

CHP Market Entry Status in the Midwest: A State-by-State Analysis

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Prepared for:
U.S. DOE Midwest Regional Office
Gary Nowakowski

Prepared by:
Midwest CHP Application Center

Clifford P. Haefke – chaefk1@uic.edu – 312/355-3476

John J. Cuttica – Cuttica@uic.edu – 312/996-4382



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Introduction:

In 2001, the U.S. Department of Energy established the first of its kind CHP Application Center at the University of Illinois at Chicago, Energy Resources Center. The mission of the Midwest CHP Application Center (MAC) is to develop technology application knowledge and the educational infrastructure necessary to foster CHP as a viable technical and financial energy / environmental option in the Midwest. The eight state Midwest Region included Illinois, Indiana, Iowa, Michigan, Minnesota, Missouri, Ohio, and Wisconsin.

To successfully deploy CHP in the Midwest, the MAC must continually assess the region's opportunities for CHP. This report, developed in response to a DOE Midwest Regional Office request, outlines 13 key factors that influence the ability to widely deploy CHP technologies and systems. Each of the eight Midwest Region states is evaluated against the 13 factors.

Much of the evaluation is subjective in nature. There is little attempt in this report to rationalize any inconsistency in the evaluations across the 13 factors. However, the MAC and its advisory group believe that the indicators revealed in this report provide valuable input for consideration and constructive debate when developing and prioritizing the MAC's program activities. For that reason, the MAC thanks the US DOE Midwest Regional Office for encouraging the development of this report.

Executive Summary:

This study identified 13 factors that influence the feasibility of CHP installations within the eight Midwest states of Illinois, Indiana, Iowa, Michigan, Minnesota, Missouri, Ohio, and Wisconsin. The factors analyzed include:

- Commercial Spark Spread / Commercial Spark Spread (Estimated On Peak)
- Industrial Spark Spread
- Electric & Natural Gas Price Trends (Commercial)
- Electric & Natural Gas Price Trends (Industrial)
- Exit Fees
- Interconnect Standards
- Electric Deregulation
- Net Metering
- Real Time Pricing
- Installed CHP Generating Capacity Since 2000
- Energy Rates (Largest Electric Utility within the State)
- Demand Rates (Largest Electric Utility within the State)
- Standby Rates (Largest Electric Utility within the State)

Within each State, the factors are evaluated as VERY FAVORABLE, MODERATELY FAVORABLE, and NOT FAVORABLE. The assessment of the favorability of each of the 13 factors is subjective; they are based on data obtained from several national and regional databases and reference sources. The following chart provides a summary of the evaluation by factor within each state. Following the chart, there is a summary of the Market Trends for CHP in the Midwest as seen by the authors (again based on the results of this report and the various data sources reviewed as part of this evaluation.

	IL	IN	IA	MI	MN	MO	OH	WI
1A. Commercial Spark Spread (Ave Costs)								
1B. On-Peak Spark Spread (Estimated)								
2. Industrial Spark Spread (Ave. Costs)								
3. Commercial Electric vs. Gas Trends								
4. Industrial Electric vs. Gas Trends								
5. Exit Fees								
6. Interconnect Standard								
7. Electric Deregulation								
8. Net Metering								
9. Real Time Pricing		-	-	-	-	-	-	-
10. Installed CHP Generating Capacity since 2000								
11. Largest Electric Utility - Energy Charges (¢/kWh)								
12. Largest Electric Utility - Demand Charges (\$/kWh)								
13. Largest Electric Utility - Standby / Backup Rates		-	-			-		-

= NOT FAVORABLE

= MODERATELY FAVORABLE

= VERY FAVORABLE

“-“ = *Information not available or investigated at time of report*

Summary Table

		Illinois	Indiana	Iowa	Michigan	Minnesota	Missouri	Ohio	Wisconsin
Average Price of Natural Gas (\$/MMBtu)									
	Commercial	10.74	11.59	10.06	8.69	9.18	11.24	10.52	9.56
	Industrial	8.75	9.36	8.11	8.29	7.14	9.62	10.56	8.73
Average Price of Electricity (¢/kWh)									
	Commercial	7.67	6.47	*6.71	7.92	*6.26	6.03	7.84	7.50
	Industrial	4.77	4.33	4.56	5.48	5.04	4.69	4.87	5.23
Spark Spread (\$/MMBtu)									
1A	Commercial	11.74	7.37	9.60	14.52	9.16	6.43	12.45	12.42
1B	Commercial On-Peak	17.35	12.11	14.51	20.32	13.74	10.85	18.19	17.91
2	Industrial	5.23	3.33	5.26	7.77	7.62	4.13	3.71	6.60
3	Electric & Natural Price Trends (Commercial)	Decreasing Electric Prices	Slightly Increasing Electric Prices	Relatively Stable Electric Prices	Increasing Electric Prices	Slightly Decreasing Electric Prices	Decreasing Electric Prices	Slightly Increasing Electric Prices	Increasing Electric Prices
		Increasing Natural Gas Prices	Increasing Natural Gas Prices	Increasing Natural Gas Prices	Increasing Natural Gas Prices	Increasing Natural Gas Prices	Increasing Natural Gas Prices	Increasing Natural Gas Prices	Increasing Natural Gas Prices
4	Electric & Natural Price Trends (Industrial)	Decreasing Electric Prices	Slightly Increasing Electric Prices	Slightly Increasing Electric Prices	Increasing Electric Prices	Increasing Electric Prices	Slightly Increasing Electric Prices	Increasing Electric Prices	Increasing Electric Prices
		Increasing Natural Gas Prices	Increasing Natural Gas Prices	Increasing Natural Gas Prices	Increasing Natural Gas Prices	Increasing Natural Gas Prices	Increasing Natural Gas Prices	Increasing Natural Gas Prices	Increasing Natural Gas Prices
5	Exit Fees	No Exit Fees; ComEd determines in own territory	No Exit Fees	No Exit Fees	No Exit Fees	No Exit Fees	No Exit Fees	No Exit Fees	No Exit Fees
6	Interconnect Standards	Adopting/Implementing; Standards under review	Developing Standards	No Standards	Adopting/Implementing	Adopting/Implementing; Applies to systems up to 1 MW	Adopting/Implementing; up to 100 kW	Established	Adopting/Implementing; 15 MW or less
7	Electric Deregulation	Restructuring Active; ComEd in 2007	Restructuring Not Active	Restructuring Not Active	Restructuring Active	Restructuring Not Active	Restructuring Not Active	Restructuring Active	Will Not Pursue Electric Deregulation
8	Net Metering	Wind & Solar only; No CHP	Up to 1,000 kWh/month	Available to Investor-Owned Utilities Only – No Limit	Available for Individual Utilities up to 20 kW	Available to Investor-Owned Utilities and Rural Coops up to 40 kW	No Net Metering Available	Available to Investor-Owned Utilities and Rural Coops – No Limit	Available to Investor-Owned Utilities Only up to 20 kW

Summary Table (continued)

		Illinois	Indiana	Iowa	Michigan	Minnesota	Missouri	Ohio	Wisconsin
9	Real Time Pricing	Available to northern customers	?	?	?	?	?	?	?
	Installed CHP Capacity (MW)								
	Total	1,231.7	2,032.3	371.8	3,100.9	1,045.0	192.6	376.8	1,218.5
10	Since 2000	122.4	80.3	1.2	102.0	100.9	10.0	33.4	46.8
	Largest Electric Utility (Commercial)								
11	Energy Rates	5.0 – 5.6	1.6 – 1.7	3.5 – 5.2	5.0 – 5.6	3.9	3.5 – 7.4	1.7	4.3
12	Demand Rates	11.0 – 16.4	10.4 – 14.1	7.0 – 9.8	10.8	8.96 – 11.6	1.3 – 3.6	12.5	11.1
13	Standby Rates	3.0	NA	NA	2.1 – 4.4	2.4 – 3.3	NA	5.4 – 8.0	NA

* 2005 Minnesota/Iowa Commercial Electric Rate Unavailable (2004 Electric Rate Used)

CHP Market Trends in the Midwest:

- Overall market trends in the Midwest are being negatively affected by both the high price and price volatility of natural gas
- Electric Deregulation only taking place in three of the eight states in the Midwest
- Despite several negative and only moderately favorable market characteristics, the Midwest has seen substantial CHP growth over the last five years
- The Midwest collectively is third among the eight regions in terms of CHP sites installed and fifth in terms of total CHP capacity installed. This suggests a significant amount of smaller (commercial / institutional) installations
- There has been a decrease in the annual rate of CHP installations (capacity and number of sites) in the Midwest in the last several years (product of high gas prices)

Illinois

- Illinois has a significant level of CHP systems installed. Their market factors are overall moderately favorable and should get better as full electric deregulation takes place in 2007.
- The resistance of ComEd in Chicago continues to stymie the growth of CHP in the City (while renewable technologies are growing). This is due in great part to the resistance of ComEd in allowing CHP to be connected to their Network Grid Systems (prevalent in the City).
- The Illinois Commerce Commission (ICC) is presently developing Interconnect standards that will have a major impact on the marketability of CHP.
- Illinois, along with Minnesota, Iowa, Wisconsin, and Ohio are all planning for a substantial increase in Ethanol Production Plants. These are good candidates for CHP systems and should be pursued.

Indiana

- NiSource Energy (unregulated subsidiary of the Indiana Electric & Gas Company) is actively marketing micro-turbine CHP systems in small industrial manufacturing and processing plants and has installed five CHP systems since 2000.
- Indiana and Ohio have programs in place through their State Energy Offices to promote the use of Distributed Generation (including CHP). This has resulted in several installations at the commercial and light industrial markets in both states.

Iowa

- Despite the poor market conditions, Iowa, due in great part to the activities of the State Energy Office, is attracting interest in CHP fueled by digester gas (Farms and Food Processing) and in Ethanol Plants (possibly fueled by coal).
- Iowa, along with Illinois, Minnesota, Wisconsin, and Ohio are all planning for a substantial increase in Ethanol Production Plants. These are good candidates for CHP systems and should be pursued.
- Iowa and Missouri have the least favorable market conditions for CHP and the number of installations track this.
- Alliant Energy (electric utility that services several of the Midwest states including Iowa and Wisconsin), has installed several CHP systems fueled from digester gas.

Michigan

- **The most favorable market factors for CHP seem to be in Michigan, yet the additional installed CHP capacity over the last 3 years is ranked 7th out of eight states. This needs to be investigated.**
- **Two states (Michigan and Wisconsin) have active state-wide initiatives promoting the use of efficient technologies, including CHP.**
 - **Wisconsin Distributed Resources Collaborative (WIDRC)**
 - **Michigan Clean Energy Cluster**

Minnesota

- **Minnesota ranks third in the Midwest in CHP capacity installed since 2000. This is due to several large district CHP systems installed.**
- **Minnesota, along with Illinois, Iowa, Wisconsin, and Ohio are all planning for a substantial increase in Ethanol Production Plants. These are good candidates for CHP systems and should be pursued.**

Missouri

- **Missouri and Iowa have the least favorable market conditions for CHP and the number of installations track this.**

Ohio

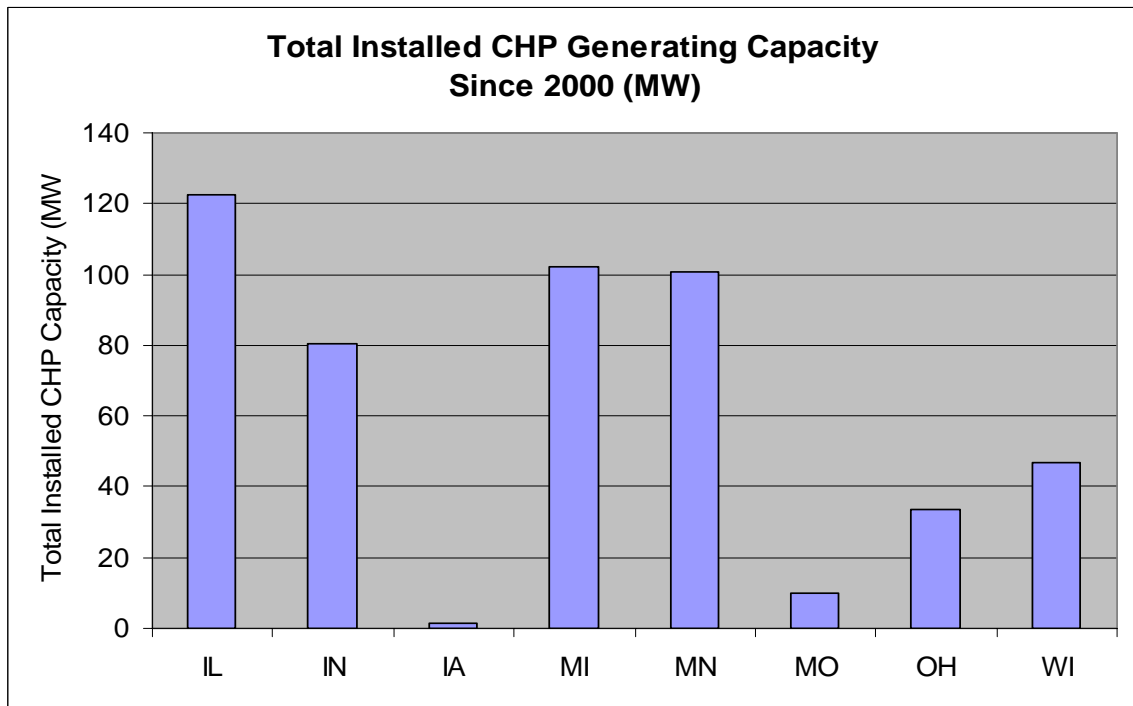
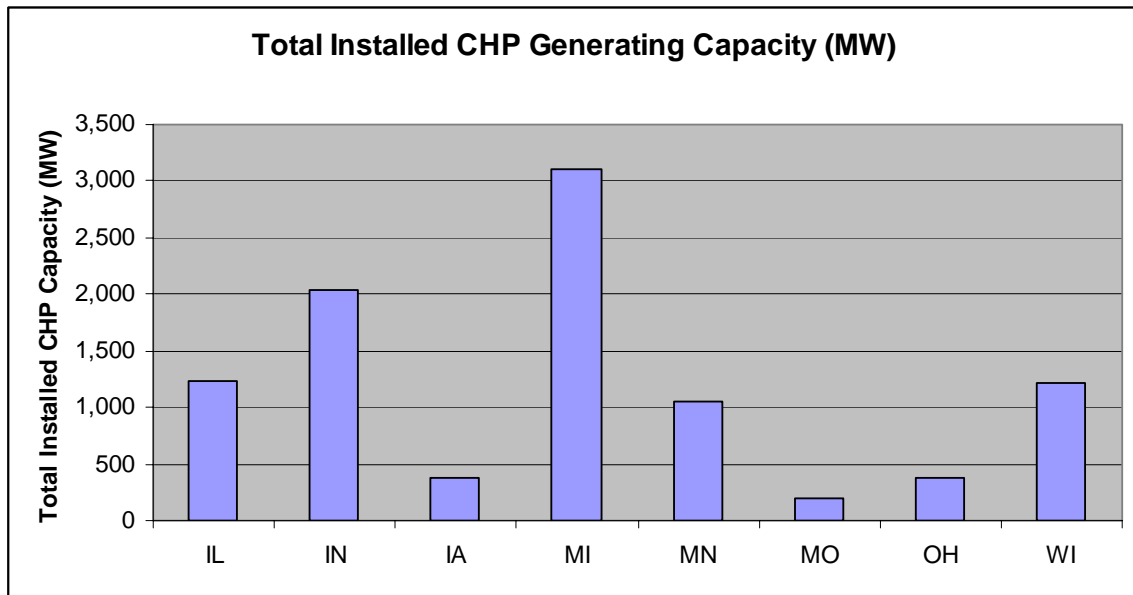
- **A major obstacle for CHP in Ohio is the Standby rates placed on CHP applications by the electric utilities. If this could be removed, market conditions in Ohio suggest significant CHP opportunities.**
- **Ohio, along with Illinois, Iowa, Minnesota, and Wisconsin are all planning for a substantial increase in Ethanol Production Plants. These are good candidates for CHP systems and should be pursued.**
- **Ohio and Indiana have programs in place through their State Energy Offices to promote the use of Distributed Generation (including CHP). This has resulted in several installations at the commercial and light industrial markets in both states.**

Wisconsin

- **Wisconsin, through its Focus on Energy Program, places its CHP efforts on waste fueled CHP steam systems in large industrial plants (temporarily abandoning natural gas fueled CHP systems).**
- **Alliant Energy (electric utility that services several of the Midwest states including Iowa and Wisconsin), has installed several CHP systems fueled from digester gas.**
- **Two states (Wisconsin and Michigan) have active state-wide initiatives promoting the use of efficient technologies, including CHP.**
 - **Wisconsin Distributed Resources Collaborative (WIDRC)**
 - **Michigan Clean Energy Cluster**

Snapshot: Number of Midwest CHP Installations

Currently, approximately 9,570 MW of CHP generating capacity exist within the eight Midwest states of Illinois, Indiana, Iowa, Michigan, Minnesota, Missouri, Ohio and Wisconsin totaling slightly over 400 CHP systems. Since 2000, 52 CHP systems have been installed in the Midwest with a total generating capacity of 497 Megawatts.



CHP Market Entry Status in the Midwest: A State-by-State Analysis

State	Total Capacity (MW)	Total Capacity Installed Since 2000 (MW)	Total Number of CHP Installations	Total Number of CHP Installations Installed Since 2000	Average Sized CHP System Size (kW)	Averaged Sized CHP System Size Installed Since 2000 (kW)	Median CHP System Size (kW)	Median CHP System Size Installed Since 2000 (kW)
IL	1,231.7	122.4	136	16	9,057	7,650	2,125	2,125
IN	2,032.3	80.3	26	6	78,166	13,378	14,750	7,060
IA	371.8	1.2	26	1	14,300	1,200	3,500	1,200
MI	3,100.9	102.0	83	8	37,361	12,755	3,700	188
MN	1,045.0	100.9	36	7	29,028	14,411	9,050	5,000
MO	192.6	10.0	16	1	12,035	10,000	6,000	10
OH	376.8	33.4	32	3	11,776	11,147	4,450	5,200
WI	1,218.5	46.8	47	10	25,926	4,683	5,000	325
Total	9,569.7	497.1	402	52				

Data obtained from the Combined Heat and Power Installation Database (Energy & Environmental Analysis, Inc.) <http://www.eea-inc.com/chpdata/index.html>

Evaluation Criteria

The purpose of this study is to analyze 13 key factors that influence the feasibility of CHP installations within the eight Midwest states of Illinois, Indiana, Iowa, Michigan, Minnesota, Missouri, Ohio, and Wisconsin. The 13 factors include:

- Commercial Spark Spread / Commercial Spark Spread (Estimated On Peak)
- Industrial Spark Spread
- Electric & Natural Gas Price Trends (Commercial)
- Electric & Natural Gas Price Trends (Industrial)
- Exit Fees
- Interconnect Standards
- Electric Deregulation
- Net Metering
- Real Time Pricing
- Installed CHP Generating Capacity Since 2000
- Energy Rates (Largest Electric Utility within the State)
- Demand Rates (Largest Electric Utility within the State)
- Standby Rates (Largest Electric Utility within the State)

Within each State, the factors are evaluated as VERY FAVORABLE, MODERATELY FAVORABLE, and NOT FAVORABLE. A summary table identifying each factor for each state can be found at the end of this report.

