

# Toward Energy Independence



**2012  
ANNUAL REPORT**



# Mission

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*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.*

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## Message from the Chair

The nation is undergoing an energy revolution. New supplies and transformative technologies are leading the way. Technology has unlocked the potential to access a wealth of natural gas resources, it has enabled a reversal of 20-years of decline in oil production, and it is opening new opportunities to develop our nation's expansive development of wind, biofuels and other renewable energy resources. *Read more.....*

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## Board Members

Each jurisdiction is represented by the governor and a legislator from the House and Senate. The Southern States Energy Board is presided over by a governor who serves as chair and a vice-chair and treasurer who are legislative members. Ex-officio, non-voting board members include a federal representative appointed by the President of the United States, the Southern Legislative Conference Energy and Environment Committee Chair and SSEB's executive director, who serves as secretary.

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## Associate Members

Represents the region's leading energy and technology providers and contributes invaluable expertise on the economic and social implication of federal and state energy and environmental policies.

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## SSEB Programs

The Southern States Energy Board operates and oversees a wide variety of energy, environmental and economic development policies, technologies and programs. Topics from carbon capture, utilization and storage to natural gas expansion and production; biomass to nuclear waste transportation and emergency response; legislative and regulatory actions to energy efficiency; and the development of all domestic energy resources *toward energy independence* fall under the purview of SSEB.

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## Partnerships

Partnerships with government, business, industry, and academia enable the Southern States Energy Board to expand its reach and leverage opportunities to assist its member states.

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## Sources of Support

The core funding comes from annual appropriations from the 18 member states and territories. Each member's share is computed by a formula written into the original Compact.

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## Photo Opportunity

This "Photo Op" was used to take memorable photographs of members, partners, and supporters of the Southern States Energy Board. The photos are from notable events during the 2011-2012 reporting year.

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# MESSAGE FROM THE CHAIR



The nation is undergoing an energy revolution. New supplies and transformative technologies are leading the way. Technology has unlocked the potential to access a wealth of natural gas resources, it has enabled a reversal of 20-years of decline in oil production, and it is opening new opportunities to develop our nation's expansive development of wind, biofuels and other renewable energy resources. Finding ways to economically capture and utilize carbon dioxide (CO<sub>2</sub>) emissions from power generation and industrial processes for enhanced oil recovery (EOR) is part of the ensuing wave that will reshape our country and make the United States more energy secure. Now, more than ever, we have an opportunity to chart a new path in the U.S. **"toward energy independence,"** the theme

for this year's Southern States Energy Board.

The Southern States Energy Board's new report on *State Energy Profiles* documents how energy consumption is changing in our member states. Overall, the Southern region consumed more than 47 percent of the energy produced in the United States in 2010. From 1960 to 2010, energy demand in the South grew over 180 percent due to the introduction of energy-intensive industrial and manufacturing processes coupled with even faster rising residential and commercial consumption rates. Our region's 2011 electricity rates are nine percent lower than the national average but consumption per household is higher. Fifty-nine percent of natural gas generation nationwide comes from our southern states. We supply 49 percent of the Nation's coal fired generation and 44 percent of nuclear power production. Thirty-one percent of wind power is in the South. This diversity is a tribute to the ingenuity and resourcefulness of our energy industries and partnerships between government and industry.

According to the Energy Information Administration of the U.S. Department of Energy (DOE), the country sits atop 482 trillion cubic feet of shale-based natural gas reserves. This rich resource base creates new opportunities. One such opportunity is clearly in the transportation sector. That is why I, along with the governors of 13 states (including Arkansas, Kentucky, Louisiana, Mississippi, Texas, and West Virginia in the SSEB region) signed a multi-state memorandum of understanding and issued a call to automobile manufacturers encouraging them to design and manufacturer vehicles that use natural gas. As Chair of the Southern States Energy Board, I worked with the governors who, like me, want to use an American energy source that is abundant, affordable, and clean, to fuel our state fleets. As leaders for energy producing states,



we know what type of opportunity this presents.

To take advantage of transformative opportunities like this, we have to work to ensure government is providing an environment that promotes business, encourages investment, and enables future development. That is why I was pleased to work with our immediate past chairman, Governor Bob McDonnell Virginia, to encourage this Administration to open more of the nation's resources to leasing and exploration. Unfortunately, the OCS 2012-2017 plan limits this opportunity. It restricts our ability to respond both to growing energy demand and economic threats. By only including areas that are currently active and restricting the potential development of the Eastern Gulf and the Mid- and South Atlantic areas, it does not, as required under the OCS Lease Act Section 18, best meet the Nation's energy needs.

In addition, renewable energy resources, including wind energy can play a major role in many SSEB states, including Oklahoma, Texas and West Virginia. Other southern states are exploring the advantages of offshore wind (Maryland, North Carolina, South Carolina and Virginia). Wind energy when used in conjunction with flexible and responsive natural gas combined cycle generators offers an excellent opportunity for economically integrating renewable energy into the power grid. Recognizing the increasingly important role renewables will continue to play, SSEB is in discussions with wind energy industries on the potential for a regional wind consortium.

The South also has extensive quantities of biomass that can be utilized to provide power, formulate transportation fuels or produce a more carbon neutral fuel. Examining these opportunities on a regional basis can raise the potential for biomass, bioenergy, biofuels and the development of biobased products. SSEB is exploring opportunities toward the harvesting of invasive plant species as energy resources throughout the region. Nuclear energy is also an essential energy source for America. More than 100 nuclear power plants operate in 31 states, including 44 reactors in the SSEB region. The Nation has faced challenges, however, regarding the policies needed for reprocessing/storing/disposing of high-level nuclear waste. Due to the need to explore further options for nuclear waste management,

DOE issued a cooperative agreement to SSEB in July 2012 seeking the advice of a regional panel of state experts to determine alternatives.

Simply recognizing the new resource base that is transforming America is not enough. We must find better, more efficient ways to use these new supplies. Energy efficiency will be a key to ensuring America stays on a path toward energy independence for years to come.

