March 18, 2011

EPA Air Docket Center Nos. EPA-HQ-OAR-2011-0089 & EPA-HQ-2011-0090
United States Environmental Protection Agency
Mail Code 6102T
1200 Pennsylvania Avenue, NW
Washington, DC 20460

Thank you for the opportunity to comment on EPA's forthcoming New Source Performance Standards for fossil-fueled utilities and refineries. We are members of the Alliance for Industrial Efficiency and the US Clean Heat and Power Association (USCHPA). The Alliance for Industrial Efficiency is a diverse coalition that includes representatives from the business, environmental, labor and contractor communities. The Alliance is committed to enhancing manufacturing competitiveness, reducing emissions, and creating jobs through industrial energy efficiency, especially the use of Waste Heat Recovery (WHR) and Combined Heat and Power (CHP). USCHPA is a non-profit trade association created to promote the growth of clean, efficient local energy generation. Our companies and organizations believe EPA's greenhouse gas rules can jumpstart investments in energy efficiency. EPA appears to share this belief – and has explicitly recognized the role of energy efficiency as a compliance mechanism to reduce criteria pollutants and greenhouse gases in many of its recent rulemakings.[1] NSPS, although flexible, offers real opportunities to incentivize both economic vitality and environmental quality.

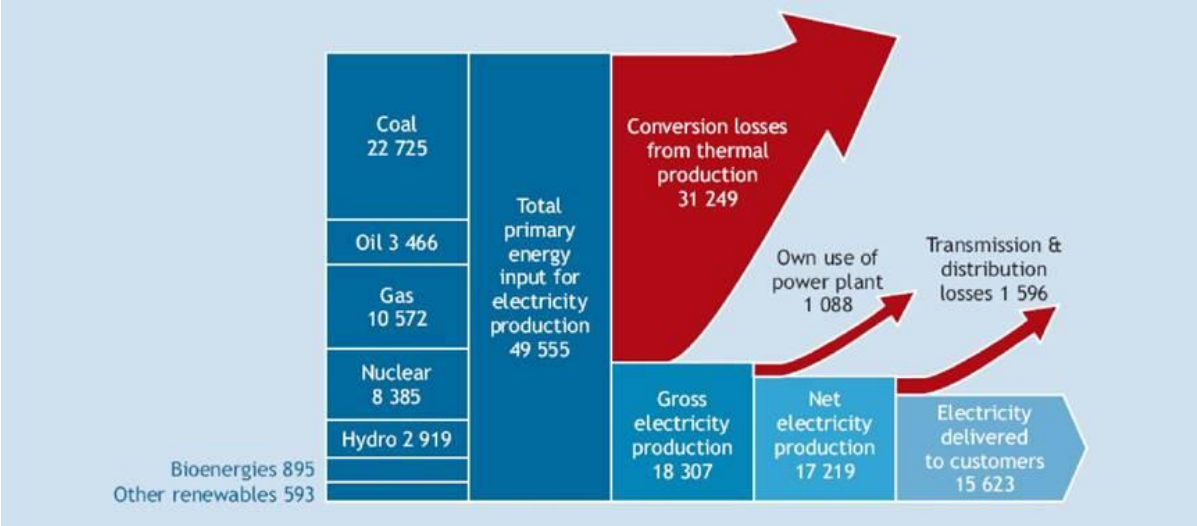
These comments offer three suggestions. First, focus NSPS on increasing efficiency, emphasizing how avoiding energy waste means avoiding pollution. As elaborated below, energy efficiency – in the form of WHR and CHP – is adequately demonstrated and cost effective for the sectors under consideration. Second, to ensure continued improvements and to reduce more pollution over time, adopt output-based standards that reward efficiency and productivity. Third, EPA should maximize emissions reductions by crediting equivalent state programs and establishing clear guidelines for states to regulate existing sources.

Waste Heat Recovery and Combined Heat and Power Offer Dramatic Efficiency Gains over Conventional Generation

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 (below) illustrates, roughly two-thirds of energy inputs (68 percent) are simply emitted into the air, with a mere 32 percent actually delivered to customers. The unfortunate results are lost competitiveness and jobs, as well as increased pollution.

