

# Greenhouse Gas Reporting Rule

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# Overview: U.S. EPA GHG Reporting Program (GHGRP)



*Goal of GHGRP is to collect accurate and timely data on GHG information to inform future policy decisions.*

- Monitoring began in 2010 for most emission sources with first reports due by March 31, 2011.
- An additional 12 source categories began collecting data in 2011 and report by March 31, 2012.
- Rule covers 41 source categories for reporting, accounting for 85-90% of U.S. GHG emissions.
- Reporting only, no control or use requirements.



# Source Categories for 2010



- **Adipic Acid Production (Subpart E)**
- **Aluminum Production (Subpart F)**
- **Ammonia Manufacturing (Subpart G)**
- **Cement Production (Subpart H)**
- **Electricity Generation (Subpart D)**
- **Ferroalloy Production (Subpart K)**
- **General Stationary Fuel Combustion Sources (Subpart C)**
- **Glass Production (Subpart N)**
- **HCFC-22 Production HFC-23 Destruction (Subpart O)**
- **Hydrogen Production (Subpart P)**
- **Iron and Steel Production (Subpart Q)**
- **Lead Production (Subpart R)**
- **Lime Manufacturing (Subpart S)**
- **Manure Management Systems (Subpart JJ)** [*EPA will not be implementing subpart JJ due to a Congressional restriction prohibiting the expenditure of funds for this purpose.*]
- **Municipal Solid Waste Landfills (Subpart HH)**
- **Miscellaneous Uses of Carbonates (Subpart U)**
- **Nitric Acid Production (Subpart V)**
- **Petrochemical Production (Subpart X)**
- **Petroleum Refineries (Subpart Y)**
- **Phosphoric Acid Production (Subpart Z)**
- **Pulp and Paper Manufacturing (Subpart AA)**
- **Silicon Carbide Production (Subpart BB)**
- **Soda Ash Production (Subpart CC)**
- **Suppliers of Coal-based Liquid Fuels (Subpart LL)**
- **Suppliers of Petroleum Products (Subpart MM)**
- **Suppliers of Natural Gas and Natural Gas Liquids (Subpart NN)**
- **Suppliers of Industrial Greenhouse Gases (Subpart OO)**
- **Suppliers of Carbon Dioxide (Subpart PP)**
- **Titanium Dioxide Production (Subpart EE)**
- **Zinc Production (Subpart GG)**

