The U.S. Department of Energy’s (DOE) Office of Fossil Energy (FE) and the National Energy Technology Laboratory (NETL) intend to issue a competitive solicitation, 89243319RFE000015, as an unrestricted, full, and open competition for conceptual design for coal-based power plants of the future, and an option to conduct a preliminary front end engineering design (Pre-FEED) to prove the technical and economic feasibility of the approach identified in the conceptual design.

This effort—the **Coal FIRST** (Flexible, Innovative, Resilient, Small, Transformative) initiative—will develop the coal plant of the future needed to provide secure, stable, and reliable power. This R&D will underpin coal-fired power plants that are capable of *flexible* operations to meet the needs of the grid; use *innovative* and cutting-edge components that improve efficiency and reduce emissions; provide *resilient* power to Americans; are *small* compared *to* today’s conventional utility-scale coal; and will *transform* how coal technologies are designed and manufactured.

The multiple award contracts will be firm-fixed price contracts for a conceptual design with an option Contract Line Item Number (CLIN) for a Pre-FEED (nominal AACE class 4) study (including performance and cost estimates). The anticipated award date for the resulting contracts will be in the second quarter of Fiscal Year (FY) 2019. Any questions should be directed to the Contract Specialist, Jason Efaw, at [Jason.Efaw@netl.doe.gov](mailto:Jason.Efaw@netl.doe.gov).

**Background:**

Changes to the U.S. electricity industry are forcing a paradigm shift in how the nation’s generating assets are operated. Coal-fired power plants optimized as baseload resources are being increasingly relied on as load-following resources to support electricity generated from intermittent renewable capacity, as well as to provide critical ancillary services to the grid. These fundamental changes to the operating and economic environment in which coal plants function are expected to persist into the next decade and beyond.

The aspects of coal-fueled electricity generation that in the past led coal to be the fuel of choice for low cost power are less applicable today, due in large part to sustained low natural gas prices, decreasing capital costs of competing electricity generating technology options, and more frequent dispatch as load-following units. Historically, coal represented a stable, low-cost fuel option. Trends in capital costs of competing electricity generating technologies, such as natural gas-fueled and renewable options, have only added pressure on capital intensive coal projects. Renewable power generation sources are causing non-renewable electricity generators to vary output to accommodate the intermittency of wind and solar power.

This economic environment for coal-based electric power generation has resulted in very few new domestic coal plants coming online in recent years. Over the long term, wide-scale retirements of the nation’s existing fleet of coal-fired power plants—without replacement—may lead to a significant undermining of the reliability of America’s electricity supply. Nevertheless, the need for considerable dispatchable generation, critical ancillary services, and grid reliability, combined with potentially higher future natural gas prices, and energy security concerns, such as the importance of onsite fuel availability during extreme weather events, create the opportunity for advanced coal-fired generation, for both domestic and international deployment. Deployment of new coal plants will require a different way of thinking.

To that end, DOE envisions that the future coal fleet may be based on electricity generating units possessing many of the following traits:

* High overall plant efficiency (40%+ HHV or higher at full load, with minimal reductions in efficiency over the required generation range)
* Small (unit sizes of approximately 50 to 350 MW), maximizing the benefits of high-quality, low-cost shop fabrication to minimize field construction costs and project cycle time
* Near-zero emissions, with options to consider plant designs that inherently emit lower amounts of carbon dioxide (amounts that are approaching those of comparable natural gas technologies) or could be retrofitted with carbon capture without significant plant modifications
* Capable of high ramp rates and minimum loads
* Integration with thermal or other energy storage (e.g., chemical production) to ease intermittency inefficiencies and equipment damage
* Minimized water consumption
* Reduced design, construction, and commissioning schedules from conventional norms by leveraging techniques including but not limited to advanced process engineering and parametric design methods for modular design
* Enhanced maintenance features including technology advances with monitoring and diagnostics to reduce maintenance and minimize forced outages
* Integration with coal upgrading, or other plant value streams (e.g., co-production)
* Capable of natural gas co-firing.

**Request for Proposal:**

Ultimately, DOE seeks to understand the configurations, equipment features, performance characteristics, and cost implications for a future commercial coal plant that incorporates, as warranted, the aforementioned attributes through conceptual designs and potential Pre-FEED studies. Such novel configurations may include, but are not limited to: coal with natural gas combined cycle, indirect sCO2 cycle, advanced ultra-supercritical plant, integrated gasification combined cycle with or without poly-generation (pressurized, oxygen and/or air blown), oxy-combustion systems (pressurized, atmospheric, fluid bed or suspension), poly-generation concepts, or direct syngas/pyrolysis gas sCO2 cycle. To achieve this end, DOE encourages broad teaming arrangements that engage A/E firms, technology developers, equipment manufacturers, and end users.

