BCHP Baseline Analysis for the Wisconsin Market

Prepared by:
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University of Illinois at Chicago – Energy Resources Center

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Executive Summary

The purpose of this baseline analysis is to assess the prevailing environment for Building Combined Heat and Power (BCHP) electric generation from a regulatory, private-market and technology perspective in Wisconsin. This information will be used to develop educational and market transformation programs, which will foster BCHP applications in Wisconsin.

Wisconsin’s vast agricultural resources constitute an inexpensive fuel source and ample opportunities for biomass fired BCHP. In fact Wisconsin Governor Scott MacCallum stated it as one of the goals to increase the use of cost-effective renewable resources in Wisconsin. As such Wisconsin Act 9 requires that renewable energy make up 2.2 percent of each retail electric provider’s sales by 2012. These requirements can be used to support BCHP development in the state. Furthermore the state has established a Public Benefits Fund to support biomass development with $3,800,000 available funding per year.

Programs by the Department of Administration (DOA) constitute further support for BCHP systems. The DOA compiled the “Wisconsin’s Renewable Energy Yellow Pages,” which contain information on firms active in the field of renewable energy development in the state.

BCHP development in Wisconsin may also benefit significantly from the (federal) 2002 Farm Bill, since BCHP systems might qualify as an energy efficiency improvement on farm and ranches. One of the biggest government driven efforts in the State, which will ultimately support the development of BCHP applications, pertains to the development of standardized interconnection guidelines. This effort is led by the Public Service Commission of Wisconsin and a multi-interest coalition, called the Wisconsin Interconnection Collaborative. Draft 5.9 of the statewide interconnection guidelines has just been completed and the final rules are expected to be in place by April 15, 2003. The guidelines provide for net metering for installations based on renewables with capacities less than 20 kWe in size. However, the guidelines will only be mandatory for Wisconsin’s large investor owned utilities and will not apply to the many municipally owned and cooperative electric suppliers in Wisconsin.

On the commercial/industrial side the Wisconsin Public Service Commission is currently conducting a study of power-park concepts, which could include BCHP systems. Weston Solutions has been hired to perform a feasibility study for this concept.

In Wisconsin there are several key organizations and companies, which support BCHP development. FOCUS ON ENERGY is a public private partnership offering energy information and services to residential, business and industrial customers in the state of Wisconsin. The partnership is comprised of the Wisconsin Department of Administration, Wisconsin Energy Conservation Corporation, Milwaukee School of Engineering, Energy Center of Wisconsin, PA Consulting and Hoffman York. FOCUS ON ENERGY can provide expert advice, project assistance and financial support for energy savings and efficiency projects. Also, three of the main manufacturers of BCHP technologies are headquartered in Wisconsin: Waukeshaw Engine, Kohler Engine and
Trane. Minergy, a subsidiary of Wisconsin Electric has developed a process, which converts wastewater solids into glass aggregate using an integrated BCHP process.

Wisconsin at this point has not introduced deregulation legislation. As such the state is currently not deregulated and will not be deregulated in the near future. In many states deregulation encourages the installation of BCHP systems since generation companies other than the traditional utilities are encouraged to sell and resell electricity into the marketplace. This is particularly important, since the incumbent utilities in many states are less supportive of BCHP technologies. However, some Wisconsin utilities and most notably Alliant Energy Corporation (Alliant) actively foster BCHP installations. Alliant is one of the main distributors of Capstone Microturbines and develops BCHP applications in several midwestern states.

Focusing on BCHP systems in non-industrial installations, the Midwest CHP Application Center (MAC) identified a total of 19 BCHP systems, producing a little over 89,000 kWe in Wisconsin. Wastewater Treatment facilities constitute the biggest installed BCHP market segment in Wisconsin (36,000 kWe) followed by landfill installations (34,000 kWe).

Capital costs as well as operating costs are generally viewed as some of the major hurdles to utilize BCHP technologies. The predominant technologies in BCHP power generation are natural gas. They range in size from reciprocating engines and microturbines in the tens of kilowatts to gas turbines in the tens of megawatts range. The least expensive technologies (large natural gas turbines) installed start around $600/kWe and increase in cost up to fuel cell technologies that run around $5,000/kWe. Natural gas reciprocating engines are the predominate technology, and can range in price from $1,000 to $1,800/kWe. Although prices of all of these technologies are expected to decrease as the technologies and system designs become more common. For smaller generating capacity units, this initial cost can have a long payback period unless electric costs are very high and thermal loads well matched.

For most BCHP systems natural gas constitutes the majority of the variable/operating cost. High natural gas prices, such as those experienced in the winter of 2000/2001, could have negative affects on the BCHP market development, but these high gas prices are not anticipated to reoccur. The Energy Information Administration expects natural gas prices to be around $3 per MMBTU by 2020. The average price paid by commercial customers for natural gas in Wisconsin was $7.60 per MMBtu (2001), which is below the average of $8.10 per MMBtu; the average price of electricity charged by utilities to commercial customers was 6.03 cents per kWh, which is significantly below the average of 7.36 cents per kWh (in 2000).

ONSITE Energy Corporation in January 2000 prepared a study for the Energy Information Administration titled “The Market and Technical Potential for Combined Heat and Power in the Commercial/Institutional Sector.” For Wisconsin’s commercial/institutional sector, ONSITE estimated a total market potential for electric production to be in the range of 1,300 to 2,400 MWe. This potential may only be realized if the regulatory and policy environment becomes more supportive of BCHP installations. Also, if incentives are provided and the use of thermal technologies is considered, additional market potential capacity could be realized.
Besides commercial and industrial applications BCHP systems also have potential market viability for multi-unit residences (those with 2 or more units). The MAC estimated the Wisconsin market potential for BCHP installations in the multi-unit residential sector for 2001 to be about 19,000 units.

This report concludes with recommendations, which address the need to educate regulators and private market participants on BCHP benefits. Case studies are needed which show the economic and environmental benefits of BCHP systems. As mentioned above alliances have to be formed with already influential companies in the BCHP field such as Alliant, FOCUS ON ENERGY, and others to develop synergies between these companies and the Midwest CHP Application Center to promote the use of BCHP. Finally, the Midwest CHP Application Center should partner with the Public Service Commission of Wisconsin to reduce or remove regulatory barriers.
1. **Introduction and Purpose**

The purpose of this analysis is to assess the current status of the BCHP sector in Wisconsin and identify current hurdles that prevent the widespread use of BCHP systems. This information will be used to identify target markets for BCHP systems as well as development of education and market transformation programs, which will foster BCHP applications. Finally, an action plan will be developed to further BCHP deployment in Wisconsin.

Cooling, Heating, and Power for Buildings (BCHP) refers to technologies which generate electricity at or near the point of use, such as a building or building complexes, while simultaneously recovering up to 80% of the waste heat for heating, cooling and/or dehumidification purposes.

In order to assess the current state of BCHP in Wisconsin, a comprehensive survey of key players involved with this technology was conducted. Key engineering firms, manufacturers, distributors, architectural firms, energy suppliers and federal, state and local agencies were identified. Furthermore a survey of existing and pending BCHP installations was conducted. Also identified in this survey were distributed generating installations that do not recover the waste heat; these installation represent relatively good candidate sites for conversion to BCHP systems because only heat recovery equipment needs to be provided and therefore the cost differential is minimal and easier to justify.

In this report, the initial cost of current BCHP related technologies and financial incentives were evaluated to assess their impact on the marketability of BCHP. A status assessment of policy related issues’ pertaining to the interconnection of BCHP was conducted.

The market capacity potential for BCHP in Wisconsin was evaluated to identify the best target sectors for deployment.

This report concludes with recommendations to effectively promote the deployment of BCHP in Wisconsin.
2. BCHP Contacts in Wisconsin

2.1 Key Wisconsin Firms with BCHP Project Experience or Capabilities

One of the major methods to promoting market acceptability of BCHP technologies is to engage the efforts of commercial firms that can promote the installation of BCHP technologies. Besides those that can benefit directly through profits and savings from BCHP, there are other firms which have the interest and capability to get involved with BCHP applications either because they promote energy efficiency, green building technologies, or have other BCHP supporting missions. The purpose of this section is to identify those key firms that currently exist in that can be allied with the Midwest CHP Application Center to promote the deployment of BCHP in Wisconsin.

Besides electricity providers, there are about 70 companies in Wisconsin that are engaged in BCHP system applications or have BCHP system capabilities. Hopefully in the near future interest in BCHP applications will increase through the activities of a multitude of local and regional organizations that are involved with the promotion of BCHP applications.

Architectural and Engineering firms are important to promoting BCHP technologies because the most economical time to install a BCHP system is during the construction of a new building or during an extensive renovation, when the central heating and cooling plant is being initially installed or completely replaced. This is because the payback period associated with the cost to install a BCHP system need only be justified on the cost differential between the BCHP system and a conventional central cooling/heating system which otherwise would have to be installed. Architectural and engineering firms are generally engaged in the design and installation of such facilities in commercial and light industrial applications. Appendix A and Appendix B respectively provide information on architectural firms and engineering firms that are potential allies in the promotion of BCHP installation in Wisconsin. There are currently 50 architectural and engineering firms that are able to developed and deploy BCHP systems in Wisconsin.

