CHAPTER 4

Energy Efficiency Indices

Energy On Wisconsin!

State Energy and UW Extension Partner to Help Communities Become More Sustainable

Wisconsin was one of only three states awarded a State Energy Extension Partnership (SEEP) competitive grant by the US Department of Energy. This grant formalized the collaboration between Wisconsin's State Energy Office and Cooperative Extension, a division of the University of Wisconsin-Extension, to engage the public, businesses, farms, tribes and youth in additional energy efficiency, renewable energy, and bio-energy education and projects through a series of meetings titled **Energy On Wisconsin**!

The SEEP grant also financed the creation of a clearinghouse website (view it here: http://energyonwi.uwex.edu) which provides funding updates, meeting registration links, photos, project information and inspiration as well as a forum for discussion. Though all of the funding from the Department of Energy has been expended, the partnership between the State Energy Office and UW Extension will endure, with quarterly meetings planned in all four corners of the State through 2015.

The SEEP efforts with Wisconsin's 140 Energy Independent Communities (EICs), through the Energy On Wisconsin website and meetings, succeeded in re-energizing efforts toward energy independence. Five new communities wrote a pledge to reduce their consumption and increase their use of renewables, joining the Wisconsin's EICs—towns, cities, villages, or school districts—that had previously pledged to reduce consumption of imported energy by 25% by 2025.

WILL ALLEN—ENTREPRENEUR AND OWNER OF GROWING POWER—SPEAKS TO THE MAY 2013 MEETING, "ENERGY MEANS BUSINESS".

UW EXTENSION DISTINGUISHED LECTURER SHERRIE GRUDER AT THE JEFFERSON SOLAR FARM KICKING OFF THE TOUR ON THE FIRST MEETING OF THE 2014 SERIES, FEBRUARY 26, 2014.

The State Energy Office and UW Extension remain committed to assisting Wisconsin Communities to:

- Increase energy awareness, education and outreach on energy conservation and efficiency, renewable energy sources and systems, bioenergy and sustainable energy planning and policies,
- Increase the opportunity for energy-related technical assistance for local units of government, locally-owned businesses and the State's residents, and
- Increase the likelihood of creating successful energy efficiency and renewable energy projects in the Wisconsin.

Indices of Wisconsin Energy Efficiency

TOTAL ENERGY USE PER $1,000 OF GROSS STATE PRODUCT

2.3%

These indices can be useful in evaluating energy efficiency trends in Wisconsin. Total Energy Use per $1,000 of Gross State Product (GSP), and Electricity Use per $1,000 of GSP trended downward by 2.3 and 1.6 percent respectively.

In 2011, Wisconsin Commercial Energy Use per Employee decreased by 0.9 percent; Industrial Energy Use per $1,000 Manufacturing Value Added decreased 3.1 percent and is 55.2 percent lower than in 1970. Agricultural Energy Use per Acre increased 19.8 percent in 2011, from 1.65 to 1.81 MMBtu/acre.

Energy efficiency activities in the residential and commercial sectors are measured primarily by recording the number of buildings that have received professional audits, installed energy efficiency improvements or were certified as meeting energy efficiency building codes.

1970-2011 MILLIONS OF BTU

Year	Total Energy Use Per $1,000 GSP[a]	Electric Energy Use Per $1,000 GSP[a]	Residential Energy Use Per Capita[b]	Commercial Energy Use Per Employee[d]	Industrial Energy Use Per $1,000 Manufacturing Value Added[a,c]	Agricultural Energy Use Per Acre
1970[r]	12.1	0.90	73.4		8.4	1.1
1975[r]	11.2	0.98	74.9		6.4	1.2
1980[r]	10.1	1.03	75.6		5.2	1.4
1985[r]	9.3	1.05	71.5		4.9	1.4
1990[r]	9.0	1.07	72.8	163.1	4.6	1.2
1995[r]	8.5	1.05	77.8	164.8	4.2	1.3
1996[r]	8.3	1.03	78.6	164.5	4.1	1.3
1997[r]	8.0	1.01	73.9	160.9	4.2	1.3
1998[r]	7.6	1.00	69.4	158.2	3.9	1.2
1999[r]	7.5	0.98	73.5	163.1	3.9	1.3
2000[r]	7.5	0.97	75.3	161.4	3.8	1.2
2001[r]	7.4	0.98	75.0	161.2	3.9	1.2
2002[r]	7.3	0.98	76.3	163.0	3.9	1.3
2003[r]	7.2	0.96	79.9	152.3	3.8	1.3
2004[r]	7.1	0.95	77.6	147.0	4.0	1.3
2005[r]	6.9	0.97	76.4	154.9	3.8	1.3
2006[r]	6.6	0.95	71.6	150.7	3.6	1.5
2007[r]	6.9	0.96	76.9	160.2	3.6	1.6
2008[r]	7.1	0.97	78.5	162.7	4.1	1.7
2009[r]	6.7	0.93	74.1	157.7	4.2	1.9
2010[r]	6.6	0.93	73.1	155.5	3.9	1.6
2011[p]	**6.5**	**0.92**	**73.3**	**154.1**	**3.8**	**1.8**

a Manufacturing Value Added and Gross State Product in 2011 dollars, deflated with Gross Domestic Product Implicit Price Deflator.

b Not adjusted for yearly variations in temperature.

c Value added data for Wisconsin not available. Value added estimated using U.S. and Wisconsin trends.

d Per Employee Data not available prior to 1990 due to change in coding from SIC to NAICS.

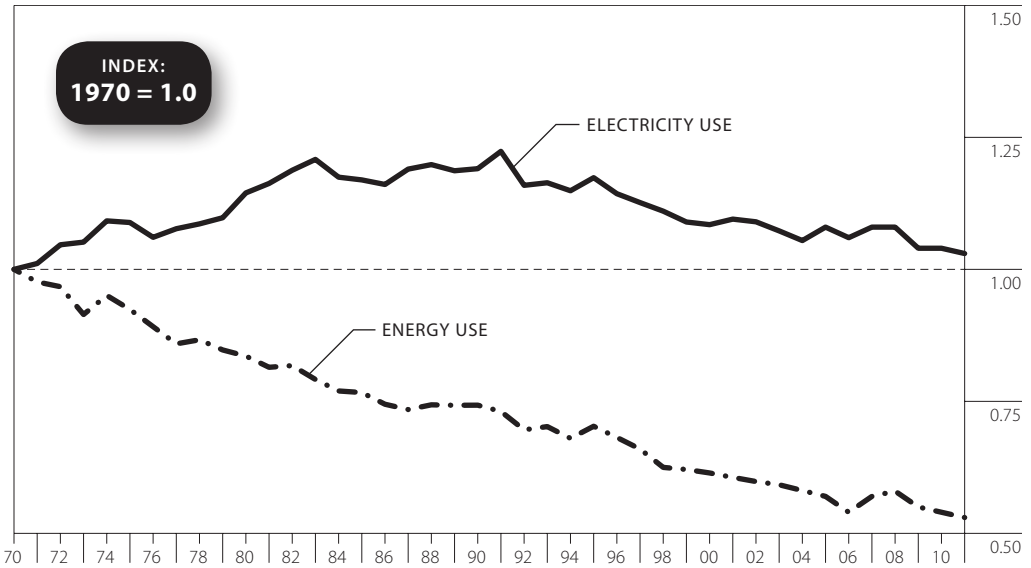
p Preliminary data.

r Revised.

