



June 29, 2018

Honorable Steven E. Winberg
Assistant Secretary
Office of Fossil Energy4
U.S. Department of Energy
1000 Independence Avenue SW
Washington, DC 20585

Attn: Request for Information DE-FOA-0001931

Re: Coal-Based Power Plants of the Future

Comments submitted electronically to DE-FOA-0001931@netl.doe.gov

The American Coal Council (“American Coal Council” or “ACC”) appreciates the opportunity to respond to the request for information (“RFI”) issued on May 8, 2018 by the U.S. Department of Energy’s (“DOE”) Office of Fossil Energy (“FE) regarding “Coal-Based Power Plants of the Future”.

Interests of the American Coal Council

The American Coal Council has been in existence for 36 years and represents the collective business interests of the American coal industry. Our members include mining companies and suppliers, transportation companies and terminals, electric utilities and independent power producers, industrial coal consumers, and many industry support services providers. ACC’s member companies touch every aspect of turning one of America’s most abundant resources into reliable and affordable electricity for the United States economy. Our diverse membership base encompasses the entire coal supply chain, and it is from this broad perspective that we assess the impacts of new initiatives, programs, policies, and regulations impacting coal supply and use. The continued use of coal as part of an “all of the above” energy policy and strategy is important to our members and to America’s energy, economic, and national security.

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ACC commends the Office of Fossil Energy for issuing this RFI to solicit stakeholder input with regard to the development of small-scale, modular coal-based power plants of the future.

This supports DOE's forward-looking research and technology development objectives including the advancement of coal-fired power plants that provide stable power generation with operational flexibility, high efficiency, and low emissions.

This is particularly relevant because of the changing mix of resources used to produce electricity, occurring as a result of many factors. Among them are energy efficiency programs and changes in end-use customer behavior; growing generation from natural gas plants and an increase in less efficient, intermittent wind and solar resources enabled by federal subsidies and state renewables mandates; and the burdens of additional regulations that have increased the cost of coal for electricity generation and industrial use, made coal less competitive against other fuels, and resulted in the closure of a large number of existing coal plants and a halt to the development of new coal plants.

America has larger coal reserves than any other country in the world. Coal as a fuel source has underpinned the supply of affordable and reliable electricity to power the U.S. economy. Continued use of coal as a key element of power sector resource diversity protects U.S. consumers, provides energy security, and safeguards national security. Continued adaptation of coal power plants to the operating characteristics of other generation resources must include developing new coal plants to address oncoming coal retirements and to provide sufficient coal capacity to reinforce other generation resources in order to assure the future reliability and resilience of the bulk power system.

DOE envisions the coal plants of the of the future to be modular for lower cost, designed using advanced methods, small scale, highly efficient (greater than 40 percent efficiency), and able to load follow to meet the demands of an evolving electricity grid.

Developing the coal plants of the future is an important mission for DOE. The ACC's stakeholder input is intended to underscore the importance of DOE's efforts in this research and development area. The sections below provide context and background information and a brief discussion of some elements important to technology aspects.

Past Policies Have Inhibited Coal Plant Technology Advancement

Under the prior administration, federal coal-related policies stymied the development of new coal power plants and coal-related technology. Following are some examples, though it was the combination of many policy actions that devastated the coal sector and detrimentally impacted the pipeline of coal technology development.

The FutureGen 2.0 project in Meredosia, Illinois was planned as a world class coal power plant carbon capture and storage demonstration project, intended to be the first full-scale oxy-combustion clean coal repowering of an existing power plant with permanent geologic storage for CO₂. At its core was a successful partnership of DOE, the FutureGen Alliance, and the State of Illinois – an important demonstration of government and industry commitment. DOE suspended funding for further development of the FutureGen 2.0 project in early 2015, and the project hit a full stop. Fortunately, another different but important project being supported by DOE came to fruition. The Petra Nova project, a joint venture between NRG Energy and JX Nippon for post combustion carbon capture to enhanced oil recovery at NRG Energy's Parish plant in Texas, commenced operation in late 2016.

The Environmental Protection Agency ("EPA") issued a regulation for CO₂ emissions standards for new power plants in August 2015. All new coal-fueled power plants would be required to meet a stringent standard of 1,400 lbs. CO₂ per megawatt-hour ("MWh") and carbon capture and storage ("CCS") was a technology requirement for compliance. This rule put regulation ahead of technology, since CCS had not yet been developed enough to be technologically or commercially feasible in utility scale application. It was a departure from other prior EPA regulations with standards based on adequately demonstrated technologies deployed at numerous power plants using a variety of coals and operating under varying conditions. Moreover, there was no CCS requirement for new natural gas plants. Thus EPA's regulation had a chilling effect, effectively halting coal as an option for new generation resources.

Power Sector Fleet Changes; Increasingly Important Reliability & Resilience Attributes

In the RFI background section, FE describes the need for new generating sources to integrate with intermittent power sources and contribute to maintaining reliability and

providing ancillary services such as ramping, load following, frequency and voltage management, black start capability, and rapid re-start from warm standby to maximum rating.

Due to the changes in electricity production and the growing reliance on less efficient, intermittent sources and plants with just in time fuel delivery, fuel-secure plants are an important part of the future generation mix. The design and technology of new coal plants of the future should be addressed in concert with adapting the current coal fleet.