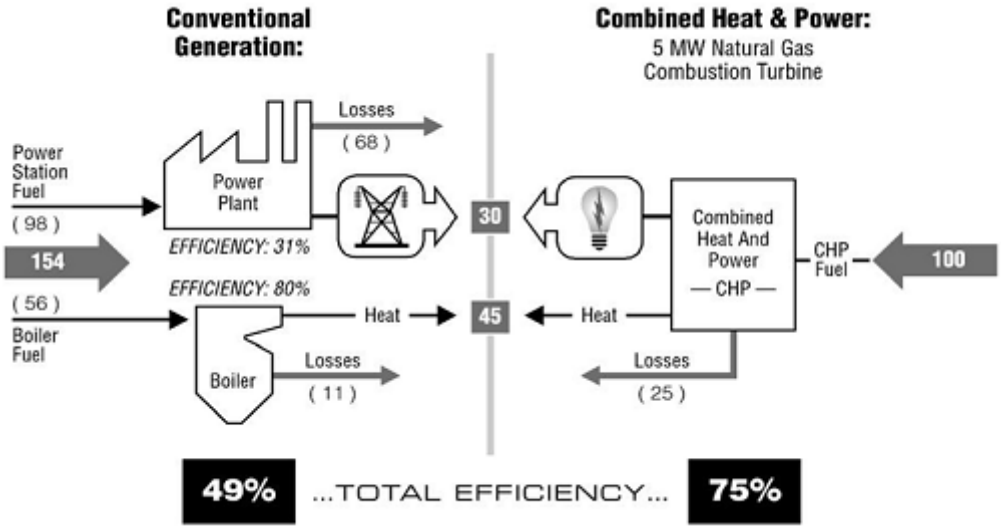
[1] *See, e.g.,* 75 Fed. Reg. 45229 (Clean Air Transport Rule, NOPR) ("Policies that will promote efficient use of electric power can be an integral, highly cost-effective component of power companies' compliance strategies."); US EPA, Office of Air and Radiation, EPA–HQ–OAR–2010–0841; FRL–9228–2, Nov. 2010, "PSD and Title V Permitting Guidance for Greenhouse Gases," at 30 ("Selecting technologies, measures and options that are energy efficient translate[s] not only in the reduction of emissions of the particular regulated NSR air pollutant undergoing BACT review, but it also may achieve collateral reductions of emissions of other pollutants, as well as GHGs.").

FIGURE 1: Losses from Conventional Power Generation[2] (TWh)



Fortunately, cost-effective alternatives already exist in the form of Combined Heat and Power. Indeed, by capturing and reusing waste heat, a CHP boiler can convert what would otherwise be wasted energy into additional electricity and thermal energy (heat). This dramatically increases fuel efficiency – allowing utilities and companies to effectively "get more with less." As Figure 2 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).

FIGURE 2: CHP System Efficiency[3]



[2] 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).

[3] US 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).

EPA recognized the efficiency gains of CHP in its 2008 proposed rule on greenhouse gases, stating "[r]eplacing an existing boiler with a combined heat and power plant could improve the energy efficiently [sic] of an existing plant by 10% to 33%."[4] Indeed, energy efficiency through the use of WHR and CHP can dramatically lower emissions for the power sector and should be reflected in the New Source Performance Standards adopted for greenhouse gases under Section 111. EPA could drive investment in these technologies by setting a standard that assumes 20-30 percent efficiency gains.

WHR and CHP Are Adequately Demonstrated and Cost Effective

EPA traditionally has thought of efficiency in terms of home insulation, better light bulbs, and improved motors and appliances. Those approaches are critical and can have profound impacts. There are far greater opportunities, however from the efficiency associated with the generation of electricity and heat, which together account for nearly two-thirds (62%) of domestic CO_2 emissions, the majority from the electric utility sector, which would be covered by the NSPS.[5] Moreover, because utility boilers are defined to include large industrial boilers that produce more than 25 MW of electricity and sell more than one-third of their generation,[6] the NSPS for utilities also covers many large industrial sources. EPA should explicitly recognize WHR and CHP as cost effective and adequately demonstrated technologies to stimulate investment in these approaches.

New Source Performance Standards are intended to reflect emission limitations achievable from "adequately demonstrated" and cost effective technologies. Waste Heat Recovery and CHP readily satisfy these requirements. As the Oak Ridge National Laboratory declared in 2008, "CHP is a proven and effective energy option."[7] Using these approaches, we can easily burn one fuel to obtain both heat and power. In 2006, the U.S. obtained about 12 percent of its power from cogeneration – or CHP.[8] Yet the potential is so much greater. For instance, countries like Denmark derive more than 50 percent of their power from CHP.[9] The U.S. Department of Energy suggests cogeneration could provide 20 percent of U.S. generation capacity by 2030, and thereby avoid over 60 percent of the projected increase in CO_2 emissions over that period. At that

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[4] US EPA, "Regulating Greenhouse Gas Emissions Under the Clean Air Act: Proposed Rule," 73 Fed. Reg 44354, 44492 (July 30, 2008).

