

CHAPTER 7

Wisconsin Expenditures for Energy

Microgrid Provides Setting for Study of Integrating Renewable Energy Sources on the Power Grid

As the number of distributed generation systems—such as commercial and residential solar electric and wind energy—grow across the state and the country, Wisconsin researchers are working to answer questions about safe, seamless and efficient interconnection of these systems into the grid.

For researchers at the Center for Renewable Energy Systems (CRES), the high-bay microgrid lab combines real and simulated power sources capable of reproducing the inherent technical challenges associated with intermittent energy sources.

“We want to be able to create all of the different operating conditions that are associated with renewable energy sources, including high- and low-wind days, bright sunlight and overcast skies, to develop improved techniques that will enable microgrids to adapt more naturally to these fluctuations,” says Tom Jahns, Grainger Professor of Power Electronics and Electrical Machines.

Located at the Wisconsin Energy Institute building on the UW-Madison campus, the high-bay lab is a successful example of partnerships between private industry and public universities. Funded through donations, private funding and the Wisconsin State Energy Office, the CRES is a partnership combining the knowledge and skills of the extensive community of energy, power and control researchers with world-class laboratories including UW-Milwaukee, UW-Madison, Marquette University and the Milwaukee School of Engineering.

The Wisconsin Energy Institute is home to a wide variety of clean energy research—from biofuels to batteries—and home to the Great Lakes Bioenergy Research Center. Across the broad spectrum of energy issues, the WEI is fostering collaboration across disciplines and forging relationships between public and private entities to address large scale energy questions.



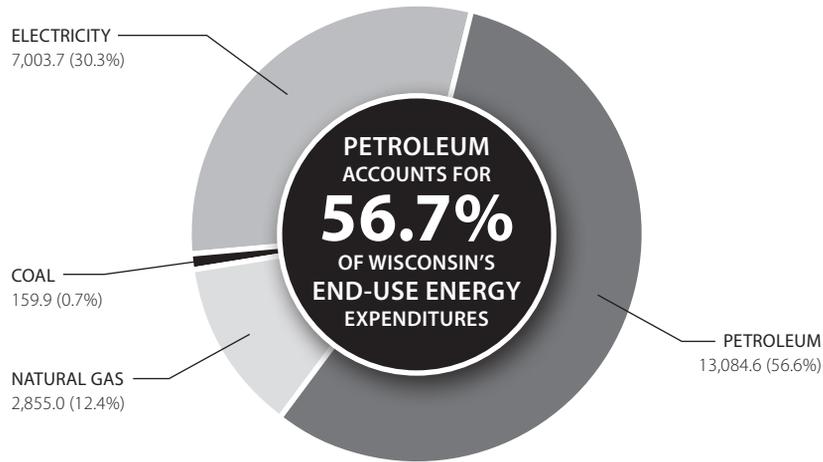
PHOTO BY MATTHEW WISNIEWSKI/WISCONSIN ENERGY INSTITUTE.

Microgrids are distributed generation systems that are designed to operate as self-contained local electrical power grids with a combination of sources and loads. They can operate equally well when they are connected to or disconnected from the utility grid, often incorporating on-site renewable energy sources such as wind turbines and solar panels as well as electrical energy storage systems.

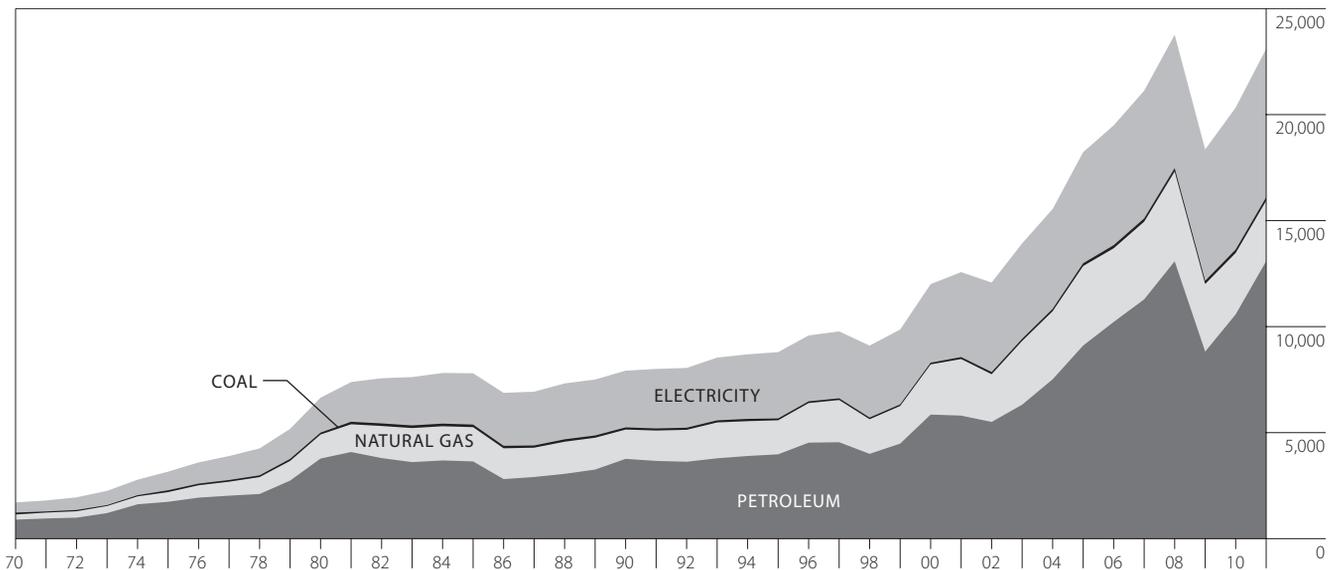
Microgrids can provide highly reliable power for commercial buildings, residential neighborhoods and factories, with flexible capabilities that include the ability to export excess power to the grid and operate independently as “islands” when utility blackouts occur.

