SSEB Perspectives on Carbon Management Policies, Regulatory Issues, and Projects

Carbon Management Workshop
Ken Nemeth, Southern States Energy Board
Midland, Texas ~ December 4, 2017
“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 and 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
Key Issues for states:
• Energy Infrastructure
• Cyber security
• Nuclear repository
• Fuel fabrication (MOX)
• Coal combustion products
• Electric grid stability
Governors Summit Continued at Annual Meeting of SSEB

Key Issues for states
• Appalachian Storage Hub
• 45Q (CCUS tax credits)
• Hydropower relicensing
• Hurricane support to states
• Workforce development & training
Electric Utility Resource Mix in the South

- Demand is flat or declining
- Natural gas and oil prices are low
- Aging fleet of coal-fired generating capacity
- Environmental requirements for generation, including uncertainty on carbon limits
- Operational flexibility of renewables increasing
- Consumers are demanding renewable resources
  - BlackRock Investments urges ExxonMobil to consider carbon emissions in future investment decisions
- 2018 Budgets for utility resource R&D uncertain
- President requests Defense budget increases offset by decreases to other federal agencies R&D
Low Cost of Oil and Natural Gas
Key Issues in the Shifting Energy Game Board

- Impact of hurricanes on major energy resources
- Regional fuel waivers during major natural disasters or supply disruptions
- Appalachian energy/storage hub
- SECARB / Petra Nova emergence of CO$_2$-EOR in region
- Industrial CCUS in the South
- Project ECO$_2$S and Regional CO$_2$ Storage Complex
- Nuclear faces cold reality in the South
- Recent rulings on Atlantic Coast and Mountain Valley pipelines
- DOE – Grid Reliability and Resiliency Markets
- Subsidies to meet state GHG goals and retain baseload power plants
- Rollback of Clean Power Plan and implications for SSEB states
- Fracking infrastructure impacts – land use, water, transport
- Infrastructure Funding in 2018 – what it might mean in the South
- Resolutions passed by SSEB Board (2017)
Harvey, Irma, Maria - “The Destructive Threesome”
Impacts on Energy Resources in the South

- Major impacts in Texas, Florida, Puerto Rico, Georgia, US Virgin Islands, Carolinas – flooding, infrastructure, power outages
- Millions of customers affected
- Shutdowns of offshore drilling
- Shutdowns of oil and gas refineries
- Shutdown of nuclear units in Florida
- Port closures for extended periods
- Pipeline deliveries disrupted
- Local electricity distribution power lines down
- Puerto Rico & USVI – entire energy infrastructure heavily damaged
- Importance of Electric Utility Mutual Assistance program
Regional Fuel Waivers & Refinery Shortages

- Hurricanes impact Gulf Coast refineries and fuel distribution systems
- EPA requires reformulated gasoline & low volatility gasoline through September 15 – difficult to get due to hurricanes
- EPA has waiver authority under the Clean Air Act to allow continued sales of “less controlled” gasoline
- Waivers ensure adequate supply of fuel throughout the South & Mid-Atlantic
- Need: *Provide regional waiver* rather than each individual state requesting waiver
Appalachian Energy Hub

• $10 + Billion infrastructure project
• Creates opportunity for chemical and downstream sectors to grow, creating economic revitalization of Appalachia
• Shale gas revolution has delivered low cost energy & feedstock
• Downstream chemical investments have increased 50%
• Shell’s ethane cracker is multi-billion dollar investment
• Storage hub necessary to support development of full regional systems
• Support for the project includes recent U.S. Chamber of Commerce letter to Energy Secretary Perry
• Senator Capito (WV) introduced *Appalachian Energy & Manufacturing Infrastructure Revitalization Act of 2017* in June, 2017 (S.1340)
West Virginia – China Investments

• China plans $250 Billion Energy Investments in West Virginia

• China Energy Investment Corporation – WV MOU (Memorandum of Understanding) regarding $84 Billion in shale gas development & chemical manufacturing projects over 20 years
SECARB CCUS Demo

- SSEB’s SECARB Demo at Plant Barry (Bucks, AL)
- 25 MW post-combustion slip-stream carbon capture
- 12 mile pipeline to Citronelle, AL for storage
- Potential for EOR
Petra Nova- Emergence of CCUS in South

