PROGRAM facts

U.S. DEPARTMENT OF ENERGY
OFFICE OF FOSSIL ENERGY
NATIONAL ENERGY TECHNOLOGY LABORATORY

Systems, Analyses and Planning

07/2005

NATURAL GAS RESOURCES AND FEDERAL LANDS

Background

Our nation's public lands are used for many purposes and provide a variety of services to the American people. These lands preserve natural and cultural treasures, provide recreation opportunities, conserve and protect fish and wildlife, and contain energy, mineral, and water resources. The Departments of Interior (DOI) and Agriculture (USDA) are responsible for managing public lands so that conservation, recreation, and resource needs can all be met. DOI manages a total of 504 million acres of surface land, or 1/5 the area of the entire United States.[1] This includes over 56 million acres of land that belongs to Native Americans. The Forest Service (an agency of the Department of Agriculture) manages national forests and grasslands encompassing 193 million acres – an area equivalent to the size of Texas.[2]

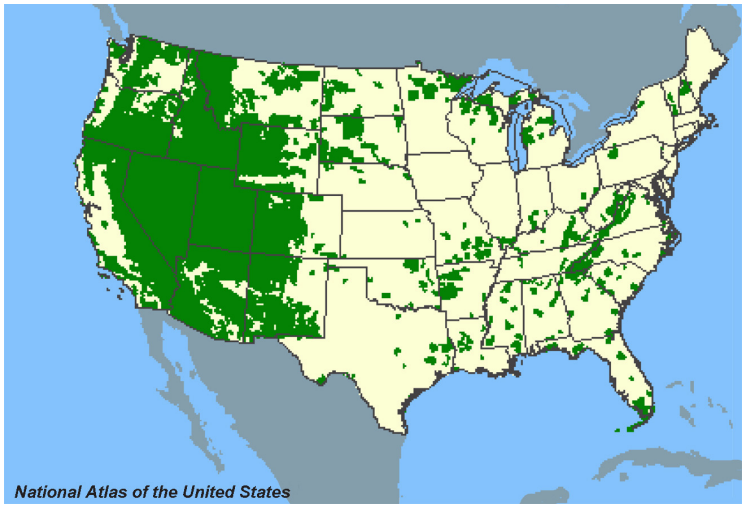


Figure 1. Federal and Native American Lands (contiguous U.S.)

Federal lands contain a large percentage of natural resources that fuel our nation's energy needs. Within the DOI, several agencies manage these lands. The Bureau of Land Management (BLM) is responsible for 261 million acres of surface land in the United States (mostly in the western states), and about 700 million acres of subsurface mineral resources. On the order of 100,000 wells are present on federal (onshore) leases. In addition to onshore resources, the Minerals Management Service (MMS) manages the federal offshore lands, which are commonly referred to as the Outer Continental Shelf (OCS). The OCS begins approximately 3 miles off coastal shorelines and extends 200 nautical miles out to sea. The 1.76 billion acre OCS supports 7,500 active oil and gas leases on 40 million acres. This area contains much of the nation's offshore oil and gas resources. Overall, energy projects on federally managed lands and offshore areas supply about 30 percent of the nation's energy supply, including 35% of our natural

CONTACTS

David Alleman
Technology Manager
918-699-2057
david.alleman@netl.doe.gov

John R. Duda
Analyst
304-285-4217
john.duda@netl.doe.gov

William Hochheiser
Program Manager
202-586-5614
william.hochheiser@hq.doe.gov

CUSTOMER SERVICE

1-800-553-7681

WEBSITE

www.netl.doe.gov

gas.[3] Looking to the future, the federal mineral estate (onshore and state offshore) is thought to hold about 320 Tcf of technically recoverable natural gas resource.[4] Ensuring domestic energy security is one of the goals identified in the National Energy Policy (NEP). Having a domestic supply of natural gas is important to achieving this goal. Federal lands are critical to meeting the nation's energy needs.

