COMMENTS OF THE CENTER FOR CLIMATE AND ENERGY SOLUTIONS ON STATE GUIDELINES FOR GREENHOUSE GAS EMISSIONS FROM EXISTING ELECTRIC UTILITY GENERATING UNITS; ADVANCE NOTICE OF PROPOSED RULEMAKING.

DOCKET ID NO. EPA–HQ–OAR–2017–0545

This document constitutes the comments of the Center for Climate and Energy Solutions (C2ES) on EPA's Advance Notice of Proposed Rulemaking on State Guidelines for Greenhouse Gas Emissions from Existing Electric Utility Generating Units. 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).

Overarching issues

Emissions of greenhouse gases lead to higher average air and ocean temperatures. These, in turn, contribute to longer and hotter heat waves, stronger storms, greater wildfire risk, longer growing seasons, and other changes to the climate. Each of these impacts is recognized to harm public health through increased mortality and morbidity, reduced air quality, and longer pollen/allergy seasons. Notably, those populations most vulnerable to these public health impacts are often low income, elderly, and children.[1]

Since 2009, when the EPA Administrator made a finding that greenhouse gases endanger public health and welfare, the body of scientific evidence demonstrating harmful consequences of greenhouse gases has only grown and strengthened. Moreover, compelling evidence is building that greenhouse gases harm the economic well-being of the United States, above and beyond the endangerment of public health. It is clearer than ever that steps must be taken to reduce greenhouse gas emissions.

C2ES believes the best way to reduce greenhouse gas emissions is an economy-wide, market-based policy implemented with national legislation; however, the urgency of the problem demands that action be taken via existing regulatory authority while a legislative approach remains under development. The Supreme Court confirmed that the Clean Air Act provides the U.S. Environmental Protection Agency (EPA) with authority to regulate greenhouse gas emissions, so C2ES supports a rulemaking to reduce greenhouse gas emissions from electric utility generating units (EGUs).

C2ES is pleased to have the opportunity to offer more specific comments on several of the main areas EPA identified.

The role of state and federal governments

The final EPA regulation of greenhouse gases from EGUs will exist in a complex landscape of other policies, both federal and state. Over the last several years, a majority of states have implemented climate and/or clean energy policies that affect greenhouse gas emissions from the power sector. These policies include mass-based limits on carbon emissions, rate-based limits on carbon emissions, mandates for renewable generation and nuclear generation, and incentives for investment in carbon capture use and sequestration technologies. Only the mass-based limits on emissions, namely the Regional Greenhouse Gas Initiative and California's cap-and-trade program, directly affect emissions at existing EGUs because they are covered sources in those programs. But the other policies indirectly affect emissions at existing EGUs, typically by reducing the total output of electricity consumed from these units in favor of non-emitting sources.

We encourage EPA to include the maximum amount of flexibility in a final rule on existing EGUs, in recognition of this complex policy landscape in which EGUs operate and of the fact that duplicative regulations will only lead to higher administrative costs with no additional environmental benefits. For example, if EPA developed sample state plan text that set a statewide mass-based target, states could consider implementing a plan that relied upon existing state mass-based programs and required only a single compliance action for EGUs.

Maximum flexibility has other benefits as well. Because the electricity grid does not respect state lines, EGUs often sell electricity in states outside of the state in which they are located. Maximum flexibility would allow states to work in partnership with neighboring states and their RTOs/ISOs to determine the scope and form of emission standards that best reflect their local circumstances. Additionally, flexible compliance options, like emissions averaging and trading, are known to reduce overall costs of reducing pollution. The EPA has a long history of successfully using trading mechanisms to achieve pollution reduction at reduced compliance costs. Examples include phasing out lead in gasoline, the Acid Rain Program, and controlling for ozone and fine particulate matter.