Energy independence is achievable. And to make it a reality for years to come, America must stay on the leading edge and continue to foster innovation. CO<sub>2</sub> enhanced oil recovery could be a game changer, and SSEB is right out front. The Board's Southeast Regional Carbon Sequestration Partnership (SECARB) is a government/industry initiative that began in 2003. The \$300 million project includes the Nation's primary integrated demonstration of CO<sub>2</sub> capture at Alabama Power Company's James M. Barry Electric Generating Plant near Mobile and CO<sub>2</sub> transportation and storage at the Citronelle oilfield operated by Denbury Onshore, LLC. CO<sub>2</sub>-EOR can produce 84 billion barrels of domestic oil or more, according to the National Energy Technology Laboratory. The SECARB project is key to demonstrating the viability and efficiency of the integrated infrastructure for future commercial deployment.

The U.S. and the southern region need to move aggressively *toward energy independence* if we are to preserve our economic vitality and our national security. It is important that we grasp the opportunity afforded by all of our energy resources if we are to persevere. We must have the national will to choose to succeed while protecting the health of our citizens and striving for a better environment for generations to come. I commend this 2012 Southern States Energy Board Annual Report for your review.

*Mary Fallin*  
Mary Fallin  
Governor of Oklahoma  
Chair 2011-2012



# EXECUTIVE COMMITTEE



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Governor's Alternate

LAST UPDATED: SEPTEMBER 7, 2012



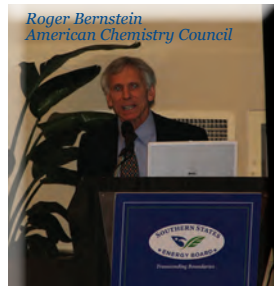
## 2012 ASSOCIATE MEMBERS WINTER MEETING WASHINGTON, DC



*Gov. Mary Fallin, OK  
SSEB, Chair*



*Scott Segal, Partner  
Bracewell and Giuliani*



*Roger Bernstein  
American Chemistry Council*



*Honorable Jeff Duncan, SC  
U.S. House of Representatives*



*Jim Gaffey and Fred McGoldrick  
Silform USA, Inc.*



*Scott Aaronson  
Edison Electric  
Institute*      *Laura Marshall Schepis  
National Rural Electric  
Cooperative Association*

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*Jill Stuckey  
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*Danny Gray, P.E.  
Charah, Inc.*



*Karl Knight  
U.S. Virgin Islands*



*Gov. Luis G. Fortuño  
Puerto Rico*

*Jim Burvett  
SCANA Corp.*



*Sen. Eddie Joe  
Williams  
AR*

*Rep. Harry  
Geisinger, GA*



# ASSOCIATE MEMBERS

SSEB's Associate Members program is comprised of industry partners who provide an annual contribution to the Board. Membership includes organizations from the non-governmental sector, corporations, trade associations and public advocacy groups. The Associate Members program provides an opportunity for public officials and industry representatives to exchange ideas, define objectives and advance energy and environmental planning to improve and enhance the quality of life in the South.

- ALPHA NATURAL RESOURCES
- AMERICAN COALITION FOR CLEAN COAL ELECTRICITY
- AMERICAN ELECTRIC POWER
- AMERICA'S NATURAL GAS ALLIANCE
- AMERICAN CHEMISTRY COUNCIL
- AGL RESOURCES
- ARCH COAL, INCORPORATED
- BELL BIO-ENERGY, INCORPORATED
- CHARAH, INC
- CHEVRON CORPORATION
- COAL UTILIZATION RESEARCH COUNCIL
- DOMINION
- DUKE ENERGY
- EASTERN COAL COUNCIL
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- SOUTHERN COMPANY
- TECO SERVICES, INCORPORATED
- TROUTMAN SANDERS, LLP
- VIRGINIA CENTER FOR COAL & ENERGY RESEARCH
- WVU RESEARCH CORPORATION



# PROGRAMS

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## ENERGY AND ENVIRONMENT LEGISLATIVE PRIORITIES AND ANALYSIS

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The Southern States Energy Board's Annual Legislative Digest serves as a compendium of energy and environmental legislation passed by the Board's 18 member states and territories. For more than four decades, SSEB has published the Digest as a reference tool and guide for state legislators and their staffs. The Digest thoroughly examines and tracks legislative trends state by state.

As technology advances in the oil and natural gas industries, five member states during their 2012 sessions adopted significant legislation related to hydraulic fracturing and horizontal drilling as well as oil and gas severance taxes. States rich in oil and gas resources continue to analyze potential environmental, economic, and social impacts arising from exploration and pipeline activities. Our member states legal and regulatory frameworks are significantly evolving as the South's oil and gas resources help lead the way to American energy independence.

During the 2012 legislative sessions, the southern states passed approximately 466 energy and environmental bills. Besides addressing the development of oil and natural gas resources, nine states adopted measures to promote energy efficiency in state and publicly owned buildings. Also, our member states addressed the serious problem of metal theft, which continues to plague citizens, businesses, governments and utilities by imposing stricter standards on sellers and recyclers. Finally, several states targeted important

economic development goals through energy and environmental legislation including providing various incentives to support the development of renewable energy enterprises or economic zones as well as the revitalization of brownfields to encourage alternative business development and recreational activities

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*The Southern States Energy Board operates and oversees a wide variety of energy, environmental and economic development policies, technologies and programs. Topics from carbon capture, utilization and storage to natural gas expansion and production; biomass to nuclear waste transportation and emergency response; legislative and regulatory actions to energy efficiency; and the development of all domestic energy resources toward energy independence fall under the purview of SSEB.*

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## CONSORTIUM FOR ADVANCED SIMULATION OF LIGHT WATER REACTORS

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The Consortium for Advanced Simulation of Light Water Reactors (CASL) is among the newest projects in the Board's nuclear energy portfolio. CASL is a five year, \$122 million dollar effort sponsored by the Department of Energy (DOE) to create an energy innovation hub to foster the development of the next generation of nuclear reactors. This



task, headquartered at DOE's Oak Ridge National Laboratory (ORNL), focuses on three issues key to the continued operation of nuclear generation in the U.S. These are: reducing cost; reducing used nuclear fuel; and enhancing safety.

CASL's mission is to apply and develop advanced modeling and simulation capabilities to create a usable virtual reactor for predictive simulation of light water reactors (LWR). Power uprates, lifetime extension, and higher fuel burnup can be enhanced through predictive simulation.

Performance of the reactor core; reactor vessel; and in-vessel components of pressurized water reactors (PWRs) are critical areas of concern to the consortium. The 'virtual reactor' will simulate power plant operations while computer models will also be used to reduce capital and operating costs per unit of energy, safely extending the lifetime of existing U.S. reactors and reducing nuclear waste volume generated by enabling higher fuel burn-ups.

