

# Wisconsin Electric Utility Sales, by Economic Sector

1970-2011 MILLIONS OF kWh AND PERCENT OF TOTAL

Year	Residential		Commercial <sup>b</sup>		Industrial		Agricultural <sup>c,d</sup>		Total <sup>e</sup>
1970	8,761	35.4%	5,738	23.2%	9,188	37.2%	1,028	4.2%	24,715
1975	10,893	34.8%	8,452	27.0%	10,721	34.3%	1,210	3.9%	31,276
1980	12,513	33.2%	11,243	29.8%	12,450	33.0%	1,539	4.1%	37,745
1985	13,257	31.8%	12,783	30.6%	13,940	33.4%	1,745	4.2%	41,725
1990 <sup>b</sup>	14,740	30.0%	15,808	32.1%	17,005	34.6%	1,645	3.3%	49,198
1995	17,040	29.4%	18,042	31.1%	21,290	36.7%	1,595	2.8%	57,967
1996	17,100	29.1%	18,588	31.6%	21,471	36.6%	1,585	2.7%	58,744
1997	16,935	28.2%	18,881	31.4%	22,703	37.8%	1,575	2.6%	60,094
1998	17,522	28.2%	19,334	31.2%	23,640	38.1%	1,565	2.5%	62,061
1999	17,942	28.2%	20,781	32.7%	23,264	36.6%	1,560	2.5%	63,547
2000	18,199	28.1%	21,407	33.1%	23,528	36.4%	1,555	2.4%	64,689
2001	18,990	28.8%	21,614	32.8%	23,823	36.1%	1,550	2.3%	65,977
2002 <sup>f</sup>	20,030	29.9%	22,290	33.3%	23,134	34.5%	1,545	2.3%	66,999
2003	21,364	31.8%	20,056	29.8%	24,226	36.0%	1,595	2.4%	67,241
2004	21,120	31.2%	19,951	29.4%	25,228	37.2%	1,501	2.2%	67,800
2005	21,385	30.4%	21,968	31.2%	25,376	36.1%	1,606	2.3%	70,335
2006	20,729	29.7%	22,232	31.8%	25,286	36.2%	1,574	2.3%	69,821
2007	21,454	30.1%	23,032	32.3%	25,436	35.7%	1,379	1.9%	71,301
2008	20,986	29.9%	22,978	32.8%	24,672	35.2%	1,486	2.1%	70,122
2009	20,458	30.9%	21,995	33.2%	22,390	33.8%	1,443	2.2%	66,286
2010	21,323	31.0%	22,514	32.7%	23,452	34.1%	1,463	2.1%	68,752
<b>2011<sup>p</sup></b>	<b>21,356</b>	<b>31.1%</b>	<b>22,585</b>	<b>32.9%</b>	<b>23,403</b>	<b>34.1%</b>	<b>1,351</b>	<b>2.0%</b>	<b>68,695</b>

TOTAL  
ELECTRICITY  
SALES  
**0.1%**

Total electricity sales decreased 0.1 percent in 2011 but have grown 4.1 percent over the past ten years. In 2011, electricity sales increased in the Residential and Commercial sectors, but decreased in the Industrial and Agricultural sectors.

Maps of Wisconsin's major electric lines and service territory areas can be found in the Map Appendix.

**a** Includes sales to public authorities (including sales for street and highway lighting) and utility company interdepartmental sales (for example, from electric to gas department of a combined utility).

**b** Beginning in 1989, U.S. DOE data sources have been used.

**c** Beginning in 2003, USDA agricultural statistics were used to electricity sales to this sector. To accommodate this shift in data sources, numbers in the residential and agricultural sectors have been historically revised.

**d** The agricultural sector does not include processing plants for crops and other agricultural products; these are classified under the commercial sector.

**e** Total sales may vary from other pages due to independent rounding.

**f** In 2002, EIA shifted their commercial and industrial criteria. Previous editions of this publication corrected for this shift, but revisions based on availability of firm agricultural electric consumption data prompted a historical revision starting in 1989. This publication no longer corrects for shifts in EIA data collection methods which are reflected in 2003.

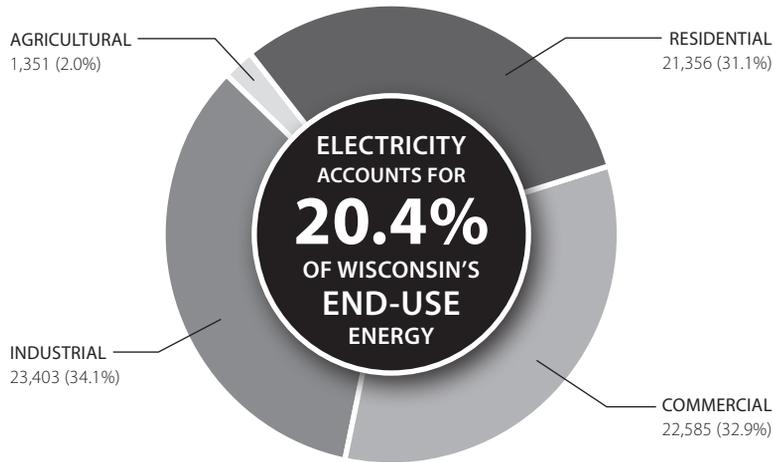
**p** Preliminary estimates.

**r** Revised.

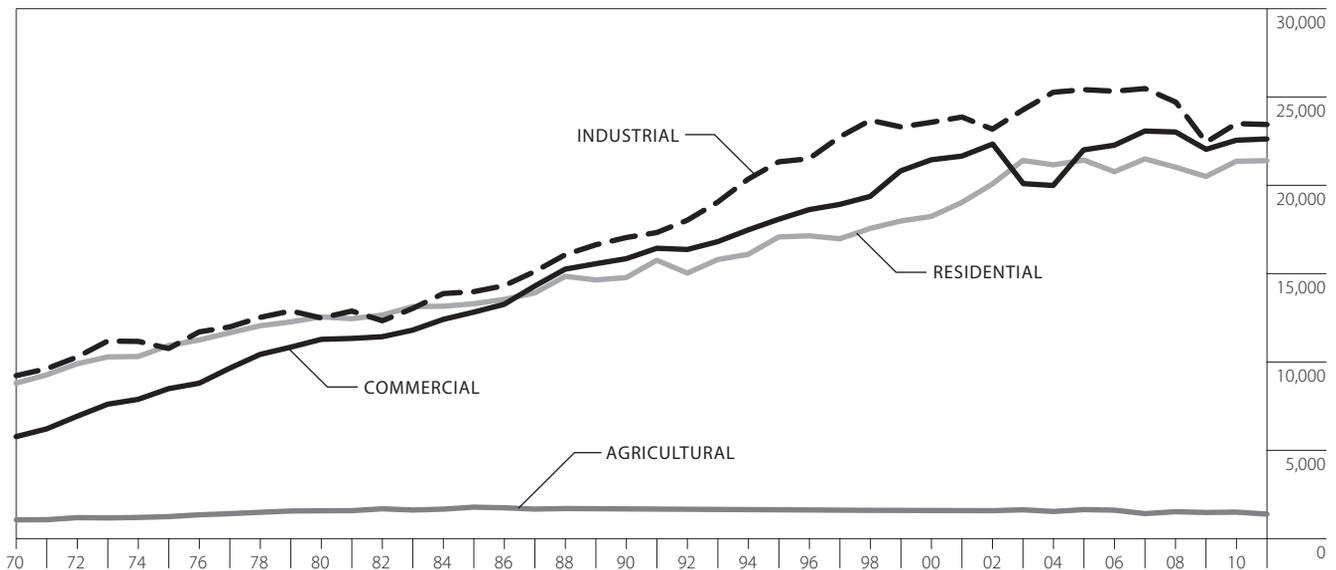
**Source:** Sectoral disaggregation by Wisconsin State Energy Office, based on Public Service Commission of Wisconsin, *Statistics of Wisconsin Public Utilities*, Bulletin #8 (1970-1994); U.S. Department of Agriculture, Rural Electrification Administration, Annual Statistical Report, REA Bulletin 1-1 (1970-1994); U.S. Department of Energy, Electric Sales and Revenue 1989-1999 [DOE/EIA-0540 (99)] (October 2000), *Electric Power Monthly*, Table 5.4B [DOE/EIA-0226 (2013/05)] (May 2013) (1989-2011). [http://www.eia.doe.gov/cneaf/electricity/epm/epm\\_sum.html](http://www.eia.doe.gov/cneaf/electricity/epm/epm_sum.html); U.S. Department of Agriculture, Economic Research Service, electricity expenditure data at <http://www.ers.usda.gov/> (2009-2011).

