

***Lower 48 Natural Gas Supply Outlook  
Through 2020***

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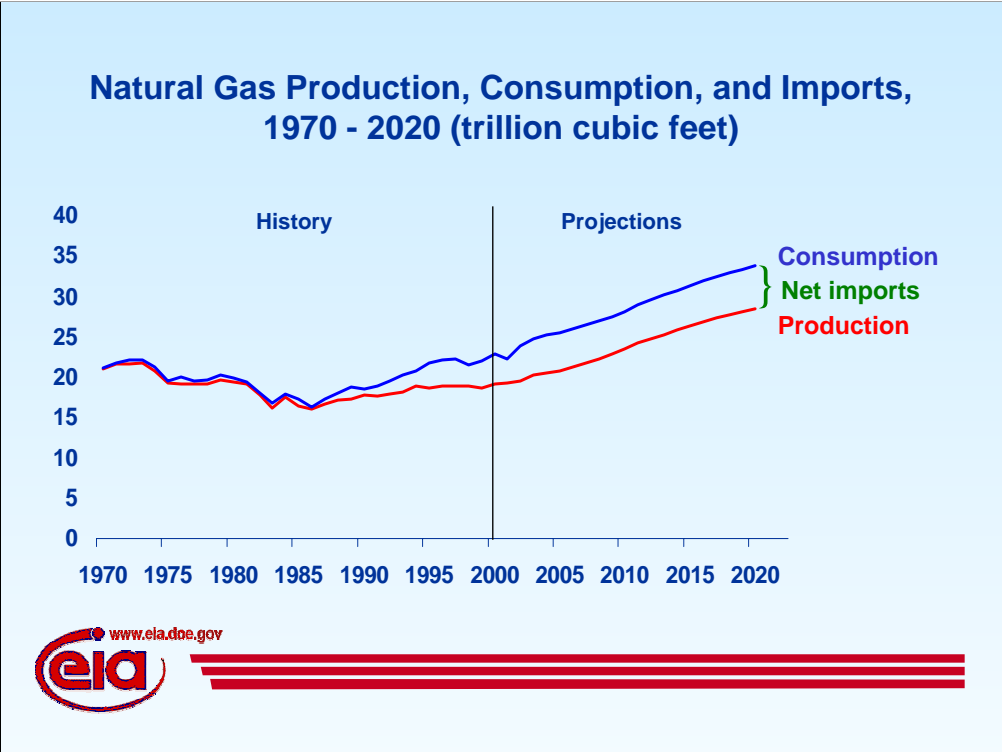
**This morning I'm going to talk about EIA's outlook for U.S. natural gas supply through 2020. Where's it going to come from? And how much will it cost?**

**These projections are from the *Annual Energy Outlook 2002*, which provides projections of domestic energy consumption, supply, prices, and carbon emissions. They are the product of the Energy Information Administration, an independent analytical and statistical agency within the U.S. Department of Energy. We do not speak for any particular point of view on energy policy, and our views should not be construed as representing those of the Department or the Administration.**

**Assumptions are critical to any forecast. The projections are not statements of what *will* happen but of what *might* happen, given certain assumptions. The reference case projections are business-as-usual forecasts, given known technology and technological trends, demographic trends, and current laws and regulations.**

**EIA does not propose, advocate, or speculate on changes in laws and regulations. So, one of our key assumptions is that all current laws and regulations remain as enacted. For AEO2002, that means, for example, that provisions in the recent House and Senate energy bills, such as the opening of ANWR for drilling, are not included in this forecast.**