SSEB staff participate on the CASL communications group that is informing and educating stakeholders and decision-makers nationwide regarding the achievements and opportunities created by CASL.

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## SSEB REGIONAL ENERGY PROFILES

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Southern States Energy Board has partnered with the Kentucky Department of Energy Development and Independence of the Energy and Environment Cabinet to produce state and regional energy profiles. This work was funded by a grant from the U.S. Department of Energy's Office of Fossil Energy. The report aggregates data from a variety of public sources including the Energy Information Administration (EIA) of the U.S. DOE; U.S. EPA; the Bureau of Labor Statistics; the Bureau of Economic Analysis; and the Census Bureau. The document has snapshots of national, regional, and state comparisons of energy consumption,

energy sources, electricity consumption, electricity generation and emissions, electricity prices, and regional energy exports. Illustrative highlights below showcase the robust nature of the region's energy resource mix and consumption.

In terms of consumption, Florida's electricity use is 52 percent residential and 8 percent commercial while Kentucky is 30 percent residential and 49 percent industrial. Oklahoma is slightly closer to the regional average with 41 percent of electricity consumed by residential customers and 26 percent by industrial consumers. In generating electricity, states also vary widely. West Virginia uses coal to generate 96 percent of its electricity while South Carolina generates 33 percent with coal and 51 percent with nuclear. Arkansas uses coal for 48 percent of its electricity generation while 23 percent is from nuclear and 21 percent from natural gas. In terms of electricity use per capita, Kentucky uses almost twice as much as the national average, with Alabama and Tennessee using significantly more than the average. Florida's and Maryland's use is approximately the national average.

Electricity consumption in the region represents 47 percent of national consumption (1.8 of 3.7 Billion Mwh). Since 2000, regional electricity consumption has risen over three times faster than the rest of the nation, almost 1.5 percent per year. Since the mid-1980s residential demand has also accounted for the largest proportion of electricity consumption in the region and the US as a whole (42 percent region and 38 percent national).

Electricity production represents 47 percent of national electricity generation (1.9 of 4.1 Billion Mwh). Regionally, electricity generated by coal was at 44 percent in 2011 but has fallen by 14 percent since 2007. Natural gas is the key substitute for coal while wind represents the fastest growing renewable resource.

*59 percent of natural gas generation nationwide is generated in the SSEB region;*





49 percent of coal generation;  
 44 percent of nuclear power generation;  
 31 percent of wind generation; and  
 14 percent of hydroelectric generation.

Electricity Prices were nine percent lower than the national average in 2011 with industrial prices being the lowest. Residential prices are substantially lower in the region but higher per capita consumption means that monthly household electricity bills are 26 percent higher than the national average of \$96.20. This high regional consumption is a result of lower electricity prices, weather, income, housing stock as well as the availability and price of substitutes such as natural gas.

Residential rates average 10.42 cents/Kwh in the south versus 11.42 nationwide; Commercial rates are 8.86 cents/ Kwh in the region versus 9.99 nationwide; Industrial rates are 6.09 cents/ Kwh in the region versus 6.67 nationwide;

Average rates overall are 8.82 cents/Kwh in the region versus 9.67 nationwide.

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## TRANSURANIC WASTE TRANSPORTATION

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The transportation program involving the movement of transuranic waste to the Waste Isolation Pilot Plant (WIPP) in Carlsbad, New Mexico is one of the Department of Energy's most successful achievements. The prominence of this program is due in large part to the activities of

SSEB's Transuranic Waste Transportation (TRU) Working Group. The TRU Working Group has helped DOE establish a legacy by developing policies and protocols for the safe shipment of Cold War era contaminants, involved in the production of nuclear weapons, from DOE laboratories in the South to WIPP. SSEB established a cooperative agreement with DOE's Carlsbad Field Office to maintain this group of radiological health professionals and emergency response workers to aid in the planning



of a comprehensive transportation program for the corridor states in the region. As a part of this agreement, SSEB distributes over \$1 million dollars to support the impacted states in developing public outreach programs, emergency response training, equipment purchasing and general planning activities.

From a big picture perspective, ongoing activities in the South continue to be a major factor in helping remediate DOE sites. The Oak Ridge National Laboratory only has been conducting shipments for four years but has already amassed





over 131 movements of TRU waste representing nearly 200,000 miles of transport. Meanwhile, the Savannah River Site (SRS) continues to set the standard with over 2 million transport miles and nearly 1,400 shipments. SRS was also the first site in the U.S. to send a shipment to WIPP in the new TRUPACT-III container. The TRUPACT-III is designed to carry large boxes of waste and will be predominately used at SRS. The small quantity site shipments of transuranic waste that hailed from the northeast and traversed the states of West Virginia, Maryland and Virginia should be complete by the end of 2012.

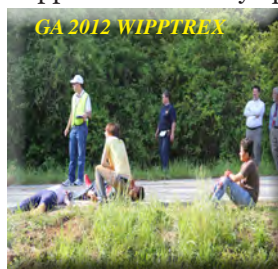
In the area of training, the state of Georgia held a Waste Isolation Pilot Plant Transportation Emergency Exercise (WIPPTREX) on April 17, 2012, in Walton County along Interstate 20. The WIPPTREX is designed to test the level of preparedness of first responders in the event of an accident involving TRU waste. Participants for the exercise included multiple response agency personnel (firefighters, law enforcement, paramedics, etc.), local hospitals, DOE-SRS Radiological Assistance Program team members, state and local emergency management responders and many more. The state of Louisiana is planning to conduct a WIPPTREX in Monroe, Louisiana, in Spring 2013.

## FOREIGN RESEARCH REACTOR SPENT NUCLEAR FUEL PROGRAM

Reducing and protecting vulnerable nuclear and radiological material worldwide is a critical mission that the Southern States Energy Board embarked upon in 1994. During that year, DOE called upon

the Board to assist in planning efforts for the return of two urgent-relief shipments of spent fuel from foreign countries to SRS. The Department identified a port of entry in the South and relied on the expertise of SSEB's radioactive materials committee members to aid in the development of a safe, efficient and effective transportation campaign.

The origins of this initiative yield from the "Atoms for Peace" program which was a non-proliferation policy that encouraged foreign countries to use nuclear technology for research and medical purposes as opposed to military applications.