Spark Spread

“Spark Spread” is defined as the cost differential between electricity purchased from the utility / electricity provider and the fuel utilized in the CHP system (normally natural gas). The “Spark Spread” is considered a first cut, very rough “Rule-of-Thumb” screening of the viability of CHP at a facility based solely on the average prices of natural gas and electricity.

NOT FAVORABLE	Spark Spread < \$12 per MMBtu
MODERATELY FAVORABLE	Spark Spread > \$12 per MMBtu Spark Spread < \$14 per MMBtu
VERY FAVORABLE	Spark Spread > \$14 per MMBtu

Electric vs. Natural Gas Pricing Trends

With the high and volatile price of natural gas throughout the Midwest (and country), and the relatively stable prices of electricity in the Midwest (due mainly to electric deregulation not yet fully implemented), the historical pricing trend is not very encouraging for CHP. **Please see Appendix A for a more detail discussion and explanation of pricing trends in the Midwest and their effect on CHP factors.**

Exit Fees

An exit fee or other equivalent charge requires departing customers to make a lump-sum payment to the utility for the stranded costs associated with those customers' decisions to select a competitive supplier or to self-generate their energy needs.

NOT FAVORABLE	Exit Fees are assessed.
MODERATELY FAVORABLE	Exit Fees are assessed within specific service regions and/or under certain criteria.
VERY FAVORABLE	No Exit Fees are assessed.

Interconnect Standards

The objective of the state interconnect standards is to establish minimum technical criteria and requirements for interconnection of distributed resources with the electricity delivery grid to achieve the ultimate goal of development of a uniform standard for electrical interconnections. These standards are to address conditions necessary for optimum performance, operation, testing, safety and maintenance of interconnected distributed resources.

NOT FAVORABLE	No Interconnect Standards are in place
MODERATELY FAVORABLE	Interconnect Standards are being reviewed and/or studied
VERY FAVORABLE	Interconnect Standards are in place

Electric Deregulation

Legislatures and the public utility commissions of many states have or are in the process of opening retail competition for electricity supply. The measures allow consumers of electricity to choose their supplier of electricity (generation), while the delivery of the power (transmission and distribution) will still be the responsibility of the incumbent (regulated) power company.

Consumers now have the power to choose an electricity supplier of their own liking. The single most important consideration in this newly deregulated market is that there are material differences between the various electricity supply products offered by the competitive service providers vs. the standard offering made by the incumbent utility. A truly competitive market is a favorable market condition for CHP, since the cost of electricity will not be subsidized or controlled through regulatory bodies.

NOT FAVORABLE	No state activity towards electric deregulation
MODERATELY FAVORABLE	Electric deregulation in the process or being reviewed
VERY FAVORABLE	Fully deregulated

Net Metering

Net metering programs serve as an important incentive for consumer investment in renewable energy generation. Net metering enables customers to use their own generation to offset their consumption over a billing period by allowing their electric meters to turn backwards when they generate electricity in excess of their demand. This offset means that customers receive retail prices for the excess electricity they generate. Without net metering, a second meter is usually installed to measure the electricity that flows back to the provider, with the provider purchasing the power at a rate much lower than the retail rate.

Net metering is a low-cost, easily administered method of encouraging customer investment in renewable energy technologies. It increases the value of the electricity produced by renewable generation and allows customers to "bank" their energy and use it at a different time than it was produced, giving customers more flexibility and allowing them to maximize the value of their production. Providers may also benefit from net metering because when customers are producing electricity during peak periods, the system load factor is improved. Currently, net metering is offered in more than 35 states.

Although the effect of net metering on CHP systems is somewhat questionable at this time (many CHP systems are not sized to sell back to the grid), it is an indication of the aggressiveness of a state to encourage DG.

NOT FAVORABLE	No Net Metering programs available towards CHP.
MODERATELY FAVORABLE	Net Metering programs available with limits on amount of generation.
VERY FAVORABLE	Net Metering programs available with no generation limit.

Real Time Pricing

Real time pricing reflect energy prices that are set for a specific time period on an advanced or forward basis and that may change according to price changes in the generation spot market. Prices paid for energy consumed during these periods are typically established and known to consumers a day ahead ("day-ahead pricing") or an hour ahead ("hour-ahead pricing") in advance of such consumption, allowing them to vary their demand and usage in response to such prices and manage their energy costs by shifting usage to a lower cost period, or reducing consumption overall.

Although real time pricing will make the financial evaluation of CHP more complex, it will better reflect the true cost of electricity. This in turn should result in spark spreads that are more favorable towards CHP.

NOT FAVORABLE	Real Time Pricing NOT Available
MODERATELY FAVORABLE	Real Time Pricing available in certain service regions
VERY FAVORABLE	Real Time Pricing Available

Installed CHP Generating Capacity Since 2000 (MW)

NOT FAVORABLE	CHP Capacity < 20 MW
MODERATELY FAVORABLE	CHP Capacity > 20 MW CHP Capacity < 70 MW
VERY FAVORABLE	CHP Capacity > 70 MW

Largest Electric Utility Provider (Commercial Customers)

Electric Energy Rates

NOT FAVORABLE	Energy Rates < 5¢/kWh
MODERATELY FAVORABLE	Energy Rates > 5¢/kWh Energy Rates < 6¢/kWh
VERY FAVORABLE	Energy Rates > 6¢/kWh

Electric Demand Rates

NOT FAVORABLE	Demand Rates < \$10/kW
MODERATELY FAVORABLE	Demand Rates > \$10/kW Demand Rates < \$15/kW
VERY FAVORABLE	Demand Rates > \$15/kW

Standby Rates

Standby rates are not published for each utility and are often negotiated at time of installation.

NOT FAVORABLE	Standby Rate > \$4/kW
MODERATELY FAVORABLE	Standby Rate > \$2/kW Standby Rate < \$4/kW
VERY FAVORABLE	Standby Rate < \$2/kW

Illinois

1. **2005 Commercial Spark Spread.....MODERATELY FAVORABLE**
2005 Estimated On Peak Spark Spread.....VERY FAVORABLE

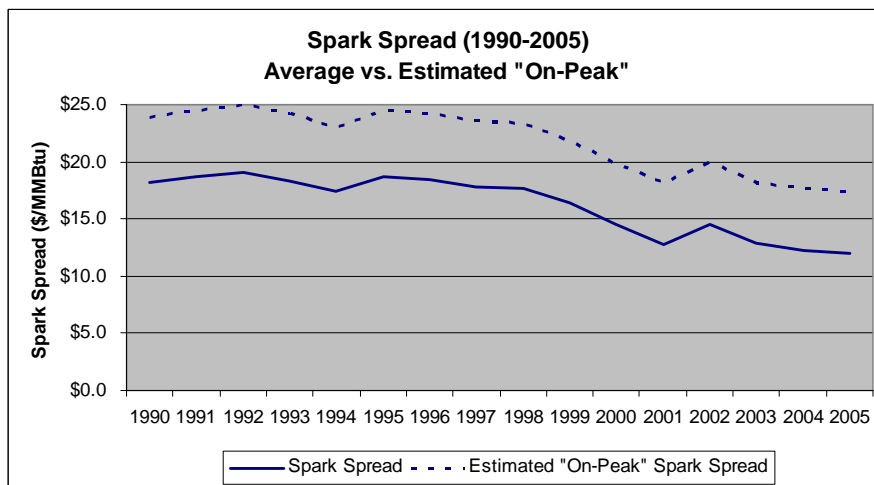
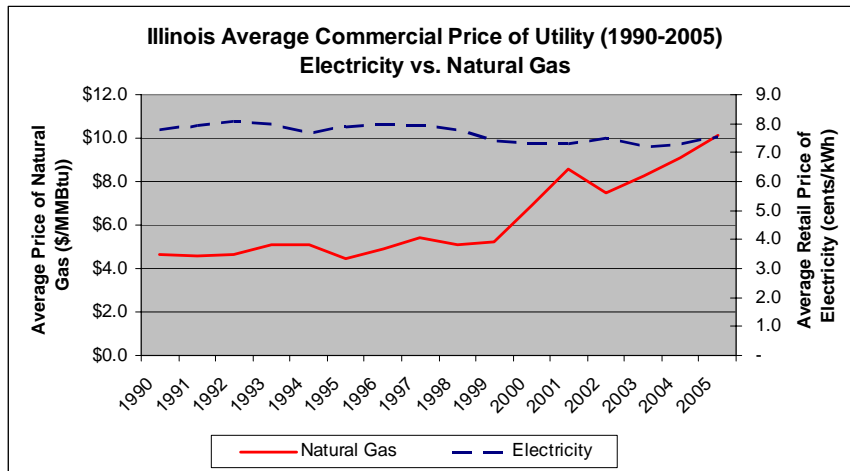
Average Commercial Electric Price: 7.67¢ per kWh
 Average Commercial Natural Gas Price: \$10.74 per MMBtu
 Average Commercial Spark Spread: \$11.74 per MMBtu
 Estimated On-Peak Commercial Spark Spread: \$17.35 per MMBtu

2. **2005 Industrial Spark Spread.....NOT FAVORABLE**

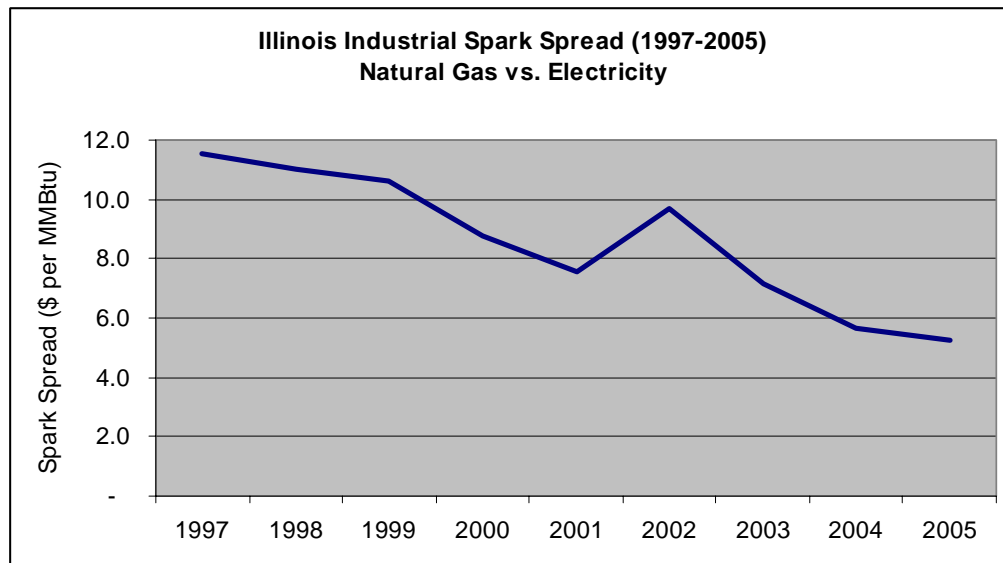
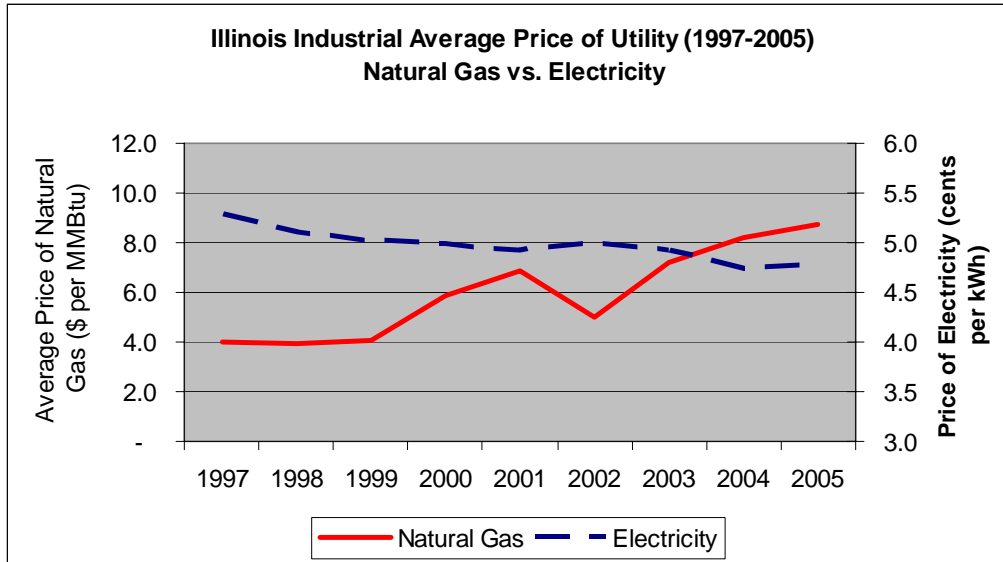
Average Industrial Electric Price: 4.77¢ per kWh
 Average Industrial Natural Gas Price: \$8.75 per MMBtu
 Average Industrial Spark Spread: \$5.23 per MMBtu

3. **Commercial Electric and Natural Gas Price Trends.....NOT FAVORABLE**

(Note: Electric Rates will be unfrozen in 2007)



4. Industrial Electric and Natural Gas Price Trends.....NOT FAVORABLE



5. Exit Fees.....MODERATELY FAVORABLE

Exit fees are not allowed if customers exit the utility system to generate electric power for their own use, i.e. “within the fence.”. Otherwise, exit fees are determined by Com Ed on a case by case basis and can be significantly high

**6. Interconnect Standards.....MODERATELY FAVORABLE
Adopting/Implementing**

In December 2003, the Illinois Commerce Commission (“ICC”) produced several preliminary documents relating to its plans to draft rules for the interconnection of distributed generation. On October 25, 2004, the ICC released a third revised draft rule – *Interconnection of*

Distributed Resources to Electric Utility Distribution Systems. The ICC staff is still (Oct. 2005) reviewing comments on the third draft rule.

7. Electric Deregulation.....VERY FAVORABLE
 Restructuring Active. Deregulation will occur in 2007.

8. Net Metering.....NOT FAVORABLE
 Net Metering by Individual Utilities for wind and solar generation under 40 kW only, no CHP.

9. Real Time Pricing..... VERY FAVORABLE
 Real time pricing is available to northern Illinois customers. Commonwealth Edison offers real time pricing options through its Rate HEP – Hourly Energy Pricing. Rate HEP is available to any nonresidential customer except such customers to which Rate IPP – Independent Power Producer Service is applicable. A Rate HEP customer is charged hourly market-based energy prices determined under Rate HEP along with other charges described in the tariff. Hourly Rate HEP energy prices are electronically posted each day for the following day on a ComEd Internet web page.

10. Installed CHP Generating Capacity.....VERY FAVORABLE

Total Installed:	1,231,718 kW
Total Installed Since Year 2000:	122,405 kW

11. Largest Utility - Cost of Electricity (¢/kWh)MODERATELY FAVORABLE
Commonwealth Edison

Nonresidential Bundled Retail Electric Service
 Demand less than 3,000 kW

On Peak Average:	5.022 – 5.599
Off Peak Average:	2.123 – 2.341

12. Largest Utility - Demand Charges (\$/kW)VERY FAVORABLE
Commonwealth Edison

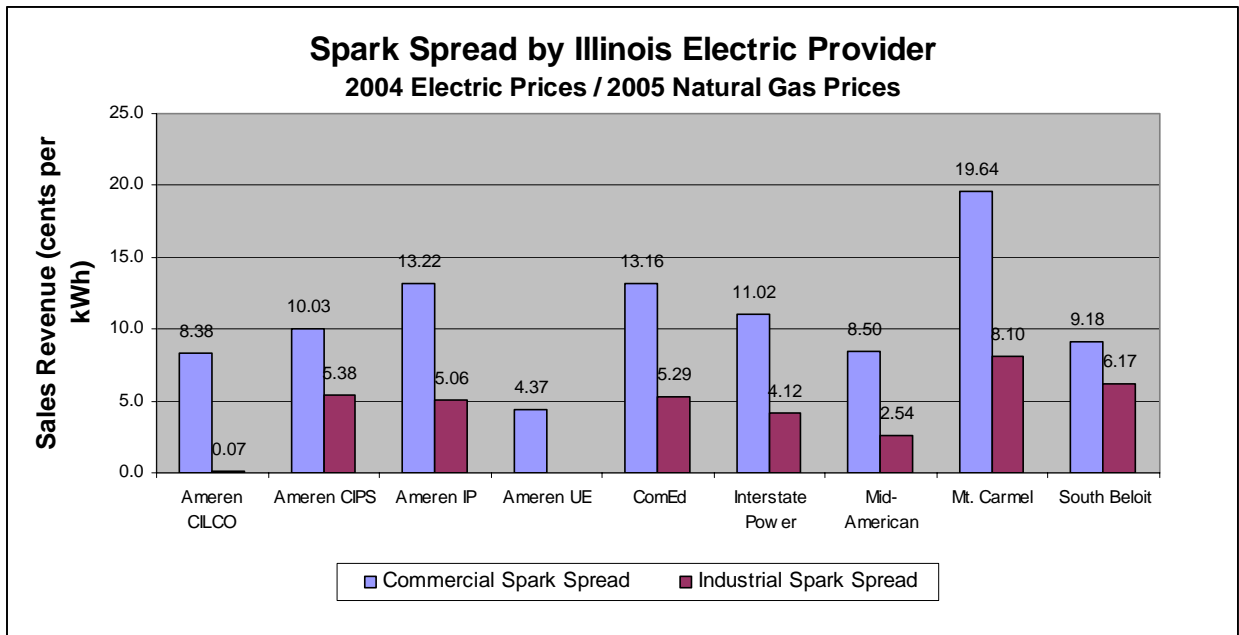
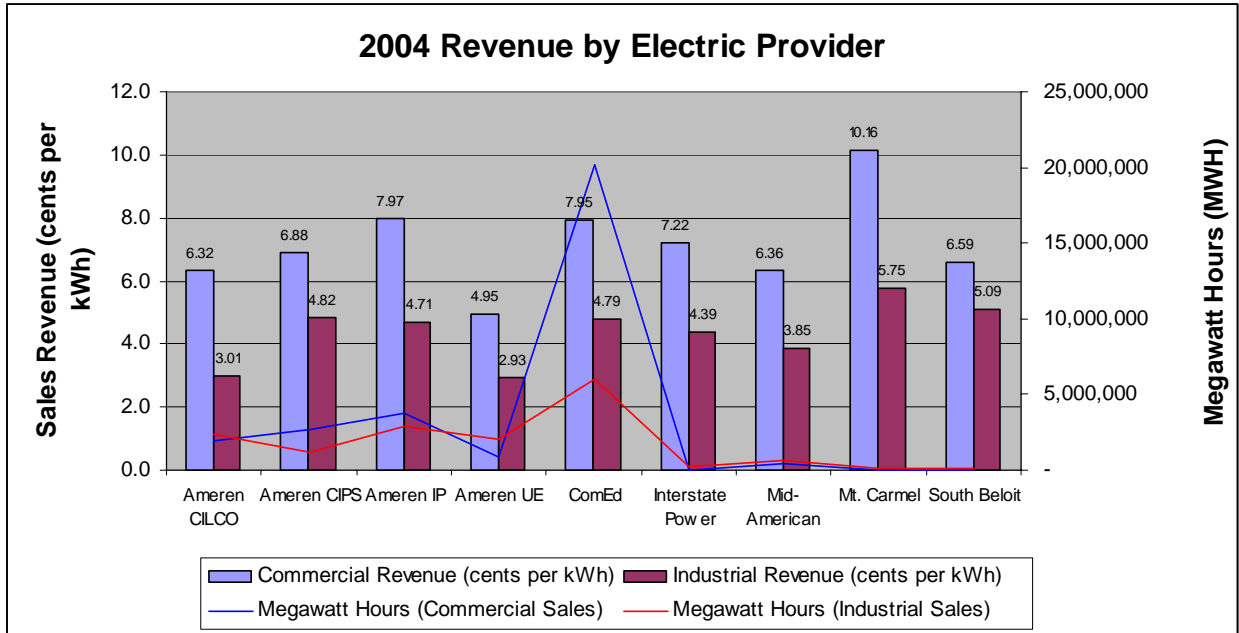
Nonresidential Bundled Retail Electric Service