Source: Wisconsin Department of Workforce Development employment data, http://worknet.wisconsin.gov/worknet/dalaus.aspx?menuselection=da; U.S. Department of Commerce, *Annual Survey and Census of Manufacturers* http://www.census.gov/mcd/asm-as3.html (1972-2011); Wisconsin Department of Agriculture, Trade and Consumer Protection, *Wisconsin's Agricultural Statistics, 2011*; other tables in this publication used for household estimates, gross state product, total resource energy use and use by sector.

Indices of Wisconsin Energy Efficiency

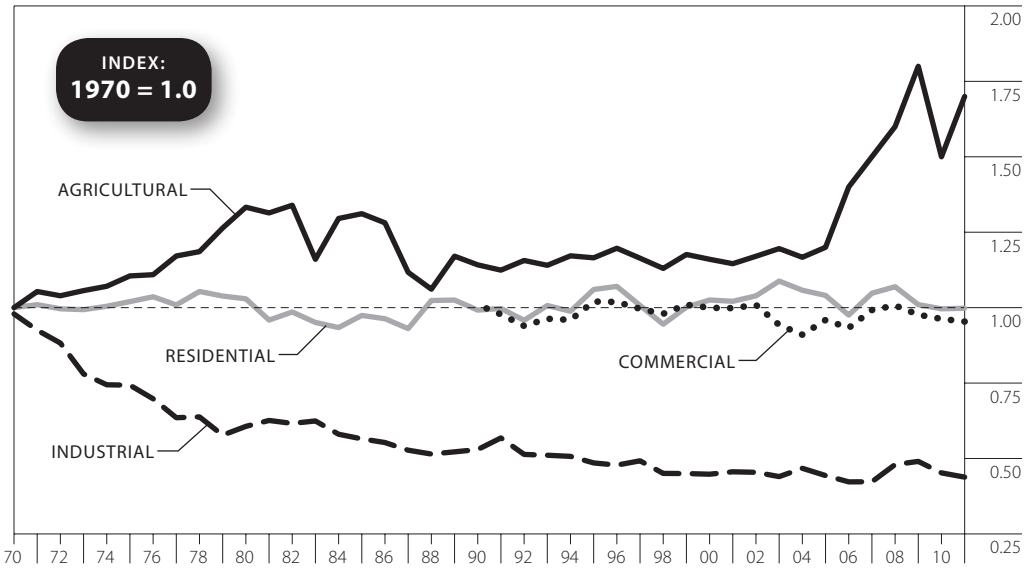
1970-2011 ENERGY AND ELECTRICITY USE PER DOLLAR OF GROSS STATE PRODUCT[a]



WISCONSIN ENERGY USE PER DOLLAR OF GROSS STATE PRODUCT

WISCONSIN ELECTRICITY USE PER DOLLAR OF GROSS STATE PRODUCT

1970-2011 ENERGY INDICES BY ECONOMIC SECTOR[a]



RESIDENTIAL ENERGY USE PER CAPITA

COMMERCIAL ENERGY USE PER EMPLOYEE

INDUSTRIAL ENERGY USE PER UNIT MANUFACTURING VALUE ADDED OUTPUT

AGRICULTURAL ENERGY USE PER ACRE

a All data, except commercial employment data, normalized to 1.0 in 1970, an arbitrary baseline to which all other years can be compared. Commercial employment data normalized to 1990, when industrial codes changed from SIC to NAICS.

Source: Wisconsin State Energy Office.

Indices of Wisconsin Energy Expenditures, 2011 Dollars

AGRICULTURAL PER ACRE

RESIDENTIAL PER HOUSEHOLD

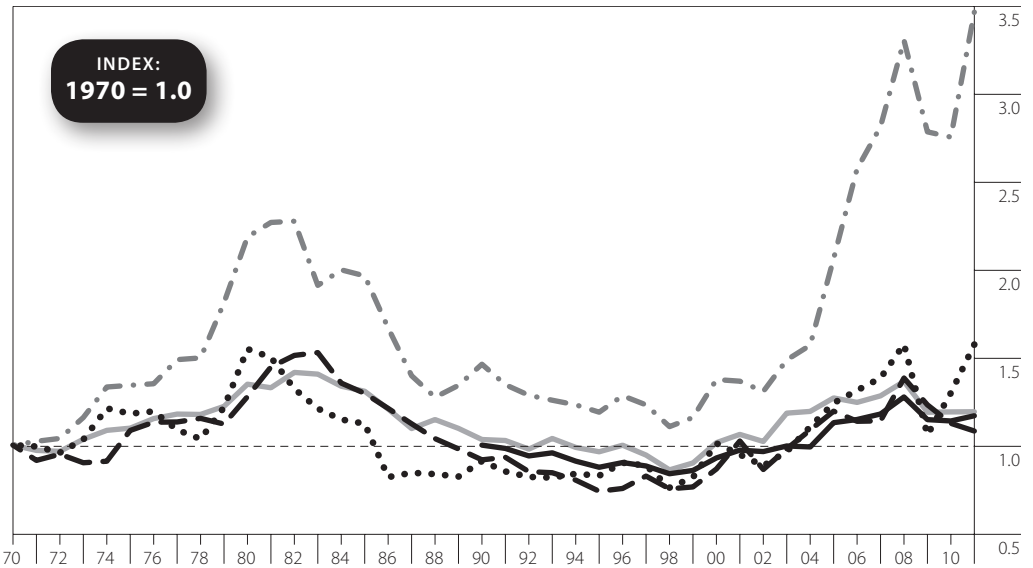
TRANSPORTATION PER VEHICLE

COMMERCIAL PER EMPLOYEE

INDUSTRIAL PER $1,000 VALUE ADDED

In 2011, Wisconsin saw increases in all but one energy expenditure index. The Expenditures per Vehicle increased 21.2 percent, Commercial Expenditures per Employee increased by 2.6 percent, Agricultural Expenditures per acre increased by 25.7 percent, Residential Expenditures per household were almost flat, with a slight increase of 0.1 percent over 2010. The Industrial Expenditures per $1,000 of Value Added decreased by 3.9 percent.

