

Carbon Credits: How They Can Provide An Accelerated Path for Deploying CCS

The 2008 Wyoming CO2 Conference

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Blue Source

Carbon Offsets, Want to Buy Some?

The Real World



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Sustainability & Reduction of Carbon Emissions: Understanding the Intersection

- Carbon – increasingly significant environmental and financial issue
- Carbon is an asset and liability that must be valued, integrated (products, services, purchases) and then managed to achieve an acceptable ROI
- Sustainability - the “Triple Bottom Line”:
 - Financial
 - Environmental
 - Social

Carbon Regulatory Landscape

- Federal, Regional and State Cap & Trade Coming
- EPA Regulatory Authority over CO₂ (Air & UI)
- 11 GHG Bills with Cap & Trade Systems Proposed in the 110th US Congress
- Regional Initiatives for Reducing GHG Emissions
 - RGGI (CT, DE, MA, MD, ME, NH, NJ, RI, VT)
 - MGGI (IL, IA, KS, MN, WI, MO)
 - WCI (AZ, BC, CA, MN, NM, OR, QE, UT, WA)
- States with GHG Reduction Targets
 - (CA, CT, NJ, HA, WA)

Regulatory Recommendations

• Federal vs. State Jurisdiction

- Federal only provides SWDA (applies to water contamination)
- CO₂ needs an exemption from all other federal regulatory requirements including RCRA, CERCLA (e.g. methane) in terms of storage (avoid turf wars among regulatory agencies)
- Primacy goes to State for all other regulatory matters

• Carbon Storage, not Waste or Hazardous Material

- Methane, Crude Oil, NGL's are stored (not treated as hazardous waste)
- CO₂ is a non-polluting injectant

• Pore Space Ownership

- Right of condemnation
- Eminent Domain
- Forced unitization

• Broad CCS Development

- Allow any type of vent-stack source of CO₂ (gas processing facilities, power generation)
- Allow any type of sink/storage (EOR, aquifer)

Key Conditions to the Deployment of CCS in Today's Carbon Markets

- Government / Industry / NGO acceptance of all forms of CCS (EOR & Non-EOR)
- Regulatory visibility and reasonableness
- Pore space ownership clarification
- Clear understanding of the liability issue

Current Vent Stack CO₂ Projects

- Val Verde – West Texas (Gas Processing)
- La Veta – Southern Colorado (Gas Processing)
- Anadarko Pipeline – Wyoming (Gas Processing)
- DGC Pipeline – North Dakota/Saskatchewan (SNG)
- Koch Nitrogen – Oklahoma (Fertilizer)
- Agrium – Texas (Fertilizer)
- La Barge – Wyoming (Gas Processing)

