

# **Capacity Building for the Implementation of the EU Emissions Trading Directive in the new EU Member States**

**Workshop**

**Brno, 7<sup>th</sup> – 8<sup>th</sup> November 2005**

**Monitoring & Reporting, Verification, Accreditation**

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**Competence Center Climate Change**

**TÜV Rheinland Group**



# ■ Content

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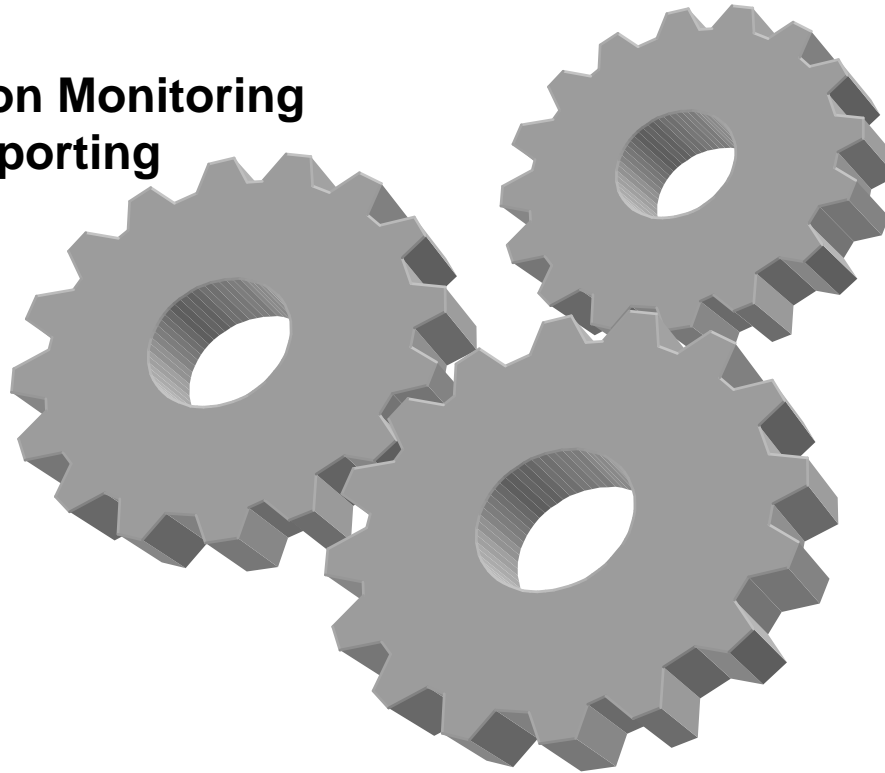
1. **Scope of the Manuals**
2. **Manual No.1: Guide on Monitoring and Reporting**
3. **Manual No.2: Guide on Verification**
4. **Manual No.3: Guide on Accreditation**
5. **Summary and Conclusion**



# ■ Interrelationship between Manuals

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**Guide on Monitoring  
and Reporting**

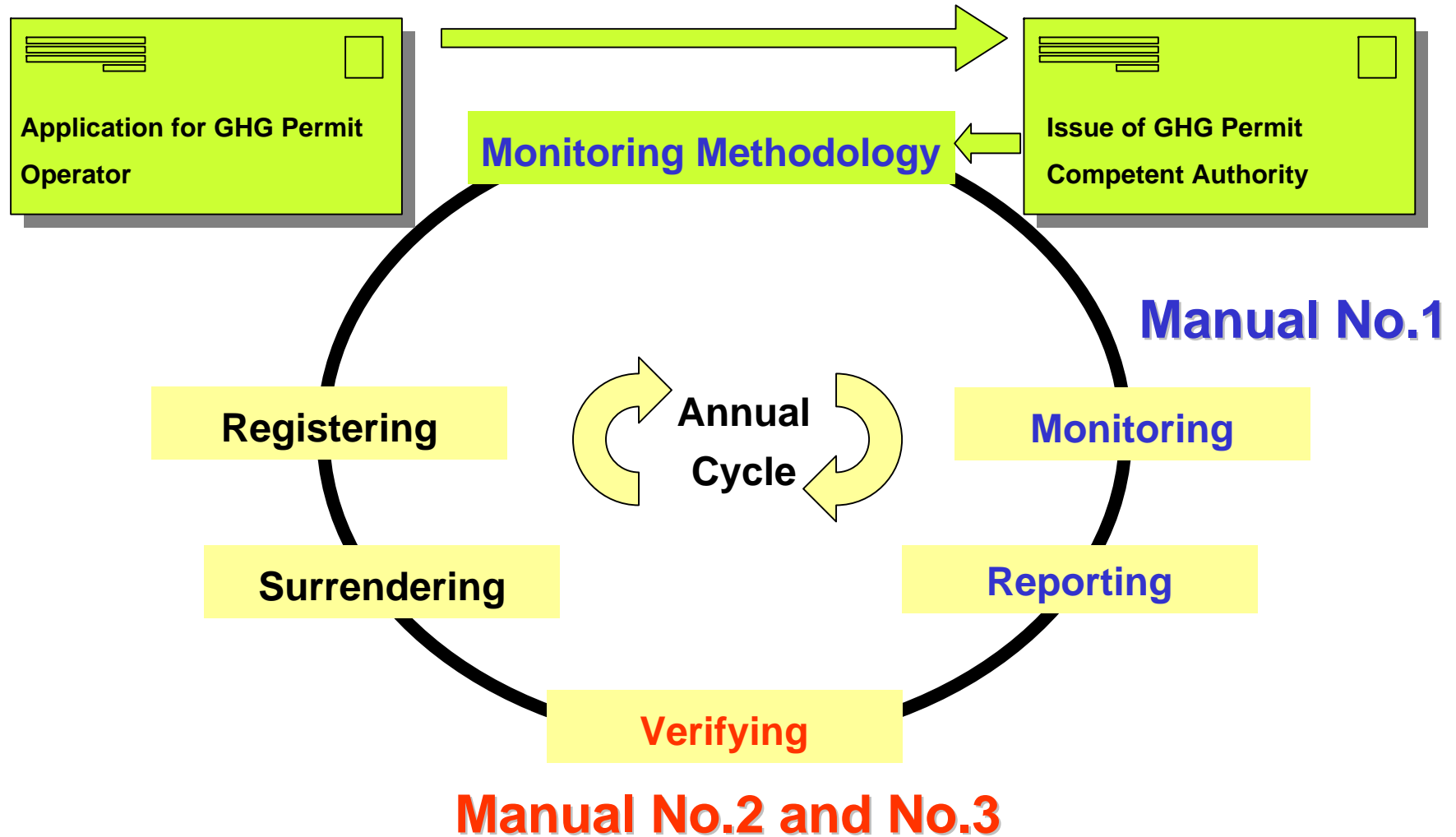


**Guide on Accreditation**

**Guide on Verification**



# ■ Scope of the Manuals



## ■ GHG Permit

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### Member States shall ...

