Comments on Model Trading Rules: Federal Plan Requirements for Greenhouse Gas Emissions From Electric Generating Units Constructed on or Before January 8, 2014

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Washington, DC 20460

Re: Comments on Model Trading Rules: Federal Plan Requirements for Greenhouse Gas Emissions From Electric Generating Units Constructed on or Before January 8, 2014

Dear Administrator McCarthy:

The Alliance for Industrial Efficiency (hereinafter, "The Alliance") appreciates this opportunity to comment on the Proposed Clean Power Plan (CPP) Model Trading Rules and Federal Plan. The Alliance is a diverse coalition that includes representatives from the business, environmental, labor and contractor communities. We are committed to enhancing manufacturing competitiveness and reducing emissions through industrial energy efficiency, particularly through the use of clean and efficient power generating systems such as combined heat and power (CHP) and waste heat to power (WHP). Our recommendations will help the CPP better advance these goals.

We appreciate that EPA repeatedly recognizes the benefits of energy efficiency in the Model Trading Rule and accompanying documents. We further appreciate EPA's recognition that "CHP units are low-emitting electric generating resources that can replace generation from affected [electric generating units] EGUs" and that WHP can produce electricity with "no incremental CO2 emissions."[1] EPA acknowledges the need to provide technical assistance to help states include CHP in their plans, and both the Final Rule and Model Trading Rule seek to provide some of this guidance. Our comments nonetheless raise the following *six* key recommendations to strengthen the treatment of CHP and WHP in the final rule:

In a Rate-Based Rule, EPA should:

1. Expressly include CHP and WHP as eligible measures that can produce emission rate credits (ERCs) in both the model rule and federal plan;
2. More accurately account for the CO_2-free MWhs generated by CHP by comparing it to actual emissions data from affected EGUs from the previous calendar year, rather than a future natural gas target; and
3. Clarify that line losses can be included in the calculation of ERCs for all non-affected CHP, regardless of size.

[1] U.S. EPA, 80 Fed. Reg. 64622, at 64902-03, October 23, 2015, "Carbon Emissions for Existing Stationary Sources: Electric Utility Generating Units; Final Rule," ("CHP units are typically very thermally efficient").

In a Mass-Based Rule, EPA should:

4. Provide states with a menu of allowance distribution mechanisms to promote CHP, WHP and IEE in the model mass-based trading rule; and
5. Include provisions to encourage CHP, WHP and industrial efficiency in a mass-based federal plan.

In the Clean Energy Incentive Program (CEIP), EPA should:

6. Expressly state that CHP and WHP projects in low-income communities are eligible for participation in the CEIP.

I. CHP Offers Environmental, Economic, and Reliability Benefits

By generating both heat and electricity from a single fuel source, CHP dramatically lowers emissions and increases overall fuel efficiency – allowing utilities and companies to effectively "get more with less." CHP can operate using more than 70 percent of fuel inputs. As a consequence, CHP can produce electricity with roughly one-quarter the emissions of an existing coal power plant. Waste heat to power (WHP) can generate electricity with no additional fuel and no incremental emissions. Due to its scale, a single CHP or WHP investment can achieve significant emission reductions.

The Administration recognizes these benefits. In fact, the final rule highlights CHP's thermal efficiency,[2] notes that CHP and WHP are eligible for ERCs,[3] and exempts most industrial CHP systems.[4] Elsewhere, the preamble acknowledges that "CHP units are low-emitting electric generating resources that can replace generation from affected EGUs."[5] EPA has already recognized the value of CHP as a proven cost-effective technology to reduce greenhouse gas emissions by providing technical assistance to large energy users through the Combined Heat and Power Partnership, exempting most industrial CHP units from regulation under the 111(b) rule,[6] and by issuing awards to various CHP ENERGY STAR® projects in recognition of their emissions reductions.[7] Upon awarding several industrial facilities for their investments in CHP, Administrator McCarthy explained, "The CHP technology offers a strategy to help meet the goals of the President's Climate Action Plan for a cleaner power sector while boosting the efficiency and competitiveness for many U.S. manufacturers."[8]

In August 2012, the Administration announced a goal of installing 40 gigawatts of new CHP by 2020. Achieving this goal would annually save energy users 1 quadrillion Btu

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[2] *Id.* at 64902 ("CHP units are typically very thermally efficient").
[3] *Id.* at 64902 ("Electric generation from non-affected CHP units may be used to adjust the CO_2 emission rate of an affected EGU").
[4] *Id* at 64953, §60.5850, "What EGUs are excluded from being affected EGUs?"
[5] *Id.* at 64902.
[6] U.S. EPA, 80 Fed. Reg. 64510, 64532, "Standards of Performance for Greenhouse Gas Emissions From New, Modified, and Reconstructed Stationary Sources: Electric Utility Generating Units; Final Rule."
[7] U.S. EPA, "Combined Heat and Power Partnership: Winners of the 2015 Energy Star CHP Award" (http://www.epa.gov/chp/award-winners).
[8] U.S. EPA, Sept. 30, 2014, "Press Release: EPA Honors Manufacturers with ENERGY STAR Award" (http://yosemite.epa.gov/opa/admpress.nsf/d0cf6618525a9efb85257359003fb69d/41a49d0a9fa717d985257d63004f5b7f!OpenDocument).

and reduce CO_2 emissions by 150 million metric tons.[9] Under a more ambitious scenario, the Department of Energy estimates that increasing CHP from its current 8-percent share of U.S. electric power to 20 percent by 2030 would reduce CO_2 emissions by more than 800-million metric tons per year – the equivalent of removing more than half of the current passenger vehicles from the road. This amounts to a 10-percent reduction in projected U.S. energy-related CO_2 emissions in 2030.[10] Such full-scale deployment would be equivalent to the power produced by more than 480 conventional power plants,[11] displacing 5.3-quadrillion Btu of fuel from conventional sources – or half the total energy currently consumed by U.S. households.[12] (see Table 1)

TABLE 1 - CHP/ WHP Projections (2030) and Environmental Benefits

	2012[13]	2030[14]
Total Electricity Generating Capacity	82 GW (8% current capacity)	241 GW (20% capacity)
Annual Energy Savings	1.8 Quads	5.3 Quads
Annual CO_2 Reduction	240 MMT	848 MMT
Number of Car Equivalents Taken Off Road	40 Million	154 Million

