

United States Sequestration Program Update

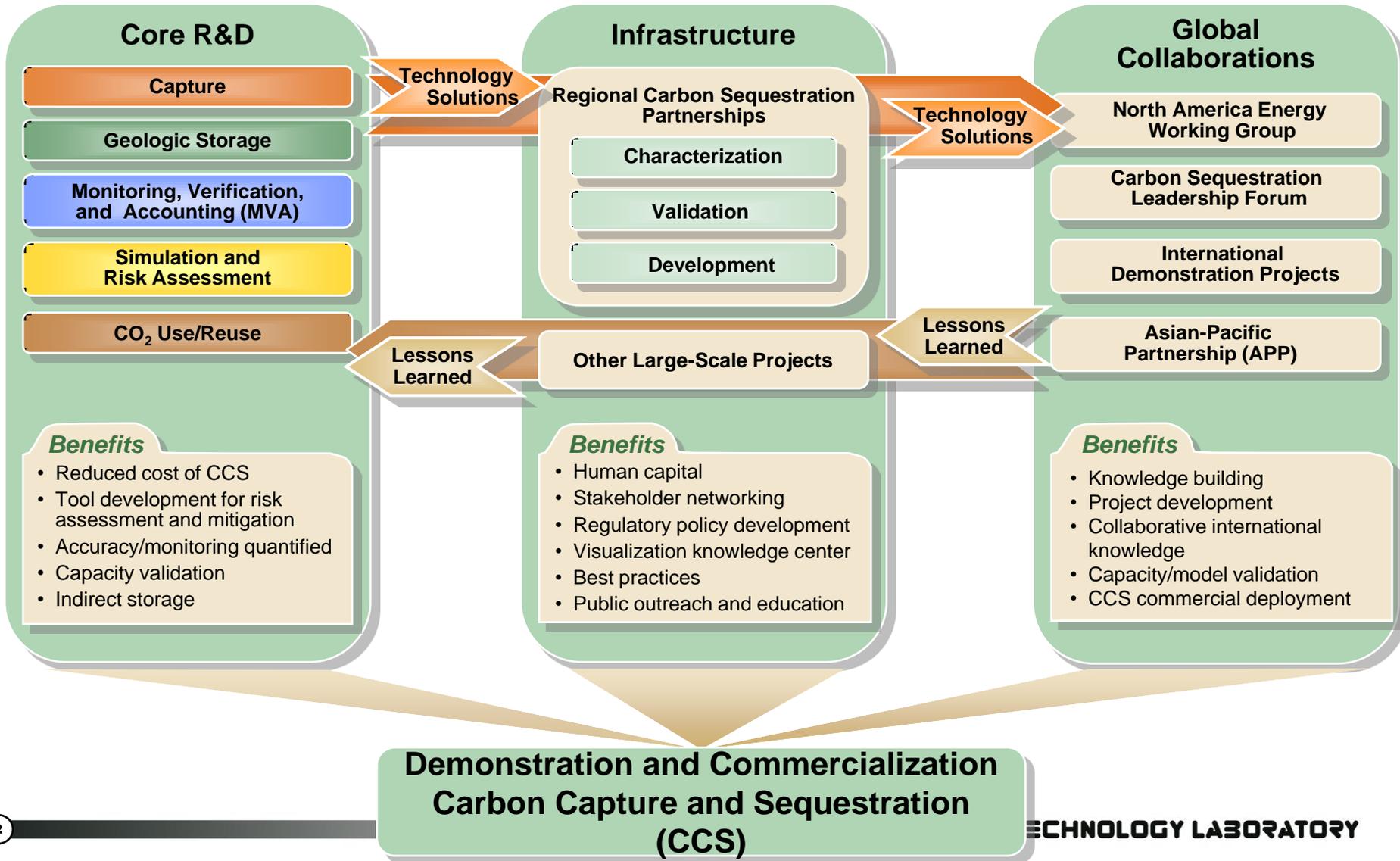
NORTH AMERICA CARBON ATLAS PARTNERSHIP

July 22, 2009

Sean Plasynski, PhD Sequestration Technology Manager



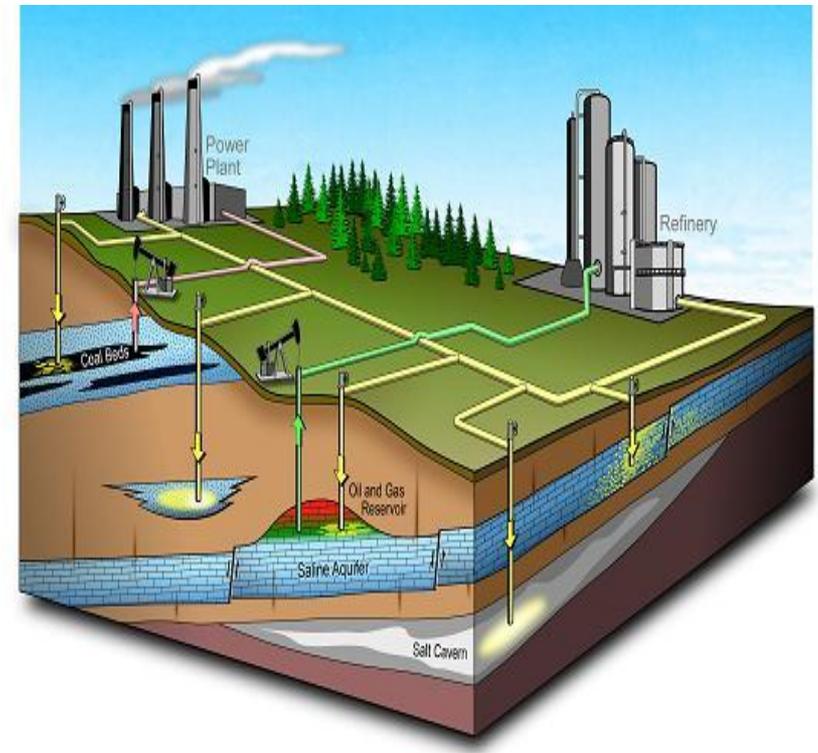