# Wisconsin Electric Utility Sales, by Economic Sector

2011 MILLIONS OF kWh AND PERCENT OF TOTAL



1970-2011 MILLIONS OF kWh



Source: Wisconsin State Energy Office.

# Wisconsin Electricity Sales to Ultimate Customers, by Private and Municipal Utilities and Power Cooperatives

1970-2011 MILLIONS OF kWh AND PERCENT OF TOTAL

Year	Private Utilities		Municipal Utilities		Power Cooperatives		Total
1970	21,515	87.1%	2,160	8.7%	1,040	4.2%	24,715
1975	27,021	86.4%	2,784	8.9%	1,471	4.7%	31,276
1980	32,335	85.7%	3,547	9.4%	1,864	4.9%	37,746
1985	35,497	85.1%	4,132	9.9%	2,096	5.0%	41,725
1990 <sup>a</sup>	41,653	84.7%	5,263	10.7%	2,282	4.6%	49,198
1995	48,814	84.2%	6,479	11.2%	2,674	4.6%	57,967
1996	49,332	84.0%	6,635	11.3%	2,777	4.7%	58,744
1997	50,640	84.3%	6,627	11.0%	2,827	4.7%	60,094
1998	52,242	84.2%	6,992	11.3%	2,827	4.6%	62,061
1999	53,517	84.2%	7,215	11.4%	2,815	4.4%	63,547
2000	54,404	84.1%	7,375	11.4%	2,910	4.5%	64,689
2001	55,545	84.2%	7,349	11.1%	3,083	4.7%	65,977
2002	56,250	84.0%	7,523	11.2%	3,226	4.8%	66,999
2003	56,459	84.0%	7,500	11.2%	3,282	4.9%	67,241
2004	57,099	84.0%	7,598	11.2%	3,279	4.8%	67,976
2005	58,899	83.7%	7,950	11.3%	3,487	5.0%	70,336
2006 <sup>r</sup>	58,407	83.7%	7,902	11.3%	3,512	5.0%	69,821
2007	59,585	83.6%	8,079	11.3%	3,637	5.1%	71,301
2008	58,429	83.3%	7,947	11.3%	3,746	5.3%	70,122
2009 <sup>r</sup>	55,051	83.1%	7,485	11.3%	3,750	5.7%	66,286
2010	57,183	83.2%	7,759	11.3%	3,810	5.5%	68,752
<b>2011<sup>p</sup></b>	<b>57,145</b>	<b>83.2%</b>	<b>7,750</b>	<b>11.3%</b>	<b>3,800</b>	<b>5.5%</b>	<b>68,695</b>

Investor owned utilities supply the vast majority of power to Wisconsin electricity customers (83.2 percent). The relative amounts of power supplied by the three types of suppliers have changed very little over the past 20 years.

<sup>a</sup> Beginning in 1989, U.S. DOE data sources have been used.

<sup>p</sup> Preliminary estimates.

<sup>r</sup> Revised.

**Source:** Public Service Commission of Wisconsin, Accounts and Finance Division, *Statistics of Wisconsin Public Utilities*, Bulletin #8, Table 5 (1970-1994); U.S. Department of Agriculture, Rural Electrification Administration, *Annual Statistical Report*, REA Bulletin 1-1, Table 31 (1970-1994); U.S. Department of Energy, *Electric Sales and Revenue 1989-2000* [DOE/EIA-0540 (2000)] (November 2001), and *Electric Power Monthly* [DOE/EIA-0226 (2012/02)] (February 2012). [www.eia.doe.gov/cneaf/electricity/epm/epm\\_sum.html](http://www.eia.doe.gov/cneaf/electricity/epm/epm_sum.html)

# Eastern Wisconsin Electric Utility Power Load and Non-Coincident Peak Demand

SUMMER  
PEAK  
DEMAND  
**5.7%**

Wisconsin's 2011 summer peak electricity demand for the eastern Wisconsin utilities<sup>a</sup> increased 5.7 percent due to warmer weather in July. The increase compared to 2010 was 662 megawatts.

WINTER  
PEAK  
DEMAND  
**4.6%**

Winter peak demand decreased 4.6 percent in 2011 due to warmer December weather. Summer peak demand in 2011 exceeded winter peak demand by 3,613 megawatts. Winter peak demand includes November through February. Because these data are presented annually, winter peak demand in this chart only includes November and December 2011; the peak demand will be adjusted to include January and February in the next edition of this publication.

Non-coincident peak demand is the sum of the individual monthly peak electric demands from Wisconsin's eastern utilities.

1970-2011

Year	Load	Peak Demand		Capacity Factor <sup>b</sup>
	(Millions of kWh)	Summer (MW)	Winter (MW)	(Percent)
1970	22,818	4,125	3,964	63.1
1975	28,616	5,314	4,903	61.5
1980	34,836	6,009	5,525	66.0
1985	39,325	6,464	6,166	69.4
1990 <sup>c</sup>	47,381	8,326	7,210	65.0
1995	55,821	9,833	8,275	64.8
1996	58,408	9,061	8,285	73.4
1997	59,946	9,313	8,302	73.5
1998	59,563	10,099	8,644	67.3
1999	61,990	10,756	8,977	65.8
2000	64,084	10,814	9,152	67.6
2001	61,701	11,645	8,440	60.5
2002	67,698	11,401	8,917	67.8
2003	68,886	11,688	9,192	67.3
2004	68,296	10,981	9,729	70.8
2005	70,441	11,946	9,595	67.3
2006	67,216	12,129	9,238	63.3
2007 <sup>r</sup>	68,796	11,698	9,237	67.1
2008	66,931	11,060	9,482	68.9
2009	63,349	11,267	9,114	64.2
2010	65,092	11,568	9,036	64.2
<b>2011<sup>p</sup></b>	<b>66,300</b>	<b>12,230</b>	<b>8,617</b>	<b>61.9</b>

<sup>a</sup> Wisconsin Electric Power Co., Wisconsin Power and Light Co., Wisconsin Public Service Corp., and Madison Gas and Electric Co.

<sup>b</sup> Capacity Factor = Annual Energy Generation (kWh) / [Peak Demand (kW) x 8,760 (hours/year)]

<sup>c</sup> Beginning in January 1988, data includes Wisconsin Electric Power Co. generation from Presque Isle, Michigan.

