Clean Carbon Technology Projects in the South

Committee on Clean Coal and Advanced Energy Technologies Collaboration

Kingsport, Tennessee

May 20, 2014

Mike Nasi, General Counsel
Outline

Overview of South Projects in the South
• Kemper County IGCC (Mississippi)
• Petra Nova Post-Combustion Retrofit (Texas)
• Sargas NGCC Carbon Capture Project (Texas)

Gulf Coast CCUS Opportunities
Ø The Market Setting
Ø The Roadmap of State Incentives
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Kemper County Energy Facility

TRIG™ Technology - Integrated Gasification Combined Cycle (IGCC)

Power Generation:
- 580MW Capacity with 65+% CO₂ capture
- New power source for 291,000 Homes

Gasifier:
- Unique to TRIG-coal that is not converted to gas in initial process sent back for a 2nd round of gasification
- this allows a high rate of coal-to-gas conversion to take place at a lower temperature — and thus lower cost

Source: Southern Company
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Petra Nova CCUS Project - Overview

Power Generation:
• 250 MW of flue gas slip stream
• Commitment to maintain full capacity to the grid

Carbon Capture:
• Post-combustion amine solvent-based system
• 90% carbon capture of slip stream
• 1.5 million tonnes (1.65 short tons) annually

Product Delivery and Utilization:
• CO2 will be safely moved from plant in 80-mile, 12-16” pipeline
• EOR operations will be conducted by Hilcorp Energy Company
• Location will be 4,000 of 11,400 acres of West Ranch Oil Field
Petra Nova WA Parish CCUS

WA Parish
Electrical Generating Station

CO₂ Capture System

Virtually no CO₂ in exhaust

CO₂ return

Flue gas with CO₂

Pure CO₂ for EOR

Naturally sealed formation (Reservoir)

Separator

Oil sales
Petra Nova CCUS – The Pipe
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Natural Gas-fired CCUS Project

250 MW power generation
Sargas Project Components

- Gas Turbine (GE LMS 100) – modified air flow.
- Gas-pressurized Heat Recovering Steam Generation (HRSG) – allows near complete use of oxygen in air.
- DSME & SNC Lavalin are EPC partners.
- Carbon Capture – Catacarb will provide capture system similar to those in use in many refineries.
- Cost competitive due to high pressure capture and higher concentration CO2 stream (12%, not 5%)
Sargas Process

Point Comfort EGU Process Flow Diagram

71 MWe

EXPANDER TURBINE

184 MWe

STEAM TURBINE

EXHAUST

NATURAL GAS INPUT

GAS PRESSURIZER TURBINE

PRIMARY HEAT EXCHANGER

PRESSURIZED HRSG

SELECTIVE CATALYTIC REDUCTION

SECONDARY HEAT EXCHANGER

CO2 CAPTURE

CO2 STRIPPED FLUE GAS

EXHAUST

CONDENSED STEAM

ELECTRICAL OUTPUT

STEAM

COMPRESSED CO2

SARGAS

TEXAS
- CO₂ is compressed at separation, thus minimizing the power needed to obtain pipeline-required pressures.
- Captured CO₂ produce up to 2-3 million barrels of oil.
- Nearby Eagle Ford and other shale plays create demand for electricity & CO₂.
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Business Case for Gulf Coast CCUS

- Gulf Coast EOR Opportunities are Significant
- 300-year Reserve of Gulf Coast Lignite
- Good Rail Access to Powder River Basin Coal
- Coal Fleet (especially Texas) is Large, Clean, Young (useful life longer than national average)
- Gulf economy is healthy & demand for power, oil, and chemicals continues to grow
- Portfolio of state-based incentives, especially in Texas, is a road map for success.
~50 Million Tons Produced Per Year
(300 years of recoverable reserves)

Gulf Coast
Lignite

Distribution of coal-bearing units in the Gulf Region
Gulf Coast Carbon Sinks

Source: UT-BEG
Growth Potential for Sale of Captured $\text{CO}_2$ for EOR

67 billion barrels recoverable in Gulf Coast with captured $\text{CO}_2$ from existing sources
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Incentives Play Key Role at Key Points in Project Development

- **Grants**
- **Time-Certain Permits**
- **Franchise Tax Credits**
- **Property Tax Abatement**
- **Eminent Domain for pipelines**
- **Franchise Tax Credits**
- **Severance Tax Exemptions**
- **Gross Receipts Tax Exemptions**

**Phases**
- FEED
- Permitting
- Financing
- Construction
- Operation

**Bills**
- HB 3732 (2007)
- HB 3732 (2007)
- HB 3732 & 469 (2007 & 2009)
- HB 3732 (2007)
- HB 1796 & 1796 (2009)
- HB 469 & 1796 (2009)
- HB 469 (2009)
- HB 469 (2009)
- HB 469 & 1796 (2009 & 2013)
- HB 2446 (2013)
- HB 2446 (2013)
Roadmap for Regional CCUS Incentives

A. Local Tax Exemptions/Abatements
B. State Tax Exemptions and Credits
C. Environmental Regulatory Certainty
D. Oil & Gas Regulatory Certainty
E. Utility Regulatory Certainty
Local Property Tax Abatements –

- Clarify that CCUS-EOR network qualifies as property tax exempt under existing programs
- For non-exempt components, abate school property taxes, as well as other property taxes
- Significant economic value here (e.g., $80-300MM+ per plant projected in Texas)
- Locally-controlled and relatively state budget-proof
State Tax Exemptions & Credits -

Sales Tax Exemption
- Clarify sales tax-exempt status of carbon capture, transportation & injection equipment relating to anthropogenic “emission” source

Gross Receipts Tax Exemption/Redirection
- Permanent exemption from gross receipts & similar taxes

Corporate Income / Franchise Tax Credit Programs
- New & retrofit projects meeting criteria
- Ensure it can be monetized (multi-year & assignable)
- Fuel neutral (see Texas HB 2446 - Crownover)
Severance Tax for oil recovered using CO₂ captured from a manmade source

- 75% tax exemption for oil recovered using EOR through the use of captured man-made CO₂
- Ensure that duration meets project needs (TX – 30 yrs)
- Fiscally-neutral, but significant incentive
Regulatory Incentives - Environmental

Time-Certain Permitting

• Cap time & refine public participation process

Multi-state effort to allow, but not mandate, documented sequestration as part of Class 2 permit

• Class VI focus not necessary (equivalency goal)

Regulatory treatment of CO\textsubscript{2} as a product and not a “waste” or “pollutant” when sold

• Relevance to air, water, & waste programs
Utility Regulatory Incentives

Regulated Market Ideas
- Deemed prudence
- Early cost recovery from FEED forward
- Clear economic tests

Deregulated Market Ideas
- Capacity payments
- Clean energy portfolio standards?
- Dispatch priority?
History

- 2004 - Created to Support Governor’s Clean Coal Technology Council (created by Executive Order)
- Became platform for varied interests to rally together to support innovative CCUS technologies
  - Local Officials (county commissioners, chambers, & busdev groups)
  - State Legislators
  - Statewide Elected Officials
  - Governor & Governor-appointed Agency Heads
  - Electric power, CCUS & EOR technologists
- Developed and aided passage of over 11 pieces of legislation over the course of the last 9 years
- 2013-2014: worked with key legislative leadership to make CCUS fuel-neutral & significantly improved incentives
QUESTIONS?

Clean Carbon Technology Projects in the South

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