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 NATIONAL ENERGY TECHNOLOGY LABORATORY
CARBON SEQUESTRATION PROGRAM



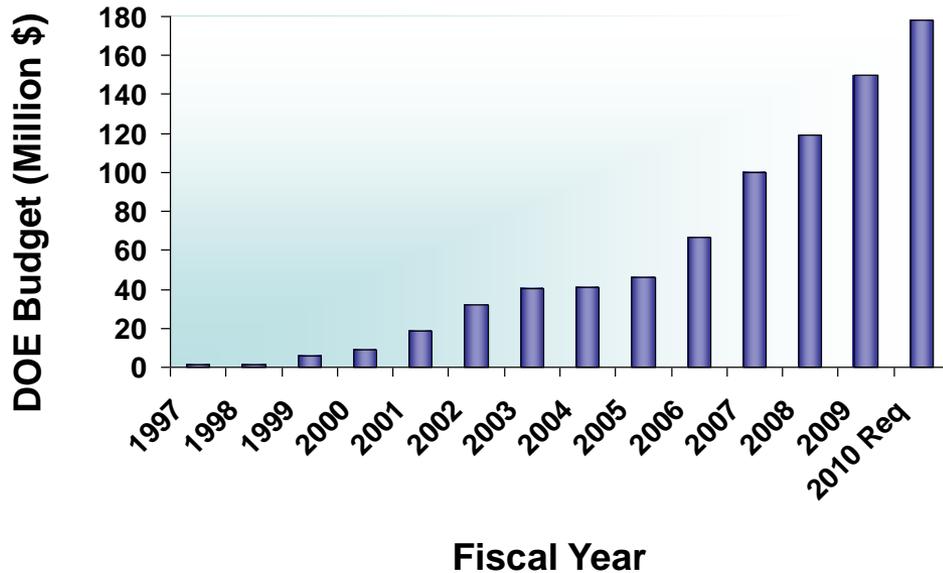
Carbon Sequestration Program Goals

Develop Technology Options That...

