



Distributed Generation: Cleaner, Cheaper, Stronger

Industrial Efficiency in Wisconsin's Changing Utility Landscape

Overview

Distributed energy sources—which generate electricity where it is used—protect businesses and institutions from unexpected outages caused by natural disasters and other disruptions. Industrial energy-efficient systems such as combined heat and power (CHP) and waste heat to power (WHP) can help make the country's electricity sector cleaner, cheaper, and more secure.

CHP and WHP have experienced periodic expansions over the past 40 years across the commercial, industrial, and institutional sectors in rural and urban settings. By producing heat and power from a single fuel source, CHP has double the efficiency of central-station power generation. WHP captures heat that would typically be vented from an industrial facility and uses it to make electricity with no additional combustion or incremental emissions. To realize the full benefits of distributed generation, Congress should pass legislation that allows more companies and institutions to deploy these energy-efficient systems.

Electricity generation in the Dairy State

Wisconsin has no fossil fuel resources of its own, but it has great potential for renewable energy development.¹ In 2013, almost 7 percent of the state's net electricity generation came from clean, in-state resources: biomass, wind, and hydroelectric. Wisconsin's industrial sector ranks 17th nationwide for energy consumption and accounts for more than 33 percent of total state energy use.² The state's strong manufacturing sector yielded 18.9 percent, \$53.38 billion, of total gross state product in 2013 and presents a significant opportunity for greater adoption of industrial energy-efficient technologies such as CHP and WHP.³ However, Wisconsin's installed CHP capacity—1.6 gigawatts at 100 sites as of Dec. 31, 2014—represents less than half of the state's technical potential, estimated at more than 5 GW.⁴ Although some state policies encourage continued deployment, a lack of explicit support for CHP and WHP creates a barrier to project development.

State energy policies

Demand drivers

Wisconsin's renewable energy standard was signed into law in October 1999 and includes provisions for CHP systems that displace conventional power use. The standard originally required that 2.2 percent of electricity come from these sources by 2012 but was amended in 2006 to a statewide target of 10 percent by 2015.⁵

Additionally, the state's 2006 energy efficiency resource standard, the Focus on Energy Program, provides technical and financial support for clean and efficient technology deployment in the state.⁶ Although CHP is not specifically identified as an eligible resource, the program supports deployment of efficiency projects, including CHP, in certain sectors of the economy.⁷

Grid integration

The state's 2004 interconnection standards apply to distributed generation projects, including CHP, of up to 15 megawatts.⁸ Wisconsin also has a net metering program for investor-owned and municipal utilities (but not electric cooperatives) for which all distributed generation systems are eligible.⁹

Financial incentives

The Focus on Energy Program supports energy efficiency technology deployment in the state by establishing requirements for utilities, offering financing opportunities, and facilitating collaborative project development.¹⁰ Investor-owned utilities are required to spend 1.2 percent of their annual operating revenue on efficient and renewable power generation, and a portion of those resources provides the funding for the program. Municipal and co-op facilities participate in the state's program or operate their own. Utilities partner with the program, which is administered by the Statewide Energy Efficiency and Renewable Administration, to fund third-party implementation of project installations, including CHP in certain sectors, and environmental and economic research and development.¹¹ Utilities may undertake additional projects, as approved by the Public Service Commission.¹²

In November 2014, Wisconsin enacted legislation amending the renewable component of the Focus on Energy Program to offer loans as well as cash-back incentives of \$5 million in 2015 and \$3.5 million in 2016. The legislation established a \$10 million revolving fund for the financing program, which began taking applications in 2015 for projects in 2016 through 2018.¹³ The low-interest loans can cover up to 50 percent of a project's costs and require matching funds from a financial institution at market rates to pay for the remainder of the project.¹⁴

Wisconsin offers a series of tax incentives for clean energy systems but none specifically include CHP or WHP.¹⁵

Emission reduction and energy goals

The Wisconsin Public Service Commission is statutorily required to review state efficiency and renewable energy programs, including assessing the standards and goals, every four years. Under the 2015-18 evaluation, the commission took public comments on a proposal to move the state's approach to clean energy deployment beyond specific consumption targets, on program cost-effectiveness, and on the power-water nexus. In addition, the state conducts a biennial strategic energy assessment of the adequacy and reliability of the electricity supply. A 2009 background study, undertaken to inform the 2012 strategic report, discussed the benefits and potential for CHP and WHP technologies in Wisconsin, but these recommendations were not included in the final assessment.¹⁶

