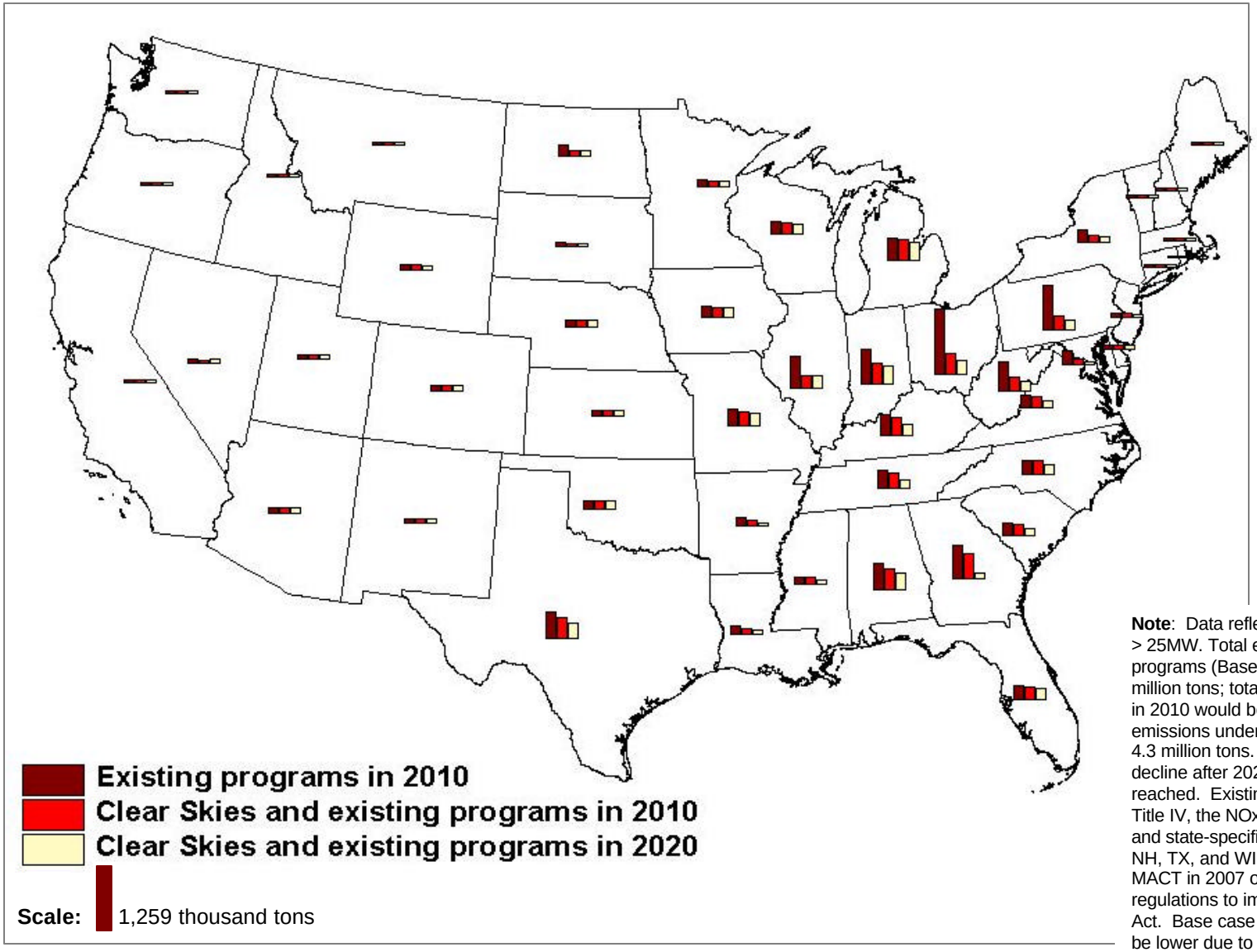
Section E:

Projected Impacts at the State and Regional-Level

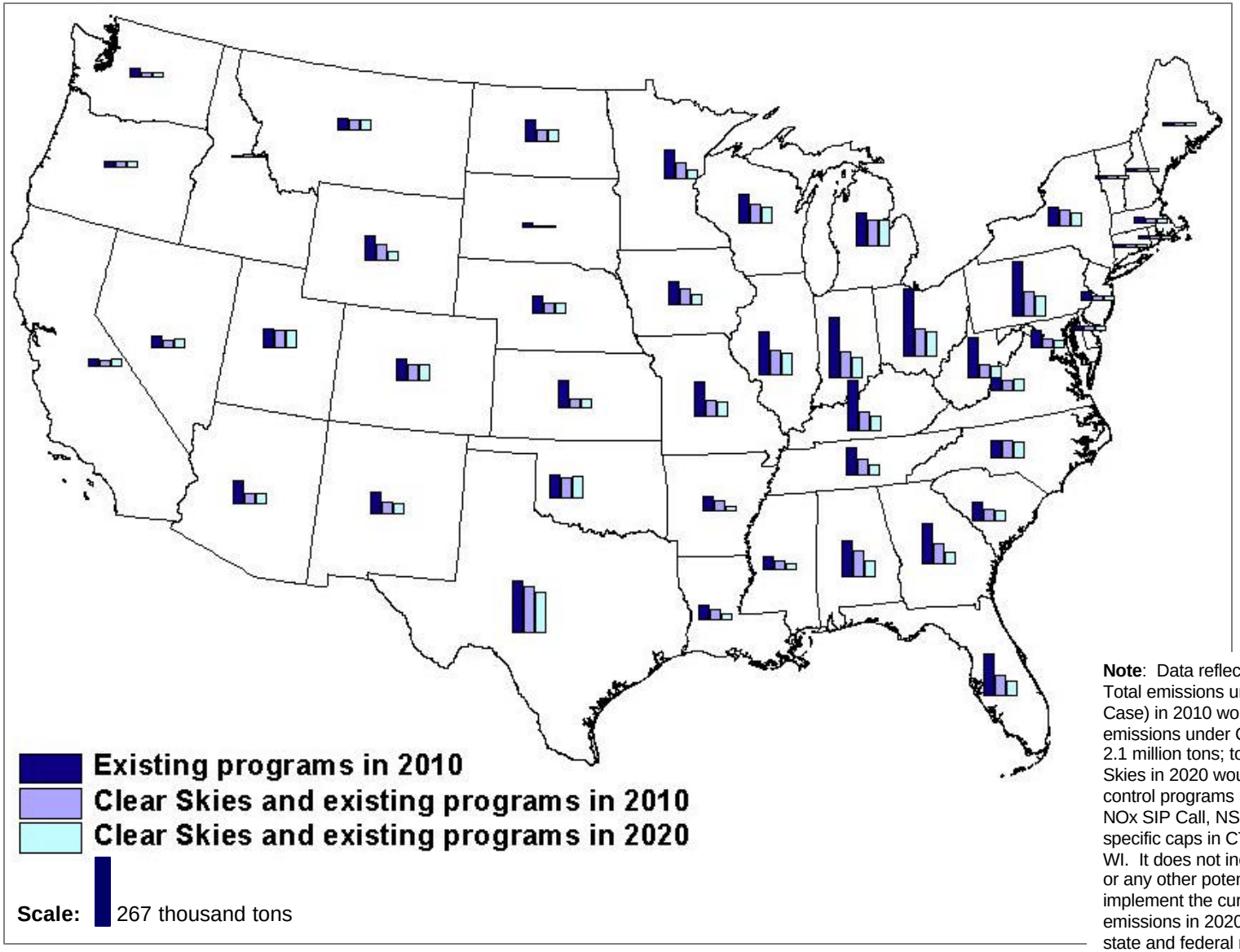
Power Industry Emissions of Sulfur Dioxide



Note: Data reflect sources > 25MW. Total emissions under existing programs (Base Case) in 2010 would be 9.9 million tons; total emissions under Clear Skies in 2010 would be 6.1 million tons; total emissions under Clear Skies in 2020 would be 4.3 million tons. Emissions will continue to decline after 2020 until the cap level is reached. Existing control programs include Title IV, the NOx SIP Call, NSR settlements, and state-specific caps in CT, MA, MO, NC, NH, TX, and WI. It does not include mercury MACT in 2007 or any other potential future regulations to implement the current Clean Air Act. Base case emissions in 2020 will likely be lower due to state and federal regulatory actions that have not yet been promulgated.

Alaska and Hawaii are not included in EPA's model of sources connected to the continental U.S. electricity grid

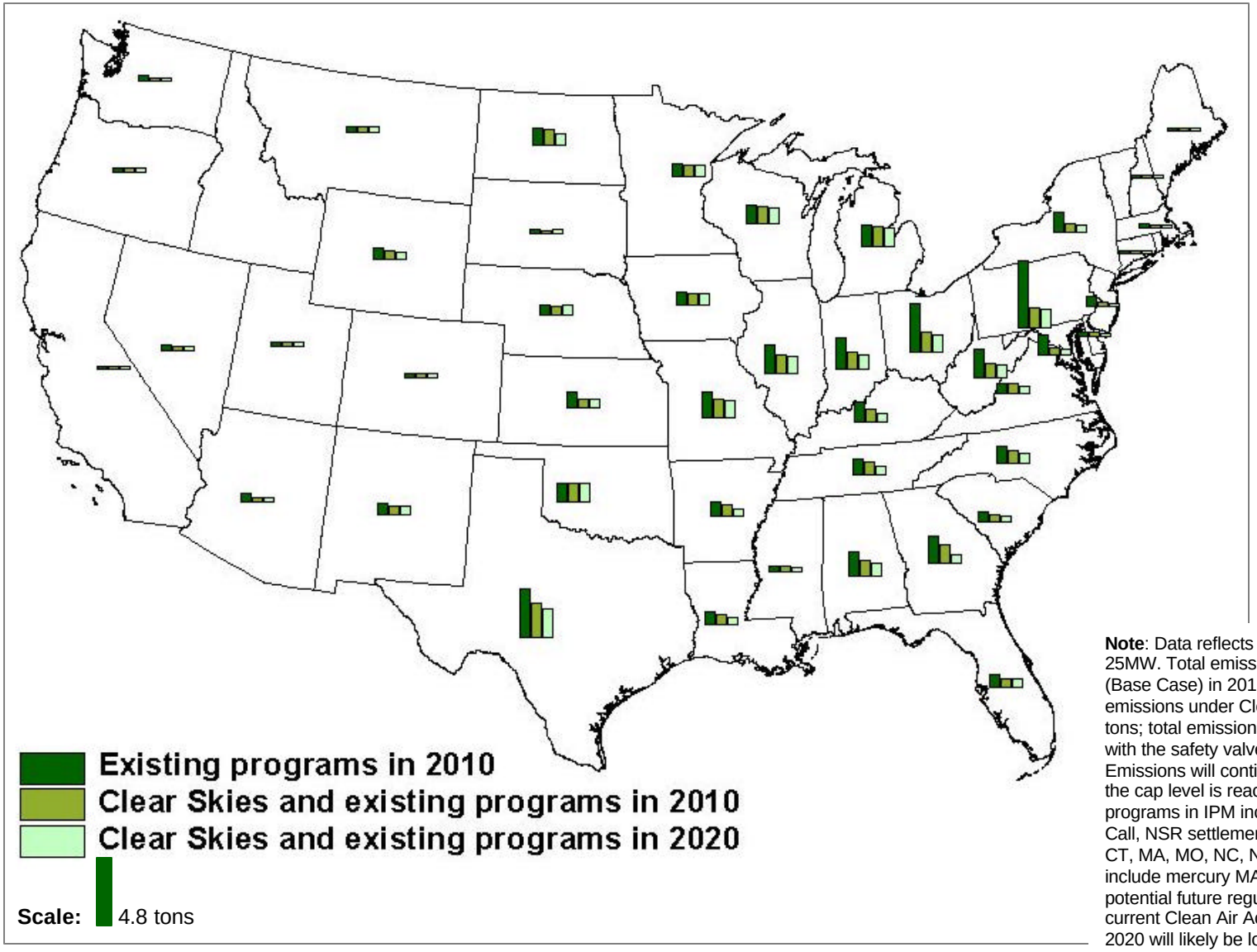
Power Industry Emissions of Nitrogen Oxide



Alaska and Hawaii are not included in EPA's model of sources connected to the continental U.S. electricity grid

Note: Data reflects power plants > 25MW. Total emissions under existing programs (Base Case) in 2010 would be 3.9 million tons; total emissions under Clear Skies in 2010 would be 2.1 million tons; total emissions under Clear Skies in 2020 would be 1.7 million tons. Existing control programs in IPM include Title IV, the NOx SIP Call, NSR settlements, and state-specific caps in CT, MA, MO, NC, NH, TX, and WI. It does not include mercury MACT in 2007 or any other potential future regulations to implement the current Clean Air Act. Base case emissions in 2020 will likely be lower due to state and federal regulatory actions that have not yet been promulgated.