Summer Demand:	14.24 – 16.41
Winter Demand:	11.13 – 12.85

13. Largest Utility - Standby / Backup Rates.....MODERATELY FAVORABLE
Commonwealth Edison

Monthly Customer Charge (\$):	106.83 - 524.61
Standby Charge (\$/kW):	2.99
Supplemental Demand (\$/kW):	13.41 – 15.16
Supplemental Energy (¢/kWh):	2.341 – 5.022

14. Other Electric Utility Rates



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	Ameren CILCO	Ameren CIPS	Ameren IP	Ameren UE	ComEd	Interstate Power	Mid- American	Mt. Carmel	South Beloit
Revenue (cents per kWh)									
Small Sales (or Commercial)	6.32	6.88	7.97	4.95	7.95	7.22	6.36	10.16	6.59
Large Sales (or Industrial)	3.01	4.82	4.71	2.93	4.79	4.39	3.85	5.75	5.09
Spark Spread (2004 Electric Prices by Electric Provider vs. 2005 Average Natural Gas Price)									
Small Sales (or Commercial)	8.38	10.03	13.22	4.37	13.16	11.02	8.50	19.64	9.18
Large Sales (or Industrial)	0.07	5.38	5.06	-0.16	5.29	4.12	2.54	8.10	6.17

Indiana

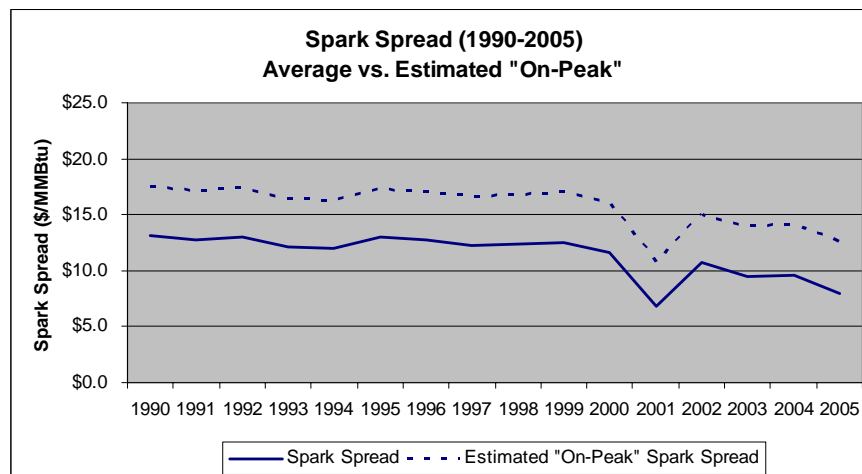
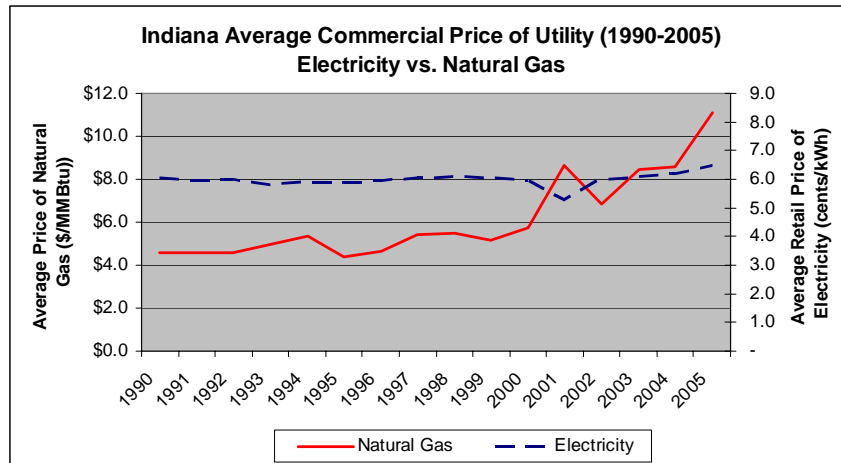
1. **2005 Commercial Spark Spread.....NOT FAVORABLE**
2005 Estimated On Peak Spark Spread.....MODERATELY FAVORABLE

Average Commercial Electric Price: 6.47¢ per kWh
 Average Commercial Natural Gas Price: \$11.59 per MMBtu
 Average Commercial Spark Spread: \$7.37 per MMBtu
 Estimated On-Peak Commercial Spark Spread: \$12.11 per MMBtu

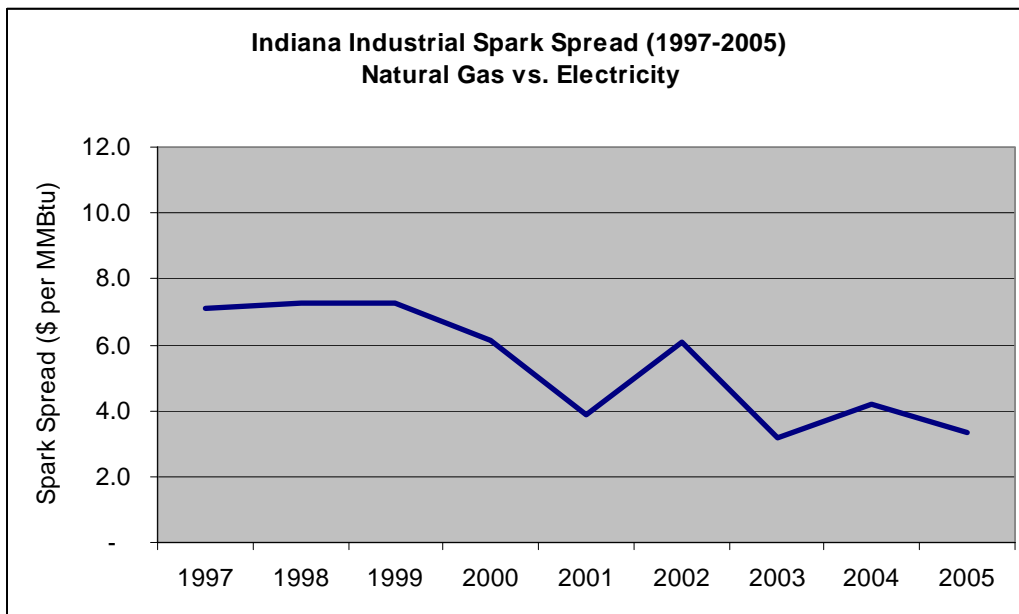
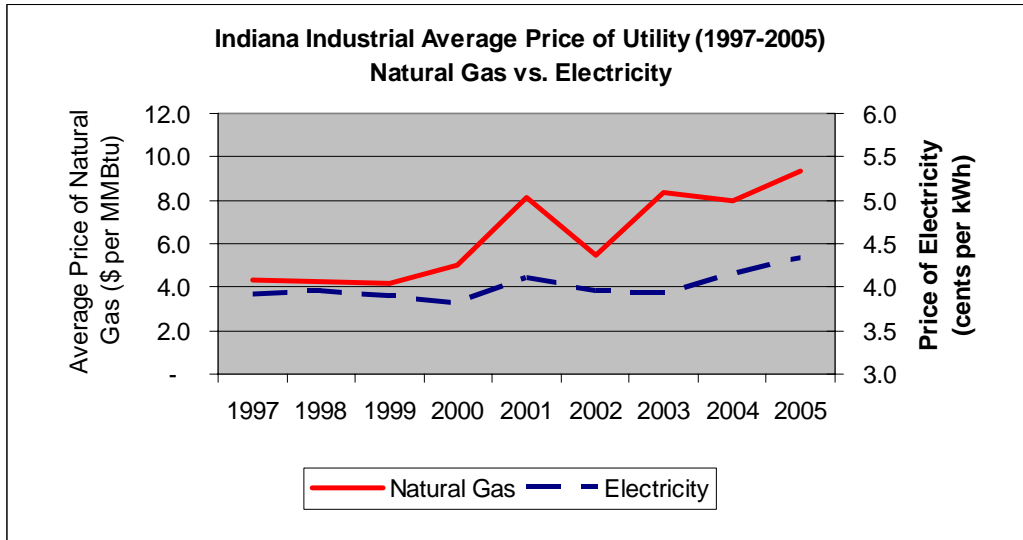
2. **2005 Industrial Spark Spread.....NOT FAVORABLE**

Average Industrial Electric Price: 4.33¢ per kWh
 Average Industrial Natural Gas Price: \$9.36 per MMBtu
 Average Industrial Spark Spread: \$3.33 per MMBtu

3. **Commercial Electric and Natural Gas Price Trends.....NOT FAVORABLE**



4. Industrial Electric and Natural Gas Price Trends.....NOT FAVORABLE



5. Exit Fees.....VERY FAVORABLE

No exit fees are currently charged to facilities that elect to generate their own electricity.

6. Interconnect Standards.....MODERATELY FAVORABLE

On February 25, 2004, the Indiana Utility Regulatory Commission (“IURC”) instituted a proposed rulemaking to amend the State’s net metering policy. On October 4, 2004, the IURC held a distributed-generation workshop to discuss “strawman” interconnection standards developed by the IURC. The workshop was designed to encourage stakeholders to discuss the manner in which the IURC should develop clear interconnection standards in order to further the development of distributed generation in Indiana.

7. Electric Deregulation.....NOT FAVORABLE
Restructuring Not Active. This state is continuing to study and/or monitor restructuring investor-owned utilities (power providers), but is not currently pursuing further action.

8. Net Metering.....MODERATELY FAVORABLE
Net Metering is available for Investor-Owned Utilities Only, Not Rural Cooperatives – 1,000 kWh/month. Indiana’s net metering rule became effective in January, 2005. There is a bill pending in the 2005 Indiana legislature which would expand net metering by allowing the use of devices of up to 2 MW. (NARUC)

9. Real Time Pricing.....

10. Installed CHP Generating Capacity.....VERY FAVORABLE

Total Installed: 2,032,323 kW
Total Installed Since Year 2000: 80,270 kW

11. Largest Utility - Cost of Electricity (¢/kWh)NOT FAVORABLE
Indiana (PSI Energy, Inc.)
Standard Contract Rider No. 12 - Available to any customer above 25 kW.
Connection Charges per Month: \$15 (Secondary), \$75 (Primary), 300 (Transmission)

Energy Charge: All Energy : 1.5848 – 1.683 cent/kWh

KVAr Charge- For each kVAr of the monthly Billed kVAr Demand: \$0.24 per kVAr

12. Largest Utility - Demand Charges (\$/kW)MODERATELY FAVORABLE
Indiana (PSI Energy, Inc.)
For each kW of Billing Maximum Load: \$10.35 to \$14.06/kW

13. Largest Utility - Standby / Backup RatesNA
Indiana (PSI Energy, Inc.)
Not available, or not published

Iowa

1. **2005 Commercial Spark Spread.....NOT FAVORABLE**
2005 Estimated On Peak Spark Spread..... VERY FAVORABLE

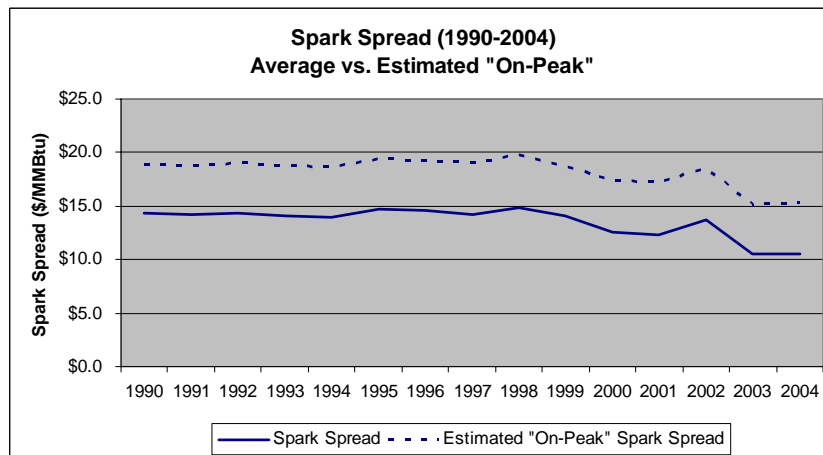
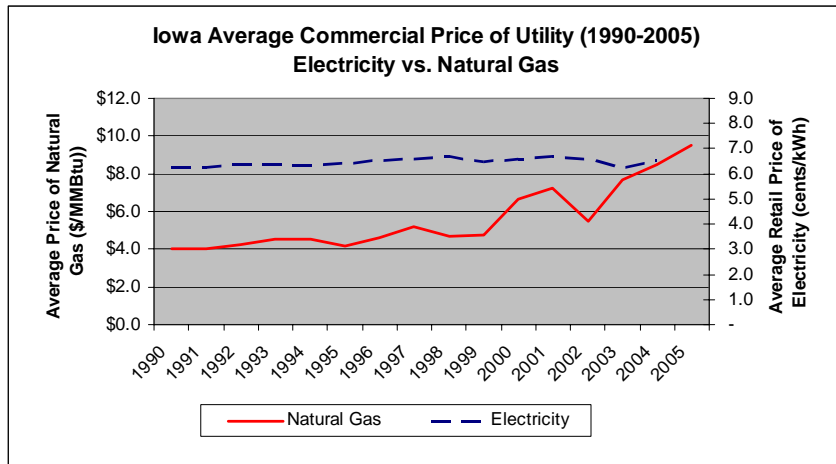
Average Commercial Electric Price*: 6.71¢ per kWh
 Average Commercial Natural Gas Price: \$10.06 per MMBtu
 Average Commercial Spark Spread: \$9.60 per MMBtu
 Estimated On-Peak Commercial Spark Spread: \$14.51 per MMBtu

* 2004 Electric Price Used

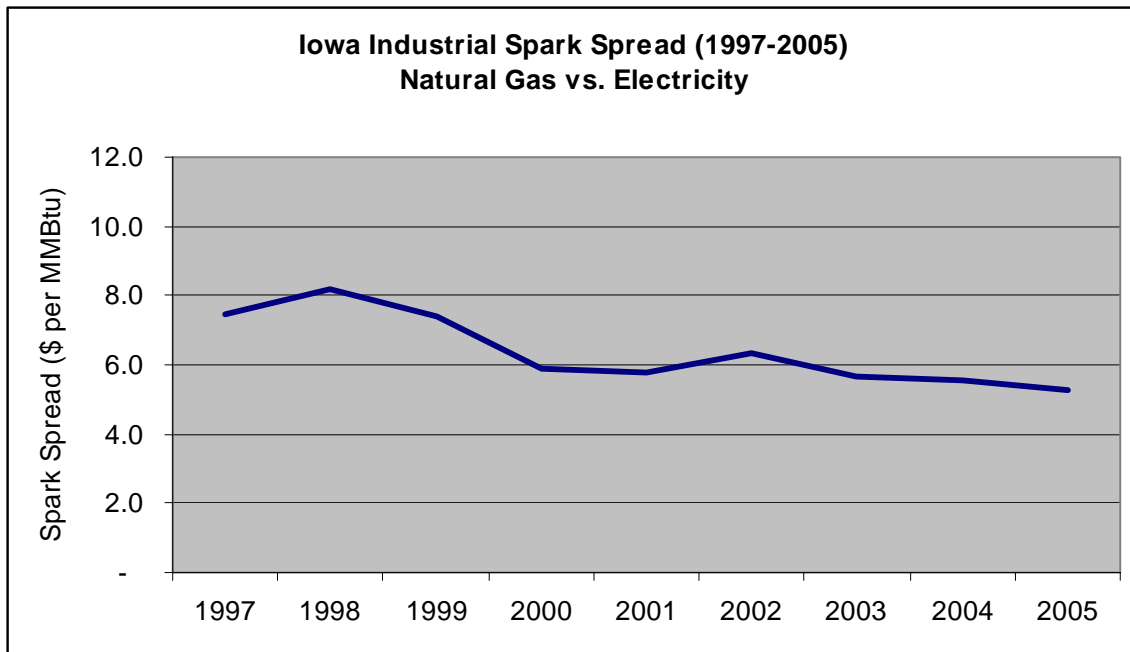
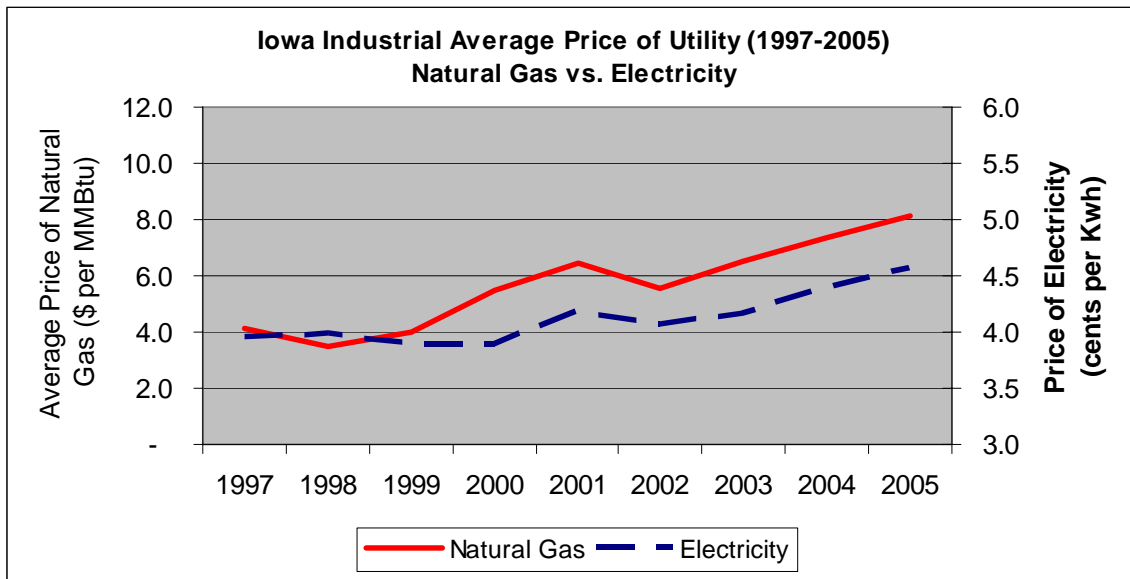
2. **2005 Industrial Spark Spread.....NOT FAVORABLE**

Average Industrial Electric Price: 4.56¢ per kWh
 Average Industrial Natural Gas Price: \$8.11 per MMBtu
 Average Industrial Spark Spread: \$5.25 per MMBtu

3. **Commercial Electric and Natural Gas Price Trends.....NOT FAVORABLE**



4. Industrial Electric and Natural Gas Price Trends.....NOT FAVORABLE



5. Exit Fees.....VERY FAVORABLE
 No exit fees are currently charged to facilities that elect to generate their own electricity.

6. Interconnect Standards.....NOT FAVORABLE
 Neither the Iowa Utilities Board nor the state of Iowa has a uniform policy for CHP interconnection. CHP facilities do not need to meet the requirements of a PURPA QF. (Brown)

7. Electric Deregulation.....NOT FAVORABLE
Restructuring Not Active. Iowa has completed studies investigating restructuring investor-owned utilities (power providers), and has decided not to pursue further action at this time.

8. Net Metering.....VERY FAVORABLE
Net Metering is available for Investor-Owned Utilities Only, Not Rural Cooperatives – NO LIMIT.

