SECA Workshop

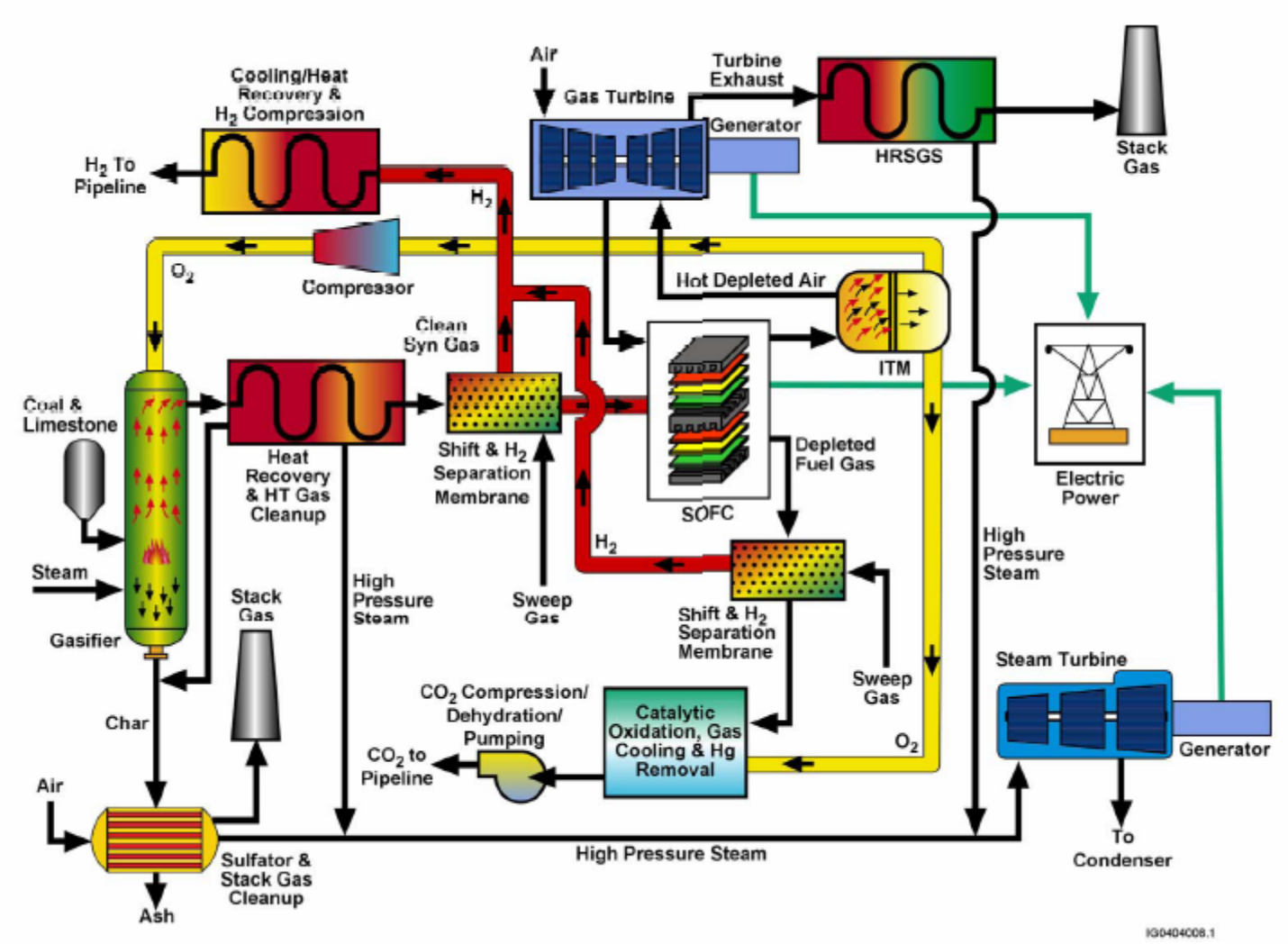
Market Mechanisms for CO_2: Issues and Opportunities

Michael Moore
Managing Partner
CO2 Global LLc

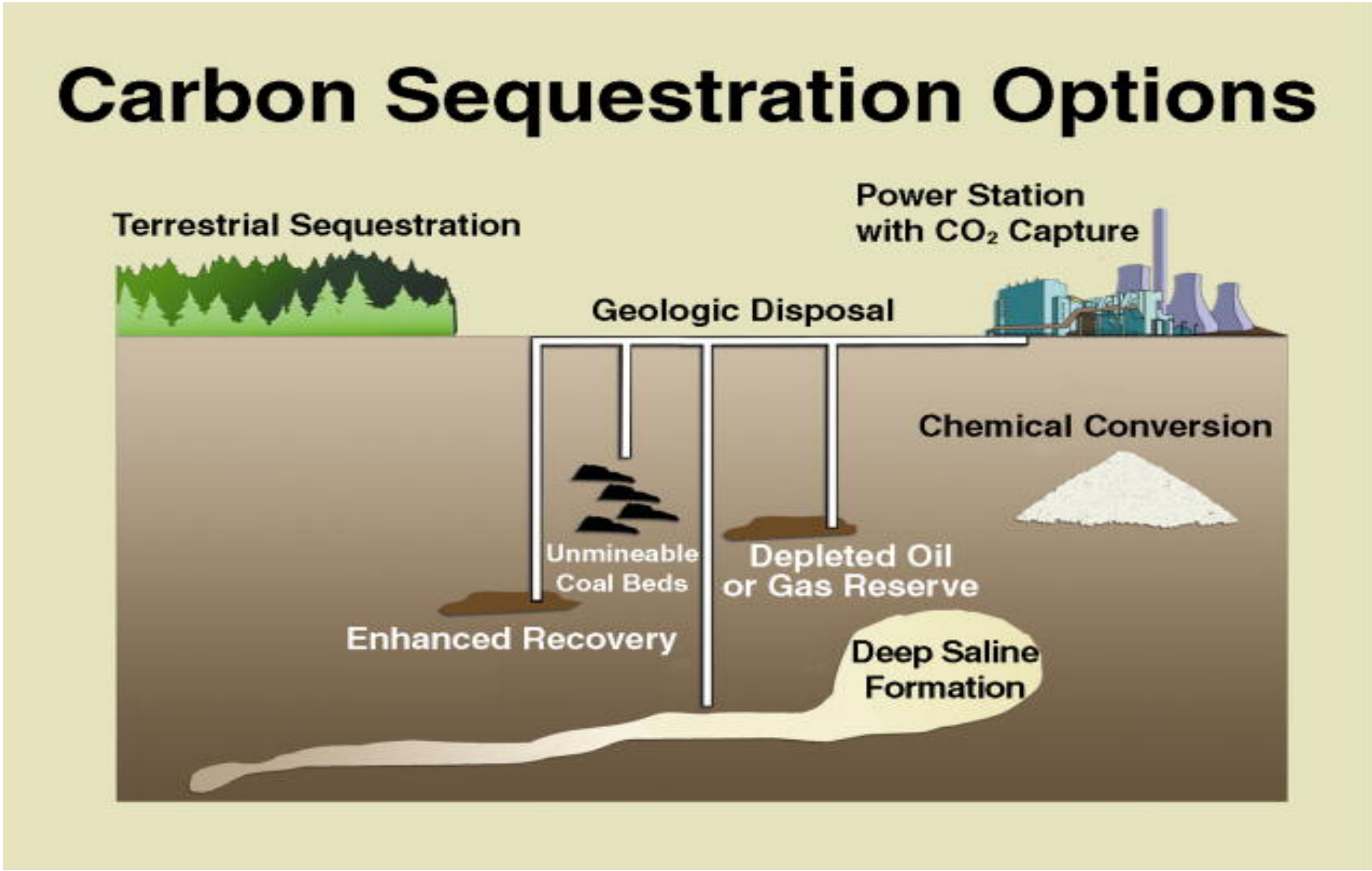
August 7, 2007
San Antonio, Texas

This is Your World

Source: McVay 2006 HiTec presentation



Here is Mine


Carbon Sequestration Options
Terrestrial Sequestration
Power Station
with CO_2 Capture
Geologic Disposal
Chemical Conversion
Unmineable
Coal Beds
Depleted Oil
or Gas Reserve
Enhanced Recovery
Deep Saline
Formation