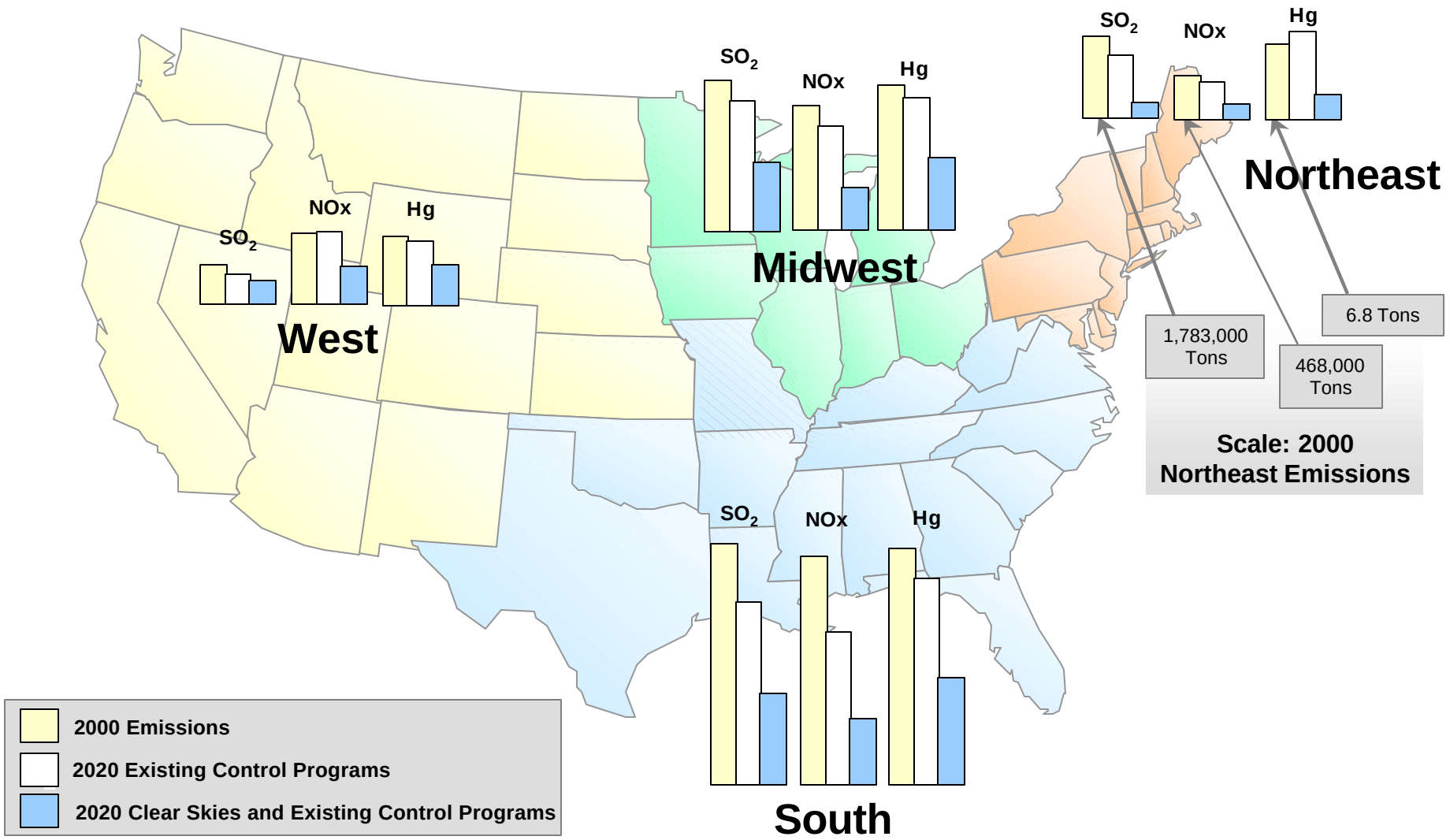
Power Industry Emissions of Mercury



Alaska and Hawaii are not included in EPA's model of sources connected to the continental U.S. electricity grid

Note: Data reflects coal-fired power plants > 25MW. Total emissions under existing programs (Base Case) in 2010 would be 45 tons; total emissions under Clear Skies in 2010 would be 27 tons; total emissions under Clear Skies in 2020 with the safety valve triggered would be 22 tons. Emissions will continue to decline after 2020 until the cap level is reached. Existing control programs in IPM include Title IV, the NOx SIP Call, NSR settlements, and state-specific caps in CT, MA, MO, NC, NH, TX, and WI. It does not include mercury MACT in 2007 or any other potential future regulations to implement the current Clean Air Act. Base case emissions in 2020 will likely be lower due to state and federal regulatory actions that have not yet been promulgated.

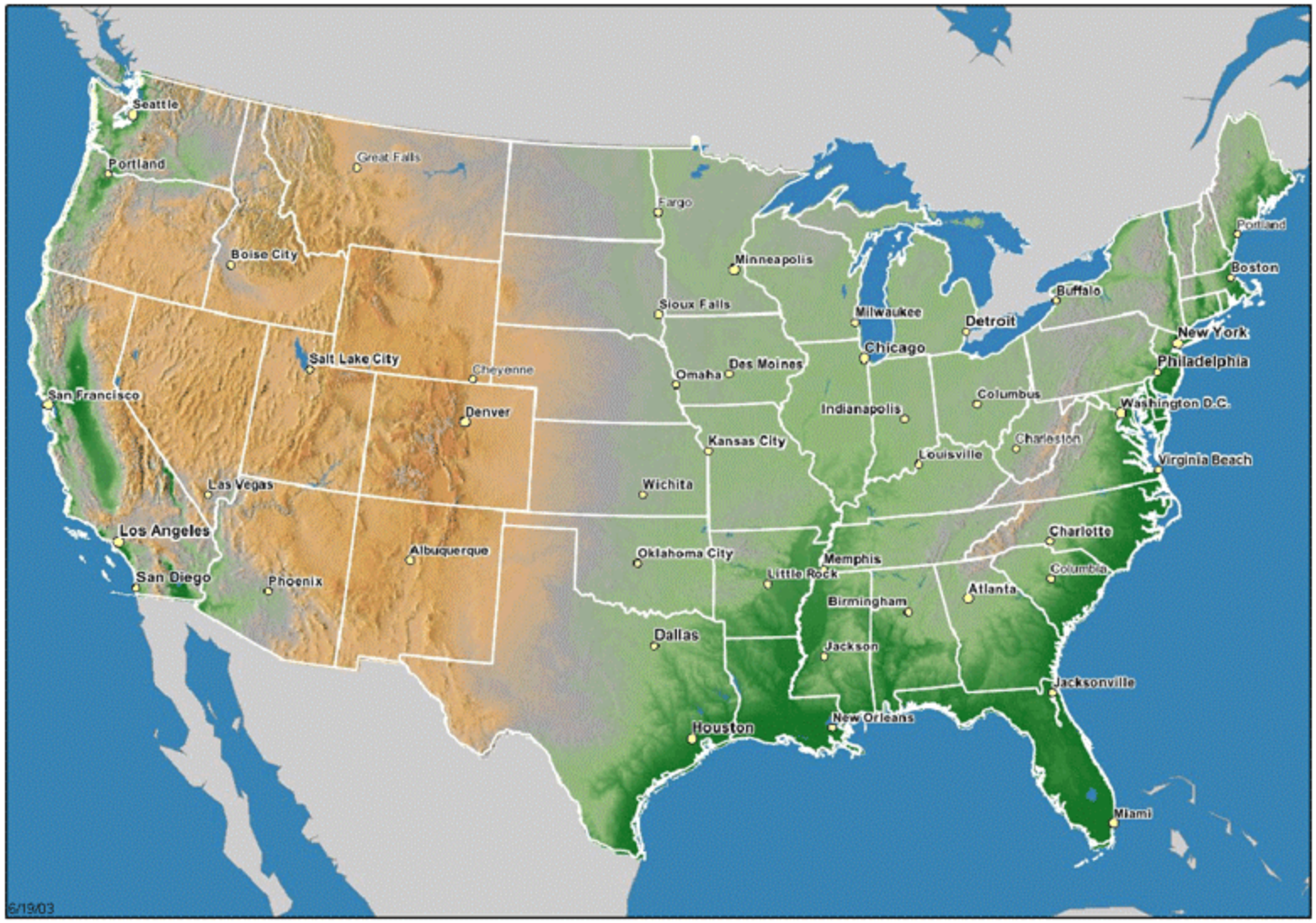
Power Industry Emissions: Current, Base Case, & Clear Skies



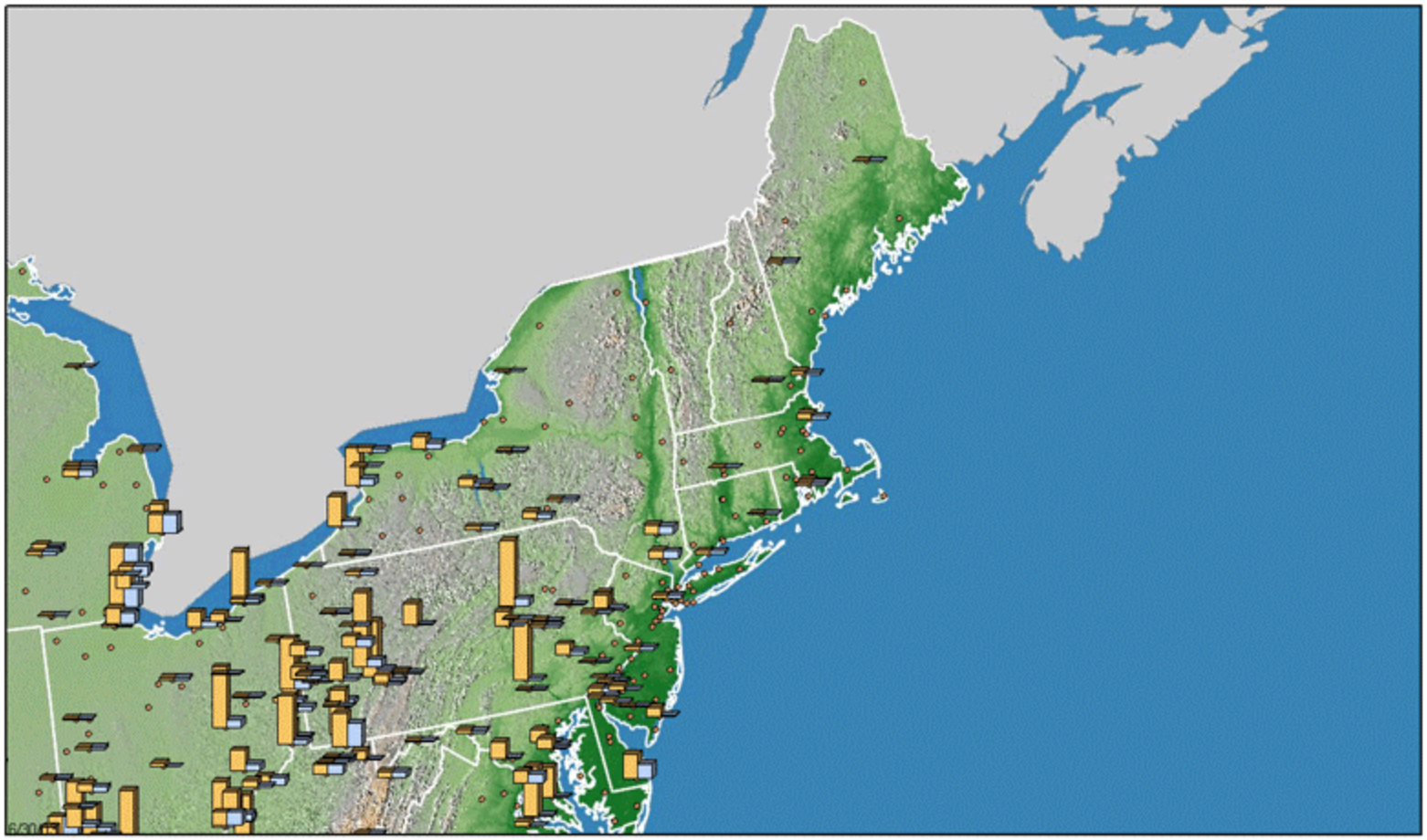
Alaska & Hawaii are not included in EPA's model of sources connected to the continental U.S. electricity grid.

Note: Existing control programs in IPM include Title IV, the NOx SIP Call, NSR settlements, and state-specific caps in CT, MA, MO, NC, NH, TX, and WI. It does not include mercury MACT in 2007 or any other potential future regulations to implement the current Clean Air Act. Base case emissions in 2020 will likely be lower due to state and federal regulatory actions that have not yet been promulgated.

