

MassDEP's GHG Reporting Regulation Requirements & Using The Climate Registry's General Reporting Protocol

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On The Call

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Training Objectives:

- Overview of MA GHG Reporting Regulation
- Reporting Basics
- Using the GRP and Calculating Emissions
- Simplified Estimation Methods
- Reporting Examples
- Where to find more information



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MA GHG Reporting Regulation (310 CMR 7.71)

- Applicability
 - Facilities subject to 310 CMR 7.00: *Appendix C* (The MA Air Operating Permit Program)
 - Facilities that emit > 5,000 short tons/year CO₂e (> 5,000 short tons/year CO₂ in 2009)
- Deadline
 - By April 15, 2010 - Report 2009 CO₂ emissions
 - By April 15, 2011 – Report 2010 emissions of all six GHGs



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GHG Emission Sources

- The MA GHG Reporting Regulation Requires:
 - All facilities report “direct stack emissions”
 - Includes emissions from stationary emission sources (factory stacks, manufacturing processes, vents, fugitive emissions, and other process emissions)
 - Facilities that emit > 5,000 short tons CO₂e report motor vehicles and “direct stack emissions”



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Reporting Requirements

- MA GHG regulation explains which GHG emissions to report
- Facilities must quantify emissions using The Climate Registry's General Reporting Protocol (GRP) v.1.1
- Additionally, MassDEP requires facilities to:
 - Quantify emissions using the most accurate methodology ("Tier A"), to the extent practicable
 - Report stationary emissions sources separately, to the extent practicable
 - Report the quantity and characteristics of material throughputs needed to determine emission factors
 - Retain certain documentation
- Facilities may use simplified estimation methods for up to 1,000 short tons CO₂e



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Documentation Requirements

- Facilities may be required to retain documentation:
 - Rationale and justification for using a less accurate methodology (“Tier B” or “Tier C”)
 - Rationale and justification for not reporting stationary emissions sources separately
 - Methodology and data used to quantify emissions in accordance with industry best practices
 - Documentation provided to verification body
- Documentation must be retained on site for 5 years from date of submittal



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Motor Vehicle Emissions

- Report company owned or company leased motor vehicles that are assigned to a reporting facility
 - Assigned to a facility means “operate in support of that facility more often than they operate in support of any other facility”
- Not necessary to report motor vehicles assigned to a facility for < 6 consecutive months, regardless of leased, rented, or owned
- 2009 emissions – only motor vehicles intended for public roadways are required to be reported



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Reporting Basics

**Collect
required
emissions
data**

**Quantify
emissions
according to
Registry
methods into
MassDEP's
electronic
registry**

**Report
Massachusetts
emissions**

**Verify
(Triennial)
emissions
with a
Verification
Body**



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Tools for Reporting

- Regulation
 - MA GHG Reporting Regulation (310 CMR 7.71)
 - Details what facilities are required to report, what emissions must be reported, and deadlines
- General Reporting Protocol (GRP)
 - Provides calculation methodologies for CO₂ and five other GHGs
- MA greenhouse gas registry software
 - Calculates your emission totals based on the information you provide:
 - Annual fuel consumption totals, CEMS readings, specific emission factors
 - Built on The Climate Registry Information System (CRIS)

