

Regional Carbon Sequestration Partnerships

West Coast Regional Carbon Sequestration Partnership

Phase I Wrap-up and Phase II Kickoff Meeting

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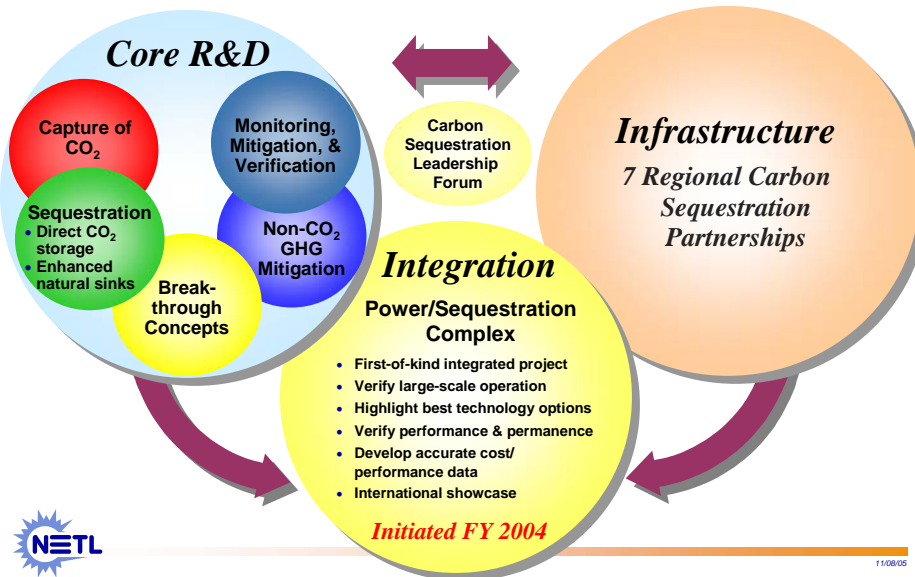
National Energy Technology Laboratory
Office of Fossil Energy



8-9 November 2005



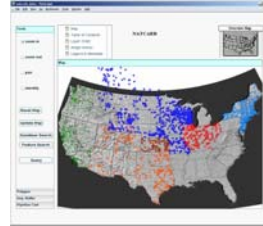
Carbon Sequestration Program Structure



Regional Carbon Sequestration Partnerships Program Phased Approach

Phase I (Characterization)

- 24 months (2003-2005)
- 7 Partnerships (40 states)



Phase II (Field Validation Tests)








- 4 years (2005 - 2009)
- All 7 Phase I Partnerships continued
- \$100 million federal funds
- \$45 million in cost share

Phase III (Integration)

- 4 years (2009-2013)
- Pending authorization
- Significance to FutureGen

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Regional Carbon Sequestration Partnerships Phase I At-a-Glance

	California Energy Commission http://www.westcarb.org/	<ul style="list-style-type: none"> • Region has identified candidate enhanced gas recovery and saline formation storage projects, and is exploring enhanced coal bed methane and enhanced oil recovery • Detailed assessment of reforestation, forest management, and fire risk reduction/biofuel opportunities
	New Mexico Institute of Mining and Technology http://www.southwestcarbonpartnership.org/	<ul style="list-style-type: none"> • Resource-rich region with two CO₂ pipelines • Identified seven candidate sites for field testing • Conducted web-based "town hall" meetings
	Montana State University http://www.bigskyc2.org/	<ul style="list-style-type: none"> • Mineralization in basalt formations large potential • Focus on agriculture and forestry accounting management and accounting protocols • Close interaction with state governments
	University of North Dakota, Energy & Environmental Research Center http://www.undeerc.org/pcor/	<ul style="list-style-type: none"> • Region rich in value-added geologic sequestration options • Wetland restoration unique opportunity • Half-hour sequestration documentary aired on prairie public television
	University of Illinois, Illinois State Geological Survey http://www.sequestration.org/	<ul style="list-style-type: none"> • Efforts centered on a CO₂ pipeline "fairway" and a focused region • Link to agriculture interests through ethanol
	Battelle Memorial Institute http://www.mrcsp.org/	<ul style="list-style-type: none"> • Strong analysis and cost-supply curves for CO₂ sequestration • Interactive website as outreach tool • 21% of U.S. CO₂ emissions in the region
	Southern States Energy Board http://www.secarbon.org/	<ul style="list-style-type: none"> • Electricity supply industry and governor-level political participation • Carbon offset program, a web-based portal for advertising sequestration opportunities



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Regional Carbon Sequestration Partnerships Phase II Goals

1. Perform regional technology validation tests for 2012 technology assessment
2. Refine and implement Measurement, Mitigation, and Verification (MM&V) protocols
3. Continue regional characterization
4. Regulatory compliance activities
5. Implement public outreach and education
6. Identify commercially available sequestration technologies ready for large scale deployment



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Goal 1 – Field Validation Tests Geologic Sequestration

- **25 Geologic Sequestration Assessments**
 - 4 stacked saline/EOR formations sequestration tests
 - 6 saline formation sequestration tests
 - 6 coal seam sequestration tests with ECBM
 - 8 depleted oil field sequestration tests with EOR
 - 1 depleted gas field sequestration test with EGR
- **Injecting 100–525,000 tons of CO₂ over 3.5 years**



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Phase I - Geologic Storage Capacity

- **Identified over 1,000GT of storage***
 - >500 years of emissions from energy point sources
- **Coal Seams and Shales- ~ 27 GT**
- **Oil and Gas Reservoirs - ~18 GT**
- **Saline Formations - ~1,200 GT**