Location of Major U.S. Cities

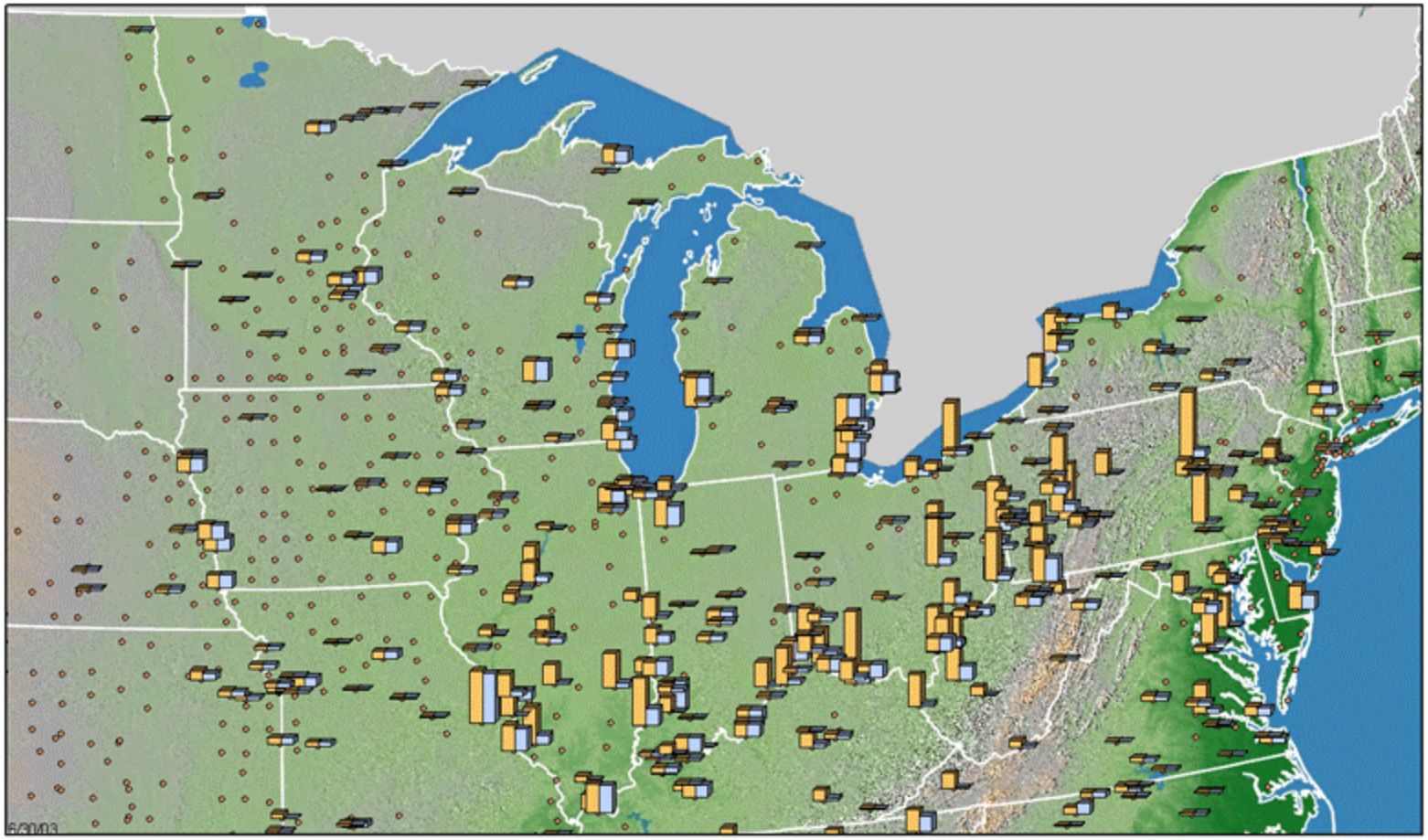


Regional Source SO_2 Emissions under Clear Skies

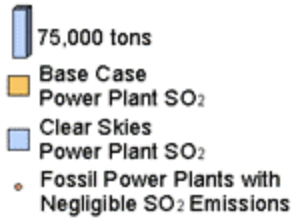


Projected SO_2 Emissions from Power Plants with the Base Case and Clear Skies (2020)
Northeast

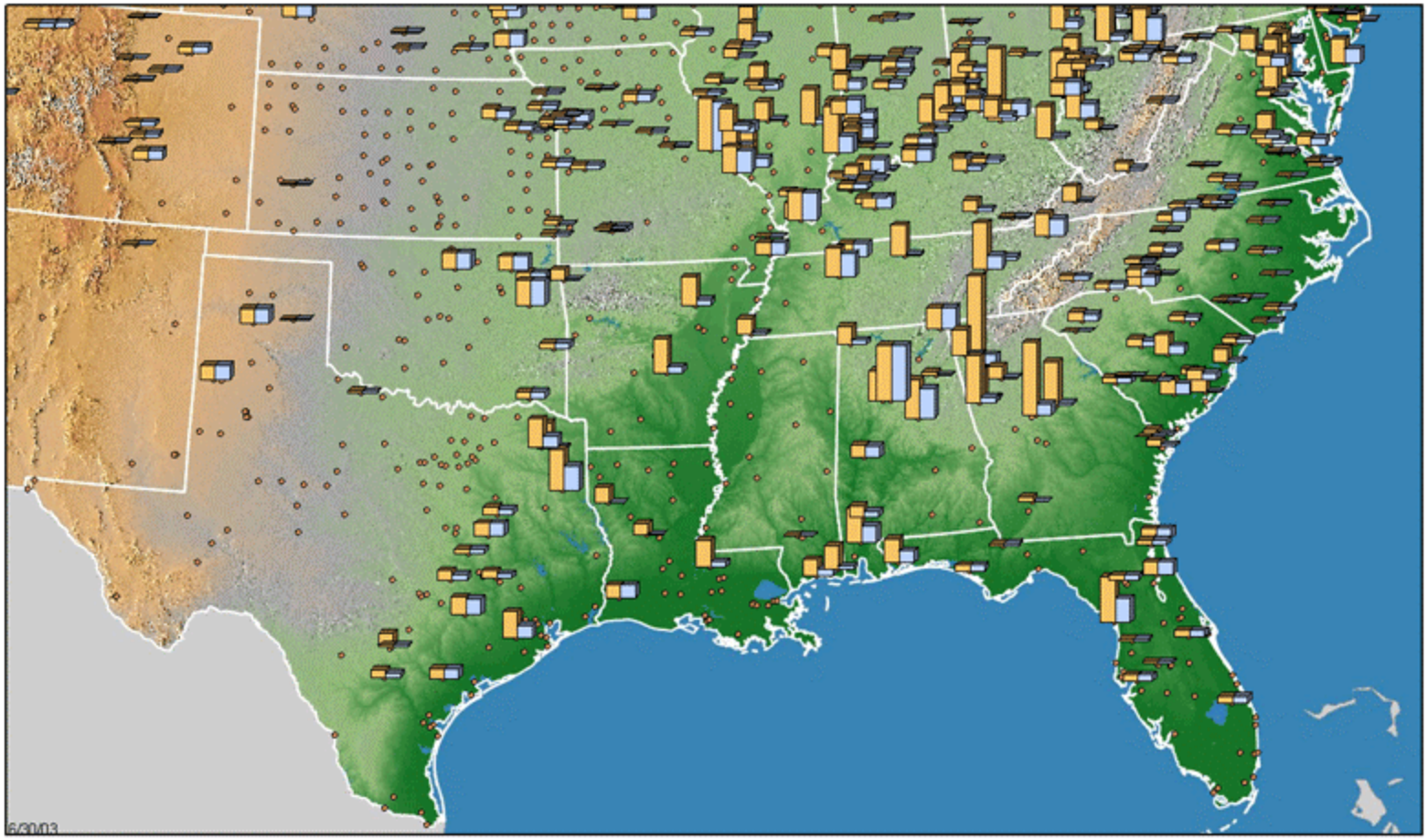
Regional Source SO_2 Emissions under Clear Skies



Projected SO_2 Emissions from Power Plants with the Base Case and Clear Skies (2020)
Midwest

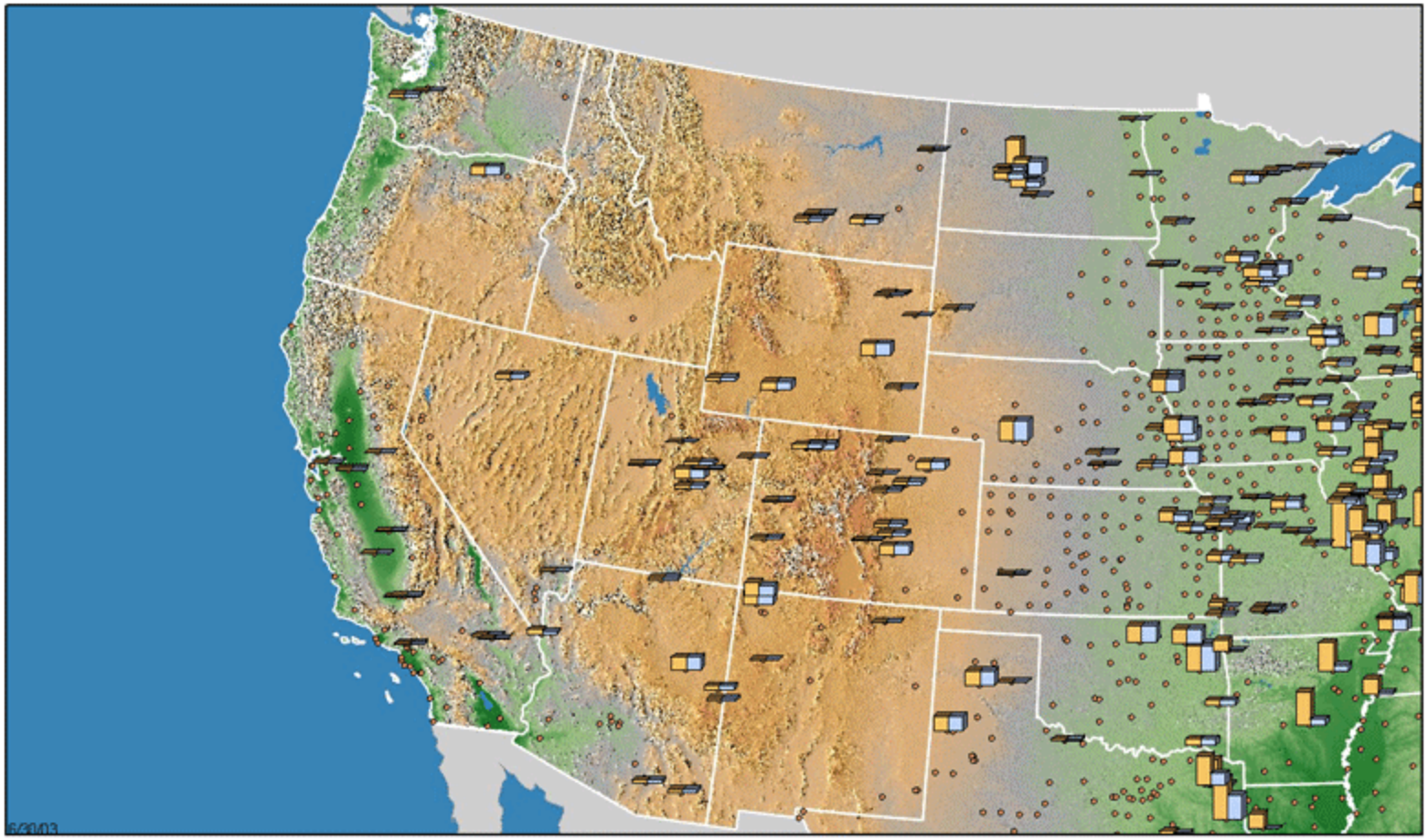


Regional Source SO_2 Emissions under Clear Skies



Projected SO_2 Emissions from Power Plants with the Base Case and Clear Skies (2020)
South

