



**EPA-HQ-OAR-2023-0072**

**COMMENTS**

**NSPS PROPOSED RULE FOR ELECTRIC GENERATORS**

**ENVIRONMENTAL PROTECTION AGENCY**

**NEW SOURCE PERFORMANCE STANDARDS**

**FOR GREENHOUSE GAS EMISSIONS**

**FROM NEW, MODIFIED, AND RECONSTRUCTED FOSSIL FUEL-FIRED  
ELECTRIC GENERATING UNITS:**

**EMISSION GUIDELINES FOR GREENHOUSE GAS EMISSIONS FROM  
EXISTING FOSSIL FUEL-FIRED ELECTRIC GENERATING UNITS;  
AND REPEAL OF THE AFFORDABLE CLEAN ENERGY RULE**

**(88 FED. REG. 33,240-33,420, MAY 23, 2023)**

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**SUBMITTED BY THERESA PUGH CONSULTING**

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## Introduction

The commenter has 21 years' experience with the electric utility sector and 9 years' experience with the oil and gas sector. Commenter served as a technical advisor to Small Entity Representative (SER) under SBREFA panel held by U. S. EPA and U.S. Small Business Administration. Comments were filed first under the SBREFA SER panel in 2013. Commenter has made many public comments and filed comments about the limitations of CCS/CCUS with the U. S. EPA beginning in 2009-2014. Commenter filed comments on Obama Administration's NSPS December 4, 2014 which included many more detailed critiques of CCS that are still applicable today. While that rule was sent back to the EPA by the Supreme Court the detailed comments on carbon capture and underground sequestration (referred to as CCS/CCUS in the comments) are available in those EPA dockets. Commenter met with EPA's electricity regulatory and oil/gas staff eight times between 2010 and 2022. The commenter believes EPA has every authority to regulate GHGs but must follow the law.

## Legal flaws Underpinning Proposed Rule

As expressed by many legal scholars who have written public articles in the last three months and as expressed by Senator Capito and 38 other Senators in a well written letter, that **the EPA ignored the West Virginia v EPA decision** (March 2022) that expressed the EPA can regulate GHGs but cannot run afoul of the authority that Congress granted the agency. Congress did not grant in Clean Air Act Amendments of 1990 or in recent laws that authorized EPA and DOE to look at alternative methods to decarbonize. Congress did not grant any authority in IRA or IJAA to demand that power plants meet obligations that lie outside the fence line (as with a BSER CO2 transport, injection and sequestration system that is outside the property owned by the electric utility). Nor did any of these newer laws, IJAA or IRA, make any new legislative authorization to retire coal plants by 2030 even if these new laws did establish grants, government agency research projects and loans toward decarbonization technologies (CCUS and hydrogen).

The commenter defers to the many comments offered by McGuire Woods, Edison Electric Institute, NRECA, APPA, and others who have identified many legal issues in the proposed rule. The commenter hopes that FERC and NERC will submit comments that address legal issues including that **once again the EPA has stepped outside its authority to regulate emissions by regulating how electricity is made and ignoring reliability**. This proposed rule also offers legal precedents for how other products can be made and regulated by EPA under Section 111.

## Economic and Feasibility Impacts Not Adequately Considered by EPA

EPA's claims, based upon their estimates that the rule, if finalized as proposed, could prematurely retire up to 155 gigawatts of coal units not planning to retire by 2032, due to the infeasibility and cost associated with permitting, constructing, and deploying carbon capture and sequestration by January 1, 2030. EPA made serious assumptions about how many coal-fired, simple cycle or combined cycle natural gas plants would retire due to market pressures before the 2030 deadline. EPA's analysis did not make it clear, based upon modeling, which plants it predicts will retire. This should be required in such a significant rulemaking.

## Hope is **Not** What Congress Meant When It Defined BSER

Commenter agrees with letter from 39 Senators that the proposed rule does not follow the established and court recognized basis for BSER to be based upon technologies that are *adequately demonstrated* and where the definition of adequately meets the common definition of commercially demonstrated. This

