State Climate and Energy Technical Forum -- eGRID

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Outline

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What is eGRID, eGRIDweb, PowerProfiler?

- Emissions & Generation Resource Integrated Database (eGRID)
  - Data on power plants 2007, 2005, 2004, 1996-2000
  - Published at www.epa.gov/egrid
- eGRIDweb
  - An online application that lets you select, view, print and export eGRID data (years 2004 and 2005) without using the spreadsheets
  - Published at http://cfpub.epa.gov/egridweb
- PowerProfiler
  - An online application that finds your eGRID subregion, displays output emission rates and resource mix, compares these to national average, and more
  - Published at www.epa.gov/powerprofiler

History & evolution

- eGRID began in 1998, included a PC based user interface installable application
- eGRIDweb began 2009, web-based application for year 2004 & 2005 eGRID data
- Power Profiler began in 2003, updated several times, most recently in March 2011

eGRID data sources

- EPA Clean Air Markets Division
  - NOx, SO_2, and CO_2 emissions and heat input monitored data as reported to the Acid Rain Program, NOx Budget Program, NOx SIP Call, Clean Air Interstate Rule.
- Energy Information Administration (EIA)
  - Electric Power Surveys, EIA-860, EIA-923, EIA-423 & FERC-423, EIA-861, and previously from the EIA-767 and EIA-906/920 among others
- EPA emissions factors
- See the eGRID Technical Support Document for more information about data sources.

Accessing eGRID data

Downloadable Microsoft Excel Workbooks:

- eGRID2010V1_0_year07_AGGREGATION.xls (plant, boiler and generation level data)
- eGRID2010V1_0_year07_AGGREGATION.xls (aggregated data levels)
- eGRID2010V1_0_STIE_USGC.xls (state import-export data and U.S. generation and consumption data)

Adobe PDF documents: technical support document, summary data, paper on the use of eGRID data, eGRID subregion GHG emission rates, and representational maps

User friendly application: eGRIDweb (2004 & 2005 data)

NOTE: Industry structure (e.g. company names, ownership) are updated beyond the data year. The year in the eGRID edition name represents the year to which the industry data are adjusted. (e.g. eGRID2010)

eGRID data elements -- plant level

- Plant identification
  - name and ORISPL (plant ID)
- Location information
  - County and state names and FIPs codes
  - lat-long coordinates (some plants based on county centroid)
  - Utility service territory, power control area, eGRID subregion, NERC region
- Operator and parent company, owners (up to 16)
- Nameplate Capacity, number of boilers and generators, primary fuel, fuel category, generation category

eGRID data elements – plant level

- Flags: CHP, biomass, pumped storage, any coal
- Emissions (annual for all years unless specified)
  - Nitrogen oxides (NO_x) – annual and ozone season
  - Sulfur dioxide (SO_2)
  - Carbon dioxide (CO_2)
  - Methane (CH_4) – 2005, 2007
  - Nitrous oxide (N_2O) – 2005, 2007
  - Carbon dioxide equivalent (CO_2e) – 2007
  - Mercury – 1998, 1999, 2000, 2004, 2005
- Unadjusted emissions (years 2004, 2005, 2007)

eGRID data elements – plant level

- Net Generation (MWh)
- Heat Input (MMBtu)
- Emission Rates
  - Total output emission rates (lb/MWh or lb/GWh)
  - Input emission rates (lb/MMBtu or lb/BBtu)
  - Combustion output emission rates (lb/MWh or lb/GWh)
    - Useful for plants that are partially combustion based
- Nominal Heat Rate (Btu/kWh)

