DOE Regional Carbon Sequestration Partnerships

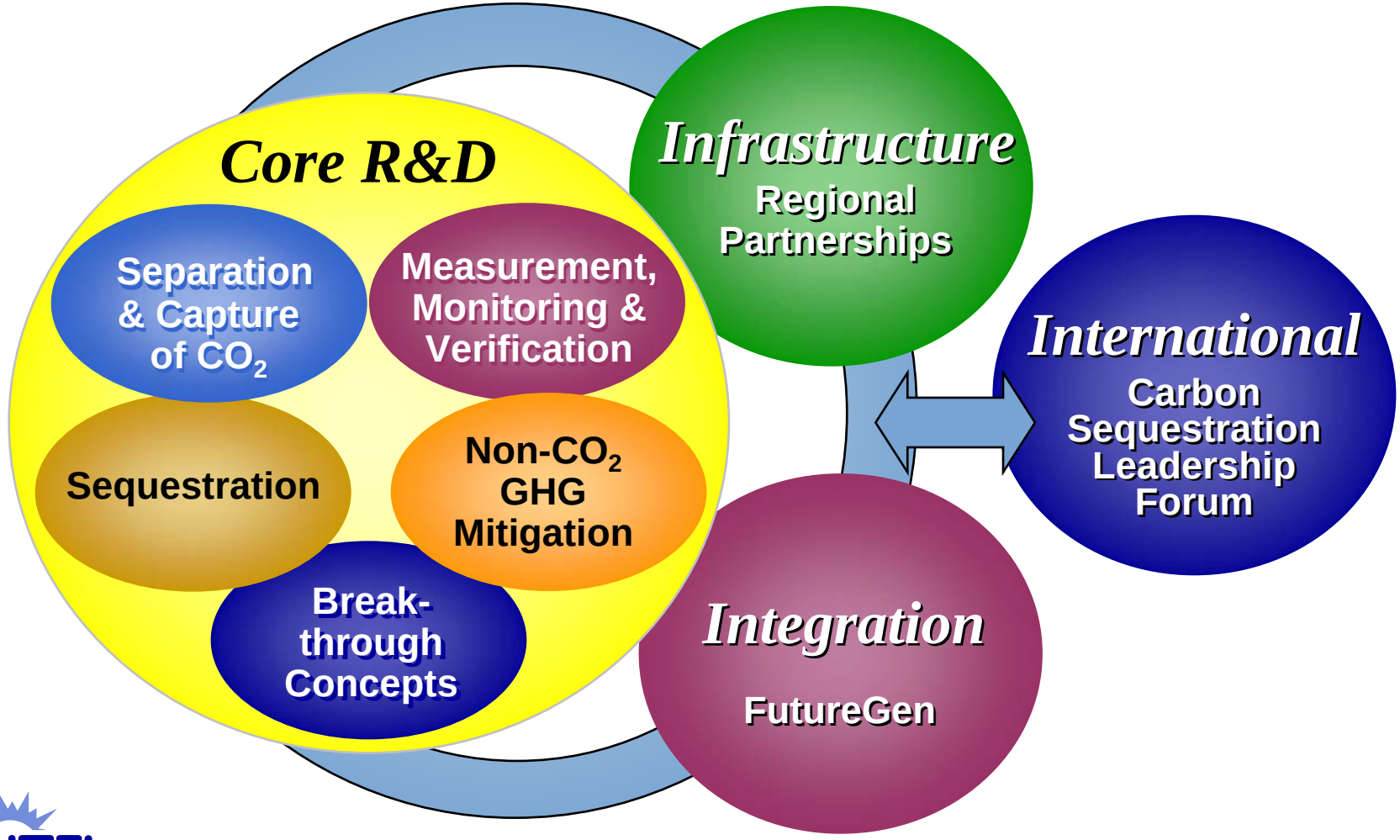
Carbon Sequestration Leadership Forum
1st International Workshop on CSLF Projects

