

## Introduction to EPA's Greenhouse Gas Emission Reporting Rule

By Gary A. Jones

On September 22, 2009 the U.S. Environmental Protection Agency (USEPA) released its final rule for the first comprehensive national system for reporting emissions of carbon dioxide (CO<sub>2</sub>) and other greenhouse gases produced by larger emitters. This reporting rule was required by Congress in 2007 under the consolidated Appropriations Act of 2008 (Pub. L. No. 110-161) and required USEPA to issue the rule.

## Who Is Required to Report?

USEPA estimates that the rule covers 13,000 facilities from a wide range of industrial sectors, accounting for about 85 percent to 90 percent of greenhouse gases emitted. The new reporting requirements will apply to suppliers of fossil fuel and industrial chemicals, manufacturers of motor vehicles and engines, power plants, auto makers, iron and steel producers, petroleum refineries, landfills, as well as large direct emitters of greenhouse gases with emissions greater than or equal to 25,000 metric tons CO<sub>2</sub> equivalent (CO<sub>2</sub>e) emissions per year. This amount is equal to approximately 27,500 standard U.S. tons.

For printing operations, reporting is required for greenhouse gas emissions from stationary fuel combustion sources burning any solid, liquid, or gaseous fuel to produce electricity, steam, useful heat, or energy for industrial, commercial, or institutional use. These devices include, but are not limited to, boilers, combustion turbines, engines, incinerators, and process heaters. Portable equipment or generating units designated as emergency generators in a permit issued by a state or local air pollution control agency would be excluded from reporting.

Facilities would not be required to submit a report if their aggregate maximum rated heat input capacity from all stationary fuel combustion units is less than 30 million British thermal units per hour (mmBtu/hr). For reference, 25,000 metric tonnes of CO<sub>2</sub>e equates to approximately 450,000 mmBtu of natural gas combustion, which means that a 50 mmBtu/hour natural gas-fired boiler or a 30 mmBtu/hour coal-fired boiler running year round would trigger the reporting requirement.

Reporting will be at the facility-level under the traditional Clean Air Act definition of "facility." This is important for those locations that may have more than one building on contiguous property as the emissions as the emissions from each building would have to be summed to calculate the facility total.

## When Are the Reports Due?

The facilities would be required to submit reports to EPA in 2011 for the calendar year 2010 and every year thereafter. The deadline for reporting would be September 30, 2011 for emissions occurring throughout 2010. Reports would be due every March 31, thereafter for emissions in the previous year.

## How Do I Report My Emissions?

Under the GHG Reporting Program entities required to submit data must register with the electronic GHG

reporting tool (e-GGRT) no later than 60 days before the reporting deadline. With this reporting deadline extension, the new deadline for registering with e-GGRT is August 1, 2011.

EPA has developed an XML reporting schema that will allow facilities to upload their greenhouse gas (GHG) data directly in lieu of using the web forms provided through the Electronic Greenhouse Gas Reporting Tool (e-GGRT).

More information on electronic reporting can be found at <http://www.ccdsupport.com/confluence/display/help/Home>

## Which Greenhouse Gases Are To Be Reported?

The greenhouse gases covered by the rule are carbon dioxide (CO<sub>2</sub>), methane (CH<sub>4</sub>), nitrous oxide (N<sub>2</sub>O), sulfur hexafluoride (SF<sub>6</sub>), hydrofluorocarbons (HFCs), and perfluorochemicals (PFCs), and other fluorinated gases, such as nitrogen trifluoride and hydrofluorinated ethers (HFEs).

Printing facilities that exceed the reporting threshold for fuel combustion emissions would only have to report on total carbon dioxide (CO<sub>2</sub>), methane (CH<sub>4</sub>), and nitrous oxide (N<sub>2</sub>O) emissions from each fuel combustion unit would be required to be reported. For each unit, CO<sub>2</sub>, CH<sub>4</sub>, and N<sub>2</sub>O emissions would be reported separately for each type of fuel combusted. No other greenhouse gases need to be reported.