... assure that from 1 January 2005 no installation covered by the EU ETS undertakes any activity unless its operator holds a GHG permit (*Article 4*)

### Application for GHG Permit shall ...

... include measures planned to monitor and report emissions in accordance with the MRG (*Article 5*)

### GHG Permit shall ...

... contain monitoring requirements, specifying monitoring methodology and frequency (*Article 6*)

**(1) *Theory not practise***

**(2) *Practise differs from MS to MS and within MS***

# ■ Content

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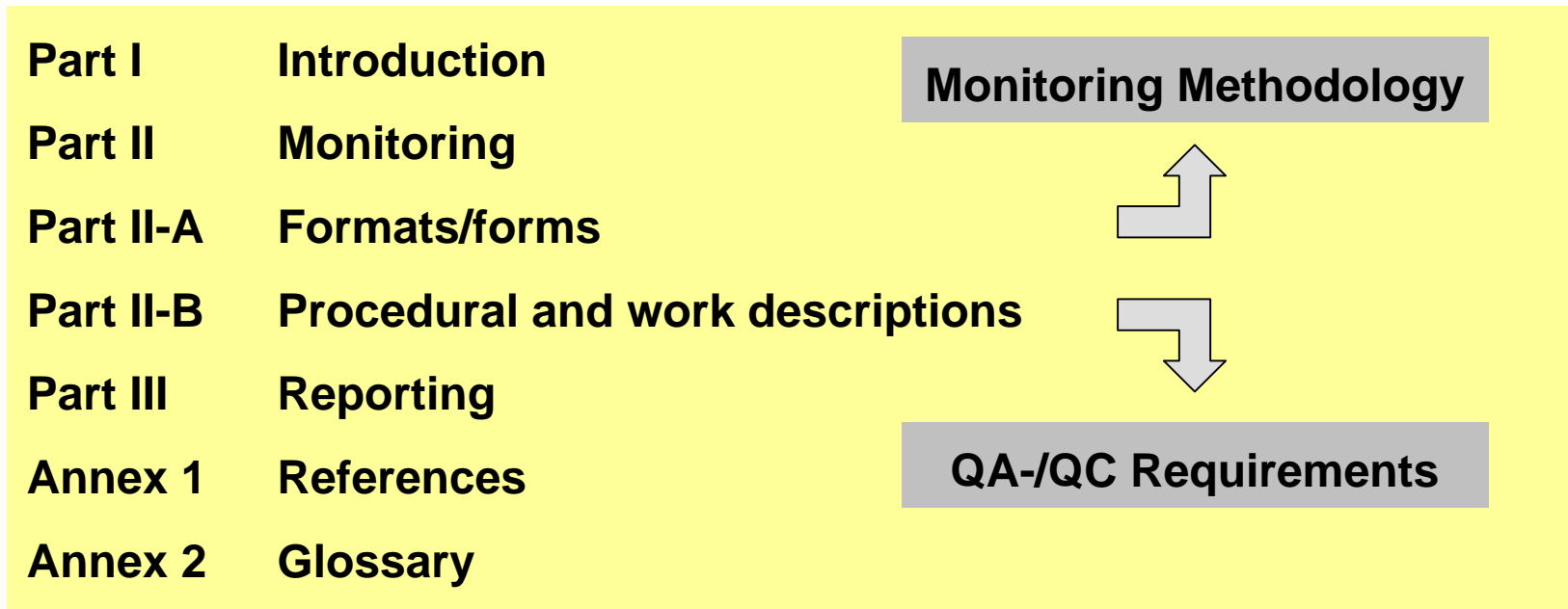
## ■ Case Study



- **Power Station**
- **400 MW**
- **2 Sources**  
(combustion; flue gas cleaning),
- **3 Streams (linked to sources)**  
(coal, timber, limestone)
- **2 Streams (not linked to sources)**
  - (FBA Furnace Bottom Ash)
  - PFA Pulverised Fuel Ash)



## ■ Structure of Manual No.1



***Case Study explains formats/forms and QA-/QC measures!***

## ■ Formats/forms

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### Monitoring Methodology

1. Information about exact definition of the installation and activities
2. Information on responsibilities for M&R
3. List of fuel and material streams
4. List of sources
5. List of tiers
6. Description of the metering devices
7. Description of the sampling of fuel and materials
8. Description of the sources or analytical approaches
9. Description of CEM
10. Description of QA/QC for data management
11. Information on links with EMAS



## ■ Definitions (1)

### LEVEL

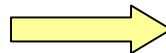
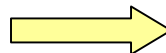
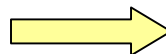
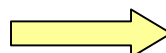
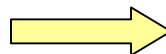
01: **Installation**

02: **Category of Activity**

03: **Activity**

04: **Source**

05: **Streams**



### SIMPLE EXAMPLE

**Power Plant**

**Energy Activities**

**Combustion**

**Gas Turbine**

**Natural Gas**

### INSTALLATIONS

means stationary technical units where one or more activities are carried out

### ACTIVITIES

means the activities listed in Annex I of The ETS Directive

### SOURCES

means separately identifiable points or processes in an installation from which GHG are emitted

## ■ Definitions (2)

LEVEL		COMPLEX EXAMPLE
01 Installation	→	Integrated Steel Works
02 Category of Activity	→	Energy Activities, <i>Production and Processing of Ferrous Metals</i>
03 Activity	→	Combustion, Coke Oven, <i>Sintering Installation, Installation for the Production of Steel</i>
04 Source	→	Incineration, Flue Gas Cleaning, <i>(N.N.)</i>
05 Streams	→	Coal, Gas Oil, Limestone, <i>(N.N.)</i>