September 29, 2005

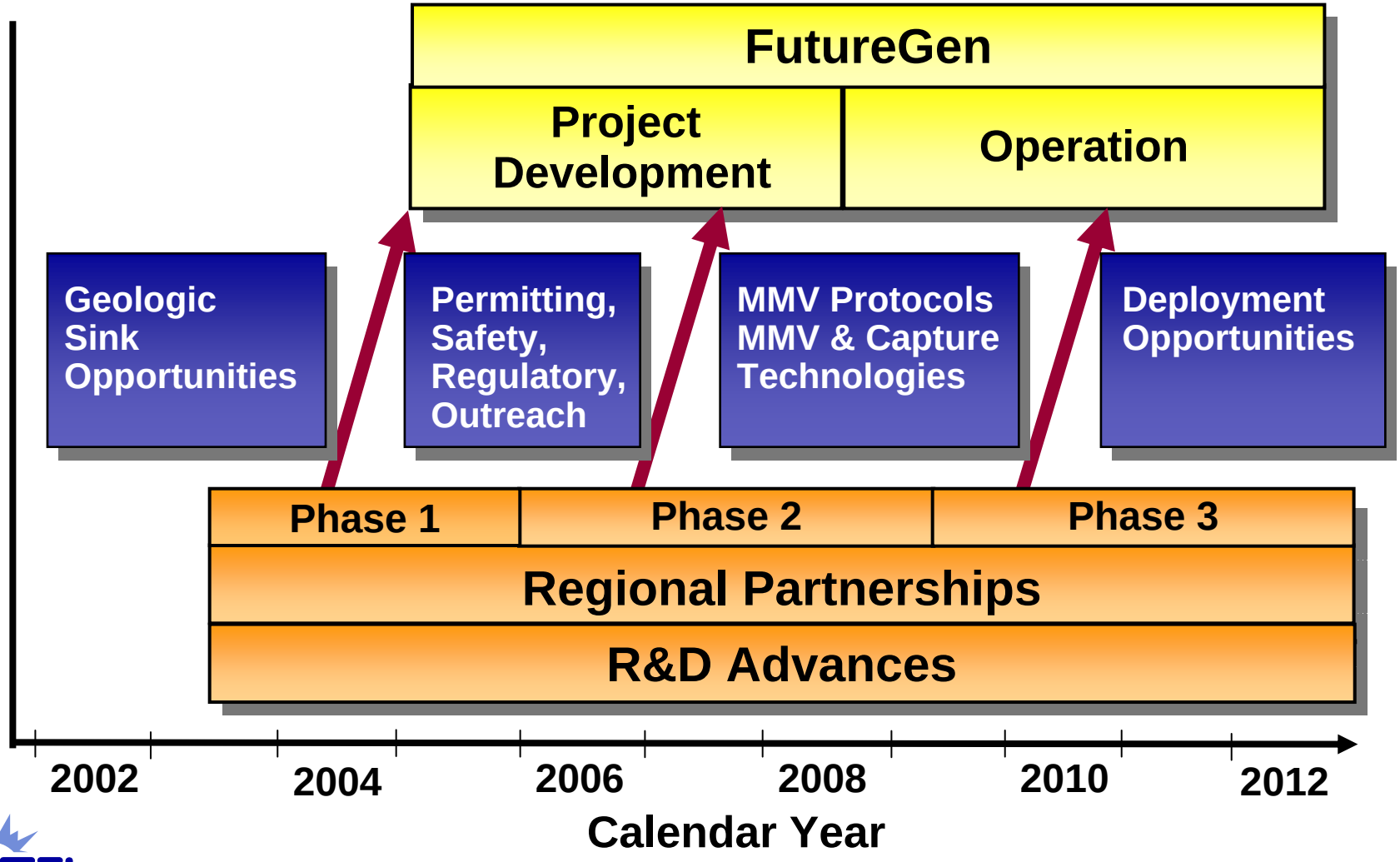
National Energy Technology Laboratory

Office of Fossil Energy

Regional Partnerships are Key Element to DOE/FE Sequestration Program



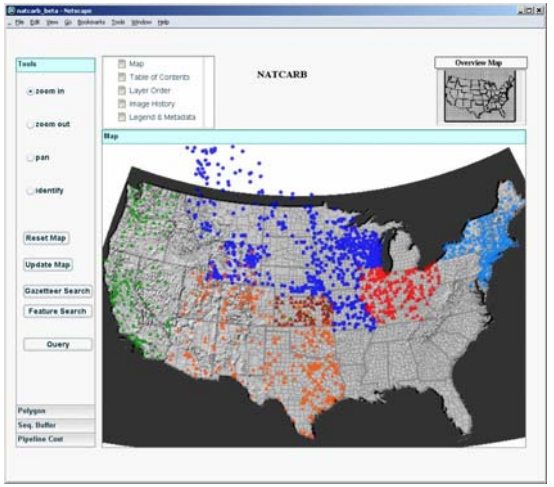
Critical Synergys



