



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, gas, coal) and energy efficiency and renewable energy program (geothermal). They are an essential investment in this nation's energy security.

AAPG, an international geoscience organization, is the world's largest professional geological society representing over 32,000 members. The purpose of AAPG is to advance the science of geology, foster scientific research, promote technology and advance the well-being of its members. With members in 116 countries, more than two-thirds of whom work and reside in the United States, AAPG serves as a voice for the shared interests of energy geologists and geophysicists in our profession worldwide. Included among its members are numerous CEOs, managers, directors, independent/consulting geoscientists, federal and State regulators, educators, researchers and students.

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

The National Petroleum Council notes in its 2007 study, *Hard Truths: Facing the Hard Truths about Energy*, that oil and gas demand will not abate anytime soon. Aggregating data from multiple oil and gas demand predictions, they report: U.S. oil demand in 2030 will be 22 to 30 million barrels per day, up from 19 million in 2000, and U.S. natural gas demand in 2030 will be 25 to 30 trillion cubic feet (TCF), up from 21 TCF in 2000.

Similarly, the Energy Information Administration¹ (EIA) projects electricity demand between 2006 and 2030 to grow from 3,814 billion kilowatt hours to 4,974 billion kilowatt hours in 2030.

¹ Statement of Guy Caruso, Administrator, Energy Information Administration before Senate Committee on Energy and Natural Resources, March 4, 2008. (<http://www.eia.doe.gov/oiaf/aeo/pdf/caruso030408.pdf>)

Meeting the nation's growing energy needs is a challenge that requires the combined efforts of the public and private sector. It means fostering energy development that is economically sustainable, environmentally responsible, and grounded in the reality of continued technological advances and innovation of the science and engineering community, rather than political rhetoric. Fossil fuels will be the foundation for the nation's energy needs for the foreseeable future, bolstered by significant growth in renewable and other energy sources. A broadly diverse supply of energy sources is an important ingredient of energy security.

Oil and natural gas technologies programs

The oil and natural gas technology programs at DOE have received low appropriations levels in recent years. Yet a robust federal petroleum R&D effort is an essential part of dealing with overheated energy markets by boosting domestic production through development and application of new technologies. For example, according to the Texas Railroad Commission, cumulative production of natural gas from the Barnett Shale in Texas through 2006 was 2.6 TCF of gas with more than 93% of that volume produced since 2000. This is a direct result of the innovative application of technology by the independent oil and gas producers. The Department of Energy's programs assisted with the development and deployment of these technologies.

It is important to understand the nature of the domestic petroleum industry. The dominant domestic players are not the major integrated oil companies, but rather independent oil and gas producers. According to a recent article in *The American Oil and Gas Reporter*, independents "develop 90% of domestic oil and gas wells, produce 68% of oil, and 82% of domestic natural gas."²

These independents run the gamut from large corporations to individuals with a few employees. Regardless of size, however, they do not have the capacity to conduct independent research and development. But they can quickly adopt new technologies to increase domestic production.

Federal oil and natural gas research efforts should include all aspects of exploration and production. This includes traditional basin and resource evaluation, technologies to improve recovery efficiencies, as well as nontraditional resource and reservoir types.

We request the Subcommittee on Energy & Water Development appropriate \$60 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 President's FY2009 budget request for coal was 25% over FY2008 appropriations. This increase recognizes the importance of the nation's coal resource, particularly for base-load power generation.

In evaluating this 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

² Cole, L. and G. Ames III (2008) Full Slate of Technologies – Vital for New Frontiers, Legacy Production. *The American Oil and Gas Reporter*, January 2008 (http://www.pttc.org/aogr_columns/AOGR_special_0108.pdf)

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 until 2030, and likely 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.

Geothermal energy technologies program

For the first time in several years the President’s budget recommends a robust funding level for geothermal technology development: \$30 million in FY2009. AAPG requests that the Subcommittee appropriate this level of funding for geothermal technology development.

The EIA projects a 100% increase in geothermal energy production from 15 to 31 billion kilowatt hours between 2006 and 2030.³

Long term the potential looks even greater: Jeff Tester of MIT and a panel of scientific experts suggest that “[w]ith a reasonable investment in R&D, EGS [Enhanced Geothermal Systems] could provide 100 GW_e or more of cost-competitive generating capacity in the next 50 years.”⁴

Training the next generation of energy workers

These technology programs not only provide the nation with the ability to harness domestic energy sources, they also play an important role in training the next generation of scientists and engineers.

At the university level much of the federal support for science comes in the form of competitive research funding. This funding provides direct benefit to society by enhancing our understanding of the natural world and developing new technologies. The second, no less direct, benefit is that these funds provide research support for faculty, graduate research opportunities, and the means to develop and maintain laboratories and instruments to conduct this research.

The petroleum industry illustrates the point: According to U.S. Department of Labor estimates, over 50% of the U.S. technical energy workforce will retire in the next fifteen years. The NPC 2007 study concurs, stating that “Nearly half of the personnel in the U.S. energy industries will be eligible for retirement within the next ten years, and fewer people have entered the workforce over the past generation.” And it isn’t just industry that is facing the challenge. Faculty members fit the same demographic as their industry colleagues, and there are insignificant replacements in the pipeline to teach and train future petroleum industry workers.

³ Statement of Guy Caruso, Administrator, Energy Information Administration before Senate Committee on Energy and Natural Resources, March 4, 2008. (<http://www.eia.doe.gov/oiaf/aeo/pdf/caruso030408.pdf>)

⁴ Tester, J.W. *et al.* (2007) The Future of Geothermal: Impact of Enhanced Geothermal Systems (EGS) on the United States in the 21st Century. (http://geothermal.inel.gov/publications/future_of_geothermal_energy.pdf)

The decline of DOE's oil and gas research program has significantly impaired the nation's ability to train this workforce. These funds historically provided support to geoscience and petroleum engineering programs at U.S. universities. The lack of adequate funds weakens these departments just as we're asking them to attract and train talent for the next generation.

To support workforce training, AAPG requests that the Subcommittee appropriate the \$12 million authorized in the America Competes Act of 2007 (Public Law 110-69) for "Hydrocarbon systems science talent expansion program for institutions of higher education" (Section 5005).

Thank you for the opportunity to present this testimony to the Subcommittee. As you deliberate appropriate funding levels for these DOE programs, please consider the important public policy implications these choices entail.

If you would like additional information for the record, please contact me at AAPG's Geoscience and Energy Office – Washington, D.C. at 202-684-8225, fax 703-379-7563, or 4214 King Street, Alexandria, VA 22302.