***Define the installation´s:***

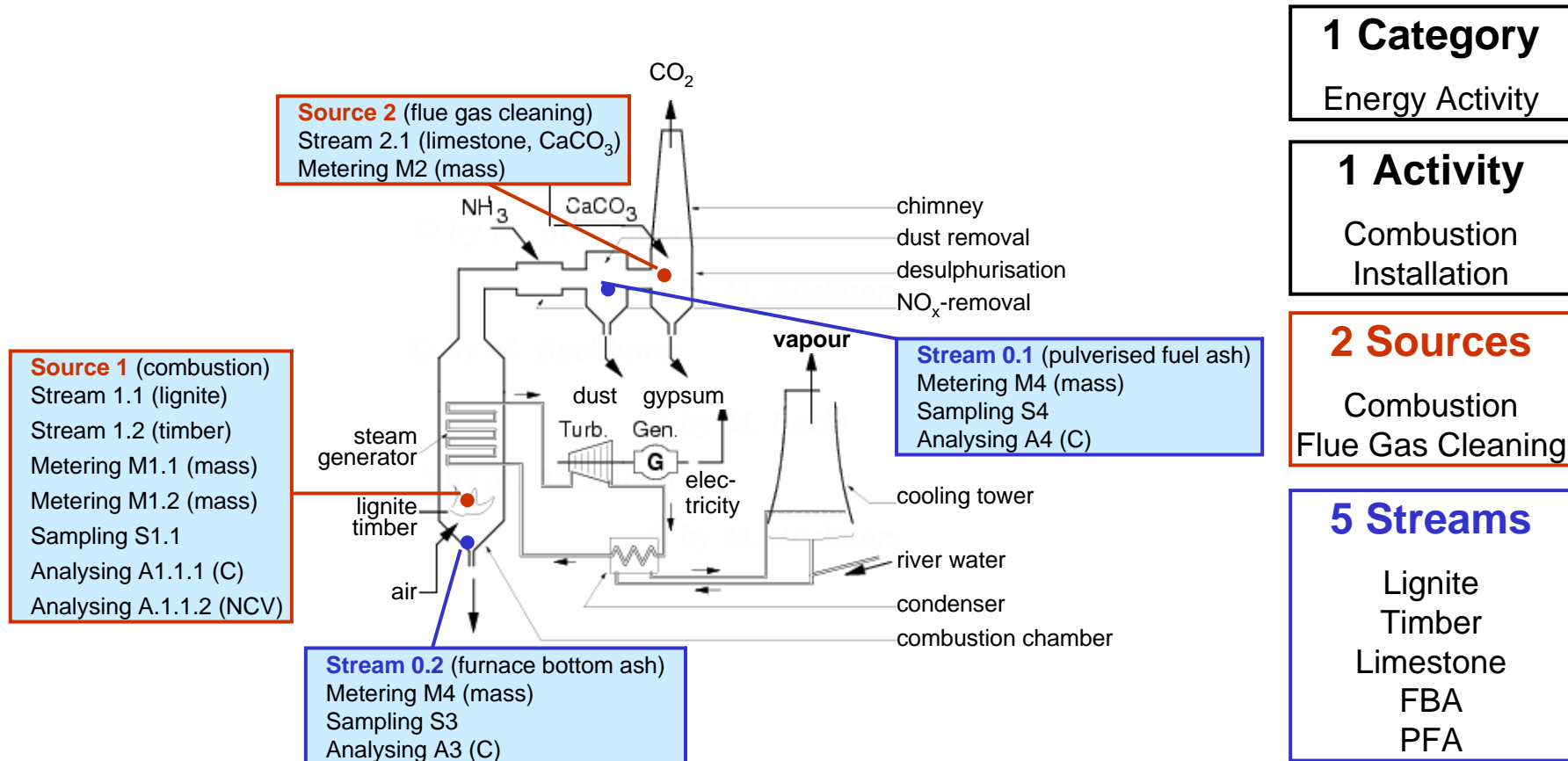
***(1) Categories of activity***

***(2) Activities***

***(3) Sources***

***(4) Fuel and material streams***

# ■ Case Study: Condensation Power Plant



**1 Category**  
Energy Activity

**1 Activity**  
Combustion  
Installation

**2 Sources**  
Combustion  
Flue Gas Cleaning

**5 Streams**  
Lignite  
Timber  
Limestone  
FBA  
PFA

## ■ Fuel and Material Streams

Activity: Combustion Installation								
Total CO <sub>2</sub> -emissions of the activity including biomass streams					774,618 t CO <sub>2</sub> /a			
Total CO <sub>2</sub> -emissions of the activity without biomass streams					709,579 t CO <sub>2</sub> /a			
Total CO <sub>2</sub> -emissions of the activity's biomass streams					65,039 t CO <sub>2</sub> /a			
Code	Name	Amount [t/a]	Biomass [%]	CO <sub>2</sub> -emissions				
				Amount [t/a]	Origin		Determination	
					Comb.	Process	Calcul.	Measure
1.1	Lignite	824,666	0	701,867	x		x	
1.2	Timber	39,543	100	65,039	x		x	
2.1	Limestone	17,540	0	7,712		x	x	
0.1	Ash (FBA)	7,020	0	Output streams with no impact on CO <sub>2</sub> -emissions but on the oxidation factor of fuel stream 1.1				
0.2	Ash (PFA)	28,074	0					


## ■ Sources

Activity: Combustion Installation							
Total CO <sub>2</sub> -emissions of the activity including biomass streams						774,618 t CO <sub>2</sub> /a	
Total CO <sub>2</sub> -emissions of the activity without biomass streams						709,579 t CO <sub>2</sub> /a	
Total CO <sub>2</sub> -emissions of the activity's biomass streams						65,039 t CO <sub>2</sub> /a	
Sources			Streams (of fuel and material)				
Code	Name	CO <sub>2</sub> without biomass	Code	Name	Amount [t/a]	CO <sub>2</sub> -emissions	
						[t CO <sub>2</sub> /a]	Biomass
1	combustion	701,867	1.1	lignite	824,666	701,867	No
			1.2	timber	39,543	65,039	Yes
2	flue gas cleaning	7,712	2.1	limestone	17,540	7,712	No

## ■ Tier Approach - Preparations

Table I of Annex I of the MRG:

Columns A, B and C contain tier values of **major sources!**

	increasing magnitude 		
Object	Class 1	Class 2	Class 3
Installation	A	B	C
Stream	de minimis	minor	major
Source	de minimis	minor	major

**Major sources including major streams of fuels and material are those, which, if ranked in the order of their decreasing magnitude, cumulatively contribute at least 95% of the total annual emissions of the installation.**

