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*National Assessment of Oil and Gas Fact Sheet*

# Natural Gas Production in the United States

*The United States has a long history of exploration and production of natural gas. Today, natural gas accounts for about 25 percent of the energy consumed daily in the United States, and the demand for natural gas is projected to continue to increase over the next few decades.*

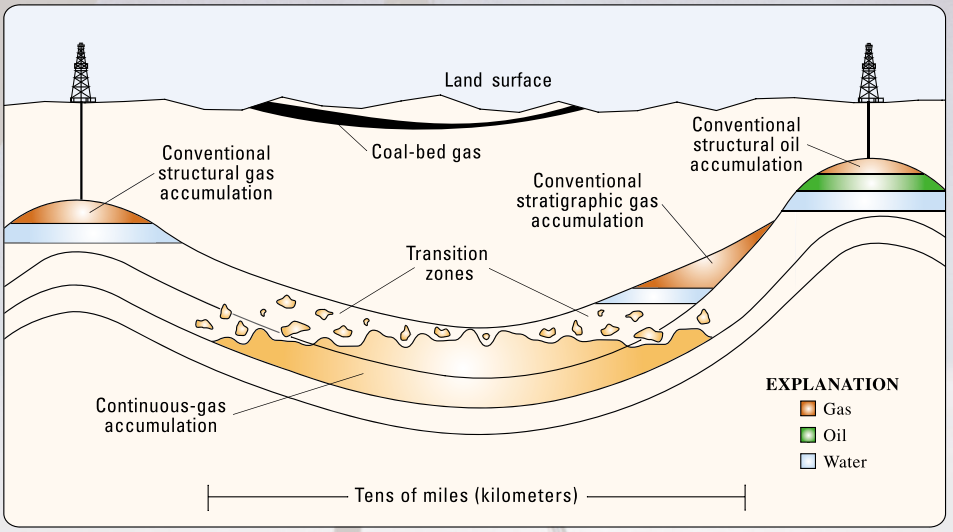


***Figure 1.*** *Categories of natural gas occurrence.*

## Types of Natural Gas

Natural gas in the U.S. is produced from three categories of occurrence: (1) non-associated gas that occurs in conventional gas fields, (2) associated-dissolved gas that occurs in conventional oil fields, and (3) continuous (or unconventional) gas that occurs as basin-centered gas, coal-bed gas, shale gas, fractured-reservoir gas, and tight-reservoir gas **(fig. 1)**. Both conventional gas fields and conventional oil fields are defined as discrete geographic entities with well-delineated hydrocarbon-water contacts **(fig. 1)**. Conventional gas fields typically have high matrix permeabilities, contain obvious seals and traps, and have high gas recovery factors. Continuous-gas accumulations are regional in extent; have diffuse boundaries; commonly have low matrix permeabilities; do not have obvious seals and traps, or hydrocarbon-water contacts; are abnormally pressured; are in close proximity to source rocks; and have very low recovery factors. In addition, estimated ultimate recoveries (EUR's) of wells in continuous accumulations are generally lower than the EUR's for wells in conventional gas accumulations (U.S. Geological Survey National Oil and Gas Resource Assessment Team, 1995). Continuous accumulations commonly have transition zones which grade into more conventional gas accumulations **(fig. 1)**.

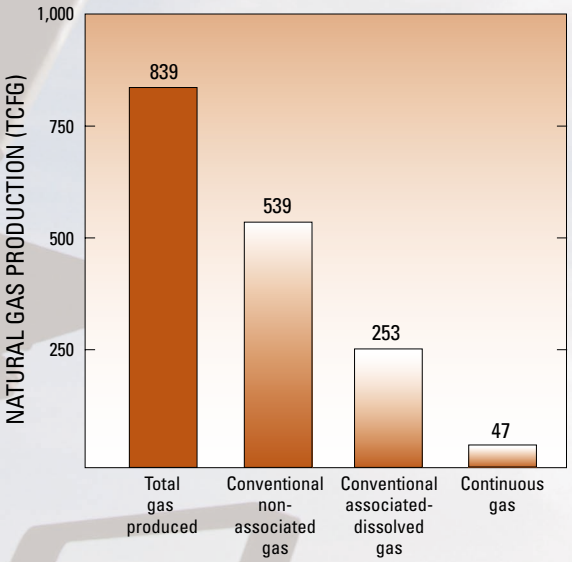


***Figure 2.*** *Total U.S. natural gas production and total production by gas type. (Data from NRG, 1999.)*

## Natural Gas Production in the U.S.

During the past 120 years, approximately 839 trillion cubic feet of gas (TCFG) has been produced in the U.S. **(fig. 2).** Of this total, 539 TCFG is conventional non-associated gas, 253 TCFG is conventional associated-dissolved gas, and 47 TCFG is continuous gas **(fig. 2)**. Historically, more than twice as much conventional natural gas has been produced from gas fields (as non-associated gas) than from oil fields (as associated-dissolved gas). Conventional gas accounts for about 94 percent of the gas produced in the U.S. Not included in this summary of production is natural gas that may have been flared at the well site.

