Just How Enormous Is the "Enormous" U.S. Gas Resource? Implications for Future Supply*

Richard Nehring1

Search and Discovery Article #70079 (2010)
Posted July 23, 2010

*Adapted from oral presentation at AAPG Annual Convention and Exhibition, New Orleans, Louisiana, April 11-14, 2010

1Nehring Associates, Inc., Colorado Springs, CO (RNehring@nehringdatabase.com)

Abstract

With the increasing development of unconventional gas resources in general and shale gas resources in particular, the U.S. is now said to have “ENORMOUS” gas resources. These resources are perceived to create new opportunities for energy policy, particularly a massive increase in the use of natural gas to generate electricity and a substantial replacement of gasoline by natural gas in the transportation sector.

However, just how enormous is the allegedly “ENORMOUS” resource? This paper examines both the currently known and the range of estimated potential U.S. gas resources by type: conventional, transitional, and unconventional.

Conventional natural gas resources provide nearly 75% of the known contiguous U.S. gas resource of 1290 Tcf. More than 90% of this known conventional resource has already been produced. Conventional production has declined 60% from its 1972 peak and will continue to decline.

Transitional gas resources include self-sourced, deep and ultradeep, and deepwater gas resources. Although deep and deepwater resources were earlier thought to have great potential, known transitional gas resources are not even 5% of total known gas resources. Transitional production peaked in 2003 and is currently declining rapidly.

The case for enormous U.S. gas resources thus rests solely on the shoulders of unconventional gas. Unconventional gas (tight sandstones, coaled methane, and shale gas) now provide over half of U.S. gas production. Unconventional gas reserve additions continue to outstrip unconventional gas production by wide margins.

Like conventional gas resources, unconventional gas resources are concentrated. However, unconventional resources are concentrated in major and mega plays, instead of giant and large fields.

Copyright © AAPG. Serial rights given by author. For all other rights contact author directly.
Whether or not the U.S. has enormous gas resources, sufficient to provide for expanded gas demand for fifty years or more, depends solely on how many mega (30 Tcf plus) unconventional plays exist. At best, there will be only two each CBM and tight sandstone marginally mega plays. The number and maximum size of the shale gas mega plays will thus determine the ultimate gas resource of the U.S. The viability of various energy policy options thus depends on the timely and accurate assessment of the potential of the largest shale plays.
JUST HOW ENORMOUS IS THE “ENORMOUS” U.S. GAS RESOURCE?

Implications for Future Supply

AAPG New Orleans ACE
April 13, 2010
Richard Nehring
AN UNFAMILIAR CONCEPT

• The idea of enormous U.S. gas resources is now commonplace.

• Until 2008, “Enormous” was not a familiar concept.

• A dramatic reversal from the constant spectre of depletion.
KNOWN AND ESTIMATED RESOURCES

- Proved (EIA) - 237.0 TCF
- Probable (PGC mean) - 418.8
- Possible (PGC mean) - 744.9
- Speculative (PGC mean) - 428.9
- Total 1829.6
HIGHLY CONCENTRATED
POTENTIAL

• Shale gas megaplays (6)- 444.4
• Tight SS megaplays (5) - 209.4
• CBM megaplays (2) - 29.0
• All other plays - 480.9

• Total Probable & Possible - 1163.7
WHAT CHARACTERISTIC IS ALWAYS ASSOCIATED WITH A VERY LARGE PLAY AREA?

HETEROGENEITY!
WHAT DOES HETEROGENEITY MEAN FOR RESOURCE ESTIMATES?

UNCERTAINTY!
UNCERTAINTY IN ESTIMATION

- Approximate remaining resources:

1190 – 1830 – 2885 TCF
IMPLICATIONS FOR FUTURE SUPPLY

- 23 Tcf/Year
- 30 Tcf/Year

Years of Supply
ZONE OF IGNORANCE

$20
18
16
14
12
10
8
6
4
2
0
0 200 400 600 800 1000 1200 1400 1600 1800
TCF
KEY CONCLUSIONS

• High confidence of enormous U.S. gas resources

• Range is uncertain, likely 1200-1600 TCF

• A few decades needed to reduce this uncertainty significantly
POLICY IMPLICATIONS

• Guarantee supply continuity

• Expand current markets

• Pursue new markets
POLICY IMPLICATIONS (2)

• LNG unnecessary for next twenty years

• Arctic gas ditto

• Gas exports to eastern Canada?