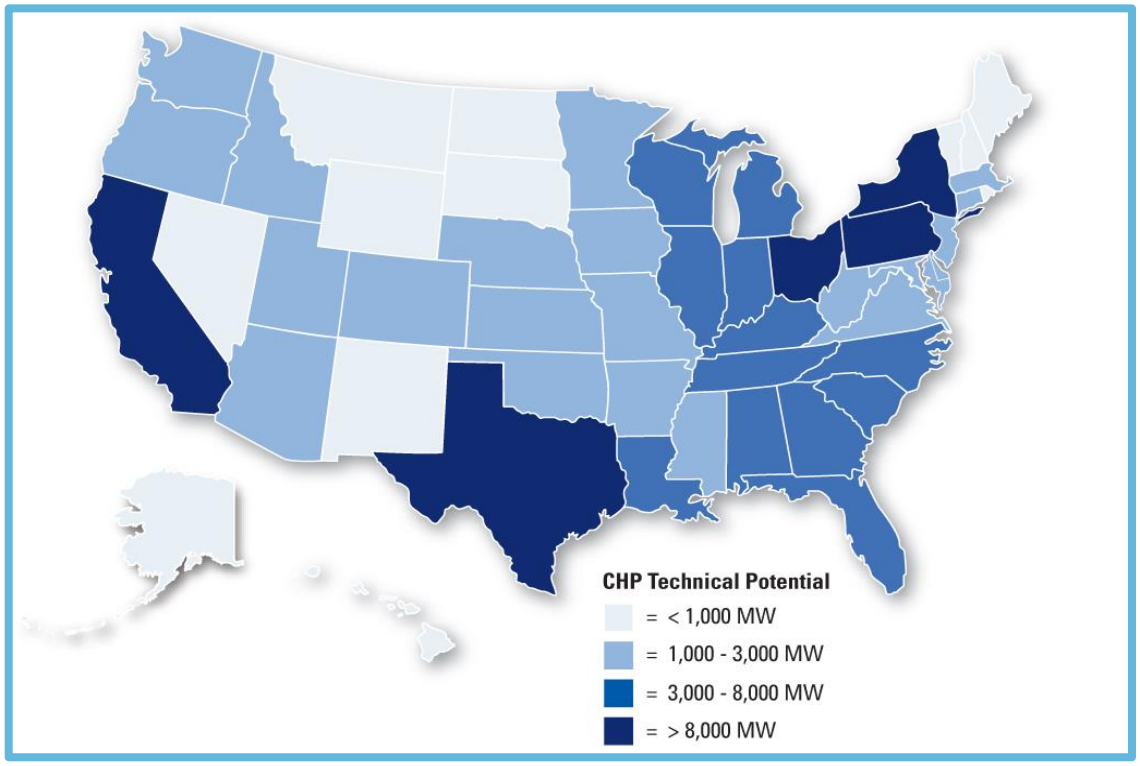
In addition to its emission benefits, CHP and WHP enhance electric reliability. Because CHP and WHP systems produce electricity at the point of use, the losses associated with transmission and distribution (T&D) can be eliminated. This reduces energy use and defers or eliminates the need for costly new T&D investment. As EPA recognizes in the preamble to the final rule, "[t]he opportunity for improvement is large because, on average, line losses account for approximately seven percent of all electricity generation."[15] Moreover, because these systems can operate independent of the grid, they can continue to provide heat and electricity during extreme weather events, which may compromise the grid. They can also be sited to relieve grid congestion, further enhancing reliability. The American Society of Civil Engineers highlighted the need to upgrade aging electric infrastructure in its regular assessment of U.S. infrastructure in 2013. In a recent survey of senior utility executives, respondents identified aging infrastructure as the top issue facing

[9] U.S. Department of Energy and U.S. EPA, 2012, "Combined Heat and Power: A Clean Energy Solution," at 3 (http://www.epa.gov/chp/documents/clean_energy_solution.pdf).
[10] U.S. Department of Energy, Oak Ridge National Laboratory (ORNL), 2008, "Combined Heat and Power: Effective Energy Solutions for a Sustainable Future," at 4 (http://info.ornl.gov/sites/publications/files/Pub13655.pdf) (reporting avoided 2030 emissions under 20-percent scenario); DOE-EPA, *supra* note 9, at 11 (reporting current avoided CO_2 emissions); and Energy Information Administration, 2014, "Energy-Related Carbon Dioxide Emissions by Sector and Source, United States," in *Annual Energy Outlook 2014* (http://www.eia.gov/forecasts/AEO/) (reporting projected CO_2 emissions in 2030).
[11] ORNL, *supra* note 10, at 4 (reporting 240,900 MW. Estimate assumes typical power generation of 500 MW from a traditional power plant).
[12] *Id.*
[13] DOE-EPA 2012, *supra* note 9, at 11.
[14] ORNL, *supra* note 10, at 12.
[15] 80 Fed. Reg. 64662, at 64758.

the industry. Distributed CHP projects can enhance the reliability of the aging grid.[16] Distributed CHP projects can enhance the reliability of the aging grid.

The potential for additional CHP and WHP installations is significant. CHP currently represents 83 gigawatts of clean and efficient power in the United States, accounting for 8 percent of installed U.S. electric generating capacity and over 12 percent of U.S. electricity generation.[17] Each year, this installed capacity decreases energy use by almost 1.9 quadrillion Btu, and avoids the release of over 248-million metric tons of CO_2 into the atmosphere.[18] Industry estimates indicate that an additional 132 GW of CHP is technically feasible.[19] These opportunities exist nationwide – and should therefore be considered in state compliance plans. (see Figure 1)

Figure 1: CHP Technical Potential[20]



[16] Pew Charitable Trusts, October 2015, "Distributed Generation: Cleaner, Cheaper, Stronger," at 7 (citing American Society of Civil Engineers, "2013 Report Card for America's Infrastructure, Energy Report") and Utility Dive, "State of the Electric Utility: 2015 Annual Survey Report").
[17] U.S. Dep't of Energy & U.S. Envtl. Prot. Agency, DOE/EE-0779,Combined Heat and Power: A Clean Energy Solution 11 (2012), (https://www1.eere.energy.gov/manufacturing/distributedenergy/pdfs/chp_clean_energy_solution.pdf).
[18] Oak Ridge National Lab., December 2008, "Combined Heat and Power: Effective Energy Solutions for a Sustainable Future" at 11 (http://www1.eere.energy.gov/manufacturing/distributedenergy/pdfs/chp_report_12-08.pdf).
[19] ICF International, October 2010, "Effect of a 30 Percent Investment Tax Credit on the Economic Market Potential for Combined Heat and Power" at 13 (http://www.localpower.org/WADE_USCHPA_ITC_Report.pdf).
[20] DOE-EPA 2012, *supra* note 9, at 17.

A recent DOE report estimated the technical potential for WHP at an additional 15 gigawatts.[21] ERCs and tradable allowances could provide a key tool to help promote these investments.

In light of these varied benefits and the remaining potential, EPA should take steps to encourage states to include CHP and WHP in their compliance plans. This can be accomplished by improving the treatment of CHP in the model rate-based trading rule; providing a menu of allowance distribution options in a mass-based rule to incentivize CHP, WHP and industrial efficiency; and by allowing ERCs for CHP and WHP in any federal plans that it develops. States will look to these presumptively approvable tools as a starting point as they develop their compliance plans. By including CHP and WHP in these plans, EPA can signal to states that they should likewise encourage greater deployment of these technologies.

II. Treatment of CHP in a Rate-Based Rule

EPA seeks comment on whether CHP should be identified as an eligible measure under the federal plan.[22] We wholeheartedly support inclusion of CHP as an eligible measure that can produce emission rate credits (ERCs) in both a rate-based federal plan and a rate-based model trading rule. CHP offers a tool to reduce emissions at both non-affected units and at affected units, through the conversion of such units from power-only generation to CHP. EPA further seeks comment on the proposed requirements for the issuance of ERCs for CHP.[23] We believe that the proposed approach outlined in the model rate-based trading rule significantly undervalues the contribution that CHP can make toward achieving the goals of the Clean Power Plan and suggest an alternative approach below.

1. EPA Should Expressly Include CHP and WHP as Eligible Measures that Can Produce ERCs in Both the Model Rule and Federal Plan

Emission rate credits (ERCs) are awarded to resources that produce electricity more cleanly than the target emission rate. Non-renewable resources can earn ERCs if they "deliver energy to or save electricity on, the electric grid."[24] Notably, the final rule's emission guidelines (EGs) explicitly identify CHP and WHP as resources that qualify for the issuance of ERCs in rate-based state plans.[25] Accordingly, CHP and WHP should likewise be included as eligible measures in the rate-based model rule, and EPA should include CHP and WHP ERCs should it develop a rate-based federal plan.

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[21] Oak Ridge National Lab., March 2015, "Waste Heat to Power Market Assessment" at 2 (http://info.ornl.gov/sites/publications/Files/Pub52953.pdf).
[22] 80 Fed. Reg. 64966, at 64994, October 23, 2015, "Federal Plan Requirements for Greenhouse Gas Emissions From Electric Utility Generating Units Constructed on or Before January 8, 2014; Model Trading Rules; Amendments to Framework Regulations; Proposed Rule" ("The agency … requests comment on the inclusion of CHP as an eligible measure under the federal plan.")
[23] *Id.* ("[T]he agency has provided detailed requirements for the issuance of ERCs for CHP, and we request comment on these requirements for inclusion in the federal plan.")
[24] 80 Fed. Reg. 64662, at 64950.
[25] *Id.* (§60.5800(4)(v)) ("What other resources qualify for issuance of ERCs?") (listing "A non-affected combined heat and power unit, including waste heat power").