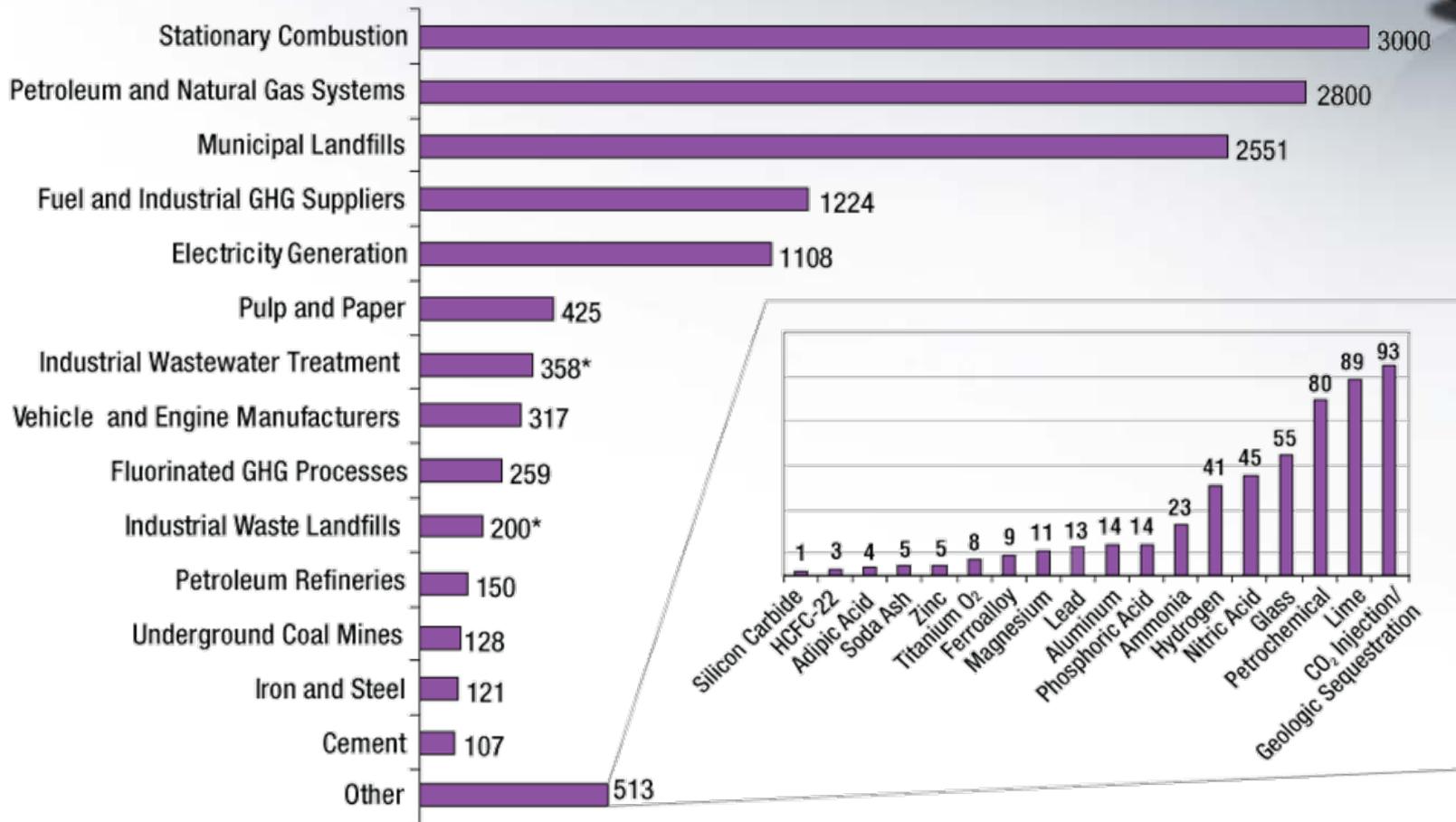
# **New Source Categories for 2011**



The twelve new source categories for reporting year 2011 and beyond include:

- **Electronics Manufacturing (Subpart I)**
- **Fluorinated Gas Production (Subpart L)**
- **Magnesium Production (Subpart T)**
- **Petroleum and Natural Gas Systems (Subpart W)**
- **Use of Electric Transmission and Distribution Equipment (Subpart DD)**
- **Underground Coal Mines (Subpart FF)**
- **Industrial Wastewater Treatment (Subpart II)**
- **Imports and Exports of Equipment Pre-charged with Fluorinated GHGs or Containing Fluorinated GHGs in Closed-cell Foams (Subpart QQ)**
- **Carbon dioxide injection and geologic sequestration (Subpart RR)**
- **Manufacture of electric transmission and distribution (Subpart SS)**
- **Industrial waste landfills (Subpart TT)**
- **Injection of carbon dioxide (Subpart UU)**

# More Than 13,000 U.S. Facilities Covered



\*The majority of these facilities already have to report under other subparts (e.g., pulp and paper, petroleum refining)

# Key Elements of the Rule



- Annual reporting of GHG by:
  - 41 source categories, which includes:
    - 33 types of direct emitters
    - 6 types of suppliers of fuel and industrial GHG
  - Facilities that inject CO<sub>2</sub> underground for geologic sequestration, enhanced oil recovery, or any other purpose.
- 25,000 metric tons CO<sub>2</sub>e or more per year reporting threshold for most sources; capacity-based thresholds where feasible
- Direct reporting to EPA electronically
- EPA verification of emissions data

# What GHGs Are Reported?



- $\text{CO}_2$
- $\text{CH}_4$  (methane)
- $\text{N}_2\text{O}$  (nitrous oxide)
- Fluorinated GHGs
  - HFCs (hydrofluorocarbons)
  - PFCs (perfluorocarbons)
  - $\text{SF}_6$  (sulfur hexafluoride)
  - Other fluorinated gases (except CFC and HCFC and gases  $<1$  mm Hg @  $25^\circ\text{C}$ )

# What Is CO<sub>2</sub>e?



- GHGs have varying heat-trapping ability and atmospheric lifetimes.
- Global warming potential (GWP) is a metric used to compare emissions among GHGs.
- The GWP of CO<sub>2</sub> is 1.0, and the GWP of other GHGs are expressed relative to CO<sub>2</sub>
  - For example, CH<sub>4</sub> has a GWP of 21. Each metric ton of CH<sub>4</sub> emissions would have 21 times as much impact on global warming (over a 100-year time horizon) as a metric ton of CO<sub>2</sub> emissions.
- $\text{Mass emissions} \times \text{GWP} = \text{CO}_2\text{e (metric tons)}$

*Table A-1 of Subpart A lists GWPs\**

*\*Fluorinated Greenhouse Gases source categories can use a default GWP of 2,000 for GWPs not listed in Table A-1.*



# **Part 2. Applicability**

# Applicability for Direct Emitters Is Facility-Based



In most cases, a facility\* is defined as...

- Physical property, plant, building, structure, source, or stationary equipment;
- on contiguous or adjacent properties;
- in actual physical contact or separated solely by public roadway or other public right of way; and
- under common ownership or common control

\*Military installations may be classified as more than one facility.

