

Getting Ready – Mandatory Reporting of GHG Emissions and Beyond

Environmental Resources Management



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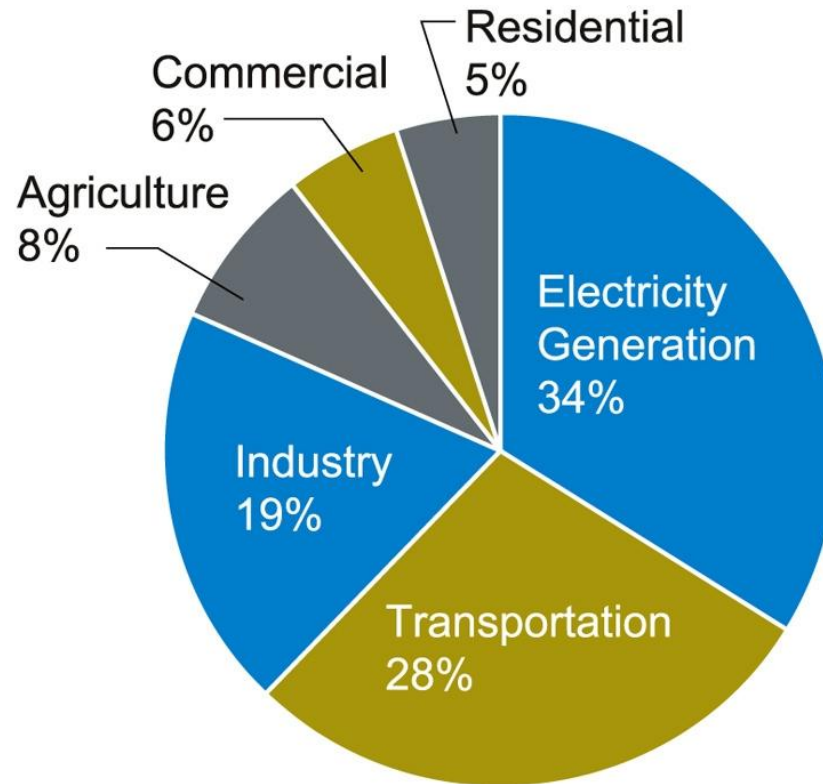
Presentation Outline

- **GHG Emission Reporting Rule Overview**
 - Changes in Final Rule
 - Applicability Concerns and Compliance Needs
 - Very Near Term January 1, 2010 Trigger Date
- **Cap and Trade Implications**
 - Climate Change – The Other Global Crisis?
 - Future Carbon Constrained Economy?
 - Greater Focus on Energy and Efficiency
 - There Will be Big Winners and Losers!

Background on GHG Emission Reporting Final Rule

- **Proposed Rule Signed by Administrator March 10, 2009**
- **40 CFR 98, Subparts A – PP (Proposed Rule Published April 10, 2009)**
- **Comments Submitted by June 9, 2009**
- **A sizable rule: Preamble and Rule >1000 pages**
- **EPA Proposed an “Endangerment Finding” Regarding CO₂ on April 17, 2009**
- **GHG Emission Reporting Rule Finalized on September 22, 2009**
- **Compliance Date of January 1, 2010 for Applicable Facilities**
- **<http://www.epa.gov/climatechange/emissions/ghgrulemaking.html>**