Today this program has evolved into the "Global Threat Reduction Initiative" (GTRI) and employs a threefold approach to securing and managing radiological material worldwide. More specifically,

the GTRI mission is to convert research reactors from the use of highly enriched uranium to low enriched uranium, remove and dispose of highly-sensitive radiological materials abroad and to protect high priority nuclear materials from theft or sabotage.

SSEB assists GTRI with the removal aspect via its two committees: the Foreign Research Reactor Spent Nuclear Fuel Transportation Working Group and the Cross-Country Transportation Working Group. These committees have coordinated with DOE to provide security, inspections, and overall planning logistics for the safe receipt of 45 shipments from 31 countries by way of the Joint Base Charleston-Weapons Station in North Charleston, South Carolina. Depending on the composition of the fuel returned, it is either



stored at SRS or the Idaho National Laboratory (INL). The shipments to INL require additional planning to move them from the port of entry to Idaho. In the event of such an occurrence, the states of South Carolina, Georgia, Tennessee and Kentucky comprise the Cross-Country Group and collaborate jointly to develop a plan for the shipment's transit through the region enroute to its final destination. The most recent shipment was received at SRS in August 2012. Next year shipments are expected from Canada, Austria, United Kingdom and Germany as the program nears its conclusion in 2019.

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## **SOUTHERN EMERGENCY RESPONSE COUNCIL (SERC)**

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The Southern Emergency Response Council (SERC) is a mutual aid compact formalized in 1972 by 14 southern governors to offer assistance to one another in the case of an incident of a radiological nature. The SERC signatory states include: Alabama, Arkansas, Florida, Georgia, Kentucky, Louisiana, Mississippi, Missouri, North Carolina, Oklahoma, South Carolina, Tennessee, Texas and Virginia.

The actual plan which embodies the spirit of SERC and documents how the procedures would be conducted in the event of such an emergency is the Southern Mutual Radiation Assistance Plan or SMRAP. Created as a blueprint for coordinating radiological emergency assistance capabilities among participating states in the southern region, SERC representatives review, revise and administer SMRAP on an annual basis to reflect changes in state emergency response capabilities and equipment. This document outlines the mutual aid agreement, the implementation process, emergency response contacts and available state resources.

A SERC meeting is held once per year in conjunction with the Organization of Agreement States Meeting.

This gathering allows members the opportunity to discuss matters related to SMRAP. The group met in Richmond, Virginia last year to ratify SMRAP. As a part of the scope of this endeavor, SSEB acts as regional coordinator to simulate the activation of the SMRAP during state nuclear power plant exercises. In the past year, the states of Georgia and North Carolina issued a courtesy notification during their drills but did not request SMRAP activation. Additionally, there has been renewed interest in the development of SERC since the Fukushima accident in Japan.

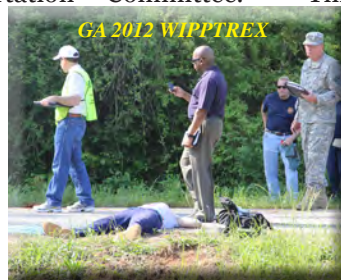
SERC's 2012 update was held in Milwaukee, Wisconsin, on August 27th.

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## **RADIOACTIVE MATERIALS TRANSPORTATION**

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Gubernatorially appointed state emergency response planners, radiological health officials and other state agency professionals comprise the Southern States Energy Board's Radioactive Materials Transportation Committee. This Committee which



has representation from every state in the region is the vehicle for developing policy in the South that is associated with the transport of radioactive materials. For nearly two decades this Committee provided input to the Office of Civilian Radioactive Waste Management on a variety of issues pertaining to radioactive materials transportation. Presently, the mission of the Committee is to support the efforts of the Nuclear Materials Management and Disposition Working Group (MDWG) within the Office of Nuclear Energy (DOE-NE).

The MDWG is tasked with the chore of implementing the recommendations of the Blue Ribbon Commission on America's Nuclear Energy Future. Through a four-year cooperative agreement issued by DOE-NE in July 2012, the Board will once again participate in the planning and establishment of a transportation system for shipments of spent nuclear fuel and high-level radioactive waste. As a part of this



collaborative effort, SSEB's Radioactive Materials Transportation Committee is poised to lend its years of experience towards the issues of consent based repository siting, transportation development, consolidated interim storage, public perception of radioactive materials, package performance testing and other topics related to the program.

In May of 2012, the Committee hosted the National Transportation Stakeholders Forum (NTSF) in Knoxville, Tennessee. During the NTSF, over 200 participants gathered from all over the nation to strategize and enhance planning efforts for radioactive materials shipping campaigns taking place throughout the DOE complex. The Office of Environmental Management and the Nuclear Regulatory Commission co-sponsored the Forum which included federal updates, topical breakout sessions, TRANSCOM Training and a tour of the Oak Ridge Reservation.

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## BIOBASED PRODUCTS AND BIOENERGY DEVELOPMENT

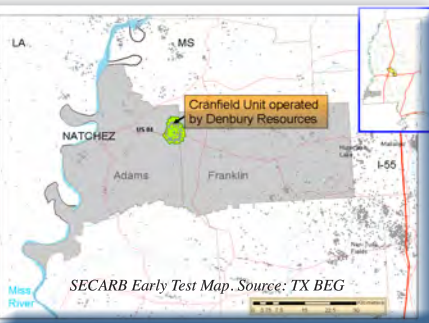
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Southern States Energy Board has a long history of analyzing and advancing the use of renewable energy in the southern states. While these resources are regional in nature, the South has numerous opportunities to accelerate the practical deployment of these technologies. Without a doubt, biomass is the primary renewable resource in the southern region.

SSEB is working with a consortium of successful business professionals in the fields of investment, feedstock identification and harvest applications, manufacturing, and transportation, who are committed to the assembly of a national biomass feedstock resource center. The NFRC is focused on development, validation, demonstration and delivery of technology and capital resources to facilitate biomass feedstock processing and logistics. Ultimately, NFRC's efforts will focus on removing invasive plant species, restoring land and facilitating national defense.

In addition to NFRC, SSEB continues to foster partnerships among industry, government, academia and others to advance biomass technologies in the region and nationally. SSEB has contributed in many areas, from assessing the technical viability of technologies and evaluating business plans for power plant development to bringing interested parties together to explore joint ventures. Numerous activities include presentations, strategic planning, technical assistance and policy guidance to our member states and others in the region. Through these activities, the Southern States Energy Board will continue to advance the growth and implementation of a bioeconomy in the South.