1970-2011 2011 DOLLARS



Year	Agricultural Expenditures Per Acre	Commercial Expenditures Per Employee[a]	Residential Expenditures Per Household	Industrial Expenditures Per $1,000 Value Added	Transportation Expenditures Per Vehicle
1970[r]	14		1,684	36	1,409
1975	18		1,847	39	1,661
1980	30		2,268	46	2,178
1985[r]	27		2,200	47	1,580
1990[r]	20	1,260	1,738	33	1,281
1995[r]	16	1,102	1,621	27	1,164
2000[r]	19	1,168	1,708	31	1,423
2001[r]	19	1,224	1,787	37	1,333
2002[r]	18	1,214	1,719	31	1,244
2003[r]	20	1,254	1,991	36	1,358
2004[r]	21	1,247	2,007	40	1,555
2005[r]	28	1,421	2,136	43	1,746
2006[r]	35	1,444	2,093	41	1,847
2007[r]	38	1,483	2,156	41	1,946
2008[r]	45	1,605	2,294	50	2,216
2009[r]	38	1,443	1,999	45	1,491
2010[r]	37	1,433	2,002	41	1,827
2011[p]	**47**	**1,470**	**2,004**	**39**	**2,214**

a All data, except commercial employment data, normalized to 1.0 in 1970, an arbitrary baseline to which all other years can be compared. Commercial employment data normalized to 1990, when industrial codes changed from SIC to NAICS.

p Preliminary estimate.

r Revised.

Source: Compiled from tables in this publication for Wisconsin residential, commercial, industrial, agricultural and transportation energy use.

Wisconsin Per Capita Resource Energy Consumption, by Type of Fuel

1970-2011 MILLIONS OF BTU

Year	Petroleum	Natural Gas	Coal	Renewable	Nuclear	Electric Imports[a]	Total
1970	103.6	74.1	80.4	6.2	0.4	-6.4	258.3
1975	104.0	80.7	57.4	6.4	24.3	-4.5	268.5
1980[r]	96.6	73.1	69.0	10.4	22.7	-1.4	270.4
1982[r]	85.3	65.8	67.6	10.7	23.5	2.3	255.2
1985[r]	87.7	64.1	78.9	10.9	25.0	-0.4	266.2
1990[r]	90.0	62.6	84.1	10.3	24.8	17.9	289.7
1995[r]	91.0	74.2	90.3	9.7	23.1	24.0	312.2
1996[r]	93.1	77.9	94.0	10.5	21.1	15.5	312.1
1997[r]	93.4	76.5	97.5	10.1	8.1	24.9	310.5
1998[r]	93.4	69.6	93.9	9.0	19.2	20.4	305.5
1999[r]	96.2	71.5	95.0	9.3	23.3	18.8	314.1
2000[r]	93.6	73.3	96.8	10.3	23.1	18.3	315.5
2001[r]	93.1	66.5	96.4	10.0	23.0	22.5	311.5
2002[r]	93.9	70.4	93.1	10.5	24.6	18.4	310.9
2003[r]	93.5	71.7	95.9	10.8	24.0	15.8	311.6
2004[r]	94.1	69.1	97.0	11.1	23.2	17.0	311.4
2005[r]	89.5	73.7	95.2	11.2	14.6	22.3	306.4
2006[r]	88.0	66.5	91.8	11.6	23.5	14.4	295.5
2007[r]	88.0	71.0	91.4	12.9	24.7	21.5	309.2
2008[r]	84.3	72.7	95.4	14.1	23.2	18.5	307.5
2009[r]	79.3	68.8	85.3	14.2	24.1	17.3	288.6
2010[r]	80.1	65.7	92.0	14.9	25.2	14.1	291.7
2011[p]	**78.7**	**69.5**	**86.3**	**15.6**	**21.9**	**17.2**	**288.8**

PER CAPITA
RESOURCE ENERGY
CONSUMPTION
1.0%

Wisconsin's per capita resource energy consumption decreased 1.0 percent in 2011. However, compared to the low point in 1982, 2011 per capita energy use in Wisconsin is 13.3 percent higher.

a "Electric Imports" is the estimated resource energy used in other states or Canada to produce the electricity imported into Wisconsin. This resource energy is estimated assuming 11,300 Btu of resource energy per kWh imported into Wisconsin. A negative sign indicates that resource energy was used in Wisconsin to produce electricity that was exported.

p Preliminary estimates.

r Revised.

Source: Compiled from tables in this publication for Wisconsin petroleum, natural gas, coal and renewable energy use, electric imports and population.

Wisconsin Residential Electricity and Natural Gas Use Per Customer

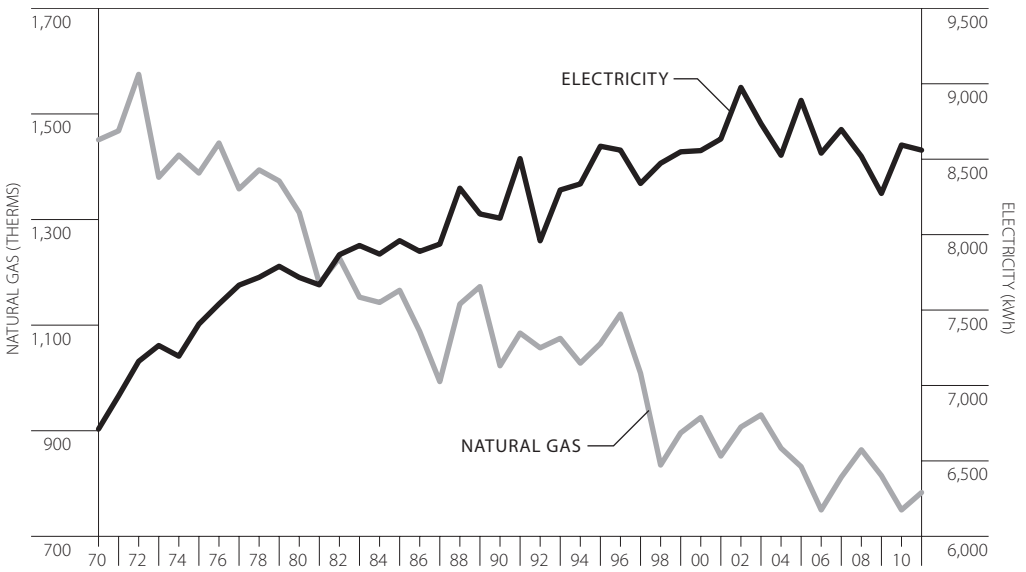
ELECTRICITY USE PER CUSTOMER 0.4%

NATURAL GAS USE PER CUSTOMER 4.4%

Electricity Use per Customer decreased 0.4 percent in 2011, while natural gas use increased 4.4 percent. The increase in natural gas relates to the relatively low price of the fuel, and an increase in Heating Degree Days (HDD) in 2011—a 6.1 percent increase over 2010. To learn more about HDDs, see the Miscellaneous chapter of this publication.

These data are from the AF2 reports submitted to the Public Service Commission of Wisconsin by gas utilities across the state. The complete datasets are published online at stateenergyoffice.wi.gov under Statistics/Tables.

