

# **The Role of the Geoscientist in the U.S. Federal Government\***

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## **Abstract**

The Federal Government and the oil and gas industry have distinctly different roles in the estimation of oil and gas resources and reserves. The Federal Government needs to understand the resource endowment of the United States, as well as the world, in order to craft energy policy, determine the best course for the country in light of its resource base, and manage Federal resources. Industry, on the other hand, determines oil and gas resources/reserves at a different scale (generally at the project level), in order to drill and develop the resource for a profit. The geoscientist working for a government entity may accordingly have a decidedly different perspective than one employed in the industry sector.

Goals of the U.S. Department of the Interior include Protection of the Nation's Natural, Cultural, and Heritage Resources, and Management of Resources to Promote Responsible Use and Sustain a Dynamic Economy. The three main bureaus responsible for mineral resource information include the U.S. Geological Survey (USGS), the Minerals Management Service (MMS), and the Bureau of Land Management (BLM):

- The USGS serves the Nation by providing reliable scientific information to describe and understand the Earth; minimize loss of life and property from natural disaster, provide information for the management of energy, mineral, water, and biological resources, and enhance and protect our quality of life. The USGS, with no resource management or regulatory responsibilities, provides unbiased energy information and is often the sole provider of resource estimates of the undiscovered, technically recoverable oil and gas resources of the U.S. onshore and State waters and the World, thus providing information on future potential reserves. Energy forecasts by other organizations, such as International Energy Agency and Energy Information Administration, use USGS estimates as their base.

- The MMS is responsible for the Federal resources of the U.S. Outer Continental Shelf, and issues permits for pre-lease exploration activities, evaluates resources and reserves, leases acreage, and regulates drilling and production activities in accordance with the Outer Continental Shelf Lands Act.
- The core mission of the Oil and Gas Program of the BLM is to encourage and regulate the exploration and development of Federal onshore oil and gas resources in accordance with the Mineral Leasing Act of 1920, as amended.

All three bureaus actively employ geoscientists to assist in their ability meet their varying responsibilities. The roles of these geoscientists may vary depending on the specific planned programs.

### **References**

Schenk, C.J. and R.M. Pollastro, 2002, Natural gas production in the United States: U.S. Geological Survey Fact Sheet FS-113-01, January 2002, Web accessed October 22, 2009 <http://geology.cr.usgs.gov/pub/fact-sheets/fs-0113-01/>

Klett (2005).