9. Real Time Pricing.....

10. Installed CHP Generating Capacity.....NOT FAVORABLE

Total Installed:	371,799 kW
Total Installed Since Year 2002:	1,200 kW

11. Largest Utility - Cost of Electricity (¢/kWh)MODERATELY FAVORABLE
Iowa (Mid American Energy Company)

Rate No. 42 Commercial and Industrial Service (East System)

Basic Service: \$20/month

For the first 6,000 kWh: 4.787 – 5.187 (winter – summer) cent/kWh

For all over 6,000 kWh: 3.537 – 3.937 (winter – summer) cent/kWh

12. Largest Utility - Demand Charges (\$/kW)NOT FAVORABLE
Iowa (Mid American Energy Company)

For the first 300 kW: \$7.55 – 9.80 (winter – summer)

For all over 300 kW: \$6.95 – 9.15 (winter – summer)

13. Largest Utility - Standby / Backup RatesNA
Iowa (Mid American Energy Company)

No Replacement Power Contract is currently in effect.

Michigan

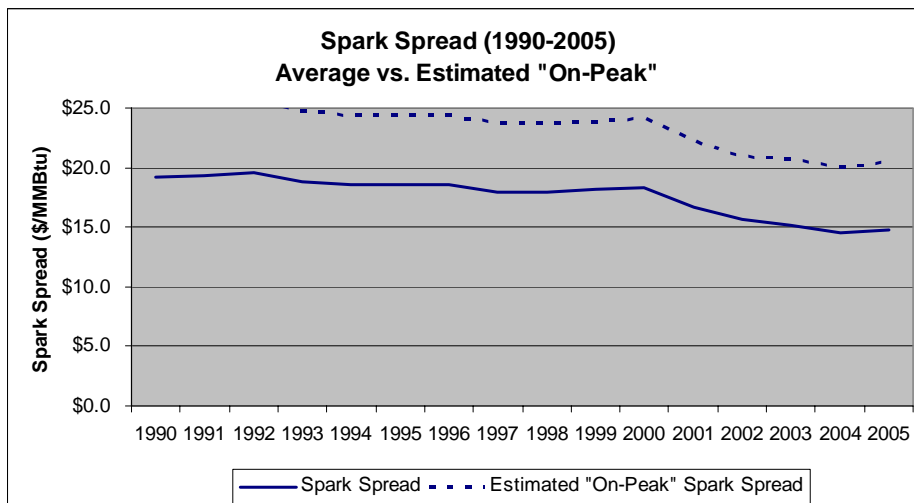
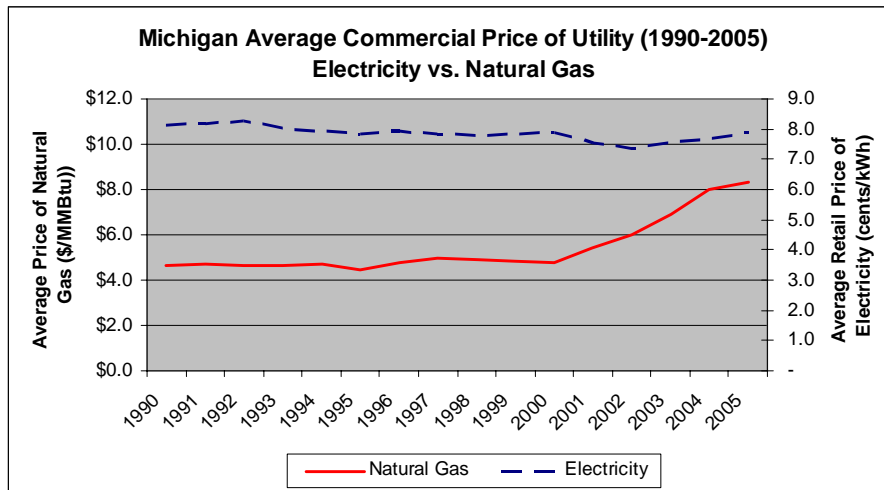
1. **2005 Commercial Spark Spread.....VERY FAVORABLE**
2005 Estimated On Peak Spark Spread.....VERY FAVORABLE

Average Commercial Electric Price: 7.92¢ per kWh
 Average Commercial Natural Gas Price: \$8.69 per MMBtu
 Average Commercial Spark Spread: \$14.52 per MMBtu
 Estimated On-Peak Commercial Spark Spread: \$20.32 per MMBtu

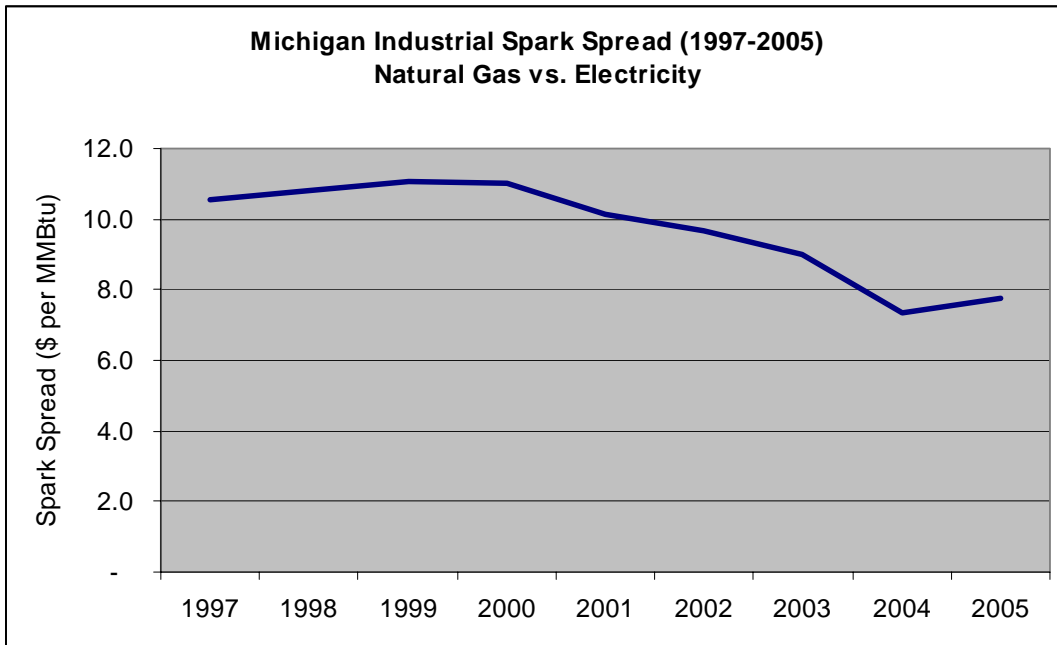
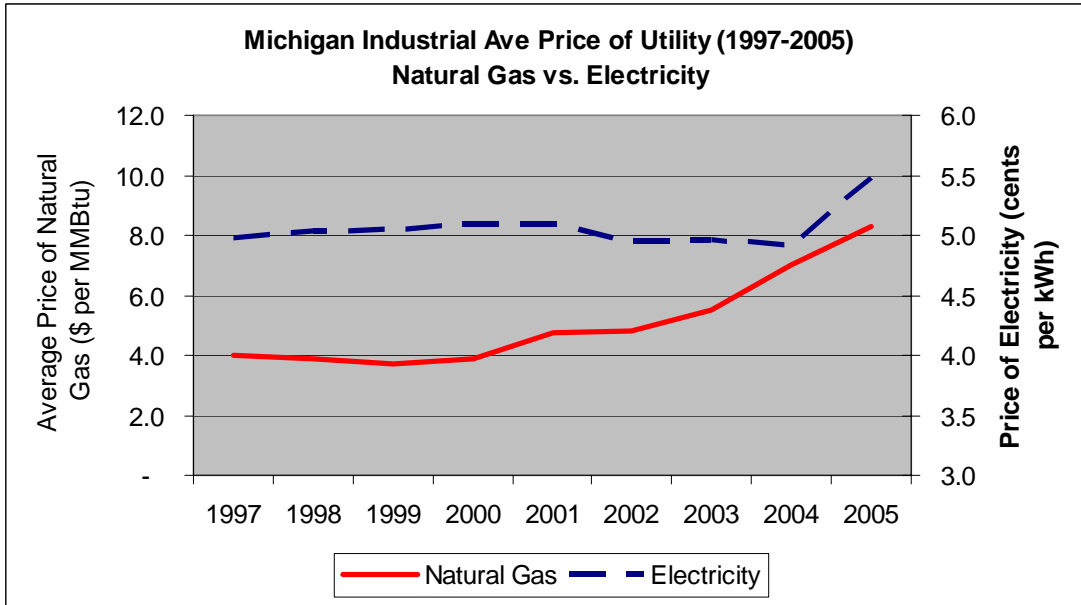
2. **2005 Industrial Spark Spread.....NOT FAVORABLE**

Average Industrial Electric Price: 5.48¢ per kWh
 Average Industrial Natural Gas Price: \$8.29 per MMBtu
 Average Industrial Spark Spread: \$7.77 per MMBtu

3. **Commercial Electric and Natural Gas Price Trends.....MODERATELY FAVORABLE**



4. Industrial Electric and Natural Gas Price Trends.....MODERATELY FAVORABLE



5. Exit Fees.....VERY FAVORABLE

No exit fees are currently charged to facilities that elect to generate their own electricity.

**6. Interconnect Standards.....MODERATELY FAVORABLE
Adopting/Implementing**

On September 22, 2003, Michigan’s final Interconnection Rules were filed with the Secretary of State.

7. Electric Deregulation.....VERY FAVORABLE Restructuring Active. The transition period for phasing in restructuring has begun in this state, and it is currently implementing a competitive electric utility market for investor-owned utilities (power providers).

8. Net Metering.....MODERATELY FAVORABLE Net Metering is available for Individual Utilities – 20 kW. On March 29, 2005, the Michigan Public Service Commission (MPSC) approved an amended consensus agreement that implements a voluntary statewide net metering program (Ann Arbor, MI). On May 18, 2004, Michigan established a net metering workgroup in the context of Michigan’s Renewable Energy Program (“MREP”).¹ The workgroup was directed to develop a net metering program for the Michigan PSC’s consideration in its next annual MREP report. In a conference on alternative energy technology, held on October 14, 2004, the Chair of the Michigan PSC announced that the MREP had reached a consensus on a potential net metering program in Michigan that could be in place in early 2005. The Michigan PSC is expected to issue an order on the stakeholder proposal.
http://www.michigan.gov/mpsc/0,1607,7-159-16400_17280-114009--,00.html

9. Real Time Pricing.....

10. Installed CHP Generating Capacity.....VERY FAVORABLE

Total Installed:	3,100,948 kW
Total Installed Since Year 2000:	102,040 kW

11. Largest Utility - Cost of Electricity (¢/kWh)MODERATELY FAVORABLE Michigan (Detroit Edison Company)

Rate Schedule No. D4 - Large General Service Rate
Service Charge: \$13.67/month

Energy Charge: 5.558 cents/kWh for the first 200kWh per kW of billing demand
Energy Charge: 5.008 cents/kWh for excess

Surcharges: 1.65158 cents/kWh

12. Largest Utility - Demand Charges (\$/kW)MODERATELY FAVORABLE

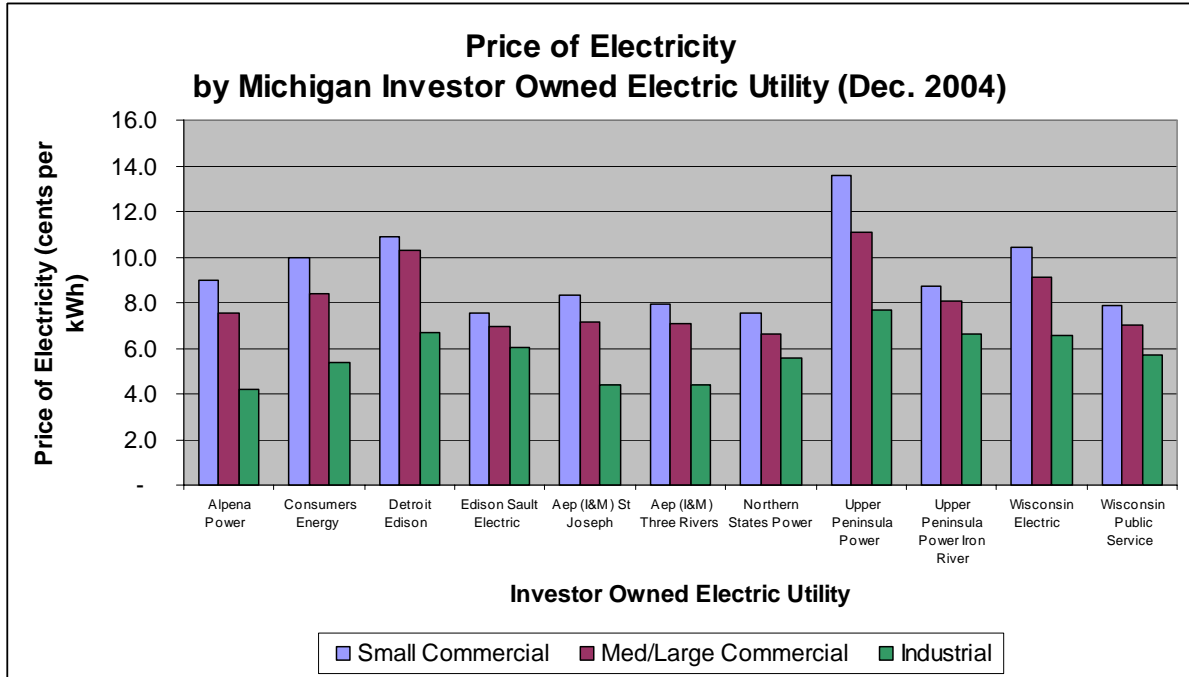
Demand: \$10.78/kW

13. Largest Utility - Standby / Backup RatesMODERATELY FAVORABLE Standard Contract Rider No. 3

Monthly Customer Charge (\$):	\$70-\$210
Standby Charge (\$/kW):	0.63/kW per month of standby contract
Non-Generation Charge (\$/kW):	\$1.51 to \$3.80/kW per month of standby contract (based on type of voltage)
Demand Charge (\$/kW):	\$1.02/kW per day for back-up and maintenance
Energy Charge (¢/kWh):	2.431+ credit and surcharges

¹ Order No. E-12915.

14. Other Electric Utility Rates



				Small Commercial		Commercial			Industrial		
	kW			5	25	100	100	100	1,000	10,000	50,000
	kWh			1,000	5,000	21,600	28,800	36,000	432,000	4,320,000	21,500,000
Investor Owned Utilities											
Alpena Power	9.79	8.99	8.59	9.24	8.70	8.49	7.42	6.68	5.17	3.70	3.69
Consumers Energy	7.94	7.94	10.68	10.28	9.71	9.65	8.19	7.32	5.39	5.37	5.38
Detroit Edison	8.94	8.94	9.63	11.25	10.54	10.40	10.39	10.00	7.05	6.64	6.40
Edison Sault Electric	7.15	6.47	6.13	7.83	7.24	7.13	7.07	6.59	6.03	6.01	6.01
Aep (I&M) St Joseph	7.22	6.11	5.80	8.92	7.71	7.41	7.09	6.90	4.54	4.28	4.30
Aep (I&M) Three Rivers	7.85	6.94	6.48	7.97	7.89	7.53	7.06	6.62	4.56	4.29	4.29
Northern States Power	8.56	7.71	7.28	7.82	7.22	7.38	6.49	5.95	5.60	5.57	5.58
Upper Peninsula Power	14.10	12.70	12.00	13.99	13.11	12.43	10.85	9.91	7.69	7.69	7.70
Upper Peninsula Power Iron River	10.65	9.45	8.85	9.06	8.34	8.89	7.94	7.37	6.62	6.62	6.62
Wisconsin Electric	12.79	10.87	8.01	11.01	9.81	9.65	9.62	8.16	6.76	6.50	6.37
Wisconsin Public Service	8.94	7.64	6.99	8.50	7.30	7.01	6.98	6.97	6.02	5.76	5.34

Minnesota

1. **2005 Commercial Spark Spread.....NOT FAVORABLE**
2005 Estimated On Peak Spark Spread.....MODERATELY FAVORABLE

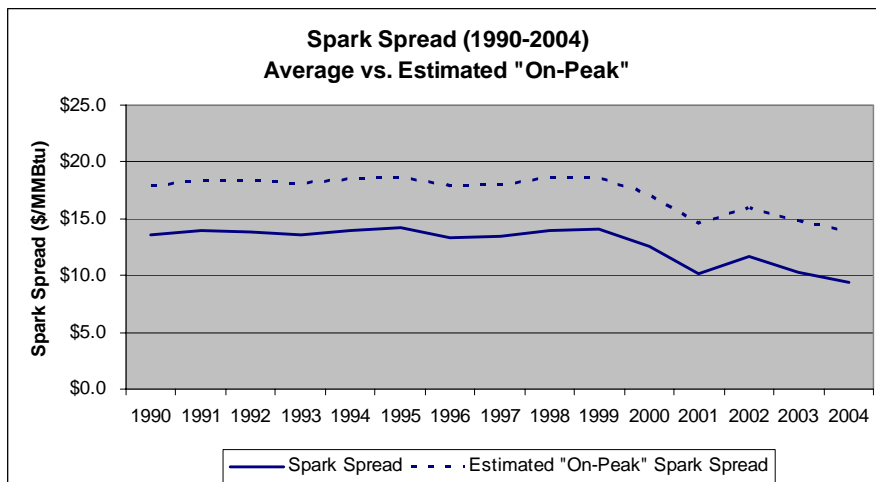
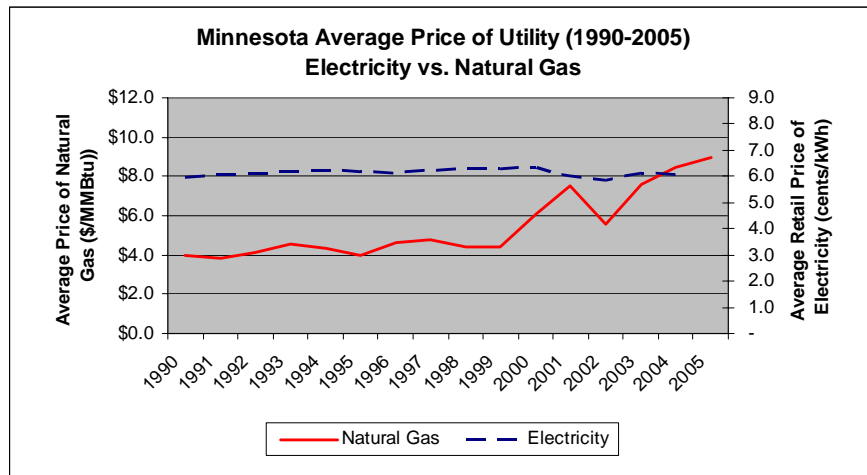
Average Commercial Electric Price*: 7.14¢ per kWh
 Average Commercial Natural Gas Price: \$9.18 per MMBtu
 Average Commercial Spark Spread: \$9.16 per MMBtu
 Estimated On-Peak Commercial Spark Spread: \$13.74 per MMBtu