[5] US EPA, 2011, "2011 Draft Inventory of Greenhouse Gas Emissions and Sinks" (http://www.epa.gov/climatechange/emissions/downloads11/US-GHG-Inventory-2011-Executive-Summary.pdf).

[6] 40 CFR §60.4Da(e)(1) & (2) Definitions ("*Electric utility combined cycle gas turbine* to include any combined cycle gas turbine used for electric generation that is constructed for the purpose of supplying more than one-third of its potential electric output capacity and more than 25 MW net-electrical output to any utility power distribution system for sale. Any steam distribution system that is constructed for the purpose of providing steam to a steam electric generator that would produce electrical power for sale is also considered in determining the electrical energy output capacity of the affected facility.").

[7] Oak Ridge National Laboratory (ORNL), Dec. 1, 2008, *Combined Heat and Power: Effective Energy Solutions for a Sustainable Future*, at 3 (http://www1.eere.energy.gov/industry/distributedenergy/pdfs/chp_report_12-08.pdf).

[8] *Id.* at 4.

[9] *Id* at 22 and International Energy Agency, 2009, *Cogeneration and District Energy: Sustainable Energy Technologies for Today … and Tomorrow,* at 11 (http://www.iea.org/files/CHPbrochure09.pdf).

level, CHP would displace the emissions produced by 154 million cars,[10] and replicate the power of more than 480 conventional coal-fired power plants.[11]

WHR and CHP can be used 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 two 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 carbon dioxide 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.[12]

Similar technology is also already in place at refineries. For instance, the Tesoro Petroleum Corporation operates a 22 MW CHP system in Salt Lake City, Utah. This system provides substantial environmental and economic benefits. It reduces greenhouse gas emissions by more than 500 tons annually. It has also enabled Tesoro to save $200,000 per month of its energy bill and creates a substantial revenue source, as 7-10 MWs of surplus power is sold to the grid for $300,000 monthly.[13]

In addition to encouraging cogeneration at power plants and refineries, there's also enormous opportunity to capture – or recycle – waste heat vented from industrial facilities that effectively function as utility generators because they return large quantities of power to the grid.[14]

Output-Based Standards Are Lawful and Support Energy Efficiency

Turning now to the role of output-based standards. EPA should change the metrics to encourage continued improvement in pollution reduction. Traditional "input-based" regulations set emission limits based on the amount of fuel used (e.g., pounds of pollutant per million BTUs). This approach has contributed to the inefficiency of our electrical production system by discriminating against energy efficiency. It's time for EPA to reverse course and use output-based standards. Such standards are expressed as emissions per unit of useful energy output (e.g., pounds per megawatt hour). This alternative approach rewards generators that have the highest "output" of megawatt hours and the lowest "output" of pollutants.

EPA has adopted several output-based emissions standards,[15] and has issued guidance encouraging states to adopt the same.[16] We appreciate that EPA has reaffirmed its interest in output-based

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[10] *Id.* at 4.
[11] ORNL at 4 reports 240,900 MW. Estimate assumes typical power generation of 500 MW from a traditional coal-fired power plant.
[12] Columbia Energy Center: 455 MW Combustion Turbine Plant, Project Profile (http://www.southeastcleanenergy.org/profiles/se_profiles/Columbia_Energy_Center.pdf).
[13] Tesoro Petroleum: 22-MW CHP System, Project Profile (http://www.intermountaincleanenergy.org/profiles/Tesoro_Petroleum-Project_Profile.pdf).
[14] *See supra* note 6.

standards in the Greenhouse-Gas Guidance,[17] and believe that this will further elevate energy efficiency as a compliance option. Even more recently, EPA has included an output-based standard as an alternative compliance standard in its hazardous emissions rules for utility, commercial and industrial boilers.[18] It should do the same for NSPS.

At the February 15, 2011 NSPS listening session with the environmental community, you heard that EPA should "strongly consider the role of output-based standards in incentivizing new technologies."[19] Only output-based measurements capture the total efficiency provided from producing both electricity and thermal load (heating and cooling) from a single source.

