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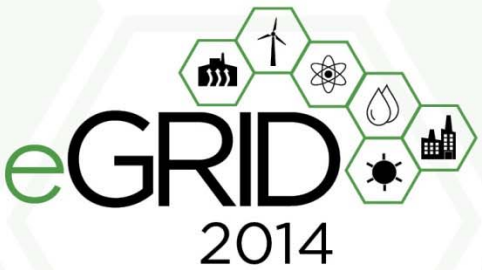
THE EMISSIONS & GENERATION RESOURCE INTEGRATED DATABASE

Technical Support Document for eGRID with Year 2014 Data



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eGRID2014

Technical Support Document

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Notices

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Abbreviations and Acronyms

40 CFR Part 75	Code of Federal Regulations Title 40 Part 75, which specifies the air emissions monitoring and reporting requirements delineated in EPA regulations
AB 32	Assembly Bill 32 - California Global Warming Solutions Act
AR4	Fourth Assessment Report of the Intergovernmental Panel on Climate Change
BA	Balancing authority
BBtu	Billion Btu
Btu	British thermal unit
CAMD	Clean Air Markets Division
CARMA	Carbon Monitoring for Action
CHP	Combined heat and power (cogeneration)
CH_4	Methane
CO_2	Carbon dioxide
CO_2e	Carbon dioxide equivalent
DOE	U.S. Department of Energy
DVRPC	Delaware Valley Regional Planning Commission
EF	Emission factor
eGRID	Emissions & Generation Resource Integrated Database
eGRID1996	First edition of Emissions & Generation Resource Integrated Database with year 1996 data
eGRID1997	Second edition of the Emissions & Generation Resource Integrated Database with year 1997 data
eGRID1998	Third edition of the Emissions & Generation Resource Integrated Database with year 1998 data
eGRID2000	Fourth edition of the Emissions & Generation Resource Integrated Database with years 1999 and 2000 data (1996-1998 data were also reissued without change)
eGRID2004	Fifth edition of the Emissions & Generation Resource Integrated Database with year 2004 data
eGRID2005	Sixth edition of the Emissions & Generation Resource Integrated Database with year 2005 data (2004 data were also reissued without change)
eGRID2007	Seventh edition of the Emissions & Generation Resource Integrated Database with year 2007 data (2005 and 2004 data were also reissued without change)

eGRID2009	Eighth edition of the Emissions & Generation Resource Integrated Database with year 2009 data (2007, 2005, and 2004 data were also reissued without change)
eGRID2010	Ninth edition of the Emissions & Generation Resource Integrated Database with year 2010 data
eGRID2012	Tenth edition of the Emissions & Generation Resource Integrated Database with year 2012 data
eGRID2014	Eleventh edition of the Emissions & Generation Resource Integrated Database with year 2014 data
EGC	Electric generating company
EIA	Energy Information Administration
ELCALLOC	Electric allocation factor
EPA	U.S. Environmental Protection Agency
FERC	Federal Energy Regulatory Commission
FIPS	Federal Information Processing Standards
GGL	Grid gross loss
GHG	Greenhouse gas
GWh	Gigawatt-hour
GWP	Global warming potential
Hg	Mercury
ICR	Information collection request
ID	Identifier
IPCC	Intergovernmental Panel on Climate Change
IPM	Integrated Planning Model
ISO	Independent System Operator
kg	Kilogram
kWh	Kilowatt-hour
lb	Pound
MISO	Midcontinent Independent System Operator
GJ	Gigajoule
MMBtu	Million Btu
MMcf	Million cubic feet
MSB	Municipal solid waste – biomass component
MSN	Municipal solid waste – non-biomass component
MSW	Municipal solid waste

MW	Megawatt
MWh	Megawatt-hour
NATCARB	National Carbon Sequestration Database and Geographic Information System
NEMS	National Energy Modeling System
NERC	North American Electric Reliability Corporation
NESCAUM	Northeast States for Coordinated Air Use Management
NETL	National Energy Technology Laboratory
NGO	Nongovernmental Organization
NO_x	Nitrogen oxides
NREL	National Renewable Energy Laboratory
N_2O	Nitrous oxide
OAP	Office of Atmospheric Programs
ORIS	Office of Regulatory Information Systems
ORISPL	Office of Regulatory Information Systems Plant code
ORNL	Oak Ridge National Laboratory
OTC	Ozone Transport Commission
PCA	Power control area
RECs	Renewable Energy Credits
RTO	Regional Transmission Organization
SAR	Second Assessment Report of the Intergovernmental Panel on Climate Change
SO_2	Sulfur dioxide
TAR	Third Assessment Report of the Intergovernmental Panel on Climate Change
TJ	Terajoule
VERSA	Voluntary Renewable Set-Aside Account

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1. Introduction

The Emissions & Generation Resource Integrated Database (eGRID) is a comprehensive source of data on the environmental characteristics of almost all electric power generated in the United States. The preeminent source of emissions data for the electric power sector, eGRID is based on available plant-specific data for all U.S. electricity generating plants that provide power to the electric grid and report data to the U.S. government. Data reported include, but are not limited to, net electric generation; resource mix (for renewable and nonrenewable generation); mass emissions of carbon dioxide (CO_2), nitrogen oxides (NO_x), sulfur dioxide (SO_2), methane (CH_4), and nitrous oxide (N_2O); emission rates for CO_2, NO_x, SO_2, CH_4, and N_2O; heat input; and nameplate capacity. eGRID reports this information on an annual basis (as well as by ozone season for NO_x) at different levels of aggregation (plant, state, and grid regions of the country).

eGRID2014, released in January 2017, is the eleventh edition of eGRID. eGRID2014 includes two Excel workbooks, one with English units and one with metric units, that contain spreadsheets by aggregation level for data year 2014: generator, unit, plant, state, balancing authority, eGRID subregion, NERC region, and United States. The workbooks also include a spreadsheet that displays the grid gross loss and the variables that are used in its estimation for year 2014.

This document provides a description of eGRID2014, including the methodology for developing the Excel spreadsheets for each level of aggregation and the grid gross loss calculation. Section 2 provides a summary of the database; Section 3 presents the methodology for emissions estimations, including adjustments for biomass and combined heat and power (CHP); Section 4 discusses eGRID specific identification codes, name changes and associations; Section 5 describes the data elements in detail; and Section 6 provides a list of references. There is also a set of four Appendices – Appendix A includes the file structure; Appendix B includes the eGRID subregion and NERC region representational maps; Appendix C includes crosswalks between different datasets and relevant data tables; and Appendix D contains information on previous releases of eGRID.

2. Summary of eGRID2014 Data

2.1 eGRID Files

eGRID2014 contains electric power data at different levels of aggregation. The eGRID2014 data are displayed in two workbooks, one with English units of measure and the other with metric units of measure. As the database name implies, the focus of the data spreadsheets is on two areas: generation and emissions. In the English unit workbook, generation is expressed in both MWh and as a percentage (called "resource mix" – generation of a certain fuel or resource type divided by total generation). Carbon dioxide, NO_x, and SO_2 emissions are expressed in short tons; CH_4, and N_2O emissions are expressed in pounds; emission rates for CO_2, NO_x, and SO_2 are expressed in lb/MWh and lb/MMBtu; and emission rates for CH_4, and N_2O are expressed in lb/GWh and lb/GBtu. In the Metric unit workbook, generation is expressed in MWh, Gigajoules (GJ), and as a percentage. Carbon dioxide, NO_x, and SO_2 emissions are expressed in metric tons; CH_4, and N_2O emissions are expressed in kilograms; emission rates for CO_2, NO_x, and SO_2 are expressed in both kg/MWh and kg/GJ; and emission rates for CH_4, and N_2O are expressed in both kg/GWh and kg/TJ. See Table C-7 for a list of English to Metric conversion factors.

The eGRID2014 workbooks can be downloaded from the EPA eGRID website, https://www.epa.gov/energy/egrid, along with Summary Tables and this document. The workbooks contain eight levels of data aggregation:

- UNIT (unit), with 23,428 records;
- GEN (generator), with 24,439 records;
- PLNT (plant), with 8,503 records;
- ST (state), with 51 records;
- BA (balancing authority), with 73 records;
- SRL (eGRID subregion), with 26 records;
- NRL (NERC region), with 10 records; and
- US, with 1 record.

The unit spreadsheet is sorted by state abbreviation, plant name, plant code, and boiler ID. The generator spreadsheet is sorted by state abbreviation, plant name, plant code, and generator ID. The plant spreadsheet is sorted by state abbreviation, plant name, and plant code. The state spreadsheet is sorted by state abbreviation, the balancing authority spreadsheet is sorted by balancing authority name, the eGRID subregion spreadsheet is sorted by eGRID subregion name, and the NERC region spreadsheet is sorted by NERC region acronym. The year 2014 grid gross loss spreadsheet is also included in the workbook.

The spreadsheet structure for each of the spreadsheets is included in Appendix A. The spreadsheet structure also includes a description of the variables and the original data sources.

Users should take note that eGRID's emissions and emission rates are calculated at the sources of generation and do not account for losses from transmission and distribution infrastructures. Please

refer to Section 3.5 for information on how to account for line losses when assigning emission rates to estimate indirect emissions associated with electricity purchases. Aggregated eGRID data only account for U.S. generation that takes place within the aggregated area and do not account for any electricity that is imported from or exported to other areas. The grid gross loss calculation, however, does account for U.S. regional interchanges with other U.S. regions as well as Canada and Mexico.

In addition, although eGRID is based on existing Federal data sources, its development requires substantial attention to quality control. Accurate matching of entities from different databases requires great care, even where identification codes are available. Inconsistencies between data sources, missing data, and ambiguous data necessitate adjustments to values of individual data elements, especially identification data. In general, however, questionable data are not altered in order to maintain consistency with the original data sources.

Please note that only certain eGRID spreadsheets can be linked from year 2014 to years 2012, 2010, 2009, 2007, 2005, or 2004. The spreadsheets that can be linked include the NERC region (by NERC acronym), eGRID subregion (by eGRID subregion acronym), state (by state abbreviation), plant (by Office of Regulatory Information Systems Plant [ORISPL] code), and the US.

2.2 What's New in eGRID

There is one major methodological change to eGRID2014. In this edition, much more effort was taken to report generator- and unit-level data. In previous editions of eGRID, these data were only reported in eGRID if they were reported at the generator or unit level in the EPA/CAMD or EIA data. In eGRID2014, we include the entire universe of generators and units that report to EPA/CAMD and EIA. Where generator- or unit-level data on generation, emissions, or heat input are available, we report them in eGRID. For all other generators or units, we distribute generation and heat input to each generator or unit using prime mover-level data. We use emission factors to estimate emissions based on heat input (see Table C-1, Table C-2, Table C-3, and Table C-6 in Appendix C).

A key advantage of this approach is that the generation from the Generator file and the emissions and heat input from the Unit file now sum to equal the plant-level generation, emissions, and heat input.

We have also changed the methodology to calculate grid gross loss. Previous editions of eGRID used data from EIA and the Federal Energy Regulatory Commission (FERC). The new methodology uses only data from EIA's State Electricity Profiles. For more information on the new methodology see Section 3.5.

Another relatively minor methodological change involves the CHP adjustment. In eGRID, the emissions from CHP units are adjusted to account for only the emissions associated with electricity generation (rather than the emissions associated with useful thermal output). This is done by multiplying the emissions of the unit to the ratio of heat input for electric power to the total heat input for that plant from EIA data. In previous editions of eGRID, for CHP units where EIA reported that the heat input for electric power was equal to the total plant heat input, we would estimate a ratio that we could use for the CHP adjustment. However, in discussions with EIA, we have decided that for those CHP units where heat input for electric power is equal to the total heat input, we will not perform a CHP adjustment in eGRID2014. We assume that for these units, all heat input is used for electric power and the units do not generate useful thermal output. The CHP adjustment is performed for all other CHP units.

Methodological changes are detailed more fully in Section 3, the Methodology Section. Previous years of eGRID data (2012, 2010, 2009, 2007, 2005, 2004, and 2000-1996) are unchanged with the release of this edition. Please refer to the corresponding Technical Support Documents issued with previous editions for methodologies specific to those years of data.

There are also several workbook/spreadsheet formatting changes in eGRID2014, including:

- Renaming the boiler spreadsheet to the unit spreadsheet to more accurately reflect that the spreadsheet contains boilers (e.g. steam turbines) as well as gas turbines, internal combustion engines, combined cycle units, and renewable sources of electricity generation (wind, solar photovoltaic, and hydroelectric);
- Removing duplicate EPA and EIA data fields as well as the field for 'best' data from the boiler spreadsheet, now called the unit spreadsheet as mentioned above. Now, only the 'best' data are reported along with the data source;
- Removing the owner and historical sequence ID fields that were reported in the Plant file in past versions of eGRID. These fields are available in a separate Excel file.
- In previous editions of eGRID, the unadjusted heat input for renewable fuels in the Plant file (geothermal, nuclear, solar, water, and wind) was set to 0. In the current edition of eGRID, all renewable fuel heat input is reported directly from EIA-923 data in the Plant file. It should be noted that the emission factors for all pollutants for nuclear, solar, water, and wind are set to 0 and no emissions data will be reported, even if there is positive heat input. See section 3.1.1.1 for a discussion of geothermal emissions.
- In previous editions of eGRID, the ozone season generation and ozone season heat input in the Unit and Plant file were reported in eGRID as monthly data if the plant reported monthly data to EIA and calculated by multiplying total generation or heat input by 5/12 if the plant reported only annual data to EIA. However, since EIA includes a distribution of generation and heat input by month for plants that report annual data only, the generation and heat input ozone season data in eGRID2014 are reported as the direct EIA monthly data for the months of May to September. The 5/12 methodology is no longer used.
- Renaming the power control area spreadsheet to the balancing authority spreadsheet to reflect the terminology used by the EIA and NERC.
- Adding fields to the eGRID Subregion file that report the nonbaseload generation by fuel type and the nonbaseload resource mix.
- Adding fields to the eGRID Subregion file that report the CH_4 and N_2O emission rates by fuel type.
- Adding an additional workbook that displays emissions, generation and emission rates in metric units.

2.3 Uses and Users of eGRID

eGRID data support a wide variety of users globally through a wide variety of uses. eGRID is valuable to those in the Federal Government, state and local governments, non-governmental organizations, academia, and companies who are generally seeking environmental information from

the electric power sector in the United States. eGRID is most often used for the estimation of indirect emissions from electricity purchases, in greenhouse gas (GHG) inventories, for carbon footprinting, and for estimating avoided emissions from programs and projects that would reduce the consumption for grid supplied electricity. eGRID data are cited by emission inventory and registry protocols, various emission calculation tools and applications, many academic papers, and many consultants, and it is used for many research applications and efforts.

Within EPA, eGRID data are used in the following applications and programs: Power Profiler web application, Climate Leaders protocols, ENERGYSTAR's Portfolio Manager and Target Finder, Waste Wise Office Carbon Footprint Tool, the Personal Greenhouse Gas Emissions Calculator, the Greenhouse Gas Equivalencies Calculator, and the Green Power Equivalency Calculator.

The eGRID methodology was also used to construct the state-level CO_2 emission rate baselines for the Clean Power Plan Final Rule. Note that there are key methodological differences between eGRID2012 and the Clean Power Plan baseline development which are described in the Technical Support Document for the Clean Power Plan baseline (http://www.epa.gov/airquality/cpp/tsd-cpp-emission-performance-rate-goal-computation.pdf).

When the EPA announced its "Apps for the Environment" challenge using EPA data, developers across the U.S. responded. EPA announced the winners on November 8, 2011 and the two top winning apps -- Light Bulb Finder (http://www.lightbulbfinder.net/) and Hootroot use eGRID data for a mobile app and/or a web app, as did several other entries (EPA, 2011). Another of the winning entries, Joulebug (http://joulebug.com/), uses eGRID data and developed a game to save energy as both a web and free iPhone app.

In 2015, Executive Order 13693 was issued, requiring Federal agencies to reduce their greenhouse gas emissions from direct and indirect activities. The order requires that Federal agencies report their building information in EPA's Portfolio Manager which uses eGRID to estimate emission reductions.

One of the most popular uses of eGRID is to determine the indirect GHG emissions from electricity purchases and avoided GHG emissions from projects and programs that reduce the demand for grid supplied electricity. For example, The Climate Registry, California's Mandatory GHG emissions reporting program (AB 32), and the Greenhouse Gas Protocol Initiative cite eGRID for use in estimating scope 2 (indirect) GHG emissions from electricity purchases in the United States (TCR, 2016; CARB, 2007; Greenhouse Gas Protocol, 2016) Most carbon footprint calculators that are applicable to the United States use eGRID data.

The website, www.fueleconomy.gov, resulting from an EPA-U.S. Department of Energy (DOE) partnership, provides fuel economy information that consumers can use to make knowledgeable decisions when buying a car. The information can also help consumers achieve the best fuel economy from currently owned cars. This website showcases its Greenhouse Gas Emissions for Electric and Plug-in Hybrid Electric Vehicles calculator, http://www.fueleconomy.gov/feg/label/calculator.jsp, which uses eGRID data to estimate the total GHG emissions from electric and plug-in hybrid vehicles, including emissions from electricity used to charge the vehicle. eGRID is cited as a data source at http://www.fueleconomy.gov/feg/label/calculations-information.shtml. In a similar vein, the Union of Concerned Scientists published a 2012 report using eGRID data to support its study results that it is advantageous to switch to a battery-powered vehicle, although there are wide differences in

both real electricity costs and GHG emissions, depending on the region in which you live (UCS, 2012).

EIA's National Energy Modeling System (NEMS)'s electricity market module supply regions are the eGRID subregions; the map used in their 2014 documentation (Figure 3) uses the eGRID subregion map and subregion colors, changing a few names (EIA, 2014).

eGRID is also used by other Federal Government agencies such as Oak Ridge National Laboratory (ORNL) for their Combined Heat and Power Calculator, the National Energy Technology Laboratory (NETL) for their sponsored distributed National Carbon Sequestration Database and Geographic Information System (NATCARB), and the National Renewable Energy Laboratory (NREL) for their micropower distributed generation optimization model named HOMER.

States and local governments rely on eGRID data for electricity labeling (environmental disclosure programs), emissions inventories, and registries as well as for efforts to analyze air emissions from the electric power sector. Several states have published state specific emissions information from eGRID or have used eGRID to inform policy decisions. The Maryland Department of the Environment determined eligibility for participation in the Voluntary Renewable Set-Aside Account (VERSA) using eGRID factors (Maryland, 2010); and in 2009, the Delaware Valley Regional Planning Commission (DVRPC) -- a nine county region in Pennsylvania and New Jersey -- completed a 2005 GHG inventory in support of regional efforts to quantify and reduce emissions associated with climate change, using eGRID factors (DVRPC, 2010).

Tracking systems for renewable energy credits (RECs), such as ISO-New England's Generation Information System and PJM Environmental Information Services' Generation Attribute Tracking System utilize eGRID data.

ISO New England uses eGRID rates in developing the 2013 New England Electric Generator Air Emissions Report (http://www.iso-ne.com/system-planning/system-plans-studies/emissions).

eGRID is additionally used for nongovernmental organizations' (NGOs) tools and analysis. The following is a list of some known users and applications of eGRID data: Northeast States for Coordinated Air Use Management (NESCAUM) analysis; Powerscorecard.org; Ozone Transport Commission (OTC)'s Emission Workbook; GHG Protocol Initiative; Rocky Mountain Institute's Community Energy Finder; Leonardo Academy's Cleaner and Greener Environmental Program; National Resource Defense Council's Benchmarking Air Emissions; Berkeley Institute of the Environment; Cool Climate Carbon Footprint Calculator; Climate and Air Pollution Planning Assistant; Emission Solution's Carbon Footprint Calculator; International Council for Local Environmental Initiatives' Clean Air software, United States Department of Transportation Federal Transit Administration, Google PowerMeter; National Public Radio's Visualizing the U.S. Electric Grid; International Code Council; American Society of Heating, Refrigerating, and Air-Conditioning Engineers; American Council for an Energy-Efficient Economy's Local Energy Efficiency Policy Calculator; and World Resource Institute's Carbon Value Analysis Tool.

The Center for Global Developments' Carbon Monitoring for Action Database (CARMA) at http://carma.org, which contains information about carbon emissions for power plant and companies in the U.S. as well as other countries, used eGRID year 2005 data as a base, according to the Center's

David Wheeler (Wheeler, 2007). eGRID data also underlie the Global Energy Observatory U.S. power plant database.

Carbon Visuals, which illustrate accurate volumetric images to visualize the carbon footprint of all U.S. power stations, used eGRID subregion GHG emission factors (Carbon Visuals, 2014).

The University of California, Berkeley's CoolClimate Carbon Footprint Maps use eGRID data (Jones and Kammen, 2013).

Several papers have been written to clarify issues and respond to questions about the uses of eGRID. The following provides details on some of the most recent papers.

- In October 2015, "EPA's Emissions & Generation Resource Integrated Database (eGRID): Improvements and Applications: (Dorn et al., 2015) was presented at the Community Modeling and Analysis System Conference.
- In February 2015, "eGRID Updates," (Johnson, Schreifels, and Quiroz, 2015) was presented at the Energy, Utility, and Environment Conference.
- The paper "Using EPA's eGRID to Estimate GHG Emissions Reductions from Energy Efficiency" (Diem, Salhotra, and Quiroz, 2013) was presented at the International Energy Program Evaluation Conference, in August 2013.
- In January 2013, "Using eGRID Data for Carbon Footprinting Electricity Purchases," (Diem and Quiroz, 2013) was presented at the Energy, Utility, and Environment Conference.
- The paper "How to use eGRID for Carbon Footprinting Electricity Purchases in Greenhouse Gas Emission Inventories" (Diem and Quiroz, 2012) was presented at the EPA 2012 International Emission Inventory Conference in August 2012.

2.4 eGRID Data Sources

eGRID is developed using the following key data sources:

- EPA/CAMD: this includes data reported to EPA by electric generating units to comply with the regulations in 40 CFR Part 75. Data include annual emissions of CO_2, NO_x, and SO_2; ozone season emissions of NO_x; and annual and ozone season generation and heat input. The data is available at https://www.epa.gov/airmarkets.
- EIA-860: this includes data reported to EIA on electric generators. Data include nameplate capacity, prime mover, primary fuel type, and indication of whether the generator is a combined-heat-and-power unit (EIA, 2016a).
- EIA-923: this includes data reported to EIA on fuel consumption and generation. Data include monthly generation and heat input at the unit or generator level for a subset of units and generators, and at the prime mover level for all plants. As discussed in more detail below, eGRID2014 uses unit- or generator-level data where available, and prime mover-level data for all other units and generators (EIA, 2016b).

The key identifier of plants in the EPA/CAMD and EIA datasets is the ORISPL code. While the ORISPL code generally matches well for plants in the different datasets, there are some plants that

have different ORISPL codes between the EPA/CAMD and EIA datasets. These plants are listed in Appendix C.

3. eGRID Methodology

This section describes the methodologies utilized to develop eGRID2014. Some methods used for eGRID2014 are modified or refined from previous editions of eGRID, and are so noted in this section. Also see Section 2.2 for a list of changes to this edition of eGRID.

3.1 Estimation of Emissions

The Unit file and Plant file in eGRID2014 include emissions data for CO_2, NO_x, SO_2, CH_4, and N_2O.[1] Carbon dioxide (CO_2) is a product of combusting fossil fuels as well as biogenic and other materials and is the primary greenhouse gas (GHG) emitted by human activities that is contributing to global climate change; nitrogen oxides (NO_x) is also emitted by electric generating units and is a precursor to the formation of ozone, or smog, and fine particulates ($PM_{2.5}$), and also contributes to acid rain and other environmental and human health impacts; sulfur dioxide (SO_2) is emitted by electric generating units, especially with coal combustion, and is a precursor to acid rain and $PM_{2.5}$ and is associated with other environmental and human health impacts;. Methane (CH_4) and nitrous oxide (N_2O), two other GHGs emitted by electric generating units, have been included in eGRID since data year 2005 at the plant level. The eGRID emissions data for the three GHGs are used as default factors in a variety of climate protocols (including The Climate Registry, California's Mandatory GHG emissions reporting program (AB 32), and EPA's Climate Leaders) for indirect emissions estimation calculations (TCR, 2016; CARB, 2007; EPA, 2016a).

Emissions estimates are included at the unit level, in the Unit file, as well as summed to the plant level, in the Plant file. Due to changes in the methodology of how the Unit file (previously the Boiler file in eGRID2012) was created in eGRID2014, the sum of unit level emissions from the Unit file will now equal the unadjusted plant level emissions in the Plant file. These methodological changes are described more fully in the next section.

Plant level emissions in eGRID reflect a combination of monitored and estimated data. Emissions and emission rates in eGRID represent emissions and rates at the point(s) of generation. While they do account for losses within the generating plants (net generation), they do not take into account any power purchases, imports, or exports of electricity into a specific state or any other grouping of plants, and they do not account for any transmission and distribution losses between the points of generation and the points of consumption. Also, eGRID does not account for any pre-combustion emissions associated with the extraction, processing, and transportation of fuels and other materials used at the plants or any emissions associated with the construction of the plants.

eGRID emissions and heat input that are displayed in the Unit file are unadjusted, while the Plant file contains emissions and heat input that are adjusted for biomass and/or CHP units, where applicable. The plant file also contains unadjusted emissions. The subsequent aggregation files are based on adjusted emissions. All emission rates in the plant file and all aggregation files are based on adjusted

[1] These files also contain fields for emissions of mercury. Data on mercury emissions were not reported to EPA/CAMD in 2014. However, electric generating units started to report mercury data in 2015. Therefore, we have retained these fields in anticipation of being able to report mercury emissions in a future edition of eGRID.

emissions, net generation, and adjusted heat input. Both the source(s) of emissions data and adjustment flags are provided in the Plant file.

3.1.1 Unit Level and Plant Level Unadjusted Emission Estimates

3.1.1.1 Annual Emission Estimates for CO_2, NO_x, and SO_2

Unit File

Unit level emissions in the eGRID Unit file are estimated in a three-step process:

1. First, we include unit-level emissions and heat input data from EPA/CAMD.
2. For units that report to EIA at the unit level but not to EPA/CAMD, we include the reported unit-level heat input from EIA.
3. For all other units that report EIA at the plant level, we distribute prime mover-level heat input to each unit based on that unit's proportion of nameplate capacity.

For units that report to EIA but not to EPA/CAMD (steps 2 and 3), we estimate emissions by multiplying the heat input by the emission factors shown in Appendix C.

Although many small units, as well as some nonutilities and cogenerators, are not subject to EPA/CAMD's data reporting, the vast majority of emissions reported in eGRID are from EPA/CAMD data. Sources that report to EPA/CAMD for year 2014 data are generally utility and nonutility steam units with at least 25 MW capacity, nonsteam units – gas turbines, combined cycles, internal combustion engines – that came on-line after 1990, and independent power producers/cogenerators that sell over a specific amount of electricity.

CO_2

As discussed above, the majority of CO_2 emissions reported in eGRID2014 are monitored data from EPA/CAMD. For units that report to EIA but not to EPA/CAMD, or for units from EPA/CAMD where there are gaps in CO_2 emissions data, the CO_2 emissions are estimated based on heat input and an emission factor.

The emission factors are primarily from the default CO_2 emission factors from the EPA Mandatory Reporting of Greenhouse Gases Final Rule (EPA, 2009, Table C-1). For fuel types that are included in eGRID2014 but are not in the EPA Mandatory Reporting of Greenhouse Gases Final Rule, additional emission factors are used from the 2006 Intergovernmental Panel on Climate Change (IPCC) Guidelines for National Greenhouse Gas Inventories and the EPA U.S. Greenhouse Gas Inventory Report: 1990-2014 (IPCC, 2007; EPA, 2016b).

Several fuel types do not have direct reported emission factors, so emission factors from similar fuel types are used:

- The emission factor for natural gas is used for to estimate emissions from process gas and other gas
- The emission factor for "Electric Power Coal" from the EPA U.S. Greenhouse Gas Inventory Report: 1990-2014 is used to estimate emissions from refined coal and waste coal

- The emission factor for other biomass liquids is used to estimate emissions from sludge waste and liquid wood waste

The CO_2 emissions from hydrogen, nuclear, purchased steam, solar, waste heat, water, wind, and energy storage are considered to be zero. The CO_2 emissions for units with a fuel cell prime mover are also assumed to be zero.

A list of the CO_2 emission factors used in eGRID2014 can be found in Table C-1 in Appendix C.

NO_x

Similar to CO_2, the emissions from NO_x come from monitored data from EPA/CAMD where available.

For all other units, the NO_x emissions are based on heat input multiplied by an emission factor. For some units, EIA reports unit-level NO_x emission rates (lbs./MMBtu) for both annual and ozone season emissions, from EIA Form 923, Schedule 8C. These unit-level emissions rates are multiplied by the unit-level heat input used to estimate annual and ozone season NO_x emissions. For all other units that report to EIA but do not report to EPA/CAMD, the unit-level heat input is multiplied by a prime mover- and fuel-specific emission factor from EPA's AP-42 Compilation of Air Pollutant Emission Factors (EPA 1995).

Ozone season NO_x emissions include emissions from May through September. For units where the NO_x emissions are estimated with an emission factor, the NO_x ozone season emissions are based on the emission factor multiplied by the heat input for May through September.

See Table C-2 in Appendix C for the NO_x emission factors used in eGRID2014.

SO_2

As with the other pollutants, emissions of SO_2 are taken from monitored data from EPA/CAMD where available.