* 2004 Electric Price Used

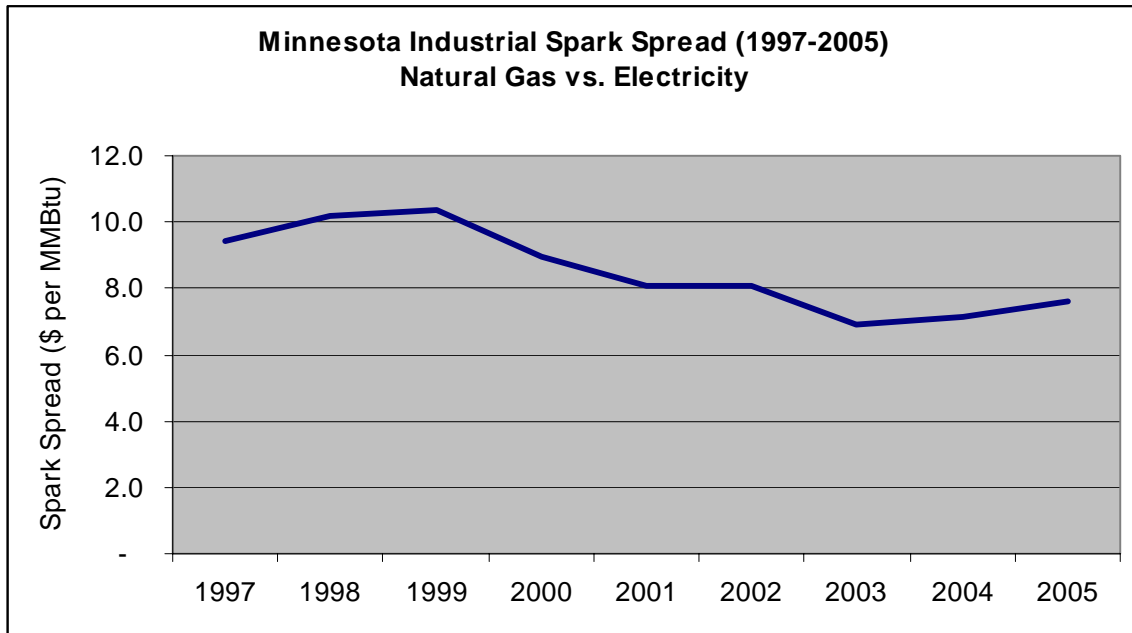
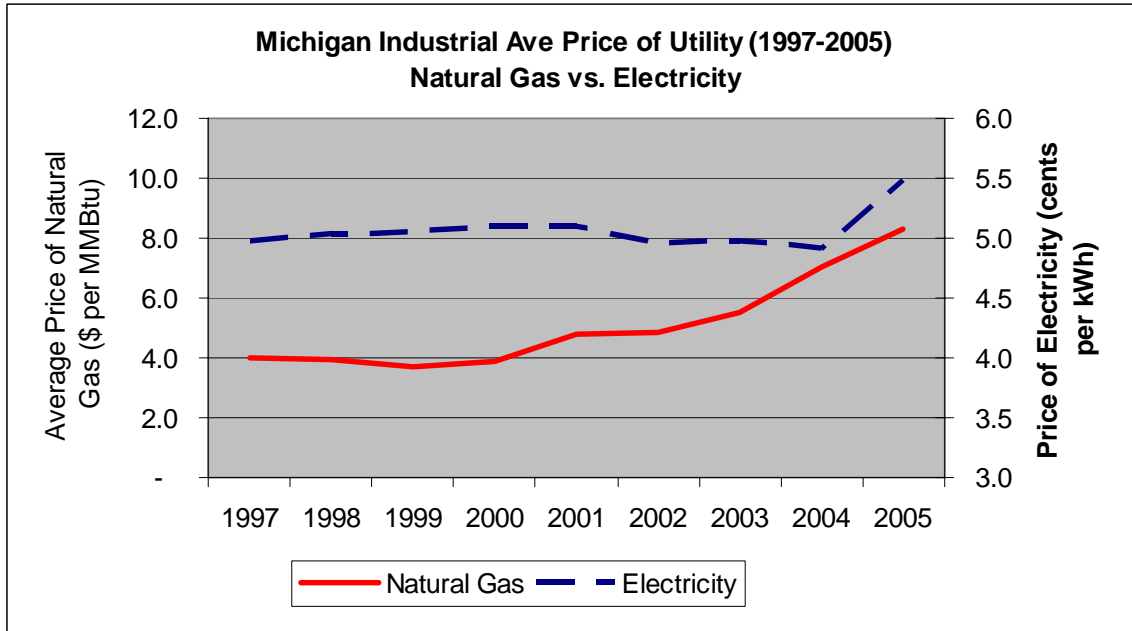
2. **2005 Industrial Spark Spread.....NOT FAVORABLE**

Average Industrial Electric Price: 5.04¢ per kWh
 Average Industrial Natural Gas Price: \$7.14 per MMBtu
 Average Industrial Spark Spread: \$7.62 per MMBtu

3. **Commercial Electric and Natural Gas Price Trends.....NOT FAVORABLE**



4. Industrial Electric and Natural Gas Price Trends.....MODERATELY FAVORABLE



5. Exit Fees.....VERY FAVORABLE
 No exit fees are currently charged to facilities that elect to generate their own electricity.

6. Interconnect Standards.....MODERATELY FAVORABLE
Adopting/Implementing

The Minnesota Public Utilities Commission (“Minnesota PUC”) and the Minnesota Department of Commerce (“MDOC”) filed supplemental comments in this proceeding to

inform the Commission about the proceedings in Minnesota regarding interconnection issues pertaining to small distributed generators. These proceedings have considered both rate-making and interconnection issues for facilities that sell power to vertically-integrated, investor-owned utilities in Minnesota. Minnesota law also requires that each municipal utility and cooperative electric association adopt a distributed generation tariff that addressed the issues included in the Minnesota PUC's Order.² On September 29, 2004, the Minnesota PUC issued an order establishing interconnection standards for distributed generation, which applies to systems up to 1 MW and above.

7. Electric Deregulation.....NOT FAVORABLE
Restructuring Not Active. This state is continuing to study and/or monitor restructuring investor-owned utilities (power providers), but is not currently pursuing further action.

8. Net Metering.....MODERATELY FAVORABLE
 Net Metering is available for Investor-Owned Utilities and Rural Cooperatives – 40 kW

9. Real Time Pricing.....

10. Installed CHP Generating Capacity.....VERY FAVORABLE

Total Installed:	1,045,015 kW
Total Installed Since Year 2000:	100,880 kW

11. Largest Utility - Cost of Electricity (¢/kWh)NOT FAVORABLE

Northern States Power Company (Xcel Energy)
 General Time of Day Service (Secondary Voltage)
 Rate Code A15
 Customer Charge: \$25.04/month
 On Peak Period: 3.8707 (¢/kWh)
 Off Peak Period: 2.8243 (¢/kWh)

Voltage Discounts: 0.05-0.13 ¢/kWh (primary/transmission)

12. Largest Utility - Demand Charges (\$/kW)MODERATELY FAVORABLE

Northern States Power Company (Xcel Energy)
 Summer Demand: \$9.26 / \$2.35 (peak/off peak)
 Winter Demand: \$6.61 / \$2.35 (peak/off peak)

Voltage Discounts: \$0.95-2.35/kW (primary/transmission)

13. Largest Utility - Standby / Backup RatesMODERATELY FAVORABLE

Northern States Power Company (Xcel Energy)
 Monthly Customer Charge: \$17.39 per month
 Unscheduled Maintenance: \$3.25 – \$0.90/kW (secondary - transmission voltage)
 Scheduled Maintenance: \$3.15 – \$0.80/kW (secondary - transmission voltage)
 Non-Firm Standby: \$2.35 – \$0.00/kW (secondary - transmission voltage)

² See Docket No. E999/CI-01-1023.

Missouri

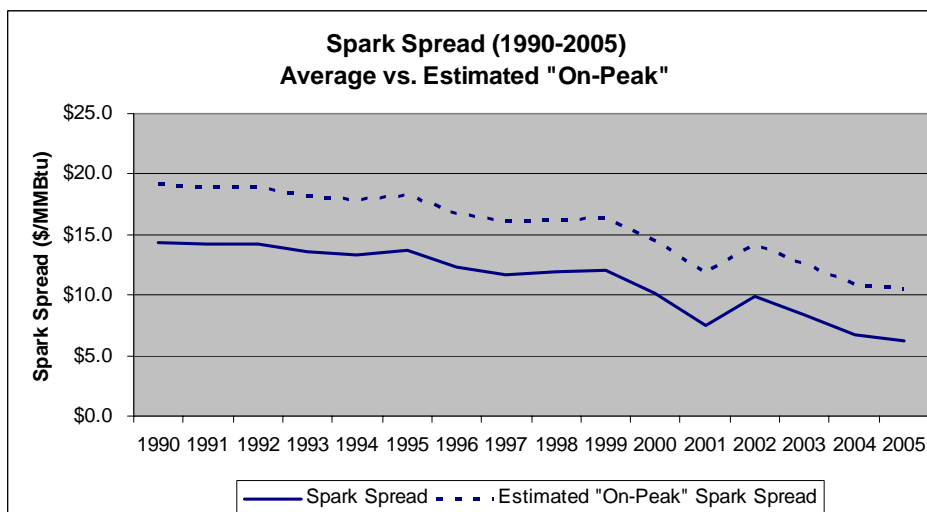
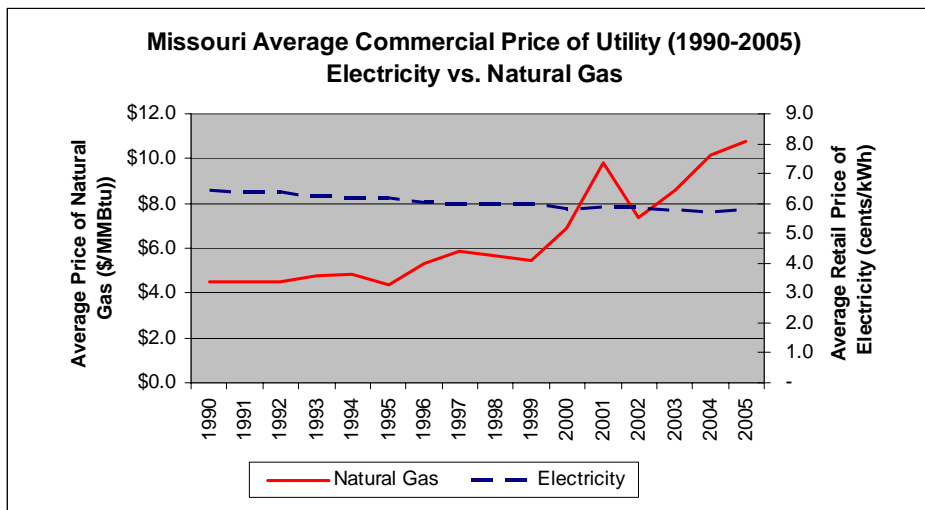
1. **2005 Commercial Spark Spread.....NOT FAVORABLE**
2005 Estimated On Peak Spark Spread.....NOT FAVORABLE

Average Commercial Electric Price:	6.03¢ per kWh
Average Commercial Natural Gas Price:	\$11.24 per MMBtu
Average Commercial Spark Spread:	\$6.43 per MMBtu
Estimated On-Peak Commercial Spark Spread:	\$10.85 per MMBtu

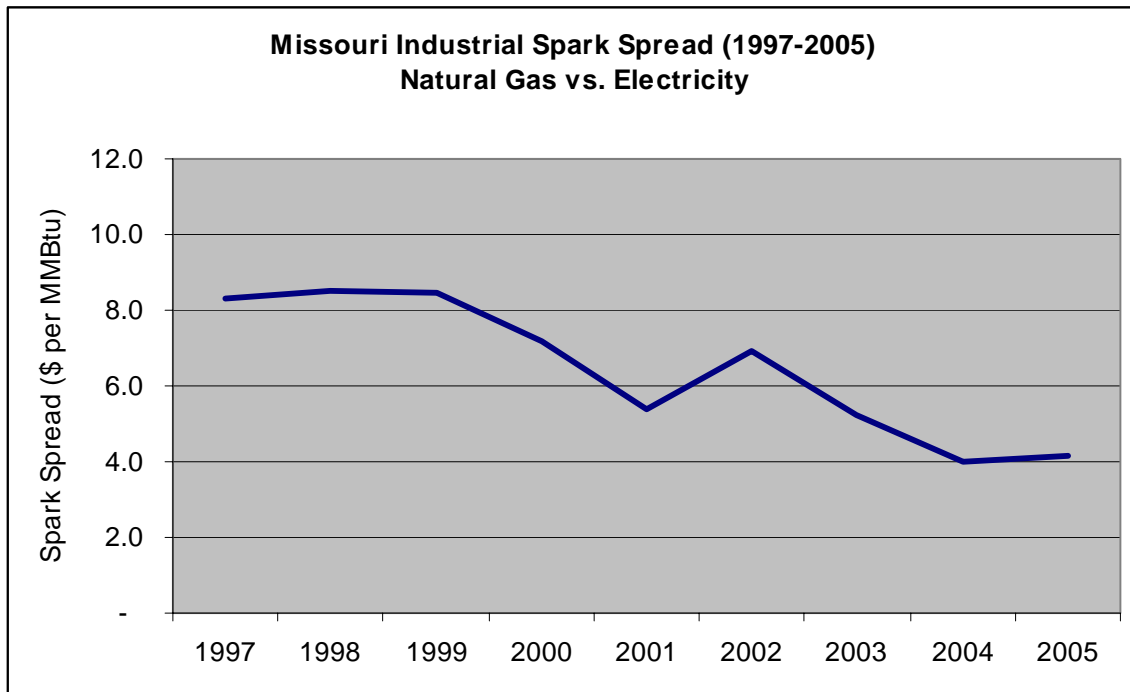
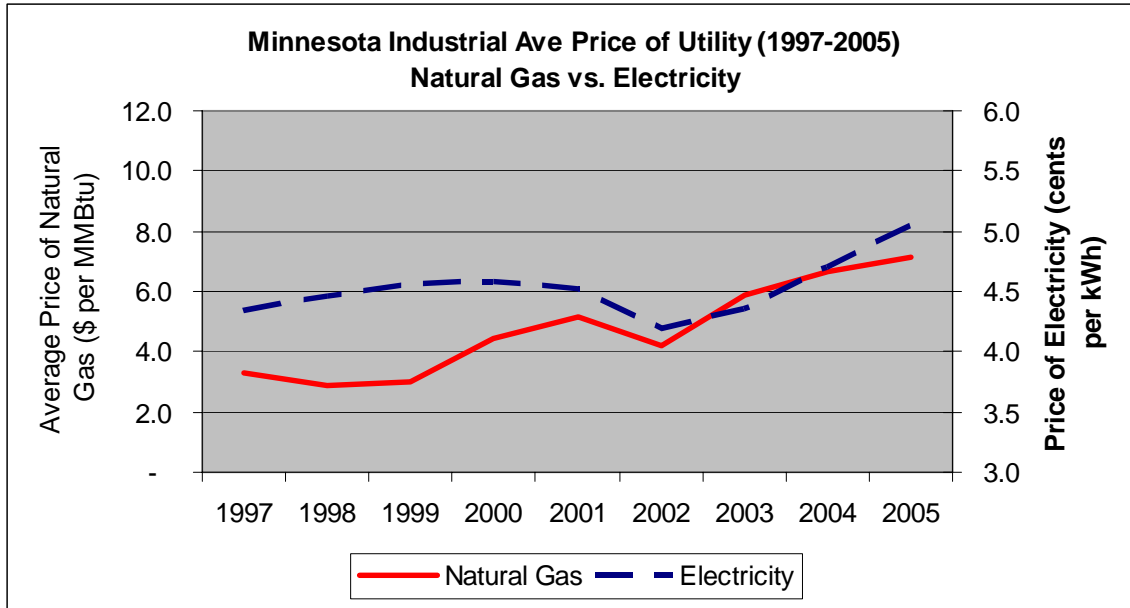
2. **2005 Industrial Spark Spread.....NOT FAVORABLE**

Average Industrial Electric Price:	4.69¢ per kWh
Average Industrial Natural Gas Price:	\$9.62 per MMBtu
Average Industrial Spark Spread:	\$4.13 per MMBtu

3. **Commercial Electric and Natural Gas Price Trends.....NOT FAVORABLE**



4. Industrial Electric and Natural Gas Price Trends.....NOT FAVORABLE



5. Exit Fees.....VERY FAVORABLE
 No exit fees are currently charged to facilities that elect to generate their own electricity.

6. Interconnect Standards.....MODERATELY FAVORABLE
Adopting/Implementing - Rules adopted by the Missouri Department of Economic Development implement the Consumer Clean Energy Act and establish standards for

interconnection of qualified net metering units (generating capacity of 100 kW or less) with retail electric power suppliers.³

7. Electric Deregulation.....NOT FAVORABLE
Restructuring Not Active. This state is continuing to study and/or monitor restructuring investor-owned utilities (power providers), but is not currently pursuing further action.

8. Net Metering.....NOT FAVORABLE
 No Net Metering is available to Missouri customers.

9. Real Time Pricing.....

10. Installed CHP Generating Capacity.....NOT FAVORABLE

Total Installed:	192,560 kW
Total Installed Since Year 2000:	10,000 kW

11. Cost of Electricity (¢/kWh)MODERATELY FAVORABLE
Missouri (Union Electric Company)

Large General Service Rate
 Customer Charge: \$66/month

Summer (June/September)

First 150 kWh per kW of Billing Demand	7.41 cent/kWh
Next 200 kWh per kW of Billing Demand	5.58 cent/kWh
All over 350 kWh per kW of Billing Demand	3.74 cent/kWh

Winter (October/May)

Base Energy Charge	
First 150 kWh per kW of Billing Demand	4.64 cent/kWh
Next 200 kWh per kW of Billing Demand	3.48 cent/kWh
All over 350 kWh per kW of Billing Demand	2.70 cent/kWh
Seasonal Energy Charge	2.70 cent/kWh

Optional Time-of-Day Adjustments

Additional Customer Charge:	\$14/month		
Energy Adjustment – per kWh		On-Peak	Off-Peak
Summer Demand Charge (June/September)		+\$0.88cent	-0.49cent
Winter Demand Charge (October/May)		+\$0.27cent	-0.15cent

12. Demand Charges (\$/kW)NOT FAVORABLE
Missouri (Union Electric Company)

Summer Demand Charge (June/September)	\$3.58
Winter Demand Charge (October/May)	\$1.28

13. Standby / Backup RatesNA
Missouri (Union Electric Company)

³ See 4 CSR 240-20.065.