1970-2011



Year	Natural Gas[a] Number of Customers (Thousands)	Natural Gas[a] Use Per Customer (Therms)	Electricity Number of Customers (Thousands)	Electricity Use Per Customer (kWh)
1970[r]	750.4	1,451	1,429	6,711
1975[r]	858.5	1,388	1,607	7,407
1980[r]	966.0	1,313	1,801	7,716
1985[r]	1,013.0	1,166	1,870	7,960
1990[r]	1,123.6	1,023	2,017	8,109
1995[r]	1,291.4	1,065	2,170	8,586
2000[r]	1,459.0	925	2,329	8,557
2001[r]	1,484.5	852	2,365	8,634
2002[r]	1,514.7	907	2,404	8,976
2003[r]	1,541.5	930	2,445	8,736
2004[r]	1,569.7	867	2,486	8,526
2005[r]	1,592.6	832	2,526	8,890
2006[r]	1,611.8	750	2,550	8,540
2007[r]	1,632.2	812	2,573	8,697
2008[r]	1,646.6	864	2,580	8,519
2009[r]	1,656.6	815	2,589	8,273
2010[r]	1,663.6	750	2,595	8,594
2011[p]	**1,670.7**	**783**	**2,600**	**8,560**

a U. S. Department of Energy/Energy Information Administration data from EIA forms 176 and 861.

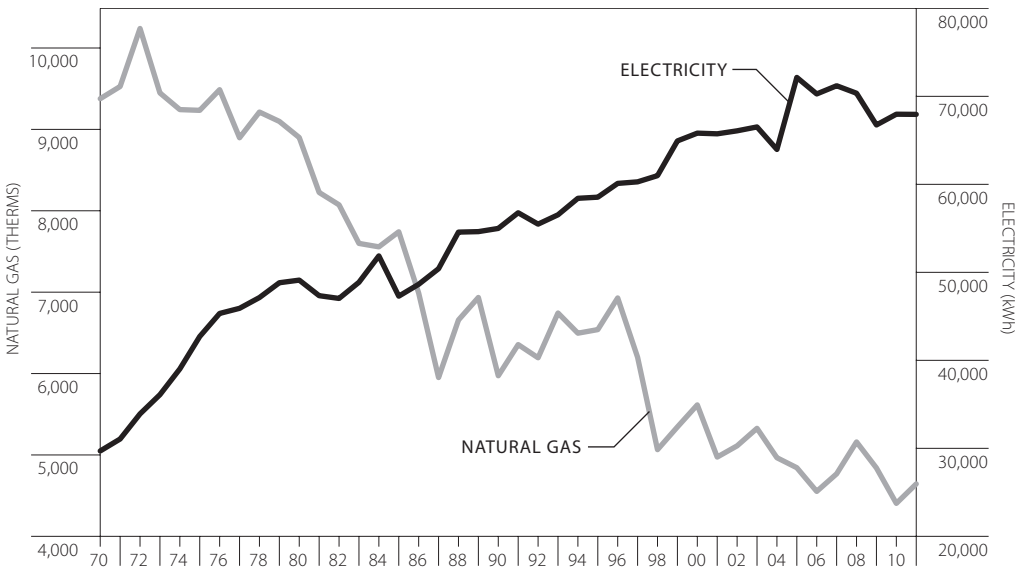
p Preliminary estimates.

r Revised.

Source: Edison Electric Institute, *Statistical Yearbook* (1971-1996); Public Service Commission of Wisconsin, Accounts and Finance Division, *Statistics of Wisconsin Public Utilities*, Bulletin #8 (1970-1979), Public Service Commission of Wisconsin, form PSC-AF 2 *Gas Sales and Sales Ratio* (1980-2011); U.S. Department of Energy, *Electric Sales and Revenues 1993-2000* [DOE/EIA-0540(2000)] (November 2001).

Wisconsin Commercial Electricity and Natural Gas Use Per Customer

1970-2011



Year	Natural Gas: Number of Customers (Thousands)	Natural Gas: Use Per Customer (Therms)	Electricity: Number of Customers (Thousands)	Electricity: Use Per Customer (kWh)
1970r	50.8	9,377	167	29,701
1975r	65.7	9,234	178	42,709
1980r	76.7	8,900	193	49,115
1985r	87.0	7,742	224	47,292
1990r	106.0	5,973	229	54,990
1995r	125.5	6,540	254	58,540
2000r	140.4	5,615	278	65,817
2001r	144.1	4,974	284	65,741
2002r	149.8	5,112	290	66,081
2003r	150.1	5,327	301	66,522
2004r	151.9	4,966	302	63,963
2005r	155.1	4,843	312	72,150
2006r	159.1	4,552	324	70,272
2007r	160.6	4,768	330	71,203
2008r	163.0	5,160	334	70,353
2009r	163.8	4,840	337	66,748
2010r	164.2	4,405	338	67,969
2011p	**164.8**	**4,644**	**339**	**67,950**

p Preliminary estimates.

r Revised.

Source: Edison Electric Institute, *Statistical Yearbook* (1971-1996); Public Service Commission of Wisconsin, Accounts and Finance Division, *Statistics of Wisconsin Public Utilities*, Bulletin #8 (1970-1979), Public Service Commission of Wisconsin, form PSC-AF 2 *Gas Sales and Sales Ratio* (1980-2011); U.S. Department of Energy, *Electric Sales and Revenues 1993-2000* [DOE/EIA-0540(2000)] (November 2001).

ELECTRICITY USE PER CUSTOMER
0.03%

NATURAL GAS USE PER CUSTOMER
5.4%

Commercial electricity use per customer in 2011 decreased 0.03 percent, while natural gas use per customer increased 5.4 percent. The increase in natural gas relates to the relatively low price for natural gas, and ain increase in Heating Degree Days (HDD) in 2011—a 6.1 percent increase compared to 2010. To learn more about HDDs, see the Miscellaneous chapter in this publication.

Focus on Energy Tracked Energy Savings

Focus on Energy is Wisconsin's rate-payer funded energy efficiency and renewable energy program. It works with energy consumers—individuals, business, industry, government—to evaluate and help fund energy efficiency and renewable energy efforts.

The table shows annual first-year[c] energy savings in Wisconsin due to Focus on Energy efforts. Gross electricity savings are shown in kilowatt hours (kWhs), while gross natural gas savings are shown in therms. The percent column shows the percent of statewide sales, by sector, represented by the verified gross savings.

The efforts of Focus on Energy undergo regular evaluation by independent contractors who certify program-tracked savings. The verified gross kWh, KW and therm savings have been verified by a third-party contractor.

