
Department of Energy Announces \$1.4 Billion in Recovery Act Funding for Industrial Carbon Capture and Sequestration

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On June 8, 2009, the Department of Energy (DOE) issued a Funding Opportunity Announcement (FOA) to spur investment in industrial carbon capture and sequestration (CCS) and clean technology. Pursuant to the American Recovery and Reinvestment Act of 2009 (Recovery Act), the DOE is allocating over \$1.3 billion for large-scale industrial CCS projects, and \$100 million for innovative concepts for beneficial use of carbon dioxide (CO₂).

This FOA is specifically targeting applications other than coal-fired electric power generation, which is being funded separately under the DOE's Clean Coal Power Initiative and FutureGen Initiative. This FOA's emphasis is on other industrial sources of carbon emissions, and on emerging technologies that will incorporate carbon in useful products.

A. Eligible Technology

Projects qualifying for the FOA fall into one of two Technology Areas.

Technology Area 1 – Large-scale industrial CCS projects from industrial sources. The purpose of the first Technology Area is to expedite large-scale testing and implementation of sequestration in a range of geologic formations. Projects qualifying for this FOA will capture and sequester carbon dioxide emissions from industrial sources other than coal-fired power plants. The projects are to integrate all aspects of CO₂ capture, transportation and sequestration, specifically including monitoring, verification and accounting.

Capture. The purpose of CO₂ capture is to produce a concentrated CO₂ stream that can be readily transported to a storage site. For purposes of this FOA, capture is to occur at large industrial sources, such as cement plants, chemical plants, refineries, steel and aluminum plants, manufacturing facilities, and power plants using opportunity fuels such as petroleum coke and municipal waste. Plants with electric power output greater than 50% of total energy output that operate on more than 55% coal as a feedstock are not eligible; as noted above, such power generation applications are being addressed by DOE separately.

Sequestration. Once CO₂ is captured, it must be safely stored or sequestered in ways that will not contribute to atmospheric concentrations of CO₂. Sequestration targets within Technology Area 1 include saline formations, operating and depleted oil and gas fields, and unmineable coal seams. Commercial benefits, such as enhanced oil recovery and enhanced coalbed methane recovery, may be reaped from the sequestration.

The DOE's objective is that recipients will operate technologies that make progress toward capture and sequestration of 75% of CO₂ from the treated stream, comprising at least 10% of the CO₂ by volume that otherwise would contribute to atmospheric concentrations. Further, the DOE's objective is that the recipients operate at a scale sufficient to evaluate the full impact of the CO₂ capture technology on plant operations, economics and performance. The DOE expects the projects to demonstrate geologic sequestration options in many geologic settings to evaluate costs, operational processes, and technical performance. Each plant included in the FOA program will be expected to capture and sequester at least one million tons per year of CO₂.

Technology Maturity. The DOE is seeking projects with technologies that have progressed beyond the research and development stage to a point of readiness for operation at a scale that, once operational, can be readily replicated and deployed into commercial practice. The DOE is also interested in funding leading-edge technologies not currently deployed in the utility marketplace or CO₂ injection industry, as opposed to incremental improvements or previously demonstrated technologies.

Number of Awards. The DOE anticipates making 10 to 12 awards for industrial-source CCS projects, and expects that an evaluation after Phase 1 will result in four to six projects continuing into Phase 2.

Technology Area 2 – Innovative concepts for beneficial CO₂ use. The purpose of the beneficial CO₂ use part of this FOA is to stimulate pilot-scale field-testing of CO₂ use technologies that will provide information on the cost and feasibility of larger scale implementation and operation. The objective of this Technology Area is to demonstrate innovative concepts for (i) CO₂ mineralization to carbonates, directly through conversion of CO₂ in flue gas; (ii) use of CO₂ from power plants or industrial applications to grow algae or other forms of biomass; (iii) conversion of CO₂ to fuels and chemicals; and (iv) other novel applications. The carbonates produced from mineralization processes must permanently store the CO₂ through end uses such as cement additives or long-term underground storage. "Use" of CO₂ must result in the permanent conversion of CO₂ from flue gas into another form, such as solid carbonates (i.e., mineralization), plastics, or fuels.

Beneficial CO₂ use efforts are to focus on novel approaches for reducing CO₂ emissions in locations where geologic storage may not be an optimal solution. Examples of CO₂ use include the use of algae or another medium to convert CO₂ to biomass (which in turn can be used for fuel, chemicals, or plastics production), direct conversion to fuels or chemicals, and direct or indirect mineralization of CO₂ to solid carbonates.