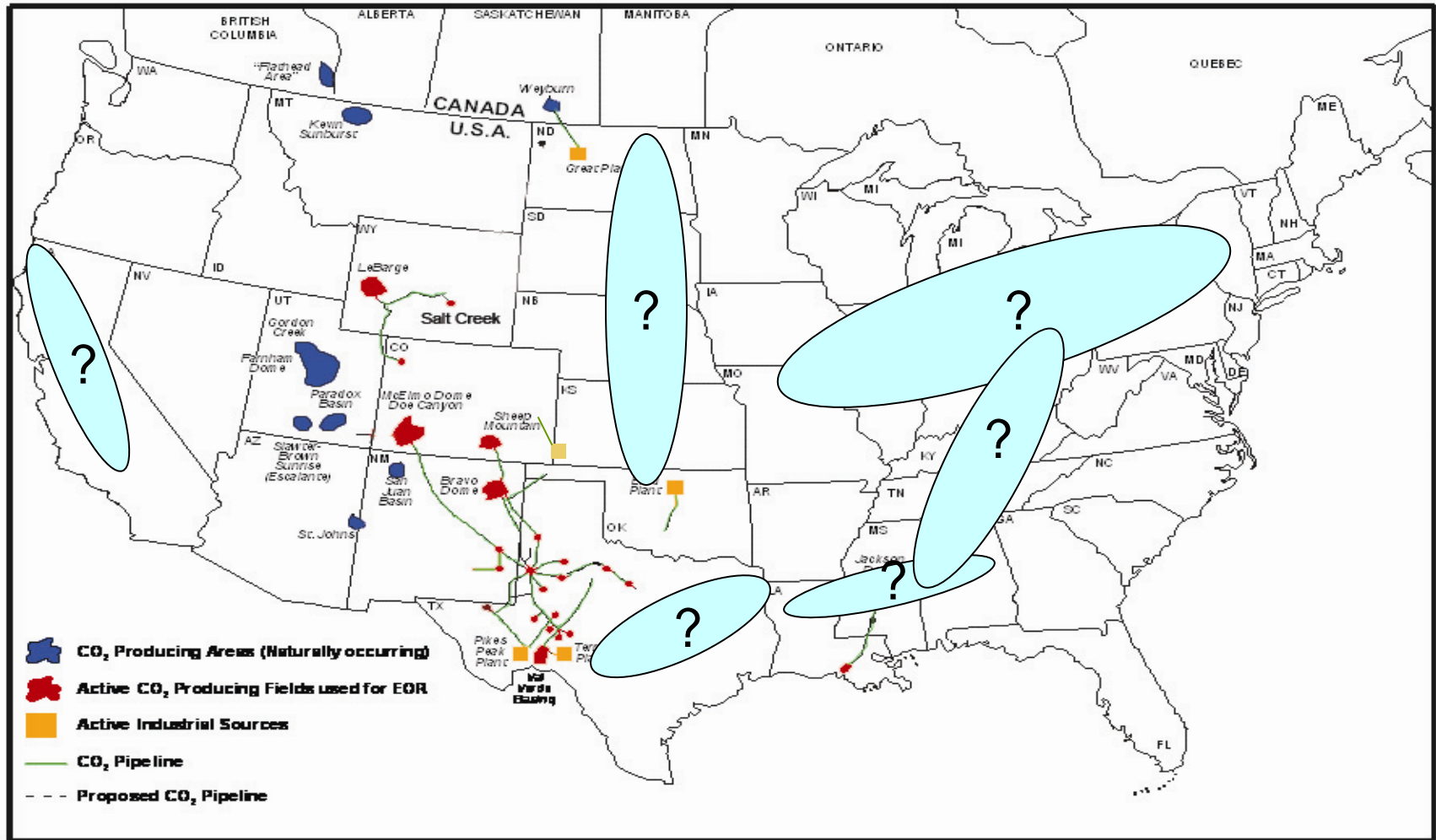
From Here to There

- EOR can lead the path forward
 - U. S. infrastructure backbone can be built on the back of Oil
 - High purity anthropogenic CO₂ sources lead the way
 - Infrastructure starts out regionally
 - Regional infrastructure sets up national backbone
 - Other geologic formations follow if key conditions are achieved (saline aquifers, depleted oil & gas reservoirs)

Why EOR Must Be Part of the CCS Strategy and Answer

- Massive carbon infrastructure must be built in U.S. to meaningfully combat GHG emissions
- EOR is environmentally additional and economically additional for the United States
- EOR improves domestic energy security
- Oil revenue offsets tens of billions of dollars in required infrastructure costs, while recovering billions of barrels of otherwise “stranded” oil

Future U.S. EOR/CCS - Infrastructure



Carbon Market Overview

- What is the current US carbon market?
 - Voluntary
 - Pre-Compliance
- What other carbon markets are there?
 - EU (European Trading Scheme)
 - Kyoto & CDM

Types of Voluntary VER Offset Projects

- Fuel Switching
- Methane Capture, Destruction and/or Utilization
- Energy Efficiency
- Transportation
- Industrial Substitution
- Terrestrial Sequestration (No Till, Forestry)
- Renewable Energy
- Geological Sequestration

