

eGRID Update

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Outline



- What is eGRID
- What's behind eGRID's emission factors for carbon dioxide (CO₂)
- Forthcoming Edition
- Conclusions

What is eGRID




- Emissions & Generation Resource Integrated Database (eGRID)
- Data from 24 Federal databases: EPA, EIA, FERC
- Comprehensive database of almost all electric generators in U.S.
 - Generation, Emissions (NO_x SO₂ CO₂ Hg), Fuel Use
 - Boiler data, generator data
 - Integrated plant level data
 - Average data by:
 - State, Electric Generating Company, Parent Company, eGRID subregion, NERC Region, U.S.
- Current version (released May 2003) contained 1996-2000 data
- <http://www.epa.gov/cleanenergy/eGRID>


“Browser”




eGRID



Emissions & Generation Resource Integrated Database




eGRID




Data Years 1996-2000
Version 2.01

U. S. Environmental Protection Agency Office of Atmospheric Programs
Prepared by E.H. Pechan & Associates, Inc.



May 2003



NEXT

“Browser”



The screenshot shows the 'eGRID2002PC, Version 2.01 - Main Selection Screen' window. The interface includes a menu bar with 'File', 'Search Filters', 'Import/Export', and 'Interchange'. On the left, there are two columns of radio buttons for 'Aggregation Level' (Power Plant, State, Electric Generating Company (EGC), US Total) and 'Grid Regions' (NERC Region, eGRID Subregion). In the center, there is a 'Search Filters' button and an 'Aggregation Method' section with 'Location (Operator)-based' selected. Below this is a search input field with the placeholder text 'Enter text to search for:' and buttons for 'Find', 'Reset', and 'Display Data'. On the right, a list of 'Power Control Areas -- Location (operator)-based' is displayed, with a red oval around the heading and another around the list items. A tooltip is visible over the 'Power Control Area (PCA)' text, containing the text: 'The US power grid is divided into 48 eGRID subregion (12 regions); eGRID subregion (27 regions); or power control area (121 regions)'. The EPA and eGRID logos are at the bottom left, and a 'help' button is at the bottom center.

“Browser”



eGRID2002PC, Version 2.01 - United States Level Data

UNITED STATES

Help Previous Next

Capacity (MW): 864,905.7 Heat Input (MMBtu): 29,221,854,977 Generation (MWh): 3,810,305,466 Data Year: 2000

Emissions Profile Generation Resource Mix U.S. Generation and Consumption Data

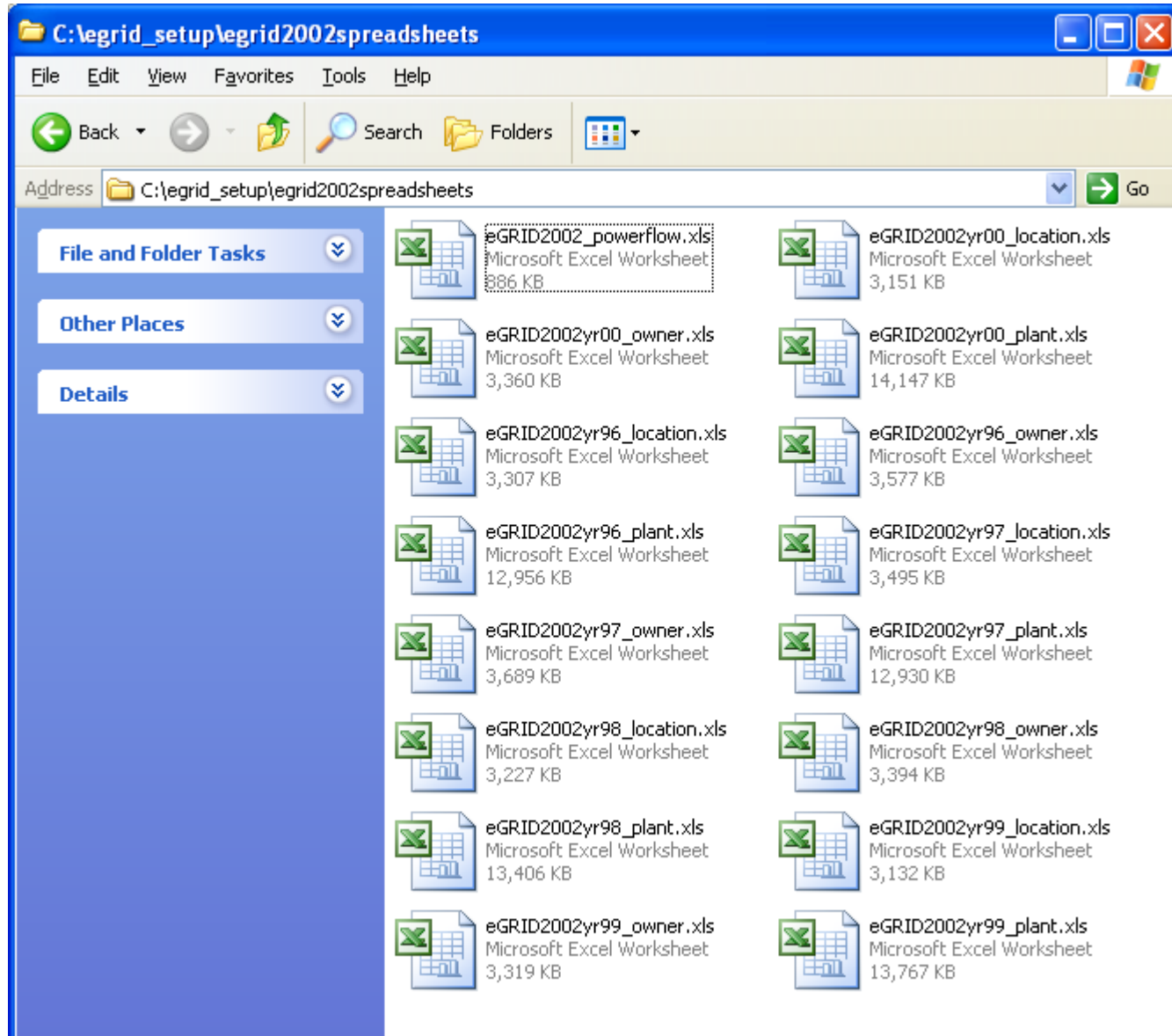
Display emission rates for fossil, coal/oil/gas

Display Ozone Season NOX Data

	Emissions (tons)	Output Rate (lbs/MWh)	Input Rate (lbs/MMBtu)
Annual CO2	2,652,901,442.24	1,392.49	181.57
Annual SO2	11,513,033.84	6.04	0.79
Annual NOX	5,644,353.87	2.96	0.39
Annual Hg #	103,554.66	0.0272	0.0035

Annual mercury (Hg) emissions are in lbs; Hg emission rates are in lbs/GWh and lbs/BBtu.