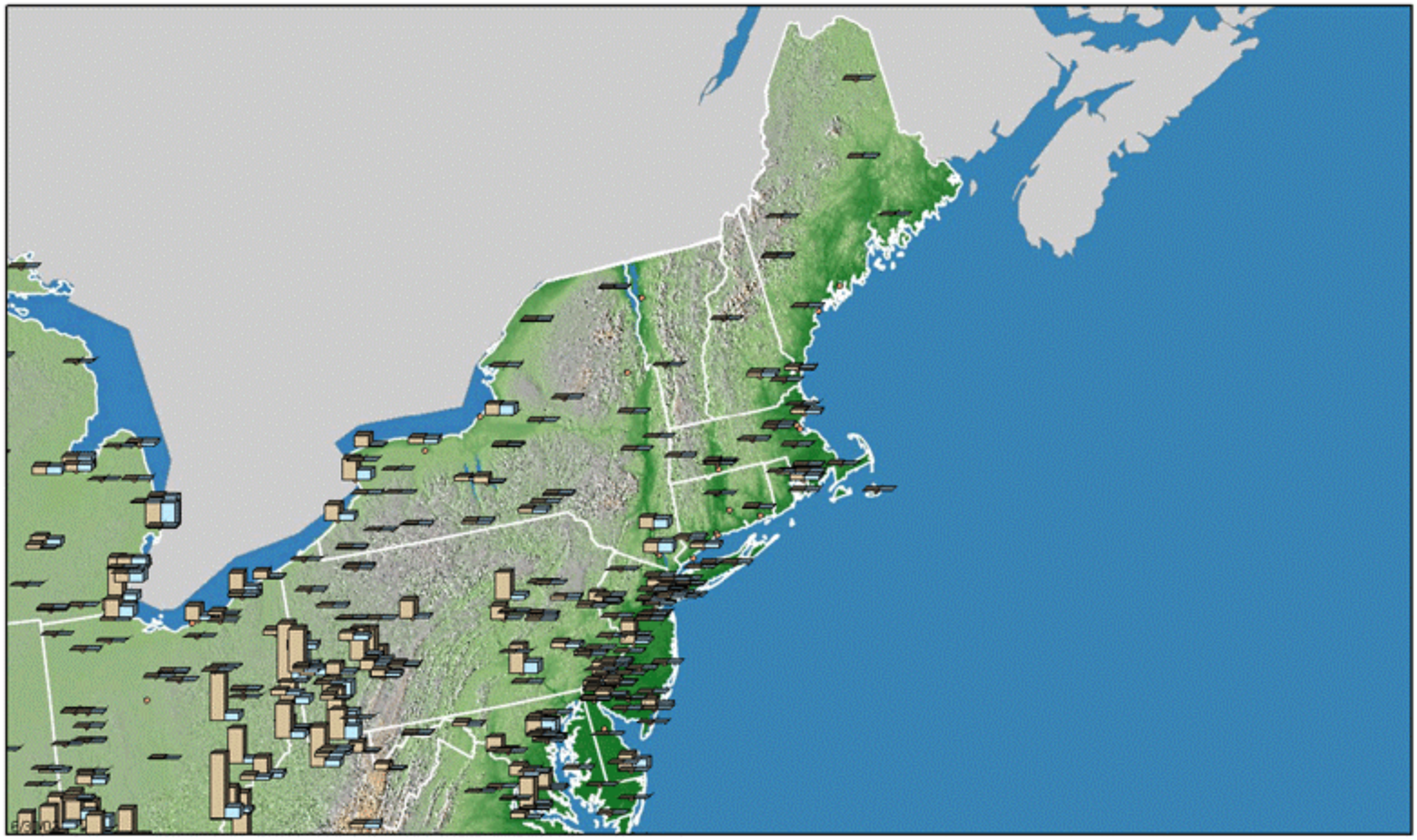
Regional Source SO_2 Emissions under Clear Skies



Projected SO_2 Emissions from Power Plants with the Base Case and Clear Skies (2020) West

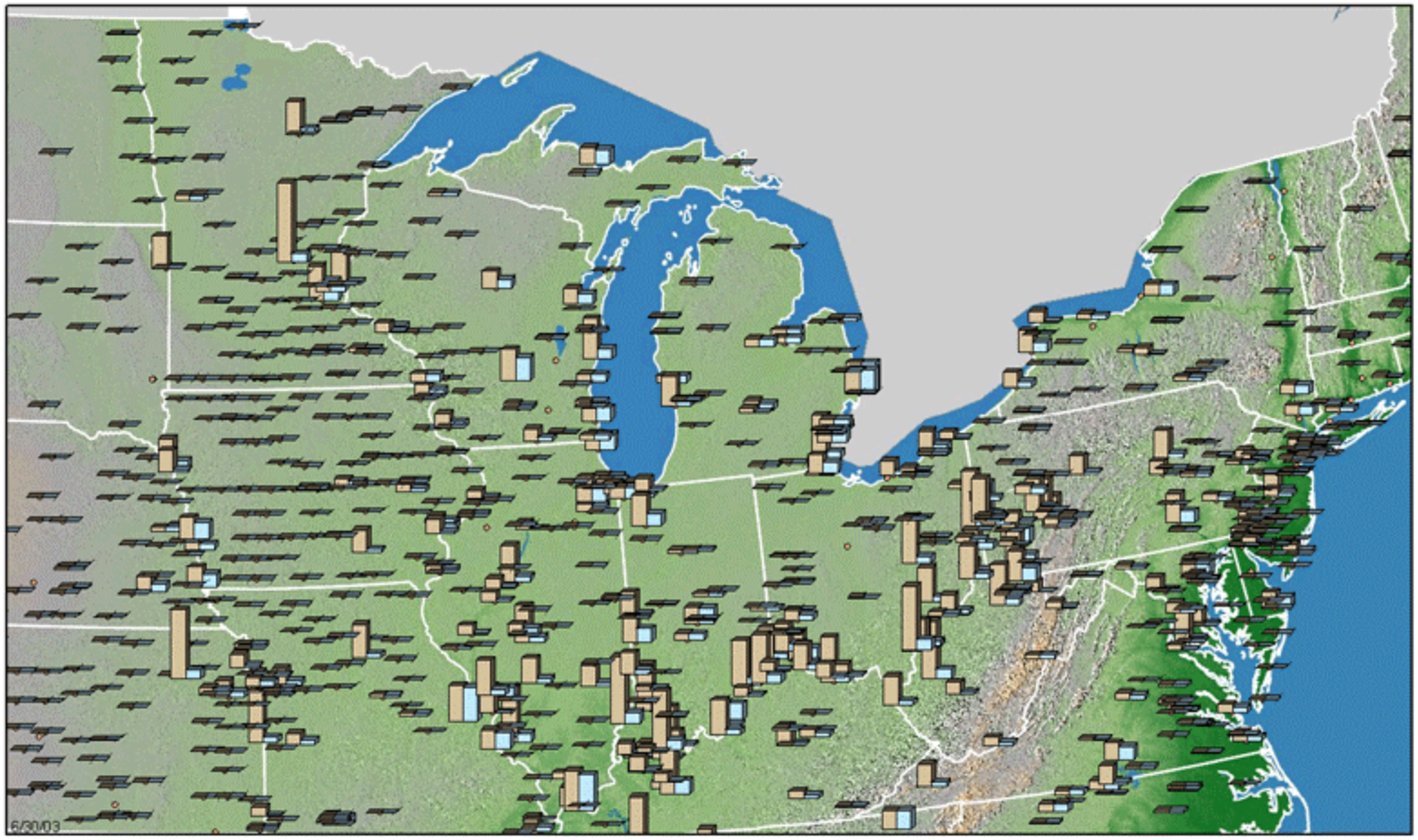
75,000 tons
Base Case Power Plant SO_2
Clear Skies Power Plant SO_2
Fossil Power Plants with Negligible SO_2 Emissions

Regional Source NOx Emissions under Clear Skies



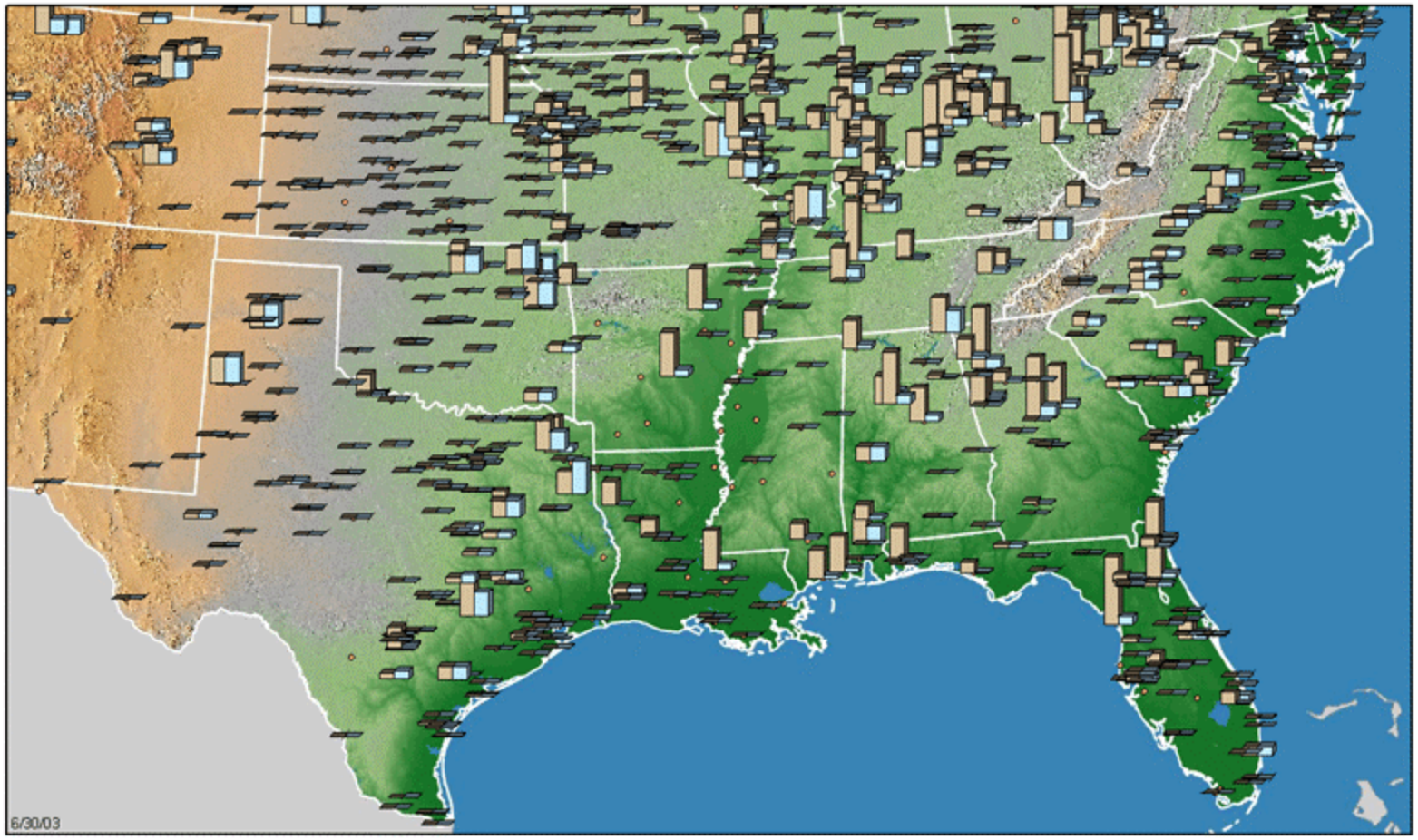
Projected NO_x Emissions from Power Plants with the Base Case and Clear Skies (2020)
Northeast

Regional Source NOx Emissions under Clear Skies



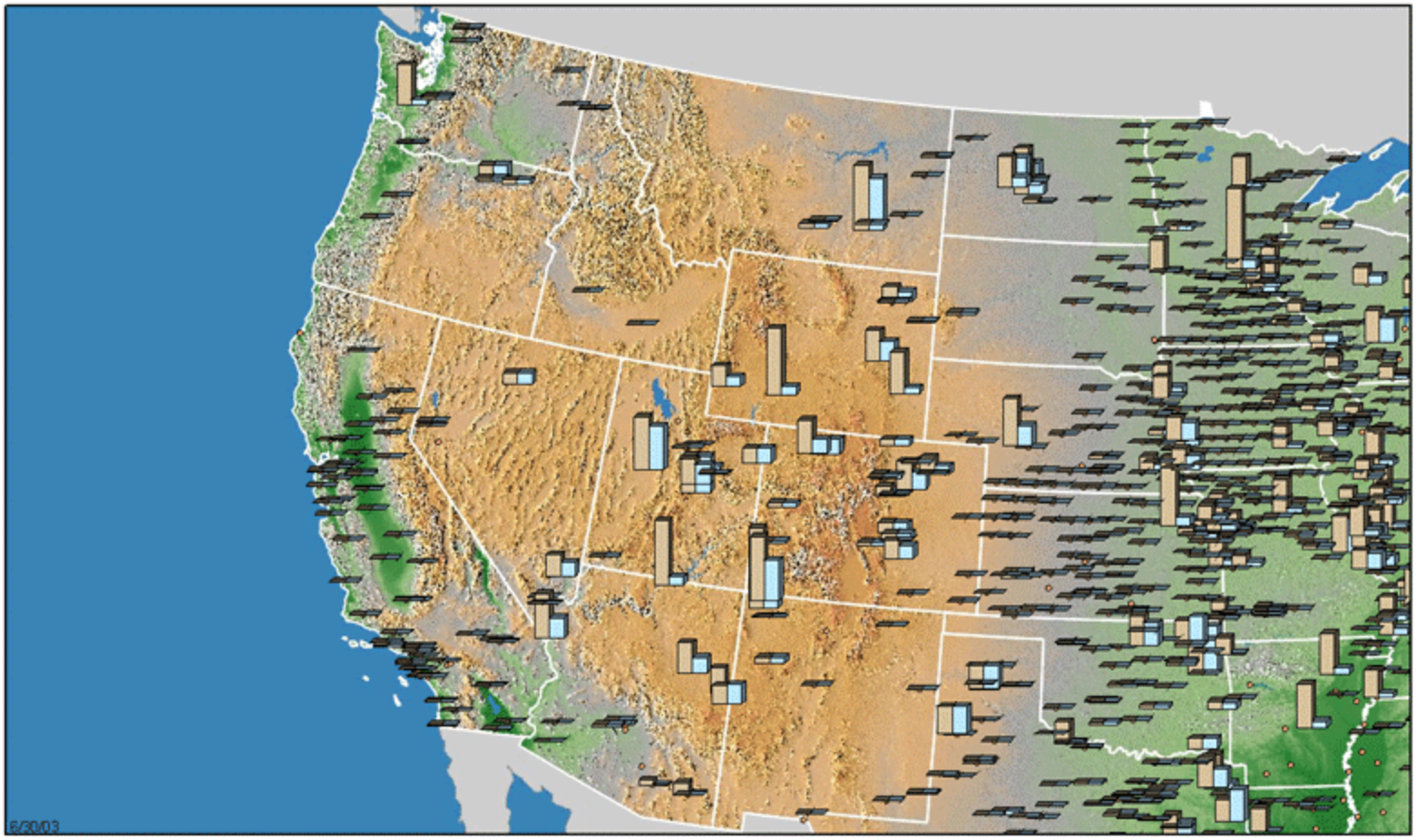
Projected NO_x Emissions from Power Plants with the Base Case and Clear Skies (2020)
Midwest