SECARB Early Test Map. Source: TX BEG



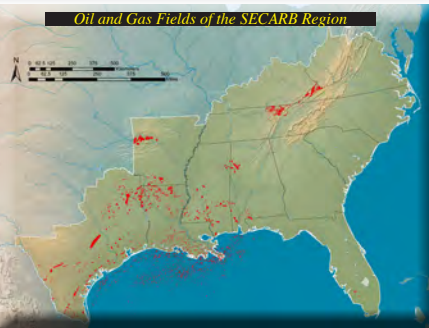
CO<sub>2</sub>-EOR Operations. Source: Denbury Resources Inc.



Jackson Dome. Source: Denbury Resources Inc.



CO<sub>2</sub> Storage Efficiency Workshop participants. Source: TX BEG



Oil and Gas Fields of the SECARB Region



Outreach event at the Early Test CO<sub>2</sub> injection well in Cranfield, MS.

## CARBON MANAGEMENT: THE SOUTHEAST REGIONAL CARBON SEQUESTRATION PARTNERSHIP (SECARB)

The Southeast Regional Carbon Sequestration Partnership is a program underway at the Southern States Energy Board to balance the environmental effects of existing and prospective fossil fuel powered electric generating facilities. SECARB is one of seven Regional Carbon Sequestration Partnerships (RCSPs) nationwide funded by the U.S. Department of Energy's National Energy Technology Laboratory and cost sharing partners. The SECARB program focuses on carbon dioxide capture, transportation and storage (CCS) opportunities for a 13-state region, including Alabama, Arkansas, Florida, Georgia, Louisiana, Mississippi, North Carolina, South Carolina, Tennessee, eastern Texas, Virginia, and portions of Kentucky and West Virginia.

The primary goal of the SECARB Partnership is to promote the development of a framework and the infrastructure necessary for the validation and deployment of CCS technologies. Currently, the SECARB Program is in its third phase, a 10-year period during which two projects are being conducted: the Early Test and the Anthropogenic Test.

Key to the success of any CCS project is an operator's ability to predict, through complex

reservoir modeling, and monitor the flow of CO<sub>2</sub> molecules injected into the subsurface and to communicate this information to stakeholders and regulators. In 2009, the Phase III Early Test deployed extensive CO<sub>2</sub> monitoring, verification, and accounting (MVA) technologies at the Cranfield oilfield operated by Denbury Onshore, LLC, near Natchez, Mississippi. This project was the first of the RCSPs to begin CO<sub>2</sub> injection and the first to monitor a one million metric ton injection. As of June 2012, the SECARB team has monitored the injection of over 5.7 million metric tons of CO<sub>2</sub>. Data collected at Cranfield is utilized by SECARB and researchers worldwide to further refine reservoir models for similar geologic settings. Additionally, the partners have evaluated multiple MVA technologies to determine their commercial viability in a CO<sub>2</sub> injection setting. In 2010, the international Carbon Sequestration Leadership Forum recognized the Early Test project at Cranfield for its outstanding accomplishments in advancing CCS MVA technologies.

Information from the Early Test is being applied at the Anthropogenic Test, where CO<sub>2</sub> injection began on August 20, 2012. This accomplishment marks another significant milestone for the team as it establishes the world's first fully integrated CCS project utilizing



Southeast Regional Carbon Sequestration Partnership

anthropogenic (man-made) CO<sub>2</sub> from a coal-fired power plant. Under separate funding, the CO<sub>2</sub> is captured at Alabama Power Company's James M. Barry Electric Generating Plant located in Bucks, Alabama. The CO<sub>2</sub> is transported 12 miles by pipeline and permanently stored within a deep saline formation at the Citronelle oilfield operated by Denbury. Over 100,000 to 150,000 metric tons of CO<sub>2</sub> per year will be injected for up to three years. The SECARB partners will apply proven and experimental MVA technologies to monitor CO<sub>2</sub> movement in the subsurface during and post-injection.

According to the U.S. DOE, the project "will help demonstrate the feasibility of carbon capture, utilization and storage (CCUS), considered by most energy experts as an important option for meeting the challenge of helping to reduce atmospheric CO<sub>2</sub> emissions linked to potential climate change." CO<sub>2</sub>-enhanced oil recovery (CO<sub>2</sub>-EOR) is a primary business driver for commercial CCUS deployment. An integrated system like the Anthropogenic Test is representative of the technical and business arrangements necessary for CO<sub>2</sub>-EOR operations utilizing anthropogenic CO<sub>2</sub> sources.

SECARB continues to characterize the

region's onshore and offshore geologic storage options; identify barriers and opportunities for the wide-scale construction of pipelines to transport CO<sub>2</sub> for sequestration, enhanced oil recovery and other commercial uses; monitor federal and state regulatory and legislative activities; and support education and outreach efforts related to the program.

Through a new "Knowledge Sharing" activity established in 2011, the SECARB partners are conducting multiple workshops to facilitate interaction among scientists, researchers, and industry during which lessons learned from CCS projects around the globe are shared to further advance the technologies. During this year, SSEB and its SECARB partners have sponsored an international workshop on MVA technologies involving representatives from six countries; regional workshops to identify carbon capture, utilization and storage opportunities for states along the Gulf Coast and in the Midwest-Ohio River Valley; and a technical workshop to re-evaluate CO<sub>2</sub> storage efficiency estimates.

Please visit the SECARB website at [www.secarbon.org](http://www.secarbon.org) for the current status of our projects and related activities, upcoming meetings and workshops, social media subscriptions and more.



SECARB at capture unit and CO<sub>2</sub> storage sites in AL.  
Source: SSEB



CO<sub>2</sub> capture facility at Plant Barry. Source: Southern Company



CO<sub>2</sub> pipeline extends from Plant Barry to the Citronelle oil field.  
Source: Denbury Resources Inc.



CO<sub>2</sub> injection well at Denbury's Citronelle oil field.  
Source: SSEB



International Knowledge Sharing Workshop on MVA Technologies.  
Source: SSEB

# SECARB



## SOUTHEAST REGIONAL CO<sub>2</sub> SEQUESTRATION TRAINING PROGRAM (SECARB-Ed)

Carbon capture and storage (CCS) technologies have tremendous potential for reducing CO<sub>2</sub> emissions and mitigating global climate change. These technologies encourage economic growth and have manageable influence on energy use. Deploying these technologies on a commercial scale will require expanding the workforce, including geologists, engineers, scientists, and



*Plant Barry CO<sub>2</sub> Capture Demo Unit*

technicians, trained in CCS specialties.