- Deliver technologies & best practices that provide Carbon Capture and Safe Storage (CCSS) with:
 - 90% CO₂ capture at source
 - 99% storage permanence
 - < 10% increase in COE
 - Pre-combustion capture (IGCC)
 - < 35% increase in COE
 - Post-combustion capture
 - Oxy-combustion



Sequestration Program Statistics FY2009



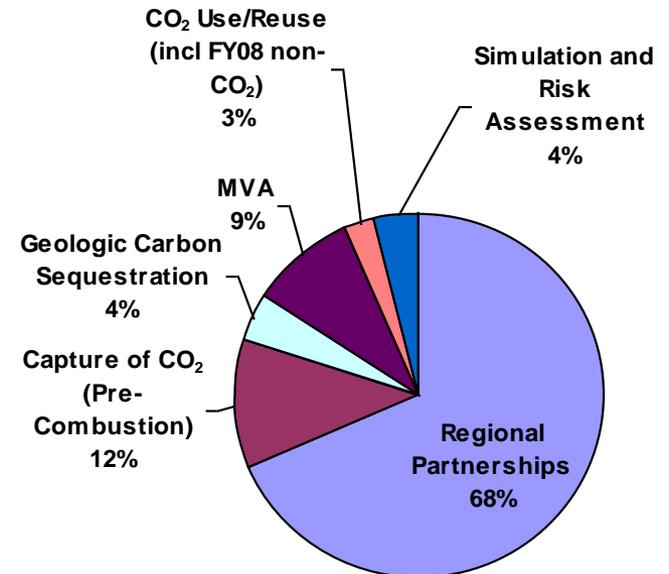
Strong industry support
 ~ 39% cost share on projects

