MONITORING FACILITY-LEVEL GHG EMISSIONS – OVERVIEWS AND METHODOLOGIES

EMELIA HOLDAWAY
RICARDO-AEA

PARTNERSHIP FOR MARKET READINESS
3RD REGIONAL MRV TECHNICAL TRAINING
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Agenda

- EU ETS
- GHG Protocol
- IPCC Tier 3
- Comparative summary

EU ETS Scope

- Installation level monitoring
- General combustion and sectors defined by activity type (and thresholds)
- Direct emissions
  - Energy
  - Process
- Monitoring and Reporting requirements defined by Regulation
  - Installation level monitoring plan

EU ETS approach – monitoring plan

- Approved document is basis for verification of emissions reports
  - Completeness, transparency, accuracy, integrity, continuous improvement
- Minimum requirements (defined by Regs)
  - General information on the installation
  - Procedures: Staff / data / QA / evaluation
  - Description of methodologies
- Special derogations for small emitters

EU ETS approach – monitoring plan

- Plan supported by evidence
  - Risk assessment
  - Uncertainty assessment
  - Sampling and analysis plans
  - Activity data
  - Calculation factors
- Standardised approaches encouraged – templates / electronic reporting
- Approval by Competent Authority

EU ETS - general monitoring approaches

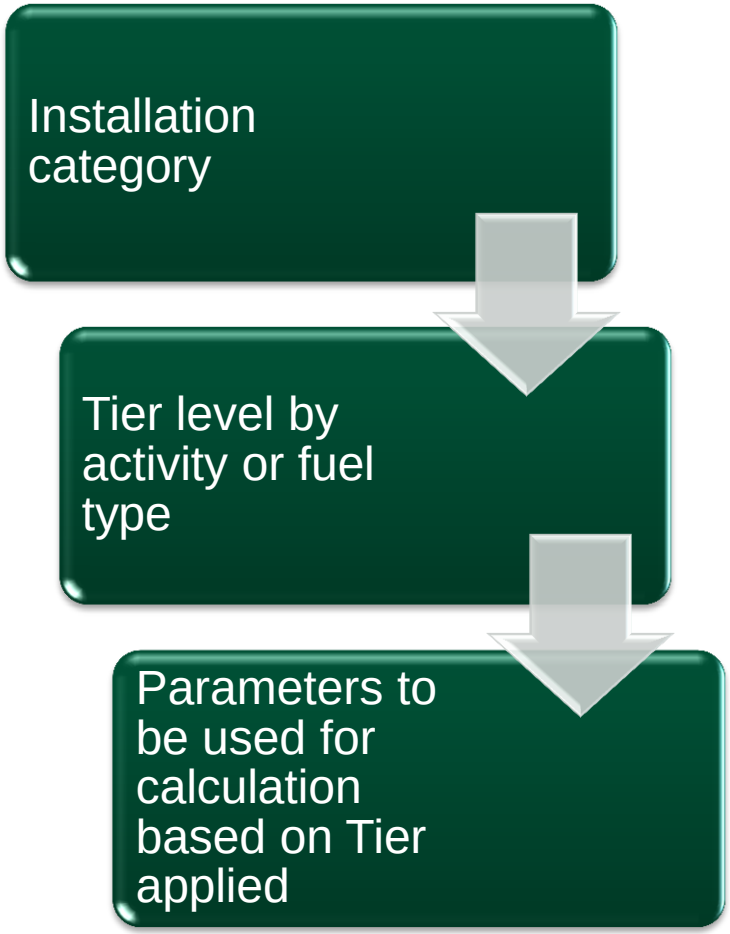
- Operator choses methodology
- Calculation-based methodology
  - Activity data multiplied by calculation factors:
    - Standard methodology
    - Mass balance methodology
- Measurement-based methodology
  - Sampling and laboratory measurement
  - Continuous measurement

