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Distributed Generation: Cleaner, Cheaper, Stronger
Industrial Efficiency in Texas' 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 Lone Star State

Texas generates more electricity than any other state in the nation, producing over 50 percent more than the next-greatest producer.[1] Unlike the rest of the states in the continental U.S., which share large regional power generation, transmission, and distribution capabilities, Texas operates predominantly on a stand-alone electric grid within its borders. This isolation means that the state is dependent on its own power resources to meet the electricity needs of its residents and businesses and that it is not subject to certain Federal Energy Regulatory Commission rules.[2] The Texas grid, which is managed by the Electric Reliability Council of Texas, serves 24 million customers, representing about 90 percent of Texas' electric load.[3]

Texas policymakers have leveraged the state's natural resources, competitive markets, and self-contained grid to encourage development of a diverse mix of energy resources. The state is the nation's largest natural gas producer and sixth-biggest coal producer.[4] Those resources accounted for 50 percent and 30 percent, respectively, of the state's generation in 2013.[5] At the same time, distributed generation has a strong presence, with two-thirds of the state's electricity created by independent producers.[6] Texas also leads the nation in wind-power generation.[7]

In 2012, the state ranked first in the nation in industrial energy use, with the sector representing over half (51.3 percent) of the total power consumed statewide.[8] As of the end of 2014, Texas also leads the nation in installed CHP capacity with 17.6 gigawatts.[9] Manufacturing accounted for 15.2 percent or $233 million of the state's total output in 2013, exemplifying the significant opportunity in Texas for further adoption of industrial energy efficiency technologies such as CHP.[10]

Recent legislation has promoted the inclusion of CHP in resiliency planning, but state policies still do not fully recognize the benefits that distributed technologies have to offer.[11] Nevertheless, Texas remains a leader in CHP and WHP deployment in large part due to the strong adoption of the technologies by the state's industrial sector.

State energy policies

Demand drivers

In 1999, Texas became the first state to establish an energy efficiency resource standard.[12] Originally, the goal called for investor-owned utilities to meet 10 percent of their annual growth in electricity demand through energy efficiency initiatives or incentives for distributed, renewable generation.[13] Policymakers have increased the standard multiple times, with the last update in 2010 requiring 30 percent by 2013. Utilities' compliance programs are funded through a fee on transmission and distribution services and administered by the utilities. Under the Public Utility Commission's 2013 rules, CHP projects of 10 megawatts or less are eligible to help utilities meet the state's targets.[14]

In 2009, Texas passed groundbreaking legislation that requires an evaluation of the feasibility of installing CHP for critical facilities undergoing construction or renovations costing more than $2 million.[15] Critical facilities are defined as government-owned buildings or campuses that serve essential health and safety needs during emergencies, operate for more than 6,000 hours a year, and have peak loads exceeding 500 kilowatts.[16]

Grid integration

Texas's interconnection standards became effective in 2001 and allow distributed generation systems, including CHP up to 10 MW, to access the grid. The rules apply to on-site generation projects and include sizing tiers that support less-restrictive interconnection for smaller systems. For example, most units up to 500 kW do not require pre-interconnection study fees.[17]

Texas is one of the few states without a net-metering policy. Retail electricity providers are permitted but not required to compensate customers for production from distributed generation systems that is exported to the grid. The lack of net metering has discouraged more rapid deployment of distributed generation installations as this mechanism is often a critical component of financing upfront system costs.[18]

Financial incentives

Texas has no financial incentives specifically intended to encourage development of CHP or WHP.[19]

Emission reduction and energy goals

Control programs for output-based emissions, which measure pollution relative to the productivity of the energy-consuming process, and local energy consumption goals can encourage adoption of efficient and clean technologies by establishing a connection among energy production, consumption, and resulting emissions.[20] In Texas, electricity-generating units are subject to output-based emissions limits on nitrogen oxides, known commonly as NOX. Facilities that install certain CHP systems and reduce emissions can receive a credit based on the amount of heat recovered and put to use.[21] In 2011, the state enacted legislation to streamline the process to enable CHP generators to more easily obtain emissions permits. The law was the result of coordination between local stakeholders and policymakers to quantify and document CHP systems' net emissions and electricity reductions.[22]

