

## Guidance for Working with the GHG Inventory and MRR Data Using Disaggregated Industrial Cogeneration Data

Statewide GHG emissions are calculated using many data sources. The primary data source is California Air Resources Board's (ARB) Regulation for the Mandatory Reporting of GHG Emissions (MRR).<sup>1</sup> Because emissions in the MRR dataset are categorized differently from the statewide GHG emission inventory, data users could not make a detailed comparison between the two datasets without greater disaggregation in the GHG inventory. Industrial cogeneration (also known as Combined Heat and Power, or CHP) represents the major categorization difference between the two datasets. To facilitate a crosswalk between the two datasets, ARB is providing additional information, including a new, more disaggregated industrial cogeneration emissions table. This document provides guidance on how to work with the GHG inventory and MRR data using the table and is only focused on stationary source combustion facilities.<sup>2</sup>

### Background: Differences Between GHG Inventory and MRR Data

**Program Coverage.** MRR requires that stationary source facilities report annual GHG emissions data directly to ARB if emissions exceed 10,000 metric tons CO<sub>2</sub>e of combustion and process emissions per year. In addition, there are a few types of industrial facilities that are subject to reporting regardless of emissions level. Reports from facilities that emit more than 25,000 metric tons of CO<sub>2</sub>e are verified by an ARB-accredited third-party verification body. Due to the reporting threshold, MRR does not capture all emitting activities in all sectors of the California economy. Because MRR data represent a subset of total GHG emissions in the State, ARB also relies on data from other state and federal agencies to develop the statewide GHG inventory. These additional sources include, but are not limited to: data from the California Energy Commission; Board of Equalization; Department of Conservation/ Division of Oil, Gas, and Geothermal Resources; Department of Food and Agriculture; and CalRecycle; as well as the U.S. Energy Information Administration and U.S. Environmental Protection Agency. All data sources used to develop the GHG inventory are listed in the Technical Support Document.<sup>3</sup>

**Data Organization.** There are differences in categorization between the MRR dataset and the statewide GHG emission inventory. The statewide GHG emission inventory categorization is consistent with international and national inventory practices outlined in the *Intergovernmental Panel on Climate Change (IPCC) Guidelines for National Greenhouse Gas Inventories*<sup>4</sup> as well as the U.S. national GHG inventory. In contrast, under the MRR program, all emissions within a reporting entity's facility boundary are included in a facility's emissions data report and broadly categorized under a facility's primary North America Industrial Classification System (NAICS) code. This is necessary to rigorously track individual reporting entity's emissions over time and to ensure high-quality data for participation in the cap-and-trade program. Due to the differences in categorization, emissions data from MRR are separated into inventory sectors and then aggregated for use in the GHG inventory.

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<sup>1</sup> More Information on MRR emissions reports can be found at: [www.arb.ca.gov/cc/reporting/ghg-rep/reported-data/ghg-reports.htm](http://www.arb.ca.gov/cc/reporting/ghg-rep/reported-data/ghg-reports.htm)

<sup>2</sup> The industrial cogeneration emissions table was first published with the 2016 edition of the GHG inventory. It includes data for 2013 and 2014 only.

<sup>3</sup> GHG inventory Technical Support Document is available at: [www.arb.ca.gov/cc/inventory/data/data.htm](http://www.arb.ca.gov/cc/inventory/data/data.htm)

<sup>4</sup> IPCC Guidelines for National Greenhouse Gas Inventories are available at: <http://www.ipcc-nggip.iges.or.jp/public/2006gl/>

**Global Warming Potential.** The GHG emission inventory uses the global warming potential (GWP) values in the IPCC Fourth Assessment Report (AR4), consistent with other national and international inventories and climate change programs. In contrast, the MRR program currently uses the GWP values from the IPCC Second Assessment Report. The use of different GWP values leads to minor differences in emissions when comparing separately published totals between the two datasets.<sup>5</sup> However, it should be noted that the GHG inventory uses the raw, unweighted emissions from MRR when incorporating its data, so this GWP difference does not introduce inconsistencies into the statewide GHG inventory.

