

INDUSTRIAL

ENERGY

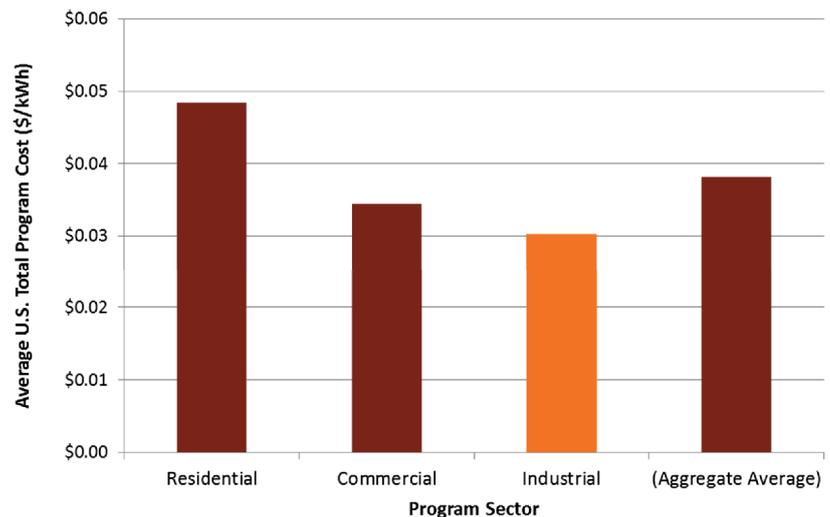
PRODUCTIVITY

INCREASING GLOBAL COMPETITIVENESS THROUGH INDUSTRIAL ENERGY PRODUCTIVITY

The manufacturing sector is the economic engine of the Midwest. In order to remain competitive in a global market, finding efficiencies and reducing costs is critical. Energy expenditures can be a significant cost for Midwestern industries, impacting the overall bottom line. There are ample opportunities for implementing energy efficiency strategies to assist Midwestern businesses in improving their global advantage, enabling economic growth and increasing job retention.

The Midwestern Governors Association (MGA) Industrial Energy Productivity (IEP) work group has been discussing and examining strategies to support energy efficiency efforts in the industrial sector. Industrial energy productivity, which includes industrial energy efficiency (IEE), is an important component of broader energy efficiency efforts. Energy efficiency programs receive greater value from industrial participation and industry benefits by reducing costs.

Figure 1: U.S. Average Cost of Saved Energy (2012)



Source: WRI, 2014

1. Opportunities for Industrial Energy Efficiency

- According to research from the World Resources Institute (WRI) and the American Council for an Energy Efficient Economy (ACEEE), the industrial sector has the lowest cost for saved energy when compared to residential and commercial sectors on a national scale.
- Industry has the ability to achieve the least cost of saved energy compared to the residential or commercial sectors. When industry is not included as a sector in energy efficiency programs, the overall cost to achieve energy savings through the program can increase by 5 percent or more (WRI, 2014).
- Even though the industrial sector currently captures the second highest levels of achieved energy savings (second only to lighting technologies), overall participation rates by the industrial sector in current utility energy efficiency programs are low. This suggests there is additional potential for greater levels of savings from the industrial sector (WRI, 2014).
- Energy efficiency programs for the industrial sector have higher benefit-cost ratios when compared to programs for residential and commercial energy efficiency (WRI, 2014).
- Energy efficiency strategies for the industrial sector not only reduce costs and save money, but also offer co-benefits, such as reduced water use, reduced pollution, and job retention for every dollar spent on efficiency improvements.
- Collaboration and coordination among state agencies responsible for energy programs and

Exemplary IEE Program – Michigan

Michigan utilities have offered enhanced industrial programs, which has led some companies in Michigan to opt-into the standard energy efficiency program instead of continuing with a self-direct approach. Efficiency United (a consortium of 22 Michigan utilities) worked with the Michigan Public Service Commission and the Michigan Economic Development Corporation to approve a multi-year, major overhaul of a Guardian Glass production facility. Energy efficiency improvements will be implemented over the next three years, and when completed will help the customer continue production in Michigan and produce a high quality product for the next 15 to 18 years.

economic development initiatives can make energy efficiency programs an even more powerful economic development tool.

- IEE has the potential to provide a cost-effective compliance option for anticipated U.S. Environmental Protection Agency (U.S. EPA) rules to regulate greenhouse gas emissions from electric generating units under Section 111(d) of the Clean Air Act.

