TESTIMONY OF DAVID GARDINER

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BEFORE THE

HOUSE SELECT COMMITTEE ON THE CLIMATE CRISIS
SOLVING THE CLIMATE CRISIS:
REDUCING INDUSTRIAL EMISSIONS THROUGH U.S. INNOVATION

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Good morning. I am David Gardiner, President of David Gardiner and Associates, a strategic consulting firm focused on climate, clean energy and sustainability. I am also Executive Director of the Combined Heat and Power Alliance ("the Alliance"), a coalition of business, labor, contractor, and non-profit organizations, who share the vision that Combined Heat and Power (CHP) and Waste Heat to Power (WHP) can make America's manufacturers and other businesses more competitive, reduce energy costs, enhance grid reliability and reduce carbon emissions.[1] Companies like Cargill, GM, Kimberly-Clark, L'Oreal, Mars, P&G, and Stonyfield, are working with my firm, the Center for Climate and Energy Solutions and the World Wildlife Fund to scale up renewable heating and cooling at their facilities as part of the Renewable Thermal Collaborative.

The industrial sector is a large source of carbon dioxide and other greenhouse gas emissions and there is widespread recognition in America's manufacturing sector of the need to reduce their emissions. A 2018 report from the Alliance examined the public clean energy goals of 160 of the nation's largest industrial companies with a combined 2,100 manufacturing facilities in the United States. It found that seventy-nine percent of these manufacturers in the United States have established ambitious public goals to reduce their greenhouse gas emissions. Those companies need our help and support to ensure they can meet those emission reduction targets and become more competitive in global markets.

Much of these industrial emissions result from the energy used to produce heat for the manufacturing production process. Across the globe, industrial heat makes up two-thirds of industrial energy demand and almost one-fifth of total energy consumption. These emissions are concentrated in eight energy-intensive basic material manufacturing sectors – steel, chemicals, cement, pulp and paper, aluminum, glass, food, and oil refining – which produce more than 77 percent of global industrial emissions. Climate solutions must include approaches

[1] Until September 17, 2019, the Combined Heat and Power Alliance was known as the Alliance for Industrial Efficiency.

to reduce emissions associated with heat production, while also making those industries more competitive.

Make Industrial Processes More Efficient with CHP and WHP

The first step in addressing these emissions is to make industrial processes more efficient through the use of technologies such as CHP and WHP. CHP uses a single fuel source to generate both heat and electricity. As a result, it is twice as energy efficient and has half the emissions of the average power plant and it can deliver both the electricity and heat which industrial companies need to power their plants. WHP captures industrial waste heat and uses it to generate electricity with no additional fuel and no incremental emissions.

Because they use heat which would otherwise be wasted, CHP and WHP can make manufacturers more competitive by reducing energy costs while also cutting emissions. Our own analysis shows that by using industrial efficiency and CHP and WHP, manufacturers can cut carbon emissions by 174.5 million short tons in 2030 – equal to the emissions from 46 coal-fired power plants – while saving businesses $298 billion from avoided electricity purchases.[2] The top 10 states in which these energy efficiency improvements would produce the greatest total carbon emission reductions and many of the cost savings are Texas, Ohio, Illinois, Indiana, Pennsylvania, Kentucky, Michigan, California, Georgia, and Alabama.

Moreover, CHP can provide overall energy and carbon dioxide savings on par with comparably sized solar photovoltaics (PV), wind, Natural Gas Combined Cycle (NGCC), and at a capital cost that is lower than solar and wind and on par with NGCC, according to the Department of Energy (DOE) and the Environmental Protection Agency (EPA).[3]

CHP systems can also run on renewable fuels, such as biomass (e.g., forest and crop residues, wood waste, food processing residue) or biogas (e.g., manure biogas, wastewater treatment biogas, landfill gas), which can lower GHG emissions even further.

CHP is also accelerating the deployment in microgrids of other renewable technologies, such as solar. A microgrid is a local energy grid that can disconnect from the traditional grid and operate on its own during grid outages. CHP provides 39% of the energy in existing microgrids and offer important reliability benefits when the solar power may not be working.[4]

In addition, because CHP and WHP produce energy onsite at manufacturing facilities, they also can make industrial plants more resilient in the wake of extreme weather events. This ability to

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[2] Alliance for Industrial Efficiency, *State Ranking of Potential Carbon Dioxide Emission Reductions through Industrial Energy Efficiency,* September 2016. https://chpalliance.org/resources/state-industrial-efficiency-ranking/
[3] U.S. DOE, EPA, *Combined Heat and Power: A Clean Energy Solution,* August 2012 https://www.epa.gov/sites/production/files/2015-07/documents/combined_heat_and_power_a_clean_energy_solution.pdf
[4] U.S. Department of Energy, Jun. 17, 2014, "How Microgrids Work" (https://bit.ly/2nFsiSP).

come back online, when the electricity grid is not operating, is a significant advantage for industries such as chemicals and petroleum refining, which are highly concentrated on the hurricane-prone Gulf Coast.