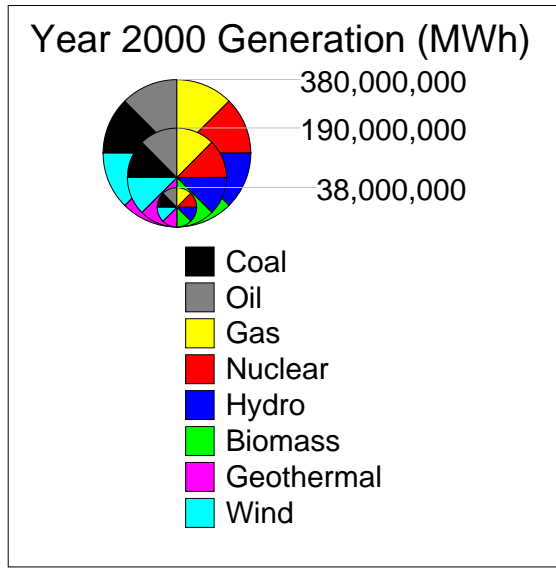
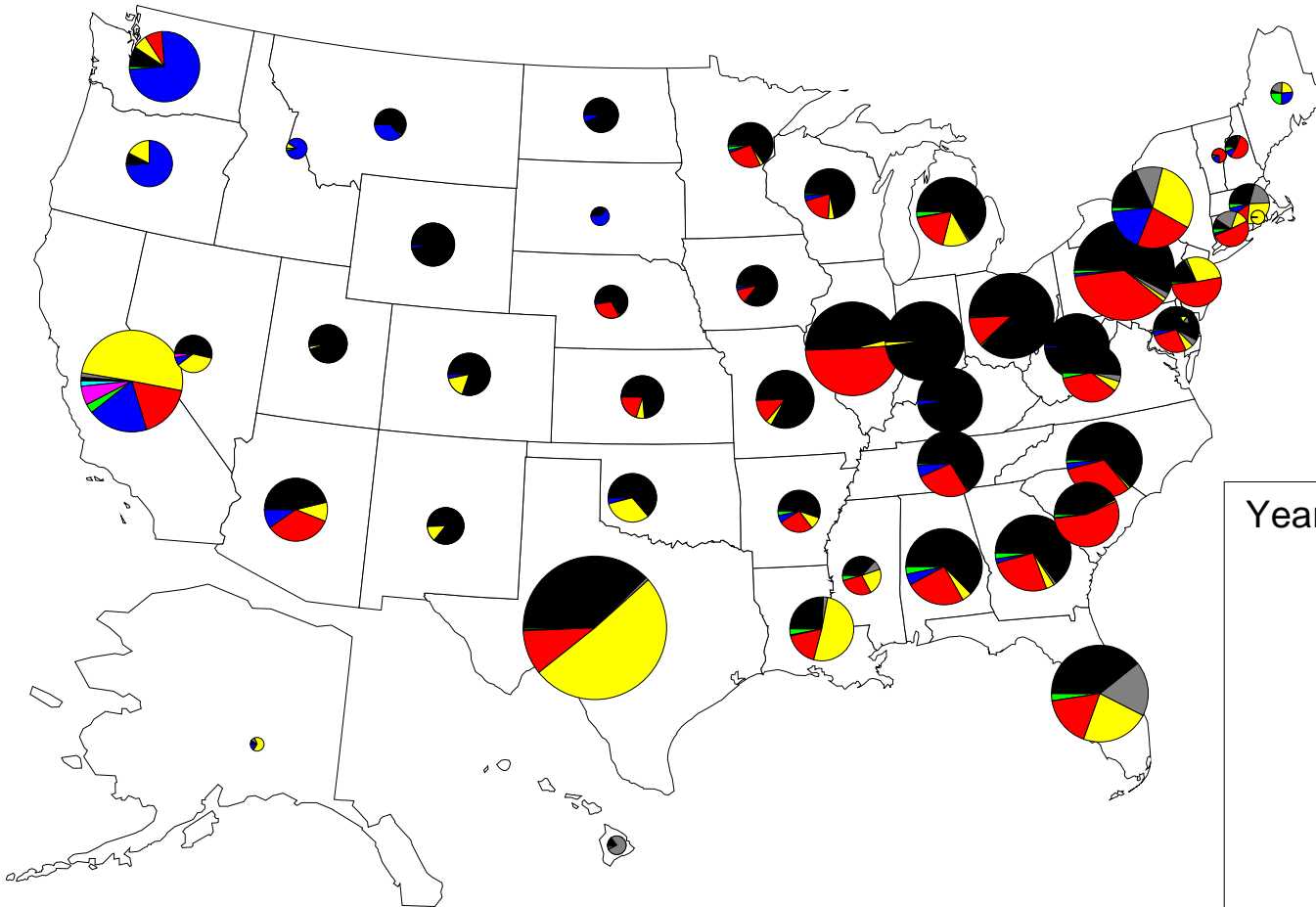
Spreadsheets



State Data Map (2000)