2. Challenges for Industrial Energy Efficiency

- Clarification of continuous process improvement is needed. IEE is more of a process than an individual action, and is longer-term and ongoing. In the industrial setting, this is something that deserves consistent measurement, verification and evaluation.
- Companies have competing priorities. Energy efficiency may take a back seat to competing priorities because non-energy “process” investments might have a greater return on investment. Lack of energy management expertise to develop, manage, implement and/or maintain energy efficiency projects may pose additional challenges.
- States that have already created, or are considering creating, provisions to exempt industrial customers from ratepayer funded energy efficiency programs are missing an important area of opportunity to both implement and/or document cost-effective and significant energy savings.

Exemplary IEE Program - Minnesota

Xcel Energy offers a process efficiency program for industrial customers in Minnesota. Xcel works with facilities to develop a three-to-five year energy management plan and identifies available rebates to reduce implementation costs (Xcel, 2014). This program is credited with exceeding annual savings goals and achieved a total savings of nearly 50 GWh in 2012 (WRI, 2014).

Exemplary IEE Activity - Illinois

The Illinois Commerce Commission approved a proposal for Public Sector Energy Efficiency Standard and Custom Incentive Programs. An addendum to the program would offer incentives to wastewater treatment facilities, where approximately 60 percent of consumed energy occurs during the aeration process. New equipment installations could reduce energy consumption by 20-50 percent.

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- The industrial sector is not an easy sector to encourage joining and participation in ratepayer-funded energy efficiency programs. The programs must be creative, offer the industrial sector meaningful projects and measures, and be mindful of industrial planning and funding cycles. The right program design is critical to really capture the energy savings opportunity.

3. Combined Heat and Power

The IEP work group focused on top-line strategies for improving the competitive edge of Midwestern manufacturers. One specific area examined was combined heat and power (CHP), which is an integrated energy system that uses a suite of commercially available technologies to simultaneously generate both thermal and electric energy from a single fuel source, such as natural gas or biomass. Instead of purchasing electricity from the electric distribution grid and burning fuel in an onsite furnace or boiler to produce thermal energy, the CHP system can provide both energy services in one energy-efficient step. CHP is one set of energy efficiency measures within the much larger IEE toolkit.

Exemplary IEE Program - Ohio

AEP Ohio offers industrial customers prescriptive, custom and self-direct, continuous energy improvement (CEI), and bid-to-win programs. Of all of AEP's industrial program offerings, the prescriptive program has resulted in the highest level of energy savings (WRI, 2014). However, the CEI program, which works with industrial customers to identify low cost/no cost energy efficiency improvements, is becoming an attractive model for procuring energy savings from industrial customers. During the first year of the program in 2013, 37 industrial participants worked with AEP to identify low cost/no cost energy efficiency improvements. CEI resulted in 23 gigawatt hours of savings in 2013 (AEP, 2014).

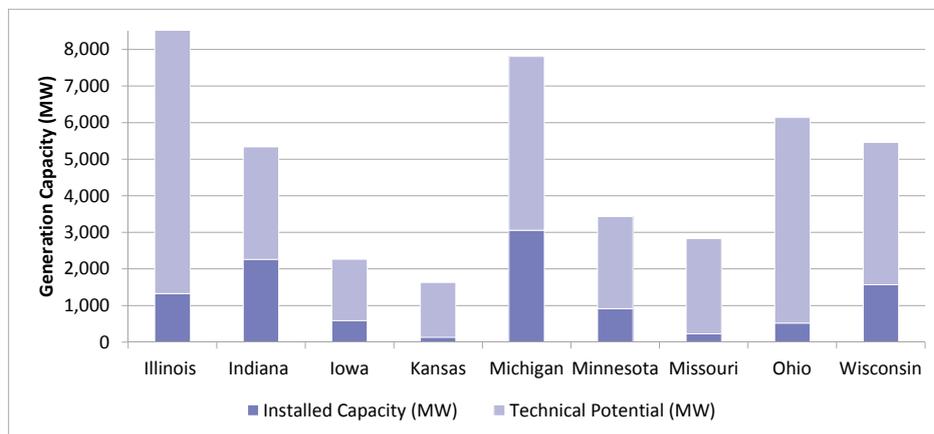
a. Opportunities for CHP

As demonstrated in figure 2, there is significant technical potential for new CHP installations in MGA member states. Despite this potential, it is important to note there is a business case that must be considered when evaluating if a CHP project is economically viable. Economic considerations (such as cost of electricity, cost of natural gas, permitting costs, utility standby rates and utility interconnection costs) in some jurisdictions might limit the potential for CHP implementation, and requires careful evaluation based on local factors. If the right economic conditions are present, increased implementation of CHP is not only a strategy to improve the efficiency of industrial facilities, but could also be used to help meet individual state goals for increased energy efficiency and clean energy.

