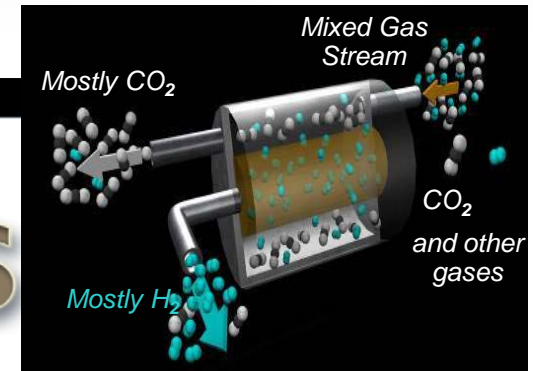
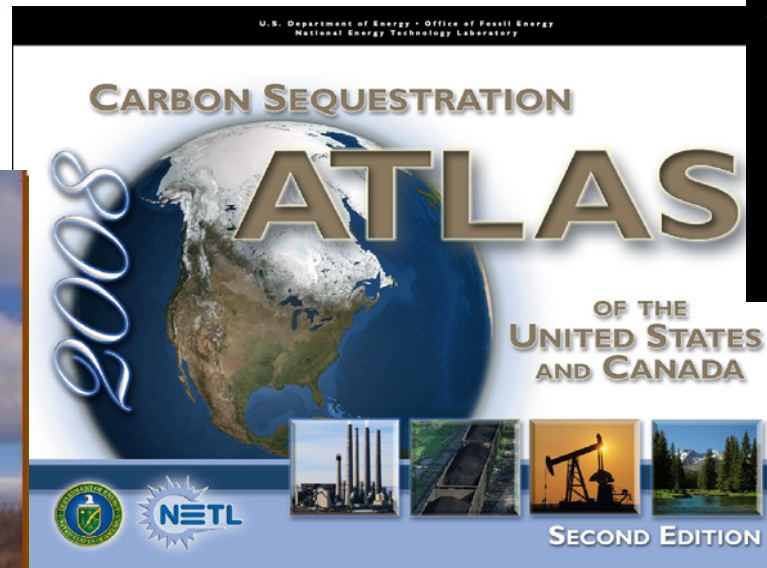