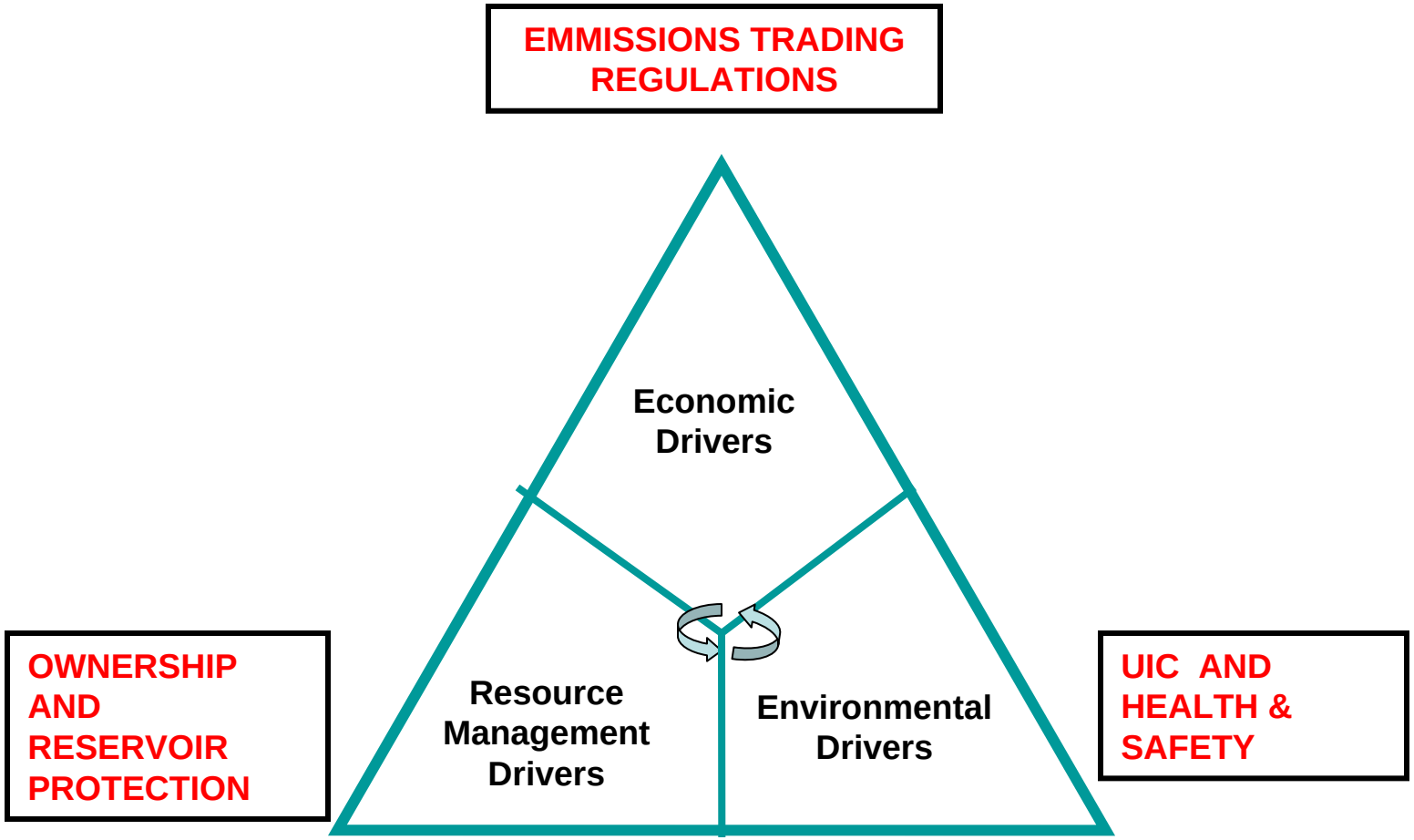
Two Markets for Same Molecule

- **Commodity CO_2 for use in Enhanced Oil Recovery in the US and Globally**
- **Sequestered CO_2 or Greenhouse Gas and resulting tradable offsets**
- **Carbon Capture Storage (CCS) can readily optimize values from both markets**

Issue: CO_2 a Commodity, Pollutant or Hazardous Waste?

- **Commodity** – commercial value for use in EOR/EGR
- ***Pollutant*** *– Recent Supreme Court ruling that EPA must make this determination-- Crude Oil, Coal and Natural Gas-are if mis-managed*
- **Hazardous Waste** - makes handling, injecting and sequestering problematic

  Kills EOR/EGR commercial opportunities



CCS REGULATORY FRAMEWORKS

Source: Larry Bengal Director of Arkansas Oil and Gas Commission for IOGCC

Current Issues

- Growing need for more CO_2 for EOR-CCS most likely route
- Mechanisms to recognize geologic sequestration
- Monitoring and verification for sequestration protocols need to be firmly and universally established
- Present and future liabilities of geologic sequestration need to be defined
- Formal framework for GHG mitigation and valuation of tradable credits
- Determination of GHG credits derived from CO_2 driven EOR and sequestration

Commodity CO_2, GHG Markets, and Drivers

GHG Markets

- Currently larger than US Wheat market in dollar value and infrastructure internationally
- California and RGGI setting the pace for US GHG markets
- Recent changes in House and Senate removing earlier barriers to carbon management- ***"How soon?"*** not ***"When"***
- Commodity type mechanisms evolving in rest of world
- Diverse participation
- Price transparency on five recognized exchanges-more developing
- Cross commodity interplay with power, gas, oil, coal and emissions markets taking place daily, now embedded in energy complex
- Knowledge base expanding

Global GHG Market Growth

- 3.2 million tonnes trade across all exchanges in Europe on Friday August 3 considered a “slow” day
- Five primary trading exchanges
- CDM/JI markets
- OTC-bilateral markets
- Additionally CCX, AUS NSW and Canada
- National registries and trading systems expanding

- 2006--***1.6 billion tonnes*** of CO_2e traded with a value of over ***$31 billion US*** or 22.5 billion euros outside the US
- 2.4 billion tonnes of CO_2e expected to trade in 2007

The Voluntary Carbon Standard (VCS), a Global Voluntary Carbon Standard

Source: Point Carbon 7-30-07

- **A trading standard to provide environmental integrity for the growing voluntary carbon credit market will be launched before the end of the year, according to an official with The Climate Group, a lobbyist that is helping to promote the standard.**

- All project types will be acceptable under the standard, which aims to ensure carbon credits generated are real, measurable, permanent, additional, independently verified and not double-counted, according to a press release from IETA.
- The Voluntary Carbon Standard (VCS), which is also being promoted by the International Emissions Trading Association (IETA), the World Business Council for Sustainable Development and the World Economic Forum, is designed to provide a global standard for offset credits in the emerging voluntary market.

GHG Credits: EUA vs. US CCX 2008 values = $28.06/tonne vs. $3.75 ton

source: August 3, 2007 Point Carbon and July 2007 Chicago Climate Exchange

Point Carbon
EUA OTC closing price

03 August 2007
EUA DEC 2008
€20.33 ▼-0.35

Methodology
Exchange prices
Carbon Market Daily

EUA price last 30 days

Historic prices

Carbon Financial Instruments - Jul 2007

Product	Vintage	High	Low	Close	Change	Volume
CFI	2003	$3.80	$3.25	$3.75	0.55	489,000
CFI	2004	$3.80	$3.20	$3.75	0.50	1,020,800
CFI	2005	$3.80	$3.20	$3.75	0.55	882,200
CFI	2006	$3.80	$3.20	$3.65	0.45	335,000
CFI	2007	$3.80	$3.30	$3.75	0.45	136,000
CFI	2008	$3.80	$3.30	$3.75	0.45	174,000
CFI	2009	$3.80	$3.30	$3.75	0.45	168,500
CFI	2010	$3.80	$3.30	$3.75	0.45	98,700
Total Electronically Traded Volume						3,304,200

Price Units: Per metric ton of CO_2
Volume: Electronically traded volume reported in metric tons CO_2
Change based on previous month's closing price

http://www.chicagoclimatex.com/market/data/monthly.jsf

CO_2 Source Activities

83 NA CO_2-EOR projects produce 237,000bbl/day

- **Kinder Morgan and Exxon Mobil McElmo Dome expansion**
- **Occidental's Bravo Dome expansion**
- **Denbury's Jackson Dome Expansion**
- **Cortes Pipeline system running at maximum capacity-adding additional capacity**