Manufacturers of power generation equipment, absorption chillers, and desiccant dehumidification equipment, and their sales representatives are important to promoting BCHP technologies for obvious reasons, to sell their equipment. In most cases these manufactures have established a market presence and have built relationships with those most likely to install BCHP technologies. Appendix C provides information on manufacturers that promote BCHP installations in Wisconsin. There are currently 20 manufactures/sales offices involved in deployment of BCHP related technologies in Wisconsin.

Property management firms are important to promoting BCHP technologies because they are the operators of most commercial buildings in which BCHP technologies would be suitable and therefore are interested in reducing energy costs. They often are the decision makers as to what type of central service systems are installed. In many of the buildings that they operate, they are already required by newer building codes to provide some sort of emergency generation electric power generation equipment. Since they are already required to install generation equipment, the cost differential to install BCHP over a conventional central heating/cooling system is again smaller and easier to justify. In addition, it provides them the ability to provide more reliable power to tenants, which is becoming an important issue to many business operators. The two main organizations,
which represent property management firms in Wisconsin are BOMA (Building Owners and Managers Association) and IREM (Institute of Real Estate Management), which accredits recognized real estate management organizations. Information on the Wisconsin BOMA chapter and IREM accredited Wisconsin property management companies can be found in Appendix D.

Local energy suppliers are also important to promoting BCHP. Many have formed subsidiary companies to promote distributed generation, especially the gas supply companies, however they are not necessarily considering BCHP because they often can justify cost based on the peak shaving savings of electrical generation and because BCHP can provide heat in winter it can also reduce the gas consumption for boilers/furnaces used for heating. A list of energy supply companies in Wisconsin is provided in Appendix E.

In the case of energy supply companies, distributed generation may be viewed as a threat to the parent company which may have rate structures that pose a disincentive to the installation of distributed and therefore to BCHP. In these cases, distributed generation is viewed as more acceptable if it is on the electric suppliers side of the meter, which makes BCHP a difficult option to promote since the electric generation source may be at some distance form the customer making the use of waste heat impractical. Energy Services companies (ESCOs) are just beginning to become interested in BCHP technologies. In the past they have not been interested because it is easier for them to find other cost saving measures like lighting retrofits and energy control systems in commercial and light industrial applications, and in many cases regulations and siting requirements served as a disincentive for them to install BCHP. Appendix F lists ESCO’s which are active in Wisconsin.

2.2 Associations and Organizations Involved with BCHP Deployment

Federal, State, and regional governmental entities are becoming interested in BCHP energy because of the energy savings and reduced emissions it provides. This creates opportunities to make BCHP systems an important part of the generation mix.

While the Federal government, through the Department of Energy, Office of Power Technologies, has provided substantial support, the most effective deployment of BCHP technology will come from regional and local activities. This is true because most of the barriers are due to local issues, such as site permitting, interconnection requirements and studies, local utility pricing, and local building codes and standards. These barriers can be overcome with support from regional and local entities.

The Midwest is home to many non-profit organizations and associations that have come forward to support the deployment of BCHP, in fact the Midwest appears to be leading the way in promoting the deployment of BCHP. Within the State of Wisconsin, FOCUS ON ENERGY has the potential to be a strong ally in the deployment of BCHP. FOCUS ON ENERGY is a public private partnership offering energy information and services to residential, business and industrial customers in the state of Wisconsin. The partnership is comprised of the Wisconsin Department of Administration, Wisconsin Energy Conservation Corporation, Milwaukee School of Engineering, Energy Center of Wisconsin, PA Consulting and Hoffman York. FOCUS ON ENERGY can provide expert advice, project assistance and financial support for energy savings and efficiency
projects. A list of these associations and organizations and their web-addresses, where available, is provided in Appendix G.
3. Survey of BCHP Installations and BCHP Targets in Wisconsin

3.1 Survey Summary

This survey was conducted to identify existing and pending BCHP installations in order to assess the current state of BCHP in Wisconsin; to establish a baseline and to identify those facility types where BCHP was most prevalent.

The information in this section is based on input from various sources including; personal interviews, manufactures and distributors, websites, associated organizations, and journals. The survey of BCHP installations and potential BCHP targets is primarily based on personal interviews as well as the use of published data. Published data consisted of the Energy Information Administration’s “Inventory of Nonutility Electric Power Plants in the United States” dated November 2000 (Source: [http://tonto.eia.doe.gov/FTPROOT/electricity/0095992.pdf](http://tonto.eia.doe.gov/FTPROOT/electricity/0095992.pdf)).

Sites that are greater than 1 MWe are easier to identify because they must file yearly reports with the Environmental Protection Agency (EPA). However sites less than 1 MWe may or may not have a to file with the EPA. The sites identified represent the best efforts of the Midwest CHP Application Center to identify actual and potential BCHP installations in Wisconsin at the time of this report. Other existing or potential BCHP sites may exist; they will be added to the database and will be available over the website in the future as they are identified.

A total of 19 BCHP systems, producing a little over 89,000 kWe, are known to be in operation in Wisconsin. Appendix H categorizes and lists the known distributed generation installations based on the facility type in which the system is installed and provides the size of the installed generation capacity. Where it is known, thermal heat recovery has been noted. Where additional information is available about the installation configuration, it is provided. This report focuses primarily on BCHP applications for buildings, which, for the purpose of this report includes landfills, wastewater treatment facilities and farms.

3.2 Sector Analysis of the Survey Data

The sites identified during the survey represent the best efforts of the Midwest CHP Application Center to identify the BCHP installations in Wisconsin. Other existing or candidate BCHP sites may exist. An analysis of the survey information for the commercial and light industrial sectors is provided in Table 3-1 and Figure 3-1 below.

<table>
<thead>
<tr>
<th>Sector</th>
<th>Capacity (kW)</th>
<th>Capacity (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Commercial/Institutional Facilities</td>
<td>17,728</td>
<td>20</td>
</tr>
<tr>
<td>Farms</td>
<td>550</td>
<td>1</td>
</tr>
<tr>
<td>Landfill Operations</td>
<td>34,851</td>
<td>39</td>
</tr>
<tr>
<td>Waster Water Treatment Facilities</td>
<td>36,350</td>
<td>41</td>
</tr>
<tr>
<td><strong>Total:</strong></td>
<td><strong>89,479</strong></td>
<td></td>
</tr>
</tbody>
</table>

Table 3-1 BCHP Capacity Installed by Sector in Wisconsin
Figure 3-1  BCHP Capacity Installed by Sector in Wisconsin

As can be seen wastewater treatment facilities constitute the biggest installed BCHP market segment in Wisconsin followed by installations at landfills.
4. **Current Pricing Issues**

Capital costs as well as operating costs are generally viewed as some of the major hurdles to utilize BCHP technologies. This section will address these issues.

4.1 **Equipment and Maintenance Costs**

The predominant prime mover technologies in BCHP applications are reciprocating engines, combustion turbines, and microturbines. In the near future fuel cell technology is expected to become a prevalent BCHP technology as well. Absorption chillers convert the waste heat stream from prime movers into cooling.

Each technology operates at different efficiency and capacity size levels. The following table compiled by the Midwest CHP Application Center indicates the cost and other relevant technical data for the various equipment types.

<table>
<thead>
<tr>
<th>Table 4-1 CHP Technologies</th>
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<table>
<thead>
<tr>
<th>Size Range (kWe)</th>
<th>Gas Engine</th>
<th>Gas Turbine - Simple Cycle</th>
<th>Microturbines</th>
<th>Fuel Cells</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>100 - 500</td>
<td>500 - 2,000</td>
<td>1,000 - 10,000</td>
<td>10,000 - 50,000</td>
</tr>
<tr>
<td>Efficiency (LHV)</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Btu/kWh</td>
<td>12,000 - 14,000</td>
<td>10,000 - 12,000</td>
<td>12,000 - 14,000</td>
<td>9,500 - 11,000</td>
</tr>
<tr>
<td>%</td>
<td>24 - 28</td>
<td>28 - 34</td>
<td>24 - 28</td>
<td>31 - 36</td>
</tr>
<tr>
<td>Installed Cost ($/kWe)* (with Heat Recovery)</td>
<td>$1,400 - $1,800</td>
<td>$1,000 - $1,500</td>
<td>$1,000 - $1,500</td>
<td>$600 - $1,000</td>
</tr>
<tr>
<td>O &amp; M Costs ($/kWh)</td>
<td>$0.012 - $0.015</td>
<td>$0.010 - $0.012</td>
<td>$0.003 - $0.006</td>
<td>$0.003 - $0.006</td>
</tr>
<tr>
<td>Recoverable Heat</td>
<td>Steam (lb/h/kWe)</td>
<td>4 - 5 (15 - 30 psi)</td>
<td>4 - 5 (15 - 30 psi)</td>
<td>5 - 6 (300 - 600 psi)</td>
</tr>
<tr>
<td></td>
<td>Hot Water (Btu/h/kWe/h)</td>
<td>4,000 - 4,500</td>
<td>4,000 - 4,500</td>
<td>4,500 - 5,000</td>
</tr>
<tr>
<td>Absorption Cooling</td>
<td>Single ($/RT)</td>
<td>$500 - $1,000</td>
<td>$250 - $500</td>
<td>$200 - $250</td>
</tr>
<tr>
<td></td>
<td>Double ($/RT)</td>
<td>N/A</td>
<td>N/A</td>
<td>$400 - $500</td>
</tr>
<tr>
<td></td>
<td>RT/kWe</td>
<td>0.22 - 0.28</td>
<td>0.22 - 0.28</td>
<td>0.28 - 0.33</td>
</tr>
<tr>
<td></td>
<td>Electric Chillers ($/RT)</td>
<td>$200 - $300</td>
<td>$200 - $300</td>
<td>$180 - $250</td>
</tr>
</tbody>
</table>

* Costs can vary significantly due to interconnection and other siteinge requirements.
4.2 Electric Pricing

In the annual Energy Information Administration report titled “Annual Energy Outlook 2002 with Projections to 2020” (www.eia.doe.gov/oiaf/aeo/pdf/0383(2002).pdf), the EIA projects that the average electricity prices will decline from 6.9 cents per kilowatt-hour in 2000 to 6.5 cents per kilowatt-hour in 2020. Electricity industry restructuring is expected to contribute to declining prices on a national level through reductions in operating and maintenance costs, administrative costs, and other costs. Electricity prices are projected to decline to 6.3 cents per kilowatt-hour by 2006 then rise in the last 5 years of the forecast as natural gas prices rise.