Wisconsin End-Use Energy Expenditures, by Type of Fuel

2011 MILLIONS OF DOLLARS AND PERCENT OF TOTAL



1970-2011 MILLIONS OF DOLLARS



Source: Wisconsin State Energy Office.

Wisconsin End-Use Energy Expenditures, by Type of Fuel

WISCONSIN'S
**OVERALL
ENERGY BILL
13.6%**

In 2011, Wisconsin's overall energy bill increased 13.6 percent— from \$20.3 billion in 2010 to \$23.1 billion.

This increase of \$2.8 billion brings Wisconsin's energy expenditures close to 2008 levels.

Expenditures increased for all fuels except natural gas, which decreased by \$43.8 million (1.5 percent). Petroleum went up by \$2.5 billion (23.7 percent), coal by \$1.6 million (1.0 percent), and electricity \$307.2 million (4.6 percent). Since 2000, Wisconsin's total energy expenditures increased by \$11 billion (92.5 percent).

Natural gas expenditures for transportation and agriculture are reported for the first time in this edition of the book.

The tables in this chapter show annual expenditures for the major energy resources used by Wisconsin's residential, commercial, industrial, agricultural and transportation sectors since 1970. Because consistent and reliable historic prices of wood, waste fuels and biogas are not available, expenditures for these fuels are excluded from the tables.

1970-2011 MILLIONS OF DOLLARS AND PERCENT OF TOTAL

Year	Petroleum		Natural Gas		Coal		Electricity		Total
1970	894.3	52.4%	244.6	14.3%	90.1	5.3%	477.6	28.0%	1,706.6
1975	1,734.8	54.9%	457.1	14.5%	86.2	2.7%	879.3	27.8%	3,157.3
1980 ^r	3,777.5	56.8%	1,133.8	17.1%	89.0	1.3%	1,648.0	24.8%	6,648.3
1985 ^r	3,639.9	46.7%	1,616.8	20.7%	121.6	1.6%	2,420.9	31.0%	7,799.3
1990 ^r	3,761.6	47.5%	1,381.9	17.4%	102.9	1.3%	2,674.5	33.8%	7,920.9
1995 ^r	3,977.3	45.2%	1,606.6	18.3%	85.6	1.0%	3,127.5	35.6%	8,797.0
1996 ^r	4,527.7	47.2%	1,867.5	19.5%	81.3	0.8%	3,108.1	32.4%	9,584.6
1997 ^r	4,546.9	46.5%	1,992.1	20.4%	80.3	0.8%	3,155.2	32.3%	9,774.6
1998 ^r	3,999.8	43.9%	1,632.4	17.9%	78.3	0.9%	3,395.6	37.3%	9,106.1
1999 ^r	4,481.7	45.4%	1,776.4	18.0%	74.3	0.8%	3,530.2	35.8%	9,862.6
2000 ^r	5,852.2	48.8%	2,366.3	19.7%	80.1	0.7%	3,705.5	30.9%	12,004.1
2001 ^r	5,803.6	46.2%	2,669.3	21.2%	90.9	0.7%	4,007.5	31.9%	12,571.3
2002 ^r	5,504.8	45.6%	2,250.7	18.6%	101.5	0.8%	4,222.1	35.0%	12,079.1
2003 ^r	6,318.2	45.4%	3,007.9	21.6%	98.8	0.7%	4,502.4	32.3%	13,927.2
2004 ^r	7,516.8	48.3%	3,211.7	20.7%	109.2	0.7%	4,712.5	30.3%	15,550.1
2005 ^r	9,107.5	50.0%	3,751.3	20.5%	128.3	0.7%	5,241.7	28.8%	18,228.8
2006 ^r	10,219.3	52.5%	3,475.1	17.8%	146.2	0.8%	5,650.4	29.0%	19,491.0
2007 ^r	11,285.0	53.4%	3,665.6	17.3%	151.7	0.7%	6,025.1	28.5%	21,127.4
2008 ^r	13,079.5	55.1%	4,237.6	17.7%	155.8	0.7%	6,291.9	26.5%	23,764.8
2009 ^r	8,822.6	48.1%	3,187.9	17.3%	151.7	0.8%	6,192.6	33.8%	18,354.7
2010 ^r	10,577.6	52.1%	2,898.8	14.2%	158.3	0.8%	6,696.7	33.0%	20,331.4
2011 ^p	13,084.6	56.7%	2,855.0	12.3%	159.9	0.7%	7,003.7	30.3%	23,103.3

