



AMERICAN ASSOCIATION OF PETROLEUM GEOLOGISTS

Geoscience & Energy Office – Washington, D.C.

Written testimony submitted to:
**Senate Appropriations Subcommittee on
Energy & Water Development**
in support of Department of Energy programs

by

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To the Chair and Members of the Subcommittee:

Thank you for this opportunity to provide testimony on the importance and need for strong federal R&D efforts in the fields of oil and natural gas, coal, and geothermal technologies. These activities reside in the U.S. Department of Energy's fossil energy program (oil, natural gas, coal) and energy efficiency and renewable energy program (geothermal). They are an essential investment in this nation's energy security.

The American Association of Petroleum Geologists (AAPG) is the world's largest scientific and professional geological association. The purpose of AAPG is to advance the science of geology, foster scientific research, and promote technology. AAPG has nearly 34,000 members around the world, with roughly two-thirds living and working in the United States. These are the professional geoscientists in industry, government, and academia who practice, regulate, and teach the science and process of finding and producing energy resources from the Earth.

AAPG strives to increase public awareness of the crucial role that geosciences, and particularly petroleum geology play in energy security and our society.

Our members have a big job. Fossil fuels supply 87% of the world's total energy needs, down only 4% in the past quarter century. Transportation represents about 30% of end use demand and is dominated by liquid fuels derived from oil. Heating is another 30% and dominated by oil and natural gas. Electricity represents the remaining 40% with a broadening portfolio of fuel sources. Coal, nuclear, and natural gas currently dominate electricity production, but alternatives like wind are growing rapidly. However, because electricity demand is also growing, alternatives remain a small fraction of total production.

Today's energy debate is often framed as a choice between fossil fuels or alternative (non-fossil) fuels, or between fossil fuels and the environment, but these are red herrings. Sustaining a healthy U.S. and global economy, and thus enabling substantial investment in our environment, requires a stable and continuous supply of fossil fuels while simultaneously developing and expanding alternative and new fuels. This is the bridge to our energy future. We need both, and

the process of building this bridge will take 25 to 40 years, perhaps longer. Our nation's energy policies and investments must reflect this reality.

For example, President Obama's FY2010 budget includes the rollback of a series of tax provisions currently available to the oil and gas industry, which is dominated today by the U.S. independent producer. It also proposes assessing new fees and taxes on oil and natural gas producers, and repealing the ultra-deepwater and unconventional research programs.

Compounded by a weak economy and limited access to capital, these proposed policies on top of an already heavily taxed industry would have a chilling effect on oil and natural gas drilling, production, and energy investment in this country, cost many jobs, and directly undermine U.S. energy security.

The U.S. tried this experiment from 1980-88 with the windfall profits tax which, compounded with the drop in price of oil in the 80's, had a disastrous effect on drilling, industry employment and U.S. energy production for nearly two decades to follow. We face a very similar price situation now and cannot afford to repeat an experiment that has already been tried and failed.

These either/or policy choices fail to recognize that as we bridge to an alternative energy future, we must preserve and even strengthen the fossil energy foundation underlying it. Research and development investments are critical to developing alternative and new fuel sources, but are also needed in fossil energy to develop the science and technology to ensure their future availability.

Oil and natural gas technologies programs

The oil and natural gas technology research programs at DOE have received grossly inadequate appropriations for many years. In fact, in FY09 federal oil and natural gas R&D represented a miniscule proportion of total energy R&D expenditures, while, ironically, oil and natural gas combined contribute 65% to our nation's energy portfolio.

President Obama's FY10 budget request continues this ill-advised pattern by proposing to eliminate DOE's petroleum-oil technologies program, funded at \$5 million in FY09, and increasing by \$5 million the natural gas technologies program (for a total program of \$25 million) to study natural gas hydrates.

Instead, these programs should be increased substantially to ensure the technology will be available to find, develop, and produce these natural resources.

Criticisms of these research programs are frequently couched in terms of "corporate welfare" or a notion that the private sector should support all oil and natural gas research on its own. But these charges reveal a fundamental misunderstanding of several important trends:

1. The transition to non-fossil fuel alternative energies will take much longer than a few decades. Alternatives are currently more expensive, less reliable and simply cannot meet the scale of energy demand. To try to force the U.S. on a different course than the rest of the world, at a cost of literally trillions of dollars, will disadvantage the U.S. at a minimum and worse further hurt the U.S. economy.

