Comments of the Center for Climate and Energy Solutions on
Standards of Performance for Greenhouse Gas Emissions from
New Stationary Sources: Electric Utility Generating Units;
Proposed Rule
United States Environmental Protection Agency
(79 Fed. Reg. 1430 (January 8, 2014))
Docket ID No. EPA-HQ-OAR-2013-0495; FRL-9839-4

This document constitutes the comments of the Center for Climate and Energy Solutions (C2ES) on the proposed standards of performance for greenhouse gas (GHG) emissions from new electric utility generating units (Proposal), proposed by the U.S. Environmental Protection Agency (EPA) and published in the Federal Register on January 8, 2014. C2ES is an independent, nonprofit, nonpartisan organization dedicated to advancing practical and effective policies and actions to address our global climate change and energy challenges. As such, the views expressed here are those of C2ES alone and do not necessarily reflect the views of members of the C2ES Business Environmental Leadership Council (BELC). In addition, the comments made in this document pertain to new sources in the specific industrial sector addressed by the Proposal and may not be appropriate for other industrial sectors or for existing electric utility generating units.

Benefits of a market-based greenhouse gas reduction policy

C2ES believes market-based policies – such as emissions averaging among companies, a cap-and-trade system, an emissions tax, or a clean energy standard with tradable credits – would be the most efficient and effective way of reducing GHG emissions and spurring clean energy development and deployment. Properly designed market-based policies create an appropriate division of labor in addressing climate change, with the law establishing the overarching goal of reducing GHG emissions, and private industry determining how best to achieve that goal. Under market-based policies, the government neither specifies a given company's emission level nor requires the use of any given technology – both of these determinations are made by the company itself.

Beyond providing an incentive for the use of best available technologies, market-based policies provide a direct financial incentive for inventors and investors to develop and deploy lower-cost, clean energy technologies, and leave the private market to determine technology winners and losers. Market-based policies can be designed to minimize transition costs for companies and their customers in moving from high-emitting technologies to low-emitting technologies; to prevent manufacturers in countries without GHG limits from gaining a competitive advantage over U.S. manufacturers; and to reverse any regressive impacts of increased energy prices. At the

federal level, market-based policies have been used to reduce sulfur dioxide emissions at a fraction of the originally-estimated cost, while at the state level they have been used successfully in renewable energy programs and cap-and-trade programs.

However, enactment of federal legislation that would establish a comprehensive market-based policy to reduce GHG emissions does not appear imminent. Given the urgency of addressing the rising risks that climate change poses to U.S. economic, environmental, and security interests, C2ES believes that in the absence of Congressional action to reduce greenhouse gas emissions, EPA must proceed using its existing authorities under the Clean Air Act.

The United States needs a comprehensive energy strategy that delivers a diverse set of affordable low-emitting sources of electricity.

C2ES believes that as a matter of national policy and economic common sense, it is imperative to enhance energy diversity through programs that advance low-emitting uses of coal and natural gas; nuclear power; renewable energy; and efficiency in generation, transmission and end-use. In particular, because coal- and natural gas-fired generation will likely be predominant sources of electricity in the United States and most of the world's other major economies for decades to come, it is essential to advance carbon capture and storage (CCS) to the point that its use is economical in the context of electricity generation. The United States needs an effective strategy for continuing to scale up CCS with the goal of making it relatively inexpensive to use on future coal and natural gas power plants.

A CCS strategy should include a major research, development and demonstration effort, and subsidies to actively encourage the use of CCS with new and existing natural gas and coal power plants so that the technology can travel down the learning curve. C2ES strongly supports, among other measures, the federal grant programs that have advanced CCS. CO_2-enhanced oil recovery (CO_2-EOR), a practice in which oil producers inject CO_2 into wells to draw more oil to the surface, presents an important opportunity to advance CCS while boosting domestic oil production and reducing CO_2 emissions. A coalition,[1] co-convened by C2ES, supports the Expanding Carbon Capture through Enhanced Oil Recovery Act of 2014, which includes a federal tax credit for capture and pipeline projects to deliver CO_2 from industrial and power plants to operating wells.

In addition to investing in CCS, it should be a national priority to invest in and otherwise advance a range of low-emitting energy technologies—for economic, as well as environmental, reasons. The diversity of energy sources used in electricity generation has been a valuable hedge against the potential of price volatility of the various fuel sources, including natural gas. An

electricity sector that becomes overly reliant on any single fuel would create unintended risks for our economy.

In light of this, the Proposal should be assessed in large part on its effectiveness in supporting, and not inhibiting, the deployment of carbon capture, CO_2-EOR, and other carbon-cutting technologies.

There has been broad experience with CCS, though it has not been widely deployed in the power sector at a commercial scale.

