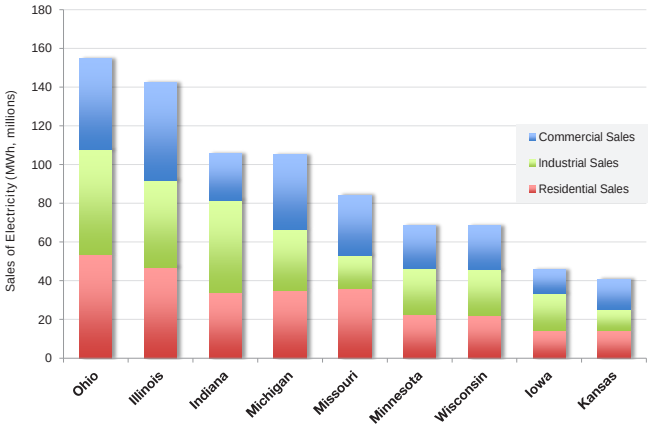
Midwest Combined Heat and Power Fact Sheet

Significant potential exists for combined heat and power (CHP) to play a larger role in the Midwest – especially within the region's strong industrial sector where the technology can help improve economic competitiveness and reduce greenhouse gas emissions. While CHP adoption and potential vary by individual state, the Midwest stands to benefit from strategic CHP deployment.

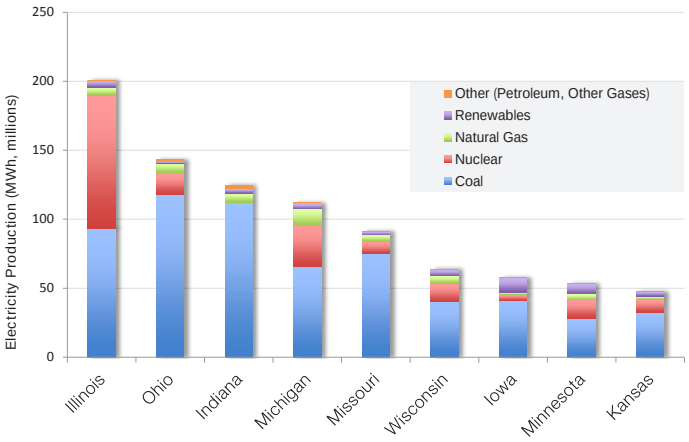
Graph 1: Sales of Electricity by State and Sector, MWh, 2011



Source: U. S. Energy Information Administration

Graph 1 breaks down electricity sales by residential, commercial and industrial sector across Midwestern states. As can be seen, the total sales of electricity and the relative share of electricity sales between each sector vary widely between states.

Graph 2: Electric Power Industry Generation by Primary Energy Source, MWh, 2010



Source: U. S. Energy Information Administration

Graph 2 summarizes electricity generation by energy source and by state. Coal is used to produce the largest share of electricity in the Midwest, representing between 50 to 90 percent of total generation across the states. Natural gas has been the preferred fuel for CHP systems in the U.S., accounting for around 70 percent of existing CHP capacity.

Table 1: State Electricity Sales (MWh)

	Ohio	Illinois	Indiana	Michigan	Missouri	Minnesota	Wisconsin	Iowa	Kansas
Residential Sales	53,687,111	47,057,002	33,912,098	34,811,337	35,941,243	22,523,727	22,149,941	14,326,771	14,343,748
Commercial Sales	47,111,763	50,468,038	24,111,250	38,612,718	30,962,081	22,371,109	23,054,970	12,087,902	15,609,278
Industrial Sales	53,913,437	44,844,111	47,774,083	31,624,220	17,329,648	23,618,724	23,406,711	19,240,204	10,807,373
Total Sales	154,712,311	142,369,151	105,797,431	105,048,275	84,232,972	68,513,560	68,611,622	45,654,877	40,760,399

Source: U. S. Energy Information Administration

Table 2: State Electricity Production (MWh)

Fuel Type	Illinois	Ohio	Indiana	Michigan	Missouri	Wisconsin	Iowa	Minnesota	Kansas
Coal	93,611,365	117,828,009	112,327,658	65,604,374	75,047,229	40,168,733	41,282,937	28,082,550	32,505,053
Nuclear	96,189,587	15,804,803	0	29,624,580	8,996,033	13,280,939	4,450,640	13,478,046	9,555,712
Natural Gas	5,723,733	7,127,859	6,474,986	12,249,262	4,689,867	5,496,814	1,312,195	4,340,847	2,287,323
Renewables	5,256,702	1,129,113	3,699,378	4,083,005	2,526,944	4,585,808	10,308,651	7,480,043	3,472,565

Source: U. S. Energy Information Administration

Table 3: Boiler MACT Affected Boilers by Fuel Type

State	Facilities	Coal Units	Biomass Units	Gas Units	Heavy Oil Units	Light Oil Units	Total Capacity (mmBtu/hr)
IA	71	41	5	208	2	6	35,935
IL	155	37	0	418	2	15	44,914
IN	160	32	10	390	11	14	50,349
KS	37	1	0	183	5	3	11,397
MI	98	54	6	192	8	7	28,039
MN	48	24	16	99	10	11	19,841
MO	56	26	2	72	3	18	11,231
OH	127	52	7	247	7	27	35,974
WI	81	43	16	148	7	8	21,331
Total	833	310	62	1,957	55	109	259,011

MACT: Maximum Achievable Control Technology standard

Source: U.S. Environmental Protection Agency

Table 3 breaks down Boiler Maximum Achievable Control Technology (Boiler MACT) affected units by fuel type and state. Boiler MACT applies to boilers and process heaters that are installed at major source facilities and fueled by coal, oil, biomass, natural gas, or other solid, liquid and gaseous non-waste materials. There are approximately 14,000 major source boilers that will be affected by Boiler MACT and most of them are located at industrial facilities. Overall, 88 percent of the units will need to follow work practice standards (tune-ups) and 12 percent (primarily coal, oil and biomass units) will need to meet numerical emissions limits. Switching some of the impacted coal and oil boilers to natural gas fuel as well as implementing a CHP system can result in large efficiency gains and major reductions to the sources covered under the regulation.

Table 4: Boiler MACT - Number of Facilities by Application

Application	IA	IL	IN	KS	MI	MN	MO	OH	WI	Total Facilities
Manufacturing	48	106	124	23	59	30	34	96	56	576
Utilities	11	18	12	5	20	12	15	16	4	113
Other Applications	3	5	12	3	6	4	3	1	8	45
Pipeline Transportation	5	18	2	5	2		2	4		38
Educational Services	4	1	4		4	1	2	4	10	30
Printing and Related Support Activities		5	4	1				4	3	17
Professional, Scientific and Technical Services		2	2		7	1		2		14
Grand Total	71	155	160	37	98	48	56	127	81	833

Source: U.S. Environmental Protection Agency

Table 5: Boiler MACT - Total Capacity by Application (mmBtu/hr)

Application	IA	IL	IN	KS	MI	MN	MO	OH	WI	Total Capacity (mmBtu/hr)
Manufacturing	24,544	38,951	41,103	9,682	19,005	9,198	3,690	24,650	16,731	187,555
Utilities	7,578	4,669	4,361	760	4,450	7,208	7,047	9,264	3,019	48,355
Educational Services	3,089		3,028		1,571		21	2,009	1,055	10,773
Professional, Scientific and Technical Services		40			2,002	939				2,981
Other Applications	724	368	157	916	376		10	10	290	2,851
Mining (except Oil and Gas)			65		634	2,150				2,849
Air Transportation			999			346				1,345
Printing and Related Support Activities		310	637					41	236	1,223
National Security and International Affairs		577		39			462			1,079
Grand Total	35,935	44,914	50,349	11,397	28,039	19,841	11,231	35,974	21,331	259,011

Source: U.S. Environmental Protection Agency

Table 5 summarizes Boiler MACT affected facilities according to application and by state. As this table illustrates, there are an especially large number of utilities and manufacturing facilities that will be affected by the rules. Over half of the affected boilers are located in just three states: Indiana, Illinois and Ohio.

Illinois Combined Heat and Power Fact Sheet

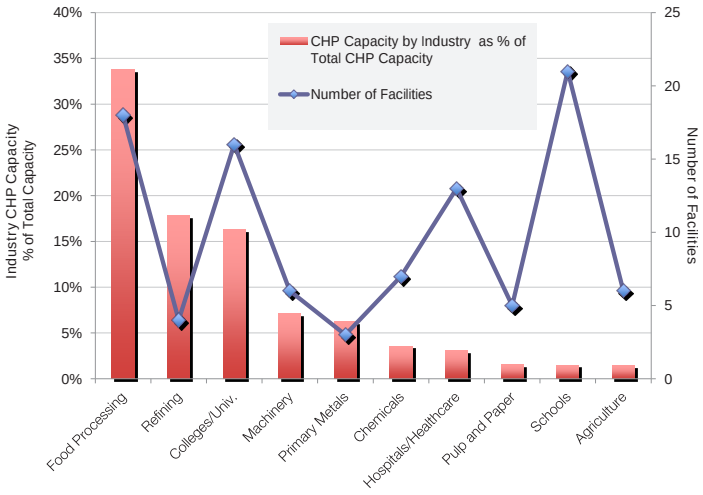
State Energy Profile

Energy consumption per capita:	**309 mmBtu (2011)**
Electric industry:	**Deregulated**
Total electric generation capacity:	**49,739 MW (2011)**
Average retail electricity price:	
All sectors:	**8.57 cents/kWh**
Residential:	**11.97 cents/kWh**
Commercial:	**8.31 cents/kWh**
Industrial:	**5.92 cents/kWh**
Average retail natural gas price:	
Residential:	**8.22 $/MCF**
Commercial:	**7.79 $/MCF**
Industrial:	**6.84 $/MCF (2011)**
Population:	**12,830,632 people (2010)**
State Real GDP:	**$594 billion**

(Statistics for the year 2012 unless otherwise noted)

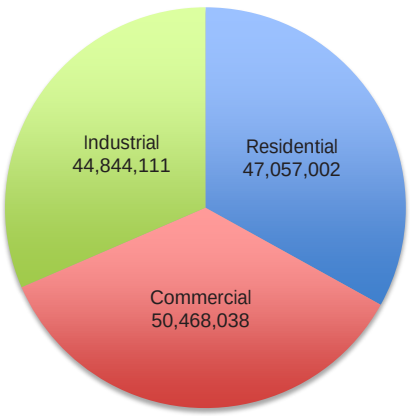
CHP Snapshot

Number of CHP facilities and capacity by industry as a percentage of total state CHP capacity



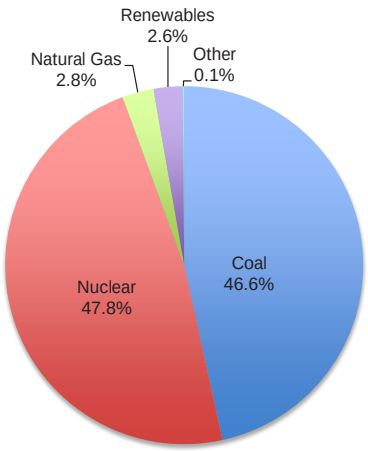
There are 137 combined heat and power (CHP) sites in Illinois, representing a total installed capacity of 1,329 MW. The largest CHP site in the state is Archer Daniels Midland Company in Decatur (230 MW), and the smallest site is a residential project located in Aurora (6 kW). As the graph above illustrates, the number of CHP facilities by industry is not necessarily correlated to an industry's share of total CHP capacity. Nationally, according to ICF International, 87 percent of current Installed CHP generation capacity is found at industrial facilities with high electric and steam demands such as chemical, paper, refining, food processing and metal manufacturing. Natural gas has been the preferred fuel for CHP systems in the U.S., accounting for around 70 percent of existing CHP capacity.