Ohio

1. **2005 Commercial Spark Spread.....MODERATELY FAVORABLE**
2005 Estimated On Peak Spark Spread.....VERY FAVORABLE

Average Commercial Electric Price: 7.84¢ per kWh
 Average Commercial Natural Gas Price*: \$10.52 per MMBtu
 Average Commercial Spark Spread: \$12.45 per MMBtu
 Estimated On-Peak Commercial Spark Spread: \$18.19 per MMBtu

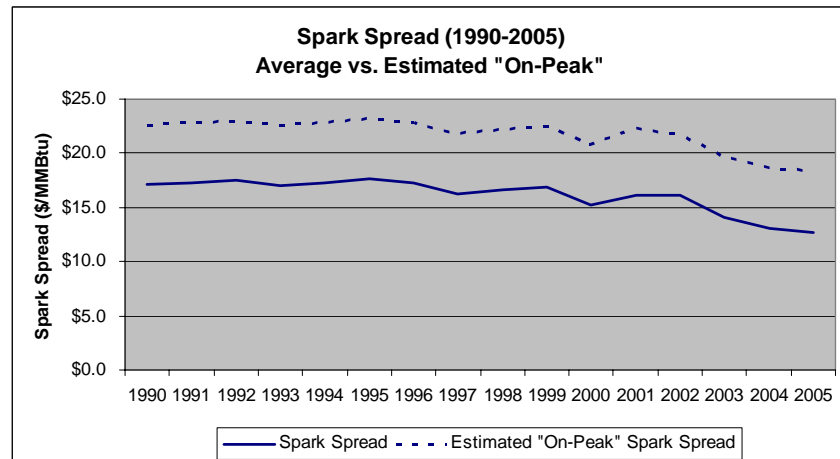
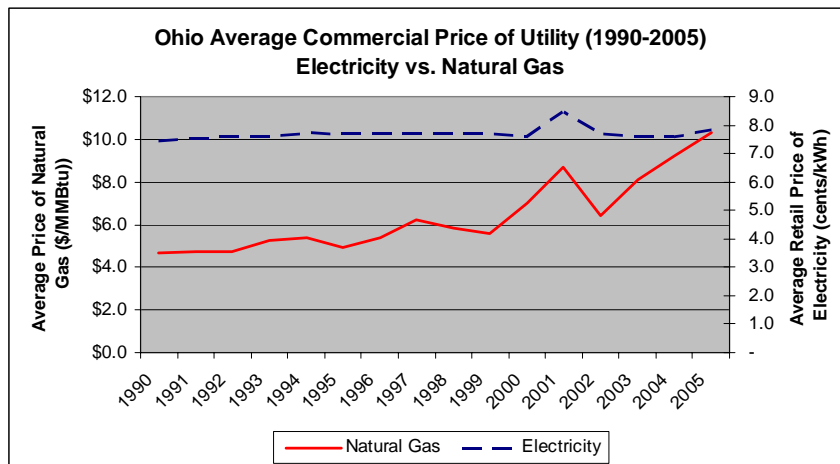
* Jun-05 Natural Gas Price Not Available

2. **2005 Industrial Spark Spread.....NOT FAVORABLE**

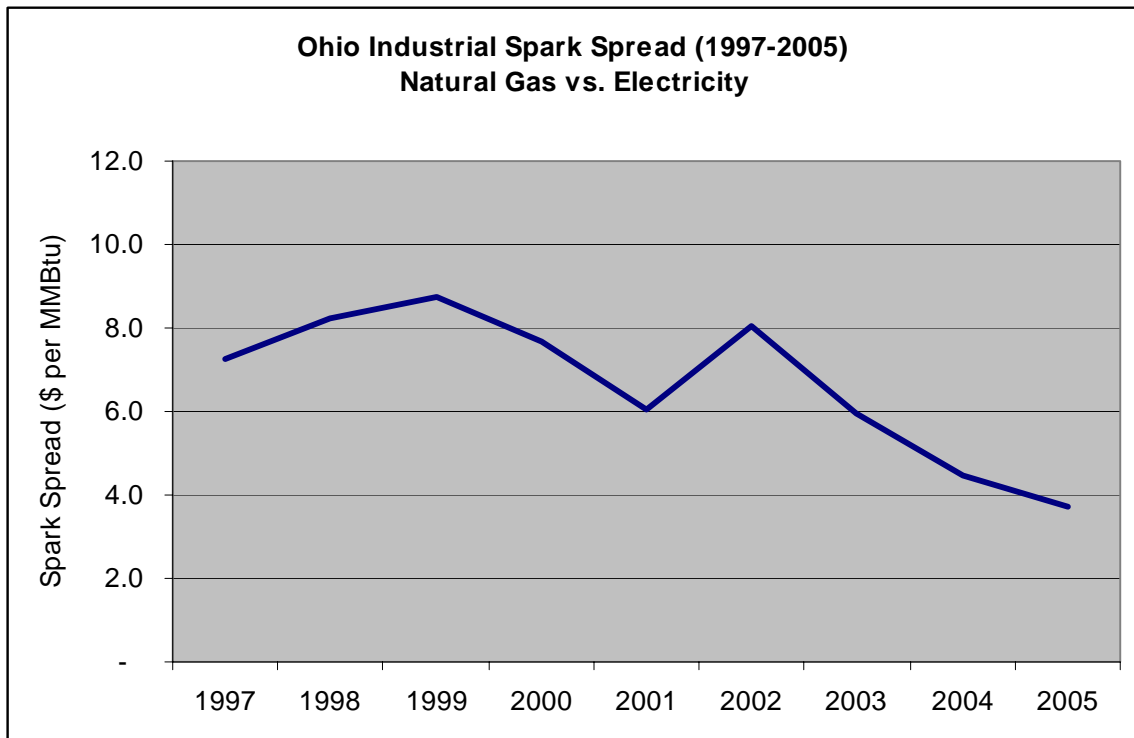
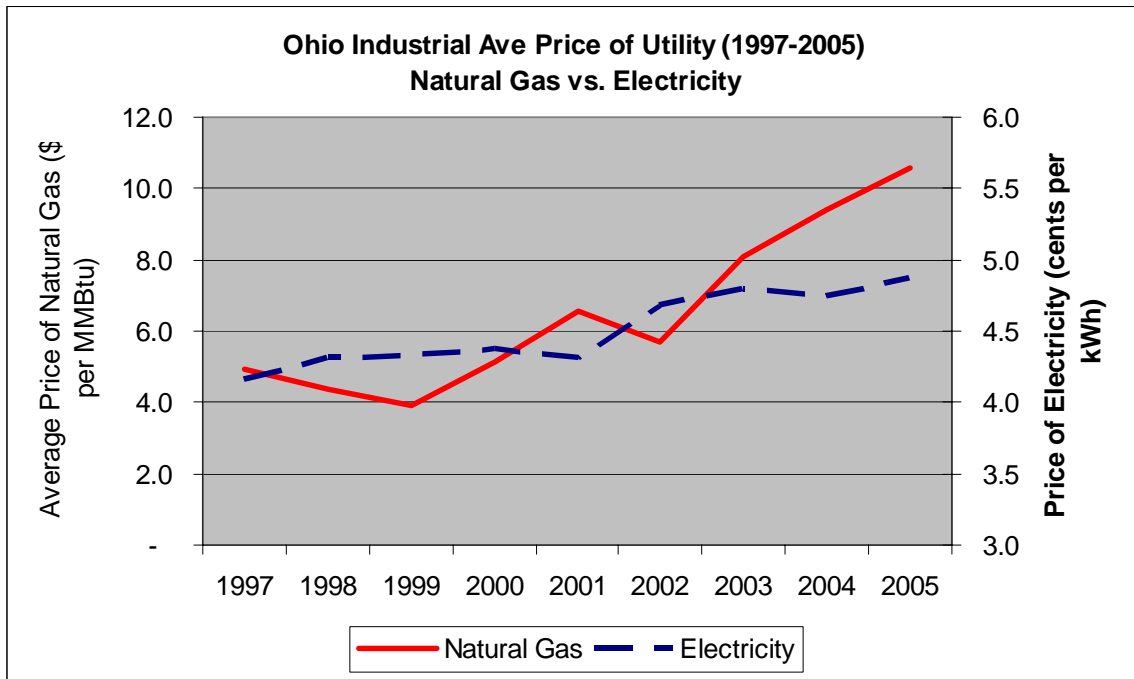
Average Industrial Electric Price: 4.87¢ per kWh
 Average Industrial Natural Gas Price*: \$10.56 per MMBtu
 Average Industrial Spark Spread: \$3.71 per MMBtu

* Jun-05 to Aug-05 Natural Gas Prices Not Available

3. **Commercial Electric and Natural Gas Price Trends.....NOT FAVORABLE**



4. Industrial Electric and Natural Gas Price Trends.....NOT FAVORABLE



5. Exit Fees.....VERY FAVORABLE

No exit fees are currently charged to facilities that elect to generate their own electricity.

**6. Interconnect Standards.....VERY FAVORABLE
Established**

Ohio was one of the first states to establish successful small generator interconnection program (CA, NY, TX, OH). The Public Utilities Commission of Ohio (“PUCO”) and the laws of the State of Ohio seek to achieve energy diversity by encouraging the interconnection of small distributed generation resources. To that end, the PUCO promulgated Ohio rules for simplified interconnection of small generators.⁴ The Ohio rules are incorporated in the *NARUC Model*. Ohio’s rules for distributed generation interconnection were developed under provisions of the State’s electric industry restructuring legislation signed into law by the Ohio Governor on July 6, 1999.⁵

**7. Electric Deregulation.....VERY FAVORABLE
Restructuring Active.** The transition period for phasing in restructuring has begun in this state and it is currently implementing a competitive electric utility market for investor-owned utilities (power providers).

8. Net Metering.....VERY FAVORABLE
Net Metering is available for Investor-Owned Utilities and Rural Cooperatives – NO LIMIT.

9. Real Time Pricing.....

10. Installed CHP Generating Capacity.....MODERATELY FAVORABLE

Total Installed:	376,823 kW
Total Installed Since Year 2000:	33,440 kW

**11. Largest Utility - Cost of Electricity (¢/kWh)NOT FAVORABLE
Ohio (Ohio Power Company)**

General Service GS-3 (Medium/High Load Factor) - Greater than 10KW but Less than 8 MW
 Customer Charge: \$24 (secondary voltage) to \$560/month (transmission voltage)
 Energy Charge: 1.72947 cent/kWh

**12. Largest Utility - Demand Charges (\$/kW)MODERATELY FAVORABLE
Ohio (Ohio Power Company)**

Demand Charge:	\$12.48
Excess KVA Demand Charge:	\$4.00/KVA
Off-Peak Excess Demand Charge:	\$2.14/KW*

*Deterrent of On-Peak CHP Operation

Maximum Energy Charge: 14.25733 cent/kWh (maximum of all charges)

**13. Largest Utility - Standby / Backup RatesNOT FAVORABLE
Ohio (Ohio Power Company)**

Schedule SBS (less than 50,000KW)
 Costs are subject to agreement

⁴ See Ohio Administrative Code § 4901:1-22-02 in compliance with Ohio Rev. Code Ann. § 4928.02.

⁵ (Amended Substitute Senate Bill 3).

Backup Service/Monthly Rate (secondary voltage):

Monthly Backup Energy Charge: 1.82057 cent/kWh
Monthly Backup Demand Charge: \$5.43 to 7.96 /kW
(based on % of forced Outage Rate) Primary voltage cost is less.

Maintenance Service/Monthly Rate (secondary voltage):

Monthly Backup Energy Charge: 2.85757 cent/kWh

Wisconsin

1. **2005 Commercial Spark Spread.....MODERATELY FAVORABLE**
2005 Estimated On Peak Spark Spread.....VERY FAVORABLE

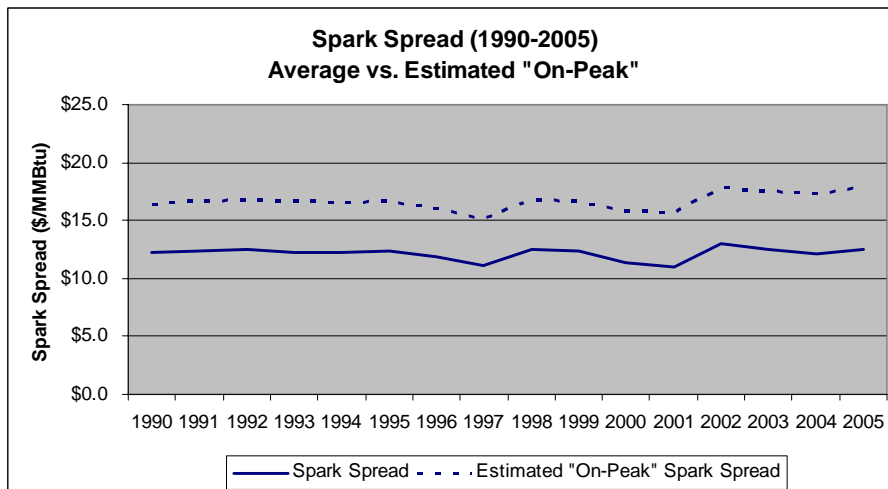
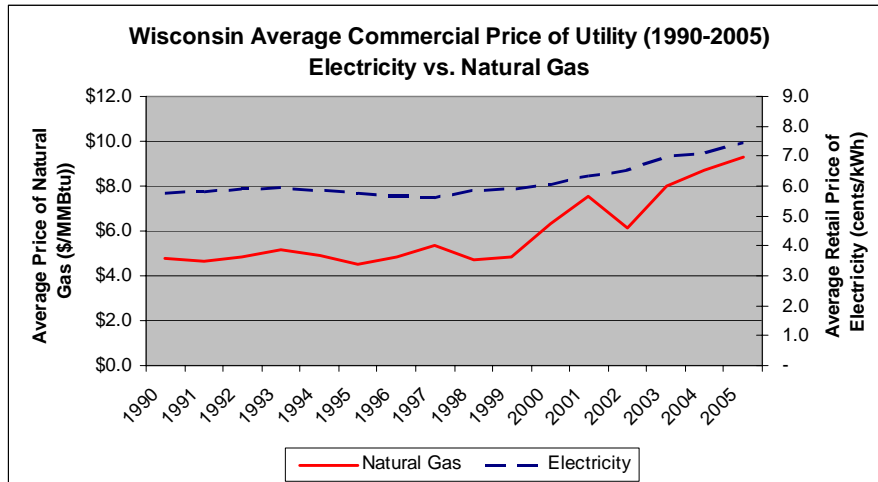
Average Commercial Electric Price:	7.50¢ per kWh
Average Commercial Natural Gas Price*:	\$9.56 per MMBtu
Average Commercial Spark Spread:	\$12.42 per MMBtu
Estimated On-Peak Commercial Spark Spread:	\$17.91 per MMBtu

* Jan-05 Natural Gas Price Not Available

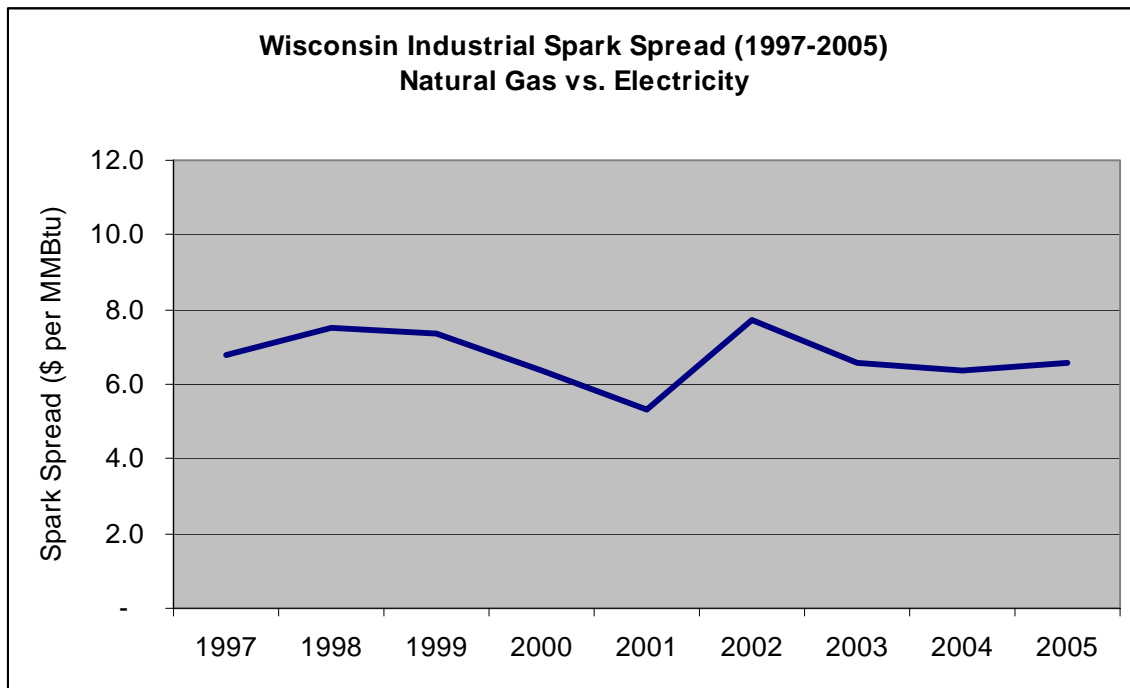
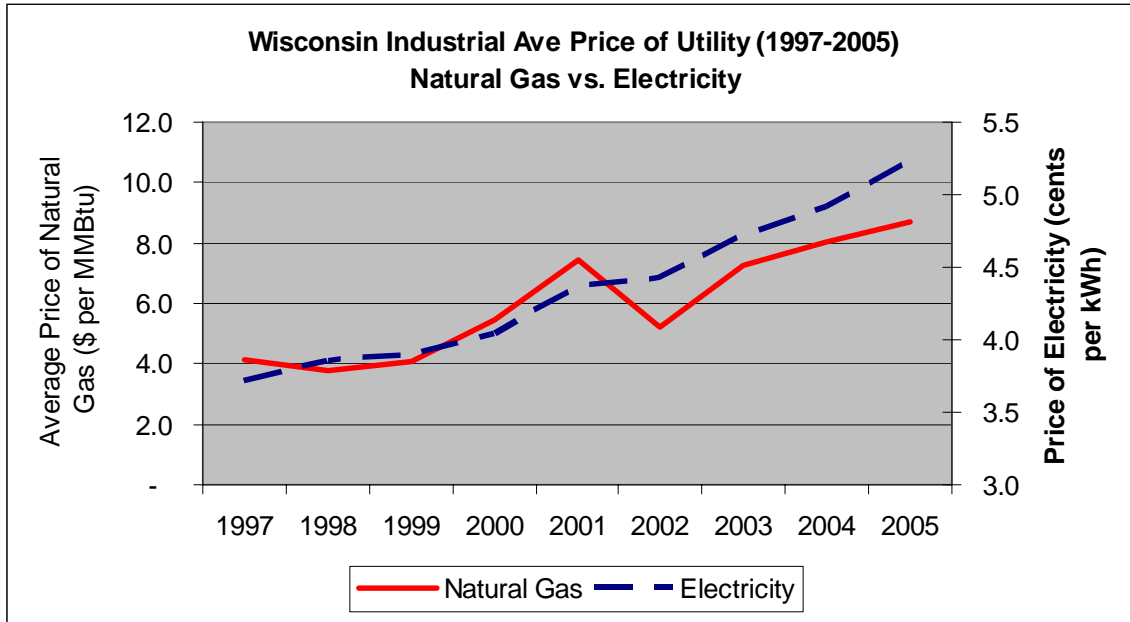
2. **2005 Industrial Spark Spread.....NOT FAVORABLE**

Average Industrial Electric Price:	5.23¢ per kWh
Average Industrial Natural Gas Price*:	\$8.73 per MMBtu
Average Industrial Spark Spread:	\$6.60 per MMBtu

3. **Commercial Electric and Natural Gas Price Trends.....MODERATELY FAVORABLE**



4. Industrial Electric and Natural Gas Price Trends.....MODERATELY FAVORABLE



5. Exit Fees.....VERY FAVORABLE
 No exit fees are currently charged to facilities that elect to generate their own electricity.

6. Interconnect Standards.....MODERATELY FAVORABLE
 Adopting/Implementing

On September 25, 2003, the Wisconsin Public Service Commission (“PSC”) adopted rules that established uniform standards for interconnecting distributed generation facilities.⁶ The Wisconsin rules apply to all electric public utilities to whose distribution systems a distributed generation facility is interconnected or to which interconnection is sought. These rules establish uniform Statewide standards for the interconnection of all distributed generation facilities with a capacity of 15 MW or less to an electric public utility’s distribution system.

7. Electric Deregulation.....NOT FAVORABLE

This state has completed studies investigating restructuring investor-owned utilities (power providers), and has decided **not to pursue** further action at this time. Studies released in 2000 and 2001 recommended against opening the electricity market to competition, owing to the fact that its limited transmission capacity will hamper growth conditions. Electric deregulation remains on hold in Wisconsin.