The U.S. Department of Energy's (DOE) National Energy Technology Laboratory (NETL) has selected seven projects to receive more than \$8.4 million in funding to help develop regional sequestration technology training centers in the United States. The majority of this funding is being provided by the American Recovery and Reinvestment Act (ARRA) of 2009.

NETL is partnering with the Southern States Energy Board (SSEB) and others, from both industry and academia, to develop the Southeast Regional CO<sub>2</sub>

Sequestration Training Program (SECARB-Ed) for the southern United States. This will establish a CCS regional training program to facilitate national and global delivery of CCS technologies. By addressing

# SECARB<sup>ED</sup>

## Southeast Regional Carbon Sequestration Technology Training Program

climate change and developing near-zero emission technologies that will significantly reduce CO<sub>2</sub> emissions from industrial plants, the project will advance the United States in its position as the leader in CCS technologies.

This year's accomplishments include eight training courses in six different states; 584 participants received training and 888 Professional Development Hours (PDHs) were awarded. Course highlights include the SECARB-Ed Flagship course in collaboration with EnTech Strategies, Research Experience in Carbon Sequestration (RECS 2012). RECS is an intensive 10-day program which is led by a world-class faculty



of CCS experts from industry, the research community, NGOs and government. It combines classroom instruction with group exercises, CCS site



## SECARB-Ed TRAINING COURSES, DATES, LOCATIONS AND PDHs AWARDED

*If no PDHs are noted then zero PDHs were awarded*

May 7, 2010 Carbon Capture and Storage-The Way Ahead at 2010 Spring Meeting of the Central Appalachian Section of SME; **West Virginia**; 60 PDHs awarded

May 25, 2010 Clean Coal Technologies Session at the Eastern Coal Council's 31st Annual Conference and Exposition; **Tennessee**; 170 PDHs awarded

October 15, 2010 Carbon Sequestration in Unmineable Coal Seams and Shale Reservoirs; **Kentucky**; 80 PDHs awarded

January 11, 2011 The Role of Carbon Capture and Storage in Rejuvenating the Energy Portfolio of the Southeastern United States; **Mississippi**; 144 PDHs awarded

March 2, 2011 Coal and Energy: Carbon Sequestration; **Colorado**; 72 PDHs awarded

March 9, 2011 CCS Technologies and Applications across the Southeast; **Georgia**; 162 PDHs awarded

March 10, 2011 CCS Projects in the Southeast; **Georgia**

March 18, 2011 CO2 Sequestration for EPA Regulators; Webinar; 325 PDHs awarded

April 7, 2011 Introduction to Carbon Sequestration; **South Carolina**; 48 PDHs awarded

May 10-11, 2011 CCS Capacity Building Workshop; **Georgia**

June 5-15, 2011 Research Experience in Carbon Sequestration (RECS) 2011; **Alabama**

September 6, 2011 World Bank CCS Training Session; **Washington DC**

September 14, 2011 SECARB-Ed CCS Training Session; **Pennsylvania**; 98 PDHs awarded

October 6-7, 2011 SECARB-Ed CCS Training Session; **Texas**; 136 PDHs awarded

October 25, 2011 SECARB-Ed CCS Training Session -USCSC; **West Virginia**

October 26, 2011 SECARB-Ed CCS Training Session -Duke Energy Seminar; **West Virginia**; 284 PDHs awarded

November 30, 2011 Is your facility carbon capture ready? Understanding the basics of carbon capture, utilization, and storage (CCUS); Webinar; 178 PDHs awarded

February 6, 2012 SECARB-Ed CCS Training Session; **Florida**; 56 PDHs awarded

March 3, 2012 Virginia Mining Association, Inc. Professional Engineers in Mining, Seminar; **Virginia**; 137 PDHs awarded

June 3-13, 2012 Research Experience in Carbon Sequestration (RECS) 2011; **Alabama**

visits and hands-on activities including: geologic storage, site characterization, CO<sub>2</sub> monitoring, modeling fluid flow in the subsurface, CCS deployment strategies and communications training. RECS 2012 was hosted by Southern Company in Birmingham, Alabama, June 3-13, 2011, in

collaboration with EnTech Strategies, SECARB-Ed and Southern Company with sponsorship from the U.S. Department of Energy, Office of Fossil Energy and National Energy Technology Laboratory.

## CLEAN COAL AND ADVANCED COAL TECHNOLOGY

The Southern States Energy Board has maintained a coal development and utilization emphasis since 1984. Increasing the use of innovative coal technologies to make coal cleaner and more efficient are the purviews of the Southern States Energy Board's Committee on Clean Coal and Energy Technologies Collaboration. This Committee is one of the Board's most active government and industry partnerships. The membership and projects of the Committee stretch across the world and include an interface with the World Energy Council and the international Carbon Sequestration Leadership Forum. This enables the Committee to pursue domestic and international policies and programs that benefit developing countries as well as the southern region.

The Southern States Energy Board Clean Coal Committee is a sponsor of the Eastern Coal Council annual meeting and the annual conference of the Gasification Technologies Council for state energy regulators. The Board also endorses and provides faculty support to the Research Experience in Carbon Sequestration and hosts an annual legislative briefing for state legislators.

Emphasis of the Committee this past year has focused on State Energy Profiles and the changing pattern of energy production, consumption, electricity use, fuels and exports across the region. Developed in cooperation with the Kentucky Department of Energy Development and Independence, this SSEB report is a current view of energy resource use in the South. Other highlights are the design



of legislation regarding carbon capture and storage of CO<sub>2</sub> and greenhouse gas legislation in the states; the development of CO<sub>2</sub> pipelines; EPA rules and regulations and their impacts on jobs and the economy; support for progress on siting and development of new power plants including Mississippi Power's Plant Ratcliffe; CO<sub>2</sub> capture and storage at Alabama Power's Plant Barry; and Dominion's Virginia City Hybrid Energy Center.

A key goal is to develop the public-private partnerships necessary to ensure a value-added energy industry. College-level education and training for coal miners and mine safety issues remain a priority.

