U.S. HOUSE OF REPRESENTATIVES
COMMITTEE ON SCIENCE, SPACE, AND TECHNOLOGY
SUBCOMMITTEE ON ENVIRONMENT
SUBCOMMITTEE ON ENERGY

HEARING CHARTER

EPA Power Plant Regulations: Is the Technology Ready?

Tuesday, October 29, 2013
10:00 a.m. – 12:00 p.m.
2318 Rayburn House Office Building

<u>PURPOSE</u>

The Subcommittees on Environment and Energy will hold a joint hearing entitled *EPA Power Plant Regulations: Is the Technology Ready?* on Tuesday, October 29th, at 10:00 a.m. in Room 2318 of the Rayburn House Office Building. The hearing will cover what considerations the EPA relied in making its selection of best system of emissions reductions in the proposed New Source Performance Standards (NSPS) for electric generating units (EGUs). In so doing, the hearing will explore the technological basis for concluding that carbon capture and storage (CCS) is adequately demonstrated as a technology for controlling carbon dioxide emissions in full-scale commercial power plants. Further, the hearing will examine whether the rule promotes or deters technological development and American leadership in energy technologies. Fundamentally, this hearing seeks to answer the question: Has CCS technology been "adequately demonstrated?"

<u>WITNESS LIST</u>

- **The Honorable Charles McConnell**, Executive Director, Energy & Environment Initiative, Rice University
- **Dr. Richard Bajura**, Director, National Research Center for Coal and Energy, West Virginia University
- **Mr. Kurt Waltzer**, Managing Director, The Clean Air Task Force
- **Mr. Roger Martella**, Partner, Environmental Practice Group, Sidley Austin LLP

<u>BACKGROUND</u>

Regulatory Context:

Section 111 of the Clean Air Act (CAA) establishes a unique technology-based mechanism for controlling emissions from stationary sources. Section 111(b) provides authority for EPA to promulgate NSPS which apply to new and modified sources. Specifically, EPA is directed to set standards based on "the degree of emission limitation achievable through the application of the best system of emission reduction which (taking into account the cost of achieving such reduction and any nonair quality health and environmental impact and energy requirements) the Administrator determines has been adequately demonstrated."[1] In setting the standard EPA is given some flexibility in that "emission limits may be established either for equipment within a facility or for an entire facility."[2]

EPA first proposed a NSPS for emissions for carbon dioxide (CO2) from power plants in 2012. However, after more than 2.5 million comments on the original proposal, EPA decided that a new approach was warranted and rescinded the original proposal.[3]

Simultaneously, on September 20, 2013 Administrator Gina McCarthy announced EPA's re-proposed CO2 NSPS for new fossil fuel-based electric generating units (EGUs). "These proposed standards reflect separate determinations of the best system of emission reduction (BSER) adequately demonstrated for utility boilers and IGCC units and for natural gas-fired stationary combustion turbines."[4]

Under the proposal, EPA concluded that CCS has been adequately demonstrated as a technology for controlling CO2 emissions in full-scale commercial applications at coal-fired EGUs, while reaching the opposite conclusion—that CCS is not adequately demonstrated—in the case of gas-fired EGUs. Based on this determination, EPA proposed an emissions limit for coal-fired sources of 1,100 lbs of CO2 per mega-Watt-Hour (MWH) and proposed standards for natural gas combined cycle sources from 1,000 to 1,100 lbs CO2/MWH depending on the size and type of unit.[5] Electric Generating Units that primarily fire biomass are exempted from the proposed rule.[6]

In examining the regulatory impact, EPA asserted that "coal units built between now and 2020 would have CCS, even in the absence of this rule." In light of this modeling, "EPA projects that this proposed rule will result in negligible CO2 emissions changes, quantified benefits, and costs by 2022."[7] The proposal seeks comment.