## ■ Thresholds for Classification

Column	Total annual CO <sub>2</sub> emissions of the installation
A	emissions ≤ 50,000 t/a
B	50,000 t/a < emissions ≤ 500,000 t/a
C	emissions > 500,000 t/a

Installation: [as indicated in Data of the Installation]		
Total annual CO <sub>2</sub> -emissions of the installation (without biomass)	Threshold for minor streams (sources )	Threshold for „de-minimis“ streams (sources )
≤ 50,000 t CO <sub>2</sub> /a	2,500 t CO <sub>2</sub> /a	500 t CO <sub>2</sub> /a
> 50,000 t/a	5% i.e. > 2,500 t CO <sub>2</sub> /a	1% i.e.> 500 t CO <sub>2</sub> /a

## ■ “de minimis”, Minor and Major Streams (Sources)

<b>Installation: Condensation Power Station [709,579 t CO<sub>2</sub>/a]</b>		
<b>Total annual CO<sub>2</sub>-emissions of the installation (without biomass)</b>	<b>Threshold for minor streams (sources )</b>	<b>Threshold for „de-minimis“ streams (sources )</b>
<b>&gt; 50,000 t/a</b>	<b>5% i.e. &gt; 2,500 t CO<sub>2</sub>/a</b>	<b>1% i.e.&gt; 500 t CO<sub>2</sub>/a</b>
<b>709,579 t CO<sub>2</sub>/a</b>	<b>35,479 t CO<sub>2</sub>/a</b>	<b>7,096 t CO<sub>2</sub>/a</b>

## ■ de minimis, Minor and Major Streams (Sources)

Installation: Power Station 709,597 t CO <sub>2</sub> /a			CO <sub>2</sub> -emissions		
MAJOR	Streams		Amount [t CO <sub>2</sub> /a]	% of total emissions	Σ(% of total emissions)
	No.	Name			
MAJOR	1.1	Lignite	701,867	98.9	98.9
	Go to MINOR if sum of percentages is ≥ 95%				
	Go to DE MINIMIS if sum of percentages is ≥ 99%				
MINOR	2.1	Limestone	7,712	1.1	100
	Go to DE MINIMIS if sum of percentages is ≥ 99%				
DE MINIMIS	-	-	-	-	100
	Sum of percentages must be in the last line 100%				

**(1) Stream 1.1 is a major stream (source)!**

**(2) Stream 2.1 is a minor stream (source)!**

**(3) No “de minimis” stream!**

## ■ Tier Approaches for Major Sources (Streams)

<b>Total emissions of the installation</b> [t CO <sub>2</sub> /a]				<b>Category</b> (accord. Table 1, Annex 1, MRG)
<b>Excl. biomass emissions *</b>		<b>709,579</b>	<b>A: emissions* ≤ 50 kt/a</b> [ ]	
<b>Incl. biomass emissions</b>		<b>774,618</b>	<b>B: 50 kt/a &lt; emissions* ≤ 500 kt/a</b> [ ]	
<b>Biomass emissions</b>		<b>65,039</b>	<b>C: emissions* &gt; 500 kt/a</b> [X]	
Code of the activity: n.a. (only one activity)				Name of the activity: combustion installation
Code of the source: 1				Name of the source: combustion
Code of the stream: 1.1				Name of the stream: lignite
	<b>Req. tier</b>	<b>Sel. tier</b>	<b>Values and units</b>	<b>Statement concerning any non-conformity between required and selected tier!</b>
Activity data	3a/3b	3a	824,666 t/a	
Net calorific value	3	3	8,41 TJ/kt	
Emission factor	3	3	101,2 tCO <sub>2</sub> /TJ	
Composition data	n.a.	n.a.	-	
Oxidation factor	2	2	0,99	
Conversion factor	n.a.	n.a.	-	

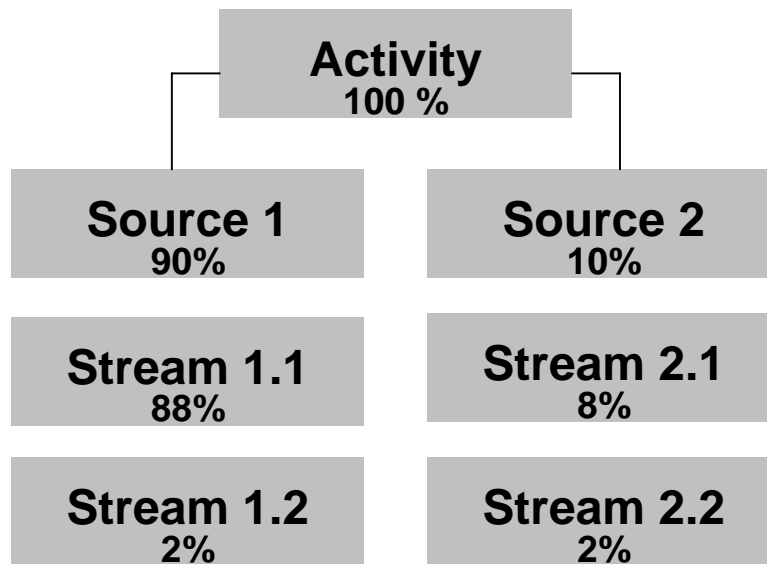
## ■ Tier Approaches for Major Sources (Streams)

<b>Total emissions of the installation</b> [t CO <sub>2</sub> /a]				<b>Category</b> (accord. Table 1, Annex 1, MRG)
<b>Excl. biomass emissions *</b>		<b>709,579</b>	<b>A: emissions* ≤ 50 kt/a</b>	<b>[ ]</b>
<b>Incl. biomass emissions</b>		<b>774,618</b>	<b>B: 50 kt/a &lt; emissions* ≤ 500 kt/a</b>	<b>[ ]</b>
<b>Biomass emissions</b>		<b>65,039</b>	<b>C: emissions* &gt; 500 kt/a</b>	<b>[X]</b>
Code of the activity: n.a. (only one activity)				Name of the activity: combustion installation
Code of the source: 1				Name of the source: combustion
Code of the stream: 1.2				Name of the stream: timber
	<b>Req. tier</b>	<b>Sel. tier</b>	<b>Values and units</b>	<b>Statement concerning any non-conformity between required and selected tier!</b>
Activity data	n.a.	2b	39,543 t/a	Fuel stream 1.2 is a pure biomass stream with no tier requirements.
Net calorific value	n.a.	1	15.3 TJ/kt	
Emission factor	n.a.	1	107,5 tCO <sub>2</sub> /TJ	For memo item calculation only!
Composition data	n.a.	n.a.	-	
Oxidation factor	n.a.	1	0,99	
Conversion factor	n.a.	n.a.	-	

## ■ Sources versus Streams

Table I of Annex I of the MRG:

Columns A, B and C contain tier values of **major sources!**



... are those, which, if ranked in the order of their decreasing magnitude, cumulatively contribute at least 95% of the total annual emissions of the installation.