**Categorization of Cogeneration Units.** Cogeneration plants combust fuel that produce electricity and useful thermal output (UTO) by utilizing waste heat. A portion of emissions from a cogeneration unit can be attributed to electricity generation, while the remaining portion is attributed to UTO. The MRR dataset aggregates all cogeneration emissions under their parent facilities, as defined by the facility boundary definition in MRR. For example, emissions from a cogeneration unit operated by a petroleum refinery are listed under the refinery and hydrogen plant sector in MRR. Emissions from a stand-alone cogeneration facility<sup>6</sup> whose primary business is electricity generation are listed under the in-state electricity generation sector in MRR. In contrast, the GHG inventory follows the IPCC Guidelines in categorizing emissions, and the portion of cogeneration emissions attributed to electricity generation is allocated to the in-state electricity generation sector, while the portion of emissions attributed to UTO is allocated to the industrial sector. Also, in the GHG inventory, emissions from all cogeneration units are aggregated together as either electricity emissions or UTO emissions, respectively, and the operator's specific NAICS code is not distinguished beyond the split between commercial and industrial sectors.

### Industrial Cogeneration Emissions Disaggregation Table

To facilitate a crosswalk between the GHG inventory and the MRR dataset, ARB published a separate industrial cogeneration emissions table that separates emissions by the facility operator's industrial sector identification as classified by MRR. The table is external to the core inventory and displays four subcategories of industrial cogeneration emissions: *NAICS 22* (stand-alone cogeneration plant whose primary business is electricity generation)<sup>6</sup>, *Oil & Gas, Refinery & H2 Production*, and *Other*. Using this information, data users can group these newly disaggregated cogeneration and UTO emissions with other emission categories in the GHG inventory (such as refinery and hydrogen production, oil and gas production, or in-state electricity generation sectors), allowing a direct and consistent comparison with published MRR data. However, as discussed in the background section of this document, MRR has a reporting threshold and captures only a subset of all emissions published in the GHG inventory; therefore, the emissions groupings described here will generally be larger than the corresponding total sector emissions in the MRR dataset.

Table 1 provides a crosswalk between the categorization of industrial cogeneration in the statewide GHG inventory and MRR. The industrial cogeneration emissions table is available as a spreadsheet and can be downloaded from the GHG inventory webpage at:

<sup>5</sup> A summary of GWP values in IPCC's Second and Fourth Assessment Reports can be found here: [www.arb.ca.gov/cc/inventory/background/gwp.htm](http://www.arb.ca.gov/cc/inventory/background/gwp.htm)

<sup>6</sup> A stand-alone cogeneration facility is a facility whose primary NAICS code is electricity generation (NAICS 22), does not have other manufacturing operations on-site that use the UTO it generates, but sells UTO to another facility not operated by the cogeneration facility's parent company.

www.arb.ca.gov/cc/inventory/data/data.htm. Specific instructions for using the spreadsheet are described following Table 1.

**Table 1. Crosswalk between the categorization of industrial cogeneration in the GHG inventory and MRR data**

Cogeneration Facility Type	MRR Sector Category <sup>1</sup>	Attribution of Energy	GHG Inventory Category <sup>3</sup>
Stand-Alone Cogen Plant	In-State Electricity Generation	Electricity	Electricity Generation (In State) > CHP: Industrial > <i>NAICS 22</i>
		UTO	Industrial > CHP: Industrial > Useful Thermal Output > <i>NAICS 22</i>
Cogen Unit Operated by an Oil & Gas Facility	Oil & Gas Production	Electricity	Electricity Generation (In State) > CHP: Industrial > <i>Oil &amp; Gas</i>
		UTO	Industrial > CHP: Industrial > Useful Thermal Output > <i>Oil &amp; Gas</i>
Cogen Unit Operated by a Refinery/ Hydrogen Plant	Refinery & Hydrogen Production	Electricity	Electricity Generation (In State) > CHP: Industrial > <i>Refinery &amp; H2 Production</i>
		UTO	Industrial > CHP: Industrial > Useful Thermal Output > <i>Refinery &amp; H2 Production</i>
Cogen Unit Operated by Other Industrial Facilities <sup>2</sup>	Other Combustion Sources	Electricity	Electricity Generation (In State) > CHP: Industrial > <i>Other</i> <sup>2</sup>
		UTO	Industrial > CHP: Industrial > Useful Thermal Output > <i>Other</i> <sup>2</sup>

1. MRR categorization aggregates all emissions within the facility boundary under the facility's primary NAICS code. In the publicly released data, MRR does not distinguish between emissions attributed to electricity or UTO generation. The publicly released emissions data also does not distinguish emissions released by a cogeneration unit from other emission sources within the same facility boundary.
2. The "Other" category represents all industrial cogeneration activities that are not already included in the 3 categories (*NAICS 22*, *Refinery & H2 Production*, and *Oil & Gas*).
3. The hierarchical path of inventory categorization in the core inventory is listed in non-italic font. In italic font is the new source-level type broken out in the industrial cogeneration emissions disaggregation table.