Electricity Sales
MWh



Source: U.S. Energy Information Administration, 2011

Electricity Production



Source: U.S. Energy Information Administration, 2010

Electricity sales are spread relatively evenly between the three sectors in Illinois and together they represent 142,369,151 MWh in total sales. Electricity generation from coal and nuclear accounts for 95 percent of the state's electricity production while natural gas, renewables and other energy sources make up the remaining 5 percent of generation.

State CHP Policies

Business Models & Decoupling

Direct Cost Recovery
All utilities with an approved energy efficiency program are eligible for a tariff rider.

Fixed Cost Recovery
Natural gas decoupling received final approval from the IIllinois Commerce Commission in 2012. North Shore Gas and People's Gas and Coke have natural gas decoupling programs. No decoupling mechanism is in place for electricity.

Noncompliance Penalties
Statutory penalty for noncompliance with energy efficiency standards. Noncompliant utilities can owe $100,000 per day of noncompliance and additional contributions to low-income home energy assistance programs. Utilities may have to establish third-party administration of energy efficiency programs.

Interconnection Standards

- No system capacity limit specified.
- Applicable to investor owned utilities (IOUs).
- Systems <10 MW require 4 levels of review based on system capacity and technology.
- Systems >10 MW require interconnection feasibility study.
- IEEE 1547 and UL 1741 adopted as certification standards.
- Rules define time limits for each level of evaluation.
- Liability insurance required for systems >1 MW (at least $4 million aggregate).
- Rules specify procedure for dispute resolution.

Financial Incentives

Grants
- Biogas and Biomass to Energy Grant Program
- Illinois Clean Energy Community Foundation Grant
- Dept. of Commerce & Economic Opportunity (DCEO) competitive grant solicitation for public CHP projects

Bonds
- Renewable Energy and Energy Efficiency Project Financing

Net Metering

Renewable CHP at or less than 2 MW could be eligible.

Output-Based Emissions Regulation

Illinois Pollution Control Board R06-26
As a part of the U.S. Environmental Protection Agency's (EPA) Clean Air Interstate Rule (CAIR), Illinois is reducing NO_x and SO_2 emissions. CHP is an eligible technology for energy efficiency set-aside allowances. For purposes of regulating NO_x and SO_2, the output of particular CHP systems is considered and factored into a determination of the system's total emissions.

Note: EPA's Cross State Air Pollution Rule was approved in April 2014. This ruling would replace CAIR standards, but at this time CAIR remains in place and no immediate action by states is required.

Portfolio Standards

Energy Efficiency Resource Standard
CHP and waste heat recovery (WHR) are not explicitly included. Energy efficiency projects by definition include measures that reduce total Btus of electricity and gas. A DCEO pilot for CHP in public buildings has been approved. 1% annual electric savings in the year starting June 2012, increasing to 2% in the year starting June 2015 and each year beyond.

For natural gas, 0.2% annual savings by May 2012, increasing to 1.5% by May 2019 and each year beyond (total savings of 7.1% as of May 2019). These are statutory goals subject to a statutory budget cap. The Illinois Commerce Commission can approve implementation plans with lower savings goals. Incentives are capped at $2M per project and up to 50% of project costs.

Renewable Portfolio Standard
CHP and WHR are not explicitly included. Utilities required to generate 25% of electricity sales renewably by 2026. At least 75% of IOU renewable energy must come from wind, 6% from solar, and 1% from distributed generation. For alternative retail electric suppliers, 60% must come from wind and 6% from solar. The remaining energy can be met using other renewables and "alternative sources of environmentally preferable energy."

State CHP Technical Potential (MW)

Facility Size	50-1000 kW	1-5 MW	5-20 MW	>20 MW	Total
Industrial	519	641	978	2,001	4,139
Commercial	1,972	1,232	40	134	3,379
Total	2,491	1,873	1,018	2,135	7,518

Source: ICF International

Technical potential is defined as the CHP electrical capacity that could be installed at existing industrial and commercial sites based on their electric and thermal needs (under the assumption that the facilities would utilize thermally loaded CHP systems sized to meet their electric demand).

Boiler MACT Affected Boilers

Facilities	155
Coal Units	37
Biomass Units	0
Gas Units	418
Heavy Oil Units	2
Light Oil Units	15
Total Capacity (mmBtu/hr)	44,914

MACT: Maximum Achievable Control Technology standard

Application	Units	Facilities	Capacity (mmBTU/hr)
Petroleum and Coal Products Manufacturing	105	5	18,790
Chemical Manufacturing	101	31	5,841
Food Manufacturing	46	15	7,303
Utilities	39	18	4,669
Pipeline Transportation	37	18	290
Transportation Equipment Manufacturing	32	8	3,786
Fabricated Metal Product Manufacturing	23	23	196
Primary Metal Manufacturing	20	2	1,454
Machinery Manufacturing	16	3	855
Printing and Related Support Activities	15	5	310

For more information on data sources, see CHP Factsheet Appendix at midwesterngovenors.org/publications/IEPfactsheet.pdf

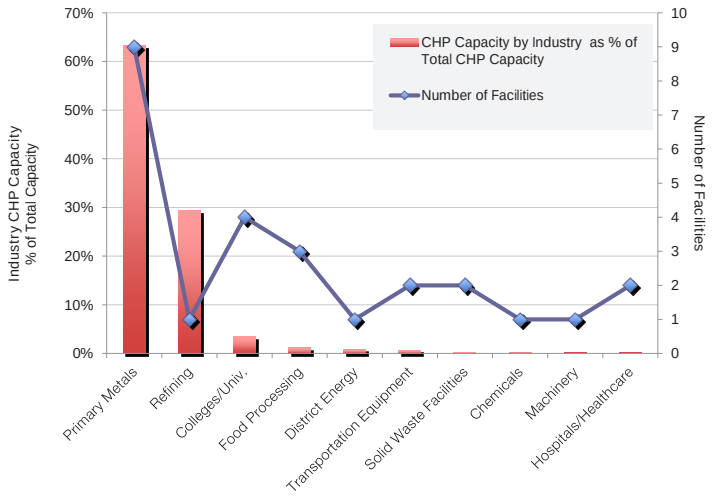
Indiana Combined Heat and Power Fact Sheet

State Energy Profile	
Energy consumption per capita:	**440 mmBtu (2011)**
Electric industry:	**Regulated**
Total electric generation capacity:	**30,765 MW (2011)**
Average retail electricity price:	
All sectors:	**8.33 cents/kWh**
Residential:	**10.71 cents/kWh**
Commercial:	**9.35 cents/kWh**
Industrial:	**6.53 cents/kWh**
Average retail natural gas price:	
Residential:	**9.46 $/MCF**
Commercial:	**8.04 $/MCF**
Industrial:	**6.53 $/MCF**
Population:	**6,483,802 people (2010)**
State Real GDP:	**$255 billion**

(Statistics for the year 2012 unless otherwise noted)

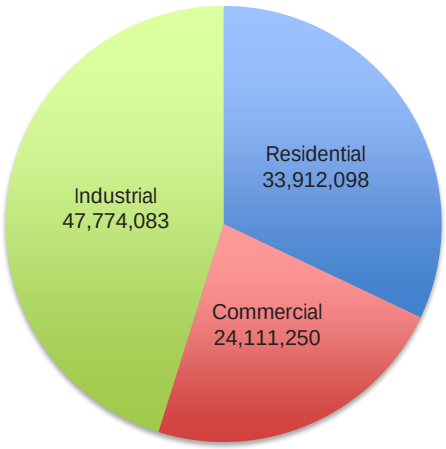
CHP Snapshot

Number of CHP facilities and capacity by industry as a percentage of total state CHP capacity



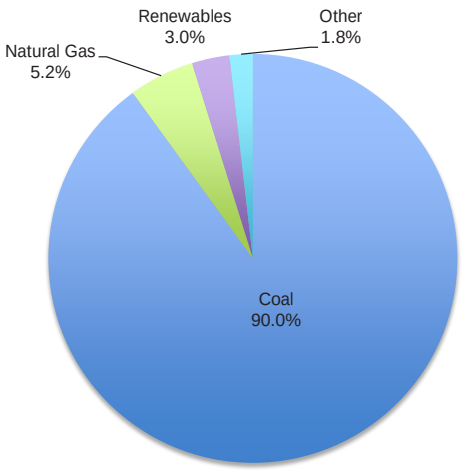
There are 37 combined heat and power (CHP) sites in Indiana, representing a total installed capacity of 2,262 MW. The largest CHP site in the state is Alcoa Smelting & Fabrication in Newburgh (755 MW) and the smallest site is the Notre Dame Energy Center Stinson-Remick Hall at the University of Notre Dame (30 kW). There is one 95 MW facility that uses waste heat recovery as a primary mover. As the graph above illustrates, the number of CHP facilities by industry is not necessarily correlated to an industry's share of total CHP capacity. Nationally, according to ICF International, 87 percent of current Installed CHP generation capacity is found at industrial facilities with high electric and steam demands such as chemical, paper, refining, food processing and metal manufacturing. Natural gas has been the preferred fuel for CHP systems in the U.S., accounting for around 70 percent of existing CHP capacity.