means that the EPA has for more than 30 years not recognized BSER to mean fuel switching or to adopt technologies that are projected as possible by researchers, university professors, investors in First of a Kind (FOAK) projects, or ideas from think tanks. BSER meant and still means technologies that are demonstrated and commercially established. In this case while **carbon separation** is technologically proven the many steps between separation, transmission through pipelines and permanent storage are not remotely demonstrated at any full scale power plant in the world. While there are two “hopeful” carbon separation and geologic sequestration projects in Texas and North Dakota and 17 other Underground Injection Control (UIC) permits pending at U. S. EPA these are **not proven to meet a permanent 90% sequestration**. One of the biggest flaws in EPA’s assumptions derived from Enhanced Oil Recovery where CO2 injection is indeed commercially demonstrated and successful. The commenter does not question EOR. The commenter observes that injecting CO2 at an EOR location (whether for gas or oil) is at an entirely different pace than presuming 600-900 MW power plants’ emissions can be moved and injected at a comparable pace. Nor does every state have geologic formations suitable for sequestration. The EPA did not address this critical point that carbon sequestration is not imaginable in states dominated by granite or karsk. That means the CO2 must be moved by pipeline across hundreds of miles in parts of New England and lower Midwest- another enormous logistical challenge. Nor did EPA acknowledge that states with higher risks of earthquakes may never be permitted to do CO2 injection.

No one actually knows the correct CO2 injection rate fast enough to take the power plants’ emissions but not so fast as to cause operational glitches or perhaps very minor earthquakes in geologic formations close to the hundreds of coal-fired and natural gas-fired power plants. EPA ignored the consequences for power plants all over the U. S. and for other industries that will be one day regulated under NSPS rulemakings). The EPA knows better and simply hopes that this final rule would send market signals to close the coal fired power plants before the final rule will work its way through the courts to be overturned as their 2015 final rule was overturned.

The closest demonstrated technologies on CCUS are two plants in the U. S. and neither are functioning today. The first is the 2014-2017 Mississippi Kemper coal plant which received \$270 million from DOE<sup>1</sup>, incentives from state agencies to only achieve only a 65% CO2 sequestration. The Kemper project also resulted in extraordinary higher costs- ballooning from \$3 million to \$7.5 million for their customers to pay a 13% rate hike for over 9 years. Mississippi is one of the poorest states in the country with an average household income of \$49,000 (2023 dollars) and where summertime household electric bills are driven by 95-110 humidity equivalent degree heat. Commenter does not offer this to criticize Mississippi Power or its parent company. Their project was indeed a modern test of syngas or gasification with CO2 separation and underground injection to see if the technology might help address decarbonization options using coal. But what the project proved was that 90% underground injection in a permanent location was not yet possible. **Thanks to Mississippi Power we learned, for now, CCS doesn’t work. That is not a complete waste of tax payers’ money. We learned we should not make hasty decisions that a technology promises when it merely looks promising.**

The second project often identified is **NRG’s Petra Nova** that closed in 2020 costing \$1 billion (sold to JX Nippon for half of its original construction costs). The facility is in Richmond, Texas where the geology and oil/gas expertise are optimal for making CCS/CCUS work. DOE provided \$195 million for this project. The proximity to oil and gas operations and copious drilling and pipeline expertise should have resulted in Petro Nova as a CCS success. But it also failed even though, for a brief time, it was able

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<sup>1</sup> Including 4412 million in investment tax credits approved by the IRS under National Energy Policy Act of 2005 and Energy Improvement and Extension Act of 2008.

to sequester 90% in a EOR location 80 miles away. But more often than not- the sequestration was only at 50-70%. **The Institute for Energy Economics and Financial Analysis believes that the Petra Nova project would only likely sustain a 72% capture and sequestration rate.** According to [Reuters](#), JX Nippon intends to restart the CCS program in August 2023 but already met a delay and this is only August 8th.

Sometimes CCS advocates, including EPA, point to beverage companies or corn ethanol plants that take a CO2 stream from their manufacturing processes. Again, while promising they are not a demonstration of the scope of CO2 coming from a coal (or natural gas) fired power plant. Nor should we presume that all beverage manufacturers should be required to sequester CO2 pulled from their operations when their companies face Section 111 regulations simply because a beverage company here or in Asia can do small scale CCUS.

Others cite the **North Dakota Gasification** plant, once sold by DOE to a coop utility for \$. It is not a functioning electric utility in the conventional sense. It is a **fertilizer plant and syngas plant** that is owned by a utility. The CO2 from that small facility travels approximately 40 miles north into Canada where Sask Power injects the CO2 into Canadian subsurface for oil recovery in Weyburn. Canada has very different laws and regulations and both North Dakota Gasification and Sask Power avoid any potential liability issues which are common in the U. S. Those liability issues include Superfund, product liability, RCRA pH soil acidification concerns, product liability laws, and possibly western water law violation issues.