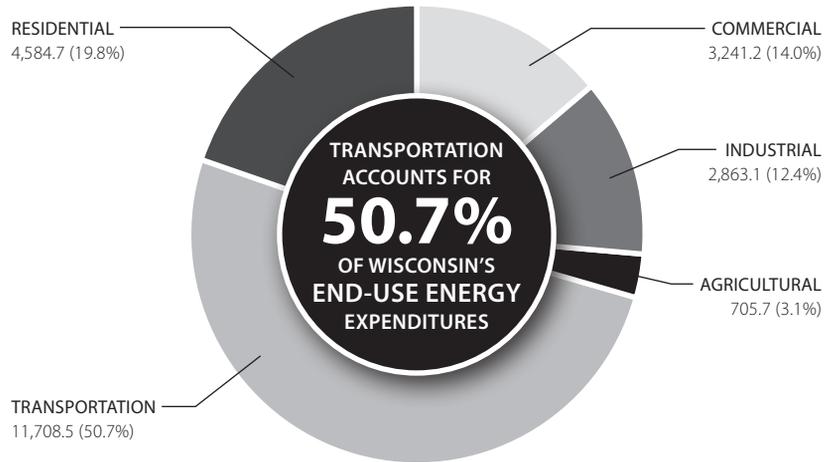
^p Preliminary estimates.

^r Revised due to revisions in price and consumption data.

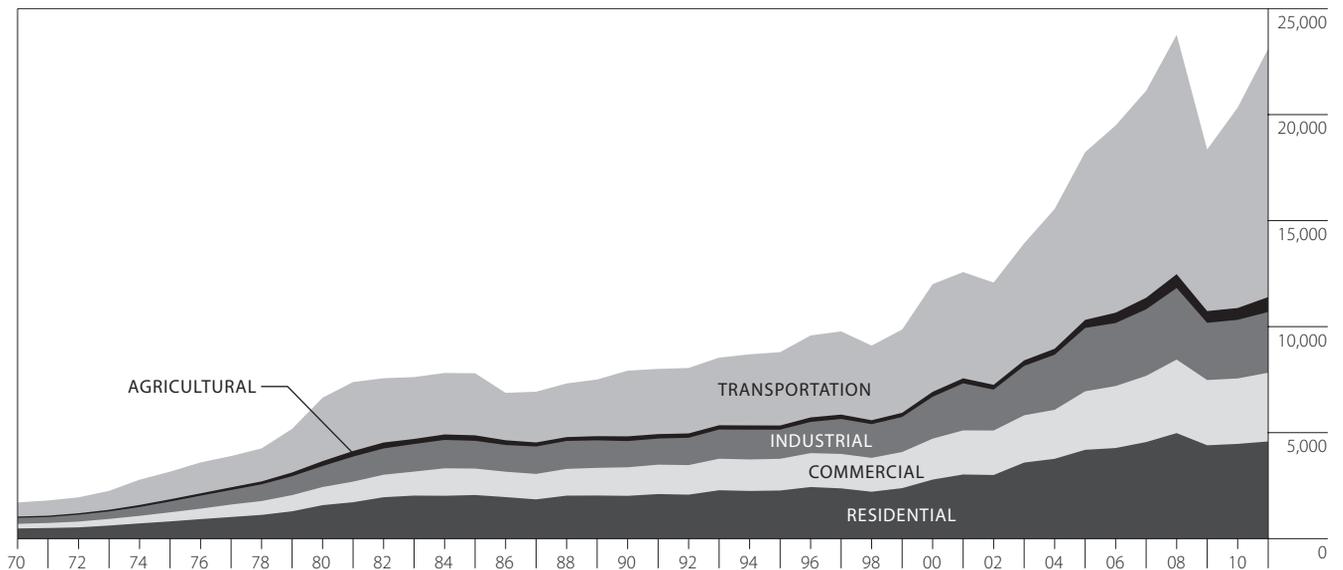
Source: Compiled from tables in this publication for Wisconsin petroleum, natural gas, coal and electricity use and prices, by economic sector.

Wisconsin End-Use Energy Expenditures, by Economic Sector

2011 MILLIONS OF DOLLARS AND PERCENT OF TOTAL



1970-2011 MILLIONS OF DOLLARS



Source: Wisconsin State Energy Office.

Wisconsin End-Use Energy Expenditures, by Economic Sector

WISCONSIN'S
END-USE
ENERGY
EXPENDITURES
INCREASED
IN ALL
SECTORS

In 2011, energy expenditures increased in all sectors, with total expenditures increasing \$2.8 billion or 13.6 percent.

Expenditures in the residential sector saw an increase of \$115.3 million (2.6 percent) over 2010, while the commercial sector increased by \$153.5 million (5.0 percent), the industrial sector by \$99.4 million (3.6 percent), the agricultural sector by \$148.8 million (26.7 percent), and the transportation sector by \$2.3 billion (23.9 percent).

Natural gas expenditures for transportation and agriculture are reported for the first time in this edition of the book.