Of increasing interest to SSEB's Committee on Clean Coal and Energy Technologies Collaboration is the role of state regulators in the planning, siting, permitting, and development of new coal power plants in the southern region. Regulatory decisions and actions impact fuel choice and the design of

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***A key goal is to develop the public-private partnerships necessary to ensure a value-added energy industry.***

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power plants throughout the South with efforts focused on the elimination of greenhouse gases and the utilization of carbon dioxide capture and storage technologies with the potential for enhanced oil and coalbed methane recovery. Educating policy makers on clean coal technologies, their reduced greenhouse gas impacts and diminished "carbon footprint" are a continued part of the Committee's agenda.

The international activities of the Committee are conducted in cooperation with the U.S. Department of Energy. This cooperative partnership examines opportunities to

export coal and clean coal technologies to developing countries in cooperation with U.S. companies interested in international business. In 2002, the Southern States Energy Board and the Industrial Estate Authority of Thailand signed a Memorandum of Agreement to explore measures to improve and enhance the economic and environmental performance of Thai industrial estates. The current agreement has led to trade missions and reverse trade missions, visits to industrial estates, cooperative ventures between U.S. and Thai partners, international conferences and workshops, and eco-industrial development proposals to turn waste streams into productive resources, providing solutions to environmental damage and stimulating markets for new products. The goal is the continued involvement of southern U.S. manufacturing and service industries in finding solutions to industrial problems through international business. During this past year, the Board provided funding and an instructor for the Asian Institute of Technology's major workshop on carbon dioxide capture and sequestration in Bangkok, Thailand.



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## EDUCATING STAKEHOLDERS

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Southern States Energy Board takes seriously its mission of outreach and education through a variety of events, conferences, workshops, panel discussions, exhibits and keynote presentations. Over the past year SSEB presented at and participated in myriad activities ranging from community discussions of residential energy efficiency applications in DeKalb County, Georgia, to key energy conversations with the Council of State Governments and the Southern Legislative Conference. Significant engagements from the past year include those listed below:

### **Southeast Biomass Partnership Conference**

*Utility Industry Perspectives on Connecting, Coordinating, Communicating and Collaborating with Key Stakeholders;*

### **Georgia Tech University Association of Environmental Engineers and Scientists**

*Policy and the Role of Hydraulic Fracturing in US Energy Supply;*

### **Rural Community College Alliance Conference**

*A New Energy Future and the Key Role to be Played by Rural Community Colleges;*

### **Gasification Technologies Council**

*Gasification: Key Future Generating Resource;*

### **West Virginia Economic Development Council**

*Looking Ahead in 2012: Energy Outlook and West Virginia;*

### **NCSL/ NARUC Carbon Capture and Sequestration Forum**

*CCS Financing and Cost Reductions for Development and Deployment;*

### **Midwestern Legislative Delegation to the Gulf Coast**

*Southern States and Carbon Dioxide for Enhanced Oil Recovery;*

### **Georgia House Natural Resources and Environment Committee Advisory Academy**

*A Regional Perspective on Energy and the Environment;*

### **US Energy Association**

*Southeast Regional Carbon Sequestration Partnership CO<sub>2</sub> Pipeline Study (with IOGCC).*

SSEB actively works with public utility commissioners in the SSEB region, as well as nationally, through NARUC. SSEB also cooperates with the utility commissioners in the Eastern Interconnection Planning Collaboration, working through a public stakeholder group to develop a robust process for studies of the electric transmission system in the East. Georgia Tech's Clean Energy Series is a monthly technical meeting of academia, engineers, entrepreneurs, public officials and during the year SSEB provided an update on Carbon Capture and Storage and how it could impact permitting, greenhouse gas emissions reductions from power plants and regulatory decision-making in southern states.



# PARTNERSHIPS

The Southern States Energy Board is able to garner expertise and leverage opportunities through its robust partnerships with government, business, industry and academia. The core of this strategy lies in the Board's Associate Members who represent the region's and nation's leading energy providers, resource companies, educational institutions and technology developers. The SSEB Associate Members program was founded in 1984 by Governor John Y. Brown of Kentucky when he was the organization's chairman.

The Associate Members provide invaluable expertise and advice regarding critical energy policy including the social and economic aspects of state and federal legislation and its effects on the member states and territories. As a result, the Associate Members offer policy recommendations for the Board's consideration each year. These resolutions span a breadth of issues considered relevant and critical to the SSEB member states.

SSEB's dual purpose of blending policy with advancing clean energy technologies creates numerous opportunities to work with the national energy laboratories. The National Energy Technology Laboratory (NETL) is the prime research arm of the U.S. Department of Energy for fossil energy. SSEB works closely with NETL in achieving national and international goals in carbon management. The Southeast Regional Carbon Sequestration Partnership (SECARB) is a stellar example of the collaboration of government, industry, non-governmental organizations and academia to achieve specific goals. The \$300 million project that began in 2003 includes the nation's primary integrated demonstration of carbon capture, transportation and storage with the potential for enhanced oil recovery.

Besides its work with NETL, SSEB has a strong partnership with the Lawrence Livermore National Laboratory (LLNL) and its Laser Inertial Fusion Energy National Ignition Facility (LIFE/NIF) project.

Fusion energy is reaching a turning point, as the NIF at LLNL is poised to demonstrate fusion with energy gain, or ignition in the near future. Once ignition is accomplished, the LIFE effort will provide a blueprint on progressing from scientific feasibility to commercial fusion energy. SSEB serves on the LIFE Industry Stakeholder Advisory Board.

In addition to the NETL and LLNL partnerships, SSEB has a long-standing relationship with the Oak Ridge National Laboratory (ORNL). Currently, SSEB is a Contributing Partner on the Consortium on Advanced Simulation of Light Water Reactors (CASL). Contributing Partners are chosen based on their technical expertise in the field of nuclear energy and the ability to bring world-class technical insight to CASL's industry challenge problems. The Consortium connects fundamental research and technology development through an integrated partnership of government, academia and industry that extends across the nuclear energy enterprise.

SSEB maintains several special partnerships that advance energy resource development and regulatory issues. A long-standing partnership with the Eastern Coal Council (ECC) has produced opportunities for joint meetings and sponsorship of ECC's annual meeting. In addition, collaboration with the Gasification Technologies Council has generated annual conclaves for state economic and environmental regulators to study the advantages of emerging gasification plants throughout the country.