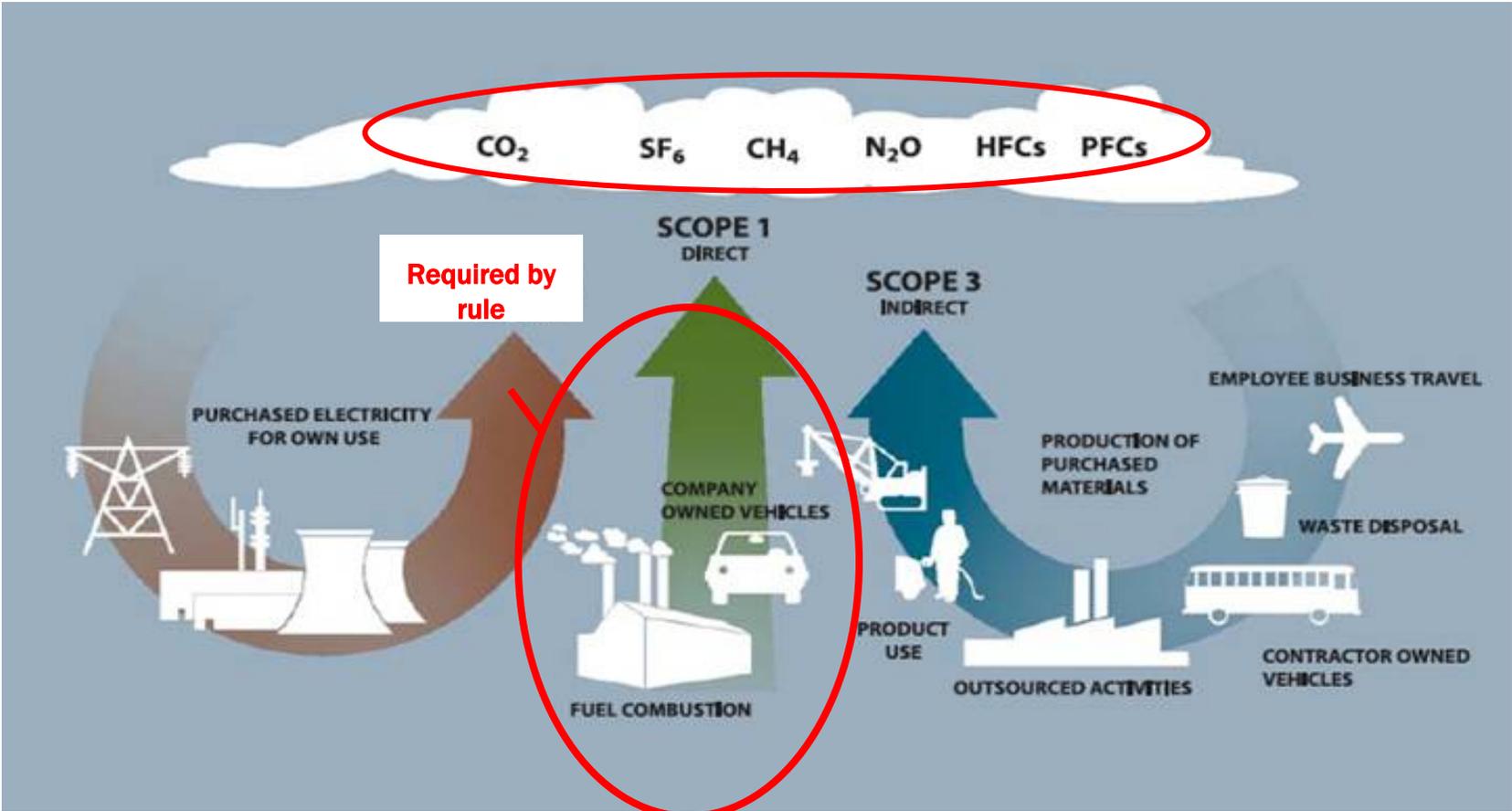


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Reporting Requirements



Software provides calculation tools for many activities and gases
(CO₂, CH₄, N₂O)



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Integrating data collection

- Creating and reporting a verifiable inventory is an annual process
- Data collection can be built into your existing data management systems
 - Accounting records
 - Fleet records
 - Facility management



What gets measured gets managed



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Calculating Emissions



The General Reporting Protocol (GRP) is organized into three parts:

Part I: Introduction

Part II: Determining What You Should Report

- MA GHG Reporting Regulation (310 CMR 7.71)
- Chapter 6: Aggregation

Part III: Quantifying Emissions

- Chapter 10: Intro to Quantifying your Emissions - Tiers
- Chapter 11: Simplified Estimation Methods
- Chapter 12: Direct Emissions from Stationary combustion
- Chapter 13: Direct Emissions from Mobile combustion
- Chapter 16: Direct Fugitive Emissions from the Use of Refrigeration and Air Conditioning Equipment.
- Appendix E: Direct Emissions from Sector-Specific Sources



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Calculating Emissions

For each source, you will enter one of these:

1. CEMS data

or

2. Annual fuel consumption

and

2a. Customize an emission factor (for Tier A)

2b. Utilize a default factor that CRIS automatically assigns for you based on the equipment type you choose (for Tier B/C)

and then use the registry software to calculate your GHG emissions...