Technical Background:

Carbon capture and storage (CCS) methods capture CO2 from fossil fuel combustion before it is released into the atmosphere and store it underground in geological formations. Unlike some emission control devices, CCS is not simply one piece of technology; it requires a system of coordinating elements for successful implementation. Broadly speaking, there are four links in the CCS chain: capture, compression, transportation, and storage. Each link in the chain poses separate and distinct challenges to the efficacy of the technology. Among these

[1] Clean Air Act § 111(a)(1), 42 USCA § 7411(a)(1) (2006).
[2] http://www2.epa.gov/sites/production/files/2013-09/documents/111background.pdf
[3] Standards of Performance for Greenhouse Gas Emissions from New Stationary Sources: Electric Utility Generating Units, Proposed Rule, Preamble p. 14-5, Sep. 20, 2013.
[4] *Id.* at 15.
[5] *Id.* at 15-6.
[6] *Id.* at 30, fn. 8.
[7] *Id.* at 16-7.

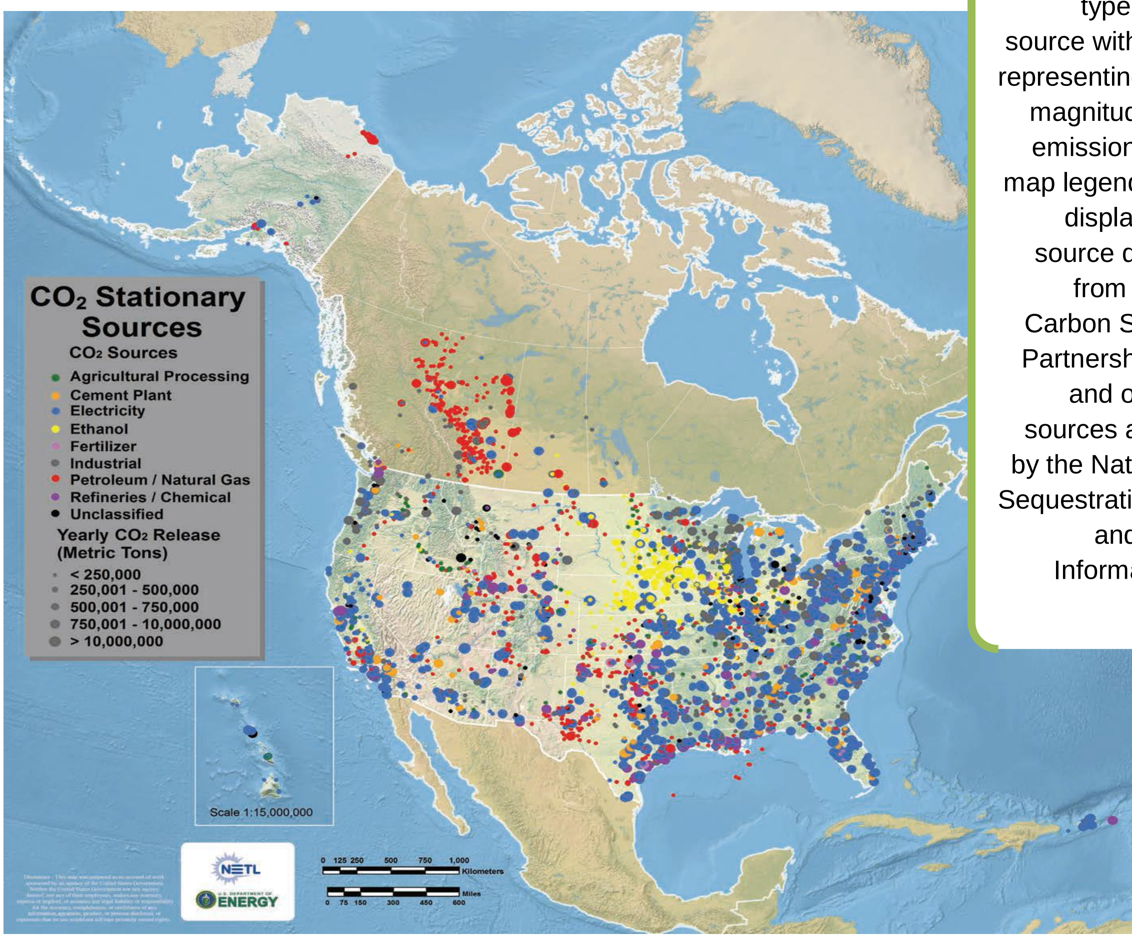
components, capture is the most technology-intensive and costly. Storage, on the other hand, poses the greatest liability and regulatory obstacles.