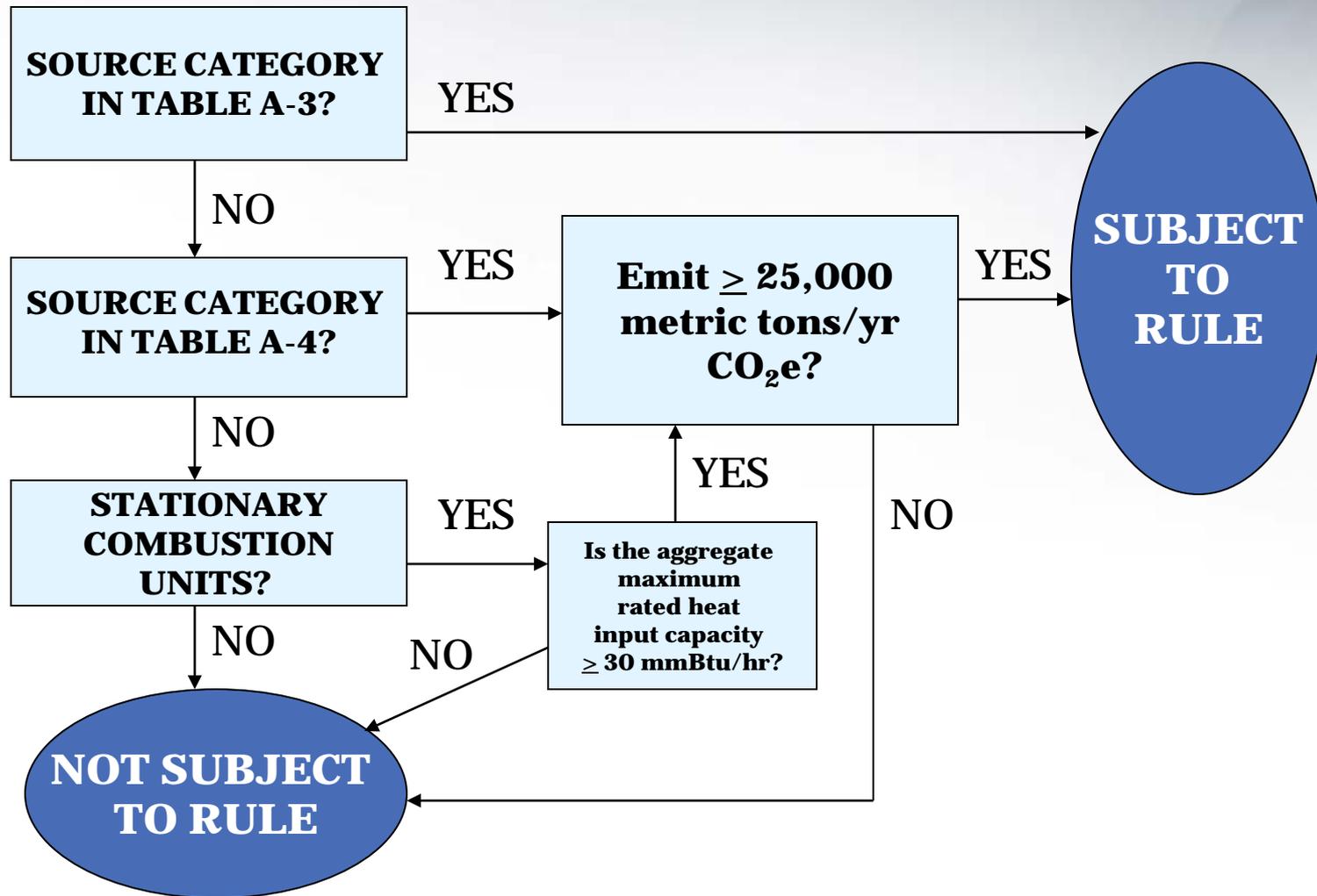
*A different definition of “facility” applies to the Electric Transmission and Distribution Equipment source category (subpart DD) and some Petroleum and Natural Gas Systems (subpart W).*

# Assessing Applicability to the Rule



- A facility can have multiple source categories.
- You must evaluate each source category separately to assess applicability to the rule.
- If rule applies, report emissions for all source categories at your facility for which methods are provided in the rule.

# Does the Rule Apply to My Facility?





# Table A-3: All-in Source Categories

## Applies in 2010

Electricity Generation if report CO<sub>2</sub> year-round through Part 75

Adipic Acid Production

Aluminum Production

Ammonia Manufacturing

Cement Production

HCFC-22 Production/  
HFC-23 Destruction Processes

Lime Manufacturing

Nitric Acid Production

Petrochemical Production

Petroleum Refineries

Phosphoric Acid Production

Manure Management Systems\*

Silicon Carbide Production

Soda Ash Production

Titanium Dioxide Production

Municipal Solid Waste Landfills that generate CH<sub>4</sub> ≥ 25,000 metric tons CO<sub>2</sub>e per year

## Applies in 2011

Carbon Dioxide Injection

Electrical Equipment Use

Electrical Equipment Manufacturing

Fluorinated GHG processes

Geologic Sequestration

Underground Coal Mines that are subject to quarterly sampling by MSHA

*\*The rule for manure management systems will not be implemented due to a Congressional restriction prohibiting the expenditure of funds for this purpose.*



## **Table A-4: Threshold Source Categories\***

### **Applies in 2010**

Ferroalloy Production  
Glass Production  
Hydrogen Production  
Iron and Steel Production  
Lead Production  
Pulp and Paper  
Manufacturing  
Zinc Production

### **Applies in 2011**

Electronics Production  
Fluorinated GHG Production  
Industrial Wastewater  
Treatment  
Industrial Waste Landfills  
Magnesium Production  
Petroleum and Natural Gas  
systems

*\*  $\geq 25,000$  metric tons  $CO_2e$  per year from all source categories, combustion units, and miscellaneous use of carbonates.*

# What Combustion Units Will Emit 25,000 MT CO<sub>2</sub>e per Year?



Fuel	Design Capacity* (mmBtu/hr)	Annual Fuel Use
Coal	30	10,800 tons
Fuel Oil	35	2.3 million gallons
Natural Gas	50	460 million ft <sup>3</sup>

*\*Assuming full utilization and 8,760 hours/yr.*

25,000 MT CO<sub>2</sub>e per year is equivalent to using 131 rail cars of coal

# Applicability Tool



To help determine if facilities must report...