CARBON CAPTURE AND STORAGE IN THE UNITED STATES



**CEC Joint Public Advisory Committee
Vancouver, British Columbia, Canada
24 March 2010**



**Robert 'Bob' Wright
Senior Advisor
Office of Fossil Energy
U. S. Department of Energy
Washington, DC**

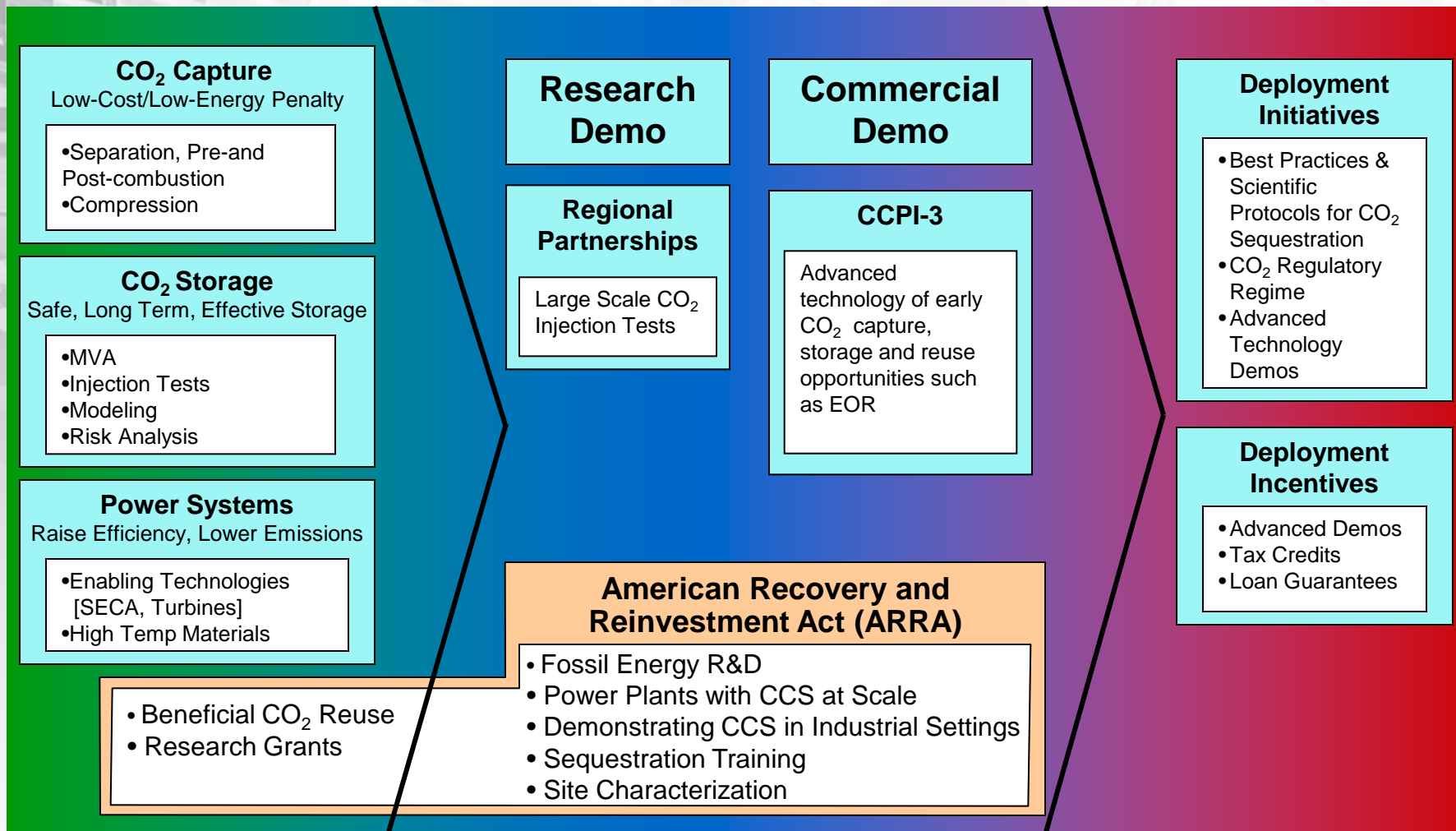
DOE's Programs Framework



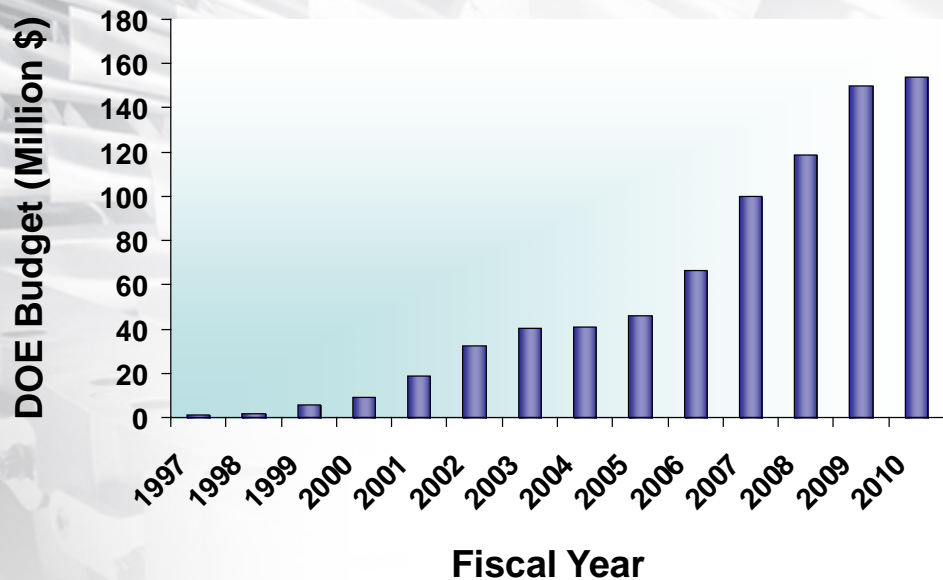
Research & Development

Demonstration

Deployment

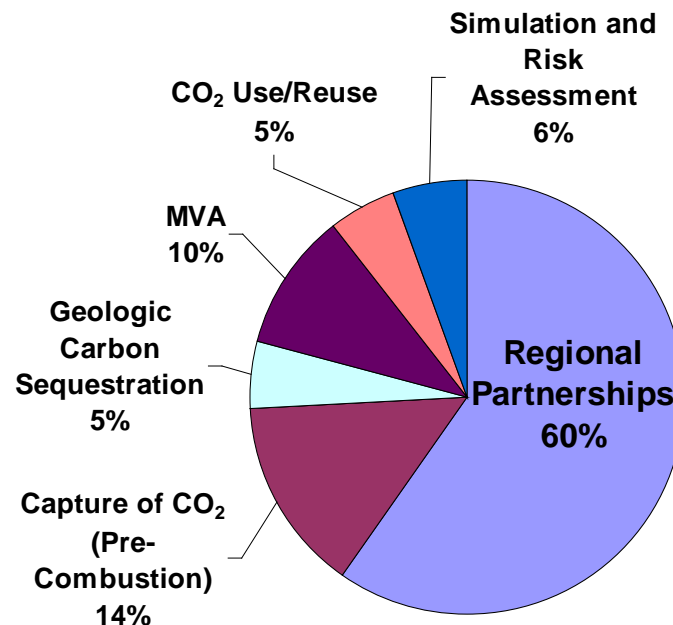


Sequestration Program Statistics



Through 2009
Strong industry support
 ~ 39% cost share on projects
Federal Investment to Date
 ~ \$631 Million
Total value of CCS efforts
 > \$1 Billion

