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## Advancing Coal Research and Development for a Secure Energy Future

Witnesses
Scott Klara
Deputy Lab Director, National Energy Technology Laboratory, Department of Energy
Janet Gellici
Chief Executive Officer, American Coal Council
Nick Akins
President, American Electric Power
David Foerter
Executive Director, Institute of Clean Air Companies
Stu Dalton
Senior Government Representative, Generation, Electric Power Research Institute

Subcommittee Members Present Andy Harris (R-MD), Chairman Brad Miller (D-NC), Ranking Member Roscoe Bartlett (R-MD) Randy Neugebauer (R-TX)

On October 13, 2011 the House Committee on Science, Space, and Technology Subcommittee on Energy and Environment held a hearing to discuss research and development (R&D) of technologies to reduce carbon emissions from coal-fired power plants. Chairman Andy Harris (R-MD) acknowledged in his opening statement that, although coal provides the U.S. with 45% of its electricity consumption in a "plentiful, affordable, and reliable" manner, it suffers from a negative reputation. Harris chided the Environmental Protection Agency's (EPA) coal regulations, saying that they might force coal production into retirement. Considering the unlikelihood of a cap and trade economy, Harris asked whether it was logical for the Department of Energy (DOE) to continue allocating so much of the coal R&D funding in the Office of Fossil Energy budget to carbon capture and sequestration (CCS). He told the witnesses that he hoped to learn more about the "status of, outlook for, and lessons learned from" the \$3.4 billion used to fund CCS projects in the American Recovery and Reinvestment Act of 2009 (P.L. 111-5). Ranking Member Brad Miller (D-NC) followed by saying, "To have a strong economy we do not have to sacrifice cleaner air and a healthier and more productive workforce." He chastised his Republican colleagues for frowning upon DOE funding for renewable energy R&D, when just about every other energy source has received government support, including coal. Miller pointed out that he was curious about the financial interests of the witnesses, but said he would not spend his 5 minutes of questioning on that subject.

Scott Klara said in his testimony that DOE's Clean Coal Program is currently pursuing cost minimization of CCS technologies and improvements for fossil energy systems, and the agency has created Regional Carbon Sequestration Partnerships with 400 companies that focus on the geologic storage of greenhouse gases (GHG). He noted that DOE's Interagency Task Force on Carbon Capture & Storage concluded that CCS has "no insurmountable technological, legal, institutional, regulatory, or other barriers from playing a role in reducing GHG emissions," but suffers from cost-ineffectiveness compared to other technologies. He said that the advanced coal technology program, which can be traced back to three out of every four coal-burning power plants in the U.S., is tackling the challenges to achieve cost-effective deployment of CCS.

Janet Gellici of the American Coal Council said that the U.S. has more recoverable coal resources than any other country in the

world, amounting to about 200 years of energy production. She also said the U.S. has the "loftiest" environmental goals in the world. She stressed, however, that we don't have to pick one over the other; she encouraged "bridging" these two facts. She recommended that R&D funding focus on higher efficiency technologies, reducing capitol costs, and increasing commercial availability of technology solutions.

Nick Akins of American Electric Power (AEP) spoke of the J.W. Turk Plant in Arkansas, the country's first power plant equipped with "ultra-supercritical technology," a high efficiency design that uses less fuel per megawatt hour of electricity and emits significantly less GHG. He also announced the completion of the world's first integrated CCS project, technology that has not yet been commercially deployed and needs DOE's continued funding support, at an existing coal-fired power plant. AEP, according to Akins, believes that the regulations being pursued by EPA will have "damaging impacts" on the reliability of America's electric system, such as premature plant retirements and over one million jobs lost in the country. He supports a more "reasonable" approach to energy and environmental policy, and encourages DOE to act as a "trusted advisor" to EPA by performing a thorough analysis of their rules impacts.

David Foerter of the Institute of Clean Air Companies (ICAC) acknowledged the importance of R&D support to improve energy technology developments, yet he argued that such technological improvements and commercial offerings must be "fostered" by a market with clean air regulations and policies. Foerter said that while CCS has large initial hurdles to overcome on its way to commercial deployment, the rewards will "be great." This is especially important, according to Foerter and ICAC, because they are "aware of no energy 'map' that does not include fossil fuels, particularly coal, as being essential to a load following, demand responsive, reliable energy strategy."

Stuart Dalton of the Electric Power Research Institute (EPRI) listed three main areas that are not sufficiently covered by the current DOE coal R&D funding: ultra-high-efficiency steam cycles based on American advanced alloy steels, improved water management at power plants, and "workable solutions" to proposed hazardous air pollutants emission standards. Dalton stressed that these areas have been identified by EPRI as "necessary to augment, not supplant" DOE's current programs focusing on CCS technology.

When asked by Chairman Harris about the amount of DOE funding from the first stimulus bill, Klara replied that \$3.4 billion was dedicated to the projects but only \$500 million has been spent thus far. Harris also inquired about the extra costs for building new supercritical power plants and potential increases in electricity costs from these plants. Klara responded that the supercritical plants cost about \$600 million more than conventional plants, but do not incur any noticeable energy price increases.

Miller asked Dalton why the coal industry is not capable of funding its own R&D for more efficient technologies. Dalton replied that moving to a commercial scale with a new technology requires "an additional order of magnitude" of funding, which intrinsically needs some sort of allocation and legislation from the government. Miller expressed a worry that such government support would crowd out private investment, but the panel felt it would enhance the partnerships with private investors.

Roscoe Bartlett (R-MD) asked Gellici if the American Coal Council's prediction for 200 years worth of coal energy assumed current energy consumption rates. She replied that, while the 200 year value was calculated with current energy consumption in mind, the American Coal Council does expect a 25 percent increase in energy use. Bartlett asked for a slide to be displayed to the panel, at which point he told Gellici that a mere two percent increase in energy consumption would decrease our energy supplies four-fold by 200 years, and encouraged her to reevaluate her calculations considering her estimate of a 25 percent increase. Randy Neugebauer (R-TX) called EPA's extensive air quality regulations "EPA's war on energy, which is really the President's war on energy." When asked about the effect of EPA regulations on energy reliability, Dalton told Neugebauer that it takes approximately five years to install a scrubber in an existing coal-fired power plant and that EPRI is dealing with "serious reliability issues" due to EPA's rules and regulations.

During a second round of questioning, Harris asked Klara where the unspent money would go if the DOE projects were not successful. Klara assured the Chairman that the money would be sent to the U.S. Treasury. Harris inquired about the practicality of allocating funding for CCS research given an absence of a cap and trade program in the country. Foerter said that there is "no structure for power plants to be built without considerations for carbon." He mentioned that retrofitting existing power plants with CCS technology would require an upfront cost but would also provide an upfront and lasting carbon benefit. Miller then asked

Foerter about the potential coal power plant retirement rates assuming EPA's regulations are successful. Foerter said that the energy production would be lowered from about 68 to 40 megawatts per hour, which in his opinion "is not much of a difference," because many of those units are planned to retire anyway. Harris concluded the hearing by asking the entire panel what aspect of coal research should receive the next-greatest attention, behind CCS. The witnesses agreed that DOE's focus should be directed at water management and efficiency improvements.

Complete opening statements, witness testimonies, and an archived webcast can be found on the House Committee on Science, Space, and Technology web site.