Regional Source NOx Emissions under Clear Skies

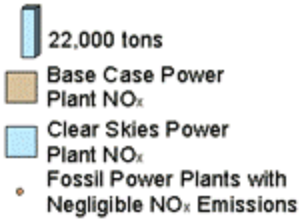


Projected NO_x Emissions from Power Plants with the Base Case and Clear Skies (2020)
South

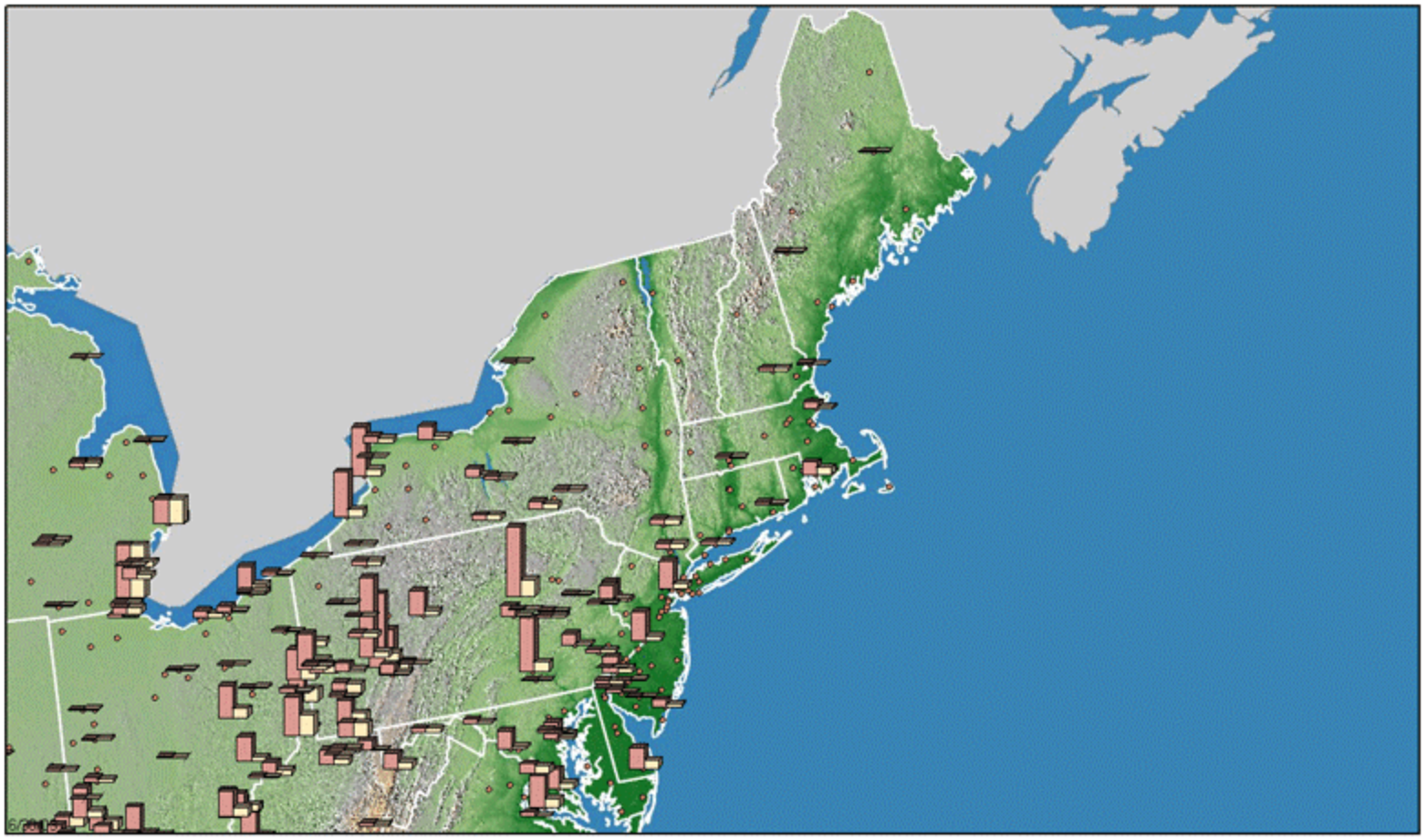
Regional Source NOx Emissions under Clear Skies



Projected NO_x Emissions from Power Plants with the Base Case and Clear Skies (2020)
West



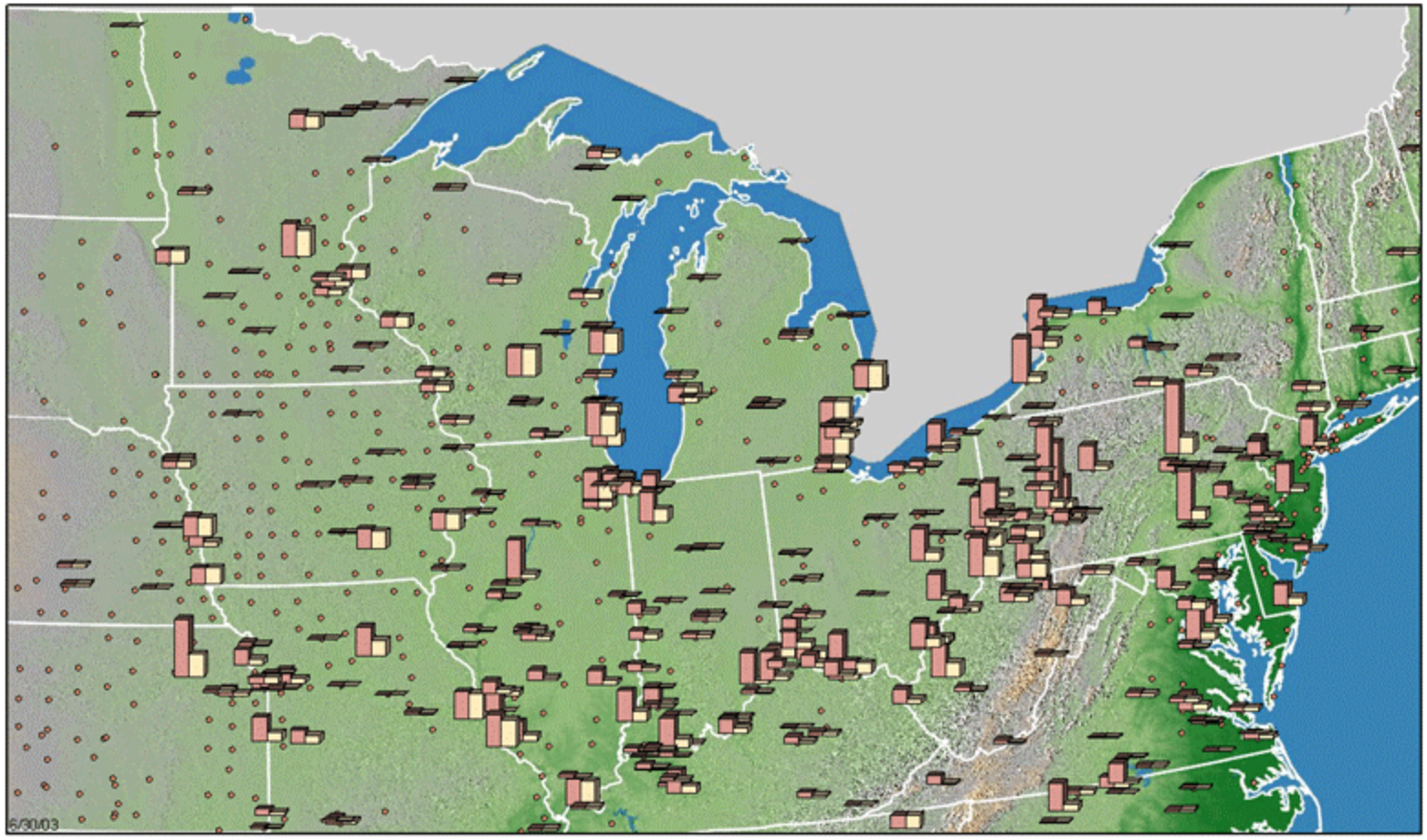
Regional Source Hg Emissions under Clear Skies



Projected Mercury Emissions from Coal-Fired Power Plants with the Base Case and Clear Skies (2020)

Northeast

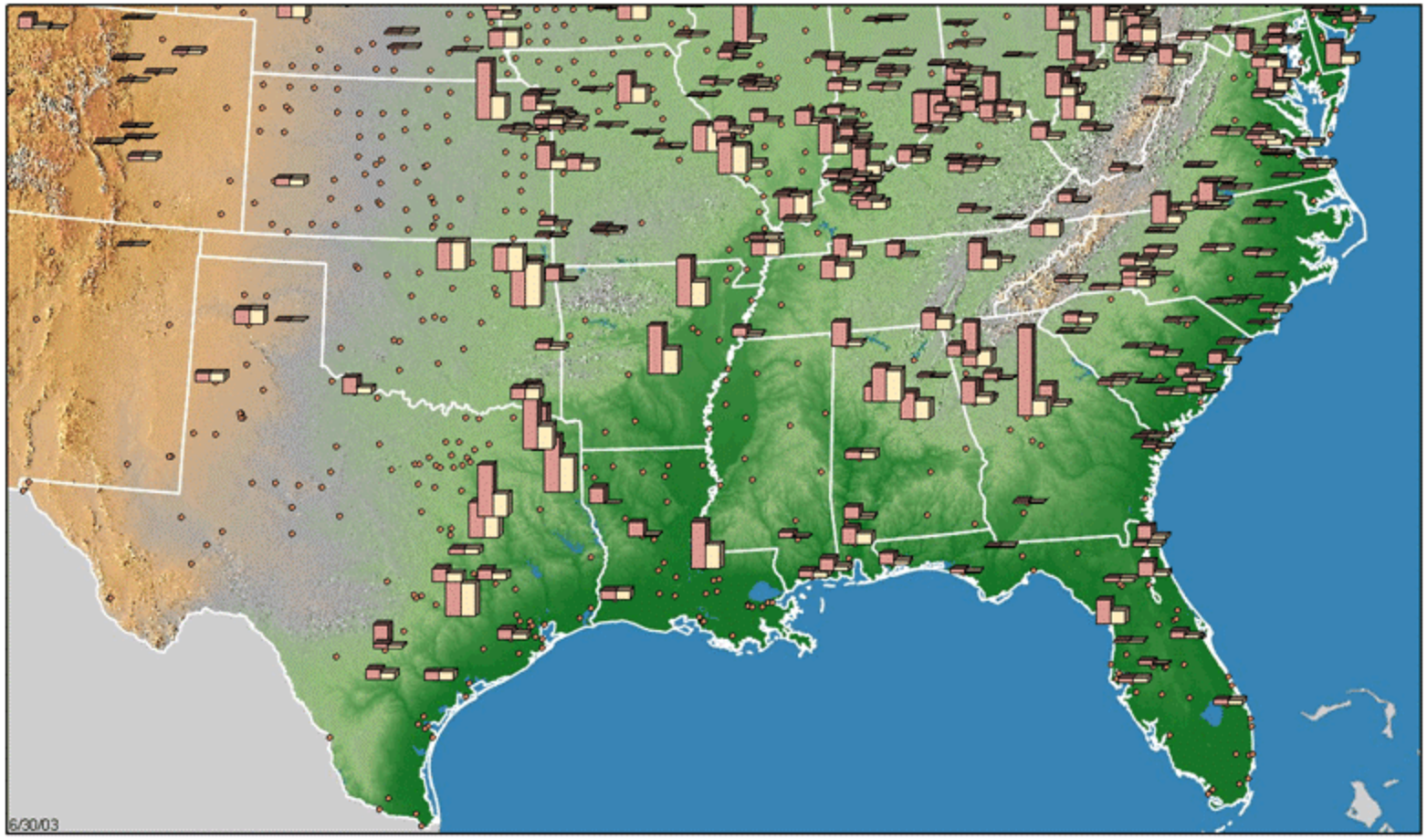
Regional Source Hg Emissions under Clear Skies