1970-2011 MILLIONS OF DOLLARS AND PERCENT OF TOTAL

Year	Residential		Commercial		Industrial		Agricultural		Transportation		Total
1970 ^r	480.5	28.2%	217.9	12.8%	285.2	16.7%	58.7	3.4%	664.3	38.9%	1,706.6
1975	813.7	25.8%	428.4	13.6%	509.4	16.1%	104.2	3.3%	1,301.7	41.2%	3,157.3
1980	1,579.5	23.8%	855.2	12.9%	990.3	14.9%	232.7	3.5%	2,990.6	45.0%	6,648.3
1985 ^r	2,057.6	26.4%	1,249.3	16.0%	1,307.7	16.8%	259.5	3.3%	2,925.1	37.5%	7,799.3
1990 ^r	2,018.8	25.5%	1,346.8	17.0%	1,237.3	15.6%	222.6	2.8%	3,095.3	39.1%	7,920.9
1995 ^r	2,271.0	25.8%	1,495.6	17.0%	1,375.1	15.6%	195.2	2.2%	3,460.0	39.3%	8,797.0
1996 ^r	2,435.0	25.4%	1,600.2	16.7%	1,471.3	15.4%	212.0	2.2%	3,866.1	40.3%	9,584.6
1997 ^r	2,370.9	24.3%	1,625.9	16.6%	1,649.2	16.9%	205.7	2.1%	3,922.8	40.1%	9,774.6
1998 ^r	2,212.6	24.3%	1,597.0	17.5%	1,591.2	17.5%	184.9	2.0%	3,520.4	38.7%	9,106.1
1999 ^r	2,381.5	24.1%	1,705.5	17.3%	1,653.9	16.8%	195.2	2.0%	3,926.4	39.8%	9,862.6
2000 ^r	2,786.4	23.2%	1,930.1	16.1%	1,975.5	16.5%	233.7	1.9%	5,078.4	42.3%	12,004.1
2001 ^r	3,026.0	24.1%	2,081.3	16.6%	2,220.1	17.7%	234.4	1.9%	5,009.6	39.8%	12,571.3
2002 ^r	3,002.5	24.9%	2,098.7	17.4%	1,928.9	16.0%	226.5	1.9%	4,822.4	39.9%	12,079.1
2003 ^r	3,588.4	25.8%	2,230.5	16.0%	2,329.2	16.7%	261.4	1.9%	5,517.9	39.6%	13,927.2
2004 ^r	3,765.7	24.2%	2,311.6	14.9%	2,597.5	16.7%	282.1	1.8%	6,593.3	42.4%	15,550.1
2005 ^r	4,189.8	23.0%	2,760.1	15.2%	2,988.8	16.4%	379.9	2.0%	7,910.3	43.4%	18,228.8
2006 ^r	4,274.9	21.9%	2,924.1	15.0%	2,970.6	15.2%	487.2	2.4%	8,834.2	45.4%	19,491.0
2007 ^r	4,555.8	21.6%	3,122.9	14.8%	3,138.4	14.9%	544.5	2.5%	9,765.8	46.2%	21,127.4
2008 ^r	4,977.8	21.0%	3,468.5	14.6%	3,373.5	14.2%	653.1	2.6%	11,291.9	47.6%	23,764.8
2009 ^r	4,403.9	24.0%	3,076.2	16.8%	2,698.7	14.7%	555.5	2.9%	7,620.5	41.6%	18,354.7
2010 ^r	4,469.5	22.0%	3,087.8	15.2%	2,763.8	13.6%	556.9	2.7%	9,453.5	46.5%	20,331.5
2011 ^p	4,584.7	19.8%	3,241.2	14.0%	2,863.1	12.4%	705.7	3.1%	11,708.5	50.7%	23,103.3

^p Preliminary estimates.

^r Revised due to revisions in price and consumption data.

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

Wisconsin Resource Use Energy Expenditures, Estimated Dollars Leaving Wisconsin

Of all petroleum energy expenditures, 85 percent are estimated to leave the state because petroleum refining operations are not located in Wisconsin, with the exception of Murphy Oil in Superior. The 15 percent estimated to stay in the state is due to Wisconsin-based gasoline and diesel blenders and retailers, LP and heating oil businesses, and utility revenues. Natural Gas production occurs out-of-state and natural gas pipelines are owned by out-of-state companies. The 15 percent estimated to stay in Wisconsin is attributed to in-state natural gas distribution businesses, LP businesses, and utility revenues.

Ninety-five percent of all expenditures on coal leave Wisconsin because this is an out-of-state resource. The five percent of expenditures estimated to stay in-state are attributed to utility revenues. All of the expenditures on imported electricity are necessarily attributed to out-of-state expenditures because this electricity is purchased from generation sources not based in Wisconsin.

This page estimates the amount of money spent on energy in Wisconsin that leaves the state. In 2011, \$15.9 billion left the state, comprising 68.7 percent of Wisconsin's \$23.1 billion in end-use energy expenditures.

Like the other tables in this chapter, these dollar amounts do not include specific expenditures on renewable energy. The exception is where imported electricity is generated by renewable sources.