For all other units, SO_2 emissions are based on heat input multiplied by an emission factor. Unlike for NO_x, EIA does not report unit-level emissions rates. Therefore, the SO_2 emissions for all non-EPA/CAMD units are estimated using emission factors from EPA's AP-42, which are specific to fuel, prime mover, and in the case of boilers, boiler type (EPA 1995).

For some fuels, such as coal and oil, the emission factor from AP-42 depends on the sulfur content of the fuel. For many units, EIA reports monthly unit-level data on the sulfur content of the fuel consumed, and these data are used with the AP-42 emission factors to estimate SO_2 emissions. For units without unit-level data on the sulfur content of fuels, the sulfur content is based on an average of the reported sulfur contents for units that have the same prime mover and fuel type.

For some units for which we calculated SO_2 emissions with an emission factor, EIA reports SO_2 control efficiencies. For these units the estimated SO_2 emissions are multiplied by (1 – control efficiency) to estimate the controlled emissions. Units that do not have unit-level control efficiency data are assumed to be uncontrolled. The control efficiencies are not used for units where the emissions data are from EPA/CAMD, because these emissions already take controls into account.

See Table C-3 in Appendix C for the SO_2 emission factors used in eGRID2014.

Geothermal

Geothermal emissions are estimated for CO_2, SO_2, and NO_x. While CO_2 is a gas in the geothermal reservoir, SO_2 and NO_x result from hydrogen sulfide combustion. The three pollutants' emission factors, obtained from a 2007 Geothermal Energy Association environmental guide (GEA, 2007), are applied to plant net generation, and differ depending on the type of geothermal plant as identified in various reports from the Geothermal Energy Association (GEA, 2016). For a binary or flash/binary geothermal plant, there are no CO_2, SO_2, or NO_x emissions since the plant operates a closed system; for a flash geothermal plant, there are no NO_x emissions and minimal CO_2 and SO_2 emissions; and for a dry steam geothermal plant, there are minimal CO_2, SO_2, and NO_x emissions.

See Table C-6 in Appendix C for the geothermal emission factors used in eGRID2014.

Plant File

The emissions of CO_2, NO_x, and SO_2 in the Plant file are the sum of all unit-level emissions at a plant from the Unit file. As stated previously, due to changes in the methodology of how the Unit file (previously the Boiler file in eGRID2012) was created in eGRID2014, the sum of unit-level emissions from the Unit file equal the unadjusted plant-level emissions in the Plant file.

3.1.1.2 Annual Emission Estimates for CH_4, N_2O, and CO_2 equivalent

Plant File

Emissions for CH_4, N_2O, and CO_2-equivalent (CO_2e) are included in eGRID2014 at the plant level.[2]

The emissions for CH_4 and N_2O are calculated using heat input data and emission factors from the EPA or the IPCC. The emission factors are primarily from the EPA Mandatory Reporting of Greenhouse Gases Final Rule (EPA, 2009, Table C-1). For fuel types that were included in eGRID2014 but not in Table C-1 of the EPA Mandatory Reporting of Greenhouse Gases Final Rule, additional emission factors were used from the 2006 IPCC Guidelines for National Greenhouse Gas Inventories and the EPA U.S. Greenhouse Gas Inventory Report: 1990-2014 (IPCC, 2007; EPA, 2016b).

Several fuel types did not have direct reported emission factors, so emission factors from similar fuel types were use:

- The emission factor for natural gas is used to estimate emissions from process gas and other gas
- The emission factor for "Electric Power Coal" from the EPA U.S. Greenhouse Gas Inventory Report: 1990-2014 is used to estimate emissions from refined coal and waste coal
- The emission factor for other biomass liquids is used to estimate emissions from sludge waste and liquid wood waste

[2] Nitrous oxide is an oxide of nitrogen that is not part of the NO_x subset of oxides of nitrogen. N_2O is a greenhouse gas, the emissions of which are contributing to global climate change. N_2O should not be confused with NO_X.

The CH_4 and N_2O emissions for electricity used from energy storage (megawatt-hours), hydrogen, nuclear, purchased steam, solar, waste heat, water, and wind are considered to be zero. The CH_4 and N_2O emissions from units with a fuel cell prime mover are also considered to be zero.

A list of the CH_4 and N_2O emission factors used in eGRID2014 can be found in Table C-1 in Appendix C.

The CO_2 equivalent (CO_2e) emissions, in tons, and total output emission rate (lb./MWh) are included in the Plant file and subsequent aggregation files. The CO_2e non-baseload output emission rate (in lb/MWh) is included at the aggregated eGRID subregion level in the eGRID Subregion file. CO_2e emissions are calculated based on the global warming potential of CO_2, CH_4, and N_2O.

Global warming potential (GWP) is a value assigned to a GHG so that the emissions of different gases can be assessed on an equivalent basis to the emissions of the reference gas, CO_2. Traditionally, the 100-year GWPs are used when calculating overall CO_2 equivalent emissions, which is the sum of the products of each GHG emission value and their GWP. Based on the second IPCC assessment (1996) (SAR), the GWP of CO_2 is 1, CH_4 is 21 and N_2O is 310. When calculating the CO_2 equivalent, it is important to ensure that each of the GHG emission values has the same measurement units (i.e. either all in short tons or all in pounds), as CO_2 emissions are expressed in short tons while both CH_4 and N_2O emissions are expressed in pounds in eGRID. In order to compare emissions across previous data years, the GWP for the IPCC SAR is used, although there have been subsequent third (2001) (TAR), fourth (2006) (AR4), and fifth (2014) (AR5) assessments. A comparison of the three GWPs forCO_2, CH_4, and N_2O is shown in Table 3-1 (EPA, 2016b, Table 1-3).

Table 3-1. Comparison of 100-Year GWPs

Gas	SAR	AR4	AR5*
CO_2	1	1	1
CH_4	21	25	34
N_2O	310	298	298

*Note that the AR5 values include climate-carbon feedbacks

3.1.1.3 Annual Emission Estimates for Mercury

No mercury (Hg) emissions are included for year 2014 data since the previously employed estimation methods are likely to produce an overestimate of the emissions for boilers for which we have original 1999/2002 data. It is likely that air pollution control devices that affect Hg emissions have been installed on some of these boilers, but for 2014, there are no Federal data available to measure their impact. Similarly, there are no 2014 available Federal monitored emissions data for Hg emissions in 2014, nor any suitable Hg emission factors for estimating mercury emissions for all electric power units. we examined MATS information collection request (ICR) Hg data (ICR No. 2362.01) for potential use in eGRID. However, we determined that the data are not suitable for use in eGRID due to the difficulty in relating the 2014 operating conditions with the different Hg emission rates reported in the ICR data for each unit. Beginning in 2015, Hg emissions data is reported from power plants under the Mercury and Air Toxics Standards (MATS). The fields for Hg emissions and emissions rates have been retained so that these data may be included in future editions of eGRID.

3.1.2 Plant Level Adjusted Emission Estimates

Emissions reported in eGRID represent emissions from fuel utilized only for electricity generation. For certain plants, there are two possible cases for which we adjust the emission estimates: (1) if the plant is a CHP facility; and (2) if one or more units at the plant burn biomass, including biogas (such as landfill, methane, and digester gas). The Plant file reports both adjusted and unadjusted emissions, while the Unit file only reports only unadjusted emissions. Due to these adjustments, the adjusted emissions reported in eGRID may be different from emissions reported in other EPA sources.

3.1.2.1 Adjustments for Biomass

Prior editions of eGRID applied a biomass adjustment to the annual emission values based on an assumption of zero emissions from biomass combustion, assuming that the amount of carbon sequestered during biomass growth equals the amount released during combustion, without consideration of other factors. For reasons of consistency, the same approach is applied to this edition of eGRID.[3]

eGRID makes adjustments for biogas emissions, for biomass emissions other than biogas, and for solid waste emissions for specified pollutants. Solid waste typically consists of a mixture of biogenic materials—such as wood, paper, and food waste—and fossil-based materials—such as plastics and tires. EIA-923 reports fuel consumption at plants that combust municipal solid waste (MSW) as the biomass component (MSB) and the non-biomass component (MSN). Emissions from the biomass component of solid waste are adjusted, while emissions from the non-biomass component of solid waste are not adjusted. In eGRID2014, the fuel type for these plants is listed as MSW.[4]

The Plant file includes a biomass adjustment flag to indicate whether a biomass adjustment was made to the annual emission values for CO_2, NO_x, SO_2, CH_4, and N_2O. The possible biomass adjustments for emissions are explained below. See Table C-1 in Appendix C for a table of biomass fuel types used in the biomass adjustments to emissions in the Plant file.

CO_2

The emissions from biomass combustion at a plant are subtracted from the plant's overall unadjusted CO_2 emissions. The CO_2 emissions from biomass can be determined at a plant level by comparing the adjusted emissions and the unadjusted emissions at plants that have a biomass adjustment flag. To determine the biomass emissions if the CHP adjustment flag is also 1, the adjusted emissions value from CHP plants using the electric allocation factor must first be calculated (since the CHP plant adjustment is applied last).

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[3] The Science Advisory Board (SAB) is currently reviewing the net climate impacts of emissions from biomass combustion. eGRID will revisit this approach for future editions after the SAB provides its findings. The Science Advisory Board (SAB) is currently reviewing EPA's draft technical report *Framework for Assessing Biogenic CO_2 Emissions from Stationary Sources*, which assesses net biogenic CO_2 emissions associated with biomass combustion for energy at stationary sources. eGRID will revisit this biomass adjustment assumption for future editions after the SAB provides its findings.

[4] Previous editions of eGRID estimated the split between the biomass and non-biomass components of MSW. Because the EIA-923 reports these components separately, this estimation is no longer necessary.

For EPA/CAMD units with a prime mover that match EIA-923 prime movers that burn one or more biomass fuels, the CO_2 emissions are adjusted by subtracting the biomass CO_2 emissions calculated using the corresponding EIA-923 data (EIA, 2016b). In previous editions of eGRID, there were different flags for the biomass adjustment to represent different biomass fuels or differences in the emissions data source. The biomass adjustment flag in eGRID2014 has been simplified to 1 = Yes.

NO_x, SO_2, CH_4, and N_2O

Emissions adjustments for NO_x, SO_2, CH_4, and N_2O emissions are only conducted for landfill gas in eGRID. This adjustment is based on the assumption that in many cases landfills would flare the gas if they did not combust it for electricity generation. Therefore, we assume that, at a minimum, the gas would have been combusted in a flare and would have produced some emissions of NO_x, SO_2, CH_4, and N_2O anyway. Similar to the CO_2 adjustments, biogas adjustments were made by deducting the emissions from landfill gas for NO_x, SO_2, CH_4, and N_2O from the overall plant total emissions. For NO_x emissions from landfill gas, an emission factor for flaring of landfill gas, 0.000283 tons per MMBtu, was used (EPA, 2016c).[5] See Table C-1 in Appendix C for a list of CH_4, and N_2O emission factors and the landfill gas (LFG) values from Table C-3 for a list of SO_2 emission factors. Note that CO_2 is also adjusted for landfill gas, as described above.

3.1.2.2 Adjustments for CHP

A CHP facility is a type of generating facility that produces electricity and another form of useful thermal energy (such as heat or steam) used for industrial, commercial, heating, or cooling purposes. CHP, also known as cogeneration, can convert energy more efficiently than facilities that separately produce heat and electricity. Plants in eGRID are designated as CHP facilities based on information from the EIA-860, EIA-923, and Department of Energy Combined Heat and Power Database datasets (EIA, 2016b; DOE, 2016). A flag indicating whether or not a plant is a CHP facility is included in the eGRID Plant file. Since emissions reported in eGRID represent electricity generation only, emissions associated with useful thermal output—the amount of heat produced in a CHP facility that is used for purposes other than making electricity—are excluded from the adjusted emissions.

eGRID's CHP adjustment methodology is designed to allocate emissions for CHP plants between electricity and thermal output. If a plant is a CHP facility, the adjustment is applied to the emissions and heat input for the entire plant after any biomass adjustment has been made.

The methodology is based on multiplying emissions and heat input by an electric allocation factor, which is calculated as follows:

1. Calculate the useful thermal output. EIA-923 reports both total fuel consumption and fuel consumption for electricity generation.[6] The useful thermal output value for eGRID2014 data is calculated from EIA-923 data as 0.8 multiplied by the difference in total heat input and electricity heat input in MMBtu. The value of 0.8 is an assumed efficiency factor from the combustion of the consumed fuel (EIA, 2016b).

[5] Note that this factor was converted from units of lbs/standard cubic foot (scf) to tons/MMBtu based on a value of 500 Btu/scf (EPA, 2016d).

[6] CHP facilities do not report these values to EIA separately. They only report total fuel consumption, and EIA estimates the fuel consumption for electricity generation.

$$Useful\ Thermal\ Output = 0.8\ \times\ (Total\ Heat\ Input - Electric\ Heat\ Input)$$

2. The electric allocation factor is calculated as the ratio of the electricity heat output to the sum of the electricity and steam heat outputs, where electricity heat output is the net generation in MWh multiplied by 3.413 to convert it to MMBtu, and steam heat output is 0.75 multiplied by the useful thermal output, in MMBtu. The 0.75 factor is another assumed efficiency factor, which accounts for the fact that once fuel is combusted for electricity generation, approximately 75 percent of the waste heat can be utilized for other purposes, such as space heating or industrial processes.[7]

$$Electric\ Allocation\ Factor = \frac{3.413 \times Net\ Generation}{0.75 \times Useful\ Thermal\ Output}$$

If the useful thermal output is zero, then the electric allocation factor is set to one. The electric allocation factor should be between zero and one. If the electric allocation factor is calculated to be greater than one, it is set to one, and if the electric allocation factor is calculated to be less than zero, it is set to zero.

In previous editions of eGRID, the CHP adjustment methodology involved a process for estimating the electric allocation factor in cases where a unit is listed as a CHP unit, but the total heat input and electric heat input reported by EIA were reported as equal. In discussions with EIA, we have determined that in these cases, there should be no CHP adjustment made. Therefore, for units listed as CHP units, but with a total heat input equal to the electric heat input, the useful thermal output is calculated to be 0, and the electric allocation factor is set to 1. This assumes that all of the heat input for these units is used for electricity generation and that useful thermal output is not produced.

3.1.3 Emission Rate Estimates

Input and output emission rates are calculated for eGRID at the plant level in the Plant file, and the subsequent aggregated files. Annual and ozone season net generation and heat input values (adjusted for CHP plants) are required to calculate the emission rates.

3.1.3.1 Generation

Net generation, in MWh, is the amount of electricity produced by the generator and transmitted to the electric grid. Net generation does not include any generation consumed by the plant. If generation consumed by the plant exceeds the gross generation of that plant, negative net generation will result. In these cases, the output emissions rates are set to 0, rather than report a negative emissions rate.

Generator-level net generation as well as prime mover-level net generation is obtained from the EIA-923. Ozone season generation is calculated by summing up the generation for the months of the ozone season, May through September (EIA, 2016b).

[7] This assumes that the CHP units generate electricity first and use the waste heat for other purposes, also known as "topping." While there are some units that generate and use heat first and then use the waste heat to generate electricity, also known as "bottoming," data from the EIA shows that the vast majority of CHP facilities are topping facilities.

The methodologies employed for obtaining year 2014 net generation data are described below.

Generator-Level Net Generation

The EIA-923 dataset reports generator-level generation for a subset of generators. This generator-level generation is reported in the Generator File in eGRID2014. For all other generators, which do not have data on generator-level generation, prime mover-level net generation is distributed to the generators in the Generator file based on the proportion of nameplate capacity of generators with that prime mover at a given plant. Ozone season net generation uses the same methodology, but only includes generation data for May to September. Annual and ozone season generation is distributed to generators with a status of operating, standby/backup, out of service but was operating for part of the data year, or retired if the retirement year was 2014.Generation is not distributed to generators with a status that indicates the generator is not yet in operation or retired before 2014.

In some cases the sum of the generator-level generation does not equal the plant-level generation, even if all generator-level generation is available for all generators. In order to ensure that the generation in eGRID matches the plant-level generation data from EIA, in some cases distributed prime mover-level data is used in place of generator-level generation data.

As explained above, some generator-level net generation data is missing or not reported for various generators in the 2014 EIA-923. EIA aggregates these missing data to the state level by fuel type, but it is not possible to distribute them back to the generator level accurately (EIA, 2016b).

Plant-Level Net Generation

The annual generation data in the Plant file are the sum of all generator-level generation at the plant from the Generator file. The ozone season generation data in the Plant file are a sum of all ozone season (May-September) generator-level generation at the plant from the Generator file.

Combustion net generation is also developed (as is non-combustion generation), based on the fuel type generation of each plant. For plants that are only composed of combustion generating units, the plant combustion net generation is the same as the total plant net generation. For plants that have both combustion and non-combustion generating units, the combustion net generation will be less than the total net generation for that plant.

3.1.3.2 Heat Input

Heat input, in MMBtu, is the amount of heat energy consumed by a generating unit that combusts fuel. The method for assigning unit-level heat input follows the same process as the method for assigning unit-level CO_2 emissions (see section 3.1.1.1). Annual and ozone season unit-level heat input for eGRID is initially obtained from the reported EPA/CAMD emissions data. EPA/CAMD heat input is based either on stack flow and CO_2/O_2 monitoring or fuel flow and the heat content of fuel.

If EPA/CAMD unit level heat input data are not reported or the overall plant is not included in the EPA/CAMD data, annual and ozone heat input data are obtained at the unit level or prime mover level from the EIA-923 monthly data (EIA, 2016b).

In previous editions of eGRID, the heat input data has only been reported for combustion units. eGRID2014 includes data for both combustion units and also total heat input, which includes heat input reported by EIA for both combustion and noncombustion units.

The Unit file unit level heat input is summed to the plant level and reported in the Plant file.

3.1.3.3 Emission Rates

Output, input, and combustion emission rates are reported in the Plant, State, Balancing Authority, eGRID Subregion, NERC Region, and US eGRID files. The fuel-based and non-baseload emission rates are reported in the State, Balancing Authority, eGRID Subregion, NERC Region, and US eGRID files.

Output and Input Emission Rates

Output emission rates for SO_2, NO_x, CO_2, and CO_2e, in lb/MWh and for CH_4, and N_2O, in lb/GWh, are reported in the Plant file. The output emission rates are calculated as total annual adjusted emissions divided by annual net generation.

Input emission rates for SO_2, NO_x, and CO_2, in lb/MMBtu, are calculated as the total annual emissions divided by the annual heat input.

Fuel-based Emission Rates

For the State, Balancing Authority, eGRID Subregion, NERC Region, and US eGRID files, coal, oil, gas, and fossil fuel output and input emission rates are calculated based on a plant's primary fuel (see Section 3.2). If a plant's primary fuel is coal, oil, gas, or another fossil fuel, then all of its adjusted emissions, adjusted heat input, and net generation from combustion are included in the respective aggregation level for that fuel category. For example, all plants in Alabama with coal as primary fuel will have their emissions, heat input, and combustion net generation summed to the state level and then the appropriate calculations will be applied to determine the coal-based output and input emission rates for Alabama. See Table 3-2 for a list of primary fuels and fuel categories used for fuel-based emission rates in the State, Balancing Authority, eGRID Subregion, NERC Region, and US eGRID files.

Table 3-2. Fuel-based Emission Rates – Primary Fuel Category

Fuel Code	Description	Fuel Category
BIT	Bituminous coal	Coal
LIG	Lignite coal	Coal
SUB	Subbituminous coal	Coal
RC	Refined coal	Coal
WC	Waste coal	Coal
SGC	Coal-derived synthetic gas	Coal
COG	Coke oven gas	Coal
NG	Natural gas	Gas
BU	Butane gas	Gas
DFO	Distillate fuel oil	Oil
JF	Jet fuel	Oil
KER	Kerosene	Oil
PC	Petroleum coke	Oil

Fuel Code	Description	Fuel Category
RG	Refinery gas	Oil
RFO	Residual fuel oil	Oil
WO	Waste oil	Oil
BFG	Blast furnace gas	Other fossil
OG	Other gas	Other fossil
TDF	Tire-derived fuel	Other fossil

Non-baseload Emission Rates

In addition to emission rates for all plants, eGRID also reports emission rates for nonbaseload plants in the State, Balancing Authority, eGRID Subregion, NERC Region, and US eGRID files. The nonbaseload emission rates are sometimes used as an estimate to determine the emissions that could be avoided through projects that displace marginal fossil fuel generation, such as energy efficiency and/or renewable energy.

Capacity factor is used as a surrogate for determining the amount of nonbaseload generation and emissions that occur at each plant. While there are other factors that can influence a particular unit's capacity factor besides dispatch or load order (e.g. maintenance and repairs), capacity factor is used as a surrogate for dispatch-order for this calculation. The nonbaseload information is published in eGRID at the aggregate level (state, balancing authority, eGRID subregion, NERC region, and the US), but not for individual plants.

The nonbaseload emission rates are determined based on the plant-level capacity factor. All generation and emissions at plants with low capacity factors (less than 0.2) are considered nonbaseload and are assigned a non-baseload factor of 1. Plants with capacity factors of 0.8 or greater are considered baseload and are assigned a non-baseload factor of 0. For plants with a capacity factor between 0.2 and 0.8, we use a linear relationship to determine the percent of generation and emissions that is nonbaseload:

$$\text{Nonbaseload Factor} = -5/3*(\text{Capacity Factor}) + 4/3$$

To aggregate the nonbaseload generation and emissions, the plant-level generation and emissions are multiplied by the nonbaseload factor and summed to the state, balancing authority, eGRID subregion, NERC region, and US levels. The aggregated nonbaseload emissions and generation are used to calculate the nonbaseload output emission rates.

While nonbaseload rates can be used to estimate the emissions reductions associated with projects that displace electricity generation, such as energy efficiency and/or renewable energy, they should not be used for assigning an emission value for electricity use in carbon-footprinting exercises or GHG emissions inventory efforts. Rather, eGRID subregion-level total output emission rates are recommended for estimating emissions associated with electricity use (scope 2 emissions).

Combustion Emission Rates

Combustion output emission rates for all pollutants are estimated at the plant level and higher levels of aggregation. Combustion fuel-based output emissions rates are calculated by dividing total plant

emissions by the combustion net generation for that plant. Generation from non-combustion sources, such as nuclear, hydro, geothermal, solar, and wind will not be included in the calculation of this rate.

3.2 Determination of Plant Primary Fuel

The primary fuel of a plant is determined solely by the fuel that has the maximum heat input in the Unit file.

For plants that do not consume any combustible fuel, the primary "fuel" is determined by the nameplate capacity of the units at the plant. The fuel from the unit with the highest nameplate capacity is used as the primary fuel.

See Section 5 for a description of all possible unit and plant primary fuel codes.

The EIA-923 includes solid waste plants as two fuel codes: municipal solid waste – biomass (MSB) and municipal solid waste – non-biomass (MSN). The EIA-860 only lists municipal solid waste under one code (MSW). In eGRID2014 the MSW fuel code is the only fuel code used for municipal solid waste in the Unit, Generator, and Plant files. While the MSB/MSN EIA-923 fuel information is used to calculate biomass adjustment emissions, these fuel codes are not listed in eGRID2014. See Section 3.1.2.1 for a discussion of the biomass adjustment methodology (EIA, 2016b).

3.3 Estimation of Resource Mix

The resource mix is the collection of nonrenewable and renewable resources that are used to generate electricity for a plant. Nonrenewable resources include fossil fuels (e.g., coal, oil, gas, and other fossil) and nuclear energy sources; renewable energy resources include biomass, solar, wind, geothermal, and hydro. The resource mix is determined by calculating the percentage of the total generation that a given nonrenewable or renewable resource generated. In eGRID, the resource mix is represented as generation, in MWh, for each nonrenewable or renewable resource category, as well as a percentage of the total. Each category for nonrenewable and renewable resources should sum to be 100 percent. eGRID plant resource mix and net generation are derived from the EIA-923 prime mover level data.

For cases in which there is only one fuel and its generation is negative, that fuel's generation percent is assigned 100%. For cases in which there are fuels with both negative and positive net generation, the generation percentages only include the positive generation in both the denominator and numerator.

For the three grouped aggregate categories—total net generation from nonrenewables, total net generation from all renewables, and total net generation from renewables minus hydro—the sum of the total net generation from nonrenewables and from all renewables equals the total net generation.

It should be noted that there are cases where the sum of the generation by fuel type does not equal the value reported for total annual generation in eGRID. This is because the total annual generation is calculated using a mix of generator- and prime mover-level data from the EIA-923. The calculation of generation by fuel type uses only prime mover-level data (EIA, 2016b).

3.4 Aggregating Plant-Level Data

eGRID includes five aggregated files: State, Balancing Authority (BA), eGRID Subregion, NERC Region, and the US. All aggregation levels in eGRID are based on the Plant file. The State file data are developed by summing up the Plant file data (adjusted heat input, adjusted emissions, adjusted fuel-based emissions, net generation, fuel-based net generation, nameplate capacity, and the plant data values needed to calculate non-baseload emission rates), based on the state in which the plant is located. The Balancing Authority, eGRID Subregion, and NERC Region files are developed by summing up the plant data for each of the values for each aggregation level. The US file is developed by taking the sum of all fields plants from the Plant file.

The Balancing Authority file in eGRID2014 only includes balancing authorities with positive generation and/or emissions. The balancing authorities with zero generation and/or emission data have not been included in the Balancing Authority file. Emission rates are recalculated at the state, balancing authority, eGRID subregion, NERC region, and US levels. Non-baseload emission rates have also been included at the aggregated level. For a list of all variables included in the aggregated files, see Sections 5.4 through 5.8.

The totals from the Plant, State, Balancing Authority, eGRID Subregion, NERC Region, and US files' adjusted heat input, adjusted emissions, adjusted fuel-based emissions, net generation, fuel-based net generation, and nameplate capacity data are equal, accounting for minor differences due to rounding.

The following sections describe three of the levels of aggregation used to summarize the data from the Plant file, including the balancing authority, eGRID subregion, and NERC region levels.

3.4.1 Balancing Authority

A balancing authority is a portion of an integrated power grid for which a single dispatcher has operational control of all electric generators. A balancing authority is the responsible entity that integrates resource plans ahead of time, maintains demand and resource balance within a BA area, and supports interconnection frequency in real time. The balancing authority dispatches generators in order to meet an area's needs and can also control load to maintain the load-generation balance.

Balancing authority ID codes are assigned to a plant based on the EIA-860 plant-level data and the balancing authority names are assigned to the corresponding balancing authority ID codes based on the EIA-861(EIA, 2016a; EIA, 2016c). In Alaska, Hawaii, and Rhode Island, isolated electric utility systems, which are not part of an integrated power grid, have been grouped into nominal balancing authorities titled Alaska Miscellaneous, Hawaii Miscellaneous, and Rhode Island Miscellaneous, respectively. These three balancing authorities have an ID code of "NA" since there are no ID codes available from EIA for these regions.

The balancing authority associated with a plant is reported to the EIA-860 plant-level data and used in eGRID2014.

Since BAs are not strictly geographically based, shapefiles for mapping them are not available with eGRID2014.

3.4.2 eGRID Subregion

eGRID subregions are developed as subsets of NERC regions. A map of the eGRID subregions used for eGRID2014 is included in Appendix B. This map is representational and shows approximate boundaries that are based on companies, not on strict geographical boundaries.[8]

eGRID subregions are identified and defined by EPA, using the NERC regions and balancing authorities as a guide. The 26 eGRID subregions are subsets of the NERC regions as configured in December 2010. The eGRID subregions themselves have not changed since eGRID2000. Note, however, that some plants operating in each eGRID subregion can change from year to year. An eGRID subregion is often, but not always, equivalent to an IPM subregion.

Plants are assigned to eGRID subregions using ArcGIS. A GIS shapefile of eGRID subregions was created based on the service territories of utilities.[9] The geographic linkage between plants and eGRID subregions is established by mapping plants based on their listed latitude/longitude values to determine the eGRID subregion location of each plant.

The 26 eGRID subregion names and their acronyms for eGRID are displayed in Table 3-3.

Table 3-3. eGRID Subregion Acronym and Names for eGRID

eGRID Subregion	eGRID Subregion Name
FRCC	FRCC All
MORE	MRO East
MROW	MRO West
NEWE	NPCC New England
NYCW	NPCC NYC/Westchester
NYLI	NPCC Long Island
NYUP	NPCC Upstate NY
RFCE	RFC East
RFCM	RFC Michigan
RFCW	RFC West
SRMW	SERC Midwest
SRMV	SERC Mississippi Valley
SRSO	SERC South
SRTV	SERC Tennessee Valley
SRVC	SERC Virginia/Carolina

[8] Note that some areas may fall into multiple eGRID subregions due to the fact that they are supplied by multiple electricity providers. Visit Power Profiler (https://www.epa.gov/energy/power-profiler) for more information on determining the eGRID subregion for a given area.

[9] The GIS shapefile is available here: (https://www.epa.gov/energy/egrid-faq)

eGRID Subregion	eGRID Subregion Name
SPNO	SPP North
SPSO	SPP South
CAMX	WECC California
NWPP	WECC Northwest
RMPA	WECC Rockies
AZNM	WECC Southwest
ERCT	ERCOT All
AKGD	ASCC Alaska Grid
AKMS	ASCC Miscellaneous
HIOA	HICC Oahu
HIMS	HICC Miscellaneous

3.4.3 NERC Region

NERC region refers to a region designated by the North American Electric Reliability Corporation (NERC). Each NERC region listed in eGRID represents one of ten regional portions of the North American electricity transmission grid: eight in the contiguous United States, plus Alaska and Hawaii (which are not part of the formal NERC regions, but are considered so in eGRID). Note that some plants operating in each NERC region can change from year to year. The ten NERC region names and their acronyms for eGRID are displayed in Table 3-4.