The option CLIN for the Pre-FEED studies will focus on performance, cost, location, ambient conditions, coal type, etc. after review of the associated conceptual design. The Government will reserve unilateral right to exercise any options for the Pre-FEED studies. Pre-FEED studies will be conducted using AACE International Recommended Practice No. 18R-97 Cost Estimate Classification System—As Applied in Engineering, Procurement, and Construction (EPC) for the Process Industries. The areas of focus for this study should be based on a nominal AACE Class 4 Estimate Classification.

DOE believes this information will be used for a DOE Funding Opportunity Announcement (FOA) in support of the Fossil Energy Research and Development (R&D) program that may culminate in the design, construction, and operation of one or more pilot-scale plants to test the salient highest risk aspects of advanced commercial coal power plant concepts.

The North American Industrial Classification System (NAICS) code for this effort is 541715. All responsible business sources may submit a proposal which shall be considered by the agency.

A solicitation, 89243319RFE000015, is anticipated to be available for downloading during the first quarter FY 2019 on FedBizOpps (https://www.fbo.gov/) and FedConnect (<https://www.fedconnect.net/Fedconnect/>).

Once the solicitation is issued, the proposal and all questions must be submitted electronically through FedConnect. Only those questions posted to FedConnect will be accepted. The Offeror must register with FedConnect to respond as an interested party, to submit questions, and to view responses to questions.

Questions will not be answered over the phone. The Contracting Officer must receive questions regarding the Request for Proposal (RFP) via FedConnect by the date and time outlined within the solicitation. The Government reserves the right to not respond to any questions received after the timeframe identified. All responses to the solicitation questions will be released on FedConnect referencing the solicitation number, with copies of both questions and answers, without reference to the originating sources. This is an electronic solicitation, therefore no hard (paper) copies of the solicitation and related documents will be made available.

Once the solicitation is posted, you will be able to find the RFP by clicking on “Search Public Opportunities” and searching by the RFP Number, 89243319RFE000015. Please bookmark this page and check it frequently for updates to the RFP. It is highly recommended that once you access the opportunity that you request to be alerted for amendments, messages, and any e-mail alerts associated with the RFP. To do so, you will need to click on the “Register to Receive Notifications” button under “What do I do now?” If someone from your company has already registered interest for this opportunity, the “Register to Receive Notifications” button will not display. Instead, you will have the option to join the response team by clicking the “Join the Team” button within the Response Team section.

Interested parties should submit an expression of interest stating company name, address, and a brief description of the planned technology area (e.g., AUSC coal plant—pulverized coal or fluidized bed combustion). It is requested that expression of interest be submitted by November 21, 2018. Expression of interest can be submitted through FedConnect or via email to the Contract Specialist, Jason Efaw ([Jason.Efaw@netl.doe.gov](mailto:Jason.Efaw@netl.doe.gov)).

Information regarding how to submit information via FedConnect can be found at

https://www.fedconnect.net. Please note, FedConnect is owned and operated by Compusearch

Software Systems Inc., not by the DOE. DOE does not provide help desk

assistance for FedConnect. For assistance with FedConnect, please contact FedConnect directly:

By e-mail: support@FedConnect.net

By phone: 1-800-899-6665 (8:00 a.m. to 8:00 p.m., Eastern Daylight Time, except Federal

holidays).

**DOE Opportunities under the Coal FIRST Initiative:**

The aforementioned RFP is part of an overarching initiative to advance the coal-based power plant of the future. Collectively, in FY 2019, DOE plans to issue several competitively-funded efforts that may ultimately culminate in the design, construction, and operation of a coal-based pilot-scale power plant. These efforts are as follows:

1. An RFP seeking conceptual designs and an option to conduct a preliminary front end engineering design (Pre-FEED) to prove the technical feasibility and economics of the approach identified in the conceptual design (aforementioned). The solicitation is anticipated to be issued in November 2018.
2. A FOA for cost-shared R&D projects focused on steam turbines that can be integrated into a 50-350 MW future advanced coal plant design. The FOA is anticipated to be issued in the second quarter of fiscal year 2019.
3. An FOA for cost-shared R&D projects focused on critical components and advanced approaches (e.g., manufacturing, fabrication, advanced design) that are needed to support a future coal plant. This FOA is expected to have two closings. The objectives and scope of the first closing will be informed by the conceptual designs completed under contracts awarded under the RFP. Likewise, the objectives and scope of the second closing will be informed by the Pre-FEED studies completed under contracts awarded under the RFP. The FOA is anticipated to be issued in the third quarter of FY 2019.

The Coal FIRST initiative will advance coal power generation beyond today’s state-of-the-art to make coal-fired power plants more adaptive to the modern electrical grid. The initiative will integrate critical R&D on power plant components with currently available technologies into a first-of-a-kind system. Through innovative technologies and advanced approaches to design and manufacturing, the initiative will look beyond today’s utility-scale power plant concepts (e.g. base-load units) in ways that integrate with the electrical grid in the United States and internationally.