Generation by Fuel Type



Prepared 05-22-03 by Art Diem, USEPA (202)564-3525 diem.art@epa.gov

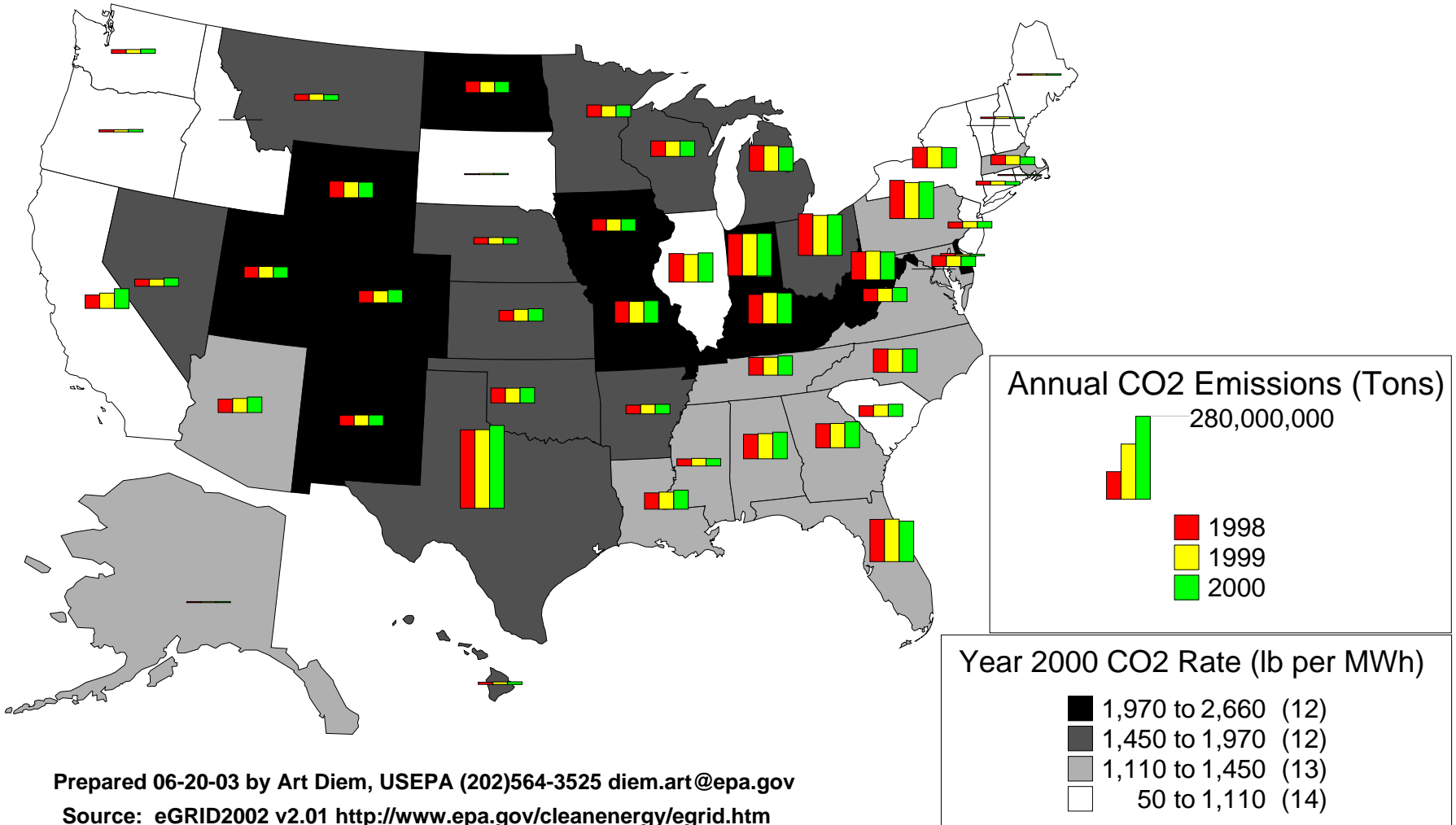
Source: eGRID2002 v2.01 <http://www.epa.gov/cleanenergy/egrid.htm>



State Data Map (2000)



Carbon Dioxide (CO2)



Prepared 06-20-03 by Art Diem, USEPA (202)564-3525 diem.art@epa.gov

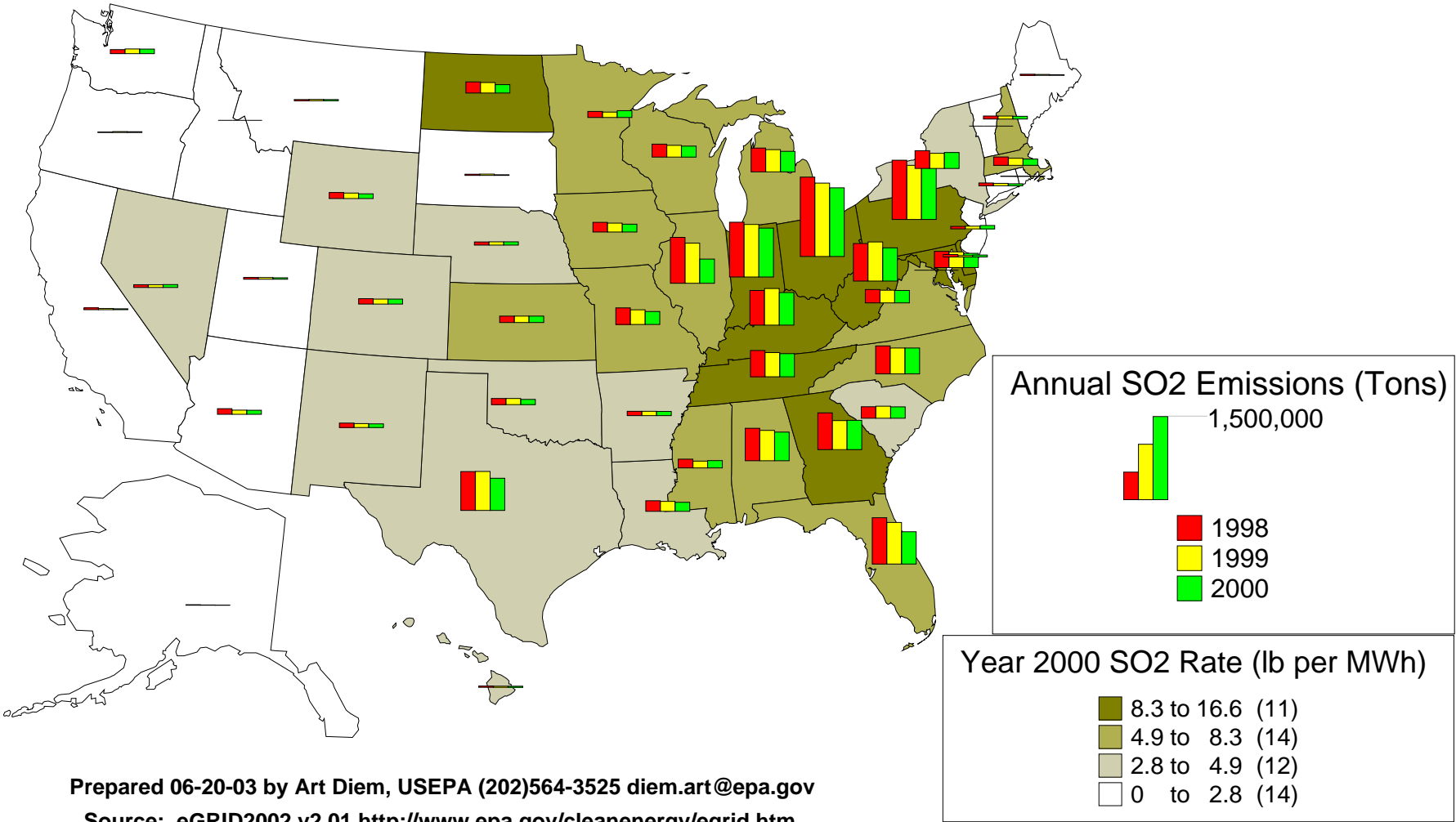
Source: eGRID2002 v2.01 <http://www.epa.gov/cleanenergy/eGRID.htm>