2001-2011 MILLIONS OF kWhs, THERMS AND DOLLARS

	Verified kWh Saved	Percent of Statewide Sector[a] kWh Saved	Verified Therms Saved	Percent of Statewide Sector Sales[b] Therms Saved	Dollar Value of Energy Saved	Number of Participants
July 1, 2001 - June 30, 2007[c]						
Total Saved	1,178.45		61,118,326		$167,907,949	1,113,842
Business	689.82		48,588,762		$94,944,633	43,281
Residential	440.95		9,247,900		$65,615,728	1,070,213
Renewables	47.69		3,281,664		$7,347,588	348
July 1, 2007 - December 31, 2008						
Total Saved	599.26	0.567%	26,622,537	0.434%	$79,598,763	592,714
Business	412.28	0.557%	20,247,680	0.501%	$49,925,700	27,658
Residential	179.99	0.568%	4,145,352	0.198%	$27,217,319	564,660
Renewables	6.99		2,229,505		$2,455,744	396
January 1, 2009 - December 31, 2009						
Total Saved	634.62	0.957%	29,661,512	0.759%	$83,273,246	514,714
Business	500.79	1.091%	20,712,687	0.810%	$58,696,839	20,517
Residential	116.89	0.573%	3,591,004	0.266%	$18,660,979	493,780
Renewables	16.93		5,357,821		$5,915,428	417
January 1, 2010 - December 31, 2010						
Total Saved	590.64	0.859%	23,640,236	0.633%	$75,411,086	432,636
Business	470.99	0.993%	20,041,916	0.806%	$56,396,192	17,672
Residential	119.65	0.562%	3,598,320	0.288%	$19,014,894	414,964
Renewables	0.00	0.000%	0	0.000%	$0	0
January 1, 2011 - December 31, 2011						
Total Saved	440.60	0.641%	16,707,201	0.423%	$56,695,791	194,285
Business	346.71	0.731%	13,831,959	0.523%	$41,183,316	12,860
Residential	93.89	0.442%	2,875,242	0.220%	$15,512,475	181,425
Renewables	0.00	0.000%	0	0.000%	$0	0
July 1, 2001 - December 31, 2011						
Total Saved	3443.58	0.478%	157,749,812	0.385%	$462,886,835	2,848,191
Business	2420.59	0.483%	123,423,004	0.458%	$301,146,680	121,988
Residential	951.38	0.433%	23,457,818	0.167%	$146,021,395	2,725,042
Renewables	71.61		10,868,990		$15,718,760	1,161

a Statewide sector sales are estimated for the non-annual reporting periods using annual data from the Wisconsin Electric Utility Sales, by Economic Sector table in Chapter Two of this publication.

b Statewide sector sales are estimated for the non-annual reporting periods using annual data from the Wisconsin Natural Gas Use, by Economic Sector table in Chapter Two of this publication. Data from this chapter are converted from tBtus to Therms for the purpose of calculation.

c Annual, first-year energy savings are what an energy saving measure accomplished during the first year, as opposed to lifetime savings.

Source: Public Service Commission of Wisconsin, Focus on Energy Evaluation *Evaluation Report 2011*, October 31, 2012; https://focusonenergy.com/about/evaluation-reports

Focus on Energy Ranked Energy Savings Measures

2001-2011 ENERGY SAVING ACTIVITIES RANKED BY OVERALL SAVINGS

	Business Programs		Residential Programs	
Electricity	**Savings (Million kWh)**	**Percent Overall Savings**	**Savings (Million kWh)**	**Percent Overall Savings**
Compact Flouresent Lights (CFL)	259.05	10.7%	519.51	54.6%
ECM[a] Furnace			111.11	11.7%
High Bay Flourescent	226.93	9.4%		
Hot Water[b]			29.63	3.1%
Lighting (other than listed)[c]	483.71	20.0%	141.21	14.8%
Other[d]	294.28	12.2%	54.07	5.7%
T8/T5 Flourescent Lighting	230.97	9.5%		
Electric Total Verified kWh Savings – All Efforts	**2,420.59**		**951.38**	

	Business Programs		Residential Programs	
Natural Gas	**Savings (Therm)**	**Percent Overall Savings**	**Savings (Therm)**	**Percent Overall Savings**
Boiler Equipment/Other Heating	16,749,391	13.6%	6,627,078	28.3%
Building Shell			5,727,545	24.4%
Clothes Washer			1,152,285	4.9%
ECM[a] Furnace			2,710,934	11.6%
Energy Recovery[e]	19,551,023	15.8%		
Hot Water[b]			3,457,372	14.7%
HVAC	15,065,499	12.2%		
Process[f]	19,725,048	16.0%		
Other[g]	11,035,484	8.9%	2,459,951	10.2%
Natural Gas Total Verified kWh Savings – All Efforts	**123,423,004**		**23,457,818**	

The table shows the five energy savings efforts funded by Focus on Energy that reaped the largest energy savings benefit. The measures are different for the business and residential sectors, and are listed according to the saved energy (e.g., kWhs or therms).

As Focus on Energy has grown, energy savings across Wisconsin have increased. In 2009, verified gross savings are about one percent of annual sales of both electricity and natural gas. The work of Focus on Energy helps to reduce overall consumption of fossil-fuel based energy and increase energy efficiency across the state.

a Electronically commutative motors (ECM) differ from conventional motors in their overall efficiency.

b Hot water refers to a variety of different measures to improve hot water heating and usage efficiency.

c Lighting improvements such as efficient lighting fixtures, torchieres, and ceiling fans, and motion/occupancy sensors.

d Other includes a wide variety of improvements.

e Recovery of exhaust heat from natural gas combustion.

f Process efforts include in-line energy efficiency and heat capture, primarily in industrial applications. May also include efficiency improvements to compressed air usage.

g Steam trap improvement to avoid loss of thermal energy.

Source: Public Service Commission of Wisconsin, Focus on Energy Evaluation *Evaluation Report 2011*, October 31, 2012; https://focusonenergy.com/about/evaluation-reports

Energy Consumption by Major New Household Appliances

REFRIGERATOR

WASHING MACHINE

FREEZER

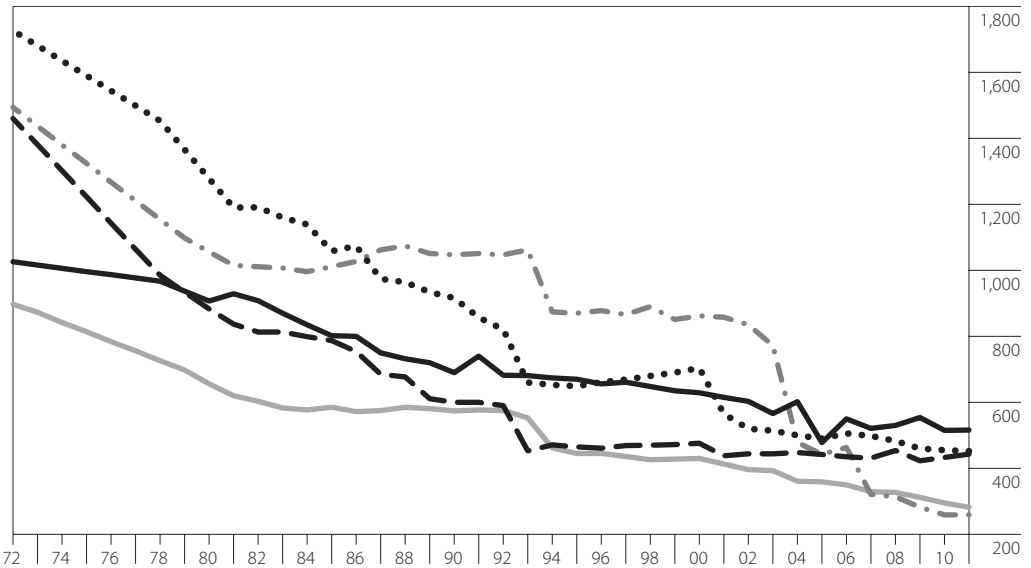
ROOM A/C

DISHWASHER

Since 1980, energy usage of new household appliances sold in the U.S. has decreased from 43.1 percent (room air conditioners) to 75.5 percent (washing machines), depending upon the appliance.