Federal Investment to Date (→08)
 ~ \$481 Million

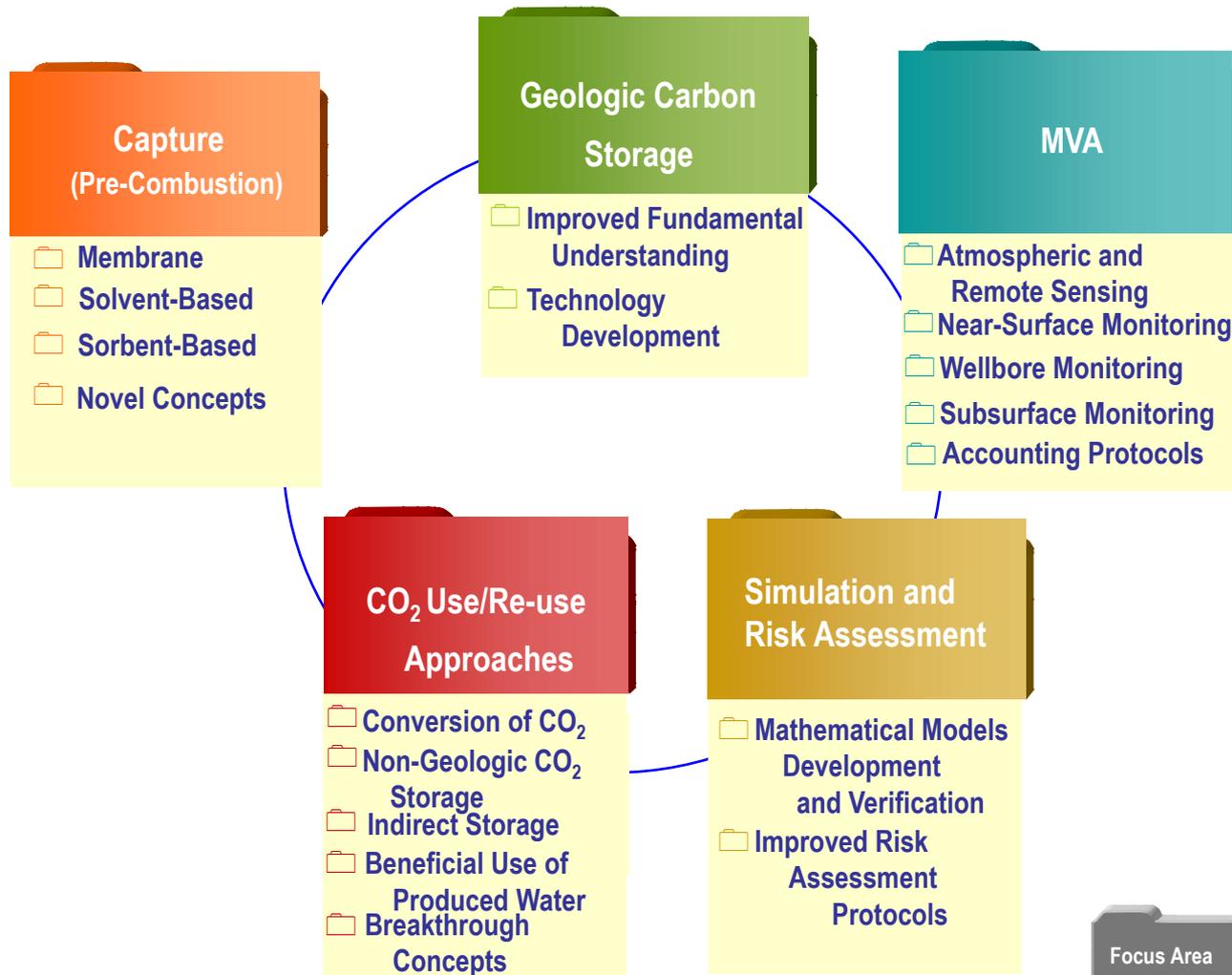
Diverse research portfolio

~ 80 Active R&D Projects

2009 Budget Breakdown



Core R&D Focus Areas and Supporting Research Pathways



Regional Carbon Sequestration Partnerships

- Engage regional, state, and local governments
- Determine regional sequestration benefits
- Baseline region for sources and sinks
- Establish monitoring and verification protocols
- Address regulatory, environmental, and outreach issues
- Validate sequestration technology and infrastructure