State Data Map (2000)



Sulfur Dioxide (SO₂)



Prepared 06-20-03 by Art Diem, USEPA (202)564-3525 diem.art@epa.gov

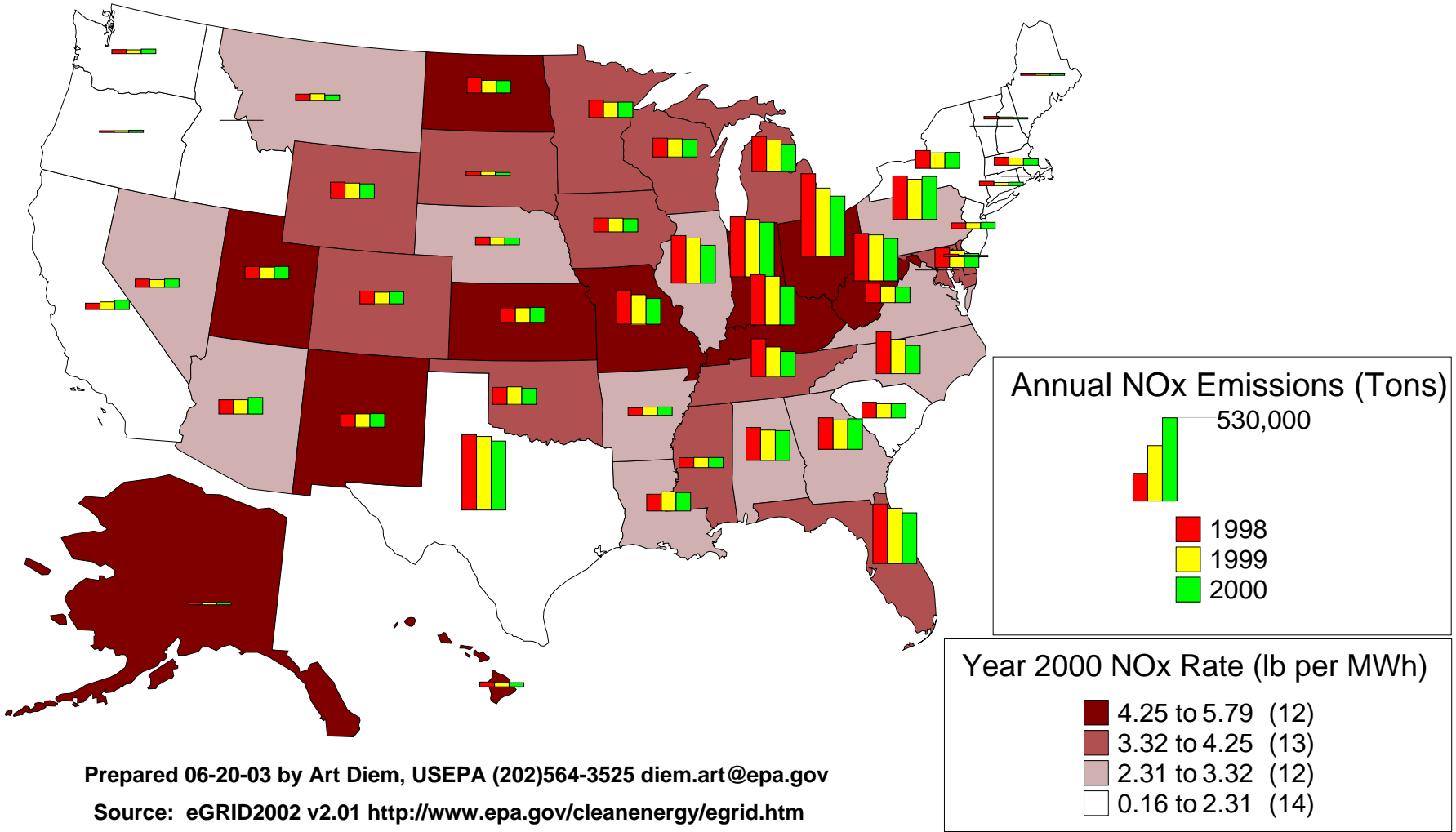
Source: eGRID2002 v2.01 <http://www.epa.gov/cleanenergy/eGRID.htm>



State Data Map (2000)



Oxides of Nitrogen (NOx)