2009 Carbon Sequestration Program Budget Breakdown



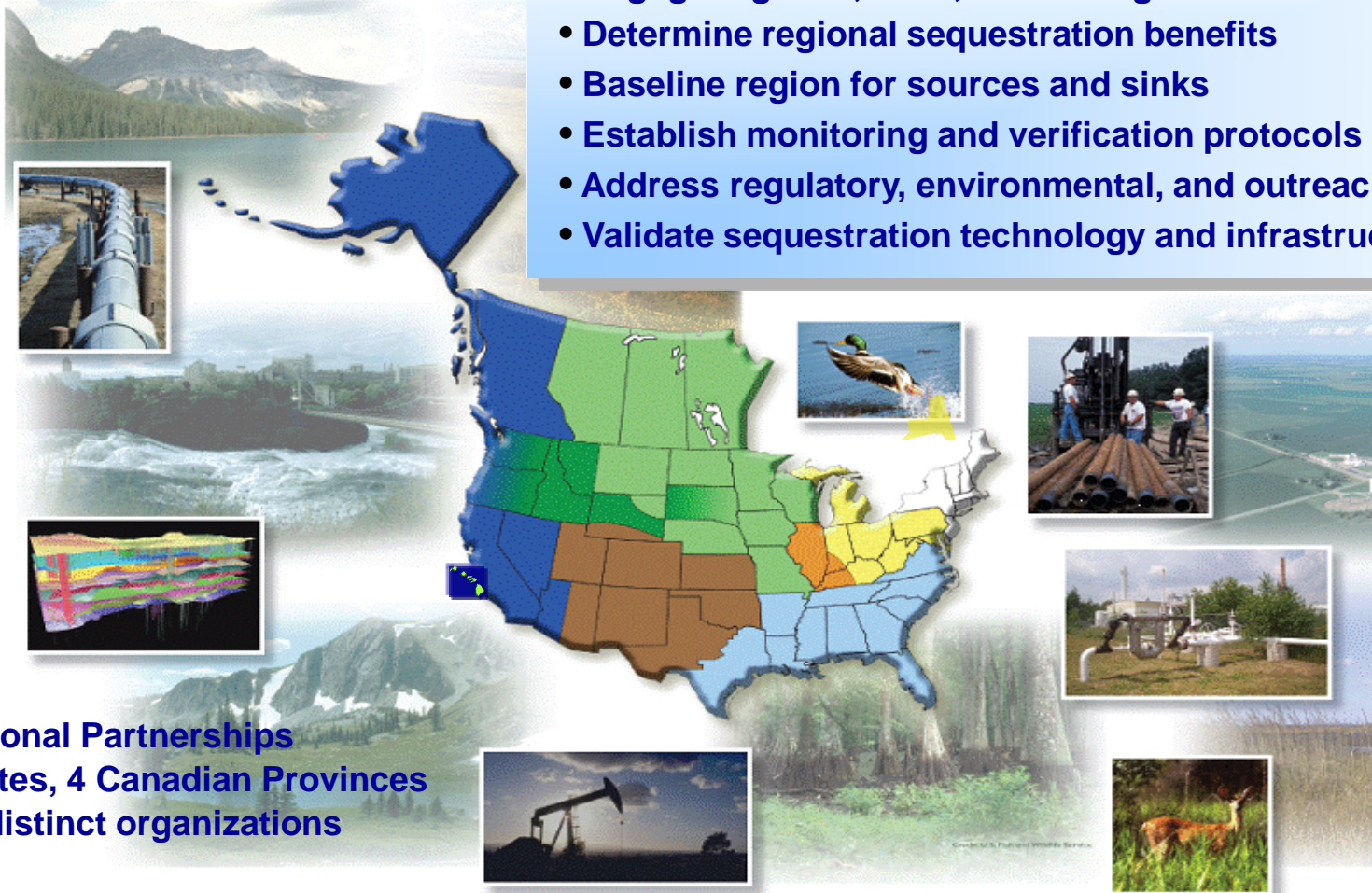
Diverse research portfolio

Nearly 100 Active R&D Projects

Regional 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



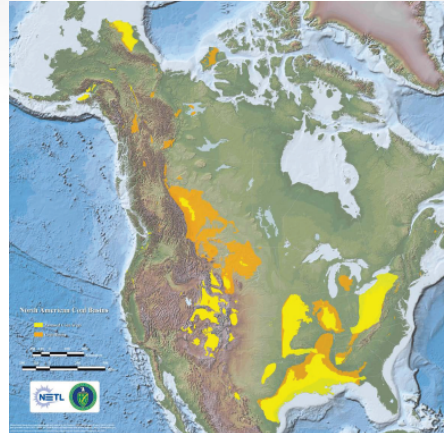
National Atlas Highlights

Adequate Storage Projected

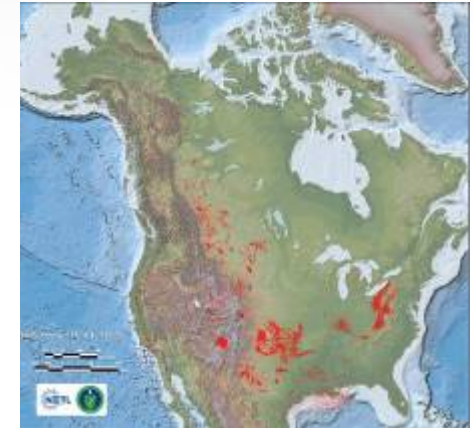
Regional Stationary Emissions >3.2 billion metric tons