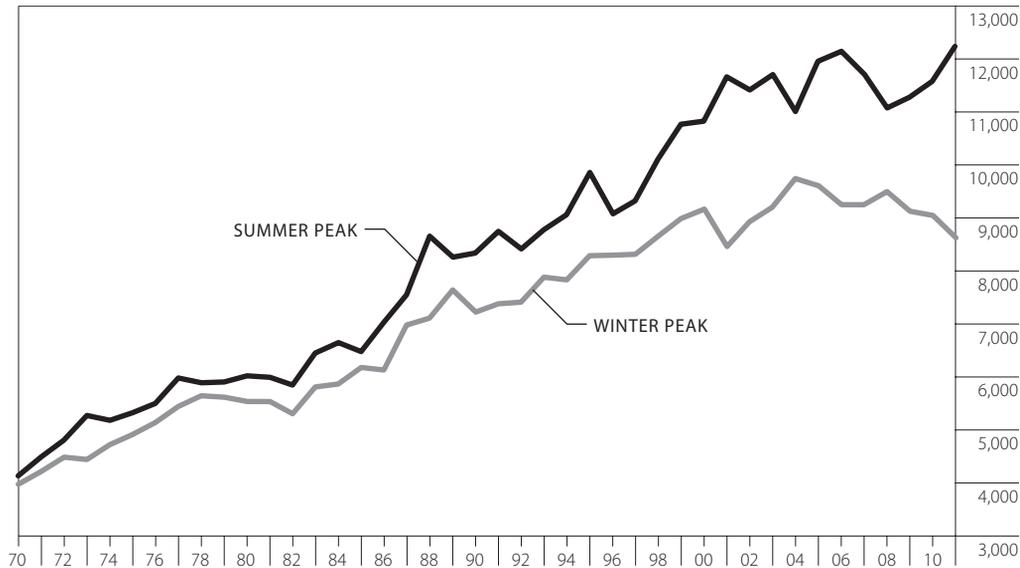
<sup>p</sup> Preliminary estimates.

<sup>r</sup> Revised.

**Source:** Wisconsin electric utility annual reports submitted to the Public Service Commission of Wisconsin (1970-2012); <http://psc.wi.gov/apps40/annreport/default.aspx>

## Eastern Wisconsin Electric Utility Non-Coincident Peak Demand

1970-2011 MEGAWATTS



HIGHEST  
PEAK  
**12,230**  
MEGAWATTS  
SUMMER  
2011

## Eastern Wisconsin Electric Utility Power Load and Non-Coincident Peak Demand, by Month

2011

Month	Load (Millions of kWh) <sup>a</sup>	Non-Coincident Peak Demand (MW) <sup>b</sup>
January	5,742	8,580
February	4,996	8,664
March	5,472	8,102
April	5,108	7,757
May	5,238	8,918
June	5,568	11,210
July	6,733	12,230
August	6,254	11,252
September	5,157	10,765
October	5,368	7,952
November	5,097	8,265
December	5,567	8,617
<b>Total</b>	<b>66,300</b>	

The highest non-coincident peak demand in 2011 was seen in July.

<sup>a</sup> Wisconsin Electric Power Co., Wisconsin Power and Light Co., Wisconsin Public Service Corp., and Madison Gas and Electric Co.

<sup>b</sup> Non-coincident peak demand is the sum of the individual monthly peak electric demands from the four utilities listed above for each month.

Source: Wisconsin electric utility annual reports submitted to the Public Service Commission of Wisconsin (2011).

<http://psc.wi.gov/apps40/annreport/default.aspx>

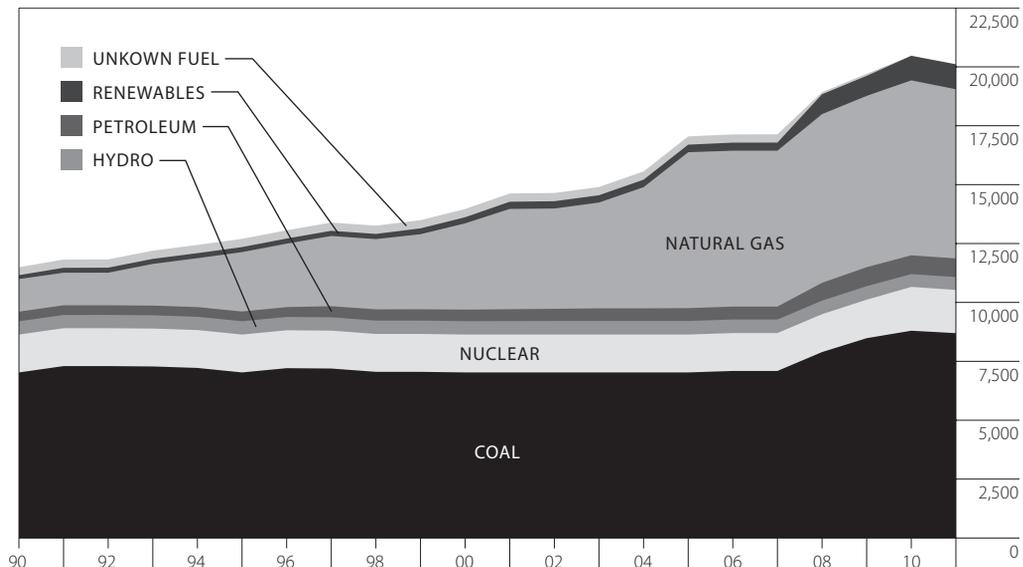
# Wisconsin Electric Generating Capacity, by Type of Plant

ELECTRIC GENERATION CAPACITY  
**362.6**  
MEGAWATTS  
(1.8 PERCENT)  
IN 2011

In 2011, Wisconsin's electric generation capacity decreased by 362.6 megawatts (1.8 percent). These data represent electricity generation capacity by Wisconsin's investor-owned utilities, municipal utilities, electric co-operatives, independent power producers, and other non-utility operations (e.g., paper mills).

The Renewables data include biomass (e.g., wood, paper byproducts, landfill gas, and methane digester gas), solar photovoltaic and wind. Out-of-state facilities are not included in the Renewables or the hydroelectric figures. These figures include renewable facilities that are not RPS-registered.

## 1990-2011 MEGAWATTS



Year	Coal	Nuclear	Hydro	Petroleum	Natural Gas	Renewables	Unknown Fuel	Total <sup>a,b</sup>
1990	7,028	1,609	562	410	1,383	165	337	11,494
1995	7,028	1,609	564	413	2,522	213	350	12,700
1996	7,209	1,609	566	417	2,694	216	350	13,062
1997	7,194	1,609	566	471	2,982	219	350	13,391
1998	7,053	1,609	567	477	2,982	220	350	13,258
1999	7,053	1,609	567	481	3,185	248	350	13,494
2000	7,028	1,609	567	491	3,662	258	350	13,965
2001	7,028	1,609	571	503	4,258	305	350	14,624
2002	7,028	1,609	576	516	4,258	308	350	14,646
2003	7,028	1,609	576	536	4,491	310	350	14,900
2004	7,028	1,609	576	536	5,143	317	350	15,560
2005	7,028	1,609	576	545	6,618	321	350	17,048
2006	7,091	1,609	576	547	6,618	341	350	17,133
2007	7,091	1,609	576	547	6,618	344	350	17,137
2008	7,893	1,608	575	756	7,161	844	89	18,925
2009	8,482	1,634	574	806	7,272	850	89	19,706
2010	8,799	1,861	544	796	7,426	1,044	0	20,470
2011 <sup>P</sup>	8,696	1,834	546	790	7,184	1,058	0	20,107

<sup>a</sup> Capacity is as of December 31 of each year.

<sup>b</sup> Totals might not add due to rounding.

<sup>P</sup> Preliminary.

Sources: Energy Information Administration, *Electric Power Annual*, [DOE/EIA-0348(2007)](October 2007), [http://www.eia.doe.gov/cneaf/electricity/epa/epa\\_sprdshts.html](http://www.eia.doe.gov/cneaf/electricity/epa/epa_sprdshts.html). In 2008, this table was historically revised with data from the Public Service Commission of Wisconsin. PSC/Wisconsin Generating Capacity by Fuel (1990-2011); EIA data were used in previous publications.