In Wisconsin the cost of electricity for commercial customers has shown relative stability over the last recorded 10 year period (1990-1999) based on information from the EIA’s State Energy Price and Expenditure Report 1999 (http://eia.doe.gov/pub/state_prices/pdf/seper.pdf). The cost of electricity to the commercial consumer has gone from $17.04/MMbtu in 1990 to $17.38/MMbtu in 1999. However there have been fluctuations in pricing over that period.

![Electricity Cost - Commercial WISCONSIN](chart.png)


Wisconsin ranked 39th highest in electricity costs at 5.53¢/kWh for average cost to the customer across all customer classes (Source: EIA State Electricity Profiles 2001 – Wisconsin). The average price paid by commercial customers for natural gas in Wisconsin was $7.60 per MMBtu (2001), which is below the average of $8.10 per MMBtu; the average price of electricity charged by utilities to commercial customers was 6.03 cents per kWh, which is significantly below the average of 7.36 cents per kWh (Sources: Energy Information Administration http://www.eia.doe.gov/pub/oil_gas/natural_gas/data_publications/natural_gas_monthly/current/pdf/table_22.pdf and http://www.eia.doe.gov/cneaf/electricity/esr/esrt12p1.html).
The five major electricity suppliers in Wisconsin are shown below in Table 4-2. Wisconsin, however, is host to over 100 Co-op and municipally owned electric suppliers.

Table 4-2 Five Largest Utilities by Retail Sales within the State, 1999 (Megawatthours)

<table>
<thead>
<tr>
<th>Utility</th>
<th>All Sectors</th>
<th>Residential</th>
<th>Commercial</th>
<th>Industrial</th>
<th>Other</th>
</tr>
</thead>
<tbody>
<tr>
<td>Wisconsin Electric Power Co.</td>
<td>23,953,896</td>
<td>7,192,564</td>
<td>7,890,496</td>
<td>8,704,240</td>
<td>166,596</td>
</tr>
<tr>
<td>Wisconsin Public Service Corp.</td>
<td>9,656,015</td>
<td>2,685,451</td>
<td>3,070,397</td>
<td>3,866,051</td>
<td>34,116</td>
</tr>
<tr>
<td>Wisconsin Power &amp; Light Co.</td>
<td>9,504,473</td>
<td>3,050,032</td>
<td>1,944,452</td>
<td>4,456,959</td>
<td>53,030</td>
</tr>
<tr>
<td>Northern States Power Company</td>
<td>5,295,629</td>
<td>1,677,848</td>
<td>923,344</td>
<td>2,657,675</td>
<td>36,762</td>
</tr>
<tr>
<td>Madison Gas and Electric Company</td>
<td>2,916,533</td>
<td>770,153</td>
<td>1,524,641</td>
<td>315,238</td>
<td>306,501</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>51,326,546</strong></td>
<td><strong>15,376,048</strong></td>
<td><strong>15,353,330</strong></td>
<td><strong>20,000,163</strong></td>
<td><strong>597,005</strong></td>
</tr>
</tbody>
</table>

(Percentage of Utility Sales)

(Source: Energy Information Administration Website http://www.eia.doe.gov/cneaf/electricity/st_profiles/wisconsin.pdf)
5. **Summary and Status of BCHP Policy Issues**

One of the biggest efforts in support of BCHP development in Wisconsin pertains to the development of standardized interconnection guidelines. The Public Service Commission of Wisconsin and a multi-interest coalition, called the Distributed Resources Coalition, are leading this effort. The legislative process and current provisions of the interconnection guidelines will be detailed in the following.

5.1 **PSC Report to the Legislature, December 2000**

In October 1999 the Wisconsin Legislature passed Wisconsin Act 9. Wisconsin Act 9 (Wis. Stat. 196.025(4)) requires the Public Service Commission to “study the establishment of a program for providing incentives for the development of high-efficiency, small-scale electric generating facilities […].” This clause shows that this policy can support BCHP. In response the Public Service Commission submitted a report titled “Report to the Legislature on the Development of Distributed Electric Generation in the State of Wisconsin.” The report was issued in December 2000. The scope of the report included “small-scale, high efficiency generating technologies” including combined heat and power systems, photovoltaic, wind power, fuel cells, microturbines, and internal combustion generators. The report reviewed each of these technologies, compares emissions, and summarized barriers and economic incentives for these technologies. The major findings of the report were as follows:

- The lack of statewide uniform technical standards can constitute a barrier for interconnecting DG to the utility grid.
- Uniform procedures for testing and certification of interconnection equipment are needed.
- Complex interconnection contracts can add unnecessary cost and time to the installation of small-scale distributed generation. A detailed contract that may be appropriate for large customer-owned generators can create an unnecessary burden for a small-scale generator.
- A barrier to market entry is created by interconnection rules and practices that vary from one utility service territory to the next.
- Impediments to interconnection are created by outright prohibition of parallel generation, study fees, engineering review fees, additional metering fees, Transmission and Distribution charges, and standby fees.
- Unreasonable insurance or indemnification requirements can unduly increase the cost of non-utility DG.
- The current limitation that net energy billing is applicable only to units of less than 20 kW is too restrictive.
- The existing rate structure includes a number of disincentives to non-utility scale generation.
- The individual and cumulative effect of small-scale diesel generators could lead to air quality degradation in certain areas.
Based on its findings, the PSC concluded as follows:

- Any incentive program to encourage greater use of high efficiency, small scale DG in the state of Wisconsin should include the updating of statutes, administrative rules, and utility tariffs.
- Establish a working group made up of stakeholders, such as equipment installers and manufacturers, customers, energy advocacy groups, environmental groups, gas and electric utilities, and staff from the Wisconsin PSC, DNR, DOA, and DOR to develop additional recommendations as needed.
- Establish uniform, simplified standards based on IEEE P1547 for DG systems.
- Establish statewide pre-certification and testing.
- Establish a state-wide standardized contract for high-efficiency, small-scale DG systems that include a) a utility interconnection fee appropriate for the size of the installation and b) a standard formula for determining the cost of distribution upgrades associated with DG interconnection.
- Establish a tariff to cover a) an expansion of the “Net Energy Billing” tariff availability for customers with service from the current 20 kW maximum to a maximum based on the manufacturer’s equipment rating, b) buy-back rates that vary depending on the environmental and grid benefits and dispatchability, and c) rules that provide for the utility to cover all or a portion of interconnection costs where there is a demonstrated benefit to the distribution grid.
- Owners of DG units that provide a benefit to society at large, such as improved “environmental performance” could be granted a production based tax credit.
- Provide state assistance to local units of government in siting DG technologies under existing planning and zoning authorities.
- Revision of Wis. Admin. Code 113.0207, “Requirements for utility rules for interconnection of small customer-owned generation facilities with the utility system.”

The interest group, “RENEW Wisconsin,” funded by the Joyce Foundation lead the initial process to come up with recommendations to the interconnection standards. RENEW Wisconsin recommended updates to Wis Admin. Code 113.0207, which had been developed in 1982 to “protect the safety of utility personnel and the integrity of the electrical system.” RENEW Wisconsin’s efforts were concentrated on the development of a standardized interconnection agreement and the interconnection of facilities of 20 kWe and less in size.