CHP Brings Dependability to Industrial Operations

At SC Johnson's Waxdale Plant in Racine, two 3.2-MW CHP installations provide operational reliability. One unit, which was installed in 2003, is fueled by gas produced by the Kestrel Hawk Park Landfill a few miles away, and the other, installed in 2005, uses primarily natural gas.* The combined 6.4-MW system provides the base load of electricity for the 2.2 million-square-foot facility and is 70 percent energy efficient, contributing to the company's nationwide goal of reducing greenhouse gas emissions.† Additionally, the turbines run 24 hours a day, seven days a week, increasing reliability and protecting the plant's operations. In case of a blackout, the CHP unit can be disconnected from the utility grid and will provide enough power to keep critical operations up and running, reducing production interruptions and revenue losses.‡

* U.S. Environmental Protection Agency, "Project Profile: Cogeneration at SC Johnson & Son, Inc.," last modified Dec. 23, 2014, <http://www3.epa.gov/lmop/projects-candidates/profiles/cogenerationatjscjohnsonso.html>.

† Midwest CHP Application Center, "SC Johnson Waxdale Plant 6.4 MW CHP Application: Project Profile," <http://www.midwestchptap.org/profiles/ProjectProfiles/SCJohnson.pdf>.

‡ PR Newswire, "Northern Power Systems Awarded \$6.0 Million Turnkey On-Site Power System Project by SC Johnson" (June 1, 2004), <http://www.prnewswire.com/news-releases/northern-power-systems-awarded-60-million-turnkey-on-site-power-system-project-by-sc-johnson-74294077.html>.

Modeling findings

The Pew Charitable Trusts commissioned ICF International Inc. to analyze proposed policy to determine the effect of industrial energy efficiency technologies on future market deployment. ICF modeled the impact of an investment tax credit for CHP and WHP that is on par with what other clean and efficient systems receive, as outlined in the Power Efficiency and Resiliency (POWER) Act of 2015 (S. 1516/H.R. 2657).¹⁷

In Wisconsin, market deployment for CHP and WHP would more than double over the status quo for a projected 418 MW of additional capacity by 2030 if the investment tax credit were extended to these technologies. CHP would account for 304 MW, almost three-fourths of the new capacity, and WHP would make up the remaining 114 MW.

Conclusion

Industrial energy-efficient systems such as CHP and WHP represent tremendous potential to reduce power consumption, save companies and institutions money, balance distribution by limiting peak demand, and create businesses and jobs, all while decreasing emissions. These projects are cleaner, cheaper, and more secure than traditional generation—factors that make them essential components of the resilient, efficient, distributed grid of the future. Improving the federal investment tax credit to create parity among clean and efficient technologies would reduce market barriers and spur adoption of CHP and WHP.



Table 1
 Snapshot of CHP and WHP in Wisconsin
 Deployment, national ranking, and policies

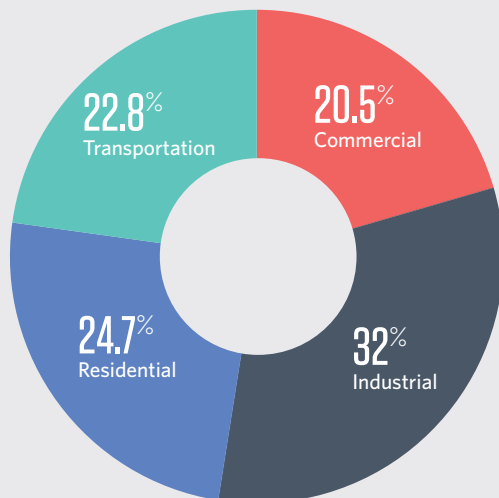
Policies	
Demand drivers	
Renewable and/or alternative energy portfolio standard	✓
Energy efficiency resource standard	
Grid integration	
Net metering	✓
Interconnection standards	✓
Financial incentives	
Tax credits/incentives	
Grants and/or loans	✓
Emission reduction and energy goals	

Statistics as of Dec. 31, 2014	
Installed CHP capacity	1.6 GW
Number of installations	100
Installed capacity rank	14th
Five-year capacity growth	42 MW

Source: NC Clean Energy Technology Center, U.S. Environmental Protection Agency, and ICF International

© 2015 The Pew Charitable Trusts

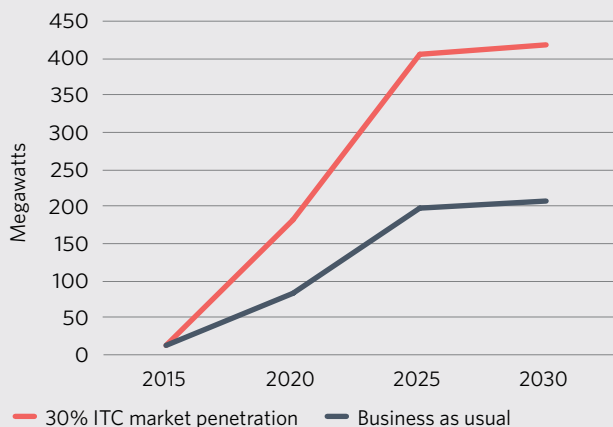
Figure 1
 Industrial Sector Uses the Most Energy in Wisconsin
 Energy consumption by end-use sector, 2013