- Indicate reporting year
- Check-off list of source categories
- Combustion calculator
- Municipal landfill calculator
- Electronics Manufacturing calculator
- Petroleum and Natural Gas Production calculators

<http://www.epa.gov/climatechange/emissions/GHG-calculator/index.html>

*\* Calculators provide conservatively high emission estimates*

# How Do I Estimate Emissions for Applicability Purposes?



- Estimate actual emissions
- Use applicable equations in the rule
- Monitoring data not required—use available company records
- Simplified methods allowed for combustion sources
- Include CO<sub>2</sub> transferred off-site
- Exclude CO<sub>2</sub> emissions from biomass combustion, but include CH<sub>4</sub> and N<sub>2</sub>O emissions
- Exclude research and development activities, unless otherwise specified in an applicable subpart (e.g. subpart RR)
- Include an F-GHG only if listed in Table A-1 of rule

*If you are close to 25,000 MT CO<sub>2</sub>e/yr based on available records, it may be prudent to monitor.*

# What Suppliers Are Covered?



- All producers of:
  - Petroleum products
  - Coal-based liquids
  - Industrial GHGs (F-GHG and N<sub>2</sub>O)
  - CO<sub>2</sub>
- Exporters of 25,000 metric tons CO<sub>2</sub>e per year or more
- Importers of 25,000 metric tons CO<sub>2</sub>e per year or more
- Natural gas and natural gas liquids
  - All fractionators
  - Local gas distribution companies that deliver 460 million ft<sup>3</sup>
- Importers and exporters of fluorinated GHGs in pre-charged equipment or closed-cell foams equivalent to 25,000 metric tons CO<sub>2</sub>e per year (starting in 2011 reporting year)

# Applicability Example #1



Facility Description	Required to Report?	Explanation
<b>A petrochemical plant</b> emits 22,000 metric tons/yr CO <sub>2</sub> e.	Yes	Because petrochemical manufacturing is a source category that is listed in Table A-3, the facility must submit a report regardless of the amount of GHGs emitted.

# Applicability Example #2



Facility Description	Required to Report?	Explanation
<p>A <b>university</b> emits 24,000 metric tons/yr CO<sub>2</sub>e from a cogeneration unit and 2,000 metric tons/yr CO<sub>2</sub>e from coal storage.</p>	<p>No</p>	<p>Because the rule does not prescribe a method for calculating GHG emissions from coal storage, coal storage emissions are not counted in determining applicability.</p>

# Applicability Example #3



Facility Description	Required to Report?	Explanation
<p>A <b>cheese manufacturing plant</b> contains:</p> <ul style="list-style-type: none"><li>• A gas-fired boiler that emits 15,000 metric tons/yr CO<sub>2</sub>e,</li><li>• A biogas-fired boiler that emits 10,000 metric tons/yr CO<sub>2</sub>, and 200 metric tons/yr of CH<sub>4</sub> and N<sub>2</sub>O</li><li>• A wastewater treatment operation that emits 9,000 metric tons/yr CO<sub>2</sub>e.</li></ul>	No	Because wastewater treatment at food processing plants is a source category listed in Table A-4, the facility must report only if emissions from wastewater treatment and stationary fuel combustion are 25,000 metric tpy CO <sub>2</sub> e or more. Because CO <sub>2</sub> emissions from combustion of biogenic fuels is excluded from the applicability computation, nonbiogenic GHG emissions for the facility are 24,200 metric tpy CO <sub>2</sub> e, and the facility is not required to report.

For more examples:

<http://www.epa.gov/climatechange/emissions/downloads09/generalprovisions.pdf>



# **Part 3. Reporting, Monitoring, and Recordkeeping Requirements**

# What Are the Reporting Requirements?



- **Subpart A: General Provisions**
  - Applicability provisions
  - Schedule
  - Reporting and recordkeeping requirements common to all reporters
  - Definitions
  - Report submission procedures
  - Other (e.g., calibration procedures, monitoring plan)
- **Subparts C-UU: Source-Specific Requirements**
  - Definition of source category
  - GHG to report
  - Calculation methods
  - Monitoring and QA/QC
  - Missing data procedures
  - Reporting and recordkeeping elements unique to each subpart

# General Monitoring Approaches



- **Continuous emission monitoring systems (CEMS)**
  - Required if already used (e.g., NSPS, Acid Rain Program) and meet specified criteria
  - Optional for other sources
- **Source category-specific GHG calculation methods**
  - Monitor process parameters, fuel use
  - Calculate GHG using equations in applicable subparts
  - Example approaches (varies by source category)
    - Mass balance calculation
    - Site-specific emission factors
    - Default emission factors



# Best Available Monitoring Methods

- Best available monitoring methods may be used during part of the first year for some source categories:
  - Use emission estimation equations provided in the rule
  - Obtain equation inputs using best available monitoring method (e.g., current monitoring methods, engineering calculations, company data)
- Must begin following all applicable monitoring and QA/QC requirements when the BMM period expires, unless an extension is approved by EPA

# Schedule for Monitoring and Reporting – Reporting Year 2010



<b>1/1/10</b>	<b>Start collecting data using required methods in each subpart or best available monitoring methods</b>
<b>12/31/10</b>	<b>Complete 2010 data collection</b>
<b>8/1/11</b>	<b>Submit certificate of representation</b>
<b>9/30/11</b>	<b>Submit GHG report for reporting year* 2010</b>
<b>Ongoing</b>	<b>Submit corrected report 45 days after each discovery (unless extension is requested)</b>
<b>Ongoing</b>	<b>Submit annual reports on 3/31 each year</b>