DOE representatives have stated that deployment projects should demonstrate the viability of technologies at a scale large enough to overcome infrastructure challenges, and ideally should include regional partnerships similar to the Department's programs for geologic sequestration. Congressional interest in beneficial CO₂ reuse is on the rise. The Senate Appropriations Subcommittee on Energy and Water Development recently held a hearing on "Beneficial Reuse of Carbon Dioxide from Coal and Other Fossil Fuels." At that hearing, DOE representatives emphasized that significant investments in the carbon recycling sector will generate important environmental and economic benefits.

Technology Maturity. The DOE is seeking those technologies that have progressed beyond the research and development stage and are ready for implementation at the pilot-scale level.

Number of Awards. The DOE anticipates making six to eight awards for large-scale beneficial use of CO₂, and expects an evaluation after Phase 1 will result in four to six projects continuing into Phase 2.

B. Types of Funding

The DOE anticipates making initial awards under the FOA of either Cooperative Agreements or Technology Investment Agreements (TIAs).

Cost Share. The recipient's cost share for Phase 1 development activities must be at least 20% of the total allowable costs for each budget period under the Cooperative Agreement or TIA, and may exceed 20% for projects with reduced technological risk or reduced uncertainty. The DOE's target for recipient cost share for commercial-scale demonstration projects is 50% of the total allowable costs of the project. For large-scale industrial source Phase 2 projects, the DOE funds would be applicable to the project costs for CCS activities and also to improvements to existing plants allowing them to integrate the capture technologies. Applicants should be aware that the government disclaims any obligation to share cost overruns.

Award recipients may charge pre-award costs that were incurred within the 90-day period preceding the effective date of the award, if the costs are otherwise allowable in accordance with applicable federal regulations. Recipients must obtain the prior approval of the contracting officer for any pre-award costs that are for any period prior to this 90-day period. Applicants should be aware that pre-award costs are incurred at their own risk, and the DOE disclaims any obligation to reimburse such costs if the applicant does not receive an award or if the award is made for a lesser amount than the applicant expects.

Phases. Phase 1 will run for a period not exceeding seven months. During Phase 1, recipients may be engaged in activities ranging from project definition to preliminary design and permitting. Recipients will also prepare information to assist the DOE in performing its obligations under the National Environmental Policy Act (NEPA).

Renewal applications for Phase 2 will be due by the end of the fifth month. Projects selected for Phase 2 will receive no more than a 4-month extension to Phase 1 to allow the DOE and the recipients enough time to negotiate the full scope and budget for Phase 2. Phase 2 activities will consist of project design, construction and operation. NEPA analyses will continue during Phase 2. Recipients will not be authorized to begin detailed design and site-specific project work until the DOE has fulfilled its NEPA obligations.

Amount of Awards. There is no minimum or maximum award under this FOA, except that the DOE's share is limited to the funds allocated for this FOA. Phase 1 awards are expected to range from \$500,000 to \$3 million. Phase 2 awards for large-scale industrial CCS projects are expected to range from \$50 million to \$400 million. The DOE reserves the right to make no awards at all.

C. Mechanics of Funding Application

Eligible applicants. Eligible applicants are all types of entities, except federal agencies, Federally Funded Research and Development Centers (FFRDC) contractors, and 501(c)(4) non-profit organizations that engaged in lobbying activities after 1995. The FOA contains no restriction on foreign entities from submitting applications under this FOA, although the project activities must be performed in the United States.

Application Submission. Applicants for either Technology Area must submit applications containing a summary and narrative of the proposed technology, technical merit and technical plan; site suitability; project organization and project management plan; commercial potential; and funding plan.

Submission Deadline. Applications must be submitted by August 7, 2009.

Live Link: The U. S. Department of Energy's Financial Assistance Funding Opportunity Announcement, "Recovery Act: Carbon Capture and Sequestration from Industrial Sources and Innovative Concepts for Beneficial CO₂ Use," can be viewed at <http://www.fossil.energy.gov/programs/sequestration/publications/arra/DE-FOA-0000015.pdf>

Carbon capture and sequestration technology continues to garner attention in Washington, DC, as Congress grapples with federal climate change legislation. Public Policy lawyers from Pillsbury played a key role in securing language to allocate funding for beneficial CO₂ reuse projects in the Recovery Act. Companies working with clean technology and CCS projects are advised to seek legal counsel with experience in Recovery Act funding and current knowledge of the wide variety of regulatory, liability, project development and permitting issues associated with these technologies.

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