States will undoubtedly look to the model rule as a starting point in designing their own compliance plans. By providing for ERCs from non-affected CHP and WHP units in the model rule, EPA can send an important signal to the states about the appropriate treatment of these resources under a rate-based approach. ERCs are intended to incentivize activities that reduce CO_2 emissions from power plants. EPA should seek to promote greater investment in CHP and WHP because, as explained above, these technologies have additional benefits when compared to other compliance options, including cost-effectively reducing CO_2 emissions and enhancing electric reliability. Moreover, the remaining potential for CHP and WHP is significant in every state (see Figure 1, above).

We acknowledge that EPA seeks to simplify and streamline the implementation of a federal plan, since EPA will need to administer a federal plan on behalf of a state. Including energy efficiency and CHP in the federal plan will help ensure that it provides for the lowest cost emission reduction options. EPA has already proposed detailed requirements and an accounting mechanism for CHP and WHP in the rate-based model rule, both of which are simple to apply. EPA can efficiently conduct evaluation, measurement, and verification for CHP in a federal plan using the same approach, although we ask EPA to address certain flaws as described below.

2. The Proposed Accounting Approach for Non-Affected CHP Undervalues Its Emissions Benefits and Should Be Modified

We are grateful that the final rule recognizes that non-affected CHP and WHP units can generate ERCs. We further appreciate that EPA acknowledges the need to provide technical assistance to help states include CHP in their plans,[26] and that the rule seeks to provide some of this initial guidance. The proposed model rule for a rate-based emission-trading program includes an accounting method for determining the ERCs from non-affected CHP units. EPA suggests that this accounting method could be a "presumptively approvable accounting approach."[27] EPA seeks comment on the proposed accounting method.[28] We believe that the proposed approach significantly undervalues CHP's emission benefits and thus fails to create an adequate incentive for increasing investment in CHP. Our comments suggest an alternative approach that would more accurately account for the CO_2-free MWhs generated by CHP, while still creating an appropriate incentive for new projects.

As EPA recognizes in the final rule, the accounting approach must both "take into account the fact that a non-affected CHP unit is a fossil fuel-fired emission source, as well as the fact that the incremental CO_2 emissions related to electrical generation from a non-affected CHP unit are typically very low."[29] We concur with EPA that it is appropriate to net out the incremental emissions associated with CHP units before ascribing ERCs to the output. The proposed methodology, however, is flawed because it

[26] *Id.* at 64705 ("In particular, the states requested training on how to use programs such as combined heat and power … to reduce carbon emissions. The EPA will continue to work with states to tailor training activities to their needs").
[27] *Id.* at 64902.
[28] *Id.* ("the agency has provided detailed requirements for the issuance of ERCs for CHP, and we request comment on these requirements for inclusion in the federal plan.").
[29] *Id.*

fails to adequately account for what electricity from affected units is most likely to be reduced by generation from non-affected CHP systems.

EPA lays out its approach for determining ERCs from non-affected CHP in the final rule:

> [A] non-affected CHP unit's electrical MWh output that can be used to adjust the reported CO_2 emission rate of an affected EGU should be prorated based on the CO_2 emission rate of the electrical output associated with the CHP unit (a CHP unit's "incremental CO_2 emission rate") compared to a reference CO_2 emission rate. This "incremental CO_2 emission rate" related to the electric generation from the CHP unit would be relative to the applicable CO_2 emission rate for affected EGUs in the state and would be limited to a value between 0 and 1.[30]

The final rule does not define the phrases "reference CO_2 emission rate" or "applicable CO_2 emission rate for affected EGUs." Instead, these terms are defined in the model rule, and thus remain open to public comment.

The proposed rate-based model rule provides that a non-affected CHP unit's electrical output be prorated as follows:[31]

> *Prorated MWh = (1 – (Incremental CHP electrical emission rate / Applicable affected EGU emission rate standard)) * CHP MWh output*

The approach EPA prescribes in the final rule for determining the "incremental CHP emission rate" is based on the avoided emissions approach. We support the use of this approach and believe that it appropriately accounts for the modest increase in on-site emissions associated with a CHP system. Under this approach, the incremental emissions rate is calculated by subtracting from the measured emissions of the CHP system the emissions that would have been produced on-site to provide the same thermal output without the CHP system (i.e., emissions that would have occurred from a "counterfactual boiler" – the boiler that is now not needed due to the installation of CHP). These incremental emissions are then divided by the net electric output of the CHP system to calculate the incremental emissions rate. Thus:

> *Incremental Emission Rate = (Annual CHP CO_2 Emissions – Annual Displaced Boiler CO_2 Emissions) / (Annual CHP Electricity Output)*

The incremental emission rate is then inserted into the previous formula to determine the prorated output (MWh) for a CHP system. That, in turn, determines the number of ERCs to be awarded to a CHP installation.

As noted above, the final rule does not define the terms "reference CO_2 emission rate" or "applicable CO_2 emission rate for affected EGUs," which is used in the denominator of the proration formula. However, the proposed model rule outlines a detailed approach for determining CHP ERCs under a rate-based plan and defines the term "reference CO_2

[30] *Id.* (emphasis added).
[31] 80 Fed. Reg. 64966, at 64996.

emission rate" in a footnote as the "the applicable CO_2 emission rate standard is in Table 6 of this preamble."[32] Table 6 is presented below:

Table 6. Glide Path Interim Performance Rates (Adjusted Output-Weighted-Average Pounds of CO_2 Per Net MWh From All Affected Fossil Fuel-Fired EGUs)

Technology	2022–2024 Compliance Rate	2025–2027 Compliance Rate	2028–2029 Compliance Rate	Final Rate
SGU or IGCC	1,671	1,500	1,380	1,305
Stationary combustion turbine	877	817	784	771

It is unclear from EPA's Table 6 whether the "applicable CO_2 emission rate" is intended to refer to the interim glide path performance rates or the final targets for SGU or stationary combustion turbines. We understand however that the "reference CO_2 emission rate" for natural gas CHP is intended to be the performance rates for stationary combustion turbines in Table 6 above (i.e., 817 lbs/ MWh in 2025-2027).[33] While we support EPA's adoption of the avoided emissions approach to determine the incremental emissions rate, we are concerned that the applicable reference CO_2 emission rate proposed in the model rule significantly undervalues the emissions benefits of a CHP system and will – as a practical matter – eliminate CHP as a potential compliance option.

To illustrate the impact of EPA's proposed approach, Table 2 calculates the incremental emissions rate for two typical natural gas CHP systems, a 1 MW gas engine and a 7 MW gas turbine. As shown, the incremental CO_2 emissions rate for these systems calculated using the avoided emissions approach described above ranges from 519 to 665 lbs/MWh.

Table 2 - Incremental CO_2 Emissions for Typical CHP Units[34]

CHP System Type	1 MW Recip. Engine	7 MW Gas Turbine
Net Electrical Efficiency	36.8%	28.9%
Total CHP Efficiency	78.5%	70.4%
Incremental CO_2 Emissions Rate (lb/MWh)	519	665

As shown in Table 3 below, applying the glide path interim performance rates for stationary combustion turbines (i.e., 817 lbs/ MWh in 2025 - 2027) to the incremental CO_2 emissions of the typical systems depicted in Table 2 yields a prorated output eligible

[32] *Id.* at n. 64.
[33] Personal communication, Jennifer Kefer *et al* with EPA staff (including Neeharika Naik-Dhungel, Christopher Sherry, Christian Fellner, Matt Clouse), Sept. 25, 2015.
[34] Based on typical performance for a 1.12 MW reciprocating engine and a 7.04 MW gas turbine from U.S. EPA, 2015, "Catalog of CHP Technologies," Tables 2-2 and 3-2 (http://www3.epa.gov/chp/documents/catalog_chptech_full.pdf).

for ERCs ranging from 19% to 36% of the CHP system output.[35] This approach undervalues the actual CO_2 emissions benefits of CHP, and it also places CHP at a significant disadvantage compared to energy efficiency and renewables, which would receive ERCs for their full electrical output.