US GHG Emissions by Sector



Total U.S. Emissions
Percent emissions by sector

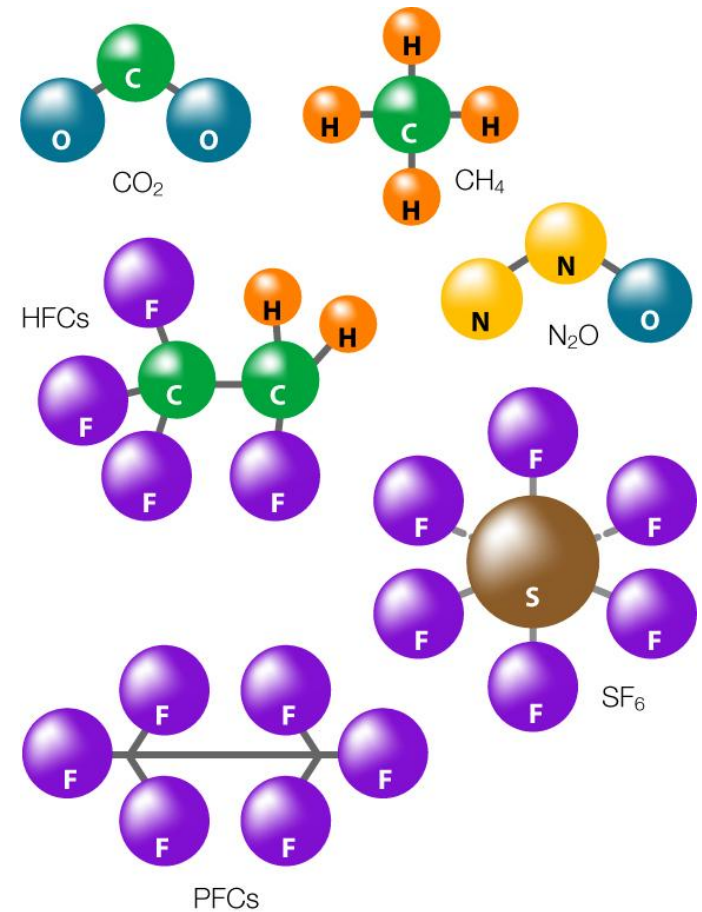


Key Provisions of the Final Rule

- What to Report
- Who Reports
- Thresholds
- Reporting Methodology
- Frequency
- Verification

Final rule overview

- **What to report – mandatory reporting:**
 - Kyoto six: CO₂, CH₄, N₂O, SF₆, Perfluorocarbons (PFCs), Hydrofluorocarbons (HFCs)
 - Other fluorinated gases: Nitrogen trifluoride (NF₃), Hydrofluorinated ethers (HFEs)
 - This is nearly **100** chemical compounds when added together
 - Reporting requirements dependent upon applicable subcategories
- **All converted to CO₂ equivalent emissions using Global Warming Potentials (GWP)**
 - CO₂ = 1
 - CH₄ = 21
 - N₂O = 310



Who needs to report?

- **Final Rule Covers ~30 Categories (Proposal Had 40)**
 - Sites need a detailed applicability review!
- **Primary Facilities**
 - Power Plants
 - Iron and Steel
 - Aluminum
 - Cement
 - Pulp and Paper
 - Petrochemical
 - Hydrogen
 - Petroleum Refineries
- **Catch All Category**
 - Stationary Source Combustion Capacity at any site ≥ 30 MMBTU/Hr in Aggregate, and
 - Emissions-Based Threshold of $\geq 25,000$ MT/yr CO₂e
- **Final Rule Eliminates Applicability, For Now, of 10 Subcategories (e.g. Electronics, Ethanol, Food, Wastewater, Industrial Landfill, etc.)**



Reporting issues

- **Once in, always in position relaxed in Final Rule**
- **Calculation and Compliance Methodologies Defined in Each Subpart**
 - Direct measurement required for many sources
- **Annual Reporting requirement unless already more frequent**
- **Monitoring starts January 1, 2010**
- **Best available monitoring data can be used until March 31, 2010 without an extension approval from US EPA**
- **First Report due March 31, 2011 for 2010 calendar year**
- **Most reporting on a unit and/or facility basis**
- **EPA responsible for verification – thus, facilities must self-certify emissions data**

Stationary fuel combustion source example

- **Broad definition of Source Category – Devices that combust solid, liquid, or gaseous fuel to either:**
 - Produce electricity, steam or heat, or
 - Reduce the volume of combustible matter
 - Note: Does not include portable equipment or emergency generators
 - Applicability based on $\geq 25,000$ MT/yr CO₂e actual emissions
- **What GHGs are covered**
 - CO₂, CH₄, N₂O from each combustion fuel unit
 - Reporting can aggregate all sources into a single group if no individual unit capacity is >250 MM BTU/hr
 - Report separately for each fuel
 - Company records can be used to address some data needs