From 1994 to 2000, average usage remained essentially unchanged. However, changes in federal energy efficiency standards since 2000 have reduced average new appliance energy consumption from 6.9 percent for freezers to 70.0 percent for washing machines. Appliance data makes it easier to understand residential energy use trends.

1972-2011 AVERAGE kWh PER YEAR



Year	Room A/C[a]	Washing Machine[b]	Dishwasher[b]	Refrigerator[c]	Freezer[c]
1972	1,026	1,494	897	1,726	1,460
1975	996	1,324	814	1,590	1,223
1980	907	1,056	656	1,278	883
1985	802	1,011	585	1,058	787
1990	690	1,047	574	916	600
1995	670	870	445	649	465
2000[e]	629	862	430	704	476
2005	478	443	359	490	442
2006	550	463	350	506	435
2007[e]	521	321	329	498	431
2008	530	314	327	483	454
2009[r]	554	282	312	460	423
2010[r]	515	259	295	455	433
2011[p]	**516**	**259**	**282**	**452**	**443**
Best Available[f]	**556**	**238**	**295**	**468**	**456**
Energy Star[d]	**500**	**122**	**180**	**429**	**403**

a Room air conditioner assumes 600 hours per year.

b Loads per year: washing machine (392), dishwasher (215) . Energy use assumes electric water heater.

c Refrigerator and freezer values estimated.

d U.S. Environmental Protection Agency (EPA) Energy Star efficiency values for average size appliance.

e Refrigerator and freezer standards increased July 1, 2001. Air conditioner standards increased October 1, 2000. Clothes waster standards increased January 1, 2004 and January 1, 2007. Dishwasher standards increased May 14, 1994 and January 1, 2010.

f Best available (most energy efficient) appliance that can be purchased for the average size and type sold today.

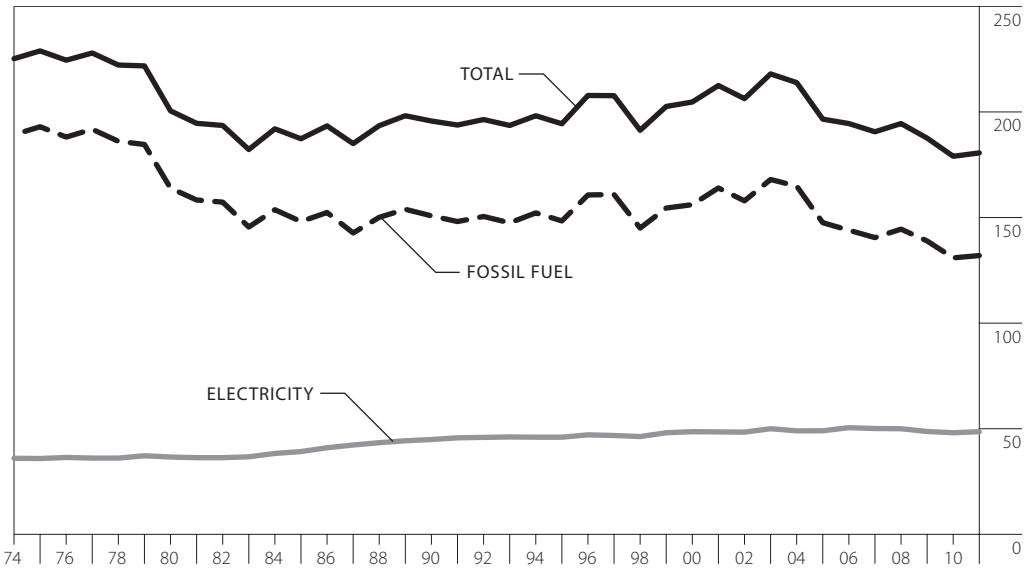
p Preliminary estimates.

r Revised.

Source: Association of Home Appliance Manufacturers (AHAM) Information Center.

Energy Use in State Owned Buildings

1974-2011 THOUSANDS OF BTU PER GROSS SQUARE FOOT PER YEAR



Fiscal Year	Fossil Fuel	Electricity	Total Energy BTU/GSF	Total Energy Weather-Adjusted[a]	Million Gross Square Feet
1974	189.2	36.0	225.2		42.7
1975	193.0	35.9	228.9		43.6
1980	163.9	36.6	200.5		46.2
1985	148.1	39.2	187.3		47.9
1990	150.8	44.9	195.7		49.7
1995	148.4	46.0	194.4		52.6
2000	156.1	48.6	204.7		55.4
2001	164.0	48.5	212.5		56.6
2002[r]	157.9	48.4	206.3		58.0
2003[r]	168.0	50.0	218.0		59.0
2004[r]	164.9	49.0	213.9		59.4
2005[a,r]	147.5	49.0	196.6	196.6	67.4
2006[r]	144.0	50.5	194.5	196.4	67.9
2007[r]	140.5	50.1	190.6	190.1	69.3
2008[r]	144.5	50.0	194.5	187.0	70.7
2009[r]	138.9	48.7	187.6	179.6	71.4
2010[r]	130.9	48.1	179.0	177.7	71.2
2011[p]	**132.0**	**48.6**	**180.6**	**174.3**	**72.0**

a Weather-adjusted data are not available previous to 2005.

b http://www.wisgov.state.wi.us/journal_media_detail.asp?locid=19&prid=1907

p Preliminary estimates.

r Revised.

Source: State of Wisconsin, Department of Administration; *Energy Use in State Owned Facilities* Unpublished.

TOTAL ENERGY USE PER GSF
1.9%
IN 2011

In 2011, total energy use per gross square foot (GSF), adjusted for weather, decreased 1.9 percent from 2010. Since 1974, overall use per GSF in state owned buildings fell 19.8 percent. Electricity use has increased 35.1 percent per GSF between 1974 and 2011, while fossil fuel use decreased 30.2 percent.

Energy use in state-owned buildings was weather-corrected back to 2005 to meet the requirements set forth in Executive Order 145[b] that addressed energy usage in state facilities. All data are based on the State Fiscal Year, July 1 – June 30, for example the data for 2011 are for the period July 1, 2010 to June 20, 2011.