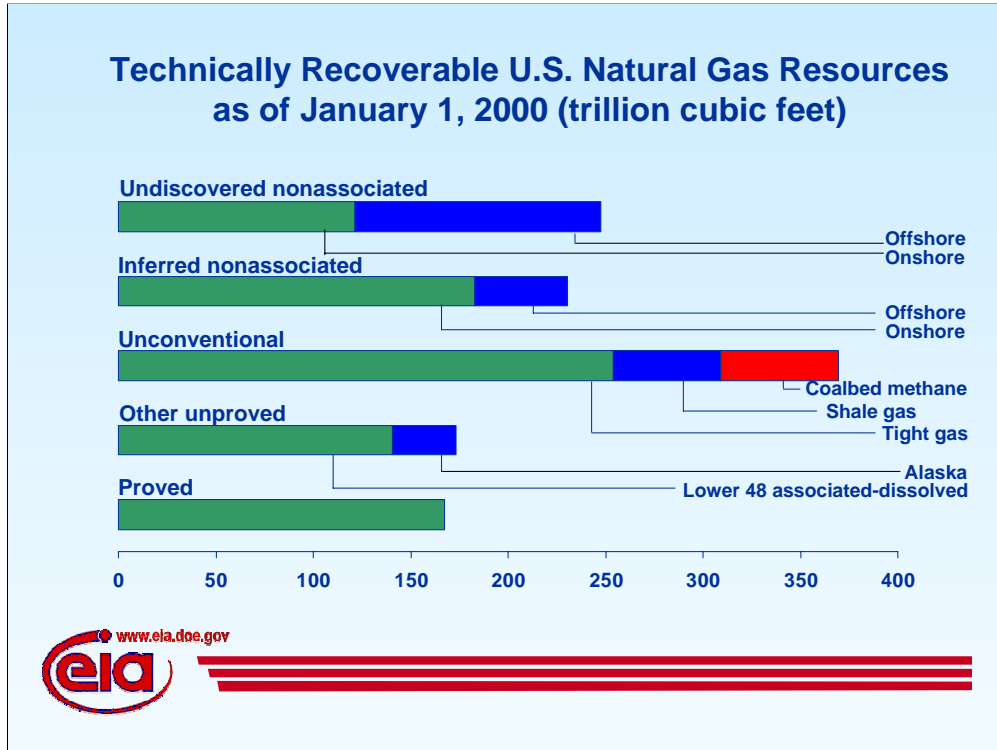
**Now let's look at an overview of the natural gas forecast.**



**Total natural gas consumption is expected to increase to almost 34 Tcf by 2020. More than half of that increase comes from the electric generation sector. By the end of the forecast 26 percent of US delivered energy consumption is in the form of natural gas.**

**Domestic gas production is expected to increase a bit less slowly than consumption over the forecast, rising from 19.2 Tcf in 2000 to 28.5 Tcf in 2020. Growing production reflects rising wellhead gas prices, relatively abundant gas resources, and improvements in technologies, particularly for offshore and unconventional gas. However, under the prices in our reference case we do not expect an Alaskan pipeline will be built to the Lower 48 States. The national average wellhead price is projected to reach \$3.26/Mcf in 2000 dollars by 2020.**

**The difference between consumption and production is made up by increasing use of imports throughout the forecast, particularly from Canada, with a 1.6 Tcf increase expected over 2000 levels. While we do not anticipate the construction of new LNG terminals in the U.S., expansion in the existing terminals results in a four-fold increase over 2000 LNG import levels.**