# Wisconsin Electric Generating Capacity, by Type of Plant and Type of Producer

## 1990-2011 MEGAWATTS

These data represent the generation capacity of utilities, who are required to have power available to customers via the power grid; and merchant producers who produce power for wholesale (Independent Power Producers) to utilities; and non-utilities which are primarily industrial sector businesses producing electricity for in-house use, any excess of which may also be sold to utilities for retail re-sale on the power grid.

Year	Utility Generating Capacity <sup>c</sup>				Non-Utility Generating Capacity			All Producers Capacity Total
	Cooperatives	Investor-Owned Utilities	Municipal	Utility Total	IPP <sup>a</sup>	Non-Utility <sup>b</sup>	Non-Utility Total	
1990	937	9,404	204	10,544	62	889	951	11,494
1991	937	9,352	203	10,492	62	916	977	11,469
1992	937	9,352	203	10,492	62	921	983	11,475
1993	937	9,627	289	10,852	62	922	983	11,836
1994	937	9,904	289	11,129	62	922	983	12,113
1995	937	10,452	290	11,678	62	960	1,022	12,700
1996	937	10,379	375	11,691	62	936	998	12,689
1997	937	10,432	376	11,744	350	939	1,289	13,033
1998	937	10,433	382	11,751	530	939	1,469	13,220
1999	937	10,455	410	11,801	830	946	1,775	13,577
2000	937	10,794	421	12,151	830	984	1,814	13,965
2001	1,033	10,798	432	12,263	1,361	1,000	2,361	14,624
2002	1,033	10,804	440	12,277	1,362	1,008	2,370	14,647
2003	1,033	11,057	440	12,530	1,362	1,008	2,371	14,901
2004	1,036	11,058	492	12,586	1,961	1,013	2,974	15,560
2005	1,037	11,098	501	12,636	3,397	1,015	4,412	17,048
2006	1,037	11,098	566	12,702	3,397	1,034	4,431	17,133
2007	1,037	10,024	566	11,628	4,471	1,038	5,509	17,137
2008	1,017	11,201	566	12,784	5,036	1,016	6,052	18,836
2009	1,017	11,960	566	13,543	5,071	1,092	6,163	19,706
2010	1,030	12,772	565	14,367	5,357	745	6,102	20,469
2011 <sup>p</sup>	972	12,520	593	14,085	5,306	716	6,022	20,107

<sup>a</sup> IPPs are independent power producers allowed under law to sell their power to wholesalers such as utility co-operatives. They are barred from selling their power on the retail market.

<sup>b</sup> Non-utility sources refers to industrial power producers such as paper mills.

<sup>c</sup> Utilities include investor-owned utilities, electric co-operatives and municipalities.

<sup>p</sup> Preliminary.

**Source:** Public Service Commission of Wisconsin, Accounts and Finance Division, *Generating Plants Operated by Wisconsin Electric Utilities*, Bulletin #46 (1971-1994) and personal communications 2002; U.S. Department of Agriculture, Rural Electrification Administration, *Annual Statistical Report*, REA Bulletin 1-1 (1971-1994); Public Service Commission of Wisconsin, unpublished electrical generation data (1990-2011).

2011 saw an overall capacity decrease of 1.8 percent from 2010. The decreases according to producers were: Investor Owned Utilities (IOUs), 2.0 percent; IPP, 1.0 percent; non-utilities, 3.8 percent; and Cooperatives, 5.6 percent.

Municipal producers saw an increase of 4.9 percent.

These data were not available until 1990; the capacity listed for 1990 represents in-place capacity for all previous years of operation.

# Wisconsin Electric Power Generation, by Type of Plant

ELECTRIC  
UTILITY  
GENERATION  
**2.7%**

Total electric generation by Wisconsin utilities decreased 2.7 percent in 2011, and generation from Independent Power Producers (IPPs) decreased by 2.7 percent as well. Industrial, or non-utility, generation increased by 0.4 percent. In 2011, 91 percent of Wisconsin's power was produced in-state, and Wisconsin's power imports increased by 22.5 percent.

Utility energy production from renewable sources increased by 10.9 percent in 2011, while production from coal decreased by 2.1 percent.

Imports and losses is a reflection of the difference between total sales recorded by EIA and total sales reported by utilities and IPPs.

*Utilities* include investor-owned utilities, electric co-operatives and municipalities.

*IPPs* are independent power producers allowed under law to sell their power to wholesalers such as utility co-operatives. They are barred from selling their power on the retail market. The primary fuel used by IPPs is uranium, followed by natural gas, wind hydroelectric, and coal.

*Non-Utility* refers to industrial power producers such as paper mills. These generation facilities primarily use coal and renewable resources such as biogas and hydro to generate electricity for their own use.

## 1970-2011 MILLIONS OF kWh

Year	Electricity Generation by Utilities <sup>e</sup>							IPP	Nonutility <sup>e</sup>	Total IPP and Nonutility	Imports & Losses <sup>c</sup>	Total Sales <sup>h</sup>
	Coal <sup>b</sup>	Nuclear <sup>d</sup>	Hydro <sup>a</sup>	Petroleum <sup>d</sup>	Natural Gas	Renewables <sup>f</sup>	Total Utilities					
1970	25,253	155	1,413		390		27,211			0	-2,496	24,715
1975	20,615	10,292	1,483		691		33,081			0	-1,805	31,276
1980	26,383	9,912	1,628		393		38,316			0	-571	37,745
1985	28,840	10,978	2,046		20		41,884			0	-159	41,725
1990	27,956	11,224	1,791	76	393		41,440			0	7,758	49,198
1995	32,994	10,970	2,097	97	924		47,082			0	10,885	57,967
2000	41,736	11,459	1,749	52	965	43	56,004			0	8,685	64,689
2005	45,219	7,574	1,499	75	2,185	105	56,657	2,648	275	2,923	11,031	70,336
2006	42,936	12,234	1,446	215	1,928	234	58,993	3,662	2,534	6,196	7,166	69,821
2007 <sup>r</sup>	39,460	0	1,314	123	3,132	277	44,306	16,263	2,913	19,176	10,731	71,301
2008 <sup>ir</sup>	41,270	0	1,428	70	2,451	508	45,726	15,126	2,874	18,000	9,269	70,122
2009 <sup>r</sup>	36,554	0	1,353	38	2,597	997	41,539	16,027	2,687	18,713	8,720	66,286
2010 <sup>r</sup>	39,427	0	2,027	39	3,164	817	45,473	16,193	2,783	18,976	7,086	68,752
<b>2011<sup>p</sup></b>	<b>38,591</b>	<b>0</b>	<b>1,928</b>	<b>37</b>	<b>2,790</b>	<b>906</b>	<b>44,251</b>	<b>15,761</b>	<b>2,794</b>	<b>18,555</b>	<b>8,683</b>	<b>68,695</b>

<sup>a</sup> From 1970 to 1989, hydroelectric data were sourced from the Public Service Commission of Wisconsin bulletins; from 1990 to 2006, and current year data, are from the federal Department of Energy, Energy Information Administration (EIA). 2007, 2008 and 2009 are from the Public Service Commission of Wisconsin.

<sup>b</sup> Coal data for 2007 and 2009 include a small amount of refuse derived fuel. That figure is 9.3 and 73.254 thousand kWhs for 2007 and 2009, respectively.

<sup>c</sup> A negative sign indicates Wisconsin utilities exported electric power to other states.

<sup>d</sup> Petroleum (oil) was split from natural gas as a generation resource starting in 1990. Prior to 1990, they were combined in this table. Propane used to produce electricity is included in this category.

<sup>e</sup> Non-utility generation sources were available prior to 2005, but not collected separately until then.