Low Income Units Weatherized Through State- and Utility-Supported Programs

NUMBER OF UNITS WEATHERIZED
1.2%

The number of units weatherized[a] in 2011 decreased by 1.2 percent from 2010. This is due in part to the cessation of additional funding through the American Recovery and Reinvestment Act (ARRA) of 2009.

The Wisconsin Division of Energy Services, under the Department of Administration, contracts with various agencies throughout the state to provide weatherization[a] services to the low-income population. Agencies include community action agencies, housing authorities, tribes, local governments, and other non-profit organizations.

The Weatherization Assistance Program was created under Title IV of the Energy Conservation and Production Act of 1976, and was designed to cut heating bills and save imported oil. See http://www.homeenergyplus.wi.gov/ for local information.

1980-2011

Year[d]	Department of Administration[b]	Wisconsin Utilities	Combined Totals
1980	5,811		5,811
1985	7,355	4,139	11,494
1990	9,302	3,384	12,686
1995	6,126	5,455	11,581
1996	4,575	6,651	11,226
1997	4,530	4,626	9,156
1998	3,854	4,848	8,702
1999	3,703	5,700	9,403
2000[c]	4,246	6,434	10,680
2001	4,867	3,378	8,245
2002[e]	5,948	1,493	7,441
2003	7,368	0	7,368
2004	8,027	0	8,027
2005	8,721	0	8,721
2006	9,057	0	9,057
2007	10,215	0	10,215
2008	8,645	0	8,645
2009	10,534	0	10,534
2010	15,392	0	15,392
2011[p]	**15,211**	**0**	**15,211**
Total	**246,497**	**81,227**	**327,724**

a Weatherization is any job in which either the state or a utility, or both, installs envelope efficiency measures, appliance efficiency measures, heating equipment replacement/retrofits, or any combination of these.

b In July 1992, the Low Income Weatherization Assistance Program was transferred from the Department of Health and Family Services to the Department of Administration.

c Estimates.

d In 1992, the program year was changed to April-March.

e Wisconsin's Public Benefits Program began in October 2000. This program has transitioned responsibility for weatherizing low-income households from the utilities to the Department of Administration, Division of Energy. The transition was completed at the end of December 2002.

p Preliminary estimate.

Source: Public Service Commission of Wisconsin, Division of Energy Planning and Programs, unpublished annual data; Wisconsin Department of Health and Family Services, Energy Services Section, unpublished annual data; Department of Administration (DOA), Division of Energy Services, *Annual Weatherization Production*, report to U.S. DOE for 2011, and unpublished data (2011).

Reported Building Activity Affected by Wisconsin Energy Codes

1979-2011

Year	New One and Two Family Units[b]	New Manufactured Dwelling Units[c,f,g]	Manufactured Homes (HUD Certified)[f,h]	New & Altered Public and Commercial Buildings[d]	Existing Rental Properties[e]	Total
1979	NA	NA	NA	4,332		4,332
1980	3,302	906		3,818		8,026
1985	6,146	1,147		6,380	2,267	15,940
1990	10,286	1,253		7,378	4,849	23,766
1995	12,846	1,991		8,434	6,955	30,226
1996	14,051	2,108		8,088	7,162	31,409
1997	13,390	1,826		7,341	7,488	30,045
1998	14,662	1,856		6,793	7,616	30,927
1999	13,282	2,292		7,387	7,270	30,231
2000	14,799	2,085		6,606	7,510	31,000
2001	14,653	1,926		6,501	6,296	29,376
2002	15,479	1,933		6,516	6,318	30,246
2003	18,851	1,999		6,455	5,136	32,441
2004	18,641	2,141	2,016	6,658	5,221	34,677
2005	19,762	1,962	1,710	6,810	4,948	35,192
2006	14,767	1,596	1,124	8,932	4,181	30,600
2007[g]	13,393		698	6,034	3,538	23,663
2008	9,004		413	4,840	2,671	16,928
2009	6,911		207	3,565	2,680	13,363
2010[h]	6,529			3,596	2,694	12,819
2011[p]	**5,099**			**3,693**	**2,541**	**11,333**

a Includes Chapter Commerce 22 of the Uniform Dwelling Code; Chapter Commerce 63 of the Commercial Building Code; and Chapter Commerce 67 (State Rental Unit Energy Efficiency Standards).

b Based on Uniform Dwelling Code permits issued. Through 2004, communities with a population of fewer than 2,500 could opt out from code enforcement and may not have issued permits. Previous numbers may have included some manufactured dwelling units.

c Reporting is required for all manufactured dwelling units. These dwelling units meet state standards and are generally delivered to the dwelling site on a flatbed.

d Includes new building and alteration plans submitted and approved by the state under general building code provisions. Some projects are exempt from plan review or were locally approved instead.

e Properties certified as meeting code requirements during current year, regardless of year of actual transfer of ownership.

f These dwelling units meet federal HUD standards, which are lower than state standards, have a chassis and generally are towed to the dwelling site.

g From 2007 forward, this category is fully captured in the One and Two Family Dwelling total.

h From 2010 forward, this category is fully captured in the One and Two Family Dwelling total.

p Preliminary.

NA – Not applicable. Rental Unit Energy Efficiency Code effective January 1, 1985 and Uniform Dwelling Code Effective June 1, 1980.

Source: Department of Safety and Professional Services, internal data files.

BUILDINGS **CERTIFIED** IN 2011 DECREASED **11.6%**

More than 11,000 buildings were certified in 2011 as meeting Wisconsin's energy efficiency building codes[a], an 11.6 percent decrease from 2010. The number of buildings certified peaked in 2005 with 35,192.

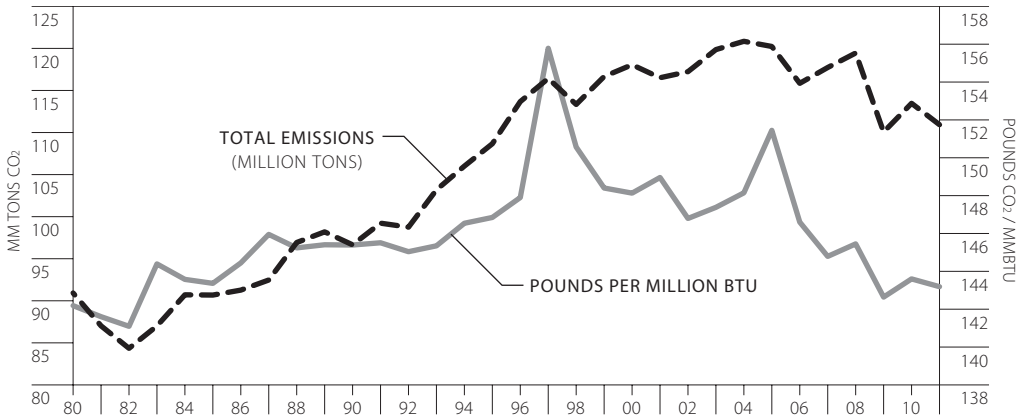
The codes, developed and enforced by the Wisconsin Department of Safety and Professional Services or local code officials, establish minimum energy standards for new construction, major renovation and existing rental units.

