GHG Emissions by Industry – GHGRP vs. U.S. GHG Inventory

EPA now publishes two data sets of economy-wide U.S. greenhouse gases emissions annually.

The Inventory of U.S. Greenhouse Gas (GHG) Emissions and Sinks is a comprehensive top-down assessment of national GHG emissions, and presents emissions across multiple years starting in 1990. EPA generally uses national energy data, data on national agricultural activities, and other national statistics to provide a comprehensive accounting of total GHG emissions for all man-made sources in the United States. The use of the aggregated national data results in total coverage of sources, but means that the national emissions estimates for most source categories are not broken down at the geographic or facility level. This aggregated national data includes coverage of small emitters, such as those in the commercial and residential sector, in its national totals. Additionally, sources of emissions and sinks in the agricultural and land use sectors are included in the national totals of the annual Inventory, as well as national emissions by transportation modes (e.g., cars, planes, trains, etc.).

The GHG Reporting Program provides bottom-up data on individual facilities, mainly above certain GHG emissions thresholds. While the GHG Reporting Program provides specific facility and supplier-level data for approximately 85-90% of total GHG emission in the U.S., it does not provide full coverage of total annual U.S. GHG emissions (e.g. excludes emissions from agricultural sector). EPA collected data from facilities through the GHGRP for the first time in 2010. Twelve new industry types reported GHG data for the first time in 2011. EPA has released summary emissions data from all facilities covered by the GHGRP as well as aggregated totals by industry type.

When compared in aggregate, some of the summary emissions totals for specific industries appear different in the Inventory and GHGRP. This is to be expected because there are differences in: 1) coverage between the two data sets; 2) division of energy related and industrial process emissions; and 3) methodologies. These differences are explained below.

Differences in Coverage between the GHGRP and the Inventory:

Different Source Category Definitions: In many cases, the definitions of sectors and industry groupings in the Inventory and the GHGRP may be similar but not identical. Users should check the definitions of industry sectors in the two data sets before making comparisons. For example, emissions attributed to a particular industrial process in the GHGRP may instead be included under fossil fuel combustion in the Inventory. In other cases, the source category definition in the GHGRP may include emissions from different processes than in the Inventory and vice versa. These definitions are particularly important for understanding differences in emissions totals for refineries, iron and steel mills, and petrochemical plants.

Reporting Threshold: Generally, the GHGRP requires facilities that emit greater than 25,000 mt CO2e per year to report. The Inventory is a comprehensive accounting of all U.S. emissions from each source category and includes small emitters in its aggregate categorizations of emissions totals for the industrial, commercial and residential sectors. Industry types that have a large number of facilities that fall below the 25,000 ton reporting threshold include: landfills, industrial wastewater treatment, zinc production, glass production, petroleum and natural gas production, and emissions from general stationary combustion of fossil fuels.

Reporting of Emissions by Fuel Type: To calculate emissions by fuel type, the Inventory uses fuel consumption statistics, based on standardized fuel categories from the Department of Energy's Energy Information Administration (EIA). In the GHGRP, facilities report emissions from specific fuel types combusted based on facility-specific measurements. In some cases, the fuels reported by a facility to the GHGRP may not match the standard EIA fuel types. This may impact the comparability of emissions totals for refineries, petrochemical facilities, and pulp and paper mills.

Division of Energy Related Emissions and Industrial Process Emissions:

All aggregated sector totals displayed in the GHGRP's data publication tool represent total emissions from the facilities that meet the source category definition under Part 98. These include both emissions from the combustion of fossil fuels and emissions from the industrial processes used to create products. In the Inventory, emissions from fossil fuel combustion across the industrial sector are aggregated together, based on national fuel consumption data, and presented in the energy chapter while industrial process emissions (e.g. from calcination of limestone to produce cement) are presented in the industrial processes chapter. This difference is broadly applicable and important to note when comparing Inventory estimates for a particular industrial category with rule subparts.

Disaggregated Data to Represent Certain Industries: Some industries specifically included in the GHGRP are included in the Inventory only in an aggregated manner rather than specifically identified. In particular, as noted, the EIA energy statistics used for estimating combustion emissions may be aggregated in way that does not allow for disaggregation to match up with the subparts in the GHG Reporting Program (GHGRP). Some industry types that have specific reporting requirements in the GHGRP, but are included in an aggregated manner in the Inventory include pulp and paper, hydrogen production, and glass manufacturing.

Use of Continuous Emissions Monitoring Technologies: Some large industrial facilities employ continuous emissions monitoring technologies to directly monitor GHG emissions under the GHGRP. In some cases it may not be possible to identify the portion of a facility's total measured stack emissions that comes from the chemical transformation of raw materials vs. emissions from combustion of fossil fuels. EPA will continue to investigate ways in which the share of each contribution could be determined. This primarily impacts facilities in the cement production industry as well as petroleum refineries and petrochemical facilities.

Methodological Differences:

Most methodologies used in the GHGRP are generally consistent with the methods used to develop the Inventory, and with the general IPCC approach. However, there are some differences described below.

Differences in use of Default International Factors from Facility-Specific Methods: The Inventory uses default emission factors from the Intergovernmental Panel on Climate Change (IPCC) to estimate emissions from some smaller source categories and these factors may differ from the facility-specific emission factors used or developed by GHGRP facilities. This difference impacts the comparability of emissions totals for the petrochemical, nitric acid, ferroalloy and lead industries.

For petroleum and natural gas systems, the Inventory relies on U.S.-specific default emissions factors, while GHGRP reporters calculate facility level emissions using direct measurement, engineering calculations, and/or emissions factors

Additionally, landfills use different methods to calculate their emissions for the GHGRP than the methods used in the Inventory. The GHGRP requires landfills to report the most appropriate of two emissions values stemming from two different methods, whereas the Inventory uses a single method to calculate national GHG emissions.