May 9, 2014

U.S. Environmental Protection Agency
Attention Docket ID No. EPA–HQ–OAR–2013–0495
Air and Radiation Docket and Information Center
Mailcode: 2822T 1200 Pennsylvania Avenue, NW
Washington, DC 20460

Via email: a-and-r-docket@epa.gov
Attn: Docket ID No. EPA-HQ-OAR-2013-0495

Re: Standards of Performance for Greenhouse Gas Emissions for New Stationary Sources: Electric Utility Generating Units, EPA–HQ–OAR–2013–0495, 79 Fed. Reg. 1430 (January 8, 2014)

Dear Administrator McCarthy:

The Alliance for Industrial Efficiency (hereinafter, "The Alliance") appreciates this opportunity to comment on the Standards of Performance for Greenhouse Gas Emissions for New Stationary Sources: Electric Utility Generating Units (hereinafter "Carbon Standards", "111(b)" or "NSPS"). The Alliance for Industrial Efficiency 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 in the form of clean and efficient combined heat and power (CHP) and waste heat to power (WHP). The Carbon Standards include a number of key provisions that help advance these goals. We also offer several modest recommendations to provide greater incentives for industrial energy efficiency. The Alliance previously filed comments on the April 13, 2012 Proposal, which has been withdrawn. Many of our comments below were originally filed in response to the 2012 Proposal.

Combined Heat and Power and Waste Heat to Power Lower Greenhouse Gas Emissions

To set the context, understand that U.S. power generation is woefully inefficient – and has not improved since Dwight Eisenhower occupied the White House. In fact, as Figure 1 (next page) illustrates, roughly two-thirds of energy inputs (68 percent) are lost, mainly as waste heat during power generation, with a mere 32 percent actually delivered to customers. The unfortunate results are lost competitiveness and jobs, as well as increased pollution.

Fortunately, cleaner, cost-effective, and more efficient alternatives already exist in the form of combined heat and power. By generating both heat and electricity from a single fuel source, CHP can produce energy from more than 70 percent of fuel inputs. This dramatically lowers emissions and increases fuel efficiency – allowing utilities and companies to effectively "get more with less." As Figure 2 (next page) illustrates, total fuel use is significantly greater with conventional separate heat and power generation (here 154 units) than it is under combined

heat and power (here 100 units). Savings are even larger with WHP, which captures waste heat that would typically be vented from an industrial facility and uses it to make electricity with no additional combustion and no incremental emissions.

FIGURE 1: Losses from Conventional Power Generation[1] (TWh)

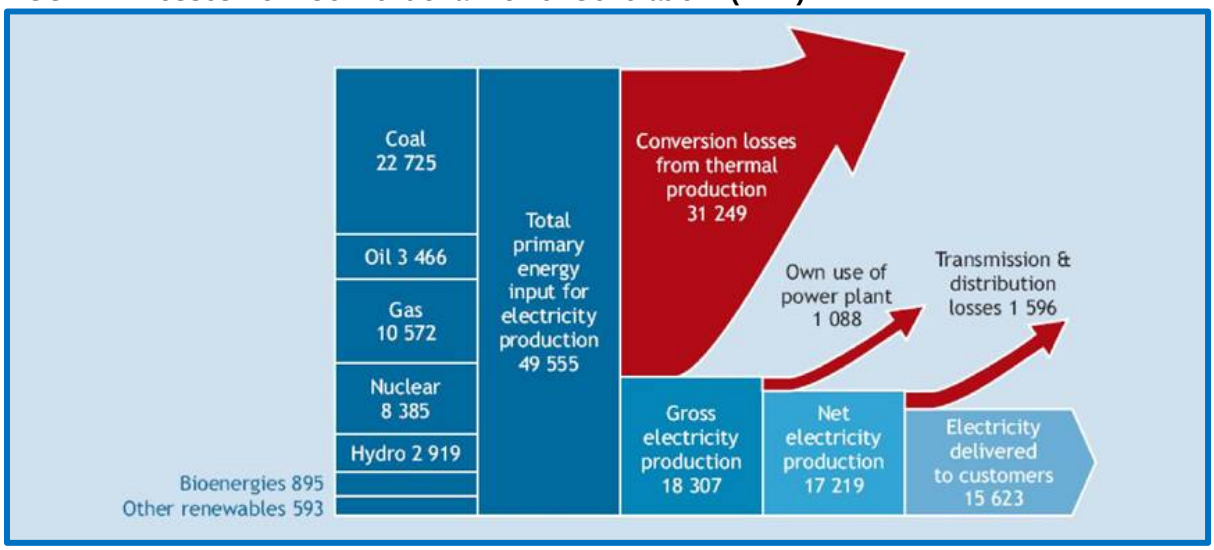
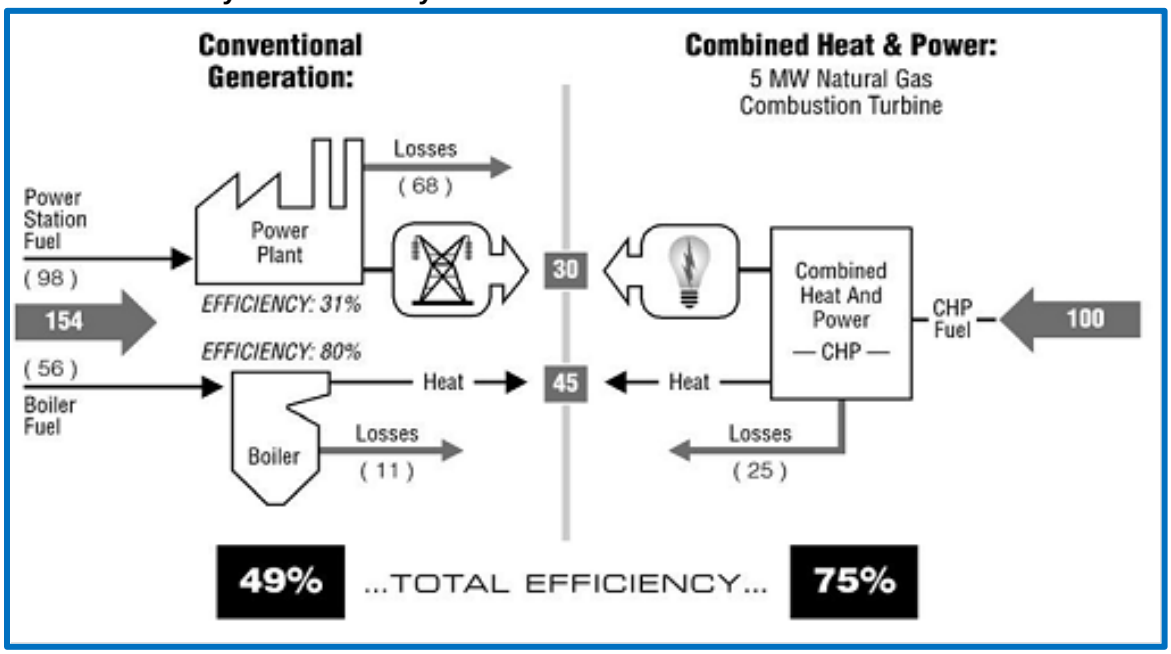