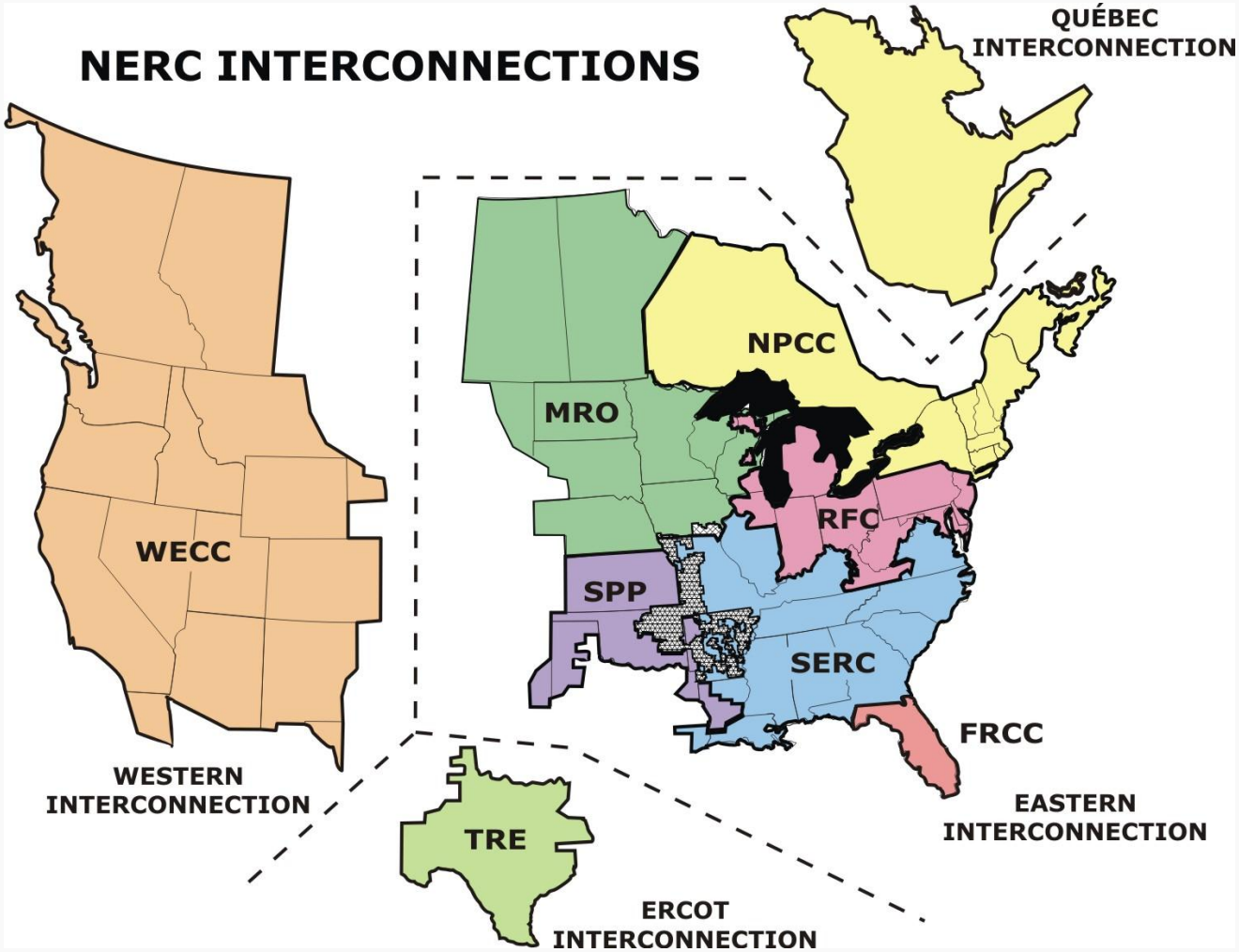
eGRID data elements – plant level

- Resource mix, that is, generation by resource type (MWh and percent)
  - Coal, oil, gas, nuclear, hydro, biomass, wind, solar, geothermal, other fossil, other unknown/purchased fuel.
- eGRID plant sequence number
  - For linking plants to previous editions of eGRID