- (1) Source 1 and 2 are major sources and Table I contains mandatory tier values for all sources and thus streams!**
- (2) Streams 1.2 and 2.2 are minor streams!**

## ■ Formats/forms

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### Monitoring Methodology

1. **Exact definition of the installation and activities** ✓
2. **Information on responsibilities for M&R**
3. **List of fuel and material streams** ✓
4. **List of sources** ✓
5. **List of tiers** ✓
6. **Description of the metering devices**
7. **Description of the sampling of fuel and materials**
8. **Description of the sources or analytical approaches**
9. **Description of CEM**
10. **Description of QA/QC for data management** ⇒ **Procedural and Work Descriptions**
11. **Information on links with EMAS**

## ■ Procedural and Work Descriptions

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### Quality Assurance, Quality Control and Data Management

1. Identification of greenhouse gas sources
2. Sequence and interaction of monitoring & reporting procedures
3. Responsibilities and competence
4. Methods of calculation or measurement
5. Measuring equipment
6. Reporting and records
7. Internal review
8. Corrective and preventive action

## ■ WD 2: Sequence, Interaction of M&R-Procedures

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- **Monitoring requirements**  
GHG permit and monitoring methodology
- **Determination of CO<sub>2</sub> emission for each source**  
Metering, sampling, analysing, responsibilities and qualification
- **First line check by operator**  
Complete, plausible, transparent
- **Determination of CO<sub>2</sub> emissions**  
Measurement or calculation, tier approach
- **Preparing the annual emission report**  
National requirements
- **Verification of the annual emission report**  
Accredited verifier, scope competence
- **Submission of the annual emission report**  
Dead line March 31<sup>st</sup>, national requirements

## ■ Reporting

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**ETS Directive**    no special reporting format required

**MRG**                special reporting formats required  
(shall be used as basis)

**UK**                 Form ETS7 for Annual Monitoring Report  
(*Form ETS2 for Monitoring Plan*)

**Germany**        Electronic reporting procedure with integrated  
verification report / statement

***(1) Member State specific reporting formats and procedures!***

***(2) No recommendation is given in Guide on Monitoring & Reporting!***



## ■ References

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- **DEFRA / SEPA (May 2004)**  
**Competent Authority Guide to the Commission Decision establishing Guidelines for Monitoring and Reporting in accordance with the EU ETS**
- **DEFRA / SEPA (June 2004)**  
**Example for the Completion of Monitoring and Reporting Plan Template**
  - coal fired power station
  - oil fired power station
  - iron and Steel
  - glass
  - gas fired power station
  - small scale combustion
  - cement
  - pulp and paper
- **DEHST (January 2005)**  
**Monitoringkonzept (in German)**
- **DEFRA / SEPA (August 2005)**  
**EU ETS – Annual Emission Report**  
**Guidance to Operators for the Completion of Form ETS 7**

# ■ Content

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1. **Scope of the Manuals**
2. **Definition of Key Terms**
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5. **Manual No.3: Guide on Accreditation**
6. **Summary and Conclusion**



## ■ Structure of Manual No.2

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<b>Part I</b>	<b>Introduction</b>
<b>Part II</b>	<b>Verification process</b>
<b>Part II-A</b>	<b>Verification requirements based on ETS Directive</b>
<b>Part II-B</b>	<b>Verification requirements based on MRG</b>
<b>Part III</b>	<b>Verification report and verification statement</b>
<b>Annex 1</b>	<b>References</b>
<b>Annex 2</b>	<b>Glossary</b>

# ■ Verification Requirements (ETS Directive)

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## Strategic Analysis

- Basis for verification, overview of all the activities and their significance for emissions

## Process Analysis

- Site visit and spot-checks to determine the reliability of the reported data and information

## Risk Analysis

- Evaluation of the data of each source regarding reliability
- Identification of those sources with a high risk of error
- Consideration any effective risk control methods applied by the operator



## ■ Documents, Procedures, Methods

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### Documents to be reviewed

- GHG permit (including approved monitoring methodology)
- Annual emission report (including applied monitoring methodology)
- “Primary” documents (e.g. invoices, data records)