Projected Mercury Emissions from Coal-Fired Power Plants with the Base Case and Clear Skies (2020)

Midwest

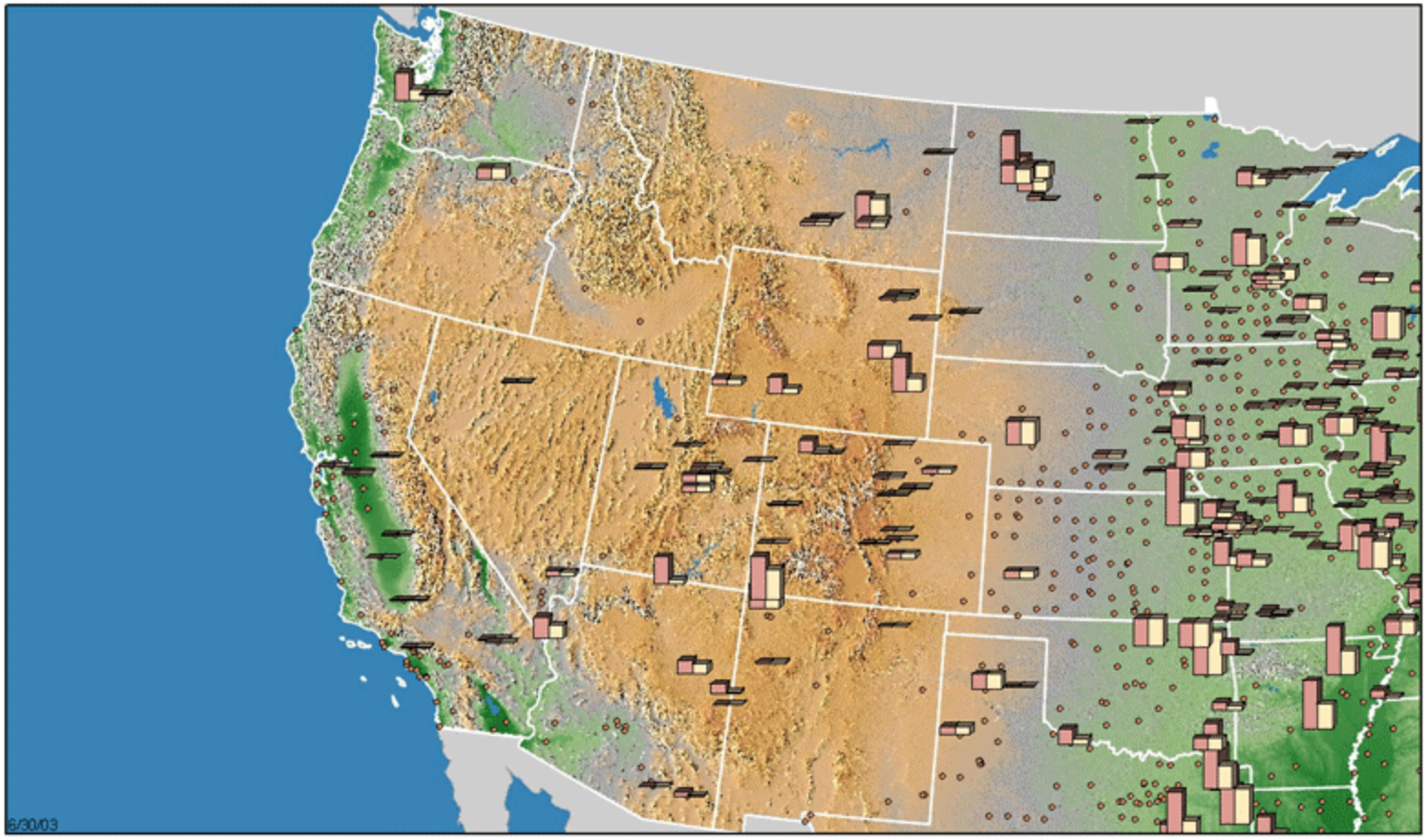
Regional Source Hg Emissions under Clear Skies



Projected Mercury Emissions from Coal-Fired Power Plants with the Base Case and Clear Skies (2020)

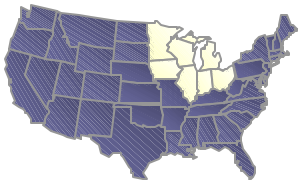
South

Regional Source Hg Emissions under Clear Skies

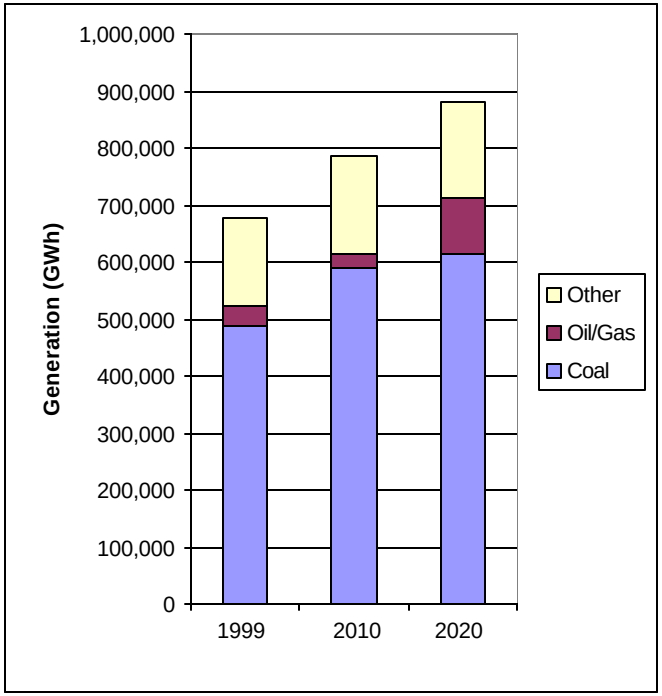


Projected Mercury Emissions from Coal-Fired Power Plants with the Base Case and Clear Skies (2020)
West

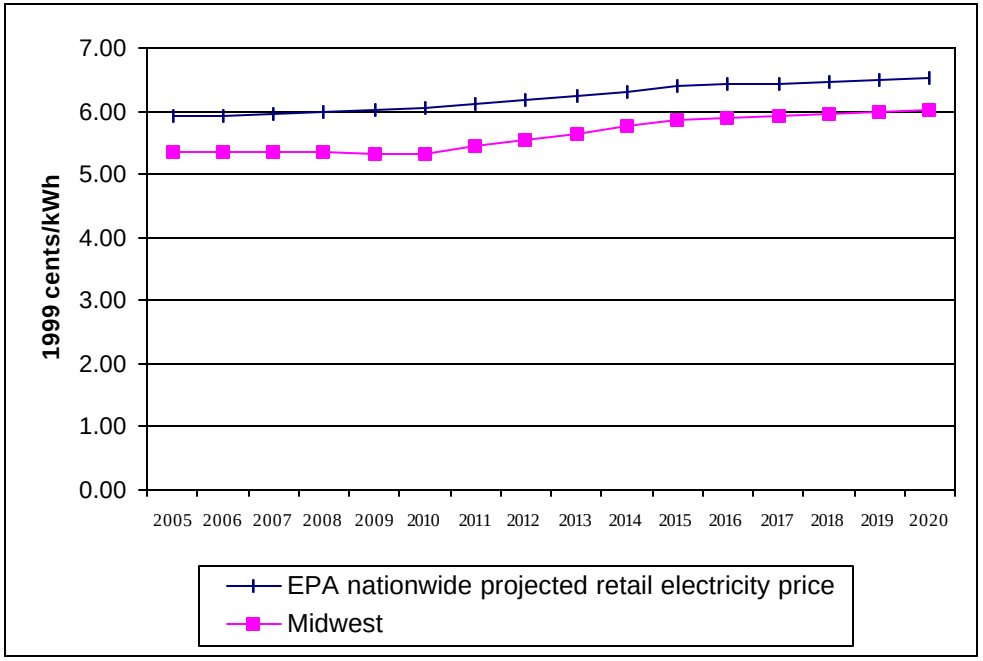
Summary of Projected Impacts in the Midwest



Current Generation Mix and Projected Mix Under Clear Skies



Projected Retail Electricity Prices under Clear Skies (2005 - 2020)



Projected Emissions Rates from Power Generators

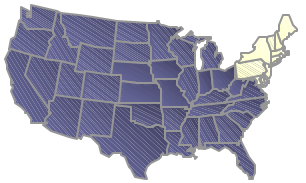
Year		SO2	NOx			Hg
		Coal	All	Coal	Gas	Coal
	Units	lbs/MMBtu	lbs/MMBtu	lbs/MMBtu	lbs/MMBtu	lbs/TBtu
2010	Base Case	1.15	0.36	0.37	0.07	4.08
	Clear Skies	0.61	0.19	0.20	0.07	2.59
2020	Base Case	0.92	0.33	0.36	0.05	3.94
	Clear Skies	0.49	0.13	0.14	0.05	2.21

Note: The Midwest includes Illinois, Indiana, Iowa, Michigan, Minnesota, Ohio and Wisconsin.

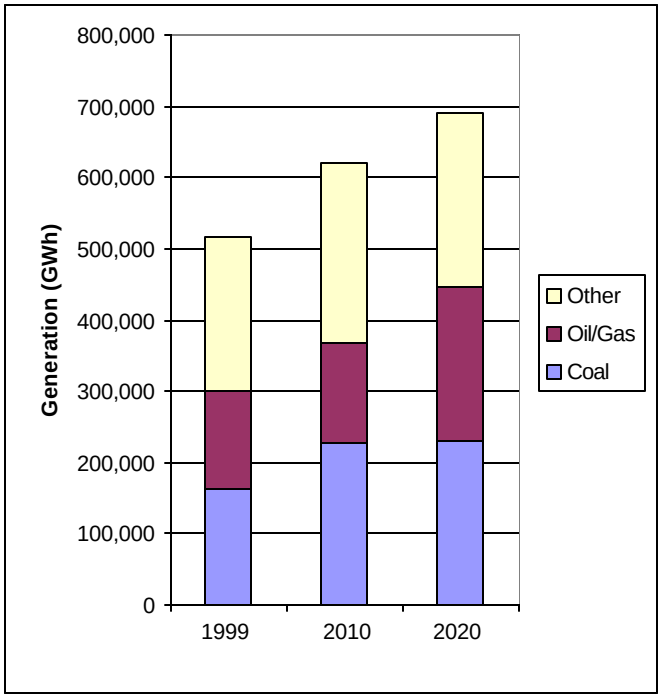
2020 generation projections are EPA estimates using IPM. 1999 generation from EIA, aggregated from state-level data at: www.eia.doe.gov/cneaf/electricity/st_profiles/ (Table 5).

Electricity prices were calculated using the Retail Electricity Price Model (see Section G for a description of the Model).