On May 18, 2001 the Joint Finance Committee of the Wisconsin Legislature voted unanimously to include some distributed generation resources provisions in the state budget, including the requirement that the PSC promulgate rules regarding interconnection standards, safety and reliability issues, tariffs, net metering, real time pricing fees, etc. It also required the PSC to complete draft rules within six months of the effective date of the budget. The standards would apply to utilities with a connected load of 1200 MWe or more.
5.2  Wisconsin Distributed Generation Interconnection Guidelines

RENEW Wisconsin and the Wisconsin Interconnection Collaborative developed Interconnection Guidelines (Guidelines) in Draft form. Draft 5.9 of the guidelines has just been completed. Work on promulgating the rules takes now place at the Wisconsin Public Service Commission. The goal is that the final rules will be in place by April 15, 2003. The Guidelines do not apply to cooperative electric utilities. However, according to the Guidelines, “Cooperative Electric Utilities are encouraged to adopt these guidelines.” Draft 5.9 of the Draft Interconnection Agreement contains the following provisions:

- **Facility Categories**
  The Guidelines establish 4 categories of DG facility sizes:

<table>
<thead>
<tr>
<th>Category</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Category 1</td>
<td>20 kW or less</td>
</tr>
<tr>
<td>Category 2</td>
<td>Greater than 20 kW to 200 kW</td>
</tr>
<tr>
<td>Category 3</td>
<td>Greater than 200 kW to 1 MW</td>
</tr>
<tr>
<td>Category 4</td>
<td>Greater than 1 MW to 15 MW</td>
</tr>
</tbody>
</table>

- **Insurance Requirements**
  Applicants interconnecting a DG facility have to provide liability insurance in the following amounts:

<table>
<thead>
<tr>
<th>Category</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Category 1</td>
<td>$300,000</td>
</tr>
<tr>
<td>Category 2</td>
<td>$1,000,000</td>
</tr>
<tr>
<td>Category 3</td>
<td>$2,000,000</td>
</tr>
<tr>
<td>Category 4</td>
<td>Negotiated</td>
</tr>
</tbody>
</table>

- **Application Forms**
  Applicants for a Category 1 DG facility file a Standard Application Form, called PSC Form 6027 whereas applicants for a Category 2 through 4 file a different form (Form PSC 6028). Upon filing of the Application Form the electric provider performs an Application Review and determines whether or not an Engineering Review and/or a Distribution System Study needs to be performed.
- Response Timelines
  The timelines for the studies according to DRAFT 5.9 are listed below:

<table>
<thead>
<tr>
<th>Step</th>
<th>Business day response periods</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Category 1 20 kW or less</td>
</tr>
<tr>
<td>1. Electric provider provides material to applicant (upon receiving a Standard Application Form request).</td>
<td>5</td>
</tr>
<tr>
<td>2. Electric provider responds that they have received the Standard Application Form materials and states if they are complete. Any deficiencies are stated.</td>
<td>10</td>
</tr>
<tr>
<td>3. Once the Standard Application Form is deemed complete, the electric provider completes an Application Review, provides any Engineering Review and Distribution System Study costs, if needed, and notifies applicant.</td>
<td>10</td>
</tr>
<tr>
<td>4. Applicant responds, asking electric provider to go forward with an Engineering Review.</td>
<td>1 year (if required)</td>
</tr>
<tr>
<td>5. The applicant is notified of the results of the Engineering Review</td>
<td>10 (if required)</td>
</tr>
<tr>
<td>6. Applicant responds, asking electric provider to go forward with Distribution System Study.</td>
<td>1 year (if required)</td>
</tr>
<tr>
<td>7. The applicant is notified of the results of the Distribution System Study.</td>
<td>10 (if required)</td>
</tr>
<tr>
<td>8. Applicants commits to paying for the distribution system modifications.</td>
<td>1 year (if required)</td>
</tr>
<tr>
<td>9. The applicant executes the Standard Interconnection Agreement.</td>
<td></td>
</tr>
<tr>
<td>10. Time period to complete distribution system upgrades and install DG Facility.</td>
<td></td>
</tr>
</tbody>
</table>
11. Electric provider completes DG Facility testing.

12. Final acceptance, cost reconciliation, and issuance of a formal letter of acceptance.

- **Study Fees**
  The respective fees for the Application Review, the Engineering Review and the Distribution System Study are as follows:

<table>
<thead>
<tr>
<th>Category</th>
<th>Application Review Fee</th>
<th>Engineering Review Fee</th>
<th>Distribution System Study Fee</th>
</tr>
</thead>
<tbody>
<tr>
<td>Category 1:</td>
<td>None</td>
<td>None</td>
<td>None</td>
</tr>
<tr>
<td>Category 2:</td>
<td>$250</td>
<td>Max $500</td>
<td>Max $500</td>
</tr>
<tr>
<td>Category 3:</td>
<td>$500</td>
<td>Cost Based</td>
<td>Cost Based</td>
</tr>
<tr>
<td>Category 4:</td>
<td>$1000</td>
<td>Cost Based</td>
<td>Cost Based</td>
</tr>
</tbody>
</table>

- **Precertified Equipment**
  The Guidelines provide for acceptance of pre-certified equipment such as anti-islanding protection and power quality related distribution interfaces. The Guidelines state that pre-certified equipment if certified to national standards “does not need the design scrutiny by the electric provider that non-certified equipment typically requires.”

- **Net Metering**
  The Guidelines also refer to the fact that DG facilities using renewable resources with a capacity of 20 kWe or less are eligible for net energy metering. This means that DG facilities can offset their associated load consumption and are compensated for any extra energy delivered to the electric provider at the rate as specified by the electric provider’s tariff. What constitutes a renewable resource is defined by the individual electric provider. In general, natural gas fired cogeneration systems do not qualify as renewable resources, however, biomass fired cogeneration systems are generally considered a renewable resource.
6. The Market Capacity Potential of BCHP in Wisconsin

The previous sections identified the key parties currently involved with BCHP technology and detailed some of the areas preventing market transformation. However, market transformation in favor of BCHP technologies is only viable if the market potential exists. Therefore the market potential for each BCHP category, industrial, commercial and multi-unit residential is discussed in the following.

Estimates for the Institutional/Commercial Sector were derived from a previous study conducted by ONSITE-SYCOM Energy Corporation (ONSITE). Estimates for the Multi-family Residential Sector are based on Midwest CHP Application Center research.

6.1 Industrial and Commercial Market

ONSITE Energy Corporation in January 2000 prepared a study for the Energy Information Administration titled “The Market and Technical Potential for Combined Heat and Power in the Commercial/Institutional Sector.” This study identified potential BCHP application sites using the iMarket, Inc. MarketPlace Database to select commercial/industrial building types based on SIC codes.

The potential buildings were: hotels/motels, nursing homes, hospitals, schools, colleges, commercial laundries, car washes, health clubs, golf clubs, museums, correctional facilities, water treatment plants, extended service restaurants, supermarkets and refrigerated warehouses. The buildings were divided into different groups based on their electric demand. The electric demand was estimated using data from Wharton Economic Forecasting. As a result ONSITE selected 1,431,805 buildings in the United States as suitable for BCHP applications requiring a capacity of 77,281 MWe.

There study focused on applications where thermal energy load was in the form of steam or hot water usage. It did not take into consideration the use of thermal activated technologies such as absorption chillers or desiccant dehumidifiers as potential candidates for thermal load. Taking into consideration these technologies will likely increase the market potential from their estimates.

On a state-by-state basis, ONSITE estimated the following potential:
For Wisconsin, ONSITE estimated a total market potential for electric production to be in the range of 1,300 to 2,400 MWe. This represents 3 to 5% of the projected DOE long-term goal of 47 gigawatts of installed BCHP capacity that was developed as part of the BCHP Roadmap Workshop. This potential may only be realized if the regulatory and policy issues become more supportive of BCHP installations. Also if incentives are provided, additional market potential capacity could be realized.

6.2 Multi-Family Residential Market

Besides commercial and industrial applications BCHP systems also have potential market viability for multi-unit residences (those with 2 or more units). Compared to conventional HVAC systems, the installation of BCHP systems are particularly competitive when it comes to new construction or complete replacement of old HVAC systems.

Since all new and replacement HVAC systems need to be permitted in Wisconsin, permitting data provides a good estimate of buildings where BCHP systems may be a potential alternative. Applying the following assumptions the potential market for BCHP applications for multi-unit residences can be estimated:

- New construction remains at or near the same level as in the year 2001 (12,993 units),
- HVAC systems need to be replaced every 20 years, therefore units installed in 1981 would need to be replaced in the year 2001, and
- The number of HVAC units replaced in 2001 is consistent with the number of units installed in 1981 (6,398 units).

Applying these assumptions the new building permit data was obtained for 1981 and 2001 (Source: [http://www.census.gov/const/C40/Table2/tb2u8099.txt](http://www.census.gov/const/C40/Table2/tb2u8099.txt)), those with less than 2 units were not considered. Therefore the market potential for multi-unit residential BCHP installation in Wisconsin for 2001 is estimated to be about 19,000 units.
7. Conclusions and Recommendations

7.1 Conclusions

7.1.1 Interest Level
On the policy side, Wisconsin seems very supportive of renewable/biomass based energy
generation, which could also promote CHP technologies. The current governor stated the
importance to foster renewable resource development in the state and a Public Benefits
Fund provides financial support for these technologies. Furthermore, there are 70 well-
known engineering firms, as well as equipment manufactures and distributors who are
pursuing the BCHP market. With respect to equipment manufacturers, three of the most
prominent CHP suppliers in the country are based in Wisconsin: Waukeshaw Engine,
Kohler Engine and Trane.

The Midwest is home to many non-profit organizations and associations that have come
forward to support the deployment of BCHP, in fact the Midwest appears to be leading
the way in promoting the deployment of BCHP with such organizations as the Midwest
CHP Initiative.

7.1.2 Installation Status
There is not a significant amount of installed BCHP in Wisconsin; the Midwest
Application Center (MAC) identified a total of 19 BCHP systems, producing a little over
89,000 kWe in Wisconsin. Wastewater treatment facilities constitute the biggest installed
BCHP market segment in Wisconsin (36,000 kWe) followed by installations at landfills
(34,000 kWe).

7.1.3 Barriers

Net Metering provisions allow BCHP facilities to resell excess electricity to the local
utility at a predetermined rate. In Wisconsin, the proposed statewide interconnection
guidelines provide net metering only for renewables facilities less than 20 kWe in size.
Furthermore, natural gas fired cogeneration systems are not considered renewable despite
their high efficiencies and low emission rates. Also the proposed interconnection
guidelines only apply to public utilities with a load in excess of 1200 MWe, which
excludes municipal owned systems, coops, Madison Gas and Electric Company and Xcel
Energy.