**SSEB Demo Goes Commercial!**

- NRG Energy (Houston, TX)
- Interest in Plant Barry Demonstration
- Plant scale-up to 240 MW
- Post-combustion slip-stream
- Captures 5,200 tons CO$_2$/day or 90% of CO$_2$
- Pipeline to Petra Nova West Ranch Oil Field (81 miles)
- EOR 300 bbls/day to 15,000 bbls/day!
- 60 million bbls Recoverable Reserves
Industrial and Commercial CO₂ Utilization Applications
• Market-driven to accelerate CCUS commercialization within industrial sector
• SSEB and DOE-FE developing roadmap and toolkit
• Central Gulf Coast Region is prime area for Industrial-CCUS
• Louisiana and industrial corridor along Mississippi uniquely situated to benefit from integrated CCUS System
  – Industrial sources produce large amount of CO₂
  – Green pipeline runs across southern Louisiana
  – Many existing oilfields could benefit from Enhanced Oil Recovery (EOR)

*Orange = Industries  Red = Oil Fields

CO₂ Emission Clusters, Pipeline Infrastructure, and Oil Fields
Source: Louisiana State University, Center for Energy Studies, 2016
Project ECO$_2$S: Pursue key advances in CO$_2$ storage knowledge & technology, including **optimizing CO$_2$ storage efficiency**, **modeling the fate of injected CO$_2$**, and **establishing residual CO$_2$ saturations**. Project ECO$_2$S will involve “real-life” experiences, issues, and challenges of **scaling-up from its regional, pre-feasibility assessment of CO$_2$ storage to establish a site-specific, commercial-scale CO$_2$ storage facility**, including capturing “lessons learned”

- **CarbonSAFE Program Goals**: Develop a commercial-scale integrated CCS storage complex
- **CarbonSAFE Program Phases**:
  - Phase 1. Integrated CCS Pre-Feasibility Study
  - **Phase 2. Storage Complex Feasibility Study**
  - Phase 3. Site Characterization
  - Phase 4. Permitting & Construction

- Advanced Resources International, Inc.
- Auburn University
- Battelle Memorial Institute
- Geological Survey of Alabama
- Gerald R Hill PHD, Inc.
- GHG Underground
- Lawrence Berkeley National Laboratory
- Los Alamos National Laboratory
- Loudon Technical Services, LLC
- Mississippi Power Company
- Mississippi State University
- Oklahoma State University
- Pashin Geoscience, LLC
- Southern Company
- Trimeric Corporation
- University of Alabama at Birmingham
- University of Wyoming
- Virginia Polytechnic Institute and State University, Virginia Center for Coal and Energy Research
• Characterize offshore CO₂ storage opportunities and conduct a volumetric analysis
• Model offshore CO₂ storage to identify well and reservoir configurations that are capable of meeting the goal of 30 megatonnes or greater storage in key focus areas
• Develop best practices to advance the state of knowledge while reducing the cost of storage operations
• 3 Planning Areas: Mid-Atlantic, South Atlantic, and Eastern Gulf of Mexico
SECARB-Ed (Workforce Development)

- Workforce development to support CO₂ storage advanced research and future commercial deployment
- Develop/provide short courses on CCUS technologies and
- Issue professional development hours and continuing education units
Atlantic Coast and Mountain Valley Natural Gas Pipeline Projects

• Projects will carry Appalachian basin (WV) gas to US markets
  – Mountain Valley Pipeline
    • $3.5 Billion, 300+ mile, 42” diameter pipe
  – Atlantic Coast Pipeline
    • $5 Billion, 600 mile, 42” diameter pipe
• FERC approved Certificate of Public Convenience/Necessity October, 2017
  – Approval carries a number of conditions
  – Other necessary permits still pending
• NC DEQ rejected Atlantic Coast pipeline saying erosion and sediment control plan was inadequate
• 4th Circuit Federal Court of Appeals sent Mountain Valley pipeline water quality permit back to WV DEP for 2nd review (10/18/17)
Department of Energy Grid Reliability Study and Reliability/Resilience NOPR