* Preliminary estimates for most promising opportunities



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Value Added Benefits from Sequestration

- **Oil – 16 billion barrels of oil during sequestration in favorable fields**
- **Coal Seams – 126 TCF CBM during sequestration in unmineable coal seams**
- **Value added products needed to develop infrastructure since most sinks are vertically stacked**



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Goal 1 – Field Validation Tests Terrestrial Sequestration

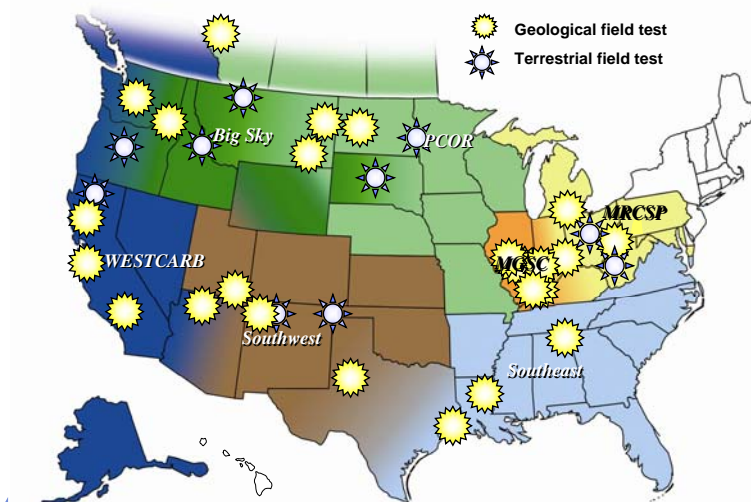
- **10 Terrestrial Indirect Sequestration Tests**

- 4 Agriculture/Rangeland management
- 4 Forestry
- 1 Mineland restoration
- 1 Wetland/Prairie Restoration



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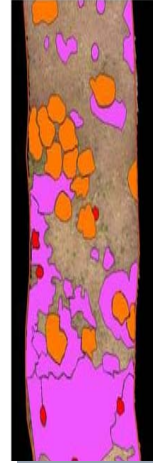
Goal 1 – Field Validation Tests Phase II Field Validation Tests



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Goal 2 - Measurement, Mitigation & Verification Protocols

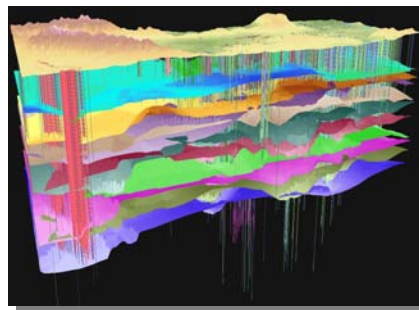
- **Apply appropriate tools for MM&V**
 - Geologic: modeling, plume tracking, leak detection, mitigation
 - Terrestrial: organic matter measurement, soil carbon measurement
- **Develop protocols to assess risks, model fate and transport, and verify permanence**
- **Develop strategies for risk mitigation**
- **Identify regional requirements for MM&V**



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Goal 3 - Continue Regional Characterization

- **Refine regional characterization**
 - Sources
 - Sinks
 - Transportation infrastructure
 - Societal parameters
- **Refine GIS, database, and tools to assess sinks and economics of projects**
- **Collaboration with NATCARB**



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Goal 4 - Regulatory Compliance Activities

- Satisfy permitting requirements for field tests
- Develop permitting action plans for future large scale deployment in region



Goal 5 - Public Outreach and Education

- Broad implementation in region
- Strategies for project implementation
- Develop and use outreach materials



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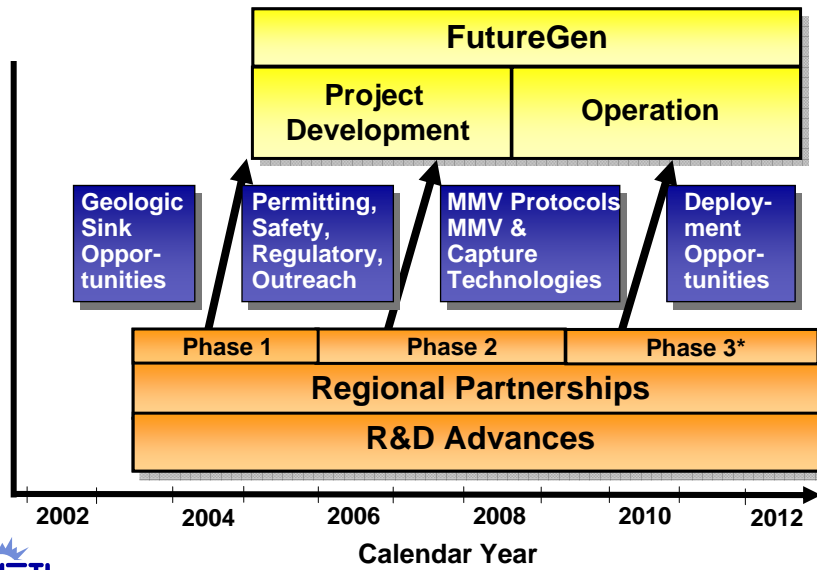
Goal 6 - Identify Commercially Available Sequestration Technologies Ready for Large Scale Deployment

- Detailed description of regional opportunities
- Deployment strategies for most promising technologies
 - Permitting requirements
 - MMV protocols
 - Economics
 - Phase II lessons learned
- Summary of public outreach tools



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Critical Synergys



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