CCS is in use at a commercial scale in various industries. Worldwide, there are approximately 50 commercial-scale CCS projects in the power and industrial sectors in various stages of development.[2] Twelve of these commercial-scale CCS projects are now in operation: eight natural gas processors, two fertilizer plants, one hydrogen plant, and one synthetic natural gas plant. In the power sector, there are two commercial-scale power plants under construction: Kemper IGCC in Mississippi and Boundary Dam in Saskatchewan. Additional CCS power projects are being planned in the United States, including: Summit Power's Texas Clean Energy Project, NRG Energy's Washington Parish Plant, SCS Energy's Hydrogen Energy California (HECA), and the FutureGen project in Illinois.

All existing commercial-scale CCS projects transfer the captured CO_2 to oil production projects for use in EOR. This practice is critical to the success of CCS in the power sector. EOR using CO_2 has been practiced in the United States for 40 years, and accounts for about 6 percent of domestic oil production.[3] CO_2-EOR creates a value for captured CO_2, which can be used to offset CCS construction costs. As an example, Air Product's Port Arthur CCS project, a hydrogen production facility, will capture approximately one million tons of CO_2 each year, which will be transported by pipeline and injected into East Texas oil wells to produce an estimated 1.6 million to 3.1 million barrels of domestic oil each year.[4] EPA has provided a pathway for demonstrating the geologic storage of CO_2 utilized in EOR by meeting certain requirements of the Underground Injection Control Program and the Greenhouse Gas Reporting Program.[5]

The United States has more than enough storage potential to accommodate captured CO_2 emissions. The U.S. Geological Survey (USGS) recently reported that the nation has the capacity to store 3,000 metric gigatons of CO_2 in geologic basins around the country, which is more than 500 times the nation's 2011 energy-related CO_2 emissions.[6] These USGS estimates are consistent with similar studies of U.S. underground storage potential. In the 2012 North American Carbon Storage Atlas, the Department of Energy's National Energy Technology Laboratory (NETL) states that "an estimated 600 to 6,700 years of CO_2 storage resource is

available in the Unites States based on 2011 emission rates."[7] The same study notes that mature oil and gas reservoirs across the United States are "excellent target locations for geologic storage of CO_2" given that they have held hydrocarbons in place for centuries and have been extensively explored, providing needed data to plan and manage potential CCS projects.[8] In Texas alone, oil and gas reservoirs could provide 120 years of CO_2 storage based on the state's current emissions rate.

A standard that requires CCS on new coal plants guards against undue climate risk.

Recent energy market developments having nothing to do with GHG regulation, such as the availability of inexpensive natural gas and the regulation of other pollutants, have created conditions under which the GHG emissions intensity of electricity generation is declining. Aside from one facility far along in the planning process and specifically exempt from the Proposal, construction of new conventional coal plants is currently not foreseen because natural gas prices are expected to remain very low through 2024 (when the Clean Air Act requires that the rule be reevaluated). For this reason, the EPA estimates that there will be no cost for industry compliance with the Proposal as compared with the status quo.

That said, it is important to recognize that energy price projections are often wrong. Significant increases in natural gas prices may renew interest in new coal plants. Issuing a standard that allows construction of new high-emitting coal plants without a CCS requirement therefore poses a nontrivial risk to our climate. Given their long lifetimes, construction of new high-emitting coal plants could lock in their higher emissions for many decades to come, exacerbating the economic challenge the United States faces in reducing its GHG emissions. C2ES considers this an unacceptable threat to the public health and welfare of the United States.

A CCS requirement for new power plants, coupled with federal support, could aid in the development and deployment of this critical technology.

CCS is a promising technology that is critical to the achievement of global climate goals, but several barriers to deployment remain. Most significantly, at this stage of its deployment, CCS, while technologically available, is not currently commercially viable in the context of electricity generation. According to the Proposal, the levelized cost of electricity for coal with partial CCS is about $109 / MWh. However, the Proposal projects that this figure could drop to $97 / MWh if the CO_2 is highly valued for use in an EOR operation. It is therefore crucial that power companies are enabled to sell captured carbon to CO_2-EOR operators and that EPA continue to recognize a pathway for demonstrating the geologic storage of CO_2 through EOR projects. With the exception of FutureGen, all of the remaining proposed commercial-scale CCS power plant

projects in the United States intend to sell CO_2 for use in EOR. While the cost of coal with CCS is still higher than natural gas generation ($59 - $86 / MWh) and coal without CCS ($92 - $97 / MWh), it is comparable to other low-carbon generation sources, such as biomass ($97 - $130 / MWh).