Phased Approach

Phase I (Characterization)

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



Phase II (Field Validation Tests)

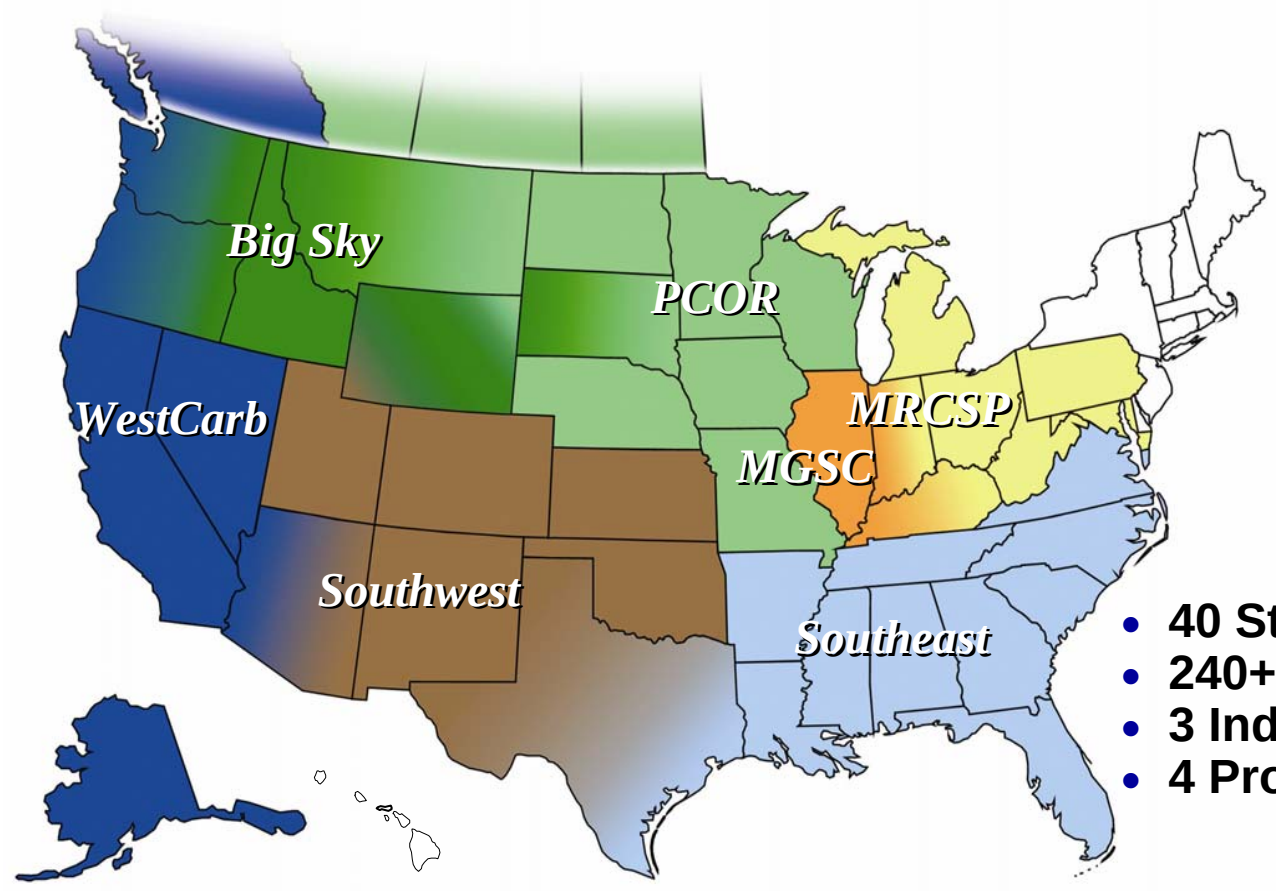
- 4 years (2005-2009)
- ~ 7 regions
- ~ $100 million federal funds