Although some NERC regions include portions of Canada and/or Mexico that are integrated with U.S. grids, eGRID aggregation data are limited to generation within the U.S.

A representation of the NERC region map used for eGRID is included in Figure B-2 in Appendix B. This map is representational and shows approximate boundaries that are not based on strict geographical boundaries.

Table 3-4. NERC Region Acronym and Names for eGRID

NERC Region	NERC Name
ASCC	Alaska Systems Coordinating Council
FRCC	Florida Reliability Coordinating Council
HICC	Hawaiian Islands Coordinating Council
MRO	Midwest Reliability Organization
NPCC	Northeast Power Coordinating Council
RFC	Reliability First Corporation
SERC	SERC Reliability Corporation
SPP	Southwest Power Pool
TRE	Texas Regional Entity
WECC	Western Electricity Coordinating Council

3.5 Grid Gross Loss

eGRID output emission rates do not account for any line losses between the points of consumption and the points of generation. For example, because there are line losses, one kilowatt hour of electricity consumption requires a little more than one kilowatt hour of electricity generation. To account for transmission and distribution line losses when applying eGRID output emission rates to electricity consumption within a certain region, consumption is divided by (one minus the grid gross loss [as a decimal]) (Table 3-5).

A revised methodology was developed for calculating the grid gross loss for eGRID2014. The previous methodology used generation, imports, exports, and consumption data from EIA and FERC. A new methodology was created in order to minimize discrepancies in datasets from these two independent agencies who have different methods of collecting data. The revised methodology uses data from only EIA—specifically, from EIA's State Electricity Profiles.[10] Utilities report the information used in these calculations directly to EIA through EIA-861, which EIA uses to create the State Electricity Profiles.

The revised methodology for estimating grid gross loss uses the following data points for each state from the EIA State Electricity Profiles:

1. Total Disposition. This is the total amount of electricity sold directly to customers, sold for resale, furnished without charge, consumed by the respondent without charge, and lost. It is equal to the total amount of electricity generated.

[10] Available at: http://www.eia.gov/electricity/state/ See Table 10: Supply and disposition of electricity, 1990-2014

2. Direct Use. This is the total amount of electricity used by plants and/or utilities in the region that is not sold for wholesale or resale; direct use electricity is not transmitted through the grid and therefore does not have the potential to be lost.

3. Estimated Losses. This is the total amount of electricity, in MWh, in the region that is generated but is not sold for resale or wholesale, furnished without charge, or used by the generator or utility; i.e., electricity that is lost in transmission and distribution.

These data are reported at the state level by EIA. We aggregate them to the NERC Interconnect level (Eastern, Western, ERCOT (Texas), as well as the states of Alaska and Hawaii, and the entire U.S.). State boundaries, however, do not perfectly correspond to Interconnect boundaries. Four states (Montana, Nebraska, New Mexico, and South Dakota) have generation in two Interconnects, and one state (Texas) has generation in three Interconnects. For these states, we distributed the data from the State Electricity Profiles based on the proportion of generation from these states in each Interconnect from the EIA-923 (EIA, 2016b).

The aggregated data are then used to calculate grid gross loss as follows:

$$Grid\ Gross\ Loss = \frac{Estimated\ Losses}{Total\ Dispostion - Direct\ Use}$$

The eGRID2014 estimated grid gross loss percentages for each U.S. interconnect power grid are included in the file called "GGL14" in the eGRID workbook and are also displayed in Table 3-5.

Table 3-5. eGRID2014 Grid Gross Loss (%)

Power Grid	Grid Gross Loss (%)
Eastern	4.97%
Western	4.79%
ERCOT	5.12%
Alaska	5.63%
Hawaii	5.18%
U.S.	**4.95%**

4. Specific eGRID Identifier Codes, Name Changes, and Associations

4.1 Plant Level

Some changes to EIA ORISPL ID codes were made in eGRID2014 to better reflect the EPA/CAMD data. Also, some EIA plants were combined into single plants to reflect EPA/CAMD data.

- The plants ArcelorMittal Indiana Harbor West and Indiana Harbor E 5 AC Station (ORISPL 10397 and 54995, respectively) were combined and the ORISPL changed to 10474 to match with the EPA/CAMD plant ArcelorMittal USA – Indiana Harbor East.
- The plants Sundevil Power Holdings – Gila River and Gila River Power Block 3 (ORISPL 59338 and 59784, respectively) were combined and the ORISPL changed to 55306 to match with the EPA/CAMD plant Gila River Power Station.

A table of ORISPL ID code changes can be found in Table C-5 in Appendix C.

5. Description of Data Elements

eGRID2014 has 8 aggregation files: UNIT (unit), GEN (generator), PLNT (plant), ST (state), BA (Balancing Authority), SRL (eGRID subregion), NRL (NERC region), and the US (United States total). eGRID2014 also includes the regional grid gross loss factor data. Appendix A provides the file structure for eGRID2014, which includes variable descriptions and original data sources. Note that definitions for similar variables are not repeated after the description in the plant file. For example, in the plant file, the net generation in MWh is defined at the plant level for the data element PLNGENAN. For each subsequent file, the net generation, XXNGENAN (where XX is ST, BA, SR, NR, or the US) is not defined; it is simply the sum of PLNGENAN attributed to the aggregation entity.

Note that values reported as 0 in eGRID were reported as 0 in the original data files. Values reported as blank in eGRID were either reported as blank in the original data files or were not included in the original data files.

5.1 The UNIT (Unit) File

There are 29 variables in the Unit file, which contains unit-level data.

1. **eGRID2014 Unit File Sequence Number (SEQUNT14) –**
   Unit-level records in the 2014 data file are sorted by state abbreviation, plant name, plant code, and unit ID, and are assigned a unique sequential number beginning with 1. This sequence number is unlikely to be the same as the sequence number in the eGRID2012 file for the same entity.

2. **Plant State Abbreviation (PSTATABB) –**
   The state abbreviation of the state in which the plant is located.
   Source: EIA-860

3. **Plant Name (PNAME) –**
   The name associated with each plant.
   Source: EPA/CAMD; EIA-860

4. **DOE/EIA ORIS Plant or Facility Code (ORISPL) –**
   This plant code corresponds to PNAME and was originally developed for power plants by the Office of Regulatory Information Systems (ORIS), which was a part of the Federal Power Commission. It is now assigned by EIA and is used as a unique plant identification code for many EPA electric power databases. Note that some EIA ORISPL ID codes were changed to reflect EPA/CAMD ORISPL ID codes. See Section 4.1 for a discussion of ORISPL ID changes made to eGRID2014. See Appendix C for a table of all ORISPL changes made between EIA and EPA/CAMD.
   Source: EPA/CAMD; EIA-860

5. **Unit ID (UNITID) –**
   The unit ID for the unit that produces the emissions.
   Source: EPA/CAMD, EIA-923

6. Prime Mover (PRMVR) –
The unit's electric prime mover type.
Possible values are:

BA = Battery energy storage
BT = Binary cycle turbine
CA = Combined cycle steam turbine
CC = Combined cycle - total unit
CE = Compressed air energy storage
CP = Concentrated solar power energy storage
CS = Combined cycle - single shaft
CT = Combined cycle combustion turbine
FC = Fuel cell
FW = Flywheel energy storage
GT = Combustion (gas) turbine
HA = Hydrokinetic turbine - axial flow
HY = Hydroelectric turbine
IC = Internal combustion engine (diesel)
OT = Other turbine
PS = Hydraulic turbine - reversible (pumped storage)
PV = Photovoltaic
ST = Steam turbine (boiler, nuclear, geothermal, and solar steam)
WS = Wind turbine - offshore
WT = Wind turbine - onshore

Source: EIA-860

7. Unit Operational Status (UNTOPST) –
The unit's operational status. Possible values are:

IP = Planned new generator canceled, indefinitely postponed, or no longer in resource plan
L = Regulatory approvals pending (not under construction)
OA = Out of service (returned or will be returned to service)
OP = Operating – in service
OS = Out of service (not expected to be returned to service)
OT = Other
P = Planned for installation but regulatory approvals not initiated (not under construction)
RE = Retired – no longer in service
SB = Stand-by (long-term storage)
T = Regulatory approvals received (not under construction)
TS = Testing, construction complete, but not yet in commercial operation
U = Under construction, less than 50% constructed
V = Under constructions, more than 50% constructed

Source: EPA/CAMD, EIA-860

8. Clean Air Markets Division (CAMD) Program Flag (CAMDFLAG) –
Indicates if the unit reported 2014 EPA/CAMD emissions and operation data to comply with either the Cross-State Air Pollution Rule or the Acid Rain Program. See

https://www.epa.gov/airmarkets/clean-air-markets-programs for additional information.

Source: EPA/CAMD

9. Program Codes (PRGCODE) –

The programs, as reported to EPA/CAMD, that the unit was subject to in 2014. Values may be combined and separated by commas. The individual values are:

ARP	= Acid Rain Program
CAIRNOX	= Clean Air Interstate Rule for NO_x (annual)
CAIROS	= Clean Air Interstate Rule for NO_x (ozone season)
CAIRSO2	= Clean Air Interstate Rule for SO_2
SIPNOX	= NO_x SIP Call

See https://www.epa.gov/airmarkets/clean-air-markets-programs for additional information.
Source: EPA/CAMD

10. Unit Bottom and Firing Type (BOTFIRTY) –

The unit firing type
Possible values are:

	= Blank
ARCH	= Arch firing
CC	= Combined cycle
CELL	= Cell
CT	= Combustion turbine
CYCLONE	= Cyclone firing
DUCTBURNER	= Ductburner
FLUIDIZED	= Fluidized bed firing
IGC	= Integrated gasification combined cycle
OTHER BOILER	= Other boiler
OTHER TURBINE	= Other turbine
PROCESS	= Refinery process heater
STOKER	= Stoker, spreader, vibrating grate, or slinger boiler
TANGENTIAL	= Tangential, concentric, or corner-fired boiler
TURBO	= Turbo
VERTICAL	= Vertically-fired boiler
WALL	= Wall-fired boiler

Source: EPA/CAMD, EIA-860

11. Number of Associated Generators (NUMGEN) –

The number of generators associated with each EIA-860 boiler in the file.
Source: EIA-860

12. Unit Primary Fuel (FUELU1) –

The primary fuel determined from EIA-923 boiler or generator reported data or the primary fuel reported to EPA/CAMD.
Possible values are:

AB = Agricultural byproduct
BFG = Blast furnace gas
BIT = Bituminous coal
BLQ = Black liquor
COG = Coke oven gas
DFO = Distillate fuel oil, light fuel oil, diesel oil
GEO = Geothermal
H = Hydrogen
JF = Jet fuel
KER = Kerosene
LFG = Landfill gas
LIG = Lignite coal
MSW = Municipal solid waste
MWH = Electricity used for energy storage (megawatt hour)
NG = Natural gas
NUC = Nuclear
OBG = Other biomass gas (digester gas, methane, and other biomass gases)
OBL = Other biomass liquids
OBS = Other biomass solid
OG = Other gas
OO = Other oil
OTH = Other
PC = Petroleum coke
PG = Gaseous propane
PRG = Process gas
PUR = Purchased Steam
RC = Refined Coal
RFO = Residual fuel oil, heavy fuel oil, petroleum
RG = Refinery gas
SGC = Coal-derived synthetic gas
SLW = Sludge waste
SUB = Subbituminous coal
SUN = Solar
TDF = Tire-derived fuel
WAT = Water
WC = Waste coal
WDL = Wood, wood waste liquid
WDS = Wood, wood waste solid
WH = Waste heat
WND = Wind
WO = Waste oil

Source: EPA/CAMD, EIA-923, EIA-860

13. Unit Operating Hours (HRSOP) –

The number of hours that an EPA/CAMD unit reported operating during the year.

Source: EPA/CAMD

14. Unit Unadjusted Annual Heat Input (HTIEAN) –
The unit's unadjusted annual total heat input, in MMBtu, based on the values reported to EPA/CAMD or calculated using EIA-923 unit data.
Source: EPA/CAMD; EIA-923

15. Unit Unadjusted Ozone Season Heat Input (HTIEOZ) –
The unit's unadjusted ozone season (May through September) heat input, in MMBtu, based on the values reported to EPA/CAMD or calculated using EIA-923 unit data.
Source: EPA/CAMD; EIA-923

16. Unit Unadjusted Annual NO_x Emissions (NOXEAN) –
The unit's unadjusted NO_x emissions, in short tons, based on the values reported to EPA/CAMD or calculated using EIA-923 unit data and unit-specific emissions rates or the emission factors listed in Appendix C.
Source: EPA/CAMD; EIA-923

17. Unit Unadjusted Ozone Season NO_x Emissions (NOXEOZ) –
The unit's unadjusted ozone season (May through September) NO_x emissions, in short tons, based on values reported to EPA/CAMD or calculated using EIA-923 unit data and unit-specific ozone-season emissions rates or the emission factors listed in Appendix C.
Source: EPA/CAMD; EIA-923

18. Unit Unadjusted Annual SO_2 Emissions (SO2EAN) –
The unit's unadjusted annual SO_2 emissions, in short tons, based on the values reported to EPA/CAMD or calculated using EIA-923 unit data and the emission factors listed in Appendix C. When not available, it is zero.
Source: EPA/CAMD; EIA-923

19. Unit Unadjusted Annual CO_2 Emissions (CO2EAN) –
The unit's unadjusted annual CO_2 emissions, in short tons, based on the values reported to EPA/CAMD or calculated using EIA-923 unit data and emission factors listed in Appendix C.
Source: EPA/CAMD; EIA-923

20. Source of Annual Heat Input Data
Identifies the annual heat input data source.
Source: EPA/CAMD; EIA-923

21. Source of Ozone Season Heat Input Data
Identifies the ozone season heat input data source.
Source: EPA/CAMD; EIA-923

22. Source of Annual NOx Emissions Data
Identifies the annual NOx emissions data source.
Source: EPA/CAMD; EIA-923

23. Source of Ozone Season NOx Emissions Data
Identifies the ozone-season NOx emissions data source.
Source: EPA/CAMD; EIA-923

24. Source of Annual SO2 Emissions Data
Identifies the annual SO_2 emissions data source.
Source: EPA/CAMD; EIA-923

25. Source of Annual CO_2 Emissions Data
Identifies the annual CO_2 emissions data source.
Source: EPA/CAMD; EIA-923

26. Unit SO_2 (Scrubber) First Control Device (SO2CTLDV) –
The first reported SO_2 control device. Values may be combined and separated by commas.
Possible values are:

	= blank
ACI	= Activated carbon injection system
CD	= Circulating dry scrubber
DA	= Dual alkali
DL	= Dry lime flue gas desulfurization unit
DSI	= Dry sorbent (powder) injection type
FBL	= Fluidized bed
JB	= Jet bubbling reactor (wet) scrubber
MA	= Mechanically aided type (wet) scrubber
MO	= Magnesium oxide
O	= Other (EPA/CAMD)
OT	= Other equipment (EIA-860)
PA	= Packed type (wet) scrubber
SB	= Sodium based
SD	= Spray dryer type/dry FGD/semi-dry FGD
SP	= Spray type (wet) scrubber
TR	= Tray type (wet) scrubber
VE	= Venturi type (wet) scrubber
WL	= Wet lime flue gas desulfurization unit
WLS	= Wet limestone

Source: EPA/CAMD, EIA-860

27. Unit NO_x First Control Device (NOXCTLDV) –
The first reported NO_x control device. Values may be combined and separated by commas.
Possible values are:

	= Blank
CM	= Combustion modification/fuel reburning

DLNB = Dry low NO_x premixed technology
H2O = Water injection
LNB = Low NO_x burner
LNBO = Low NO_x burner with overfire air
LNC1 = Low NO_x burner technology with close-coupled overfire air
LNC2 = Low NO_x burner technology with separated OFA
LNC3 = Low NO_x burner technology with close-coupled and separated overfire air
LNCB = Low NO_x burner technology for cell burners
NH3 = Ammonia injection
O = Other
OFA = Overfire air
SCR = Selective catalytic reduction (EPA/CAMD)
SNCR = Selective noncatalytic reduction
SR = Selective catalytic reduction (EIA-860)
STM = Steam injection
Source: EPA/CAMD

28. Unit Hg Activated Carbon Injected System Flag (HGCTLDV) –
The activated carbon injection mercury control flag (1=Yes).
Source: EIA-860

29. Unit Year On-Line (UNTYRONL) –
The four-digit year the unit came on-line.
Source: EPA/CAMD, EIA-860

5.2 The GEN (Generator) File

There are 16 variables in the second file, GEN, which contains generator level data. This file includes generation from steam boilers and nuclear units in the EIA-923, from those plant prime movers in the EIA-923 that have only one generator in the EIA-860, and distributed generation from the EIA-923 plant prime movers to the generator level based on nameplate capacity.

1. eGRID2014 File Generator Sequence Number (SEQGEN14) –
The generator records in the 2014 generator data file are sorted by state abbreviation, plant name, plant code, and generator ID, and are assigned a unique sequential number beginning with 1. This sequence number is unlikely to be the same as the sequence number in the eGRID2012 file for the same entity.

2. Plant State Abbreviation (PSTATABB) –
The state abbreviation in which the plant is located.
Source: EIA-860

3. Plant Name (PNAME) –
The name associated with each plant.
Source: EPA/CAMD; EIA-860

4. DOE/EIA ORIS Plant or Facility Code (ORISPL) –

This plant code was developed for power plants by the Office of Regulatory Information Systems (ORIS), which was a part of the Federal Power Commission. It is now assigned by EIA and is used as a unique plant identification code for many EPA electric power databases. Note that some EIA ORISPL ID codes were changed to reflect EPA/CAMD ORISPL ID codes. See Section 4.1 for a discussion of ORISPL ID changes made to eGRID2014. See Table C-5 in Appendix C for a table of all ORISPL changes made between EIA and EPA/CAMD.
Source: EPA/CAMD; EIA-860

5. Generator ID (GENID) –
The electrical generation unit (generator) at a plant. In the majority of cases, there is a one-to-one correspondence with the boiler ID if it is a steam generator.
Sources: EIA-860

6. Number of Associated Boilers (NUMBLR) –
The number of EIA-860 boilers associated with each generator in the file.
Sources: EIA-860

7. Generator Status (GENSTAT) –
The reported generator status at the end of the given year.
Possible values are:

IP = Planned new generator canceled, indefinitely postponed, or no longer in resource plan
L = Regulatory approvals pending (not under construction)
OA = Out of service (returned or will be returned to service)
OP = Operating – in service
OS = Out of service (not expected to be returned to service)
OT = Other
P = Planned for installation but regulatory approvals not initiated (not under construction)
RE = Retired – no longer in service
SB = Stand-by (long-term storage)
T = Regulatory approvals received (not under construction)
TS = Testing, construction complete, but not yet in commercial operation
U = Under construction, less than 50% constructed
V = Under constructions, more than 50% constructed

Generators with one of these above generator status values are considered potentially operating generators (including generators with status = 'RE', if the retirement date is the data year or later).
Source: EIA-860

8. Generator Prime Mover Type (PRMVR) –
The reported generator's electric generator type.
Possible values are:

BA = Battery energy storage

BT = Binary cycle turbine
CA = Combined cycle steam turbine
CC = Combined cycle - total unit
CE = Compressed air energy storage
CP = Concentrated solar power energy storage
CS = Combined cycle - single shaft
CT = Combined cycle combustion turbine
FC = Fuel cell
FW = Flywheel energy storage
GT = Combustion (gas) turbine
HA = Hydrokinetic turbine - axial flow
HY = Hydroelectric turbine
IC = Internal combustion engine (diesel)
OT = Other turbine
PS = Hydraulic turbine - reversible (pumped storage)
PV = Photovoltaic
ST = Steam turbine (boiler, nuclear, geothermal, and solar steam)
WS = Wind turbine - offshore
WT = Wind turbine - onshore

Source: EIA-860

9. Generator Primary Fuel (FUELG1) –

The potential primary fuel reported for the generator.

Possible values are:

AB = Agricultural by-products
BFG = Blast furnace gas
BIT = Bituminous coal
BLQ = Black liquor
DFO = Distillate fuel oil, diesel, No. 1, No. 2, and No. 4 fuel oils
GEO = Geothermal
JF = Jet fuel
KER = Kerosene
LFG = Landfill gas
LIG = Lignite coal
MSW = Municipal solid waste
MWH = Electricity
NG = Natural gas
NUC = Nuclear materiel
OBG = Other biomass gas (digester gas, methane, and other biomass gases)
OBL = Other biomass liquids
OBS = Other biomass solids
OG = Other gas
OTH = Other unknown
PC = Petroleum coke
PG = Gaseous propane
PUR = Purchased steam
RC = Refined coal
RFO = Residual fuel oil
SGC = Synthesis gas – coal-derived
SGP = Synthesis gas – petroleum coke
SLW = Sludge waste
SUB = Subbituminous coal
SUN = Solar
TDF = Tire-derived fuel
WAT = Water
WC = Waste coal
WDL = Wood waste liquid (excluding black liquor)
WDS = Wood, Wood waste solid
WH = Waste heat
WND = Wind
WO = Waste oil

Source: EIA-860

10. Generator Nameplate Capacity (NAMEPCAP) –

The nameplate capacity, in MW, of the generator.

Source: EIA-860

11. Generator Capacity Factor (CFACT) –

This field is calculated at the generator level:

CFACT = (GENNTAN) / (NAMEPCAP * 8760).

The value should generally be between 0 and 1. However, there are outliers where (according to reported data) there are units with capacity factors greater than 1. The capacity factor for plants with negative net generation has been set to 0.

12. Generator Annual Net Generation (GENNTAN) –
The reported net generation in MWh.
Sources: EIA-923

13. Generator Ozone Season Net Generation (GENNTOZ) –
The generator five-month ozone season (May through September) net generation in MWh, based on monthly generator generation data.
Sources: EIA-923

14. Generation Data Source (GENERSRC) –
The data source of the generator net generation data. The values are as follows:

- Blank (no generator level data)
- Distributed from EIA-923 Generation and Fuel
- EIA-923 Generator File
- Data from EIA-923 Generator File overwritten with distributed data from EIA-923 Generation and Fuel

15. Generator Year On-Line (GENYRONL) –
The four-digit year the generator came on-line.
Source: EIA-860

16. Generator Retirement Year (GENYRRET) –
The four-digit year the generator retired or is planned to retire.
Source: EIA-860

5.3 The PLNT (Plant) File

There are 120 variables in the Plant file (PLNT).

1. eGRID2014 File Plant Sequence Number (SEQPLT14) –
The plant records in the2014 plant data file are sorted by state abbreviation and plant name, and are assigned a unique sequential number beginning with 1. This sequence number is unlikely to be the same as the sequence number in the eGRID2012 file for the same entity.

2. Plant State Abbreviation (PSTATABB) –
The state abbreviation in which the plant is located.
Source: EIA-860

3. Plant Name (PNAME) –
The name associated with each plant.
Source: EPA/CAMD; EIA-860

4. DOE/EIA ORIS Plant or Facility Code (ORISPL) –
This plant code corresponds to PNAME and was originally developed for power plants by the Office of Regulatory Information Systems (ORIS), which was a part of the Federal Power Commission. It is now assigned by EIA and is used as a unique plant identification code for many EPA electric power databases, too. Note that some

EIA ORISPL ID codes were changed to reflect EPA/CAMD ORISPL ID codes. See Section 4.1 for a discussion of ORISPL ID changes made to eGRID2014. See Table C-5 in Appendix C for a table of all ORISPL changes made between EIA and EPA/CAMD.
Source: EPA/CAMD; EIA-860

5. **Plant Operator Name (OPRNAME) –**
The name associated with each operating company (EGC).
Source: EIA-860

6. **Plant Operator ID (OPRCODE) –**
The operating company ID. Each operating company has a unique company code assigned by EIA, with some exceptions.
Source: EIA-860

7. **Utility Service Territory Name (UTLSRVNM) –**
The name of the owner of the transmission/distribution company/EGC, also known as the utility service territory (a utility company or EGC) [and previously known as the utility service area] in which the plant is located.
Source: EIA-860

8. **Utility Service Territory ID (UTLSRVID) –**
The unique ID code associated with the utility service territory name.
Source: EIA-860

9. **Balancing Authority Name (BANAME) –**
The name of the balancing authority for the plant. The balancing authority is associated with the plant's eGRID subregion and NERC region.
Source: EIA-860, EIA-861

10. **Balancing Authority ID Code (BAID) –**
The ID of the balancing authority for the plant.
Source: EIA-860, EIA-861

11. **NERC Region Acronym (NERC) –**
The acronym for the NERC region in which the plant is located. The NERC region is associated with the plant's BA and eGRID subregion. A representation of the eGRID NERC region map is included in Appendix B.
Source: EIA-860

12. **eGRID Subregion Acronym (SUBRGN) –**
The acronym for the eGRID subregion in which the plant is located. The eGRID subregion is associated with the plant's balancing authority and NERC region. A representation of the eGRID subregion map is included in Appendix B.
Source: EPA

13. **eGRID Subregion Name (SRNAME) –**

The name of the eGRID subregion in which the plant is located.
Source: EPA

14. Plant associated ISO/RTO Territory (ISORTO) –
The name, if applicable, of the Independent System Operator (ISO) or Regional Transmission Organization (RTO) associated with the plant.
Possible values are CAISO, ERCOT, ISONE, MISO, NYISO, PJM, SPP, OTHER, or blank.
Source: EIA-860

15. Plant FIPS State Code (FIPSST) –
The two-digit Federal Information Processing Standards (FIPS) state character code of the state in which the plant is located. The codes are from the National Institute of Standards and Technology (US Census, 2016).
Source: US Census

16. Plant FIPS County Code (FIPSCNTY) –
The three digit FIPS county character code of the county in which the plant is located. The codes are from the National Institute of Standards and Technology (US Census, 2016).
Source: US Census

17. Plant County Name (CNTYNAME) –
The name of the county in which the plant is located.
Source: EIA-860

18. Plant Latitude (LAT) –
The latitude, in degrees to four decimal places, associated with the plant.
Source: EIA-860

19. Plant Longitude (LON) –
The longitude, in degrees to four decimal places, associated with the plant.
Source: EIA-860

20. Number of Boilers (NUMBLR) –
The number of operating boilers or turbines within a plant.
Source: EIA-860

21. Number of Generators (NUMGEN) –
The number of potentially operating generators within a plant.
Source: EIA-860

22. Plant Primary Fuel (PLPRMFL) –
The plant's primary fuel based on maximum heat input of fuel consumed by the plant. If the plant does not consume fuel, it is based on the maximum nameplate capacity. Possible values are:

AB = Agricultural byproduct
BFG = Blast furnace gas
BIT = Bituminous coal
BLQ = Black liquor
COG = Coke oven gas
DFO = Distillate fuel oil, light fuel oil, diesel oil
GEO = Geothermal steam
H = Hydrogen
JF = Jet fuel
KER = Kerosene
LFG = Landfill gas
LIG = Lignite coal
MSW = Municipal solid waste
MWH = Electricity used for energy storage (megawatt hour)
NG = Natural gas
NUC = Nuclear materiel
OBG = Other biomass gas
OBL = Other biomass liquid
OBS = Other biomass solid
OG = Other gas
OTH = Other (unknown)
PC = Petroleum coke
PRG = Process gas
PUR = Purchased fuel (unknown)
RC = Refined coal
RFO = Residual fuel oil, heavy fuel oil, petroleum
SGC = Coal-derived synthetic gas
SLW = Sludge waste
SUB = Subbituminous coal
SUN = Sun
TDF = Tire-derived fuel
WAT = Water
WC = Waste coal
WDL = Wood, wood waste liquid
WDS = Wood, wood waste solid
WH = Waste heat
WND = Wind
WO = Waste oil
Source: EPA/CAMD; EIA-860

23. Plant Primary Fuel Category (PLFUELCT) –

The fuel category for the primary fuel of the plant. This field is “COAL” if the plant’s primary fuel is derived from coal (fuel type = BIT, COG, LIG, RC, SGC, SUB, WC), “OIL” if it is derived from oil (DFO, JF, KER, PC, RFO, WO), “GAS” if it is derived from gas (BU, NG, PG), “OFSL” if it is another fossil fuel (BFG, OG, TDF), “NUCLEAR” if it is derived from nuclear (NUC), “HYDRO” if it is derived from hydro power (WAT), “SOLAR” if it is derived from solar power, (SUN), “WIND” if it is derived from wind power, ”GEOTHERMAL” if it is derived from geothermal power, “OTHF” if it is derived from waste heat/unknown/purchased

(MWH, OTH, PRG, PUR, WH), and "BIOMASS" if it is derived from biomass sources (AB, BLQ, LFG, MSW, OBG, OBL, OBS, SLW, WDL, WDS).

24. Flag indicating if the plant burned or generated any amount of coal (COALFLAG) –

A flag to indicate if the plant burned or, if it has positive heat input and generated electricity from coal (1= Yes). The plant will not be flagged if the plant has negative coal generation and no coal heat input for a given year.

25. Plant Capacity Factor (CAPFAC) –

The plant capacity factor, expressed with four decimal places. It is calculated as follows:

CAPFAC = (PLNGENAN / (NAMEPCAP * 8760))

Although the value should be between 0 and 1, there are outliers.

26. Plant Nameplate Capacity (NAMEPCAP) –

The nameplate capacity of the plant, in MW.