Electricity Sales
MWh



Source: U.S. Energy Information Administration, 2011

Electricity Production



Source: U.S. Energy Information Administration, 2010

The industrial sector represents almost half of total electricity sales in the state. All together, these three sectors represent 105,797,431 MWh in total electricity sales. Electricity generation from coal accounts for 90 percent of the state's electricity production while natural gas, renewables and other energy sources make up the remaining 10 percent of generation.

State CHP Policies

Output-Based Emissions Regulations

Indiana Administrative Code Title 326, Article 24
Allows energy efficiency set-asides as part of plan to reduce NO_x levels. CHP that is at least 40% efficient can be eligible for the set-asides, but some technologies are required to be up to 60% efficient. CHP systems are regulated using output-based measures.

The U.S. Environmental Protection Agency's Cross State Air Pollution Rule was approved in April 2014. This ruling would replace Clean Air Interstate Rule (CAIR) standards, but at this time CAIR remains in place and no immediate action by states is required.

Interconnection Standards

- No system capacity limit specified.
- Applicable to state investor owned utilities.
- 3 levels of review based on capacity.
- Systems must comply with IEEE 1547 and UL 1741 standards.
- Fees vary depending on nameplate capacity: $0-$100 initial cost plus $1-$2 per kWh plus other costs (e.g. engineering work <$100/ hour).
- Rules account for a mutual indemnification provision and reasonable time limits on application review. Disputes between customers and utilities settled using Indiana Utility Regulator Commission consumer-complaint rules.
- CHP eligible.

Financial Incentives

Production Incentives
- City of Bloomington - Sustainable Development Incentives

Rebates
- Northern Indiana Public Service Company Business Energy Efficiency Rebate Program

Grants
- Community Conservation Challenge

Portfolio Standards

Energy Efficiency Resource Standard
Indiana's energy efficiency resource standard was overturned on March 27, 2014. The program will terminate on December 31, 2014, having achieved 1.1% electricity savings.

Renewable Portfolio Standard
Voluntary goal of 10% clean energy by 2025, based on level of electricity supplied by the utility in 2010. Fossil-fueled and renewable-fueled CHP systems and waste heat recovery systems eligible.

Decoupling Utility Revenues

Indiana's energy efficiency resource standard was overturned in March 2014, overturning all direct cost recovery, fixed cost recovery, and performance incentives.

Net Metering

Renewable CHP at or less than 1 MW or 1% of the most recent peak summer load could be eligible.

State CHP Technical Potential (MW)

Facility Size	50-1000 kW	1-5 MW	5-20 MW	>20 MW	Total
Industrial	331	422	427	299	1,480
Commercial	921	582	0	91	1,593
Total	1,252	1,004	427	390	3,073

Source: ICF International

Technical potential is defined as the CHP electrical capacity that could be installed at existing industrial and commercial sites based on their electric and thermal needs (under the assumption that the facilities would utilize thermally loaded CHP systems sized to meet their electric demand).

Boiler MACT Affected Boilers

Facilities	160
Coal Units	32
Biomass Units	10
Gas Units	390
Heavy Oil Units	11
Light Oil Units	14
Total Capacity (mmBtu/hr)	50,349

MACT: Maximum Achievable Control Technology standard

Application	Units	Facilities	Capacity (mmBTU/hr)
Primary Metal Manufacturing	137	16	22,323
Petroleum and Coal Products Manufacturing	66	2	9,521
Chemical Manufacturing	31	13	4,402
Food Manufacturing	28	13	2,268
Transportation Equipment Manufacturing	27	19	1,123
Plastics and Rubber Products Manufacturing	25	17	300
Utilities	21	12	4,361
Printing and Related Support Activities	20	4	637
Educational Services	18	4	3,028
Wood Product Manufacturing	17	11	227

For more information on data sources, see CHP Factsheet Appendix at midwesterngovenors.org/publications/IEPfactsheet.pdf

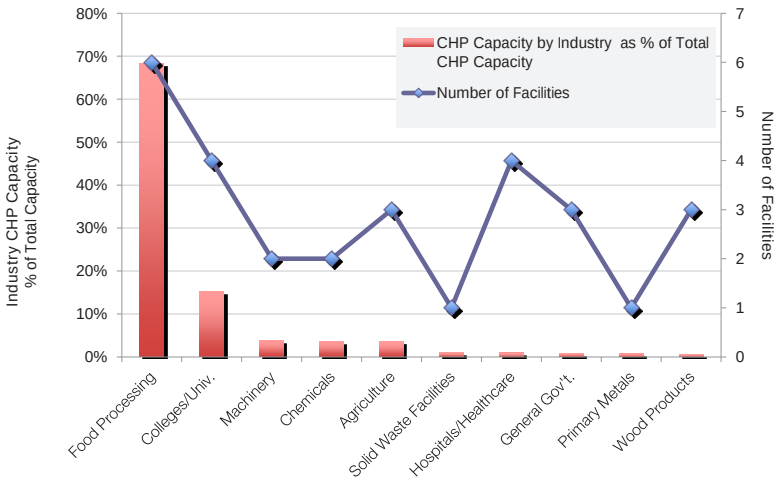
Iowa Combined Heat and Power Fact Sheet

State Energy Profile	
Energy consumption per capita:	**494 mmBtu (2011)**
Electric industry:	**Regulated**
Total electric generation capacity:	**16,470 MW (2011)**
Average retail electricity price:	
All sectors:	**7.30 cents/kWh**
Residential:	**10.31 cents/kWh**
Commercial:	**7.52 cents/kWh**
Industrial:	**5.05 cents/kWh**
Average retail natural gas price:	
Residential:	**9.54 $/MCF (2011)**
Commercial:	**7.13 $/MCF**
Industrial:	**4.71 $/MCF**
Population:	**3,046,355 people (2010)**
State Real GDP:	**$129 billion**

(Statistics for the year 2012 unless otherwise noted)

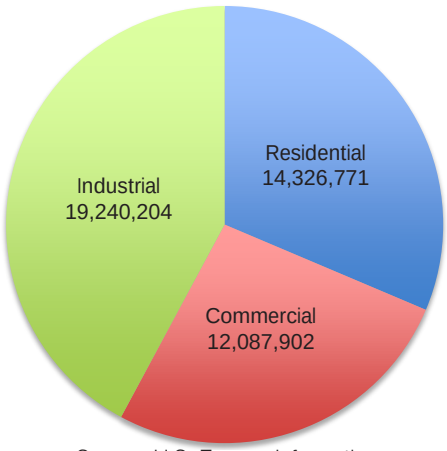
CHP Snapshot

Number of CHP facilities and capacity by industry as a percentage of total state CHP capacity



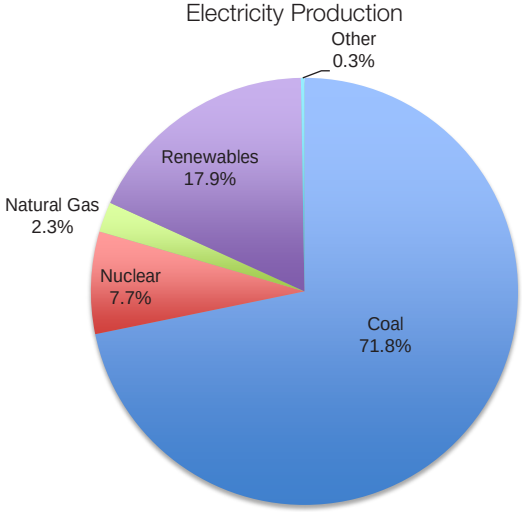
There are 34 combined heat and power (CHP) sites in Iowa, representing a total installed capacity of 590 MW. The largest CHP site in the state is the Archer Daniels Midland Company in Clinton (187 MW), and the smallest site is Kendrick Forest Products in Edgewood (50 kW). As the graph above illustrates, the number of CHP facilities by industry is not necessarily correlated to an industry's share of total CHP capacity. Nationally, according to ICF International, 87 percent of current installed CHP generation capacity is found at industrial facilities with high electric and steam demands such as chemical, paper, refining, food processing and metal manufacturing. Natural gas has been the preferred fuel for CHP systems in the U.S., accounting for around 70 percent of existing CHP capacity.

Electricity Sales
MWh



Source: U.S. Energy Information Administration, 2011

Electricity Production



Source: U.S. Energy Information Administration, 2010

The industrial sector represents around 40 percent of electricity sales in Iowa, out of 45,654,877 MWh in total electricity sales across the residential, commercial and industrial sectors. Electricity generation from coal and renewables account for 90 percent of the state's electricity production while nuclear, natural gas and other energy sources make up the remaining 10 percent.

State CHP Policies

Business Models & Decoupling

Direct Cost Recovery
Utilities with approved energy efficiency plans recover costs through an automatic adjustment mechanism. The mechanism takes the form of a tariff rider.

Fixed Cost Recovery
Decoupling is not required for Iowa gas and electric utilities. Utilities may propose automatic adjustment mechanisms or other rate design changes that decouple their profits from sales revenues. No utilities have decoupling programs.

Performance Incentives
A long-term revenue sharing arrangement was approved for MidAmerican Energy Company's regulated electric retail service.

Interconnection Standards

- 10 MW system capacity limit.
- Applicable to the two rate-regulated utilities.
- Limited guidelines for non rate-regulated utilities.
- 4 levels of review for interconnection based on capacity and technology.
- Standardized interconnection applications and agreements.
- IEEE 1547 and UL 1741 adopted as certification standards.
- Rules define time limits for each level of evaluation.
- Fees vary depending upon capacity: $50-$1,000 initial cost plus $1-$2/kwh depending on tier.
- General liability insurance requirements for facilities >1 MW vary between $2 million-$4 million.
- Rules specify procedure for dispute resolution.
- CHP eligible.

Financial Incentives

Loans
- Alternate Energy Revolving Loan Program
- Iowa Area Development Group Energy Bank Revolving Loan Program

Taxes
- Energy Replacement Generation Tax Exemption
- Renewable Energy Production Tax Credit

Portfolio Standards

Energy Efficiency Resource Standard
CHP not explicitly included. The Iowa Utility Board (IUB) approved CHP and waste heat recovery (WHR) for both of Iowa's rate-regulated utilities. Energy efficiency goals differ by utility. On average, Iowa must achieve 1.4% annual electricity savings and 1.2% annual natural gas savings through 2014.