<http://energy.usgs.gov>

*The Role of the Geoscientist in the U.S.  
Federal Government*

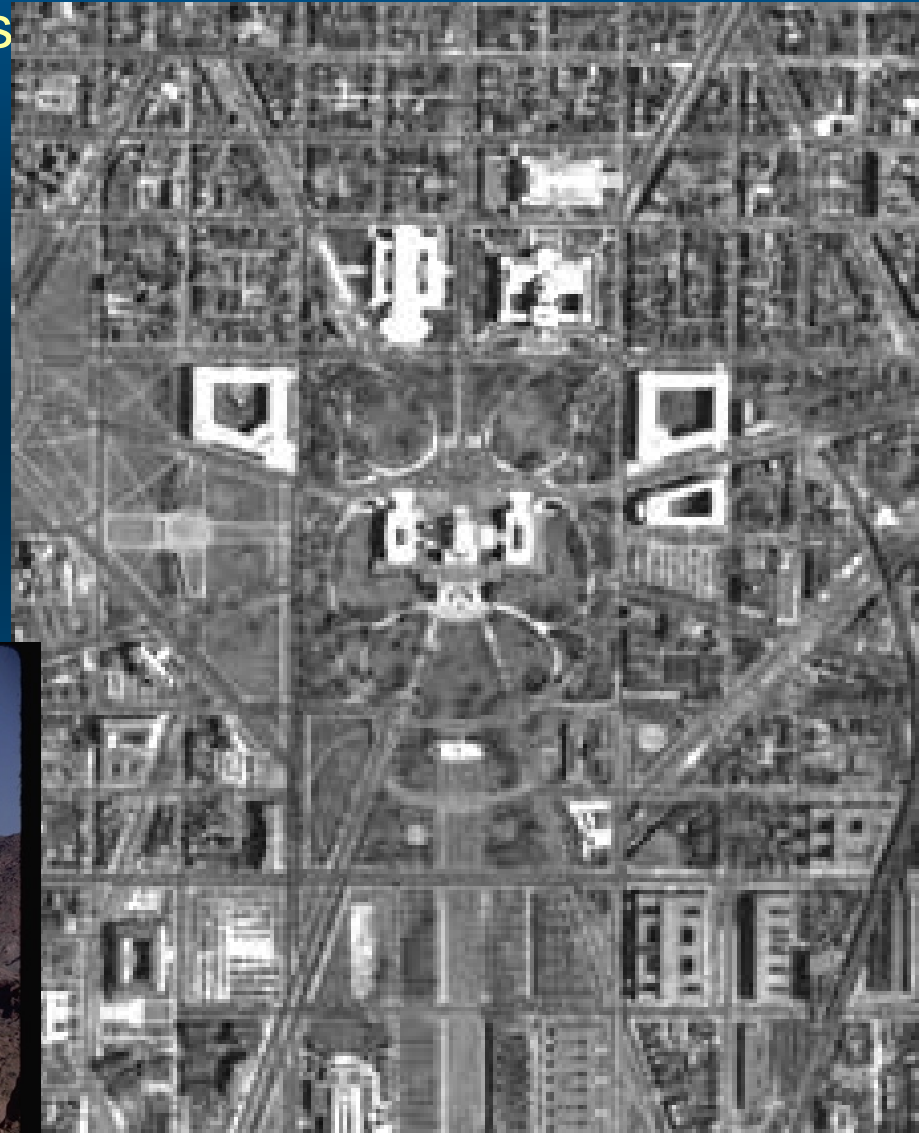


*Brenda Pierce, USGS*

*Geological Aspects of Estimating Petroleum  
Resources and Reserves, Sept 2009*

# U.S. Department of the Interior

The Mission of DOI is to protect and provide access to our Nation's natural and cultural heritage and honor our trust responsibilities to Indian Tribes and our commitments to island communities.



**1849** Creation of Home Dept consolidating the General Land Office, Patent Office, Indian Affairs Office, military pension offices. Interior functions expand – include census, reg territorial govt's, exploration of the west, mgt of D.C. jail and water system.

**1869** Begin geological survey of the west.

**1872** Establishes Yellowstone as the first National Park.

**1873** Territorial oversight from the Sec of State to Interior.

**1879** Creation of the U.S. Geological Survey.

**1946** Interior's General Land Office and Grazing Service are merged into the BLM.

**1982** MMS established. Parts of USGS go to MMS and BLM.



# DOI Quick Facts

- \$16.87 billion total annual budget; raises >\$18.2 billion in revenues from energy, mineral, grazing, timber, recreation, land sales, and other activities.
- Energy projects on federally managed lands, on- and off-shore, supply ~30% of the Nation's energy production: 39% of natural gas, 35% of oil, 42% of coal, 17% of hydro power, 50% of geothermal