Saline Formations



Unmineable Coal Seams



Oil and Gas Fields

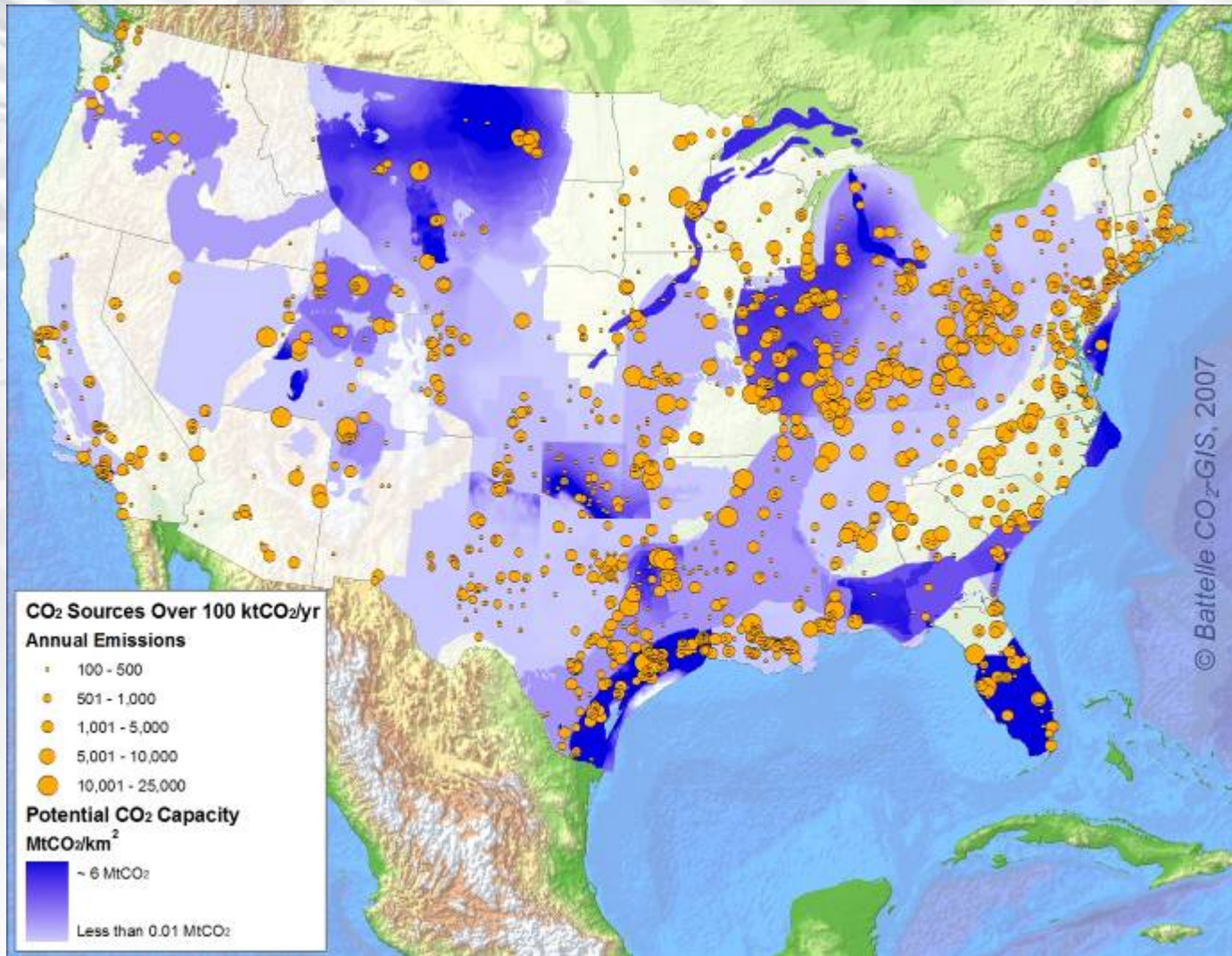
Regional CO₂ Storage Potential
(Billion Metric Tons)