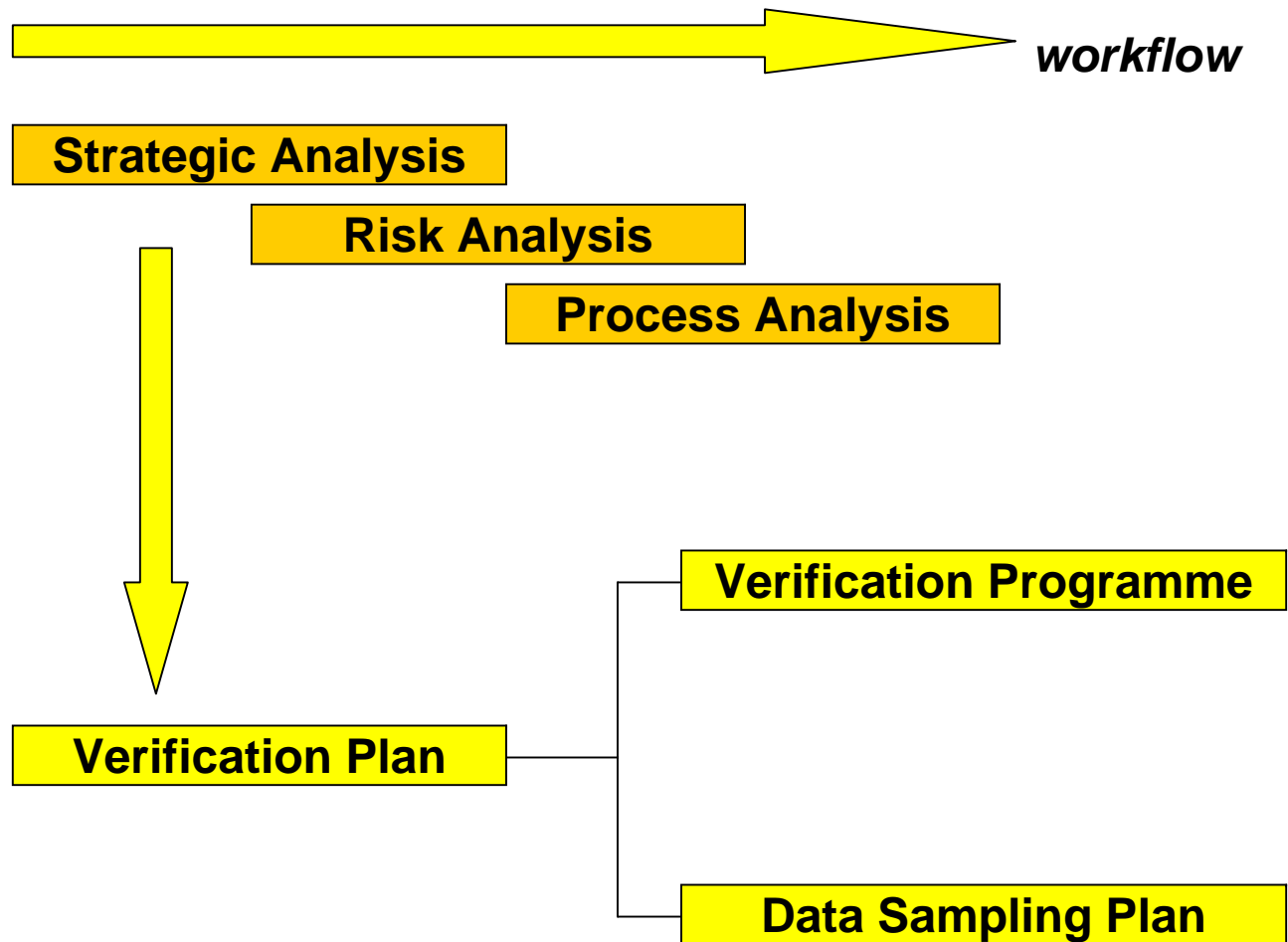
### Procedures to be investigated

- Implementation of Monitoring Methodology
- Internal QA-/QS-measures
- Data management including determination of CO<sub>2</sub> emissions

### Methods to be applied

- Document reviews
- Interviews
- Site visits

## ■ Verification Process (MRG)



# ■ Strategic Analysis

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## Complexity of the installation

- Categories of activities, activities, sources and streams?
- Calculation or measurement?

## Operational structure, especially data management system

- What kind and how many sampling, analysing metering?
- What kind of data collection, processing and archiving?

## Organizational structure, especially responsibilities

- Who is operator and “CO<sub>2</sub> manager”?
- What kind of responsibilities are delegated and to whom?

## QA-/QS-measures

- Handbook, procedural descriptions, work descriptions?
- Stand alone system or integrated system (QMS, EMS)?

# ■ Risk Analysis

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## Risks relate generally to

- material errors, omissions and misstatements in reported data
- non-conformities with requirements of the GHG permit

## Inherent risk

- probability of a parameter to a misstatement that could be material (due to missing internal control system)

## Internal control risk

- probability that the internal control system does not detect / prevent / correct non conformities



## ■ Inherent Risks, Internal Control Risks

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### **Inherent Risks are generally low at installations with**

- simple technology, i.e. not too complex
- simple and transparent work flow
- only few or no differences to previous year

### **Internal control risk are generally low at installations with**

- documented and implemented data management system
- segregation of duties
- integration of monitoring and reporting in existing systems
- only few or no changes to previous years



# ■ Process Analysis

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## Site visit

- site of the installation (compliance audit)
- installation's head office (if data are processed there)
- other locations (e.g. supplier)

## Confirm/check, whether

- monitoring and reporting complies with GHG permit,
- data management is effective,
- QA-/QC-processes are implemented,
- personnel is aware of responsibilities and duties,
- physical meters are in line with and maintenance plan/system,
- no essential changes have occurred,
- abnormal operations are handled clearly (e.g. repairs)

## ■ Verification Requirements (MRG)

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1. Understanding of activities
2. Understanding of data management systems
3. Establishing an acceptable material level
4. Analysing the data risks
5. Drawing up a verification plan
6. Carrying out a verification plan
7. Checking the accuracy level
8. Request to provide missing data and/or to revise calculation

Strategic A.  
Process A.  
Strategic A.  
Risk A.  
Strategic A.  
Process A.  
Risk A.  
Strategic, Process, Risk A.



# ■ Verification Report and Statement

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## LEGAL REQUIREMENTS

### 1. Validation / verification report

The verifier shall prepare a report on the validation process stating whether the annual emission report is satisfactory.

*(ETS Directive)*

### 2. Verification / validation judgement

At the end of the verification process, the verifier shall make a judgement with respect to whether the emissions report contains any material misstatement.

*(MRG)*

## RECOMMENDATIONS / REQUIREMENTS

- **Verification process report**

**is used for internal independent technical review**

*(EA-6/03 and ISO/DIS 14064-3)*

# ■ Internal Verification Process Report

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## Background documentation

- Information concerning the industry and legislative environment within which the installation operates,
- Information about organisational boundaries of the installation,
- Information about the identification of CO<sub>2</sub>-sources and fuel and material streams,
- Procedures for quantifying CO<sub>2</sub> emissions,
- An annotated process flow diagram, characterising mass and energy flows for CO<sub>2</sub> sources and metering and sampling devices,
- Extracts or copies of important agreements, contracts, etc. with relevance to CO<sub>2</sub> emissions.



# ■ Internal Verification Process Report

## Process documentation

- Evidence of the verification plan including any changes,
- Details of the anticipated and actual verification programme,
- Details of the anticipated and actual data sampling plan,
- Records relating to verification team personnel, including verifier competence and performance evaluation,
- Records of who completed the activities, when they were performed and how these activities contributed to the verification findings and conclusions,
- Results of the risk assessment including evidence of inherent and control risk assessments (materiality level),
- Evidence that the verifier has a clear understanding of the operator's data management and internal control system.