1970-2011 MILLIONS OF DOLLARS

Year	Petroleum		Natural Gas		Coal		Imported Electricity		Total Expenditure Leaving State
	Expenditures	Expenditure Leaving State	Expenditures	Expenditure Leaving State	Expenditures	Expenditure Leaving State	Expenditures	Expenditure Leaving State	
1970	900.1	765.1	257.6	219.0	177.1	168.2	-47.7	-47.7	1,104.7
1975	1,753.3	1,490.3	473.3	402.3	273.5	259.8	-50.5	-50.5	2,101.9
1980	3,802.3	3,231.9	1,175.3	999.0	476.9	453.1	-24.6	-24.6	4,659.4
1985 ^r	3,649.5	3,102.1	1,622.6	1,379.2	693.4	658.8	-9.2	-9.2	5,130.9
1990 ^r	3,768.3	3,203.1	1,388.9	1,180.6	585.4	556.1	417.4	417.4	5,357.1
1995 ^r	3,980.5	3,383.4	1,628.9	1,384.6	555.8	528.0	583.4	583.4	5,879.4
1996 ^r	4,532.2	3,852.4	1,889.8	1,606.3	546.4	519.1	372.4	372.4	6,350.2
1997 ^r	4,554.1	3,871.0	2,042.5	1,736.2	583.9	554.7	602.1	602.1	6,763.9
1998 ^r	4,006.1	3,405.2	1,697.3	1,442.7	558.6	530.7	518.6	518.6	5,897.2
1999 ^r	4,489.9	3,816.4	1,838.9	1,563.1	543.1	516.0	489.0	489.0	6,384.5
2000 ^r	5,862.1	4,982.8	2,461.3	2,092.1	560.9	532.8	495.9	495.9	8,103.6
2001 ^r	5,817.5	4,944.9	2,776.2	2,359.8	586.1	556.8	654.2	654.2	8,515.7
2002 ^r	5,512.7	4,685.8	2,325.2	1,976.4	604.3	574.1	557.9	557.9	7,794.2
2003 ^r	6,329.4	5,380.0	3,150.5	2,678.0	637.3	605.4	510.7	510.7	9,174.0
2004 ^r	7,529.8	6,400.4	3,349.3	2,846.9	672.2	638.6	572.1	572.1	10,458.0
2005 ^r	9,130.6	7,761.0	4,266.7	3,626.7	735.3	698.5	825.1	825.1	12,911.3
2006 ^r	10,242.5	8,706.1	3,798.3	3,228.6	828.4	787.0	582.6	582.6	13,304.3
2007 ^r	11,316.1	9,618.7	4,073.6	3,462.5	928.9	882.5	910.0	910.0	14,873.7
2008 ^r	13,102.1	11,136.8	4,617.6	3,924.9	1,111.5	1,055.9	834.2	834.2	16,951.8
2009 ^r	8,829.7	7,505.3	3,385.8	2,877.9	1,030.0	978.5	817.9	817.9	12,179.6
2010 ^r	10,586.0	8,998.1	3,130.0	2,660.5	1,168.3	1,109.9	693.0	693.0	13,461.6
2011 ^p	13,095.7	11,131.4	3,089.2	2,625.9	1,284.5	1,220.2	888.3	888.3	15,865.8

^p Preliminary estimates.

^r Revised due to revisions in price and consumption data.

Source: Compiled from tables in this publication for Wisconsin petroleum, natural gas, coal and electricity use and prices, by economic sector.

Wisconsin Expenditures for Residential Energy, by Type of Fuel

WISCONSIN'S
OVERALL
RESIDENTIAL
ENERGY
EXPENDITURES
2.6%

In 2011, overall residential energy expenditures increased by 2.6 percent (\$115.3 million) over 2010. Expenditures increased for petroleum (7.6 percent) and electricity (3.4 percent), while decreasing for natural gas (1.1 percent).

1970-2011 MILLIONS OF DOLLARS AND PERCENT OF TOTAL

Year	Petroleum		Natural Gas		Coal		Electricity		Total ^a
1970	142.6	29.7%	130.5	27.2%	15.5	3.2%	191.9	39.9%	480.5
1975	250.5	30.8%	209.4	25.7%	11.8	1.5%	342.0	42.0%	813.7
1980	483.8	30.6%	472.4	29.9%	9.0	0.6%	614.4	38.9%	1,579.5
1985 ^r	412.0	20.0%	749.6	36.4%	3.8	0.2%	892.2	43.4%	2,057.6
1990 ^r	383.7	19.0%	653.6	32.4%	1.3	0.1%	980.2	48.6%	2,018.8
1995 ^r	290.2	12.8%	792.0	34.9%	1.1	0.0%	1,187.7	52.3%	2,271.0
1996 ^r	364.5	15.0%	892.9	36.7%	1.0	0.0%	1,176.5	48.3%	2,435.0
1997 ^r	331.5	14.0%	873.3	36.8%	1.0	0.0%	1,165.1	49.1%	2,370.9
1998 ^r	242.7	11.0%	712.7	32.2%	0.9	0.0%	1,256.3	56.8%	2,212.6
1999 ^r	281.4	11.8%	787.7	33.1%	0.8	0.0%	1,311.6	55.1%	2,381.5
2000 ^r	394.7	14.2%	1,020.6	36.6%	0.7	0.0%	1,370.4	49.2%	2,786.4
2001 ^r	426.6	14.1%	1,098.5	36.3%	0.7	0.0%	1,500.2	49.6%	3,026.0
2002 ^r	355.9	11.9%	1,007.4	33.6%	0.7	0.0%	1,638.5	54.6%	3,002.5
2003 ^r	416.6	11.6%	1,318.9	36.8%	0.6	0.0%	1,852.3	51.6%	3,588.4
2004 ^r	472.1	12.5%	1,377.5	36.6%	0.6	0.0%	1,915.6	50.9%	3,765.7
2005 ^r	558.9	13.3%	1,564.5	37.3%	0.6	0.0%	2,065.8	49.3%	4,189.8
2006 ^r	628.2	14.7%	1,467.6	34.3%	0.5	0.0%	2,178.6	51.0%	4,274.9
2007 ^r	646.0	14.2%	1,577.3	34.6%	0.4	0.0%	2,332.0	51.2%	4,555.8
2008 ^r	762.0	15.3%	1,800.3	36.2%	0.0	0.0%	2,415.5	48.5%	4,977.8
2009 ^r	528.5	12.0%	1,432.8	32.5%	0.0	0.0%	2,442.7	55.5%	4,403.9
2010 ^r	493.8	11.0%	1,278.3	28.6%	0.0	0.0%	2,697.4	60.4%	4,469.5
2011^p	531.5	11.6%	1,264.1	27.6%	0.0	0.0%	2,789.1	60.8%	4,584.7

^a Does not include renewable energy, except those renewable fuels used in electricity production.