In the NSPS proposal, EPA notes four projects which—with significant governmental financial assistance—are designed to use some type of capture technology.[8] Although none of these projects have been completed, EPA anticipates at least one of these demonstration projects will be operational in the near future. EPA cites Southern Company's Kemper County Energy Facility in Mississippi, SaskPower's Boundry Dam CCS Project in Canada, The Texas Clean Energy Project in Odessa, and Hydrogen Energy California, LLC. Each of these projects, when completed, will utilize some elements of the CCS system EPA has selected in this proposal.

However, despite the promise of CCS technologies in power systems, currently there are no electric power plants operating with the CCS technology on a commercial scale.

CO_2 Sources

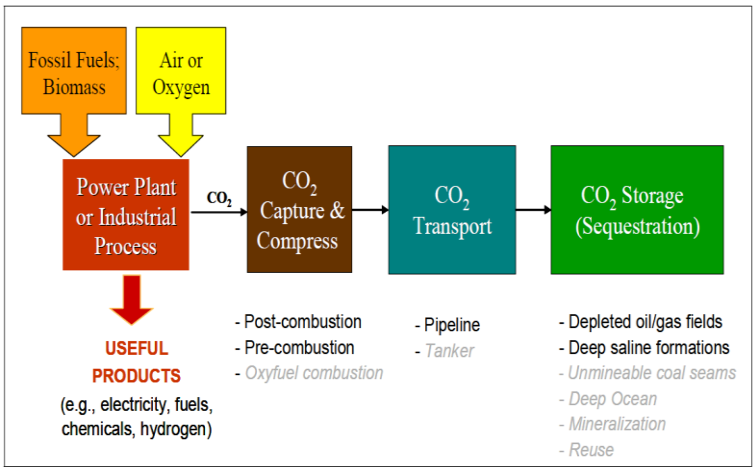
Where does CO2 come from? Nearly half of emissions come from mobile sources, like cars. But Stationary Sources also release CO2. Each colored dot represents a different type of stationary source with the dot size representing the relative magnitude of the CO_2 emission source (see map legend). This map displays stationary source data obtained from the Regional Carbon Sequestration Partnerships (RCSPs) and other external sources and compiled by the National Carbon Sequestration Database and Geographic Information System (NATCARB).



[8] EPA cites Southern Company's Kemper County Energy Facility, SaskPower's Boundry Dam CCS Project, Texas Clean Energy Project, and Hydrogen Energy California, LLC.

Capture

CO2 capture may be achieved through pre-combustion, post-combustion, or oxy-combustion technologies. **Pre-combustion** removal methods typically require the high-concentration of CO2 associated with expensive gasification systems. **Post-combustion**, on the other hand, utilizes nitrogen-based solvents to scrub the CO2 from the flue gas. However, because post-combustion capture requires substantial heat input to release the CO2 and regenerate the solvent, it results in significant reductions in overall plant efficiency and a substantial increase in cost. A third process, **oxy combustion**, requires expensive and energy intensive air separation units. While oxy systems hold promise, they are more experimental. Overall, while capture technologies exist, the new challenges associated with operating at a larger scale will not become clear until after full-scale deployment.



Source: E. S. Rubin, "Will Carbon Capture and Storage be Available in Time?" Proc. *AAAS Annual Meeting, San Diego, CA, 18-22 February 2010*, American Academy for the Advancement of Science, Washington, DC.