*Conservative
Resource
Assessment*

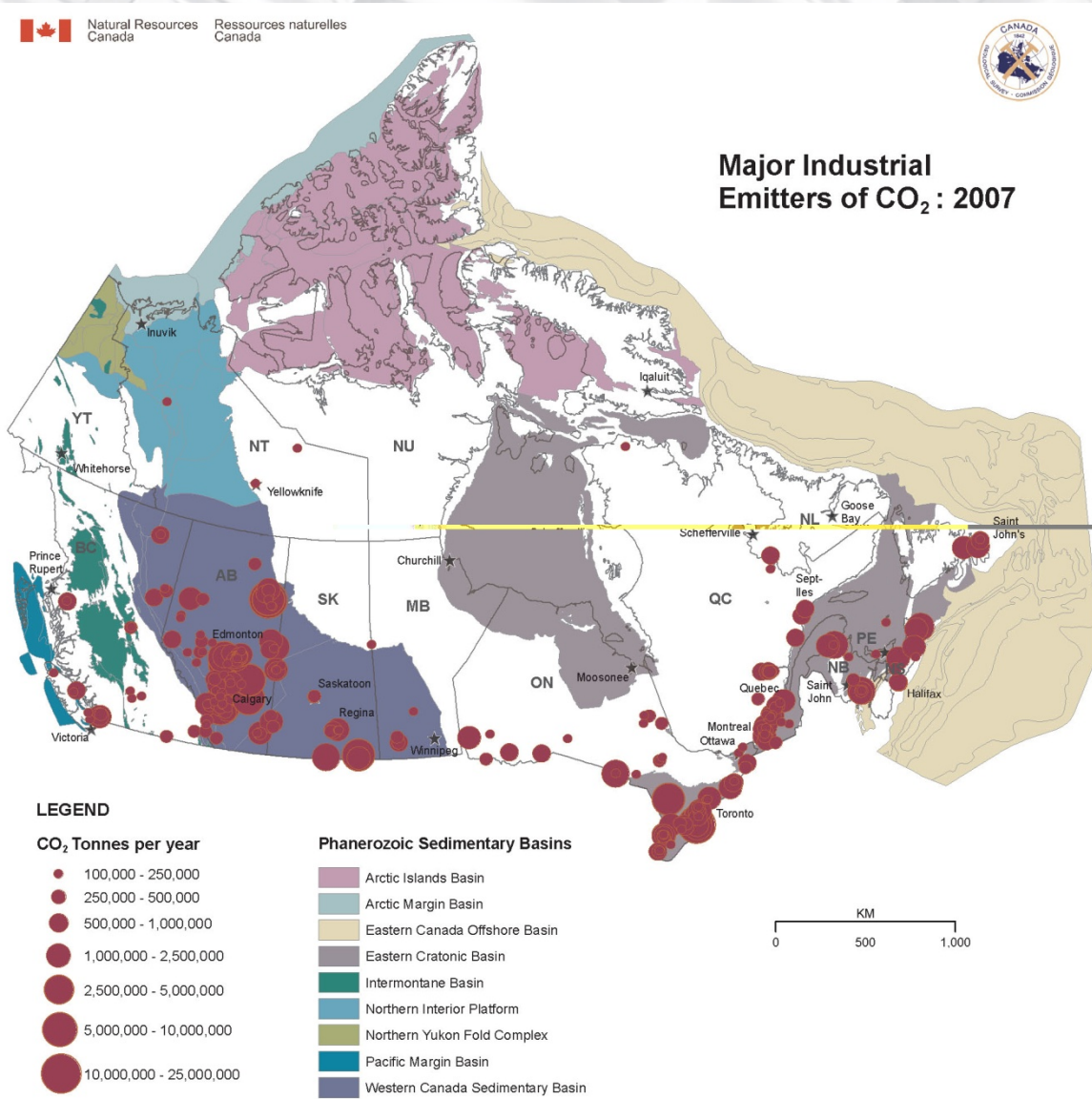
Sink Type	Low	High
<i>Saline Formations</i>	3,300	12,600
<i>Unmineable Coal Seams</i>	160	180
<i>Oil and Gas Fields</i>	140	140

*Hundreds of
Years of
Storage
Potential*

Source-Sink Matching



CO₂ Sources in Canada





Collaboration

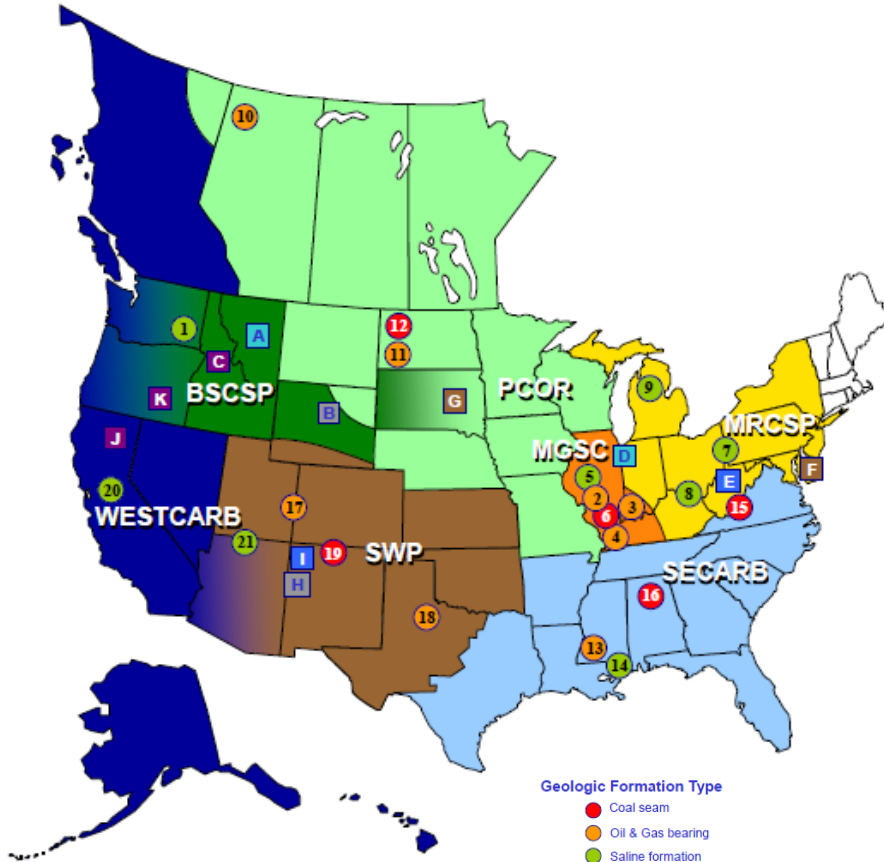
■ U.S. Canada Clean Energy Dialogue

- 
- North American Carbon Storage Atlas
 - CO₂ Injection and Storage Testing
 - Next Generation Technologies
 - Working Towards Compatible Rules, Standards and Practices
 - Knowledge Sharing on Large-Scale CCS Demonstration Projects
 - Strategies for Public Engagement
 - Bilateral National Conference