Prepared 06-20-03 by Art Diem, USEPA (202)564-3525 diem.art@epa.gov

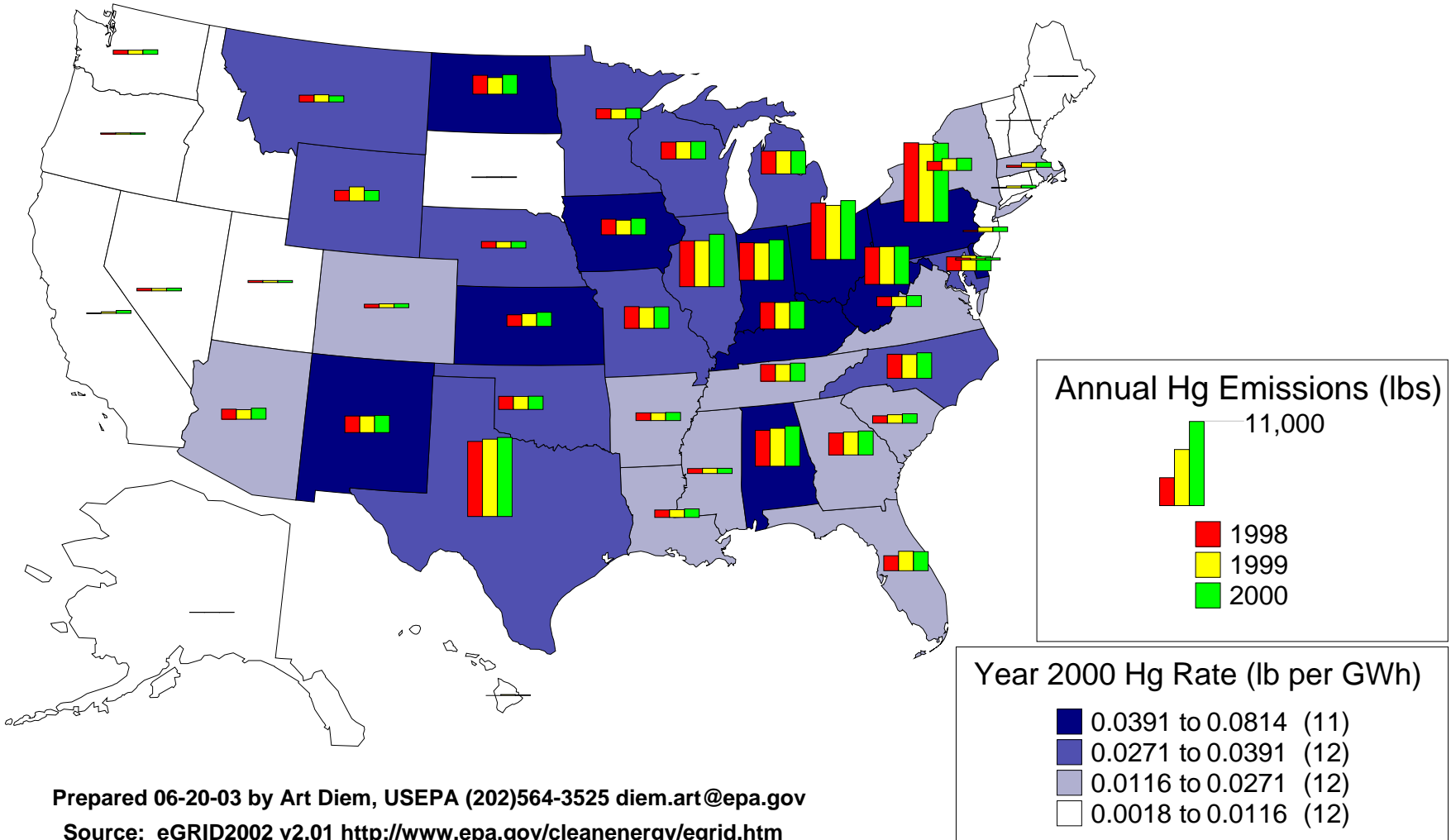
Source: eGRID2002 v2.01 <http://www.epa.gov/cleanenergy/eGRID.htm>



State Data Map (2000)



Mercury (Hg)



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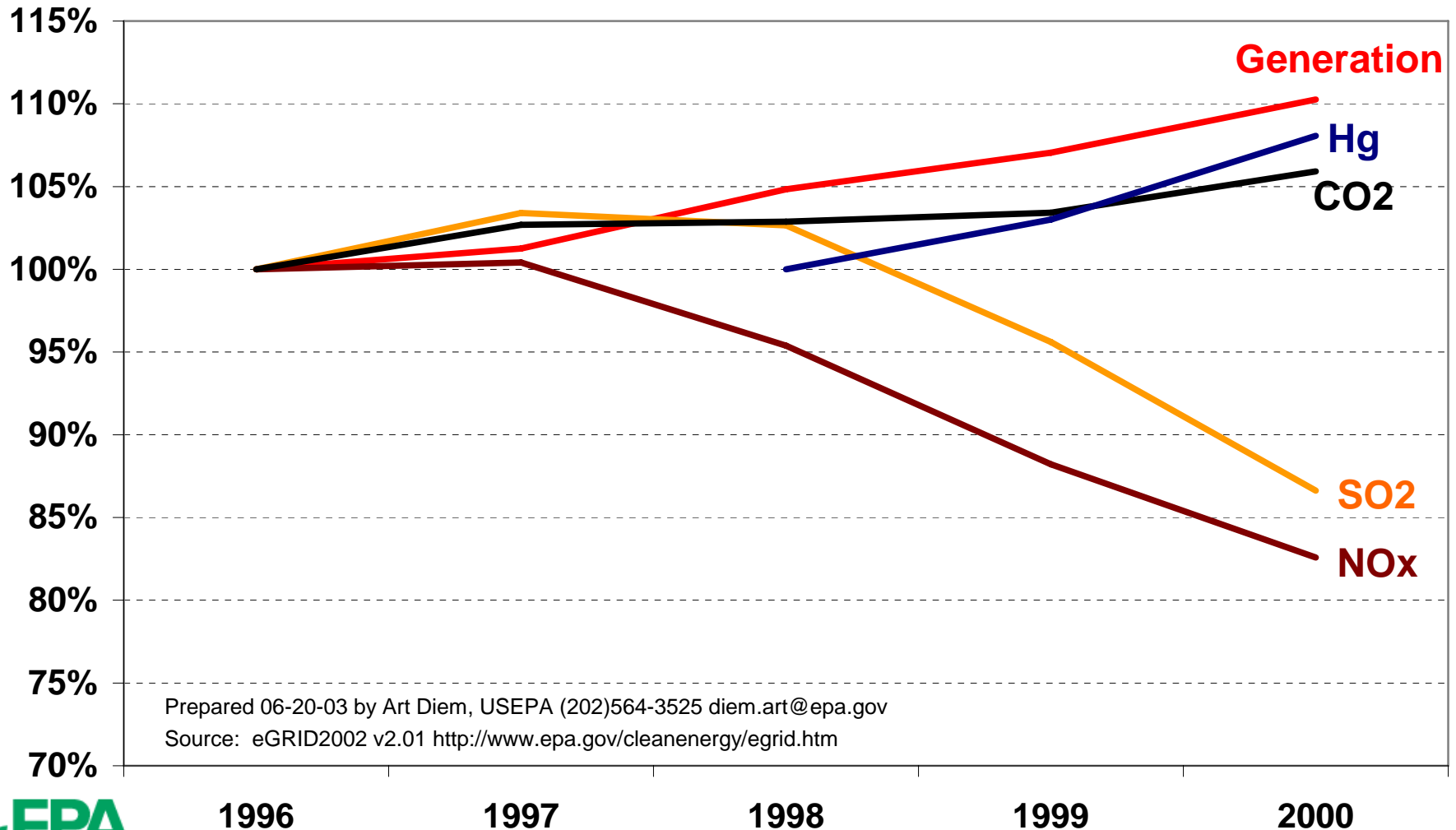
Source: eGRID2002 v2.01 <http://www.epa.gov/cleanenergy/eGRID.htm>



