

# **Determining Emissions from Electricity Use**

### Follow these three steps to determine emissions from electricity use using eGRID data.



The Emissions & Generation Resource Integrated Database (eGRID) is the preeminent source of U.S. power sector data and a primary source of U.S. emission rates for organizations reporting <u>location-based</u>, <u>Scope 2 emissions</u>. eGRID is based on available plant-specific data from the Energy Information Administration and EPA's Clean Air Power Sector Programs for all U.S. electricity generating plants that provide power to the electric grid and report energy and environmental data to the U.S. government. Emission data from EPA are carefully integrated with generation data from EIA to produce useful values like pounds of emissions per megawatt-hour of electricity generation. eGRID also provides aggregated data by state, U.S. total, and by three different sets of electric grid boundaries (i.e., balancing authority area, North American Electric Reliability Corporation (NERC) region, and eGRID subregion).



#### a. Determine Data Year

When making an inventory or calculating emissions over time, use the eGRID data year that best matches your inventory data year. For historical analysis, use emission rates from eGRID versions that most closely match each historical year. Before 2018, eGRID was not released every year, so there may not be an exact match between the eGRID data year and your greenhouse gas inventory year. eGRID is now available every year.

#### b. Determine eGRID subregion

EPA recommends using the eGRID subregion level for estimating emissions from electricity use (e.g., Scope 2 emissions). eGRID subregions were developed to account for the approximate mix of power plants supplying electricity to each given region. eGRID subregions were designed as a compromise between the larger NERC regions and often smaller balancing authorities. Using the eGRID subregion emission rates for the purposes of estimating Scope 2 emissions will more accurately represent the regional emissions associated with the power consumed at a given location.



Use the eGRID subregion where your facility is located. If needed, you can use <u>EPA's Power Profiler</u> site to determine your eGRID subregion by entering your facility's zip code.

#### c. Select the Pollutant of Interest

eGRID contains emissions data for nitrogen oxides (NO<sub>x</sub>), sulfur dioxide (SO<sub>2</sub>), carbon dioxide (CO<sub>2</sub>), methane (CH<sub>4</sub>), nitrous oxide (N<sub>2</sub>O), CO<sub>2</sub>-equivalent (CO<sub>2</sub>e), particulate matter 2.5 microns in diameter or smaller (PM2.5), volatile organic compounds (VOCs), and ammonia (NH<sub>3</sub>). CO<sub>2</sub>e emissions are calculated by multiplying emissions of CO<sub>2</sub>, CH<sub>4</sub>, and N<sub>2</sub>O by their respective global warming potential (GWP) factors. See <u>this Q&A</u> for more information on the GWPs used in eGRID.

#### d. Select the emission rate type to use for estimating emissions

EPA recommends using the *total output emission rates* (lb/MWh) to determine emissions from electricity use, as they provide a straightforward estimate of total annual emissions when multiplied by total electricity purchases. eGRID provides several different types of rates, each of which should be used for different purposes. The two most commonly used rates are:

- 1. total output emission rates which represent the average emissions intensity of electricity for a region and are typically used to determine emissions from electricity use; and
- 2. nonbaseload output emission rates which represent the average emissions intensity from nonbaseload units or marginal generation that might be avoided from efforts to reduce electricity generation, such as energy efficiency and/or renewable energy projects.

More information about other rates including rates based on fuel input, fuel type, and generation type can be found in the <u>eGRID Technical Guide</u>.

## Step 2: Collect electricity use data

Collect the electricity use data in megawatt-hours (MWh), generally available from electricity billing records, for all facilities covered by the analysis. Sum the data for the period of the analysis (e.g., calendar year).

Note: If the electricity purchases are expressed in kilowatt-hours (kWh), divide the total electricity purchases by 1,000 to convert them to MWh.



Use the eGRID output emission rate to calculate the emissions attributable to your facility's electricity use (i.e., location-based Scope 2 emissions) with the following equation:

 $eGRID emission rate \left(\frac{lbs}{MWh}\right) \times electricity usage (MWh) = Scope 2 Emissions (lbs)$ 

For more information on how to use eGRID for estimating emissions, please see this guide, <u>Using eGRID for</u> <u>Environmental Footprinting of Electricity Purchases.</u>

#### **GRID Estimates Grid Gross Loss**

eGRID provides the grid gross loss (GGL) which is an estimate for the percentage of generation lost in the process of supplying electricity to consumers in the United States. GGL, also known as line losses, power losses, or transmission and distribution (T&D) losses, mainly occurs from energy dissipated in the conductors, transformers, and other equipment used for transmission, transformation, and distribution of power. The GGL is often used in Scope 3 GHG reporting.