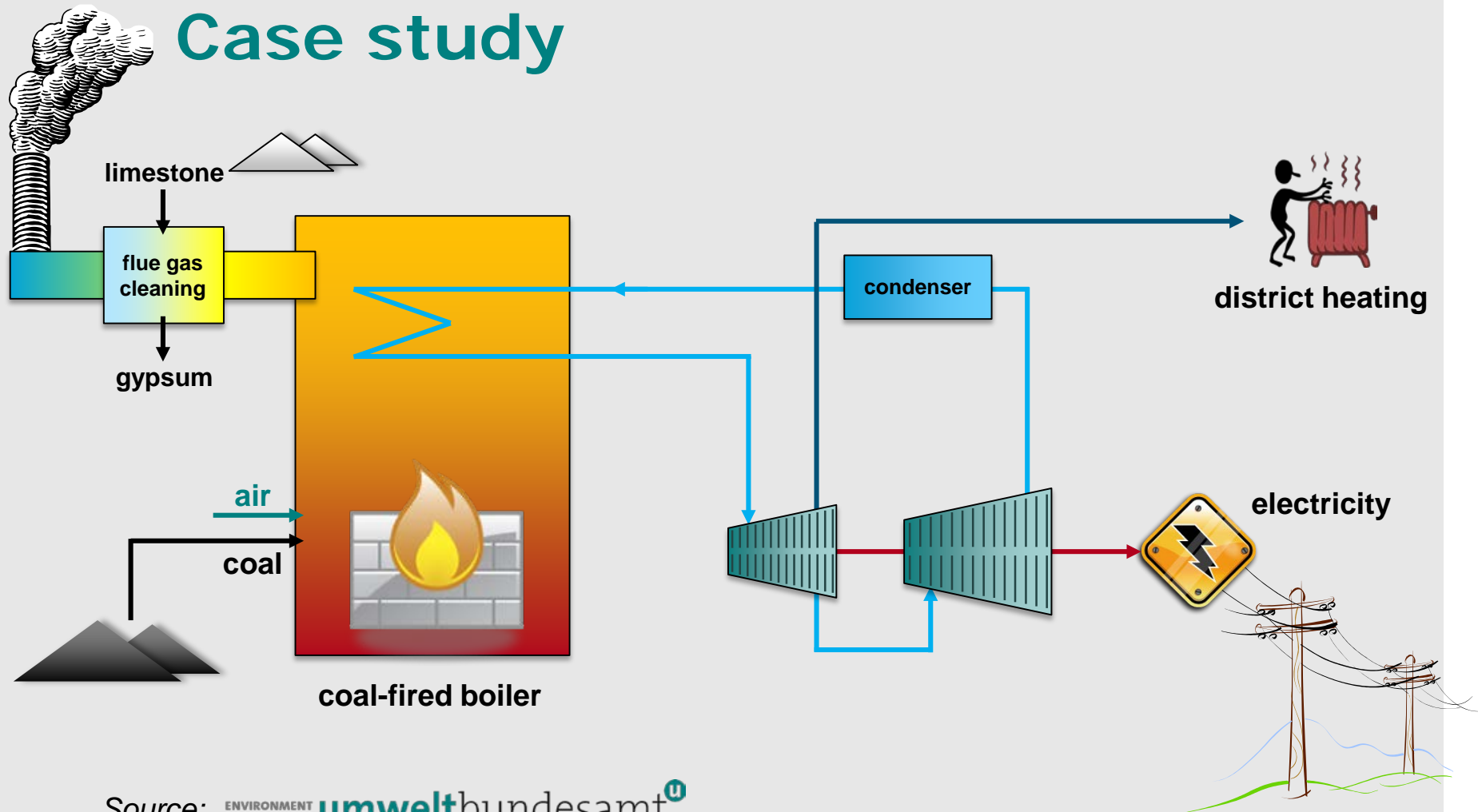
Definition – Emission points

- ❑ **Emission points:** (in particular relevant for measurement-based approaches)
 - Term is not defined explicitly by the MRR
 - However, where measurement-based approaches are used, the MRR (Annex I, section 1 (4)(b)) requires to be included in the monitoring plan that:

“a list of all relevant emission points during typical operation, and during restrictive and transition phases, including breakdown periods or commissioning phases, supplemented by a process diagram where requested by the competent authority”.

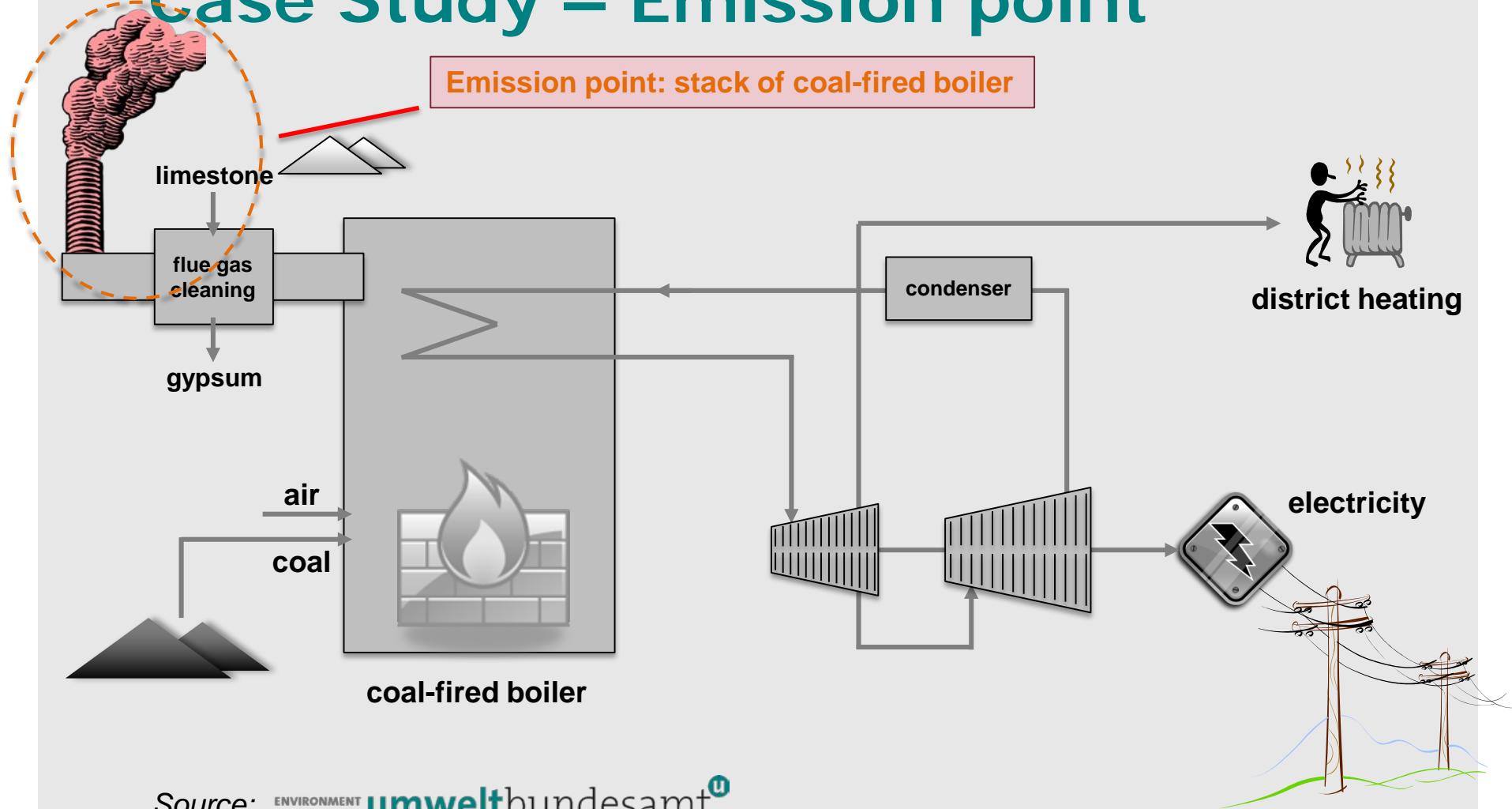
✓ *‘Emission points’ are the points where the greenhouse gases are actually released from the installation, including fugitive emissions, if applicable*