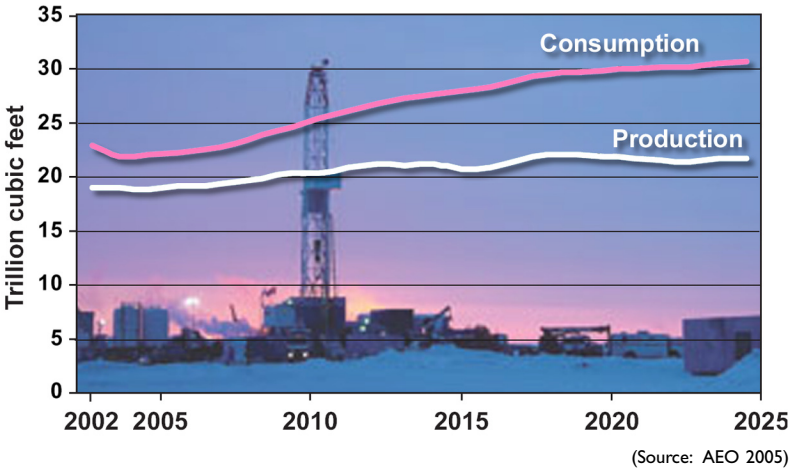


Figure 2. Natural Gas Consumption is Outpacing Domestic Production

Natural gas plays an increasingly vital role in satisfying the U.S. national energy demand. Natural gas provides nearly one-quarter of our nation's energy needs.[5] Environmental regulation has also necessitated greater utilization of gas in the electricity sector – most new power plants are gas-fired. Having abundant domestic supplies will help to ensure our nation's economic, environmental, and energy security. However, as natural gas production lags further and further behind consumption, we will need to find new ways to guarantee adequate supply. In fact, the gap between consumption and domestic production is projected to increase from over 3 Tcf/year to almost 9 Tcf in 2025. Responsible development of natural gas underlying federal lands can help to fill this gap.

In addition to providing services and resources, federal lands also generate revenue through collected bonuses, rents, and royalties. The Minerals Management Service is responsible for collecting and distributing income from minerals leases, including oil and gas leases. Since 1982, MMS has collected over $143 billion in minerals revenue with a significant percentage of the total going into the General Fund of the United States Treasury. A state is entitled to a share of the mineral revenues generated on federal lands within that state's boundaries – generally, one-half of the receipts is returned to the states. For 2004, states earned more than $1.3 billion in mineral revenues generated on federal lands. Wyoming led all states by receiving more than $600 million for 2004. All told, mineral revenues from federal and native American lands totaled about $8 billion for FY 2004.[6]

Federal Lands Access

Industry groups and natural gas producers charge that restricted access to federal lands limits gas production and jeopardizes our ability to meet future demand. Conservation groups disagree with this assertion. They contend that more federal land ought to be restricted, and the amount of undiscovered resources on restricted lands is not significant enough to warrant greater access. Recent studies have provided new information on how much of our nation's natural gas resources are off-limits to development.

In late 2003, the National Petroleum Council (NPC) released a study showing that access to 29% of potential gas resources in the Rocky Mountains Region is prohibited or restricted, making "it increasingly difficult to economically produce natural gas from areas that are nominally open to leasing." [7] Although drilling is allowed on restricted lands, delays and other burdens can work to increase costs for producers and discourage development. The study found that improved access would lead to favorable impacts on future gas production and prices.

Recently, an interagency committee completed an inventory of oil and natural gas resources on federal lands.[8] This study was required by a provision of the 2000 Energy Policy and Conservation Act (EPCA). This analysis looked at the technically-recoverable natural gas contained in five key U.S. basins (104 million acres – 59 million of which are managed by the federal government) and found that restrictions fully block access to 12% of the resource. 63% is available under standard lease stipulations, while the remaining gas is available for drilling, but with restrictions. In these areas, land that is available under standard lease terms is estimated to contain 87 Tcf of natural gas and land available with increased access restriction is estimated to contain 36 Tcf of natural gas. Fully restricted lands (lands not available for leasing) contain nearly 16 Tcf of natural gas. Results of the EPCA inventory are generally consistent with those of the NPC. Environmental advocates used the study to support their view that adequate lands are already available for drilling while industry groups pointed out that still more gas would be available if restrictions were eased. "Phase II" of the EPCA Inventory is nearing completion and results should be available Summer 2005.

To some degree, the controversy surrounding federal lands and access to the natural gas resources contained therein may be linked to the methodologies used to develop estimates of recoverable gas. Quantities of the commodity are reported in terms of technically recoverable resource but just as frequently, they are also reported in terms economically recoverable resource. Recently, one organization proposed an approach for assessing natural gas resources that considers multiple attributes of energy resources that influence their value.[9]

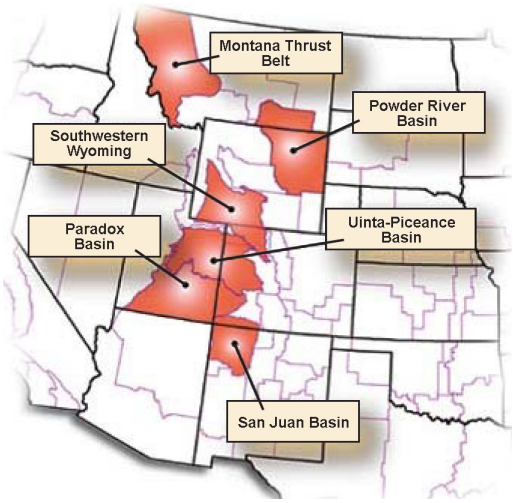
Policy Actions

Increasing energy supply in ways that protect and improve the environment is one of the three major challenges recognized in the President's NEP. Increased development of vitally-needed natural gas resources underlying public lands will help to increase domestic supplies of natural gas, but this must be balanced with environmental and other concerns. Based on a NEP recommendation, the President issued an Executive Order directing all federal agencies to include in any regulatory action that could significantly and adversely affect energy supply, distribution, or use, a statement on the energy impacts of the proposed action. In addition, land management agencies are examining the potential for increased natural gas and oil production from federal lands, and reviewing restrictions and streamlining processes in order to facilitate their responsible development.