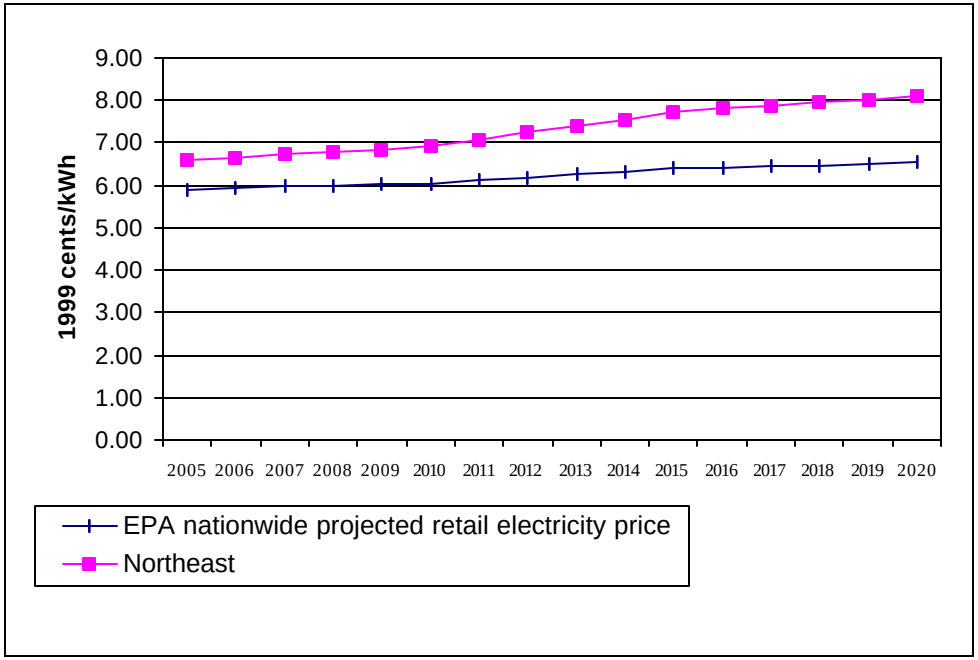
Summary of Projected Impacts in the Northeast



Current Generation Mix and Projected Mix Under Clear Skies



Projected Retail Electricity Prices under Clear Skies (2005 - 2020)



Projected Emissions Rates from Power Generators

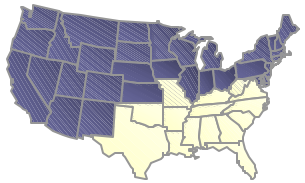
Year		SO2	NOx			Hg
		Coal	All	Coal	Gas	Coal
	Units	lbs/MMBtu	lbs/MMBtu	lbs/MMBtu	lbs/MMBtu	lbs/TBtu
2010	Base Case	1.24	0.24	0.32	0.06	7.56
	Clear Skies	0.47	0.12	0.16	0.06	2.37
2020	Base Case	1.17	0.21	0.32	0.05	6.88
	Clear Skies	0.29	0.09	0.12	0.05	2.03

Note: The Northeast includes Connecticut, Delaware, District of Columbia, Maine, Maryland, Massachusetts, New Hampshire, New Jersey, New York, Pennsylvania, Rhode Island and Vermont.

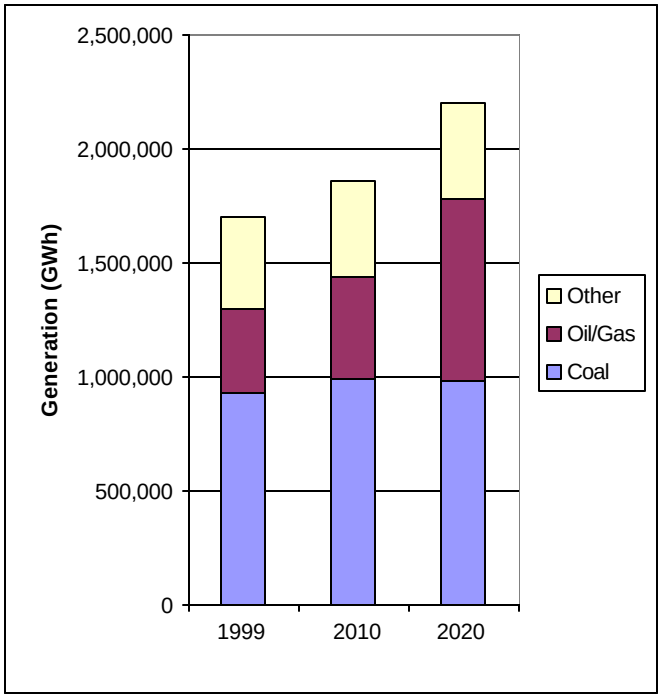
2020 generation projections are EPA estimates using IPM. 1999 generation data from EIA, aggregated from state-level data at: www.eia.doe.gov/cneaf/electricity/st_profiles/ (Table 5).

Electricity prices were calculated using the Retail Electricity Price Model (see Section G for a description of the Model).

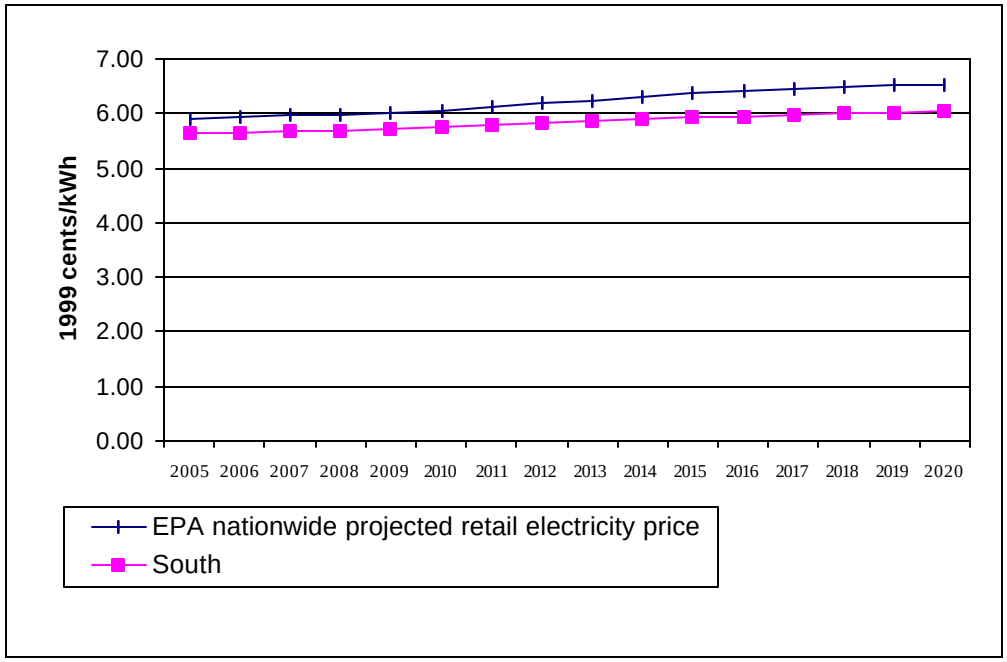
Summary of Projected Impacts in the South



Current Generation Mix and Projected Mix Under Clear Skies



Projected Retail Electricity Prices under Clear Skies (2005 - 2020)



Projected Emissions Rates from Power Generators

Year		SO2	NOx			Hg
		Coal	All	Coal	Gas	Coal
	Units	lbs/MMBtu	lbs/MMBtu	lbs/MMBtu	lbs/MMBtu	lbs/TBtu
2010	Base Case	0.87	0.25	0.31	0.06	3.79
	Clear Skies	0.68	0.14	0.17	0.05	2.64
2020	Base Case	0.77	0.21	0.30	0.04	3.66
	Clear Skies	0.40	0.09	0.12	0.04	1.97

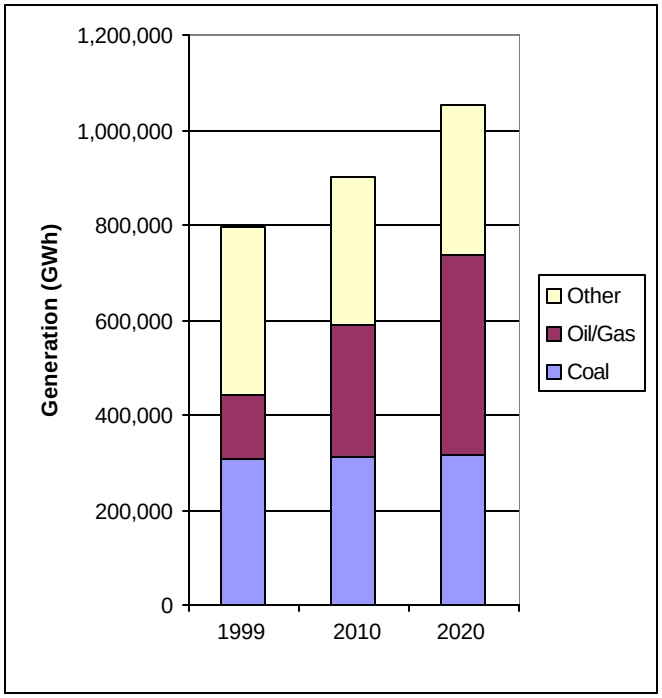
Note: The South includes Alabama, Arkansas, Florida, Georgia, Kentucky, Louisiana, Mississippi, Missouri, North Carolina, Oklahoma, South Carolina, Tennessee, Texas, Virginia and West Virginia.

2020 generation projections are EPA estimates using IPM. 1999 generation from EIA, aggregated from state-level data at: www.eia.doe.gov/cneaf/electricity/st_profiles/ (Table 5).

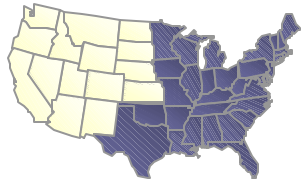
Electricity prices were calculated using the Retail Electricity Price Model (see Section G for a description of the Model).

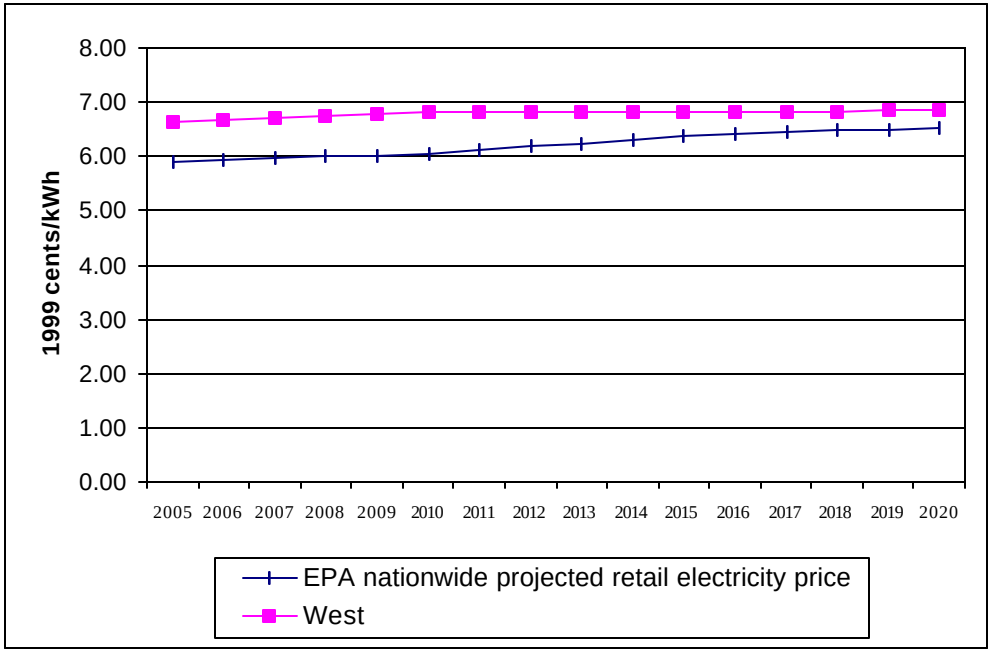
Summary of Projected Impacts in the West

Current Generation Mix and Projected Mix Under Clear Skies



Projected Retail Electricity Prices under Clear Skies (2005 - 2020)





Projected Emissions Rates from Power Generators

Year		SO2	NOx			Hg
		Coal	All	Coal	Gas	Coal
	Units	lbs/MMBtu	lbs/MMBtu	lbs/MMBtu	lbs/MMBtu	lbs/TBtu
2010	Base Case	0.40	0.29	0.45	0.03	3.48
	Clear Skies	0.32	0.16	0.24	0.03	2.50
2020	Base Case	0.38	0.25	0.45	0.03	3.48
	Clear Skies	0.32	0.13	0.22	0.03	2.26

Note: The West includes Arizona, California, Colorado, Idaho, Kansas, Montana, Nebraska, Nevada, New Mexico, North Dakota, Oregon, South Dakota, Utah, Washington and Wyoming.

2020 generation projections are EPA estimates using IPM. 1999 generation from EIA, aggregated from state-level data at: www.eia.doe.gov/cneaf/electricity/st_profiles/ (Table 5).

Electricity prices were calculated using the Retail Electricity Price Model (see Section G for a description of the Model).

Projected State Generation Mix in 2010

Note: "Other" includes generation from nuclear, hydroelectric, biomass, geothermal, landfill gas, wind, and solar sources.