Source: EIA-860

27. Nonbaseload Factor (NBFACTOR) –

The proportion of generation that is considered nonbaseload generation. A value of 0 means none of the generation is nonbaseload generation. See Section 3 for more information.

Source: Calculated

28. Biogas/Biomass Plant Adjustment Flag (RMBMFLAG) –

A biogas (landfill gas, digester gas)/biomass adjustment flag, used to indicate where emissions were adjusted for plants using biogas or biomass fuels (1=Yes). A facility's emissions reported in eGRID may be different from that reported in other EPA sources, such as EPA/CAMD's emissions data, due to this adjustment.

29. Combined Heat and Power (CHP) Plant Adjustment Flag (CHPFLAG) –

A flag to indicate if the plant is a CHP facility (1=Yes). A CHP facility's emissions and heat input reported in eGRID may be different from that reported in other EPA sources such as EPA/CAMD's emissions data, due to this adjustment.

Source: EPA/CAMD; EIA-860

30. CHP Plant Useful Thermal Output (USETHRMO) –

The useful thermal output, in MMBtu, estimated for a CHP facility.

Source: EIA-923 calculated

31. CHP Plant Power to Heat Ratio (PWRTOHT) –

The power to heat ratio for a CHP facility, which is the ratio of the heat value of electricity generated (3413 * kWh output) to the facility's useful thermal output.

32. CHP Plant Electric Allocation Factor (ELCALLOC) –
The CHP plant's decimal fraction of the emissions that are attributed to electricity. It is derived as the ratio of the electric heat output to the sum of the electric and steam heat outputs, where the steam output is 75% of the useful thermal output. The electric allocation factor is used to allocate emissions from a CHP facility to both electricity generation and useful thermal output. For non-CHP plants, eGRID uses an electric allocation factor of 1.0.

33. Plant Pumped Storage Flag (PSFLAG) –
Indicates if the plant has at least one pumped storage generator (1= Yes).
Source: EIA-860

34. Plant Annual Heat Input from Combustion (PLHTIAN) –
The total annual heat input from combustion, in MMBtu, for the plant. For CHP plants, the value is adjusted by the electric allocation factor.

35. Plant Ozone Season Heat Input from Combustion (PLHTIOZ) –
The five-month ozone season (May through September) heat input from combustion, in MWh, for the plant. For CHP plants, the value is adjusted by the electric allocation factor.

36. Plant Total Annual Heat Input (PLHTIANT) –
The total annual heat input from combustion and noncombustion units, in MMBtu, for the plant. For CHP plants, the value is adjusted by the electric allocation factor.

37. Plant Total Ozone Season Heat Input (PLHTIOZT) –
The five-month ozone season (May through September) heat input from combustion and noncombustion units, in MWh, for the plant. For CHP plants, the value is adjusted by the electric allocation factor.

38. Plant Annual Net Generation (PLNGENAN) –
The total reported annual net generation, in MWh, for the plant, summed from the Unit file
Source: EIA-923

39. Plant Ozone Season Net Generation (PLNGENOZ) –
The five-month ozone season (May through September) net generation for the plant.
Source: EIA-923

40. Plant Annual NO_x Emissions (PLNOXAN) –
The total annual NO_x emissions, in short tons, for the plant. Biogas components are adjusted. For CHP plants, the value is adjusted by the electric allocation factor. This adjusted emissions field is estimated by first making the biogas adjustment (if it exists) and then applying the electric allocation factor (if the plant is a CHP).

41. Plant Ozone Season NO_x Emissions (PLNOXOZ) –
The five-month ozone season (May through September) NO_x emissions, in short tons, for the plant. Biogas components are adjusted. For CHP plants, the value is adjusted

by the electric allocation factor. This adjusted emissions field is estimated by first making the biogas adjustment (if it exists) and then applying the electric allocation factor (if the plant is a CHP).

42. Plant Annual SO_2 Emissions (PLSO2AN) –
The total annual SO_2 emissions, in short tons, for the plant. Landfill gas components are adjusted. For CHP plants, the value is adjusted by the electric allocation factor. This adjusted emissions field is estimated by first making the landfill gas adjustment (if it exists) and then applying the electric allocation factor (if the plant is a CHP).

43. Plant Annual CO_2 Emissions (PLCO2AN) –
The total annual CO_2 emissions, in short tons, for the plant. All CO_2 emissions from biomass fuels are adjusted to zero. For CHP plants, the value is adjusted by the electric allocation factor. This adjusted emissions field is estimated by first making the biomass adjustment (if it exists) and then applying the electric allocation factor (if the plant is a CHP).

44. Plant Annual CH_4 Emissions (PLCH4AN) –
The total annual CH_4 emissions, in pounds, for the plant. Biogas biomass components are adjusted. For CHP plants, the value is adjusted by the electric allocation factor. This adjusted emissions field is estimated by first making the biomass adjustment (if it exists) and then applying the electric allocation factor (if the plant is a CHP).

45. Plant Annual N_2O Emissions (PLN2OAN) –
The total annual N_2O emissions, in pounds for the plant. Biogas biomass components are adjusted. For CHP plants, the value is adjusted by the electric allocation factor. This adjusted emissions field is estimated by first making the biomass adjustment (if it exists) and then applying the electric allocation factor (if the plant is a CHP).

46. Plant Annual CO_2 Equivalent Emissions (PLCO2EQA) –
The annual CO_2 equivalent emissions, in short tons, for the plant. This value is a universal standard of measurement. The GWPs from the second IPCC assessment are used per EPA for the calculation; the formula used is as follows:

PLCO2EQA = ((1* PLCO2AN) + (21* PLCH4AN / 2000) + (310 * PLN2OAN / 2000)).

47. Plant Annual Hg Emissions (PLHGAN) –
The total annual Hg emissions, in pounds for the plant. For CHP plants, the value is adjusted by the electric allocation factor.

48. Plant Annual NO_x Total Output Emission Rate (PLNOXRTA) –
This field, in lb/MWh, is calculated as follows:
PLNOXRTA = 2000 * (PLNOXAN / PLNGENAN).

49. Plant Ozone Season NO_x Total Output Emission Rate (PLNOXRTO) –
This field, in lb/MWh, is calculated as follows:
PLNOXRTO = 2000 * (PLNOXOZ / PLNGENOZ).

50. Plant Annual SO_2 Total Output Emission Rate (PLSO2RTA) –
This field, in lb/MWh, is calculated as follows:
PLSO2RTA = 2000 * (PLSO2AN / PLNGENAN).

51. Plant Annual CO_2 Total Output Emission Rate (PLCO2RTA) –
This field, in lb/MWh, is calculated as follows:
PLCO2RTA = 2000 * (PLCO2AN / PLNGENAN).

52. Plant Annual CH_4 Total Output Emission Rate (PLCH4RTA) –
This field, in lb/GWh, is calculated as follows:
PLCH4RTA = PLCH4AN / (PLNGENAN / 1000).

53. Plant Annual N_2O Total Output Emission Rate (PLN2ORTA) –
This field, in lb/GWh, is calculated as follows:
PLN2ORTA = PLN2OAN / (PLNGENAN / 1000).

54. Plant Annual CO_2 Equivalent Total Output Emission Rate (PLC2ERTA) –
This field, in lb/MWh, is calculated as follows:
PLC2ERTA = 2000 * (PLCO2EQA / PLNGENAN).

55. Plant Annual Hg Total Output Emission Rate (PLHGRTA) –
This field, in lb/GWh, is calculated as follows:
PLHGRTA = PLHGAN / (PLNGENAN / 1000).

56. Plant Annual NO_x Input Emission Rate (PLNOXRA) –
This field, in lb/MMBtu, is calculated as follows:
PLNOXRA = 2000 * (PLNOXAN / PLHTIAN).

57. Plant Ozone Season NO_x Input Emission Rate (PLNOXRO) –
This field, in lb/MMBtu, is calculated as follows:
PLNOXRO = 2000 * (PLNOXOZ / PLHTIOZ).

58. Plant Annual SO_2 Input Emission Rate (PLSO2RA) –
This field, in lb/MMBtu, is calculated as follows:
PLSO2RA = 2000 * (PLSO2AN / PLHTIAN).

59. Plant Annual CO_2 Input Emission Rate (PLCO2RA) –
This field, in lb/MMBtu, is calculated as follows:
PLCO2RA = 2000 * (PLCO2AN / PLHTIAN).

60. Plant Annual Hg Input Emission Rate (PLHGRA) –
This field, in lb/BBtu, is calculated as follows:
PLHGRA = PLHGAN / (PLHTIAN / 1000).

61. Plant Annual NO_x Combustion Output Emission Rate (PLNOXCRT) –
This field, in lb/MWh, is calculated as follows:
PLNOXCRT = 2000 * (PLNOXAN / PLGENACY).

62. Plant Ozone Season NO_x Combustion Output Emission Rate (PLNOXCRO) –
This field, in lb/MWh, is calculated as follows:
PLNOXCRO = 2000 * (PLNOXOZ / ((PLGENACY * PLNGENOZ) / PLNGENAN)).

63. Plant Annual SO_2 Combustion Output Emission Rate (PLSO2CRT) –
This field, in lb/MWh, is calculated as follows:
PLSO2CRT = 2000 * (PLSO2AN / PLGENACY).

64. Plant Annual CO_2 Combustion Output Emission Rate (PLCO2CRT) –
This field, in lb/MWh, is calculated as follows:
PLCO2CRT = 2000 * (PLCO2AN / PLGENACY).

65. Plant Annual CH_4 Combustion Output Emission Rate (PLCH4CRT) –
This field, in lb/GWh, is calculated as follows:
PLCH4CRT = PLCH4AN / (PLGENACY / 1000).

66. Plant Annual N_2O Combustion Output Emission Rate (PLN2OCRT) –
This field, in lb/GWh, is calculated as follows:
PLN2OCRT = PLN2OAN / (PLGENACY / 1000).

67. Plant Annual Hg Combustion Output Emission Rate (PLHGCRT) –
This field, in lb/GWh, is calculated as follows:
PLHGCRT = PLHGAN / (PLGENACY / 1000).

68. Plant Unadjusted Annual NO_x Emissions (UNNOX) –
The total plant-level unadjusted annual NO_x emissions, in short tons.

69. Plant Unadjusted Ozone Season NO_x Emissions (UNNOXOZ) –
The unadjusted five-month ozone season (May through September) NO_x emissions, in short tons, for the plant.

70. Plant Unadjusted Annual SO_2 Emissions (UNSO2) –
The total plant-level unadjusted annual SO_2 emissions, in short tons.

71. Plant Unadjusted Annual CO_2 Emissions (UNCO2) –
The total plant-level unadjusted annual CO_2 emissions, in short tons.

72. Plant Unadjusted Annual CH_4 Emissions (UNCH4) –
The total plant-level unadjusted annual CH_4 emissions, in pounds.

73. Plant Unadjusted Annual N_2O Emissions (UNN2O) –

The total plant-level unadjusted annual N_2O emissions, in pounds.

74. Plant Unadjusted Annual Hg Emissions (UNHG) –
The total plant-level unadjusted annual Hg emissions, in pounds. This field is not calculated in eGRID2014.

75. Plant Unadjusted Annual Heat Input from Combustion (UNHTI) –
The total plant-level unadjusted annual heat input from combustion, in MMBtu.
Sources: EPA/CAMD, EIA-923

76. Plant Unadjusted Ozone Season Heat Input from Combustion (UNHTIOZ) –
The five-month ozone season (May through September) heat input from combustion, in MMBtu for the plant.
Sources: EPA/CAMD, EIA-923

77. Plant Total Unadjusted Annual Heat Input (UNHTIT) –
The total plant-level unadjusted annual heat input from combustion and noncombustion units, in MMBtu.
Sources: EPA/CAMD, EIA-923

78. Plant Total Unadjusted Ozone Season Heat Input (UNHTIOZT) –
The five-month ozone season (May through September) heat input from combustion and noncombustion units, in MMBtu for the plant.
Sources: EPA/CAMD, EIA-923

79. Plant Unadjusted Annual NO_x Emissions Source (UNNOXSRC) –
The source of plant-level unadjusted annual NOx emissions.

80. Plant Unadjusted Ozone Season NO_x Emissions Source (UNNOZSRC) –
The source of plant-level unadjusted ozone NOx emissions.

81. Plant Unadjusted Annual SO2 Emissions Source (UNSO2SRC) –
The source of plant-level unadjusted annual SO2 emissions.

82. Plant Unadjusted Annual CO_2 Emissions Source (UNCO2SRC) –
The source of plant-level unadjusted annual CO_2 emissions.

83. Plant Unadjusted Annual CH4 Emissions Source (UNCH4SRC) –
The source of plant-level unadjusted annual CH4 emissions.

84. Plant Unadjusted Annual N2O Emissions Source (UNN2OSRC) –
The source of plant-level unadjusted annual N2O emissions.

85. Plant Unadjusted Annual Hg Emissions Source (UNHGSRC) –
The source of plant-level unadjusted annual Hg emissions.

86. Plant Unadjusted Annual Heat Input Source (UNHTISRC) –

The source of plant-level unadjusted annual heat input.

87. Plant Unadjusted Ozone Season Heat Input Source (UNHOZSRC) –
The source of plant-level unadjusted ozone season heat input.

88. Plant Nominal Heat Rate (PLHTRT) –
The plant nominal heat rate, in Btu/kWh, for at least partially combusted plants. It is calculated as follows:
PLHTRT = 1000 * (PLHTIAN / PLNGENAN) for combustion plants; and
PLHTRT = 1000 * (PLHTIAN / PLGENACY) for partial combustion plants.
For CHP plants, the value is, in effect, adjusted by the electric allocation factor, since the heat input has been adjusted.

89. Plant Annual Coal Net Generation (PLGENACL) –
The plant annual net generation, in MWh, for coal. Fuel codes that are included in coal are BIT, COG, SUB, LIG, WC, and SC.

90. Plant Annual Oil Net Generation (PLGENAOL) –
The plant annual net generation, in MWh, for oil. Fuel codes included in oil are DFO, JF, KER, OO, PC, RFO, RG, and WO.

91. Plant Annual Gas Net Generation (PLGENAGS) –
The plant annual net generation, in MWh, for natural gas. Fuel codes included in gas are NG and PG.

92. Plant Annual Nuclear Net Generation (PLGENANC) –
The plant annual net generation, in MWh, for nuclear. Fuel codes include NUC.

93. Plant Annual Hydro Net Generation (PLGENAHY) –
The plant annual net generation, in MWh, for hydro. Fuel codes include WAT.

94. Plant Annual Biomass Net Generation (PLGENABM) –
The annual net generation, in MWh, for biomass. Biomass is a fuel derived from organic matter such as wood and paper products, agricultural waste, or methane (e.g., from landfills). The renewable portion of solid waste, fuel code MSB, is included as biomass, as are AB, BLQ, DG, LFG, ME, OBL, OBS, PP, SLW, WDL, and WDS.

95. Plant Annual Wind Net Generation (PLGENAWI) –
The plant annual net generation, in MWh, for wind. Fuel codes include WND.

96. Plant Annual Solar Net Generation (PLGENASO) –
The plant annual net generation, in MWh, for solar. Fuel codes include SUN.

97. Plant Annual Geothermal Net Generation (PLGENAGT) –
The plant annual net generation, in MWh, for geothermal. Fuel codes include GEO.

98. Plant Annual Other Fossil Net Generation (PLGENAOF) –

The plant annual net generation, in MWh, for other fossil fuel that cannot be categorized as coal, oil, or gas. Other fossil fuel codes include BFG, COG, HY, LB, MH, MSF, OG, PRG, and TDF.

99. Plant Annual Other Unknown/ Purchased Fuel Net Generation (PLGENAOP) –
The plant annual net generation, in MWh, for other unknown/purchased. Fuel codes include OTH, PUR, or WH.

100. Plant Annual Total Nonrenewables Net Generation (PLGENATN) –
The annual total nonrenewables net generation, in MWh, for the plant. Nonrenewables are exhaustible energy resources such as coal, oil, gas, other fossil, nuclear power, and other unknown/purchased fuel. This field is the sum of PLGENACL, PLGENAOL, PLGENAGS, PLGENAOF, PLGENANC, and PLGENAOP.

101. Plant Annual Total Renewables Net Generation (PLGENATR) –
The annual total renewables net generation, in MWh, for the plant. Renewables are inexhaustible energy resources such as biomass, wind, solar, geothermal, and hydro. This field is the sum of PLGENABM, PLGENAWI, PLGENASO, PLGENAGT, and PLGENAHY.

102. Plant Annual Total Nonhydro Renewables Net Generation (PLGENATH) –
The annual total nonhydro renewables net generation, in MWh, for the plant. This field is the sum of PLGENABM, PLGENAWI, PLGENASO, and PLGENAGT.

103. Plant Annual Total Combustion Net Generation (PLGENACY) –
The annual total combustion net generation, in MWh, for the plant. This field is the sum of PLGENACL, PLGENAOL, PLGENAGS, PLGENAOF, PLGENABM, and PLGENAOP.

104. Plant Annual Total Noncombustion Net Generation (PLGENACN) –
The annual total noncombustion net generation, in MWh, for the plant. This field is the sum of PLGENANC, PLGENAHY, PLGENAWI, PLGENASO, and PLGENAGT.

105. Plant Coal Generation Percent (PLCLPR) –
The coal resource mix expressed as a percent of plant annual net generation. PLCLPR = 100 * (PLGENACL / PLNGENAN).

106. Plant Oil Generation Percent (PLOLPR) –
The oil resource mix expressed as a percent of plant annual net generation. PLOLPR = 100 * (PLGENAOL / PLNGENAN).

107. Plant Gas Generation Percent (PLGSPR) –
The gas resource mix expressed as a percent of plant annual net generation. PLGSPR = 100 * (PLGENAGS / PLNGENAN).

108. Plant Nuclear Generation Percent (PLNCPR) –
The nuclear resource mix expressed as a percent of plant annual net generation.
PLNCPR = 100 * (PLGENANC / PLNGENAN).

109. Plant Hydro Generation Percent (PLHYPR) –
The hydro resource mix expressed as a percent of plant annual net generation.
PLHYPR = 100 * (PLGENAHY / PLNGENAN).

110. Plant Biomass Generation Percent (PLBMPR) –
The biomass resource mix expressed as a percent of plant annual net generation.
PLBMPR = 100 * (PLGENABM / PLNGENAN).

111. Plant Wind Generation Percent (PLWIPR) –
The wind resource mix expressed as a percent of plant annual net generation.
PLWIPR = 100 * (PLGENAWI / PLNGENAN).

112. Plant Solar Generation Percent (PLSOPR) –
The solar resource mix expressed as a percent of plant annual net generation.
PLSOPR = 100 * (PLGENASO / PLNGENAN).

113. Plant Geothermal Generation Percent (PLGTPR) –
The geothermal resource mix expressed as a percent of plant annual net generation.:
PLGTPR = 100 * (PLGENAGT / PLNGENAN).

114. Plant Other Fossil Generation Percent (PLOFPR) –
The other fossil resource mix expressed as a percent of plant annual net generation.
PLOFPR = 100 * (PLGENAOF / PLNGENAN).

115. Plant Other Unknown/Purchased Fuel Generation Percent (PLOPPR) –
The other unknown/purchased fuel/waste heat resource mix expressed as a percent of plant annual net generation.
PLOPPR = 100 * (PLGENAOP / PLNGENAN).

116. Plant Total Nonrenewables Generation Percent (PLTNPR) –
The total nonrenewables resource mix expressed as a percent of plant annual net generation.
PLTNPR = 100 * (PLGENATN / PLNGENAN).

117. Plant Total Renewables Generation Percent (PLTRPR) –
The total renewables resource mix expressed as a percent of plant annual net generation.
PLTRPR = 100 * (PLGENATR / PLNGENAN).

118. Plant Total Nonhydro Renewables Generation Percent (PLTHPR) –
The total nonhydro renewables resource mix expressed as a percent of plant annual net generation.
PLTHPR = 100 * (PLGENATH / PLNGENAN).

119. Plant Total Combustion Generation Percent (PLCYPR) –
The total combustion resource mix expressed as a percent of plant annual net generation.
PLCYPR = 100 * (PLGENACY / PLNGENAN).

120. Plant Total Noncombustion Generation Percent (PLCNPR) –
The total noncombustion resource mix expressed as a percent of plant annual net generation.
PLCNPR = 100 * (PLGENACN / PLNGENAN).

5.4 The ST (State) File

There are 112 variables in the fourth file, ST, which contains state level data. All size, heat input, generation, and emission values are derived by aggregating from the plant level based on the state in which the plant is located. Aggregated variable names generally begin with "ST." Variables that are either identical to those in the plant file or different from those in the plant file by the first two letters of their names (e.g., STHTIAN instead of PLHTIAN) are not re-defined here.

1. State Abbreviation (PSTATABB) –

2. FIPS State Code (FIPSST) –

3. State Nameplate Capacity (NAMEPCAP) –

4. State Annual Heat Input from Combustion (STHTIAN) –

5. State Ozone Season Heat Input from Combustion (STHTIOZ) –

6. State Total Annual Heat Input (STHTIANT) –

7. State Total Ozone Season Heat Input (STHTIOZT) –

8. State Annual Net Generation (STNGENAN) –

9. State Ozone Season Net Generation (STNGENOZ) –

10. State Annual NO_x Emissions (STNOXAN) –

11. State Ozone Season NO_x Emissions (STNOXOZ) –

12. State Annual SO_2 Emissions (STSO2AN) –

13. State Annual CO_2 Emissions (STCO2AN) –

14. State Annual CH_4 Emissions (STCH4AN) –

15. State Annual N_2O Emissions (STN2OAN) –

16. State Annual CO_2 Equivalent Emissions (STCO2EQA) –
This field, in short tons, is the sum of each state's plants' PLCO2EQA.

17. State Annual Hg Emissions (STHGAN) –

18. State Annual NO_x Total Output Emission Rate (STNOXRTA) –
This field, in lb/MWh, is calculated as follows:
STNOXRTA = 2000 * (STNOXAN / STNGENAN).

19. State Ozone Season NO_x Total Output Emission Rate (STNOXRTO) –
This field, in lb/MWh, is calculated as follows:
STNOXRTO = 2000 * (STNOXOZ / STNGENOZ).

20. State Annual SO_2 Total Output Emission Rate (STSO2RTA) –
This field, in lb/MWh, is calculated as follows:
STSO2RTA = 2000 * (STSO2AN / STNGENAN).

21. State Annual CO_2 Total Output Emission Rate (STCO2RTA) –
This field, in lb/MWh, is calculated as follows:
STCO2RTA = 2000 * (STCO2AN / STNGENAN).

22. State Annual CH_4 Total Output Emission Rate (STCH4RTA) –
This field, in lb/GWh, is calculated as follows:
STHCH4RTA = STCH4AN / (STNGENAN / 1000).

23. State Annual N_2O Total Output Emission Rate (STN2ORTA) –
This field, in lb/GWh, is calculated as follows:
STN2ORTA = STN2OAN / (STNGENAN / 1000).

24. State Annual CO_2 Equivalent Total Output Emission Rate (STC2ERTA) –
This field, in lb/MWh, is calculated as follows:
STC2ERTA = 2000 * (STCO2EQA / STNGENAN).

25. State Annual Hg Total Output Emission Rate (STHGRTA) –
This field, in lb/GWh, is calculated as follows:
STHGRTA = STHGAN / (STNGENAN / 1000).

26. State Annual NO_x Input Emission Rate (STNOXRA) –
This field, in lb/MMBtu, is calculated as follows:
STNOXRA = 2000 * (STNOXAN / STHTIAN).

27. State Ozone Season NO_x Input Emission Rate (STNOXRO) –
This field, in lb/MMBtu, is calculated as follows:
STNOXRO = 2000 * (STNOXOZ / STHTIOZ).

28. State Annual SO_2 Input Emission Rate (STSO2RA) –
This field, in lb/MMBtu, is calculated as follows:
STSO2RA = 2000 * (STSO2AN / STHTIAN).

29. State Annual CO_2 Input Emission Rate (STCO2RA) –
This field, in lb/MMBtu, is calculated as follows:
STCO2RA = 2000 * (STCO2AN / STHTIAN).

30. State Annual Hg Input Emission Rate (STHGRA) –
This field, in lb/BBtu, is calculated as follows:
STHGRA = STHGAN / (STHTIAN / 1000).

31. State Annual NO_x Combustion Output Emission Rate (STNOXCRT) –
This field, in lb/MMBtu, is calculated as follows:
STNOXCRT =2000 * (STNOXAN / STGENACY).

32. State Ozone Season NO_x Combustion Output Emission Rate (STNOXCRO) –
This field, in lb/MMBtu, is calculated as follows:
STNOXCRO = 2000 * (STNOXOZ / ((STGENACY*STNGENOZ)/STNGENAN)).

33. State Annual SO_2 Combustion Output Emission Rate (STSO2CRT) –
This field, in lb/MMBtu, is calculated as follows:
STSO2CRT = 2000 * (STSO2AN / STGENACY).

34. State Annual CO_2 Combustion Output Emission Rate (STCO2CRT) –
This field, in lb/MMBtu, is calculated as follows:
STCO2CRT = 2000 * (STCO2AN / STGENACY).

35. State Annual CH_4 Combustion Output Emission Rate (STCH4CRT) –
This field, in lb/BBtu, is calculated as follows:
STCH4CRT = STCH4AN / (STGENACY / 1000).

36. State Annual N_2O Combustion Output Emission Rate (STN2OCRT) –
This field, in lb/BBtu, is calculated as follows:
STN2OCRT = STN2OAN / (STGENACY / 1000).

37. State Annual Hg Combustion Output Emission Rate (STHGCRT) –
This field, in lb/BBtu, is calculated as follows:
STHGCRT = STHGAN / (STGENACY / 1000).

38. State Annual NO_x Coal Output Emission Rate (STCNOXRT) –
The sum of the annual NO_x emissions from all plants in the state that have coal as the primary fuel (PLPRMFL) divided by the sum of the annual combustion net generation from the same set of plants, and multiplied by a unit conversion factor, in lb/MWh.

39. State Annual NO_x Oil Output Emission Rate (STONOXRT) –
The sum of the annual NO_x emissions from all plants in the state that have oil as the primary fuel (PLPRMFL) divided by the sum of the annual combustion net generation from the same set of plants, and multiplied by a unit conversion factor, in lb/MWh.

40. State Annual NO_x Gas Output Emission Rate (STGNOXRT) –
The sum of the annual NO_x emissions from all plants in the state that have natural gas as the primary fuel (PLPRMFL) divided by the sum of the annual combustion net generation from the same set of plants, and multiplied by a unit conversion factor, in lb/MWh.

41. State Annual NO_x Fossil Fuel Output Emission Rate (STFSNXRT) –
The sum of the annual NO_x emissions from all plants in the state that have any fossil fuel (coal, oil, gas**,** or other fossil) as the primary fuel (PLPRMFL) divided by the sum of the annual combustion net generation from the same set of plants, and multiplied by a unit conversion factor, in lb/MWh.

42. - 45. State Ozone Season NOx Coal, Oil, Gas, and Fossil Fuel Output Emission Rates –
The descriptions of these fields, in lb/MWh, contain the same information for ozone season NOx as fields #37 through #40, respectively, do for annual NOx. The state ozone season combustion net generation, used in the denominator of the equations used to calculate these state fuel-based output emission rates is calculated as the ratio of the state annual to ozone season net generation for that fuel times the state annual combustion net generation.

46. - 49. State Annual SO_2 Coal, Oil, Gas, and Fossil Fuel Output Emission Rates –
The descriptions of these fields, in lb/MWh, contain the same information for annual SO_2 as fields #37 through #40, respectively, do for annual NO_x.

50. - 53. State Annual CO_2 Coal, Oil, Gas, and Fossil Fuel Output Emission Rates –
The descriptions of these fields, in lb/MWh, contain the same information for annual CO_2 as fields #37 through #40, respectively, do for annual NO_x.

54. - 55. State Annual Hg Coal, Oil, Gas, and Other Fossil Fuel Output Emission Rates –
The descriptions of these fields, in lb/GWh, contain the same information for annual Hg as fields #37 and #40, respectively, do for annual NO_x.

56. - 73. State Annual NO_x, Ozone Season NO_x, Annual SO_2, Annual CO_2 Coal, Oil, Gas, and Fossil Fuel Input Emission Rates; and Annual Hg Coal and Fossil Fuel Input Emission Rates –

The description of these fields, primary fuel-specific input emission rates, contains the same information that fields #37 through #54 do for primary fuel-specific output emission rates – except that the calculations include heat input, rather than net generation. Note that for Hg input emission rates, the units are lb/BBtu, not lb/MMBtu. These values are calculated in the same manner as the input emission rates, using heat input in place of generation.

74. - 80. State Annual NO_x, Ozone Season NO_x, Annual SO_2, Annual CO_2, Annual CH_4, Annual N_2O, and Annual Hg Non-baseload Output Emission Rate –

This field, in lb/MWh, is calculated as the sum of the annual non-baseload NO_x, ozone season non-baseload NO_x, annual non-baseload SO_2, annual non-baseload CO_2, annual non-baseload CH_4, annual non-baseload N_2O, and annual non-baseload Hg emissions divided by the sum of annual non-baseload net generation in the state and then multiplied by a unit conversion factor. This field is intended to provide a more refined estimate of avoided emissions than the fossil-fuel average output emission rate. The non-baseload emissions and generation include only emissions and generation from combustion sources and exclude emissions and generation from plants that have high capacity factors. The remaining emissions and generation are weighted by a factor which is a function of capacity factor. For more information, see the Methodology Section.