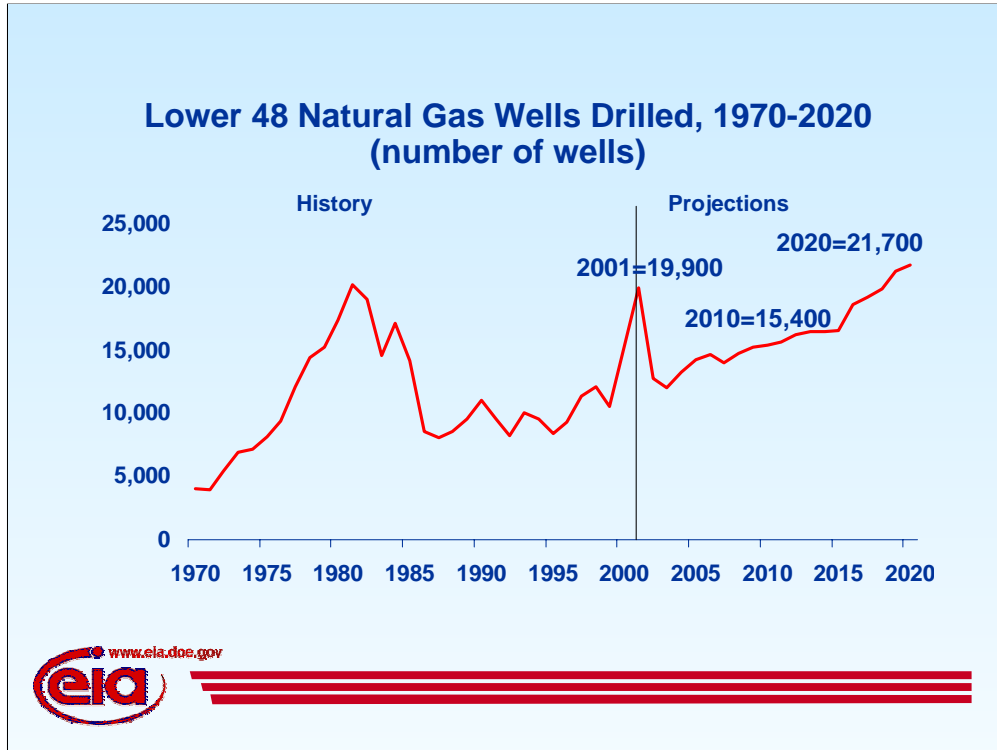
The estimate of total technically recoverable natural gas resources as of January 1, 2000, that was used in developing our forecast is 1,191 Tcf. One way of looking at this, is that we could produce almost 30 Tcf a year for the next 40 years, before we'd run out.

These resource assessments come primarily from the assessments done by the U.S. Geological Survey for onshore regions and by the Mineral Management Service for the offshore.

We had 167 Tcf of proved reserves in the beginning of 2000. That is, gas from known reservoirs that has been demonstrated with reasonable certainty (using geological and engineering data) as being recoverable in future years under existing economic and operating conditions.

Inferred reserves (at 231 Tcf) are also in known reservoirs, but data are insufficient as to the certainty of recovery. 79 percent of inferred reserves are in onshore reservoirs. In the undiscovered resource category, more than half are in the offshore, with 65 percent of these in deep waters, greater than 200 meters.

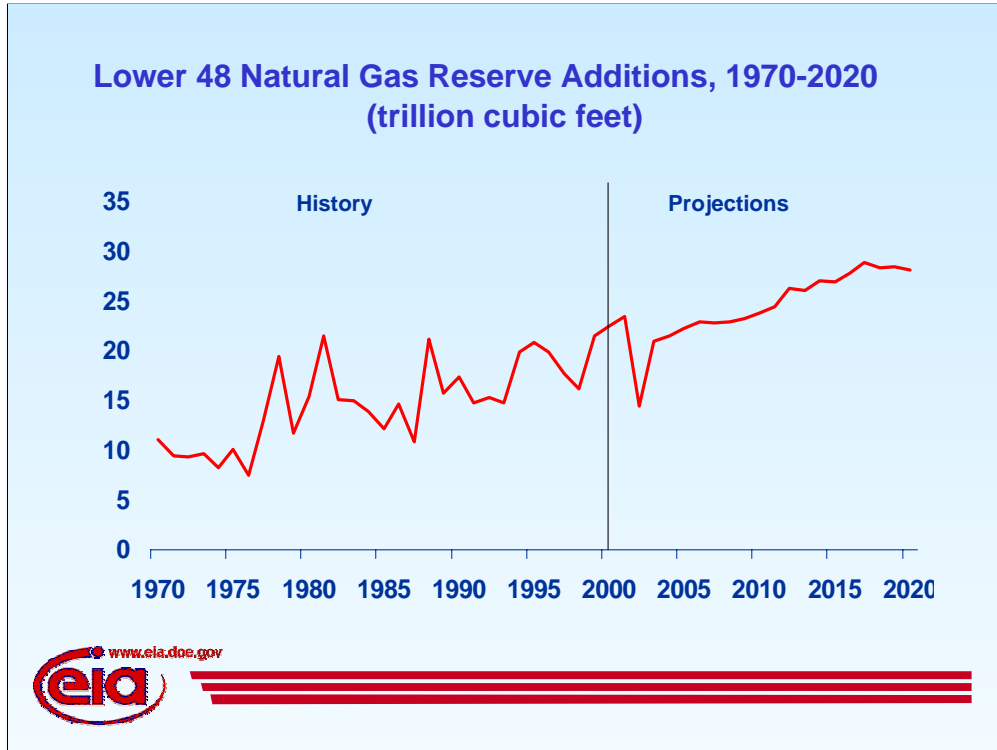
The largest category is unconventional resources with 370 Tcf, with most of that from tight sandstones at 69 percent.