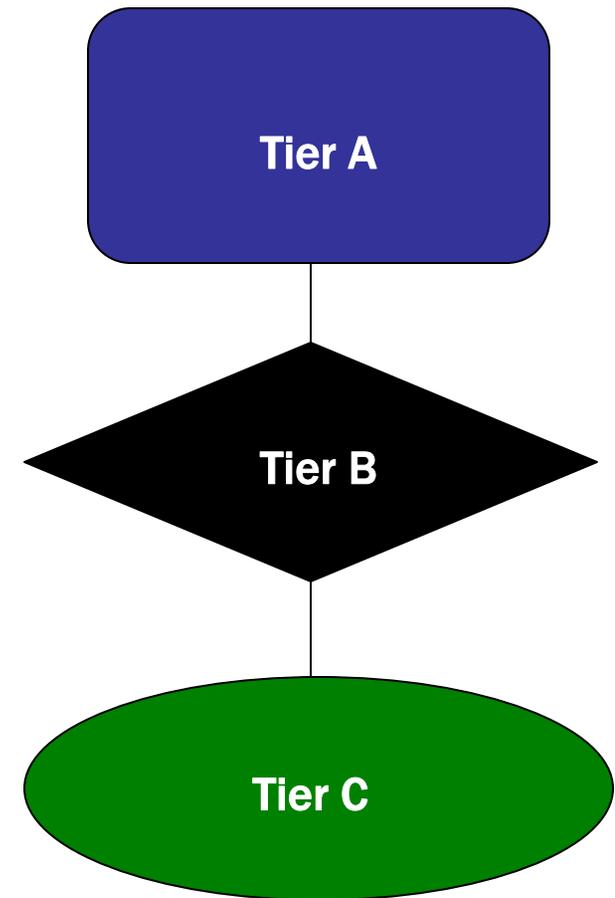
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Calculation Tiers

- Each Chapter includes a set of data calculation tiers.
- Tier A represents the preferred approach for a given emissions source; Tier B represents the second best approach, etc.
- In some cases there may be multiple, equally accurate, approaches within the same tiered ranking (such as A1 and A2)



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Calculating CO₂ for Stationary Combustion

1. Determine annual fuel consumption of each type of fuel or use direct measurement
2. Determine the appropriate CO₂ emission factor for each fuel

Tier	Quantification	Registry software will...
Tier A1	Direct Measurement	Calculate CO ₂ e
Tier A2	Collect carbon, heat content of each fuel and annual fuel consumption.	Calculate CO ₂ e and CO ₂ based on your custom emission factor
Tier B	Collect either carbon or heat content of each fuel and annual fuel consumption. Use the defaults from Tables 12.1-12.4 to combine with your more specific data.	Calculate CO ₂ e and CO ₂ based on your custom emission factor
Tier C	Collect annual fuel consumption, registry will assign an emission factor based on Tables 12.1 & 12.2	Calculate CO ₂ e and CO ₂ using a default factor

See GRP Chapter 12

Calculating CH₄ & N₂O for Stationary Combustion

1. Determine annual fuel consumption of each type of fuel
2. Determine the appropriate CH₄ & N₂O emission factor for each fuel

Tier	Quantification	Registry Software will...
Tier A	Use direct monitoring to obtain specific emission factors	Calculate CO ₂ e emissions
Tier B/C	Collect annual fuel consumption and based on the specific type of combustion equipment used at your facilities, registry will assign the appropriate emission factor (see GRP Tables 12.5-12.8)	Calculate CO ₂ e and CH ₄ & N ₂ O emissions using a default factor

See GRP Chapter 12



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Example: Stationary combustion

Step 1: Collect your annual fuel consumption

* 769,921,800 scf of natural gas

Step 2: Determine the appropriate emission factors for each fuel for Tier A if there is no CEMS (you obtained fuel characteristics from your fuel suppliers)

* Heat Content = 1,024 Btu/scf

* Carbon Content = 14.43 kg C/MMBtu

Step 3: Enter your fuel specific data and annual fuel consumption into the software; registry software will calculate your total CO₂ emissions for CO₂, CH₄ and N₂O:

Metric tons of CO₂ = Fuel Use X Emission Factor / 1,000 kg/metric ton

Metric tons of CO₂e = Fuel Use X Emission Factor / 1,000,000 g/metric ton



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Calculating CO₂ for Mobile Combustion

