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Seminar: Massachusetts Greenhouse Gas Reporting Rule

Calculate, Document and Verify Your GHG Emissions

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Agenda

- Points for consideration
- Understanding your GHG emissions
- Electronics manufacturing plant example
- Calculating GHG emissions
- Documenting GHG emissions
- Verification

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Points for Consideration

- Rule is facility and process specific
- The Climate Registry Reporting Protocols are incorporated by reference
- Rule uses short tons not metric tons
- You will be verified so do it right the first time

Points for Consideration

- Verification starts in 2011, then every 3 years
- Reporting starts in 2010 for 2009 emissions
- Your reporting data is accumulating now. Is it what you need?
- Errors not corrected before you report and later found during verification will require resubmission of all affected reports

Understanding Your GHG Emissions

Greenhouse Gases include but are not limited to:

	GWP
Carbon dioxide	1
Methane	21
Nitrous oxide	310
Hydrofluorocarbons	(compound)
Perfluorocarbons	(compound)
Sulfur hexafluoride	23,900

Understanding Your GHG Emissions

Sources of GHG emissions to report:

- **Stacks**
- **Manufacturing processes and vents**
- **Fugitive emissions**
- **Other process emissions**
- **Motor vehicles**
- **Retail sellers of electricity**

Electronics Manufacturing Plant Example

Emissions Type	Emissions Source	CO_2	CH_4	N_2O	HFC	PFC	SF_6
Indirect Emissions	Purchased Electricity	√	√	√			
Mobile Emissions	Vehicle Fleet	√	√	√			
	On-site Vehicles						
Stationary Combustion	Facility Heating	√	√	√			
	Boilers	√	√	√			
	Incinerators	√	√	√			
	Burnboxes	√	√	√			

Electronics Manufacturing Plant Example

Emissions Type	Emissions Source	CO_2	CH_4	N_2O	HFC	PFC	SF_6	
Process Emissions	Semiconductor Production		√			√	√	
	Cleaning	√			√			
	Nitric Acid Etching			√				
Fugitive Emissions	Process Gas Transpiration and Storage				√	√	√	
	Nitric Acid Fugitives			√				
	A/C Systems				√			
	Fire Suppression	√			√	√		

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Electronics Manufacturing Plant Example

Scope 1 Direct Emissions Types

- Stationary combustion – boilers
- Process emissions – cleaning
- Fugitive emissions - chillers
- Mobile emissions – vehicle fleet

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Calculating GHG Emissions: Basic Approach

- Determine the Geographic, Organizational and Operational Boundaries for your reporting entity.
- For each GHG, identify each source of GHG emissions for the reporting year.
- For each source and GHG, decide whether to use calculations or monitored data to report emissions.

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Calculating GHG Emissions: Basic Approach

- Determine what emission factor in tons per activity unit to use for each source of each GHG.

  Example: tons CO2 per gallon #2 oil combusted

5. Assemble information on the required activity levels for the reporting year.

6. Calculate the CO2e emissions

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Calculating GHG Emissions

Basic Equation:

$CO_2e = GWP \times Emission\ Factor \times Activity\ Level$

where:

CO_2e is the equivalent CO_2 emissions in tons per year

GWP is the Global Warming Potential of a GHG relative to CO_2

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Calculating GHG Emissions

Data Quality Tiers: The Climate Registry and the Massachusetts GHG Reporting Rule use a tiered quantification system to rank emissions quantification methodologies according to their levels of accuracy.

Data Types

- Fuel is Tier B
- Cleaner is Tier A Mass Balance

Calculating GHG Emissions

In the electronics manufacturing plant example:

the calculation of CO2E emissions from Data Types

- Fuel is Tier B
- Cleaner is Tier A Mass Balance

Calculating GHG Emissions

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Data Quality Tiers:

Tier A designates the preferred, or most accurate, approach for a given emissions source

Tier B represents an alternative second-best approach

Tier C represents the least accurate, but still acceptable approach

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Calculating GHG Emissions

- Using an industrial example because of the significant impact high GWP materials can have
- Power generation can include use of CFCs in chillers
- Match your fuels or substances with the correct emissions factor and Data Tiers

Calculating GHG Emissions

- Example calculation for heating and process emission for cleaning
- Assume that the boundaries and control considerations are set
- Volumes used – from inventory control
- Substance - fuel or GWP material
- Emission factors from tables
- Calculate CO2E (for two of the many potential emissions at the facility)

Calculating GHG Emissions

- Process Emission for Cleaning

800 kg of PFC (~140 gallons consumed) x 9,200 GWP

= 7,360,000 kg CO2E = 7,360 metric tons CO2E

= 1.1023 x 7,360 = **8,113 short tons CO2E**

Data Quality Level: Tier A

Calculating GHG Emissions

- Fuel Oil by comparison

21,000 gallon #2 fuel oil X 9.57 kg C02/gallon

= 200,970 kg CO2 = 201 metric tons CO2

= 1.1023 x 201 = **222 short tons CO2**

Data Quality Level: Tier B

Calculating GHG Emissions: Considerations

- Data management – are the numbers valid?
  - "Materials Dept. has always done it that way"
  - "No, meter has never been calibrated"
- Are the units correct
  - Gallons when it should be pounds

Calculating GHG Emissions: Considerations

- Has the correct emissions factor been selected?
- Have you explained why a lower Data Tier is used for the activity level?

DOCUMENTING GHG EMISSIONS

- You will need records – examples
  - Fuel delivery records, invoices, lab results
  - Inventory mass balance
- Plan them now for when you need them (before they have been archived or lost)

DOCUMENTING GHG EMISSIONS

- Have a system for completeness and backup
- Anticipate the varying support different departments will provide

Verification

- A verifier will be checking your records in a year or it may go out 3 years on the triennial cycle
- Don’t wait until 2011 to find out you don’t have the information your verifier needs

Verification

- Records
  - MA 7.71 requires 5 years retention after report submission (7.71 (6) (c)
  - TCR is not specific but retention is tied to your verification schedule

Verification

- Verification is part of you compliance plan
- Your GHG report is public information
- If you have a material error, you have to go back and correct earlier reports
- Will you have the necessary records?

For More Information Contact:

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