



Research

Greenhouse Gas Standards for New Facilities Present Significant Technology Challenges

CATRINA RORKE, SAM BATKINS | OCTOBER 18, 2013

The Environmental Protection Agency (EPA) released a revised proposed rule to limit greenhouse gas emissions from new power facilities. This is the most recent component of the President’s “[Climate Action Plan](#),” and follows two prior greenhouse gas rules that regulated the fuel economy of heavy-duty trucks and cars. Though this rule is not considered “economically significant,” it will be devastating to new coal construction.

EMISSIONS LIMIT PROPOSAL

This proposal improves the legal foundation of a [March 2012 proposed New Source Performance Standard](#) for power facilities, and prescribes emissions limits per megawatt hour (MWh) for new power facilities as follows:

	Emissions Limit (lb CO2/MWh)
Natural Gas – Larger Units	1,000
Natural Gas – Smaller Units	1,100
Coal – one year average	1,100
Coal – seven year average	1,000-1,050

These regulatory limits rely on specific technologies as the “best system of emissions reduction.” Requirements for natural gas are based on the emissions profile of state-of-the-art natural gas combined cycle (NGCC) units. Smaller facilities are generally less efficient than larger facilities, and are given a degree of leniency.

The limits on coal are based on estimates of emissions from facilities employing partial carbon capture and storage (CCS). These limits apply to utility boilers and integrated gasification combined cycle (IGCC) units, alike. (IGCC is a newer technology that gasifies, rather than combusts, coal, allowing for more efficient isolation of pollutants from the emissions stream.) The two compliance time frames allow facilities to select between employing CCS at start-up or phasing it in during operation.

This regulation will not require any significant technology improvements for the natural gas sector. A new

natural gas facility built with the best available equipment will comply without any additional control technology. Not so with new coal facilities.

The American Coalition for Clean Coal Electricity advocated for emissions limits for new coal of 1900-2150 lb CO₂/MWh, which reflect the emissions profiles of top-of-the-line coal facilities.

Existing coal facilities	Emissions Rate(lb CO ₂ /MWh)
Ten largest coal facilities by total generation	2034
Ten largest coal facilities by nameplate capacity	1960
Ten cleanest coal facilities	1678

Source: EPA's Emissions & Generation Resource Integrated Database, Year 2009

The National Energy Technology Laboratory composed a [lifecycle analysis of a coal facility](#) using highly efficient integrated gasification combined cycle (IGCC) technology. Their results suggest an IGCC facility will emit roughly 1850 lb CO₂/MWh, slightly below ACCCE recommendations. A facility that employs CCS to remove roughly 90 percent of its carbon emissions stream would emit 250 lb CO₂/MWh.

The emissions limits stipulated by EPA are unattainable without the addition of CCS technology. Though EPA contends that partial CCS is demonstrated, this is the subject of considerable debate.

OBSTACLES TO CARBON CAPTURE AND STORAGE

The CCS requirement for new coal is a controversial red line for the industry. Despite EPA's claims, the U.S. does not have an operational commercial-scale power facility operating CCS that serves as an industry-wide example. Demonstration projects have been underway for a number of years, but the size of these facilities and the emissions stream they capture do not provide adequate evidence of the feasibility of CCS.

The regulation cites Southern Company's Kemper facility in Mississippi as a commercial example. Employing both IGCC and CCS, this 582 megawatt facility is heralded by the Department of Energy as a "technological first." It will capture roughly two-thirds of its CO₂ emissions for sale to nearby oil fields, which will use the gas to increase output in a process called enhanced oil recovery (EOR). It has also seen \$1 billion in cost overruns, received partial financing from government, benefits from the unique coincidence of a nearby oil field, and, significantly, is not yet operational. Using the Kemper facility as a model for all new facilities is a preposterous leap, and any suggestion of the effectiveness of its CCS technology is pure conjecture.

In reality, there's much work to be done on CCS, particularly in storage. Oil fields employing EOR present only a finite market for captured CO₂; once their demand is met, facilities will have to rely on (and pay for) geologic storage. Evidence suggests 3,000 gigatons of available national storage potential. To use it, we'll need to figure out how to get CO₂ to storage sites, price storage costs, settle issues of long term risk liability, and determine the proper ways to monitor and protect the sequestered gases. Both the national infrastructure and the legal

framework are woefully inadequate to begin commercial-scale storage of the type prescribed in this regulation.

ECONOMIC IMPACTS

Despite requiring major technological advancements for coal-fired facilities, this rule is not considered “economically significant.” To be economically significant, it would need to carry an impact of \$100 million or more. Agency analysis suggests that market conditions alone are pushing operators to build units in compliance with this rule. As a result, it declares the proposed regulations “yield non-monetized benefits and impose negligible costs, economic impacts, or energy impacts on the electricity sector or society.”

The agency does admit that under certain circumstances, such scenarios could result in net costs. If natural gas prices increase dramatically, operators could potentially see net costs of \$9.50/MWh at the high end. Another scenario EPA examines is the construction of new coal plants that utilize CCS technology. While the results vary depending upon the portion of carbon emissions captured and potential revenue from EOR sales, net costs under this scenario could potentially reach \$44/MWh.

Paperwork burdens are not anticipated to change from the original EPA estimate of \$15,570 and 396 hours of annual paperwork. In its discussion of the Regulatory Flexibility Act (RFA), EPA finds that the proposal would not “have significant economic impact on a substantial number of small entities.” However, the agency also notes that it felt the need to meet with various small business representatives multiples times during the proposals’ formulation.

In particular, EPA noted that there was “substantial interest in this rule among small entities (municipal and rural electric cooperatives).” AAF recently produced [a study on the implications](#) this rule, and the rest of the administration’s climate plan, could have on those entities. The RFA section also designates the particular North American Industry Classification System code for affected facilities: “fossil fuel electric power generation.” According to U.S. Census data, the following states could be the most affected:

State	Number of Fossil Fuel Power Plants
Texas	126
Louisiana	81
Ohio	66
California	64
Pennsylvania	64