Case study



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Case Study – Emission point



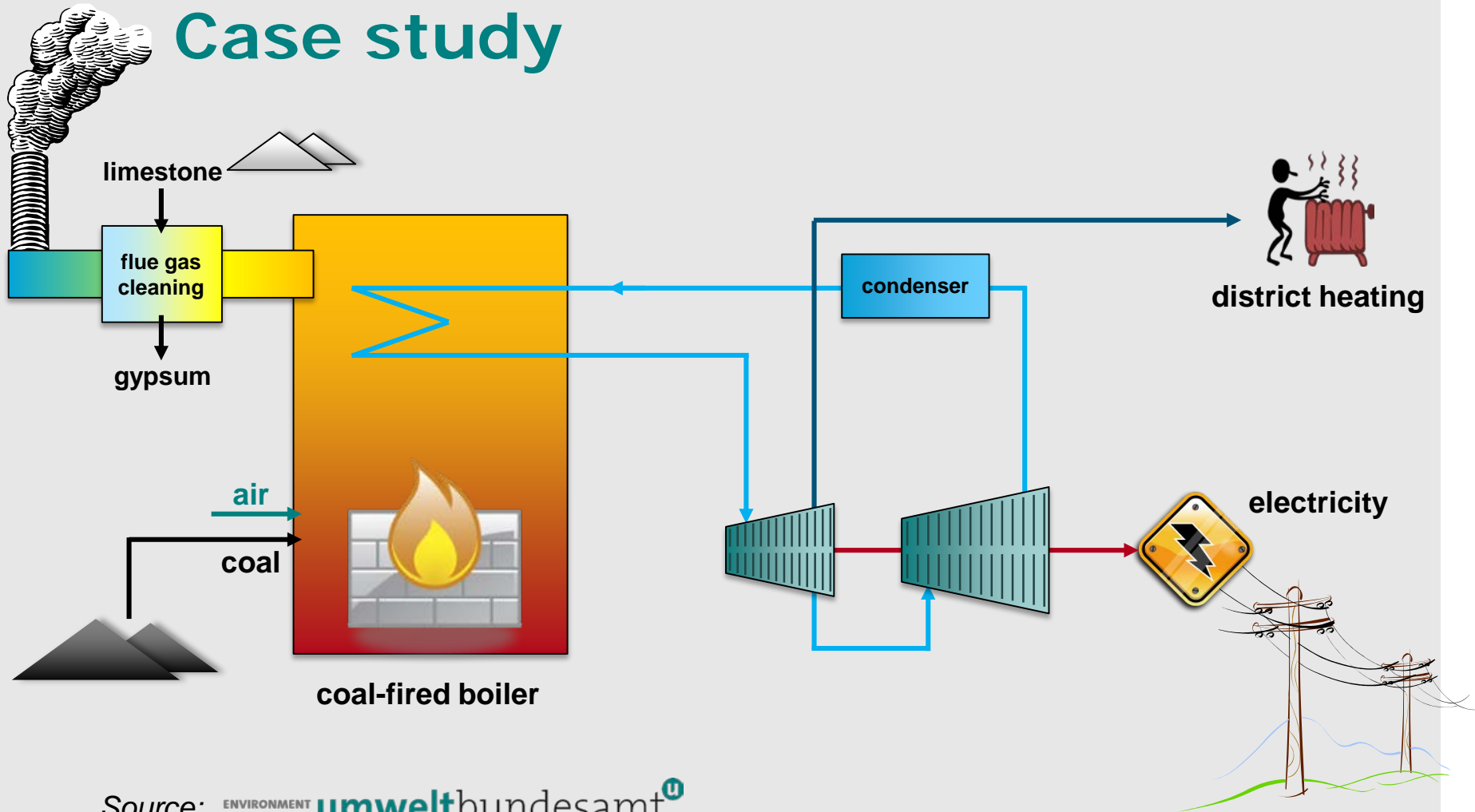
Source: ENVIRONMENT AGENCY AUSTRIA **umwelt**bundesamt^u

Definition – Measurement point

- ❑ **Art 3(42) of the MRR**
- ❑ **Measurement point** means the emission source for which continuous emission measurement systems (CEMS) are used for emission measurement, or the cross-section of a pipeline system for which the CO₂ flow is determined using continuous measurement systems"

✓ *'Measurement' point is the point where the instruments of a continuous measurement system are installed.*

