The USGS world oil and gas assessment*

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A new assessment by the U.S. Geological Survey of the technically recoverable undiscovered oil and gas resources of the world was released at the World Petroleum Congress in Calgary in June 2000. Assessments were made by a team of over 30 geoscientists at the end of the calendar year 1999. Petroleum systems are identified and assessed using a probabilistic methodology coupled with geologic analysis. Nearly 1,000 provinces were defined; they in turn were grouped into eight regions roughly comparable to the eight economic regions defined by the U.S. State Department. Petroleum resources are allocated to 409 of these (refer to Figures 1, 2). A total of 76 priority provinces containing 95% of the world's known oil and gas and 26 boutique, or highly prospective, provinces are assessed. Based upon our initial analyses, several observations are clear. First, our estimates of undiscovered technically recoverable oil resources will not differ greatly from those of the 1994 USGS assessment; however, estimates of both natural gas and natural gas liquid resources will be larger than previous estimates (refer to Figures 3, 4). In addition, field growth estimates** of known fields will likely be large and several algorithms are utilized to encompass uncertainty associated with this critical component of any analysis of world oil and gas supply. A production plateau concept of reserve development rather than a bell shaped (or Hubbert) production profile is advocated and is linked to the concept of field growth. Continuous or unconventional oil and gas resources have been captured digitally for a future assessment effort and represent a significant future resource. A series of digital products including geologic maps of the world as well as petroleum system write-ups have been made available via the CD-ROM and the internet. These digital products and the methodology employed in the assessment have been favorably reviewed by the National Academy of Science (NRC), AAPG and GIS World.

**Estimates of reserve growth at the world level were made for the first time in Assessment 2000. Reserve growth estimates nearly equal those of undiscovered resources. Reserve growth results from the following:

- ❏ As drilling and production within discovered fields progresses, new pools or reservoirs are found that were not previously known.
- ❏ Advances in exploration technology make it possible to identify new targets within existing fields.
- ❏ Advances in drilling technology make it possible to recover oil, and gas not previously considered recoverable in the initial reserve estimates.
- ❏ Enhanced oil recovery techniques increase the recovery factor for oil and thereby increase the reserves within existing fields.

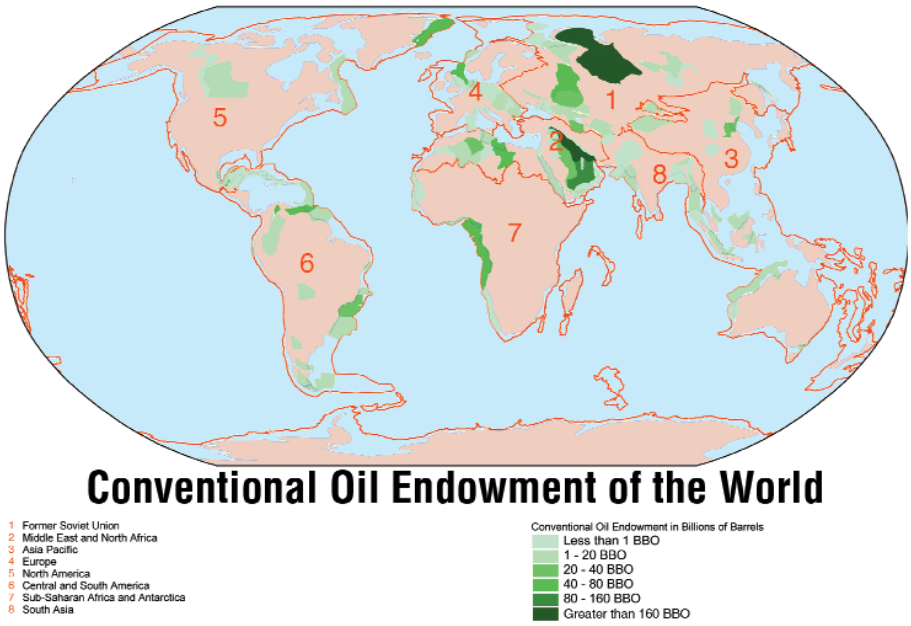

Figure 1. Conventional oil endowment of the world.

Other highlights of the assessment:

- ❏ A 20 percent increase in undiscovered oil and a slight decrease in undiscovered natural gas.
- ❏ More oil and gas in the Middle East and in the offshore areas of western Africa and eastern South America than previously reported.
- ❏ Less oil and gas in Canada and Mexico.
- ❏ Significantly lower volumes of natural gas in the Former Soviet Union.

Notable Quotes:

Thomas S. Ahlbrandt: "There is still an abundance of oil and gas in the world. Since oil became a major energy source about 100 years ago, about 539 billion barrels of oil have been produced outside of the United States. We now estimate the total amount of future technically recoverable oil, outside the U.S., to be about 2,120 billion barrels."

Gene Whitney, USGS: "These assessments provide a snapshot of current information about the location and abundance of undiscovered oil and gas resources at a point in history, Such an overview provides exploration geologists, economists and investors a general picture of where oil and gas resources are likely to be developed in the future."