8. Net Metering.....MODERATELY FAVORABLE

Net Metering is available to Investor-Owned Utilities Only, Not Rural Cooperatives – 20 kW

9. Real Time Pricing.....

10. Installed CHP Generating Capacity.....MODERATELY FAVORABLE

Total Installed:	1,218,525 kW
Total Installed Since Year 2000:	46,830 kW

11. Largest Utility - Cost of Electricity (¢/kWh).....NOT FAVORABLE

Wisconsin (Wisconsin Electric Power Co.)

Secondary Demand/Time-of Use (Rate Cg3) - 30,000 + kWh per month for any 3 months

Connection Charge : 46.50 per month (plus \$4 for each additional meter)

On Peak: 4.272 cents/kWh

Off Peak: 2.825 cents/kWh

12. Largest Utility - Demand Charges (\$/kW)MODERATELY FAVORABLE

Wisconsin (Wisconsin Electric Power Co.)

On Peak Demand Charge: 10.44/kW (discounted in months used for shorter times)

Customer Demand Charge: 0.70/kW

Fuel Adjustments:

On Peak Energy Charge: 1.388 cents/kWh

Off Peak Energy Charge: 0.494 cents/kWh

On Peak Demand Charge: \$0.31/kW

Transmission Adjustment:

On Peak Energy Charge: 0.194 cents/kWh

Off Peak Energy Charge: 0.028 cents/kWh

On Peak Demand Charge: \$0.40/kW

13. Standby / Backup RatesNA

⁶ See Administrative Code PSC Chapter 119.

CHP Market Entry Status in the Midwest: A State-by-State Analysis

Summary Table

		Illinois	Indiana	Iowa	Michigan	Minnesota	Missouri	Ohio	Wisconsin
	Average Price of Natural Gas (\$/MMBtu)								
	Commercial	10.74	11.59	10.06	8.69	9.18	11.24	10.52	9.56
	Industrial	8.75	9.36	8.11	8.29	7.14	9.62	10.56	8.73
	Average Price of Electricity (¢/kWh)								
	Commercial	7.67	6.47	*6.71	7.92	*6.26	6.03	7.84	7.50
	Industrial	4.77	4.33	4.56	5.48	5.04	4.69	4.87	5.23
	Spark Spread (\$/MMBtu)								
1A	Commercial	11.74	7.37	9.60	14.52	9.16	6.43	12.45	12.42
1B	Commercial On-Peak	17.35	12.11	14.51	20.32	13.74	10.85	18.19	17.91
2	Industrial	5.23	3.33	5.26	7.77	7.62	4.13	3.71	6.60
3	Electric & Natural Price Trends (Commercial)	Decreasing Electric Prices	Slightly Increasing Electric Prices	Relatively Stable Electric Prices	Increasing Electric Prices	Slightly Decreasing Electric Prices	Decreasing Electric Prices	Slightly Increasing Electric Prices	Increasing Electric Prices
		Increasing Natural Gas Prices	Increasing Natural Gas Prices	Increasing Natural Gas Prices	Increasing Natural Gas Prices	Increasing Natural Gas Prices	Increasing Natural Gas Prices	Increasing Natural Gas Prices	Increasing Natural Gas Prices
4	Electric & Natural Price Trends (Industrial)	Decreasing Electric Prices	Slightly Increasing Electric Prices	Slightly Increasing Electric Prices	Increasing Electric Prices	Increasing Electric Prices	Slightly Increasing Electric Prices	Increasing Electric Prices	Increasing Electric Prices
		Increasing Natural Gas Prices	Increasing Natural Gas Prices	Increasing Natural Gas Prices	Increasing Natural Gas Prices	Increasing Natural Gas Prices	Increasing Natural Gas Prices	Increasing Natural Gas Prices	Increasing Natural Gas Prices
5	Exit Fees	No Exit Fees; ComEd determines in own territory	No Exit Fees	No Exit Fees	No Exit Fees	No Exit Fees	No Exit Fees	No Exit Fees	No Exit Fees
6	Interconnect Standards	Adopting/Implementing; Standards under review	Developing Standards	No Standards	Adopting/Implementing	Adopting/Implementing; Applies to systems up to 1 MW	Adopting/Implementing; up to 100 kW	Established	Adopting/Implementing; 15 MW or less
7	Electric Deregulation	Restructuring Active; ComEd in 2007	Restructuring Not Active	Restructuring Not Active	Restructuring Active	Restructuring Not Active	Restructuring Not Active	Restructuring Active	Will Not Pursue Electric Deregulation
8	Net Metering	Wind & Solar only; No CHP	Up to 1,000 kWh/month	Available to Investor-Owned Utilities Only – No Limit	Available for Individual Utilities up to 20 kW	Available to Investor-Owned Utilities and Rural Coops up to 40 kW	No Net Metering Available	Available to Investor-Owned Utilities and Rural Coops – No Limit	Available to Investor-Owned Utilities Only up to 20 kW

Summary Table (continued)

		Illinois	Indiana	Iowa	Michigan	Minnesota	Missouri	Ohio	Wisconsin
9	Real Time Pricing	Available to northern customers	?	?	?	?	?	?	?
	Installed CHP Capacity (MW)								
	Total	1,231.7	2,032.3	371.8	3,100.9	1,045.0	192.6	376.8	1,218.5
10	Since 2000	122.4	80.3	1.2	102.0	100.9	10.0	33.4	46.8
	Largest Electric Utility (Commercial)								
11	Energy Rates	5.0 – 5.6	1.6 – 1.7	3.5 – 5.2	5.0 – 5.6	3.9	3.5 – 7.4	1.7	4.3
12	Demand Rates	11.0 – 16.4	10.4 – 14.1	7.0 – 9.8	10.8	8.96 – 11.6	1.3 – 3.6	12.5	11.1
13	Standby Rates	3.0	NA	NA	2.1 – 4.4	2.4 – 3.3	NA	5.4 – 8.0	NA

* 2005 Minnesota/Iowa Commercial Electric Rate Unavailable (2004 Electric Rate Used)

Evaluation Criteria Summary Table

	IL	IN	IA	MI	MN	MO	OH	WI
1A. Commercial Spark Spread (Ave Costs)	●	○	○	●	○	○	●	●
1B. On-Peak Spark Spread (Estimated)	●	●	●	●	●	○	●	●
2. Industrial Spark Spread (Ave. Costs)	○	○	○	○	○	○	○	○
3. Commercial Electric vs. Gas Trends	○	○	○	●	○	○	○	●
4. Industrial Electric vs. Gas Trends	○	○	○	●	●	○	○	●
5. Exit Fees	●	●	●	●	●	●	●	●
6. Interconnect Standard	●	●	○	●	●	●	●	●
7. Electric Deregulation	●	○	○	●	○	○	●	○
8. Net Metering	○	●	●	●	●	○	●	●
9. Real Time Pricing	●	-	-	-	-	-	-	-
10. Installed CHP Generating Capacity since 2002	●	●	○	●	●	○	●	●
11. Largest Electric Utility - Energy Charges (¢/kWh)	●	○	●	●	○	●	○	○
12. Largest Electric Utility - Demand Charges (\$/kWh)	●	●	○	●	●	○	●	●
13. Largest Electric Utility - Standby / Backup Rates	●	-	-	●	●	-	○	-

○ = NOT FAVORABLE
 ● = MODERATELY FAVORABLE
 ● = VERY FAVORABLE

“-“ = Information not available or investigated at time of report

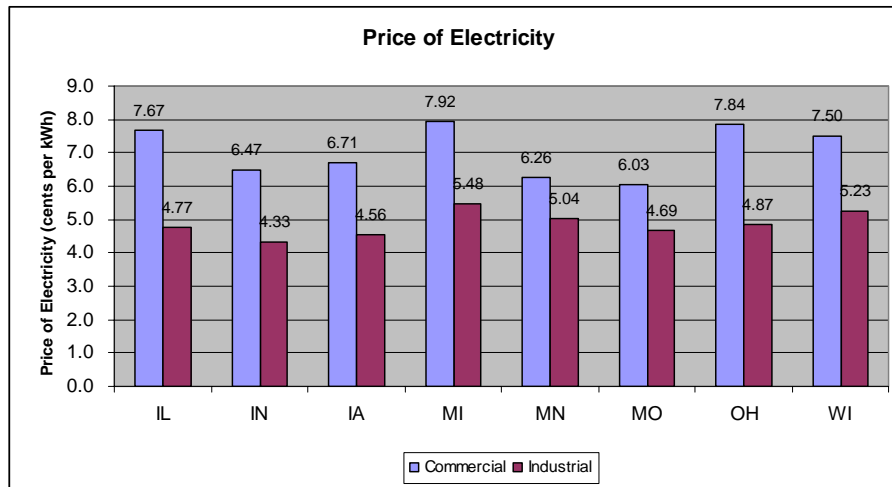
Appendix A

Electric & Natural Gas Prices in the Midwest

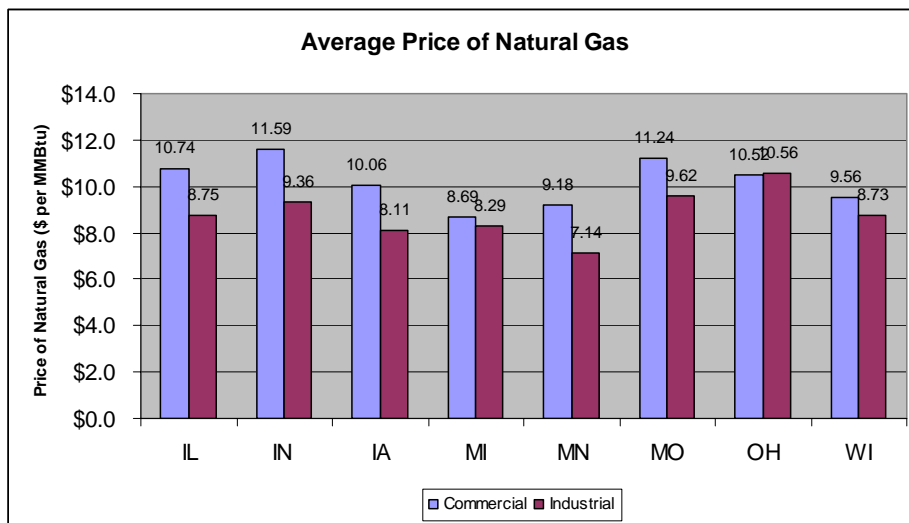
Electric and Natural Gas Prices in the Midwest

The commercial and industrial utility prices in the Midwest for both electricity and natural gas have recently been showing unfavorable trends towards the economic viability of natural gas fueled CHP systems. The large bulk of operating CHP systems within the commercial and industrial market sectors utilize natural gas as their primary fuel, constituting the majority of the variable/operating cost of these systems.

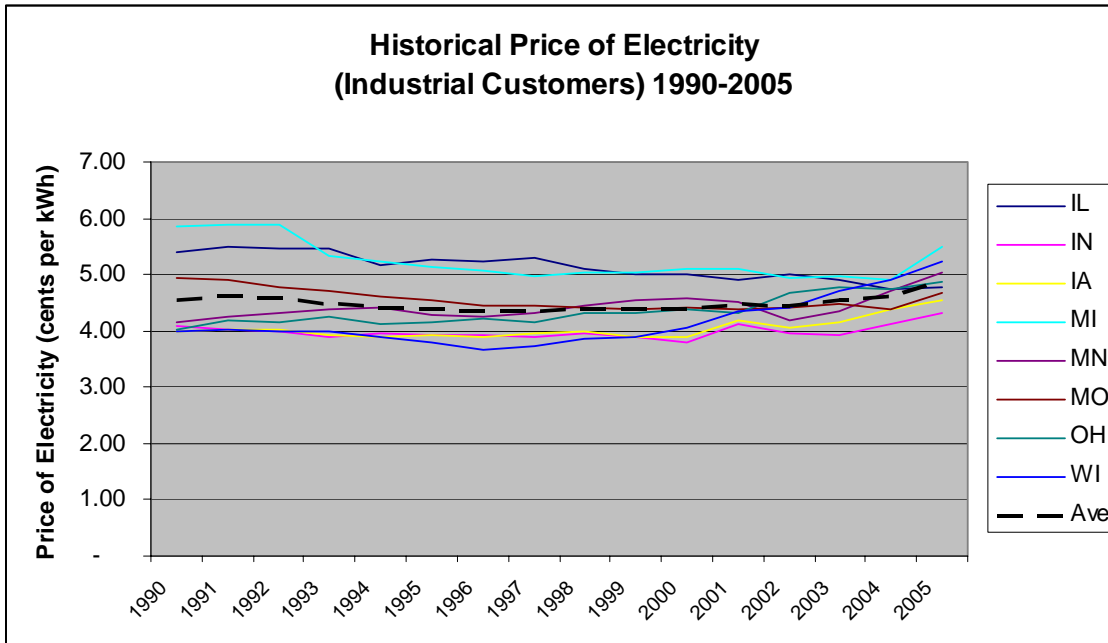
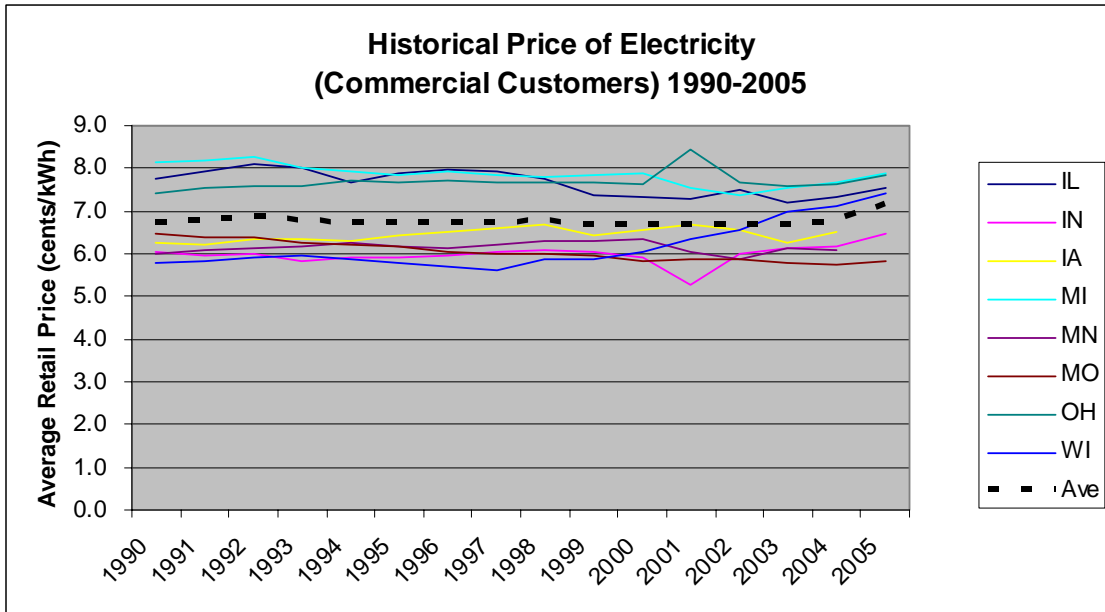
The average Midwest cost of electricity for the commercial market sector in 2005 is 7.05 cents per kWh and 4.87 cents per kWh for the industrial market sector. The average commercial electric rates range from 6.03 cents per kWh in Missouri to 7.92 cents per kWh in Michigan, while the average industrial electric rates range from 4.33 cents per kWh in Indiana to 5.48 cents per kWh in Michigan.



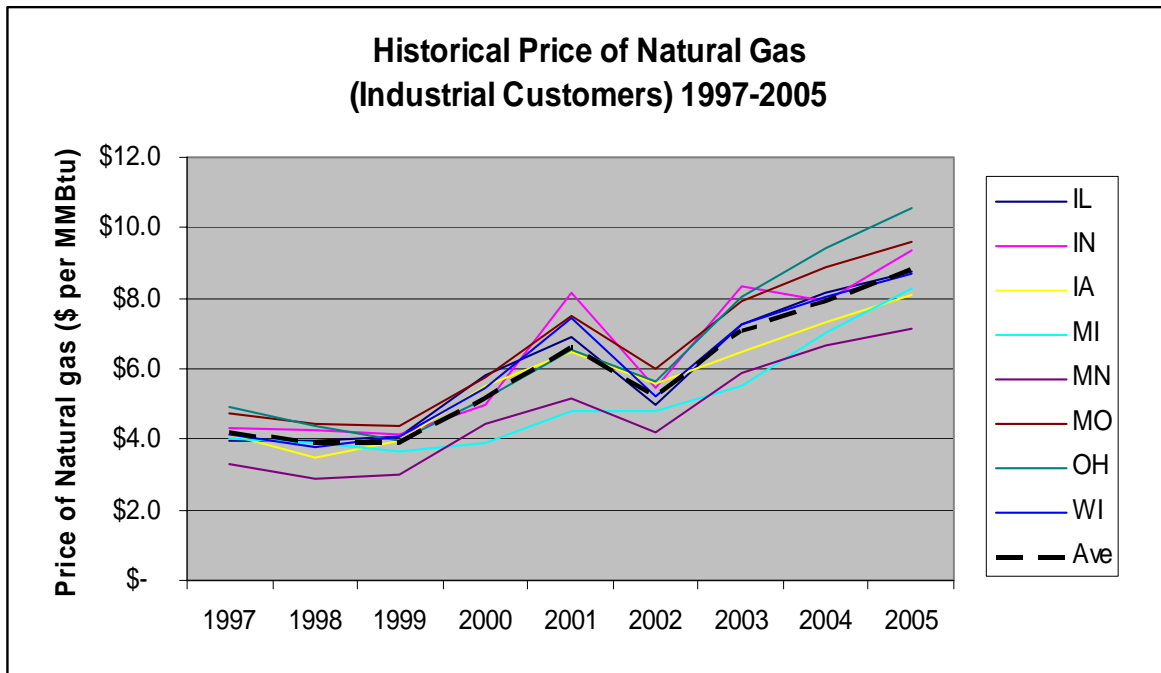
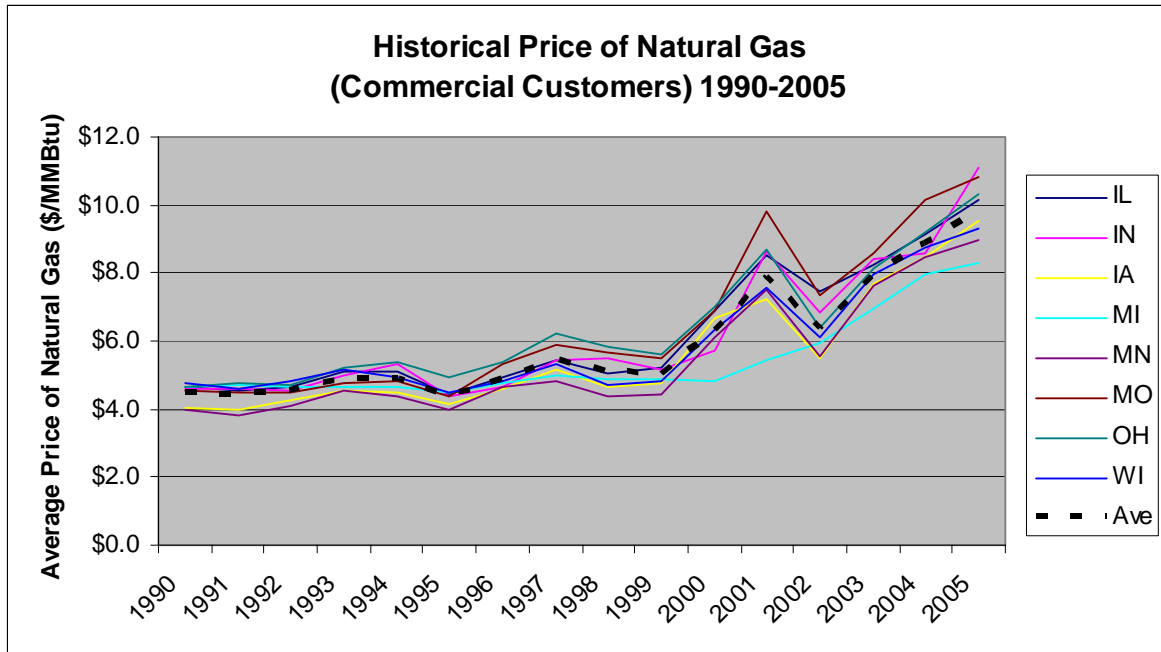
The average price of natural gas in the Midwest for 2005 is currently \$10.20 per MMBtu in the commercial market sector and \$8.82 per MMBtu in the industrial market sector. The average price of natural gas in the commercial market sector ranges from \$8.69 per MMBtu in Michigan to \$11.59 per MMBtu in Indiana. The average price of natural gas in the industrial market sector ranges from \$7.14 per MMBtu in Minnesota to \$10.56 per MMBtu in Ohio.