81. State Annual Coal Net Generation (STGENACL) –

82. State Annual Oil Net Generation (STGENAOL) –

83. State Annual Gas Net Generation (STGENAGS) –

84. State Annual Nuclear Net Generation (STGENANC) –

85. State Annual Hydro Net Generation (STGENAHY) –

86. State Annual Biomass Net Generation (STGENABM) –

87. State Annual Wind Net Generation (STGENAWI) –

88. State Annual Solar Net Generation (STGENASO) –

89. State Annual Geothermal Net Generation (STGENAGT) –

90. State Annual Other Fossil Net Generation (STGENAOF) –

91. State Annual Other Unknown/Purchased Fuel Net Generation (STGENAOP) –

92. State Annual Total Nonrenewables Net Generation (STGENATN) –

93. State Annual Total Renewables Net Generation (STGENATR) –

94. State Annual Total Nonhydro Renewables Net Generation (STGENATH) –

95. State Annual Total Combustion Net Generation (STGENACY) –

96. State Annual Total Noncombustion Net Generation (STGENACN) –

97. State Coal Generation Percent (STCLPR) –

98. State Oil Generation Percent (STOLPR) –

99. State Gas Generation Percent (STGSPR) –

100. State Nuclear Generation Percent (STNCPR) –

101. State Hydro Generation Percent (STHYPR) –

102. State Biomass Generation Percent (STBMPR) –

103. State Wind Generation Percent (STWIPR) –

104. State Solar Generation Percent (STSOPR) –

105. State Geothermal Generation Percent (STGTPR) –

106. State Other Fossil Generation Percent (STOFPR) –

107. State Other Unknown/Purchased Fuel Generation Percent (STOPPR) –

108. State Total Nonrenewables Generation Percent (STTNPR) –

109. State Total Renewables Generation Percent (STTRPR) –

110. State Total Nonhydro Renewables Generation Percent (STTHPR) –

111. State Total Combustion Generation Percent (STCYPR) –

112. State Total Noncombustion Generation Percent (STCNPR) –

5.5 The BA (Balancing Authority) File

There are 112 variables in the fifth file, BA, which contains location (operator)-based balancing authority data. All generation and emission values are derived by aggregating from the plant level based on the associated balancing authority.

All variables have been described in previous file variable descriptions. Aggregated variable names generally begin with "BA."

5.6 The SRL (eGRID Subregion) File

There are 151 variables in the sixth file, SRL, which contains location (operator)-based eGRID subregions. All generation and emission values are derived by aggregating from the plant level based on the associated eGRID subregion.

The eGRID Subregion file contains several unique variables that are not included in the other aggregated level files. These variables include: nonbaseload generation and resource mix by fuel type (coal, oil, gas, and fossil fuel). These are calculated as the generation at a plant from the Plant file multiplied by the nonbaseload factor for that plant, summed for each fuel type.

All other variables in the eGRID Subregion file have been described in previous file variable descriptions. Aggregated variable names generally begin with "SR."

5.7 The NRL (NERC Region) File

There are 112 variables in the seventh file, NRL, which contains location (operator)-based NERC region data. All generation and emission values are derived by aggregating from the plant level based on the associated NERC region.

The only variable in this file that has not been described in a previous file variable description is NERCNAME, the NERC region name associated with the NERC region acronym (see Section 3.5.1). Aggregated variable names generally begin with "NR."

5.8 The US (U.S.) File

There are 110 variables in the eighth file, US, which contains data for the entire United States. All generation and emission values are derived by aggregating from the plant level. All variables have been described in previous file variable descriptions. Aggregated variable names generally begin with "US."

5.9 The Regional Grid Gross Loss File

There are five variables in the GGL file, reported in eGRID at the regional level based on the aforementioned aggregated state level data:

1. **REGION**
   One of the three interconnect power grids in the U.S.: Eastern, Western, or ERCOT, plus the states of Alaska and Hawaii, and the entire U.S.

2. Estimated Losses (ESTLOSS)
The total amount of electricity, in MWh, in the region that is generated but is not sold for resale or wholesale, furnished without charge, or used by the generator or utility; i.e., electricity that is lost in transmission and distribution.
Source: EIA State Electricity Profiles, Supply and disposition of electricity, 1990-2014.

3. Total Disposition (TOTDISP)
The total amount of electricity, in MWh, in the region that is sold directly to customers, sold for resale, furnished without charge, consumed by the respondent without charge, and lost; i.e., all electricity generated.
Source: EIA State Electricity Profiles, Supply and disposition of electricity, 1990-2014.

4. Direct Use (DIRCTUSE)
The total amount of electricity, in MWh, used by plants and/or utilities in the region that is not sold for wholesale or resale; direct use electricity is not transmitted through the grid and therefore does not have the potential to be lost.
Source: EIA State Electricity Profiles, Supply and disposition of electricity, 1990-2014.

5. Grid Gross Loss (GGRSLOSS)
The estimated grid gross loss as a percent. The formula used is **[ESTLOSS/(TOTDISP – DIRCTUSE)]*100**.

The grid gross loss values can be used when applying eGRID GHG factors (eGRID subregion annual GHG total output emission rates) to consumption. Specifically, to account for indirect emissions associated with consumption of electricity (both from generation and from transmission and distribution line losses) divide the product of the electricity consumption and the generation based eGRID total output emission rates by (one minus the grid gross loss as a decimal). See the equation below:

GHG emis cons = GHG emis rate * Consumption / (1-ggl%/100)/2000

Where;

GHG emis cons	=	a specified GHG emission associated with a certain amount of electricity consumption (generation and line losses) in short tons,
GHG emis rate	=	eGRID subregion annual total output emission rate in lb/MWh for a specified GHG,
Consumption	=	the given electricity consumption in MWh (kWh/1000), and
ggl%	=	the estimated regional grid gross loss as a percent.

If reporting the indirect emissions for the electricity generation (scope 2 emissions) separately from the indirect emissions as a result of transmission and distribution line losses (scope 3 emissions), then the scope 2 emissions are simply the consumption in MWh multiplied by the eGRID subregion annual total output emission rate in lb/MWh, and the scope 3 emissions are calculated in the following equation:

GHG emis ll = GHG emis rate * Consumption * (ggl%/100) / (1-ggl%/100)/2000

Where;

GHG emis ll	=	a specified GHG emission associated with the line losses of a certain amount of electricity consumption in short tons,
GHG emis rate	=	eGRID subregion annual total output emission rate in lb/MWh for a specified GHG,
Consumption	=	the given electricity consumption in MWh (= kWh/1000), and
ggl%	=	the estimated regional grid gross loss as a percent.

6. References

CARB, 2007: California Air Resources Board "Regulation for the Mandatory Reporting of Greenhouse Gas Emissions (AB 32 requirements)" Table 5 in Appendix A, December 2007. http://www.arb.ca.gov/regact/2007/ghg2007/frofinoal.pdf

Carbon Visuals, 2016: "Visualizing the carbon footprint of all US power stations," http://www.carbonvisuals.com/projects/2015/6/23/visualising-the-carbon-footprint-of-all-us-power-stations?rq=eGRID

Diem, Salhotra and Quiroz, 2013: Diem, A., M. Salhotra, and C. Quiroz, "Using EPA's eGRID to Estimate GHG Emissions Reductions from Energy Efficiency" International Energy Program Evaluation Conference, Chicago IL, August 2013.

Diem and Quiroz, 2013: Diem, A. and C. Quiroz, "Using eGRID Data for Carbon Footprinting Electricity Purchases," Energy, Utility, and Environment Conference, Phoenix, Arizona, January 2013.

Diem and Quiroz, 2012: Diem, A., and C. Quiroz, "How to use eGRID for Carbon Footprinting Electricity Purchases in Greenhouse Gas Emission Inventories" presented at the U.S. Environmental Protection Agency 2012 International Emission Inventory Conference, Tampa, Florida, August 2012.
http://www.epa.gov/ttn/chief/conference/ei20/session3/adiem.pdf
http://www.epa.gov/ttn/chief/conference/ei20/index.html#ses-3

Dorn et al., 2015: "EPA's Emissions & Generation Resource Integrated Database (eGRID): Improvements and Applications," presented at the Community Modeling and Analysis System Conference. https://www.cmascenter.org/conference/2015/agenda.cfm

DOE, 2016: U.S. Department of Energy, Energy Efficiency and Renewable Energy, Combined Heat and Power Installation Database. https://doe.icfwebservices.com/chpdb/

DVRPC, 2010: Delaware Valley Regional Planning Commission, Regional Greenhouse Gas Emissions Inventory, revised December 2010.
http://www.dvrpc.org/reports/09038A.pdf

EIA, 2016a: Energy Information Administration, "2014 Annual Electric Generator Report," Form EIA-860, Washington, DC, 2014.
http://www.eia.gov/cneaf/electricity/page/eia860.html

EIA, 2016b: Energy Information Administration, "2014 Power Plant Operations Report," Form EIA-923, Washington, DC, 2014.
http://www.eia.gov/cneaf/electricity/page/eia906_920.html

EIA, 2016c: Energy Information Administration, "2014 Annual Electric Power Industry Report," Form EIA-861, Washington, DC, 2014.
http://www.eia.gov/cneaf/electricity/page/eia861.html

EIA, 2016d: Energy Information Administration, "2014 State Electricity Profiles."
http://www.eia.gov/electricity/state/

EIA, 2014: Energy Information Administration, "The Electricity Market Module of the National Energy Modeling System: Model Documentation 2014," Figure 3, Washington, DC, August 2014. http://www.eia.gov/outlooks/aeo/nems/documentation/electricity/pdf/m068(2014).pdf

EPA, 1995: U.S. Environmental Protection Agency, "Compilation of Air Pollutant Emission Factors, Volume I: Stationary Point and Area Source, AP-42, Fifth Edition." https://www.epa.gov/air-emissions-factors-and-quantification/ap-42-compilation-air-emission-factors#5thed

EPA, 2009: U.S. Environmental Protection Agency, Final Mandatory Reporting of Greenhouse Gases Rule (Table C-1, Default CO_2 Emission Factors and High Heat Values for Various Types of Fuel and Table C-2, Default CH_4 and N_2O Emission Factors for Various Types of Fuel), Washington, D.C., October 30, 2009. https://www.epa.gov/sites/production/files/2015-06/documents/ghg-mrr-finalrule.pdf

EPA, 2016a: EPA Center for Corporate Climate Leadership. https://www.epa.gov/climateleadership

EPA, 2016b: Inventory of U.S. Greenhouse Gas Emissions and Sinks: 1990-2014. https://www.epa.gov/ghgemissions/inventory-us-greenhouse-gas-emissions-and-sinks-1990-2014

EPA, 2016c: WebFIRE, Technology Transfer Network Clearinghouse for Inventories and Emissions Factors. https://cfpub.epa.gov/webfire/

EPA, 2016d: LFG Energy Project Development Handbook. Landfill Methane Outreach Program. https://www.epa.gov/sites/production/files/2016-11/documents/pdh_full.pdf

Galvin, 2011: Galvin Electricity Initiative, Achieve Cheaper, Cleaner Electricity Now through Restructuring, 2010. http://www.galvinpower.org/achieve-cheaper-cleaner-electricity-now-through-restructuring

GEA, 2007: Alyssa Kagel, Diana Bates, and Karl Gawell. Table 3, Air Emissions Summary, in "A Guide to Geothermal Energy and the Environment", Geothermal Energy Association, Washington, D.C., April 2007. http://geo-energy.org/reports/Environmental%20Guide.pdf

GEA, 2016: Geothermal Energy Association, geothermal plant type from annual power production reports, http://geo-energy.org/reports.aspx.

Greenhouse Gas Protocol, 2016: The Greenhouse Gas Protocol. http://www.ghgprotocol.org/

IPCC, 2007: The Intergovernmental Panel on Climate Change (IPCC), "2006 IPCC Guidelines for National Greenhouse Gas Inventories", volume 2 (Energy), April 2007. http://www.ipcc-nggip.iges.or.jp/public/2006gl/pdf/2_Volume2/V2_2_Ch2_Stationary_Combustion.pdf

Johnson, Schreifels, and Quiroz, 2015: Johnson, T., J. Schreifels, and C. Quiroz, "eGRID Updates." Energy, Utility, and Environment Conference, San Diego, CA, February 2015.

Jones and Kammen, 2013: "Data & Calculations for "Quantifying Carbon Footprint Reduction Opportunities for U.S. Households" Cool Climate Network Maps https://docs.google.com/file/d/0BwI9ptFQU1QiM2IzNWE0YTQtNjY4NS00MzM5LWFkZDUt

OWNkY2NkNTMxOTM4
http://coolclimate.berkeley.edu/maps

Maryland, 2010: Maryland Department of the Environment, Technical Support Document for Amendments to COMAR 26.09 MD CO_2 Budget Training Program, Baltimore, MD, October 25, 2010. http://www.mde.state.md.us/aboutmde/AboutMDEHome/Documents/RGGI-VERSA_TSD.PDF

TCR, 2016: The Climate Registry, "General Reporting Protocol Version 2.1," https://www.theclimateregistry.org/tools-resources/reporting-protocols/general-reporting-protocol/

UCS, 2012: Union of Concerned Scientists, "State of Charge: Electric Vehicles' Global Warming Emissions and Fuel-Cost Savings Across the United States, April 2012. http://www.ucsusa.org/clean_vehicles/technologies_and_fuels/hybrid_fuelcell_and_electric_vehicles/emissions-and-charging-costs-electric-cars.html?utm_source=SP&utm_medium=head&utm_campaign=EV%2BReport

US Census, 2016: United States Census Bureau, "2010 FIPS Codes for Counties and County Equivalent Entities," https://www.census.gov/geo/reference/codes/cou.html

Wheeler, 2007: David Wheeler, Senior Fellow, Center for Global Development, CARMA developer, personal communication, November 30, 2007.

Appendix A. eGRID File Structure - Variable Descriptions for eGRID2014

The structure of the nine files – including descriptions of the variables, unit of measurement, and original source(s) of data – are delineated below in the file structure. NOTE: *Italics indicates new field*; **bold indicates methodological change.**

Table A-1. eGRID File Structure, eGRID2014 UNIT Unit File

Field	Name	Description	Unit	Source(s)
1	SEQBLR14	eGRID2014 file boiler sequence number		
2	PSTATABB	Plant state abbreviation		EIA-860
3	PNAME	Plant name		EPA/CAMD
4	ORISPL	DOE/EIA ORIS plant or facility code		EPA/CAMD, EIA-860
5	UNITID	Unit ID		EPA/CAMD, EIA-923
6	*PRMVR*	*Prime Mover*		*EPA/CAMD, EIA-860*
7	*UNTOPST*	*Unit operational status*		*EPA/CAMD, EIA-860*
8	CAMDFLAG	CAMD Program flag		EPA/CAMD
9	PRGCODE	Program code(s)		EPA/CAMD
10	BOTFIRTY	Boiler bottom and firing type		EPA/CAMD, EIA-860
11	NUMGEN	Number of associated generators		EIA-860
12	FUELU1	Unit primary fuel		EPA/CAMD, EIA-923, EIA-860
13	HRSOP	Unit operating hours	hours	EPA/CAMD
14	**HTIAN**	**Unit unadjusted annual heat input**	**MMBtu**	**EPA/CAMD, EIA-923**
15	**HTIOZ**	**Unit unadjusted ozone season heat input**	**MMBtu**	**EPA/CAMD, EIA-923**
16	**NOXAN**	**Unit unadjusted annual NO_x emissions**	**tons**	**EPA/CAMD, EIA-923**
17	**NOXOZ**	**Unit unadjusted ozone season NO_x emissions**	**tons**	**EPA/CAMD, EIA-923**
18	**SO2AN**	**Unit unadjusted annual SO_2 emissions**	**tons**	**EPA/CAMD**
19	**CO2AN**	**Unit unadjusted annual CO_2 emissions**	**tons**	**EPA/CAMD**
20	*HTIANSRC*	*Unit unadjusted annual heat input source*		*EPA/CAMD, EIA-923*
21	*HTIOZSRC*	*Unit unadjusted ozone season heat input source*		*EPA/CAMD, EIA-923*
22	*NOXANSRC*	*Unit unadjusted annual NO_x emissions source*		*EPA/CAMD, EIA-923*
23	*NOXOZSRC*	*Unit unadjusted ozone season NO_x emissions source*		*EPA/CAMD, EIA-923*
24	*SO2SRC*	*Unit unadjusted annual SO_2 emissions source*		*EPA/CAMD, EIA-923*
25	*CO2SRC*	*Unit unadjusted annual CO_2 emissions source*		*EPA/CAMD, EIA-923*
26	SO2CTLDV	Unit SO_2 (scrubber) first control device		EPA/CAMD, EIA-860
27	NOXCTLDV	Unit NO_x first control device		EPA/CAMD
28	HGCTLDV	Unit Hg activated carbon injection system flag: 1 = Yes		EIA-860
29	UNTYRONL	Unit year on-line		EPA/CAMD, EIA-860

Table A-2. eGRID File Structure, eGRID2014 GEN Generator File

Field	Name	Description	Unit	Source(s)
1	SEQGEN14	eGRID2014 file generator sequence number		
2	PSTATABB	Plant state abbreviation		EIA-860
3	PNAME	Plant name		EPA/CAMD; EIA-860
4	ORISPL	DOE/EIA ORIS plant or facility code		EPA/CAMD; EIA-860
5	GENID	Generator ID		EIA-860
6	NUMBLR	Number of associated boilers		EIA-860
7	GENSTAT	Generator status		EIA-860
8	PRMVR	Generator prime mover type		EIA-860
9	FUELG1	Generator primary fuel		EIA-860
10	NAMEPCAP	Generator nameplate capacity	MW	EIA-860
11	CFACT	Generator capacity factor		
12	**GENNTAN**	**Generator annual net generation**	**MWh**	**EIA-923**
13	**GENNTOZ**	**Generator ozone season net generation**	**MWh**	**EIA-923**
14	GENERSRC	Generation data source		
15	GENYRONL	Generator year on-line		EIA-860
16	*GENYRRET*	*Generator year retired*		*EIA-860*

Table A-3. eGRID File Structure, eGRID2012 PLNT Plant File

Field	Name	Description	Unit	Source(s)
1	SEQPLT14	eGRID 2014 file plant sequence number		
2	PSTATABB	Plant state abbreviation		EIA-860
3	PNAME	Plant name		EPA/CAMD; EIA-860
4	ORISPL	DOE/EIA ORIS plant or facility code		EPA/CAMD; EIA-860
5	OPRNAME	Plant operator name		EIA-860
6	OPRCODE	Plant operator ID		EIA-860
7	UTLSRVNM	Utility service territory name		EIA-860
8	UTLSRVID	Utility service territory ID		EIA-860
9	BANAME	Balancing authority name		EIA-860; EIA-861
10	BACODE	Balancing authority ID code		EIA-860; EIA-861
11	NERC	NERC region acronym		EIA-860
12	SUBRGN	eGRID subregion acronym		EPA
13	SRNAME	eGRID subregion name		EPA
14	ISORTO	Plant associated ISO/RTO Territory		EIA-860
15	FIPSST	Plant FIPS state code		US Census
16	FIPSCNTY	Plant FIPS county code		US Census
17	CNTYNAME	Plant county name		EIA-860
18	LAT	Plant latitude		EIA-860
19	LON	Plant longitude		EIA-860
20	NUMBLR	Number of boilers		EIA-860
21	NUMGEN	Number of generators		EIA-860
22	PLPRMFL	Plant primary fuel		EPA/CAMD; EIA-923
23	PLFUELCT	Plant primary fuel category		
24	COALFLAG	Flag indicating if the plant burned or generated any amount of coal: 1 = Yes		
25	CAPFAC	Plant capacity factor		
26	NAMEPCAP	Plant nameplate capacity	MW	EIA-860
27	*NBFACTOR*	*Plant nonbaseload factor*		*Calculated*
28	RMBMFLAG	Biogas/biomass plant adjustment flag		
29	CHPFLAG	Combined heat and power (CHP) plant adjustment flag		EPA/CAMD; EIA-860
30	USETHRMO	CHP plant useful thermal output	MMBtu	EIA-923 calculated
31	PWRTOHT	CHP plant power to heat ratio		
32	**ELCALLOC**	**CHP plant electric allocation factor**		
33	PSFLAG	Plant pumped storage flag: 1 = Yes		EIA-860
34	PLHTIAN	Plant annual heat input for combustion units	MMBtu	EPA/CAMD; EIA-923
35	PLHTIOZ	Plant ozone season heat input for combustion units	MMBtu	EPA/CAMD; EIA-923
36	*PLHTIANT*	*Plant annual heat input for all units*	*MMBtu*	*EPA/CAMD; EIA-923*
37	*PLHTIOZT*	*Plant ozone season heat input for all units*	*MMBtu*	*EPA/CAMD; EIA-923*
38	PLNGENAN	Plant annual net generation	MWh	EIA-923, EPA/CAMD
39	PLNGENOZ	Plant ozone season net generation	MWh	EIA-923, EPA/CAMD
40	PLNOXAN	Plant annual NO_x emissions	tons	
41	PLNOXOZ	Plant ozone season NO_x emissions	tons	
42	PLSO2AN	Plant annual SO_2 emissions	tons	
43	PLCO2AN	Plant annual CO_2 emissions	tons	
44	PLCH4AN	Plant annual CH_4 emissions	lbs	
45	PLN2OAN	Plant annual N_2O emissions	lbs	
46	PLCO2EQA	Plant annual CO_2 equivalent emissions ((1 * PLCO2AN) + (21 * PLCH4AN/2000) + (310 * PLN2OAN/2000))	tons	
47	PLHGAN	Plant annual Hg emissions	lbs	
48	PLNOXRTA	Plant annual NO_x total output emission rate	lb/MWh	
49	PLNOXRTO	Plant ozone season NO_x total output emission rate	lb/MWh	
50	PLSO2RTA	Plant annual SO_2 total output emission rate	lb/MWh	

Field	Name	Description	Unit	Source(s)
51	PLCO2RTA	Plant annual CO_2 total output emission rate	lb/MWh	
52	PLCH4RTA	Plant annual CH_4 total output emission rate	lb/GWh	
53	PLN2ORTA	Plant annual N_2O total output emission rate	lb/GWh	
54	PLC2ERTA	Plant annual CO_2 equivalent total output emission rate	lb/MWh	
55	PLHGRTA	Plant annual Hg total output emission rate	lb/GWh	
56	PLNOXRA	Plant annual NO_x input emission rate	lb/MMBtu	
57	PLNOXRO	Plant ozone season NO_x input emission rate	lb/MMBtu	
58	PLSO2RA	Plant annual SO_2 input emission rate	lb/MMBtu	
59	PLCO2RA	Plant annual CO_2 input emission rate	lb/MMBtu	
60	PLHGRA	Plant annual Hg input emission rate	lb/BBtu	
61	PLNOXCRT	Plant annual NO_x combustion output emission rate	lb/MWh	
62	PLNOXCRO	Plant ozone season NO_x combustion output emission rate	lb/MWh	
63	PLSO2CRT	Plant annual SO_2 combustion output emission rate	lb/MWh	
64	PLCO2CRT	Plant annual CO_2 combustion output emission rate	lb/MWh	
65	PLCH4CRT	Plant annual CH_4 combustion output emission rate	lb/GWh	
66	PLN2OCRT	Plant annual N_2O combustion output emission rate	lb/GWh	
67	PLHGCRT	Plant annual Hg combustion output emission rate	lb/GWh	
68	UNNOX	Plant unadjusted annual NO_x emissions	tons	EPA/CAMD, EIA-923
69	UNNOXOZ	Plant unadjusted ozone season NO_x emissions	tons	EPA/CAMD, EIA-923
70	UNSO2	Plant unadjusted annual SO_2 emissions	tons	EPA/CAMD, EIA-923
71	UNCO2	Plant unadjusted annual CO_2 emissions	tons	EPA/CAMD, EIA-923
72	UNCH4	Plant unadjusted annual CH_4 emissions	lbs	EPA/CAMD, EIA-923
73	UNN2O	Plant unadjusted annual N_2O emissions	lbs	EPA/CAMD, EIA-923
74	UNHG	Plant unadjusted annual Hg emissions	lbs	
75	UNHTI	Plant unadjusted annual heat input for combustion units	MMBtu	EPA/CAMD, EIA-923
76	UNHTIOZ	Plant unadjusted ozone season heat input for combustion units	MMBtu	EPA/CAMD, EIA-923
77	*UNHTIT*	*Plant unadjusted annual heat input for all units*	*MMBtu*	*EPA/CAMD, EIA-923*
78	*UNHTIOZT*	*Plant unadjusted ozone season heat input for all units*	*MMBtu*	*EPA/CAMD, EIA-923*
79	*UNNOXSRC*	*Plant unadjusted annual NO_x emissions source*		*EPA/CAMD, EIA-923*
80	*UNNOZSRC*	*Plant unadjusted ozone season NO_x emissions source*		*EPA/CAMD, EIA-923*
81	*UNSO2SRC*	*Plant unadjusted annual SO_2 emissions source*		*EPA/CAMD, EIA-923*
82	*UNCO2SRC*	*Plant unadjusted annual CO_2 emissions source*		*EPA/CAMD, EIA-923*
83	*UNCH4SRC*	*Plant unadjusted annual CH_4 emissions source*		*EPA/CAMD, EIA-923*
84	*UNN2OSRC*	*Plant unadjusted annual N_2O emissions source*		*EPA/CAMD, EIA-923*
85	*UNHGSRC*	*Plant unadjusted annual Hg emissions source*		
86	*UNHTISRC*	*Plant unadjusted annual heat input source*		*EPA/CAMD, EIA-923*
87	*UNHOZSRC*	*Plant unadjusted ozone season heat input source*		*EPA/CAMD, EIA-923*
88	PLHTRT	Plant nominal heat rate	Btu/kWh	
89	PLGENACL	Plant annual coal net generation	MWh	
90	PLGENAOL	Plant annual oil net generation	MWh	
91	PLGENAGS	Plant annual gas net generation	MWh	
92	PLGENANC	Plant annual nuclear net generation	MWh	
93	PLGENAHY	Plant annual hydro net generation	MWh	
94	PLGENABM	Plant annual biomass net generation	MWh	
95	PLGENAWI	Plant annual wind net generation	MWh	
96	PLGENASO	Plant annual solar net generation	MWh	
97	PLGENAGT	Plant annual geothermal net generation	MWh	
98	PLGENAOF	Plant annual other fossil net generation	MWh	
99	PLGENAOP	Plant annual other unknown/purchased fuel net generation	MWh	
100	PLGENATN	Plant annual total nonrenewables net generation	MWh	
101	PLGENATR	Plant annual total renewables net generation	MWh	

Field	Name	Description	Unit	Source(s)
102	PLGENATH	Plant annual total nonhydro renewables net generation	MWh	
103	PLGENACY	Plant annual total combustion net generation	MWh	
104	PLGENACN	Plant annual total noncombustion net generation	MWh	
105	PLCLPR	Plant coal generation percent (resource mix)		
106	PLOLPR	Plant oil generation percent (resource mix)		
107	PLGSPR	Plant gas generation percent (resource mix)		
108	PLNCPR	Plant nuclear generation percent (resource mix)		
109	PLHYPR	Plant hydro generation percent (resource mix)		
110	PLBMPR	Plant biomass generation percent (resource mix)		
111	PLWIPR	Plant wind generation percent (resource mix)		
112	PLSOPR	Plant solar generation percent (resource mix)		
113	PLGTPR	Plant geothermal generation percent (resource mix)		
114	PLOFPR	Plant other fossil generation percent (resource mix)		
115	PLOPPR	Plant other unknown/purchased fuel generation percent (resource mix)		
116	PLTNPR	Plant total nonrenewables generation percent (resource mix)		
117	PLTRPR	Plant total renewables generation percent (resource mix)		
118	PLTHPR	Plant total nonhydro renewables generation percent (resource mix)		
119	PLCYPR	Plant total combustion generation percent (resource mix)		
120	PLCNPR	Plant total noncombustion generation percent (resource mix)		