Today, CHP produces approximately 9 percent of U.S. electricity, but the potential is much greater. CHP could produce 20 percent of all electricity by 2030, according to DOE's Oak Ridge National Laboratory.[5] DOE has identified nearly 241 GW of remaining CHP technical potential capacity, an amount equal to 480 conventional power plants. The chemicals, petroleum refining, food, paper and primary metals industrial sectors have the greatest potential for CHP installation and to cut emissions while increasing competitiveness, according to DOE.[6]

Unfortunately, CHP and WHP face economic and financial, regulatory and informational barriers to their deployment, according to DOE.[7] CHP requires a significant upfront capital investment, forcing it to compete with other industrial company priorities for limited investment capital. The business model of a utility can reduce its interest in promoting industrial CHP projects. States may adopt policies, such as burdensome standby rates, which discriminate against CHP, or fail to account for its resilience, cost savings and emission reduction benefits. Potential hosts, utilities and policymakers are often unaware of the benefits of CHP and WHP.

Make American Manufacturers Clean and More Competitive with CHP and WHP Policies

To drive the emission reductions and increased competitiveness which CHP and WHP can deliver to America's manufacturers, the Combined Heat and Power Alliance recommends Congress adopt policies which can overcome these barriers. In particular, we urge Congress to enact:

- Tax – There are several tax policy measures that would support greater adoption of CHP and WHP, and ensure their contribution to greenhouse gas emission reduction is recognized in the marketplace.
    - (HR 2283 and S 2289) Renewable Energy Extension Act which would extend the section 48 investment tax credit for CHP for five years, and (S.2283) The Waste Heat to Power Investment Tax Credit Act which would add WHP to the section 48 tax credit.

[5] Oak Ridge National Laboratory, *Combined Heat and Power: Effective Energy Solutions for a Sustainable Future*, December 2008. https://info.ornl.gov/sites/publications/files/Pub13655.pdf
[6] U.S. DOE, *Combined Heat and Power Technical Potential in the United States*, March 2016. https://www.energy.gov/sites/prod/files/2016/04/f30/CHP%20Technical%20Potential%20Study%203-31-2016%20Final.pdf
[7] U.S. DOE, barriers report, 2015. https://www.energy.gov/sites/prod/files/2015/06/f23/EXEC-2014-005846_6%20Report_signed_v2.pdf

    - (S 1288) Clean Energy for America Act which is a technology neutral clean energy tax credit that accounts for both the thermal and electric energy that CHP systems generate when determining a system's overall greenhouse gas reduction benefit.
    - Finally, Congress should consider boosting the value of the investment tax credit for CHP to incentivize wider adoption, especially in non-traditional markets such as light manufacturing and multifamily housing.
- Energy Infrastructure – (HR 2741) The Leading Infrastructure for Tomorrow's (LIFT) America Act proposes several grid modernization and resiliency programs that encourage the use of onsite energy generation resources like CHP.
    - Section 31101 – Authorizes $515 million per year (2020-2024) for a grant program to support state, local, and tribal governments in their efforts to employ "resiliency related technologies," like CHP, to harden their electric grids and protect critical infrastructure.
    - Section 31201 - Authorizes $200 million per year (2020-2024) for a financial assistance program to support grid modernization partnership projects and allow greater customer based electric generation.
    - Sections 33301 – 33304 – Establishes several programs to support distributed energy systems, including CHP and WHP. These include the creation of a revolving loan fund to support states, tribes, higher education institutions and utilities distributed energy deployment projects, and a technical assistance and grant program to assist nonprofit and profit entities with site identification, evaluation, engineering, and design of distributed energy systems.
- Regulatory – Regulatory policies promoting clean energy should allow CHP and WHP fair and equal access to energy markets.
    - (HR 2597 and S 1359) Clean Energy Standard Act which credits the greenhouse gas reduction benefits of CHP.
    - Encourage states to establish standby rate and interconnection policies that allow CHP and WHP deployment, and technical assistance grants. The Heat Efficiency through Applied Technology (HEAT) Act introduced by Senator Shaheen in 2017 proposed establishing model best practices states could use to address regulatory barriers to CHP and WHP deployment.
    - Recognize WHP as a renewable energy for purposes of federal electricity purchases (H.R. 8, 114th Congress, sec. 3115).
- Information – (HR 1480 and S 2425) CHP Support Act which would continue to provide information to manufacturers about the benefits of CHP and WHP by reauthorizing the Department of Energy's Technical Assistance Partnerships (TAPs). Congress should continue to provide appropriations for this program.
- Industrial Efficiency Policies – Congress should also enact policies that focus the federal government on broad strategies to encourage energy efficiency in the industrial sector such as the Energy Savings and Industrial Competitiveness Act (H.R. 3962, S. 2137), and Smart Manufacturing Leadership Act (H.R. 1633, S. 715).