## ■ Verification Judgement or Statement

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### Verified without comments

- no material errors, omissions and misstatements
- monitoring and reporting in accordance with the GHG permit
- any inconsistencies have been resolved and are no longer an issue

### Verified with comments

- non-conformities with the GHG permit have been detected, that
  - could be resolved by the operator and/or
  - have not caused material errors, omissions and misstatements

### Not verified

- non-conformities with the GHG permit have been detected, that
  - could not be resolved by the operator and
  - have caused material errors, omissions and misstatements

## ■ References

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- **DEFRA** (*August 2005*)  
**EU Emissions Trading Scheme  
Guidance on Annual Verification**
- **IETA** (*September 2005*)  
**Verification Protocol, version 2.0 (2005)**  
**Verification of Annual Emission Reports of installations engaged in  
EU emission trading**



# ■ Content

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## ■ Structure of the Manual No.3

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<b>Part I</b>	<b>Introduction</b>
<b>Part II</b>	<b>Guidance for recognition of verification bodies under the EU ETS</b>
<b>Annex 1</b>	<b>Procedures for the accreditation of independent entities</b>
<b>Annex 2</b>	<b>Impartiality and independence</b>
<b>Annex 3</b>	<b>References</b>
<b>Annex 4</b>	<b>Glossary</b>



## ■ Definition of Verifier in MRG

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### Verifier

means a competent, independent, accredited **verification body** with responsibility for performing and reporting on the verification process.

- **Verification Body or Verifier** (requirements for organisation)
- **Verification Team** (requirements for group of individuals)
- **Auditor** (requirements for individual)



# ■ Competency Requirements for Verification Bodies

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## The verification body should

- demonstrate that it has available sufficient qualified personnel,
- have effective procedures for the training and recruitment of competent staff, and monitoring their performance,
- maintain their own competence by ensuring that their knowledge is updated periodically to reflect current best practice in the field,
- ensure that the performance of auditors and reviewers is regularly reviewed, including on-site witnessing of verification activities,
- establish and maintain personnel records, which demonstrate that the personnel are qualified in accordance with the requirements on emissions trading.

## ■ Education and Work Experience of Auditors

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### Auditors should - as a minimum -

- either hold a science and technology or business qualification from a tertiary institution [minimum 3 years program] or,
- be able to demonstrate completion of work experience and other personal development activities which provide communication, technical and/or business as well as analytical skills necessary to conduct verification and,
- have a minimum of four years full time work place experience as a manager, or other professional role involved in
  - environmental management auditing and verification of environmental data
  - emissions related management and technology

## ■ Knowledge for Auditors

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### The auditor's knowledge should consist of:

- the applicable national legislation on emissions trading in conjunction with the ETS Directive, the MRG and an installations' typical GHG permit including monitoring methodology,
- differences in interpretation by CA of the coverage of the ETS Directive, e.g. scope of combustion installations, level of assurance, materiality,
- the specific activity or the industrial sector in which the installation is engaged,
- data and information auditing methods including data risk analysis,
- assessing data management and QA/QC systems,
- activities required to identify failures in the CO<sub>2</sub> reporting systems and the assessment of the impact of failures on the emission report.

# ■ Competency Requirements for Verification Teams

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## Each team member should:

- have a knowledge of the national and EU legislation,
- have a knowledge of data auditing,
- have a clear understanding of his individual role,
- be able to communicate effectively,
- have been selected on the basis of knowledge and experience and skills (team as a whole meets the requirements of verification).

# ■ Auditor Training Course (1)

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## EU and national legislation on emission trading

- Knowledge of ETS Directive, Linking Directive and MRG,
- Knowledge of national legislations and related regulations,
- Ability to perform an assessment of conformity with the requirements of the EU and national legislation,
- Awareness of
  - the Kyoto Protocol and relevant international and national commitments under the Kyoto Protocol,
  - the broader role of emissions trading,
  - mechanisms required to make it operational.

## ■ Auditor Training Course (2)

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### Data and information auditing

- knowledge of monitoring and reporting principles, materiality, inaccuracy and uncertainty,
- the roles of quality assurance and quality control,
- sampling in data verification and methods of checking data.

### Performing a verification engagement

- knowledge of the verification process incl. reporting procedures
- the role played by different team members and lead auditor's role and responsibility
- ability to act as a lead auditor and complete a verification engagement
- awareness of third party inspection in the scheme

## ■ References

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- **EA-6/03** (*March 2005*)  
**Guidance for the Recognition of Verification Bodies under EU ETS Directive**
- **IETA and IRCA** (*March 2005*)  
**Certification Criteria for the EU Emissions Trading Scheme Greenhouse Gas Auditor Training Course**