FIGURE 2: CHP System Efficiency[2]

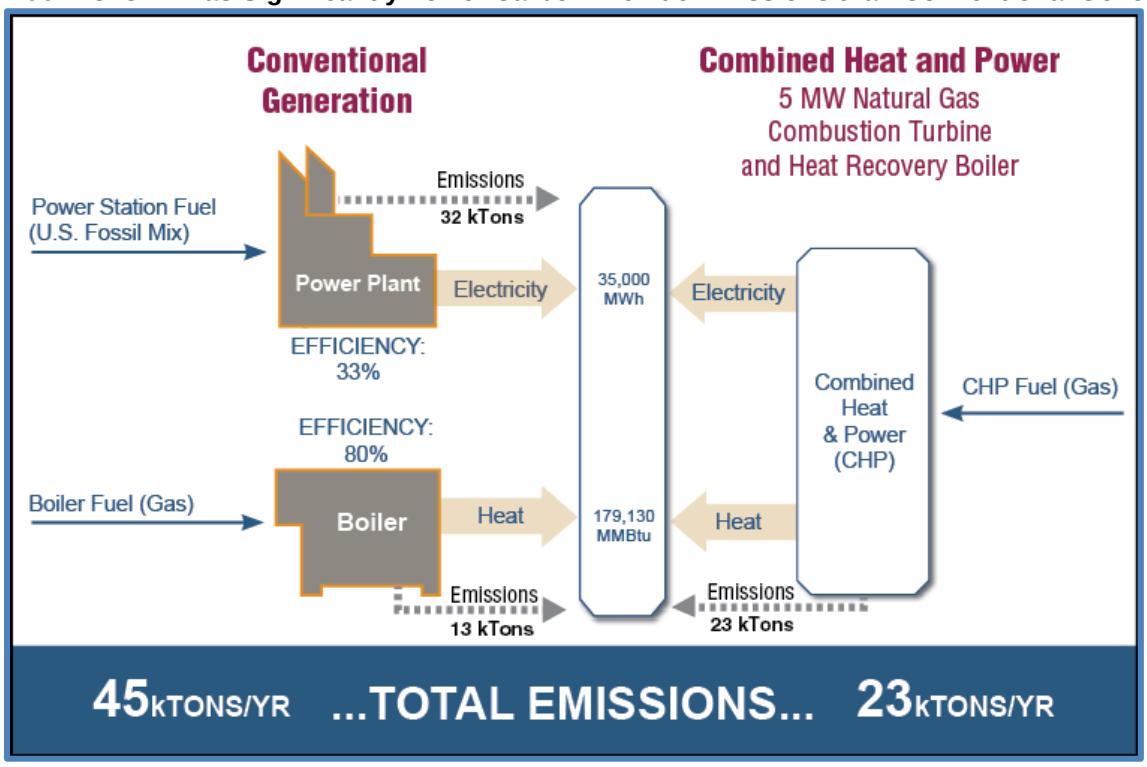


By producing both heat and power from a single fuel source (CHP) and by capturing otherwise wasted heat from industrial processes to generate additional electricity (WHP), CHP and WHP

[1] International Energy Agency, 2008, "*Combined Heat and Power: Evaluating the benefits of greater global investment,"* at 6 (Figure 3) (http://www.iea.org/papers/2008/chp_report.pdf).
[2] U.S. EPA, "Output-Based Environmental Regulations Fact Sheet" (http://www.epa.gov/chp/state-policy/obr_factsheet.html) (Note that this figure is for illustration only. CHP performance relative to separate heat and power depends on numerous site- and project-specific factors).

dramatically lower energy use and associated emissions. In fact, CHP can produce one-half the carbon dioxide (CO_2) emissions of the separate generation of heat and power to deliver the same amount of useful energy (Figure 3).[3] WHP produces electricity with no additional combustion and no incremental carbon emissions.