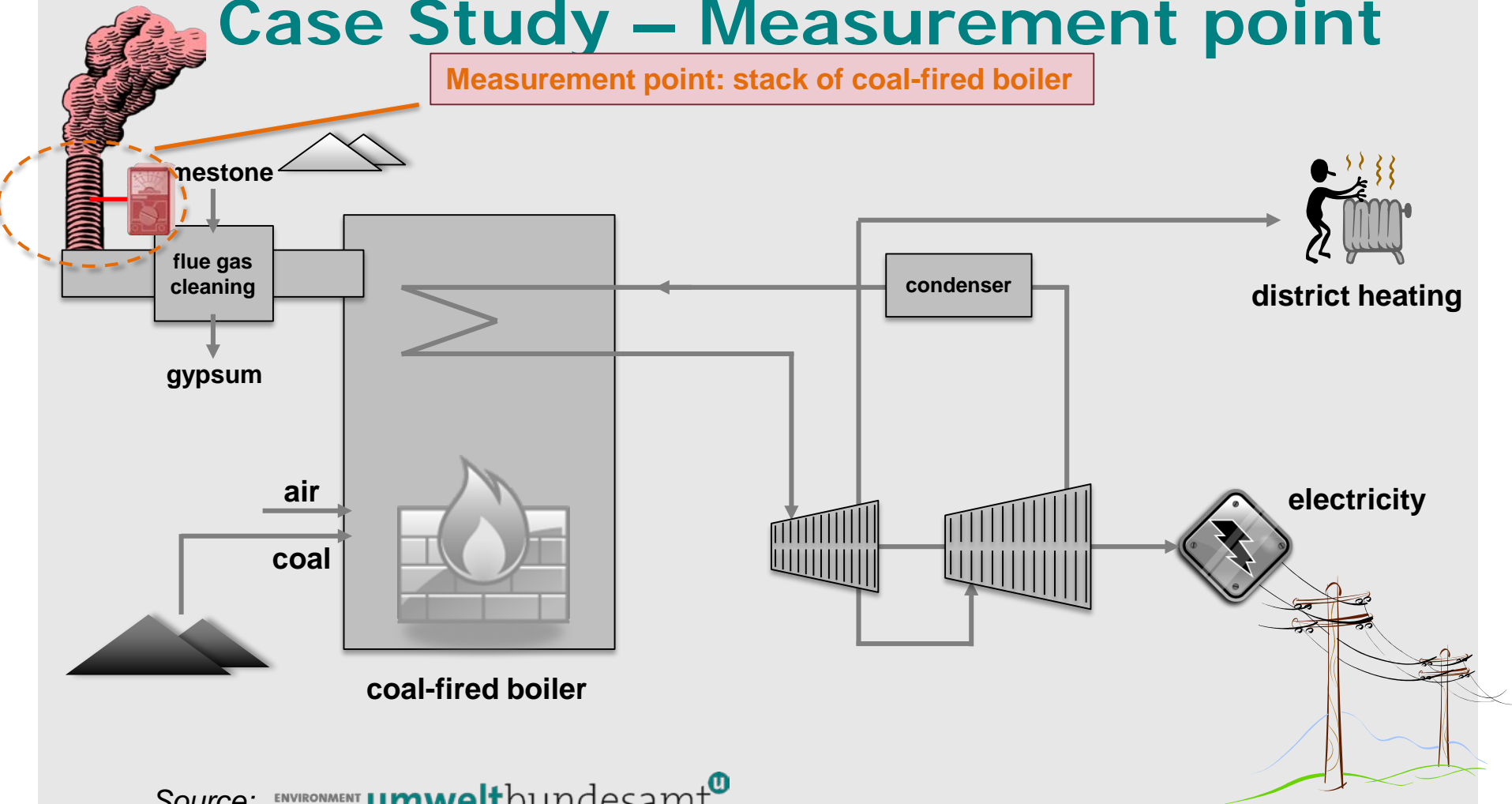
Case study



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Case Study – Measurement point

Measurement point: stack of coal-fired boiler



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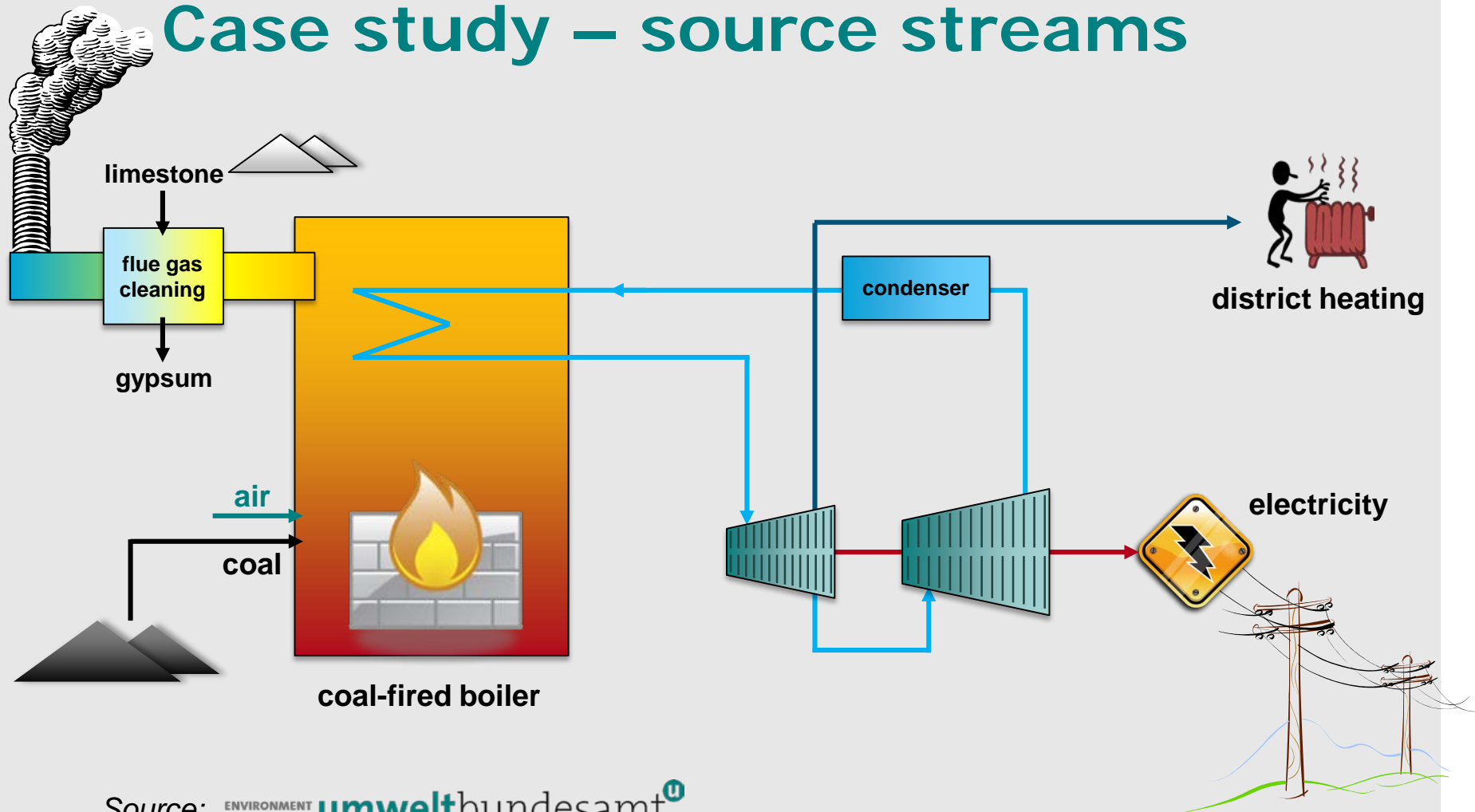
Source streams



- ❑ **Art 3(4) of the MRR**
- ❑ **“‘Source stream’ means any of the following:**
 - a specific fuel type, raw material or product giving rise to emissions of relevant greenhouse gases at one or more emission sources as a result of its consumption or production
 - a specific fuel type, raw material or product containing carbon and included in the calculation of greenhouse gas emissions using a mass balance methodology”