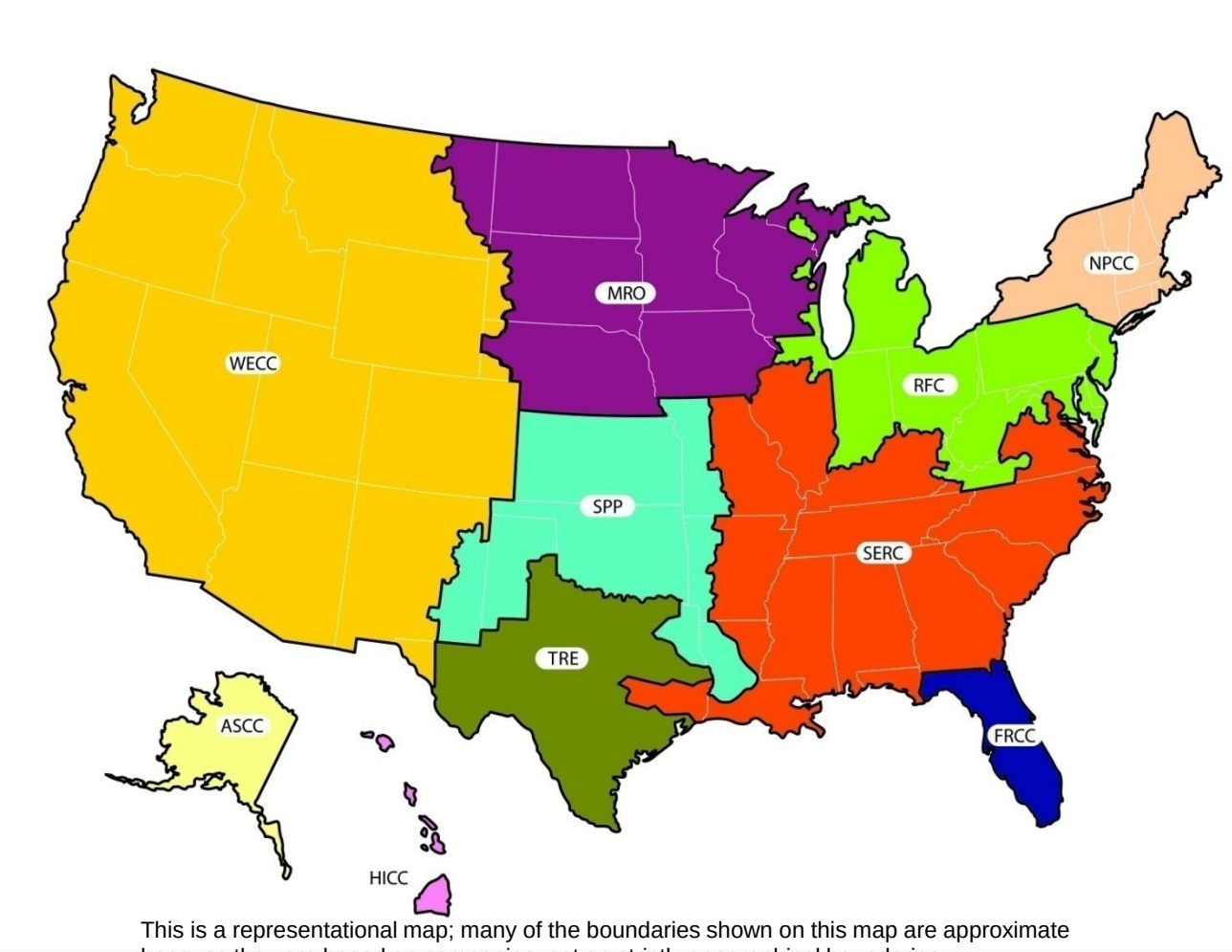
eGRID data elements

- Unit level data (in separate sheets the “PLANT” xls file)
  - Boiler level
  - Generator level
- Aggregated data at many levels (in the “AGGREGATION” xls file)
  - US total
  - 50 States and the District of Columbia
  - Three grid region levels (NERC, eGRID subregion, Power Control Area)
  - Company
    - Company aka “EGC” (operator based and owner based)
    - Parent company (operator based and owner based)