^p Preliminary estimates.

^r Revised due to revisions in price and consumption data.

Source: Compiled from tables in this publication for Wisconsin residential energy use and prices.

Wisconsin Expenditures for Commercial Energy, by Type of Fuel

1970-2011 MILLIONS OF DOLLARS AND PERCENT OF TOTAL

Year	Petroleum		Natural Gas		Coal		Electricity		Total ^a
1970 ^r	34.7	15.9%	34.6	15.9%	11.5	5.3%	137.1	62.9%	217.9
1975	70.8	16.5%	73.5	17.2%	11.0	2.6%	273.0	63.7%	428.4
1980	82.4	9.6%	210.6	24.6%	6.8	0.8%	555.4	64.9%	855.2
1985 ^r	124.7	10.0%	307.4	24.6%	9.3	0.7%	807.9	64.7%	1,249.3
1990 ^r	103.5	7.7%	315.1	23.4%	8.2	0.6%	920.0	68.3%	1,346.8
1995 ^r	64.5	4.3%	382.1	25.5%	6.2	0.4%	1,042.8	69.7%	1,495.6
1996 ^r	83.0	5.2%	453.6	28.3%	7.8	0.5%	1,055.8	66.0%	1,600.2
1997 ^r	85.8	5.3%	475.1	29.2%	7.7	0.5%	1,057.3	65.0%	1,625.9
1998 ^r	71.3	4.5%	382.8	24.0%	7.9	0.5%	1,134.9	71.1%	1,597.0
1999 ^r	79.7	4.7%	395.9	23.2%	8.0	0.5%	1,221.9	71.6%	1,705.5
2000 ^r	117.2	6.1%	514.0	26.6%	8.0	0.4%	1,290.8	66.9%	1,930.1
2001 ^r	125.7	6.0%	576.6	27.7%	8.6	0.4%	1,370.3	65.8%	2,081.3
2002 ^r	107.2	5.1%	524.9	25.0%	8.8	0.4%	1,457.8	69.5%	2,098.7
2003 ^r	127.5	5.7%	695.8	31.2%	9.2	0.4%	1,397.9	62.7%	2,230.5
2004 ^r	139.6	6.0%	717.5	31.0%	10.0	0.4%	1,444.5	62.5%	2,311.6
2005 ^r	182.8	6.6%	880.1	31.9%	12.2	0.4%	1,684.9	61.0%	2,760.1
2006 ^r	174.0	5.9%	875.6	29.9%	13.6	0.5%	1,860.8	63.6%	2,924.1
2007 ^r	194.4	6.2%	910.8	29.2%	11.6	0.4%	2,006.1	64.2%	3,122.9
2008 ^r	281.0	8.1%	1,046.2	30.2%	8.9	0.3%	2,132.4	61.5%	3,468.5
2009 ^r	167.7	5.5%	796.6	25.9%	6.9	0.2%	2,104.9	68.4%	3,076.2
2010 ^r	145.2	4.7%	687.9	22.3%	7.9	0.3%	2,246.9	72.8%	3,087.8
2011^p	198.0	6.1%	680.5	21.0%	7.0	0.2%	2,355.6	72.7%	3,241.2

^a Does not include renewable energy, except those renewable fuels used in electricity production.

^p Preliminary estimates.

^r Revised due to revisions in price and consumption data.

Source: Compiled from tables in this publication for Wisconsin commercial energy use and prices.

WISCONSIN
EXPENDITURES
FOR
COMMERCIAL
ENERGY
5.0%

Commercial energy expenditures increased 5.0 percent (\$153.5 million) in 2011. Commercial energy expenditures are dominated (72.7 percent) by electricity used for lighting, cooling, ventilation and office equipment.

Wisconsin Expenditures for Industrial Energy, by Type of Fuel

WISCONSIN
EXPENDITURES
FOR
INDUSTRIAL
ENERGY
3.6%

In 2011, industrial energy expenditures increased 3.6 percent (\$99.4 million). Industrial energy use is dominated by electricity (60.0 percent) and natural gas (31.1 percent). Expenditures for all fuels except natural gas increased: petroleum, 15.9 percent; electricity, 6.9 percent; and coal, 1.6 percent. Natural gas saw a decrease of 3.1 percent from 2010.