FIGURE 3: CHP Has Significantly Lower Carbon Dioxide Emissions than Conventional Generation



CHP can represent a sizable portion of U.S. electric capacity. In 2008, Department of Energy's Oak Ridge National Laboratory ("ORNL") assessed the economic and environmental benefits of a "high deployment strategy," wherein CHP and WHP would provide 20 percent of U.S. electric capacity by 2030 – up 122 percent from the time the report was written.[4] This scenario is on par with DOE's projections for wind,[5] and current nuclear power production.[6] ORNL found that such full-scale deployment would be equivalent to the power produced by more than 480 conventional power plants,[7] displacing 5.3-quadrillion Btus of fuel from conventional sources – or half the total energy currently consumed by U.S. households.[8] It could 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. What's more, if CHP and WHP provided

[3] U.S. EPA, Combined Heat and Power Partnership, *Environmental Benefits* (graphic) (http://www.epa.gov/chp/basic/environmental.html) (visited April 29, 2014).
[4] Oak Ridge National Laboratory (hereinafter "ORNL"), Dec. 1, 2008, *Combined Heat and Power: Effective Energy Solutions for a Sustainable Future*, at 4 (http://www1.eere.energy.gov/industry/distributedenergy/pdfs/chp_report_12-08.pdf).
[5] U.S. Department of Energy, 2008, *20% Wind Energy by 2030: Increasing Wind Energy's Contribution to U.S. Electricity Supply* (http://www.nrel.gov/docs/fy08osti/41869.pdf)
[6] EIA, 2013, *Electric Power Annual, Table* 1.1. (http://www.eia.gov/electricity/annual/)
[7] ORNL, *supra* note 4, at 4 reports 240,900 MW. Estimate assumes typical power generation of 500 MW from a traditional power plant.
[8] *Id.* at 4.

20 percent of U.S. electric capacity, more than 600 additional MMT of CO_2 emissions could be avoided annually in 2030 as compared to 2012, amounting to a 10-percent reduction in projected U.S. energy-related CO_2 emissions in 2030.[9] (Table 1, next page)
The ORNL scenario is based on the additional deployment of 156 gigawatts (GW) of CHP and WHP from 2008 to 2030. Notably, a 2010 report confirmed 130 GW of technical CHP potential in the commercial and industrial sectors.[10] A separate 2012 analysis found 7 to 10 GW of additional WHP potential.[11] These assessments indicate that – with the right policies and incentives in place – the ORNL deployment scenario is tenable.

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

	2012[12]	2030[13]
Total Electricity Generating Capacity	82 GW (8% current capacity)	241 GW (20% predicted 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

Some of these projects can occur at electric utilities. For instance, Calpine's Columbia Energy Center in Gaston, South Carolina operates a 630 MW natural gas CHP plant that has been online since May 2004. The gas-fired combustion turbines provide power to the local utility and steam to a nearby chemical plant. This cooperative arrangement allowed the chemical plant (Voridian, a division of Eastman Chemical) to close the coal-fired boilers at its Columbia site, reducing CO_2 emissions by 142,000 tons per year. With an operating efficiency of around 54 percent, the CHP system needs about 31 percent less fuel than typical onsite thermal generation and purchased electricity.[14] Similarly, Mid-Georgia Cogen owns a dual-fuel CHP system adjacent to the Frito-Lay food processing facility in Kathleen, Georgia. The plant sells "substantially all" of its 308 MW electrical output to Georgia Power under a long-term power purchase agreement and provides 350 million pounds of steam annually to the Frito-Lay facility. The facility went into commercial operation in 1998.[15]

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[9] *Id.* (reporting avoided 2030 emissions under 20-percent scenario); U.S. Department of Energy and U.S. EPA, 2012, *Combined Heat and Power: A Clean Energy Solution*, at 11 (http://1.usa.gov/1gcPMlC) (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).
[10] ICF-USCHPA-WADE, Oct. 2010, *Effect of a 30 Percent Investment Tax Credit on the Economic Market Potential for Combined Heat and Power*, at 11-12 (Tables 3 & 4) (projecting roughly 65 GW of technical potential in each the industrial and commercial/ institutional sectors, for a total of 130 GW); *see also* DOE & EPA, *supra* note 9, at 13 (reaffirming these findings); personal communication with Anne Hampson, ICF Consulting, Nov. 22, 2013 (noting that their current estimates for CHP on-site technical potential are 126 GW).
[11] U.S. EPA, CHP Partnership, May 2012, *Waste Heat to Power Systems,* at 2.
[12] DOE & EPA 2012, *supra* note 9, at 11.
[13] ORNL, *supra* note 4, at 12.
[14] Columbia Energy Center: 455 MW Combustion Turbine Plant, Project Profile (http://southeastchptap.org/profiles/se_profiles/Columbia_Energy_center-CHP_Project_Profile.pdf) (visited April 29, 2014).
[15] Mid-Georgia Cogeneration Plant (http://www.perennialpower.net/portfolio.htm) (visited Mar. 27, 2014).