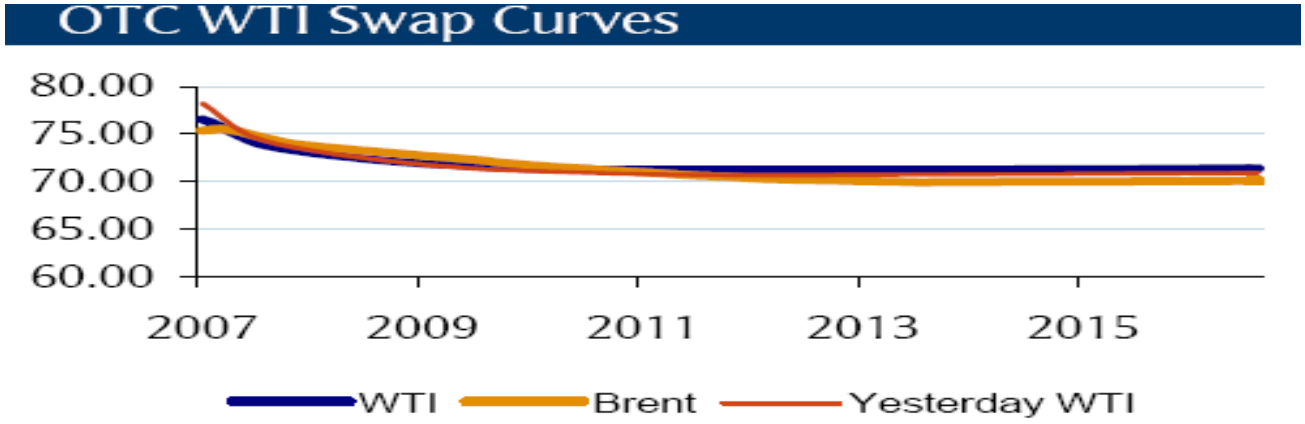
- **St.John's Dome development/expansion**
- **Cat Head Mesa?**
- **Exxon Mobil LaBarge gas processing expansion**
- **Blue Source "La Vita" gas processing**
- **Great Plains Gasification CO_2 expansion**
- **Amerada Hess Bravo dome development**

- **Denbury expanding into Texas with Hastings Field and "Green Line"**
- **GE exploring Gulf Coast partners for petcoke gasification and CO_2 issue**
- **TXU changes hands and GHG strategies**
- **Gasification planned or expanding in: Kansas, Illinois, Ohio, Montana, Wyoming, Florida, Kentucky, NY, California, Mississippi and Louisiana**

- **Ethanol plant developments**

Brent and WTI forward Swap/Price curve

August 2, 2007 Barclays daily market report



10 year WTI/Brent Oil price ~$70.00/bbl. Value of CO_2 created by oil price.
In US rule of thumb: 1000 cubic ft of CO_2 is valued as 3.5% of bbl of oil value.

$70. X 3.5% = 2.45/mcf, hence
***Implied value* delivered to wellhead: 17.4 X 2.45 = $42.63/ US ton.**

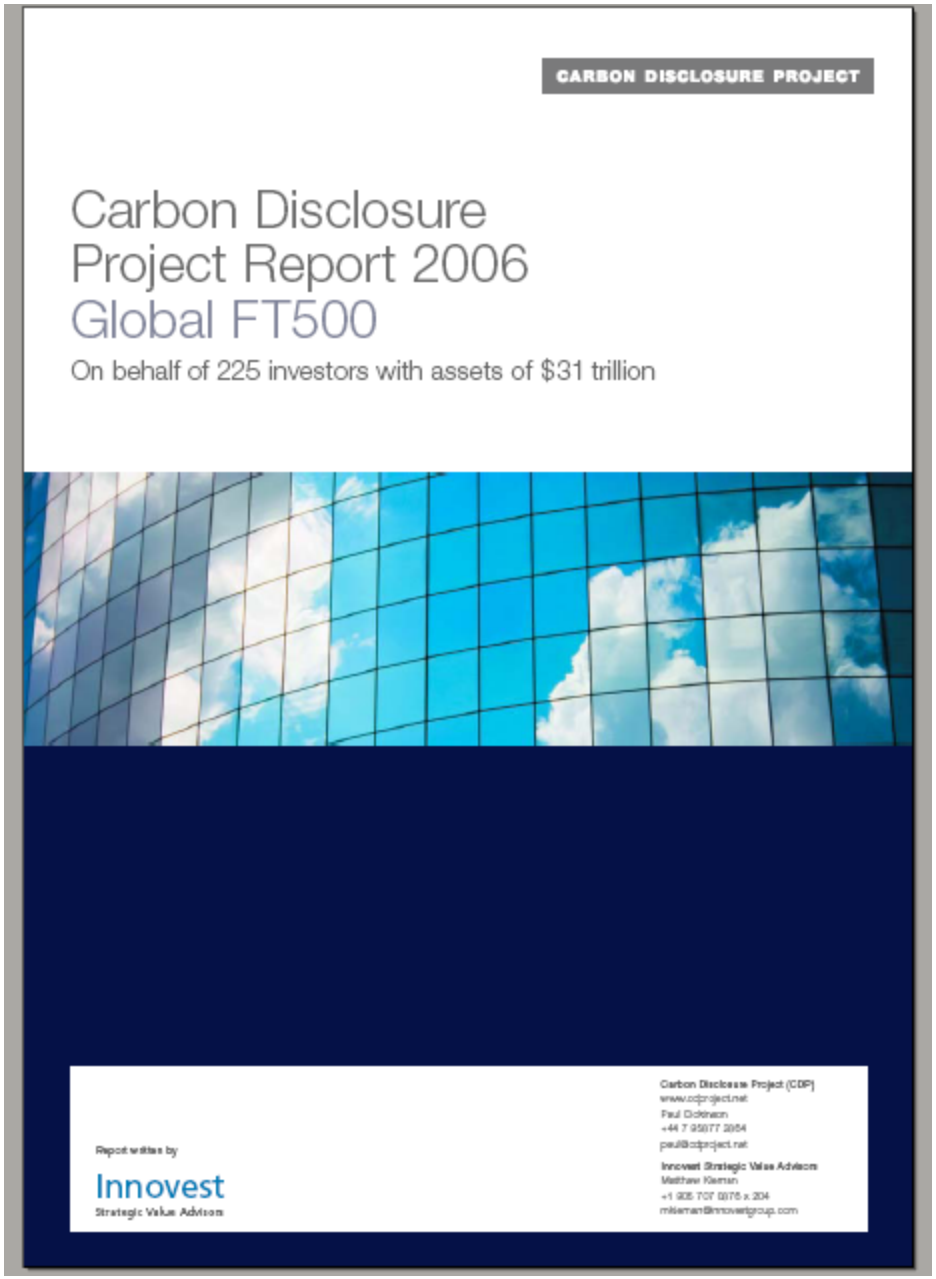
One US ton (17,400 cubic feet) will produce ~2.5 bbls of oil

Crude oil quality, field characteristics, distance to/from markets will influence ultimate CO_2 value.

CCS Responders

- ***Texas and/or Illinois FutureGen?***
- Eastman Chemicals
- Seminole Electric
- Peabody Coal-Conoco Phillips
- Tampa Electric 2nd Polk Unit
- Power Holdings-Illinois Coal Gasification
- Goldman Sachs and First Reserve
- Denbury Resources
- Kinder Morgan US and Canada
- Sithe
- TXU-increasing Texas FutureGen stake

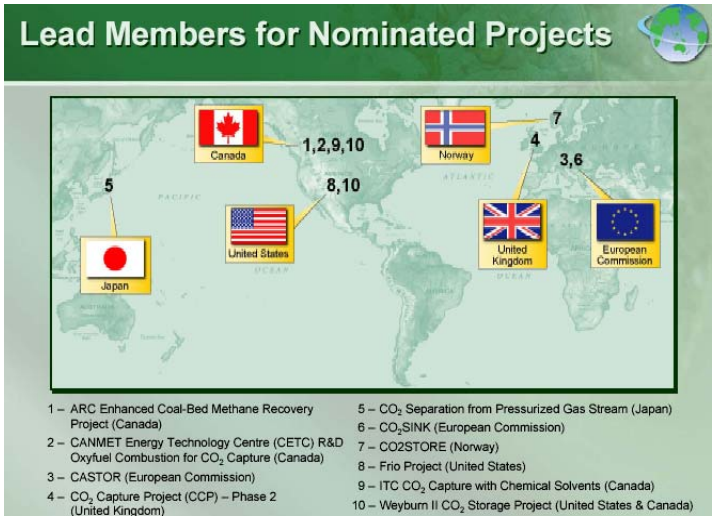
Activities



The **“Carbon Disclosure Project”** is having a profound effect on the global carbon market development.
By guiding publicly traded firms to address their carbon issues, assess financial impacts and understand economical ways to make carbon management work.
“Ignorance is no longer bliss”

