DOCKETED	
Docket Number:	22-IEPR-01
Project Title:	2022 Integrated Energy Policy Report Update
TN #:	242415
Document Title:	Combined Heat and Power Alliance Comments - on 2022 Scoping Order
Description:	N/A
Filer:	System
Organization:	Combined Heat and Power Alliance
Submitter Role:	Public
Submission Date:	3/22/2022 3:58:10 PM
Docketed Date:	3/22/2022

Comment Received From: Combined Heat and Power Alliance
Submitted On: 3/22/2022
Docket Number: 22-IEPR-01

on 2022 Scoping Order

Additional submitted attachment is included below.

March 22, 2022

Combined Heat and Power Alliance
David Gardiner, Executive Director
3100 Clarendon Blvd., Suite 800
Arlington, VA 22201
703-717-5590
david@dgardiner.com

This information is provided in response to the California Energy Commission's (CEC) Notice of Request for Public Comments on the Draft Scoping Order for the 2022 Integrated Energy Policy Report (IEPR) update (Docket No. 22-IEPR-01).

The Combined Heat and Power Alliance (CHP Alliance) appreciates the opportunity to submit feedback on the 2022 IEPR update and commends the CEC for building on previous analyses of the state's efforts to decarbonize California's energy system. Our comments focus on Section 3 – Addressing Emerging Topics: the role for hydrogen in California's clean energy future. Combined heat and power (CHP) utilizing renewable and lower-carbon fuels such as clean hydrogen can enable significant emissions reductions across the industrial and buildings sectors that will be critical to achieving California's goal of statewide carbon neutrality by 2045.

The CHP Alliance also appreciates the CEC's acknowledgment that there are often important issues that need attention and analysis that may not fit into the typical timeframe of a single IEPR. We intend to provide recommendations on other CEC order instituting informational proceedings (OIIPs) when they are released, in areas such as decarbonizing the California gas system.

About the CHP Alliance

The CHP Alliance is a diverse coalition with more than 70 members including equipment manufacturers and distributors, engineers, utilities, labor, contractors, non-profit organizations, and educational institutions.[1] Our members come together with the common purpose to educate all Americans about CHP and waste heat to power (WHP), and how CHP and WHP can make America's manufacturers and other businesses more competitive, reduce energy costs, enhance grid reliability, and reduce emissions.

[1] "Who We Are," Combined Heat and Power Alliance, accessed March 2022, https://chpalliance.org/about/.

About CHP

CHP is a proven and highly efficient technology that can reduce emissions using traditional fuels and can reduce emissions even further using clean hydrogen fuel. Properly designed systems typically operate with an overall efficiency of 65 to 85 percent, with some systems approaching 90 percent.[2] No other technologies using traditional fuels can reach these levels of efficiency. This is compared to an average efficiency of 39 percent for fossil-fueled power plants in the U.S., and an efficiency of 50 percent when electricity generation is combined with an on-site boiler for thermal energy needs.[3] CHP systems achieve these high efficiencies by recovering the waste heat by-product of electricity generation as useful thermal energy for heating and cooling.[4] Because they operate efficiently, CHP systems combust less fuel to provide the same energy services. This efficient generation of energy reduces all types of emissions, including greenhouse gases such as carbon, criteria pollutants, and hazardous air pollutants.

CHP in California

Today, there is nearly 8,400 megawatts (MW) of CHP capacity across over 1,200 sites in California.[5] Looking to the future, the Department of Energy has identified 11,772 MW of remaining CHP (including WHP) total technical potential capacity at nearly 29,000 sites in California, as described in the table below.

[2] "Combined Heat and Power (CHP) Technical Potential in the United States," U.S. Department of Energy, March 2016, p. 3, www.energy.gov/sites/prod/files/2016/04/f30/CHP%20Technical%20Potential%20Study%203-31-2016%20Final.pdf ; "CHP Benefits," U.S. Environmental Protection Agency Combined Heat and Power Partnership, last accessed March 2022, https://www.epa.gov/chp/chpbenefits.

[3] "Combined Heat and Power and a Changing Climate: Reducing Emissions and Improving Resilience," Combined Heat and Power Alliance, January 2021, p. 10. https://chpalliance.org/resources/chp-and-a-changing-climate-reducing-emissions- and-improving-resilience/.

[4] "Fuel and Carbon Dioxide Emissions Savings Calculation Methodology for Combined Heat and Power Systems," U.S. Environmental Protection Agency, Combined Heat and Power Partnership, February 2015, p. 3. https://www.epa.gov/sites/production/files/2015-07/documents/fuel_and_carbon_dioxide_emissions_savings_calculation_methodology_for_combined_heat_and_power_syste ms.pdf.