RCSP Phase II: Validation Phase

Small-Scale Geologic and Terrestrial Tests

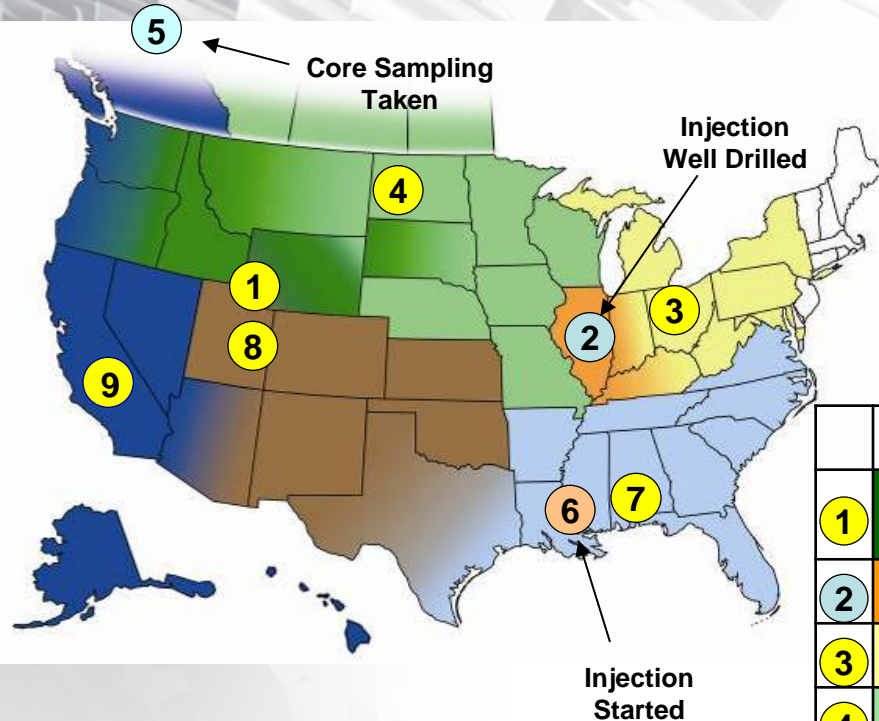


Partnership	Geologic Province/ Location	Geologic		Terrestrial
		Total CO ₂ Injection (tons CO ₂)	Approximate Depth (feet)	Estimated CO ₂ Capacity
1	Columbia Basin	0*	2,500 – 4,000	
A, B, C BIG SKY CARBON SEQUESTRATION PARTNERSHIP	North Central MT Eastern WY Region-wide			60 Mt over 20 years 30 Mt over 10 years 640 – 1,040 Mt over 80 years
2, 3, 4, 5, 6 MGSC	Loudon Oil Field Mumford Hills Oil Field Sugar Creek Oil Field Illinois Basin Illinois Basin	< 50 2,700* 4,600* 0* 100	1,550 1,551 1,548 6,650 – 7,050 1,000	
7, 8, 9 D, E, F MRCSP MIDWEST REGIONAL CARBON SEQUESTRATION PARTNERSHIP	Appalachian Basin Cincinnati Arch Michigan Basin Region-wide Region-wide Cambridge, MD	< 100 1,000 60,000	5,900 – 8,300 3,200 – 3,500 3,200 – 3,500	25 Mt over 20 years 100 Mt over 20 years TBD
10, 11, 12 G The Plains CO ₂ Reduction Partnership PCOR	Keg River Formation Duperow Formation Williston Basin Great Plains wetlands complex (PPR)	30,000 440 90	5,000 10,000 – 10,500 1,600 – 1,800	14.4 Mt
13, 14, 15, 16 H, I SECARB Southeast Regional Carbon Sequestration Partnership	Gulf Coast } stacked Gulf Coast } Mississippi Coastal Plain Central Appalachian Black Warrior Basin	500,000 3,082 1,000 0*	10,304 10,400 8,600 1,600 – 2,300 1,500 – 2,500	
17, 18, 19 J, K SWP SOUTHWEST PARTNERSHIP CO ₂ SEQUESTRATION	Paradox Basin--Aneth Field Permian Basin San Juan Basin Region-wide San Juan Basin Coal Fairway (Navajo City, NM)	250,000 475,000 18,430	5,600 – 5,800 5,800 3,000	TBD TBD
20, 21 WEST COAST REGIONAL CARBON SEQUESTRATION PARTNERSHIP westcarb.org	Sacramento Basin* Colorado Plateau Shasta County, CA Lake County, OR	0* 0	8,000 4,000	4,600 Mt over 80 years (CA) 900 Mt over 80 years (OR)