*\* Reporting year is the year in which the data are collected (e.g., reporting year 2010 data are contained in the report submitted on March 31, 2011).*

# Schedule for Monitoring and Reporting – Reporting Year 2011



<b>1/1/11</b>	<b>Start collecting data using required methods in each subpart or best available monitoring methods</b>
<b>12/31/11</b>	<b>Complete 2011 data collection</b>
<b>1/31/12</b>	<b>Submit certificate of representation</b>
<b>3/31/12</b>	<b>Submit GHG report for 2011</b>
<b>Ongoing</b>	<b>Submit corrected report 45 days after each discovery (unless extension is requested)</b>
<b>Ongoing</b>	<b>Submit annual reports on 3/31 each year</b>

# What Do Facilities Report?



- Identifying information, parent companies, NAICS code(s)
- Annual GHG emissions excluding biomass CO<sub>2</sub>, metric tons CO<sub>2</sub>e
- Annual CO<sub>2</sub> emissions from biomass combustion, metric tons
- Annual emissions of each GHG for each source category, metric tons each gas
- Other emissions data required by an applicable subpart (e.g., by unit or process line)
- Verification data required by each subpart
- Data elements for which a missing data procedure was used
- Certification by the “designated representative”

*Facilities for which the rule does not apply are not subject to any reporting or recordkeeping requirements. Further, facilities are not required to submit verification or notify EPA that they are not subject to the rule. However, it may be prudent to retain a record of your emission computations in the event that you may be audited.*

# What Do Suppliers Report?



- Identifying information, parent companies, NAICS code(s)
- Annual quantity from all supply categories, metric tons CO<sub>2</sub>e
- Annual quantity from each supply category, metric tons of each gas
- Other data required by an applicable subpart
- Verification data required by each subpart
- Data elements for which a missing data procedure was used
- Certification by the “designated representative”

# What Is Not Reported?



- Indirect emissions (e.g., electricity use)
- Mobile source emissions (e.g., fleet emissions, off-road equipment)
- Emission offsets

# **Retain These Records for 3 Years:**



- List of all units, operations, processes, and activities for which GHG emission were calculated
- All data used to calculate the GHG emissions for each unit, operation, process, and activity, categorized by fuel or material type
- The annual GHG reports
- Missing data computations
- Written GHG Monitoring Plan
- Certification and QA tests
- Maintenance records for measurement equipment
- Other data required by applicable subparts

# Monitoring Plan



- Identifies responsibilities (i.e., job titles) for data collection
- Explains processes and methods used for data collection
- Describes QA/QC procedures for monitors
- May rely on references to existing corporate documents (e.g., existing QA plans, standard operating procedures)
- **Monitoring Plans must be prepared by the following dates:**

**For 2010 Reporters:**

**4/1/2010**

**For 2011 Source Categories:**

**1/1/2011** *for magnesium production, underground coal mines, industrial wastewater treatment, and industrial waste landfills*

**4/1/2011** *for all other 2011 reporters*

# **General Monitor Calibration Requirements [40 CFR 98.3(i)]**



- **Calibrate flow meters and other required measurement devices (e.g. weighing devices) by April 1, 2010 (unless previous calibration still active) or by date specified in each subpart.**
  - **May postpone until next maintenance outage if calibration requires a process or unit shutdown**
  - **For 2011 source categories, calibrate by date the measurement device must be installed, unless the subpart provides a different date**
- **Calibrate using manufacturer's specifications, industry consensus standard, or method in rule subpart. Describe in monitoring plan.**
- **Recalibrate at frequency specified in subpart. If not specified, use manufacturer's recommendations or industry consensus practice.**

# General Monitor Calibration Requirements [40 CFR 98.3(i)] (cont.)



- Flow meters measuring liquid or gaseous fuel feed rates, process stream flow rates, or feedstock flow rates must meet accuracy specifications in 98.3(i) if specified by the subpart
  - No more than 5% calibration error for most flow meters
  - Other values specified for orifice, nozzle, and venturi flow meters
- Calibration and accuracy requirement do not apply to:
  - Company records
  - Best available information
  - Part 75 methodologies
  - Fuel billing meters (unless company combusting fuel owns meters)
  - Flow meters used exclusively for unit startup

# When Can I Stop Annual Reporting?



- Notify EPA by March 31 of the year after you meet one of the following conditions:
  - If annual reports demonstrate CO<sub>2</sub>e <25,000 metric tons/yr for 5 consecutive years.
  - If annual reports demonstrate CO<sub>2</sub>e <15,000 metric tons/yr for 3 consecutive years.
  - If you shut down all processes/units/supply operations covered by the rule. (Does not apply to landfills)
- You must resume reporting in future year if conditions are no longer met

# How Will Emissions Be Verified?



- **Self certification**
  - Designated representative certifies report
  - Rule requires one designated representative (DR) and allows one alternate designated representative (ADR) for each facility and supplier
- **EPA verification**
  - Reports submitted through an electronic system
  - Built-in calculation and completeness checks for reporters
  - Electronic QA and consistency checks
  - EPA data review and follow-up with reporters
  - On-site audits