Phase III – 2009-2013

- Pending authorization
- Significance to FutureGen

Seven Regional Partnerships

Developing the Infrastructure for National Deployment of Carbon Sequestration Technologies



- 40 States
- 240+ Organizations
- 3 Indian Nations
- 4 Provinces

Phase I Accomplishments

- **Carbon Sequestration Atlases**
  - GIS based regional systems & support to NATCARB
- **Decision support tools**
  - Assess sink characteristics for potential sites
  - Proximity to sources and transportation infrastructure
- **MMV technologies and protocols**
- **Matching sources with capture technology**
- **Permitting guidelines**
- **Outreach and education mechanisms**
  - Town hall meetings, focus groups, videos

Phase I Partnerships At-a-Glance

	**California Energy Commission** http://www.westcarb.org/	• Region has identified candidate enhanced coal bed methane and enhanced oil recovery projects • Detailed assessment of forestation opportunities in storage, fire management, and biofuel
	**New Mexico Institute of Mining and Technology** http://www.southwestcarbonpartnership.org/	• Resource-rich region with two CO_2 pipelines • Identified seven candidate sites for field testing • Conducted web-based "town hall" meetings
	**Montana State University** http://www.bigskyco2.org/	• 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/	• 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/	• Efforts centered on a CO_2 pipeline "fairway" and a focused region • Link to agriculture interests through ethanol
	**Battelle Memorial Institute** http://198.87.0.58/default.aspx	• Strong analysis and cost-supply curves for CO_2 sequestration • Interactive website as outreach tool • 21% of U.S. CO2 emissions in the region
	**Southern States Energy Board** http://www.secarbon.org/	• Electricity supply industry and governor-level political participation • Carbon offset program, a web-based portal for advertising sequestration opportunities

