



U.S. DEPARTMENT OF ENERGY LOAN PROGRAMS OFFICE

Draft Advanced Fossil Energy Solicitation to Support Reductions in Greenhouse Gas and Other Pollution

The Department of Energy's (DOE) Loan Programs Office is releasing a new draft loan guarantee solicitation for innovative and advanced fossil energy projects and facilities. The Advanced Fossil Energy solicitation is authorized by Title XVII of the Energy Policy Act of 2005 through Section 1703 of the Loan Guarantee Program. The solicitation will support projects that avoid, reduce, or sequester air pollutants or greenhouse gas emissions, an important part of the Administration's long-term plan towards a cleaner and more secure energy future. The Department will make available up to \$8 billion in loan guarantee authority through this solicitation.

When issued, the solicitation will seek applications for projects and facilities that cover a range of technologies. These technologies could include any fossil technology that is new or significantly improved, as compared to commercial technologies in service in the U.S. Applicants must show that their proposed project avoids, reduces, or sequesters air pollutants or greenhouse gas emissions. In addition to soliciting public comment about the technologies that DOE identifies in the draft solicitation, DOE welcomes comments that identify other technologies within its statutory authority that DOE should consider supporting through this loan guarantee solicitation.

The solicitation identifies the following specific technology areas:

Technology Area 1: Advanced Resource Development

Resource development and extraction can be an energy intensive process and a major contributor of lifecycle greenhouse gas emissions associated with fossil fuel use. Together, the processes account for roughly five percent of the United States greenhouse gas emissions. Advances in technologies and practices associated with developing coal, natural gas, and oil resources offer the ability to improve efficiencies and reduce upstream greenhouse gas emissions associated with producing and delivering fossil energy to end users. This area is seeking projects that employ new or significantly improved technologies that avoid, reduce, or sequester air pollutants or greenhouse gas emissions from the development, recovery, and production of traditional and non-traditional fossil energy resources. While initial eligibility will ultimately be evaluated on a project by project basis, DOE anticipates qualifying projects may include, but are not limited to, the following:

- a) Novel oil and gas drilling, stimulation, and completion technologies, including dry fracking, that avoid, reduce, or sequester air pollutants or anthropogenic emission of greenhouse gases;
- b) Use of associated gas production to reduce flaring;
- c) Coal-bed methane recovery to reduce methane emissions into the atmosphere associated with coal mining;
- d) Underground coal gasification; and
- e) Methane emissions capture from energy production, transmission, or distribution.

Technology Area 2: Carbon Capture

Fossil-based energy systems are point-sources that generate CO₂ in their processes and typically emit large volumes of CO₂ into the atmosphere. Currently, these facilities account for over half of the United

States' annual greenhouse gas emissions. The purpose of carbon capture technology is to selectively remove CO₂ from process streams and flue gases, and produce a concentrated stream that can be compressed and transported to a permanent storage site. Carbon capture technologies are most applicable to large, centralized sources of CO₂ in the power and industrial sectors. This area could support projects that integrate fossil fuel usage with new or improved technology that captures and removes CO₂ for permanent storage in underground formations or through beneficial reuse. While initial eligibility will ultimately be evaluated on a project by project basis, DOE anticipates qualifying projects may include, but are not limited to, the following:

- a) CO₂ capture from synthesis gases in fuel reforming or gasification processes;
- b) CO₂ capture from flue gases in traditional coal or natural gas electricity generation; and
- c) CO₂ capture from effluent streams of industrial processing facilities.

Technology Area 3: Low-Carbon Power Systems

Fossil-based electricity generation traditionally involves fuel combustion with air as a heat and power source, producing a flue gas with low concentrations of CO₂, and, therefore, making the adoption of carbon capture expensive and inefficient. Novel processes have been proposed with carbon mitigation in mind that generate fossil-based electricity and do not require traditional gas separation technology in order to capture CO₂ emissions. This area is seeking projects that utilize fossil fuels for electricity generation using novel processes or improved technologies that can seamlessly integrate with CO₂ storage or beneficial reuse. While initial eligibility will ultimately be evaluated on a project by project basis, DOE anticipates qualifying projects may include, but are not limited to, the following:

- a) Coal or natural gas oxycombustion;
- b) Chemical looping processes;
- c) Hydrogen turbines; and
- d) Synthesis gas, natural gas, or hydrogen based fuel cells.

Technology Area 4: Efficiency Improvements

Industrial fossil-based systems typically utilize only a fraction of the energy available from their feedstocks, and often reject a large amount of low quality and waste heat from their processes. Technology improvements to increase the efficiency of fossil-based systems can result in reduced emissions-per-product and better feedstock utilization. This area is seeking projects that incorporate new or improved technologies to increase efficiencies and substantially reduce greenhouse gas emissions associated with fossil fuel supply and use. While initial eligibility will ultimately be evaluated on a project by project basis, DOE anticipates qualifying projects may include, but are not limited to, the following:

- a) Combined heat and power;
- b) Waste heat recovery on industrial facilities;; and
- c) High-efficiency distributed fossil power systems.