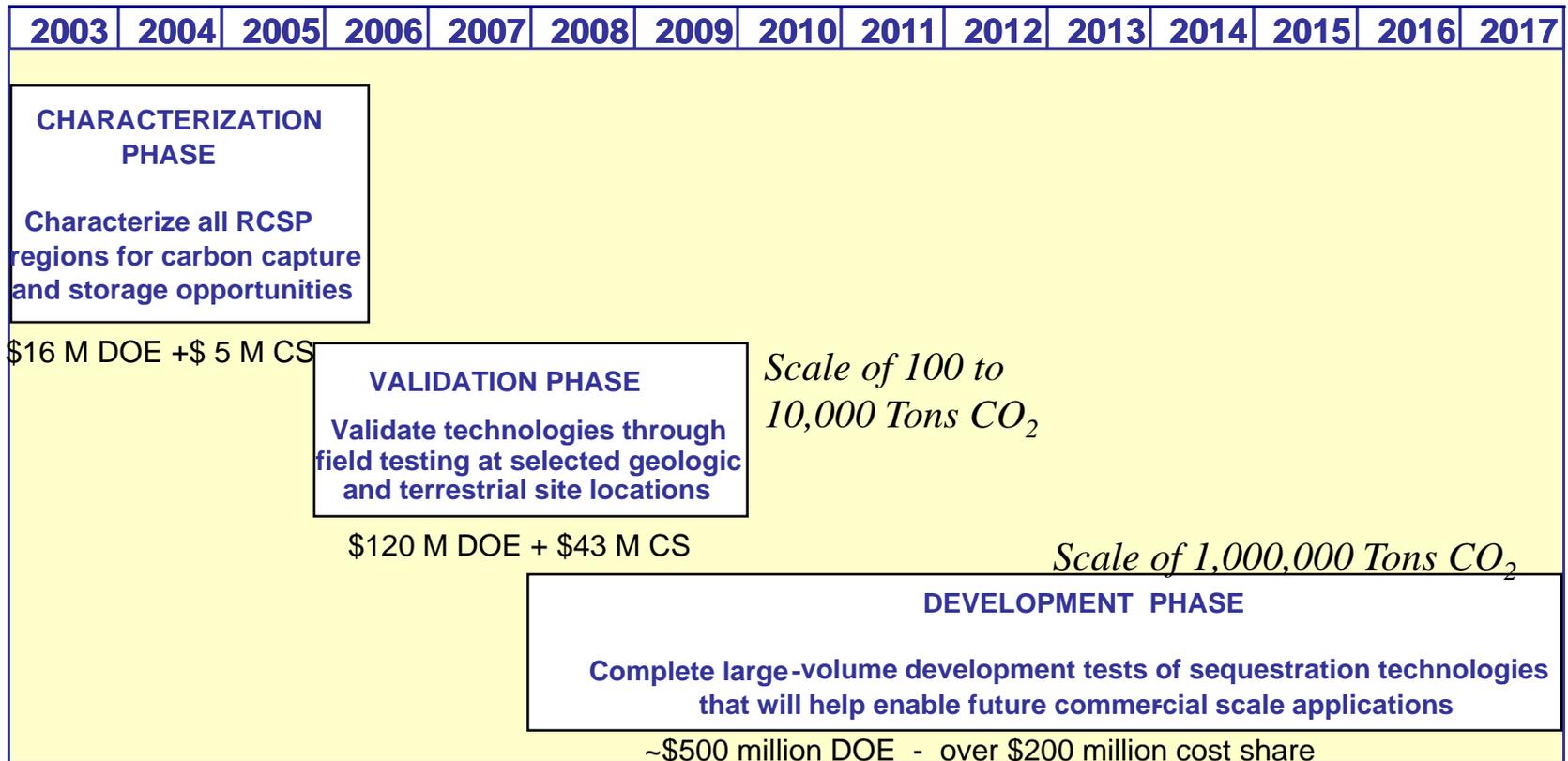


- 7 Regional Partnerships
- 43 States, 4 Canadian Provinces
- 350+ distinct organizations