Exemplary IEE Activity – Missouri

Missouri's IEE programs, which were implemented through the American Recovery and Reinvestment Act of 2009 State Energy Program, achieved more than 85 million kWh from installed energy efficiency projects and leveraged more than \$7.4 million. In addition, over 213 million kWh were identified from conducted energy efficiency audits, and all four of Missouri's investor-owned utilities have filed energy efficiency plans with the Missouri Public Service Commission. Two of the four utilities began program implementation in 2013 with expanded incentive offerings for commercial and industrial businesses.

Figure 2: Comparison of Installed CHP Capacity and Technical Potential



Source: U.S. DOE, 2013 and ICF, 2010

b. Benefits of CHP Systems

- CHP systems are more efficient than separate generation of electricity and heat.
- Waste heat recovery opportunities offer a significant energy savings and are generally more cost-effective compared to energy purchases from central station generation.
- Higher efficiency can translate to lower operating costs, depending on local economic conditions (however, CHP does require significant capital investment).
- Higher efficiency reduces emissions of all air pollutants.
- CHP can increase energy reliability and enhance power quality for industrial customers.
- CHP is recognized as a technology that can be part of an emission compliance strategy to meet U.S. EPA standards, such as the Industrial Boiler Maximum Available Control Technology rules.
- Properly placed CHP systems can reduce electric grid congestion and help avoid or delay distribution grid update costs.
- Similar to IEE, CHP has the potential to provide an additional cost-effective compliance option for forthcoming U.S. EPA rules to regulate greenhouse gas emissions from electric generating units under Section 111(d) of the Clean Air Act.

Exemplary IEE Program – Wisconsin

Wisconsin Focus on Energy is a statewide energy efficiency and renewable energy program offering a variety of services to Wisconsin residents and businesses. Program offerings in 2014 cover multiple industries with a diverse set of equipment and process upgrades. The industrial program offerings cover a range of services, including technical assistance, financial incentives, and targeted information and assistance for energy intensive sub-sectors. Practical Energy Management™ is specifically designed for large energy users and provides a customizable template to assist business with controlling costs (SEE Action, 2014.) According to an Economic Impacts Report, in 2012, the nonresidential program, which is made up of mostly industrial customers, had a cost-benefit ratio of 2.7 compared to 1.5 for the residential program (PSC-WI, 2013). Additionally, nonresidential program expenditures were \$81 million compared to \$42 million for residential programs (SEE Action, 2014).

c. Challenges for CHP

Although there is significant technical potential for increased CHP installations in Midwestern states, there is also a common set of challenges that need to be overcome to more fully capture the technical potential.

- **Air quality regulations:** Designing streamlined procedures, such as permit by rule, would help to expedite CHP project implementation. Adopting output-based emission accounting in air quality permitting would provide an incentive for generation resources that produce the highest amount of energy relative to pollution output. This would encourage the most fuel-efficient combustion technologies (WRI, 2012).
- **Interconnection standards:** A more equitable allocation method for interconnection fees would set upper and lower bounds commensurate with system size. Increased levels of transparency for application procedures and a clearly defined process for dispute resolution among parties would better serve CHP projects (SEE Action, 2013).
- **Standby rate design:** Effective rates for CHP projects would make a differentiation between on-peak and off-peak demand. The offering of daily or monthly as-used demand charges for backup power and shared transmission could also be elements of standby rates for CHP customers (SEE Action, 2013).
- **CHP in Clean Energy Standards:** Clean energy portfolio standards (energy efficiency portfolio standards and renewable portfolio standards) are tools states use to increase the adoption of cost-effective energy measures. Including CHP as an

National Governors Association (NGA) Policy Academy on Enhancing Industry through Energy Efficiency and Combined Heat and Power

The states of Illinois and Iowa participated in the NGA policy academy, where representatives evaluated current opportunities for CHP implementation, reviewed current policy and regulatory frameworks, and engaged diverse sets of stakeholders in CHP discussions.