# Electronic Reporting System



- All reporting under the GHG Reporting Program will be electronic.
- Web-based system for facility/supplier to EPA reporting
  - Web-forms will guide reporters through data entry and submission.
  - Include a mechanism to submit file directly using Extensible Markup Language (XML) format.
  - XML schema is available on the EPA website.
- For updates on the data system, training schedule, and to view the XML schema:

<http://www.epa.gov/climatechange/emissions/data-reporting-system.html>

*Note: Subparts LL and MM must report using the Office of Transportation and Air Quality Fuels Registration (OTAQREG) system.*

# e-GGRT User and Facility Registration



**e-GGRT Help**

- About e-GGRT
- Climate Change Home Page
- Applicability Tool for the Mandatory Greenhouse Gas Reporting Rule

## About the e-GGRT One-time User Registration Process

**SHOULD YOU REGISTER TO USE e-GGRT?**

You will need to create an e-GGRT user account, if you plan to register or represent a Facility or Supplier affected by EPA's Mandatory Greenhouse Gas Reporting Rule.

If you are uncertain, the [Applicability Tool](#) may help you assess whether your facility is required to report greenhouse gas (GHG) emissions. Note that information tailored to Suppliers and other affected entities can also be found there.

**You are already registered if:**

- You have a CDX Account.** CDX and e-GGRT are integrated so that both will work with your existing CDX account.

Login to e-GGRT with your username and password.

- On screen directions explain each step of user registration. Additional context sensitive help links

### User Registration Process

- 1 Create User Profile** Add a new user profile to the system. (You will be asked to create a user profile if you do not have one.)
- 2 Pick Challenge Questions** Pick, and supply answers to, five challenge questions. You will be asked one of these questions anytime you certify and sign a submission in e-GGRT.
- 3 Electronic Signature Agreement** Print the Electronic Signature Agreement (ESA). Sign the form, then mail or courier to EPA.  
You will not be able to use e-GGRT until EPA has received and processed this paper agreement with your signature.
- 4 Print Summary** Print the summary of your registration for your records. If you have questions regarding your registration, including the status of your ESA, you can refer to this document.

**Start Using e-GGRT** EPA will not activate your account until your ESA has been received and processed. An account activation notice will be sent to the email address you used for registration. You will then be able to use e-GGRT.

**BEGIN REGISTRATION**

**!** *If your facility is not subject to the GHG reporting rule in 2010, your facility is not required to register with the e-GGRT system by August 1, 2011. If your facility triggers the rule during 2011, you would be required to register your facility 60 days before submission of your initial report (i.e., January 31, 2012).*

# GHG Data Publication



- EPA plans to publish collected through the GHG RP on the web
- EPA will only publish non-CBI data
  - CBI data will be aggregated to shield sensitive information
- EPA is developing a publication tool for the GHG RP data
  - Display facilities on a map
  - Create charts, graphs, and lists
  - Download data
  - Leverage social media

# Goals for Data Publication



- Increase understanding of the sources of GHG emissions in the U.S. among the public
- Encourage voluntary reductions of emissions
- Improve quality of reported data
- Support regional, state, and local programs
- Information to be displayed in a simple, transparent manner

# Confidential Business Information (CBI)



- EPA will protect any information claimed as CBI in accordance with regulations in 40 CFR Part 2, subpart B
- In general, emissions data collected under CAA sections 114 and 208 cannot be considered CBI
- EPA is deferring the reporting of certain data elements that are inputs to emission equations to better assess implications of its collection and public release. See 12/27/10 FR notice for list of data elements not required to be reported in March 2011.



*Reporters must submit their 2010 GHG Reports by Sept. 30, 2011. The Interim Final deferral action published on December 27, 2010 in the Federal Register applies only to specific data elements listed in that action and does not defer reporting of any other GHG data.*



# **Part 4. Subpart C: Stationary Fuel Combustion Sources**

# What Units Are Covered?



- **Devices that combust solid, liquid, or gaseous fuel for:**
  - producing electricity, generating steam, or providing useful heat or energy for industrial, commercial, or institutional use, or
  - reducing the volume of waste by removing combustible matter
- **Examples:**
  - Boilers
  - Stationary Internal Combustion Engines
  - Process Heaters
  - Combustion Turbines
  - Incinerators
  - Other Stationary Fuel Combustion Equipment (e.g. control devices)
- **Covers any fuel combustion device, unless specifically exempted**

# **Subpart C Does Not Apply to These:**



- **Portable equipment**
- **Emergency generators and emergency equipment**
- **Agricultural irrigation devices**
- **Flares, unless otherwise required by another subpart (e.g., subpart W)**
- **Electricity Generating Units subject to subpart D**
- **Hazardous waste combustion (co-fired fossil fuels only)**
- **Pilot lights**

# Applicability



Three ways for subpart C to apply:

- Facility is subject to the rule because of another source category
- Facility emits 25,000 metric tons CO<sub>2</sub>e/year from all stationary fuel combustion units
- Another subpart refers to subpart C for combustion emissions (e.g., kiln emissions)

# What GHGs Are Reported?



- **CO<sub>2</sub> from fossil fuel and biomass**
  - Four different methods (Tiers) for calculating CO<sub>2</sub> emissions
  - Different tiers used based on unit size, fuel type, other factors
  - Separately estimate CO<sub>2</sub> from sorbent used for acid gas control (unless CO<sub>2</sub> is measured with CEMS)
- **CH<sub>4</sub> and N<sub>2</sub>O**
  - Emission factors



# CO2 Emission Calculation Tiers

Tier	For this fuel...	Measure these parameters...	And use a default factor for...
1	60 fuels <sup>1</sup>	Annual fuel use	HHV CO2 emission factor
2	60 fuels <sup>1</sup>	Annual fuel use HHV	CO2 emission factor
	MSW	Steam generation	CO2 emission factor
3	Solid/liquid	Annual fuel use Carbon content	--
	Gas	Annual fuel use Carbon content Molecular weight	--
4	All	CO2	--

<sup>1</sup>Any of the 60 fuels listed in Table C-1 of subpart C, except MSW units that generate steam.