**One of the key activities in producing natural gas is drilling. The slowdown in drilling that resulted from low natural gas wellhead prices in 1998 and 1999 is one of the contributing factors to last winter's high prices, and the subsequent boom in drilling in 2000 and 2001.**

**While lower prices are expected to bring down drilling levels this year, this slowdown reverses itself in the AEO2002 forecast. The number of gas wells drilled is projected to increase from 15,200 in 2000 to 21,700 in 2020. Throughout the forecast about 96 percent of total gas wells are drilled for development in proven reservoirs.**

**Increases in drilling over the forecast are largely driven by growing revenues from drilling activities, as a result of both higher prices and higher production levels. A secondary driver of increased drilling is decreases in drilling costs resulting from technological advances. Technological improvements in the oil and gas supply industry are assumed to continue at historically estimated rates.**

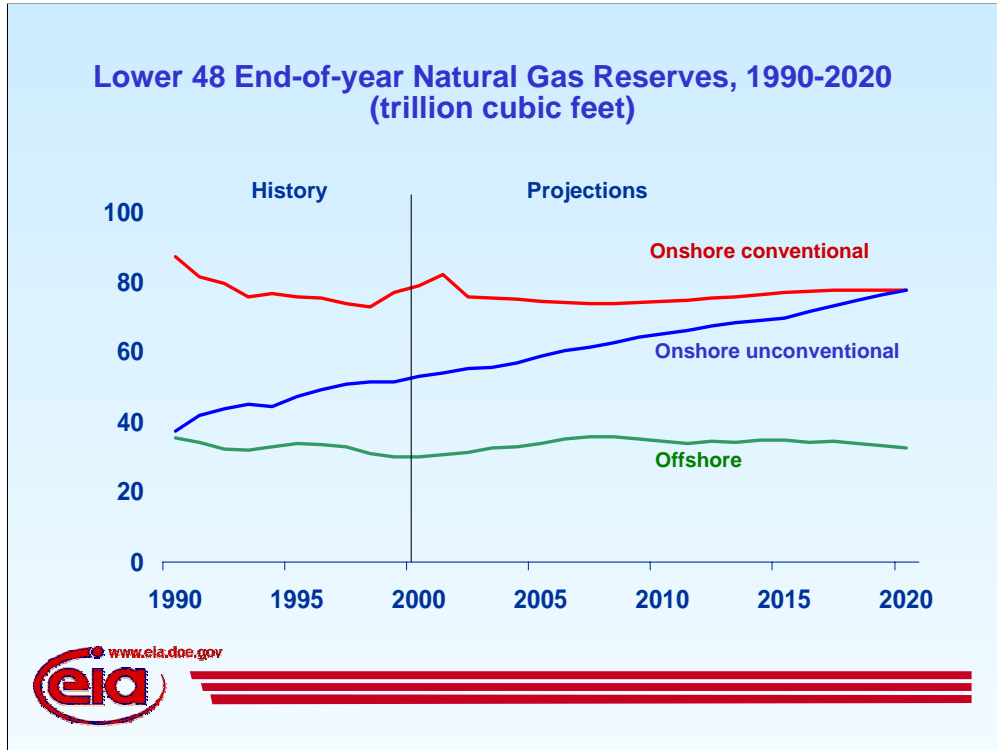