Stationary Combustion Calculation Methods

Tier Level	Calculation Methodology	Applicability
1	Default emission factor Default HHV	≤250MMBtu/hr & EF avail. No fuel analyses performed Biogenic fuels
2	Default emission factor Measured HHV	≤250MMBtu/hr & EF avail.
3	Measured fuel composition Measured MW	Any fuel, any size unit RFG or process gas
4	CEMS	Any fuel, any size unit

Sample Calculations – Tier 1 Methodology

$$CO_2 = 1 \times 10^{-3} * Fuel * HHV * EF \quad (Eq. C - 1)$$

CO2 = Annual CO₂ mass emissions for specific fuel type (metric tons)

Fuel = Mass or volume of fuel combusted per year

HHV = Default high heat value of the fuel (Table C-1)

EF = Fuel-specific default CO₂ emission factor (Table C-1)

NOTES:

- Method to determine N₂O and CH₄ emissions is identical.
- Only site-specific data required is fuel-usage.

Sample Calculation 2010 Natural Gas Usage (1,096,036,000 SCF)

$$\begin{aligned} CO_2 &= 1 \times 10^{-3} * Fuel * HHV * EF \\ &= 1 \times 10^{-3} * (1,096,036,000 \text{ SCF}) * (1.03 \times 10^{-3} \frac{\text{mmBtu}}{\text{ton}}) * (53.02 \frac{\text{kg CO}_2}{\text{mmBtu}}) \\ &= 59,681 \text{ MT CO}_2 \end{aligned}$$

Fuel Usage to Trigger Reporting (Tier 1)

Fuel	Estimated Usage to Exceed 25,000 MT/yr CO _{2e}	Combustion Source Capacity (MMBtu/hr)				
		50	75	100	150	200
Natural Gas	458,692,137 SCF	108%	72%	54%	36%	27%
Distillate Fuel Oil (#1, 2, 4)	2,452,060 gallons	78%	52%	39%	26%	19%
Residual Fuel Oil (#5, 6)	2,109,998 gallons	72%	48%	36%	24%	18%
Sub-bituminous Coal	14,835 tons	58%	39%	29%	19%	15%
Wood and Wood Waste	16,991 tons	60%	40%	30%	20%	15%

Stationary Combustion Source - Monitoring

- **Fuel Sampling for HHV and Carbon Content (CC)**
 - According to applicable requirements in 98.34 (in Subpart C), including:
 - Monthly or semi-annual sampling for natural gas, biogas, liquid fuels
 - Weekly sampling for solid fuels to form monthly composite for analysis
 - Daily (CC & MW) for other gaseous fuels, including refinery fuel gas (RFG) and process gas
- **Fuel Flow Calibrations**
 - Initial and annually using meter test or manufacturer's procedure (can use manufacturer's minimum calibration frequency)
- **CO₂ or GHG Direct Measurements Required for Some Sources**
- **“Quality Assured Data” is the Focus for All Monitoring!**

General Recordkeeping Requirements

- **All information and data used for calculating emissions (e.g., compositions, emission factors, methods, calculations, etc.)**
- **Documentation of process used to collect data for the GHG emissions calculations**
- **Management of change log (e.g., calculation methods, instrumentation changes)**
- **Missing data computations for specific sources**
- **A written Quality Assurance Program Plan (QAPP) including**
 - Process used to ensure accuracy of measurements of fuel/material usage
 - Maintenance & repair procedures and log for all instrumentation & flow meters
 - Calibrations of weighing equipment, fuel flow meters, and other measurement devices and other QA procedures and log
 - Estimated accuracy of measurement devices and technical basis for estimates

Gap assessment now!!!

- **What?**
 - Are all sources/GHGs covered
 - Are methods consistent with rule
 - Are measurements completed or planned
 - Are data management systems adequate
 - Flow meter and instrumentation calibrations prior to April 1, 2010
 - Is all documentation complete
- **Why?**
 - Only months away from compliance
 - Limited time to make changes
 - Baseline for cap-and-trade regulations, which are likely coming soon



Mandatory Reporting – Just The First Step

Initial focus is on US EPA's reporting rule

- 40 CFR 98 is an air rule, with a very broad reach
- Sites need to determine applicability, affected sources, and compliance assurance requirements
- Long-term significance likely greater than 1990 Clean Air Act Amendments?!