Carbon Sequestration Leadership Forum

Source: http://www.cslforum.org



International Activity on Carbon Sequestration is Extensive

Multilateral Collaboration

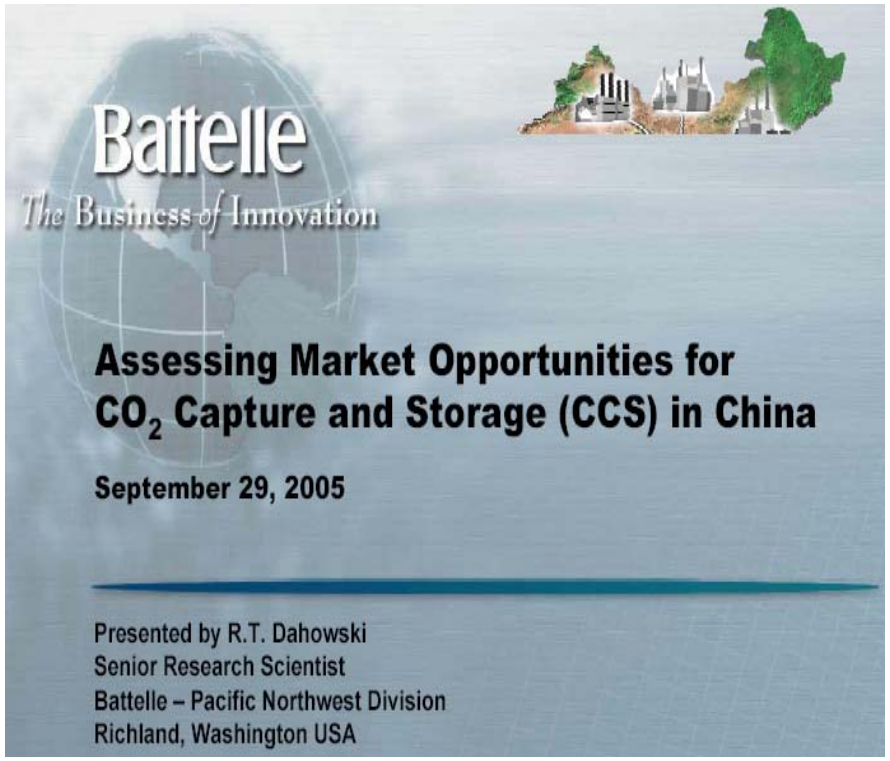
- G8
- Carbon Sequestration Leadership Forum
- International Energy Agency
- Asia-Pacific Partnership
- ASEAN
- United Nations
- World Bank
- World Energy Council

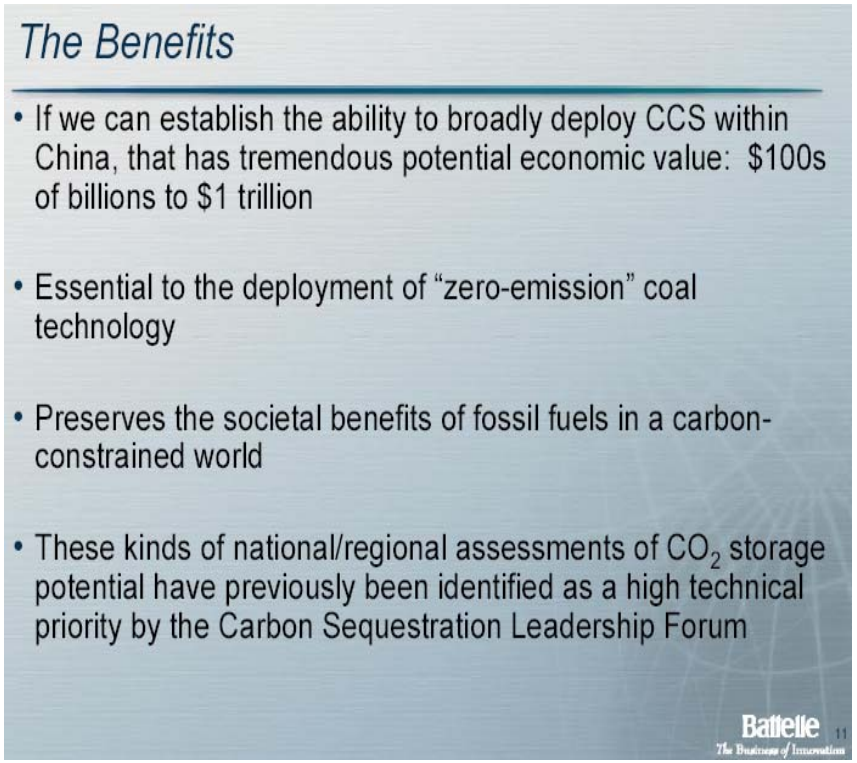
Bilateral Collaboration

- Australia
- Canada
- China
- European Commission
- India
- Norway
- United Kingdom

World Wide CO_2 and Geologic Sequestration related Activities

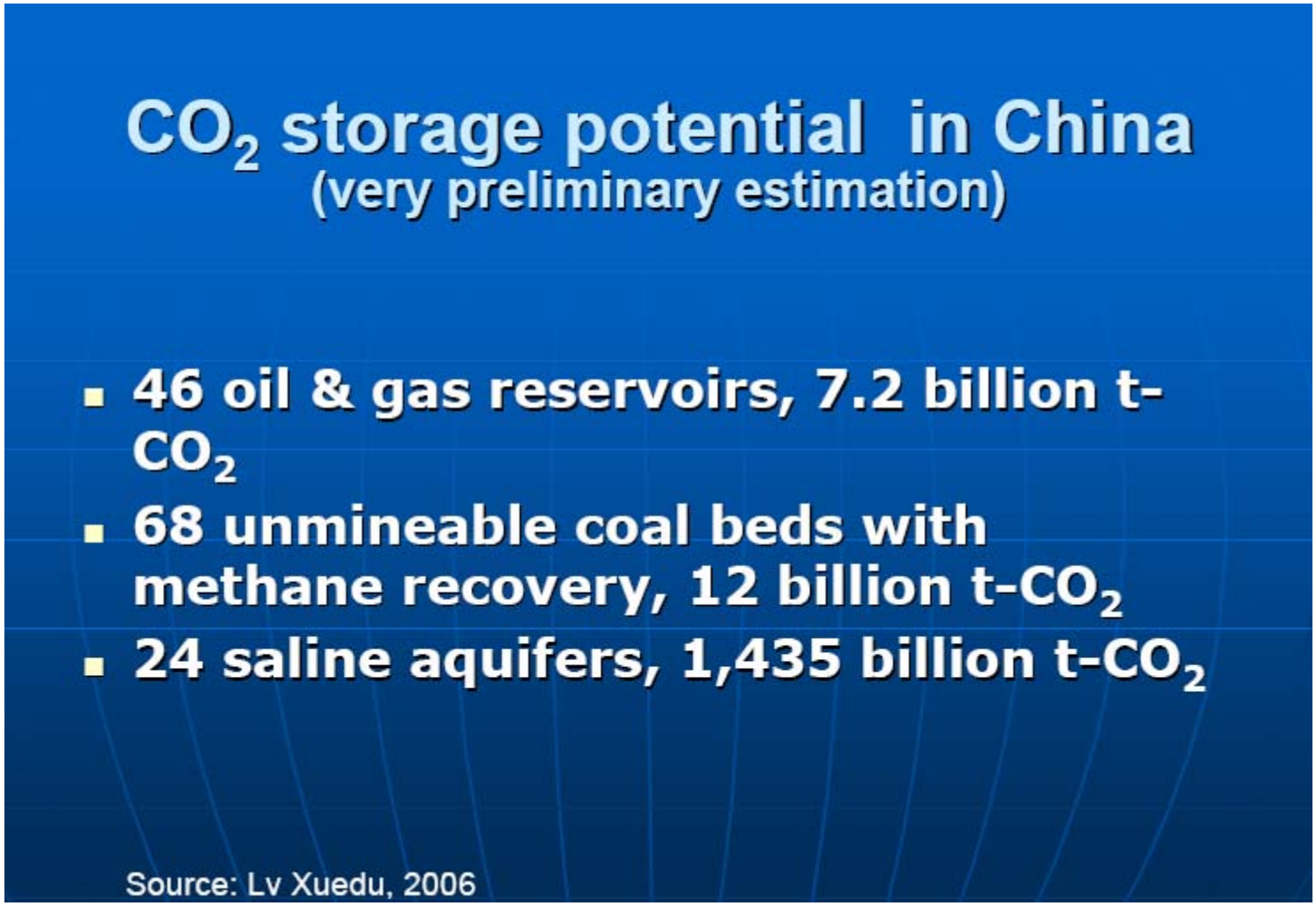
China CCS Developments





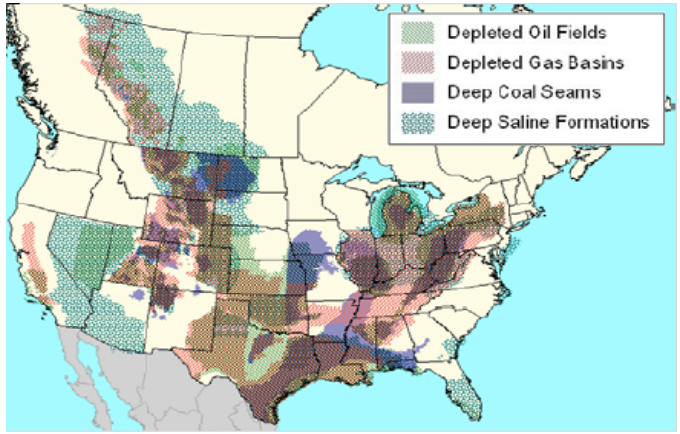
China's CCS Potential

Source: Li Gao's-(China's Office of Global Environmental Affairs) presentation Aug. 22, 2006 atG-8 IEA/CSLF CCS Workshop on early CCS Opportunities