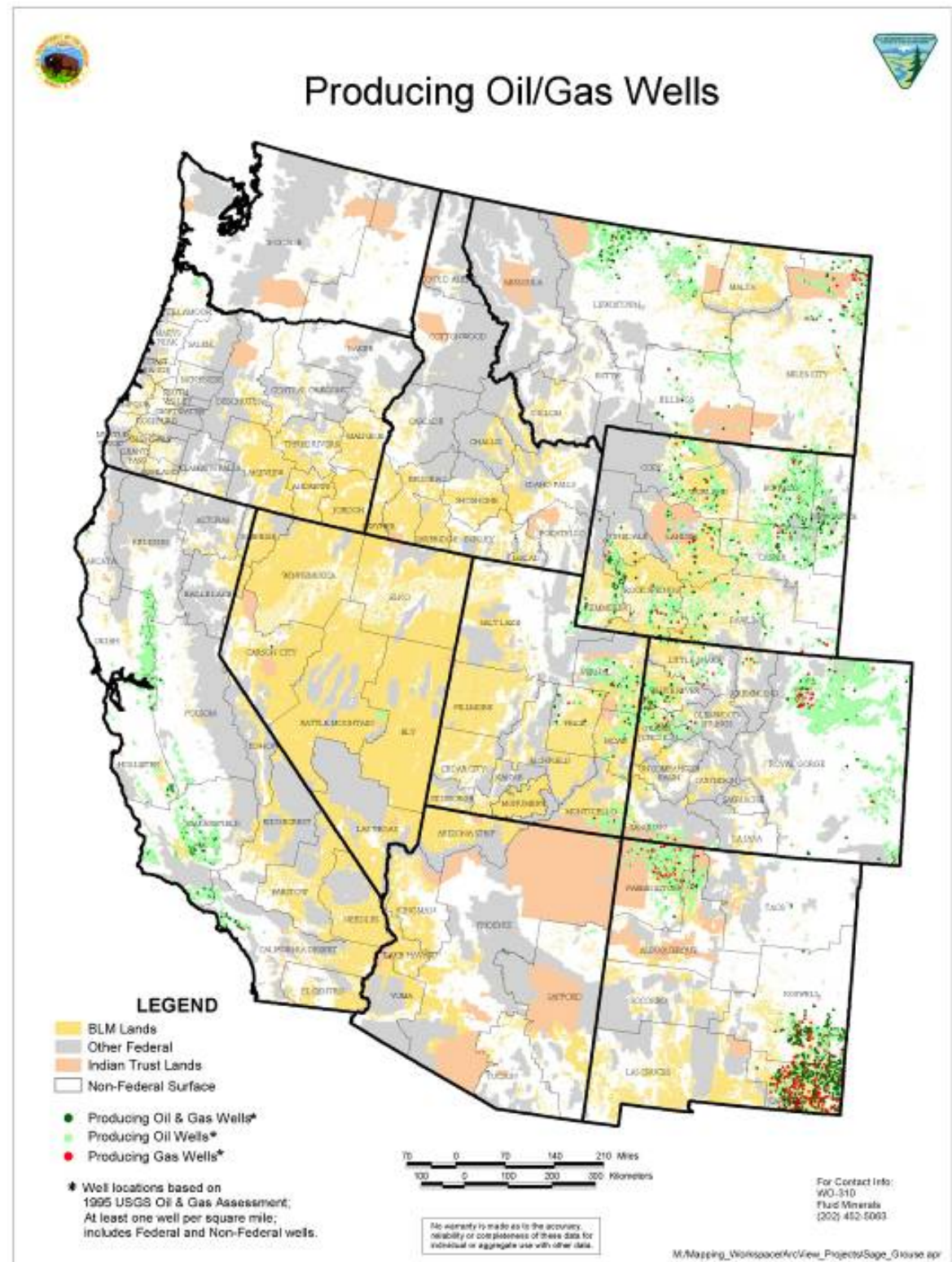
# DOI – Federal Oil and Gas Resources

- **MMS** issues permits for pre-lease exploration activities; (2) evaluates resources; (3) leases acreage; (4) regulates drilling and production activities
- **BLM** – Development of onshore Federal oil and natural gas resources happens in five phases: (1) land use planning; (2) parcel nominations and lease sales; (3) well permitting and development; (4) operations and production; (5) plugging and reclamation.
- Responsible for fair market value to the public and protection of all resources.



# BLM

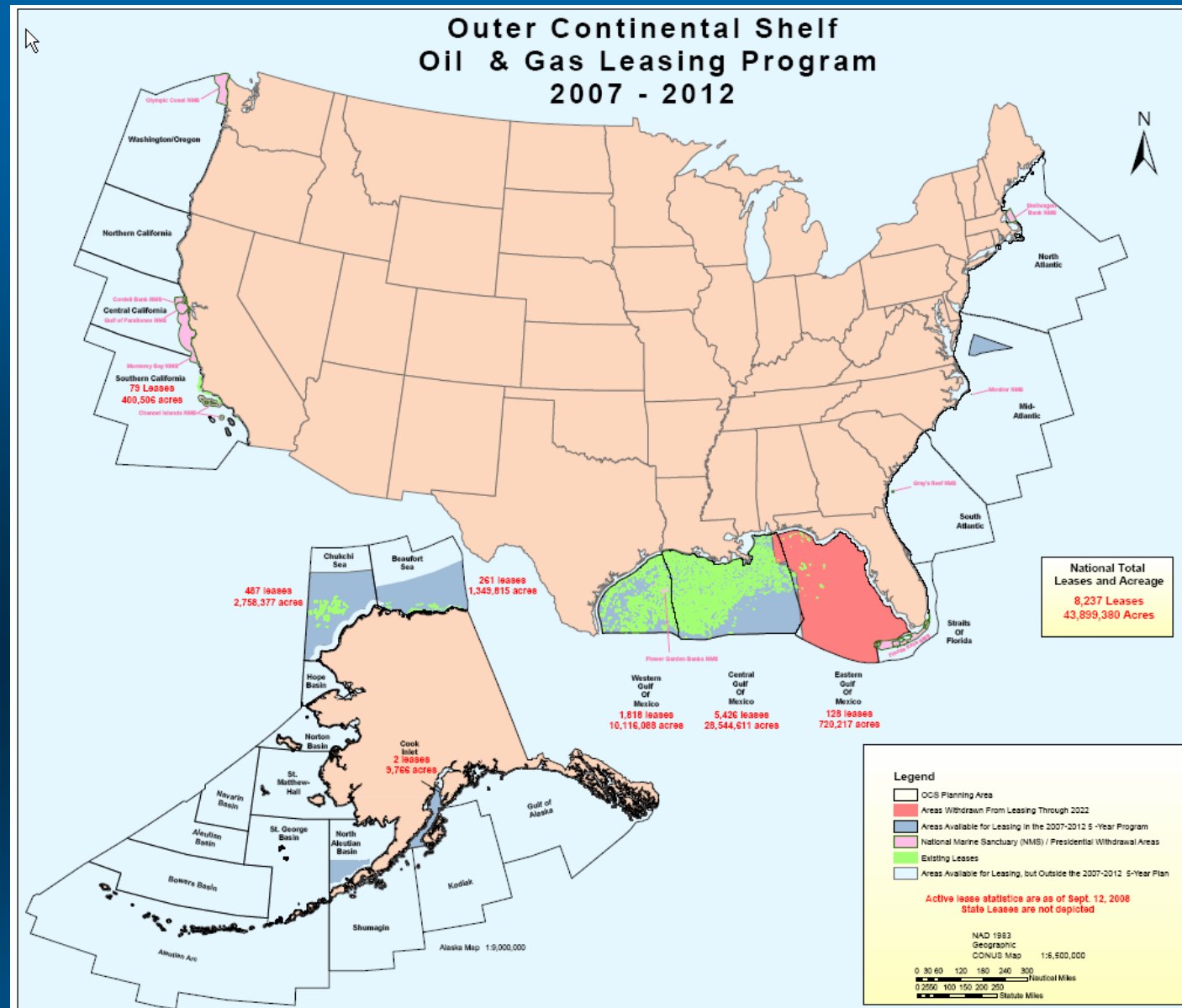
BLM manages 256 million surface acres and 700 million acres of Federal mineral estate. Produces about 11% of the Nation's domestic natural gas and 5% of the domestic oil.