By supporting utility-based CHP projects, the NSPS Rule helps realize this potential, lowering GHG emissions in the power sector. Energy efficiency can also lower compliance costs for all ratepayers. EPA recognized this in the sensitivity analysis it conducted for the Utility Mercury Air Toxics Standard ("Utility MATS"). That analysis demonstrated that a modest suite of energy-efficiency investments could reduce compliance costs for that rule by $11-billion by 2030.[16] The economic benefits of energy efficiency were reaffirmed in the final Utility MATS rule, which notes: "In addition to helping address reliability concerns, reducing demand through mechanisms such as energy efficiency and demand side management practices … can reduce the cost of compliance."[17] Such savings, in turn, can help keep energy costs low for all Americans.

While the Utility MATS sensitivity analysis did not consider CHP and WHP, these technologies are cost effective and can reduce emissions at substantially lower cost than other clean-energy sources. Indeed, CHP can reduce CO_2 emissions at less than 15 percent the cost of distributed solar power and roughly half the cost of wind power (Table 2).

TABLE 2: CHP Value Proposition[18]

Category	10 MW CHP	10 MW PV	10 MW Wind	Combined Cycle (10 MW Portion)
Annual Capacity Factor	85%	22%	34%	70%
Annual Electricity	74,446 MWh	19272 MWh	29784 MWh	61320 MWh
Annual Useful Heat	103,417 MWh_t	0	0	0
Footprint Required Capital Cost	6,000 ft^2 $20 million	1,740,000 ft^2 $60.5 million	76,000 ft^2 $24.4 million	N/A $10 million
Annual Energy Savings	308,100 MMBtu	196,462 MMBtu	303,623 MMBtu	154,649 MMBtu
Annual CO_2 Savings	42,751 Tons	17,887 Tons	27,644 Tons	28,172 Tons
Annual NOx Savings	59.4 Tons	16.2 Tons	24.9 Tons	39.3 Tons
Cost Per Ton of CO_2 Savings	**$468**	**$3,382**	**$883**	**$355**[19]

[16] U.S. Environmental Protection Agency, 76 Fed. Reg. 24976, 25074 (Table 23), May 3, 2011, "National Emission Standards for Hazardous Air Pollutants From Coal- and Oil-Fired Electric Utility Steam Generating Units and Standards of Performance for Fossil-Fuel-Fired Electric Utility, Industrial-Commercial-Institutional, and Small Industrial-Commercial-Institutional Steam Generating Units; Proposed Rule."

[17] U.S. EPA, 77 Fed. Reg. 9304, 9409, Feb. 16, 2012, "National Emission Standards for Hazardous Air Pollutants From Coal- and Oil-Fired Electric Utility Steam Generating Units and Standards of Performance for Fossil-Fuel-Fired Electric Utility, Industrial-Commercial-Institutional, and Small Industrial-Commercial-Institutional Steam Generating Units; Final Rule."

[18] EPA & DOE, 2012, *supra* note 9, at 8 (cost per ton of CO_2 savings added to original table).

[19] Note that this estimate does not include any transmission and distribution investments, which might be required for a new central station plant. Such costs would be substantial and would greatly increase the cost per ton of CO_2 reduction associated with a natural gas combined cycle unit. Such investments would *not* be required for CHP, since CHP systems provides energy at the point of use.

The values in Table 2 are based on:

- 10 MW Gas Turbine CHP with 28% electric efficiency and 68% total efficiency, 15 PPM NOx;
- Capacity factors and capital costs for PV and Wind based on utility systems in DOE's Advanced Energy Outlook 2011;
- Capital cost and efficiency for natural gas combined cycle system based on Advanced Energy Outlook 2011 (540 MW system proportioned to 10 MW of output), NGCC 48% electric efficiency, NOx emissions 9 ppm;
- Electricity displaces National All Fossil Average Generation (eGRID 2012): 9,572 Btu/kWh, 1,743 lbs CO_2/MWh, 1.5708 lbs NOx/MWH; 6.5% transmission and distribution losses; CHP thermal displaces 80% efficient on-site natural gas boiler with 0.1 lb/MMBtu NOx emissions)

EPA has repeatedly recognized the value of CHP as a proven cost-effective technology to reduce greenhouse gas emissions. It has incorporated CHP in its greenhouse gas best available control technology (BACT) guidance[20] and issued awards to various CHP Energy Star projects in recognition of their emissions reductions.[21] Many states have likewise recognized the emission benefits of CHP and WHP. For instance, 15 states recognize WHP as a renewable resource in their state renewable portfolio standards because WHP produces electricity with no incremental combustion or emissions.