1. Identify total annual fuel consumption by fuel type.
2. Select the appropriate CO₂ emission factor for each fuel.

Tiers	Quantification	Registry Software will...
Tier A1	Collect either fuel density & carbon content <i>or</i> heat content & carbon content of each fuel and annual fuel consumption.	Calculate CO ₂ e and CO ₂ based on your custom emission factor
Tier A2	Collect measured carbon content data and annual fuel consumption and use a default heat content factor from Table 13.1.	Calculate CO ₂ e and CO ₂ based on your custom emission factor
Tier B/C	Collect annual fuel consumption and use the default factors from Tables 13.1.	Calculate CO ₂ e and CO ₂ based on a default emission factor

See GRP Chapter 13

Calculating CH₄ and N₂O for Mobile Combustion

1. Identify the vehicle type, fuel type, and technology type of model year for each vehicle you own and operate.
2. Identify the annual mileage by vehicle type.
3. Select the appropriate emission factor for each vehicle type.

Tier	Quantification	Registry Software will...
Tier A	Enter annual mileage driven and specify the actual control technology employed in each vehicle in software (see GRP Tables 13.3, 13.5-6)	Calculate CH ₄ & N ₂ O using a default factor
Tier B	Enter annual mileage driven and specify vehicle model year - software will assign an emission factor based on Tables 13.4, 13.5-6	Calculate CH ₄ & N ₂ O using a default factor
Tier C	Determine your vehicle model years and use your fuel use and fuel economy to calculate mileage to enter into software.	Calculate CH ₄ & N ₂ O using a default factor

See GRP Chapter 13

Example: Mobile emissions



Step 1: Identify annual fuel consumption by fuel type

Vehicle Type	Fuel	Model Year	No. of Vehicles	Annual Fleet Fuel Usage (gallons)	Annual Fleet Mileage
Passenger Cars	Motor Gasoline	2000	200	20,000	400,000

Step 2: Determine the appropriate emission factors for each fuel for Tier A (company obtained fuel characteristics from its fuel suppliers)

- * Fuel Density = 100 kg/gallon
- * Carbon Content = 10 kg C/kg fuel

Step 3: Enter your fuel specific data and annual fuel consumption and the registry software will calculate your total CO₂ emissions for CO₂, CH₄ and N₂O:

Amount of metric tons of CO₂ = Fuel Use X Emission Factor / 1,000 mt/kg

Amount of metric tons of CO₂e = Fuel Use X Emission Factor / 1,000,000 g/metric ton



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Quantifying Process Emissions

- Appendix E

- Adipic acid production
- Aluminum production
- Ammonia production
- Cement production
- Electricity transmission and distribution
- HCFC-22 production
- Iron and steel production
- Lime production
- Nitric acid production
- Pulp and paper production
- Refrigeration and air condition equipment manufacturing
- Semiconductor manufacturing



- If The Registry has not endorsed guidelines for quantifying emissions from a particular emissions source, use existing industry best practice methods.

- Industry best practice = information that has been peer reviewed and published by e.g., US EPA, Mass DEP, TCR protocols, etc.



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Quantifying Fugitive Emissions

From refrigeration and air conditioning

Tier	Quantification	Registry Software will...
Tier A	Calculate Changes to the base inventory for each HFC and PFC	Convert to units of CO ₂ e
Tier B	Determine types and quantities of refrigerants used and estimate the annual emissions of each type of refrigerant	Convert to units of CO ₂ e

See GRP Chapter 16

From SF₆ from the Electric Power Sector

- Use Industry Best Practice



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Simplified Estimation Methods

- To ease the reporting burden, reporters may estimate up to 1000 short tons of **CO₂e**
 - from any combination of sources and/or gases
- Simplified Estimation Methods use upper-bound assumptions following the principle of conservativeness -
 - err on the side of *overestimating* rather than *underestimating* your emissions
- Estimated emissions must be documented *and* verified
 - Assumptions can be re-used



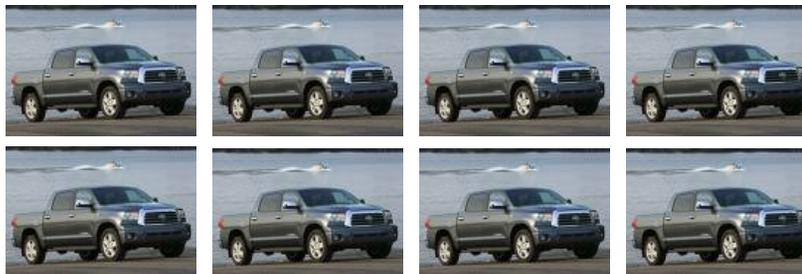
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Example: How to use simplified estimation