Source: U.S. Energy Information Administration

© 2015 The Pew Charitable Trusts

Figure 2
 Improved Policy Could Result in 101.6% Increase in Deployment of CHP and WHP in Wisconsin
 Capacity growth with business as usual vs. enhanced investment tax credit, 2015-30, in MW



Source: ICF International

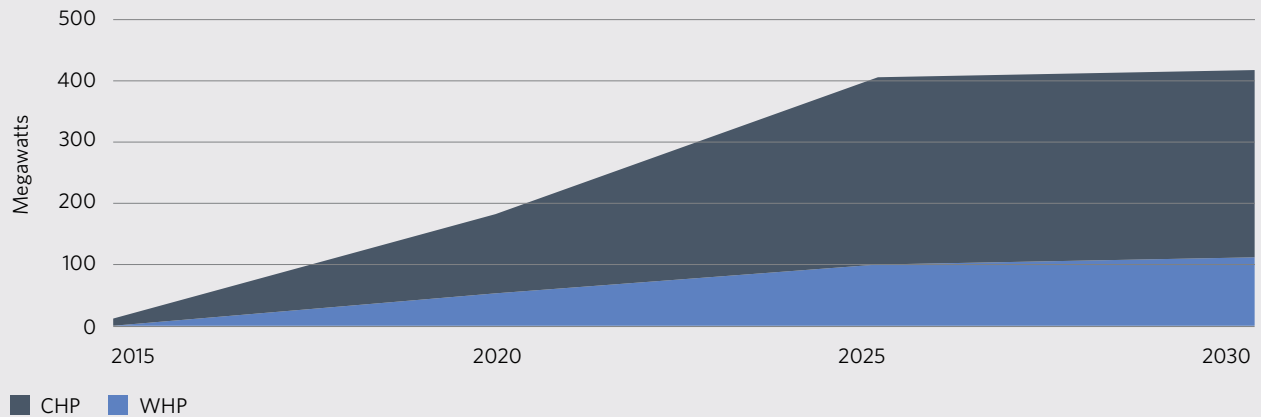
© 2015 The Pew Charitable Trusts



Figure 3

Improved Policy Could Result in 418 MW of New CHP and WHP Capacity by 2030 in Wisconsin

Anticipated market penetration with enhanced investment tax credit, 2015-30, in MW



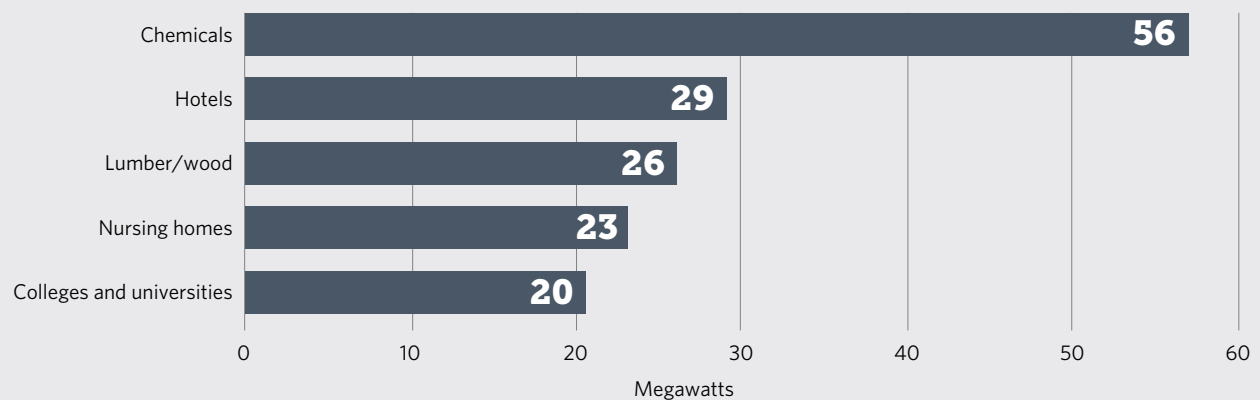
Source: ICF International

© 2015 The Pew Charitable Trusts

Figure 4

Wisconsin Chemical Sector Could See Greatest CHP and WHP Deployment Opportunity With Enhanced Investment Tax Credit