Capital costs and payback time frames are of concern. The least expensive electric
generating technologies (large natural gas turbines) installed start around $600/kWe and
increase up in cost to fuel cell technologies that run around $5,000/kWe. Additional
costs, associated with thermal recovery equipment and engineering costs further add to
the cost of the project. Prices are expected to decrease as the technologies and system
designs become more common. For smaller generating capacity units, this initial cost
can have a long payback period unless electric costs are very high and thermal loads well
matched.

Operating costs due to fluctuating gas prices as seen in the winter of 2000/2001 may be
perceived as a concern, even though prices have returned to previous levels. The EIA
expects natural gas prices to be around $3 per MMBTU by 2020. The average price paid
for natural gas by commercial customers in Wisconsin was $7.60 in 2001, slightly below
the national average.
Standby charges and Electricity rates are also a factor in BCHP because they affect the payback period. Standby rates in Wisconsin differ from utility to utility. This means BCHP developers in the state face a cumbersome set of tariffs to comply with.

The average price of electricity charged by utilities to commercial customers in Wisconsin was 6.03 cents per kWh (in 2000), which is significantly below the national average of 7.36 cents per kWh. Low prevailing electricity prices, however, reduce the economic competitiveness of BCHP systems.

7.1.4 Favorable Characteristics

A Favorable political climate for energy efficient technologies and particularly renewable energy appears to exist in Wisconsin. Wisconsin Governor Scott MacCallum stated as one of the goals to increase the use of cost-effective renewable resources in Wisconsin. As such Wisconsin Act 9 requires that renewable energy make up 2.2 percent of each retail electric provider’s sales by 2012. (Strategic Directions for Wisconsin’s Energy and Economic Future, June 2001, p. 3). These requirements can be used to support BCHP development in the state. Furthermore the state has established a Public Benefits Fund to support biomass development with $3,800,000 available funding per year.

Statewide Interconnection Guidelines for distributed generation will most likely be established by April 2003. These guidelines include standardized fees, standardized insurance requirements and timelines for interconnection with the local utility. The guidelines also include net metering provisions for certain renewable facilities.

Favorable alliances exit in Wisconsin. The Midwest appears to be leading the way in promoting the deployment of BCHP with such organizations as FOCUS ON ENERGY. FOCUS ON ENERGY is a public private partnership offering energy information and services to residential, business and industrial customers in the state of Wisconsin. The partnership is comprised of the Wisconsin Department of Administration, Wisconsin Energy Conservation Corporation, Milwaukee School of Engineering, Energy Center of Wisconsin, PA Consulting and Hoffman York. FOCUS ON ENERGY can provide expert advice, project assistance and financial support for BCHP projects.

Market potential appears to be reasonable for BCHP. ONSITE Energy Corporation estimates for Wisconsin a total market potential of between 1,300 to 2,400 MWe. Besides commercial and institutional estimates by ONSITE the MAC estimated that the potential Wisconsin market for BCHP installations in the multi-unit residential sector to be about 19,000 units.

7.2 Recommendations

1) Increase Interest and Market Penetration

Develop a higher level of interest in BCHP by providing information and education to Architects, Engineers, Property Management Firms on the

- Technical and financial benefits of BCHP.
- Siting and permitting process.
- Successful BCHP installations (Case Studies).
• Technical and financial assessments tools and resources available.

2) **Influence the Removal of Regulatory Barriers**

Support the Public Service Commission of Wisconsin and State Regulators with their ongoing efforts on
• Promoting the energy, environmental, and financial benefits of BCHP.
• Preparation of uniform interconnection standards and fees, which would be binding for all energy service companies in the state not just the major utilities.
• Need to consider appropriate incentives for BCHP such as tax incentives and subsidies such as is being done with renewable energy technologies.

3) **Build Alliances**

Build alliances with potential partners such as:
• Large Architect/Engineering Firms with BCHP capabilities
• FOCUS ON ENERGY
• Department of Administration (DOA)
• RENEW Wisconsin
• Wisconsin Interconnection Collaborative
• Wisconsin Energy Center
• Alliant Energy Corporation
Appendix A  Architect Firms with Sustainable Design/BCHP Capabilities

AIA Wisconsin
321 South Hamilton Street
Madison, WI  53703-4000
Phone: 608-257-8477
Fax: 608-257-0242
aiaw@aiaw.org

Architectural Design Group
393 Red Cedar St. #3
Menomonie, WI 54751-2267
Phone: (715) 235-4848
Fax: (715) 235-4898
E-mail: adg@adg-architects.com
http://www.adg-architects.com

Architecture Network, Inc.
116 East Dayton St.
Madison, WI 53703-2114
Phone: (608) 251-7515
Fax: (608) 251-7566
E-mail: ani_archnet@tds.net
http://www.archnetwork.com

Dimension IV
PO Box 12585
Green Bay, WI 54307-2585
Phone: (920) 499-6873
Fax: (920) 499-6873
E-mail: djroarty@dimension-iv
http://www.dimension-iv.com

ECOME
507 Main Street
La Crosse, WI 54601

Engberg Anderson Design Partnership Inc.
611 North Broadway #517
Milwaukee, WI 53202-5004
Phone: (414) 944-9000
Fax: (414) 944-9100
E-mail: info@eadp.com
http://www.eadp.com/
Eppstein Uhen Architects, Inc.
333 East Chicago St.
Milwaukee, WI 53202-5809
Phone: (414) 271-5350
Fax: (414) 298-2251
E-mail: richt@eppsteinuhen.com
http://www.eppsteinuhen.com

Flad & Associates, Inc.
644 Science Dr.
Madison, WI 53711-1072
Phone: (608) 238-2661
Fax: (608) 238-6727
E-mail: flad@flad.com
http://www.flad.com

Hoffman Corporation
N434 Greenville Center
PO Box 8034
Appleton, WI 54912-8034
Phone: (920) 731-2322
Fax: (920) 731-4236
E-mail: info@hoffman.net
http://www.hoffman.net

Kahler Slater
111 West Wisconsin Ave.
Milwaukee, WI 53203-2501
Phone: (414) 272-2000
Fax: (414) 272-2001
E-mail: ks@kahlerslater.com
http://kahlerslater.com

The Kubala Washatko Architects, Inc.
W61N617 Mequon Ave.
Cedarburg, WI 53012-2017
Phone: (262) 377-6039
E-mail: zkron@tkwa.com
NOTE: This list represents only those firms that the MW BCHP Application Center was able to identify at the time of this report. Other firms may exist that promote BCHP; they will be added to the database and will be available over the website in the future as they are identified.
Appendix B  Engineering and Consulting Firms

Charles Equipment Co.
N15W22120 Jericho Drive Unit 6
Waukesha, WI 53186
Capabilities: BCHP Turnkey Installations

Cummins NPower LLC
9401 South 13th Street
Oak Creek, WI 53154
Capabilities: BCHP Turnkey Installations

Microgy Cogeneration Systems, Inc.
1009 W Glen Oaks Lane, Suite 209
Mequon WI 53092
Capabilities: Developer of anaerobic digester systems dairy, swine and poultry operations producing renewable electric power

GHD, Inc.
PO Box 69
Chilton WI 53014
Capabilities: Design and install anaerobic digestors, installation of gen-set units for heat production.

Robert E. Lee & Associates
2825 S. Webster St.
Green Bay WI 54306
Website www.releeinc.com
Capabilities: A full-service consulting firm specializing in and environmental engineering, planning, surveying and comprehensive laboratory testing.

Crane Engineering Sales Inc.
PO Box 38 707 Ford Street
Kimberly WI 54136-0038
Website http://www.crane-eng.com
Capabilities: Process equipment design and equipment supply, including piping, metering, filters, valves, and design of piping

Energy Integration Corp.
2988 Gruenwald Rd
Mosinee WI 54455-7640

American Resource Recovery
1020 N Broadway
Milwaukee WI 53202-3157
Applied Technologies, Inc.
16815 W Wisconsin Ave
Brookfield WI 53005
Website www.itiiae.com

Camp Dresser & Mckee
312 E Wisconsin Ave., Ste 500
Milwaukee WI 53202-4305

Dorgan Associates, Inc.
7601 Ganser Way Madison WI 53719 Phone: 608-837-6880
Capabilities: Consulting engineers and scientists in energy modeling, commissioning, buildings, HVAC, and fuel cells.

Emcon/OWT Solid Waste Services
17 Park Place, Suite 400
Appleton WI 54914-8232
Website www.emconinc.com
Capabilities:
Site analysis for energy recovery projects, landfill gas-to-electric projects, small engine/generator sets for on-site electric consumption

Environmental Technology Associates
1400 Cty Rd Z Blue Mounds WI 53517

Graef Anhalt Schloemer
125 S 84th St #401 Milwaukee WI 53214-1469

R J Miller Associates, Inc.
12745 W Capitol Dr
Brookfield WI

Foth & Van Dyke
PO Box 19012, 2737 S Ridge Rd
Green Bay WI 54301

Montgomery Watson, Inc.
1 Science Court
Madison WI 53711
R W Beck, Inc.
555 D'Onofrio Dr #103
Madison WI 53719
Capabilities: Consultant Engineers

Triad Engineering
325 E Chicago St
Milwaukee WI 53202

WD Meadows & Associates
901 Platt St.
Eau Claire WI 54703-5145

Residential Energy Services
416 E. Court Street
Viroqua WI 54665
Capabilities: Efficient design retrofit.