<sup>f</sup> The renewables category includes biomass, methane from landfills and digesters, solar and wind resources. In 2011, the renewables category also includes undifferentiated renewables. These renewables are not split out by type of fuel due to data source limitations.

<sup>g</sup> Wisconsin utilities no longer own nuclear generation; all nuclear reactors located in Wisconsin are owned by Independent Power Producers. Nuclear generation data can be found in the IPP category in the above table.

<sup>h</sup> Sales figures for all years are from the EIA *Electric Power Monthly*.

<sup>i</sup> Starting with the 2008 publication, these data were revised from previous publications that used federal Department of Energy, Energy Information Administration data. 2009 data are EIA-sourced data that will be revised using PSC data when available.

<sup>p</sup> Preliminary.

<sup>r</sup> Revised.

**Source:** Public Service Commission of Wisconsin, Accounts and Finance Division, *Generating Plants Operated by Wisconsin Electric Utilities*, Bulletin #46 (1971-1994) and personal communications 2002; U.S. Department of Agriculture, Rural Electrification Administration, *Annual Statistical Report*, REA Bulletin 1-1 (1971-1994); US Department of Energy, Energy Information Administration, *Electric Power Monthly* [DOE/EIA-0226 (2012/05)] (May 2012) (1990-2006); Public Service Commission of Wisconsin, unpublished electrical generation data (2007-2011).

# Wisconsin Electric Utility Fuel Costs of Power Generation, by Type of Plant

The costs in the table below reflect costs incurred by Wisconsin's five largest investor owned utilities.

1970-2011 CENTS PER kWh

Year	Fossil Fuel Steam (Coal)	Nuclear Steam <sup>b</sup>	Internal Combustion <sup>a</sup>	Total
1970	0.43	0.16	0.75	0.44
1975	1.01	0.36	1.47	0.75
1980	1.72	0.50	3.58	1.40
1985	2.02	0.61	6.76	1.60
1990 <sup>e</sup>	1.61	0.52	4.51	1.27
1995 <sup>e</sup>	1.33	0.48	3.62	1.12
1996 <sup>e</sup>	1.26	0.49	3.15	1.07
1997 <sup>e</sup>	1.28	0.50	4.30	1.22
1998 <sup>e</sup>	1.25	0.52	3.76	1.13
1999 <sup>e</sup>	1.21	0.53	3.70	1.07
2000 <sup>e</sup>	1.24	0.52	6.41	1.14
2001 <sup>e</sup>	1.27	0.54	6.36	1.15
2002 <sup>e</sup>	1.31	0.50	4.61	1.12
2003 <sup>e</sup>	1.37	0.48	6.49	1.21
2004 <sup>e</sup>	1.44	0.47	6.19	1.24
2005 <sup>e</sup>	1.58	0.39	10.29	1.65
2006 <sup>e</sup>	1.78	0.35	8.28	1.61
2007 <sup>e</sup>	2.00	0.27	7.49	1.84
2008 <sup>e</sup>	2.21	Not Available	7.14	1.89
2009 <sup>e</sup>	2.33	Not Available	4.52	1.81
2010 <sup>e</sup>	2.41	Not Available	3.70	1.85
<b>2011<sup>e</sup></b>	<b>2.76</b>	<b>Not Available</b>	<b>2.76</b>	<b>2.03</b>

<sup>a</sup> Internal combustion includes both gas-powered turbines and diesel-powered engines.

<sup>b</sup> Nuclear cost.

<sup>e</sup> Estimate by Wisconsin State Energy Office based on amount of generation by the five major Wisconsin utilities.

**Source:** Public Service Commission of Wisconsin, Accounts and Finance Division, Generating Plants Operated by Wisconsin Electric Utilities, Bulletin #46 (1971-1994); annual reports of the five major Wisconsin electric generating utilities (1990-2011).  
<http://psc.wi.gov/apps40/annlreport/content/munilist.aspx>

In this table, only the cost of fuel per kilowatt-hour of generation is reported. The table on the next page includes the annual variable cost of generation. Renewables such as hydroelectric plants, wind turbines and solar photovoltaic installations are not included here because they have no associated fuel costs.

Wisconsin utilities no longer own nuclear generation; all nuclear reactors located in Wisconsin are owned by Independent Power Producers. The data for 2005, 2006, and 2007 show a decline in fuel costs for nuclear generation because these are the years in which the sales of the plants were completed. Fuel cost data for nuclear plants are no longer available because these plants are owned by Independent Power Producers who do not submit annual reports to the Public Service Commission.

# Utility Annual Variable Costs of Power Generation, by Type of Plant and Cost of Purchased Power

This table shows the annual variable cost of generating one kWh of electricity by various technologies in Wisconsin's electric utility plants. The average cost is almost double the previous peak in 1983 of 2.21 cents per kWh. The cost of purchased power has risen in recent years and is 31.4 percent more expensive than electricity generated in Wisconsin.

Wisconsin utilities no longer own nuclear generation; all nuclear reactors located in Wisconsin are owned by Independent Power Producers. The data for 2005, 2006, and 2007 show an increase in the per kWh cost of nuclear generation because these are the years in which sales of the plants were completed. Cost per kWh continues remain high for nuclear generation.

The All Plants and Purchased Power figures are revised from previous editions of this publication due to the break out of nuclear generation from purchased power.

The costs in the table below reflect costs incurred by Wisconsin's five largest investor owned utilities.

## 1970-2011 CENTS PER kWh

Year	Fossil Fuel Steam (Coal)	Nuclear Steam <sup>b</sup>	Internal Combustion <sup>a</sup>	Hydro	All Plants	Purchased Power	Average Cost
1970	0.55	0.29	1.76	0.27	0.53	NA	NA
1975	1.25	0.51	2.73	0.32	0.97	NA	NA
1980	2.13	0.86	5.74	0.52	1.72	NA	NA
1983	2.58	1.61	29.27	0.56	2.21	NA	2.21
1985	2.55	1.32	19.12	0.61	2.09	NA	NA
1990 <sup>e</sup>	2.13	1.50	10.87	1.00	1.94	2.22	1.99
1995 <sup>e</sup>	1.80	1.63	4.71	0.71	1.75	2.17	1.83
1996 <sup>e</sup>	1.68	1.73	4.69	0.64	1.67	2.15	1.77
1997 <sup>e</sup>	1.68	4.37	5.09	0.69	1.94	2.27	2.04
1998 <sup>e</sup>	1.68	2.83	4.70	1.02	1.94	2.67	2.11
1999 <sup>e</sup>	1.68	2.03	4.83	0.87	1.79	2.96	2.05
2000 <sup>e</sup>	1.75	2.16	7.73	0.86	1.91	3.36	2.24
2001 <sup>e</sup>	1.76	2.37	7.63	0.90	1.95	3.90	2.41
2002 <sup>e</sup>	1.87	2.18	6.09	0.75	1.97	3.64	2.40
2003 <sup>e</sup>	1.91	2.40	8.02	1.12	2.10	4.05	2.61
2004 <sup>e</sup>	1.97	2.46	14.63	1.06	2.19	4.26	2.72
2005 <sup>e</sup>	2.11	2.64	16.02	1.21	2.74	5.25	3.48
2006 <sup>e</sup>	2.68	2.83	14.81	1.40	3.11	5.83	3.88
2007 <sup>e</sup>	2.94	3.05	11.76	1.65	3.42	6.29	4.22
2008 <sup>e</sup>	3.49	4.03	13.29	1.53	4.00	6.76	4.74
2009 <sup>e</sup>	3.77	4.25	9.84	1.81	4.22	5.78	4.65
2010 <sup>e</sup>	3.86	4.15	8.19	1.28	4.16	6.06	4.59
<b>2011<sup>e</sup></b>	<b>4.25</b>	<b>4.01</b>	<b>7.49</b>	<b>1.37</b>	<b>4.33</b>	<b>5.69</b>	<b>4.65</b>

<sup>a</sup> Internal combustion includes both gas powered turbines and diesel powered engines.