# Tier 1 Monitoring: Fuel Use



## Use “company records”

- Direct measurements of fuel consumption by gravimetric or volumetric means
- Tank drop measurements
- Engineering calculations (e.g., using generation or unit operating hours)
- Fuel billing records
- Other

**Must maintain records of methods used**

# Tier 2 Monitoring: HHV



- **Fuel use**
  - Company records
- **High heating value of fuel. Minimum sampling frequency:**
  - Natural gas: Semiannual
  - Coal and fuel oil: Each fuel lot (shipment or delivery)
  - Other liquid fuels, fossil fuel-derived gas fuels, and biogas: Quarterly
  - Other solid fuels: Weekly sample and monthly analysis

# Tier 3 Monitoring: Fuel Carbon Content



- Fuel use
  - Solid fuel: Company records
  - Liquid fuel: Flow meter, billing meter, or tank drop measurements
  - Gaseous fuel: Flow meter or billing meter
- Minimum fuel sampling frequency (carbon):
  - Same as for Tier 2, except
  - Other gaseous fuels: Daily (if equipment in place) or weekly

# Tier 4 Monitoring (CEMS)



- Install CO<sub>2</sub> and volumetric flow rate monitor
  - O<sub>2</sub> monitor may be used in some situations
  - Calculate hourly mass emission rates
  - Sum to quarterly and annual emissions
- Three alternatives: Use continuous heat input measurements and part 75 equations [98.33(a)(5)]

# Use of Tier 1 (measure fuel use only)



Tier 1 may be used in these situations:

- Unit  $\leq 250$  mmBtu/hour & fuel listed in Table C-1\*
- Units of any size:
  - Municipal solid waste (MSW) unit that does not produce steam
  - MSW unit burning  $\leq 1,000$  tons MSW per year
  - MSW and/or tires provides  $\leq 10\%$  annual heat input
  - Natural gas if consumption is provided in therms or mmBtu
  - Biomass listed in Table C-1 \*

\*If HHV data are available at the minimum required frequency, Tier 2 must be used.

# **Use of Tier 2 (measure HHV)**



**Tier 2 may be used in 3 situations:**

- **Unit  $\leq$  250 mmBtu/hour and fuel listed in Table C-1 (60 fuels)**
- **Natural gas and/or distillate fuel oil in unit of any size**
- **MSW unit that produces steam**

# Use of Tier 3 (measure carbon content)



Tier 3 must be used in 2 situations:

- Unit  $> 250$  mmBtu/hour for any fuel listed in Table C-1, except:
  - Natural gas, distillate fuel oil, and biomass fuels
  - MSW
  - If Tier 4 is required
- Unit  $> 250$  mmBtu/hour and a fuel not listed in Table C-1, only if:
  - The fuel provides 10% or more of annual heat input to the unit, and
  - Tier 4 is not required

# **Use of Tier 4 (CEMS) (large units)**



For large units, required if ALL six requirements are met:

1. Unit has CEMS that is required by regulation or permit.
2. Unit  $>250$  mmBtu/hr, or  $>600$  tons per day of MSW.
3. Solid fossil fuel or MSW is primary or secondary fuel.
4. Unit operated  $>1,000$  hours in any calendar year since 2005.
5. CEMS has a gas monitor of any kind or a stack gas volumetric flow rate monitor
6. Monitors undergo periodic QA testing under part 75, NSPS, or State program.

# **Use of Tier 4 (CEMS) (small units)**



For small units, required if ALL six requirements are met:

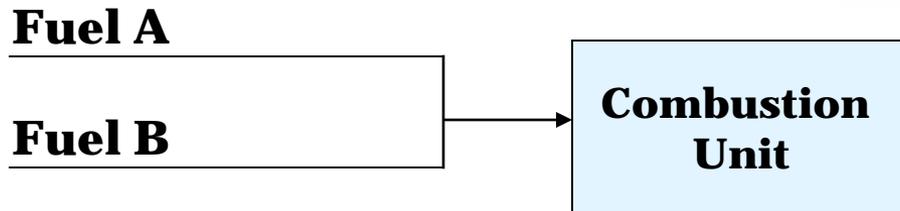
1. Unit has CEMS that is required by regulation or permit.
2. Unit  $\leq 250$  mmBtu/hr, or  $\leq 600$  tons per day of MSW.
3. Solid fossil fuel or MSW is primary or secondary fuel.
4. Unit operated  $>1,000$  hours in any calendar year since 2005.
5. CEMS has a CO<sub>2</sub> monitor and a stack gas volumetric flow rate monitor
6. Monitors undergo periodic QA testing under part 75, NSPS, or State program.