Massachusetts Manufacturing, Inc. (MMI). has 10 vehicles that support a facility:



Two (2) 2004 Toyota Camrys

Eight (8) 2000 Toyota Tundras

- They don't track mileage or fuel consumption.
- They can identify the truck that was driven the most by checking vehicle mileage logs.
- MMI made the following conservative estimate:
 - 1) 20,000 annual miles driven by the highest-mileage Toyota Tundra
 - 2) 20,000 x 10 vehicles in fleet
- These methods were described and disclosed in the registry software report.



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Reporting example: Facility GT



- Facility GT has:
 - 1 power generation unit with a CEMS
 - 5 assigned cars
 - 1 office building that maintains a roof top A/C unit and a boiler for winter heating
 - 3 office refrigerators
- Facility GT will need:
 - CEMS data from the generation unit to input into registry software
 - Annual fuel consumption for the vehicles and their miles driven*
 - Information on its A/C unit (capacity and type of refrigerant used) and annual fuel usage for the heater*
 - Information on the three refrigerators (capacity and type of refrigerant used)*

* = Mobile CH_4 and N_2O emissions (you'll need miles driven), fugitive emissions from air conditioning and refrigeration, and small sources that emit under 1,000 short tons CO_2e are all good candidates for simplified estimation methods



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Reporting example: Facility GT

- CEMS data
 - Facility GT enters this directly into the software
- Vehicles consumed 2,000 gallons of gasoline and are model years 1995-2000. Facility GT did not track their annual mileage during this period
 - Facility GT enters type of vehicle and the amount of gallons consumed to calculate CO₂ emissions.
 - Facility GT uses gallons consumed to calculate miles driven and enters miles into the software in order to report CH₄ and N₂O emissions as a simplified estimation method. Facility GT will start to track miles driven beginning in the next year.
- Facility GT does not have service records for the A/C unit
 - Facility GT uses information in GRP Chapter 16 to estimate the capacity of the unit (100kg) and the refrigerant used (HFC-152a) and calculates these emissions offline to be entered as a simplified estimation method.
- Facility GT finds the annual natural gas consumed through gas company bills
 - Facility GT enters the amount of natural gas into the software consumed to calculate CO₂, CH₄ and N₂O emissions.
- Facility GT found the capacity and type of refrigerant used for the refrigerators on the equipment
 - The refrigerators have a capacity of 0.1kg and use HFC-152a. Using GRP Chapter 16 they calculate their CO₂e emissions.



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Report data into the MA Greenhouse Gas Registry

To report in registry software you may need to know the following:

- **Who needs access to electronic MassDEP GHG registry?**
 - Who will be a system user?
- **Your Facility Information**
 - Location, address, facility category, NAICS code, other necessary info.
- **Your emission sources**
 - Tier you are using for calculations
 - Equipment type and fuel source
 - Annual fuel consumption
 - Must enter annual emissions data each year, i.e. fuel consumed, CEMS readings, etc.
 - Specific emission factors