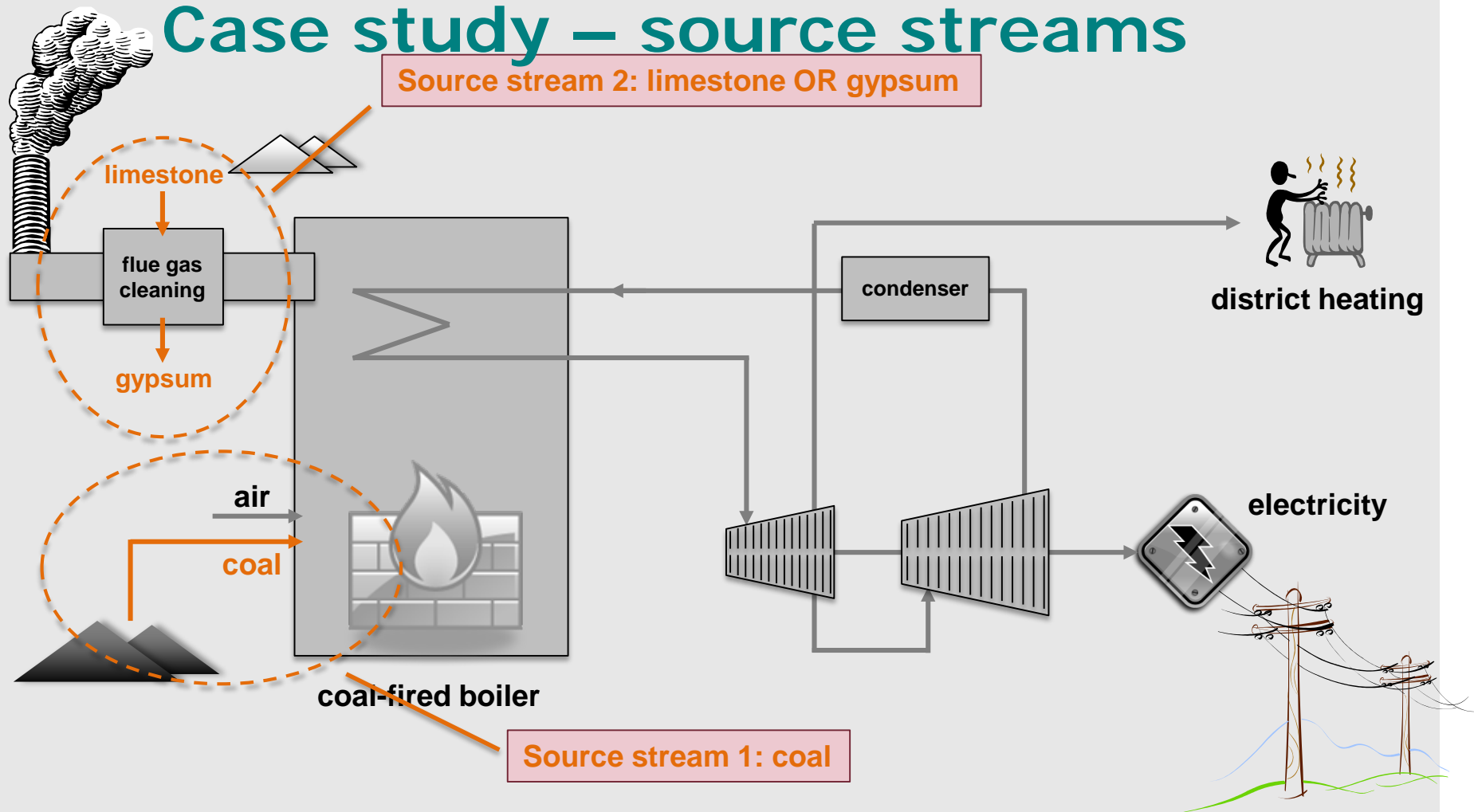
✓ *Source streams are all relevant fuel types, raw materials and products*

Case study – source streams



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Case study – source streams



Categorisation of source streams

❑ Source streams may be classified

➤ De-minimis source streams

jointly correspond to less than 1.000 t fossil CO_{2(e)} / year or
less than 2% (up to 20.000 tonnes) of fossil CO_{2(e)} / year
(relevant for installations with 50.000 – 1 mio t fossil CO_{2(e)} / year)

➤ Minor source streams

jointly correspond to less than 5.000 t fossil CO_{2(e)} / year or
less than 10% (up to 100.000 tonnes) of fossil CO_{2(e)} / year
(relevant for installations with 50.000 – 1 mio t fossil CO_{2(e)} / year)

➤ Major source streams

not classified as minor or de-minimis

➤ Before subtraction of transferred CO₂

Categorisation of source streams: Example installation (2)

Fuel/material	t CO ₂	%	classification
Coal	760,000	99.8%	Major
Limestone	1,496	0.2%	De-minimis

- What if also 75,000 t CO₂ from heavy fuel oil are emitted?

Fuel/material	t CO ₂	%	classification
Coal	760,000	90.9%	Major
Heavy fuel oil	75,000	9.0%	Minor
Limestone	1,496	0.2%	De-minimis



Practicle case study

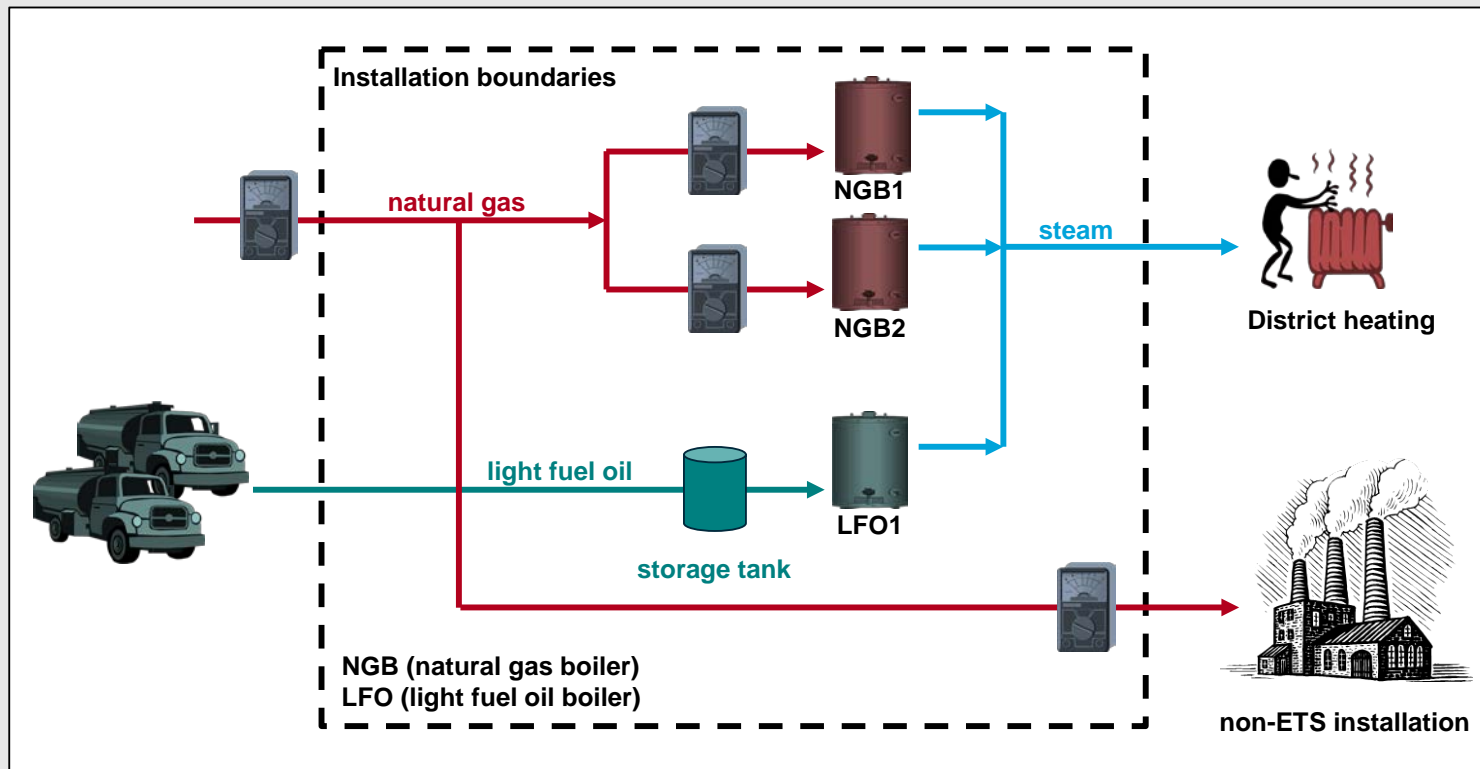
- Example installation

Example description (1)

- ❑ **The installation's only product is measurable heat exported to a districting heating network and to small manufacturing companies not covered by the EU ETS.**
- ❑ **Inputs:**
 - Natural gas from the gas network supplier; main gas meter is not used as primary data flow because approx. 5% of the gas is directly exported to the connected small companies.
 - Light fuel oil delivered by trucks and stored in tanks.
- ❑ **Outputs:**
 - Measurable heat (steam) for district heating and process heat. Heat measured by main heat meter.
 - Approx. 5% of the natural gas is exported.