We are pleased that the proposed rule includes a number of provisions to encourage continued deployment of CHP and WHP and believe that these measures are consistent with President Obama's 2012 Executive Order for "Accelerating Investment in Industrial Energy Efficiency," which sets a national goal of providing 40 GW of new CHP and WHP by 2020 and directs federal agencies (including the EPA) to "coordinate policies to encourage investment in industrial efficiency in order to reduce costs for industrial users, improve U.S. competitiveness, create jobs, and reduce harmful air pollution." The Executive Order further requires federal agencies to "utilize their respective relevant authorities and resources to encourage investment in industrial energy efficiency and CHP."[22] Doing so would have substantial environmental benefits. In a report issued alongside the Executive Order, DOE and EPA projected that achieving the 40 GW goal would reduce energy use by one quadrillion Btus (1 Quad) (the equivalent of 1 percent of all energy use in the U.S.) and lower CO_2 by 150 million metric tons (equivalent to the emissions from over 25-million cars).[23]

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[20] *See, e.g.,* U.S. EPA, Office of Air and Radiation, EPA–HQ–OAR–2010–0841; FRL–9228–2, Nov. 2010, *PSD and Title V Permitting Guidance for Greenhouse Gases*, March 2011, "PSD and Title V Permitting Guidance for Greenhouse Gases," at 29, 30 & 31 (hereinafter "BACT Guidance") ("Applying the most energy efficient technologies at a source should in most cases translate into fewer overall emissions of all air pollutants per unit of energy produced"; "The second category of energy efficiency improvements includes options that could reduce emissions from a new greenfield facility by improving the utilization of thermal energy and electricity that is generated and used on site." and "For example, an applicant proposing to build a new facility that will generate its own energy with a boiler could also consider ways to optimize the thermal efficiency of a new heat exchanger that uses the steam from the new boiler.").

[21] *See, e.g.,* U.S. EPA, Combined Heat and Power Partnership (listing winners of the agency's Energy Star CHP Awards and highlighting carbon reductions) (http://www.epa.gov/chp/partnership/current_winners.html) (visited Jan. 10, 2014).

[22] Executive Order, Aug. 30, 2012, "Accelerating Investment in Industrial Energy Efficiency," Sec. 2 (http://www.whitehouse.gov/the-press-office/2012/08/30/executive-order-accelerating-investment-industrial-energy-efficiency).

[23] DOE & EPA, Aug. 2012, *supra* note 9, at 3.

By adopting an output-based standard, recognizing thermal output, and crediting avoided line losses, the proposed rule helps fulfill this mandate. Moreover, the proposed rule sets important precedent for similar treatment of CHP and WHP in the forthcoming 111(d) rule for existing sources and in complementary state policies. Below, we identify several modest improvements that would further encourage the use of CHP and WHP by electric utility generating units.

Applicability of the Rule to Combined Heat and Power and Waste Heat to Power Facilities

1. EPA Should Clarify that the Rule Applies to CHP and WHP

The proposed standard includes several provisions that are aimed at creating incentives for increased deployment of CHP, which is defined as "a steam-generating unit that simultaneously produces both electric (and mechanical) and useful thermal energy from the same primary energy source."[24] We are concerned, however, that the definition of CHP in the rule may be too narrow, and thus limit the applicability of these benefits.

First, some CHP projects produce hot oil, rather than steam. To ensure that these projects are covered by the rule, EPA should omit the phrase "steam-generating" from the definition of CHP. We are also concerned that it is not clear that the definition extends to waste heat to power projects. To address this, we encourage EPA to add a separate definition of waste heat to power to clarify that incentives that apply to CHP (e.g., the line-loss credit) extend to WHP. We recommend the WHP definition currently being considered in a number of legislative proposals:[25]

> The term 'waste heat to power property' means property comprising a system which generates electricity through the recovery of a qualified waste heat resource. The term 'qualified waste heat resource' means exhaust heat or flared gas from any industrial process, waste gas or industrial tail gas that would otherwise be flared, incinerated, or vented, a pressure drop in any gas for an industrial or commercial process, or such other forms of waste heat resources as the Secretary may determine. The term 'qualified waste heat resource' does not include any heat resource from a process whose primary purpose is the generation of electricity.

2. The Proposed Rule Appropriately Excludes Units that Sell to Third-Party Developers

The vast majority of CHP projects will not be subject to the Carbon Standard. The standard only applies to "a facility that supplies more than one-third of its potential electricity output and more than 219,000 MWh 'net electric output' to the grid per year."[26] Net electric output, in turn, excludes power purchased by the facility during the year. As EPA recognizes, CHP systems are often owned and operated by third-party developers, who are distinct from the thermal host. This arrangement is necessary because of the substantial upfront cost and ongoing maintenance responsibilities for a CHP or WHP system. We support EPA's proposed solution of clarifying that applicability of the rule will be based on gross electric sales to the utility "minus purchased power of the thermal host facility."[27] This recognizes the reality that such sales do not constitute sales to the grid.

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[24] 79 Fed. Reg. at 1515 (§ 60.5580 What definitions apply to this subpart?).
[25] *See, e.g.,* H.R. 2972, "The Heat is Power Act," 113th Congress, 1st Session.
[26] 79 Fed. Reg. at 1502.
[27] 79 Fed. Reg. at 1506 (definition of net electric output).