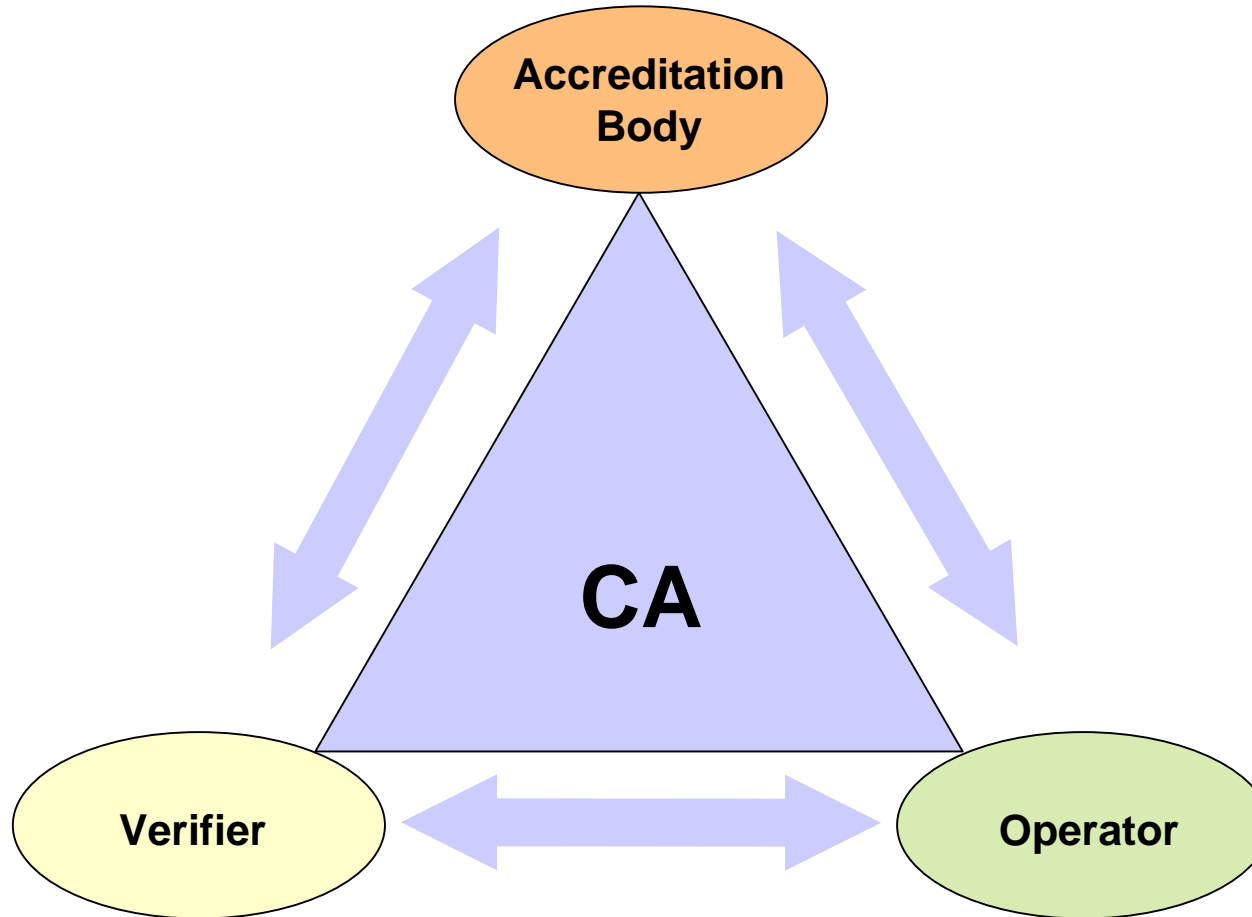
# ■ Content

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1. **Scope of the Manuals**
2. **Definition of Key Terms**
3. **Manual No.1: Guide on Monitoring and Reporting**
4. **Manual No.2: Guide on Verification**
5. **Manual No.3: Guide on Accreditation**
6. **Summary and Conclusion**

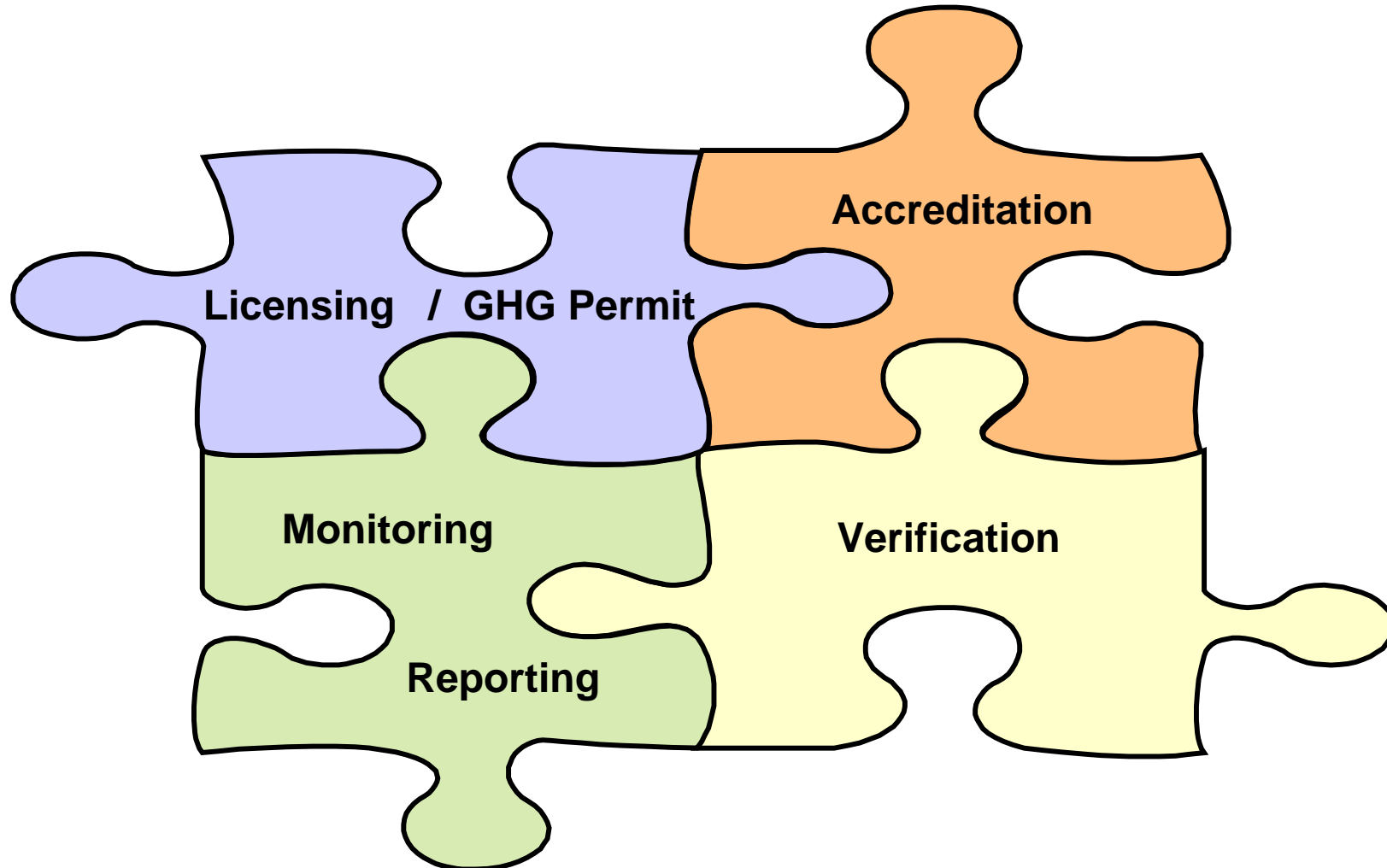
## ■ Key Actors

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## ■ Key Processes

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## ■ Selected TÜV Expertise in Emissions Trading

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**2002 – 2003**

**Development of draft MRG**

**2004 – 2006**

**Support to the Commission's Work related to the implementation, evaluation and further development of the MRG**

**2005 – 2006**

**Support to the Commission's Work related to the review of the MRG**

**2004**

**Verification of application forms for the allocation of EU allowances**

**2004 – today**

**Examination for publicly certified verifier for emissions trading**

**2004 – today**

**Validation, verification of CDM-projects (*Designated Operational Entity*)**

**2004 – today**

**Pre-Determination of JI-projects (*applied for Independent Entity*)**

■ **Any Questions? Please contact:**

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