# MMS

- Manages ~ 1.7 billion acres of OCS, on which it manages about 8,300 active oil and gas leases on 44 million acres.

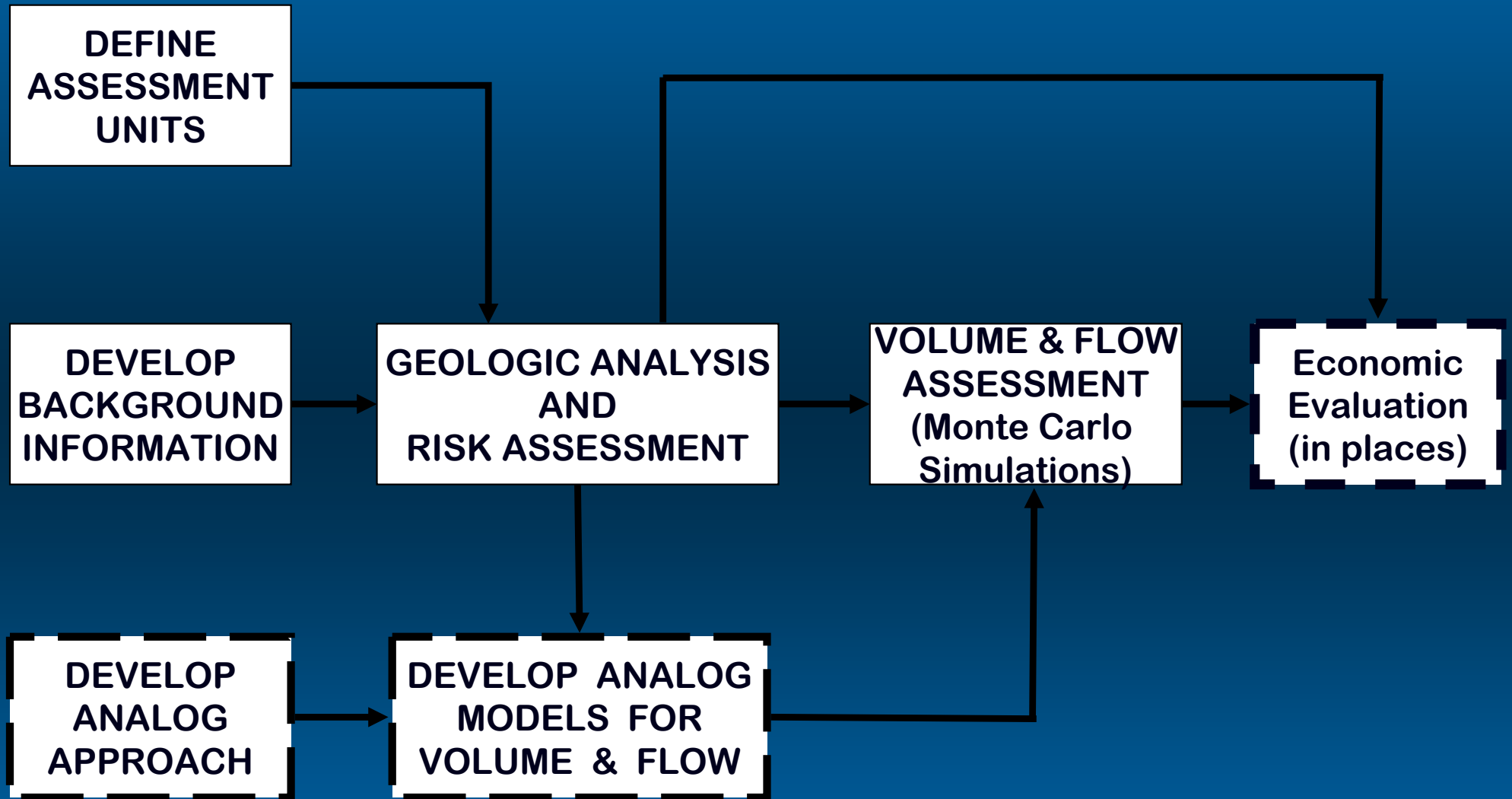


- ~ 43 million leased OCS acres = ~15% of the Nation's domestic natural gas production and about 27% of its oil production.