Table 3 - Percent of CHP Output Credited Using EPA's Proposed Approach

CHP System Type	1 MW Recip Engine	7 MW Gas Turbine
Incremental CO_2 emissions rate (lb/MWh)	519	665
2025 – 2027 Compliance Rate for Stationary Combustion Turbine (Table 6)	817	817
Percent of CHP Output (MWh) Credited	**36.4%**	**18.6%**

We believe EPA has chosen to compare CHP to the natural gas target rate because it has characterized CHP as a "low-emitting generation resource,"[36] and believes it must therefore treat CHP in the same manner that it treats all other "low-emitting generation resources." The final rule allows affected EGUs that perform better than the emission standard to generate ERCs, and we agree that ERCs for such units should be calculated based on the specific emission rate target for those affected units. However, unlike high-performing affected natural gas generating units, non-affected CHP units do not have specific emissions targets and therefore do not need to be compared to a specific emission standard. Instead, the emissions benefits from CHP can be converted to an equivalent amount of zero-emission MWh generated by using a "reference emissions rate" that reflects the emissions rate of affected EGUs being displaced by non-affected CHP, similar to the way that MWhs of savings from demand-side efficiency results from reductions in generation from affected units. In fact, CHP is the *only* non-affected low-emitting generation resource identified in the rule. As such, concerns about consistent treatment are unwarranted.

EPA's proposed "reference rate" for CHP systems suffers from two key flaws:

1. It compares the CHP output to natural gas generation, rather than the generation that is most likely to be avoided due to CHP deployment; and
2. It compares the CHP output to emission target rates, rather than real-time emissions rates.

We do not believe it is appropriate to base the proration of the electrical output from a natural gas CHP system on the compliance goals for stationary combustion turbines. Instead, we believe EPA should define the reference rate using actual emissions data from affected EGUs from the previous calendar year. We propose three alternative

[35] While EPA provided no specific guidance, we assume that the compliance rate to be used in the proration calculation is the applicable rate for the time period in which the ERCs are being generated. We used the 2025 – 2027 interim performance rates in this calculation as a general illustration of the impact of the proposed approach on CHP ERCs.
[36] 80 Fed. Reg. 64662, at 64902 ("CHP units are low-emitting electric generating resources").

approaches for EPA to consider. All three of these approaches would more accurately account for the actual emission reductions from CHP and increase the value of ERCs for CHP over EPA's proposed approach. EPA could give states the option of using one of the first two approaches below, or suggest that all states use the third approach:

1. The average affected EGU emission rate for the eGRID subregion in which the CHP project is located;
2. The average affected EGU emission rate for each state; or
3. A single national average affected EGU emission rate.[37]

Each of these options is described in detail below. Table 4 (p. 11) summarizes the reference rates and percent of credited CHP output under each option.

Options 1 and 2: Use the average affected EGU emission rate for the eGRID subregion or state in which the CHP project is located

The data on actual affected EGU emission rates will be readily available during the compliance period, since states must submit emissions data to EPA as part of their Clean Power Plan compliance. Under this approach, EPA would update the reference rate each year, sorting emissions (lbs of CO_2) and output (MWh) from all EGUs into the appropriate eGRID subregion or state. [38]

During the CPP compliance periods, owners of affected EGUs may adjust the dispatch orders of their generation assets to achieve targets, varying the consumption of coal and natural gas. It is fair to assume that CHP would offset emissions from a *mix* of fossil resources. Using a reference rate based on the average affected EGU emission rates for the state or regional electricity grid is a reasonable way to estimate the emissions benefits of CHP. CHP would offset fossil-based generation; it would not offset baseload nuclear or hydro, nor would it offset wind or solar resources.

Using the eGRID subregions for the average emission rates (option 1) would provide a better estimation of emissions impacts than using state averages (option 2), because there are significant exports and imports of electricity across state borders. The eGRID subregions were defined to approximate regional power pools, for which exports and imports are minimal.[39]

Some states may prefer to use the state-average affected EGU emissions rate, especially states that include parts of several eGRID subregions. While we believe eGRID subregion level data more accurately reflects the potential emissions impact of

[37] Another option for a single national value for the reference rate would be to use the performance targets for SGU or IGCC units, provided in EPA's Table 6 (i.e., 1500 lb/ MWh in 2025-2027). 80 Fed. Reg. 64966 at 64996, n. 64. This value would be similar to our suggested option 3, but probably slightly lower. While we think this approach is overly simplistic and suffers from the flaw of comparing CHP to a target rate, it is likely more accurate to assume that CHP units are displacing coal, rather than natural gas (as EPA assumes in the proposed approach).

[38] It should be relatively easy for EPA to sort the affected EGU CO_2 emissions and output into the eGRID subregions in order to calculate these average emission rates.

[39] EPA CHPA Partnership, February 2015, "Fuel and Carbon Dioxide Emissions Savings Calculation Methodology for Combined Heat and Power Systems" at 25.

CHP projects, the state-average EGU emissions rates would provide a reasonable proxy for the emissions savings from reduced generation from affected EGUs resulting from CHP projects, and EPA may want to allow states to have this flexibility.

Option 3: Use a uniform national reference rate

EPA could also calculate a national reference rate (Option 3). The advantage of using an eGRID subregional (Option 1) or state-specific reference rate (Option 2) is that it would create a greater incentive for CHP deployment in states/regions where CHP would have the largest benefits (i.e., CHP projects in states or regions with a higher reference rate would receive more ERCs). The disadvantage of this approach is that credited CHP output will vary between states and regions depending upon their fuel mixes, potentially creating greater incentives for CHP in some states compared to others. By comparison, applying a national reference rate (Option 3) would have the advantage of providing a single reference rate for all states, creating a simplified approach and leveling the playing field for CHP. It would also simplify the process of annual updating of the reference rate(s). However, a uniform national rate would undervalue the CO_2 emissions benefits of CHP in states or regions with a more coal-intensive resource mix, while overvaluing these benefits in less carbon-intensive states/regions.

Using any of these options has several advantages compared to EPA's current approach. First, using these reference rates would allow the calculated ERCs to best reflect the actual emissions-free MWh generated by a CHP system. In the case of Option 3, this would at least be true on a national average basis, even if actual benefits are somewhat over- or under-estimated in a particular state or region. Second, using the EGU emission rates would be consistent with the approach recommended by the EPA CHP Partnership for calculating avoided CO_2 emissions from CHP.[40] Third, as shown in Table 4 (below), all three of these reference rates would allow a much larger portion of CHP electricity output to be counted as ERCs, thus providing CHP projects with greater incentives that are more commensurate with their actual emissions benefits

[40] The EPA CHP Partnership recommends using the eGRID subregional "all-fossil" CO_2 emission rates to approximate the types of generation that are most likely to be replaced by customer-sited CHP. (*See* footnote 36.) Using the actual emissions from regulated EGUs would be very similar to the eGRID all-fossil emissions rates, except that the data would be more current than eGRID data (which is not updated annually), and would exclude any fossil generation units smaller than 25 MW. Using the eGRID subregional averages would be the most consistent with the EPA CHP Partnership's methodology (and most accurate).

Table 4 – Percent of CHP Output Credited Using Alternative Reference Rates[41]

Approach for Reference Emissions Rate	Reference Emissions Rate (lb CO_2/MWh)	Percentage of CHP Output (MWh) Credited	
		1 MW Recip Engine; incremental emissions rate of 519 lb CO_2/MWh	7 MW Gas Turbine; incremental emissions rate of 665 lb CO_2/MWh
EPA's proposed approach: Interim compliance goal for gas turbines	817[42]	36.4%	18.6%
Option 1: 2025 eGRID subregional EGU emission rate	~980 - 1937[43]	47.0% - 73.2%	32.1% - 65.7%
Option 2: State 2025 EGU emission rate	~883 - 2155[44]	41.2% - 75.9%	24.7% - 69.1%
Option 3: National avg 2025 EGU emission rate	~1570[45]	66.9%	57.6%

As Table 4 demonstrates, these options allow a significantly greater percentage of CHP output to be credited as ERCs than EPA's proposed approach. Options 1 and 2 are somewhat more complicated, but would create a greater incentive for CHP deployment in the states or regions where it would have the greatest benefit. Option 3 would be simple for EPA to calculate each year during the compliance period and would allow a level playing field for CHP in all states. Accordingly, we urge EPA to define the reference rate for CHP based on actual EGU emissions, using any of these three options.