State	% Coal	% Gas/Oil	% Other
Alabama	50.0%	20.2%	29.8%
Arizona	28.9%	41.5%	29.5%
Arkansas	45.1%	25.4%	29.5%
California	1.5%	57.0%	41.6%
Colorado	82.4%	11.9%	5.7%
Connecticut	11.8%	37.3%	50.9%
Delaware	85.4%	13.8%	0.9%
District Of Columbia	0.0%	100.0%	0.0%
Florida	37.9%	43.9%	18.2%
Georgia	59.4%	15.3%	25.3%
Idaho	0.0%	38.1%	61.9%
Illinois	48.5%	2.6%	48.9%
Indiana	98.5%	1.3%	0.1%
Iowa	85.2%	0.5%	14.3%
Kansas	78.5%	0.9%	20.6%
Kentucky	95.4%	0.9%	3.6%
Louisiana	31.6%	38.6%	29.8%
Maine	4.6%	75.8%	19.6%
Maryland	61.9%	3.0%	35.1%
Massachusetts	22.0%	56.9%	21.1%
Michigan	71.5%	10.6%	17.9%
Minnesota	68.7%	1.2%	30.1%
Mississippi	42.7%	34.9%	22.4%
Missouri	82.1%	4.5%	13.4%
Montana	60.0%	6.9%	33.1%
Nebraska	69.8%	1.1%	29.1%
Nevada	44.4%	39.2%	16.5%
New Hampshire	14.9%	39.7%	45.4%
New Jersey	22.4%	21.2%	56.4%
New Mexico	95.9%	2.0%	2.1%
New York	20.4%	31.6%	48.0%
North Carolina	64.4%	2.6%	33.1%
North Dakota	93.3%	0.0%	6.7%
Ohio	87.9%	2.0%	10.1%
Oklahoma	52.9%	43.0%	4.1%
Oregon	6.3%	37.2%	56.5%
Pennsylvania	56.8%	6.4%	36.9%
Rhode Island	0.0%	99.3%	0.7%
South Carolina	41.0%	4.4%	54.6%
South Dakota	2.8%	0.0%	97.2%
Tennessee	61.3%	0.3%	38.4%
Texas	33.6%	53.5%	12.9%
Utah	96.9%	0.0%	3.0%
Vermont	0.0%	0.1%	99.9%
Virginia	49.9%	5.7%	44.4%
Washington	8.6%	26.3%	65.1%
West Virginia	99.0%	0.3%	0.7%
Wisconsin	74.1%	5.3%	20.6%
Wyoming	97.3%	0.0%	2.7%
National	**50.9%**	**21.5%**	**27.6%**

Projected Retrofits By State in 2010 and 2020

	Incremental Coal Capacity Retrofitted by 2010 (MW)			Incremental Coal Capacity Retrofitted by 2020 (MW)		
	SCR/SNCR	Scrubber	ACI	SCR/SNCR	Scrubber	ACI
Alabama	0	1,400	0	1,100	2,500	0
Arizona	3,700	0	0	3,900	0	0
Arkansas	1,300	1,300	0	3,700	3,700	0
California	0	0	0	0	0	0
Colorado	1,100	0	0	1,100	0	0
Connecticut	0	0	0	0	0	0
Delaware	0	0	0	0	0	0
District Of Columbia	0	0	0	0	0	0
Florida	5,500	1,400	0	7,300	1,400	0
Georgia	0	3,800	0	0	11,900	0
Idaho	0	0	0	0	0	0
Illinois	3,000	7,600	0	2,700	7,700	0
Indiana	4,100	3,400	0	6,100	5,600	0
Iowa	700	0	0	3,300	0	600
Kansas	3,900	0	0	3,900	0	0
Kentucky	1,400	1,300	0	2,900	4,500	0
Louisiana	500	500	0	2,200	2,200	0
Maine	0	0	0	0	0	0
Maryland	0	2,100	0	600	3,200	0
Massachusetts	0	0	0	0	0	0
Michigan	0	0	0	200	1,900	0
Minnesota	600	0	0	4,000	0	0
Mississippi	900	0	0	2,200	1,600	0
Missouri	2,200	0	0	2,400	1,100	0
Montana	1,400	0	0	1,400	0	0
Nebraska	700	0	0	700	0	0
Nevada	100	0	0	100	0	0
New Hampshire	0	0	0	0	0	0
New Jersey	0	0	1,200	200	400	1,200
New Mexico	1,700	0	0	1,700	0	0
New York	400	400	0	900	800	0
North Carolina	700	900	200	1,300	500	200
North Dakota	1,000	1,000	0	1,000	1,000	900
Ohio	4,900	9,600	0	3,700	12,800	0
Oklahoma	0	0	0	0	0	0
Oregon	0	0	0	0	0	0
Pennsylvania	600	5,900	200	1,300	8,800	200
Rhode Island	0	0	0	0	0	0
South Carolina	0	0	0	300	1,200	0
South Dakota	0	0	0	400	0	0
Tennessee	0	900	0	1,000	3,100	0
Texas	0	2,300	600	800	4,100	600
Utah	0	0	0	0	0	0
Vermont	0	0	0	0	0	0
Virginia	0	1,100	0	200	2,200	0
Washington	1,300	0	0	1,300	0	0
West Virginia	1,600	5,300	0	400	7,700	0
Wisconsin	300	0	0	700	0	1,200
Wyoming	4,100	0	0	4,100	0	0
Grand Total	**47,700**	**50,200**	**2,200**	**69,100**	**89,900**	**4,900**

Notes:

Table includes retrofits in response to Clear Skies only. This data is a slight over-estimate of retrofits due to IPM modeling limitations. The base case in IPM includes Title IV, the NOx SIP Call, NSR settlements, and state-specific caps in CT, MA, MO, NC, NH, TX, and WI. It does not include mercury MACT in 2007 or any other potential future regulations to implement the current Clean Air Act. Column entitled SCR (Selective Catalytic Reduction) may include a small amount of SNCR (Selective Non-catalytic Reduction) retrofitted capacity for certain states. ACI = Activated Carbon Injection

Projected Retail Electricity Prices under Clear Skies

- In 2000, the national average retail electricity price was 6.6 cents/kWh or 66.0 mills/kWh.

Retail Electricity Prices under Clear Skies

Power Region	Main States Included	2000	RETAIL PRICES (Mills Per Kwh - 1999$) Basecase 2005	Basecase 2010	Basecase 2015	Basecase 2020	Clear Skies 2005	Clear Skies 2010	Clear Skies 2015	Clear Skies 2020	Percentage Price Change 2005	2010	2015	2020
ECAR	OH, MI, IN, KY, WV, PA	57.4	50.9	51.2	55.0	56.6	52.1	53.7	58.5	58.9	2.4%	5.0%	6.4%	4.0%
ERCOT	TX	65.1	48.5	54.4	64.5	66.3	49.4	55.7	64.9	66.7	2.1%	2.3%	0.6%	0.7%
MAAC	PA, NJ, MD, DC, DE	80.4	54.7	58.5	67.5	74.1	56.6	60.9	70.4	75.7	3.3%	4.1%	4.2%	2.1%
MAIN	IL, MR, WI	61.2	53.3	53.0	57.2	62.6	54.3	55.1	60.9	64.4	1.9%	4.0%	6.5%	2.9%
MAPP	MN, IA, SD, ND, NE	57.4	56.0	54.5	50.9	49.0	56.1	55.3	52.1	50.7	0.2%	1.4%	2.3%	3.5%
NY	NY	104.3	76.8	80.4	87.9	90.8	78.8	82.2	90.0	91.2	2.6%	2.3%	2.4%	0.4%
NE	VT, NH, ME, MA, CT, RI	89.9	70.5	71.8	77.8	84.1	71.3	73.1	79.8	84.6	1.1%	1.8%	2.7%	0.5%
FRCC	FL	67.9	71.9	71.1	70.2	68.6	72.2	72.3	71.0	69.8	0.4%	1.7%	1.2%	1.8%
STV	VA, NC, SC, GA, AL, MS, TN, AR, LA	59.3	56.9	55.8	54.7	54.7	57.3	56.6	55.6	56.2	0.7%	1.4%	1.7%	2.8%
SPP	KS, OK, MR	59.3	51.3	51.7	53.0	56.4	51.7	53.7	54.7	57.6	0.8%	4.0%	3.3%	2.2%
PNW	WA, OR, ID	45.9	48.9	50.2	49.1	48.6	49.2	50.8	49.4	49.0	0.5%	1.2%	0.5%	0.9%
RM	MT, WY, CO, UT, NM, AZ, NV, ID	64.1	61.7	62.9	64.4	65.5	62.1	64.5	65.4	66.3	0.6%	2.6%	1.6%	1.1%
CALI	CA	94.7	93.4	96.0	97.0	97.5	93.7	96.7	97.4	97.9	0.3%	0.7%	0.4%	0.4%
NATIONAL	Contiguous Lower 48 States	66.0	58.5	59.5	62.2	63.9	59.3	61.1	63.9	65.2	1.3%	2.6%	2.8%	2.0%

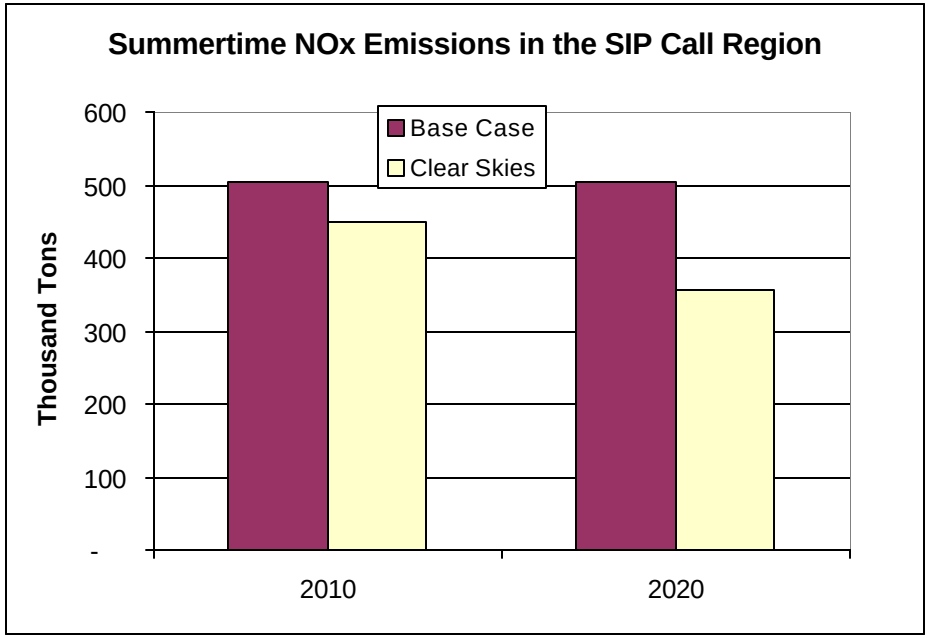
Note:
A mill is one tenth of a cent.

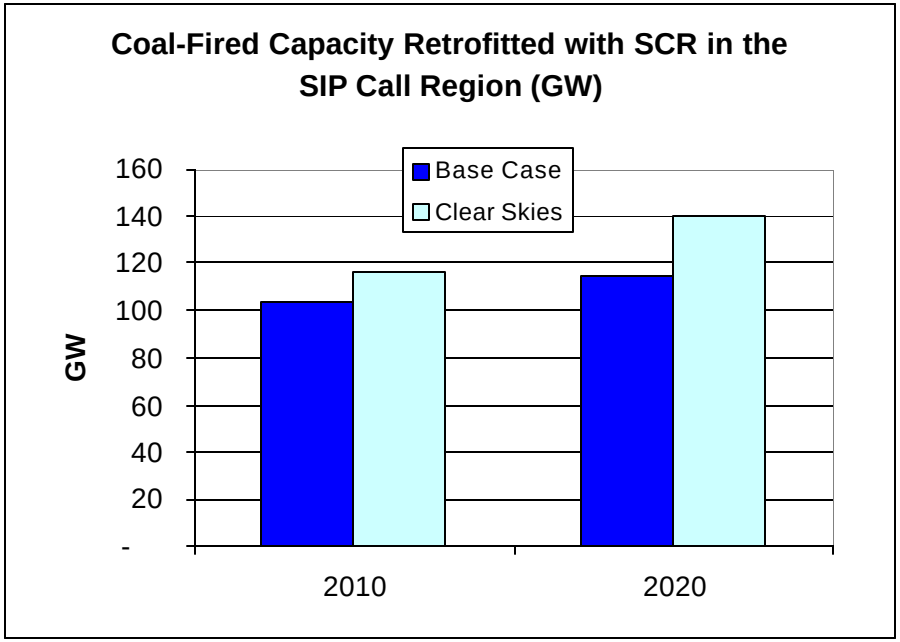
Information on the North American Electric Reliability Council (NERC) is available at http:// www.nerc.com.

2000 national average electricity retail price: EIA at http://www.eia.doe.gov/cneaf/electricity/page/fact_sheets/retailprice.html.
2005 - 2020 projections: from the “Retail Electricity Price Model” (see section G for a description of the Model.)

Impact of Clear Skies on the NOx SIP Call Region

- Summertime NOx emissions in the SIP Call region with Clear Skies are significantly lower than the emissions predicted under the NOx SIP Call. The additional reductions with Clear Skies come from the approximately 25 GW of additional SCR retrofits by 2020.





Note: The NOx SIP Call Region includes nineteen Eastern States and DC. Summertime NOx emissions occur between May 1 and September 30. Georgia is not currently part of the SIP Call program; however, EPA is drafting regulations that would include Georgia in the SIP Call Region by 2007 and a significant number of utilities in Georgia are installing controls to comply with potential future requirements. For these reasons, EPA has included Georgia in the SIP Call region modeled under the Base Case. This does not materially change the trends.