# Goal of USGS Assessments

**Develop geologically based and statistically sound hypotheses concerning the quantities of oil and gas that have the potential to be added to proved reserves in the U.S. and the world = undiscovered, technically recoverable resource estimates.**

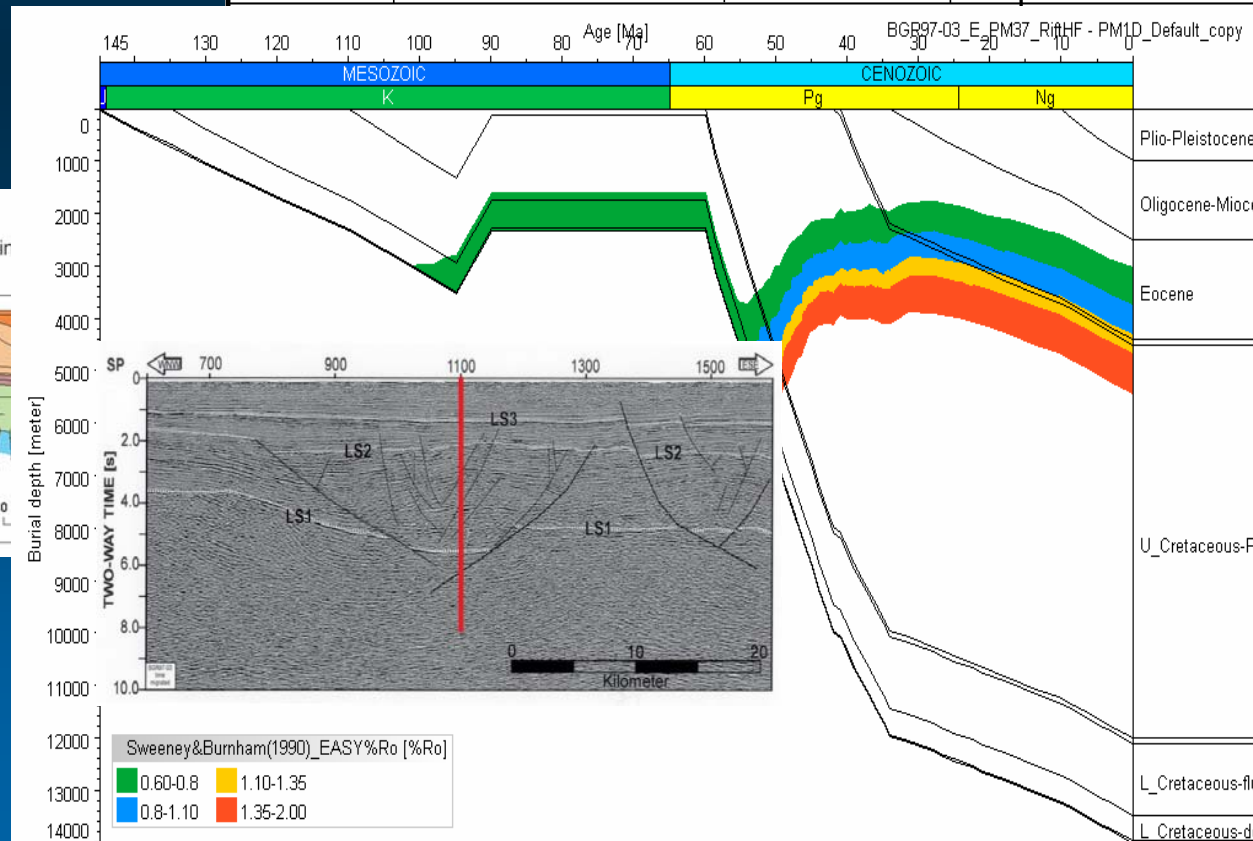
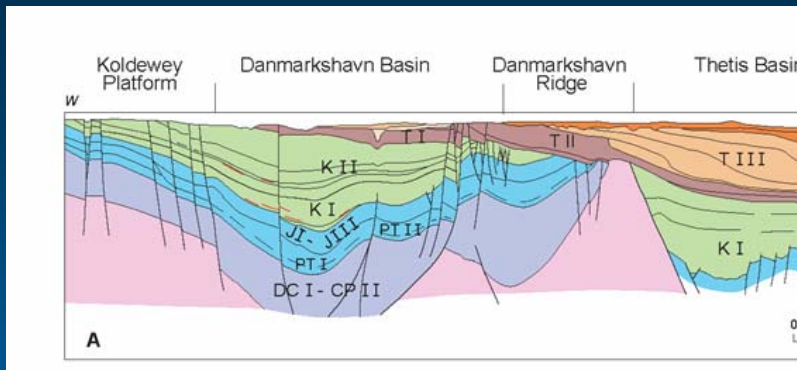
# Integrated Evaluation Algorithm