Table A-4. eGRID File Structure, eGRID2014 ST State File

Field	Name	Description	Unit
1	PSTATABB	State abbreviation	
2	FIPSST	FIPS state code	
3	NAMEPCAP	State nameplate capacity	MW
4	STHTIAN	State annual heat input from combustion	MMBtu
5	STHTIOZ	State ozone season heat input from combustion	MMBtu
6	*STHTIANT*	*State total annual heat input*	*MMBtu*
7	*STHTIOZT*	*State total ozone season heat input*	*MMBtu*
8	STNGENAN	State annual net generation	MWh
9	STNGENOZ	State ozone season net generation	MWh
10	STNOXAN	State annual NO_x emissions	tons
11	STNOXOZ	State ozone season NO_x emissions	tons
12	STSO2AN	State annual SO_2 emissions	tons
13	STCO2AN	State annual CO_2 emissions	tons
14	STCH4AN	State annual CH_4 emissions	lbs
15	STN2OAN	State annual N_2O emissions	lbs
16	STCO2EQA	State annual CO_2 equivalent emissions	tons
17	STHGAN	State annual Hg emissions	lbs
18	STNOXRTA	State annual NO_x total output emission rate	lb/MWh
19	STNOXRTO	State ozone season NO_x total output emission rate	lb/MWh
20	STSO2RTA	State annual SO_2 total output emission rate	lb/MWh
21	STCO2RTA	State annual CO_2 total output emission rate	lb/MWh
22	STCH4RTA	State annual CH_4 total output emission rate	lb/GWh
23	STN2ORTA	State annual N_2O total output emission rate	lb/GWh
24	STC2ERTA	State annual CO_2 equivalent total output emission rate	lb/MWh
25	STHGRTA	State annual Hg total output emission rate	lb/GWh
26	STNOXRA	State annual NO_x input emission rate	lb/MMBtu
27	STNOXRO	State ozone season NO_x input emission rate	lb/MMBtu
28	STSO2RA	State annual SO_2 input emission rate	lb/MMBtu
29	STCO2RA	State annual CO_2 input emission rate	lb/MMBtu
30	STHGRA	State annual Hg input emission rate	lb/BBtu
31	STNOXCRT	State annual NO_x combustion output emission rate	lb/MWh
32	STNOXCRO	State ozone season NO_x combustion output emission rate	lb/MWh
33	STSO2CRT	State annual SO_2 combustion output emission rate	lb/MWh
34	STCO2CRT	State annual CO_2 combustion output emission rate	lb/MWh
35	STCH4CRT	State annual CH_4 combustion output emission rate	lb/GWh
36	STN2OCRT	State annual N_2O combustion output emission rate	lb/GWh
37	STHGCRT	State annual Hg combustion output emission rate	lb/GWh
38	STCNOXRT	State annual NO_x coal output emission rate	lb/MWh
39	STONOXRT	State annual NO_x oil output emission rate	lb/MWh
40	STGNOXRT	State annual NO_x gas output emission rate	lb/MWh
41	STFSNXRT	State annual NO_x other fossil fuel output emission rate	lb/MWh
42	STCNXORT	State ozone season NO_x coal output emission rate	lb/MWh
43	STONXORT	State ozone season NO_x oil output emission rate	lb/MWh
44	STGNXORT	State ozone season NO_x gas output emission rate	lb/MWh
45	STFSNORT	State ozone season NO_x other fossil fuel output emission rate	lb/MWh
46	STCSO2RT	State annual SO_2 coal output emission rate	lb/MWh
47	STOSO2RT	State annual SO_2 oil output emission rate	lb/MWh
48	STGSO2RT	State annual SO_2 gas output emission rate	lb/MWh
49	STFSS2RT	State annual SO_2 other fossil fuel output emission rate	lb/MWh
50	STCCO2RT	State annual CO_2 coal output emission rate	lb/MWh
51	STOCO2RT	State annual CO_2 oil output emission rate	lb/MWh
52	STGCO2RT	State annual CO_2 gas output emission rate	lb/MWh

Field	Name	Description	Unit
53	STFSC2RT	State annual CO_2 other fossil fuel output emission rate	lb/MWh
54	STCHGRT	State annual Hg coal output emission rate	lb/GWh
55	STFSHGRT	State annual Hg other fossil fuel output emission rate	lb/GWh
56	STCNOXR	State annual NO_x coal input emission rate	lb/MMBtu
57	STONOXR	State annual NO_x oil input emission rate	lb/MMBtu
58	STGNOXR	State annual NO_x gas input emission rate	lb/MMBtu
59	STFSNXR	State annual NO_x other fossil fuel input emission rate	lb/MMBtu
60	STCNXOR	State ozone season NO_x coal input emission rate	lb/MMBtu
61	STONXOR	State ozone season NO_x oil input emission rate	lb/MMBtu
62	STGNXOR	State ozone season NO_x gas input emission rate	lb/MMBtu
63	STFSNOR	State ozone season NO_x other fossil fuel input emission rate	lb/MMBtu
64	STCSO2R	State annual SO_2 coal input emission rate	lb/MMBtu
65	STOSO2R	State annual SO_2 oil input emission rate	lb/MMBtu
66	STGSO2R	State annual SO_2 gas input emission rate	lb/MMBtu
67	STFSS2R	State annual SO_2 other fossil fuel input emission rate	lb/MMBtu
68	STCCO2R	State annual CO_2 coal input emission rate	lb/MMBtu
69	STOCO2R	State annual CO_2 oil input emission rate	lb/MMBtu
70	STGCO2R	State annual CO_2 gas input emission rate	lb/MMBtu
71	STFSC2R	State annual CO_2 other fossil fuel input emission rate	lb/MMBtu
72	STCHGR	State annual Hg coal input emission rate	lb/BBtu
73	STFSHGR	State annual Hg other fossil fuel input emission rate	lb/BBtu
74	STNBNOX	State annual NO_x non-baseload output emission rate	lb/MWh
75	STNBNXO	State ozone season NO_x non-baseload output emission rate	lb/MWh
76	STNBSO2	State annual SO_2 non-baseload output emission rate	lb/MWh
77	STNBCO2	State annual CO_2 non-baseload output emission rate	lb/MWh
78	STNBCH4	State annual CH_4 non-baseload output emission rate	lb/GWh
79	STNBN2O	State annual N_2O non-baseload output emission rate	lb/GWh
80	STNBHG	State annual Hg non-baseload output emission rate	lb/GWh
81	STGENACL	State annual coal net generation	MWh
82	STGENAOL	State annual oil net generation	MWh
83	STGENAGS	State annual gas net generation	MWh
84	STGENANC	State annual nuclear net generation	MWh
85	STGENAHY	State annual hydro net generation	MWh
86	STGENABM	State annual biomass net generation	MWh
87	STGENAWI	State annual wind net generation	MWh
88	STGENASO	State annual solar net generation	MWh
89	STGENAGT	State annual geothermal net generation	MWh
90	STGENAOF	State annual other fossil net generation	MWh
91	STGENAOP	State annual other unknown/purchased fuel net generation	MWh
92	STGENATN	State annual total nonrenewables net generation	MWh
93	STGENATR	State annual total renewables net generation	MWh
94	STGENATH	State annual total nonhydro renewables net generation	MWh
95	STGENACY	State annual total combustion net generation	MWh
96	STGENACN	State annual total noncombustion net generation	MWh
97	STCLPR	State coal generation percent (resource mix)	%
98	STOLPR	State oil generation percent (resource mix)	%
99	STGSPR	State gas generation percent (resource mix)	%
100	STNCPR	State nuclear generation percent (resource mix)	%
101	STHYPR	State hydro generation percent (resource mix)	%
102	STBMPR	State biomass generation percent (resource mix)	%
103	STWIPR	State wind generation percent (resource mix)	%
104	STSOPR	State solar generation percent (resource mix)	%
105	STGTPR	State geothermal generation percent (resource mix)	%
106	STOFPR	State other fossil generation percent (resource mix)	%

Field	Name	Description	Unit
107	STOPPR	State other unknown/purchased fuel generation percent (resource mix)	%
108	STTNPR	State total nonrenewables generation percent (resource mix)	%
109	STTRPR	State total renewables generation percent (resource mix)	%
110	STTHPR	State total nonhydro renewables generation percent (resource mix)	%
111	STCYPR	State total combustion generation percent (resource mix)	%
112	STCNPR	State total noncombustion generation percent (resource mix)	%

Table A-5. eGRID File Structure, eGRID2014 BA File, Balancing Authority (BA) File

Field	Name	Description	Unit
1	BAID	BA ID	
2	BANAME	BA name	
3	NAMEPCAP	BA nameplate capacity	MW
4	BAHTIAN	BA annual heat input from combustion	MMBtu
5	BAHTIOZ	BA ozone season heat input from combustion	MMBtu
6	*BAHTIANT*	*BA total annual heat input*	*MMBtu*
7	*BAHTIOZT*	*BA total ozone season heat input*	*MMBtu*
8	BANGENAN	BA annual net generation	MWh
9	BANGENOZ	BA ozone season net generation	MWh
10	BANOXAN	BA annual NO_x emissions	tons
11	BANOXOZ	BA ozone season NO_x emissions	tons
12	BASO2AN	BA annual SO_2 emissions	tons
13	BACO2AN	BA annual CO_2 emissions	tons
14	BACH4AN	BA annual CH_4 emissions	lbs
15	BAN2OAN	BA annual N_2O emissions	lbs
16	BACO2EQA	BA annual CO_2 equivalent emissions	tons
17	BAHGAN	BA annual Hg emissions	lbs
18	BANOXRTA	BA annual NO_x total output emission rate	lb/MWh
19	BANOXRTO	BA ozone season NO_x total output emission rate	lb/MWh
20	BASO2RTA	BA annual SO_2 total output emission rate	lb/MWh
21	BACO2RTA	BA annual CO_2 total output emission rate	lb/MWh
22	BACH4RTA	BA annual CH_4 total output emission rate	lb/GWh
23	BAN2ORTA	BA annual N_2O total output emission rate	lb/GWh
24	BAC2ERTA	BA annual CO_2 equivalent total output emission rate	lb/MWh
25	BAHGRTA	BA annual Hg total output emission rate	lb/GWh
26	BANOXRA	BA annual NO_x input emission rate	lb/MMBtu
27	BANOXRO	BA ozone season NO_x input emission rate	lb/MMBtu
28	BASO2RA	BA annual SO_2 input emission rate	lb/MMBtu
29	BACO2RA	BA annual CO_2 input emission rate	lb/MMBtu
30	BAHGRA	BA annual Hg input emission rate	lb/BBtu
31	BANOXCRT	BA annual NO_x combustion output emission rate	lb/MWh
32	BANOXCRO	BA ozone season NO_x combustion output emission rate	lb/MWh
33	BASO2CRT	BA annual SO_2 combustion output emission rate	lb/MWh
34	BACO2CRT	BA annual CO_2 combustion output emission rate	lb/MWh
35	BACH4CRT	BA annual CH_4 combustion output emission rate	lb/GWh
36	BAN2OCRT	BA annual N_2O combustion output emission rate	lb/GWh
37	BAHGCRT	BA annual Hg combustion output emission rate	lb/GWh
38	BACNOXRT	BA annual NO_x coal output emission rate	lb/MWh
39	BAONOXRT	BA annual NO_x oil output emission rate	lb/MWh
40	BAGNOXRT	BA annual NO_x gas output emission rate	lb/MWh
41	BAFSNXRT	BA annual NO_x fossil fuel output emission rate	lb/MWh
42	BACNXORT	BA ozone season NO_x coal output emission rate	lb/MWh
43	BAONXORT	BA ozone season NO_x oil output emission rate	lb/MWh
44	BAGNXORT	BA ozone season NO_x gas output emission rate	lb/MWh
45	BAFSNORT	BA ozone season NO_x fossil fuel output emission rate	lb/MWh
46	BACSO2RT	BA annual SO_2 coal output emission rate	lb/MWh
47	BAOSO2RT	BA annual SO_2 oil output emission rate	lb/MWh
48	BAGSO2RT	BA annual SO_2 gas output emission rate	lb/MWh
49	BAFSS2RT	BA annual SO_2 fossil fuel output emission rate	lb/MWh
50	BACCO2RT	BA annual CO_2 coal output emission rate	lb/MWh
51	BAOCO2RT	BA annual CO_2 oil output emission rate	lb/MWh
52	BAGCO2RT	BA annual CO_2 gas output emission rate	lb/MWh

Field	Name	Description	Unit
53	BAFSC2RT	BA annual CO_2 fossil fuel output emission rate	lb/MWh
54	BACHGRT	BA annual Hg coal output emission rate	lb/GWh
55	BAFSHGRT	BA annual Hg fossil fuel output emission rate	lb/GWh
56	BACNOXR	BA annual NO_x coal input emission rate	lb/MMBtu
57	BAONOXR	BA annual NO_x oil input emission rate	lb/MMBtu
58	BAGNOXR	BA annual NO_x gas input emission rate	lb/MMBtu
59	BAFSNXR	BA annual NO_x fossil fuel input emission rate	lb/MMBtu
60	BACNXOR	BA ozone season NO_x coal input emission rate	lb/MMBtu
61	BAONXOR	BA ozone season NO_x oil input emission rate	lb/MMBtu
62	BAGNXOR	BA ozone season NO_x gas input emission rate	lb/MMBtu
63	BAFSNOR	BA ozone season NO_x fossil fuel input emission rate	lb/MMBtu
64	BACSO2R	BA annual SO_2 coal input emission rate	lb/MMBtu
65	BAOSO2R	BA annual SO_2 oil input emission rate	lb/MMBtu
66	BAGSO2R	BA annual SO_2 gas input emission rate	lb/MMBtu
67	BAFSS2R	BA annual SO_2 fossil fuel input emission rate	lb/MMBtu
68	BACCO2R	BA annual CO_2 coal input emission rate	lb/MMBtu
69	BAOCO2R	BA annual CO_2 oil input emission rate	lb/MMBtu
70	BAGCO2R	BA annual CO_2 gas input emission rate	lb/MMBtu
71	BAFSC2R	BA annual CO_2 fossil fuel input emission rate	lb/MMBtu
72	BACHGR	BA annual Hg coal input emission rate	lb/BBtu
73	BAFSHGR	BA annual Hg fossil fuel input emission rate	lb/BBtu
74	BANBNOX	BA annual NO_x non-baseload output emission rate	lb/MWh
75	BANBNXO	BA ozone season NO_x non-baseload output emission rate	lb/MWh
76	BANBSO2	BA annual SO_2 non-baseload output emission rate	lb/MWh
77	BANBCO2	BA annual CO_2 non-baseload output emission rate	lb/MWh
78	BANBCH4	BA annual CH_4 non-baseload output emission rate	lb/GWh
79	BANBN2O	BA annual N_2O non-baseload output emission rate	lb/GWh
80	BANBHG	BA annual Hg non-baseload output emission rate	lb/GWh
81	BAGENACL	BA annual coal net generation	MWh
82	BAGENAOL	BA annual oil net generation	MWh
83	BAGENAGS	BA annual gas net generation	MWh
84	BAGENANC	BA annual nuclear net generation	MWh
85	BAGENAHY	BA annual hydro net generation	MWh
86	BAGENABM	BA annual biomass net generation	MWh
87	BAGENAWI	BA annual wind net generation	MWh
88	BAGENASO	BA annual solar net generation	MWh
89	BAGENAGT	BA annual geothermal net generation	MWh
90	BAGENAOF	BA annual other fossil net generation	MWh
91	BAGENAOP	BA annual other unknown/purchased fuel net generation	MWh
92	BAGENATN	BA annual total nonrenewables net generation	MWh
93	BAGENATR	BA annual total renewables net generation	MWh
94	BAGENATH	BA annual total nonhydro renewables net generation	MWh
95	BAGENACY	BA annual total combustion net generation	MWh
96	BAGENACN	BA annual total noncombustion net generation	MWh
97	BACLPR	BA coal generation percent (resource mix)	
98	BAOLPR	BA oil generation percent (resource mix)	
99	BAGSPR	BA gas generation percent (resource mix)	
100	BANCPR	BA nuclear generation percent (resource mix)	
101	BAHYPR	BA hydro generation percent (resource mix)	
102	BABMPR	BA biomass generation percent (resource mix)	
103	BAWIPR	BA wind generation percent (resource mix)	
104	BASOPR	BA solar generation percent (resource mix)	
105	BAGTPR	BA geothermal generation percent (resource mix)	
106	BAOFPR	BA other fossil generation percent (resource mix)	

Field	Name	Description	Unit
107	BAOPPR	BA other unknown/purchased fuel generation percent (resource mix)	
108	BATNPR	BA total nonrenewables generation percent (resource mix)	
109	BATRPR	BA total renewables generation percent (resource mix)	
110	BATHPR	BA total nonhydro renewables generation percent (resource mix)	
111	BACYPR	BA total combustion generation percent (resource mix)	
112	BACNPR	BA total noncombustion generation percent (resource mix)	

Table A-6. eGRID File Structure, eGRID2014 SRL File, eGRID Subregion File

Field	Name	Description	Unit
1	SUBRGN	eGRID subregion acronym	
2	SRNAME	eGRID subregion name	
3	NAMEPCAP	eGRID subregion nameplate capacity	MW
4	SRHTIAN	eGRID subregion annual heat input from combustion	MMBtu
5	SRHTIOZ	eGRID subregion ozone season heat input from combustion	MMBtu
6	*SRHTIANT*	*eGRID subregion total annual heat input*	*MMBtu*
7	*SRHTIOZT*	*eGRID subregion total ozone season heat input*	*MMBtu*
8	SRNGENAN	eGRID subregion annual net generation	MWh
9	SRNGENOZ	eGRID subregion ozone season net generation	MWh
10	SRNOXAN	eGRID subregion annual NO_x emissions	tons
11	SRNOXOZ	eGRID subregion ozone season NO_x emissions	tons
12	SRSO2AN	eGRID subregion annual SO_2 emissions	tons
13	SRCO2AN	eGRID subregion annual CO_2 emissions	tons
14	SRCH4AN	eGRID subregion annual CH_4 emissions	lbs
15	SRN2OAN	eGRID subregion annual N_2O emissions	lbs
16	SRCO2EQA	eGRID subregion annual CO_2 equivalent emissions	tons
17	SRHGAN	eGRID subregion annual Hg emissions	lbs
18	SRNOXRTA	eGRID subregion annual NO_x total output emission rate	lb/MWh
19	SRNOXRTO	eGRID subregion ozone season NO_x total output emission rate	lb/MWh
20	SRSO2RTA	eGRID subregion annual SO_2 total output emission rate	lb/MWh
21	SRCO2RTA	eGRID subregion annual CO_2 total output emission rate	lb/MWh
22	SRCH4RTA	eGRID subregion annual CH_4 total output emission rate	lb/GWh
23	SRN2ORTA	eGRID subregion annual N_2O total output emission rate	lb/GWh
24	SRC2ERTA	eGRID subregion annual CO_2 equivalent total output emission rate	lb/MWh
25	SRHGRTA	eGRID subregion annual Hg total output emission rate	lb/GWh
26	SRNOXRA	eGRID subregion annual NO_x input emission rate	lb/MMBtu
27	SRNOXRO	eGRID subregion ozone season NO_x input emission rate	lb/MMBtu
28	SRSO2RA	eGRID subregion annual SO_2 input emission rate	lb/MMBtu
29	SRCO2RA	eGRID subregion annual CO_2 input emission rate	lb/MMBtu
30	SRHGRA	eGRID subregion annual Hg input emission rate	lb/BBtu
31	SRNOXCRT	eGRID subregion annual NO_x combustion output emission rate	lb/MWh
32	SRNOXCRO	eGRID subregion ozone season NO_x combustion output emission rate	lb/MWh
33	SRSO2CRT	eGRID subregion annual SO_2 combustion output emission rate	lb/MWh
34	SRCO2CRT	eGRID subregion annual CO_2 combustion output emission rate	lb/MWh
35	SRCH4CRT	eGRID subregion annual CH_4 combustion output emission rate	lb/GWh
36	SRN2OCRT	eGRID subregion annual N_2O combustion output emission rate	lb/GWh
37	SRHGCRT	eGRID subregion annual Hg combustion output emission rate	lb/GWh
38	SRCNOXRT	eGRID subregion annual NO_x coal output emission rate	lb/MWh
39	SRONOXRT	eGRID subregion annual NO_x oil output emission rate	lb/MWh
40	SRGNOXRT	eGRID subregion annual NO_x gas output emission rate	lb/MWh
41	SRFSNXRT	eGRID subregion annual NO_x fossil fuel output emission rate	lb/MWh
42	SRCNXORT	eGRID subregion ozone season NO_x coal output emission rate	lb/MWh
43	SRONXORT	eGRID subregion ozone season NO_x oil output emission rate	lb/MWh
44	SRGNXORT	eGRID subregion ozone season NO_x gas output emission rate	lb/MWh
45	SRFSNORT	eGRID subregion ozone season NO_x fossil fuel output emission rate	lb/MWh
46	SRCSO2RT	eGRID subregion annual SO_2 coal output emission rate	lb/MWh
47	SROSO2RT	eGRID subregion annual SO_2 oil output emission rate	lb/MWh
48	SRGSO2RT	eGRID subregion annual SO_2 gas output emission rate	lb/MWh
49	SRFSS2RT	eGRID subregion annual SO_2 fossil fuel output emission rate	lb/MWh
50	SRCCO2RT	eGRID subregion annual CO_2 coal output emission rate	lb/MWh
51	SROCO2RT	eGRID subregion annual CO_2 oil output emission rate	lb/MWh
52	SRGCO2RT	eGRID subregion annual CO_2 gas output emission rate	lb/MWh

Field	Name	Description	Unit
53	SRFSC2RT	eGRID subregion annual CO_2 fossil fuel output emission rate	lb/MWh
54	*SRCCH4RT*	*eGRID subregion annual CH_4 coal output emission rate*	*lb/GWh*
55	*SROCH4RT*	*eGRID subregion annual CH_4 oil output emission rate*	*lb/GWh*
56	*SRGCH4RT*	*eGRID subregion annual CH_4 gas output emission rate*	*lb/GWh*
57	*SRFCH4RT*	*eGRID subregion annual CH_4 fossil fuel output emission rate*	*lb/GWh*
58	*SRCN2ORT*	*eGRID subregion annual N_2O coal output emission rate*	*lb/GWh*
59	*SRON2ORT*	*eGRID subregion annual N_2O oil output emission rate*	*lb/GWh*
60	*SRON2ORT*	*eGRID subregion annual N_2O gas output emission rate*	*lb/GWh*
61	*SRFN2ORT*	*eGRID subregion annual N_2O fossil output emission rate*	*lb/GWh*
62	SRCHGRT	eGRID subregion annual Hg coal output emission rate	lb/GWh
63	SRFSHGRT	eGRID subregion annual Hg fossil fuel output emission rate	lb/GWh
64	SRCNOXR	eGRID subregion annual NO_x coal input emission rate	lb/MMBtu
65	SRONOXR	eGRID subregion annual NO_x oil input emission rate	lb/MMBtu
66	SRGNOXR	eGRID subregion annual NO_x gas input emission rate	lb/MMBtu
67	SRFSNXR	eGRID subregion annual NO_x fossil fuel input emission rate	lb/MMBtu
68	SRCNXOR	eGRID subregion ozone season NO_x coal input emission rate	lb/MMBtu
69	SRONXOR	eGRID subregion ozone season NO_x oil input emission rate	lb/MMBtu
70	SRGNXOR	eGRID subregion ozone season NO_x gas input emission rate	lb/MMBtu
71	SRFSNOR	eGRID subregion ozone season NO_x fossil fuel input emission rate	lb/MMBtu
72	SRCSO2R	eGRID subregion annual SO_2 coal input emission rate	lb/MMBtu
73	SROSO2R	eGRID subregion annual SO_2 oil input emission rate	lb/MMBtu
74	SRGSO2R	eGRID subregion annual SO_2 gas input emission rate	lb/MMBtu
75	SRFSS2R	eGRID subregion annual SO_2 fossil fuel input emission rate	lb/MMBtu
76	SRCCO2R	eGRID subregion annual CO_2 coal input emission rate	lb/MMBtu
77	SROCO2R	eGRID subregion annual CO_2 oil input emission rate	lb/MMBtu
78	SRGCO2R	eGRID subregion annual CO_2 gas input emission rate	lb/MMBtu
79	SRFSC2R	eGRID subregion annual CO_2 fossil fuel input emission rate	lb/MMBtu
80	SRCCH4R	eGRID subregion annual CH_4 coal input emission rate	lb/MMBtu
81	SROCH4R	eGRID subregion annual CH_4 oil input emission rate	lb/MMBtu
82	SRGCH4R	eGRID subregion annual CH_4 gas input emission rate	lb/MMBtu
83	SRFCH4R	eGRID subregion annual CH_4 fossil input emission rate	lb/MMBtu
84	SRCN2OR	eGRID subregion annual N_2O coal input emission rate	lb/MMBtu
85	SRON2OR	eGRID subregion annual N_2O oil input emission rate	lb/MMBtu
86	SRGN2OR	eGRID subregion annual N_2O gas input emission rate	lb/MMBtu
87	SRFN2OR	eGRID subregion annual N_2O fossil input emission rate	lb/MMBtu
88	SRCHGR	eGRID subregion annual Hg coal input emission rate	lb/BBtu
89	SRFSHGR	eGRID subregion annual Hg fossil fuel input emission rate	lb/BBtu
90	SRNBNOX	eGRID subregion annual NO_x non-baseload output emission rate	lb/MWh
91	SRNBNXO	eGRID subregion ozone season NO_x non-baseload output emission rate	lb/MWh
92	SRNBSO2	eGRID subregion annual SO_2 non-baseload output emission rate	lb/MWh
93	SRNBCO2	eGRID subregion annual CO_2 non-baseload output emission rate	lb/MWh
94	SRNBCH4	eGRID subregion annual CH_4 non-baseload output emission rate	lb/GWh
95	SRNBN2O	eGRID subregion annual N_2O non-baseload output emission rate	lb/GWh
96	SRNBC2ER	eGRID subregion annual CO_2e non-baseload output emission rate	lb/MWh
97	SRNBHG	eGRID subregion annual Hg non-baseload output emission rate	lb/GWh
98	SRGENACL	eGRID subregion annual coal net generation	MWh
99	SRGENAOL	eGRID subregion annual oil net generation	MWh
100	SRGENAGS	eGRID subregion annual gas net generation	MWh
101	SRGENANC	eGRID subregion annual nuclear net generation	MWh
102	SRGENAHY	eGRID subregion annual hydro net generation	MWh
103	SRGENABM	eGRID subregion annual biomass net generation	MWh
104	SRGENAWI	eGRID subregion annual wind net generation	MWh
105	SRGENASO	eGRID subregion annual solar net generation	MWh
106	SRGENAGT	eGRID subregion annual geothermal net generation	MWh

Field	Name	Description	Unit
107	SRGENAOF	eGRID subregion annual other fossil net generation	MWh
108	SRGENAOP	eGRID subregion annual other unknown/purchased fuel net generation	MWh
109	SRGENATN	eGRID subregion annual total nonrenewables net generation	MWh
110	SRGENATR	eGRID subregion annual total renewables net generation	MWh
111	SRGENATH	eGRID subregion annual total nonhydro renewables net generation	MWh
112	SRGENACY	eGRID subregion annual total combustion net generation	MWh
113	SRGENACN	eGRID subregion annual total noncombustion net generation	MWh
114	SRCLPR	eGRID subregion coal generation percent (resource mix)	%
115	SROLPR	eGRID subregion oil generation percent (resource mix)	%
116	SRGSPR	eGRID subregion gas generation percent (resource mix)	%
117	SRNCPR	eGRID subregion nuclear generation percent (resource mix)	%
118	SRHYPR	eGRID subregion hydro generation percent (resource mix)	%
119	SRBMPR	eGRID subregion biomass generation percent (resource mix)	%
120	SRWIPR	eGRID subregion wind generation percent (resource mix)	%
121	SRSOPR	eGRID subregion solar generation percent (resource mix)	%
122	SRGTPR	eGRID subregion geothermal generation percent (resource mix)	%
123	SROFPR	eGRID subregion other fossil generation percent (resource mix)	%
124	SROPPR	eGRID subregion other unknown/purchased fuel generation percent (resource mix)	%
125	SRTNPR	eGRID subregion total nonrenewables generation percent (resource mix)	%
126	SRTRPR	eGRID subregion total renewables generation percent (resource mix)	%
127	SRTHPR	eGRID subregion total nonhydro renewables generation percent (resource mix)	%
128	SRCYPR	eGRID subregion total combustion generation percent (resource mix)	%
129	SRCNPR	eGRID subregion total noncombustion generation percent (resource mix)	%
130	*SRNBGNCL*	*eGRID subregion annual total nonbaseload coal generation*	*MWh*
131	*SRNBGNOL*	*eGRID subregion annual total nonbaseload oil generation*	*MWh*
132	*SRNBGNGS*	*eGRID subregion annual total nonbaseload gas generation*	*MWh*
133	*SRNBGNNC*	*eGRID subregion annual total nonbaseload nuclear generation*	*MWh*
134	*SRNBGNHY*	*eGRID subregion annual total nonbaseload hydro generation*	*MWh*
135	*SRNBGNBM*	*eGRID subregion annual total nonbaseload biomass generation*	*MWh*
136	*SRNBGNWI*	*eGRID subregion annual total nonbaseload wind generation*	*MWh*
137	*SRNBGNSO*	*eGRID subregion annual total nonbaseload solar generation*	*MWh*
138	*SRNBGNGT*	*eGRID subregion annual total nonbaseload geothermal generation*	*MWh*
139	*SRNBGNOF*	*eGRID subregion annual total nonbaseload other fossil generation*	*MWh*
140	*SRNBGNOP*	*eGRID subregion annual total nonbaseload other unknown/purchased fuel generation*	*MWh*
141	*SRNBCLPR*	*eGRID subregion nonbaseload coal generation percent (resource mix)*	*%*
142	*SRNBOLPR*	*eGRID subregion nonbaseload oil generation percent (resource mix)*	*%*
143	*SRNBGSPR*	*eGRID subregion nonbaseload gas generation percent (resource mix)*	*%*
144	*SRNBNCPR*	*eGRID subregion nonbaseload nuclear generation percent (resource mix)*	*%*
145	*SRNBHYPR*	*eGRID subregion nonbaseload hydro generation percent (resource mix)*	*%*
146	*SRNBBMPR*	*eGRID subregion nonbaseload biomass generation percent (resource mix)*	*%*
147	*SRNBWIPR*	*eGRID subregion nonbaseload wind generation percent (resource mix)*	*%*
148	*SRNBSOPR*	*eGRID subregion nonbaseload solar generation percent (resource mix)*	*%*
149	*SRNBGTPR*	*eGRID subregion nonbaseload geothermal generation percent (resource mix)*	*%*
150	*SRNBOFPR*	*eGRID subregion nonbaseload other fossil generation percent (resource mix)*	*%*
151	*SRNBOPPR*	*eGRID subregion nonbaseload other unknown/purchased fuel generation percent (resource mix)*	*%*