Two typical features of the existing coal fleet are the larger size of the units or plants and the design for baseload operation. Today, these larger existing plants are being called upon to operate differently than in the past when baseload operation was the norm. ACC appreciates DOE's other recent RFI seeking stakeholder input on improving the efficiency, reliability, and flexibility of existing coal plants, to which we responded.

ACC commends DOE FE for these two forward-looking initiatives, one on existing coal plants and the other on new coal plants. They are important, prudent steps in fostering the development of the best mix of generation resources for continuing to deliver 24/7/365 electricity to our nation. They come at a critical time.

Announced power sector coal retirements in the U.S. currently total nearly 115,000 MW (628 generating units).¹ Approximately 68,000 MW of coal capacity has already retired and another 25,000 MW is expected to be shut down between 2018 and 2020.² Much of this is attributable to previously-enacted regulations and prior environmental policies.

There is abundant and increasing evidence of coal's importance to grid resilience and reliability.

Most recently, in late May the North American Electric Reliability Corporation ("NERC") released its summer reliability assessment. This highlighted operational challenges and reliability concerns NERC foresees this summer for California and Texas.³ The 2015 Aliso Canyon gas storage leak and ongoing storage constraints there continue to affect availability of natural gas in southern California. NERC's Texas analysis looked at typical maintenance or forced outages, extreme forced outages, extreme weather, and a low-wind scenario and found with any one of these situations the state would fall below its operating reserve margin this summer.⁴ ACC notes that California's move away from coal and increasing use of natural gas and renewables has reduced fuel

¹ American Coalition of Clean Coal Electricity, "Retirement of U.S. Coal-Fired Electric Generating Units", May 1, 2018.

² *Ibid.*

³ North American Electric Reliability Corporation, "2018 Summer Reliability Assessment, May 30, 2018.

⁴ *Ibid.*

diversity and options for electricity providers. In Texas, over 4,000 MW of coal generating capacity was shut down earlier this year.

A report this spring by the DOE's National Energy Technology Laboratory ("NETL") on this winter's "Bomb Cyclone" showed that coal was the most resilient form of power generation across six electricity market regions during this severe weather period. Of the contributions by various assets to meet the surge in demand, coal accounted for more than 55% of the incremental daily generation needed to keep the lights on and avoid electricity shortages. Availability of coal plants in reserve and their on-site fuel inventories made this response possible.

In PJM, which serves 65 million people including in the mid-Atlantic and Midwest, the value of resilience during the Bomb Cyclone was estimated at \$3.5 billion by NETL.

Aging Coal Plant Considerations

The DOE NETL report assessed the impact of an aging coal fleet and oncoming retirements. NETL reported announced U.S. coal retirements at 31 GW through 2025 and EIA-projected retirements at 41 GW by 2025. However, NETL suggested EIA's assumed coal capacity factor at 72 percent is unrealistically high due to the age of the fleet, detrimental impacts of running plants more in cycling mode, and New Source Review barriers to investments in the fleet. NETL cautioned the actual coal retirements might be far higher, perhaps as much as 76 GW by 2025.

FE's RFI notes a number of characteristics for the coal-fired fleet of the future, with new systems needing to achieve high baseload efficiency and with minimal reductions to efficiency when rapidly cycling through part load conditions, or re-starting from warm standby. ACC recognizes the need for flexibility and notes the need for developing technology and design solutions, especially considering the shrinking size of the existing U.S. coal fleet and the important objectives of maintaining America's energy diversity and security.

Technology Considerations and Imperatives

- While the coal plant of the future must be designed for the operating characteristics of tomorrow, it is imperative that it be cost-competitive. Therefore, costs should be minimized to the greatest possible extent.
- The coal plant of the future should use coal as its primary fuel. Dual fuel or co-firing plants could be considered if they would provide needed operational flexibility and responsiveness and/or improve the plant economics and competitiveness.

- CO₂ capture and storage should not be a technology requirement for the coal plant of the future. Where potentially attractive technical, logistical, and cost attributes can be identified, designing for carbon capture readiness may be prudent.
- Host sites for the coal power plant of the future should be assessed on cost attractiveness, infrastructure availability, transportation-logistics characteristics, transmission access, and other attributes that will promote their quicker permitting, building, and operation. Host sites might include existing power plant sites, mine-mouth situations, or location on federal or tribal lands.
- A cost share of 20% is commensurate with the cost share requirement for other early stage technologies, and ACC believes a 20% share offers the best opportunity to incent private sector participation in developing this modular coal plant technology.

Conclusion

The American Coal Council appreciates the opportunity to offer this stakeholder input to DOE's Office of Fossil Energy. We applaud DOE's forward-looking and innovative research and development initiatives to address the changing mix of generation resources brought about by the combination of electricity policies, regulations and markets. With about one-third of the U.S. coal fleet that existed less than ten years ago planned to retire by 2020, developing new power plants is critical to support future bulk power system reliability and resilience. ACC stands ready to support efforts by DOE and the private sector through our programs, communications, and stakeholder network. Preserving coal as a key element of power sector resource diversity protects U.S. consumers, provides energy security, and safeguards national security.