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**RE: National Definition for a Zero Emissions Building: Part 1 Operating Emissions  
Version 1.00 Draft Criteria**

The Combined Heat and Power Alliance submits these comments to the Department of Energy's (DOE) Building Technologies Office regarding the National Definition for Zero Emissions Building: Part 1 Operating Emissions. We address the following sections within the Request for Information:

- Section A: Overall
- Section B: Energy Efficiency Criteria
- Section C: On-site Emissions from Energy Use.
- Section F: Use Cases

**Section A: Overall.**

*5. Are the draft criteria clear and appropriate for the definition of a zero emissions building? Should any other criteria be considered for Part 1? Please provide specific feedback about this draft definition.*

We applaud DOE for addressing the need to cut carbon emissions in the buildings sector and for providing a draft National Definition for a Zero Emissions Building. We understand the intent to “create a standardized, consistent, and measurable basis for zero operating emissions buildings,” but strongly encourage DOE to broaden the scope of eligible solutions to combat climate change. The criteria as drafted miss opportunities to substantially reduce emissions, will leave many building owners without climate solutions they could implement today, and increase the likelihood that critical facilities will be without power and heat during the rising number of climate-induced blackouts.

We urge DOE to provide equal treatment of all electricity emissions, regardless of whether they are generated on-site or off-site. Since the proposal allows grid electricity to be covered by RECs, we encourage the same treatment of on-site electricity generation by sources such as highly efficient combined heat and power (CHP).



Additionally, CHP using renewable and decarbonized fuels and technologies—biomass, biogas, clean hydrogen, renewable natural gas, renewable propane, solar, and fossil fuels coupled with carbon capture and storage technologies (CCS)—as onsite generation should be included under the zero emissions building definition. These fuels and technologies deliver the same onsite zero emissions as electrification technologies powered by renewable energy and the definition should reflect this. We believe buildings should continue to benefit from the overall efficiency of generating power and heat simultaneously. Well-applied CHP maximizes the efficient use of these renewable and decarbonized fuels and technologies, delivering zero emission electricity, heating, and cooling to buildings.

DOE should provide explicit and complete methodologies for building owners to demonstrate their onsite zero emission power and heat generation from all these renewable and decarbonized fuels and technologies. For example, EPA Greenpower Partnership guidelines referenced in the proposal are far too limiting—they do not allow for biogas, RNG, clean hydrogen, renewable propane, or CCS as eligible sources.

DOE should prioritize improving resilience, acknowledge the complexity of electrifying the entire building sector, and drive innovation in climate change solutions.

1. **Improve resilience.** In a changing climate, we face an exponential increase in grid disruptions due to the frequency and intensity of extreme weather events. Building owners are and should be concerned about energy reliability during prolonged power outages. CHP is proven to supply clean, efficient, and reliable power and thermal energy with the ability to operate independent of the grid. Hospitals, universities, multi-family buildings, nursing homes, and other critical buildings need CHP to keep the lights and heat on.
2. **Complexity around electrification.** Some buildings have physical limitations that make electrification impossible. DOE's definition should acknowledge that for certain building sector applications electrification is not the most clean, efficient, resilient, or cost-effective solution. EPA identifies that in large multi-family, commercial buildings and institutional settings with central heating systems, CHP is currently and will likely continue to be used. Over the last 10 years, multi-family housing installed the most CHP of any sector in the U.S.
3. **Drive innovation.** DOE is investing in RDD&D of renewable and decarbonized fuels and technologies, spurring American innovation in the fields of biofuel production, hydrogen production, and CCS capabilities. CCS technologies are already in use in commercial buildings across the U.S. DOE should encourage implementation of these innovative solutions and incentivize using them as efficiently as possible through CHP systems in buildings.



## **Section B: Energy Efficiency Criteria.**

*6. Should energy efficiency be considered a criterion for the definition of a zero emissions building? If the efficiency of an existing building should be considered, do you agree that requiring energy performance in the top 25% of similar buildings is an appropriate measure of energy efficiency for this definition? (ENERGY STAR® score of 75 or above.) Should it be higher or lower? Are there other benchmarks or approaches that should be considered? For an existing building, is one year of measured energy performance an appropriate requirement for demonstrating efficiency or is another approach appropriate?*

Yes, energy efficiency should be considered a criterion for the draft national definition for a zero-emissions building. Energy efficiency is an established lever to reducing the emissions of the buildings sector, and high levels of efficiency should continue to be incentivized. DOE should be supporting as many solutions as possible in the short- and long-term to combat the climate crisis, including energy efficiency.