2. Increasingly, domestic oil and natural gas production is shifting to non-traditional (unconventional) resources, such as the Barnett Shale in Texas or the Bakken formation in the Williston basin. These resources are different from the conventional resources of the past and hold great promise, but realizing that potential requires significant R&D and technology development. Each resource has unique challenges and if the U.S. is to leverage their global potential it must invest accordingly and substantially.
3. Over the past decade the U.S. has added substantial natural gas reserves with a net increase on the order of 15 trillion cubic feet (TCF) in the past three years owing to drilling and expansion of shale gas. Proven reserves of dry natural gas, including Prudhoe Bay, are about 300 TCF. Natural gas resource estimates are 6-7 times the proven reserves. U. S. domestic production of dry natural gas in 2008 was 20.6 TCF. Natural gas is the largest source of domestically produced energy, slightly greater than coal, substantially greater than oil, nuclear, and all other sources. With the proper incentives, and combined with a commitment to LNG, natural gas could support all of the demand growth in power generation needed for several decades. Such a shift in the fossil fuel mix would have a very positive impact on reducing CO₂ emissions growth.
4. The U.S. oil and gas industry is in decline. Many of the top public companies that built the U.S. energy advantage no longer exist. Such names as Mobil, Amoco, Texaco, Phillips, Unocal, Arco, Kerr McGee and others are gone as the result of mergers and acquisitions. This decline has not stopped. All combined public companies control less than 10% of the world's oil and natural gas reserves; the remainder is controlled by national oil companies (NOCs), many of them OPEC nations. These NOCs are now leasing up resources globally and will become the international oil companies of the future.
5. Domestic oil and natural gas resources are increasingly developed by independent producers, ranging from individuals to large companies. They do not have the capacity or resources to conduct independent research. They have, however, been willing and able to quickly adopt and commercialize new technologies when appropriate technology transfer occurs.
6. Federal R&D has historically provided support for the nation's universities and colleges, which have proven to be a rich source of technological innovation. But as federal support for oil and natural gas technologies has waned, so has the ability to conduct this type of research and train the next generation of U.S. scientists and engineers. This trend is particularly worrisome, because developing nations are investing significantly in fossil energy research and development and U.S. universities are now heavily enrolled by non U.S. students.

Given the important role that oil and particularly natural gas currently play in our energy portfolio, we must rebuild and expand the nation's federal R&D and training capacity for oil and natural gas through a partnership of government, academia, and industry. These and other trends demonstrate the need for a robust federal oil and natural gas program, one that is funded on the scale of coal, nuclear and alternatives.

We request the Subcommittee on Energy & Water Development and Related Agencies appropriate \$500 million for oil and natural gas technology programs to be administered by the Department of Energy's Office of Fossil Energy to support research projects that target increased production of domestic oil and natural gas resources.

Coal program

The nation's coal resource is vitally important to U.S. energy security. AAPG supports significant research and development funding for coal, including clean coal technologies such as carbon capture and sequestration. We support the funding provided in the American Recovery and Reinvestment Act of 2009 for coal research, and encourage Congress to sustain this commitment in its FY2010 appropriations by funding at FY2009 levels or higher.

Again, these investments must be balanced. In evaluating the DOE coal program, I urge you to review the findings of the National Academy's report entitled Coal: Research and Development to Support National Energy Policy, released in June 2007. The study finds that while there are significant uncertainties in U.S. coal reserve and resource estimates, there is sufficient coal at current consumption to last for more than 100 years.

However, there is a real need for more "upstream" coal research to increase our understanding of the nation's resource base. They observe that currently, over 90% of federal R&D spending for coal is on the "downstream" side, focused on utilization, carbon capture and sequestration, and transport and transmission. Only 10% goes to resource and reserve assessment, mining and processing, environment/reclamation, and safety and health.

AAPG supports the \$3.4 billion for coal R&D provided in the American Reinvestment and Recovery Act of 2009, and **supports President Obama's FY10 request of \$404 million.**

Geothermal energy technologies program

Geothermal energy is an important alternative energy resource that provides baseload power to the nation's electrical grid. Significant expansion of geothermal power production may be possible through the development of enhanced or engineered geothermal systems, but developing and proving these technologies will require R&D investment.

AAPG supports the \$400 million for geothermal energy R&D and deployment in the American Reinvestment and Recovery Act of 2009. **AAPG supports President Obama's FY10 request for \$50 million for this program, and encourages Congress to appropriate at this level.**

Summary

Thank you for the opportunity to present this testimony to the Subcommittee. Building a bridge to our energy future requires significant investment in new and alternative energy and fuel sources, but it also requires significant R&D investment in fossil fuels, the foundation of our global energy system, to ensure an orderly transition.

AAPG's Geoscience and Energy Office – Washington, D.C. would be pleased to provide additional information. You can contact the office at 202-684-8225, fax 703-379-7563, or 4220 King Street, Alexandria, VA 22302.