The commenter spent two days at the North Dakota Gasification Plant and appreciated the detailed expertise provided. But that small company is not a demonstration that CCS can be scaled up comparable to a 600-1,000 MW power plant. Nor are there any indications that the company wants to inject its CO2 in the U. S. The commenter commends the company, a division of Basin Electric, for what it has accomplished in the same manner that the commenter thinks that CO2 injected for oil and gas recovery is excellent. Bravo for their cleverness to use coal to make syngas and fertilizers during some seasons and sell the CO2 to an energy producer in Canada. But these are not power plants.

## EPA's Presto-Chango Magical Thinking on CO2 Sequestration

The commenter's stresses on the Kemper project and the still uncertain opportunity for CCUS in Texas is to point out that CCUS is simply not adequately demonstrated. Nor is it commercially likely given the fact that at least **15 states do not recognize pore space ownership**. Without pore space ownership rights, it is not legal to inject CO2 into the earth. Nor is it even clear that U.S. EPA will defer to Texas Commission on Environmental Quality (TCEQ) and Texas' Railroad Commission (RRC) for primacy in equivalent of permitting Class VI UIC wells.

The EPA skimmed over all these details in suggesting that simply because the carbon can be separated (perhaps even with Direct Air Capture) that the technologies and logistics of the many parts to the "system" that will **magically function**.

EPA's analysis made no serious analysis about pore space, whether CO2 pipelines to convey from power plants to adjacent state injection locations would be deemed a "common carrier" and if the PUCs, FERC or courts will agree that these actions meet the "public good" test. The EPA gave no serious thought to the questions that power of eminent domain give to the question whether carbon dioxide transport across thousands of miles and injection into locations where the landowner may have no financial incentives in the same way that mineral rights owners have when oil or gas is extracted. Landowners might receive some compensation for short term eminent domain determinations but one cannot presume that that

compensation would compensate the landowner permanently yet the assumptions the EPA makes is that the CO<sub>2</sub> is **permanently sequestered only to never be emitted**. Further to the point, through power of eminent domain it is possible that many land owners would have pipelines built under their properties against their will through eminent domain. One need only look at the extraordinarily controversial carbon injection plans for Summit Energy and related companies to take CO<sub>2</sub> from four states (Iowa, South Dakota, Illinois, Minnesota, and North Dakota) and move the CO<sub>2</sub> into EOR locations in North Dakota.

The EPA's assumptions about sequestration also did not address liability coverage. Even Texas, a state known for its enthusiastic support for oil and gas enterprises, does not give a permanent civil liability cap to non-economic losses that result from poor management or failures at sequestration locations. Nor does Texas give long term or perpetual long-tail liabilities after the CO<sub>2</sub> sequestration facility is closed<sup>2</sup>. Nor did EPA give any serious consideration to how the new sequestration locations will require that states will have to pass laws addressing both pore space rights and unitization- concepts that are common in oil and gas producing states but not ever discussed in other states.

The myriad of policy and legal uncertainties related to CO<sub>2</sub> temporary storage, transmission by pipelines, consequences of eminent domain for the thousands of miles for both CO<sub>2</sub> (and hydrogen) pipelines and permanent carbon sequestration are like the “whiskey’s for drinking and water’s for fightin’ **but on steroids**”. The EPA ignored all these issues that are essential to meeting the assumptions for decarbonization with 90% sequestration by 2030- **only 6-7 years away**. Many state legislatures only meet every two years so realistically those states barely have a chance to pass appropriate laws and regulations to accomplish CO<sub>2</sub> sequestration or approvals of CO<sub>2</sub> pipelines to move CO<sub>2</sub> (and hydrogen).

EPA's poor analysis includes the fact that their own agency only has a handful of fulltime staff assigned and already **overwhelmed with 70 Class VI well permit applications**. In order to meet the 2030 deadline, the EPA would have to increase its Office of Water staff and contractors by many hundreds of fulltime employees to review the many Class VI permit applications.

## Hydrogen Energy

The assumptions made by EPA on hydrogen are even more laughable than for geologic sequestration.

Congress authorized DOE funds and IRS tax credits to assist in explorations of different types of hydrogen technologies after funding Hydrogen Hubs. The commenter does not oppose hydrogen research-especially if naturally occurring hydrogen is available. But we are years (perhaps decades) from determining hydrogen should be contemplated for BSER. PERHAPS EPA could revisit in the subsequent six year review of BSER. But it is ridiculous to think that hydrogen was appropriate for BSER determination based upon where we are with hydrogen. Nor do we have any notion that hydrogen based electricity is affordable.

The EPA made assumptions about how hydrogen could be the solution for natural gas-fired power plants as though they know anything about how hydrogen is produced and transported. EPA's analysis did not show any proof that it met with DOT's Pipeline and Hazardous Materials Safety Administration (PHMSA) regarding what amount of pipeline would need to be built for 100% hydrogen (and the many different types of hydrogen) or whether any amount of hydrogen could be carried and mixed with existing natural gas pipelines. I doubt they had the sense to ask.