CHP systems by nature are highly energy efficient through generating electricity and heat simultaneously. They currently offer significant emissions reductions for buildings, as they are much more efficient than traditional power sources connected to the electric grid. According to the EPA, properly designed CHP systems typically operate with an overall efficiency of 65 to 85 percent, with some systems approaching 90 percent efficiency. No other technologies using traditional fuels can reach these levels of efficiency. This is compared to the average efficiency of 39 percent for fossil-fueled power plants and an efficiency of 50 percent when generating thermal and electric energy separately. CHP systems achieve these high efficiencies by recovering the waste heat byproduct of electricity generation as useful thermal energy for heating and cooling. Because they operate so efficiently, CHP requires less fuel inputs for the same energy outputs. This reduces all types of emissions including greenhouse gases, criteria pollutants, and hazardous air pollutants.

For example, the Gaylord National Resort and Convention Center in National Harbor, Maryland operates a CHP system with a maximum efficiency of 82% and reduces greenhouse gas emissions by 59%. Those levels of efficiency and immediate carbon reductions should be recognized in the zero emissions building draft definition.

## **Section C: On-site Emissions from Energy Use.**

*10. Should there be an exemption allowed for emission producing emergency generation? Are there any other exemptions needed?*



In the event of a natural disaster or grid outage, well-applied CHP can provide reliable power, both electric and thermal. This is essential for critical infrastructure within the buildings sector. CHP allows hospitals, military bases, colleges and universities, nursing homes, hotels, and other buildings to remain operational and serve as emergency shelters and place of sanctuary for local communities. Grid outages can last for days, weeks, or even months on end—as was the case for Hurricane Maria in Puerto Rico. Solutions such as on-site battery storage cannot feasibly provide power at those lengths and would be compounded by a likely lack of renewables production leading up to and during the extreme weather event. Additionally, the reliability of CHP systems avoids the need for diesel backup generators during power outages, further reducing emissions as CHP systems are much cleaner alternatives than diesel generators.

The Montgomery County Public Safety Headquarters installed a microgrid CHP system coupled with solar arrays in 2012 after a derecho left the 250,000 county residents and 71 county facilities without power for days. The CHP system installed at the Shands Medical Center in Gainesville, FL allowed the hospital to maintain operations during Hurricane Irma and serve as a disaster relief command center throughout the storm. The CHP unit at the Brevoort residential cooperative in New York, NY kept the lights on during a utility power outage in Superstorm Sandy, doubling its occupancy and providing refuge for the community.

#### *11. Should biofuels consumed on-site be allowed? If so, how?*

Biofuels consumed on-site should be allowed in the definition of a zero-emission building. The current definition permits use of biomass and biodiesel, but the scope should be expanded to include biogas, renewable natural gas (RNG) or biomethane, clean hydrogen, renewable propane, and carbon capture and storage as eligible methods. Inclusion of these fuels will incentivize their production, and we must leverage every fuel and technology that reduces emissions now to combat the climate crisis.

CHP systems already provide high levels of efficiency, which creates substantial emissions reductions. Incorporating renewable fuels and other low-carbon technologies—such as biogas, biomass, RNG, renewable propane, clean hydrogen and traditional fuels coupled with carbon, capture, and storage—to power CHP systems generates even greater emissions reductions, since CHP systems are the most efficient way to use these fuels. CHP has a track record of utilizing digester and landfill gas as clean fuel sources, and systems installed today can run on higher RNG blends as availability increases. Production of RNG and other biofuels also significantly reduces methane emissions, which have a far greater warming potential than carbon dioxide. Additionally, CHP manufacturers are piloting and operating systems on high percentage hydrogen blends, up to 100 percent clean hydrogen.



In 2020 EPA identified over 750 CHP systems using low-carbon fuels nationwide. That number increased to nearly 800 facilities in 2023 according to DOE's own CHP Installations Database data and we expect this upward trend to continue. The inclusion of biofuels, hydrogen, and carbon capture and storage in the definition will incentivize their development and deployment by the private sector. As more clean fuels are brought to market, every effort should be made to combust them as efficiently as possible by using CHP systems.

### **Section F: Use Cases**

*20. Is it important for a national definition to cover all building types, including commercial, multifamily, and single-family?*

The draft definition in its current form should not cover all building types as the path to reaching zero emissions differs by building. Regarding energy efficiency, all buildings can be viewed relatively the same, but this is not the case for decarbonization strategies. Some buildings, such as those on university and hospital campuses, are much harder to abate than others. These larger building systems are complex and electrifying them will take significant time, but CHP can lower their emissions today. We understand the Administration's initiatives to electrify residential buildings and acknowledge that electrification of homes can reduce emissions up to 90% by 2050, but we are wary of applying a uniform method of emissions reduction to all building sectors. Building owners understand the value of CHP: over the last ten years, multi-family housing installed the most CHP systems of any sector in the country. EPA acknowledges that CHP coupled with central heating systems are already in use in large multi-family, commercial, and institutional buildings applications and will continue to be used.

We welcome the opportunity to discuss these matters further with DOE Building Technologies Staff.

Respectfully,

A handwritten signature in black ink, appearing to read "David Gardiner".

David Gardiner  
Executive Director  
Combined Heat and Power Alliance