Renewable Portfolio Standard
CHP and WHR not explicitly included. Iowa's rate-regulated utilities msut generate 105 MW renewably annually.

Standby Rate Design

An IUB docket is considering a standby rate policy as one of several alternative rate mechanisms to address additional expenses associated with distributed generation (DG). Other considered mechanisms include demand charges, customer charges, an electricity exchange market, and rebuilding the cost of service framework. The newest docket is written in the context of solar energy, while the original specified no particular form of DG.

Output-Based Emissions Regulations

None

Net Metering

Renewable CHP at or less than 500 kW could be eligible.

State CHP Technical Potential (MW)

Facility Size	50-1000 kW	1-5 MW	5-20 MW	>20 MW	Total
Industrial	171	287	227	252	937
Commercial	444	279	0	15	738
Total	615	566	227	267	1,675

Source: ICF International

Technical potential is defined as the CHP electrical capacity that could be installed at existing industrial and commercial sites based on their electric and thermal needs (under the assumption that the facilities would utilize thermally loaded CHP systems sized to meet their electric demand).

Boiler MACT Affected Boilers

Facilities	71
Coal Units	41
Biomass Units	5
Gas Units	208
Heavy Oil Units	2
Light Oil Units	6
Total Capacity (mmBtu/hr)	35,935

MACT: Maximum Achievable Control Technology standard

Application	# Units	# Facilities	Capacity (mmBTU/hr)
Food Manufacturing	98	20	15,521
Fabricated Metal Product Manufacturing	39	3	1,083
Educational Services	30	4	3,089
Utilities	22	11	7,578
Chemical Manufacturing	18	5	2,970
Pipeline Transportation	13	5	286
Machinery Manufacturing	13	8	4,438
Wood Product Manufacturing	8	3	216
Plastics and Rubber Products Manufacturing	5	3	117
Electrical Equipment, Appliance and Component Manufacturing	4	2	23

For more information on data sources, see CHP Factsheet Appendix at midwesterngovenors.org/publications/IEPfactsheet.pdf

Kansas Combined Heat and Power Fact Sheet

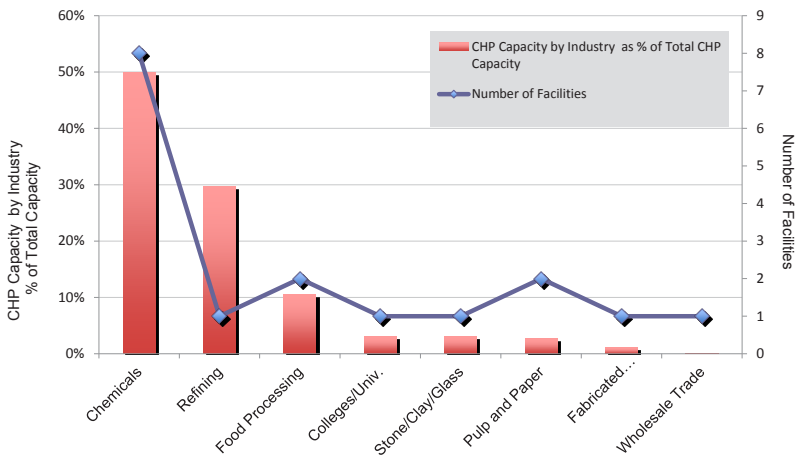
State Energy Profile

Energy consumption per capita:	**405 mmBtu (2011)**
Electric industry:	**Regulated**
Total electric generation capacity:	**13,821 MW (2011)**
Average retail electricity price:	
All sectors:	**8.76 cents/kWh**
Residential:	**10.74 cents/kWh**
Commercial:	**8.84 cents/kWh**
Industrial:	**6.69 cents/kWh**
Average retail natural gas price:	
Residential:	**10.18 $/MCF**
Commercial:	**8.81 $/MCF**
Industrial:	**3.80 $/MCF**
Population:	**2,853,118 people (2010)**
State Real GDP:	**$118 billion**

(Statistics for the year 2012 unless otherwise noted)

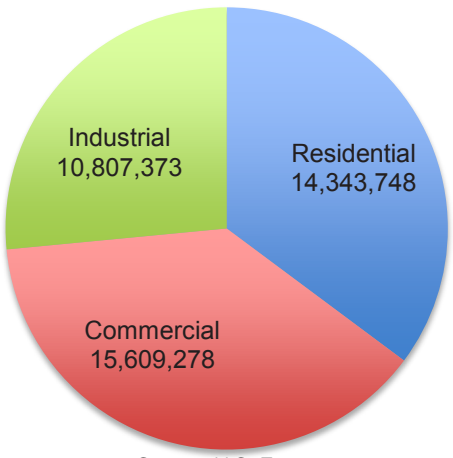
CHP Snapshot

Number of CHP facilities and capacity by industry as a percentage of total state CHP capacity



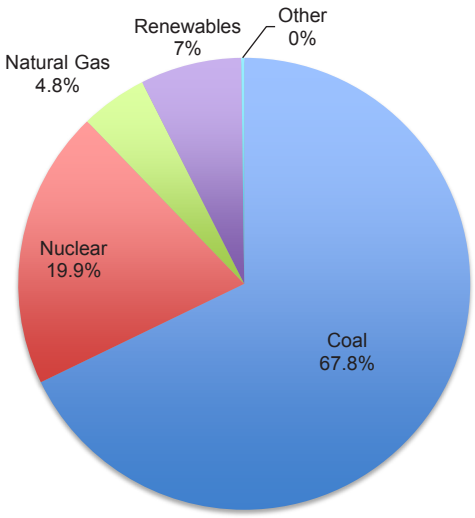
There are 17 combined heat and power (CHP) sites in Kansas, representing a total installed capacity of 134 MW. The largest CHP site in the state is El Dorado Refinery in El Dorado (40 MW), and the smallest site is Marvin E. Boyer Oil Company, Inc. in Iola (95 kW). There is one 4,000 kW CHP facility that uses waste heat recovery as a primary mover. As the graph above illustrates, the number of CHP facilities by industry is not necessarily correlated to an industry's share of total CHP capacity. Nationally, according to ICF International, 87 percent of current installed CHP generation capacity is found at industrial sector facilities with high electric and steam demands such as chemical, paper, refining, food processing and metal manufacturing. Natural gas has been the preferred fuel for CHP systems in the U.S., accounting for around 70 percent of existing CHP capacity.

Electricity Sales
MWh



Source: U.S. Energy Information Administration, 2011

Electricity Production



Source: U.S. Energy Information Administration, 2010

The commercial and residential sectors account for roughly 70 percent of total electricity sales. All together, these three sectors represent 40,760,399 MWh in total sales. Electricity generation from coal and nuclear account for close to 90 percent of the state's electricity production while natural gas, renewables and other energy sources make up the remaining 10 percent of generation.

State CHP Policies

Business Models & Decoupling	Interconnection Standards	Financial Incentives
Direct Cost Recovery Proposals for cost recovery will be considered on a case-by-case basis. **Fixed Cost Recovery** The Kansas Corporation Commission (KCC) will consider decoupling proposals from electric and gas utilities on a case-by-case basis. No plans have been approved. **Performance Incentives** The KCC will evaluate shared savings proposals on a case-by-case-basis. Westar Energy has a shared savings program.	• 200 kW capacity limit for non-residential customers; 25 kW capacity limit for residential customers. • Applicable to investor owned utilities. • IEEE 1547 and UL 1741 adopted as technical standards. • Specified fee amounts or utility response timelines not established in guidelines. • No additional liability insurance is required if safety and interconnection standards are met. • Procedure for dispute resolution may be established by utilities. • Renewable-fueled CHP systems eligible.	**Taxes** • Renewable Energy Property Tax Exemption • Property Tax Incentives for Waste Energy Recovery System
Output-Based Emissions Regulations	**Net Metering**	**Portfolio Standards**
None	15 kW capacity limit for residential customers, 100 kW limit for commercial customers, and 150 kW limit for churches and schools. Renewable CHP at or less than these limits could be eligible.	**Energy Efficiency Resource Standard** None **Renewable Portfolio Standard** CHP and waste heat recovery ineligible. Utilities must generate 20% of peak demand capacity from renewable sources by 2020.

State CHP Technical Potential (MW)

Facility Size	50-1000 kW	1-5 MW	5-20 MW	>20 MW	Total
Industrial	117	192	184	296	789
Commercial	409	238	0	63	710
Total	526	430	184	359	1,499

Source: ICF International

Technical potential is defined as the CHP electrical capacity that could be installed at existing industrial and commercial sites based on their electric and thermal needs (under the assumption that the facilities would utilize thermally loaded CHP systems sized to meet their electric demand).

Boiler MACT Affected Boilers

Facilities	37
Coal Units	1
Biomass Units	0
Gas Units	183
Heavy Oil Units	5
Light Oil Units	3
Total Capacity (mmBtu/hr)	11,397

MACT: Maximum Achievable Control Technology standard

Application	# Units	# Facilities	Capacity (mmBTU/hr)
Transportation Equipment Manufacturing	83	7	1,645
Petroleum and Coal Products Manufacturing	54	2	5,782
Chemical Manufacturing	17	6	1,595
Pipeline Transportation	11	5	101
Utilities	7	5	760
Oil and Gas Extraction	6	1	815
Food Manufacturing	4	2	257
Plastics and Rubber Products Manufacturing	4	1	393
National Security and International Affairs	4	1	39
Nonmetallic Mineral Product Manufacturing	2	3	10

For more information on data sources, see CHP Factsheet Appendix at midwesterngovenors.org/publications/IEPfactsheet.pdf

