Business & Technology Advisory

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DOE Issues Funding Opportunity for both Pilot Scale Testing and Front-End Engineering Design Studies for Carbon Capture Systems at Industrial Facilities and Natural Gas Plants

Key Highlights

- The U.S. Department of Energy has announced a funding opportunity for pilot scale testing and full-scale Front-End Engineering and Design Studies (FEED) at existing NGCC plants. FEED studies will complete detailed engineering and cost estimates for retrofitting post combustion CO_2 capture technology on an existing natural gas fired unit.
- NRECA is available to support cooperatives' applications. Interested cooperatives are asked to contact Emma Stewart, NRECA Chief Scientist, **by March 7, 2022**.

What has changed?

The U.S. Department of Energy's (DOE) Office of Fossil Energy (FE) has reopened a Funding Opportunity Announcement (FOA) entitled, "*Carbon Capture R&D for Natural Gas and Industrial Point Sources, and Front-End Engineering Design Studies for Carbon Capture Systems at Industrial Facilities and Natural Gas Plants*." The full funding announcement is available online.

According to the FOA, the program's purpose relevant to generation cooperatives is "to accelerate the demonstration of the lower cost Generation 2 carbon capture technologies at existing industrial manufacturing sites and power plants to prove their commercial viability at higher capture efficiencies (e.g., 95% or greater) and leverage the 45Q tax credits legislation. To that end, DOE-FE is supporting front-end engineering and design (FEED) studies for power plants integrated with carbon capture systems."

The FOA states, "By developing innovative clean energy technologies capable of capturing at least 95% of CO2 emissions from point sources, and by supporting their commercial deployment into the power and industrial sectors, this FOA will enable the U.S. to achieve a carbon pollution-free power sector by 2035 and a net-zero carbon pollution economy by 2050, while promoting creation of jobs located in power plant or industrial communities that are economically distressed and/or have been disproportionately harmed by adverse environmental impacts of the energy industry.

NRECA is willing to assist member cooperatives who may be interested in pursuing funding for a full-scale FEED study or testing of a novel post combustion capture facility at pilot (>5 tons of CO2 captured per day) at a natural gas combined cycle unit (NGCC) by:

- Introducing cooperatives to potential capture technology partners and universities.
- Providing support and expertise in evaluating post combustion capture technology.

- Supporting cooperatives by providing available information for CO_2 storage potential.
- Providing guidance on the FOA application process.

What is the impact on cooperatives?

Cooperatives may be interested in applying for funds under the FOA or partnering with other entities. Area of Interest (AOI) 5 is titled: *Engineering-Scale Testing of Transformational Post-Combustion Carbon Capture Technologies for NGCC power plants*. AOI 7b is titled: *Front-End Engineering Design Studies for Carbon Capture Systems at Existing (Retrofit) Domestic NGCC Power Plants*. Both areas of interest provide opportunities to evaluate post combustion capture technology. AOI 5 allows natural gas fired units to observe pilot scale testing of novel carbon capture technologies on site, while AOI 7b allows cooperatives the opportunity to complete much of the engineering work required to deploy a full-scale carbon capture system.

Projects under AOI 5 should have the following elements:

➢ Project approach must include:

1. **Technology Competitive Assessment and Carbon Capture Technology Readiness Level Evaluation.** In the case of this pilot study, capture technology partners must have achieved a TRL of at least 5. Projects must also capture a minimum of 5 metric tonnes per day to satisfy scale requirements.

2. **Carbon Capture Technology Description.** Applicant are required to describe the technology including process flow diagrams, heat and material balances, steam and power requirements, etc.

3. **Host Site Selection.** The applicant must select and propose a specific existing NGCC or carbon capture test facility at a plant located in the United States.

4. **NGCC Plant Description and Carbon Capture System Integration.** The applicant must describe the existing NGCC plant, including but not limited to, process diagrams, hardware sketches and emissions profiles and include how the carbon capture system will be integrated into the NGCC plant.

5. **Summary of the Preliminary Techno-economic Analysis (TEA) or Pre-FEED Study and Preliminary Business Case Analysis.** The Preliminary TEA should provide the cost of the proposed capture system to achieve 95% carbon capture efficiency.

6. Applicants will be required to prepare and submit a preliminary **Environmental Justice Analysis**.

7. Applicants are required to submit a **preliminary economic revitalization and job creation outcomes analysis** associated with the proposed carbon capture system.

Projects under AOI 7b should have the following elements:

➢ Project approach must include:

1. **Carbon Capture Technology Description and Technology Readiness Level (TRL) Evaluation.** In the case of this FEED study, capture technology partners must have achieved a TRL of at least 6.

2. **Host Site Selection.** The applicant must select and propose a specific existing NGCC plant located in the United States.

3. **NGCC Plant Description and Carbon Capture System Integration.** The applicant must describe the existing NGCC plant, including, but not limited to, process diagrams, hardware sketches and emissions profiles and include how the carbon capture system will be integrated into the NGCC plant.

4. **CO2 Storage options.** Applications should identify plausible options for CO_2 storage. CO_2 pressure, quality, and quantity should match the requirements of the intended transport and storage solution.

5. **Summary of the Preliminary Techno-economic Analysis (TEA) or Pre-FEED Study and Preliminary Business Case Analysis.** The Preliminary TEA should provide the cost of the proposed capture system to achieve 95% carbon capture efficiency.

6. Applicants will be required to prepare and submit a preliminary **Environmental Justice Analysis**.

7. Applicants are required to submit a **preliminary economic revitalization and job creation outcomes analysis** associated with the proposed carbon capture system.

What do cooperatives need to know or do about it?

The Department of Energy has established a 20% cost share for AOI 5 and 7b. That means that winning teams will have to cover at least 20% of the projects cost with their own funds.

AOI 5 Engineering-Scale Testing of Transformational Post-Combustion Carbon Capture Technologies for NGCC Power Plants – up to 5 awards DOE covers 80% of the costs and estimates DOE contribution is $5,000,000-$15,000,000 per project with an additional 20% cost share required.

AOI 7b Front-End Engineering Design Studies for Carbon Capture Systems at Existing (Retrofit) Domestic Industrial Facilities and Natural Gas Combined Cycle (NGCC) Power Plants – DOE will cover 80% of project costs and anticipates 2 awards at up to $6,000,000 DOE contribution per award with another 20% cost share required.

Proposal timeline:

Submission Deadline for Full Applications:	04/11/2022 11:59pm ET
Expected Date for Selection Notifications:	08/01/2022
Expected Date for Award:	09/30/2022

Co-ops interested in exploring NRECA support for their application to this DOE FOA are asked to contact:

Emma Stewart, NRECA Chief Scientist, **by March 7, 2022.**

Additional Resources

- **Carbon Capture Technology Spreadsheet** (*NRECA Members who are interested in receiving this spreadsheet, please contact Dan or Will at the emails below and they will provide it to you.*)

Contacts

Questions about Applying to the DOE FOA:

- **Emma Stewart,** Chief Scientist: Emma.Stewart@nreca.coop

Questions about Carbon Capture and other Generation Related Topics:

- **Dan Walsh,** Senior Power Supply and Generation Director: Daniel.Walsh@nreca.coop
- **Dr. Will Morris**, Technical Liaison - Consultant: Will.Morris-contractor@nreca.coop