EU ETS proportionality: tiers

- Tiers for parameters in monitoring methodologies
  - Robust proportionate levels of accuracy
  - Tiers according to category of installation
  - Categories (Installations)
    - Defined at installation level
    - Represents classification of installation with regard aspects of the methodology
      - Category A: <50,000tCO_2 (small: <25,000 tCO_2)
      - Category B: Between 50,000tCO_2 and 500,000tCO_2
      - Category C: >500,000tCO_2

Use of tiered approach

- Example: calculation based approach



Example of Tiers - uncertainty

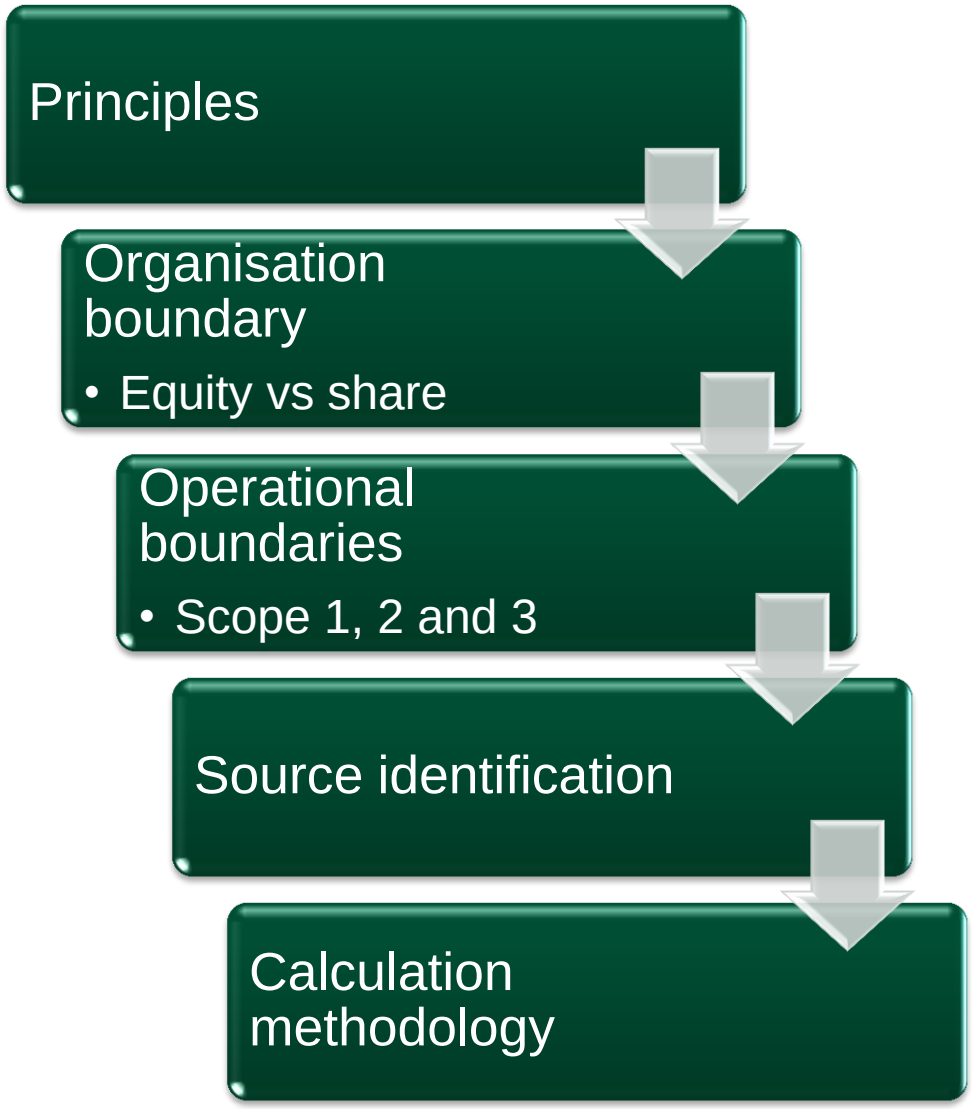
Maximum permitted uncertainty

Activity / Source stream type	Parameter to which uncertainty is applied	Tier 1	Tier 2	Tier 3	Tier 4
Combustion of fuels (+/- %)					
Solid fuels	Amount of fuel	7.5	5.0	2.5	1.5