Table A-7. eGRID File Structure, eGRID2014 NRL File, NERC Region File

Field	Name	Description	Unit
1	NERC	NERC region acronym	
2	NERCNAME	NERC region name	
3	NAMEPCAP	NERC region nameplate capacity	MW
4	NRHTIAN	NERC region annual heat input from combustion	MMBtu
5	NRHTIOZ	NERC region ozone season heat input from combustion	MMBtu
6	*NRHTIANT*	*NERC total region annual heat input*	*MMBtu*
7	*NRHTIOZT*	*NERC total region ozone season heat input*	*MMBtu*
8	NRNGENAN	NERC region annual net generation	MWh
9	NRNGENOZ	NERC region ozone season net generation	MWh
10	NRNOXAN	NERC region annual NO_x emissions	tons
11	NRNOXOZ	NERC region ozone season NO_x emissions	tons
12	NRSO2AN	NERC region annual SO_2 emissions	tons
13	NRCO2AN	NERC region annual CO_2 emissions	tons
14	NRCH4AN	NERC region annual CH_4 emissions	lbs
15	NRN2OAN	NERC region annual N_2O emissions	lbs
16	NRCO2EQA	NERC region annual CO_2 equivalent emissions	tons
17	NRHGAN	NERC region annual Hg emissions	lbs
18	NRNOXRTA	NERC region annual NO_x total output emission rate	lb/MWh
19	NRNOXRTO	NERC region ozone season NO_x total output emission rate	lb/MWh
20	NRSO2RTA	NERC region annual SO_2 total output emission rate	lb/MWh
21	NRCO2RTA	NERC region annual CO_2 total output emission rate	lb/MWh
22	NRCH4RTA	NERC region annual CH_4 total output emission rate	lb/GWh
23	NRN2ORTA	NERC region annual N_2O total output emission rate	lb/GWh
24	NRC2ERTA	NERC region annual CO_2 equivalent total output emission rate	lb/MWh
25	NRHGRTA	NERC region annual Hg total output emission rate	lb/GWh
26	NRNOXRA	NERC region annual NO_x input emission rate	lb/MMBtu
27	NRNOXRO	NERC region ozone season NO_x input emission rate	lb/MMBtu
28	NRSO2RA	NERC region annual SO_2 input emission rate	lb/MMBtu
29	NRCO2RA	NERC region annual CO_2 input emission rate	lb/MMBtu
30	NRHGRA	NERC region annual Hg input emission rate	lb/BBtu
31	NRNOXCRT	NERC region annual NO_x combustion output emission rate	lb/MWh
32	NRNOXCRO	NERC region ozone season NO_x combustion output emission rate	lb/MWh
33	NRSO2CRT	NERC region annual SO_2 combustion output emission rate	lb/MWh
34	NRCO2CRT	NERC region annual CO_2 combustion output emission rate	lb/MWh
35	NRCH4CRT	NERC region annual CH_4 combustion output emission rate	lb/GWh
36	NRN2OCRT	NERC region annual N_2O combustion output emission rate	lb/GWh
37	NRHGCRT	NERC region annual Hg combustion output emission rate	lb/GWh
38	NRCNOXRT	NERC region annual NO_x coal output emission rate	lb/MWh
39	NRONOXRT	NERC region annual NO_x oil output emission rate	lb/MWh
40	NRGNOXRT	NERC region annual NO_x gas output emission rate	lb/MWh
41	NRFSNXRT	NERC region annual NO_x fossil fuel output emission rate	lb/MWh
42	NRCNXORT	NERC region ozone season NO_x coal output emission rate	lb/MWh
43	NRONXORT	NERC region ozone season NO_x oil output emission rate	lb/MWh
44	NRGNXORT	NERC region ozone season NO_x gas output emission rate	lb/MWh
45	NRFSNORT	NERC region ozone season NO_x fossil fuel output emission rate	lb/MWh
46	NRCSO2RT	NERC region annual SO_2 coal output emission rate	lb/MWh
47	NROSO2RT	NERC region annual SO_2 oil output emission rate	lb/MWh
48	NRGSO2RT	NERC region annual SO_2 gas output emission rate	lb/MWh
49	NRFSS2RT	NERC region annual SO_2 fossil fuel output emission rate	lb/MWh
50	NRCCO2RT	NERC region annual CO_2 coal output emission rate	lb/MWh
51	NROCO2RT	NERC region annual CO_2 oil output emission rate	lb/MWh
52	NRGCO2RT	NERC region annual CO_2 gas output emission rate	lb/MWh

Field	Name	Description	Unit
53	NRFSC2RT	NERC region annual CO_2 fossil fuel output emission rate	lb/MWh
54	NRCHGRT	NERC region annual Hg coal output emission rate	lb/GWh
55	NRFSHGRT	NERC region annual Hg fossil fuel output emission rate	lb/GWh
56	NRCNOXR	NERC region annual NO_x coal input emission rate	lb/MMBtu
57	NRONOXR	NERC region annual NO_x oil input emission rate	lb/MMBtu
58	NRGNOXR	NERC region annual NO_x gas input emission rate	lb/MMBtu
59	NRFSNXR	NERC region annual NO_x fossil fuel input emission rate	lb/MMBtu
60	NRCNXOR	NERC region ozone season NO_x coal input emission rate	lb/MMBtu
61	NRONXOR	NERC region ozone season NO_x oil input emission rate	lb/MMBtu
62	NRGNXOR	NERC region ozone season NO_x gas input emission rate	lb/MMBtu
63	NRFSNOR	NERC region ozone season NO_x fossil fuel input emission rate	lb/MMBtu
64	NRCSO2R	NERC region annual SO_2 coal input emission rate	lb/MMBtu
65	NROSO2R	NERC region annual SO_2 oil input emission rate	lb/MMBtu
66	NRGSO2R	NERC region annual SO_2 gas input emission rate	lb/MMBtu
67	NRFSS2R	NERC region annual SO_2 fossil fuel input emission rate	lb/MMBtu
68	NRCCO2R	NERC region annual CO_2 coal input emission rate	lb/MMBtu
69	NROCO2R	NERC region annual CO_2 oil input emission rate	lb/MMBtu
70	NRGCO2R	NERC region annual CO_2 gas input emission rate	lb/MMBtu
71	NRFSC2R	NERC region annual CO_2 fossil fuel input emission rate	lb/MMBtu
72	NRCHGR	NERC region annual Hg coal input emission rate	lb/BBtu
73	NRFSHGR	NERC region annual Hg fossil fuel input emission rate	lb/BBtu
74	NRNBNOX	NERC region annual NO_x non-baseload output emission rate	lb/MWh
75	NRNBNXO	NERC region ozone season NO_x non-baseload output emission rate	lb/MWh
76	NRNBSO2	NERC region annual SO_2 non-baseload output emission rate	lb/MWh
77	NRNBCO2	NERC region annual CO_2 non-baseload output emission rate	lb/MWh
78	NRNBCH4	NERC region annual CH_4 non-baseload output emission rate	lb/GWh
79	NRNBN2O	NERC region annual N_2O non-baseload output emission rate	lb/GWh
80	NRNBHG	NERC region annual Hg non-baseload output emission rate	lb/GWh
81	NRGENACL	NERC region annual coal net generation	MWh
82	NRGENAOL	NERC region annual oil net generation	MWh
83	NRGENAGS	NERC region annual gas net generation	MWh
84	NRGENANC	NERC region annual nuclear net generation	MWh
85	NRGENAHY	NERC region annual hydro net generation	MWh
86	NRGENABM	NERC region annual biomass net generation	MWh
87	NRGENAWI	NERC region annual wind net generation	MWh
88	NRGENASO	NERC region annual solar net generation	MWh
89	NRGENAGT	NERC region annual geothermal net generation	MWh
90	NRGENAOF	NERC region annual other fossil net generation	MWh
91	NRGENAOP	NERC region annual other unknown/purchased fuel net generation	MWh
92	NRGENATN	NERC region annual total nonrenewables net generation	MWh
93	NRGENATR	NERC region annual total renewables net generation	MWh
94	NRGENATH	NERC region annual total nonhydro renewables net generation	MWh
95	NRGENACY	NERC region annual total combustion net generation	MWh
96	NRGENACN	NERC region annual total noncombustion net generation	MWh
97	NRCLPR	NERC region coal generation percent (resource mix)	
98	NROLPR	NERC region oil generation percent (resource mix)	
99	NRGSPR	NERC region gas generation percent (resource mix)	
100	NRNCPR	NERC region nuclear generation percent (resource mix)	
101	NRHYPR	NERC region hydro generation percent (resource mix)	
102	NRBMPR	NERC region biomass generation percent (resource mix)	
103	NRWIPR	NERC region wind generation percent (resource mix)	
104	NRSOPR	NERC region solar generation percent (resource mix)	
105	NRGTPR	NERC region geothermal generation percent (resource mix)	
106	NROFPR	NERC region other fossil generation percent (resource mix)	

Field	Name	Description	Unit
107	NROPPR	NERC region other unknown/purchased fuel generation percent (resource mix)	
108	NRTNPR	NERC region total nonrenewables generation percent (resource mix)	
109	NRTRPR	NERC region total renewables generation percent (resource mix)	
110	NRTHPR	NERC region total nonhydro renewables generation percent (resource mix)	
111	NRCYPR	NERC region total combustion generation percent (resource mix)	
112	NRCNPR	NERC region total noncombustion generation percent (resource mix)	

Table A-8. eGRID File Structure, eGRID2014 U.S. File, United States File

Field	Name	Description	Unit
1	NAMEPCAP	U.S. nameplate capacity	MW
2	USHTIAN	U.S. annual heat input from combustion	MMBtu
3	USHTIOZ	U.S. ozone season heat input from combustion	MMBtu
4	*USHTIANT*	*U.S. total annual heat input*	*MMBtu*
5	*USHTIOZT*	*U.S. total ozone season heat input*	*MMBtu*
6	USNGENAN	U.S. annual net generation	MWh
7	USNGENOZ	U.S. ozone season net generation	MWh
8	USNOXAN	U.S. annual NO_x emissions	tons
9	USNOXOZ	U.S. ozone season NO_x emissions	tons
10	USSO2AN	U.S. annual SO_2 emissions	tons
11	USCO2AN	U.S. annual CO_2 emissions	tons
12	USCH4AN	U.S. annual CH_4 emissions	lbs
13	USN2OAN	U.S. annual N_2O emissions	lbs
14	USCO2EQA	U.S. annual CO_2 equivalent emissions	tons
15	USHGAN	U.S. annual Hg emissions	lbs
16	USNOXRTA	U.S. annual NO_x total output emission rate	lb/MWh
17	USNOXRTO	U.S. ozone season NO_x total output emission rate	lb/MWh
18	USSO2RTA	U.S. annual SO_2 total output emission rate	lb/MWh
19	USCO2RTA	U.S. annual CO_2 total output emission rate	lb/MWh
20	USCH4RTA	U.S. annual CH_4 total output emission rate	lb/GWh
21	USN2ORTA	U.S. annual N_2O total output emission rate	lb/GWh
22	USC2ERTA	U.S. annual CO_2 equivalent total output emission rate	lb/MWh
23	USHGRTA	U.S. annual Hg total output emission rate	lb/GWh
24	USNOXRA	U.S. annual NO_x input emission rate	lb/MMBtu
25	USNOXRO	U.S. ozone season NO_x input emission rate	lb/MMBtu
26	USSO2RA	U.S. annual SO_2 input emission rate	lb/MMBtu
27	USCO2RA	U.S. annual CO_2 input emission rate	lb/MMBtu
28	USHGRA	U.S. annual Hg input emission rate	lb/BBtu
29	USNOXCRT	U.S. annual NO_x combustion output emission rate	lb/MWh
30	USNOXCRO	U.S. ozone season NO_x combustion output emission rate	lb/MWh
31	USSO2CRT	U.S. annual SO_2 combustion output emission rate	lb/MWh
32	USCO2CRT	U.S. annual CO_2 combustion output emission rate	lb/MWh
33	USCH4CRT	U.S. annual CH_4 combustion output emission rate	lb/GWh
34	USN2OCRT	U.S. annual N_2O combustion output emission rate	lb/GWh
35	USHGCRT	U.S. annual Hg combustion output emission rate	lb/GWh
36	USCNOXRT	U.S. annual NO_x coal output emission rate	lb/MWh
37	USONOXRT	U.S. annual NO_x oil output emission rate	lb/MWh
38	USGNOXRT	U.S. annual NO_x gas output emission rate	lb/MWh
39	USFSNXRT	U.S. annual NO_x fossil fuel output emission rate	lb/MWh
40	USCNXORT	U.S. ozone season NO_x coal output emission rate	lb/MWh
41	USONXORT	U.S. ozone season NO_x oil output emission rate	lb/MWh
42	USGNXORT	U.S. ozone season NO_x gas output emission rate	lb/MWh
43	USFSNORT	U.S. ozone season NO_x fossil fuel output emission rate	lb/MWh
44	USCSO2RT	U.S. annual SO_2 coal output emission rate	lb/MWh
45	USOSO2RT	U.S. annual SO_2 oil output emission rate	lb/MWh
46	USGSO2RT	U.S. annual SO_2 gas output emission rate	lb/MWh
47	USFSS2RT	U.S. annual SO_2 fossil fuel output emission rate	lb/MWh
48	USCCO2RT	U.S. annual CO_2 coal output emission rate	lb/MWh
49	USOCO2RT	U.S. annual CO_2 oil output emission rate	lb/MWh
50	USGCO2RT	U.S. annual CO_2 gas output emission rate	lb/MWh
51	USFSC2RT	U.S. annual CO_2 fossil fuel output emission rate	lb/MWh

Field	Name	Description	Unit
52	USCHGRT	U.S. annual Hg coal output emission rate	lb/GWh
53	USFSHGRT	U.S. annual Hg fossil fuel output emission rate	lb/GWh
54	USCNOXR	U.S. annual NO_x coal input emission rate	lb/MMBtu
55	USONOXR	U.S. annual NO_x oil input emission rate	lb/MMBtu
56	USGNOXR	U.S. annual NO_x gas input emission rate	lb/MMBtu
57	USFSNXR	U.S. annual NO_x fossil fuel input emission rate	lb/MMBtu
58	USCNXOR	U.S. ozone season NO_x coal input emission rate	lb/MMBtu
59	USONXOR	U.S. ozone season NO_x oil input emission rate	lb/MMBtu
60	USGNXOR	U.S. ozone season NO_x gas input emission rate	lb/MMBtu
61	USFSNOR	U.S. ozone season NO_x fossil fuel input emission rate	lb/MMBtu
62	USCSO2R	U.S. annual SO_2 coal input emission rate	lb/MMBtu
63	USOSO2R	U.S. annual SO_2 oil input emission rate	lb/MMBtu
64	USGSO2R	U.S. annual SO_2 gas input emission rate	lb/MMBtu
65	USFSS2R	U.S. annual SO_2 fossil fuel input emission rate	lb/MMBtu
66	USCCO2R	U.S. annual CO_2 coal input emission rate	lb/MMBtu
67	USOCO2R	U.S. annual CO_2 oil input emission rate	lb/MMBtu
68	USGCO2R	U.S. annual CO_2 gas input emission rate	lb/MMBtu
69	USFSC2R	U.S. annual CO_2 fossil fuel input emission rate	lb/MMBtu
70	USCHGR	U.S. annual Hg coal input emission rate	lb/BBtu
71	USFSHGR	U.S. annual Hg fossil fuel input emission rate	lb/BBtu
72	USNBNOX	U.S. annual NO_x non-baseload output emission rate	lb/MWh
73	USNBNXO	U.S. ozone season NO_x non-baseload output emission rate	lb/MWh
74	USNBSO2	U.S. annual SO_2 non-baseload output emission rate	lb/MWh
75	USNBCO2	U.S. annual CO_2 non-baseload output emission rate	lb/MWh
76	USNBCH4	U.S. annual CH_4 non-baseload output emission rate	lb/GWh
77	USNBN2O	U.S. annual N_2O non-baseload output emission rate	lb/GWh
78	USNBHG	U.S. annual Hg non-baseload output emission rate	lb/GWh
79	USGENACL	U.S. annual coal net generation	MWh
80	USGENAOL	U.S. annual oil net generation	MWh
81	USGENAGS	U.S. annual gas net generation	MWh
82	USGENANC	U.S. annual nuclear net generation	MWh
83	USGENAHY	U.S. annual hydro net generation	MWh
84	USGENABM	U.S. annual biomass net generation	MWh
85	USGENAWI	U.S. annual wind net generation	MWh
86	USGENASO	U.S. annual solar net generation	MWh
87	USGENAGT	U.S. annual geothermal net generation	MWh
88	USGENAOF	U.S. annual other fossil net generation	MWh
89	USGENAOP	U.S. annual other unknown/purchased fuel net generation	MWh
90	USGENATN	U.S. annual total nonrenewables net generation	MWh
91	USGENATR	U.S. annual total renewables net generation	MWh
92	USGENATH	U.S. annual total nonhydro renewables net generation	MWh
93	USGENACY	U.S. annual total combustion net generation	MWh
94	USGENACN	U.S. annual total noncombustion net generation	MWh
95	USCLPR	U.S. coal generation percent (resource mix)	
96	USOLPR	U.S. oil generation percent (resource mix)	
97	USGSPR	U.S. gas generation percent (resource mix)	
98	USNCPR	U.S. nuclear generation percent (resource mix)	
99	USHYPR	U.S. hydro generation percent (resource mix)	
100	USBMPR	U.S. biomass generation percent (resource mix)	
101	USWIPR	U.S. wind generation percent (resource mix)	
102	USSOPR	U.S. solar generation percent (resource mix)	
103	USGTPR	U.S. geothermal generation percent (resource mix)	

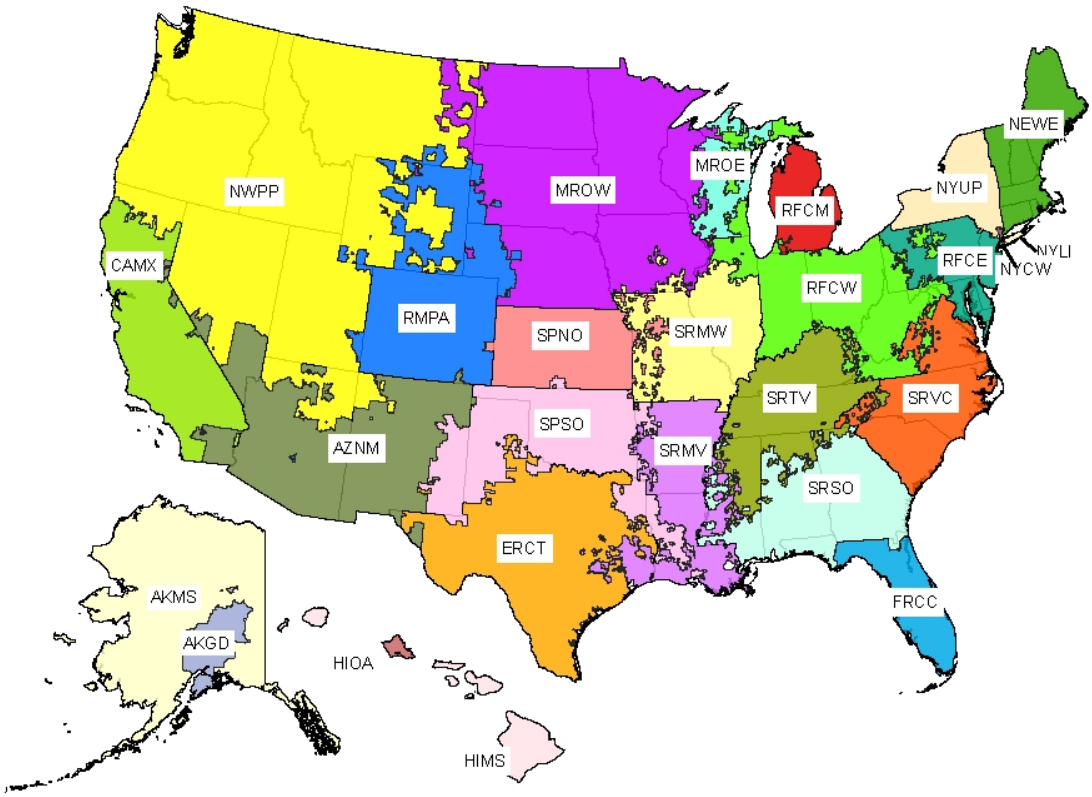
Field	Name	Description	Unit
104	USOFPR	U.S. other fossil generation percent (resource mix)	
105	USOPPR	U.S. other unknown/purchased fuel generation percent (resource mix)	
106	USTNPR	U.S. total nonrenewables generation percent (resource mix)	
107	USTRPR	U.S. total renewables generation percent (resource mix)	
108	USTHPR	U.S. total nonhydro renewables generation percent (resource mix)	
109	USCYPR	U.S. total combustion generation percent (resource mix)	
110	USCNPR	U.S. total noncombustion generation percent (resource mix)	

Table A-9. eGRID File Structure, eGRID2012 GGL File, Grid Gross Loss (%) File

Field	Name	Description	Unit	Source(s)
1	REGION	One of the three interconnect power grids in the U.S. (plus Alaska, Hawaii, and the entire U.S.)		
2	ESTLOSS	The total amount of electricity in the region that is generated but is not sold for resale or wholesale, furnished without charge, or used by the generator or utility	MWh	EIA State Electricity Profiles, Supply and disposition of electricity, 1990-2014
3	TOTDISP	The total amount of electricity in the region that is sold directly to customers, sold for resale, furnished without charge, consumed by the respondent without charge, and lost	MWh	EIA State Electricity Profiles, Supply and disposition of electricity, 1990-2014
4	DIRCTUSE	The total amount of electricity used by plants and/or utilities in the region that is not sold for wholesale or resale; direct use electricity is not transmitted through the grid and therefore does not have the potential to be lost	MWh	EIA State Electricity Profiles, Supply and disposition of electricity, 1990-2014
5	GGRSLOSS	The estimated regional grid gross loss as a percent [Estimated losses/(Total disposition – Direct use)]*100	%	
7	YEAR	Data year		

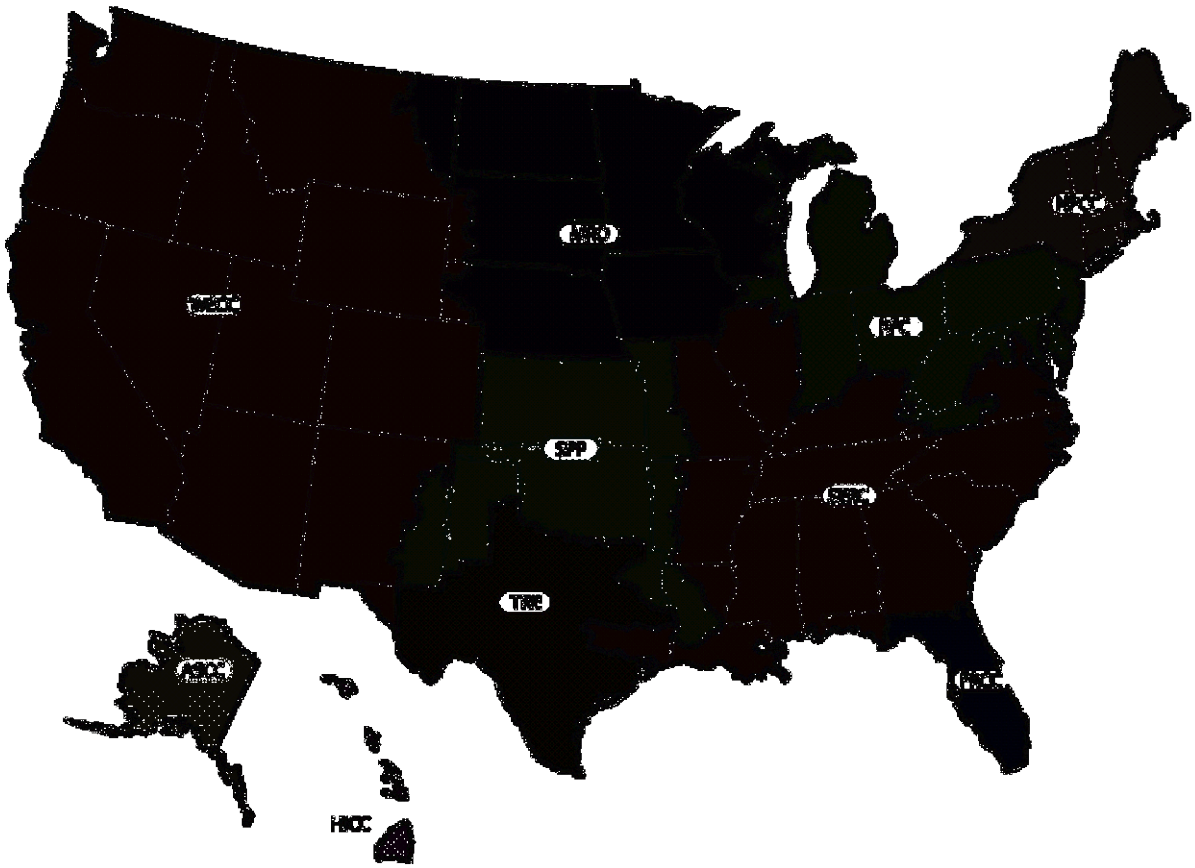
Appendix B. eGRID Subregion and NERC Region Representational Maps

Figure B-1. eGRID Subregion Representational Map



This is a representational map; many of the boundaries shown on this map are approximate because they are based on companies, not on strict geographical boundaries.

Figure B-2. eGRID NERC Region Representational Map



This is a representational map; many of the boundaries shown on this map are approximate because they are based on companies, not on strict geographical boundaries.

Appendix C. Crosswalks and Additional Data Tables

This Appendix contains reference tables used in the development of eGRID2014. These include:

- Emission factors used to estimate emissions (where they are not available from EPA/CAMD)
- Biomass fuels used in the plant file biomass emissions adjustment
- A crosswalk of plant ORISPL IDs that are different between EPA/CAMD and EIA datasets
- Geothermal emission factors by geotype and pollutant
- English to Metric conversion factors

Emission Factors – NOx, CO_2, SO_2, CH_4, and N_2O

For more information regarding the emission factors used and the methodology to estimate emissions, please see Section 3.1.