CHP Enhances Resiliency of Texas Hospitals

Health care facilities must have assured power sources in order to deliver essential public safety and response functions during outages and other emergencies. CHP systems have an established track record of offering reliable off-grid energy during major disruptions and constitute important components of hospital resiliency plans while also lowering utility costs and reducing emissions.*

In Texas, medical facilities are embracing CHP to provide reliable on-site power and are reaping the benefits. One example is Dell Children's Medical Center of Central Texas in Houston where a 4.3-MW CHP project, commissioned in 2007, provides 100 percent of the campus' energy. The system helps the center meet its sustainability and resiliency goals by producing steam, chilled water, and uninterrupted power.† The hospital can remain fully operational and run uninterrupted during an outage, allowing it to act as a refuge during emergency situations.‡ The local municipal utility, Austin Energy, owns and operates the system and exports surplus electricity back to the grid and excess chilled water to nearby facilities. The project has saved the center $6.8 million in gross capital.§

* Meister Consultants Group, "Powering the Future of Health Care: Financial and Operational Resilience—A Combined Heat and Power Guide for Massachusetts Hospital Decision Makers," Boston Green Ribbon Commission and Health Care Without Harm (2013), http://www.greenribboncommission.org/downloads/CHP_Guide_091013.pdf.

† U.S. Department of Energy, CHP Technical Assistance Partnerships: Southwest, "Dell Children's Medical Center & Austin Energy," (2015), http://www.southwestchptap.org/data/sites/1/documents/profiles/Dell_Childrens_Medical_Center-Project_Profile.pdf.

‡ Ibid.

§ U.S. Department of Energy, Energy Efficiency & Renewable Energy, Building Technologies Program, "Dell Children's Medical Center of Central Texas," (July 2011), http://apps1.eere.energy.gov/buildings/publications/pdfs/alliances/hea_dell_business_case.pdf.

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).[23]

In Texas, market deployment for CHP and WHP would increase by 16 percent over the status quo for a projected 2,288 MW of additional capacity by 2030 if the investment tax credit were extended to these technologies. CHP would account for 1,709 MW, nearly three-fourths of this new capacity, and WHP would make up the remaining 579 MW.

Texas

Table 1

Snapshot of CHP and WHP in Texas

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	✓

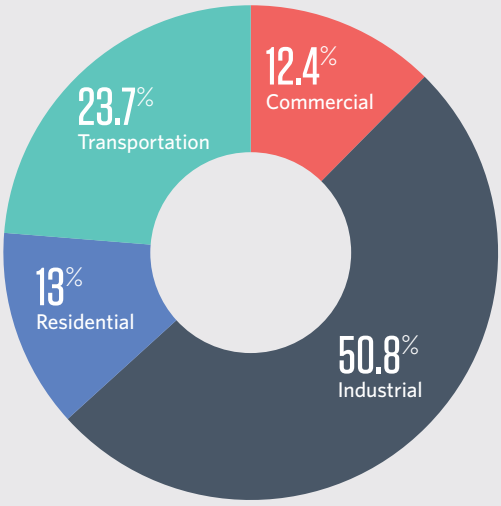
Statistics as of Dec. 31, 2014	
Installed CHP capacity	17.6 GW
Number of installations	126
Installed capacity rank	1st
Five-year capacity growth	133 MW

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

Figure 1

Industrial Sector Uses the Most Energy in Texas

Energy consumption by end-use sector, 2013

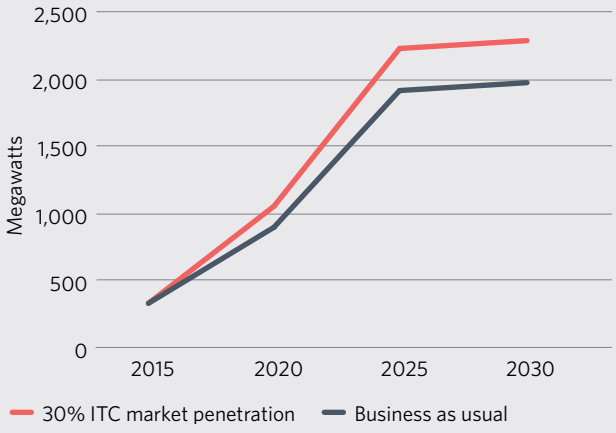


Source: U.S. Energy Information Administration

Figure 2

Improved Policy Could Result in 16% Increase in Deployment of CHP and WHP in Texas