The average commercial and industrial electric rates in the Midwest have remained fairly constant over the past 15 with a slight increase in price occurring over the past two to three years. The price of electricity over the past

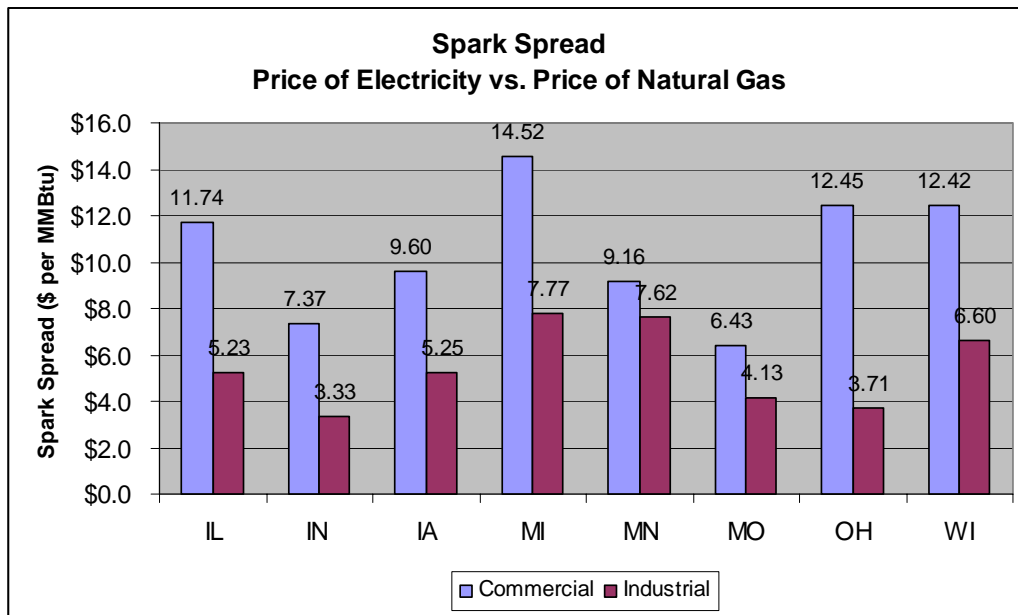


On the contrary, the average price of natural gas for the commercial and industrial market sector has been increasing during this same time frame since 1990. The price of natural gas has also shown volatile characteristics over the past five years.



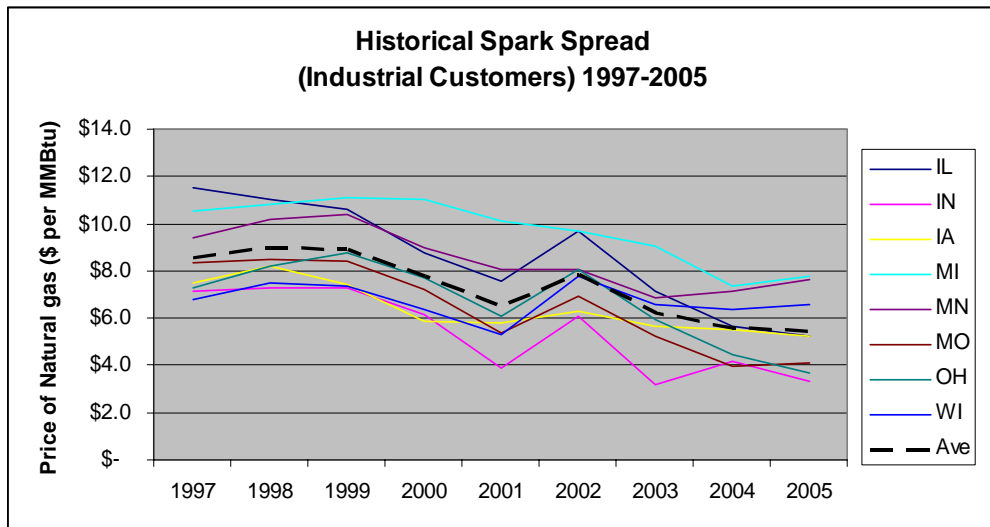
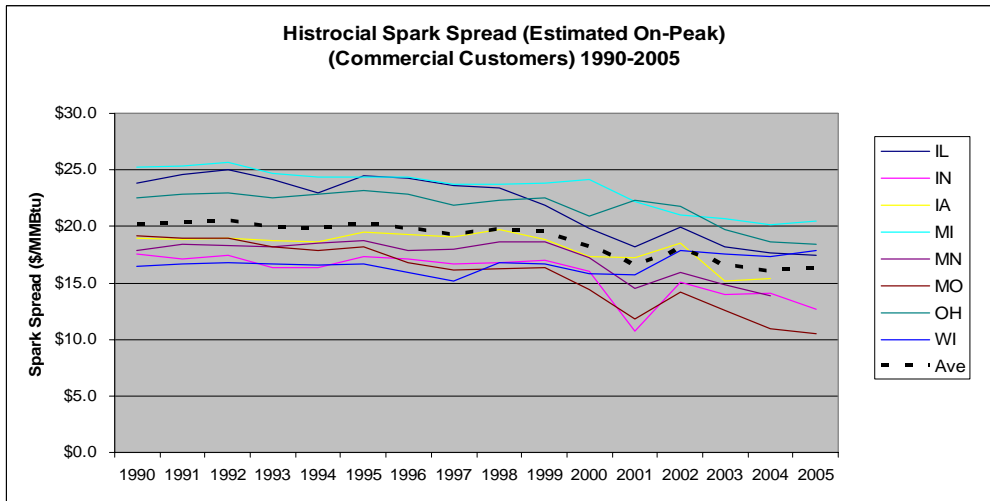
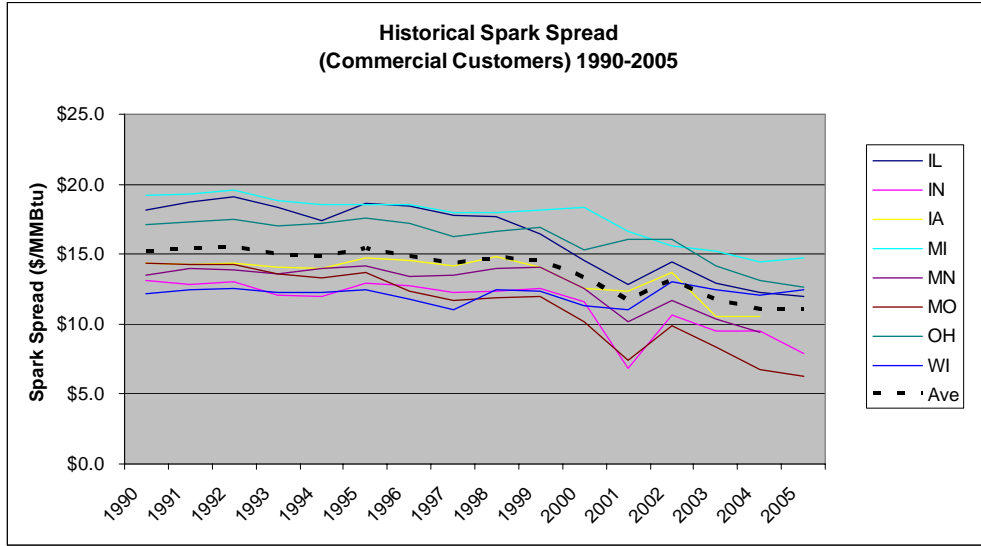
For a first cut, very rough “Rule-of-Thumb” screening of the economic viability of a CHP system, the cost differential between electricity and natural gas can be estimated as the “Spark Spread.” If the “Spark Spread” is greater than \$12 per MMBtu, then CHP has the potential for favorable payback based solely on the prices of electric and natural gas. As the “Spark Spread” begins to fall below \$12 per MMBtu, then CHP may not show the potential for a favorable payback unless other benefits such as increased electric reliability, the need for a backup power, a desire to increase energy efficiency, and/or or governmental support / incentives. As the “Spark Spread” begins to fall within single digits, the economic justification for CHP becomes increasingly more difficult.

The 2005 spark spread within the commercial market sector is \$10.46 per MMBtu while the spark spread in the industrial market sector is \$5.46 per MMBtu. The spark spread for the commercial market sector ranges from \$6.43 per MMBtu in Missouri to \$14.52 per MMBtu in Michigan. The spark spread for the industrial market sector ranges from \$3.33 per MMBtu in Indiana to \$7.77 per MMBtu.



With the current trends in the price of electricity and natural gas, the “Spark Spread” within the Midwest has been declining over the past 15 years both in the commercial and industrial market sectors. The price of electricity for the industrial market sector has shown a slight increase in the past couple of years, but the increased price of natural gas has shown a larger increase, continuing the downward trend for the spark spread.

The “Spark Spreads” shown above are for the overall average electric rates that include both “On-Peak” and “Off-Peak” prices. Most CHP systems within the commercial market sector today are operated during the electric utility’s “On-Peak” period ONLY to take advantage of the maximum “Spark Spread” of the day. Therefore, to show the “Spark Spread” for the “On-Peak” period, a conservative 25% increased cost was added to the average electric price to help estimate the “Spark Spread” during the “On-Peak” period. The new “Spark Spread” still shows a decline, but in most states, the “Spark Spread” remained above \$12 per MMBtu, a favorable characteristic for preliminary screening of CHP projects.



Appendix B

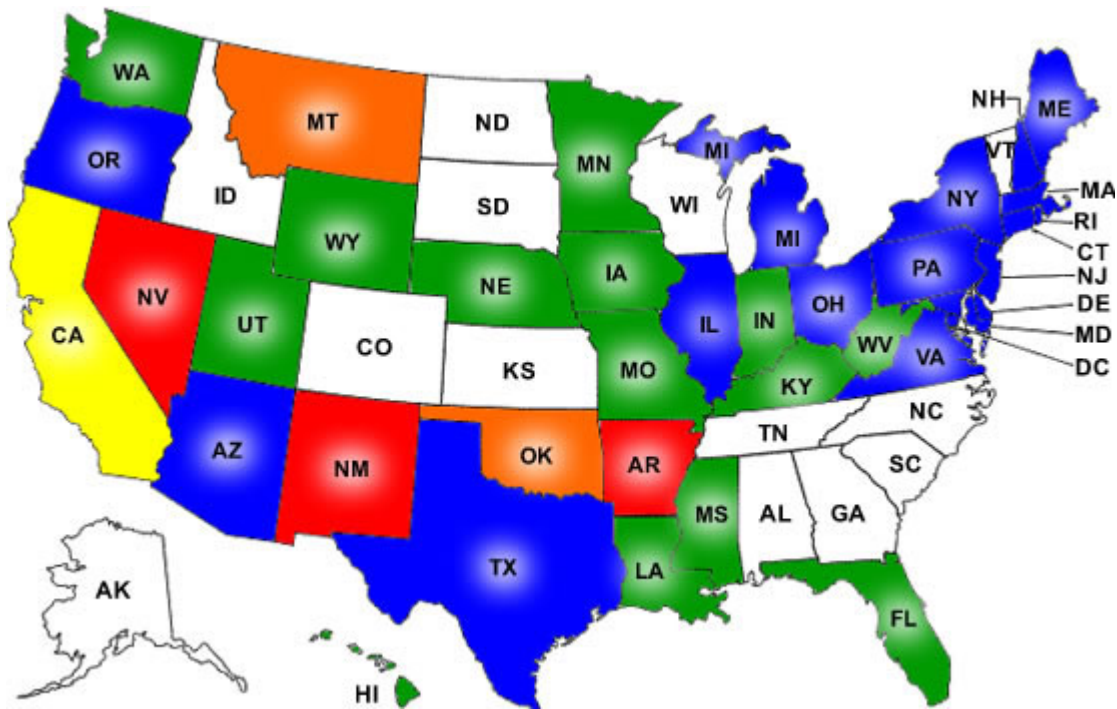
Additional Graphs and Charts

Restructuring Status of Electric Markets

http://www.eere.energy.gov/femp/program/utility/utilityman_staterestruc.cfm

Legend







	The transition period for phasing in restructuring has begun in these states, and they are currently implementing a competitive electric utility market for investor-owned utilities.
	These states are continuing to study and/or monitor restructuring investor-owned utilities, but are not currently pursuing further action.
	These states have completed studies investigating restructuring investor-owned utilities (power providers), and have decided not to pursue further action at this time.
	These states have passed legislation suspending the restructuring process.
	These states have passed legislation delaying the restructuring process.
	These states have passed legislation repealing the restructuring process.

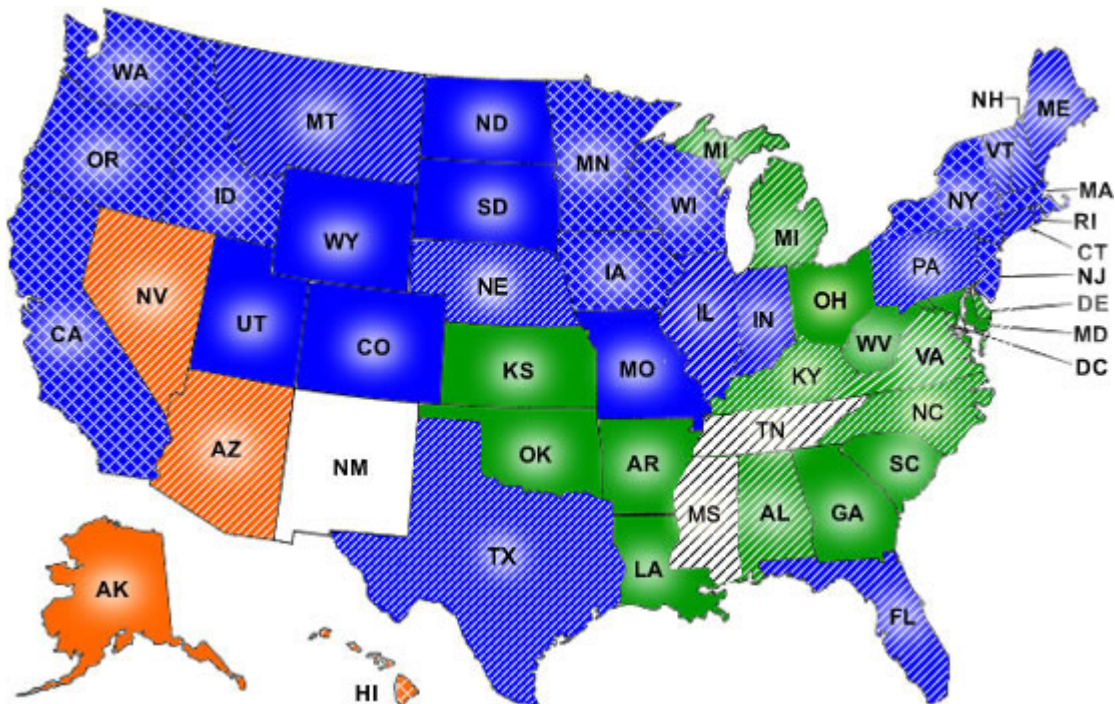


Energy-Efficiency Funds and Demand Response Programs

Select a state below to access more detailed information about that state's programs.

Legend

	These states have public purpose and/or utility energy efficiency programs as well as demand response/load management programs.
	These states have demand response/load management programs.
	These states have public purpose and/or utility energy efficiency programs.
	These states have distributed energy resource options available.
	These states have gas energy efficiency programs.
	These states have no energy management programs.



Note

The energy management programs are categorized according to the following definitions:

Energy Efficiency Programs: Can be either 1) *public purpose* programs which are administered either by utilities, state agencies or other third parties, and are paid for by utility ratepayers, typically through a non-bypassable System Benefits Charge which is instituted as part of restructuring legislation or rules or 2) *utility programs* administered by the local utility and paid for by utility ratepayers through their bundled rates.

Demand Response Programs/Load Management: Programs which provide incentives to curtail demand and reduce load during peak periods in response to system reliability or market conditions.

Summary of State Net Metering Programs

http://www.eere.energy.gov/greenpower/resources/maps/netmetering_map.shtml

This Table was last updated on 7/12/2004

State	Allowable Technology and Size	Allowable Customer	Statewide Limit	Treatment of Net Excess Generation (NEG)	Authority	Enacted	Scope of Program	Citation/Reference
Michigan	Renewables - solar, wind, geothermal, biomass, including waste-to-energy and landfill gas or hydroelectric				Michigan Public Service Commission (MPSC)	2005		
Illinois	Solar and wind ≤40 kW	All customer classes; ComEd only	0.1% of annual peak demand	NEG purchased at avoided cost	ComEd tariff	2000	Commonwealth Edison	Special billing experiment [1]
Indiana	Renewables and cogeneration ≤1,000 kWh/month	All customer classes	None	Monthly NEG granted to utilities	Public Utility Commission	1985	IOUs only, RECs are not rate-regulated	Indiana Administrative Code 4-4.1-7
Iowa	Renewables and cogeneration (No limit per system)	All customer classes	105 MW	Monthly NEG purchased at avoided cost	Iowa Utility Board	1993	IOUs only, RECs are not rate-regulated[2]	Iowa Administrative Code [199] Chapter 15.11(5)
Minnesota	Qualifying facilities ≤40 kW	All customer classes	None	NEG purchased at utility average retail energy rate	Legislature	1983	All utilities	Minn. Stat. §216B.164
Ohio	Renewables, microturbines, and fuel cells (no limit per system)	All customer classes	1.0% of aggregate customer demand	NEG credited to next month	Legislature	1999	All utilities	S.B. 3 (effective 01/01/01)
Wisconsin	All technologies ≤20 kW	All retail customers	None	Monthly NEG purchased at retail rate for renewables, avoided cost for non-renewables	Public Service Commission	1993	IOUs only, RECs are not rate-regulated	PSCW Order 6690-UR-107

Notes:

- IOU — Investor-owned utility
- GandT — Generation and transmission cooperatives
- REC — Rural electric cooperative

[1] For information, see the Database of State Incentive for Renewable Energy (<http://www.dcs.ncsu.edu/solar/dsire/dsire.cfm>).

[2] Except for the Linn County Electric Cooperative, which is rate-regulated by Iowa PUC.

The original format for this table is taken from: Thomas J. Starrs (September 1996). *Net Metering: New Opportunities for Home Power*. Renewable Energy Policy Project, Issue Brief, No. 2. College Park, MD: University of Maryland

Net Metering By State