* Currently injecting or will begin injecting in 2010

RCSP Phase III: Development Phase

Large-Scale Geologic Tests



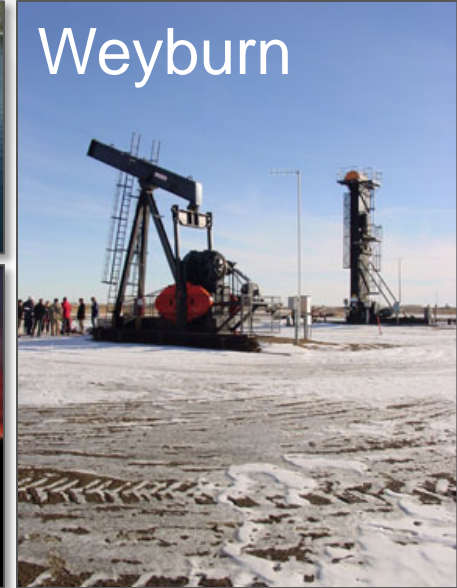
- ✓ *Nine large-volume tests*
- ✓ *1 million tons CO₂ or more*
- ✓ *Injections from 2009 to 2011*

	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

- 2010/2011 Injection Scheduled
- 2011/2012 Injection Scheduled



CCS Is Operating Today



Five large-scale integrated projects are operating today, but none from power generation, coal-to-liquids, oil sands, ethanol production, refining, cement making and metals production.