Participation in the policy academy provided an opportunity to hear directly from stakeholders and engage executive-level and state agencies in the discussion about overcoming identified barriers. As a result of the academy participation, both states are proceeding with on-going CHP work.

allowable technology under state clean energy standards can provide cost effective options for the industrial sector and assist in meeting state energy program goals. Two Midwestern states recently included CHP and waste heat to power as allowable technologies under their ratepayer funded energy efficiency programs (DOE and EPA, 2012).

d. State-Level CHP Activities

During the course of the MGA IEP work group, several member states conducted CHP related activities. There are also on-going CHP efforts. The MGA IEP work group has been able to amplify the progress made in individual states through shared learning and information sharing at the regional-level, and all MGA members states have benefited from specific state activities.

Private Sector Interest in CHP: Results from 2013 Iowa Survey

As part of the policy academy process in Iowa, a survey of current and potential CHP users and CHP developers was conducted. The survey found that the most significant barriers for CHP facilities to be:

- Compliance with environmental regulations
- Initial capital cost
- Permitting
- Time to recover investment
- Standby rates
- Interconnection with grid owner/operator

Potential CHP users also noted lack of incentives, such as tax credits as an additional barrier.

Source: Iowa Economic Development Authority (IEDA), Energy Office, 2013.

CHP Activity in Midwestern States

- **Illinois** has approved CHP as an allowable technology in their energy efficiency portfolio standard. The plan is to implement a specifically designed CHP program targeted at the public sector and to handle private sector CHP applications through the utility custom programs. The programs should be implemented in June, 2014.
- **Iowa** has been awarded a grant from the U.S. Department of Energy (DOE) to address policy, regulatory or market barriers to CHP implementation. Work will be conducted throughout 2014.
- **Michigan** has been examining the potential for CHP installations in the agricultural sector.
- **Minnesota** has been conducting studies and stakeholder discussions on CHP implementation. Study results will be shared and disseminated with work group members. Minnesota has also been awarded a CHP grant from the DOE.
- **Missouri** has been evaluating CHP and identifying potential barriers that may need to be overcome to increase CHP uptake.
- **Ohio** has approved CHP and waste energy recovery (WER) as allowable technologies under their energy efficiency portfolio standard and WER as an allowable technology under their renewable portfolio standard. The Public Utilities Commission of Ohio is developing implementation rules.
- **Wisconsin** has been examining strategies to increase CHP adoption at municipal wastewater treatment facilities and have been identifying ways to overcome barriers to increase implementation at livestock and food processing facilities. The state has also been awarded a CHP grant from DOE.

References

American Electric Power (AEP). February 2014. *AEP Ohio's Continuous Energy Improvement Initiative: Saving Energy Without Investing Capital Dollars Through No/Low Cost Opportunities*. PowerPoint. <http://www.slideshare.net/AEPOhio/2014-ohio-energy-management-conf-aep-ohio-cei-initiative-slides-final-draft>, accessed March 3, 2014.

ICF International. October 2010. *Effect of a 30 Percent Investment Tax Credit on the Economic Market Potential for Combined Heat and Power*.

Iowa Economic Development Authority (IEDA). June 2013. *Action Plan on Enhancing Industry through CHP*.

Public Service Commission of Wisconsin (PSC-WI). November 2013. *Focus on Energy, Calendar Year 2012, Economic Impacts Report*.

State and Local Energy Efficiency Action Network (SEE Action). March 2013. *Guide to the Successful Implementation of State Combined Heat and Power Policies*.

State and Local Energy Efficiency Action Network (SEE Action). March 2014. *Industrial Energy Efficiency: Designing Effective State Programs for the Industrial Sector*.

U.S. Department of Energy (DOE) and U.S. Environmental Protection Agency (U.S. EPA). August, 2012 *Combined Heat and Power – A Clean Energy Solution*.

U.S. Department of Energy (DOE). *Combined Heat and Power Installation Database*. <http://www.eea-inc.com/chpdata/>. Accessed December 2, 2013.

World Resources Institute (WRI). Forthcoming 2014. *Beyond Lighting: The Role of Industry Programs in U.S. Ratepayer-Funded Energy Efficiency*.

World Resources Institute (WRI). February 2012. *Midwest Manufacturing Snapshot: Energy Use and Efficiency Policies*.

Xcel Energy. Process Efficiency.

<http://www.xcelenergy.com/staticfiles/xcel/Marketing/Managed%20Documents/co-mn-bus-process-efficiency-info-sheet.pdf>, accessed January 31, 2014.

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