## How Do I Determine Greenhouse Gas Emissions for My Operation?

The first step is to conduct an inventory of all fuel combustion equipment along with its respective firing rate and the fuels that are burned in them. The second step is to total all of the firing rates of units by fuel burned and compare that to the relative thresholds for reporting. If the total of all firing rates are greater than 30 million mmBtu/hr, then an emission report might be required. However, if the fuel being burned is natural gas, then the threshold would increase to 50 million mmBtu/hr. (Remember, portable equipment or generating units designated as emergency generators in a permit issued by a state or local air pollution control agency would be excluded from the inventory.)

The other option would be to actually calculate or measure the greenhouse gases being emitted and then convert them to carbon dioxide equivalents. The reporting threshold and other requirements are based on a relatively new unit of measure called carbon dioxide equivalents, which is abbreviated CO<sub>2</sub>e. This unit takes into account the relative global warming potential of each gas in relationship to carbon dioxide (CO<sub>2</sub>), which has a global warming potential of 1 and other greenhouse gases having a factor greater than 1. For example, methane has a global warming potential 21 times greater than CO<sub>2</sub>.

To calculate greenhouse gas (GHG) emissions for comparison to the 25,000 metric ton CO<sub>2</sub>e/year emission threshold, the mass emissions of CO<sub>2</sub>, CH<sub>4</sub>, N<sub>2</sub>O need to first be determined (see below). Then, the emissions of each GHG need to be converted to metric tons CO<sub>2</sub>e per year and summed for all combustion units and fuels used at the facility.

## Determining CO<sub>2</sub>e

The following formula is used to convert the emissions of all greenhouse gases to carbon dioxide equivalents:

$$\text{CO}_2\text{e} = \text{GHG} \times \text{GWP}$$

Where:

CO<sub>2</sub>e = Carbon dioxide equivalent, metric tons/year

GHG = Mass emissions of each greenhouse gas emitted, metric tons/year

GWP = Global warming potential for each greenhouse gas

The GWP\* for CO<sub>2</sub>, CH<sub>4</sub>, N<sub>2</sub>O are as follows:

Gas	GWP
CO <sub>2</sub>	1
CH <sub>4</sub>	21
N <sub>2</sub> O	310

## Determining Greenhouse Gas Mass Emissions

In the rule, there are several approaches, called tiers, provided for determining the emissions of the greenhouse gases and they are dependent upon the type of operation and total firing rate of all of the fuel combustion units. Since most printing operations are not subject to the Acid Rain Program, have continuous emission monitors for combustion gases, and have a total firing rate of less than 250 mmBtu/hr and do not burn solid fuels, then emissions for each for each greenhouse gas can be calculated using default high heating values and CO<sub>2</sub> emission factors. The only exception would be if there was available from the supplier a measured high heating value for the fuel being used in the combustion unit, then this would have to be used in the calculations.

The mass emissions of each greenhouse gas emitted are determined by using the following formulas:

$$\text{CO}_2 = 1 \times 10^{-3} \times \text{Fuel} \times \text{HHV} \times \text{EF}$$

$$\text{CH}_4 = 1 \times 10^{-3} \times \text{Fuel} \times \text{HHV} \times \text{EF}$$

$$\text{N}_2\text{O} = 1 \times 10^{-3} \times \text{Fuel} \times \text{HHV} \times \text{EF}$$

Where:

CO<sub>2</sub> = Annual CO<sub>2</sub> mass emissions for the specific fuel type (metric tons)

CH<sub>4</sub> = Annual CH<sub>4</sub> mass emissions for the specific fuel type (metric tons)

N<sub>2</sub>O = Annual N<sub>2</sub>O mass emissions for the specific fuel type (metric tons)

Fuel = Mass or volume of fuel combusted per year, from company records (express mass in short tons for solid fuel, volume in standard cubic feet for gaseous fuel, and volume in gallons for liquid fuel)

HHV = Default high heat value of the fuel (mmBtu per mass or mmBtu per volume, as applicable)

EF = Fuel-specific default emission factor - CO<sub>2</sub> (kg CO<sub>2</sub>/mmBtu), CH<sub>4</sub> (kg CH<sub>4</sub> per mmBtu), N<sub>2</sub>O (kg N<sub>2</sub>O per mmBtu).