While we support a final rule that gives states the maximum compliance flexibility, it is important that the rule deliver real reductions in addition to what state policies and market forces are expected to do without federal action. A unit-by-unit performance standard, based on historic emissions rates for individual EGUs, would be one way to achieve this result. EPA could still allow states to adopt flexible mechanisms within this framework. As precedent, Washington state's Clean Air Rule required individual units to reduce emissions relative to their historic performance, but units could generate tradable credits by reducing even faster than required. This mechanism provides an incentive for units to overcomply, but at the same time provides compliance flexibility for unanticipated situations without comprising environmental performance.

Defining "systems of reductions" for greenhouse gases

C2ES does not have specific comment on this area.

Defining BSER for greenhouse gases for existing EGUs

The Clean Air Act is meant to be technology forcing, and C2ES supports federal policy that drives innovation in clean energy technologies that can be sold in the U.S. and abroad. Both 111(d) and 111(b) share an objective of promoting innovation. While there is little case law on the meaning of the "best system of emissions reduction" in the 111(d) context, there is case law on what BSER means in the 111(b) context. The 111(b) context makes clear that cost impacts can be considered at a national and regional level over time (as opposed to at the plant level in the immediate present). The 111(b) context also makes clear that adequate demonstration of the BSER does not require that it is routinely achieved within the industry. In fact, EPA may find adequate demonstration based on reasonable extrapolation of the technology's performance in other industries.

There are many technologies to reduce greenhouse gas emissions at existing EGUs that have been adequately demonstrated by this definition, including carbon capture use and storage retrofits. C2ES is pleased to provide an update on technology and market developments in this space over the last few years, in response to EPA's request for comment on this technology specifically.

In the power sector, the first major milestone is that in December 2016, NRG Energy completed construction of the Petra Nova project in Texas on time and on budget. Petra Nova is America's first coal-fired power plant retrofitted with post-combustion carbon capture technology, and is the largest of its kind in the world. The captured CO_2 is transported by pipeline to a nearby oil field where it is used for enhanced oil

recovery (EOR). Importantly, this retrofit does not impose a parasitic load on the existing power plant, and the International Energy Agency estimates projects like this have lifecycle net negative emissions (including the emissions associated with combusting the oil produced by EOR).[2]

The second recent power sector milestone is that in August 2016, the SaskPower Boundary Dam project in Saskatchewan, Canada successfully captured 1 million tons of CO_2 since it began operation in October 2014. The Boundary Dam project was the world's first commercial-scale retrofit of an existing coal-fired power plant with carbon capture technology. The captured carbon is used for EOR in Saskatchewan.

There have also been notable milestones in the industrial sector, which are worth highlighting because these may have implications for the power sector, both in terms of the learning-by-doing that occurs in technology and project development as well as in business model innovation. In November 2016, the Emirates Steel Industries Abu Dhabi CCS project came online as the world's first steel plant retrofitted with carbon capture technology. In April 2017, the Archer Daniels Midland Company announced that the Illinois Industrial Carbon Capture and Storage project in Decatur came online. It is the world's first commercial-scale retrofit of an ethanol production plant with carbon capture technology. The project captures more than a million tons of CO_2 annually and stores the captured emissions in a nearby saline formation.

In the past, there have been concerns expressed about the feasibility of carbon capture on EGUs because of a perception that CO_2 storage sites were not available and accessible. The Fifth Edition of the Carbon Storage Atlas, published in 2015 by U.S. Department of Energy (DOE) in collaboration with local, state and Federal authorities, helps address this concern by expanding characterization of storage sites. DOE has also continued work on the Regional Carbon Sequestration Partnerships with a goal of better understanding CO2 storage in different types of geologic depositional environment storage reservoir classes. As a result of these efforts, there is improved characterization of storage opportunities available for consideration by owners and operators of power plants. Other efforts are ongoing. Several state officials in the Western Governors' Association State CO2-EOR Deployment Work Group have recently advocated for financial incentives for carbon capture infrastructure, such as CO_2 pipelines that would help connect sources of CO_2 with storage opportunities.[3]

It is important to underscore that including some CCS in the setting of the performance standard would not require that all power plants be retrofitted with CCS, if flexible mechanisms like trading are also included. Therefore, some of the concerns that have been expressed about carbon capture technology, such as the availability of space on-site for retrofit technology and the proximity of CO2 storage or pipelines, can be addressed on a case-by-case basis.