Table C-1. eGRID Emission Factors (CO_2, CH_4, and N_2O)

Fuel Type	EIA Fuel Type Code	CO_2 EF (ton CO_2/mmBtu)	CH_4 EF (lbs CH_4/mmBtu)	N_2O EF (lbs N_2O/mmBtu)	Source
Agricultural Byproducts	AB	0.13026	0.07055	0.00926	(EPA, 2009)
Anthracite	ANT	0.11413	0.02425	0.00353	(EPA, 2009)
Blast Furnace Gas	BFG	0.30239	0.00005	0.00022	(EPA, 2009)
Bituminous	BIT	0.10296	0.02425	0.00353	(EPA, 2009)
Sulphite lyes (Black Liquor)	BLQ	0.11083	0.00698	0.00465	(IPCC, 2007)
Coke Oven Gas	COG	0.05164	0.00106	0.00022	(EPA, 2009)
Distillate Fuel Oil (avg)	DFO	0.08166	0.00661	0.00132	(EPA, 2009)
Hydrogen	H	0.00000	0.00000	0.00000	No EF
Kerosene-Type Jet Fuel	JF	0.07961	0.00661	0.00132	(EPA, 2009)
Kerosene	KER	0.08289	0.00661	0.00132	(EPA, 2009)
Landfill Gas	LFG	0.06350	0.00233	0.00023	(IPCC, 2007)
Lignite	LIG	0.10622	0.02425	0.00353	(EPA, 2009)
Municipal Solid Waste	MSW	0.09998	0.07055	0.00926	(EPA, 2009)
Megawatt hours	MWH	0.00000	0.00000	0.00000	No EF
Pipeline (Weighted U.S. Average)	NG	0.05844	0.00220	0.00022	(EPA, 2009)
Nuclear	NUC	0.00000	0.00000	0.00000	No EF

Fuel Type	EIA Fuel Type Code	CO_2 EF (ton CO_2/mmBtu)	CH_4 EF (lbs CH_4/mmBtu)	N_2O EF (lbs N_2O/mmBtu)	Source
Other Biogas	OBG	0.06350	0.00233	0.00023	(IPCC, 2007)
Other Liquid Biofuels	OBL	0.09257	0.00698	0.00140	(IPCC, 2007)
Other Primary Solid Biomass	OBS	0.11630	0.06978	0.00930	(IPCC, 2007)
Other Gas	OG	0.05844	0.00220	0.00022	Use NG EF
Petroleum Coke	PC	0.11289	0.00661	0.00132	(EPA, 2009)
Propane	PG	0.06775	0.00661	0.00132	(EPA, 2009)
Process Gas	PRG	0.05844	0.00220	0.00022	Use NG EF
Purchased Steam	PUR	0.00000	0.00000	0.00000	No EF
Refined Coal	RC	0.10529	0.00233	0.00349	(EPA, 2016b)
Residual Fuel Oil (avg)	RFO	0.08159	0.00661	0.00132	(EPA, 2009)
Synthetic Gas - Petroleum Coke	SGP	0.05844	0.00220	0.00022	Use NG EF
Sludge Waste	SLW	0.09257	0.00698	0.00140	Same as OBL
Subbituminous	SUB	0.10695	0.02425	0.00353	(EPA, 2009)
Solar	SUN	0.00000	0.00000	0.00000	No EF
Tires	TDF	0.09477	0.07055	0.00926	(EPA, 2009)
Water	WAT	0.00000	0.00000	0.00000	No EF
Waste Coal	WC	0.10529	0.00233	0.00349	(EPA, 2016b)
Wood, Wood Waste Liquid	WDL	0.09257	0.00698	0.00140	Use OBL EF
Wood and Wood Residuals	WDS	0.10340	0.07055	0.00926	(EPA, 2009)
Waste Heat	WH	0.00000	0.00000	0.00000	No EF
Wind	WND	0.00000	0.00000	0.00000	No EF
Waste Oils	WO	0.08525	0.06978	0.00930	(IPCC, 2007)

Table C-2. Nitrogen oxides (NO_x) emission factors

Prime Mover	Primary Fuel Type	Boiler Firing Type (if applicable)	Emission Factor	Emission Factor Numerator	Emission Factor Denominator
ST	AB	N/A	1.2	lb	ton
ST	AB	STOKER	1.2	lb	ton
ST	BFG	WALL	0.0154	lb	Mcf
ST	BFG	N/A	0.0154	lb	Mcf

Prime Mover	Primary Fuel Type	Boiler Firing Type (if applicable)	Emission Factor	Emission Factor Numerator	Emission Factor Denominator
ST	BFG	TANGENTIAL	0.0154	lb	Mcf
ST	BIT	WET VERTICAL	31	lb	ton
ST	BIT	WET WALL	31	lb	ton
ST	BIT	WET TANGENTIAL	14	lb	ton
ST	BIT	WET OTHER	31	lb	ton
ST	BIT	DRY VERTICAL	12	lb	ton
ST	BIT	WET FLUIDIZED	5	lb	ton
ST	BIT	OTHER	12	lb	ton
ST	BIT	DRY WALL	12	lb	ton
ST	BIT	WET CYCLONE	33	lb	ton
ST	BIT	CYCLONE	33	lb	ton
ST	BIT	N/A	12	lb	ton
ST	BIT	DRY CYCLONE	33	lb	ton
ST	BIT	DRY TANGENTIAL	10	lb	ton
ST	BIT	TANGENTIAL	10	lb	ton
ST	BIT	DRY STOKER	11	lb	ton
ST	BIT	DRY FLUIDIZED	5	lb	ton
ST	BIT	FLUIDIZED	5	lb	ton
ST	BIT	STOKER	11	lb	ton
ST	BLQ	OTHER	1.5	lb	ton
ST	BLQ	CYCLONE	1.5	lb	ton
ST	BLQ	DRY TANGENTIAL	1.5	lb	ton
ST	BLQ	TANGENTIAL	1.5	lb	ton
ST	BLQ	DRY FLUIDIZED	1.5	lb	ton
ST	BLQ	WALL	1.5	lb	ton
ST	BLQ	DRY WALL	1.5	lb	ton
ST	BLQ	N/A	1.5	lb	ton
ST	DFO	DRY WALL	1.008	lb	barrels
GT	DFO	N/A	5.124	lb	barrels
ST	DFO	OTHER	1.008	lb	barrels
ST	DFO	WET TANGENTIAL	1.008	lb	barrels
ST	DFO	DRY TANGENTIAL	1.008	lb	barrels
CS	DFO	N/A	5.124	lb	barrels
CT	DFO	N/A	5.124	lb	barrels
CT	DFO	N/A	5.124	lb	barrels
ST	DFO	N/A	1.008	lb	barrels
CA	DFO	N/A	5.124	lb	barrels
ST	DFO	N/A	1.008	lb	barrels

Prime Mover	Primary Fuel Type	Boiler Firing Type (if applicable)	Emission Factor	Emission Factor Numerator	Emission Factor Denominator
IC	DFO	N/A	18.6396	lb	barrels
IC	JF	N/A	18.144	lb	barrels
ST	JF	N/A	1.008	lb	barrels
GT	JF	N/A	4.9896	lb	barrels
GT	KER	N/A	4.9896	lb	barrels
CT	LFG	N/A	0.144	lb	Mcf
GT	LFG	N/A	0.144	lb	Mcf
ST	LFG	N/A	0.07244	lb	Mcf
IC	LFG	N/A	1.21522	lb	Mcf
CA	LFG	N/A	0.144	lb	Mcf
CS	LFG	N/A	0.144	lb	Mcf
ST	LIG	DRY TANGENTIAL	7.1	lb	ton
ST	LIG	FLUIDIZED	3.6	lb	ton
ST	LIG	WET FLUIDIZED	3.6	lb	ton
ST	LIG	TANGENTIAL	7.1	lb	ton
ST	LIG	DRY FLUIDIZED	3.6	lb	ton
ST	LIG	DRY WALL	6.3	lb	ton
ST	LIG	WET CYCLONE	15	lb	ton
ST	MSB	N/A	5	lb	ton
ST	MSW	N/A	5	lb	ton
ST	MSW	OTHER	5	lb	ton
ST	NG	DRY VERTICAL	0.28	lb	Mcf
ST	NG	DRY WALL	0.28	lb	Mcf
ST	NG	DRY DUCTBURNER	0.17	lb	Mcf
CT	NG	N/A	0.328	lb	Mcf
CT	NG	DUCTBURNER	0.328	lb	Mcf
ST	NG	DRY TANGENTIAL	0.17	lb	Mcf
GT	NG	TANGENTIAL	0.328	lb	Mcf
ST	NG	DUCTBURNER	0.17	lb	Mcf
IC	NG	N/A	2.768	lb	Mcf
ST	NG	N/A	0.17	lb	Mcf
ST	NG	DRY STOKER	0.28	lb	Mcf
ST	NG	DRY CYCLONE	0.28	lb	Mcf
ST	NG	CYCLONE	0.28	lb	Mcf
GT	NG	N/A	0.328	lb	Mcf
ST	NG	FLUIDIZED	0.28	lb	Mcf
ST	NG	OTHER	0.17	lb	Mcf
CS	NG	N/A	0.328	lb	Mcf

Prime Mover	Primary Fuel Type	Boiler Firing Type (if applicable)	Emission Factor	Emission Factor Numerator	Emission Factor Denominator
ST	NG	N/A	0.17	lb	Mcf
CS	NG	DUCTBURNER	0.328	lb	Mcf
ST	NG	WET CYCLONE	0.28	lb	Mcf
ST	NG	STOKER	0.28	lb	Mcf
ST	NG	TANGENTIAL	0.17	lb	Mcf
CA	NG	DUCTBURNER	0.328	lb	Mcf
CA	NG	N/A	0.328	lb	Mcf
ST	NG	WALL	0.28	lb	Mcf
CA	NG	DRY DUCTBURNER	0.328	lb	Mcf
CA	NG	DRY WALL	0.328	lb	Mcf
CT	NG	N/A	0.328	lb	Mcf
CS	OBG	N/A	0.3136	lb	Mcf
IC	OBG	N/A	2.64648	lb	Mcf
ST	OBG	N/A	0.11283	lb	Mcf
GT	OBG	N/A	0.3136	lb	Mcf
CA	OBG	N/A	0.3136	lb	Mcf
CT	OBG	N/A	0.3136	lb	Mcf
GT	OBL	N/A	4.7166	lb	barrels
IC	OBL	N/A	17.1486	lb	barrels
ST	OBS	N/A	2	lb	ton
ST	OG	CYCLONE	0.15282	lb	Mcf
IC	OG	N/A	2.22641	lb	Mcf
ST	OG	DRY TANGENTIAL	0.15282	lb	Mcf
ST	OG	DRY DUCTBURNER	0.15282	lb	Mcf
ST	OG	DUCTBURNER	0.15282	lb	Mcf
GT	OG	N/A	0.26382	lb	Mcf
ST	OG	DRY WALL	0.15282	lb	Mcf
ST	OG	N/A	0.15282	lb	Mcf
ST	OG	OTHER	0.15282	lb	Mcf
ST	OG	N/A	0.15282	lb	Mcf
ST	PC	FLUIDIZED	5	lb	ton
ST	PC	N/A	21	lb	ton
CA	PC	OTHER	21	lb	ton
ST	PC	OTHER	21	lb	ton
ST	PC	WET WALL	21	lb	ton
ST	PC	DRY WALL	21	lb	ton
ST	PC	DRY FLUIDIZED	5	lb	ton
GT	PG	N/A	803.36	lb	MMCF

Prime Mover	Primary Fuel Type	Boiler Firing Type (if applicable)	Emission Factor	Emission Factor Numerator	Emission Factor Denominator
ST	PRG	DRY WALL	0.28	lb	Mcf
ST	PRG	DUCTBURNER	0.17	lb	Mcf
ST	PRG	OTHER	0.17	lb	Mcf
ST	PRG	TANGENTIAL	0.17	lb	Mcf
ST	PRG	N/A	0.17	lb	Mcf
ST	RC	DRY TANGENTIAL	10	lb	ton
CA	RFO	N/A	5.5314	lb	barrels
IC	RFO	N/A	20.118	lb	barrels
ST	RFO	WET WALL	1.974	lb	barrels
CT	RFO	N/A	5.5314	lb	barrels
CT	RFO	N/A	5.5314	lb	barrels
CS	RFO	N/A	5.5314	lb	barrels
GT	RFO	N/A	5.5314	lb	barrels
ST	RFO	DRY TANGENTIAL	1.344	lb	barrels
ST	RFO	DRY WALL	1.974	lb	barrels
ST	RFO	WALL	1.974	lb	barrels
ST	RFO	N/A	1.974	lb	barrels
ST	RFO	TANGENTIAL	1.344	lb	barrels
ST	SGC	N/A	0.28	lb	Mcf
CT	SGP	N/A	0.28	lb	Mcf
CA	SGP	N/A	0.28	lb	Mcf
CS	SGP	N/A	0.28	lb	Mcf
ST	SUB	DRY TANGENTIAL	7.2	lb	ton
ST	SUB	DRY FLUIDIZED	5	lb	ton
ST	SUB	N/A	5	lb	ton
ST	SUB	TANGENTIAL	7.2	lb	ton
ST	SUB	FLUIDIZED	5	lb	ton
ST	SUB	CYCLONE	17	lb	ton
ST	SUB	WET TANGENTIAL	7.2	lb	ton
ST	SUB	DRY WALL	7.4	lb	ton
ST	SUB	WET FLUIDIZED	5	lb	ton
ST	SUB	WET CYCLONE	17	lb	ton
ST	SUB	WET WALL	24	lb	ton
ST	TDF	STOKER	11	lb	ton
ST	WC	FLUIDIZED	3.6	lb	ton
ST	WC	N/A	3.6	lb	ton
ST	WC	DRY FLUIDIZED	3.6	lb	ton
ST	WDL	N/A	0.22806	lb	barrels

Prime Mover	Primary Fuel Type	Boiler Firing Type (if applicable)	Emission Factor	Emission Factor Numerator	Emission Factor Denominator
ST	WDS	DRY WALL	2.51	lb	ton
ST	WDS	WET STOKER	1.5	lb	ton
ST	WDS	WET TANGENTIAL	2.51	lb	ton
ST	WDS	FLUIDIZED	2	lb	ton
ST	WDS	OTHER	2	lb	ton
ST	WDS	DRY TANGENTIAL	2.51	lb	ton
ST	WDS	N/A	2	lb	ton
ST	WDS	STOKER	1.5	lb	ton
ST	WDS	DRY STOKER	1.5	lb	ton
ST	WDS	DRY FLUIDIZED	2	lb	ton
CT	WO	N/A	3.8724	lb	barrels
ST	WO	N/A	0.798	lb	barrels
GT	WO	N/A	3.8724	lb	barrels
IC	WO	N/A	14.0784	lb	barrels
CA	WO	N/A	3.8724	lb	barrels
ST	WO	DRY WALL	0.798	lb	barrels
CS	WO	N/A	3.8724	lb	barrels

Source: AP-42 (EPA, 1995).
N/A = not applicable

Table C-3. Sulfur dioxide (SO_2) emission factors

Prime Mover	Primary Fuel Type	Boiler Firing Type (if applicable)	Emission Factor	Emission Factor Numerator	Emission Factor Denominator
ST	AB	N/A	0.025	lb	MMBtu
ST	AB	STOKER	0.025	lb	MMBtu
ST	BFG	WALL	0.0006	lb	Mcf
ST	BFG	N/A	0.0006	lb	Mcf
ST	BFG	TANGENTIAL	0.0006	lb	Mcf
ST	BIT	WET VERTICAL	38*S	lb	short tons
ST	BIT	WET WALL	38*S	lb	short tons
ST	BIT	WET TANGENTIAL	38*S	lb	short tons
ST	BIT	WET OTHER	38*S	lb	short tons
ST	BIT	DRY VERTICAL	38*S	lb	short tons
ST	BIT	WET FLUIDIZED	38*S	lb	short tons
ST	BIT	OTHER	38*S	lb	short tons
ST	BIT	DRY WALL	38*S	lb	short tons

Prime Mover	Primary Fuel Type	Boiler Firing Type (if applicable)	Emission Factor	Emission Factor Numerator	Emission Factor Denominator
ST	BIT	WET CYCLONE	38*S	lb	short tons
ST	BIT	CYCLONE	38*S	lb	short tons
ST	BIT	N/A	38*S	lb	short tons
ST	BIT	DRY CYCLONE	38*S	lb	short tons
ST	BIT	DRY TANGENTIAL	38*S	lb	short tons
ST	BIT	TANGENTIAL	38*S	lb	short tons
ST	BIT	DRY STOKER	38*S	lb	short tons
ST	BIT	DRY FLUIDIZED	38*S	lb	short tons
ST	BIT	FLUIDIZED	38*S	lb	short tons
ST	BIT	STOKER	38*S	lb	short tons
ST	BLQ	OTHER	7	lb	short tons
ST	BLQ	CYCLONE	7	lb	short tons
ST	BLQ	DRY TANGENTIAL	7	lb	short tons
ST	BLQ	TANGENTIAL	7	lb	short tons
ST	BLQ	DRY FLUIDIZED	0.7	lb	short tons
ST	BLQ	WALL	7	lb	short tons
ST	BLQ	DRY WALL	7	lb	short tons
ST	BLQ	N/A	7	lb	short tons
ST	DFO	DRY WALL	6.3*S	lb	barrels
GT	DFO	N/A	1.01*S	lb	MMBtu
ST	DFO	OTHER	5.964*S	lb	barrels
ST	DFO	WET TANGENTIAL	6.3*S	lb	barrels
ST	DFO	DRY TANGENTIAL	6.3*S	lb	barrels
CS	DFO	N/A	1.01*S	lb	MMBtu
CT	DFO	N/A	1.01*S	lb	MMBtu
CT	DFO	N/A	1.01*S	lb	MMBtu
ST	DFO	N/A	5.964*S	lb	barrels
CA	DFO	N/A	1.01*S	lb	MMBtu
ST	DFO	N/A	5.964*S	lb	barrels
IC	DFO	N/A	0.29	lb	MMBtu
IC	JF	N/A	1.01*S	lb	MMBtu
ST	JF	N/A	1.01*S	lb	MMBtu
GT	JF	N/A	1.01*S	lb	MMBtu
GT	KER	N/A	1.01*S	lb	MMBtu
CT	LFG	N/A	0.045	lb	MMBtu
GT	LFG	N/A	0.045	lb	MMBtu
ST	LFG	N/A	0.0006	lb	Mcf
IC	LFG	N/A	0.045	lb	MMBtu

Prime Mover	Primary Fuel Type	Boiler Firing Type (if applicable)	Emission Factor	Emission Factor Numerator	Emission Factor Denominator
CA	LFG	N/A	0.045	lb	MMBtu
CS	LFG	N/A	0.045	lb	MMBtu
ST	LIG	DRY TANGENTIAL	30*S	lb	short tons
ST	LIG	FLUIDIZED	10*S	lb	short tons
ST	LIG	WET FLUIDIZED	10*S	lb	short tons
ST	LIG	TANGENTIAL	30*S	lb	short tons
ST	LIG	DRY FLUIDIZED	30*S	lb	short tons
ST	LIG	DRY WALL	30*S	lb	short tons
ST	LIG	WET CYCLONE	30*S	lb	short tons
ST	MSB	N/A	1.7	lb	short tons
ST	MSW	N/A	1.7	lb	short tons
ST	MSW	OTHER	1.7	lb	short tons
ST	NG	DRY VERTICAL	0.0006	lb	Mcf
ST	NG	DRY WALL	0.0006	lb	Mcf
ST	NG	DRY DUCTBURNER	0.0006	lb	Mcf
CT	NG	N/A	0.0006	lb	Mcf
CT	NG	DUCTBURNER	0.0006	lb	Mcf
ST	NG	DRY TANGENTIAL	0.0006	lb	Mcf
GT	NG	TANGENTIAL	0.0006	lb	Mcf
ST	NG	DUCTBURNER	0.0006	lb	Mcf
IC	NG	N/A	0.0006	lb	Mcf
ST	NG	N/A	0.0006	lb	Mcf
ST	NG	DRY STOKER	0.0006	lb	Mcf
ST	NG	DRY CYCLONE	0.0006	lb	Mcf
ST	NG	CYCLONE	0.0006	lb	Mcf
GT	NG	N/A	0.0006	lb	Mcf
ST	NG	FLUIDIZED	0.0006	lb	Mcf
ST	NG	OTHER	0.0006	lb	Mcf
CS	NG	N/A	0.0006	lb	Mcf
ST	NG	N/A	0.0006	lb	Mcf
CS	NG	DUCTBURNER	0.0006	lb	Mcf
ST	NG	WET CYCLONE	0.0006	lb	Mcf
ST	NG	STOKER	0.0006	lb	Mcf
ST	NG	TANGENTIAL	0.0006	lb	Mcf
CA	NG	DUCTBURNER	0.0006	lb	Mcf
CA	NG	N/A	0.0006	lb	Mcf
ST	NG	WALL	0.0006	lb	Mcf
CA	NG	DRY DUCTBURNER	0.0006	lb	Mcf

Prime Mover	Primary Fuel Type	Boiler Firing Type (if applicable)	Emission Factor	Emission Factor Numerator	Emission Factor Denominator
CA	NG	DRY WALL	0.0006	lb	Mcf
CT	NG	N/A	0.0006	lb	Mcf
CS	OBG	N/A	0.0065	lb	MMBtu
IC	OBG	N/A	0.0065	lb	MMBtu
ST	OBG	N/A	0.0006	lb	Mcf
GT	OBG	N/A	0.0065	lb	MMBtu
CA	OBG	N/A	0.0065	lb	MMBtu
CT	OBG	N/A	0.0065	lb	MMBtu
GT	OBL	N/A	0.0065	lb	MMBtu
IC	OBL	N/A	0.0065	lb	MMBtu
ST	OBS	N/A	0.025	lb	MMBtu
ST	OG	CYCLONE	0.0006	lb	Mcf
IC	OG	N/A	0.000588	lb	MMBtu
ST	OG	DRY TANGENTIAL	0.0006	lb	Mcf
ST	OG	DRY DUCTBURNER	0.0006	lb	Mcf
ST	OG	DUCTBURNER	0.0006	lb	Mcf
GT	OG	N/A	0.0006	lb	Mcf
ST	OG	DRY WALL	0.0006	lb	Mcf
ST	OG	N/A	0.0006	lb	Mcf
ST	OG	OTHER	0.0006	lb	Mcf
ST	OG	N/A	0.0006	lb	Mcf
ST	PC	FLUIDIZED	0.362*S	lb	MMBtu
ST	PC	N/A	0.362*S	lb	MMBtu
CA	PC	OTHER	0.362*S	lb	MMBtu
ST	PC	OTHER	0.362*S	lb	MMBtu
ST	PC	WET WALL	0.362*S	lb	MMBtu
ST	PC	DRY WALL	0.362*S	lb	MMBtu
ST	PC	DRY FLUIDIZED	0.362*S	lb	MMBtu
GT	PG	N/A	0.0006	lb	Mcf
ST	PRG	DRY WALL	0.0006	lb	Mcf
ST	PRG	DUCTBURNER	0.0006	lb	Mcf
ST	PRG	OTHER	0.0006	lb	Mcf
ST	PRG	TANGENTIAL	0.0006	lb	Mcf
ST	PRG	N/A	0.0006	lb	Mcf
ST	RC	DRY TANGENTIAL	38*S	lb	short tons
CA	RFO	N/A	1.01*S	lb	MMBtu
IC	RFO	N/A	0.29	lb	MMBtu
ST	RFO	WET WALL	6.594*S	lb	barrels

Prime Mover	Primary Fuel Type	Boiler Firing Type (if applicable)	Emission Factor	Emission Factor Numerator	Emission Factor Denominator
CT	RFO	N/A	1.01*S	lb	MMBtu
CT	RFO	N/A	1.01*S	lb	MMBtu
CS	RFO	N/A	1.01*S	lb	MMBtu
GT	RFO	N/A	1.01*S	lb	MMBtu
ST	RFO	DRY TANGENTIAL	6.594*S	lb	barrels
ST	RFO	DRY WALL	6.594*S	lb	barrels
ST	RFO	WALL	6.594*S	lb	barrels
ST	RFO	N/A	6.594*S	lb	barrels
ST	RFO	TANGENTIAL	6.594*S	lb	barrels
ST	SGC	N/A	38*S	lb	short tons
CT	SGP	N/A	0.362*S	lb	MMBtu
CA	SGP	N/A	0.362*S	lb	MMBtu
CS	SGP	N/A	0.362*S	lb	MMBtu
ST	SUB	DRY TANGENTIAL	35*S	lb	short tons
ST	SUB	DRY FLUIDIZED	35*S	lb	short tons
ST	SUB	N/A	35*S	lb	short tons
ST	SUB	TANGENTIAL	35*S	lb	short tons
ST	SUB	FLUIDIZED	35*S	lb	short tons
ST	SUB	CYCLONE	35*S	lb	short tons
ST	SUB	WET TANGENTIAL	35*S	lb	short tons
ST	SUB	DRY WALL	35*S	lb	short tons
ST	SUB	WET FLUIDIZED	35*S	lb	short tons
ST	SUB	WET CYCLONE	35*S	lb	short tons
ST	SUB	WET WALL	35*S	lb	short tons
ST	TDF	STOKER	38*S	lb	short tons
ST	WC	FLUIDIZED	30*S	lb	short tons
ST	WC	N/A	30*S	lb	short tons
ST	WC	DRY FLUIDIZED	30*S	lb	short tons
ST	WDL	N/A	0.025	lb	MMBtu
ST	WDS	DRY WALL	0.025	lb	MMBtu
ST	WDS	WET STOKER	0.025	lb	MMBtu
ST	WDS	WET TANGENTIAL	0.025	lb	MMBtu
ST	WDS	FLUIDIZED	0.025	lb	MMBtu
ST	WDS	OTHER	0.025	lb	MMBtu
ST	WDS	DRY TANGENTIAL	0.025	lb	MMBtu
ST	WDS	N/A	0.025	lb	MMBtu
ST	WDS	STOKER	0.025	lb	MMBtu
ST	WDS	DRY STOKER	0.025	lb	MMBtu

Prime Mover	Primary Fuel Type	Boiler Firing Type (if applicable)	Emission Factor	Emission Factor Numerator	Emission Factor Denominator
ST	WDS	DRY FLUIDIZED	0.025	lb	MMBtu
CT	WO	N/A	1.01*S	lb	MMBtu
ST	WO	N/A	6.174*S	lb	barrels
GT	WO	N/A	1.01*S	lb	MMBtu
IC	WO	N/A	0.29	lb	MMBtu
CA	WO	N/A	1.01*S	lb	MMBtu
ST	WO	DRY WALL	6.174*S	lb	barrels
CS	WO	N/A	1.01*S	lb	MMBtu

Source: AP-42 (EPA, 1995).
N/A = not applicable
S = sulfur content of fuel (%)

Biomass fuels used in the Plant file biomass emission adjustments

For more information regarding the methodology for biomass adjustments to emissions, please see Section 3.1.2.1.

Table C-4. Fuel types included in the Plant file biomass emission adjustments

Fuel Type	EIA Fuel Type Code	Biomass Adjustment Made?			
		CO_2	NO_x	CH_4	N_2O
Agricultural Byproducts	AB	x			
Sulphite lyes (Black Liquor)	BLQ	x			
Digester Gas	DG	x			
Landfill Gas	LFG	x	x	x	x
Municipal Solid Waste - biomass component	MSB	x			
Other Biogas	OBG	x			
Other Liquid Biofuels	OBL	x			
Other Primary Solid Biomass	OBS	x			
Sludge Waste	SLW	x			

Fuel Type	EIA Fuel Type Code	Biomass Adjustment Made?			
		CO_2	NO_x	CH_4	N_2O
Wood, Wood Waste Liquid	WDL	x			
Wood and Wood Residuals	WDS	x			

Plant ORISPL ID Changes

For more information regarding the ORISPL ID changes, please see Section 4.1.

Table C-5. Crosswalk of EIA ORISPL ID changes to EPA/CAMD ORISPL IDs

EIA		EPA/CAMD	
ORISPL ID	Plant Name	ORISPL ID	Plant Name
57901	El Segundo Power	330	El Segundo
57068	GenConn Middletown LLC	562	Middletown
7546	Ponca City	762	Ponca
57842	Wabash Valley Power IGCC	1010	Wabash River Gen Station
56565	J Lamar Stall Unit	1416	Arsenal Hill Power Plant
58215	Lee Combined Cycle Plant	2709	H F Lee Steam Electric Plant
58697	L V Sutton Combined Cycle	2713	L V Sutton
58378	W.A. Parish Carbon Capture Plant	3470	W A Parish
7799	West Marinette 34	4076	West Marinette
7294	Central Energy Plant	7254	Reedy Creek
7268	491 E 48th Street	7258	48th Street Peaking Station
55545	Hidalgo Energy Center	7762	Calpine Hidalgo Energy Center
7709	Dahlberg	7765	Dahlberg (Jackson County)
10397	ArcelorMittal Indiana Harbor West	10474	ArcelorMittal USA - Indiana Harbor East
54995	Indiana Harbor E 5 AC Station	10474	ArcelorMittal USA - Indiana Harbor East
7784	Allegany Cogen	10619	Alleghany Station No. 133
1393	R S Nelson	50030	Nelson Industrial Steam Company
59338	Sundevil Power Holdings - Gila River	55306	Gila River Power Station
59784	Gila River Power Block 3	55306	Gila River Power Station
57664	Astoria Energy II	55375	Astoria Energy
58557	Mesquite Generating Station Block 1	55481	Mesquite Generating Station
55874	Panoche Peaker	55508	CalPeak Power - Panoche LLC
54538	Hartwell Energy Facility	70454	Hartwell Energy Facility

Geothermal Geotype

Table C-6. Geothermal Emission Factors by Geotype and Pollutant

Geotype Code	Geotype Description	NOx EF (lbs/mWh)	CO_2 EF (lbs/mWh)	SO_2 EF (lbs/mWh)
F	Flash	0	60	0.35
S	Steam	0.00104	88.8	0.000215
B	Binary	0	0	0
B/F	Binary/Flash	0	0	0

English to Metric Conversion Factors

Table C-7. Conversion Factors

English		Metric	
Value	**Unit**	**Value**	**Unit**
1.10231	short ton	1	metric ton
2.2046	pound (lb)	1	Kilogram (kg)
0.9478	MMBtu	1	Gigajoule (GJ)
0.2778	GJ	1	Megawatt-hour (MWh)

Appendix D. Information on Prior Editions of eGRID

Previous releases of eGRID include the following:

- eGRID1996 was first released in December 1998.
- eGRID1997, with 1996 and 1997 data, was first released in December 1999.
- eGRID1998, with 1998 data, and with 1996 and 1997 data from eGRID97, was released in March and September 2001.
- eGRID2000, with preliminary 2000 data, was first released as Version 1.0 in December 2002 and with 1996-2000 data as Version 2.0 in April 2003 and Version 2.01 in May 2003.
- eGRID2004 Version 1.0, with the year 2004 plant spreadsheet file, was first released in December 2006; Version 2.0, which includes one Excel workbook with an updated plant file, as well as the boiler and generator files for year 2004, was released in early April 2007; and Version 2.1, with the complete set of files – boiler, generator, plant, state, electric generating company (EGC) location (operator)- and owner-based, parent company location (operator)- and owner-based, power control area, eGRID subregion, and North American Electric Reliability Corporation (NERC) region – was released in late April 2007 and updated for typos in May 2007.
- eGRID2005 Version 1.0 was released in October 2008 and Version 1.1 was released in January 2009, both with two Excel workbooks with year 2005 data (plant and aggregation) and one Excel workbook with years 2004 and 2005 data (ImportExport).
- eGRID2007 Version 1.0 was released on February 23, 2011 and Version 1.1 was released May 20, 2011, including three Excel workbooks with year 2007 data as well as data for years 2004 and 2005 (the same as those included in eGRID2007). Import-export data for years 2007, 2005, and 2004 are also included.
- eGRID2009 Version 1.0 with year 2009 data was release on May 10, 2012. This edition also includes year 2007, 2005, and 2004 data from the three previously released editions. Import-export data for years 2009, 2007, 2005, and 2004 are also included.
- eGRID2010 Version 1.0 with year 2010 data was released on February 24, 2014. This edition also includes year 2009, 2007, 2005, and 2004 data from the three previously released editions. Import-export data for years 2010, 2009, 2007, 2005, and 2004 are also included.
- eGRID2012 Version 1.0 with year 2012 data was released on October 8, 2015.

Note that the naming convention for eGRID had been changed with the release of eGRID2012 so that the year noted in the title reflects the data year rather than the release year.