



DE-FOA-0000015

Phase 2 Down Select

Carbon Capture & Sequestration from Industrial Sources
Technology Area 2 -- Innovative Concepts for
Beneficial CO₂ Use





Industrial Carbon Capture & Sequestration

- **Background**

- 2009 American Recovery And Reinvestment Act
- Provisions for Fossil Energy Research & Development
 - “...\$1,520,000,000 for a competitive solicitation for a range of industrial carbon capture and energy efficiency improvement projects, including **a small allocation** for innovative concepts for beneficial CO₂ reuse”
 - “A small allocation” = \$100,000,000
- FOA 0000015 issued June 8, 2009

FOA Overview

- **Topic Areas**
 - Technology Area 1: Large-Scale Industrial CCS Projects from Industrial Sources
 - **Technology Area 2: Innovative Concepts for Beneficial CO₂ Use**
- **Phased Approach**
 - Phase I – Project Definition Activities
 - Phase II (Down Select)
 - Sub phase 2a – Design
 - Sub phase 2b – Construction
 - Sub phase 2c – Operation (i.e., Testing)

Area 2 – Innovative Concepts Objectives

- **Overall**
 - Demonstrate innovative concepts for beneficial use of carbon dioxide emitted from industrial sources.
 - Permanent storage, e.g., mineralization
 - Beneficial use, e.g., production of fuels or chemicals
 - Conduct pilot-scale field testing of technologies that utilize CO₂ from industrial sources.

Area 2 – Innovative Concepts Objectives

- **Phase I**
 - Project definition activities e.g.,
 - R&D to collect critical data
 - Conceptual Design
 - Permit Planning
 - Preliminary Design
 - Project Planning
 - Obtain commitments from industrial site and for cost share
- **Phase 2**
 - Design, Construct and Operate pilot-scale field test unit

Phase 1 Summary

- **Applications**

- 50 acceptable applications received

- 22 algae, 19 chemical conversion, 8 mineralization, 1 other

- **Selections**

- Phase 1 Selections made December 2009

- Twelve applications selected to participate in Phase 1

- Awards made January 15, 2010

- FOA advertised 7 month Phase 1

- ARRA schedule required us to reduce to 5.5 months, with renewal applications due in 4 months from award

Phase 1 Applications Summary

Industrial CO₂ Sources

- Metals refineries
- Ethylene plant
- Boilers
- Power plants
- Cement plants
- Chemicals plants
- Steam plants
- Pet-coke gasifier
- Commodity CO₂

Proposed Products

- Carbonate enhanced clay
- Plastics/resins
- SNG/Methane
- Methanol/DME
- Formic acid
- Biocrude/biofuel
- Carbonates/bicarbonates
- Gasoline/Kerosene/Diesel
- Fertilizer
- Ethanol

Innovative Concepts Summary

- **Twelve Applicants received Phase 1 Funding and were eligible to compete for Phase 2 Funding:**

Mineralization (4)	Chemical Conversion (3)	Biological Conversion (5)
University of Mass. – Lowell	Research Triangle Institute	Touchstone Research Laboratory
Alcoa	Renewable Energy Institute International	Sunrise Ridge Algae
Calera Corporation	Novomer	UOP LLC
Skyonic Corporation		Phycal
		Gas Technology Institute

- **Eleven Phase 2 Renewal applications received on May 17, 2010**
 - GTI did not submit an application; cost share.
- **Nominally \$83.2 million available to distribute.**

Phase 2 Status

- **Evaluation Process**

- Review teams convened to evaluate: Technical, Financial, Budget and Environmental aspects of the project;
- Reviews began on May 20, 2010;
- Review Teams will present results to the Merit Review Board (MRB) on June 16 and June 17, 2010.
- MRB makes recommendations to Selection Official on June 21, 2010;
- Selections projected for the week of June 21, 2010;
- Notifications to Congress, etc., before public announcement can be made.

Phase 2 Statistics

- **Applications request from \$6.2 million to \$25.0 million of DOE Funding .**
 - Total of \$169 million requested from DOE-NETL
 - Total Phase 2 values from \$7.8 million to \$115.6 million per project
- **Cost share proposed ranges from 20% to 78.4%**
- **Estimated CO₂ capture ranges from 60% to 100%**
- **Operations sub-phases estimated to last from 6 months to 34 months**
- **Applicant defined “pilot-scale” ranges from 0.36 kg/day to 525 tonnes/day of CO₂ utilized.**

QUESTIONS?