Example description (2)

- Natural gas is combusted in two 35 MW boilers (Internal names: NGB1 and NGB2). Light fuel oil boiler (10 MW) is used as a reserve/peak load boiler (Internal name LFO1).



Source: MRR Guidance - exemplar monitoring plan



Example installation

- See practical demonstration in the "Exemplar Monitoring Plan"

Questions?

Where to find more information?

Regulation No. 601/2012 (MRR)

<http://eur-lex.europa.eu/LexUriServ/LexUriServ.do?uri=CONSLEG:2012R0601:20120801:EN:PDF>

Guidance Documents on European Commission's website

http://ec.europa.eu/clima/policies/ets/monitoring/documentation_en.htm

*MRR Guidance Document No. 1 General guidance for installations
Exemplar monitoring plan*

Contact & Information

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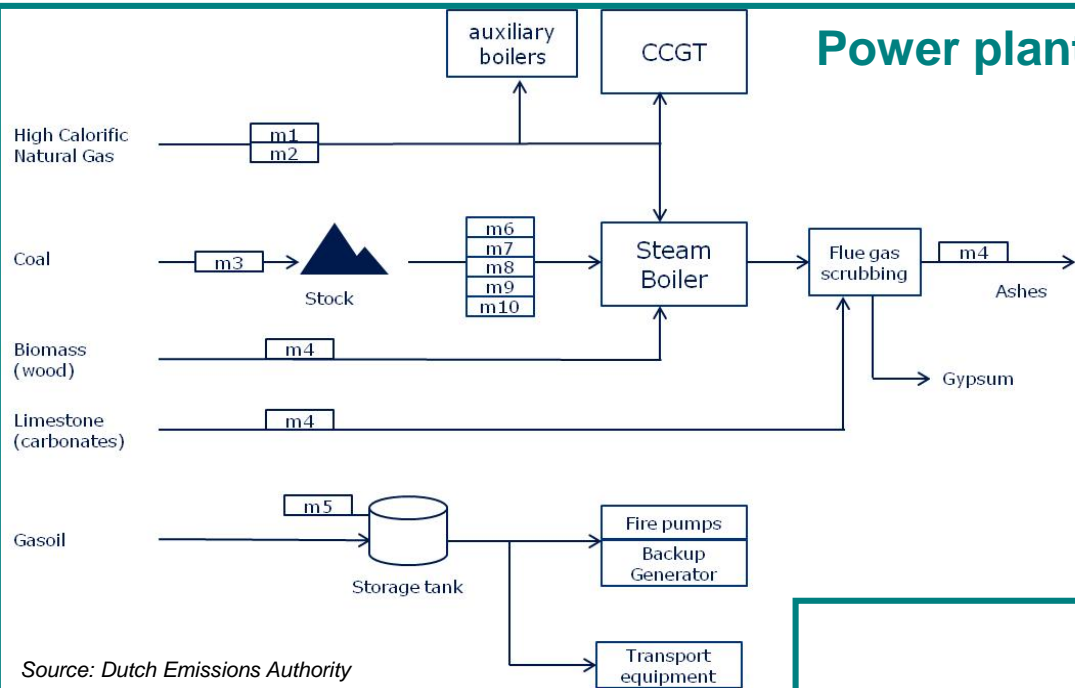
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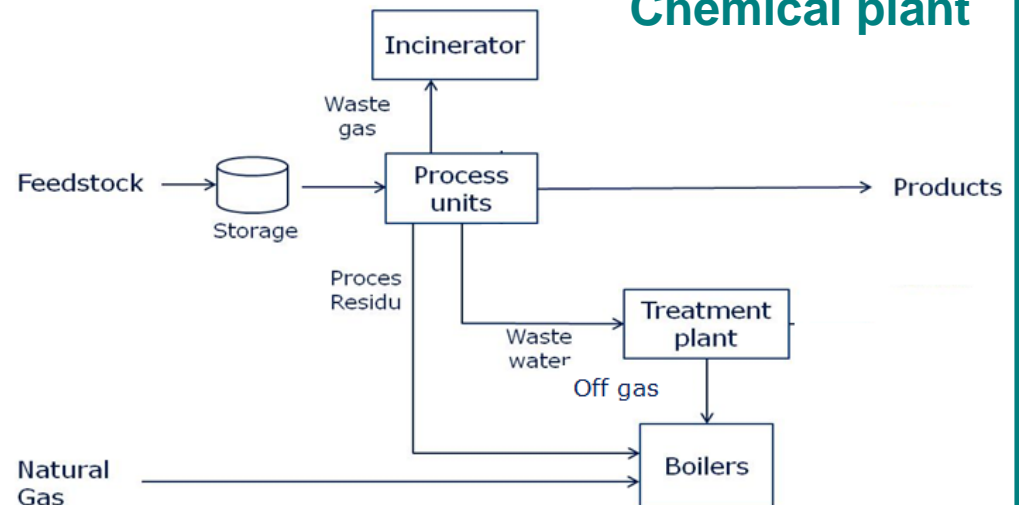
Power plant