Develop Cost-Effective and Sustainable Renewable Thermal Technologies

The second approach to reducing emissions from the energy used to produce heat used in the manufacturing process is to accelerate the development and deployment of renewable heat sources. This is an area which has received little attention in discussions of how to reduce the emissions which cause climate change. Indeed, the International Energy Agency (IEA) has called renewable heating and cooling "the sleeping giant" of renewable energy.[8] IEA has also found that only 10 percent of global heat production is powered with renewable energy, with the remaining 90 percent from carbon emitting fuel sources.[9]

Renewable heat sources include Renewable Natural Gas (produced from agricultural and food wastes, wastewater treatment and landfills), biomass (under the right circumstances), renewable hydrogen and electrification, solar thermal, and geothermal.

Over the long term, the Energy Transmission Commission, for example, recommends using three renewable technologies to address industrial emissions, especially for heat production – biomass, electrification, and hydrogen.[10] In the short-term, however, the best approach is to advance a broad range of renewable thermal technologies and let markets determine the best outcomes.

In March, the Renewable Thermal Collaborative issued a Renewable Energy Buyers Statement calling on market players and policy makers to accelerate the deployment of cost-effective renewable thermal technologies. Leading industrial companies such as Cargill, Clif Bar, Chemours, GM, HP, L'Oreal, Mars, Procter & Gamble, and Stonyfield signed the statement.[11] They note that renewable thermal technologies are needed as they meet their own corporate commitments to reduce carbon emissions and that these technologies face many barriers. They believe we should follow a path similar to that of the renewable electricity market, where steady technology innovation and improvement has made wind and solar cost-effective and the preferred choice in many markets. Renewable thermal energy will benefit from a similar approach to develop innovative new technologies and deploy market-ready ones. As they note in their statement, this "may include development of new technologies, innovation and efficiency improvements in existing technologies, and research and deployment support from the national government".

These technologies face supply, market, and policy barriers, as outlined in a 2018 report to the Renewable Thermal Collaborative from my firm.[12] Renewable thermal technologies have few

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[8] International Energy Agency, *Waking the Sleeping Giant,* February 2015, http://iea-retd.org/wp-content/uploads/2015/02/RES-H-NEXT.pdf

[9] International Energy Agency (IEA), 2014, *Heating without Global Warming*, https://bit.ly/2jj4mCy

[10] Energy Transitions Commission, *Mission Possible: Reaching Net-Zero Carbon Emissions from Harder-To-Abate Sector by Mid-Century,* November 2018. http://www.energy-transitions.org/sites/default/files/ETC_MissionPossible_FullReport.pdf

[11] Renewable Thermal Buyers Statement, https://www.renewablethermal.org/buyers-statement/

[12] David Gardiner and Associates, *A Landscape Review of the Global Renewable Heating and Cooling*

supporting policies, especially when compared to renewable electricity. According to the IEA, more than 120 countries in all world regions have introduced policies designed to promote renewable electricity, whereas only around 40 have specific policies for renewable heat, most of which are within the European Union.[13]

Conclusion

In conclusion, the Committee should focus significant attention on reducing the greenhouse emissions associated with producing heat. The first step is to accelerate energy efficiency measures, such as CHP and WHP, and the second is to focus on innovation of renewable thermal technologies. Many of the approaches to accelerate energy efficiency, CHP and WHP enjoy bipartisan support and Congress should move them forward quickly.

Market, July 2018, https://www.renewablethermal.org/a-landscape-review-of-the-global-renewable-heating-and-cooling-market/

[13] International Energy Agency (IEA), 2014, *Heating without Global Warming*, https://bit.ly/2jj4mCy