



# CCS Financing and Cost Reductions for Development and Deployment

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NCSL/NARUC Carbon Capture and Storage Institute  
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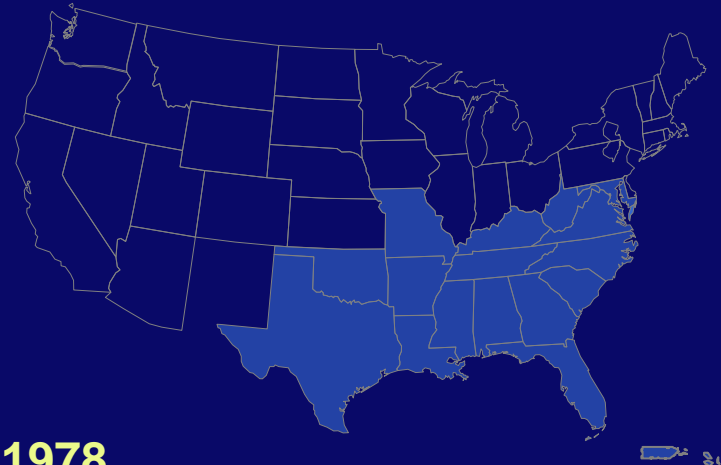
# Background



*Through innovations in energy and environmental policies, programs and technologies, the Southern States Energy Board enhances economic development and the quality of life in the South.*

*- SSEB Mission Statement*

- **Established 1960, expanded in 1978**
- **16 U.S. States and Two Territories**
- **Each jurisdiction represented by the governor, a legislator from the House and Senate and a governor's alternate**
- **Federal Representative Appointed by U.S. President**



# SSEB Activities Related to Reliable Power Supply

- Southeast Regional Carbon Sequestration Partnership
- SECARB-Ed
- State Energy/ Environmental Legislation
- International Cooperation – IEA, WEC, CSLF, GCCSI
- Water for Energy
- Southern States Biobased Alliance / National Biomass Partnership
- CASL- Nuclear Hub
- Nuclear Energy/ Radioactive Materials Transportation Committees
- Clean Coal Technology and Advanced Power Systems
- CO2 Pipeline and Outer Continental Shelf Studies
- Advanced Coal Technology Education and Outreach
- State Energy Planning
- Electric Utility Transmission Planning issues – CSG Committee
- Puerto Rico Green Energy Manufacturing
- 51st Anniversary Annual Meeting





# Accelerating Commercial CCS through Creating Viable Business Models

Carbon Sequestration Leadership Forum (CSLF)



- “Widespread global deployment of CCS will require moving CCS from research status through demonstration projects to commercial operation... requiring financing, constructing and operating in different markets”
- CSLF Financing Task Force is working with industry, financial community & stakeholders to formulate & promote viable business models for commercial deployment...requiring balance of risks and rewards for all participants



# CSLF Financing Task Force



- Created in June 2009- France as Chair
- Initial investigation of incentives and investments for CCS worldwide
- Two roundtables in London and DC with representatives of banks, insurance, government, industry
- Recent World Bank CCS Workshop in Johannesburg (June 2011)
- Upcoming Fall 2011:
  - World Bank CCS Workshop
  - CSLF Ministerial in China
  - Asian Development Bank Report on CCS in the Far East



# World Bank Activities: CCS Trust Fund



- Two core elements guiding its work at international, regional and national levels
  - Capacity building and knowledge sharing assistance related to CCS
  - Carbon asset creation services
- In co-operation with leading international and bilateral initiatives (Global CCS Institute, CLSF, EC programs, IEA Programs)
- CCS Trust Fund structure and work program
  - Total capitalization \$8 million
  - Work Program components
    - Country-level focused on nine country or project specific (\$6.9 million)
    - Economic and sector work on regional regulatory, economic and financial instruments analyses (\$1.1 million)