Michigan Combined Heat and Power Fact Sheet

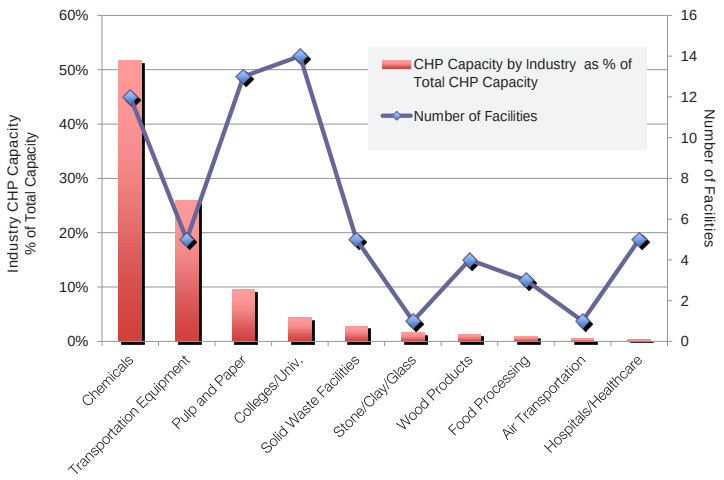
State Energy Profile

Energy consumption per capita:	**284 mmBtu (2011)**
Electric industry:	**Deregulated**
Total electric generation capacity:	**33,066 MW (2011)**
Average retail electricity price:	
All sectors:	**10.62 cents/kWh**
Residential:	**13.64 cents/kWh**
Commercial:	**10.71 cents/kWh**
Industrial:	**7.44 cents/kWh**
Average retail natural gas price:	
Residential:	**9.96 $/MCF**
Commercial:	**8.34 $/MCF**
Industrial:	**7.42 $/MCF**
Population:	**9,883,640 people (2010)**
State Real GDP:	**$348 billion**

(Statistics for the year 2012 unless otherwise noted)

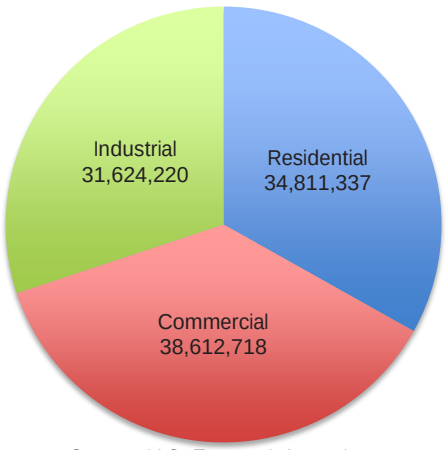
CHP Snapshot

Number of CHP facilities and capacity by industry as a percentage of total state CHP capacity



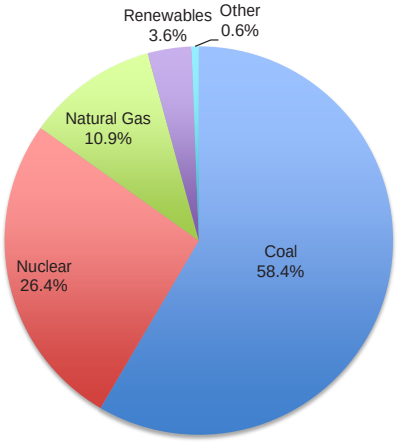
There are 87 combined heat and power (CHP) sites in Michigan, representing a total installed capacity of 3,057 MW. The largest CHP site in the state is Dow Chemical Company in Midland (1,370 MW), and the smallest site is Wayne State University College of Engineering in Detroit (5 kW). As the graph above illustrates, the number of CHP facilities by industry is not necessarily correlated to an industry's share of total CHP capacity. Nationally, according to ICF International, 87 percent of current Installed CHP generation capacity is found at industrial facilities with high electric and steam demands such as chemical, paper, refining, food processing and metal manufacturing. Natural gas has been the preferred fuel for CHP systems in the U.S., accounting for around 70 percent of existing CHP capacity.

Electricity Sales
MWh



Source: U.S. Energy Information Administration, 2011

Electricity Production



Source: U.S. Energy Information Administration, 2010

Electricity sales are spread relatively evenly between the three sectors and together they represent 105,048,275 MWh in total sales. Electricity generation from coal and nuclear account for 85 percent of the state's electricity production while natural gas, renewables and other energy sources make up the remaining 15 percent of generation.

State CHP Policies

Business Models & Decoupling

Direct Cost Recovery
All utilities with energy efficiency programs are eligible for a tariff rider to recover costs specified in approved energy efficiency plans.

Fixed Cost Recovery
Natural gas decoupling approved through Act 295 for companies which spend at least 0.5% of their total revenues on energy efficiency programs. Michigan Consolidated Gas Company, Consumers Energy and Michigan Gas Utilities have been approved for decoupling. Decoupling for electric utilities, initially established by Act 295, was overturned in 2012.

Performance Incentives
Performance incentives must be no more than 15% of the total cost of energy efficiency programs. Only rate-regulated utilities are eligible. Detroit Edison Company was approved for an incentive.

Noncompliance Penalties
Noncompliance penalties are subject to regulatory review. Utilities which do not comply may have energy efficiency programs suspended and receive no new cost-recovery funds for new programs. Civil action can be brought against a utility for noncompliance by the Michigan Attorney General or a member of cooperative utility.

Interconnection Standards

- No system capacity limit specified.
- Applicable to all utilities except for municipal utilities.
- 5 levels of review for interconnection based on capacity.
- IEEE 1547 and UL 1741 adopted as system certification standards.
- Timelines for processing and review included for different system categories.
- Fees vary depending on capacity from $75 - $100.
- Liability insurance greater than $1 million required for systems >150 kW.
- Standardized communication procedures to address inquiries about technical issues or the status of interconnection requests.
- Rules specify procedure for dispute resolution through the Michigan Public Service Commission (MPSC) or through panel of experts.
- CHP eligible.

Net Metering

Renewable CHP at or less than 150 kW could be eligible.

Output-Based Emissions Regulations

None

Portfolio Standards

Energy Efficiency Resource Standard
CHP and waste heat recovery (WHR) are not explicitly included. 1% annual electricity savings from 2012-2015. 0.75% annual natural gas savings from 2012-2015. Standards after 2015 will be determined by the MPSC. Efficiency spending is capped at 2.0% of the total retail sales revenues.

Renewable Portfolio Standard
Utilities required to generate 10% of electricity sales using renewables by 2015. Energy efficiency and advanced cleaner energy credits (ACECs) can meet 10% of the requirement. Industrial CHP and WHR systems are eligible for ACECs without commission approval. Stricter standards are applied to the largest utilities. Detroit Edison must generate 600 MW renewably by 2015, and Consumers Energy must generate 500 MW renewably by 2015.

Financial Incentives

Loans
- Property Assessed Clean Energy (Local Option)

Tax Credits
- Nonrefundable Business Activity Tax Credit
- Refundable Payroll Tax Credit
- Alternative Energy Personal Property Tax Exemption
- Renewable Energy Renaissance Zones

State CHP Technical Potential (MW)

Facility Size	50-1000 kW	1-5 MW	5-20 MW	>20 MW	Total
Industrial	454	435	690	735	2,314
Commercial	1,391	943	0	99	2,434
Total	1,845	1,378	690	834	4,748

Source: ICF International

Technical potential is defined as the CHP electrical capacity that could be installed at existing industrial and commercial sites based on their electric and thermal needs (under the assumption that the facilities would utilize thermally loaded CHP systems sized to meet their electric demand).

Boiler MACT Affected Boilers

Facilities	98
Coal Units	54
Biomass Units	6
Gas Units	192
Heavy Oil Units	8
Light Oil Units	7
Total Capacity (mmBtu/hr)	28,039

MACT: Maximum Achievable Control Technology standard

Application	# Units	# Facilities	Capacity (mmBTU/hr)
Transportation Equipment Manufacturing	65	22	4,742
Professional, Scientific and Technical Services	33	7	2,002
Food Manufacturing	30	9	2,226
Utilities	25	20	4,450
Paper Manufacturing	21	8	6,783
Primary Metal Manufacturing	20	2	1,927
Petroleum and Coal Products Manufacturing	16	1	1,347
Furniture and Related Product Manufacturing	13	4	774
Educational Services	11	4	1,571
Chemical Manufacturing	9	5	814

For more information on data sources, see CHP Factsheet Appendix at midwesterngovenors.org/publications/IEPfactsheet.pdf

Minnesota Combined Heat and Power Fact Sheet

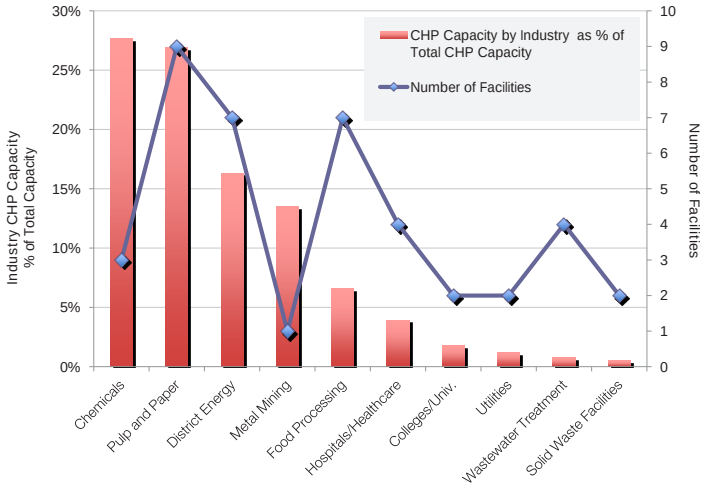
State Energy Profile

Energy consumption per capita:	**349 mmBtu (2011)**
Electric industry:	**Regulated**
Total electric generation capacity:	**17,169 MW (2011)**
Average retail electricity price:	
All sectors:	**8.67 cents/kWh**
Residential:	**10.97 cents/kWh**
Commercial:	**8.62 cents/kWh**
Industrial:	**6.51 cents/kWh**
Average retail natural gas price:	
Residential:	**7.97 $/MCF**
Commercial:	**6.34 $/MCF**
Industrial:	**4.29 $/MCF**
Population:	**5,303,925 people (2010)**
State Real GDP:	**$252 billion**

(Statistics for the year 2012 unless otherwise noted)

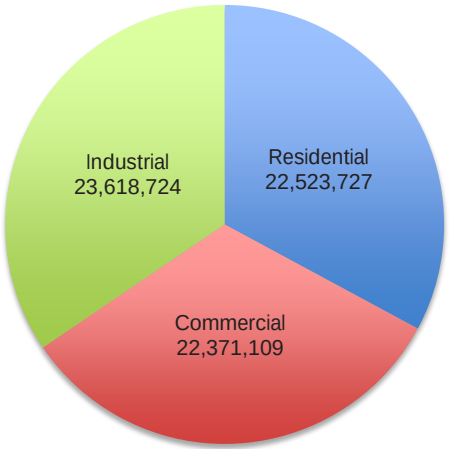
CHP Snapshot

Number of CHP facilities and capacity by industry as a percentage of total state CHP capacity



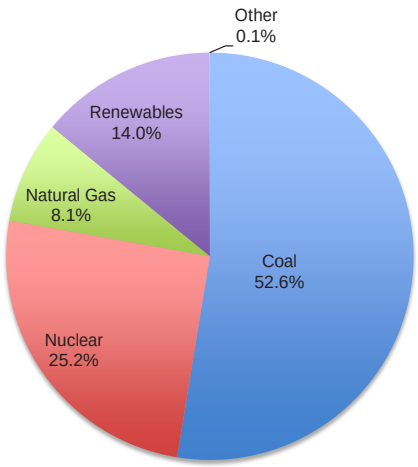
There are 55 combined heat and power (CHP) sites in Minnesota, representing a total installed capacity of 919 MW. The largest CHP site in the state is the 3M Plant in Cottage Grove (251 MW), and the smallest site is Fond du Lac Tribal and Community College in Cloquet (30 kW). As the graph above illustrates, the number of CHP facilities by industry is not necessarily correlated to an industry's share of total CHP capacity. Nationally, according to ICF International, 87 percent of current Installed CHP generation capacity is found at industrial facilities with high electric and steam demands such as chemical, paper, refining, food processing and metal manufacturing. Natural gas has been the preferred fuel for CHP systems in the U.S., accounting for around 70 percent of existing CHP capacity.