Source: Dutch Emissions Authority

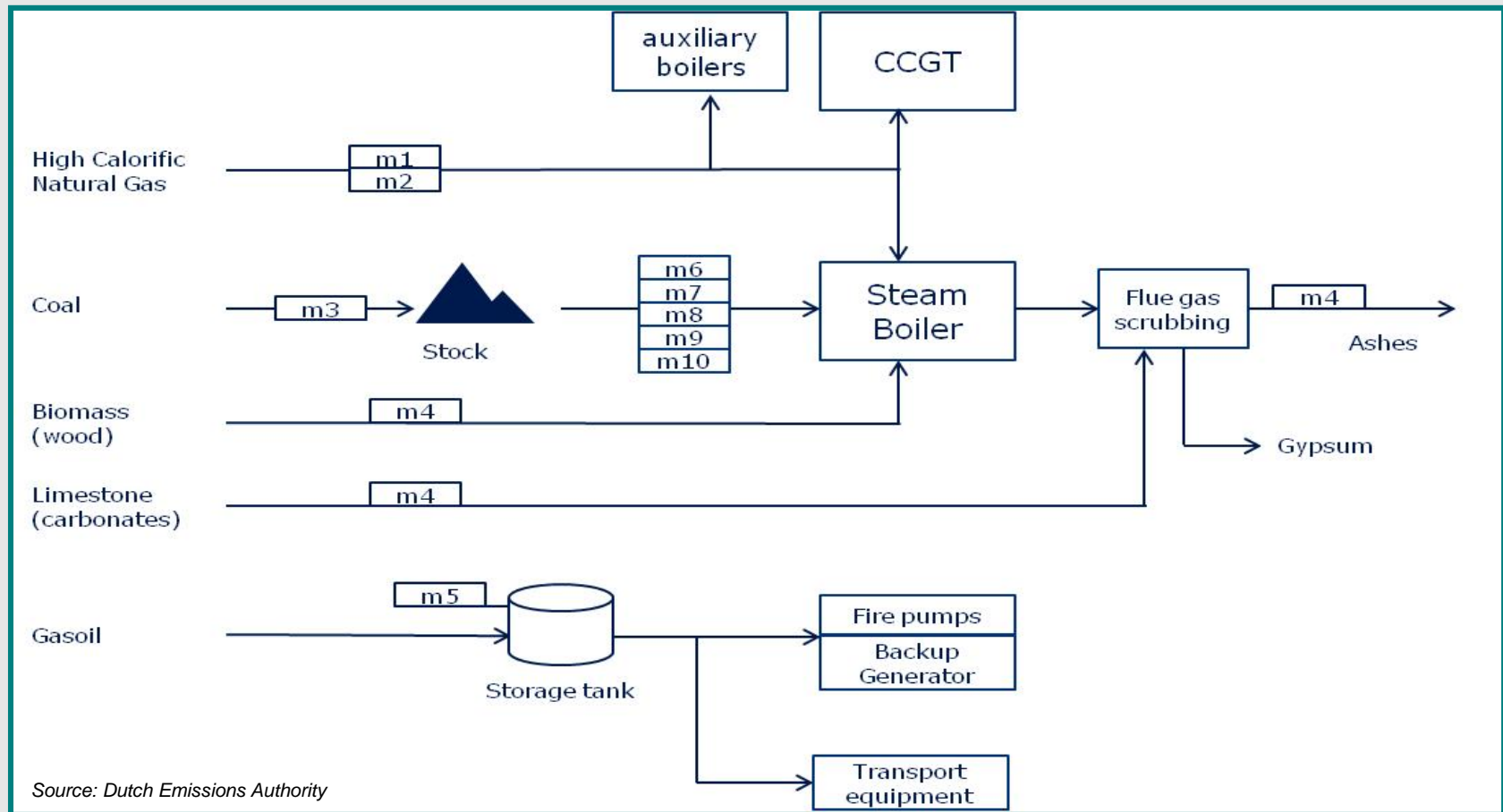
Examples

Chemical plant

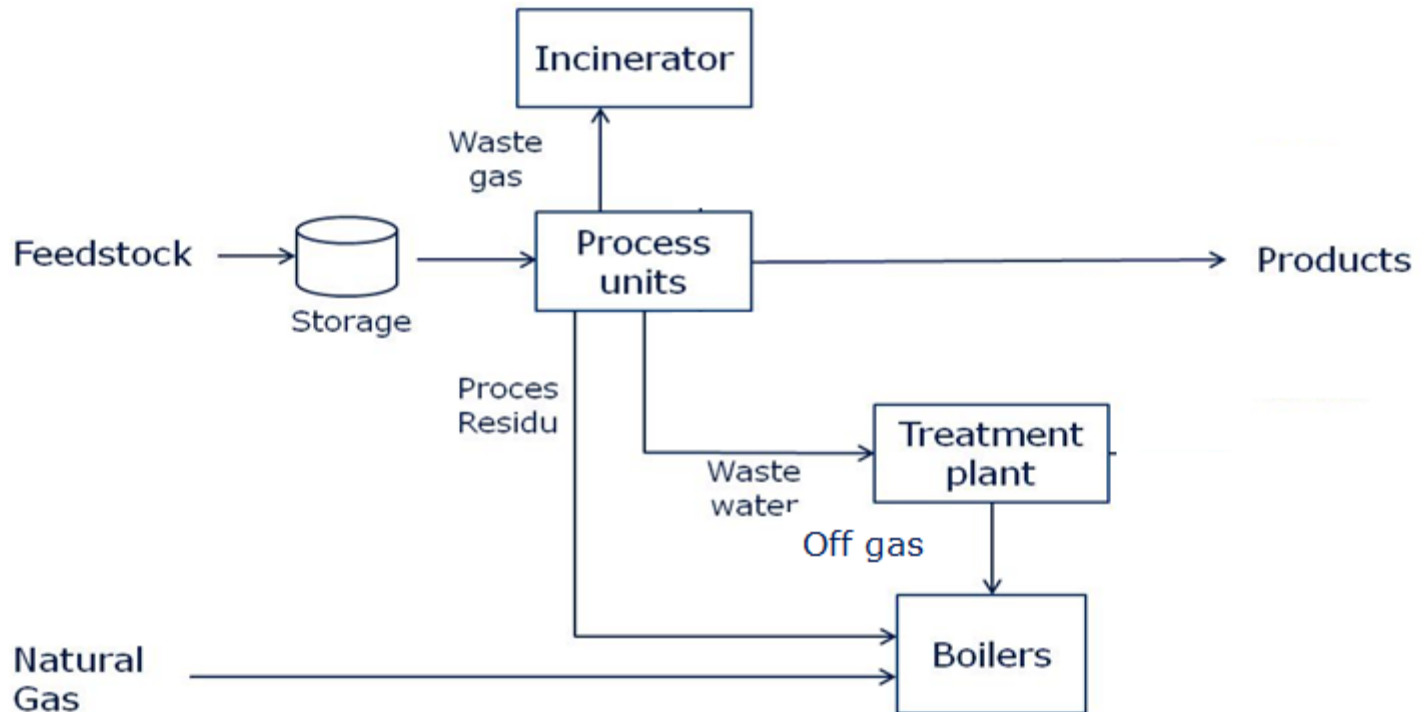


Source: Dutch Emissions Authority

Example: coal-fired power plant

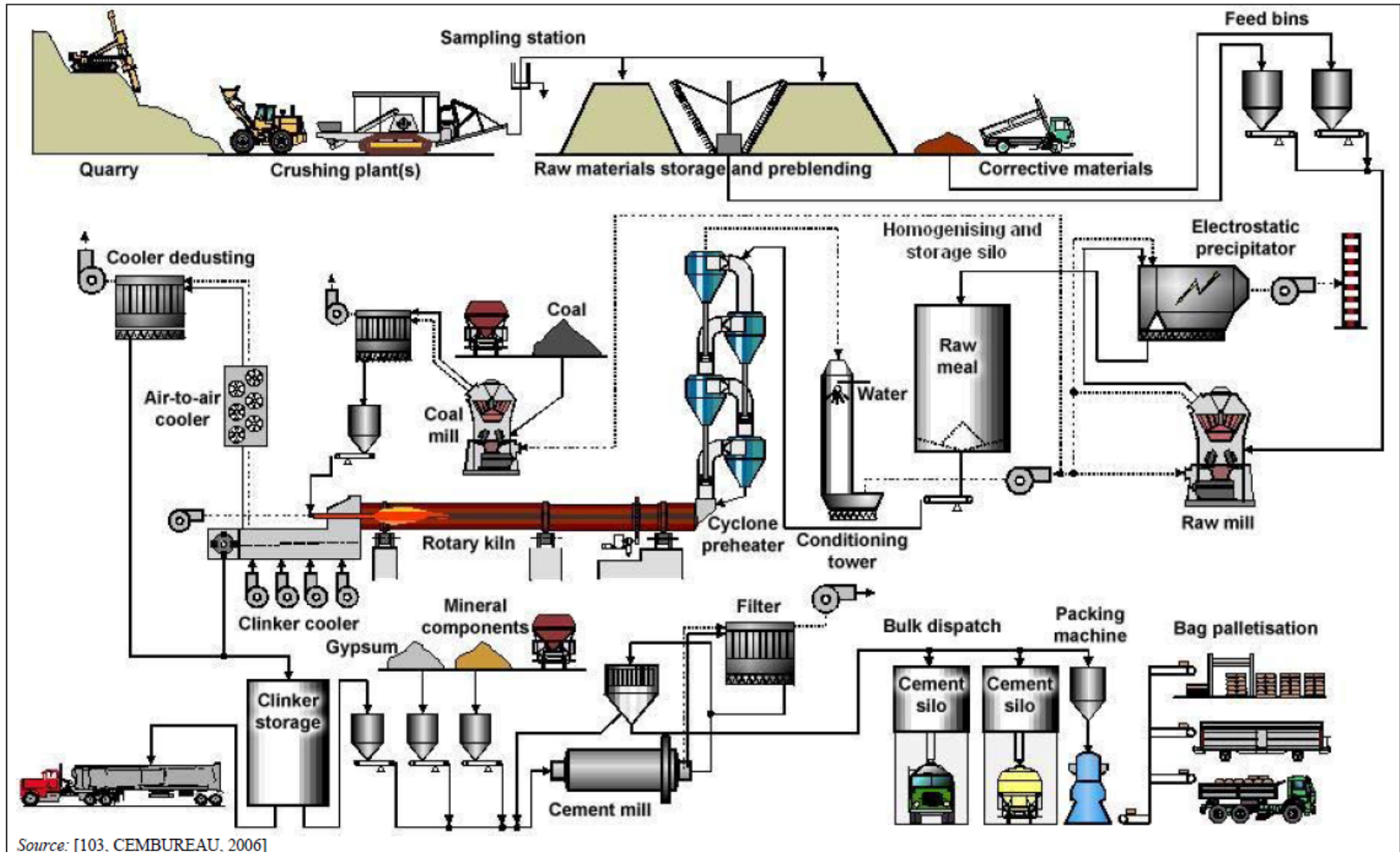


Example: Chemical plant



Source: Dutch Emissions Authority

Example: Cement



Source: BREF document CLM