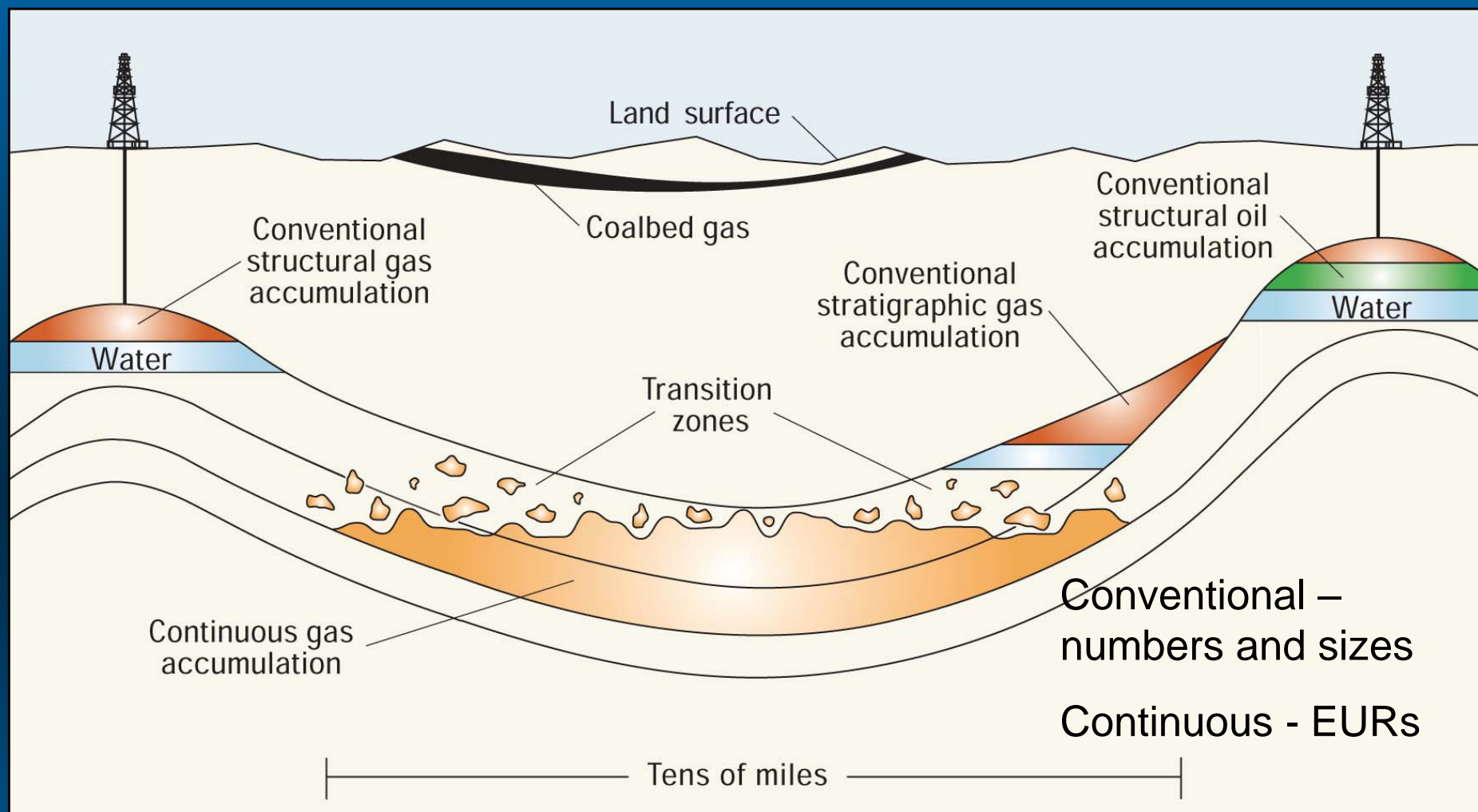
# Geologic Analysis and Risk Assessment

- Geologic data (TPS)
- Evaluate alt. hypotheses
- Model burial history
- Assess risk