Electricity Sales
MWh



Source: U.S. Energy Information Administration, 2011

Electricity Production



Source: U.S. Energy Information Administration, 2010

Electricity sales are spread relatively evenly between the three sectors and together they represent 68,513,560 MWh in total sales Electricity generation from coal and nuclear account for close to 80 percent of the state's electricity production while natural gas, renewables and other energy sources make up the remaining 20 percent of generation.

State CHP Policies

Business Models & Decoupling

Direct Cost Recovery
All utilities with approved conservation improvement programs are eligible for rate decoupling through rate cases and a tariff rider. The Minnesota Public Utilities Commission (PUC) must consider conservation improvement programs when determining rates.

Fixed Cost Recovery
The PUC has criteria and standards for revenue decoupling pilot proposals. Proposals were due December 30, 2011. CenterPoint Energy and Minnesota Energy Resources Corporation have decoupling in place for natural gas customers.

Performance Incentives
Minnesota has a state-wide performance incentive. Electric utilities earn $0.07/kWh for 1.5% retail sales savings. Natural gas utilities save $9.00 per thousand cubic feet. Performance incentives have a cap of 20% of net benefits on the incentive.

Standby Rate Design

A 2013 PUC docket proposes that projects that are 100 kW or under and in public utility service territory not be subject to standby rates.

Output Based Emissions Regulations

None

Interconnection Standards

- 10 MW system capacity limit.
- Applicable to all investor owned utilities (IOUs), municipal utilities and rural electric cooperatives.
- Streamlined uniform interconnection applications and process addressing safety, economics and reliability issues.
- Technical requirements related to engineering studies.
- IEEE 1547 and UL 1741 adopted as system certification standards.
- Standard application fees.
- Mandatory minimum insurance requirements for different sized systems.
- Dispute resolution process.
- CHP eligible.

Net Metering

All distributed generation technologies are eligible. Commercial, industrial and residential sectors are eligible. 1 MW capacity limit for public utilities. The PUC may limit cumulative generation. Applies to all IOUs, municipal utilities and electric cooperatives. Utilities must compensate customers with < 40 kW capacity for their net excess generation at the "average retail utility energy rate." For systems 40 kW - 1 MW, net excess generation is credited at avoided cost rate, or customers may elect to be compensated through kWh credit. Excess credit reimbursed at the end of the calendar year at the avoided cost rate. Meter aggregation is allowed for IOU customers.

Financial Incentives

Production Incentive
- Renewable Energy Production Incentive

Portfolio Standards

Energy Efficiency Resource Standard
CHP and waste heat recovery (WHR) eligible. WHR systems get credit for their electricity output. Sets savings targets for electric and gas utilities that apply to CHP: 1.5% annual electric savings starting in 2010; 1% annual gas savings from 2013 forward. Of the 1.5% savings for electricity, 1% must be met with direct energy efficiency savings. Up to 0.5% may be met with efficiency enhancements to generation, transmission, and distribution. Electricity utilities must spend 1.5% of their gross operating revenues on energy efficiency programs, and natural gas utilities must spend 0.5%.

Renewable Portfolio Standard
Eligible CHP facilities must be powered by renewable fuels like biomass or landfill gas. Municipal and cooperative electric utilities are required to meet 25% of electric sales with renewable power by 2025. The standard is 30% by 2020 for Xcel Energy and 26.5% by 2025 for other IOUs. Of Xcel's 30% renewable energy requirement, a total of 25% must come from solar and wind power, with a maximum of 1% generated from solar. Xcel must also produce 825 MW wind energy and 110 MW biomass energy by 2020. Other IOUs must produce 1.5% of their energy from solar sources, 10% of which must be met with systems < 20 kW. Minnesota has a state-wide goal of 10% solar energy by 2030.

State CHP Technical Potential (MW)

Facility Size	50-1000 kW	1-5 MW	5-20 MW	>20 MW	Total
Industrial	247	324	332	172	1,075
Commercial	865	515	0	55	1,434
Total	1,112	839	332	227	2,509

Source: ICF International

Technical potential is defined as the CHP electrical capacity that could be installed at existing industrial and commercial sites based on their electric and thermal needs (under the assumption that the facilities would utilize thermally loaded CHP systems sized to meet their electric demand).

Boiler MACT Affected Boilers

Facilities	48
Coal Units	24
Biomass Units	16
Gas Units	99
Heavy Oil Units	10
Light Oil Units	11
Total Capacity (mmBtu/hr)	19,841

MACT: Maximum Achievable Control Technology standard

Application	# Units	# Facilities	Capacity (mmBTU/hr)
Food Manufacturing	34	10	4,252
Utilities	31	12	7,208
Petroleum and Coal Products Manufacturing	30	1	1,805
Mining (except Oil and Gas)	18	3	2,150
Air Transportation	14	1	346
Paper Manufacturing	12	4	2,804
Wood Product Manufacturing	7	5	207
Professional, Scientific and Technical Services	6	1	939
Nonmetallic Mineral Product Manufacturing	3	2	97
Furniture and Related Product Manufacturing	2	1	10

For more information on data sources, see CHP Factsheet Appendix at midwesterngovenors.org/publications/IEPfactsheet.pdf

Missouri Combined Heat and Power Fact Sheet

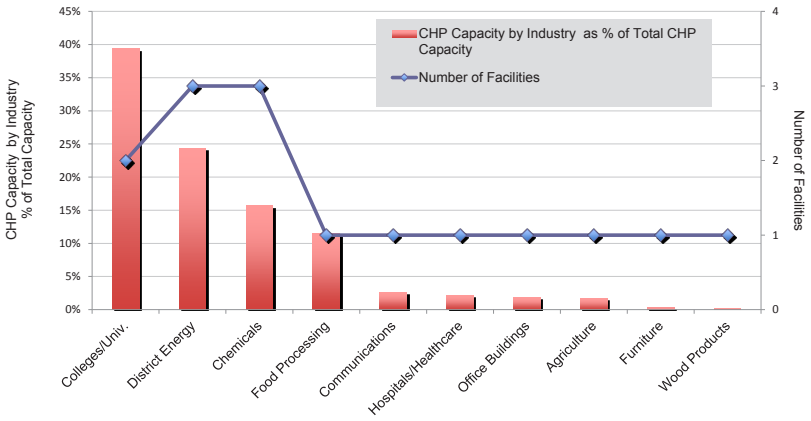
State Energy Profile

Energy consumption per capita:	**313 mmBtu (2011)**
Electric industry:	**Regulated**
Total electric generation capacity:	**23,764 MW (2011)**
Average retail electricity price:	
All sectors:	**7.57 cents/kWh**
Residential:	**9.23 cents/kWh**
Commercial:	**7.73 cents/kWh**
Industrial:	**5.20 cents/kWh**
Average retail natural gas price:	
Residential:	**12.31 $/MCF**
Commercial:	**9.68 $/MCF**
Industrial:	**7.86 $/MCF**
Population:	**5,988,927 people (2010)**
State Real GDP:	**$221 billion**

(Statistics for the year 2012 unless otherwise noted)

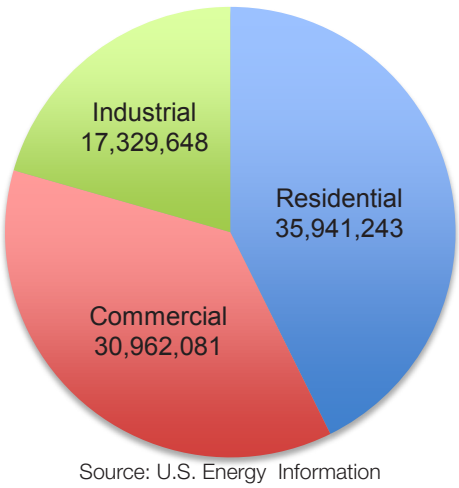
CHP Snapshot

Number of CHP facilities and capacity by industry as a percentage of total state CHP capacity



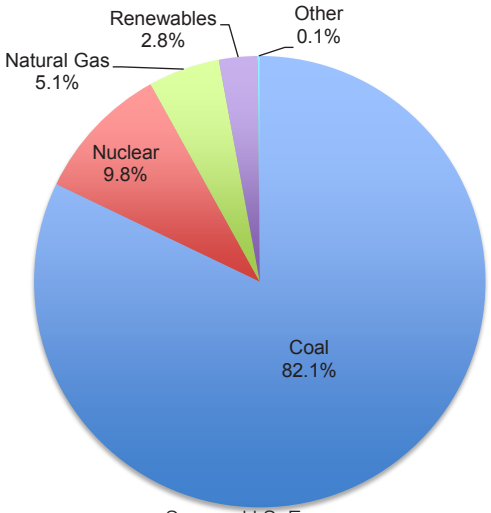
There are 19 combined heat and power (CHP) sites in Missouri, representing a total installed capacity of 228 MW. The largest CHP site in the state is the University of Missouri Power Plant (84 MW), and the smallest site is located in the Lewistown School District (60 kW). As the graph above illustrates, the number of CHP facilities by industry is not necessarily correlated to an industry's share of total CHP capacity. Nationally, according to ICF International, 87 percent of current installed CHP generation capacity is found at industrial sector facilities with high electric and steam demands such as chemical, paper, refining, food processing and metal manufacturing. Natural gas has been the preferred fuel for CHP systems in the U.S., accounting for around 70 percent of existing CHP capacity.