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Example: Steel

Source: BREF document IS

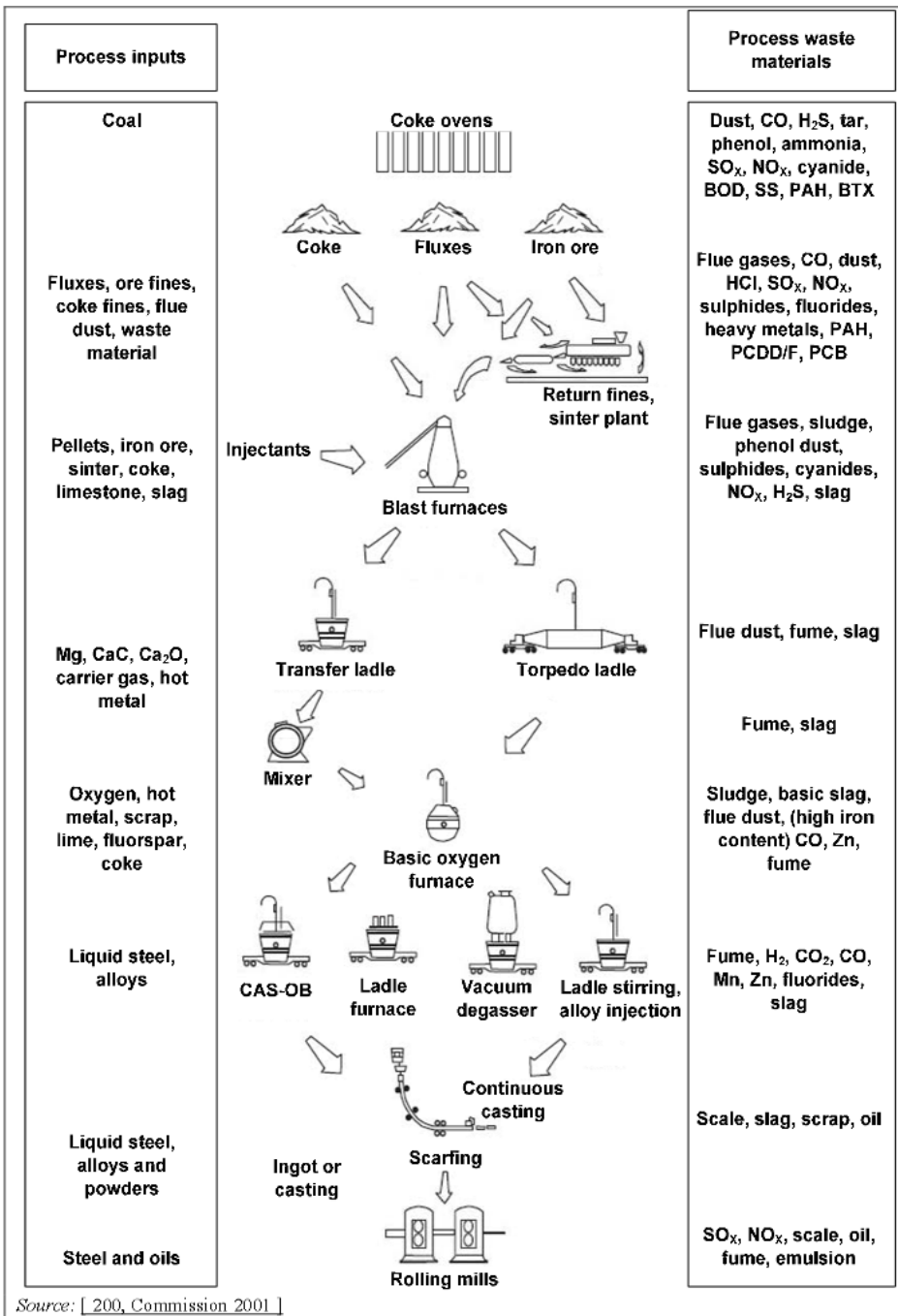


Figure 1.6: Overview of the process routes of an integrated steelworks

Example: ammonia/nitric acid

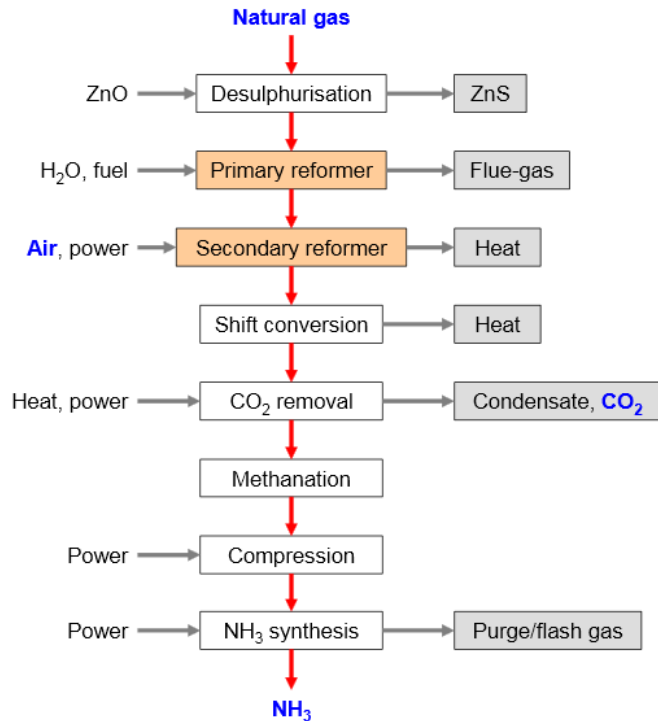


Figure 2.1: NH_3 production by conventional steam reforming
[1, EFMA, 2000]