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<sup>2</sup> “The Top Five Legal Barriers to Carbon Capture and Sequestration in Texas”, Forbes, Nov. 19, 2019.

Many pipeline safety analysts have expressed concerns about using existing natural gas pipelines being able to safely transport more than 5% of hydrogen with natural gas because of **corrosion on steel and different pressurization for different types of hydrogen**. There may be a need for more frequent hydraulic safety tests on CO<sub>2</sub> and hydrogen pipelines. Nor do we know, as a nation, about hydrogen transport on pipelines given **no CO<sub>2</sub> or hydrogen blast zone modeling**. Current pipelines are regulated based upon blast zone predictions. At the May 2023 PHMSA public meetings in Iowa PHMSA senior staff stated that PHMSA had not done any blast zone analysis on CO<sub>2</sub>. PHMSA only looks at natural gas for modeling blast zones. One can easily presume that PHMSA has not yet studied hydrogen either. And state agencies rarely conduct their own blast zone modelling. They rely upon PHMSA. This is a critical factor for making hydrogen or CCUS work and EPA didn't even mention it. These issues are clear examples of where BSER cannot require a technology that does not have all parts of the "system" working and available.

EPA's economic analysis, to be considered in BSER, ignored that we know nothing about the costs in making electricity with hydrogen. As pointed out in the Senator Capito lead letter co-signed by 38 Senators:

*...“Despite the nascent status of the technology, the EPA is proposing for baseload natural gas plants to use 96-percent clean hydrogen co-firing for natural gas plants by 2038. The EPA acknowledges that a “viable hydrogen infrastructure requires that hydrogen be able to be delivered from where it is produced to the point of end use, such as an industrial facility, power generator, or fueling station.” This type of infrastructure is not available and will face years to decades of permitting and investment before it could be even built, further indicating that this technology has not been adequately demonstrated. Beyond the EPA’s fundamental flaws in its projections for the technology, it has included unrealistic assumptions about the cost of hydrogen to make the rule appear less expensive. In modeling released just last month, the EPA estimates that clean hydrogen will be available at a delivered price of \$0.50 per kilogram. According to the International Energy Agency (IEA), the average cost of producing clean hydrogen today is “USD 3.5-7.5/kg” which drops to “around USD 1.5-3.5/kg in 2030 and USD 1-2.5/kg in 2050.” While EPA claims this \$0.50 per kilogram includes the cost of transportation, the IEA states, “[I] long-distance transport of hydrogen, however, is difficult and costly because of its low energy density, and can add around USD 1-3/kg of hydrogen to its price.”*

## Electric Reliability Concerns Ignored by EPA's Results in Arbitrary and Capricious 2030 Deadline

EPA's poor analysis failed to address electric reliability despite the fact that we have more evidence of reliability concerns in 2023-2030 than we have had in the last seven years because of so many coal-fired power plant retirements and more reliance upon interruptible renewables. EPA claimed to have looked at electric reliability issues but failed to look at [NERC's May 2023 Summer Reliability Assessment](#). We are not yet out of the 2023 summer and have seen rolling brownout in several states and extreme costs due to having many coal-fired power plants close in the last few years. NERC's assessment includes this analysis which EPA failed to contemplate. While these findings are for short-term they are indicators of

future problems with electric reliability if the EPA final rule pushes more retirements of coal-fired or natural-gas generation by the 2030 decarbonization deadlines.

This NERC report was written without specific references to any pending NSPS so the NERC findings can be easily described as rosy. The proposed EPA NSPS (replacing the 2015 Clean Power Plan or 2018 ACE rule) would easily make NERC's findings about reliability more of a concern.

#### **NERC's findings:**

***New environmental rules that restrict power plant emissions will limit the operation of coal-fired generators in 23 states, including Nevada, Utah, and several states in the Gulf Coast, mid-Atlantic, and Midwest. The U.S. Environmental Protection Agency's (EPA) Good Neighbor Plan, finalized on March 15, 2023, ensures that affected states meet the Clean Air Act's "Good Neighbor" requirements by reducing pollution that significantly contributes to problems attaining and maintaining the EPA's health-based air quality standard<sup>1</sup> for ground level ozone (i.e., smog) in downwind states.***