1970-2011 MILLIONS OF DOLLARS AND PERCENT OF TOTAL

Year	Petroleum		Natural Gas		Coal		Electricity		Total ^a
1970 ^r	18.7	6.5%	79.4	27.8%	63.1	22.1%	124.0	43.5%	285.2
1975	46.7	9.2%	174.2	34.2%	63.4	12.4%	225.1	44.2%	509.4
1980	64.1	6.5%	450.8	45.5%	73.2	7.4%	402.1	40.6%	990.3
1985 ^r	28.8	2.2%	559.9	42.8%	108.5	8.3%	610.6	46.7%	1,307.7
1990 ^r	52.2	4.2%	413.2	33.4%	93.5	7.6%	678.5	54.8%	1,237.3
1995 ^r	59.5	4.3%	432.5	31.5%	78.3	5.7%	804.8	58.5%	1,375.1
1996 ^r	92.0	6.3%	521.0	35.4%	72.5	4.9%	785.8	53.4%	1,471.3
1997 ^r	89.3	5.4%	643.7	39.0%	71.7	4.3%	844.6	51.2%	1,649.2
1998 ^r	72.4	4.5%	536.8	33.7%	69.5	4.4%	912.5	57.3%	1,591.2
1999 ^r	90.7	5.5%	592.8	35.8%	65.5	4.0%	905.0	54.7%	1,653.9
2000 ^r	122.0	6.2%	831.7	42.1%	71.3	3.6%	950.5	48.1%	1,975.5
2001 ^r	105.6	4.8%	994.3	44.8%	81.6	3.7%	1,038.7	46.8%	2,220.1
2002 ^r	93.8	4.9%	718.3	37.2%	92.0	4.8%	1,024.8	53.1%	1,928.9
2003 ^r	106.1	4.6%	993.1	42.6%	88.9	3.8%	1,141.0	49.0%	2,329.2
2004 ^r	138.4	5.3%	1,116.7	43.0%	98.6	3.8%	1,243.7	47.9%	2,597.5
2005 ^r	212.0	7.1%	1,293.6	43.3%	115.5	3.9%	1,367.8	45.8%	2,988.8
2006 ^r	238.9	8.0%	1,120.4	37.7%	132.0	4.4%	1,479.2	49.8%	2,970.6
2007 ^r	266.4	8.5%	1,165.4	37.1%	139.7	4.5%	1,566.9	49.9%	3,138.4
2008 ^r	269.9	8.0%	1,350.5	40.0%	147.0	4.4%	1,606.1	47.6%	3,373.5
2009 ^r	111.2	4.1%	935.9	34.7%	144.8	5.4%	1,506.8	55.8%	2,698.7
2010 ^r	88.4	3.2%	918.4	33.2%	150.5	5.4%	1,606.5	58.1%	2,763.8
2011^p	102.5	3.6%	889.7	31.1%	152.9	5.3%	1,718.1	60.0%	2,863.1

^a Does not include renewable energy, except those renewable fuels used in electricity production.

^p Preliminary estimates.

^r Revised due to revisions in price and consumption data.

Source: Compiled from tables in this publication for Wisconsin industrial energy use and prices.

Wisconsin Expenditures for Agricultural Energy, by Type of Fuel

1970-2011 MILLIONS OF DOLLARS AND PERCENT OF TOTAL

Year	Motor Gasoline	Diesel Fuel ^a	LPG	Other Fuel ^b	Total Petroleum		Electricity		Natural Gas ^d		Total ^c
1970	19.1	9.8	5.2		34.1	58.1%	24.6	41.9%			58.7
1975	30.1	24.1	10.8		65.1	62.5%	39.1	37.5%			104.2
1980	39.0	94.8	22.9		156.7	67.3%	76.0	32.7%			232.7
1985 ^r	22.4	99.0	27.8		149.3	57.5%	110.3	42.5%			259.5
1990 ^r	11.5	93.7	21.7		126.9	57.0%	95.7	43.0%			222.6
1995 ^r	8.0	71.9	23.1		103.0	52.8%	92.2	47.2%			195.2
1996 ^r	8.0	80.0	34.0		122.0	57.5%	90.0	42.5%			212.0
1997 ^r	7.6	79.6	30.4		117.5	57.1%	88.2	42.9%			205.7
1998 ^r	6.5	68.1	18.4		93.0	50.3%	91.9	49.7%			184.9
1999 ^r	7.2	75.1	21.2		103.5	53.0%	91.7	47.0%			195.2
2000 ^r	8.8	103.9	27.2		139.9	59.9%	93.8	40.1%			233.7
2001 ^r	8.6	98.5	28.9		136.1	58.1%	98.3	41.9%			234.4
2002 ^r	8.3	92.8	24.3		125.5	55.4%	101.0	44.6%			226.5
2003 ^r	9.7	112.9	27.5		150.2	57.5%	111.2	42.5%			261.4
2004 ^r	10.9	129.8	32.6		173.4	61.5%	108.7	38.5%			282.1
2005 ^r	72.6	130.7	36.5	4.0	243.8	64.2%	123.2	32.4%	12.9	3.4%	379.9
2006 ^r	68.1	224.0	47.1	5.1	344.3	70.7%	131.7	27.0%	11.2	2.3%	487.2
2007 ^r	84.9	269.0	53.7	5.1	412.7	75.8%	120.1	22.1%	11.7	2.1%	544.5
2008 ^r	77.6	320.4	71.2	5.8	475.0	72.7%	137.9	21.1%	40.2	6.2%	653.1
2009 ^r	70.1	247.1	67.4	10.5	395.1	71.1%	138.1	24.9%	22.3	4.0%	555.5
2010 ^r	69.2	270.6	53.0	4.3	397.3	71.3%	146.0	26.2%	13.7	2.5%	557.0
2011 ^p	77.4	417.4	45.3	4.9	545.0	77.2%	140.9	20.0%	19.8	2.8%	705.7

a Includes fuel oil and kerosene.

b The fuel is primarily distillate and kerosene, but may include small amounts of coal and wood.

c Does not include renewable energy, except those renewable fuels used in electricity production.

d The increase in expenditures in 2008 reflects the relatively high price of natural gas in that year, as well as the inclusion of nurseries and greenhouses in the sample.

p Preliminary estimates.

r Revised due to revisions in price and consumption data.