Continental U.S. Interconnections

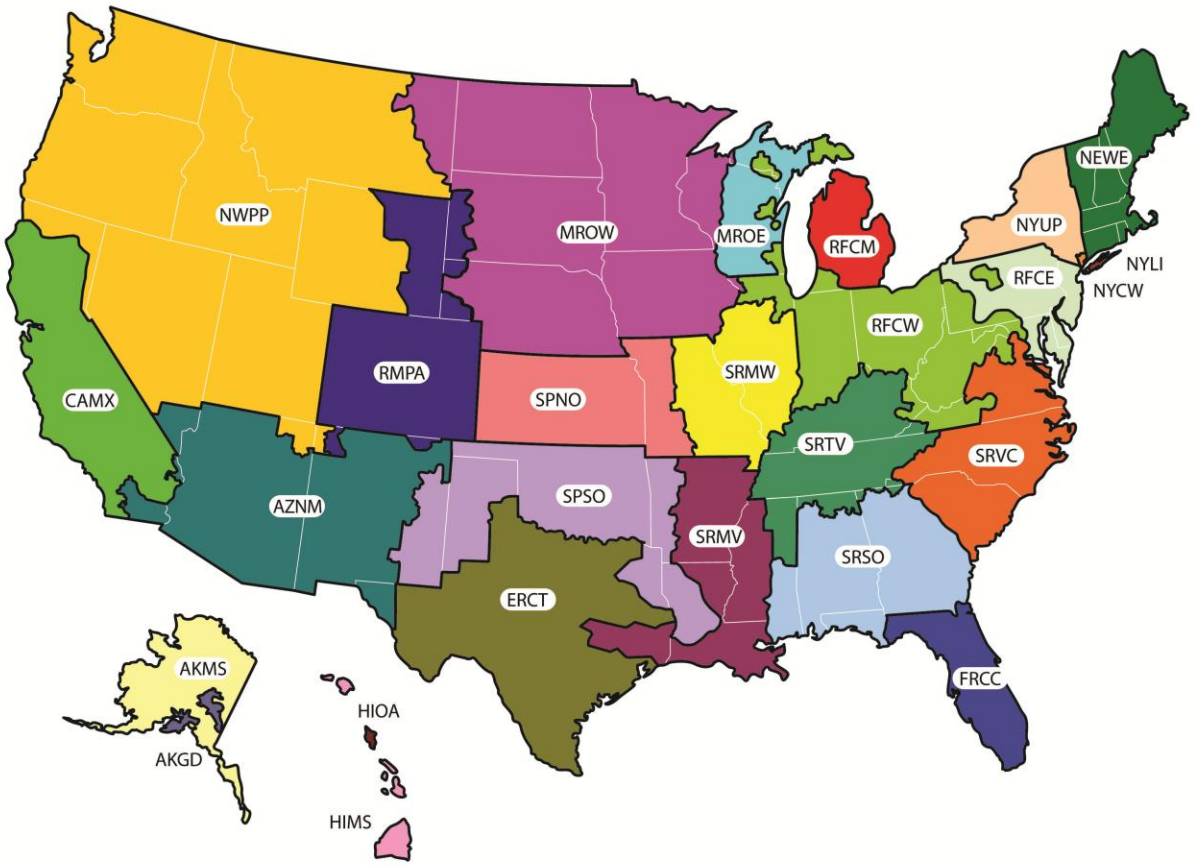


NERC regions



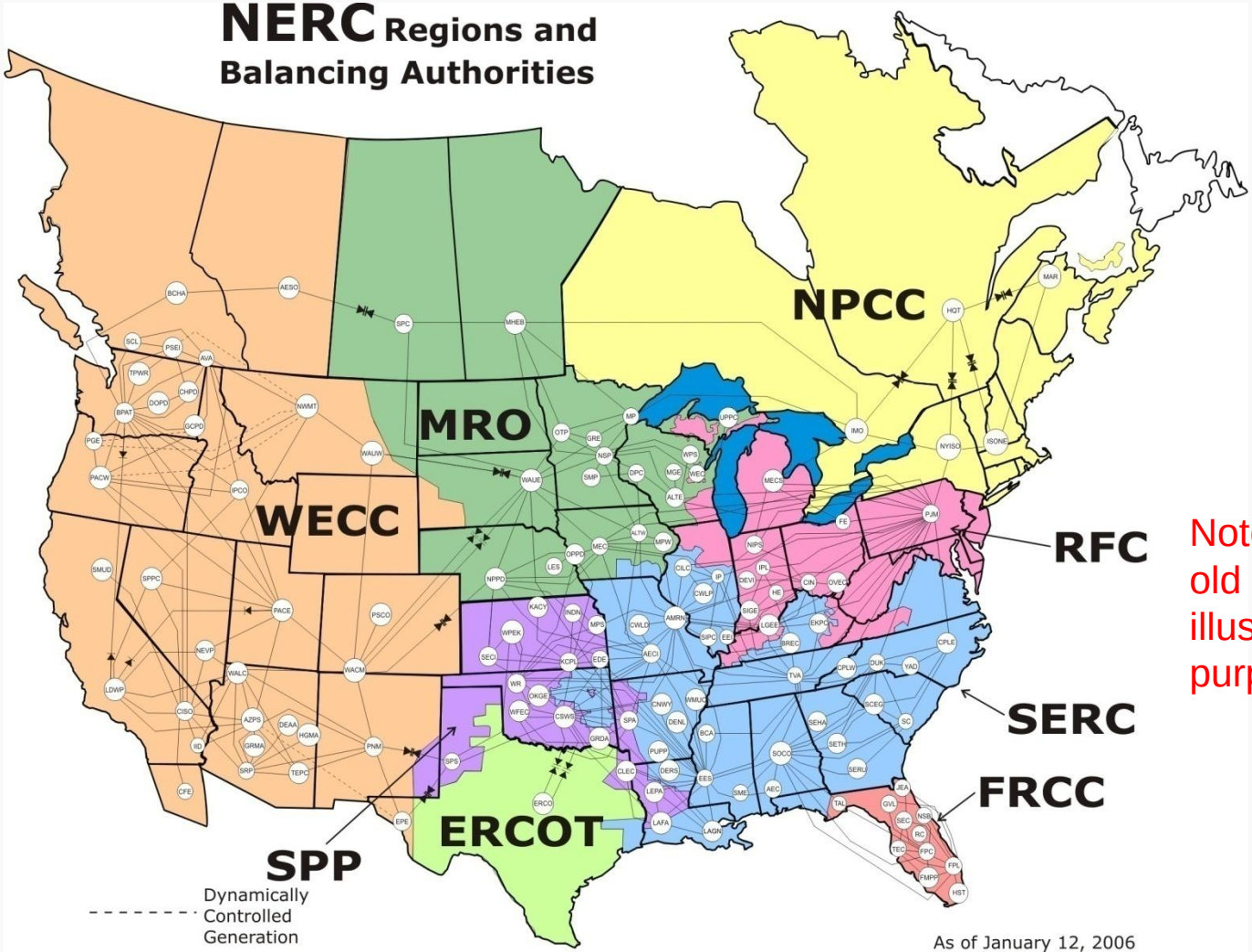
This is a representational map; many of the boundaries shown on this map are approximate because they are based on companies, not on strictly geographical boundaries.