U.S. Trend Data



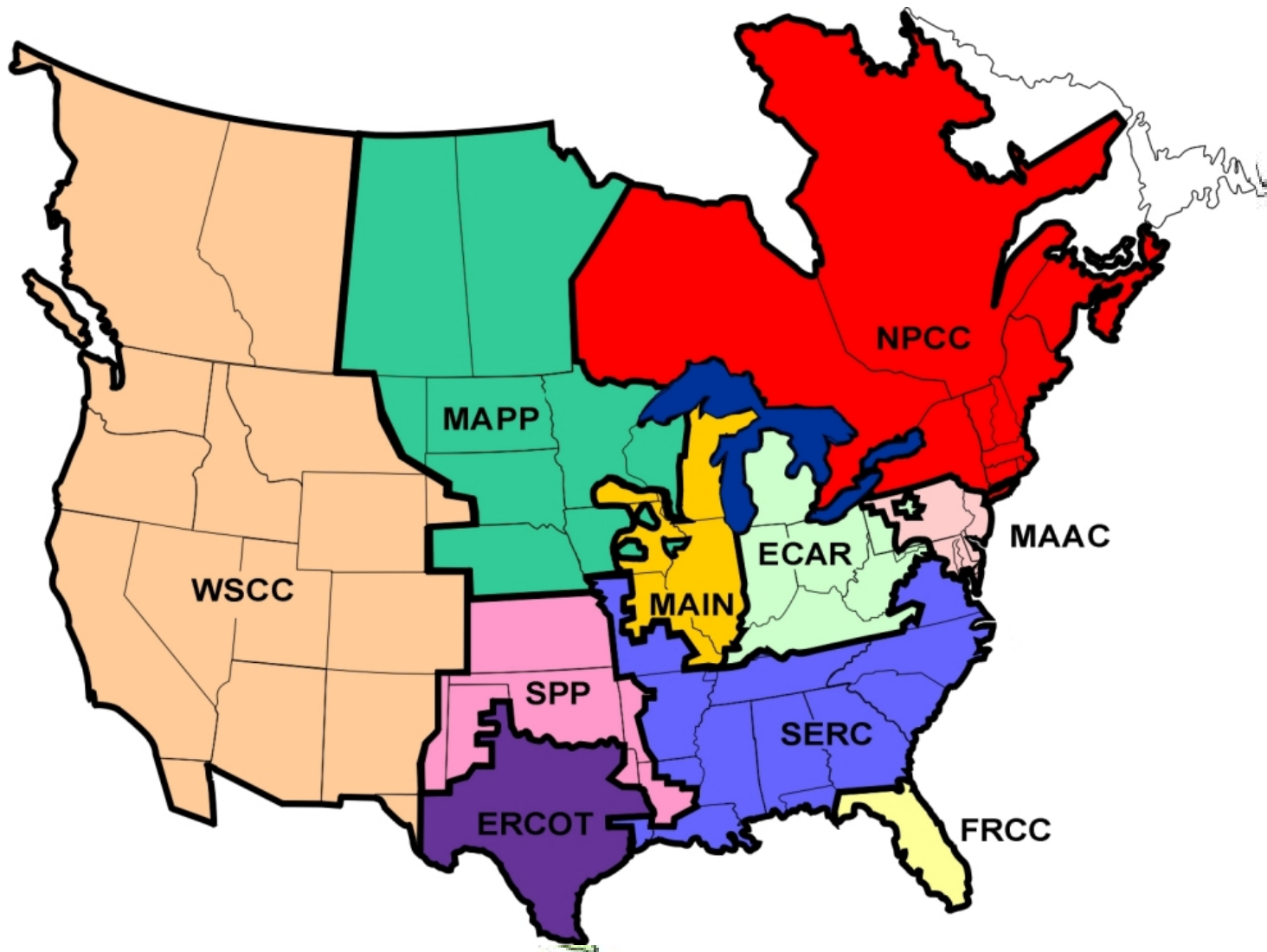
Changes in U.S. Electricity Generation and Emissions since 1996 (since 1998 for Hg)