Phase II Goals
Field Validation Testing

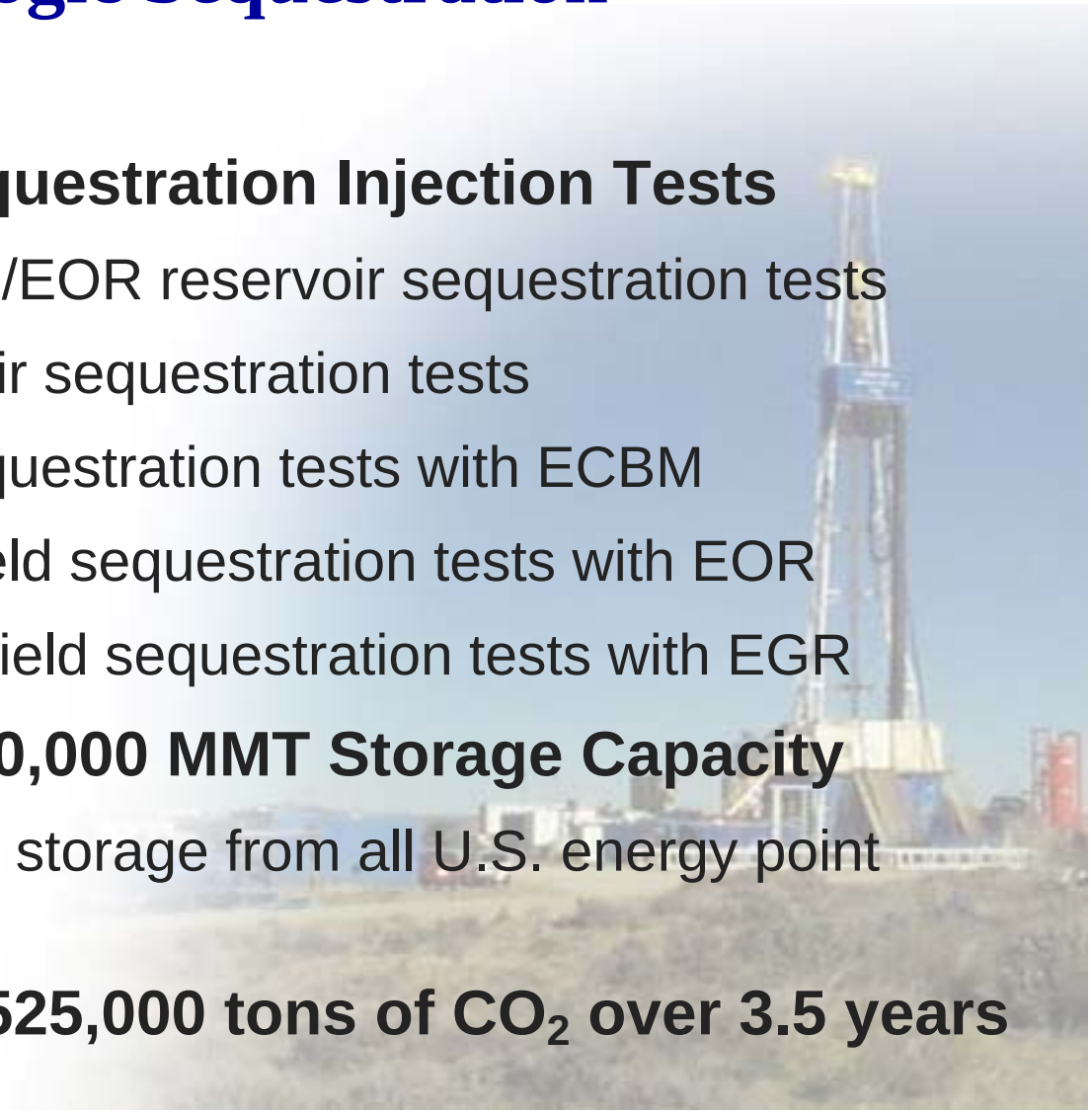
1. **Perform regional technology validation tests for 2012 technology assessment**
2. **Refine and implement MMV protocols**
3. **Continue regional characterization**
4. **Regulatory compliance activities**
5. **Implement public outreach and education**
6. **Identify commercially available sequestration technologies ready for large scale deployment**

Goal 1 - Regional Technology Validation Tests
2012 Technology Assessment

Integrated Regional Approaches

- Geologic sequestration
- Terrestrial sequestration
- Capture and transportation Assessment

Geologic Sequestration



- **25 Geologic Sequestration Injection Tests**
  - 4 stacked saline/EOR reservoir sequestration tests
  - 6 saline reservoir sequestration tests
  - 6 coal seam sequestration tests with ECBM
  - 8 depleted oil field sequestration tests with EOR
  - 1 depleted gas field sequestration tests with EGR
- **Represents >600,000 MMT Storage Capacity**
  - ~300 years CO_2 storage from all U.S. energy point sources
- **Injecting 1,000-525,000 tons of CO_2 over 3.5 years**