Through the U.S. Department of Energy's Office of Clean Energy Collaboration and the U.S. Energy Association, the Board became a founding stakeholder in the Carbon Sequestration Leadership Forum (CSLF) in 2003. The policy and technical forums further international cooperation and understanding of carbon capture, utilization and storage, legal and regulatory issues, intellectual property and myriad related issues. The CSLF recognized SSEB's SECARB Partnership as



an international program of excellence.

These are only a few examples of the collaborative efforts of the Southern States Energy Board. Building partnerships is an essential goal of the Board in order to leverage opportunities and expand its reach to assist its member states. These collaborations allow SSEB to increase its program and financial commitments to the benefit of the entire southern region.

To foster regional cooperation and collaboration, the Board continues a strong working relationship with other regional organizations such as the Southern Governors' Association, the Southern Legislative Conference and the Southern Growth Policies Board. SSEB works to foster on-going relationships with other regional organizations with similar goals.

# SOURCES OF SUPPORT

The Southern States Energy Board's core funding comes from annual appropriations from the 18 member states and territories. Each member's share is computed by a formula written into the original Compact. This formula is comprised of an equal share, per capita income and population. The Board has not requested an increase in annual appropriations in more than 25 years. The Compact authorizes the Board to accept funds from any state or federal agency, interstate agency, institution, person, firm or corporation provided those funds are used for the Board's purposes and functions. This year, additional support was received for research projects from grants and cooperative agreements from the U.S. Department of Energy and through the American Recovery & Reinvestment Act of 2009 (ARRA).

Additionally, the SSEB Carbon Management Program/Southeast Regional Carbon Sequestration Partnership's Industry Associates provide an annual monetary contribution to support the SECARB Program. Allocation of these contributions is at the discretion of the Southern States Energy Board to support the

carbon management initiatives and programs. Industry Associates receive updates on current activities and progress made on SECARB projects, as well as participation in an annual stakeholder meeting. For a current list of industry associates, as well as all team members, please visit [www.secarbon.org](http://www.secarbon.org).

<i>STATE APPROPRIATIONS</i>	<i>FY 2012</i>
<i>Alabama</i>	<i>\$32,572</i>
<i>Arkansas</i>	<i>\$31,027</i>
<i>Florida</i>	<i>\$47,212</i>
<i>Georgia</i>	<i>\$35,782</i>
<i>Kentucky</i>	<i>\$32,197</i>
<i>Louisiana</i>	<i>\$33,817</i>
<i>Maryland</i>	<i>\$37,192</i>
<i>Mississippi</i>	<i>\$29,077</i>
<i>Missouri</i>	<i>\$36,247</i>
<i>North Carolina</i>	<i>\$37,042</i>
<i>Oklahoma</i>	<i>\$32,512</i>
<i>Puerto Rico</i>	<i>\$25,597</i>
<i>South Carolina</i>	<i>\$31,372</i>
<i>Tennessee</i>	<i>\$34,267</i>
<i>Texas</i>	<i>\$55,402</i>
<i>U.S. Virgin Islands</i>	<i>\$25,297</i>
<i>Virginia</i>	<i>\$38,362</i>
<i>West Virginia</i>	<i>\$28,732</i>



# SSEB PHOTO OP 2011-2012



Rep. Rocky Adkins, KY



Gov. John Hickenlooper  
CO

Gov. Mary Fallin and  
Sec. Mike Ming, OK



Dr. Leonard Peters  
KY Energy and  
Environment  
Cabinet Secretary

Sec. Mike Ming  
OK Secretary of Energy



Paul Koence  
Dominion Virginia Power



Ken Nemeth  
SSEB

Hon. Christine Todd Whitman  
The Whitman Strategy Group



Charles McConnell  
U.S. DOE  
Office of Fossil Energy



Gary Spitznogle  
American Electric Power



Mr. Nick Akins, AEP

Sen. Eddie Joe Williams  
AR



Gov. Robert McDonnell and Rep. Morgan Griffith, VA



Vello Kuuskraa  
Advanced Resources  
International, Inc.



Herbert Wheary, Dominion  
Resources; Dr. Michael  
Karmis, VA Tech; and  
Dr. Gerald Hill, SSEB



Rep. Micky Hammon  
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Randy Eminger  
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Jimmy Keeton  
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Rep. Gary Staples, MS, and Rep. Randy Davis, AL



Del. Sally Jameson, MD



Robert Mannes  
Core Energy, LLC

Mike Smith  
Interstate Oil & Gas  
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Michael Moore  
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Vello Kuuskraa  
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Sen. Mark Norris and Rep. John Ragan, TN



Sen. Bob Rucho, NC, and Sen. John Watkins, VA



Gov. Luis G. Fortuño and Lt. Gov. Kenneth McClintock, Puerto Rico



Rep. Micky Hammon, AL

Rep. Evelyn Smith, GA

Sen. Cam Ward, AL



Calvin Dooley, American Chemistry Council



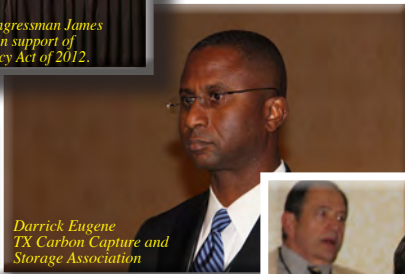
Sec. Mike Ming at the hearing where Congressman James Lankford, OK, spoke on the House floor in support of H.R. 5872, the Sequestration Transparency Act of 2012.



U.S. Senator Joe Manchin, II, WV



John Caldwell and Brian McCormack, Edison Electric Institute



Darrick Eugene, TX Carbon Capture and Storage Association



Mr. Jose Rafael Diaz, PR



William Bryson, U.S. DOE



Rep. Rocky Adkins, KY; Rep. Myra Crowner, TX; and Patrick Raffaniello, Raffaniello & Associates



Cheri Collins, Southern Company



Barry Smitherman, Railroad Commission of TX



Rep. Bill Sandifer, SC

Rep. Chuck Martin, GA



Hugo Hodge, Jr., Virgin Islands Water and Power Authority; Jim Burwell, SCANA Corp.; and Karl Knight, Virgin Islands Energy Office

# PUBLICATIONS



*\*\*View additional publications at [www.sseb.org/reference.php](http://www.sseb.org/reference.php)*



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