eGRID subregions



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

Power Control Areas (a.k.a. balancing authorities)



Note: this is an old map for illustration purposes only.

eGRID data elements – aggregated data

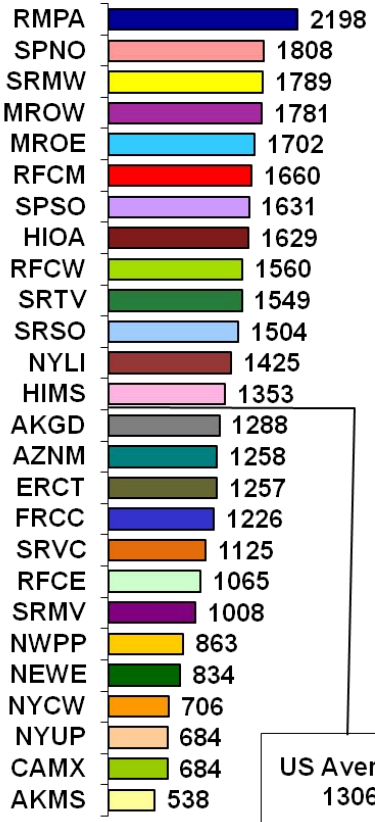
- Aggregations of many of the plant file fields
  - Capacity, net generation
  - Heat input
  - Emissions, emissions rates (input, total output, combustion output)
  - Resource mix
- Plus
  - Output and input emission rates for Fossil, Coal, Oil, & Gas Plants
  - Non-baseload output emission rates