Big Picture focus needed on emission reductions

- You'll need to report and pay for GHG emissions
- You'll need to know options for reducing costs/impacts
- You'll likely need to look beyond direct site emissions

Climate Change – The Other Global Crisis?

- **Climate change is now a mainstream issue**
- **Stories about it are front page news**
- **Physical effects getting attention**
- **Growing consumer awareness**
- **Congress & nearly every gov't agency are working on it**
- **Reporting will lead to GHG emission reductions and business costs**



Legislation & Regulation – Policy is Coming

- **Congress:**

- 2008 – Lieberman/Warner - Senate
- 2009 – Waxman/Markey – House of Representatives

USEPA:

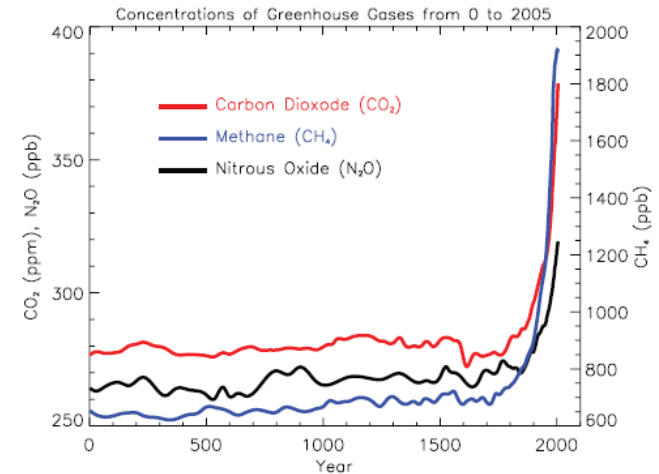
- GHG Reporting Rule
- CAA Endangerment Finding

Administrator Lisa Jackson 4/17/09:

“This finding confirms that greenhouse gas pollution is a serious problem now and for future generations. Fortunately, it follows President Obama’s call for a low carbon economy and strong leadership in Congress on clean energy and climate legislation. This pollution problem has a solution – one that will create millions of green jobs and end our country’s dependence on foreign oil.”

States:

- Mandatory reporting in over 17 states
- Cap & Trade, low carbon fuel standards, renewable portfolio standards, etc.



So what's it going to cost?

There's a growing reality...

The cost of carbon is going to enter the marketplace

- Will it be Cap & Trade?
 - Power sector only?
 - Economy-wide?
 - Modeled after Acid Rain or NOx SIP Call?
- Will it be a fuel tax?
- Will it be low carbon fuel standards?
- Will it be some combination?



So what's it going to cost?

Congress and/or the regulators will choose our poison

Point is, the costs are coming

- Slow & easy?
- Shock to the system?

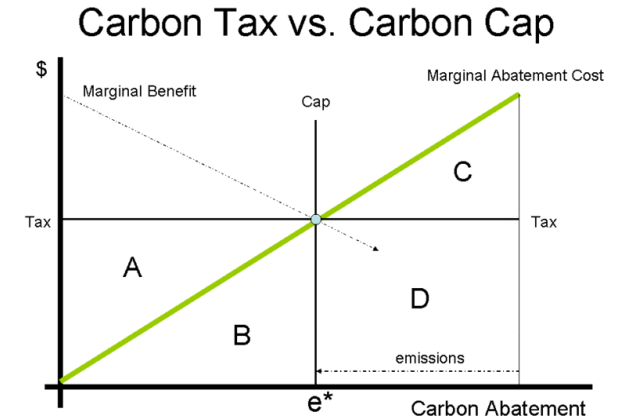
How much cost?

- \$2/ton? \$50/ton?
- It depends on how the market and overall economy responds
- How ensure cost effective \$/Ton approach?

“How?” & “When?” are still open questions

There will be big winners and losers!