40	35	30	25	20	15	10	5	0 Ma	Geologic time scale	Basin characteristics
Eocene		Oligocene		Miocene			Plioc.	P.		
m	u	l	u	l	m	u	l	u		
Extensional		Compressional							Tectonic setting	
Rift		Sag		Foreland		Exhumation			Basin type	
High		Low		Medium			Rapid uplift		Subsidence rate	
Heat flow									Heat flow	
35°			40°			45°			Paleolatitude	
Hot/arid		Warm/seasonal precipitation			Temperate wet		Cold/wet		Paleoclimate	

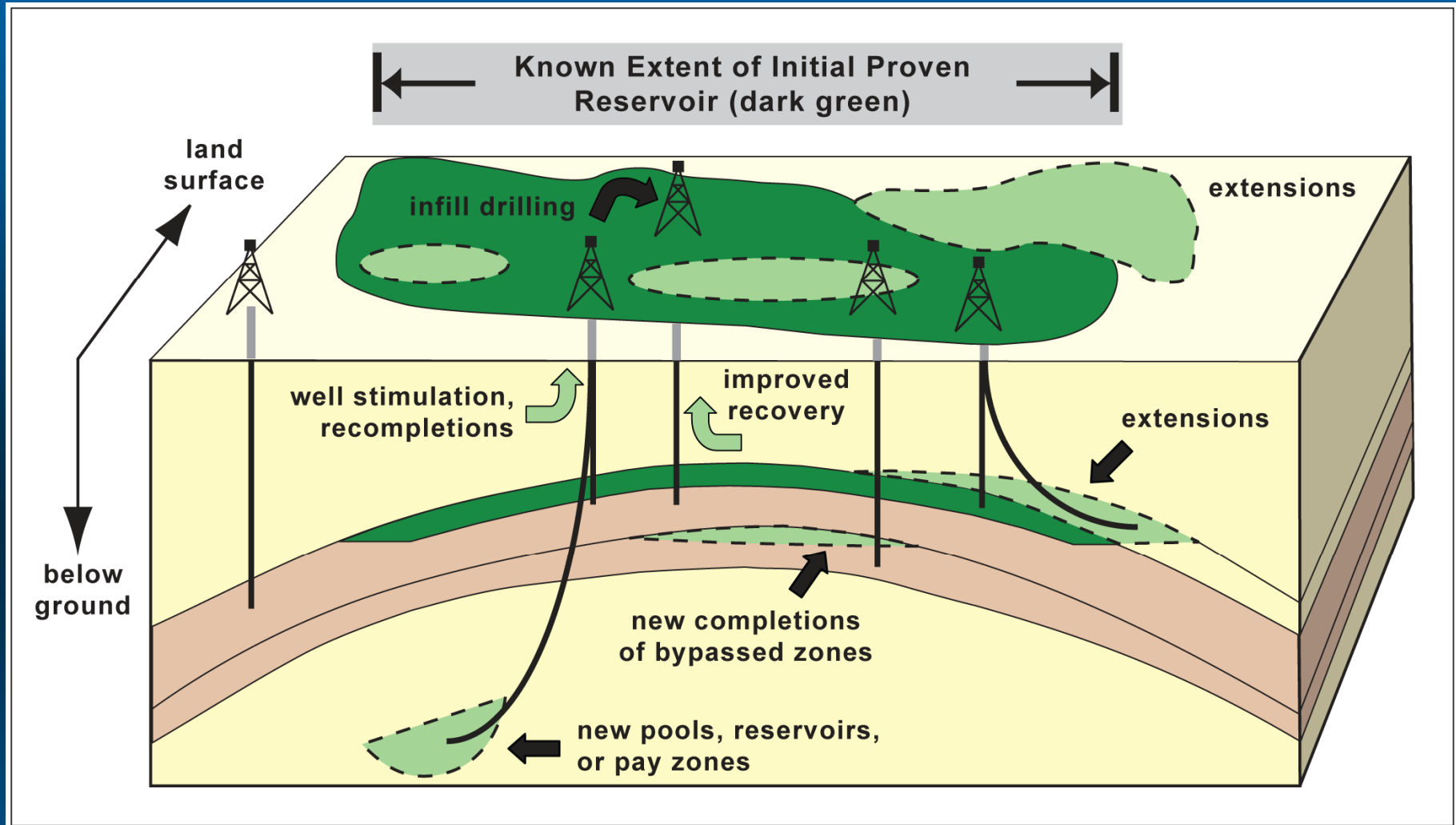


# Conventional vs. Continuous Resources



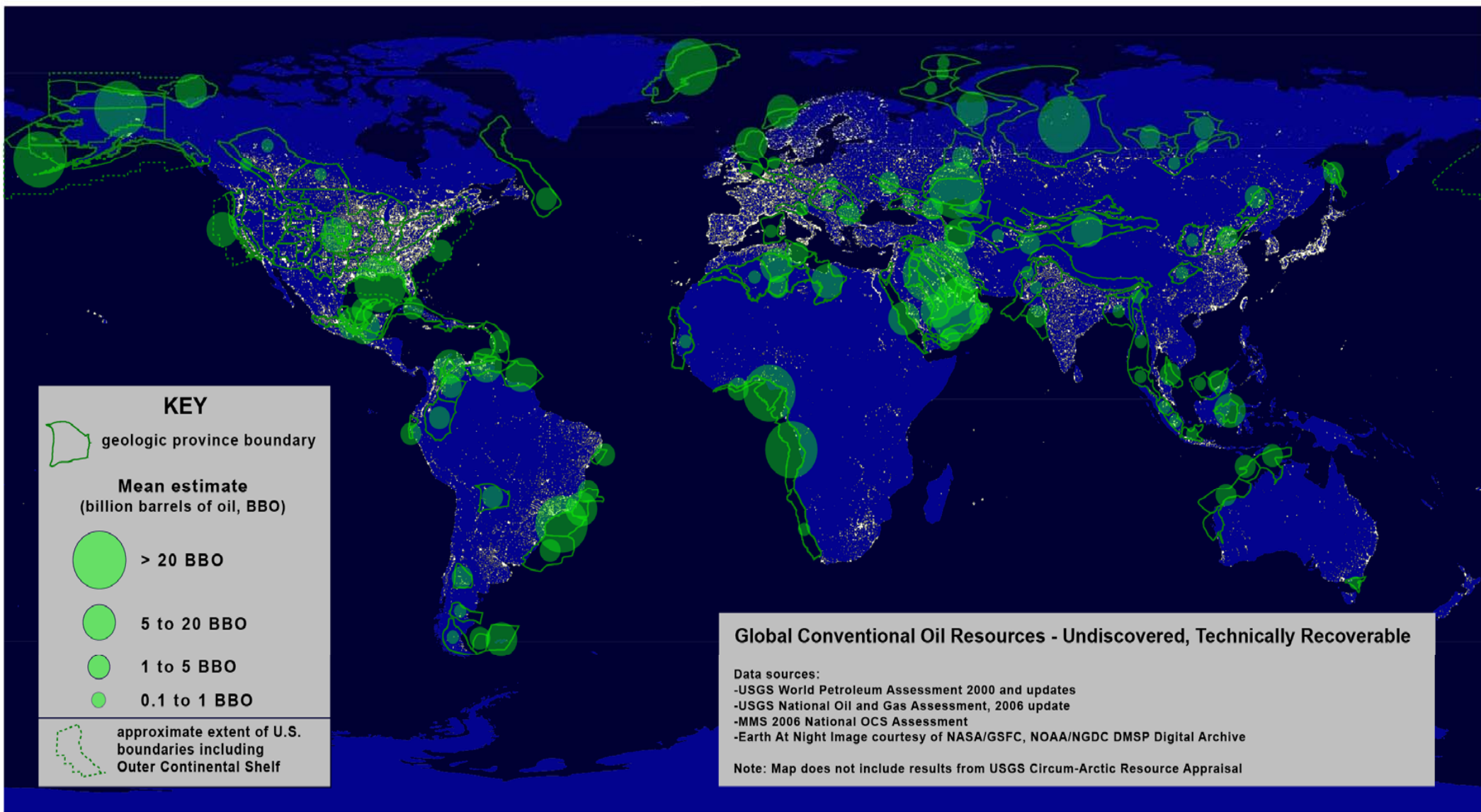
Conceptual diagram illustrating the differences in geologic context between conventional and continuous (nonconventional) petroleum resource accumulations. Modified from Schenk and Pollastro (2002).

# Reserve Growth



Conceptual diagram illustrating how changes in geologic understanding of petroleum resource accumulations can affect estimates of reserves, leading to the phenomenon known as reserve growth. Modified from Klett (2005).

# Global Conventional Oil Resources





<http://energy.usgs.gov>