Terrestrial Sequestration

10 Terrestrial Indirect Sequestration Tests

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

Capture and Transportation

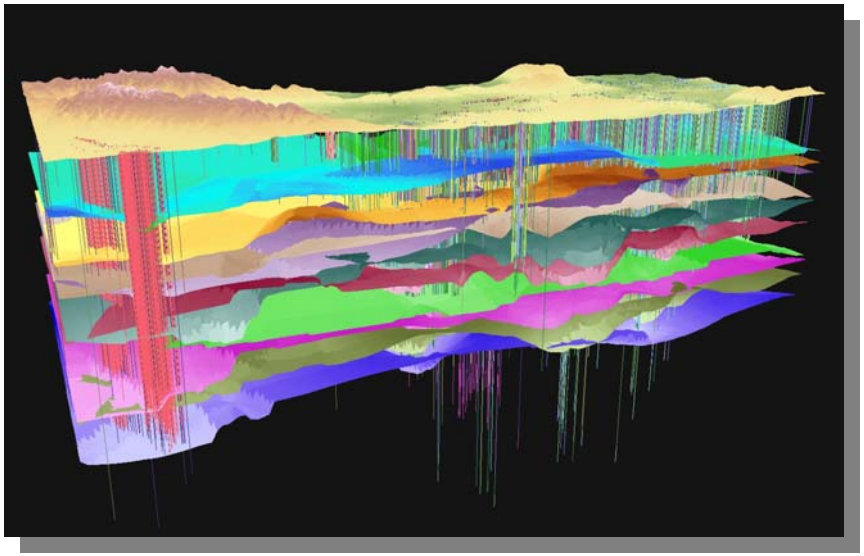
- Match regional sources with capture technologies
- Assess transportation costs associated with construction, operations, and proximity of regional sources to sinks

Goal 2 -Measurement, Mitigation & Verification Protocols

- **Apply appropriate tools for MMV**
  - Models and/or measurement technologies
- **Develop protocols to assess risks, model fate and transport, and verify permanence**
- **Develop strategies for risk mitigation**
- **Project guidelines should satisfy DOE 1605B Voluntary Reporting Guidelines and emerging market requirements**

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**



Goal 4 - Regulatory Compliance Activities

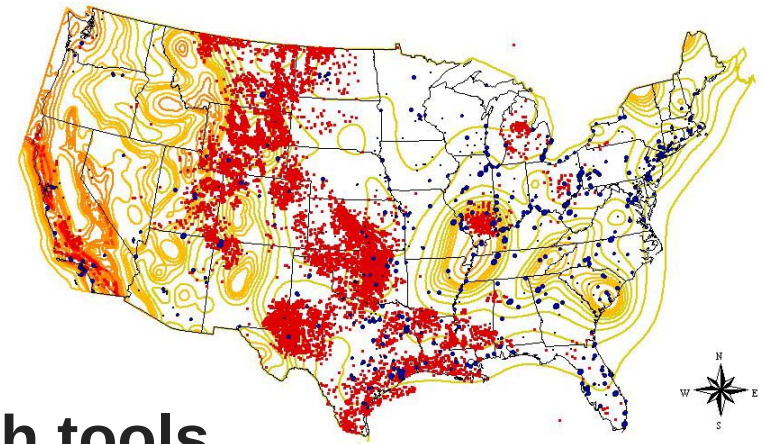
- Capture, handling, transport, and sequestration
- Satisfy permitting requirements for feasibility project
- Develop permitting action plans for future large scale deployment in region

Goal 5 - Public Outreach and Education

- **Broad implementation in region**
- **Strategies for project(s) implementation**
- **Develop and use outreach materials**
  - Focus groups
  - Fact sheets
  - Town hall meetings
  - Websites
  - Curricula
  - Videos

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**



Points of Contact

National Energy Technology Laboratory
Strategic Center for Coal
Office of Fossil Energy

SCOTT KLARA
(412) 386-4864
Scott.Klara@netl.doe.gov

SEAN PLASYNSKI
(412) 386-4867
Sean.Plasynski@netl.doe.gov

JOHN LITYNSKI
(304) 285-1339
John.Litynski@netl.doe.gov

SARAH FORBES
(304) 285-4670
Sarah.Forbes@netl.doe.gov

U.S. Department of Energy
Office of Coal and Power Systems
Office of Fossil Energy

LOWELL MILLER
(301) 903-9451
Lowell.Miller@hq.doe.gov

BOB KANE
(202) 586-4753
Robert.Kane@hq.doe.gov

JAY BRAITSCH
(202) 586-9682
Jay.Braitsch@hq.doe.gov

Conclusion

- Partnerships are key Element of DOE/FE NETL Carbon Sequestration Program and support to FutureGen
- Fossil fuels will continue to play a major role for decades
- Field testing is needed to validate technologies, capacity, and environmental efficacy
- Technical and societal challenges for sequestration will be solved through public and private partnerships such as these