The approximately 18 percent cost difference between coal plants without and with CCS (assuming no EOR price) found by EPA is roughly in line with estimates made by other experts. A 2013 report by ICF International for the National Association of Regulatory Utility Commissioners and the Eastern Interconnection States' Planning Council compiled CCS cost estimates made by the Energy Information Administration, the National Renewable Energy Laboratory, and the National Energy Technology Laboratory. ICF reported that the inclusion of CCS technology on an IGCC coal plant would add to the levelized cost of electricity by roughly 18 to 30 percent.[9] Since this estimate assumes no return from EOR, net CCS costs should be lower.

Given its cost, power companies currently have little reason to invest in CCS projects. To counter this, CCS in the power sector needs the combination of a regulatory driver and financial support. Requiring CCS for new coal plants would send a clear regulatory signal to power companies, their investors, and utility regulators that power companies will need to invest in CCS technology in order to utilize the energy value of coal well into the future.

While a CCS requirement is necessary to the deployment of CCS in the power sector (assuming no significant price on carbon in the market), it is not sufficient. In addition to the regulatory driver provided by the Proposal, CCS deployment needs federal financial support to be a viable option for power companies and their customers. CCS deployment can be hastened through the expansion of a variety of federal funding programs already in place, in addition to the tax credit to cover the difference between the cost of investing in CCS and the sales revenue received for utilizing CO_2 in EOR discussed above. These funding programs include investment tax credits and Department of Energy initiatives including grants through the Clean Coal Power Initiative and loan guarantees. A combination of these measures has been critical in supporting CCS power projects in development, such as the Kemper plant in Mississippi and the HECA plant in California.

CCS projects also need the support of state Public Service Commissions (PSC), which to date have often been ambivalent because of both the costs of CCS technology and the lack of any regulatory impetus to employ this technology. The PSCs of both Virginia and West Virginia, for example, denied American Electric Power's request to have expenses for the installation of pilot-scale CCS equipment at its Mountaineer Plant reimbursed by ratepayers.[10] The Virginia PSC had previously cited uncertainty regarding federal carbon regulations when denying an earlier rate case for Mountaineer.[11] Requiring new coal plants to employ CCS technology would likely give

state PSCs certainty and could encourage them to approve the construction of coal plants with CCS, especially as the first commercial-scale power plants become operational and provide lessons for reducing the cost of CCS. This certainty would likely make PSCs more willing to approve ratepayer cost recovery for CCS projects, making them a more realistic option for power companies.

EPA should consider adding flexibility mechanisms for coal plant compliance to allow time for technology development.

Establishing a regulatory requirement and providing financial support for CCS would only be part of the solution. Power companies would also need time to bring CCS to the point of being cost competitive with alternative low- and no-carbon power generating technologies. Given the importance of this development time, we encourage EPA to explore options to allow power companies some flexibility in installing CCS on new coal plants. Below we offer two possible approaches EPA might take to allow for flexibility in the CCS requirement. These options are described for illustrative purposes only and this should not be taken as a C2ES endorsement of either.

We agree with the Proposal that all coal-fired power plants built after the rule is finalized should be required to employ CCS. However, we believe that the technology development benefits of a flexible compliance timeline would hasten the broad deployment of CCS in the power sector, more than outweighing any near-term carbon emission increases relative to the Proposal. One method to enhance flexibility would be to allow power companies to comply with an average emission rate over an extended period of time, similar to the 30-year average option included in EPA's original proposal for this rule. As an example, EPA could require an average of 40 percent carbon capture over each coal plant's first 20 years of existence. With this option, a power plant operator would be authorized to construct a new coal power plant, operate it without capture for 5 years while further developing CCS technology, and operate the plant with 55 percent capture from then on, such that in the first 20 years it captured an average of about 40 percent of its CO_2 emissions.[12] In addition to allowing time for technology development, this option would give power plant operators a revenue stream to invest in CCS construction, including the pipes and other infrastructure necessary to deliver captured carbon to CO_2-EOR fields. If a long-term average option provides too little assurance that CO_2 will ultimately be captured and sequestered, EPA could also include an interim deadline by which some set percentage of emissions must be captured. For example, EPA could require an average of 40 percent capture for the first 20 years of a plant's existence, and that at least 20 percent capture must be achieved in the plant's fifth year of existence.

As an alternative to the long-term average option, EPA could require a set percentage of capture by a set date, but allow some time for new plants to operate without CCS. The percentage requirement could be increased from the Proposal to ensure little or no net increase in carbon dioxide emissions relative to the Proposal. For example, EPA could require that all coal plants constructed in 2015 or later must achieve at least 50 percent capture by 2020.

EPA should set the emissions standards for natural gas plants at levels that can be reliably achieved by currently available technology under reasonably expected operating conditions.