GHG Protocol - approach

- Many related standards have been prepared (life cycle, cities etc)
- Corporate reporting standard applied by enterprises for facility level monitoring
- Standard and Guidance document supported by sector-specific calculation tools, consistent with IPCC

GHG Protocol - approach



Scope	Coverage
1	Direct
2	Electricity
3	Other indirect

- Source identification (against scope)
  - Stationary combustion, mobile combustion, process, fugitive
- Determine calculation approach
  - Calculation-based approach
    - Emission factors applied to measure of activity
    - Recommended IPCC guidelines hierarchy of calculation approaches from generic to specific
    - Mass balance or stoichiometric approaches
  - Direct monitoring possible

- Company to select methodology
  - Most accurate vs appropriate – balance
  - Threshold for materially misleading - 5% total
- Cross-sector tools
  - General combustion, refrigeration, uncertainty
- Sector-specific guidelines. Worksheets:
  - Input activity data
  - Select emission factors (or accept default)
  - Certain sectors involve tiered approach

- Scope
  - Guidance for National Inventories
  - W.r.t Installations: energy and industrial processes most relevant
  - Only consider direct emissions
  - Boundaries defined by emissive processes

IPCC methodology

- Mostly activity x emission factor
- Also mass balance (e.g. iron and steel)
- Can use CEMS (e.g. nitric acid)
- Tiered approach
  - Tier 1 (default) through tier 3 (detailed specific)
  - Decision tree for tier selection
  - Key categories require higher tiers

IPCC Tier 3 – installation specific

- Both activity and emission factor installation specific
- Flexibility:
  - No detailed requirements on evidence
  - No detailed requirements on EF frequency
  - Flexibility on how and when to report to inventory team
  - Flexibility on QA/QC procedures
  - No uncertainty thresholds for activity data

Comparison

Aspect	EU ETS	GHG Protocol - Corporate	IPCC (Tier 3)
Context	Mandatory installation regulation	Company reporting (voluntary and mandatory)	National emissions inventory
Scope - emissions	Installation direct – energy and process	Company – direct and indirect	Direct
Scope - sectors	General combustion / power, industry	All commercial	All sectors but installation specific mainly energy and industry
Methodologies available	Calculation: Standard and mass Balance Measurement: Sampling and CEMS		

Comparison (2)

Aspect	EU ETS	GHG Protocol - Corporate	IPCC (Tier 3)
Documentation and guidance	Directive, Regulations, EC Guidance, National documents, templates, electronic reporting language. High level of complexity. General and sector specific.	Standard and guidance document, general and sector specific tools. Introductory level leading to more complex contexts	Suite of guidance documents covering general and sector specific aspects. Leads to complex concepts for expert practitioners

Comparison (3)

Aspect	EU ETS	GHG Protocol - Corporate	IPCC (Tier 3)
Use of Tiers	Yes, by installation emission size	Yes, as IPCC	Yes, by category
Mandatory tiers	Yes, minimum level (lower tier) maximum tier possible (others)	Company discretion based on accuracy and appropriateness	Guidance: national circumstances / key categories
Emission Factors	Default -> national -> installation (by tier)	Mostly standard used)	Default (tier 1) -> national -> installation (tier 3)
Uncertainty thresholds	Mandatory, by tiers	No, but guidelines on treatment	No
Reporting timing and frequency	Mandatory compliance cycle	Company choice	Flexibility (inventory team)

Thank You

Ricardo-AEA

emelia.holdaway@ricardo-aea.com

For more information on the Partnership for Market Readiness please contact:

PMR Secretariat

pmrsecretariat@worldbank.org

www.thepmr.org