- Example of coal usage across US!?
- Example of Biomass Power Plant



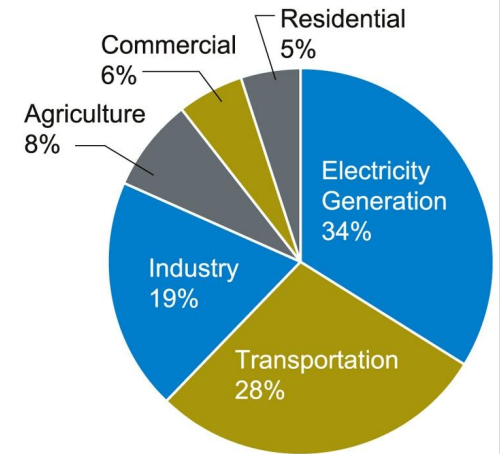
So what can you do about it?

Factor the cost of carbon into business planning

It's all about energy and efficiency

And energy is money →→→ more money if you factor in carbon

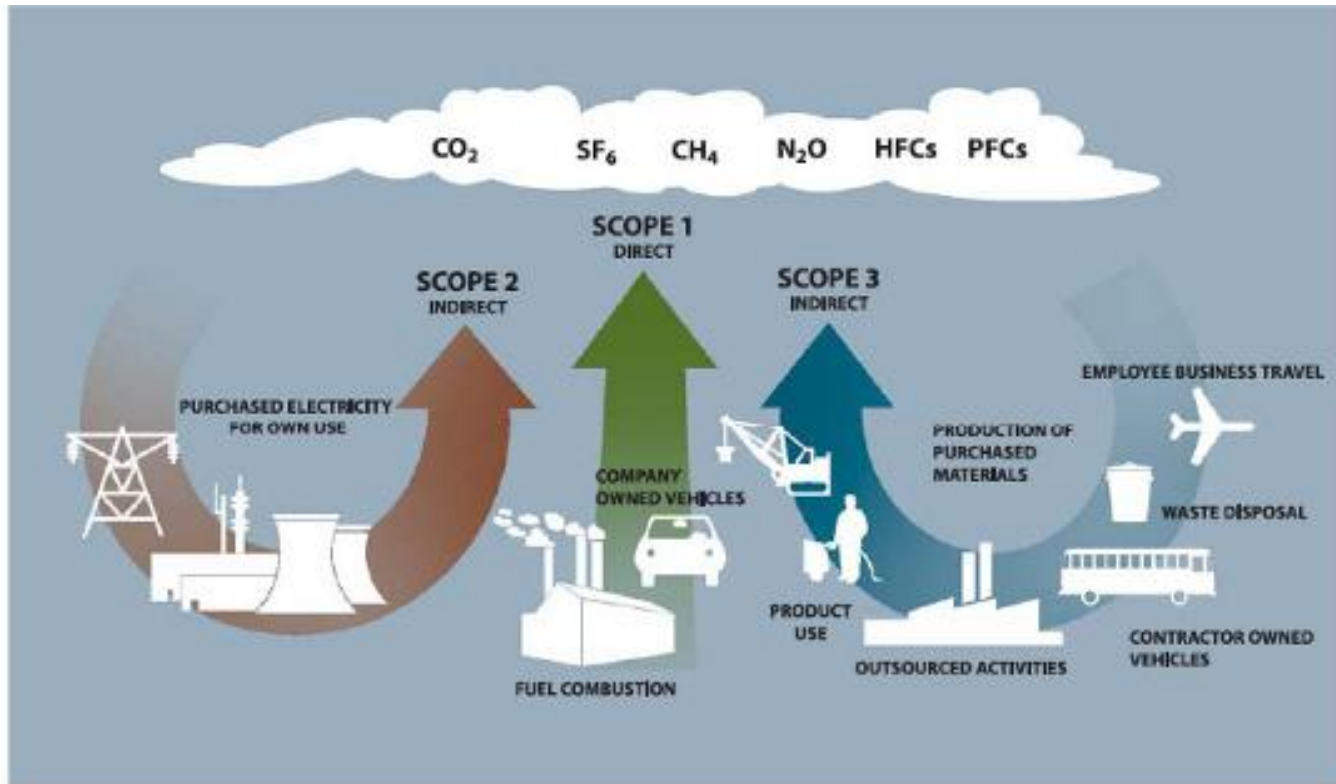
Carbon intensity of your energy will have a new cost impact



Total U.S. Emissions
Percent emissions by sector

So what can you do about it?

How much carbon do you have and where can you reduce?



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