3. Avoided Line Losses Should Be Included in the Calculation of ERCs for *all* Non-Affected CHP

[41] All of the credited percentages are calculated using the same formula, but with the various reference CO_2 emissions rates noted. The formula is:
Prorated percentage of CHP output eligible for ERCs = (1 – CHP incremental CO_2 emissions rate)/Reference CO_2 emissions rate. Note that these percentages do not take into account T&D losses (for simplicity), but the actual calculation of ERCs for non-affected CHP units should do so, as noted in our comments below. This can be done by dividing the prorated percentage of CHP output by the factor: (1 - %T&D losses). Incremental emissions rates for representative CHP systems are from EPA's Catalog of CHP Technologies (2015).
[42] 80 Fed. Reg. 64966, at 64990, (Table 6).
[43] This range of 980 – 1937 lb CO_2/MWh is based on several assumptions. We started with the 2012 eGRID subregional fossil emission factors, which range from 980 lb/MWh for the NPCC New England subregion to 2152 lb/MWh for the MRO West subregion. As discussed above, these factors are a good approximation of subregional EGU CO_2 emission rates (using data available now). Then we assumed by 2025 the lowest subregional fossil/EGU emission rate would stay the same, and the higher value (2152 lb/MWh) would be reduced by about 10%, to 1937 lb/MWh. These seem like reasonable assumptions for emission reductions from EGUs between now until 2025; EPA can also change these assumptions based on its own projections.
[44] This range of 883 – 2156 lb CO_2/MWh is based on several assumptions. We started with the 2012 eGRID state all-fossil emission factors, which range from 883 lb/MWh for CT to 2395 lb/MWh for MT. These factors are a good approximation of the actual state EGU CO_2 emission rates. Then, as in footnote 43, we assumed by 2025 the lowest state EGU emission rate would stay the same, and the higher value (2395 lb/MWh) would be reduced by about 10%. Again, EPA can modify these assumptions based on its own projections.
[45] Calculations assume that by 2025, the 2012 eGRID national average all-fossil emission rate of 1652 lb CO_2/MWh would be reduced by about 5%, which is consistent with the assumptions in footnotes 40 and 41.

We commend EPA for recognizing the value that distributed generation has in reducing line losses. Indeed, as EPA acknowledges in the Final Rule, "[t]he opportunity for improvement is large because, on average, line losses account for approximately seven percent of all electricity generation."[46] Accordingly, the model rate-based trading rule proposes that for "demand-side EE programs … the presumptively approvable approach is to use the smaller of 6 percent or the calculated statewide annual average T&D loss rate (expressed as a percentage) calculated using the most recent data published by the U.S. EIA State Electricity Profile."[47]

The avoided T&D losses associated with a non-affected CHP unit serving a customer's on-site electricity loads should be included as shown in this formula:

> *Prorated percentage of CHP output = (1 – Incremental CHP electrical emission rate / reference CO_2 emission rate) / (1 – %T&D losses)*

As noted above (see footnote 38), we did not include T&D losses in the percentages of CHP output eligible for ERCs shown in Table 4. Including T&D losses of 6% would increase the percentages shown by about 3 percentage points. For example, a CHP system with a prorated output of 58% in Table 4 would be eligible for ERCs for 61% of its output with the inclusion of T&D losses.

The final Model Rule should eliminate any ambiguity surrounding the line-loss credit. The model rule states:

> If the combined heat and power unit has an electric generating capacity less than or equal to 1 MW the unit must keep monthly cumulative recordings of useful thermal output and fossil fuel input along with the determination of baseline thermal source efficiencies based on manufacturer data. For CHP units that directly serve on-site end-use electricity loads, avoided transmission and distribution (T&D) system losses can be assessed as is commonly practiced with demand-side EE.[48]

This paragraph implies that only CHP units smaller than 1 MW can include T&D losses in the calculation of ERCs. We do not believe this was EPA's intent. Accordingly, we encourage EPA to clarify that *all* non-affected CHP units that serve on-site end-use electricity loads, not just those with capacities of 1 MW or less, should be allowed to account for the avoided T&D losses in the calculation of ERCs. EPA should also explicitly clarify that this credit applies to CHP, as elsewhere in the rule "demand-side EE" does not appear to include CHP.

[46] 80 Fed. Reg. 64662, at 64757-58.
[47] *Id.* at 65007.
[48] 80 Fed. Reg. 64966, at 65072 (par. iv).

III. Treatment of CHP and WHP in a Mass-Based Rule

EPA seeks comment on whether CHP and energy efficiency should receive allowances under the mass-based model rule and any federal plans.[49] We recommend that EPA provide a menu of options in the model rule to help states promote CHP, WHP, and industrial energy efficiency (IEE) projects. We also recommend that EPA consider including these options in any mass-based federal plan(s).

1. EPA Should Provide States with a Menu of Allowance Distribution Mechanisms to Promote CHP, WHP and IEE in the Model Mass-Based Trading Rule

As discussed above, there is significant potential for CHP and WHP, in all states (see Figure 1). There is also significant potential for industrial energy efficiency. These types of projects help reduce generation and emissions from affected units, but if the projects are implemented independently of state and utility programs they would receive no value for their emission benefits under a mass-based approach. Therefore, such projects should be encouraged through an allowance distribution approach.

Most states will implement state plans rather than accept a federal plan. While EPA correctly leaves allowance distribution decisions up to states, EPA should provide states three options in the model rule for allowance distribution to support CHP, WHP and industrial efficiency. This will give the states that look to the model rule for guidance more confidence in their options for encouraging these types of projects.

Option a: EPA Should Include an Allowance Auction Mechanism in the Model Rule with a Discussion of How to Reinvest Auction Proceeds to Incentive Energy Efficiency

Option b: EPA Should Include an Updating, Output-Based Direct Allocation Mechanism that Supports CHP, WHP, and IEE in the Model Rule

Option c: EPA Should Include Several Options for Allowance Set-Asides in the Model Rule

a. EPA Should Include an Allowance Auction Mechanism in the Model Rule with a Discussion of How to Reinvest Auction Proceeds to Incentivize Energy Efficiency

In the proposed model trading rule, EPA seeks comment on alternative allowance distribution methods that EPA or states might implement, including allowance auctions.[50] The states participating in the Regional Greenhouse Gas Initiative (RGGI) have had enormous success implementing a near 100% allowance auction to electric generators.

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[49] 80 Fed. Reg. 64966, at 65022. ("The agency is also taking comment on whether distribution should extend to demand-side energy efficiency (DSEE) and CHP projects").
[50] *Id.* at 65015-16. ("In addition, we request comment on alternative allowance distribution approaches—such as auctioning or allocations to load-serving entities—that the EPA or states might adopt.")

RGGI has used allowance proceeds to invest in clean-energy technologies, such as CHP and energy efficiency. Since its inception in 2008, participating states have generated more than $1-billion to support energy efficiency through allowance auctions.[51] Because of its scope, the CPP could generate substantially more resources for energy efficiency. For example, assuming a $10/ ton allowance value, an auction could generate as much as $18.45-billion annually, beginning in 2022 (see Table 5). EPA should include guidance on how to implement an auction in the model rule based on the RGGI approach. EPA should also provide specific guidance on how states can implement an auction to maximize incentives for CHP, WHP, and energy efficiency.