Capacity growth with business as usual vs. enhanced investment tax credit, 2015-30, in MW

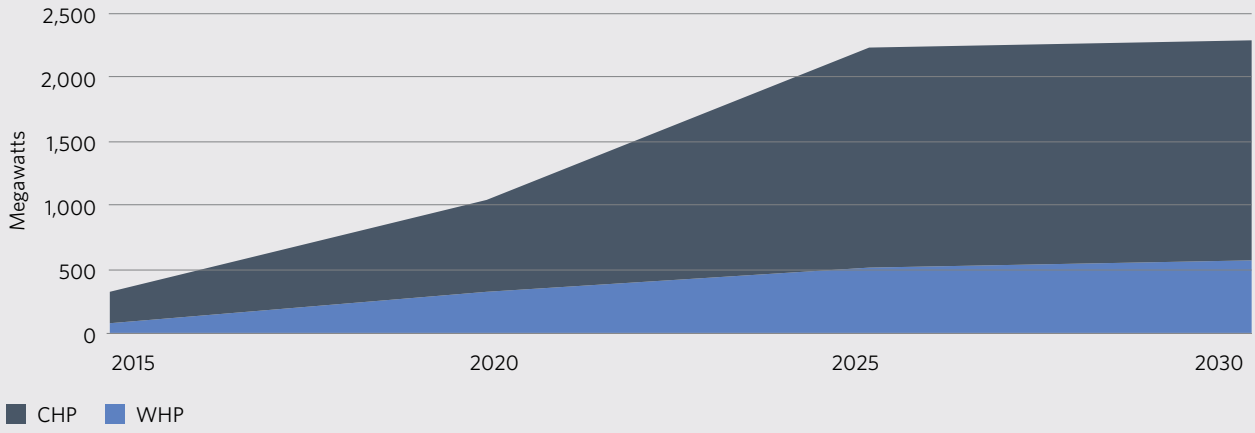


Source: ICF International

Figure 3

Improved Policy Could Result in 2,288 MW of New CHP and WHP Capacity by 2030 in Texas

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

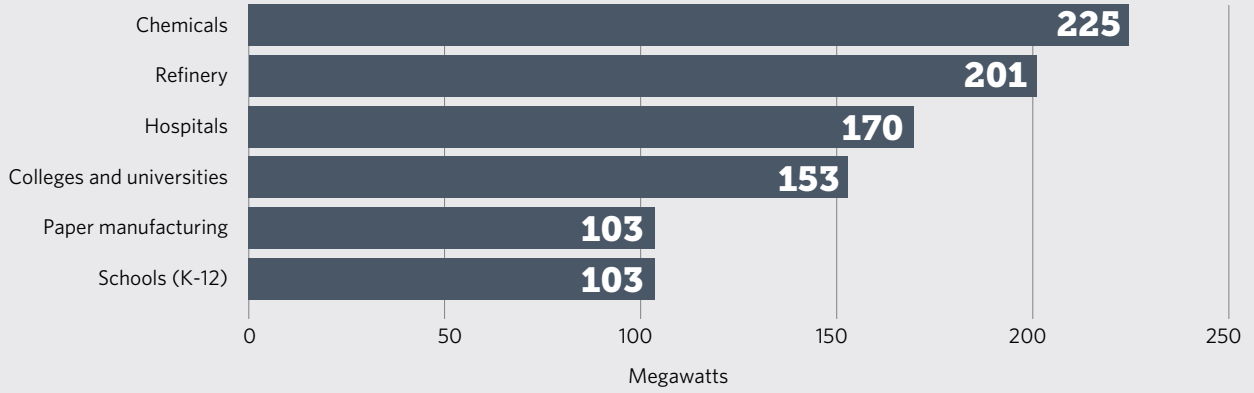


Source: ICF International

Figure 4

Texas 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

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.

Endnotes

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For further information, please visit:

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