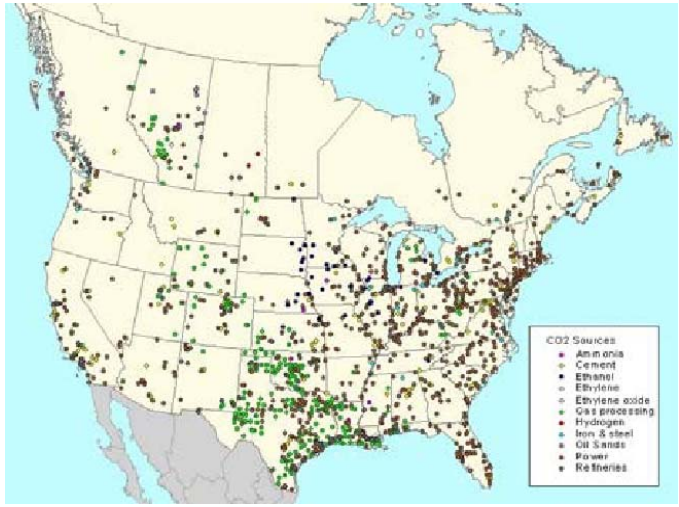
Magnitude of US Source and Sinks

Source: Battelle/USEA “Providing Low-Cost Energy in a Carbon Constrained World: The Role of Sequestration” Jim Dooley Jan 19, 2005 DC USEA Briefing www.usea.org



3,800+ $GtCO_2$ Capacity within 330 US and Canadian Candidate Geologic CO_2 Storage Reservoirs

- 3,730 $GtCO_2$ in deep saline formations (DSF)
- 65 $GtCO_2$ in deep unmineable coal seams with potential for enhanced coalbed methane (ECBM) recovery
- 40 $GtCO_2$ in depleted gas fields
- 13 $GtCO_2$ in depleted oil fields with potential for enhanced oil recovery (EOR)



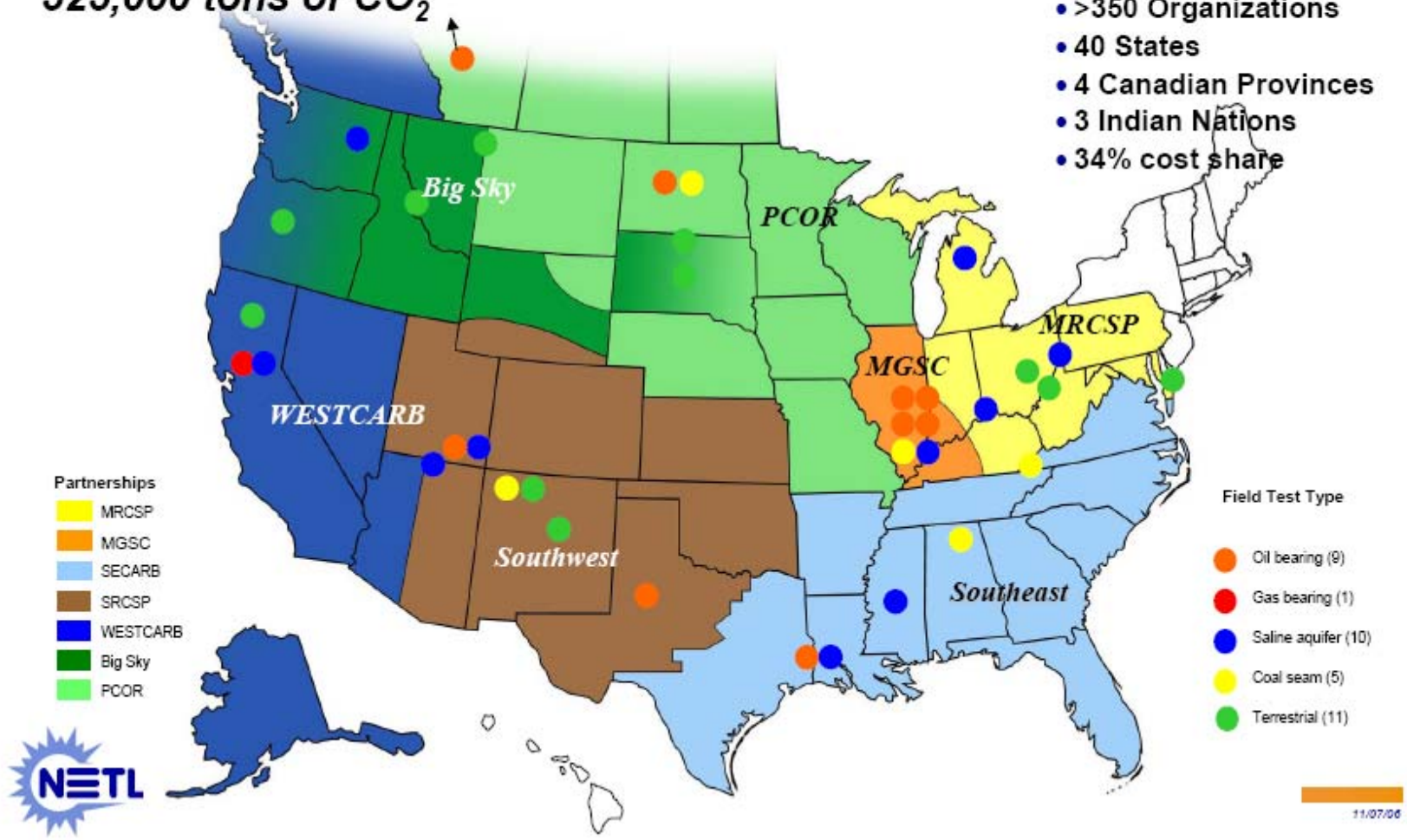
2,082 Large Sources (100+ $ktCO_2/yr$) with Total Annual Emissions = 3,800 $MtCO_2/yr$

- 1,185 electric power plants
- 447 natural gas processing facilities
- 154 petroleum refineries
- 53 iron & steel foundries
- 124 cement kilns
- 43 ethylene plants
- 9 oil sands production areas
- 40 hydrogen production
- 25 ammonia refineries
- 47 ethanol production plants
- 8 ethylene oxide plants

Regional Carbon Sequestration Partnerships

Validation Phase Field Tests

Injecting between 750 – 525,000 tons of CO_2



DOE-ARI Basin Assessments

OUTLOOK FOR CO_2-EOR

Recently completed "basin studies" of applying "state-of-the-art" CO_2-EOR in the U.S. indicate:

- Nearly 89 billion barrels of technically recoverable resource,
- From 4 to 47 billion barrels of economically recoverable resource.

Results are based on applying streamline reservoir simulation to 1,581 large oil reservoirs (two thirds of U.S. oil production).