• DOE Secretary Perry: study impacts of loss of fuel diversity to reliability
• Report focus:
  – Evolution of wholesale electricity markets
  – Do energy and capacity markets compensate resiliency?
  – Do regulatory burdens force early retirements of baseload power plants?
• DOE issued Notice of Proposed Rulemaking Sept. for FERC to issue rule on grid reliability & resilience pricing
• Objective: Ensure reliability & resilience attributes are fully valued, on-site fuel supply (90-days), full cost recovery (capital and operating costs) & ROI
• Applies to deregulated markets with capacity & energy markets (ISO-NE, ISO- NY, PJM) (ERCOT excluded–no capacity market)
• Responses to NOPR largely negative
Clean Power Plan Rollback: Implications for SSEB states

• Clean Power Plan rollback can expect to see:
  – Litigation
  – Increased uncertainty for electric utilities
  – Continued negative demand growth which causes coal to compete with less expensive energy efficiency, solar power, wind power, natural gas

• Other pressures on carbon emissions:
  – Corporate commitments to 100% Renewable power (large loads like Google, Walmart, Amazon) and shareholder pressures to consider climate change
  – Approximately 400 cities have committed to meeting Paris Climate Agreement goals
  – States (NC, VA) – plan to meet climate goals
  – ExxonMobil shareholders (Blackrock) – voted for price on carbon
State Actions related to Oil & Gas Resources

• Oklahoma Corporation Commission
  – Request 11% budget increase to help with rash of earthquakes related to Oil and Gas activity
• Texas Railroad Commission
  – 20% increase proposed by House
• North Dakota Department of Mineral Resources
  – Maintaining staff and budget to also handle pipeline safety
• Alaska Oil and Gas Conservation Commission
  – Slight increase while other government agencies shrink
• California Division of Oil, Gas and Geothermal Resources
  – Increases include monitoring / cleanup of abandoned wells
Fracking Infrastructure Impacts

• Innovations in drilling through fracking – gives access to incredible amounts of natural gas and crude oil and leads to low gas prices

• Infrastructure impacts:
  – Land: drilling operations (temporary); heavy truck traffic; pipelines; seismic concerns; access roads; noise
  – Water: well integrity especially at surface and operations; significant water requirements; infusion of water with chemicals (USGS Survey: average ~10 million gallons/well)
Global Expansion of LNG

• LNG trade poised for growth
• Large natural gas discoveries leading to LNG exports
• Major markets:
  – Asia-Pacific Region (e.g. Japan, largest importer)
  – European Region
  – Latin America
• Numerous U.S. LNG Export Terminals on the horizon (including these)
  – Sabine Pass (LA)
  – Dominion Cove Point (MD)
  – Cameron (LA)
  – Freeport (TX)
  – Elba Island (GA)
Key SSEB Resolutions - 2017

• Enhancing Electric Grid Stability and Incentivizing Carbon Emissions Reductions through improved efficiency base load coal units (Resolution 8.2017)
  – Coal is abundant resource providing reliable, secure, resilient power supply
  – Increased efficiency of coal fleet reduces carbon dioxide emissions
  – SSEB recognizes importance of incentivizing efficiency of coal generation and R&D for efficiency improvements

• Prioritizing State Mineral Property and Conservation Law Principles as they apply to Federal Incentives that advance investment in Carbon Capture & Enhanced Oil Recovery (Resolution 11.2017)
  – Expanding and extending existing federal tax credits for CO2 capture and use in EOR should be compatible with state oil and gas mineral property laws & private mineral leases
  – SSEB urges federal tax incentives including 45Q, master limited partnerships or private facilities bonds for CCS-EOR
1. Improving energy infrastructure federal permitting efficiency
2. Reforming the New Source Review Modification program
3. Modernizing and enhancing energy infrastructure
4. Protecting the nation’s electric power grid from cyber and physical security threats
5. Supporting advancement of a national repository for spent nuclear fuel and high-level radioactive waste
6. Encouraging completion of fuel fabrication facility in SC
7. Encouraging resource conservation, preservation, and recovery of coal combustion products
8. Enhancing electric grid stability and incentivizing carbon emissions reduction through improved efficiency base load coal units
9. Cost allocation of grid-stability transmission projects
10. Prioritizing construction of the Appalachian storage hub
11. Prioritizing state mineral property and conservation law principles as they apply to federal incentives that advance investment in carbon capture & enhanced oil recovery
12. Expressing opposition to dilution of states’ rights in the context of hydropower relicensing under Section 401 of the Clean Water Act
13. Providing support to SSEB Member jurisdictions in the aftermath of Hurricane disasters