Output-Based Standards Ensure that Energy-Efficiency Benefits Are Credited

We commend EPA for establishing an output-based emissions limit in the proposed rule. Under this approach, compliance is based on emissions per unit of energy generated (i.e., pounds per megawatt-hour), rather than the amount of fuel used. In contrast, traditional "input-based" regulations set emission limits based on the amount of fuel used (e.g., pounds of pollutant per million Btus). The input-based approach has contributed to the inefficiency of our electrical production system by discriminating against energy efficiency. CHP systems fare better under an output-based standard because they can produce two forms of useful output (thermal energy and electricity). The output-based standard credits both of these products, thereby rewarding generators that have the highest "output" of megawatt-hours per "output" of pollutants. We are grateful that the emission limit for the new source rule is written as an output-based standard, and hope that EPA continues to adopt this approach in future rulemakings.

We do, however, offer several suggestions to improve the output-based standard in the proposed rule:

1. The Rule Should Provide a 100 Percent Thermal Credit

As noted above, output-based standards benefit CHP because they credit both the heat and electricity produced by such projects. The proposed rule would credit all of the electricity produced from CHP systems, but only 75 percent of the useful thermal output. EPA asks whether 75 percent "is the appropriate discount factor for useful thermal output," and seeks comment on "a range of two-thirds to three-fourths for useful thermal output in the final rule."[28] While the Alliance is gratified to see this thermal credit in the proposed rule, we do not believe that thermal output should be discounted in this manner. Rather, to fully account for the benefits of energy efficiency, the rule should credit 100 percent of a facility's useful thermal output.

The characteristic that makes CHP both clean and efficient is its ability to produce both useful thermal and electric output simultaneously. The system's environmental benefits will only be recognized if both of these products are considered. EPA recognizes this. In a 2012 white paper on methods for calculating CO_2 savings from a CHP system, EPA determined, "To calculate the fuel and CO_2 emissions savings of a CHP system, both electric and thermal outputs of the CHP system must be accounted for."[29] For this reason, it is important to consider both thermal and electric output when determining a system's emission rate. The proposed rule represents a good first step, but stops short of fully crediting system benefits.

EPA seeks comment on the appropriateness of crediting "a range of two-thirds to three-fourths" of the useful thermal output in the final rule.[30] We think that this proposal is too limiting and believe that a full (100 percent) thermal credit should be used. A 2005 EPA memo examining thermal credits explained that "giving between 75 to 100 percent thermal credit for thermal

[28] 79 Fed. Reg. at 1448.
[29] U.S. Environmental Protection Agency, CHP Partnership, Aug. 2012, *Fuel and Carbon Dioxide Emissions Savings Calculation Methodology for Combined Heat and Power Systems* (http://www.epa.gov/chp/documents/fuel_and_co2_savings.pdf).
[30] 79 Fed. Reg. at 1448.

output from CHP units most accurately accounts for the environmental benefits of CHP."[31] In the context of that rule (which addressed criteria pollutants, not CO_2), EPA found that 75 percent was appropriate since it represented the average equivalent input-based emissions for the regulated pollutants (NOx, SO_2 and PM) based on interpolating then current input-based New Source Performance Standards for industrial boilers and utility boilers. This rationale does not apply to this rule, which is regulating CO_2. Further, unlike with criteria air pollutants, there are no National Ambient Air Quality Standard compliance or health impacts for this proposed rule. Moreover, the memo acknowledges that "one could also argue that 100 percent credit for thermal output is also appropriate."[32]

There is precedent supporting a 100 percent thermal credit. For instance, EPA has recognized 100 percent of thermal output in the NSPS for Stationary Combustion Turbines.[33] A 100 percent credit has likewise been applied in several states.[34] Notably, the Proposed Stationary Combustion Turbine Rule favorably cited Texas' permit-by-rule regulation, which gives facilities 100 percent credit for steam generation thermal output.[35]

We understand that it may be appropriate to discount thermal output where there are concerns that the thermal energy is not being accurately measured or properly used. Such concerns do not exist here. The proposed rule mandates the use of continuous monitoring of recovered thermal energy from CHP systems.[36] It further limits eligibility to CHP systems where "20.0 percent of the total gross useful energy output consists of useful thermal output."[37] These requirements should alleviate any concerns about so-called "sham" CHP projects.

This matter has important implications for future regulatory and legislative proceedings. EPA will be proposing greenhouse gas rules for existing utilities this summer. Assuming that the same applicability standards apply, large-scale CHP systems that are connected to the grid will be directly affected by the Rule. Moreover, even where CHP systems are not directly affected, states may seek to include policies that encourage greater use of CHP in their state compliance plans. Absent proper consideration of their thermal output, these plans will underestimate the emissions benefits of these units. States will likely turn to the 111(b) Rule as a guide for the appropriate treatment of CHP in their state compliance plans and underlying policies (e.g., portfolio standards).

EPA's treatment of thermal output also has important policy implications beyond greenhouse gas regulation. Congress is currently exploring options for comprehensive tax reform. In December 2013, the Senate Finance Committee released a draft energy tax reform proposal, which provided a "technology neutral tax credit" for all clean-energy technologies that are 25