The technology on which the standards for both larger (> 850 mmBtu/hr) and smaller (< 850 mmBtu/hr) natural gas plants in the Proposal is based is natural gas combined cycle (NGCC). It is imperative that the EPA set the GHG emissions standards at levels and in forms that can be reliably achieved by currently available NGCC technology under the full range of reasonably expected operating conditions.

C2ES supports the bifurcation of NGCC standards based on plant size. We also, however, urge EPA to ensure that the proposed standards are achievable for new NGCC plants under all likely operating conditions. In order to maximize the efficiency of the overall interconnected electric system – and often to minimize the overall GHG emissions – it is sometimes necessary to run a particular plant at less than peak efficiency. The standards should reflect this reality.

EPA should codify the New Source Performance Standards in a way that maximizes options available during the rulemaking for greenhouse gas standards for existing power plants.

EPA is seeking comment on whether the proposed NSPS should be split between 40 CFR Part 60 subparts Da and KKKK or should appear together in a new subpart, TTTT. EPA should consider the impacts that this choice will have on its rulemaking process for GHG standards for existing power plants under Clean Air Act Section 111(d). Although C2ES does not yet have specific recommendations regarding this 111(d) rulemaking, we suggest that, due to the linked nature of these two regulatory processes, EPA not take any unnecessary action through 111(b) that might limit its options under 111(d). To that end, C2ES believes the proposed NSPS should be codified together under subpart TTTT.

Codifying the proposed NSPS within a single subpart of the CFR should make it more certain that EPA's guidelines for existing power plants under 111(d) could allow for credit trading among different subcategories of sources. Although the Proposal stresses that all electric

generating units will fall within a single source category for purposes of Clean Air Act regulation, splitting the NSPS into two subparts could leave this open to legal challenge. Since we see no downside to codification in a single subpart, this approach is preferred.

The Energy Policy Act of 2005 prohibits EPA from determining a financially supported technology as "adequately demonstrated" only if EPA's sole basis for this determination are financially supported projects.

EPA is seeking comment on the impact of the Energy Policy Act of 2005 (EPAct) on its determination of CCS technology as "adequately demonstrated" for the purpose of Clean Air Act Section 111. Our reading of EPAct suggests that EPA cannot base this determination on projects supported by the Clean Coal Power Initiative (CCPI) or other tax credits listed in EPAct if these projects are the *sole* basis for EPA's determination. However, CCPI-supported projects can be part of EPA's "adequately demonstrated" determination if other projects are also part of the determination. Since EPA has based its determination on CCPI supported projects, such as the Texas Clean Energy Project, as well as additional projects, such as SaskPower's Boundary Dam plant, we believe EPA has not erred in the evidence presented for its finding that CCS technology for the power sector has been adequately demonstrated.

The key EPAct language at issue appears in Section 402(i) of EPAct, which is codified as 42 U.S.C. § 15962(i). The word "solely" in this section indicates that CCPI-supported projects cannot be the only basis for EPA's determination that a technology has been adequately demonstrated. However, this does not mean that these projects cannot be considered at all. We believe the alternate reading -- that EPA cannot consider CCPI-supported projects at all -- effectively reads "solely" out of the statutory language and is therefore incorrect. Parallel reasoning can be applied to Section 1307(b) of EPAct (26 U.S.C. § 48A(g)).

EPA should carefully consider the relationships among its carbon pollution standards for new, modified or reconstructed, and existing power plants.

We request that, to the extent feasible, EPA provide guidance as to when, specifically, individual power plants would shift regulatory regimes within the standards for new, modified or reconstructed, and existing power plants. This is critical to reducing long-term uncertainty both for investment in new power plants and the scope of state plans to implement carbon pollution standards for existing power plants. It is currently unclear whether a new plant built to comply with the carbon pollution standard for new power plants (Section 111(b)) would ever have to comply with carbon pollution standards for existing plants (Section 111(d)), or if such a plant would be permanently exempt from future emission cuts.

Several states have been publically discussing their preference for a Section 111(d) rule that authorizes a statewide carbon budget to cap and reduce emissions from existing power plants. In such states it may be more administratively efficient and cost-effective simply to place new plants immediately under the carbon budget determined in accord with the Section 111(d) guidelines. These states would benefit greatly from knowing as soon as possible how and when to factor new plants into their carbon budgets. Additionally, it is necessary to specify whether modified or reconstructed plants will be covered by Section 111(d) rules, in addition to Section 111(b).

References

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[12] This assumes the plant operates with the same capacity factor throughout. The first 20 years of operation can be summarized as: 0 percent capture x 5 years + 55 percent capture x 15 years. Averaging this capture amount over the first 20 years: 55 percent x 15/20 = ~40 percent capture over 20 years.