Electricity Sales
MWh



Source: U.S. Energy Information Administration, 2011

Electricity Production



Source: U.S. Energy Information Administration, 2010

The commercial and residential sectors account for roughly 80 percent of total electricity sales. All together, these three sectors represent 84,232,972 MWh in total sales. Electricity generation from coal accounts for approximately 82 percent of the state's electricity production while nuclear, natural gas, renewables and other energy sources make up the remaining 18 percent of generation.

State CHP Policies

Business Models & Decoupling

Direct Cost Recovery
Utilities with energy efficiency programs may use rate cases to adjust rates more frequently. Ameren and Kansas City Power & Light-Greater Missouri Operations (KCP&L GMO) have been approved for the rate case.

Fixed Cost Recovery
No decoupling policies in place, but utilities may recover revenue through a demand-side investment mechanism. Lost revenue recovery is based on verified energy savings. Ameren and KCP&L GMO have been approved for lost revenue recovery.

Performance Incentives
Under the Missouri Energy Efficiency Investment Act, Ameren Missouri and KCP&L GMO receive incentives based on net shared benefits from reaching energy efficiency program targets.

Noncompliance Penalties
Penalties for noncompliance are not permitted.

Interconnection Standards

- 100 kW system capacity limit.
- Applicable to investor owned utilities.
- Systems must meet IEEE 1547 and UL 1741 standards.
- Timelines detailed in the rules.
- Eligible systems must net meter.
- No additional interconnection fees are permitted.
- Liability insurance is at least $100,000 for systems >10 kW.
- Dispute resolution is handled by the Missouri Public Service Commission.
- Renewable-fueled CHP eligible.

Net Metering

100 kW capacity limit. Renewable CHP at or less than 100 kW could be eligible if other requirements of revised statute 386.8990 are met.

Financial Incentives

Loans
- Energy Revolving Fund Loans
- Local Property Assessed Clean Energy programs
- Qualified Energy Conservation Bonds

Portfolio Standards

Energy Efficiency Resource Standard
CHP and waste heat recovery (WHR) not explicitly included. Voluntary energy savings targets of 0.3% annual electric savings in 2012, 0.9% in 2015, and 1.7% in 2019. The standard achieves aggregate annual savings of 9.9% by 2020.

Renewable Portfolio Standard
CHP and WHR not explicitly included. Utilities must generate 15% of their energy from renewable sources by 2021, with a 2% solar-electric requirement.

Output-Based Emissions Regulations

The U.S. Environmental Protection Agency's (EPA) Clean Air Interstate Rule (CAIR), requires Missouri to reduce its annual NO_x emissions. The state developed a cap-and-trade program for NO_x (includes allowances for CHP projects based upon the system's output).

Note: The U.S. EPA's Cross State Air Pollution Rule was approved in April 2014. This ruling would replace CAIR standards, but at this time CAIR remains in place and no immediate action by states is required.

State CHP Technical Potential (MW)

Facility Size	50-1000 kW	1-5 MW	5-20 MW	>20 MW	Total
Industrial	215	345	290	223	1,073
Commercial	847	569	0	117	1,533
Total	1,062	914	290	340	2,606

Source: ICF International

Technical potential is defined as the CHP electrical capacity that could be installed at existing industrial and commercial sites based on their electric and thermal needs (under the assumption that the facilities would utilize thermally loaded CHP systems sized to meet their electric demand).

Boiler MACT Affected Boilers

Facilities	56
Coal Units	26
Biomass Units	2
Gas Units	72
Heavy Oil Units	3
Light Oil Units	18
Total Capacity (mmBtu/hr)	11,237

Application	# Units	# Facilities	Capacity (mmBTU/hr)
Utilities	36	15	7,047
Transportation Equipment Manufacturing	34	8	1,502
Chemical Manufacturing	14	11	932
Food Manufacturing	13	3	1,098
National Security and International Affairs	10	1	462
Furniture and Related Product Manufacturing	4	1	99
Wood Product Manufacturing	2	2	10
Nonmetallic Mineral Product Manufacturing	2	2	10
Fabricated Metal Product Manufacturing	2	5	35
Pipeline Transportation	2	2	10

MACT: Maximum Achievable Control Technology standard

For more information on data sources, see CHP Factsheet Appendix at midwesterngovenors.org/publications/IEPfactsheet.pdf

Ohio Combined Heat and Power Fact Sheet

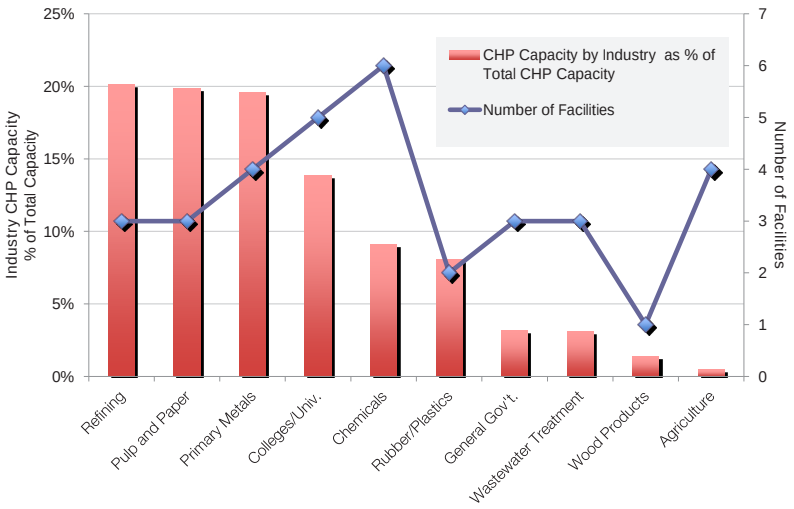
State Energy Profile

Energy consumption per capita:	**332 mmBtu (2011)**
Electric industry:	**Deregulated**
Total electric generation capacity:	**36,305 MW (2011)**
Average retail electricity price:	
All sectors:	**8.68 cents/kWh**
Residential:	**11.25 cents/kWh**
Commercial:	**9.48 cents/kWh**
Industrial:	**5.89 cents/kWh**
Average retail natural gas price:	
Residential:	**9.84 $/MCF**
Commercial:	**7.14 $/MCF**
Industrial:	**6.77 $/MCF (2011)**
Population:	**11,536,504 people (2010)**
State Real GDP:	**$435 billion**

(Statistics for the year 2012 unless otherwise noted)

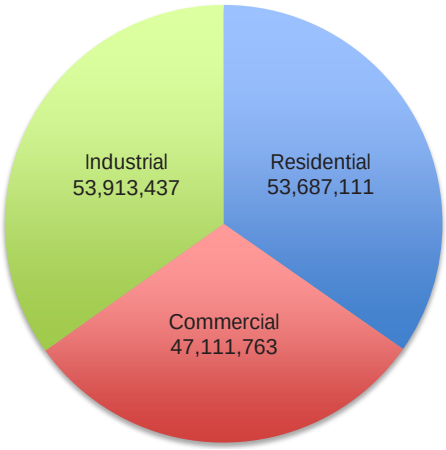
CHP Snapshot

Number of CHP facilities and capacity by industry as a percentage of total state CHP capacity



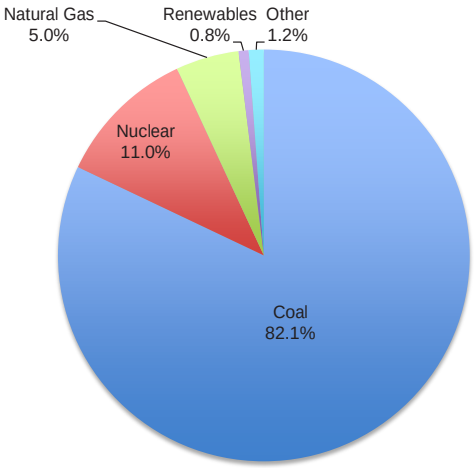
There are 45 combined heat and power (CHP) sites in Ohio, representing a total installed capacity of 521 MW. The largest CHP site in the state is Glatfelter Research in Chillicothe (81 MW), and the smallest site is International Cogeneration Corporation's Clarke Gm Diesel in Cincinnati (75 kW). There are two CHP sites (99 MW total capacity) that use waste heat recovery as a primary mover. As the graph above illustrates, the number of CHP facilities by industry is not necessarily correlated to an industry's share of total CHP capacity. Nationally, according to ICF International, 87 percent of current Installed CHP generation capacity is found at industrial facilities with high electric and steam demands such as chemical, paper, refining, food processing and metal manufacturing. Natural gas has been the preferred fuel for CHP systems in the U.S., accounting for around 70 percent of existing CHP capacity.

Electricity Sales
MWh



Source: U.S. Energy Information Administration, 2011

Electricity Production



Source: U.S. Energy Information Administration, 2010

Electricity sales are spread relatively evenly between the three sectors and together they represent 154,712,311 MWh in total sales. Electricity generation from coal accounts for approximately 82 percent of the state's electricity production while nuclear, natural gas, renewables and other energy sources make up the remaining 18 percent of generation.

State CHP Policies

Decoupling Utility Revenues	Interconnection Standards	Output-Based Emissions Regulations
None	• 20 MW system capacity limit. • Applicable to investor owned utilities. • 3 levels of review based on capacity. • Simplified review process for lower levels of interconnection. • Systems must meet IEEE 1547 and UL 1741 standards. • Timelines detailed in the rules. • Fees specified in rules. • Utilities may not require additional liability insurance. • Provision for alternative dispute resolution and formal complaints. • CHP eligible.	**Ohio Administrative Code 3745-14** Under Ohio's NO_x Budget Trading Program, CHP counts for energy efficiency allowances and renewable energy NO_x set-asides. Program dormant as there has been little to no subscription in the program. Note: The U.S. Environmental Protection Agency's Cross State Air Pollution Rule was approved in April 2014. This ruling would replace Clean Air Interstate Rule (CAIR) standards, but at this time CAIR remains in place and no immediate action by states is required.
Net Metering		
Renewable CHP at or less than 1 MW could be eligible.		
Portfolio Standards	**Financial Incentives**	
Ohio's energy efficiency resource standard and renewable portfolio standard were suspended in May, 2014. Lawmakers are currently reviewing the standards, which are expected to be reinstated in 2017 with significant changes.	**Bond** • Advanced Energy Job Stimulus Program **Rebates** • AEP Commercial Custom Project Rebate & Self Direct Rebate Program **Loan** • Energy Loan Fund	**Taxes** • Air-Quality Improvement Tax Incentives • Energy Conversion and Thermal Efficiency Sales Tax Exemption

State CHP Technical Potential (MW)

Facility Size	50-1000 kW	1-5 MW	5-20 MW	>20 MW	Total
Industrial	586	873	1,092	901	3,384
Commercial	1,219	826	186	0	2,231
Total	1,805	1,699	1,278	901	5,615

Source: ICF International

Technical potential is defined as the CHP electrical capacity that could be installed at existing industrial and commercial sites based on their electric and thermal needs (under the assumption that the facilities would utilize thermally loaded CHP systems sized to meet their electric demand).

