The Wyoming Enhanced Oil Recovery Institute
4th Annual Wyoming CO₂ Conference

A Global View of CCS Development:
Strategies at the LaBarge Field/Shute Creek Facility and Beyond

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June 30, 2010

This presentation includes forward-looking statements. Actual future conditions (including economic conditions, energy demand, and energy supply) could differ materially due to changes in technology, the development of new supply sources, political events, demographic changes, and other factors discussed herein (and in Item 1 of ExxonMobil’s latest report on Form 10-K). This material is not to be reproduced without the permission of Exxon Mobil Corporation.
Agenda

• A View on the Global Development of CCS
  • Energy Outlook
  • CCS Challenges
  • CCS Costs and outlook
  • Large scale CCS example
  • Summary

• LaBarge/Shute Creek Facility Update
  • Gas Process Facilities
  • Commercial Enablers for New Carbon Dioxide Sales
  • Shute Creek Compressor Expansion Project Status
Global Energy Demand and CO₂ Emissions

- **Demand**: Quadrillion BTUs
  - Average Growth / Yr. 2005 - 2030: 1.2%
  - Coal, Oil, Gas, Other

- **CO₂ Emissions**: Billion Tons
  - Average Growth / Yr. 2005 - 2030: 0.9%
  - Res/Comm, Transportation, Industrial, Power Generation

ExxonMobil
Gas & Power Marketing
Challenges In Commercializing CCS

• Large scale demonstration of integrated component technologies
• Technology improvements to reduce capital cost and energy intensity
• Sound policy, legal, and regulatory framework
  • Stable economic basis
  • Property rights/access
  • Long term site responsibility
• Recognition of scale
  • Rivals existing oil and gas production infrastructure
  • Human and capital resource demands
Electricity Generation Cost

US Baseload, Startup 2025
2009 Cents/kWhr

- Coal: $60 per Ton CO2
- Gas: $30 per Ton CO2
- Solar: No CO2 Cost

Electricity generation cost comparison for different energy sources in the US baseload market, projected for startup in 2025.
The CCS Conundrum – When?

Capture Cost ($/t)

$125/tonne

$75/tonne

$50/tonne

CO2 Price

CCS Projects

CO2 Price from ICF International, 2009

CCS Projects from IEA CCS Roadmap, 2009
Research and Development Partnerships

- Sponsored research
  - CO₂ReMoVe, GCEP, Georgia Tech, IEA GHG, MIT CSI, University of Texas
- Program support
  - USDOE Regional Program Partner, Southeast and Southwest programs
  - University of Wyoming data sharing and research collaboration
- Founding member of the “Global CCS Institute”
CCS – A Promising Option

- CCS - a promising tool to address risks posed by rising GHG emissions
- Widespread deployment requires a sound legal and regulatory framework and economic basis
- Near term, public/private collaboration on research and demonstrations is essential
- Long term, CCS must compete economically with other GHG mitigation technologies
- Oil and gas industry, ExxonMobil in particular, can provide relevant support and expertise
- Collaborative effort needed to reach our mutual goal of reduced emissions

Adapted from Summary for Policy Makers, IPCC Special Report on CO2 Capture and Storage, 2005
LaBarge

- **History**
  - 1981: Exxon drilled exploration wells
  - 1984: Shute Creek construction
  - 1986: First production

- **Raw gas stream**
  - Produced from the LaBarge Madison reservoir
  - Average well produces 45 MMCFD
  - Gathered to the Black Canyon Processing Facility
  - Transported 40 miles to the Shute Creek Treating Facility
Experience With CCS Technologies

Shute Creek, Wyoming

Shute Creek Gas Plant

CO₂ Compression

CO₂ Metering

Gas Composition
65% Carbon dioxide
22% Methane
7.4% Nitrogen
5.0% Hydrogen Sulfide
0.6% Helium

Wellfield

Black Canyon Processing Facility

H₂O

Shute Creek Gas-Treating Facility

LNG 5 MCFD
Methane 115 MCFD
Helium 4 MCFD
CO₂ 230 MCFD

108 MW Cogen
Commercial Enablers

The “chicken vs. egg” dilemma:

- Does project financing enable a commitment or does the commitment enable financing?

  New customers should plan on owning pipeline capacity or securing FT agreements

  Creditworthiness must be assured on an ongoing basis

- Project plan forms that foundation of the commercial relationship

Long-term agreements help minimize commercial uncertainty

**PROJECT FINANCING**

**ACCESS TO FIRM TRANS.**

**SUSTAINABILITY OF DEMAND**

**FINANCIAL PERFORMANCE**

**PROJ. PLANNING/DEFINITION**
Shute Creek CO₂ Sales Gas Expansion Project

Project Purpose
• Install 23,000 hp of CO₂ compression (capacity increase of 110 Mcfd)
• Fully utilize the capacity of the CO₂ pipeline network departing the Shute Creek Facility

Current Status
• Construction complete
• Commissioning in progress

Next Steps
• Liquidating available commissioning tasks. Starting-up supply CO₂ (low pressure) compressor late 2Q2010
• Resume sales gas compressor (high pressure) commissioning July-August
• Start-up of sales CO₂ compressor forecast for late 3Q2010
Shute Creek CO2 Sales Gas Expansion Schematic
# Carbon Dioxide Sales Organization

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THANK YOU