Table 5 – Size of a Potential Allowance Market

State	Interim Mass-Based Goal (Short Tons)[52]	Allowance Value @ $10/ton (Million $)
Alabama	62,210,288	$622.10
Arkansas	33,683,258	$336.80
Arizona	33,061,997	$330.60
California	51,027,075	$510.30
Colorado	33,387,883	$333.90
Connecticut	7,237,865	$72.40
Delaware	5,062,869	$50.60
Florida	112,984,729	$1,129.80
Georgia	50,926,084	$509.30
Iowa	28,254,411	$282.50
Idaho	1,550,142	$15.50
Illinois	74,800,876	$748.00
Indiana	85,617,065	$856.20
Kansas	24,859,333	$248.60
Kentucky	71,312,802	$713.10
Louisiana	39,310,314	$393.10
Massachusetts	12,747,677	$127.50
Maryland	16,209,396	$162.10
Maine	2,158,184	$21.60
Michigan	53,057,150	$530.60
Minnesota	25,433,592	$254.30

[51] Hibbard, Paul *et al.,* "The Economic Impacts of the Regional Greenhouse Gas Initiative on Ten Northeast and Mid-Atlantic States: Review of the Use of RGGI Auction Proceeds from the First Three-Year Compliance Period," November 15, 2011, Analysis Group. (http://www.analysisgroup.com/uploadedfiles/content/insights/publishing/economic_impact_rggi_report.pdf); Hibbard, Paul *et al.,* "The Economic Impacts of the Regional Greenhouse Gas Initiative on Nine Northeast and Mid-Atlantic
States: Review of RGGIS's Second Three-Year Compliance Period (2012-2014)," July 14, 2015, Analysis Group
(http://www.analysisgroup.com/uploadedfiles/content/insights/publishing/analysis_group_rggi_report_july_2015.pdf).

[52] 80 Fed. Reg. 64662, at 64825. "Interim Mass-Based Emissions Performance Goals."

Missouri	62,569,433	$625.70
Mississippi	27,338,313	$273.40
Montana	12,791,330	$127.90
North Carolina	56,986,025	$569.90
North Dakota	23,632,821	$236.30
Nebraska	20,661,516	$206.60
New Hampshire	4,243,492	$42.40
New Jersey	17,426,381	$174.30
New Mexico	13,815,561	$138.20
Nevada	14,344,092	$143.40
New York	33,595,329	$336.00
Ohio	82,526,513	$825.30
Oklahoma	44,610,332	$446.10
Oregon	8,643,164	$86.40
Pennsylvania	99,330,827	$993.30
Rhode Island	3,657,385	$36.60
South Carolina	28,969,623	$289.70
South Dakota	3,948,950	$39.50
Tennessee	31,784,860	$317.80
Texas	208,090,841	$2,080.90
Utah	26,566,380	$265.70
Virginia	29,580,072	$295.80
Washington	11,679,707	$116.80
Wisconsin	31,258,356	$312.60
West Virginia	58,083,089	$580.80
Wyoming	35,780,052	$357.80
National Totals		$18,445.40

b. EPA Should Include an Updating, Output-Based Direct Allocation Mechanism that Supports CHP, WHP and IEE in the Model Rule

EPA should provide states with a direct allocation mechanism in the model rule that allocates allowances to new CHP, WHP and IEE projects (i.e., those installed after 2012). Direct allocation of allowances is our preferred way of ensuring that independent investments in CHP, WHP and IEE can be awarded value for reducing power sector CO_2 emissions. Under a direct allocation, projects would automatically receive allowances during the initial distribution of allowances based on a set formula. This is distinct from an allowance set aside, where eligible projects would have to apply for a limited pool of set-aside allowances. Under a direct allocation approach, eligible CHP, WHP, and IEE projects (i.e., those beginning operation after 2012) would receive allowances equal to the CO_2 emissions avoided by the facility (after netting out facility emissions) at the start

of the compliance period. EPA appears to recognize the potential for such direct allocation in the final rule.[53]

An updating, output-based approach rewards investments that occur after the program begins rather than actions that occurred in past years. This approach is consistent with EPA's rate-based model rule, in which new installations, rather than existing facilities, receive ERCs based on their actual performance.

Under an updating, output-based allocation, new non-affected CHP and other eligible facilities would register with the state and measure, monitor and report emissions and output (or energy savings). On an annual basis, the state would take stock of output (or energy savings) during the prior year (or years) across all facilities that are eligible for an allocation. Facilities would receive an allocation based on output (or energy saved) during this "look-back" period.[54]

Direct allocation has several advantages compared to set-asides. It treats eligible projects the same as affected units for purposes of receiving allocations and does not require periodic project-based applications to secure allowances. A set-aside is comprised of a reserved pool of allowances established at the beginning of a compliance period. Owners of eligible resources must then apply for allowances on an annual basis, subject to a limit on the size of the set aside. To institute a set aside, EPA must determine up-front the size of the set-aside pool and will likely be unable to award set-aside allowances to all eligible activities. A direct allocation does not require the same up-front determination. As a consequence, it is administratively simpler for both state agencies and for potential allowance recipients.

c. <u>EPA Should Include Several Options for Allowance Set-Asides in the Model Rule</u>

We suggest that the model rule include the following two options for set-asides for CHP, WHP, and industrial energy-efficiency projects:

1. A separate set-aside of allowances for CHP, WHP, and industrial energy efficiency.
2. Include CHP, WHP, and IEE as eligible measures for allowance set-asides designed to address leakage from new sources.

In the model rule, EPA should establish a separate allowance set-aside for CHP, WHP and IEE investments that are made independently of state or utility programs.[55] The application to privately delivered industrial efficiency is important, since few state or

[53] *Id* at 64756, n. 441 ("However, the EPA notes that a state could establish a mechanism for encouraging affected EGUs to apply CHP technology under a mass-based plan, for example, through awards of emission allowances to CHP projects.").
[54] Updating, output-based allocation has been done successfully in states participating in the NOx trading program, including in Massachusetts and New Jersey. It is also essentially the approach EPA proposes for the updating, output-based allocation to gas units out of the set-aside to address leakage in a federal plan.
[55] "Under a mass-based approach, energy efficiency automatically "counts" toward compliance and states can use an unlimited amount to help achieve their state goals. " (http://www.epa.gov/sites/production/files/2015-08/documents/fs-cpp-ee.pdf).

utility programs offer effective incentives for CHP. The creation of a set-aside will establish an independent pathway for owners of industrial facilities to contribute to emission reductions under the CPP mass cap. This will increase the range of compliance options available to affected power plants, thereby lowering the cost of compliance.

Although states have flexibility to choose how many allowances to give to these types of projects, ideally the set-asides should award allowances to CHP and WHP projects in an amount that recognizes their emission reduction benefits. EPA should provide guidance to states on how to calculate these benefits, in a way that is consistent with the guidance on calculating ERCs for CHP under a rate-based approach.[56] However, as noted in our comments on the proposed rate-based model rule (see page 5- 13 above), EPA's currently proposed approach for quantifying ERCs from CHP grossly undervalues CHP's emissions benefits.

The model rule could suggest that the set-aside pool be sized based on the potential for CHP and WHP in the state, expanded as needed to also include industrial energy efficiency.[57] We propose that allowances should be distributed to the eligible CHP, WHP, and IEE projects in the state based on the projects' estimated emissions reductions, with a limit of 1 allowance per ton of avoided CO_2 emissions. Any excess allowances should be returned to the EGUs. This proposal would be fair, would provide a meaningful incentive to these types of projects, and would allow power plant owners to tap this source of low-cost emission reductions to ease their compliance burdens.

In addition to a separate set-aside for CHP, WHP, and IEE projects, EPA should allow states the option of awarding allowances to CHP, WHP and IEE projects from the proposed renewable energy set-aside to address leakage to new sources. EPA proposes to include a 5-percent renewable energy set aside in the mass-based model rule as part of the effort to address "leakage" from affected units to new units. We suggest that independent CHP, WHP and IEE projects should also be eligible to receive allowances from this set-aside and the set-aside should be increased to 10 percent of total allowances to accommodate these projects. States may choose to set aside fewer than 10 percent of total allowance, but EPA should encourage the maximum amount of emissions reductions from eligible RE, CHP, WHP, and IEE projects in the model rule. As in the approach for set-asides described above, we propose that allowances be distributed to the eligible RE, CHP, WHP, and IEE projects in the state based on the projects' estimated emissions reductions, with a limit of 1 allowance per ton of avoided CO_2 emissions, with any excess allowances returned to the state's EGUs. This would address leakage from new sources while maintaining the integrity of the mass-based cap.