[5] "Combined Heat and Power Installation Database," U.S. Department of Energy, data current as of October 31, 2021. https://doe.icfwebservices.com/state/chp/CA

CHP Technical Potential in California (including WHP)[6]

Top Industrial Sectors		Top Commercial Sectors	
Petroleum Refining	1,427 MW	Commercial Office Buildings	1,410 MW
Chemicals	1,111 MW	Colleges and Universities	1,273 MW
Food	776 MW	Multifamily Buildings	757 MW
Stone/Glass/Clay	204 MW	Govt. Buildings	571 MW
Transportation Equipment	147 MW	Hospitals	555 MW
Paper	134 MW	Military	445 MW

3. Addressing Emerging Topics: Role for Hydrogen in California's Clean Energy Future

Historically, CHP units have run on traditional fuels, and many today use natural gas. This use of CHP can be thought of as "CHP 1.0," the first wave of CHP technologies that relied on fossil fuels. However, CHP units can be fueled by renewable and lower-carbon fuels, including hydrogen, known as "CHP 2.0." Use of hydrogen fuel can allow CHP systems to reduce emissions even further than they do under CHP 1.0. Hydrogen fuel can serve as the primary fuel source for CHP systems and further reduce emissions across the industrial, commercial, and municipal sectors. Moreover, CHP systems use hydrogen fuel efficiently, requiring less fuel inputs for the same energy outputs compared to other generation units. Given the high cost of hydrogen, using hydrogen fuel efficiently in CHP systems will help to keep costs low and enable significant greenhouse gas reductions. Efficient use of hydrogen fuel should be central to any hydrogen and climate strategy, and CHP helps to meet this goal.

Today's existing and newly installed CHP systems can use a substantial blend of clean hydrogen – ranging from 20-100%, according to equipment manufacturers.[7] Work is

[6] "Combined Heat and Power (CHP) Technical Potential in the United States," U.S. Department of Energy, March 2016, p. D-9, www.energy.gov/sites/prod/files/2016/04/f30/CHP%20Technical%20Potential%20Study%203-31-2016%20Final.pdf

[7] "Clean Hydrogen and CHP: A Roadmap for Industrial and Commercial Decarbonization," Combined Heat and Power Alliance, March 2022, https://chpalliance.org/resources/publications/clean-hydrogen-and-combined-heat-and-power-a-roadmap-for-industrial-and-commercial-decarbonization/

being done to increase the volume of hydrogen fuel that can be used in CHP systems industry-wide, and some CHP systems are already capable of running entirely on 100% clean hydrogen.[8] Gas turbine manufacturers are looking to provide equipment that can accommodate higher percentages of hydrogen fuel: various companies in the U.S. and abroad are deploying or working on hydrogen-ready technology. In 2019, a number of European companies committed to provide gas turbines that can handle 20% hydrogen content in fuel by 2020, and 100% by 2030.[9] This month, the CHP Alliance put out a roadmap to convert all existing and new CHP systems to 100% clean hydrogen by 2030 or sooner, highlighting that existing systems, including ones installed today, can convert to 100% hydrogen at reasonable cost and with minimal downtime because these conversions can occur during scheduled overhauls.[10,11]

However, a critical barrier to clean hydrogen is its price and the need to scale up production to ensure adequate supply to meet demand. In the past several decades, America has succeeded in driving down the cost of wind and solar energy using a variety of policy tools to scale up these technologies. State governments should use the same approaches to scale up production and supply of clean hydrogen, which will help drive down the costs and should ensure this fuel is used as efficiently as possible by pairing it with CHP. We urge California to bring together hydrogen suppliers, CHP developers, end-users, industry experts, and other stakeholders to understand, analyze, educate, and address the key issues for the deployment of clean hydrogen, such as modernizing gas pipeline infrastructure. We also urge California to adopt policies to incentivize gas utilities to scale up the use of clean hydrogen, and to ensure that any tax credit or incentive must be made available to all technologies capable of utilizing clean hydrogen for electric power.

While hydrogen fuel has the potential to see more extensive use in CHP systems in the future and achieve deeper emissions reductions, it is critical that the CEC keep in mind the following considerations when developing hydrogen policies to ensure that this potential becomes a reality:

---

[8] "The UKs First 100% Hydrogen CHP." *2EA*, February 19, 2021, https://www.2ea.co.uk/The-UKs-first-100Percent-hydrogen-CHP.html

[9] Sonal Patel, "High-Volume Hydrogen Gas Turbines Take Share," *POWER*, May 1, 2019, https://www.powermag.com/high-volume-hydrogen-gas-turbines-take-shape/.

[10] "Clean Hydrogen and CHP: A Roadmap for Industrial and Commercial Decarbonization." Combined Heat and Power Alliance, March 2022, https://chpalliance.org/resources/publications/clean-hydrogen-and-combined-heat-and-power-a-roadmap-for-industrial-and-commercial-decarbonization/

[11] A CHP system overhaul typically occur every 8-10 years for a unit that runs continuously.

- **Transportation**: The existing gas pipeline system may provide a cost-effective way to transport clean hydrogen, but additional research is required to determine what quantities of hydrogen can safely be transported or what retrofits may be required.
- **Distributed Generation**: Distributed generation technologies such as CHP can be deployed at the point of clean hydrogen production, allowing the use of hydrogen fuel in CHP systems and the realization of corresponding emissions benefits while the development of hydrogen-ready pipelines is still underway.
- **Use**: While research and development of hydrogen-ready CHP technologies is ongoing, technology manufacturers and end users will need support evaluating what amount of hydrogen current equipment can use, identifying the retrofits and upgrades needed to ensure the adjustment of existing equipment for hydrogen use is easy and affordable, and the development and deployment of new equipment as required.