Available on the U.S. DOE web site.
http://www.fe.doe.gov/programs/oilgas/eor/Ten_Basin-Oriented_CO2-EOR_Assessments.html

BELLONA

"Environment and value creation"

CO_2 for EOR on the Norwegian shelf

– A case study

Bellona report

August 2005

Viktor E. Jakobsen

Frederic Hauge, Marius Holm & Beate Kristiansen

Carbon Capture and Storage:
A Regulatory Framework for States

Summary of Recommendations

IOGCC

Interstate Oil and Gas Compact Commission
2005

International Carbon Capture and Storage Projects Overcoming Legal Barriers

DOE/NETL-2006/1236

June 23, 2006

NETL

Early Commercial Opportunities for Carbon Capture and Storage (CCS) Systems:

Dialogue for CCS Commercial Deployment Strategies

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For:
International Energy Agency, Working Party for Fossil Fuels

Draft: June 9, 2006

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Commodity CO_2 News

A Publication of the Coalition for Commodity CO_2

Volume 1, Issue 1

TO THE READERS OF OUR NEW NEWSLETTER

This is the inaugural edition of the newsletter for the Coalition for Commodity CO_2. Founded in March 2005, the non-profit Coalition for Commodity CO_2 ("Coalition") advocates for policies that support the subsurface injection of carbon dioxide ("CO_2-EOR") for industrial purposes including enhanced oil recovery ("EOR"). Industrial subsurface injection most often refers to the recovery of oil or gas from a reservoir by injecting gas or other substances into the reservoir rock that alter the properties of the reservoir pore fluids. Injectants include, but are not limited to, substances such as carbon dioxide and steam. Injection for purposes of enhanced coal bed methane and simple storage is also included.

The Coalition's initial goals were two-fold: (1) creating awareness of the magnitude of on-going commercial activity surrounding CO_2 injection; and (2) pursuing an enhancement of the existing federal EOR tax credit. In the summer of 2005, the Coalition succeeded in convincing the Senate to enact a new incentive for the use of anthropogenic CO_2 for purposes of EOR (our original bill would have granted the incentive to natural sources of CO_2 as well but the Senate narrowed our language to anthropogenic). The Coalition also was influential in convincing Congress to enact the CO_2-EOR royalty relief and demonstration projects provisions in section 354 of the Energy Policy Act of 2005.

The Coalition recently expanded its goals to promote and defend the commodity use of CO_2 more broadly within industry through a variety of legislative, legal and policy actions. We support the commercialization of CO_2 markets through private sector action that is supported, when necessary and appropriate, with targeted incentives. We believe that companies engaged in CO_2-EOR and related activities should position themselves to take advantage of the carbon management sentiments that are sweeping the world while ensuring that CO_2 is not regulated in a manner to cripple those business opportunities.

Among our recent activities:

- Submitting comments to the United Nations in support of Mitsubishi's efforts to have CO_2-EOR qualify as a carbon-crediting generating activity under the Kyoto Protocol.
- Working to ensure that CO_2 injection under FutureGen is not regulated as Class 1 hazardous for purposes of the Safe Drinking Water Act.
- Participating in the World Resource Institute's stakeholder process to prepare "best practices" guidelines for carbon capture & storage ("CCS").
- Drafting model federal CCS legislation to, among other things, provide that the federal government is responsible for post-injection CO_2 abandonment liability.

The Benefits of Commodity

Considerable experience exists within industry for the commercial use of CO_2. The most obvious relates to CO_2-EOR, a well-established technology that is currently in use throughout North America. The process involves the significant increase in oil and gas production from existing reservoirs through the injection, recapture, reinjection and storage of CO_2.

This increased production of oil and gas, in turn, leads to: (1) greater energy independence for America; (2) direct economic benefits, such as enhanced revenues for Federal and State governments through taxation of the incremental energy produc-

In This Issue:

The American Energy Security Study

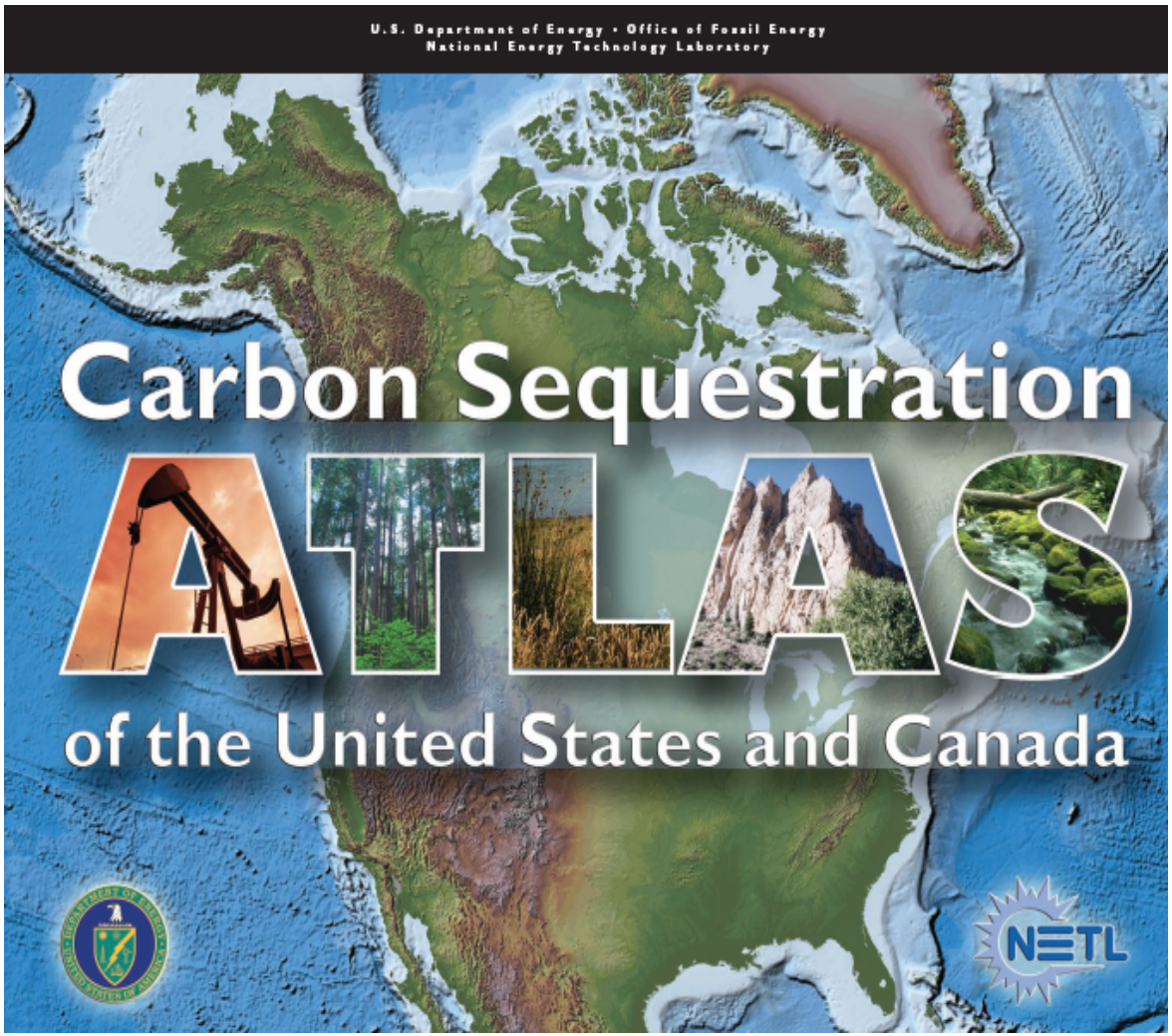
Building a Bridge to Energy Independence and a Sustainable Energy Future

Executive Summary

Southern States Energy Board

DOE National Sequestration "Atlas" Released

http://www.netl.doe.gov/publications/carbon_seq/atlas/index.html



NPC Report pges 342 & 258

E. ADDRESS CARBON CONSTRAINTS

1. Enable Carbon Capture and Sequestration (CCS)

The NPC makes the following recommendations to enable long-term environmental viability of coal for both power and fuel:

- Establish a legal and regulatory framework that is conducive to CCS.
  - Provide regulatory clarity for land use and liability policies.
  - Provide access to federal lands for storage.
- Enable full scale CCS and clean coal technology demonstration.
  - Organize efforts between the power and oil/natural gas industries.
- Undertake a national CO_2 sequestration capacity assessment.
  - Build on the existing efforts being undertaken by the DOE Regional Partnerships.
  - Encourage global application.
- Continue federal research and development support for advanced coal-to-fuel technologies.

Potential Effect: Maintaining coal's projected 30 percent contribution (54 quadrillion Btu per year in 2005) to the future U.S. energy mix, including potential coal-to-liquids production, even in carbon-constrained circumstances.

As policymakers consider actions to reduce CO_2 emissions, the NPC recommends:

- An effective global framework for carbon management incorporating all major emitters of CO_2 and focusing particularly on opportunities for U.S.–China cooperation.
- A U.S. mechanism for setting an effective cost for emitting CO_2 that is:
  - Economy-wide, market-based, visible, transparent, applicable to all fuels.
  - Predictable over the long term for a stable investment climate.
- A credit for CO_2 used in enhanced oil and natural gas recovery.