NERC Regions



2003



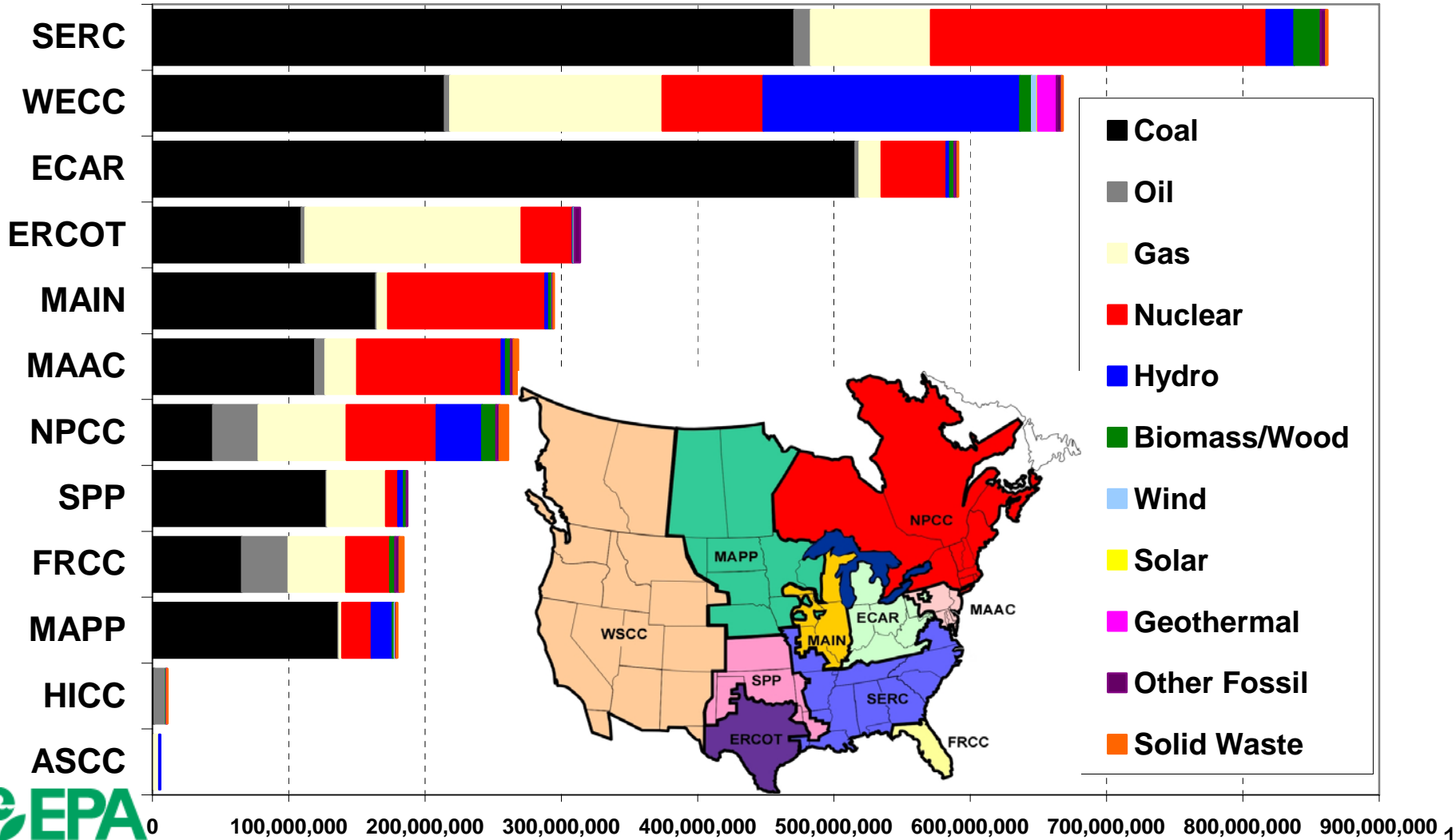
Fuel Mix Data (by NERC Region) (2000)



Generation by Fuel Type for each NERC Region (MWh)

Prepared 06-23-03 by Art Diem, USEPA (202)564-3525 diem.art@epa.gov

Source: eGRID2002 v2.01 <http://www.epa.gov/cleanenergy/egrid.htm>



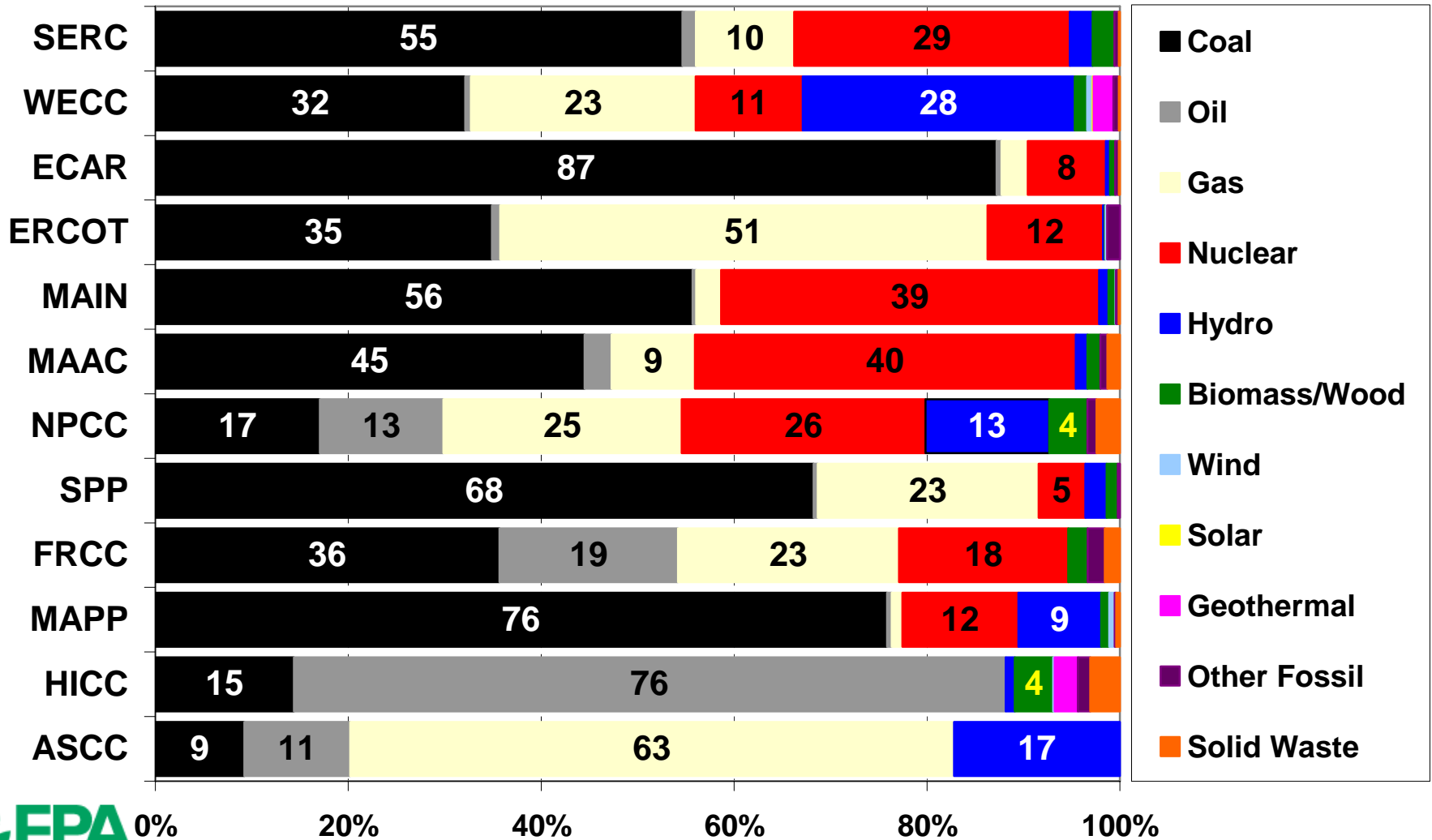
Fuel Mix Data (by NERC Region) (2000)