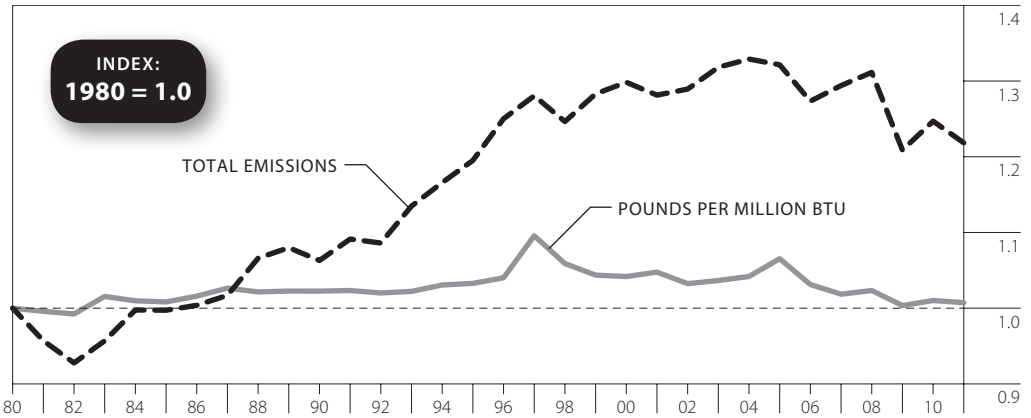
Wisconsin Carbon Dioxide Emissions from Energy Use

CO_2 EMISSIONS 1.9%

Wisconsin's CO_2 emissions from energy (pounds per MMBtu) decreased 1.9 percent in 2011. Since 1990, total CO_2 emissions, in millions of tons, have increased 14.8 percent, but 2011 levels reflect a decrease of 7.8 percent from 2010.

1980-2011 MILLIONS OF TONS AND POUNDS PER MILLION BTU[a]





Year	Tons CO_2 (Millions)	Pounds CO_2 Per MMBtu
1980	90.9	142.2
1985	90.7	143.4
1990	96.7	145.4
1995	108.7	146.8
2000	118.1	148.1
2005	120.2	151.5
2006	115.8	146.6
2007	117.7	144.8
2008	119.5	145.5
2009	110.1	142.7
2010	113.5	143.6
2011[p]	**110.9**	**143.2**

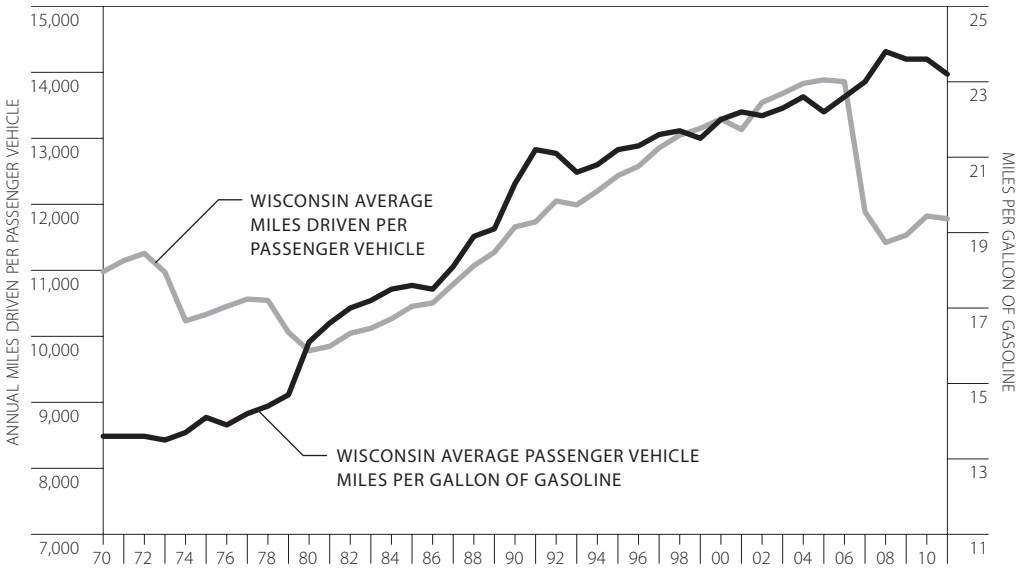
a Does not include electric imports.

p Preliminary estimates.

Source: Compiled from tables in this book for fuel use, and U.S. EPA emission factors.

Average Miles Driven Per Vehicle and Average Miles Per Gallon of Gasoline, Wisconsin and United States

1970-2011



	Average Annual Miles Per Passenger Vehicle[a,b]		Average Passenger Vehicle Miles Per Gallon of Gasoline[a,b]	
Year	Wisconsin	U.S.	Wisconsin	U.S.
1970	10,980	9,892	13.6	13.5
1975	10,332	9,309	14.1	14.0
1980	9,782	8,813	16.1	16.0
1985	10,455	9,419	17.6	17.5
1990	11,659	10,504	20.3	20.2
1995	12,435	11,203	21.2	21.1
2000	13,293	11,976	22.0	21.9
2005	13,886	12,510	22.2	22.1
2006	13,858	12,485	22.6	22.5
2007[r]	11,888	10,710	23.0	22.9
2008[r]	11,422	10,290	23.8	23.7
2009[r]	11,534	10,391	23.6	23.5
2010[r]	11,822	10,650	23.6	23.5
2011[p]	**11,782**	**10,614**	**23.2**	**23.1**

a Wisconsin and U.S. figures come from different sources and may not be directly comparable.

b Light duty vehicles with a short wheel base are passenger vehicles including passenger cars, light trucks, vans and sport utility vehicles, all with a wheel base of less than 122 inches.

p Preliminary estimates.

r Revised.

Source: Wisconsin Department of Transportation, Division of Planning and Budget, Bureau of Policy Planning and Analysis, personal communication (1993); U.S. Department of Energy, Energy Information Administration, *Monthly Energy Review*, table 1.8 [DOE/EIA-0035 (2013/03)] (March 2013) http://www.eia.gov/totalenergy/data/monthly.

AVERAGE NUMBER OF MILES DRIVEN ANNUALLY 0.3%

The average number of miles driven annually per vehicle in Wisconsin decreased 0.3 percent in 2011. It is 20.5 percent higher than in 1980 and 11.0 percent higher than the U.S. average.

Fuel efficiency has been relatively stagnant since 1991 because of the increasing number of less fuel efficient large cars sold each year. Wisconsin cars were 70.6 percent more fuel efficient in 2011 than in 1970.

Data have been modified beginning in 2007 to include additional types of vehicles because of increased use of larger vehicles by residential households.