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[56] The calculation of net emissions from CHP should take into account the CHP system's fuel consumption, the offset of on-site fuel consumption through the CHP system's useful thermal output, and the offset of electricity consumption from the grid from the CHP system's electrical output. Emissions from offset electricity should be calculated using the appropriate average EGU CO_2 emission rate, as we discuss in our rate-based comments.

[57] American Gas Association, May 2013, "The Opportunity for CHP in the US" (providing state-by-state economic and technical potential estimates) at 32-33 (https://www.aga.org/sites/default/files/sites/default/files/media/the_opportunity_for_chp_in_the_united_states_-_final_report_0.pdf).

2. EPA Should Include Provisions to Encourage CHP, WHP and Industrial Efficiency in a Federal Plan

In the federal mass-based plan, EPA should consider including many of the same provisions highlighted above for the model mass-based trading rule. In particular, we suggest that EPA include set-asides for CHP, WHP, and industrial energy efficiency projects that are implemented independently of state and utility programs. EPA should also consider including the direct allocation approach described above in the federal plan.

A federal plan should allow the awarding of allowances to CHP, WHP and IEE projects from the proposed renewable energy set-aside to address leakage to new sources. EPA proposes to include a 5-percent renewable-energy set aside in the mass-based model rule as part of the effort to address "leakage" from affected units to new units. We propose that independent CHP, WHP and IEE projects should also be eligible to receive allowances from these set-asides. For the federal plan, we also propose that this set-aside be increased to 10 percent of total allowances in the state. As discussed above, the net emission reductions should be calculated for CHP projects.[58] Allowances should be distributed to the eligible RE, CHP, WHP, and IEE projects in the state based on the projects' estimated emissions reductions, with a limit of 1 allowance per ton of avoided CO_2 emissions. Any excess allowances should be returned to the EGUs. If done in this manner, increasing the set-side to 10 percent of the state's allowances would not affect the integrity of the mass-based implementation approach. This proposal would also be relatively simple for EPA to administer, and it would allow power plant owners to tap a wider range of low-cost emission reductions to ease their compliance burdens.

EPA should also consider including a separate allowance set-aside for CHP, WHP and IEE investments made independently of state or utility programs.[59] Few state or utility programs offer effective incentives for CHP. The creation of a set-aside would establish an independent pathway for owners of industrial facilities to contribute to emission reductions under the CPP mass cap, through CHP, WHP, or industrial energy efficiency projects. This will increase the range of compliance options available to affected power plants, thereby lowering the cost of compliance.

IV. Treatment of CHP and WHP in the Clean Energy Incentive Program

We support EPA's development of the Clean Energy incentive Program as an approach to encourage early action to reduce greenhouse gas emissions. As elaborated below, CHP and WHP provide substantial environmental and non-air quality health benefits that would be particularly meaningful in low-income communities. Consequently, we

[58] The calculation of net emissions from CHP should take into account the CHP system's fuel consumption, the offset of on-site fuel consumption through the CHP system's useful thermal output, and the offset of electricity consumption from the grid from the CHP system's electrical output. Emissions from offset electricity should be calculated using the appropriate average EGU CO_2 emission rate, as we discuss in our rate-based comments.

[59] "Under a mass-based approach, energy efficiency automatically "counts" toward compliance and states can use an unlimited amount to help achieve their state goals." (http://www.epa.gov/sites/production/files/2015-08/documents/fs-cpp-ee.pdf).

recommend that EPA expressly state that CHP and WHP projects in low-income communities are eligible for participation in the CEIP. This simple change will encourage greater use of CHP and WHP and help realize their environmental, economic, and reliability benefits in low-income communities.

EPA seeks comment on the criteria that should be used to define eligible wind and solar projects, as well as eligible energy-efficiency projects that are implemented in low-income communities under the Clean Energy Incentive Program (CEIP).[60] Through the Clean Power Plan, EPA seeks to "reduce GHG emissions that contribute to climate change and its harmful impacts on public health and the environment."[61] While we appreciate EPA's recognition of the benefits of energy efficiency to reduce greenhouse gas emissions and the importance of increasing access of low-income communities to energy-efficiency programs, we are concerned that the definition of energy efficiency is too narrow. We strongly urge EPA to extend eligibility for the CEIP to CHP and WHP, which offer many environmental, economic, and reliability benefits that are particularly meaningful in low-income communities. Utilizing CHP systems in affordable housing will improve residential energy efficiency and reduce greenhouse gas emissions. CHP and WHP installed in manufacturing facilities will create and preserve labor-intensive jobs in low-income communities and reduce greenhouse gas emissions. Since job creation is a crucial contributor to the health of low-income communities, the CEIP should include manufacturing energy efficiency, and specifically CHP and WHP as eligible measures.

We recommend that EPA expressly state that CHP and WHP projects in low-income communities are eligible for participation in the CEIP.

Since energy use is a necessity and does not change with income level, low-income residents bear a disproportionate burden for energy costs as compared to their higher-income counterparts. Housing surveys have shown that low-income tenants' utility costs are nearly equal to those of higher-income renters, with energy accounting for a larger proportion of their incomes and overall housing costs.[62] The larger burden on low-income renters may also be due in part to the lower energy efficiency of low-income housing, which would require more energy for the desired level of comfort or service.[63]

Increased investment in CHP would benefit low-income communities in several ways. First, utilizing CHP systems in affordable housing can significantly improve home energy efficiency, reduce energy costs, and help to reduce GHG emissions throughout the airshed. Installing CHP and WHP systems in industrial facilities presents additional benefits to low-income communities by creating and preserving jobs. Finally, CHP systems not only provide power reliability and resiliency benefits for residential households, but

[60] U.S. EPA, Oct. 21, 2015, **"**Clean Energy Incentive Program Next Steps**"** at 1 (http://www2.epa.gov/sites/production/files/2015-10/documents/ceip_next_steps_10_21_15.pdf)**.**
[61] 80 Fed. Reg. 64662, at 64665.
[62] U.S. Department of Housing and Urban Development, September 2013, "American Housing Survey for the United States: 2011," (https://www.census.gov/content/dam/Census/programs-surveys/ahs/data/2011/h150-11.pdf).
[63] Joint Center for Housing Studies of Harvard University, December 2013, "Reducing Energy Costs in Rental Housing" at 1 (http://www.jchs.harvard.edu/sites/jchs.harvard.edu/files/carliner_research_brief_0.pdf).

businesses as well, resulting in daily operating cost savings and enhanced competitiveness.

1. **There is significant potential for CHP applications at low-income housing projects and CHP and WHP in manufacturing facilities.**

Multi-family programs implemented by the U.S. Department of Housing and Urban Development (HUD) assist a total of five-million renters in the U.S., with over $5 billion spent annually for utilities in HUD affordable housing program properties.[64] These affordable housing sites present a significant opportunity for CHP installations. A 2013 report found that only 26 public housing developments use CHP; however, the potential is far greater.[65] For instance, DOE estimates 4.3 gigawatts of remaining technical potential for CHP in multi-family buildings.[66] Expansion of CHP is very plausible in upcoming years due to increased reliability and cost-effectiveness of CHP systems; a decrease in the cost of natural gas, which is the most common fuel for CHP systems; and the expansion of state and utility incentives for CHP installations.[67]

Of particular note, HUD and EPA have been working together to implement the HUD CHP initiative – outlined in HUD's *Energy Action Plan* – which promotes the use of CHP in multi-family buildings.[68] HUD's *Energy Action Plan* consists of 21 proposed activities that HUD can undertake to support the energy-efficiency goals of the President's National Energy Policy. HUD determined that reducing energy bills by just five percent could yield savings of $2 billion over the next 10 years for the agency.[69] As part of the *Energy Action Plan*, the CHP Initiative seeks to introduce building owners to the value of CHP and assist them with initial site screening. Including CHP as an eligible energy-efficiency measure for the CEIP would complement the EPA/HUD CHP initiative and provide additional opportunity for CHP growth in low-income communities.