Noting EPA's concern about withstanding legal challenges, know that output-based standards clearly are permissible under the Clean Air Act – as demonstrated by the NOx NSPS EPA promulgated more than 10 years ago.[20] Indeed, the D.C. Circuit upheld the standards despite a challenge from lignite manufacturers.[21] The DC Circuit also explicitly upheld EPA's assignment of a credit for steam production from CHP facilities. EPA's experience with output-based NOx emissions standards also has been replicated at the state level: California, Washington and Oregon have each adopted output-based greenhouse gas standards that expressly credit thermal energy from CHP.[22]

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[15] EPA has used an output-based approach for the new source performance standards (NSPS) for NOx from utility boilers, NSPS for mercury from coal-fired utility boilers, and cement kilns. For instance, the most recent *New Source Performance Standards for Stationary Gas Turbines* ([EPA–HQ–OAR–2004–0490, FRL–8033–4], RIN 2060–AM79, p. 38483) provides turbine owners with the option of using an output-based standard for calculating NOx emitted per unit of useful recovered energy. In its final NESHAP rule for the Portland Cement Manufacturing Industry ([EPA-HQ-OAR-2007-0877]; RIN 2060-AO42), EPA proposed an output-based methodology for PM, NOx and SO_2.

[16] *See* US EPA, "Output-Based Regulations: A Handbook for Air Regulators" (Aug. 2004) (http://www.epa.gov/chp/documents/obr_final_9105.pdf).

[17] US 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," at 46. *See also id.* at 38 (noting that for "combustion sources, it may be more appropriate to rank control options based on output-based metrics that would fully consider the thermal efficiency of the options when determining control effectiveness").

[18] National Emission Standards for Hazardous Air Pollutants for Major Sources: Industrial, Commercial, and Institutional Boilers and Process Heaters, Final Rule, 40 CFR Part 63 (§63.7533) (EPA–HQ–OAR–2002–0058, FRL–RIN 2060-AQ25) (http://www.epa.gov/airquality/combustion/docs/20110221majorsourceboilers.pdf).

[19] Remarks of Jonathan Peress, Conservation Law Foundation (1:38:32) (http://www.ustream.tv/recorded/12714653).

[20] *See* 63 Fed. Reg. 49,442, 49,443 (1998) (to be codified at 40 C.F.R. pt. 60). The NOx NSPS was changed to a generation output-based standard of 1.6 lb/MWh (approximately equivalent to 0.15 lb/MMBtu at a heat rate of 10,500 Btu/kWh) for new coal-fired plants that commenced construction after July 9, 1997. The most recent NSPS revision applies to units built after Feb. 28, 2005, with separate limits for new units (1.0 lb/MWh), existing reconstructed units (0.11 lb/MMBtu), or existing modified units (0.15 lb/MMBtu).

[21] *Lignite Energy Council, et al. v. EPA,* 198 F.3d 930 (D.C. Cir. 1999) (http://openjurist.org/198/f3d/930/lignite-energy-council-et-al-v-united-states-environmental-protection-agency).

[22] *See* Senate Bill 1368 (Stats 2006, ch. 598) (http://www.energy.ca.gov/emission_standards/documents/sb_1368_bill_20060929_chaptered.pdf) (directing California Public Utility Commission to adopt a methodology for calculating an emissions rate that recognizes both the thermal output and the electric output associated with CHP). Washington and Oregon have adopted the same approach.

EPA Must Give Flexibility for States Under Section 111(d)

The Alliance for Industrial Efficiency asks EPA to provide flexibility to states in implementing plans under Section 111(d) for existing sources. Many states already have ambitious energy efficiency and renewable energy programs, which reduce greenhouse gas emissions from the electric utility sector.[23] Others have adopted state or regional GHG reduction programs (e.g., the Regional Greenhouse Gas Initiative and California AB32). To the extent that these programs are "equivalent" (or superior) to the federal guidelines, we urge EPA to credit reductions associated with these programs in any proposed electric utility GHG emissions guidance. To do otherwise would undermine the steps states are already taking to advance energy efficiency and cost-effectively reduce emissions.

We further urge EPA to provide guidance to the states on what EPA will require in state plans submitted under Section 111(d). Such guidance should address issues of additionality; enforceability; measurement and verification (M&V); and permissibility and potential restrictions on allowance trading (including across sectors and across state and national borders), banking, and offsets. Such guidance is needed for states to move forward in the regulation of existing sources.

Again, on behalf of the Alliance for Industrial Efficiency and the US Clean Heat and Power Association, thank you for the invitation to comment on this important rule – and for your continued recognition of the role of energy efficiency as a compliance mechanism.

Sincerely,

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On behalf of:
Avalon Consulting, Inc.
DCO Energy
Energenic
Infinia Corp.
Mechanical Contractors Association of America (MCAA)
National Electrical Contractors Association (NECA)
The Ohio Business Council for a Clean Economy
Ormat Technologies Inc.
Pew Environment Group

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[23] *See* US Department of Energy, States with Renewable Portfolio Standards (providing an interactive map and descriptions of state standards) (http://apps1.eere.energy.gov/states/maps/renewable_portfolio_states.cfm) (visited March 16, 2011).

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