Compression & Transport

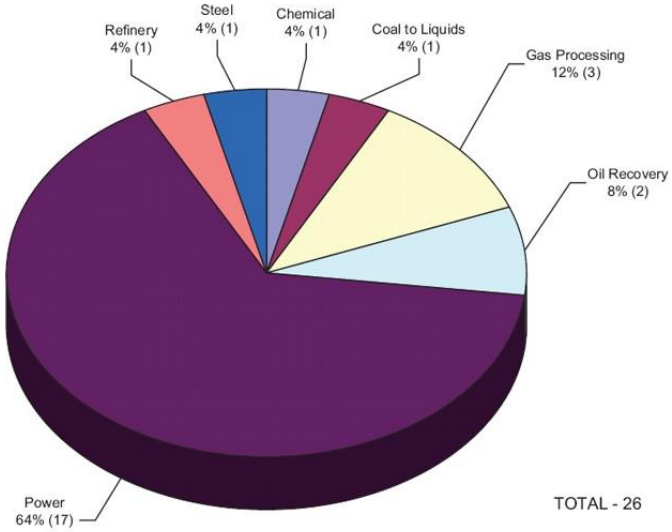
Once the CO2 is captured, it must be compressed. As with capture, compression is an energy intensive process. After compression, transportation to a storage site is required. Although dedicated CO2 pipelines have potential, technical challenges remain to ensure safe and reliable transport. Given the numerous policy and regulatory issues related to siting, permitting, and environmental requirements, creation of a full-scale CO2 pipeline infrastructure requires tremendous capital investment.

Storage

The critical final step in a CCS system is storage. However, permanently storing emissions is highly dependent on geologic systems. Geological storage is potentially available in deep saline formations, depleted oil fields, un-mineable coal seams, or for enhanced oil or gas recovery (EOR). However, lessons learned from failed storage sites in Africa demonstrate that maps of promising geologic formations do not always equate to locations where carbon storage can occur. Consequently, unresolved issues related to property rights acquisition, pore space management, regulatory structure, environmental protection issues, and liability remain a challenge. Significantly, EPA is unable to release operators from federal liability and litigation risk without legislative changes to existing environmental law.

Because of these challenges and the potential to offset the significant cost of CCS, the proposed rule focuses on the use of the captured CO_2 for enhanced oil recovery (EOR). EOR has been used as a way to increase production in depleted oil fields by injecting CO_2 into the oil deposit and pumping previously unrecoverable oil to surface. While EOR provides outstanding opportunities to increase oil production in some regions, many locations do not have access to an EOR market. Absent a robust EOR market, CO_2 would simply be stored geologically.

According to the Global CCS Institute's 2013 report, seventeen (65 percent) of the 26 cancelled or delayed CCS projects are in power generation.



Future of CCS Demand:

As discussions of new climate strategies continue, pressure for additional CO_2 restrictions will likely increase. Simultaneously, worldwide energy demand, particularly in emerging economies, is growing rapidly. Much of the current and future demand for energy will continue to be supplied by fossil fuels. Consequently, many projections suggest a strong long-term need for affordable technologies that can supply low-carbon energy from fossil fuels.

Additional Reading:

CONGRESSIONAL RESEARCH SERVICE, *Carbon Capture and Sequestration (CCS): A Primer*. July 16, 2013. Available at: http://www.crs.gov/pdfloader/R42532.

GLOBAL CCS INSTITUTE, *Global Status of CCS: 2013*. Oct. 10, 2013. Available at: http://www.globalccsinstitute.com/publications/global-status-ccs-2013/online/117741.

Hearing Charter, HOUSE SCIENCE, SPACE, AND TECHNOLOGY, SUBCOMMITTEE ON ENERGY AND ENVIRONMENT HEARING, *The Future of Coal: Utilizing America's Abundant Energy Resources*, July 25, 2013. Available at: http://science.house.gov/sites/republicans.science.house.gov/files/documents/HHRG-113-SY20-20130725-SD001%20.pdf.

U.S. ENVIRONMENTAL PROTECTION AGENCY, *Standards of Performance for Greenhouse Gas Emissions from New Stationary Sources: Electric Utility Generating Units*. 40 CFR Part 60. Sep. 20, 2013. Available at: http://www2.epa.gov/carbon-pollution-standards/2013-proposed-carbon-pollution-standard-new-power-plants.