$1 \times 10^{-3}$  = Conversion factor from kilograms to metric tons

Fuel Type	Default High Heat Value*	Default CO <sub>2</sub> Emission Factor*	Default CH <sub>4</sub> Emission Factor*	Default N <sub>2</sub> O Emission Factor*
Natural Gas	$1 \times 10^{-3}$ mmBtu/cf	53.02 kg/mmBtu	$9 \times 10^{-4}$ kg/mmBtu	$1 \times 10^{-4}$ kg/mmBtu
Distillate Fuel Oil (#1,2,4)	0.139 mmBtu/gal	73.10 kg/mmBtu	$3 \times 10^{-3}$ kg/mmBtu	$6 \times 10^{-4}$ kg/mmBtu
LPG	0.092 mmBtu/gal	62.98 kg/mmBtu	$1 \times 10^{-3}$ kg/mmBtu	$1 \times 10^{-4}$ kg/mmBtu

\* EPA's regulation contains several charts that identify Global Warming Potentials for other gases and Default High Heat Values and Default Emission Factors for many other fuels. Only the common ones are presented in this fact sheet. See [www.epa.gov/climatechange/emissions/ghgrulemaking.html](http://www.epa.gov/climatechange/emissions/ghgrulemaking.html) for more information.

## Would a Business With a Vehicle Fleet Be Required to Report?

No. Under the rule, emissions from mobile sources would be covered by reports from fuel suppliers and manufacturers of vehicles and engines, not by fleet operators; however, EPA is taking comment on whether it is appropriate to require additional information from fleet operators.

## Do the Emission Reports Have To Be Verified By an Independent Third Party?

No. Under the final rule, a separate verification is not required. The facility will be self-certifying as is the case in many other EPA required reporting rules. EPA reserved the right to revisit the third party certification in the future. In order to assure data quality, the Reporting Rule provides quality control and assurance measures for each affected sector, requires facilities to submit supporting data to EPA, and provides for EPA to verify emission figures.

## What Records Would Need To Be Kept?

- Under the rule, each facility and supplier would retain the following records for three years in electronic or hard-copy format:
- A list of all units, operations, processes, and activities for which the reporter calculates GHG emissions.
- Data used to calculate the GHG emissions for each unit, operation, process, and activity, categorized by

fuel or material type. These data vary by source category and include, but are not limited to:

- The GHG emission calculations and methods used.
- Analytical results for the development of site-specific emission factors.
- Results of all required analyses of high heat value, carbon content, or other required fuel or feedstock parameters.
- Any facility operating data or process information used for the GHG emissions calculation.
- Annual GHG reports.
- Missing data computations. For each missing data event, also record the duration of the event, actions taken to restore malfunctioning equipment, the cause of the event, and actions taken to prevent or minimize occurrence in the future.
- A written GHG monitoring plan. The plan can rely on references to existing operating documents (e.g., standard operating procedures, other documents), providing the following elements are included and easily recognizable:
  - Identification of positions of responsibility (i.e., job titles) for collecting GHG data.
  - Explanation of processes and methods used to collect the data needed to calculate GHG emissions.
  - Description of procedures and methods used for quality assurance, maintenance, and repair of monitoring systems used to provide data for the GHG reports.
- The results of all required certification and quality assurance tests of monitoring systems used to provide data for the annual GHG report.
- Maintenance records for monitoring instrumentation.
- Any other data specified in any applicable subpart of this rule.