Generation by Fuel Type for each NERC Region (Percent)

Prepared 06-23-03 by Art Diem, USEPA (202)564-3525 diem.art@epa.gov

Source: eGRID2002 v2.01 <http://www.epa.gov/cleanenergy/egrid.htm>



CO2 emission factors (2000)

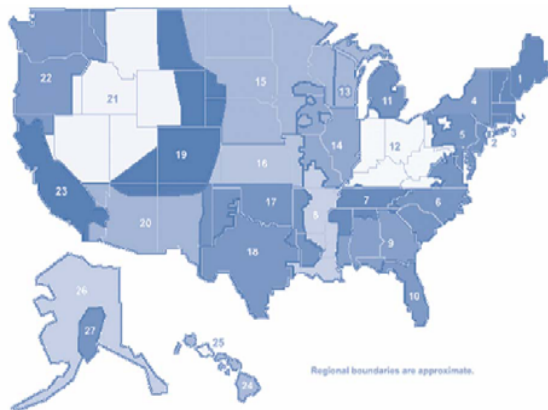


Indirect Emissions from Purchases/Sales of Electricity and Steam

http://www.epa.gov/climateleaders/resources/cross_sector.html

APPENDIX B Purchases/Sales of Electricity and Steam – Guidance

eGRID Subregion Emission Rates



Map No.	Name	Abbr.	Year 2000 Emissions Rates		
			(lbs. CO ₂ /MWh)	(lbs. CH ₄ /MWh)	(lbs. N ₂ O/MWh)
1	NPCC New England	NEWE	897.11	0.0766	0.0159
2	NPCC NYC/Westchester	NYCW	1,090.13	0.0343	0.0050
3	NPCC Long Island	NYLI	1,659.76	0.0915	0.0143
4	NPCC Upstate New York	NYUP	843.04	0.0228	0.0107
5	MAAC All	MAAC	1,097.55	0.0241	0.0162
6	SERC Virginia/Carolina	SRVC	1,164.19	0.0276	0.0190
7	SERC Tennessee Valley	SRTV	1,372.70	0.0223	0.0215
8	SERC Mississippi Valley	SRMV	1,331.34	0.0335	0.0142
9	SERC South	SRSO	1,561.51	0.0451	0.0263

Map No.	Name	Abbr.	Year 2000 Emissions Rates		
			(lbs. CO ₂ /MWh)	(lbs. CH ₄ /MWh)	(lbs. N ₂ O/MWh)
10	FRCC All	FRCC	1,390.04	0.0439	0.0171
11	ECAR Michigan	ECMI	1,632.06	0.0338	0.0243
12	ECAR Ohio Valley	ECOV	1,966.53	0.0230	0.0296
13	MAIN North	MANN	1,761.09	0.0331	0.0276
14	MAIN South	MANS	1,237.29	0.0144	0.0181
15	MAPP All	MAPP	1,838.83	0.0268	0.0279
16	SPP North	SPNO	2,011.15	0.0225	0.0278
17	SPP South	SPSO	1,936.65	0.0328	0.0244
18	ERCOT All	ERCT	1,408.27	0.0207	0.0134
19	WSCC Rockies	ROCK	1,872.51	0.0211	0.0263
20	WSCC Southwest	WSSW	1,423.95	0.0169	0.0188
21	WSCC Great Basin	NWGB	852.31	0.0121	0.0123
22	WSCC Pacific Northwest	NWPN	671.04	0.0222	0.0099
23	WSCC California	CALI	804.54	0.0305	0.0073
24	HICC Hawaii Miscellaneous	HIMS	1,702.93	0.1121	0.0204
25	HICC Oahu	HIOA	1,721.69	0.0733	0.0183
26	ASCC Alaska Miscellaneous	AKMS	757.81	0.0230	0.0039
27	ASCC Alaska Grid	AKGD	1,399.95	0.0264	0.0079
	Off-Grid	OFFG	1,706.71	0.0309	0.0031
	US Total	TOTAL	1,392.49	0.0284	0.0194

CO2 emission factors



- What's behind the numbers:
 - EPA's Acid Rain Program's Emission Tracking System CO2 emissions data (usually CEM based).
 - For other units, we use EIA-906 fuel use data and apply same methodology for EPA's GHG Inventory.
 - Account for Combined Heat and Power (CHP) units so that only the CO2 emissions associated with electricity are counted.
 - Account for biomass combustion, assigning a zero for CO2 emissions because they would otherwise be released to the atmosphere through decomposition.

Forthcoming Edition



- Schedule:
 - 2004 plant data expected to be released
 - **December 2006**
 - 2004 aggregated data (eGRID subregions) expected
 - **January 2007**
 - 2003 and 2002 data expected March 2007.
- Features:
 - Updated/revised eGRID subregions (most important in Midwest where electric grid and NERC region boundaries have changed since 2002)
 - Unadjusted emissions at plant level (user can see how much went up the stack, without adjustments for CHP, biomass, etc.)
 - Non-baseload emission rates at eGRID subregion level
 - (less important for inventories but a better estimate of emission reductions due to EE projects for non-inventory purposes).

Conclusions



- eGRID = premiere U.S. database relating generation and emissions
 - Produces accurate data relevant to the electric grid territories not just state boundaries.
- New data (2004) expected December 2006
- Yearly updates from here on
 - Goal: close gap between data year and eGRID publication