Within the Department of Energy, Fossil Energy (FE) and NETL staff work closely in identifying regulatory, fiscal, and policy issues that affect natural gas development and transmission, and quantifying their impacts. The team conducts its analyses in a coordinated manner, i.e., through continual dialog with other agencies and offices. One example of such coordination deals with the future development of coalbed methane in the Powder River Basin. There is a possibility that more restrictive produced water management could be required in the basin. FE/NETL quickly analyzed the impacts of more restrictive practices and showed that up to 15 Tcf could be rendered uneconomical by requiring more costly, but not necessarily more protective, water management.[10] DOE coordinated closely with the Bureau of Land Management, the Environmental Protection Agency, and multiple state agencies in this effort. A significant portion of natural gas resource development in the basin – possibly requiring the drilling of up to 76,000 wells – will be from federal lands. Results of these types of studies are also being used to guide and set targets for research at the NETL, thus supporting lowest cost, least impact resource exploitation.

The Role of Technology

Technology remains a key to expanding natural gas supplies. The NEP recognizes the critical role of technology and recommends that the government take action to accelerate the development of advanced technologies for natural gas exploration and production. Less costly and more efficient technologies can not only facilitate additional access but will be required to economically produce natural gas from evermore challenging resource settings. The Energy Information Administration forecasts that a larger percentage of our nation's future natural gas supply will come from low permeability sands, organic shales, and coals. A significant gas resource is also thought to exist in deeply buried formations – at depths greater than 16,000 feet. And, if the knowledge base and



(Courtesy U.S. Geological Survey)

Figure 3. Map of EPCA Basins

To manage the development of federal lands, the government issues oil and gas leases, based on statutory and regulatory requirements that are meant to protect environmental, social, historical, and cultural resources. In terms of leasing, there are generally three categories of federal lands:

1. Leasing permitted under standard stipulations with no restrictions

2. Leasing permitted with increased access restrictions, usually seasonal limitations where drilling is permitted only during certain times of year. Access restrictions may be imposed when the proposed resource recovery is in conflict with the land use plan. For example, this situation may arise when land is important to seasonal wildlife activity (i.e., migration pattern, nesting, etc.), is in close proximity to inhabited areas, or when seasonal fire threat exists.

3. Oil and gas leasing is prohibited. Leasing may be prohibited for a variety of reasons including off-road vehicle restrictions (roadless area), critical habitat for endangered or threatened species, potential impact to water supplies, or it has been designated a historic, recreation, or scenic area.

technologies advance sufficiently, a seemingly endless supply of natural gas may become available from methane hydrates. Most, if not all, of these non-traditional sources of natural gas exist as part of the federal mineral estate.

Examples of technology development through government-industry partnerships and sponsored by the National Energy Technology Laboratory include:

- Advanced seismic techniques to locate and high grade resource development opportunities
- High performance drilling systems to lower costs, drill faster, and reduce environmental impacts
- Multiple analyses and operating practices focused on protecting and improving the environment in support of resource development.[11]

FE/NETL have planned and conducted research on myriad sources of natural gas for decades and have an extensive knowledge base covering reservoir characterization and modeling, imaging, drilling and completion, production operations, and economics. Other federal and state agencies recognize DOE's expertise and often seek out assistance from the Department. Clearly, technology can continue to help us realize the full potential of our natural gas resources and support a secure energy future for the U.S.

Fore more information on natural gas and federal lands, policy issues, and advanced natural gas technologies, visit the National Energy Technology Laboratory and Fossil Energy websites at: **www.netl.doe.gov** and **www.fossil.energy.gov**

ADDRESS

National Energy Technology Laboratory

626 Cochrans Mill Road
P.O. Box 10940
Pittsburgh, PA 15236-0940
412-386-4687

3610 Collins Ferry Road
P.O. Box 880
Morgantown, WV 26507-0880
304-285-4764

One West Third Street, Suite 1400
Tulsa, OK 74103-3519
918-699-2000

539 Duckering Bldg./UAF Campus
P.O. Box 750172
Fairbanks, AK 99775-0172
907-452-2559

RELATED LINKS

Bureau of Land Management
www.blm.gov

Energy Information Administration
www.eia.doe.gov

Independent Petroleum Association of America
http://www.ipaa.org

Minerals Management Service
www.mms.gov

The Wilderness Society
http://www.tws.org/ourissues/energy/

USDA Forest Service
http://www.fs.fed.us/

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