# Key Components to CCS Financeability: Legislative



- Educating legislators, PUCs and staff, and Energy Offices is key to appropriate legislation
- Energy policy question: Will legislation provide a government role for long-term stewardship in a post-closure period?
- Fiscal policy
  - Appropriations
  - Basic Research and Development
  - Funding Regional Sequestration Partnerships
    - CCS Training Workforce of the Future
    - Reservoir Characterization
    - USGS data collection





# Key Components to CCS Financeability: Regulatory



- Need a Regulatory Framework in order to meet financial challenges and to share risks appropriately
- Regulatory risks include:
  - State rules on liability and pore space ownership
  - Uncertain EPA carbon regulation
  - Incentives to offset the costs of CCS (first commercial applications)
- Rate treatment by Public Utility Commissions
  - Utilities must be key partners in advancing state of the art CCS technology
  - Recovery of these costs must be acknowledged
- Reducing costs and increasing financeability requires resolution to issues of:
  - Pore space ownership
  - Pipeline siting for CO<sub>2</sub> transport to storage fields or EOR, EGR, ECBM
  - Long term stewardship plan for CO<sub>2</sub>



# Key Components to CCS Financeability: Business Solutions



- Collaboration in RISK sharing among utilities, financial houses, coal companies, pipeline carriers, vendors
- Insurance and bonding to cover risks
  - Selected technical risks:
    - Capital cost of CCS
    - Plant operating costs
    - Equipment downtime – take or pay CO<sub>2</sub>
    - CCS site technical failure (low probability, high impact)
- Pipeline transport of CO<sub>2</sub> is currently private contractual matter
- Revenue enhancements through the beneficial uses of CO<sub>2</sub>
  - Enhanced Oil Recovery, Algae Production for Biofuels, feedstock for fuels and chemicals, Enhanced Coal Bed Methane Recovery
- Consider different perspectives: bond markets, governments, investors



# Key Components to CCS Financeability: Incentives



- Federal Tax Policy can encourage CCS investments
  - 45Q Sequestration Tax Credit
  - 48A Qualifying advanced coal project credit
  - 48B qualifying gasification project credit
  - Clean Coal Power Initiative
- Financial incentives such as loan guarantees, direct loans, grants
- Developing energy market mechanisms to accommodate use of CCS, which could include price on carbon
- Weakening of regional markets for GHG emission regulation, e.g. New Jersey announcement dropping out of RGGI



# Key Components to CCS Financeability: Other



- Formalize knowledge sharing and continued learning through international community
  - CSLF and European Union partnerships
- R&D continues in reducing costs of electricity from carbon capture plant
  - Can CCS costs be covered in electricity rates?
- State Tax Policy
  - Severance Tax Relief
  - Efforts to enact capture incentives (e.g. Mississippi)



# Keys to Unlocking CCS Potential



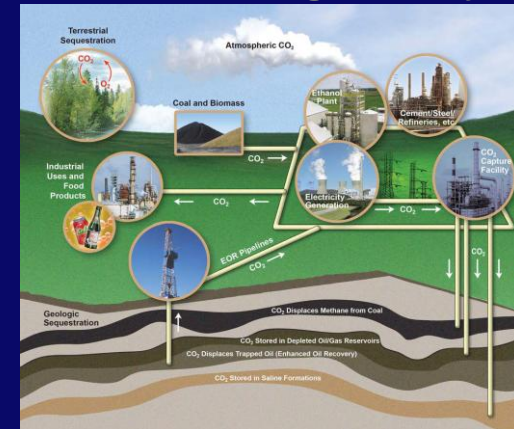
- Educating legislators, PUCs and staff, Energy offices
- Developing regulatory framework to enable CCS
- Collaboration in RISK sharing among utilities, financial houses, coal companies, pipeline carriers
- Formalizing knowledge sharing and continued learning through international community
- Developing energy market mechanisms to accommodate use of CCS, which could include a price on carbon
- Developing Tax policy and other financial incentives to encourage CCS investments