Furthermore, EPA acknowledges and supports the implementation of CHP projects to benefit low-income communities. In a 2014 guide, EPA cites the 2012 installation of a 400 kW CHP system at Glenside Homes by the Reading (Pennsylvania) Housing Authority, as well as examples from the New Bedford and Watertown (Massachusetts) Housing Authorities. The Glenside Homes CHP project resulted in an annual estimated cost savings of $75,000 to $100,000, while the New Bedford CHP project is estimated to save the

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[64] Groberg, Robert, *et al.,* "Promoting Combing Heat and Power (CHP) for Multifamily Properties" at 1 (http://www1.eere.energy.gov/manufacturing/distributedenergy/pdfs/chp_multifamily_properties.pdf).
[65] U.S. Department of Energy, U.S. Department of Housing and Urban Development, U.S. EPA, September 2013, "Guide to Using Combined Heat and Power for Enhancing Reliability and Resiliency in Buildings" (http://www3.epa.gov/chp/documents/chp_for_reliability_guidance.pdf).
[66] U.S. Department of Energy, December 2015, "Combined Heat and Power Installation Database"; E-mail from Claudia Tighe, DOE to Jennifer Kefer, Executive Director of the Alliance for Industrial Efficiency, Dec. 9, 2015 (Note that technical potential is not limited to public housing, but reflects CHP potential for *all* multi-family dwellings).
[67] Natural Resources Defense Council, April 2013. "Combined Heat and Power Systems: Improving the Energy Efficiency of Our Manufacturing Plants, Buildings, and other Facilities," (http://www.nrdc.org/energy/files/combined-heat-power-ip.pdf).
[68] U.S. Department of Housing and Urban Development, May 2009, "HUD CHP GUIDE #2: Feasibility Screening For Combined Heat And Power In Multifamily Housing" at 2 (https://portal.hud.gov/hudportal/documents/huddoc?id=chpguide2.pdf).
[69] U.S. Department of Housing and Urban Development, "HUD Energy Action," (http://www.hud.gov/energy/energyactionbrochure.pdf).

housing authority nearly $400,000 over 10 years.[70] These projects illustrate the potential economic benefits CHP projects can deliver to low-income communities.

2. <u>Investing in CHP and WHP at manufacturing sites helps create and preserve jobs in low-income communities by increasing the economic competitiveness of these employers.</u>

Investment in CHP and WHP systems stimulates the local economy both directly and indirectly. CHP and WHP projects create direct jobs in manufacturing, engineering, installation, operations, and maintenance, which in turn, increase the economic competitiveness of companies that install the systems and receive the energy savings benefits. Individuals employed as a result of CHP and WHP installations are able to spend their income on goods and services within their local communities, while businesses and consumers can reinvest the energy bill savings they receive from those systems into other goods and services as well. For example, businesses may reinvest energy bill savings in support of facility expansion or other capital projects or to hire and/or retain workers. All of this activity creates and retains jobs and induces economic growth in local communities.[71]

A 2013 NRDC issue paper states that each GW of installed CHP capacity may be reasonably expected to create and maintain between 2,000 and 3,000 full-time equivalent jobs throughout the lifetime of the system. These jobs would be in manufacturing, construction, operations and maintenance, as well as indirect jobs from redirection of industrial energy expenditures and the spending of commercial and residential energy bill savings on other goods and services.[72]

Manufacturing facilities are particularly important employers in many low-income communities. They are often large facilities that offer a variety of skilled employment opportunities for individuals with varying educational backgrounds. Many types of manufacturing jobs also offer starting salaries above the minimum wage. An Urban Institute study investigating the relationship between earnings and industry found for single mothers receiving welfare, manufacturing provided above average annual earnings regardless of educational background.[73] This research suggests that manufacturing jobs may provide above average annual earnings for low-income community members and provide a strong opportunity for local economic growth. Encouraging CHP deployment in these communities would help create these opportunities.

3. <u>CHP offers additional benefits – beyond GHG reductions – that will be meaningful in low-income communities.</u>

CHP offers many benefits beyond GHG reductions and energy savings that are significant for low-income communities. CHP systems provide power reliability and have

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[70] U.S. EPA, 2014, "Combined Heat and Power: A Guide to Developing and Implementing Greenhouse Gas Reduction Programs" at 6, 18 (http://www3.epa.gov/statelocalclimate/documents/pdf/CHPguide508.pdf).
[71] NRDC, *supra* note 67.
[72] *Id*.
[73] The Urban Institute, June 2002, "Can Targeting Industries Improve Earnings for Welfare Recipients Moving From Welfare-To-Work?: Preliminary Findings" at 11 (http://www.urban.org/sites/default/files/alfresco/publication-pdfs/410537-Can-Targeting-Industries-Improve-Earnings-for-Welfare-Recipients-Moving-from-Welfare-to-Work-.PDF).

the ability to serve power and thermal needs during outage events. The ability to provide critical emergency power and to keep vital services online during a grid disruption provides resiliency and reliability and reduces vulnerability in low-income communities. This would allow manufacturing facilities with CHP systems to continue operations even when the grid is down.[74] Power outages can be very costly for companies. For example, a one-hour outage at an industrial manufacturing facility may cost a company up to $50,000 in losses.[75] Furthermore, the U.S. Department of Energy estimates that outages cost U.S. businesses up to $150 billion per year.[76] Therefore, the benefit of utilizing CHP in industrial facilities is very valuable.

As a testament to the power resiliency of CHP systems, during both Hurricane Katrina in 2005 and Hurricane Sandy in 2012, facilities with CHP continued to have access to power and thermal amenities, including several hospitals that were able to continue serving patients throughout the storm.[77] Indeed, while more than eight-million residents in the Mid-Atlantic lost power during Hurricane Sandy in October 2012, CHP systems helped several large energy users — New York University, Long Island's South Oaks Hospital, Co-op City in the Bronx and New Jersey's Bergen County Utilities Authority — stay warm and bright. These islands of power acted as places of refuge for emergency workers, displaced people, and evacuated patients from medical facilities without power.[78] The increased reliability that CHP systems provide is especially important for critical infrastructure, like hospitals. Including a CHP option in the CEIP would help bring this power resiliency to low-income communities.

Conclusion

We support EPA's use of a system-wide approach to reduce GHG emissions. As elaborated above, CHP and WHP provide substantial environmental and non-air quality health benefits and are demonstrated, cost-effective control strategies. We commend EPA for recognizing these benefits and including provisions to encourage their use as a compliance option.

In sum, our comments offer *six* key recommendations to strengthen the treatment of CHP and WHP in the proposed rule:

In a Rate-Based Rule, EPA should:

1. Expressly include CHP and WHP as eligible measures that can produce ERCs in both the model rule and federal plan;

[74] Ribeiro, David, *et al.,* Oct. 2015, "Enhancing Community Resilience through Energy Efficiency" at 1 (http://aceee.org/sites/default/files/publications/researchreports/u1508.pdf).
[75] ORNL, *supra* note 10.
[76] The Pew Charitable Trusts, *supra* note 16, at 6.
[77] NRDC, *supra* note 67.
[78] *See, e.g.,* U.S. EPA, June 18, 2014, 79 Fed. Reg, 34830, 34899, "Carbon Pollution Emission Guidelines for Existing Stationary Sources: Electric Utility Generating Units" (noting that CHP "reduce[s] demand for centrally generated power and thus relieve[s] pressure on the grid.").

2. More accurately account for the CO_2-free MWhs generated by CHP by comparing to actual emissions data from affected EGUs from the previous calendar year, rather than a future natural gas target; and
3. Clarify that line losses can be included in the calculation of ERCs for all non-affected CHP, regardless of size.

In a Mass-Based Rule, EPA should:

4. Provide states with a menu of allowance distribution mechanisms to promote CHP, WHP and IEE in the model mass-based trading rule; and
5. Include provisions to encourage CHP, WHP and industrial efficiency in a federal plan.

In the Clean Energy Incentive Program (CEIP), EPA should:

6. Expressly state that CHP and WHP projects in low-income communities are eligible for participation in the CEIP.

These changes will encourage greater use of CHP and WHP and help realize their environmental, economic, and reliability benefits.

Thank you for the opportunity to comment.

Jennifer Kefer
Executive Director, Alliance for Industrial Efficiency