eGRID data extent

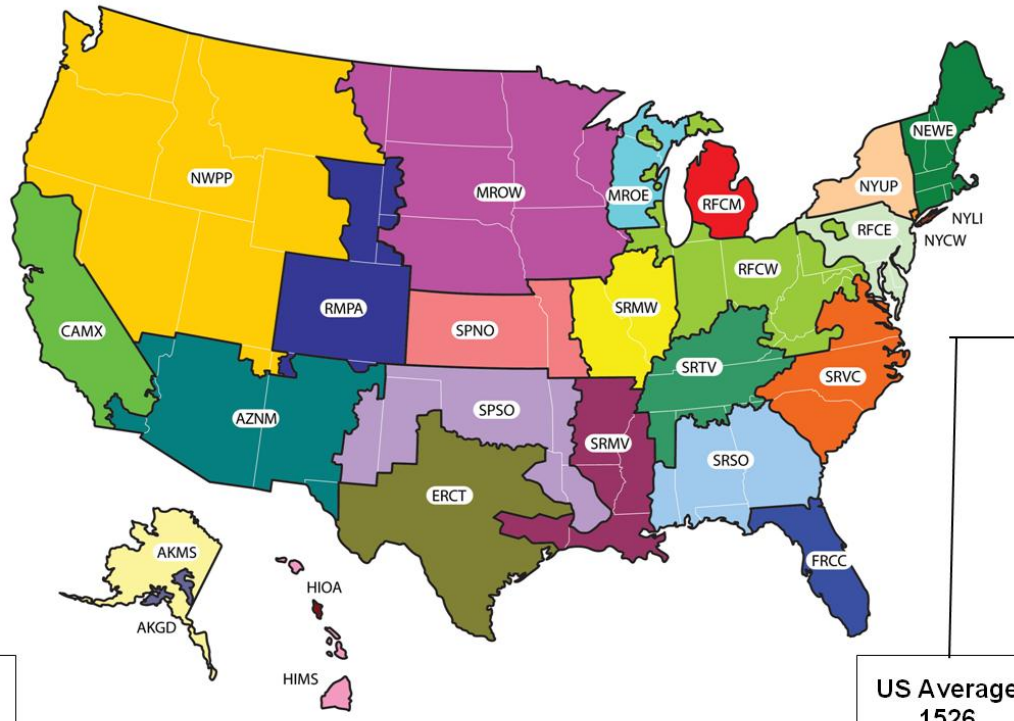
- Emissions and emissions rates are generation based:
  - Do not include life-cycle emissions (e.g. extraction, processing and transportation of fuels)
  - Do not include transmission & distribution line losses
- If you want to account for line losses, eGRID gross grid loss factors are available. For the groups of states that generally comprise the three grid regions in the continental U.S., Alaska, and Hawaii, these eGRID gross grid loss factors are based on generation, consumption, and foreign net imports.
  - MWh generation = MWh consumption / (1- grid loss factor)

2007 eGRID Subregion Annual CO_2e Output Emission Rates (lb/MWh)