Developing the Infrastructure for Wide-Scale Deployment

Regional Carbon Sequestration Partnerships Program Phases

FISCAL YEAR



RCSP Phase II: Validation

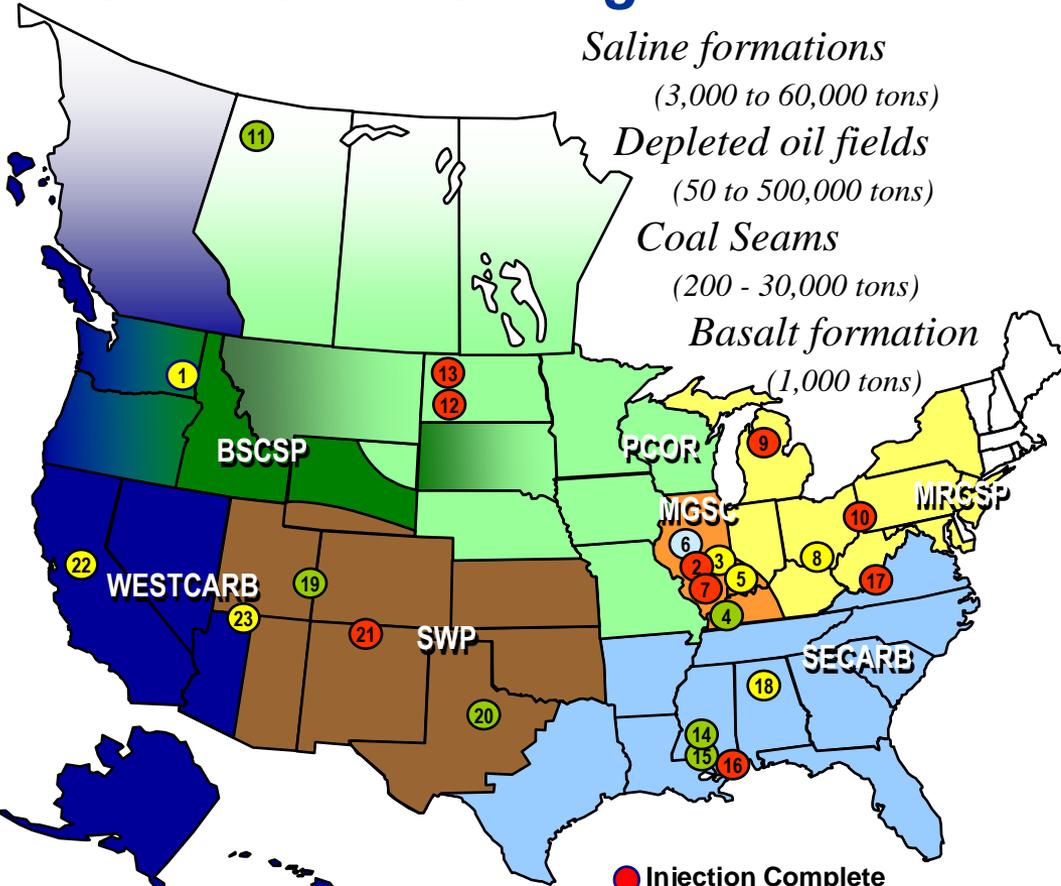
Small-Scale Geologic Field Tests

Saline formations
(3,000 to 60,000 tons)

Depleted oil fields
(50 to 500,000 tons)

Coal Seams
(200 - 30,000 tons)

Basalt formation
(1,000 tons)



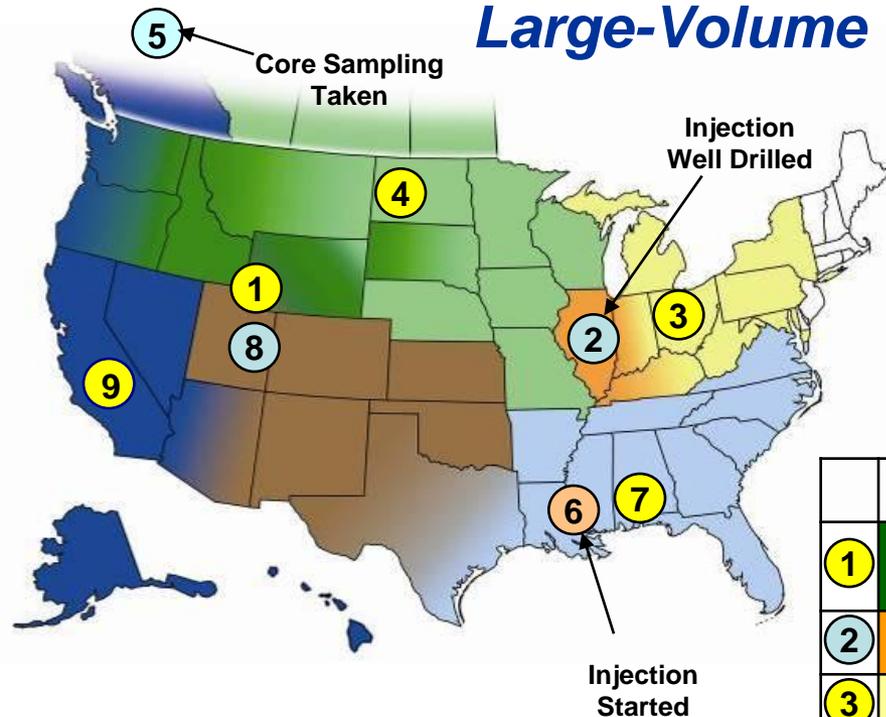
- Injection Complete
- Injection Ongoing
- 2009 Injection
- 2010 Injection (Project moved to Phase III)