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[31] Memo from Christian Fellner to Utility, Industrial, and Commercial Boiler NSPS File, Feb. 2005, "*Combined Heat and Power (CHP) Compliance*," at 4.
[32] *Id.*
[33] *See* New Source Performance Standard (NSPS) for Stationary Combustion Turbines (40 CFR Part 60, Subpart KKKK) (crediting 100% of thermal output); New Source Performance Standard (NSPS) for Electric Utility Steam Generating Units (40 CFR Part 60, Subpart Da) (crediting 75 percent of thermal output from CHP systems).
[34] *See* U.S. EPA, CHP Partnership, Feb. 2013, *Accounting for CHP in Output-Based Regulations*, at 7-9 (citing California's multi-pollutant regulations and Texas permit by rule and standard permitting program) (http://www.epa.gov/chp/documents/accounting.pdf).
[35] 70 Fed. Reg. 8314, at 8318 (Feb. 18, 2005).
[36] *See* 79 Fed. Reg. at 1507 (§60.4373(d)) ("If the affected stationary combustion turbine is a CHP stationary combustion turbine, you must also install, calibrate, maintain, and operate meters to continuously determine and record the total useful recovered thermal energy").
[37] 79 Fed. Reg. at 1448.

percent cleaner than the grid average. Given their carbon benefits, WHP and CHP should readily meet this test – however, the proposal was limited to electrical output. Using this approach, CHP would not be eligible for favorable tax treatment. As tax reform moves forward, Congress will look to EPA for guidance. Again, by crediting 100 percent of thermal output in the 111(b) Rule, EPA sends a signal to Congress that it should do the same.

2. The Rule Should Include Additional Guidelines for Calculating the Thermal Credit

Second, while the definition of Useful Thermal Output in the proposed rule includes some additional detail that was not included in the April 2012 proposal,[38] EPA should also provide guidelines to help facilities calculate their useful thermal output. EPA has already generated these materials, and should reference them in the final rule.[39] By adding such detail, EPA can assuage concerns that regulated entities may take credit for thermal energy that is not put to good use.

3. The Rule Should Apply a Net Output-Based Standard

EPA seeks comment on whether to calculate emissions through a gross or net energy output-based approach.[40] We support the use of a net output-based standard as this approach creates incentives for even greater efficiency. By basing output-based standards on net-energy output, facilities would have an incentive to minimize parasitic energy demands from in-plant processes, such as pollution-control equipment.

While we recognize the potential monitoring difficulties associated with tracking on-site energy use,[41] we also note that utilities should be eager to accurately measure their power output, since this determines their potential revenue. Given that inclination, we believe that such difficulties should not be insurmountable.

4. The Proposed Line-Loss Credit Is Inadequate

The proposed rule includes a 5 percent "line loss credit" for CHP systems "to account for a five percent avoided energy loss in the transmission of electricity."[42] We commend EPA for including this credit in the rule, as avoided line losses are one of the key benefits of distributed generation.[43] We believe, however, that the proposed credit is inadequate. On average, actual line losses from conventional generation are higher than 5 percent, and thus CHP projects that avoid such losses warrant a higher credit. According to EIA data, national, annual electricity transmission and distribution losses average about 6.5 percent of the electricity that is

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[38] *Compare* 79 Fed. Reg. at 1516 with 77 Fed. Reg. 22440 (excluding thermal output used for "mechanical output at the affected facility" from the definition)
[39] *See, e.g.,* U.S. EPA, CHP Partnership, Feb. 2013, *supra* note 34; U.S. EPA, CHP Partnership, Aug. 2012, *Fuel and Carbon Dioxide Savings Calculation Methodology for Combined Heat and Power Systems* (http://www.epa.gov/chp/documents/fuel_and_co2_savings.pdf).
[40] 79 Fed. Reg. at 1447.
[41] *Id*. at 1448.
[42] *Id*.
[43] *See, e.g.,* U.S. EPA., Combined Heat and Power Partnership, *Efficiency Benefits* ("Because CHP is more efficient, less fuel is required to produce a given energy output than with separate heat and power. Higher efficiency translates into…reduced grid congestion and avoided distribution losses") (http://www.epa.gov/chp/basic/efficiency.html) (visited Feb. 26, 2014).

transmitted in the United States,[44] costing nearly $26-billion in foregone revenue in 2010 alone.[45] These losses are even greater during peak hours. In fact, a 2011 report by the Regulatory Assistance Project finds that a grid segment or area with average line losses of 7 percent could have marginal line losses of 20 percent during peak load.[46] Studies at Carnegie Mellon University and MIT have shown that one megawatt-hour (MWh) of local generation, like CHP, can displace up to 1.47 MWh of central generation in some cases.[47] These numbers imply the CHP benefit should be well above 5 percent where such lines-loss benefits exist. EPA asserts that 5 percent "represents a reasonable average amount for the avoided transmission and distribution losses for CHP facilities."[48] In fact, 6.5 percent is a more "reasonable average" and we recommend increasing the credit accordingly and clarifying that it applies to WHP as well.

EPA also provides that the intended line-loss credit would apply whenever the useful thermal output is at least 20 percent of the total output.[49] We suggest that the rule add an efficiency standard to be consistent with the definition of qualifying CHP projects in the tax code.[50] This will help counter any concerns that may exist about "sham" CHP projects.