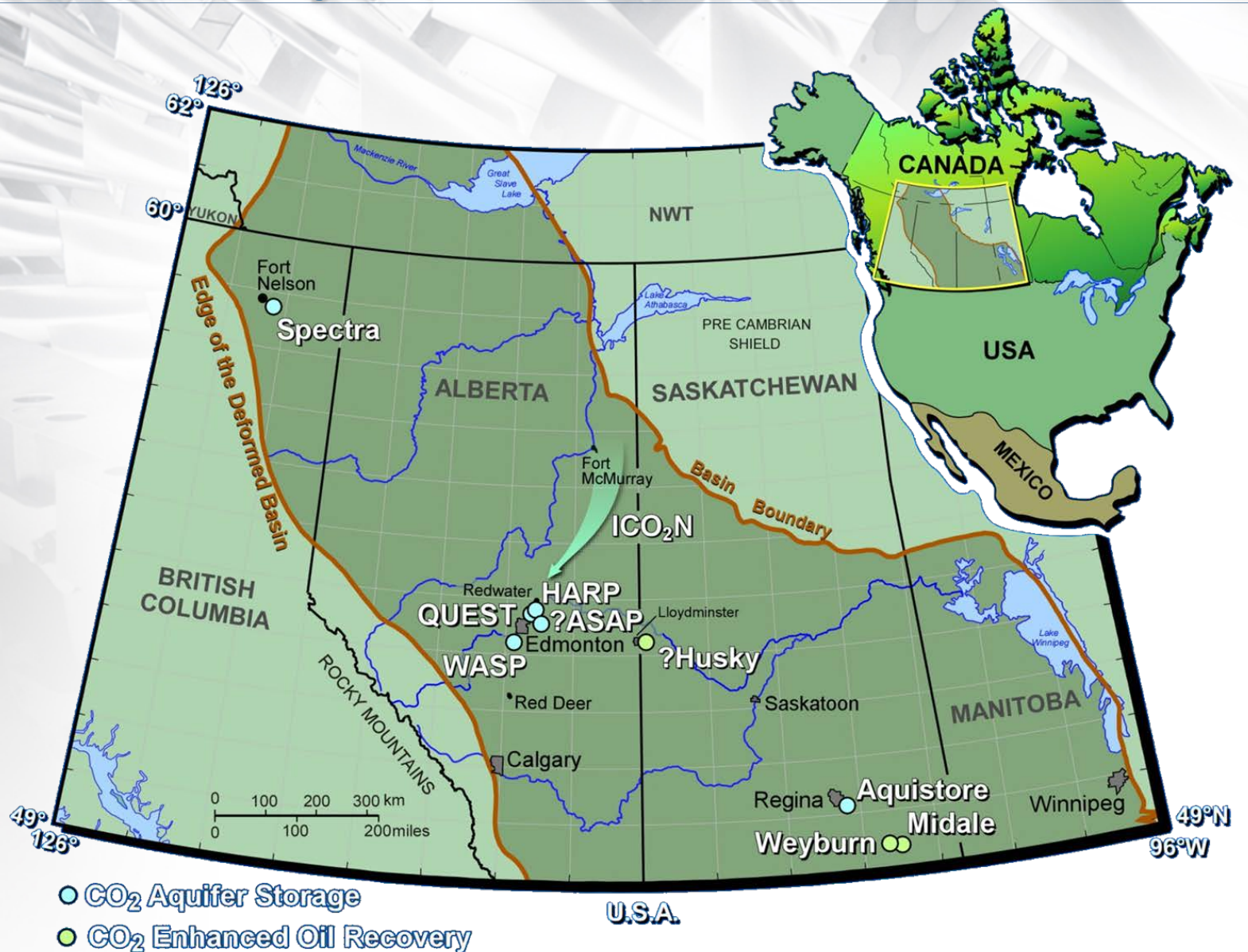
Source: Brendan Beck, IEA



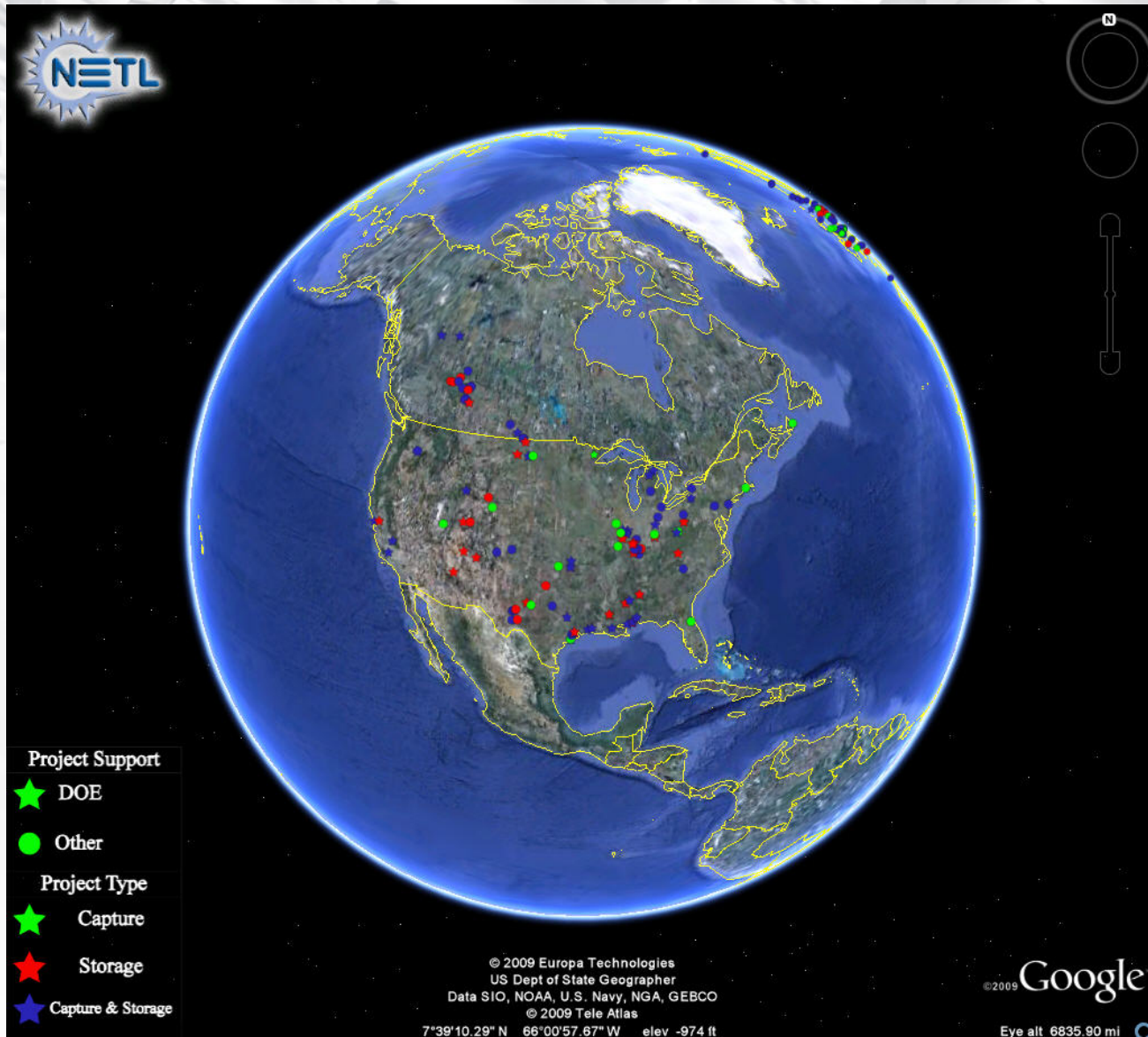
U.S.--ARRA (Stimulus Funding)

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

CCS Projects in Western Canada



Projects in North America



Visit Office of Fossil Energy and NETL Websites



U.S. DEPARTMENT OF ENERGY Office of Fossil Energy

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- Petroleum Reserves



Recent Fossil Energy Updates....
Stripper Well Technology to Extend Life of Oil Wells
 DOE-backed consortium delivers technologies to extend life of oil wells



\$760 Million Depleted Uranium Programs in FY 2010
 DOE's fiscal year 2010 budget includes funding for research; increase in uranium cells; hydrogen from technologies R&D.

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PUBLICATIONS & PROJECTS // [All >](#)

- [netlqa newsletter](#)
- [2005 Annual Site Environmental Report](#)
- [2006 Mercury Control](#)

NETL's Bauer Named 'Laboratory Director of the Year' // Carl Bauer, Director of the Office of Fossil Energy's National Energy Technology Laboratory, has been named a Laboratory Director of the Year by the Federal Laboratory Consortium for Technology Transfer. [Read More!](#)



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