

**Statement of
Charles D. McConnell
Assistant Secretary for Fossil Energy
U.S. Department of Energy
Before the
Subcommittee on Energy and the Environment
Committee on Science, Space, and Technology
U.S. House of Representatives**

May 10, 2012

Chairman Harris, Ranking Member Miller, and members of the Subcommittee, I appreciate the opportunity to discuss the role that the Department of Energy's Office of Fossil Energy continues to play in the safe and responsible development of the Nation's unconventional fossil resources.

As you know, in March 2011, the President laid out a specific goal for our Nation: to reduce imports of oil by a third over the next 10 years. This is a goal that we can and must achieve. Reducing our imports will reduce our vulnerability to international oil prices, and create new jobs. And the development of all sources of American energy – including unconventional oil and gas – will support this goal.

In fact, we are already making progress. Since 2008, U.S. oil and natural gas production has increased each year. In 2011, U.S. crude oil production reached its highest level in eight years. Natural gas production grew in 2011 as well – the largest year-over-year volumetric increase in history. Overall, oil imports have been falling since 2005, and our dependence on imported oil declined from 57 percent in 2008 to 45 percent in 2011 – the lowest level since 1995.

Challenges and Opportunities

The safe and responsible development of unconventional domestic natural gas resources production creates jobs and provides economic benefits to the entire domestic production supply chain, as well as to chemical and other manufacturers, who benefit from lower feedstock and energy costs. By helping to power our transportation system, greater use of natural gas can also reduce our dependence on oil. And with appropriate safeguards, natural gas can provide a cleaner source of energy than other fossil fuels. For these reasons, it is vital that we utilize our unconventional natural gas resources, while giving American families and communities confidence that natural and cultural resources, air and water quality, and public health and safety will not be compromised.

Indeed, this is a period of great opportunity for the prudent development of our Nation's oil and gas resources. Expanding production of American energy resources is a key part of President Obama's all-of-the-above energy strategy that includes renewables, nuclear *and* fossil resources. But to get these benefits we're going to have to do this right.

Proposed Research

As the United States continues to expand domestic natural gas and oil production, it is critical that the public have full confidence that the right safety and environmental protections are in place – guided by the best available science.

Historically, the Department of Energy has played a critical role in the development of technologies that have enabled the Nation to expand development of our energy resources. In fact, between 1978 and 1992, public research investments managed by the Department led to the breakthroughs in hydraulic fracturing and extended horizontal laterals that spurred private sector investments and industry innovation, unlocking billions of dollars in economic activity associated with shale gas. As the President noted in his State of the Union address and as others in industry as well as academia have confirmed, the domestic shale gas boom we see today demonstrates that government support can be critical in helping businesses get new energy ideas off the ground.

Today, we apply that lesson to other nascent technologies like wind and solar, and, within my office, to clean coal and other sources of clean domestic energy. For example, to support the economics of carbon capture and storage (CCS) technology – which captures CO₂ from industrial facilities and power plants; compresses it to liquid form; transports it to an appropriate location; and then injects it into suitable geological formations for permanent storage underground – we are exploring ways to use the off-take from CCS projects to be treated as an asset instead of waste. To this end, the Department is including enhanced oil recovery utilizing carbon dioxide (CO₂-EOR) in its portfolio of CCS projects. Geologically complex oil reservoirs with large volumes of residual oil will benefit the most from next generation technology. DOE's role here is to move forward on the goals of the carbon capture program for lowering the cost of capture and continue to develop the technology and methods to measure, monitor, and verify that the carbon is sequestered in place. The fact that these projects can be done at lower cost makes them more attractive to the program, and related work on saline aquifers will continue.

Of course, just as we continue to support public research to explore new opportunities, we must address the technical challenges that remain with the resources being developed today. For instance, concerns about how to safely and prudently develop unconventional shale gas and tight oil resources have received a great deal of attention, and the Department, in collaboration with other Federal agencies, will conduct research to address those concerns and will quantify the risks inherent in the production of these resources. By doing so, we can help ensure that subsequent regulations at the State and Federal levels, as well as voluntary action by industry, will effectively mitigate the risks that have been scientifically quantified.

On April 13, 2012, the President signed an Executive Order creating a new Interagency Working Group to Support Safe and Responsible Development of Unconventional Domestic Natural Gas Resources. On the same day DOE, the Environmental Protection Agency, and the Department of the Interior's U.S. Geological Survey signed a related Memorandum of Agreement initiating a Multi-Agency Collaboration on Unconventional Oil and Gas Research.

FE's Natural Gas Technologies Program will be refocused to carry out this R&D initiative. The objective of this collaborative effort is to better understand and address the potential

environmental, health, and safety impacts of natural gas development through hydraulic fracturing. Through the collaboration, a robust Federal R&D plan will be developed, taking into account the recommendations of the Secretary of Energy Advisory Board (SEAB) Natural Gas Subcommittee. DOE's role in this initiative will focus on priorities identified by the interagency collaboration in a research plan to be formed over the next nine months within its area of core research competencies, including wellbore integrity, flow and control; green technologies; and systems engineering, imaging and materials. While this R&D is focused on addressing issues surrounding shale gas, many of the environmental mitigation efforts we are pursuing are also applicable to the growing shale oil production.

DOE Capabilities and Expertise

Practices employed by companies engaging in exploration and production evolve rapidly. An understanding of these technologies and practices is critical if the Federal Government is to accurately quantify the risks of these activities. DOE has research experience and capabilities in drilling, production, and environmentally sustainable technologies, as well as imaging, materials, earth science and engineering.

DOE capabilities include experience and expertise in quantifying, evaluating and mitigating potential risks resulting from the production and development of the shale gas resources, to include multi-phase flow in wells and reservoirs, well control, casing, cementing, drilling fluids, and abandonment operations. DOE has experience in evaluating seal-integrity and wellbore-integrity characteristics in the context of protection of groundwater.

DOE has experience and expertise in the development of a wide range of new technologies and processes that reduce the environmental impact of exploration and production, such as flowback water treatment processes and water filtration technologies. Data from these research activities assists regulatory agencies in making a science-based cost-benefit analysis of requiring producers to adopt new technologies to mitigate environmental risks.

DOE specializes in the development of complex engineered systems, high speed computing and predictive modeling, and has experience in quantifying and mitigating low-frequency, high-impact risks. This includes evaluating human factors that potentially contribute to failures. DOE has developed and evaluated novel imaging technologies for aerial magnetic surveys for the detection of unmarked abandoned wells, and for detecting and measuring fugitive methane emissions from exploration, production, and transportation facilities.

DOE also has experience in understanding fundamental interactions caused during the drilling process, such as the "equation of state" research that investigates the relationship between pressure, temperature, and viscosity of multi-phase fluids at the high temperatures and pressures associated with deep drilling and hydraulic fracturing. DOE's experience in engineered underground containment systems for CO₂ storage brings capabilities that are relevant to the challenges of safe shale gas production, such as evaluating cement-casing integrity in corrosive environments.

Conclusion

The Department of Energy is committed to developing the science and technology that will allow the Nation to use its abundant fossil energy resources in a way that balances the energy needs for sustaining a robust economy with continued environmental responsibility. As we move forward on a multi-agency, collaborative research program with DOI and EPA into understanding and minimizing the unwanted consequences of unconventional fossil resource development, the Office of Fossil Energy will pursue its mission with the same commitment to excellence and innovation.

Mr. Chairman, this completes my prepared statement. I would be happy to answer any questions you or other members of the committee may have at this time.