Community Builders
4280 Algoma Rd
Capabilities: Products and services for solar heat and electricity, high performance homes, indoor air quality and energy conservation. Energy design and building science analysis.

La Salle Associates
3700 North Southport
Chicago, IL 60613
Capabilities: BCHP Turnkey Installations

Stanley Consultants, Inc.
225 Iowa Avenue
Muscatine, IA 52761
(563) 264-6457
Capabilities: BCHP Engineering, Environmental and Construction Services

Ballard Engineering
3555 Electric Avenue
Rockford, IL 61125
(815) 229-1800
Capabilities: BCHP Turnkey Systems

GKC-EME
205 W. Wacker Drive
Chicago, IL 60606
Capabilities: BCHP Turnkey Installations
Primera Engineering
25 E. Washington St.
Suite 510
Chicago, IL  60602
Capabilities: HVAC Engineering, BCHP Potential

GLHN A&Es
Capabilities: HVAC Engineering, BCHP Potential

Cuh2a, Inc.
Capabilities: HVAC Engineering, BCHP Potential

Epstein and Sons International, Inc.
Capabilities: HVAC Engineering, BCHP Potential

Jacobs Facilities, Inc.
Capabilities: HVAC Engineering, BCHP Potential

General Energy Corp
Capabilities: HVAC Engineering, BCHP Potential

Globetrotters Engineering Corporation
Capabilities: HVAC Engineering, BCHP Potential

Patrick Engineering, Inc.
Capabilities: HVAC Engineering, BCHP Potential

Sebesta Blomberg & Associates, Inc.
2381 Rosegate
Roseville, MN 55113
651-634-0775
Capabilities: HVAC Engineering, BCHP Potential

NOTE: This list represents only those firms that the MW BCHP Application Center was able to identify at the time of this report. Other firms may exist that promote BCHP; they will be added to the database and will be available over the website in the future as they are identified. The information above was compiled based on a survey by the Midwest CHP Application Center and other sources such as the “Wisconsin Renewable Energy Yellow Pages” compiled by the Department of Administration, Wisconsin Energy Division. Any errors are, of course, the responsibility of the Midwest CHP Application Center.
Appendix C  Equipment Distributors/Manufactures That Promote BCHP Technologies in Wisconsin

Waukesha
Eastern Regional Office
1000 West St. Paul Avenue
Waukesha, WI 53188
Capabilities: Recip. Engines

Kohler Engines
444 Highland Drive
Kohler, WI 53044
Customer Service: 800.544.2444 or 920.457.4441
Literature: 800.544.2444

Trane
4801 Voges Road, Suite A
Madison, WI 53718
Phone: 608-838-8200
Or
11400 W. Theodore Trecker Way
West Allis, WI 53214
Phone: 414-266-5200
Capabilities: HVAC systems, Air Handling Products

Caterpillar
FABCO Equipment, INC.
11200 W Silver Spring Rd.
Milwaukee, WI 53225-3198
Or
1111 Applegate Rd
Madison, WI 53713
Capabilities: Electric Generation Equipment Manufacturer

Solar Turbines Incorporated
40 Shuman Blvd. Suite 350
Naperville, IL 60563
(630) 527-1700
Capabilities: Electric Generation Equipment Manufacturer

Generac Power Systems
Hwy. 59 & Hillside Road
P.O. Box 8
Waukesha, WI 53187
Capabilities: Power Generators
Detroit Diesel
Inland Diesel Inc.
13015 W. Custer Ave
(Milwaukee)
P.O. Box 916
Butler, WI 53007-0916
Phone: 262-781-7100 or 800-236-6667
or
Interstate Diesel, Inc.
322 Winter Street
Superior, WI 54880
Phone: 715-394-5398

Hess Microgen
12 Industrial Parkway, Unit B-1
Carson City, NV 89706
(775) 884-1000
Capabilities: Generators with Heat Recovery

Eisenmann
150 E. Dartmoor Dr.
Crystal Lake, IL 60014
Contact: Mark West
(815) 455-4100
Capabilities: Air Purification

ADA Systems
955 North Lively Boulevard
Wood Dale, IL 60191
Capabilities: Evaporative Cooling Systems, Energy Recovery

Huntington Environmental Systems, Inc.
707C West Algonquin Road
Arlington Heights, IL 60005
Capabilities: Emissions Control Equipment

Munters
Capabilities: Desiccant Dehumidification Products

GE Power Systems
Capabilities: Combustion Turbine Products

Ingersold Rand
Capabilities: Microturbines

International Fuel Cells, Inc.
Capabilities: Fuel Cells

Yazaki
Capabilities: Thermally Activated Chillers
Wartsilla
Power Plants
201 Defense Highway, Suite 100
Annapolis, Maryland, 21401
Tel: 410 573 2100
Capabilities: Recip. Engines
York
Capabilities: HVAC Systems
Honeywell
Capabilities: Microturbines
Broad
Capabilities: Thermally Activated Chillers

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Appendix D  Property Management Organizations and Firms in Wisconsin

BOMA Milwaukee
710 N. Plankinton Ave.
Suite 207
Milwaukee, WI 53203
414-278-7557

Institute for Real Estate Management (IREM) Accredited Real Estate Management Firms:

Affiliated Capital Corp.,
21150 W. Capitol Dr., No. 5,
Pewaukee, WI 53072
Phone: 262/790-9828
Web: www.affiliatedcapital.com
Property Type(s):
Conventional apartments, Condominiums,
Federally assisted housing

Dominium Management Services, Inc.,
112 Stimpson St.,
Watertown, WI 53094
Phone: 920/262-0304
Property Type(s):
Conventional apartments
Federally assisted housing

Farmer Management and Development Co.,
714 S. Barstow St.,
P.O. Box 246,
Eau Claire, WI 54701-0246
Phone: 715/834-2691
Property Type(s):
Conventional apartments, Condominiums, Federally assisted housing
Office buildings,

National Realty Management, Inc.,
1155 Quail Ct.,
Pewaukee, WI 53072
Phone: 262/695-1400
Web: www.national-realty.net
Property Type(s): Conventional apartments,
Condominiums, Office buildings, Retail Properties and shopping centers,
Single family homes, Warehouses and miniwarehouses
Oakbrook Corp.,
111 E. Water St. No. 300,
Appleton, WI 54911
Phone: 920/731-7242
Property Type(s):
Conventional apartments
Federally assisted housing

Oakbrook Corp.,
626 E. Kilbourn Ave.,
Milwaukee, WI 53202
Phone: 414/274-6684
Property Type(s):
Conventional apartments
Federally assisted housing

Oakbrook Corp.,
2 Science Ct.,
Madison, WI 53711
Phone: 608/238-2600
Property Type(s): Conventional apartments, Federally assisted housing,
Office buildings, Retail Properties and shopping centers,

Ogden & Co., Inc.,
1665 N. Water St.,
Milwaukee, WI 53202
Phone: 414/276-5285
FAX: 414/276-4207
Web: www.ogdenrealty.com
Property Type(s): Conventional apartments, Condominiums, Federally assisted housing, Cooperative housing,
Industrial parks, Office buildings, Retail Properties and shopping centers,
Single family homes, Warehouses and miniwarehouses

Optimum Property Management,
2120 W. Clybourn St.,
Milwaukee, WI 53233-2510
Phone: 414/342-2218
FAX: 414/342-9077
Property Type(s): Conventional apartments,
Condominiums, Cooperative housing, Industrial parks, Office buildings
Retail Properties and shopping centers, Single family homes
Hotels and motels, Warehouses and miniwarehouses
Polacheck Property Management Corp.,
250 N. Sunny Slope Rd., Ste. 150,
Brookfield, WI 53005
Phone: 262/641-7000
FAX: 262/641-7020
Web: www.polacheckmgmt.com
Property Type(s): Industrial parks, Office buildings
Retail Properties and shopping centers

Trammell Crow Co./Central Division,
100 E. Milwaukee Ave., Ste. 1000,
Milwaukee, WI 53202
Phone: 414/289-9030
FAX: 414/289-0372
Property Type(s): Industrial parks, Office buildings, Warehouses and miniwarehouses

NOTE: This list represents only those firms that the MW BCHP Application Center was able to identify at the time of this report. Other firms may exist that promote BCHP; they will be added to the database and will be available over the website in the future as they are identified.
Appendix E  Energy Supply and Service Companies in Wisconsin

Natural Gas Providers:

WE Energies (Wisconsin Gas Company)
231 W. Michigan
Milwaukee, WI 53290
Website: www.we-energies.com

Wisconsin Public Service Corp. (Wisconsin Fuel and Light)
PO Box 19001
Green Bay WI 54307
Website www.wpsr.com

Alliant Energy, Wisconsin Power and Light
222 W Washington Ave
Madison WI 53703
Website Products or Services:

Madison Gas and Electric
PO Box 1231
Madison WI 53701
Website www.mge.com

Northern States Power Co.
PO Box 8 1414 W Hamilton Ave.
Eau Claire WI 54702-0008

Electricity Providers:

Investor Owned Electric Utilities

WE Energies
231 W. Michigan
Milwaukee, WI 53290
Website: www.we-energies.com

Wisconsin Public Service Corp.
PO Box 19001
Green Bay WI 54307
Website www.wpsr.com

Alliant Energy, Wisconsin Power and Light
222 W Washington Ave
Madison WI 53703
Madison Gas and Electric
PO Box 1231
Madison WI 53701
Website www.mge.com

Northern States Power Co.
PO Box 8 1414 W Hamilton Ave.
Eau Claire WI 54702-0008

Cooperative Electric Utilities
[National Rural Elect Cooperative Association (NRECA) Members only]

Adams-Columbia Electric Co-op Friendship
Badger Unified Co-op Services Friendship
Barron Electric Cooperative Barron
Bayfield Electric Co-op, Inc. Iron River
Central Wisconsin Electric Co-op Iola
Chippewa Valley Electric Co-op Cornell
Clark Electric Co-op Greenwood
Dairyland Power La Crosse
Dunn Electric Co-op Menomonie
Eau Claire Energy Co-op Fall Creek
GEN~SYS Energy La Crosse
Head of the Lakes Electric Co-op Superior
Jackson Electric Co-op Black River Falls
Jump River Electric Co-op Ladysmith
Mid-Wisconsin DBS, LLC Iola
Oakdale Electric Co-op Oakdale
Oconto Electric Co-op Oconto Falls
Pierce-Pepin Cooperative Services Ellsworth
Polk-Burnett Electric Co-op Centuria
PowerPlus Engineering, LLC La Crosse
Price Electric Co-op, Inc. Phillips
Richland Electric Co-op Richland Center
Riverland Energy Cooperative Arcadia
Rock County Electric Co-op Assn. Janesville
Rural Electric Supply Co-op Madison
Scenic Rivers Energy Co-op Lancaster
Skyview DBS Boscobel
St. Croix Electric Co-op Hammond
Taylor Electric Cooperative Medford
Vernon Electric Co-op Westby
Western Wisc. Communications Co-op Independence
Wisconsin Federation of Co-ops
Municipal Electric Utilities

Municipal Electric Utilities of Wisconsin (MEUW) is an association of the 82 municipal electric utilities in the state. MEUW can be contacted at the following address:

MEUW
725 Lois Drive
Sun Prairie, WI 53590
Tele.: 608-837-2263
FAX: 608-837-0206

MEUW Members:
- Algoma Utility Commission
- Arcadia Electric Utility
- Argyle Utility
- Bangor Municipal Utility
- Barron Light and Water Commission
- Belmont Municipal Light & Water Utility
- Benton Electric and Water Utility
- Black Earth Electric Utilities
- Black River Falls Municipal Utilities
- Bloomer Electric and Water Utility
- Boscobel Utilities
- Brodhead Water & Light Commission
- Cadott Light & Water Department
- Cashton Municipal Light & Water Plant
- Cedarburg Light & Water Commission
- Centuria Municipal Electric Utility
- Clintonville Water & Electric Utility
- Columbus Water & Light Department
- Cornell Municipal Lighting Department
- Cuba City Light and Water Plant
- Cumberland Municipal Utility
- Eagle River Light & Water Department
- Elkhorn Light & Water
- Elroy Electric and Water Utility
- Evansville Water & Light Department
- Fennimore Municipal Utilities
- Florence Water & Light Commission
- Gresham Municipal Water & Electric
- Hartford Utility Department
- Hazel Green Light & Water Utility
- Hustisford Utilities
- Jefferson Water & Light Department
- Juneau Utility Commission
- Kaukauna Electric & Water Department
- Kiel Utilities
- La Farge Municipal Utilities
Lake Mills Light & Water Department
Lodi Utilities
Manitowoc Public Utilities
Marshfield Electric & Water Department
Mazomanie Electric Utility
Medford Electric Utility
Menasha Utilities
Merrillan Electric & Water Utility
Mount Horeb Utilities
Muscoda Light & Water Commission
New Glarus Municipal Light & Water
New Holstein Utilities
New Lisbon Municipal Light & Water
New London Utility Commission
New Richmond City Utilities
Oconomowoc Utilities
Oconto Falls Water & Light Commission
Pardeeville Public Utilities
Plymouth Utilities
Prairie du Sac Electric Department
Princeton Light & Water Department
Reedsburg Utility Commission
Rice Lake Utilities
Richland Center Municipal Utility
River Falls Municipal Utility
Sauk City Utilities
Shawano Municipal Utilities
Sheboygan Falls Utilities
Shullsburg Electric Utility
Slinger Electric Utilities
Spooner Municipal Electric Utility
Stoughton Electric & Water Utilities
Stratford Water & Electric Department
Sturgeon Bay Utilities
Sun Prairie Water & Light Commission
Trempealeau Electric Committee
Two Rivers Water & Light Department
Viola Municipal Electric Utility
Waterloo Water & Light Commission
Waunakee Water & Light Commission
Waupun Public Utilities
Westby Electric & Water Utility
Whitehall Municipal Electric Utility
Wisconsin Dells Water & Light
Wisconsin Rapids Water Works & Lighting Commission
Wonewoc Municipal Water & Light Dept.
Appendix F  Energy Service Companies

The following list includes only companies accredited by the National Association of Energy Service Companies (NAESCO):

Johnson Controls, Inc.
Paul von Paumgartten
Director, Energy & Environmental Affairs
Milwaukee, WI

Siemens Building Technologies
Milwaukee
135 W. Wells
Suite 110
Milwaukee WI 53203

NOTE:  This list represents only those firms that the MW BCHP Application Center was able to identify at the time of this report.  Other firms may exist that promote BCHP; they will be added to the database and will be available over the website in the future as they are identified.
## Appendix G  Associations/Organizations Associated with BCHP Deployment in Wisconsin

### Wisconsin/Regional Organizations

<table>
<thead>
<tr>
<th>Organization</th>
<th>Website</th>
</tr>
</thead>
<tbody>
<tr>
<td>2. BOMA Building Owners and Managers Association</td>
<td><a href="http://www.boma.org">http://www.boma.org</a></td>
</tr>
<tr>
<td>3. FOCUS ON ENERGY</td>
<td><a href="http://focusonenergy.com">http://focusonenergy.com</a></td>
</tr>
<tr>
<td>5. Delta Institute</td>
<td><a href="http://www.delta-institute.org">http://www.delta-institute.org</a></td>
</tr>
<tr>
<td>6. RENEW Wisconsin</td>
<td><a href="http://Renewwisconsin.org">http://Renewwisconsin.org</a></td>
</tr>
<tr>
<td>8. Energy Resources Center – University of Illinois at Chicago</td>
<td><a href="http://www.erc.uic.edu">http://www.erc.uic.edu</a></td>
</tr>
<tr>
<td>13. Wisconsin Department of Natural Resources</td>
<td><a href="http://www.dnr.state.wi.us/">www.dnr.state.wi.us/</a></td>
</tr>
<tr>
<td>15. Wisconsin Public Service Commission</td>
<td><a href="http://psc.wi.gov">http://psc.wi.gov</a></td>
</tr>
<tr>
<td>16. Midwest CHP for Buildings Application Center</td>
<td>Contact through Gas Technology Institute or Energy Resources Center</td>
</tr>
<tr>
<td>17. Midwest CHP Initiative</td>
<td><a href="http://www.neimw.org/usBCHPa/regional.html#midw">http://www.neimw.org/usBCHPa/regional.html#midw</a></td>
</tr>
<tr>
<td>21. Wisconsin Department of Administration – Division of Energy</td>
<td><a href="http://www.doa.state.wi.us/depb/index.jsp">http://www.doa.state.wi.us/depb/index.jsp</a></td>
</tr>
</tbody>
</table>

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### Federal Government Agencies

<table>
<thead>
<tr>
<th>Agency</th>
<th>Website/Contact Information</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. DOE Combined Heat and Power (BCHP) Initiative</td>
<td><a href="http://www.eren.doe.gov/der/BCHP/">http://www.eren.doe.gov/der/BCHP/</a></td>
</tr>
<tr>
<td>2. DOE Distributed Energy Resources (DER) Taskforce</td>
<td><a href="http://www.eren.doe.gov/der/">http://www.eren.doe.gov/der/</a></td>
</tr>
<tr>
<td>3. DOE Distributed Power (DP) Program</td>
<td><a href="http://www.eren.doe.gov/distributedpower/">http://www.eren.doe.gov/distributedpower/</a></td>
</tr>
<tr>
<td>5. DOE Energy Information Administration</td>
<td><a href="http://www.eia.doe.gov/">http://www.eia.doe.gov/</a></td>
</tr>
<tr>
<td>7. DOE Inventions &amp; Innovation Program (I&amp;I)</td>
<td><a href="http://www.oit.doe.gov/inventions/">http://www.oit.doe.gov/inventions/</a></td>
</tr>
<tr>
<td>9. DOE Office of Industrial Technologies</td>
<td><a href="http://www.oit.doe.gov/">http://www.oit.doe.gov/</a></td>
</tr>
<tr>
<td>10. DOE Office of Power Technologies (OPT)</td>
<td><a href="http://www.eren.doe.gov/power/">http://www.eren.doe.gov/power/</a></td>
</tr>
<tr>
<td>11. EPA Climate Protection Division (CPD)</td>
<td><a href="http://www.epa.gov/cpd.html">http://www.epa.gov/cpd.html</a></td>
</tr>
<tr>
<td>12. EPA Office of Air &amp; Radiation</td>
<td><a href="http://www.epa.gov/oar/">http://www.epa.gov/oar/</a></td>
</tr>
<tr>
<td>13. EPA Office of Air Quality Planning and Standards</td>
<td><a href="http://www.epa.gov/oar/oaps/">http://www.epa.gov/oar/oaps/</a></td>
</tr>
<tr>
<td>20. US Environmental Protection Agency (EPA)</td>
<td><a href="http://www.epa.gov">http://www.epa.gov</a></td>
</tr>
</tbody>
</table>