<sup>b</sup> Nuclear reactors in Wisconsin are owned by independent power producers.

<sup>e</sup> Estimate by Wisconsin State Energy Office based on amount of generation by the five major Wisconsin utilities.

NA – Not available.

**Source:** Public Service Commission of Wisconsin, Accounts and Finance Division, *Generating Plants Operated by Wisconsin Electric Utilities*, Bulletin #46 (1971-1994); annual reports of the five major Wisconsin electric generating utilities (1990-2011).  
<http://psc.wi.gov/apps40/annreport/content/munilist.aspx>

# Electric Utility Sulfur Dioxide Emissions

1980-2011 TONS

Year	1980	1990	2000	2005	2006 <sup>r</sup>	2007	2008 <sup>r</sup>	2009 <sup>r</sup>	2010 <sup>r</sup>	2011 <sup>p</sup>
<b>Dairyland Power Cooperative</b>										
Alma	23,641	6,510	3,445	8,816	11,748	10,748	9,558	4,809	4,189	1,196
Genoa	43,516	28,130	8,165	13,074	13,658	12,480	11,970	6,479	8,874	3,296
J.P. Madgett	4,088	7,330	5,376	7,762	7,807	8,028	9,114	10,041	4,976	4,827
Stoneman	4,663	790	0	0	0	0	0	0	0	0
<b>Madison Gas and Electric Co.</b>										
Blount Street	8,436	3,851	6,923	5,969	2,617	2,762	2,958	397	278	1
<b>Northern States Power Co.</b>										
Bay Front	2,708	393	786	1,196	944	1,149	1,041	735	347	286
<b>Wisconsin Electric Power Co.</b>										
Oak Creek	122,472	45,650	22,831	12,903	13,594	13,695	14,472	14,823	13,032	14,021
Pleasant Praire	4,972	26,933	28,726	33,656	28,566	2,229	1,092	988	1,195	928
Port Washington	42,295	4,009	15,572	2	2	4	4	6	6	5
Valley	41,761	14,053	15,835	8,482	7,087	6,848	6,887	5,376	4,890	4,226
<b>Wisconsin Power and Light Co.</b>										
Blackhawk	2,006	0	0	0	0	0	0	0	0	0
Columbia 1	24,937	18,616	15,056	13,729	10,616	12,093	13,561	11,833	14,527	12,340
Columbia 2	14,614	13,909	13,270	12,370	11,780	13,332	13,303	12,396	13,192	12,429
Edgewater 1-4	60,014	38,021	8,962	9,103	7,675	7,166	7,205	5,666	5,758	5,785
Edgewater 5	0	6,744	8,744	7,741	8,084	9,502	7,858	7,782	8,779	8,340
Nelson Dewey	32,304	10,985	14,275	14,999	14,519	15,064	13,531	12,646	13,454	11,505
Rock River	14,139	7,220	24	12	2	2	2	4	0	
<b>Wisconsin Public Services Corp.</b>										
Pulliam	42,087	25,631	6,314	12,175	10,869	10,448	8,446	4,386	5,517	3,507
Weston 1, 2	21,009	6,589	3,340	3,988	3,278	2,983	2,852	2,060	2,601	1,679
Weston 3	0	7,598	8,358	9,540	9,318	6,125	7,338	5,912	7,216	5,593
Weston 4	0	0	0	0	0	0	333	972	1,120	904
<b>Municipal Utilities</b>										
Manitowoc	1,318	1,727	3,282	217	732	1,033	1,706	794	593	435
Marshfield	1,651	139	0	0	0	0	0	0	0	0
Menasha	991	695	79	0	0	0	0	0	0	0
<b>Total</b>										
<b>Utility Sources</b>	<b>513,622</b>	<b>275,523</b>	<b>189,363</b>	<b>175,734</b>	<b>162,896</b>	<b>135,691</b>	<b>133,231</b>	<b>108,105</b>	<b>110,544</b>	<b>91,305</b>
<b>All Other Sources</b>	<b>172,777</b>	<b>101,517</b>	<b>87,115</b>	<b>68,600</b>	<b>67,392</b>	<b>67,838</b>	<b>101,419</b>	<b>89,849</b>	<b>94,150</b>	<b>40,474</b>
<b>All Stationary Sources</b>	<b>686,399</b>	<b>377,040</b>	<b>276,478</b>	<b>244,334</b>	<b>230,288</b>	<b>203,529</b>	<b>234,650</b>	<b>197,954</b>	<b>204,694</b>	<b>131,779</b>
<b>Percent Utility Sources</b>	<b>74.8%</b>	<b>73.1%</b>	<b>68.5%</b>	<b>71.9%</b>	<b>70.7%</b>	<b>66.7%</b>	<b>56.8%</b>	<b>54.6%</b>	<b>54.0%</b>	<b>68.9%</b>

p Preliminary estimates.

r Revised.

Source: Wisconsin Department of Natural Resources, Annual Survey of Point Source Emissions, Sulfur Dioxide and Nitrogen Oxides Emissions Report PUBL-AM-343 and published by facility on the Wisconsin Department of Natural Resources website at <http://dnr.wi.gov/air/emission/ObtainEmissionSummary1995ToPresent.htm> (1986-2011).

**SULFUR  
DIOXIDE  
EMISSIONS**  
**17.4%**

Utility sulfur dioxide emissions decreased 17.4 percent from 2010 to 2011. Declines in total emissions will depend on the growth in coal fired generation, old plant retirement, the effectiveness of future energy efficiency efforts and increased use of natural gas and renewable energy.

# Electric Utility Nitrogen Oxides Emissions

**NITROGEN  
OXIDES  
EMISSIONS  
9.6%**

Utility nitrogen oxides emissions decreased 9.6 percent from 2010 to 2011. Future decreases in total emissions will depend on the growth in coal fired generation, old plant retirement, the effectiveness of future energy efficiency efforts, increased use of natural gas and renewable energy, and the disposition of proposed U.S. EPA rules.

Recent changes in combustion technology have resulted in reduced NOX emissions for some generating plants.