Market Acceptance of Offset Credit Types

Type of Credit	2006 Market Share	2007 Market Share
Renewable Energy	32%	31%
Energy Efficiency	5%	18%
Methane Destruction	2%	16%
Forestry	37%	18%
Industrial Gas Dest.	20%	2%
Geo. Sequestration	1%	1%
Fuel Switching	1%	9%
Mixed	2%	5%

Requirements for a Quality VER Credit

- Additionally – Would the reduction have happened anyway, with or without the offset?
- Follows a Standard; i.e. Voluntary Carbon Standard (VCS)
- Third Party Certification & Verification
- Registration

Characteristics of a Voluntary & Pre-Compliance Market Transaction

- Buyers (emitters, speculators, traders)
- Structures (firm forwards, derivatives, swaps, slice of pie)
- Types (US unique, N2O, CCS, CH4, high additionally)
- Vintages
 - Voluntary (2002 to 2015, 2020)
 - Pre-Compliance (2008 to 2020)
- Prices (hybrids of fixed, % market, % compliance cost)

The Voluntary Market Today

World Wide Basis

2006

- 24.6 M metric tons VERs
 - 10.3 million tons by CCX
 - 14.3 million tons on OTC
- Market Value: \$97 million
- Pricing
 - Weighted Average Price: \$4.10/ton CO₂e
 - Range: \$0.45 to \$45/ton (quality dependent)

2007

- 65 M metric tons VERs
 - 23 million tons by CCX
 - 42 million tons on OTC
- Market Value: \$331 million
- Pricing
 - Weighted Average Price: \$6.45/ton CO₂e
 - Range: \$1.62 to \$300/ton (quality dependent)

European Trading Scheme vs. Kyoto's CDM

EU Trading Scheme (ETS)

Market Cap: 2298 M m-tons

- 2006 1,104 M m-tons
- 2007 2,061 M m-tons

Market Value:

- 2006 \$24.4 Billion
- 2007 \$50.1 Billion

Kyoto Clean Development Mechanism – CDM

Market Size: No Limit

- 2006 537 M m-tons
- 2007 551 M m-tons

Market Value:

- 2006 \$ 6.9 Billion
- 2007 \$ 13.4 Billion

Implications of CO₂a in EOR CCS and non-EOR CCS in Today's Carbon Markets

- Financial Capital
 - Revenue and return are improved – CCS income
 - Offsets (2x), allowances (>2X) or storage/transfer (X) income
 - National resource development (trade balance, etc)
- Environmental Capital
 - EOR CCS acts as an infrastructure bridge (key)
 - Buys “climate change” time – for technology to play catch up
 - CCS is one of the really big answers to climate change mitigation
- Political Capital
 - Technology transfer to other nations
- Market Capital and Acceptance
 - Pre-compliance and compliance markets
 - Regulatory acceptance

Blue Source At A Glance...

- Largest portfolio of greenhouse gas offsets in North America (U. S. and Canada)
 - 170+ MTons VCS (post 2002) VERs, 11 types, 48 states,
 - 100+ MTons pre 2002 VERs
 - A large pipeline of new projects
- Long-term source: supply agreements through 2022
- Leading offset provider (> 40MT registered to date)
- Experienced GHG project developer
- Committed capital up to \$500M

Blue Source At A Glance...CCS Qualifications

- Blue Source's management team has designed and / or built all anthropogenic CO₂ pipelines constructed in North America during the last 20 years
- Blue Source has evaluated more than 100 CCS projects during last 10 years
- Blue Source has 10+ potential CCS projects now under development

Accessing the Carbon Market: (What Blue Source Provides)

- Partnership with client
- Identify carbon exposures throughout supply chain
- Analyze investments, strategic decisions, operating efficiencies and process changes for emission reduction opportunities
- Assess marketability, title claims, commercial size of identified opportunities
- Create Reductions; then Verify, Register and Sell VERs
- Identify and Fund new reduction opportunities