Top sectors in projected additional market penetration by 2030, in MW



Source: ICF International

© 2015 The Pew Charitable Trusts

Endnotes

- 1 U.S. Energy Information Administration, “Wisconsin State Profile and Energy Estimates—Profile Analysis,” last updated Feb. 19, 2015, <http://www.eia.gov/state/analysis.cfm?sid=WI>.
- 2 U.S. Energy Information Administration, “Energy Consumption Estimates by End-Use Sector, Ranked by State, 2013,” http://www.eia.gov/state/seds/sep_sum/html/pdf/rank_use.pdf; and U.S. Energy Information Administration, “Wisconsin State Profile and Energy Estimates—Wisconsin Energy Consumption by End-Use Sector, 2013,” <http://www.eia.gov/state/?sid=WI#tabs-2>.
- 3 National Association of Manufactures, “Wisconsin Manufacturing Facts,” <http://www.nam.org/Data-and-Reports/State-Manufacturing-Data/2014-State-Manufacturing-Data/Manufacturing-Facts--Wisconsin>.
- 4 U.S. Department of Energy, “Combined Heat and Power Installations in Wisconsin,” U.S. DOE Combined Heat and Power Database, <https://doe.icfwebsiteservices.com/chpdb/state/WI>.
- 5 American Council for an Energy-Efficient Economy, “State and Local Policy Database: Wisconsin,” <http://database.aceee.org/state/wisconsin#sthash.YzkCAun.dpuf>; and NC Clean Energy Technology Center, “Wisconsin: Renewable Portfolio Standard,” Database of State Incentives for Renewables & Efficiency, last updated Nov. 18, 2015, <http://programs.dsireusa.org/system/program/detail/190>.
- 6 NC Clean Energy Technology Center, “Wisconsin: Energy Efficiency Standard for Focus on Energy,” Database of State Incentives for Renewables & Efficiency, last updated Feb. 4, 2015, <http://programs.dsireusa.org/system/program/detail/4689>.
- 7 American Council for an Energy-Efficient Economy, “State and Local Policy Database: Wisconsin.”
- 8 Ibid.
- 9 U.S. Environmental Protection Agency, “CHP Policies and Incentives Database: Wisconsin Net-Metering Rules,” <http://www.epa.gov/chp/policies/policies/wiwisconsinnetmeteringrules.html>.
- 10 NC Clean Energy Technology Center, “Wisconsin: Energy Efficiency Standard for Focus on Energy”; and American Council for an Energy-Efficient Economy, “State and Local Policy Database: Wisconsin.”
- 11 Midwest Energy Efficiency Alliance, “Energy Efficiency Policies and Practices in Wisconsin,” <http://www.mwalliance.org/node/1907>.
- 12 American Council for an Energy-Efficient Economy, “State and Local Policy Database: Wisconsin.”
- 13 NC Clean Energy Technology Center, “Wisconsin: Focus on Energy Program,” Database of State Incentives for Renewables & Efficiency, <http://programs.dsireusa.org/system/program/detail/2085>.
- 14 Renew Wisconsin, “Wisconsin’s Renewable Energy Rebates Extended for Two Years, but Funding Levels Are Lower” (Nov. 7, 2014), <http://www.renewwisconsin-blog.org/2014/11/wisconsins-renewable-energy-rebates.html>.
- 15 U.S. Environmental Protection Agency, “CHP Policies and Incentives Database: Wisconsin,” <http://www3.epa.gov/chp/policies/database.html>.
- 16 Midwest Energy Efficiency Alliance, “Energy Efficiency Policies and Practices in Wisconsin”; Energy Center of Wisconsin, “Energy Efficiency and Customer-Sited Renewable Resource Potential in Wisconsin for the Years 2012 and 2018” (July 6, 2009), <http://www.ecw.org/sites/default/files/244-1.pdf>; and Public Service Commission of Wisconsin, “Strategic Energy Assessment Report: Energy 2018 (SEA)” (November 2012), <http://psc.wi.gov/hotTopics/SEA.htm>.
- 17 The Pew Charitable Trusts, *Distributed Generation: Cleaner, Cheaper, Stronger—Industrial Efficiency in the Changing Utility Landscape* (October 2015), <http://www.pewtrusts.org/-/media/assets/2015/10/cleanercheaperstrongerfinalweb.pdf>. The full methodology for this analysis is provided in the appendix of the report.

For further information, please visit:

pewtrusts.org/cleanenergy

Contact: Michelle Blackston, communications officer

Email: mblackston@pewtrusts.org

Project website: pewtrusts.org/cleanenergy

The Pew Charitable Trusts is driven by the power of knowledge to solve today's most challenging problems. Pew applies a rigorous, analytical approach to improve public policy, inform the public, and invigorate civic life.