## 1989-2011 TONS

Year	1989	1990	2000	2005	2006	2007	2008	2009 <sup>r</sup>	2010 <sup>r</sup>	2011 <sup>p</sup>
<b>Dairyland Power Cooperative</b>										
Alma	1,934	1,962	2,774	3,834	4,252	4,883	3,671	1,100	763	367
Genoa	5,243	5,304	3,611	3,717	3,909	3,556	2,696	1,574	1,669	769
J.P. Madgett	4,728	4,963	4,845	4,469	4,098	4,114	3,962	3,636	2,898	2,932
<b>Madison Gas and Electric Co.</b>										
Blount Street	1,511	1,165	1,480	1,187	490	463	568	78	88	47
<b>Northern States Power Co.</b>										
Bay Front	0	0	1,288	1,527	1,171	1,590	1,562	916	665	535
<b>Wisconsin Electric Power Co.</b>										
Oak Creek	13,967	8,917	19,786	4,650	4,634	4,646	4,978	5,530	4,982	5,657
Pleasant Praire	17,701	16,356	18,452	11,318	8,745	2,560	2,862	2,623	2,711	2,498
Port Washington	1,005	771	4,074	45	85	111	129	129	131	115
Valley	4,414	4,874	7,259	3,893	3,435	3,268	3,106	1,817	1,446	1,250
<b>Wisconsin Power and Light Co.</b>										
Columbia 1	6,059	6,844	7,981	3,022	2,699	2,655	2,715	2,438	2,899	2,781
Columbia 2	7,943	10,336	6,874	2,829	2,448	2,484	2,549	2,329	2,447	2,703
Edgewater 1-4	16,583	16,684	12,817	3,781	2,726	2,697	2,805	1,409	1,503	1,563
Edgewater 5	2,960	3,638	8,743	2,282	2,276	1,976	1,698	1,552	1,791	1,735
Nelson Dewey	9,997	9,997	5,413	3,060	2,848	2,938	2,589	2,382	3,082	3,237
Rock River	4,367	3,697	419	373	125	108	88	33	6	6
<b>Wisconsin Public Services Corp.</b>										
Pulliam	6,769	7,087	8,045	9,235	8,164	8,222	6,591	3,391	2,705	1,348
Weston 1, 2	3,003	3,308	3,262	3,754	2,622	3,039	2,699	971	1,212	786
Weston 3	2,374	2,360	3,228	4,385	3,965	2,529	2,593	2,034	1,492	1,165
Weston 4	0	0	0	0	0	0	281	794	922	914
<b>Municipal Utilities</b>										
Manitowoc	923	923	102	88	146	278	593	245	234	22
<b>Total</b>										
<b>Utility Sources</b>	<b>111,481</b>	<b>109,186</b>	<b>120,453</b>	<b>67,449</b>	<b>58,838</b>	<b>52,117</b>	<b>48,735</b>	<b>34,981</b>	<b>33,646</b>	<b>30,430</b>
<b>All Other Sources</b>	<b>86,473</b>	<b>24,774</b>	<b>19,625</b>	<b>45,232</b>	<b>41,282</b>	<b>42,660</b>	<b>48,287</b>	<b>43,196</b>	<b>48,621</b>	<b>22,132</b>
<b>All Stationary Sources</b>	<b>197,954</b>	<b>133,960</b>	<b>140,078</b>	<b>112,681</b>	<b>100,120</b>	<b>94,777</b>	<b>97,022</b>	<b>78,177</b>	<b>82,267</b>	<b>51,209</b>
<b>Percent Utility Sources</b>	<b>56.3%</b>	<b>81.5%</b>	<b>86.0%</b>	<b>59.9%</b>	<b>58.8%</b>	<b>55.0%</b>	<b>50.2%</b>	<b>44.7%</b>	<b>40.9%</b>	<b>56.8%</b>

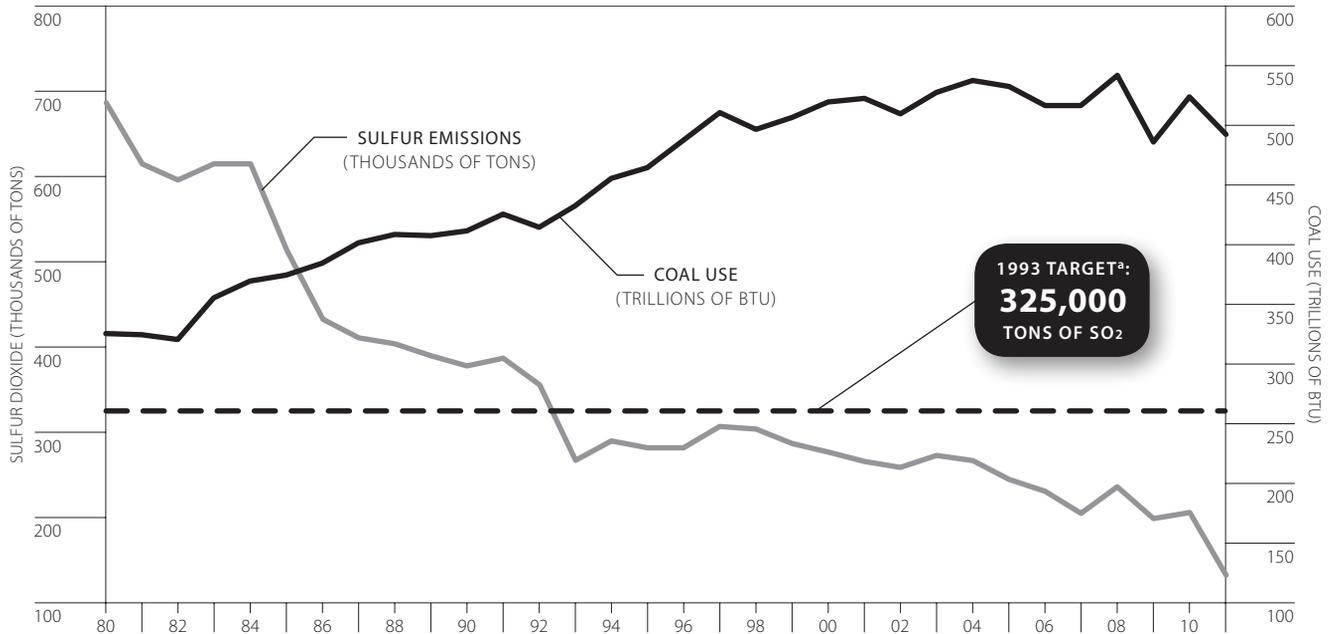
<sup>p</sup> Preliminary estimates.

<sup>r</sup> Revised.

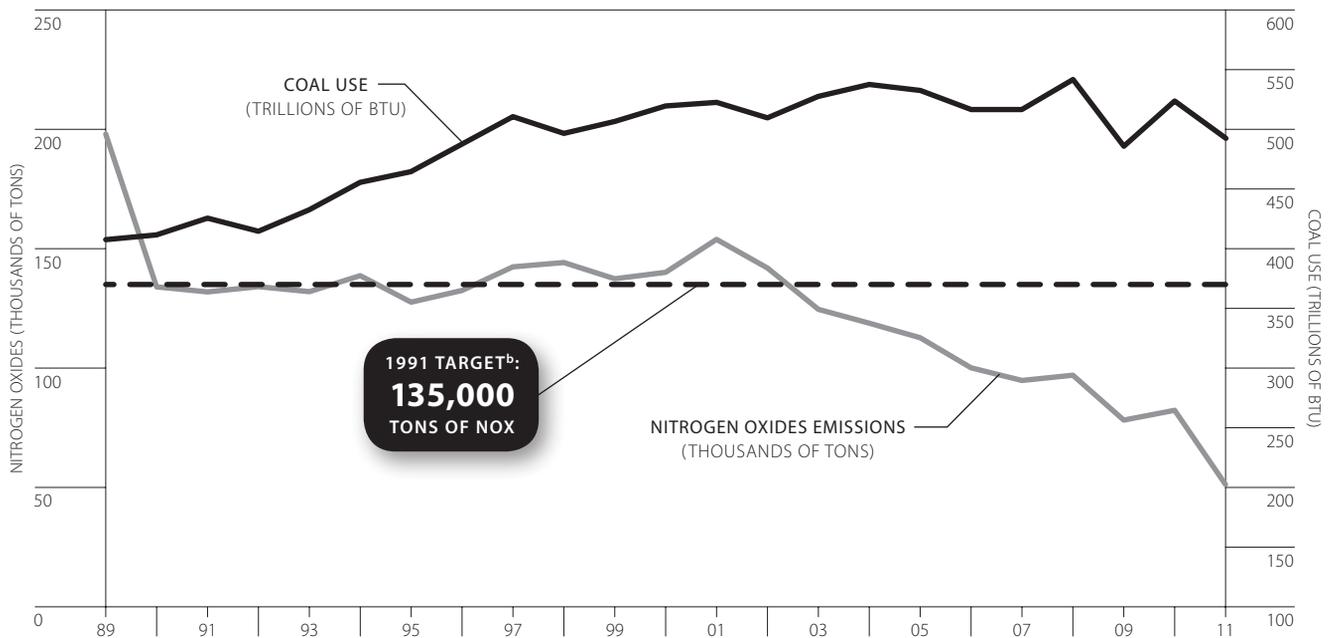
**Source:** Wisconsin Department of Natural Resources, Annual Survey of Point Source Emissions, Sulfur Dioxide and Nitrogen Oxides Emissions Report PUBL-AM-343 and published by facility on the Wisconsin Department of Natural Resources website at <http://dnr.wi.gov/air/emission/ObtainEmissionSummary1995toPresent.htm> (1986-2011).