# Thermal Oxidizers/Control Devices



- **Hazardous Wastes**
  - Use CEMS if required by another rule
  - Otherwise, report only fuels listed in Table C-1
- **Units  $\leq 250$  MMBtu/hour**
  - Report only fuels listed in Table C-1
- **Units  $> 250$  MMBtu/hour**
  - Report only fuels listed in Table C-1, and
  - Any other fuel that provides  $> 10\%$  annual heat input to the unit

# Mixed Fuel



## Tier 1 or Tier 2

1. Estimate relative portion of fuel using best available information
2. Determine a heat-weighted average CO<sub>2</sub> emission factor
3. Apply Tier 1 or 2 equation

## Tier 3

Measure carbon content (and molecular weight for gases) of mixed fuel

- Use appropriate tier for each fuel.

# What Must Be Reported?



- CO<sub>2</sub>, N<sub>2</sub>O, and CH<sub>4</sub> from fossil fuel and biomass
- Reporting is at unit level (each fuel) with some exceptions:
  - Aggregate units  $\leq 250$  mmBtu/hr
  - Aggregate units served by common pipe
  - Aggregate units sharing common stacks using CEMS
- Verification data specified at § 98.36(e)

# Requirements for Biomass



- Biomass CO<sub>2</sub> emissions not considered in applicability, but are reported separately if subject to rule
- Estimate biogenic CO<sub>2</sub> emissions for fuels listed in Table C-1, and non-Table C-1 fuels, if >10% of annual heat input in a unit >250 mmBtu/hr
  - Wood and Wood Residuals
  - Agricultural Byproducts
  - Peat
  - Solid byproducts
  - Biogas
  - Ethanol
  - Biodiesel
  - Rendered Animal Fat
  - Vegetable Oil
- CH<sub>4</sub> and N<sub>2</sub>O emissions are considered in applicability and reported

# Calculating Biogenic CO<sub>2</sub> from Mixed Biomass and Fossil Fuels



- If no CEMS
  - Tier 1 (or Tier 2 if required) and company records for amount of biomass combusted
- If use CEMS
  - Tier 1 (or Tier 2 if required), or
  - Equations using F-factors, or
  - ASTM D7459-08 and D6866-06a (quarterly)
- If burning tires, reporting biomass is optional
  - Tier 1 or 2 or 3 (as applicable) for total CO<sub>2</sub>, and
  - ASTM D7459-08 and D6866-06a (quarterly), or
  - Tier 1 and default value of 20% for biogenic fraction if MSW and tires(combined)  $\leq 10\%$  annual heat input

# Calculating Biogenic CO<sub>2</sub> from Mixed Biomass and Fossil Fuels (continued)



- If burning MSW
  - Tier 1 or 2 (as applicable) for total CO<sub>2</sub>, and
  - ASTM D7459-08 and D6866-06a (quarterly)
  - or
  - Tier 1 and default value of 60% for biogenic fraction if  $\leq 1,000$  tpy MSW, or MSW and tires(combined)  $\leq 10\%$  annual heat input

# CH<sub>4</sub> and N<sub>2</sub>O Calculation Methods



If you use this Tier for	Measure these parameters <sup>1</sup>	And use a default factor for
Tier 1 or Tier 3	Annual fuel use	HHV CH <sub>4</sub> emission factor N <sub>2</sub> O emission factor
Tier 2 Fuel Option (Eq. C-9a)	Annual fuel use HHV	CH <sub>4</sub> emission factor N <sub>2</sub> O emission factor
Tier 2 Steam Option (Eq.C-9b)	Annual steam generation MMBtu/lb steam output (maximum rated)	CH <sub>4</sub> emission factor N <sub>2</sub> O emission factor
Tier 4	Annual heat input	CH <sub>4</sub> emission factor N <sub>2</sub> O emission factor

<sup>1</sup>Use same values as used for CO<sub>2</sub> calculations

# What Is Reported for Each Unit?



- Unit identification number
- Type of unit (code)
- Rated capacity
- Each fuel type burned
- Tier methodology used for CO<sub>2</sub>
- For Tier 1-3 (for each fuel)
  - CO<sub>2</sub> emissions in tons
  - CH<sub>4</sub> and N<sub>2</sub>O emissions in tons and CO<sub>2</sub>e
- For Tier 4
  - CO<sub>2</sub> emissions for all fossil fuels combined
  - CO<sub>2</sub> emissions for all biomass fuels combined
  - CH<sub>4</sub> and N<sub>2</sub>O emissions for each fuel (tons and CO<sub>2</sub>e)
- CO<sub>2</sub> sorbent emissions (if not using CEMS)
- Customer meter number for natural gas
- Verification data

# Additional Information



- [www.epa.gov/climatechange/emissions/ghgrulemaking.html](http://www.epa.gov/climatechange/emissions/ghgrulemaking.html)
  - Preamble and rule
  - Technical background documents on source categories
  - Response to comment documents
  - Link to rulemaking docket
  - Technical assistance materials (e.g., Information Sheets, Monitoring Checklists, FAQs, optional forms)
  - Data reporting system information (e-GGRT)
  - On-line applicability tool
- Rule questions: [GHGMRR@epa.gov](mailto:GHGMRR@epa.gov)
- e-GGRT questions: [GHGReporting@epa.gov](mailto:GHGReporting@epa.gov)



**Questions?**