# Cleaning up Coal Through Carbon Capture and Sequestration



- SECARB Regional Carbon Sequestration Partnership
- Key Issues to be addressed by comprehensive regulatory framework:
  - ✧ Subsurface Ownership
  - ✧ Long Term Liability
  - ✧ Transfer of Ownership
  - ✧ Project Authority
  - ✧ Financing Source
- Southern states with CCS related legislation
  - ✧ Kentucky, Louisiana, Mississippi, Oklahoma, Texas, West Virginia





# Regional Carbon Sequestration Partnership “Firsts” Achieved by SECARB



## **SECARB Phase II:**

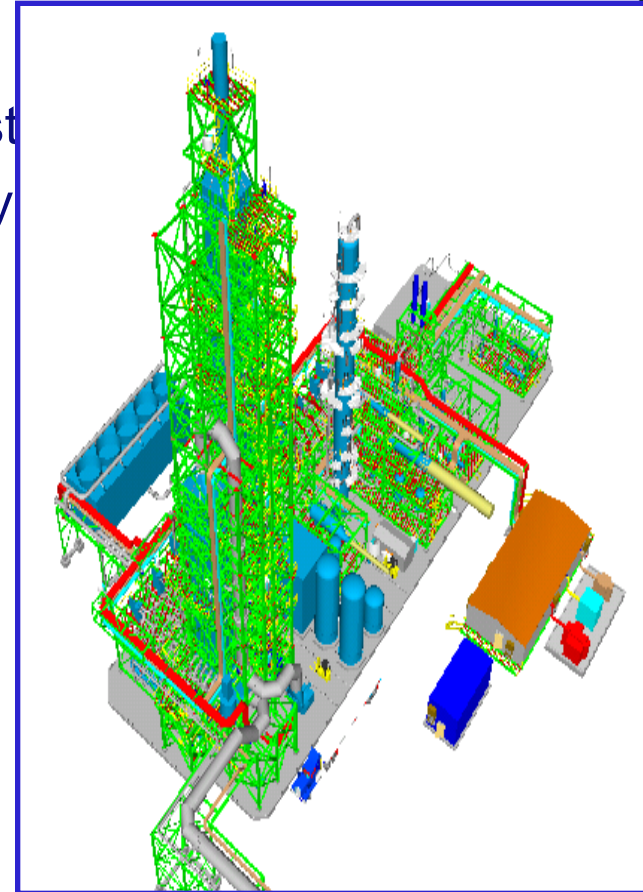
- The Gulf Coast Stacked Storage Project was the FIRST of the RCSPs to monitor a 500,000 tonne CO<sub>2</sub> injection. Nov 30, 2010, 1.75 million tonnes monitored at the site.

## **SECARB Phase III:**

- The Early Test is the FIRST of the RCSPs to commence CO<sub>2</sub> injection.
- The Early Test is the FIRST of the RCSPs to monitor a 1 million tonne CO<sub>2</sub> injection. Volume injected as of Nov 30, 2010, is 3.37 million tonnes (Phases II and III).
- The Anthropogenic Test is the FIRST of the RCSPs to utilize anthropogenic CO<sub>2</sub> in an integrated demonstration
- **CSLF International award** – Fall 2010 in Warsaw, Poland

# 25 MW Integrated CCS Demo – APC Plant Barry

- CO<sub>2</sub> Capture and Compression
  - SCS/MHI collaboration with partners
  - KM-CDR capture technology (500 TPD)
- Transportation and Sequestration
  - DOE SECARB Phase III “Anthropogenic Test
  - 150k tpy for up to 3 years into saline geology
  - ~12 mile CO<sub>2</sub> pipeline to Citronelle Field
- Objectives/Goals
  - Advance saline sequestration technology through large field test
  - Characterize operations to support full scale deployment
  - Continue outreach and education to ensure seamless deployment





# Integrated CCS Demo – Current Status

- Capture Plant
  - Design: complete
  - Construction: 90% complete
  - Start up and commissioning: underway
  - Gas In: June 2011
  - Compressed Gas: July 2011
- Transportation and Sequestration
  - Characterization well complete
  - Denbury beginning initial pipeline and surface facility work
  - Procurement underway



# CO<sub>2</sub> Capture Facility – Process Island





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