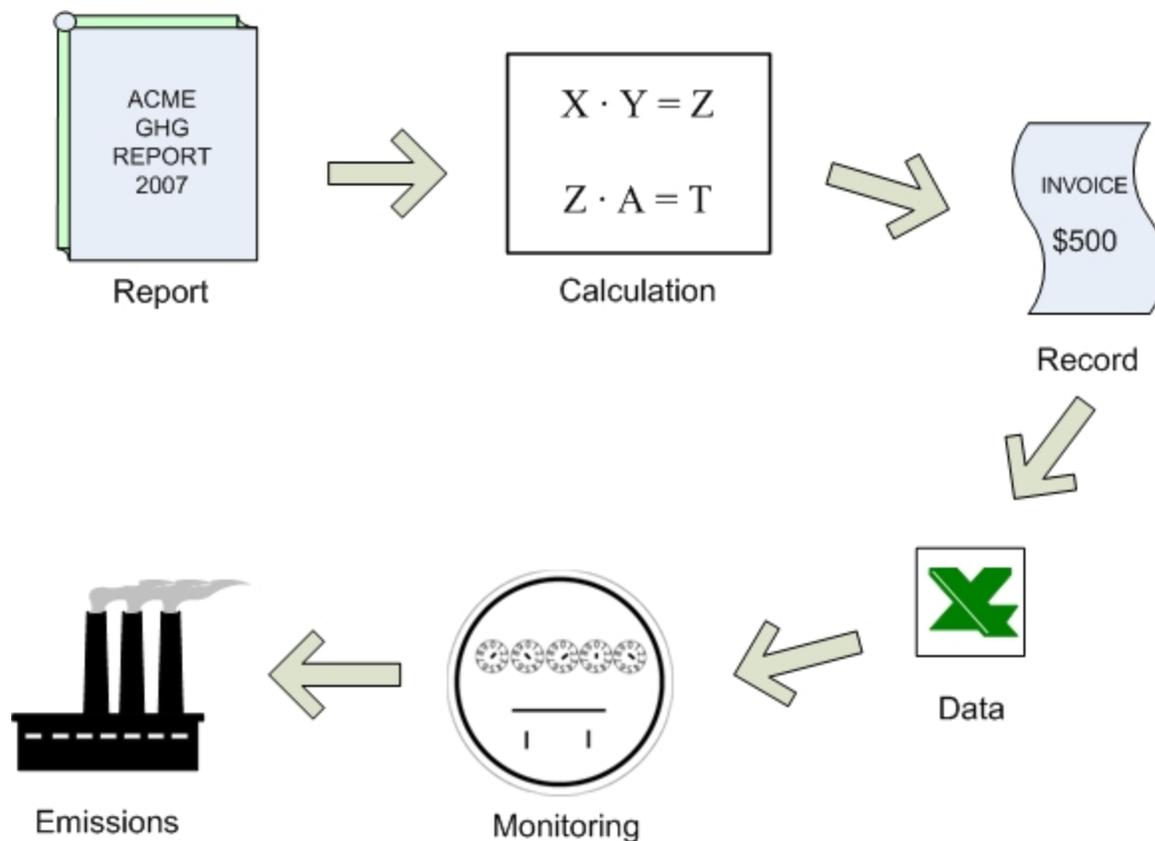


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Good data management establishes a clear trail for compliance and verification



Graphic courtesy of:

First Environment



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Additional Trainings

- Sign up for trainings at MassDEP's website
 - FAQs Document
 - Online trainings on Mass GHG Registry Software:
 - 1 hour modules
 - Available during reporting season
 - Recorded presentations are also available
 - Other information

www.mass.gov/dep/air/climate/reporting.htm



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For More Information

Visit MassDEP's website:

www.mass.gov/dep/air/climate/reporting.htm

- View the training schedule
- Email MassDEP@theclimateregistry.org
- Call the helpline (Mon-Fri, 12-5 PM):

213-213-1240

1-888-807-8423 (January – April)

www.TheClimateRegistry.org



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Q3 – The regulation requires facilities to retain “documentation” if it is not “practicable” to use a Tier A methodology. What type of documentation is acceptable for this purpose?

- A3 – The documentation must clearly show that it would not be practicable to use a “Tier A” methodology to quantify emissions from a particular emission source at a facility. Among the criteria that may be considered acceptable are costs, or the need to implement significant operational changes at a facility. Examples of acceptable documentation could include comparative cost estimates for testing that would be required to use a Tier A methodology (vs. Tier B or C), or written explanations or diagrams documenting technical obstacles to using a Tier A methodology. The purpose of this requirement is to ensure that reporters fully explore the potential to use the most accurate methodologies, not to require facilities to implement costly or significant changes to achieve minor improvements in accuracy. Therefore, documents that explain significant expenditures or disruptions that would be needed to use a Tier A methodology at a particular facility are generally acceptable to meet this requirement.



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Verification

- All facilities will be required to hire a third party verifier to verify reports once every three years. The verification requirement will be implemented on a staggered schedule beginning with facilities that report more than 25,000 tons of CO₂ emissions for 2009. These facilities will be required to verify their 2010 emissions reports in 2011. An information sheet about verification is available on the MassDEP website. MassDEP will provide additional information about verification in 2010.
- <http://www.mass.gov/dep/air/climate/ghgvba.doc>



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