## Natural Gas Production by Gas Type

Total annual natural gas production in the U.S. peaked in 1972 at 21.4 TCFG, declined to a low of about 15.2 TCFG in 1983, and has risen and leveled off at about 18.4 TCFG in 1998 **(fig. 3)**. The annual production of conventional non-associated gas and associated-dissolved gas has generally declined since production peaked in the early 1970's (from 14 TCFG to 12 TCFG, and 6.5 TCFG to 4 TCFG, respectively), whereas the annual production of continuous gas (including coal-bed gas) has increased since 1990 from 0.7 TCFG to about 2.2 TCFG in 1998 **(fig. 3)**. The reasons for the decline in annual natural gas production from 1972 to 1983 are complex, but the decline was partly due to a perception in the mid- to late 1970's that there was a shortage of natural gas. This perception led to policies discouraging the use of natural gas.

## Productivity of U.S. Gas Wells

Average daily production of U.S. gas wells peaked in 1971 at about 435 thousand cubic feet of gas (MCFG)/day/well and declined to about 160 MCFG/day/well in 1985, and continued at the 1985 level through 1999 **(fig. 4)**. The average gas well today produces one-third that of gas wells producing in the early to mid-1970's. The decrease in well productivity may be partly due to increased drilling of continuous-gas accumulations, which generally have lower EUR's than wells drilled in conventional-gas accumulations.

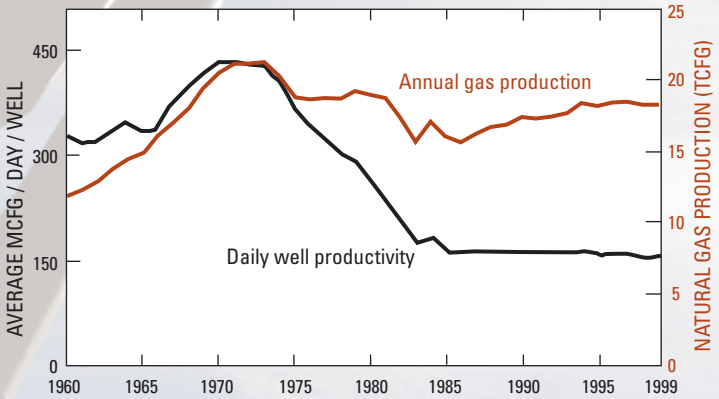


***Figure 4.*** *Daily average gas well productivity compared to annual total natural gas production. (Data from EIA, 2001.)*

## Summary of U.S. Natural Gas Production

- A total of 839 TCFG of natural gas has been produced in the U.S. during the past 120 years, and 94 percent of the gas was from conventional gas and oil fields.
- Annual domestic gas production peaked in 1972 at 21.4 TCFG, declined to about 15.2 TCFG in 1983, and increased to about 18.4 TCFG in 1998. The production decline was due, in part, to a perception of a gas shortage that discouraged natural gas usage and exploration.
- Annual production of continuous gas (including coal-bed gas) increased from 0.7 TCFG in 1990 to about 2.2 TCFG in 1998. The contribution of continuous gas to the total annual natural gas production in the U.S. will likely increase.
- Average daily gas well productivity in the U.S. today is one-third that of wells completed in the 1970's, possibly because of increasing numbers of lower EUR wells completed in continuous-gas accumulations.

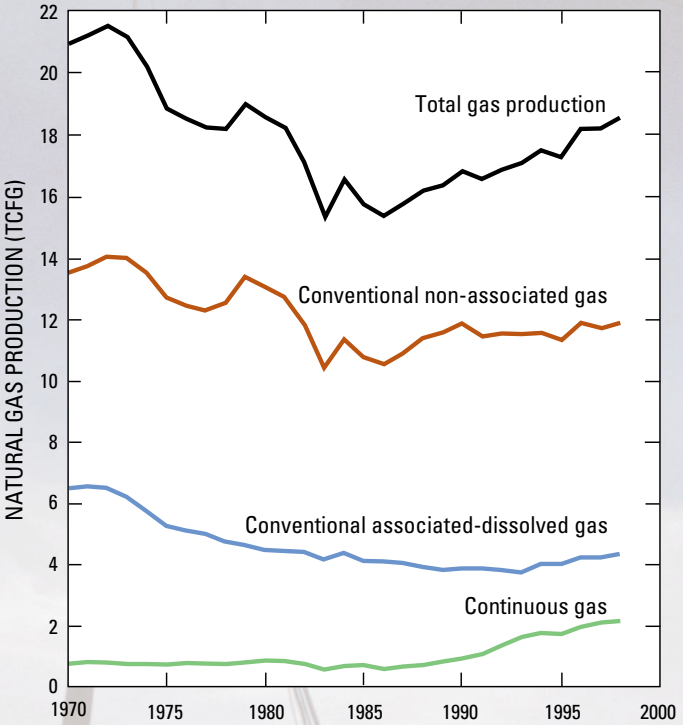


***Figure 3.*** *U.S. natural gas annual production and annual production by gas type. (Data from NRG, 1999.)*

## References Cited


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## For more information:


***Christopher J. Schenk***
(schenk@usgs.gov)

***Richard M. Pollastro***
(pollastro@usgs.gov)

U.S. Geological Survey
P.O. Box 25046
Denver Federal Center, MS 939
Denver, CO 80225

http://energy.cr.usgs.gov/oilgas/noga/