Since the preparation and publication of the Kuuskraa paper that provided a basis for this report, considerable additional work has been completed by the author's firm that further confirm the estimates of undeveloped U.S. oil resources. A total of 10 domestic oil basins and areas have now been assessed (up from the original 6). These 10 assessments indicate that the technically recoverable oil resource from application of "state-of-the-art" CO2-EOR is 89 billion barrels. This earlier estimate of 80 billion barrels for applying EOR to the stranded light oil resource has been updated to 90 billion barrels (rounded off), as shown in Table T-VI.1.

New work on the transition/residual oil zone resource documents the presence of 42 billion barrels of this category of oil in place in just three domestic oil basins (Permian, Big Horn, and Williston). Detailed reservoir simulation assessment shows that about 20 billion barrels of this oil in place could become technically recoverable by applying CO_2-EOR. This work provides support to the transition/residual oil zone resource estimate of 100 billion barrels in Table T-VI.1 and indicates that an important portion of this resource may become recoverable.

Finally, the author and his firm took an in-depth look at the additional oil recovery from applying "next generation" CO_2-EOR technology. This work shows that combining: (1) advanced, high reservoir contact well designs; (2) mobility and miscibility enhancement; (3) large volumes of CO_2 injection; and (4) real-time performance feedback and process control technology could bring about "game changer" levels of improvement in oil recovery efficiency. This work provides support that a national average oil recovery efficiency target of 60 percent could become realistic, assuming a successful program of advanced technology development, affordable supplies of CO_2 and other EOR injectants, and appropriate risk-mitigation policies, such as federal and state tax incentives to help overcome the risk of applying these new technologies. The NPC studied EOR in 1976 and 1984, and raised great expectations for domestic EOR activity (projecting 3 million and 2 million barrels per day, respectively). These expectations have not been met. Peak domestic EOR production occurred in 1992 at 761,000 barrels per day. Current activity is 680,000 barrels per day. In the interim, many technologies have been tried, but most failed. Two successes are CO_2-miscible floods and steam (cyclic, steam-assisted gravity drainage [SAGD], and steam flood).

A broad portfolio of oil-recovery policies and technologies, plus targeted risk-mitigation incentives, would help industry convert these higher-cost, undeveloped domestic oil resources into economically feasible reserves and production. Table T-VI.2 lists the future technologies that the subcommittee believed will provide the greatest impact on conventional wells, including EOR and arctic.

GHG and CCS Actions

State and Federal Proposed Legislation 2007

- **The "National Carbon Dioxide Storage Capacity Assessment Act of 2007" adds to the expanding list of bills offered to date to address global warming.**
- **Cosponsors for the Senate bill, *S. 731*, include Sens. Ken Salazar (D-Colo.), Jim Webb (D-Va.), Jon Tester (D-Mont.) and Jim Bunning (R-Ky.). In the House, Rep. Bart Gordon (D-Tenn.) is the lead sponsor of a companion version, *H.R. 1267*. Both bills task the U.S. Geologic Survey, Energy Department and U.S. EPA with calculating storage capacity in all 50 states, as well as estimate potential volumes of oil and gas that could be recovered after carbon injections. Federal agencies also would determine the risk tied to carbon sequestration.**

- **Obama-Bunning Legislation -- The major vehicle thus far is *S. 155*, The Coal-To-Liquid Fuel Promotion Act of 2007, introduced by Senator Jim Bunning (KY) with 11 Senate cosponsors, including Barak Obama (D-IL).**
- **House. *H.R. 370* is sponsored by Rep. Geoff Davis (KY) and has 24 cosponsors to-date is a companion bill to S. 155.**
- ***Draft Thune Legislation* -- Senator Thune (R-SD) is well into drafting on legislation to encourage a commercial synthetic fuels industry.**

- **Bill Number: TX80R *HB 1967* by Farabee filled 2-26-2007 "relating to the regulation as common carriers of certain owners, operators, or managers of pipelines for the transportation of feedstock for carbon gasification, the products of carbon gasification, or the derivative products of carbon gasification"**

- ***Three Texas Gasification Bills 1950, 1951, 1952-but nearly 20 bills in Texas alone tied to CO2-clean coal and GHG issues***
- ***New Mexico and Kansas both recently passed supportive legislation***

- ***Montana HB 24* 2007 "Common Carrier for CO2 Pipelines" Introduced by H. Klock**

“Cap and Trade” Pressures Growing

Source: ***Greenwire*** 3/1/2007

- **Montana Gov. Brian Schweitzer (D) urged Congress today to establish a national cap-and-trade program to limit greenhouse gas emissions.**
- ***"We can't have a cap-and-trade that is regional,"* Schweitzer told the Senate Finance Committee. *"We need a cap-and-trade that is national."***
- The first-term governor insisted the national approach to global warming was necessary to avoid the "balkanization" of climate programs being assembled in separate states, including a five-state regional pact signed yesterday that covers Arizona, California, New Mexico, Oregon and Washington.
- Echoing recent comments he has made during the National Governors Association winter meetings in Washington, Schweitzer also said the viability of coal-based fuels and new coal-fired power plants rests on the success of ***carbon capture and sequestration, or CCS***.
- Schweitzer said he hopes to see development of coal-to-liquid fuels plants in his state that make use of its massive coal reserves. And he called for $10 billion in federal research and development funding for sequestration. "Coal won't be the fuel of the future unless we get carbon sequestration correct," he said. And he assed “Baucus' panel should restrict new tax credits only to coal-fired power plants and coal synfuel plans that capture and bury their carbon emissions”

- Senate Finance Committee Chairman Max Baucus (D-Mont.) has previously called for a national cap-and-trade system to avoid the state patchwork. Opening the hearing, Baucus repeated his commitment to "address climate change.“ He added, "Sequestering the carbon emitted from coal-fired plants is the right thing to do.“

- Princeton University engineering professor Robert Socolow urged Congress to coordinate a federal cap-and-trade system to control greenhouse gases with policies that support CCS. And Socolow said policymakers must not allow coal-to-liquids plants unless carbon capture and storage is required.

Last Week Highlights

- **IOWA FARM BUREAU STARTS SELLING CARBON CREDITS**

The Farm Bureau of the US state of Iowa on Tuesday launched a new business that will buy carbon reductions from farmers and sell them on the Chicago Climate Exchange (CCX), a voluntary greenhouse gas market.

- **NEW US CAP-AND-TRADE PROPOSAL ON THE HORIZON**

Independent Senator Joe Lieberman and Republican Senator John Warner will present a draft of a new economy-wide cap-and-trade bill, which is likely to feature a cost management provision, before Congress heads into a four-week recess starting 6 August.

- **EPA STUDY PREDICTS COST OF US CAP-AND-TRADE AROUND 1% GDP**

The first greenhouse gas cap-and-trade bill introduced in the US Congress would reduce US GDP by up to 1.6 per cent in 2030, according to a study by the US Environmental Protection Agency (EPA).

- **US PRESIDENTIAL CANDIDATE CLINTON LAYS OUT CLIMATE AGENDA**

US presidential candidate Hillary Clinton told voters in New Hampshire yesterday that as president she would implement an economy wide cap-and-trade system to lower greenhouse gas emissions 80 per cent by 2050 and increase federal funding for green buildings.

- **BANK OF AMERICA TAKES 0.5 PER CENT STAKE IN CLIMATE EXCHANGE**

Bank of America, one of the largest commercial banks in the US, today said it had taken a 0.5 per cent stake in London-listed Climate Exchange and pledged to purchase 500,000 carbon offset credits over three years on its subsidiary trading platform Chicago Climate Exchange (CCX).

Milestone Actions

- **FPL denied Glades 1950 mw coal plant**
- **TXU fight over planned coal plants in Texas results in change of ownership**

California issues rules for electricity purchases based on GHG emissions

The California Energy Commission on Thursday issued rules prohibiting the state's utilities from purchasing power from plants that exceed the carbon emissions profile of a combined-cycle natural gas facility.

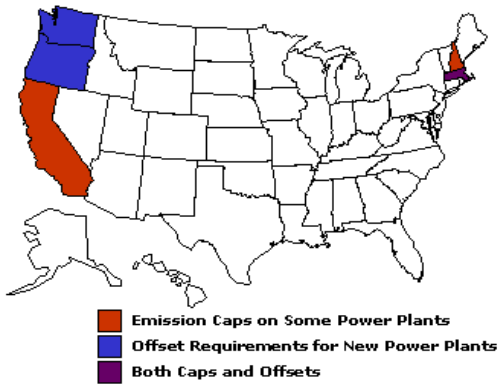
The rules implement provisions of S.B. 1368, part of Governor Arnold Schwarzenegger's plan to cut the state's emissions of air pollutants by 25% by 2020 *(GD 9/5)*. To reduce greenhouse gas emissions, the law directs the CEC, along with the California Public Utilities Commission and the California Air Resources Board, to establish a GHG emissions performance standard for power plants.