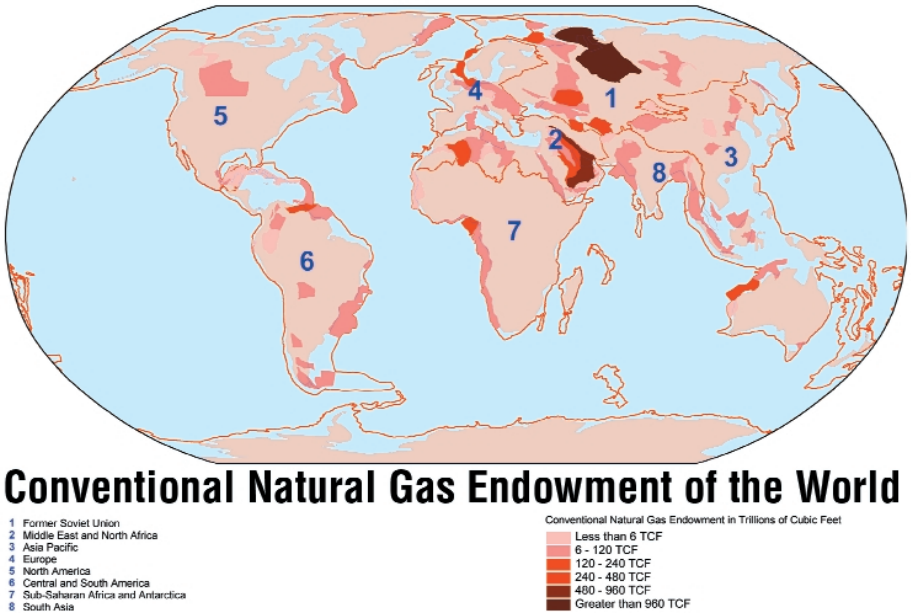

Figure 2. Conventional natural gas endowment of the world.

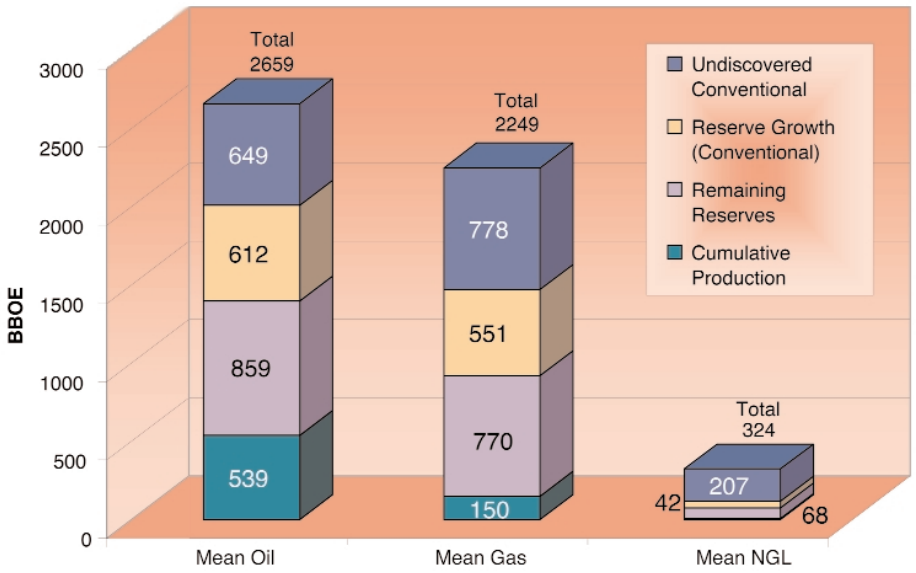

Figure 3. Estimates of oil and gas resources, including conventional reserve growth, in Assessment 2000.

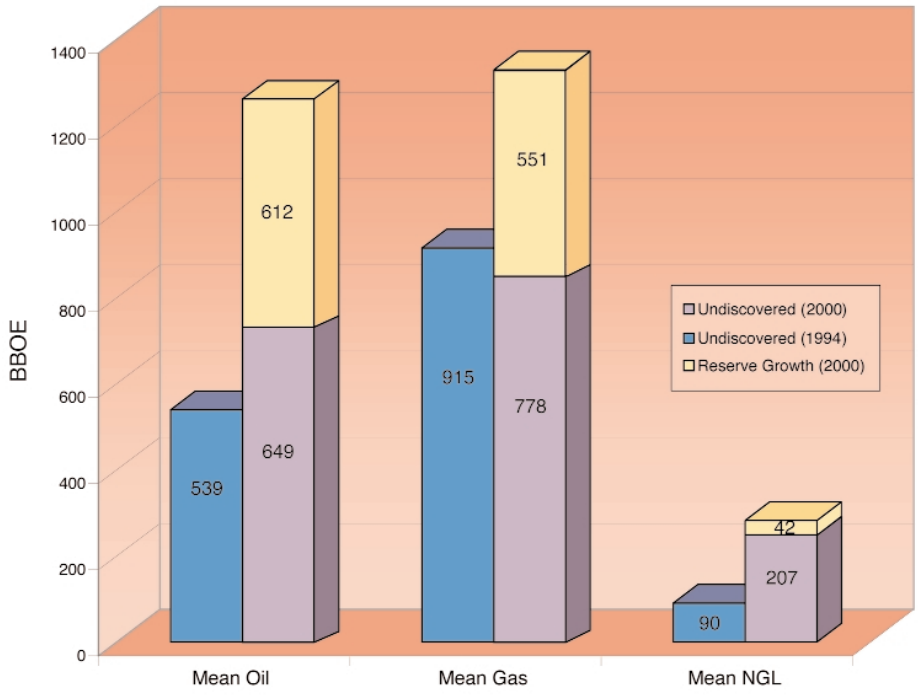

Figure 4. Estimates of undiscovered oil and natural gas, together with reserve growth, Assessment 2000 in comparison to assessment in 1994.

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