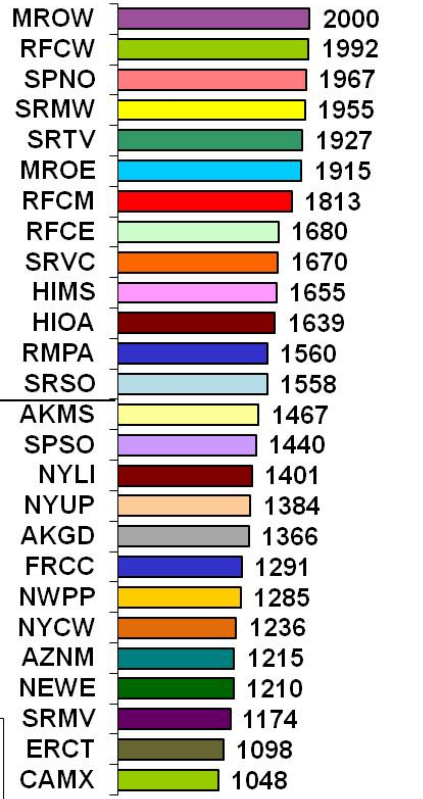
Total



US Average 1306



Non-baseload



US Average 1526

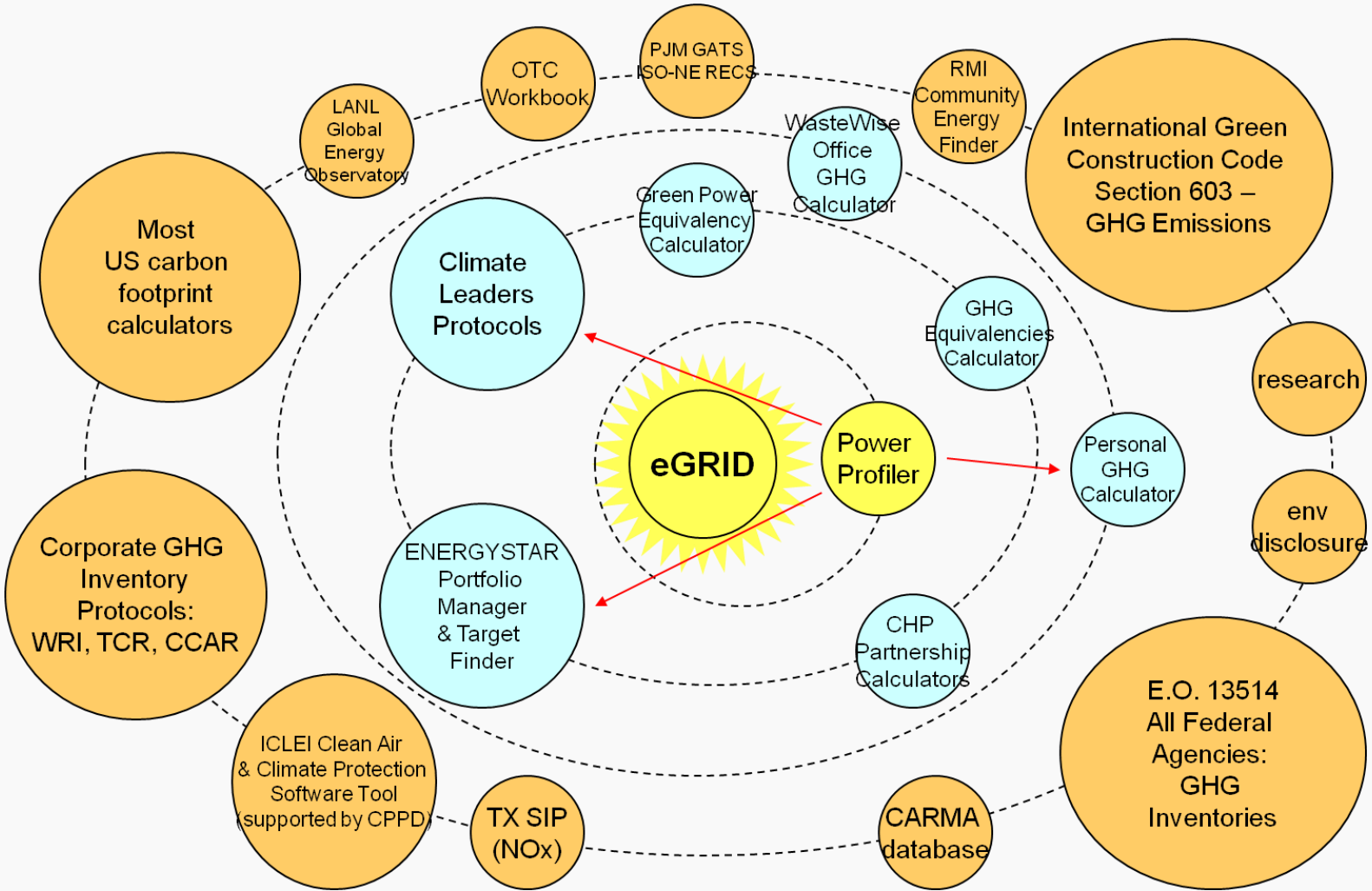
What's new in eGRID2010 with 2007 data?

- New data elements & methodologies
  - New generation based plant primary fuel category
    - Other plant primary fuel category is based heat input
  - Biomass CO_2 emissions are shown in the unadjusted plant emissions (previously not shown in unadjusted plant emissions)
  - Coal flag indicated for any plant that has any coal fuel use or any coal generation (previously based just on fuel use)
  - New CO_2 equivalent emissions and emissions rates fields based on IPCC SAR GWP (so you don't have to do the math)

What's new in eGRID2010 with 2007 data?

- New data elements & methodologies (continued)
  - Nominal heat rate calculated using the combustion based generation (previously all generation)
  - Updated lat-long coordinates for many plants
  - New EGC type field (nonutility and seven utility types)
  - Utility service territory listed for all plants (previously just nonutility plants)
  - More CAMD data used (previously just Acid Rain Program plants)

eGRID uses & users



eGRID uses & users

- For GHG Inventories or Carbon Footprinting indirect emissions from electricity purchases
  - Use eGRID subregion total output emission rates
- For estimating avoided emissions from reductions in grid supplied electricity
  - Use eGRID subregion non-baseload output emission rates
- See paper “The Value of eGRID and eGRIDweb to GHG Inventories” for further information.

What's next?

- Next edition of eGRID with year 2009 data planned for 2012 release

- Update eGRIDweb application with year 2007 data?

eGRID walk through

- eGRID web site
- eGRID worksheets & summary tables
- eGRID web application (2004 & 2005 data)
- Power Profiler web site
- SAP Experience web site (2005 data)
  - http://experience.sap.com/experience/html/Pages/egrid/
  - Update with 2007 data pending, E.T.A. a week or two

Q&A

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