## When Are Reporters Required to Complete Their GHG Monitoring Plan?

EPA requires that the Monitoring Plan will be developed by no later than April 1, 2010, which is the date when the full monitoring approach will be implemented by most sources. The purpose of plan is to document the process and procedures for collecting and reviewing the data needed to estimate annual GHG emissions. Therefore, this plan needs to be in place prior to collecting data to ensure that consistent and accurate data are collected. The plan does not have to be complex and can rely on existing corporate documents like SOPs and Monitoring Plans developed for compliance with other air programs. While some facilities may use best available methods to estimate GHG emissions for a period beyond 3 months (after April 1, 2010), facilities

still need to have a plan developed for the basic procedures that will be used to collect data. A facility's data collection methods may change and evolve as the facility gains experience with monitoring equipment and develops more effective procedures for data management. Under the final rule, the Monitoring Plan must be revised to reflect these changes.

## When Can Reporting Be Discontinued?

In order to encourage emission reductions and ensure that the reporting system only captures major facilities, the final rule was amended to allow facilities to discontinue reporting when their reports show emissions of

- Less than 25,000 tons CO<sub>2</sub>-e for five consecutive years, or ;
- Less than 15,000 tons CO<sub>2</sub>-e for three consecutive years, or;
- Cease reporting if the GHG-emitting processes or operations are shut down

## Will the Public Be Able to See My Reports?

Emissions data reported to EPA under the Reporting Rule will be made available to the public. Other data submitted to EPA (e.g., certain production and process data) may be protected under the agency's procedures governing confidential business information. EPA has indicated that a future rulemaking will address the question of what information qualifies as "emissions data" for purposes of GHG reporting.

## Is This Reporting Requirement the Same As A Carbon Footprint?

No. Carbon footprinting involves a much greater scope of carbon emissions than is what is covered by this rule. There are actually two separate carbon footprints that can be determined with one focusing on the product and the other on the printing operations. While there could be some overlap between the two, there are also distinct differences.

Regarding the carbon footprinting of printing operations, there are several different protocols being used with the World Resources Institute and the World Business Council for Sustainable Development ([www.ghgprotocol.org](http://www.ghgprotocol.org)) being commonly adopted by newspapers. The other two common protocols are EPA's Climate Leaders program ([www.epa.gov/stateply/basic/index.html](http://www.epa.gov/stateply/basic/index.html)) and the Climate Registry ([www.theclimateregistry.org](http://www.theclimateregistry.org)).

While there are differences between the protocols, they all require the counting of carbon from direct sources (fossil fuel combustion), indirect sources such as electricity purchasing, and optional sources such as transportation due to business such as airline travel, company and other delivery vehicles, employee commuting, etc. The EPA rule only requires emission reporting from the direct combustion of fuels.

## How Does This Requirement Impact State

# Greenhouse Gas Reporting Rules?

This regulation is separate from any state requirement. Since states can implement their own greenhouse gas emission reporting programs, many have done so and they usually have lower thresholds and different requirements with respect to data verification. For example, Massachusetts has a reporting threshold of 5,000 tons of CO<sub>2</sub>-e and other states require any company with a Title V Operating Permit to submit annual emission information. For an interactive map of the state's greenhouse gas emission reporting requirements see [http://www.pewclimate.org/what\\_s\\_being\\_done/in\\_the\\_states/reporting\\_map.cfm](http://www.pewclimate.org/what_s_being_done/in_the_states/reporting_map.cfm). EPA also has an interactive map, which can be found at <http://www.epa.gov/statelocalclimate/state/tracking/reporting.html#a02>.

## Where Can I Get More Information?

More information on EPA's greenhouse gas reporting rule is available at [www.epa.gov/climatechange/emissions/ghgrulemaking.html](http://www.epa.gov/climatechange/emissions/ghgrulemaking.html).

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