**Now let's go from drilling to total reserve additions.**

**For most of the past two decades lower 48 natural gas production has exceeded reserve additions. Since 1994 this pattern has reversed itself, with the exception of 1997 and 1998 which experienced particularly low prices.**

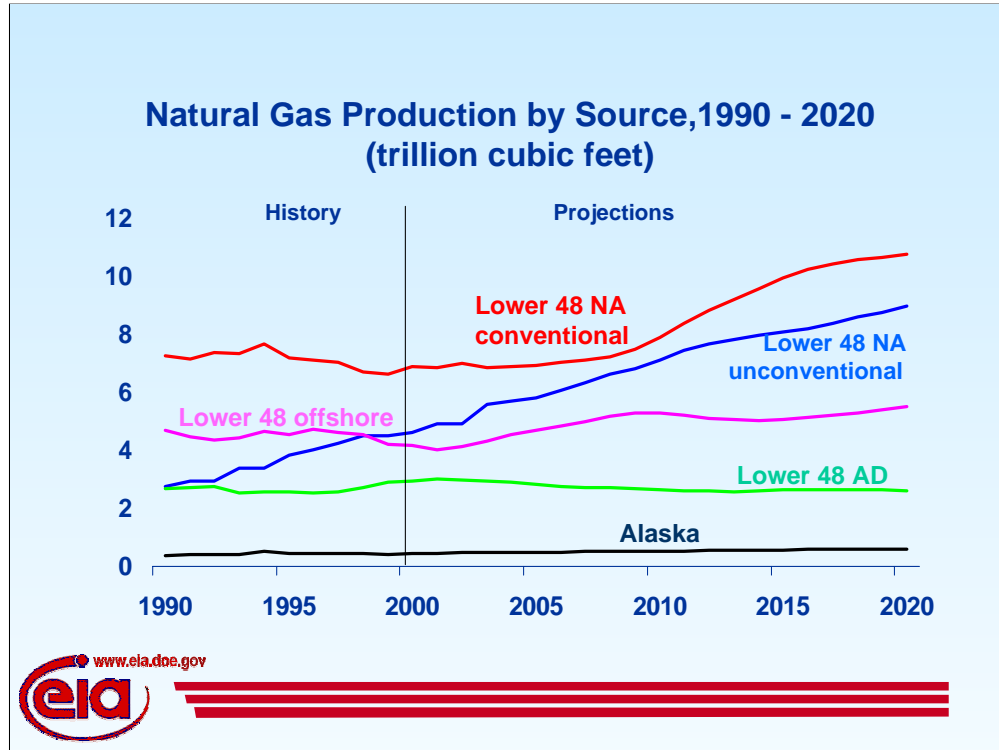
**While low prices in 2002 are expected to result in lower reserve additions relative to production, after 2003, rising prices are projected to result in natural gas reserve additions that generally exceed production through 2020, even with expected increases in demand.**

**The relatively high projected levels of annual gas reserve additions through 2020 reflect an expected increase in exploratory and developmental drilling. This increase is a result of higher prices and expected strong growth in demand, as well as expected productivity gains from technology improvements comparable to those of recent years.**



**As we have just seen, from the early 1980's until the mid-1990's, yearly production of natural gas in the United States exceeded reserve additions.**