Boiler MACT Affected Boilers

Facilities	127
Coal Units	52
Biomass Units	7
Gas Units	247
Heavy Oil Units	7
Light Oil Units	27
Total Capacity (mmBtu/hr)	35,974

MACT: Maximum Achievable Control Technology standard

Application	# Units	# Facilities	Capacity (mmBTU/hr)
Transportation Equipment Manufacturing	79	20	3,758
Chemical Manufacturing	51	21	4,869
Petroleum and Coal Products Manufacturing	44	4	5,031
Utilities	37	16	9,264
Food Manufacturing	22	7	2,120
Primary Metal Manufacturing	20	3	4,649
Educational Services	18	4	2,009
Electrical Equipment, Appliance and Component Manufacturing	18	6	358
Paper Manufacturing	15	11	3,112
Plastics and Rubber Products Manufacturing	14	9	561

For more information on data sources, see CHP Factsheet Appendix at midwesterngovenors.org/publications/IEPfactsheet.pdf

Wisconsin Combined Heat and Power Fact Sheet

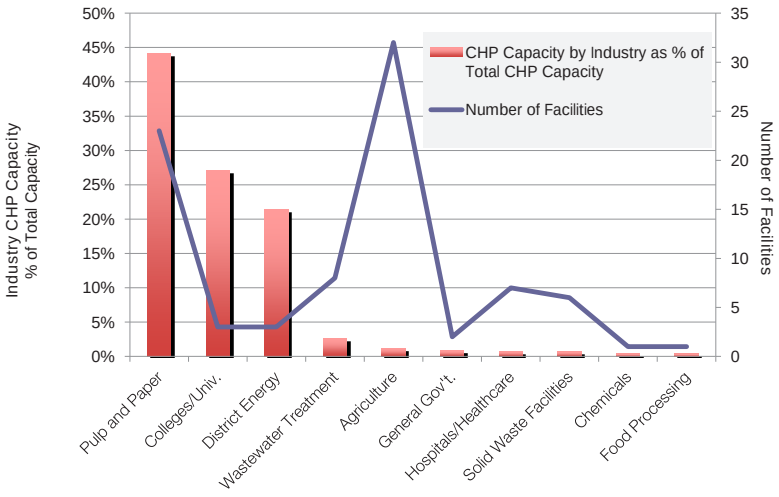
State Energy Profile

Energy consumption per capita:	**313 mmBtu (2011)**
Electric industry:	**Regulated**
Total electric generation capacity:	**17,836 MW (2011)**
Average retail electricity price:	
All sectors:	**10.54 cents/kWh**
Residential:	**13.43 cents/kWh**
Commercial:	**10.67 cents/kWh**
Industrial:	**7.57 cents/kWh**
Average retail natural gas price:	
Residential:	**9.23 $/MCF**
Commercial:	**7.32 $/MCF**
Industrial:	**5.80 $/MCF**
Population:	**5,686,986 people (2010)**
State Real GDP:	**$225 billion**

(Statistics for the year 2012 unless otherwise noted)

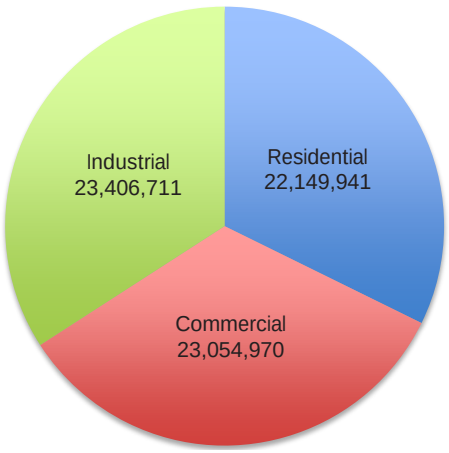
CHP Snapshot

Number of CHP facilities and capacity by industry as a percentage of total state CHP capacity



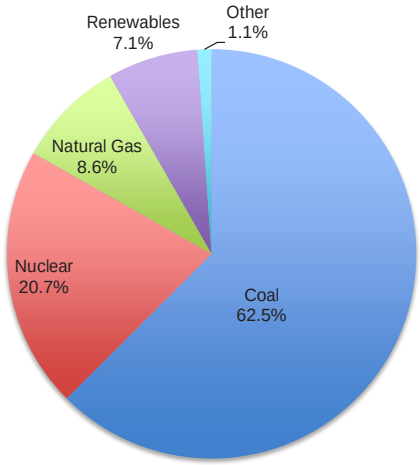
There are 94 combined heat and power (CHP) sites in Wisconsin, representing a total installed capacity of 1,570 MW. The largest CHP site in the state is Wisconsin Electric Power Company in Milwaukee (267 MW), and the smallest site is Burleigh Elementary School in Elm Grove (30 kW). As the graph above illustrates, the number of CHP facilities by industry is not necessarily correlated to an industry's share of total CHP capacity. Nationally, according to ICF International, 87 percent of current Installed CHP generation capacity is found at industrial facilities with high electric and steam demands such as chemical, paper, refining, food processing and metal manufacturing. Natural gas has been the preferred fuel for CHP systems in the U.S., accounting for around 70 percent of existing CHP capacity.

Electricity Sales
MWh



Source: U.S. Energy Information Administration, 2011

Electricity Production



Source: U.S. Energy Information Administration, 2010

Electricity sales are spread relatively evenly between the three sectors and together they represent 68,611,622 MWh in total sales. Electricity generation from coal and nuclear account for around 85 percent of the state's electricity production while natural gas, renewables and other energy sources make up the remaining 15 percent of generation.

State CHP Policies

Output-Based Emissions Regulations

Wisconsin Administrative Code Chapter NR 432
As a part of the U.S. Environmental Protection Agency's (EPA) Clean Air Interstate Rule (CAIR), Wisconsin is required to reduce SO_2 and NO_x emissions. CHP systems > 25 MW are eligible to participate in a voluntary emission trading scheme for annual SO_2 emissions, annual NO_x emissions, and ozone-season NO_x emissions.

Note: EPA's Cross State Air Pollution Rule was approved in April 2014. This ruling would replace CAIR standards, but at this time CAIR remains in place and no immediate action by states is required.

Interconnection Standards

- 15 MW system capacity limit.
- Applicable to all investor owned utilities and municipal utilities.
- 4 levels of review based on capacity.
- 2 sets of standard forms for interconnection: 1 for systems <20 kW and the other for systems <15 MW.
- Systems must meet IEEE 1547 and UL 1741 standards.
- Fees vary depending on capacity (no fees for systems <20 kW).
- Minimum liability insurance of at least $300,000 per occurrence required for systems <20 kW with higher amounts for larger systems.
- No defined process for settling disputes.
- CHP eligible.

Business Models & Decoupling

Direct Cost Recovery
Companies which fund Focus on Energy may receive direct cost recovery through a rate case and tariff rider. Wisconsin Power & Light uses a rate case.

Fixed Cost Recovery
Wisconsin Public Service Corporation approved a revenue decoupling pilot from 2008 to 2013.

Performance Incentives
Shared savings performance incentives are offered as a part of rate cases. Wisconsin Power & Light has an approved performance incentive.

Portfolio Standards

Energy Efficiency Resource Standard
CHP is not explicitly included. Deployment of CHP that is fueled by renewable fuels or waste heat is supported by grants from the state's Focus on Energy program. 2011-2014 net annual electric energy savings goal must be 1,816,320,000 kWh and the net annual natural gas savings goal is 73,040,000 therms. Utilities are required to spend 1.2% of annual operating revenues to fund both energy efficiency and renewable energy programs.

Renewable Portfolio Standard
CHP explicitly included. Requires municipal and investor owned utilities and rural electric cooperatives to increase their renewable energy percentages annually to meet a statewide renewable energy goal of 10% by 2015.

Financial Incentives

Rebates
- Focus on Energy - Renewable Energy Competitive Incentive Program for waste heat fueled CHP
- Business Incentive Program and Large Energy User Program
- Design Assistance Program

Loans
- Alliant Energy Shared Savings Program (waste heat fueled CHP)

Net Metering

All distributed generation technologies are eligible. Commercial, industrial and residential sectors eligible. 20-100 kW capacity limit. No aggregate capacity limit. Net excess generation varies by utility.

State CHP Technical Potential (MW)

Facility Size	50-1000 kW	1-5 MW	5-20 MW	>20 MW	Total
Industrial	375	519	642	817	2,353
Commercial	857	575	103	0	1,535
Total	1,232	1,094	745	817	3,888

Source: ICF International

Technical potential is defined as the CHP electrical capacity that could be installed at existing industrial and commercial sites based on their electric and thermal needs (under the assumption that the facilities would utilize thermally loaded CHP systems sized to meet their electric demand).

Boiler MACT Affected Boilers

Facilities	81
Coal Units	43
Biomass Units	16
Gas Units	148
Heavy Oil Units	7
Light Oil Units	8
Total Capacity (mmBtu/hr)	21,331

MACT: Maximum Achievable Control Technology standard

Application	Units	Facilities	Capacity (mmBTU/hr)
Paper Manufacturing	85	30	14,306
Primary Metal Manufacturing	19	2	218
Petroleum and Coal Products Manufacturing	18	2	664
Utilities	15	4	3,019
Educational Services	15	10	1,055
Miscellaneous Manufacturing	14	2	485
Printing and Related Support Activities	10	3	236
Chemical Manufacturing	8	2	285
Wood Product Manufacturing	8	8	190
Plastics and Rubber Products Manufacturing	7	1	82

For more information on data sources, see CHP Factsheet Appendix at midwesterngovenors.org/publications/IEPfactsheet.pdf

Appendix: Data Sources & References

State Energy Profile

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