*Coal and natural-gas-fired generators in states affected by the Good Neighbor Plan will likely meet tighter emissions restrictions primarily **by limiting hours of operation** in this first year of implementation rather than through adding emissions control equipment. RCs in summer-peaking areas typically are not able to authorize extended outages to upgrade systems during this summer season in order to ensure sufficient resources for high demand. The final rule approved by the EPA includes provisions designed to give grid owners and operators flexibility to help maintain reliability, including allowance trading mechanisms. Consequently, RCs, BAs, and GOs will need to be vigilant for emissions rule **constraints that affect generator dispatchability** and the potential need for emission allowance trades or waivers to meet high demand or low resource conditions. State regulators and industry should have protocols in place at the start of summer for managing emergent requests.*

***Curtailment of electricity transfers to areas in need during periods of high regional demand is a growing reliability concern.*** During energy emergencies and periods of transmission system congestion, RCs and BAs may curtail area transfers for various reasons using established procedures and protocols. ***While the curtailments alleviate an issue in one part of the system, they can contribute to supply shortages or effect local transmission system operations in another area.*** Two recent extreme temperature events highlight the effect of transfer curtailments on area supply needs during energy emergencies. During the September 2022 wide-area heat dome, a BA in the WECC-SW assessment area declared an energy emergency when the neighboring assessment area, California Independent System Operator (CAISO), curtailed transfers in order to meet the high demand within their own area. During Winter Storm Elliott, firm exports were curtailed from PJM during a period of widespread energy emergencies in the U.S. Eastern Interconnection. For the summer of 2023, several areas identified as having capacity or energy risks are relying on imports of electricity supplies. These areas include MISO, NPCC-Ontario, SERC-Central, and the assessment areas in the U.S. Western Interconnection. A wide-area heat event that severely affects regional demand or generator availability presents an added concern in areas that are dependent on imports for managing high electricity demand.

## If EPA Wanted to Make BSER Genuinely Focused on Decarbonization with Known, Available and with Long-term Commercial Demonstrated Technology the EPA Should Have Given a 2040 Deadline for the Following Technologies.

To be clear the commenter does not believe that Section 111 (d) or (b) gives EPA the right to designate any technology that includes a system outside the fence line of a power plant as BSER. But **IF** this commenter were to agree that the Supreme Court recent West Virginia v EPA decision allows the EPA to be able to make this determination on a “system” then the EPA selected the wrong available, commercially demonstrated and known multiple technologies as BSER. If the EPA could step outside the fence line of a power plant then the technologies that EPA should have proposed as BSER options should have included choices of existing low-carbon or near zero carbon technologies such as **nuclear power** (including modular nuclear power that can be scaled up from 90 MW by adding modules) with proven high electric reliability. Other alternatives that are demonstrated and commercially proven are **geothermal, pump storage hydro or conventional hydro, biomass power** (recognized by almost all EU countries under their decarbonization methods), and **hydropower with natural as cold start**. EPA’s push for decarbonization should have recognized that not all states can have the same options- whether for baseload renewables, hydro, natural gas, coal or nuclear power. Nor did Congress ever intend in the many laws in energy and environmental policy passed in the last 30 years that there is one generation type that is optimal or available for all states. EPA’s BSER determinations about coal with CCUS and natural gas with hydrogen is as unrealistic as presuming that we can have 100% wind or 100% solar generation- or that 100% natural gas generation is realistic in Hawaii or Alaska (despite Alaska being a natural gas resource rich state).

Again, the commenter does not like the idea of stepping outside the power plant for selecting BSER with an emphasis on “system.” Technologies be based upon the many factors needed to work are not what Congress intended. But the commenter offers that if the EPA was sincere in wanting to meet its decarbonization goals they would have announced that the new NSPS for new power plants after 2040 could be met with any of these near zero carbon technologies along with options to explore the **new CCUS and hydrogen technologies if they were available and demonstrated**. All existing plants should have been able to meet BSER for efficiency improvements (with elimination of the New Source Review Policy and regulations that prevent optimal efficiency improvements by replacing boilers etc. But commenter offers these ideas to rebut the EPA’s assertions that they have selected the right technologies for BSER in this proposed rulemaking. The commenter believes that the prior ACE rule’s determination that 111 for existing sources should be based upon what could be done at the source- given a variety of factors including the remaining useful life of the plant, energy and cost issues for the ultimate energy consumer were correct.

## EPA Ignored Executive Orders to Address Electric Reliability and Decarbonization

EPA failed to thoroughly meet its obligations under Executive Order 14057 on energy and decarbonization or Executive Order 12866 since this NSPS as proposed has serious consequences on state, local and Federal agencies. This includes all the agencies that will be tasked with permitting approvals for hydrogen and CCUS.



Thank you for considering these comments.

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