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Executive Summary: United States Clean Heat & Power Association

I welcome the opportunity to respond to the Committee's questions regarding the design elements of a Clean Energy Standard (CES) on behalf of the United States Clean Heat & Power Association (USCHPA). USCHPA believes that a CES that effectively incentivizes greater deployment of combined heat and power (CHP) and waste heat to power (WHP) will allow the United States to more effectively meet both the President's stated goal of generating 80% of American electricity from clean sources, but also the underlying goals to protect the environment and strengthen the economy.

USCHPA is a trade association whose members are leaders in combined heat and power (CHP) technologies. Our membership includes 60 companies - manufacturers, developers, suppliers, and non-profits, who seek sound clean energy policy and marketplace solutions that will facilitate deployment of CHP topping-cycle and WHP bottoming-cycle systems.

USCHPA supports the overall policy objectives behind the CES proposal, such as reducing emissions of greenhouse gasses and other emissions, creating new innovation and manufacturing opportunities, and increasing the overall energy efficiency of the American economy. Greater deployment of CHP and WHP has the potential to greatly contribute to all of these objectives. For instance, the Oak Ridge National Laboratory estimated in a 2008 study that if the United States adopted high-deployment policies to achieve 20 percent of generation capacity through CHP by 2030, it could save 5.3 quadrillion BTU of fuel annually—nearly equivalent to the total energy consumed by U.S. households. In addition, such policies would create \$234 billion in cumulative investment, and create over one million high-skilled technical jobs.¹

In our responses to the Committee's questions number two and three, USCHPA advocates for the inclusion of CHP and WHP as clean energy technologies. Generation from CHP and WHP, along with other "clean energy" sources, will achieve the ambitious clean energy goal the President articulated. We also outline other ways in which CHP and WHP can be economically beneficial as the United States moves towards a cleaner and more sustainable energy portfolio.

¹ U.S. Department of Energy, Oak Ridge National Laboratory. December 1, 2008. *Combined Heat and Power: Effective Energy Solutions for a Sustainable Future*.
<http://info.ornl.gov/sites/publications/files/Pub13655.pdf>

Question 2. What resources should qualify as “clean energy”?

Submitter’s Name/Affiliation: Jessica Bridges, United States Clean Heat and Power Association (USCHPA)

- *On what basis should qualifying “clean energy” resources be defined? Should the definition of “clean energy” account only for the greenhouse gas emissions of electric generation, or should other environmental issues be accounted for (e.g. particulate matter from biomass combustion, spent fuel from nuclear power, or land use changes for solar panels or wind, etc.)?*

We believe “clean energy” resources should include a combination of sources with environmental and greenhouse gas benefits that are substantially more “clean” than the fuel source displaced. In addition, all electric generation that produces no additional emissions should be allotted full clean energy credits under the CES. These principles should guide the Committee whether it decides to limit the definition of clean energy to address only greenhouse gas emissions or expand it to include other emissions.

“Clean energy” resources should encompass a broad enough range of technologies and approaches to reach 80% of electric generation from clean sources by 2035. By accepting all “clean energy sources,” including new natural-gas-fired combined heat and power (CHP) and new waste heat to power (WHP), the Committee will allow the United States to reach the target without compromising on the legislation's natural resource conservation and environmental protection objectives. A broadly focused clean energy standard can help to reduce dependence on higher greenhouse gas emitting fuels, which currently account for approximately 50% percent of the national electricity generating mix. This approach also will broaden fuel diversity in order to minimize price fluctuations and supply issues.

The United States Clean Heat & Power Association (USCHPA) recommends the Committee consider the output of natural gas fired CHP, also known as cogeneration, to be clean energy. A CHP facility is far more efficient than the separate generation of electricity and thermal energy. Consequently, CHP units emit fewer greenhouse gasses and other emissions and allow users to obtain 2-3 times the useful energy out of a unit of fuel than standard generation methods. Put another way, onsite generation from a CHP system produces additional useful energy while reducing overall emissions of greenhouse gasses or other emissions as compared to separate generation of electric and thermal energy, or remotely generated grid power. In addition, CHP unlike many “clean” resources is available across all regions of the U.S. CHP, given its ubiquity and significantly higher efficiency (as compared to generation without such systems), should be considered “clean energy” generation within the context of the CES.

USCHPA also recommends the Committee consider WHP as a clean generating electricity source. WHP technology captures heat that would be wasted from an industrial source and generates “emission free” clean electricity from that heat. The WHP potential is substantial since the industrial sector is responsible for about one-third of total US energy demand. In addition to their environmental benefits, WHP systems help industrial customers reduce their energy costs, and expand their productivity and competitiveness, and create thousands of jobs nationwide. In the past couple of years, ten states have added WHP technologies to their list of renewable technologies within their portfolio standards.

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These technologies are already contributing to the central goals behind a clean energy standard. Through CHP alone, the United States currently avoids more than 1.9 quadrillion BTU of fuel consumption and 248 million metric tons of carbon dioxide emissions compared to separate production of energy for thermal and electricity. If the United States pursues high deployment policies to achieve generation capacity of 20% from CHP by 2030 from the current capacity of 9%, such policies would result in an annual reduction in carbon dioxide emissions of over 800 million megatons—equivalent to removing 145 million cars from the road.¹

¹ U.S. Department of Energy, Oak Ridge National Laboratory. December 1, 2008. *Combined Heat and Power: Effective Energy Solutions for a Sustainable Future*.
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- *What is the role for energy efficiency in the standard? If energy efficiency qualifies, should it be limited to the supply side, the demand side, or both? How should measurement and verification issues be handled?*

Efficient generation-side technologies should be considered part of the supply side of a Clean Energy Standard. Although CHP and WHP generate clean power, previous proposals for national renewable electricity standards incorrectly included them with demand-side efficiency measures such as better light bulbs and appliances. CHP and WHP are fundamentally distinct from demand side technologies and the CES should treat them accordingly.