**NOTE:** This list represents only those organizations that the MW BCHP Application Center was able to identify at the time of this report. Other organizations may exist that promote BCHP; they will be added to the database and will be available over the website in the future as they are identified.
### Others Associations and Organizations

<table>
<thead>
<tr>
<th>Organization/Association</th>
<th>Website/Contact Information</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Alliance to Save Energy</td>
<td><a href="http://www.ase.org">http://www.ase.org</a></td>
</tr>
<tr>
<td>6. Distributed Power Coalition of America (DPCA)</td>
<td><a href="http://www.dpcg.org">http://www.dpcg.org</a></td>
</tr>
<tr>
<td>11. National Association of State Energy Officials (NASEO)</td>
<td><a href="http://www.naseo.org">http://www.naseo.org</a></td>
</tr>
<tr>
<td>15. Northeast Midwest Institute</td>
<td><a href="http://www.nemw.org">http://www.nemw.org</a></td>
</tr>
<tr>
<td>17. Regulatory Assistance Project</td>
<td><a href="http://www.rapmaine.org">http://www.rapmaine.org</a></td>
</tr>
</tbody>
</table>

**NOTE:** This list represents only those organizations that the MW BCHP Application Center was able to identify at the time of this report. Other organizations may exist that promote BCHP; they will be added to the database and will be available over the website in the future as they are identified.
### Appendix H  Distributed Generation – Commercial/Light Industrial Facilities in Wisconsin

<table>
<thead>
<tr>
<th>Project Name</th>
<th>Generator Capacity (MWe)</th>
<th>Generator Type</th>
<th>Primary Energy Source</th>
<th>Generating Unit Status</th>
<th>Heat Recovery</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Commercial/Institutional Facilities</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>St. Mary’s Hospital, Madison, WI</td>
<td></td>
<td>Turbine</td>
<td>Natural Gas</td>
<td>Operating</td>
<td>Yes</td>
</tr>
<tr>
<td>Beloit Memorial Hospital, Beloit WI</td>
<td>3000</td>
<td>Recip Engines</td>
<td>Natural Gas</td>
<td>Operating</td>
<td>Yes</td>
</tr>
<tr>
<td>Burleigh Elementary School, Elm Grove, WI</td>
<td>28</td>
<td>Capstone Microturbine</td>
<td>Natural Gas</td>
<td>Operating</td>
<td>Yes</td>
</tr>
<tr>
<td>State of Wisconsin, Capitol Heat and Power Plant, Madison, WI</td>
<td>3000</td>
<td>Turbines</td>
<td>Gas/Coal</td>
<td></td>
<td>Yes</td>
</tr>
<tr>
<td>State of Wisconsin Department of Administration, UW Madison Power Plant</td>
<td>9700</td>
<td>Steam Turbine</td>
<td>Coal</td>
<td>Operating</td>
<td>Yes</td>
</tr>
<tr>
<td>State of Wisconsin, Waupun Correctional Institution</td>
<td>2000</td>
<td>Steam Turbine</td>
<td>Coal</td>
<td></td>
<td>Yes</td>
</tr>
<tr>
<td>Project Name</td>
<td>Generator Capacity (MWe)</td>
<td>Generator Type</td>
<td>Primary Energy Source</td>
<td>Generating Unit Status</td>
<td>Heat Recovery</td>
</tr>
<tr>
<td>--------------------------------------------------</td>
<td>--------------------------</td>
<td>-------------------</td>
<td>-----------------------</td>
<td>------------------------</td>
<td>--------------</td>
</tr>
<tr>
<td>Anaerobic Digesters</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Yes</td>
</tr>
<tr>
<td>Duck Farm, Southeastern WI</td>
<td>200</td>
<td>Recip Engine</td>
<td>Digester Gas</td>
<td>Operating</td>
<td>Yes</td>
</tr>
<tr>
<td>Deere Ridge Dairy, Amhurst, WI</td>
<td>150</td>
<td>Caterpillar Recip</td>
<td>Ag Digester</td>
<td>Operating</td>
<td>Yes</td>
</tr>
<tr>
<td>Double S Dairy, Alto, WI</td>
<td>200</td>
<td>Hess Recip</td>
<td>Ag Digester</td>
<td>Operating</td>
<td>Yes</td>
</tr>
<tr>
<td>Landfill Operations</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Pheasant Run, Bristol, WI</td>
<td>5600</td>
<td>Recip Engine</td>
<td>Landfill Gas</td>
<td>Operating</td>
<td>Yes</td>
</tr>
<tr>
<td>Metro Gas Recovery</td>
<td>9000</td>
<td>Gas Turbine</td>
<td>Landfill Gas</td>
<td>Operating</td>
<td>Yes</td>
</tr>
<tr>
<td>Outagamie County Landfill Cogeneration Facility, Appleton, WI</td>
<td>2700</td>
<td>Recip Engine</td>
<td>Landfill Gas</td>
<td>Operating</td>
<td>Yes</td>
</tr>
<tr>
<td>Winnebago County Landfill Gas Recovery, Oshkosh, WI</td>
<td>6111</td>
<td></td>
<td>Landfill Gas</td>
<td></td>
<td>Yes</td>
</tr>
<tr>
<td>Metro Gas Recovery, Franklin, WI</td>
<td>9200</td>
<td>Gas</td>
<td>Operating</td>
<td></td>
<td>Yes</td>
</tr>
<tr>
<td>Superior Glacier Ridge Landfill, Haricon, WI</td>
<td>2000</td>
<td>Waukesha Recip</td>
<td>Landfill Gas</td>
<td>Operating</td>
<td>Yes</td>
</tr>
<tr>
<td>Sauk County Landfill, Reedsburg, WI</td>
<td>240</td>
<td>Capstone Micro Turbine</td>
<td>Landfill Gas</td>
<td>Fall 2000</td>
<td>Yes</td>
</tr>
<tr>
<td>Project Name</td>
<td>Generator Capacity (MWe)</td>
<td>Generator Type</td>
<td>Primary Energy Source</td>
<td>Generating Unit Status</td>
<td>Heat Recovery</td>
</tr>
<tr>
<td>--------------------------------------------------------</td>
<td>--------------------------</td>
<td>--------------------</td>
<td>-----------------------</td>
<td>------------------------</td>
<td>--------------</td>
</tr>
<tr>
<td>Waste Water Treatment Facilities</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Waste Water Treatment Plant, Janesville, WI</td>
<td>400</td>
<td>Recip Engines</td>
<td>Digester Gas</td>
<td>Operating</td>
<td>Yes</td>
</tr>
<tr>
<td>Kaukanna, WI</td>
<td>750</td>
<td>Recip Engines</td>
<td>Digester Gas</td>
<td>Operating</td>
<td>Yes</td>
</tr>
<tr>
<td>MMSD Jones Island Wastewater Treatment Plant, Milwaukee Metro Sewerage District</td>
<td>35200</td>
<td>Gas Turbine</td>
<td>Gas</td>
<td>Operating</td>
<td>Yes</td>
</tr>
<tr>
<td>Industrial Facilities</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>National By-Products, Inc., Berlin, WI</td>
<td>2400</td>
<td>Caterpillar Recip</td>
<td>Landfill Gas</td>
<td>Operating</td>
<td></td>
</tr>
<tr>
<td>Industrial Facility, Neenah, WI</td>
<td>70</td>
<td>Honeywell</td>
<td>Natural Gas</td>
<td>Operating</td>
<td></td>
</tr>
<tr>
<td>Whitewater Cogeneration Facility, Whitewater, WI</td>
<td>315000</td>
<td>Turbine</td>
<td>Natural Gas</td>
<td>Operating</td>
<td></td>
</tr>
<tr>
<td>Marathon Electric Co.</td>
<td>3600</td>
<td>Recip Engine</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>MGE - Backup Generation Service, Madison, WI</td>
<td>50000</td>
<td>About 50 Distributed Generators</td>
<td>Operating</td>
<td></td>
<td>No</td>
</tr>
<tr>
<td>Project Name</td>
<td>Generator Capacity (MWe)</td>
<td>Generator Type</td>
<td>Primary Energy Source</td>
<td>Generating Unit Status</td>
<td>Heat Recovery</td>
</tr>
<tr>
<td>----------------------------------------------------------------------------</td>
<td>--------------------------</td>
<td>-------------------------</td>
<td>-------------------------</td>
<td>------------------------</td>
<td>--------------</td>
</tr>
<tr>
<td>A host of major paper companies in Wisconsin operate CHP facilities</td>
<td>&gt; 250,000</td>
<td>Coal, Black Liquor</td>
<td>Operating</td>
<td>Some</td>
<td></td>
</tr>
<tr>
<td>including Fox River Paper Co., Wasau Mosinee Paper Corp., Weyerhaeuser Co,</td>
<td></td>
<td>Biomass</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>