RCSP	Formation Type	Geologic Province
Big Sky	Saline ①	Columbia Basin
MGSC	Oil-bearing ② ③ ④ ⑤ Saline ⑥ Coal seam ⑦	Illinois Basin
MRCSP	Saline ⑧ ⑨ ⑩	Cincinnati Arch, Michigan Basin, Appalachian Basin
PCOR	Oil-bearing ⑪ ⑫ Coal seam ⑬	Keg River, Duperow, Williston Basin
SECARB	Oil-bearing ⑭ Saline ⑮ ⑯ Coal seam ⑰ ⑱	Gulf Coast, Mississippi Salt Basin, Central Appalachian, Black Warrior Basin
SWP	Oil-bearing ⑲ ⑳ Coal seam ㉑	Paradox Basin, Aneth Field, Permian Basin, San Juan Basin
WESTCARB	Saline ㉒ ㉓	Sacramento Valley, Colorado Plateau

RCSP Phase III: Development

Large-Volume Geologic Field Tests

- ✓ *Nine large-volume tests*
- ✓ *Injections initiated 2009 – 2011*



- 2009 Injection Scheduled
- 2010 Injection Scheduled
- 2011 Injection Scheduled

	Partnership	Geologic Province	Type
1	Big Sky	Triassic Nugget Sandstone / Moxa Arch	Saline
2	MGSC	Deep Mt. Simon Sandstone	Saline
3	MRCSP	Shallow Mt. Simon Sandstone	Saline
4	PCOR	Williston Basin Carbonates	Oil Bearing
5		Devonian Age Carbonate Rock	Saline
6	SECARB	Lower Tuscaloosa Formation Massive Sand Unit	Saline
7			
8	SWP	Regional Jurassic & Older Formations	Saline
9	WESTCARB	Central Valley	Saline

Lessons Learned Captured CCS Best Practice Manuals

• Phase II

- Monitoring Verification and Accounting (Issued - Feb 2009)
- Site characterization (2010)
- Simulation and Risk Assessment (2010)
- Well construction and closure (2010)
- Regulatory Compliance (2010)
- Public Education (2009)
- Terrestrial Practices (2010)

• Phase III Updates

- Updates 2016-17

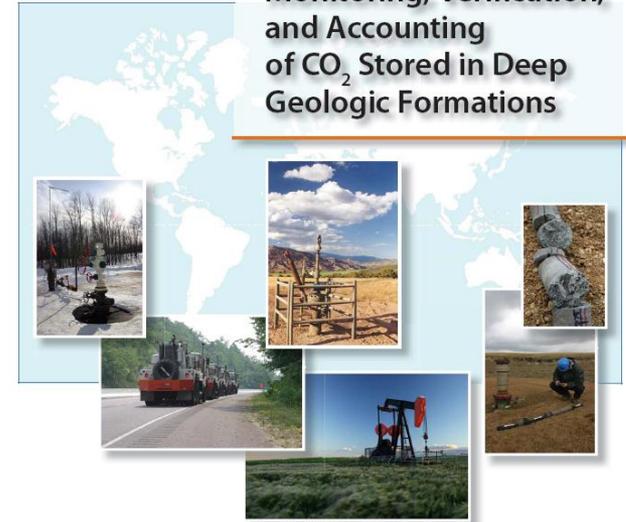
• Final Guidelines (2020)



the **ENERGY** lab

BEST PRACTICES for:

Monitoring, Verification,
and Accounting
of CO₂ Stored in Deep
Geologic Formations



First Edition

NATIONAL ENERGY TECHNOLOGY LABORATORY



Fossil Energy Recovery Act Provisions

Fossil Energy (\$ in Thousands)	Funding Amount
Fossil Energy Research and Development	\$1,000,000
Clean Coal Power Initiative – Round 3 FOA	\$800,000
Industrial Carbon Capture Solicitation	\$1,520,000
Geologic Formation Site Characterization	\$50,000
Geologic Sequestration Training & Research	\$20,000
Program Direction	\$10,000
Total, Fossil Energy	\$3,400,000

Visit Office of Fossil Energy & NETL Websites

U.S. DEPARTMENT OF ENERGY
Office of Fossil Energy

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 technologies to extend life

\$760 Million Programs in
 DOE's fiscal year
 billion includes fu
 research; increa
 cells, hydrogen f
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- ▶ [netlog newsletter](#)
- ▶ [2005 Annual Site Environmental Report](#)
- ▶ [2006 Mercury Control](#)

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