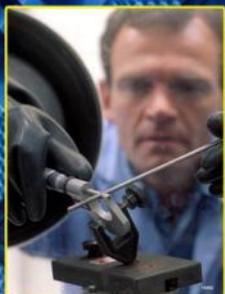


# Carbon Management Initiative (CMI)



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October 19, 2009

**BOISE STATE**  
UNIVERSITY



Idaho State University



Idaho National Laboratory

University of Idaho

# CAES

**Center for Advanced  
Energy Studies**



# CMI – Description and Focus

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- Description
  - Reducing greenhouse gases by storing CO<sub>2</sub> in geologic formations, soils, and vegetation
  - Geographical differences dictate regional approaches
- Focus
  - Internationally recognized capabilities in reactive rock sequestration
    - Modeling and monitoring
    - Formation relevant experiments
  - Regional recognized capabilities in carbon management
    - Sequestration options (geologic & terrestrial)
    - Life cycle cost analysis, regulatory & legal assessments

# CMI – Goal

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- By 2015, CAES will be an internationally recognized R&D center for geologic CO<sub>2</sub> sequestration in reactive rocks and a regionally recognized R&D center for carbon management
  - Minimize impact of carbon constrained economy on regional economic development
    - Opportunities
    - Regulatory Structure
  - Support Idaho's Office of Energy Resources
    - Strategic Energy Alliance
    - Governor's Carbon Sequestration Advisory Committee

# CMI – Goals

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- Funding (annual)
  - 2012 – \$2,000 (industry : government – 25:75)
  - 2015 – \$5,000 (industry : government – 20:80)
  - University : INL split
    - 2012 – 20:80
    - 2015 – 50:50
- Personnel
  - 2012 – 6 FTE INL; 8 faculty; 5 students
  - 2015 – 10 FTE INL; 15 faculty; 40 students

# CMI – Strategy (Background & Overview)

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- CAES institutions have conducted funded sequestration research for nearly a decade
- Further growth in funding requires
  - Transitioning extensive CAES expertise in subsurface contamination to subsurface sequestration
    - Assessing and modeling multiphase fluid flow and transport in complex geological settings
    - Risk assessment and mitigation
  - Developing industry relationships
    - Many programs require cost share
    - Industry ultimately responsible for implementation

# CMI – Strategy and Tactics

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- Strategy
  - Expand capabilities through strategic partnerships
  - Facilitate DOE's Regional Sequestration Partnership
  - Identify unique regional opportunities
  - Develop leadership depth
- Tactics
  - Identify industrial partnership opportunities
  - Review Federal and State funding profiles
  - Conduct LDRD research
  - Participate in Faculty/Staff Exchange
  - Support Idaho Strategic Energy Alliance
  - Team with EPI and CAMS

# CMI – Outcomes: Projects

Year (\$)	Project	Customer	Collaborators
FY 2009	\$393K* BSCSP	DOE-FE	INL, UI, ISU
	\$45K* ICEWATER HIS	DOE/INRA	ISU
Total	\$32K* CUAHSI	NSF	ISU
\$481K*	\$11K* StatOil and others	Industry	UI
FY 2010	\$393K* BSCSP	DOE-FE	INL, UI, ISU
	\$45K* ICEWATER HIS	DOE/INRA	ISU
	\$240K* Reactive Rocks	Shell	INL, UI
Total	\$50K* Feedstock Modeling	DOE	INL, ISU
\$785K*	\$57K* BCAL LIDAR	NOAA	
\$1,006K(P)	\$276K Western Interconnect	DOE/AARA	INL, UI, ISU
\$1791K(T)	\$130K Seq. Indemnification	Zurich Financial	INL, UI
	\$300K Membrane Evaluation	Albedo Tech.	INL, UI
	\$300K BEERC	DOE-FE	INL, UI, ISU
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\$1,006K(P)	\$300K Membrane Evaluation	Albedo Tech.	INL, UI
\$1,696K(T)	\$300K BEERC	DOE-FE	INL, UI, ISU

# CMI – Outcomes: Highlights

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- Faculty (8)
  - UI – 2; ISU – 2; BSU – 2; INL – 2
- Students (5)
  - 3 MS completed, 1 MS underway, 2 PhD underway
- Leadership
  - Carbon Management Workshop (Boise, August 6-7, 2008)
  - Legislative and Governor's Presentations
  - Industry/Public Presentations
  - 3 Member Idaho Carbon Advisory Committee
  - 5 Members Idaho Strategic Energy Alliance
    - Chair of Carbon Issues Task Force

# CMI – Investments

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FY 09 Total: \$155K	\$125K LDRD \$30K PDF \$0K Capital Equipment \$0K ACE
FY10 Total: \$812K	\$205K LDRD \$30K PDF \$577K Capital Equipment \$0K ACE
Multi-Year	\$0K IUC \$67K State Stimulus

# CMI – Investments

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- PDF – \$30K (2009) and \$30K (2010)
  - Support travel to develop relationships with potential industrial and other partners (FY09, FY10)
  - Support travel to develop proposal/research teams (FY10)
  - Support, as needed, time for proposal development and preparation (FY10)
  - Develop business plan (FY10)

# CMI – Investments

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- LDRD
  - FY 2007 – FY 2009 (\$125K yr<sup>-1</sup>; 30 Months)
    - Suitability of Layered Basalt as Targets for Industrial CO<sub>2</sub> Sequestration
  - FY 2010 – FY2012 (\$205K yr<sup>-1</sup>; 36 Months)
    - Prediction and Monitoring of CO<sub>2</sub> Behavior in Deep Reactive Formations

# CMI – Infrastructure (\$577K)

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- 8 Station Stirred Pressure Reactor and Process Controller (\$193K)
- Optical Petrographic Microscope (\$47K)
- Energy Dispersive X-Ray Fluorescence Microscope (\$169K)
- Gas Chromatograph - Mass Spectrometer (\$57K)
- Inductively Coupled Plasma - Optical Emission Spectrometer (\$91K)
- Procedures and Training (\$20K)

# CMI – Human Capital

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- Hire an energy geoscientist
  - CAES recurring funding and joint appointment
  - Assignment location
- Outreach to other faculty and staff
  - Agriculture and forestry
  - Connect with Energy Policy Institute
- Better integration of universities into INL activities
  - Joint appointment/assignment
  - Participation in planning meeting
- Establish virtual multi-institutional technical group
  - Staff meeting
  - Assignments and follow through

# CMI – Discussion Points

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- Disciplinary vs. issue-based organization
  - What is the correct university organizational structure?
- Individual PI vs. collaborative teams
  - How do we facilitate/ incentivize multi-institutional collaboration?
- CAES as a customer vs. opportunity
  - How do we communicate/realize the opportunity presented by CAES beyond funding LDRD/PDF activities?