EPA Should Add a Definition of Industrial Unit to the Rule

EPA is seeking comment on whether it should exempt combustion turbines at industrial units from the emission limit under 111(b), while continuing to subject such units to other aspects of the standard of performance (i.e., monitoring, reporting and recordkeeping requirements).[51] Such units would apparently be treated as utility units and subject to the emissions limit whenever they meet the threshold applicability limits (i.e., whenever the facility supplies more

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[44] U.S. Energy Information Administration, DOE/EIA-0348(01)/2, Jan 27, 2012, State Electricity Profiles 2012 (Table 10: "Supply and Disposition of Electricity, 2000 and 2004 through 2010 (Million Kilowatthours)") (http://205.254.135.7/electricity/state/pdf/sep2010.pdf) (line losses calculated as ["estimated losses" divided by "total disposition" minus "direct use"]*100 or [261,990/ (4,170,143-134,554)]*100 = 6.49%)]; U.S. Energy Information Administration, Frequently Asked Questions: How much electricity is lost in transmission and distribution in the United States? (reporting "about 6%") (http://www.eia.gov/tools/faqs/faq.cfm?id=105&t=3) (visited May 9, 2014).

[45] U.S. Energy Information Administration, DOE/EIA-0348(01)/2, Jan 27, 2012, State Electricity Profiles 2012 (Table 8: "Retail Sales, Revenue, and Average Retail Price by Sector, 2000 and 2004 through 2010") (reporting average retail prices of 9.83 cents/ kWh in 2010); *Id.* (Table 10: "Supply and Disposition of Electricity, 2000 and 2004 through 2010 (Million Kilowatthours)") (reporting 261,990 million kilowatt hours in estimated losses in 2010) (9.83 cents * 261,990 million kilowatt hours = $25.8 billion).

[46] Jim Lazar & Xavier Baldwin, Regulatory Assistance Project, *Valuing the Contribution of Energy Efficiency to Avoided Marginal Line Losses and Reserve Requirements*, July 2011, at 2 (explaining that "marginal losses avoided are much greater than average losses on a utility distribution system" because "losses grow exponentially with load.").

[47] Masoud H. Nazari and Professor Marija, Oct. 2010, *Enhancing Efficiency and Robustness of Modern Distribution Systems* (reporting 270 billion KWh in transmission and distribution losses in U.S. in 2007; concluding that 1 MW of correctly located distributed generation can displace, on average, 1.5 MW of grid generation).

[48] 79 Fed. Reg. at 1448.

[49] *Id.*

[50] *See* Section 48(c)(3)(A) ("The term 'combined heat and power system property' means property comprising a system— … (ii) which produces— (I) at least 20 percent of its total useful energy in the form of thermal energy … [and] the energy efficiency percentage of which exceeds 60 percent…").

[51] *See* 79 Fed. Reg. at 1461 ("EPA would promulgate applicability requirements or a definition of utility unit designed to assure that combustion turbine utility units—but not combustion turbine industrial units or other types of non-utility units—would be subject to the standard of performance.").

than one-third of its potential electric output and more than 25 MW net electric output to the grid per year over a three-year rolling average).

The language in the proposed rule is unclear. While the proposed rule distinguishes between "combustion turbine utility units" and "combustion turbine industrial units," these terms are not defined. These terms should be defined so that regulated entities can better understand the applicability requirements.

If such a definition were added, we would be comfortable with the proposed treatment of such units. Monitoring and record-keeping is necessary to identify years in which these units trigger the applicability requirements.

We Encourage EPA to Incentivize Energy Efficiency in Subsequent Carbon Standards for Existing Utilities

As EPA develops carbon pollution standards for existing power plants, responsible for 40 percent of U.S. carbon pollution, we urge the agency to consider the full range of emission reduction potential that is available to the power sector. Maximizing waste heat capture and use from power generation (CHP) and industrial operations (WHP), and improving supply-side energy efficiency, including both CHP and WHP, are readily available resources that can meaningfully reduce power sector greenhouse gas emissions while at the same time saving American families and businesses money, cutting co-pollutant emissions, stimulating local economies, and creating jobs. Mobilizing demand-side energy efficiency, expanding renewable energy generation and shifting use to cleaner generation sources similarly offer significant potential to reduce emissions from conventional power plants. We strongly recommend that EPA adopt a system-wide approach to carbon reduction from existing power plants reflecting the full range of solutions that can secure meaningful and cost-effective emissions reductions.

CONCLUSION

We are happy that the proposed rule includes provisions that recognize the benefits of CHP and WHP and believe that this sets an important precedent for the forthcoming 111(d) rule and for supportive state policies. As elaborated above, CHP and WHP provide substantial environmental benefits and are demonstrated, cost-effective control strategies. The 2012 industrial efficiency executive order mandates that federal agencies – including EPA – embrace policies to increase deployment.

Our comments offer a number of modest recommendations to the proposed rule. To ensure that energy efficiency is properly incentivized, we urge EPA to incorporate a separate definition for WHP. We are particularly pleased that the emission limit uses an output-based standard. We believe EPA can strengthen this standard by providing credit for all (100 percent) useful thermal output, providing additional guidelines about how to measure useful thermal output, and incorporating a net output-based standard. We are pleased that the proposed rule includes a credit for avoided line losses associated with CHP and WHP projects; however, believe this credit should be increased to at least 6.5 percent to reflect actual avoided line losses. We believe that EPA should add a definition of "combustion turbine industrial unit" to eliminate ambiguity in the applicability requirements. We further encourage EPA to incorporate similar provisions to advance energy efficiency in the forthcoming Carbon Standard for existing utilities.

Thank you for the opportunity to comment. We look forward to working with EPA throughout the rulemaking process.

Sincerely,

David Gardiner, Executive Director
Alliance for Industrial Efficiency