Under the rules, publicly owned utilities are barred from entering into long-term contracts with plants that exceed 1,100 pounds of carbon dioxide per MWh. The standard was reached by evaluating existing combined-cycle gas baseload power plants across the West, the CEC noted. SGS

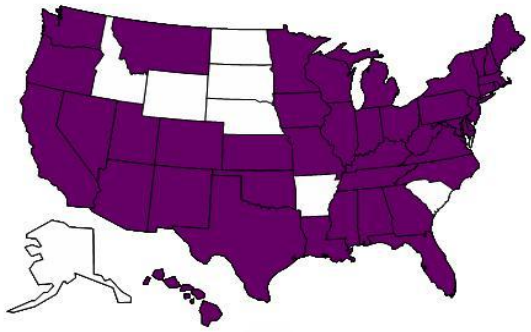
GHG Actions Increasing

http://www.pewclimate.org/what_s_being_done/in_the_states/state_action_maps.cfm

States with a Carbon Cap or Offset Requirement for Power Plants



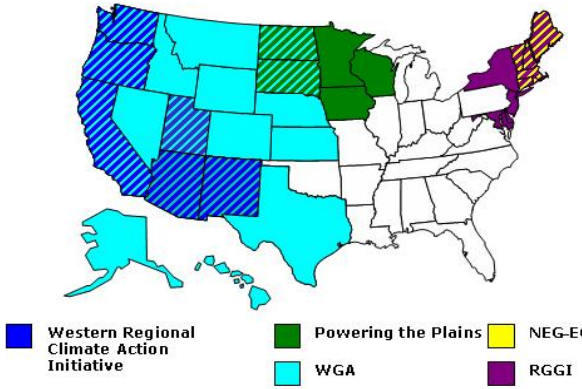
States with Greenhouse Gas Inventories



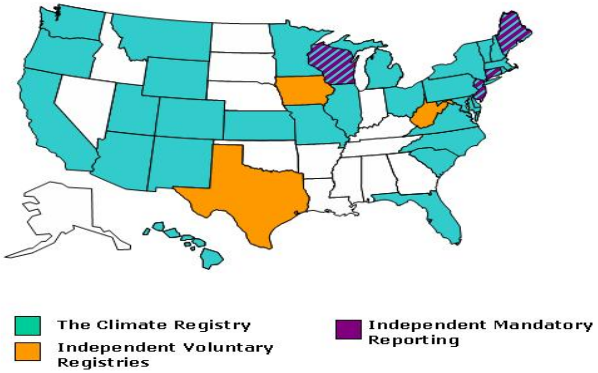
These states have completed greenhouse gas inventories, which estimate total greenhouse gas emissions from all sectors in the state.

Regional Initiatives

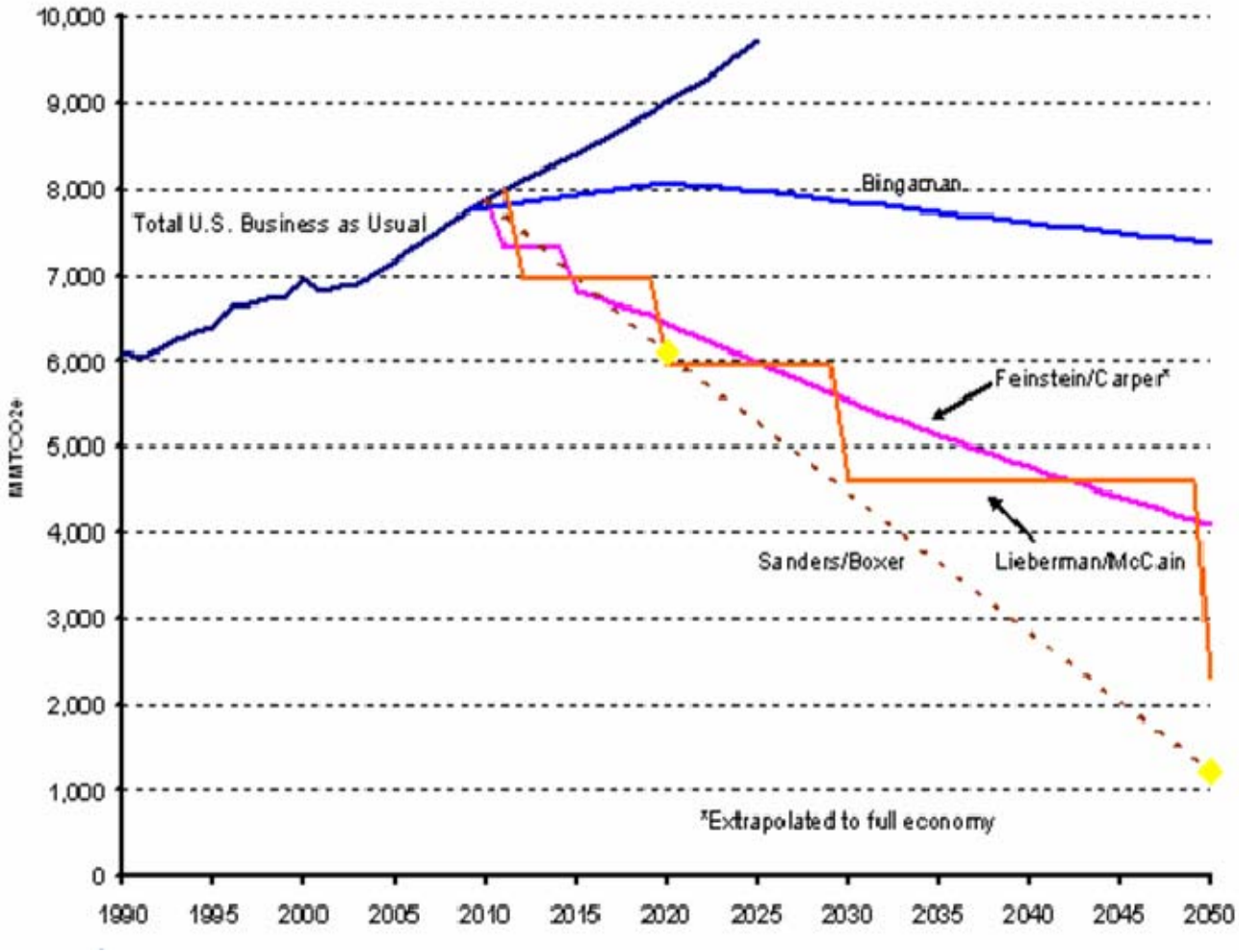
Regional initiatives can be more efficient than programs at the state level, as they encompass a broader geographic area, eliminate duplication of work, and create more uniform regulatory environments. Over the past few years, a number of regional initiatives have begun developing systems to reduce carbon dioxide emissions from power plants, increase renewable energy generation, track renewable energy credits, and research and establish baselines for carbon sequestration.



States with GHG Reporting & Registries



TIMING AND LEVELS – 2007 FEDERAL GHG PROPOSALS



Natural Gas vs. Coal CCS

- Perception-policy-regulatory-pubic-financial
- Lead times: coal vs. gas
- Cost of delivered kw's very expensive for coal with carbon mitigation-gas has 50% of coal carbon footprint
- Must serve-pressure to provide generation as well as managing reserve margin
- Growing demand-unlikely to slow anytime soon
- Financing-40-50 yr lifecycle puts plants in path of carbon risk
- Unlimited and undefined liability-no clarity-checkerboard happening at state level-hence pressure at Federal level

CCS Issues

- CDM recognition for CCS—MOP2-Nairobi pushed back again to at least 2008 with no clear direction
- UK-not giving the expected financial incentives for CCS-BP's "PeterHead Project DOA"
- RGGI-geologic sequestration not included
- California-in debate-more interested in new technology
- Institutional push back-"preserving" current carbon market for their ongoing investments
- Market fears of competing funds in which CCS takes away from future carbon avoidance projects—views CCS as "business as usual"
- CO_2-EOR use limited or excluded from CCS due to additionality issues
- Oil producing states most likely early adapters anyway

Conclusion

- Geologic sequestration and CO_2 driven EOR moving to center stage
- Federal and State CO_2 legislation on front burner
- Commercial activity engaged
- NGO activity supportive
- US energy independence supported
- Massive market with long life cycle

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