While not addressing the wisdom of including efficiency within a CES, USCHPA believes CHP and WHP should be afforded the same opportunities as other clean electricity "generation" to reach their full potential.

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- *Should the standard be focused solely on electricity generation, or is there a role for other clean energy technologies that could displace electricity, such as biomass-to-thermal energy?*

Thermal energy is an area of American energy consumption that is too great to be ignored. Over 50% of energy consumed in commercial buildings is used for heating, cooling and ventilation. 38% of the energy consumed is for space heating.² Despite the rising share of home energy being consumed by appliances and electronics, 49% of energy consumed in private residences is still consumed for heating and air conditioning—41% is used for heating.³

We encourage the Committee, therefore, to also recognize the thermal energy efficiency benefits of a CHP facility - by providing additional Clean Energy credits for the useful thermal output of CHP facilities. Credit for thermal output should be fuel “agnostic”. This can be accomplished in the context of a system that utilizes electric utilities as the vehicle of implementation and MWH as its currency by following the lead of Massachusetts and other states who have simply converted each 3412 thousand BTUs of useful thermal energy produced by an eligible CHP facility into one equivalent MWH. (See 225 Code of Mass. Regs. 16.05(2)(a).)

² United States. Energy Information Administration. 2003. *Commercial Buildings Energy Consumption Survey*. http://www.eia.gov/emeu/cbecs/cbecs2003/detailed_tables_2003/detailed_tables_2003.html
<http://www.eia.gov/consumption/>

³ United States. Energy Information Administration. March 29, 2009. “Share of Energy Used by Appliances and Consumer Electronics Rises in U.S. Homes.”
<http://www.eia.gov/consumption/residential/reports/electronics.cfm>

Question 3. How should the crediting system and timetables be designed?

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- *Should partial credits be given for certain technologies, like efficient natural gas and clean coal, as the President has proposed? If partial credits are used, on what basis should the percentage of credit be awarded? Should this be made modifiable over the life of the program?*

Natural gas is a clean burning fuel that is readily abundant in the United States. It has a significant place in America's future energy portfolio, and the Clean Energy Standard (CES). Many of our member companies have developed a suite of CHP technologies that allow natural gas to be consumed more efficiently by reducing heat losses.

While the President and others have suggested that natural gas fired power-only facilities may only be eligible for half of a CES credit, it is important to distinguishing these power-only facilities from CHP and WHP. We encourage the Committee to recognize the significantly superior efficiency and emissions reduction benefits of CHP and WHP by awarding eligible natural gas fueled CHP facilities with full credits. We recommend that CHPs and WHP facilities meeting an eligibility criteria equal to or greater than 60 percent efficiency – almost twice the average grid efficiency – be included along other “clean energy” resources eligible for full CES credits. Furthermore, eligible CHP should include both new systems and any incremental efficiency gains from the retrofitting of both (a) existing CHP (e.g., converting waste heat from existing CHP to useful thermal output), and (b) existing non-CHP (e.g., converting power only plants to CHP).

The CES should encourage the efficient use of natural gas. Encouraging the greater deployment of CHP and natural gas together also has been shown to foster growth in manufacturing industries. The Energy Information Administration estimates that increased natural gas use for CHP corresponds to faster growth of industrial production in small, non-energy-intensive industries (such as metal-based durable goods manufacturing).¹

¹ U.S. Energy Information Administration, 2011. *Annual Energy Outlook 2011 Early Release Overview*. p. 5. <http://www.eia.doe.gov/forecasts/aeo/>

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- *Is there a deployment path that will optimize the trade-off between the overall cost of the program and the overall amount of clean energy deployed?*

The timelines and percentages should take advantage of technologies that are ready for market and can achieve early emissions reductions. Early targets should be attainable, but aggressive enough to allow technologies that are deployable in the early years of a CES, like combined heat and power (CHP) and waste heat to power (WHP), to move into the market quickly and begin to reduce emissions of greenhouse gasses and other emissions. The United States should not allow what we can do in the future to obstruct the possibility of making substantial progress right now. As time progresses, the clean energy targets will be more aggressive and new technologies would have an opportunity to compete for the growing share of generation that will be required to be clean.

CHP and WHP can be deployed quickly. As these systems are typically installed within existing industrial and commercial sites, CHP and WHP avoid the land use issues other power generators typically confront. In addition, CHP and WHP are commercial technologies that can have a substantial immediate impact on the U.S. energy market.

Through CHP alone, the United States currently avoids more than 1.9 quadrillion BTU of fuel consumption and 248 million metric tons of carbon dioxide emissions compared to separate production of energy for thermal and electricity. The Oak Ridge National Laboratory estimated that if the United States adopted high deployment policies 20% of generation capacity could be met with CHP. This would save 5.3 quadrillion BTU's (Quads) of fuel annually, which is equivalent to nearly half the energy consumed by U.S. households in 2008. Carbon dioxide emissions could be reduced by more than 800 million metric tons per year—equivalent to removing 154 million cars from the road. In the Oakridge study's 20% scenario, this level of CHP deployment would avoid over 60% of the projected increase in CO2 emissions between 2008 and 2030.² Including the CHP and WHP as "clean energy" will produce positive early results as other technologies are coming online.

² U.S. Department of Energy, Oak Ridge National Laboratory. December 1, 2008. *Combined Heat and Power: Effective Energy Solutions for a Sustainable Future*.
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