# Wisconsin Sulfur Dioxide and Nitrogen Oxides Emissions and Coal Use

1980-2011 SULFUR DIOXIDE EMISSIONS AND COAL USE



1989-2011 NITROGEN OXIDES EMISSIONS AND COAL USE



a 1993 target established in Wisconsin Statutes, 285.45(2)(a). <http://www.legis.state.wi.us/statutes/Stat0285.pdf>. Target is for all major utilities and large sources.

b 1991 target established in Wisconsin Statutes, 285.47(2). <http://www.legis.state.wi.us/statutes/Stat0285.pdf>. Target is for all major utilities.

Source: Wisconsin State Energy Office.

# Wisconsin Utility Power Plant Inventory, 2011

Utility / Site <sup>a</sup>	Nameplate Capacity (MW)	Number of Units	Primary Fuel
<b>Dairyland Power Cooperative</b>			
Alma 4, 5	136.0	2	Coal
Elk Mound	71.0	2	Gas
Flambeau	22.0	3	Hydro <sup>b</sup>
Genoa 3	345.6	1	Coal, Oil
J.P. Madgett	387.0	1	Coal, Oil
Seven Mile Creek	4.1	4	LFG <sup>i</sup>
Various Biogas Methane	1.6	2	Gas
<b>Madison Gas and Electric Co.</b>			
Blount Street 6, 7	100.0	2	Gas, RDF <sup>c</sup>
Fitchburg 1, 2	57.6	2	Gas
Nine Springs	16.2	1	Gas
Portables	54.0	1	Oil
Rosiere	11.2	17	Wind
Sycamore	41.6	2	Gas
Various Solar	0.1	8	Solar
West Campus	169.3	3	Gas
<b>Northern States Power Co.</b>			
Bay Front 4, 5, 6	67.2	3	Wood, Coal
Flambeau	16.0	1	Gas
French Island 1, 2	30.4	2	Wood, RDF <sup>c</sup>
French Island 3, 4	157.6	2	Oil
Various Hydro	240.9	58	Hydro <sup>b</sup>
Wheaton 1-6	322.2	6	Gas, Oil
<b>Shared Ownership</b>			
Columbia 1 <sup>f</sup>	512.0	1	Coal
Columbia 2 <sup>f</sup>	511.0	1	Coal
Edgewater 4 <sup>g</sup>	330.0	1	Coal
Edgewater 5 <sup>h</sup>	380.0	1	Coal
Elm Road C1 <sup>k</sup>	1200.0	2	Coal
W. Marinette 33 <sup>e</sup>	83.5	1	Gas
Weston 4 <sup>d</sup>	595.0	1	Coal

Utility / Site <sup>a</sup>	Nameplate Capacity (MW)	Number of Units	Primary Fuel
<b>Wisconsin Electric Power Co.</b>			
Blu Sky Green Field	145.2	88	Wind
Byron	1.3	2	Wind
Concord	381.2	4	Gas
Germantown 1, 2, 3, 4	244.8	4	Oil
Germantown 5	106.9	1	Gas
Milwaukee	11.0	1	Coal
Paris	381.2	4	Gas
Pleasant Prairie 1, 2	1233.0	2	Coal
Pleasant Prairie 3	2.0	1	Oil
Port Washington 1-6	1182.0	6	Gas
S. Oak Creek 5-8	1191.6	4	Coal
Valley 1,2	272.0	2	Coal
Valley 3	2.7	1	Oil
Various Hydro	13.6	8	Hydro <sup>b</sup>
Various Solar	0.003	3	Solar
<b>Wisconsin Power and Light Co.</b>			
Cedar Ridge	67.7	41	Wind
Edgewater 3	60.0	1	Coal
Nelson Dewey 1, 2	200.0	2	Coal
Rock River 3-6	144.0	4	Gas
Sheepskin	40.0	1	Gas
South Fond Du Lac	344.0	4	Gas
Valley Trail	2.0	2	LFG <sup>i</sup>
Various Hydro	36.6	11	Hydro <sup>b</sup>
Various Solar	0.010	5	Solar

Utility / Site <sup>a</sup>	Nameplate Capacity (MW)	Number of Units	Primary Fuel
<b>Wisconsin Public Services Corp.</b>			
DePere	187.2	1	Gas
Lincoln	9.2	14	Wind
Pulliam 31	91.0	1	Gas
Pulliam 5-8	350.2	4	Coal
Various Hydro	57.2	38	Hydro <sup>b</sup>
Various Solar	0.1	8	Solar
W. Marinette 31, 32, 34	166.6	3	Gas
Weston 1-3	492.1	3	Coal
Weston 31, 32	76.3	2	Gas
<b>Municipal Utilities</b>			
Manitowoc, City of	5.5	1	Gas
Manitowoc, City of	117.4	3	Coke
Menasha, City of	28.0	3	Coal
<b>Merchant/IPP</b>			
Kewaunee	560.1	1	Nuclear
Point Beach	1073.6	2	Nuclear
<b>Statewide Utilities</b>			
Statewide	422.9	221	Renewables
Statewide	8694.8	64	Coal
Statewide	545.9	320	Hydro <sup>b</sup>
Statewide	7183.5	84	Gas
Statewide	789.8	100	Oil
Statewide	635.1	74	Wind
Statewide Totals <sup>j</sup>	18272.0	863	All

<sup>a</sup> Does not include non-utility generation, all electric cooperative or all municipal utility.

<sup>b</sup> Hydroelectric capacity differs from sums on other tables due to different data sources

<sup>c</sup> RDF is Refuse Derived Fuel.

<sup>d</sup> The Weston 4 unit is owned by Wisconsin Public Service Corp. (70%) and Dairyland Power Cooperative (30%).

<sup>e</sup> The West Marinette 33 unit is jointly owned by Wisconsin Public Service Corp. (68%) and the City of Marshfield (32%).

<sup>f</sup> The Columbia 1 and 2 units are owned by Alliant Energy (46.2%), Wisconsin Public Service Corp. (31.8%) and Madison Gas & Electric Co. (22.0%).

<sup>g</sup> The Edgewater 4 unit is owned by Alliant Energy (68.2%) and Wisconsin Public Service Corp. (31.8%).

<sup>h</sup> The Edgewater 5 unit is owned by Alliant Energy (75%) and Wisconsin Electric Power Co. (25%).

<sup>i</sup> LFG is Landfill Gas

<sup>j</sup> Statewide totals here are slightly different from capacity totals on other pages in this section because this table does not include unknown fuel (88.9 MW) or nuclear reactors (1,633.7 MW). Nuclear reactors are not included because they are owned by Independent Power Producers, not utilities.

<sup>k</sup> The Elm Road C1 unit is owned by Wisconsin Electric Power Co. (81.67%), WPPI Energy (10%) and Madison Gas and Electric (8.33%).

**Source:** U.S. Department of Energy, Energy Information Administration, Existing Electric Generating Units in the United States by State, Company and Plant, <http://www.eia.doe.gov/cneaf/electricity/page/capacity/capacity.html> (through 2007); Public Service Commission of Wisconsin, unpublished data (2008); Annual report of Dairyland Power Cooperative submitted to the U.S. Department of Agriculture, Rural Utilities Service (2008-2011).