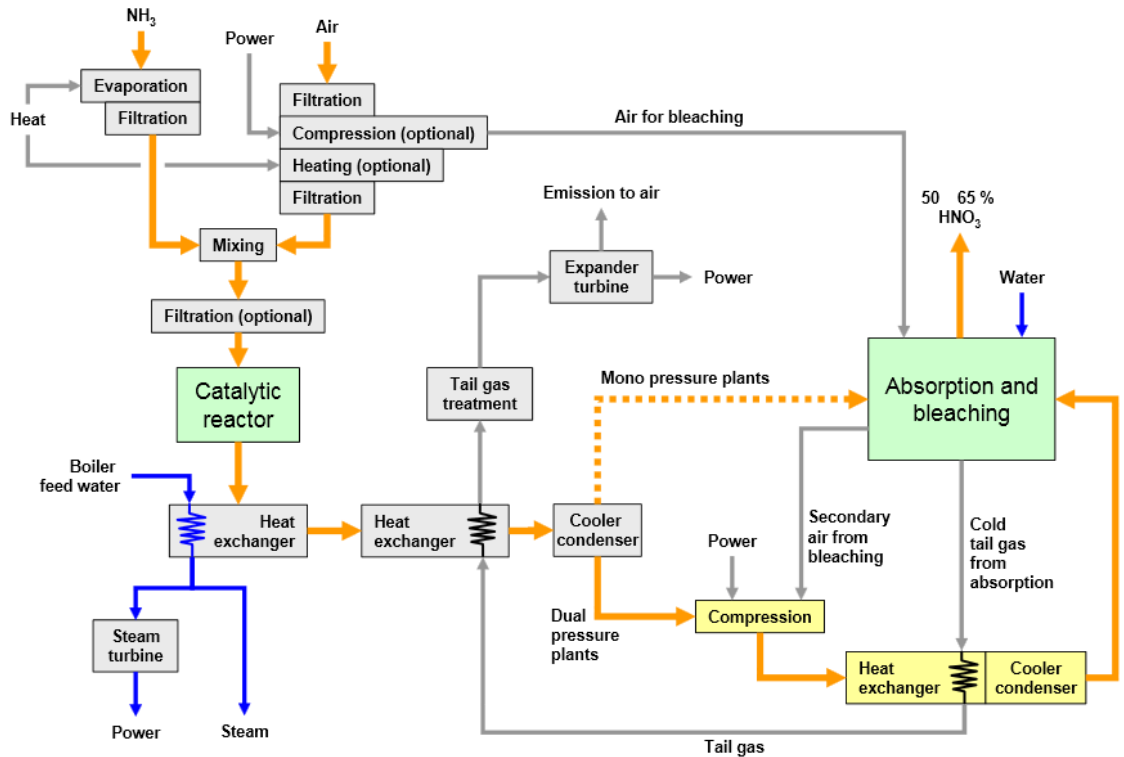


Figure 3.2: Overview of the production of HNO_3
This figure is based on [88, infoMil, 1999, 102, EFMA, 2000]

Example: refinery

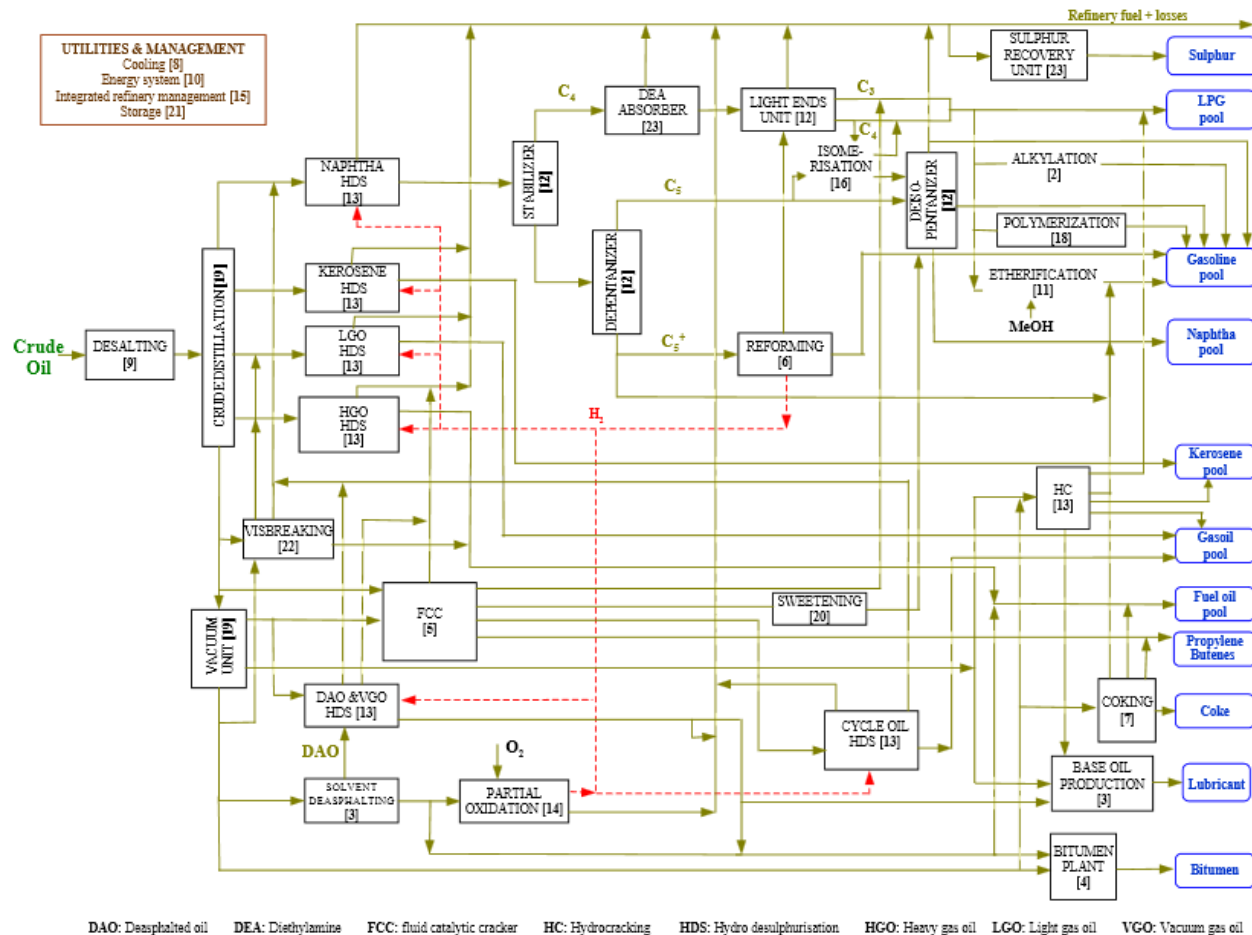


Figure 2.1: General scheme of a complex oil refinery

Note: Numbers in the figure are the section numbers given to each type of process in this chapter.

Source: BREF document REF