Source: Compiled from tables in this publication for Wisconsin agricultural energy use and prices.

WISCONSIN'S
AGRICULTURAL
ENERGY BILL
26.7%

Wisconsin's agricultural energy bill is 26.7 percent more than 2010, an increase of \$148.8 million

Natural gas data, which was not available prior to 2005, is now part of the overall calculation of agricultural energy expenditures. The agriculture sector uses natural gas primarily for space heating and crop drying.

Wisconsin Expenditures for Transportation Energy, by Type of Fuel

WISCONSIN'S
TRANSPORTATION
ENERGY BILL
23.9%

Wisconsin's transportation energy bill increased 23.9 percent (\$2.3 billion dollars) in 2011. Vehicle gasoline accounts for 75.7 percent of all transportation expenditures, costing motorists \$8.9 billion.

2011 represents the first year that compressed natural gas vehicle fuel is included in the calculation of overall transportation expenditures.

Information about natural gas as a vehicle fuel, as well as a refueling station map locator, can be found on the Wisconsin State Energy Office website at stateenergyoffice.wi.gov.

1970-2011 MILLIONS OF DOLLARS AND PERCENT OF TOTAL

Year	Vehicle Gasoline ^a		Diesel Fuel		Aviation Gasoline		Jet Fuel		Middle Distillate		Natural Gas		Total
1970	626.2	94.3%	23.0	3.5%	2.4	0.4%	5.9	0.9%	6.7	1.0%			664.3
1975	1,187.1	91.2%	74.4	5.7%	4.5	0.3%	21.2	1.6%	14.5	1.1%			1,301.7
1980	2,531.3	84.6%	335.7	11.2%	8.4	0.3%	72.7	2.4%	42.5	1.4%			2,990.6
1985 ^r	2,369.2	81.0%	470.0	16.1%	5.2	0.2%	52.6	1.8%	28.1	1.0%			2,925.1
1990 ^r	2,429.2	78.5%	570.8	18.4%	5.3	0.2%	68.0	2.2%	22.0	0.7%			3,095.3
1995 ^r	2,661.8	76.9%	724.6	20.9%	5.6	0.2%	45.0	1.3%	23.1	0.7%			3,460.0
1996 ^r	2,974.6	76.9%	798.0	20.6%	6.0	0.2%	57.3	1.5%	30.1	0.8%			3,866.1
1997 ^r	3,006.1	76.6%	830.4	21.2%	6.1	0.2%	55.0	1.4%	25.2	0.6%			3,922.8
1998 ^r	2,692.2	76.5%	761.4	21.6%	5.3	0.2%	41.6	1.2%	19.8	0.6%			3,520.4
1999 ^r	2,993.6	76.2%	852.1	21.7%	6.0	0.2%	49.3	1.3%	25.4	0.6%			3,926.4
2000 ^r	3,850.2	75.8%	1,101.7	21.7%	8.0	0.2%	81.3	1.6%	37.2	0.7%			5,078.4
2001 ^r	3,842.3	76.7%	1,054.9	21.1%	7.5	0.1%	70.3	1.4%	34.5	0.7%			5,009.6
2002 ^r	3,718.4	77.1%	997.5	20.7%	5.6	0.1%	69.1	1.4%	31.8	0.7%			4,822.4
2003 ^r	4,284.1	77.6%	1,113.4	20.2%	5.7	0.1%	80.8	1.5%	33.9	0.6%			5,517.9
2004 ^r	5,034.0	76.4%	1,387.8	21.0%	6.7	0.1%	118.7	1.8%	46.1	0.7%			6,593.3
2005 ^r	5,946.8	75.2%	1,684.1	21.3%	8.6	0.1%	194.6	2.5%	76.0	1.0%	0.289	0.004%	7,910.3
2006 ^r	6,550.7	74.2%	1,964.8	22.2%	8.7	0.1%	214.2	2.4%	95.6	1.1%	0.264	0.003%	8,834.2
2007 ^r	7,348.0	75.2%	2,083.1	21.3%	8.0	0.1%	218.9	2.2%	107.5	1.1%	0.316	0.003%	9,765.8
2008 ^r	8,203.7	72.7%	2,644.5	23.4%	9.0	0.1%	322.7	2.9%	111.8	1.0%	0.316	0.003%	11,291.9
2009 ^r	5,892.2	77.3%	1,507.8	19.8%	6.0	0.1%	156.3	2.1%	57.8	0.8%	0.308	0.004%	7,620.5
2010 ^r	7,153.1	75.7%	1,992.5	21.1%	7.1	0.1%	220.7	2.3%	79.5	0.8%	0.521	0.006%	9,453.4
2011^p	8,866.9	75.7%	2,447.7	20.9%	9.5	0.1%	264.4	2.3%	119.1	1.0%	0.933	0.008%	11,708.5

^a Includes ethanol.

^p Preliminary estimates.

^r Revised due to revisions in price and consumption data.

Source: Compiled from tables in this publication for Wisconsin transportation energy use and prices.