Finally, the costs of partial carbon capture are not exorbitant and can be expected to continue to decline. As we have seen with wind and solar energy, overlapping financial incentives at the Federal and state level paired with consistent Research, Development, Demonstration & Deployment (RDD&D) can lead to dramatic cost declines. In Feb. 2018, Congress enacted an extension and expansion of the Section 45Q tax credit, the main financial incentive for investment in carbon capture projects. This action is expected to mobilize private capital and accelerate deployment of carbon capture technology, which can be expected to lead to performance improvements and cost declines.

Potential interactions of a possible rule limiting GHG emissions from existing EGUs with existing statutory and regulatory programs

The EPA previously found that partial carbon capture was adequately demonstrated and is a BSER for new fossil fuel-fired steam EGUs and IGCC plants. In light of the recent carbon capture and storage project and policy milestones described above, this determination is only better supported by the record. To be specific,

there are major coal-fired power plants retrofitted with carbon capture technology in both Canada (the SaskPower Boundary Dam project) and the United States (the NRG Energy Petra Nova project). Carbon capture technology continues to be deployed in new industries, such as on ethanol and steel production facilities. On the policy side, the enactment of an extended and expanded Section 45Q tax credit for investments in carbon capture use and storage technologies suggests that more carbon capture projects are likely to come online, which – based on the experience of wind and solar energy – will likely lead to performance improvements, learning-by-doing, and cost reduction. EPA's original conclusion, that partial carbon capture has been adequately demonstrated and is a BSER for new fossil fuel-fired steam EGUs and IGCC plants, is now even better supported by the record.

Other comments

Many economic studies have shown that market-based approaches are more efficient and less costly overall than command-and-control approaches. They also promote innovation and a greater level of reductions, both of which would have public health and economic benefits in the case of greenhouse gases. Many lessons in program design have been learned over the several decades that environmental markets have been used (and the 10 years for which markets have been used to reduce greenhouse gas emissions).[4] For these reasons, we strongly urge EPA to allow states to implement plans that include market-based approaches, such as emissions trading, to the maximum extent possible.

Endnotes

[1] USGCRP, 2016: The Impacts of Climate Change on Human Health in the United States: A Scientific Assessment. Crimmins, A., J. Balbus, J.L. Gamble, C.B. Beard, J.E. Bell, D. Dodgen, R.J. Eisen, N. Fann, M.D. Hawkins, S.C. Herring, L. Jantarasami, D.M. Mills, S. Saha, M.C. Sarofim, J. Trtanj, and L. Ziska, Eds. U.S. Global Change Research Program, Washington, DC, 312 pp. http://dx.doi.org/10.7930/J0R49NQX

[2] International Energy Agency, Storing CO2 Through Enhanced Oil Recovery (IEA, 2015), available at https://www.iea.org/publications/insights/insightpublications/storing-co2-through-enhanced-oil-recovery.html

[3] Western Governors' Association State CO2-EOR Deployment Work Group, 21st Century Energy Infrastructure: Policy Recommendations for Development of American CO2 Pipeline Networks (2017), available at http://www.betterenergy.org/publications/state-work-group-releases-infrastructure-plan-co2-pipeline-networks-cites-potential

[4] A recent summary of these lessons is provided by Richard Schmalansee and Robert Stavins, "Lessons Learned from Three Decades of Experience with Cap-and-Trade", *Review of Environmental Economics and Policy* 11:1, January 2017 https://doi.org/10.1093/reep/rew017.