The data in the "included industrial cogen" tab of the spreadsheet presents these newly disaggregated industrial cogeneration emissions for each sector, activity (fuel type), and pollutant. It contains emissions classified as "included emissions" in the inventory. Biogenic CO<sub>2</sub> emissions from combusting biomass-derived fuel are not a part of this table. The rows with "Category Sum in GHG Inventory" in Column I represent the category sum of disaggregated emissions, and are equivalent to the corresponding rows in the "included emissions" tab of the detailed inventory spreadsheet, which can be downloaded from the *Download the Entire Inventory* section of the GHG inventory webpage www.arb.ca.gov/cc/inventory/data/data.htm.<sup>7</sup>

<sup>7</sup> For the 2016 edition of the GHG inventory data, the detailed spreadsheet is located at: [www.arb.ca.gov/cc/inventory/data/tables/ghg\\_inventory\\_by\\_sector\\_sum\\_00-14\\_20160509.xlsx](http://www.arb.ca.gov/cc/inventory/data/tables/ghg_inventory_by_sector_sum_00-14_20160509.xlsx) After 2016, always check the webpage for the latest edition of the spreadsheet.

To obtain total sector emissions by operator's industrial sector identification for comparison with MRR data,<sup>8</sup> users can add the disaggregated cogeneration emissions in this table to those listed in the "included emissions" tab of the detailed inventory spreadsheet. For example, filter the cogeneration table by "Refinery & H2 Production" in Column I to obtain the emissions from cogeneration units operated by petroleum refineries and hydrogen production plants. Add these cogeneration emissions to the emissions listed under the "petroleum refining and hydrogen production" category in the detailed inventory spreadsheet. The sum is the total emissions released by facility operators that identify "petroleum refining and hydrogen production" as their primary business in the published MRR data.

### Methodology Used to Disaggregate Cogeneration Emissions

This section describes the methodology used to disaggregate the *CHP: industrial* category of the core inventory into four subcategories based on the facility owner's primary business identification: *NAICS 22* (stand-alone cogeneration plant), *Refinery and Hydrogen Plants*, *Oil & Gas*, and *Other*.

Most of the cogeneration data in the GHG inventory are derived from MRR data. Staff compared MRR data with data from the U.S. Energy Information Administration (EIA)<sup>9</sup>, which contain details for all cogeneration operations regardless of emission level, to identify any cogeneration units that are not captured by MRR. The comparison found that all the cogeneration units operated by petroleum refineries, hydrogen production facilities, and oil and gas extraction facilities are captured by MRR (i.e., no cogeneration units in these subcategories are in facilities that fall below the reporting threshold of 10,000 MTCO<sub>2</sub>e). However, a few cogeneration units in the other two subcategories (*NAICS 22* and *Other*) do not report to MRR due to their emission levels falling below the threshold. In these cases, staff used EIA data to supplement the gaps in emissions data for cogeneration operations that do not report to MRR. The select data extracted from EIA dataset are then added to what is reported to MRR to obtain a complete cogeneration dataset.

Emission calculations for each of the four subcategories use the same methodology as the existing *CHP: Industrial > fuel combustion* categories in the existing core inventory. Emissions are calculated from fuel use using MRR default emission factors. For information about how those emissions are calculated, see the Technical Support Document for the GHG inventory, available at: [www.arb.ca.gov/cc/inventory/data/data](http://www.arb.ca.gov/cc/inventory/data/data).

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<sup>8</sup> MRR data available at: [www.arb.ca.gov/cc/reporting/ghg-rep/reported-data/ghg-reports.htm](http://www.arb.ca.gov/cc/reporting/ghg-rep/reported-data/ghg-reports.htm)

<sup>9</sup> Energy Information Administration. Form EIA-923 detailed data. Available at: <https://www.eia.gov/electricity/data/eia923/>