**With the 1994 reversal in this trend, reserves have increased in 5 of the past 7 years. Reserves are expected to increase through most of the forecast period, with increasing onshore unconventional reserves compensating for declines in conventional reserves. Lower 48 end-of-year reserves in 2020 are projected to be 16 percent above 2000 levels. As a result, reserves are anticipated to be adequate to sustain the projected levels of production throughout the AEO2002 forecast period.**

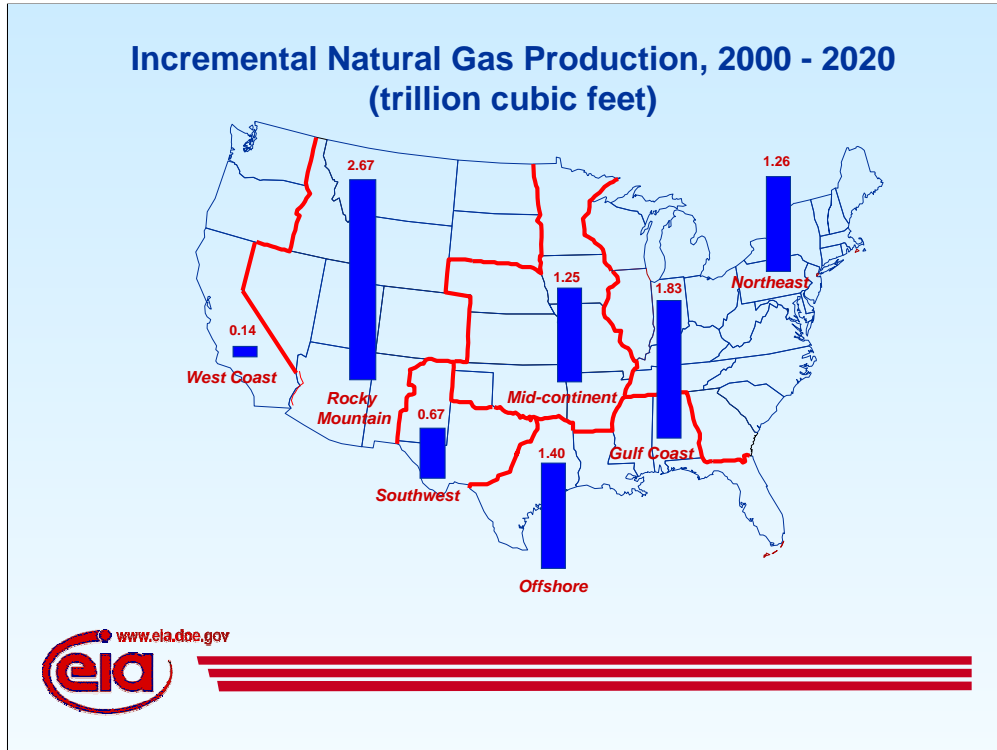


Domestic gas production is expected to increase from 19.2 Tcf in 2000 to 28.5 Tcf in 2020. Increased US natural gas production comes primarily from lower 48 onshore conventional nonassociated sources--which accounted for 36 percent of US domestic production in 2000--with an expected increase of 3.9 Tcf by 2020.

Offshore production, mainly from wells in the Gulf of Mexico, also rises, although less rapidly. Lower 48 offshore Gulf Coast production was 5.3 Tcf in 2000, down slightly from the record 5.5 tcf level in 1996. But by 2020 this level is expected to increase to 6.8 Tcf.

Unconventional gas production increases at the fastest rate of any other source over the forecast period, largely because of expanded tight sands gas production in the Rocky Mountain region. Annual production from unconventional sources is expected to increase by 4.4 Tcf by the end of the forecast.

Alaska natural gas production rises gradually over the forecast to provide for consumption in the State itself and continued LNG exports to Japan.



The Rocky Mountain region, with the majority of the unconventional production, shows the greatest increase in production due to improved technologies and the availability of abundant resources.

While the onshore Gulf Coast region is the second highest producing region throughout the forecast, it is the only region with a decline in production in the last 3 years.

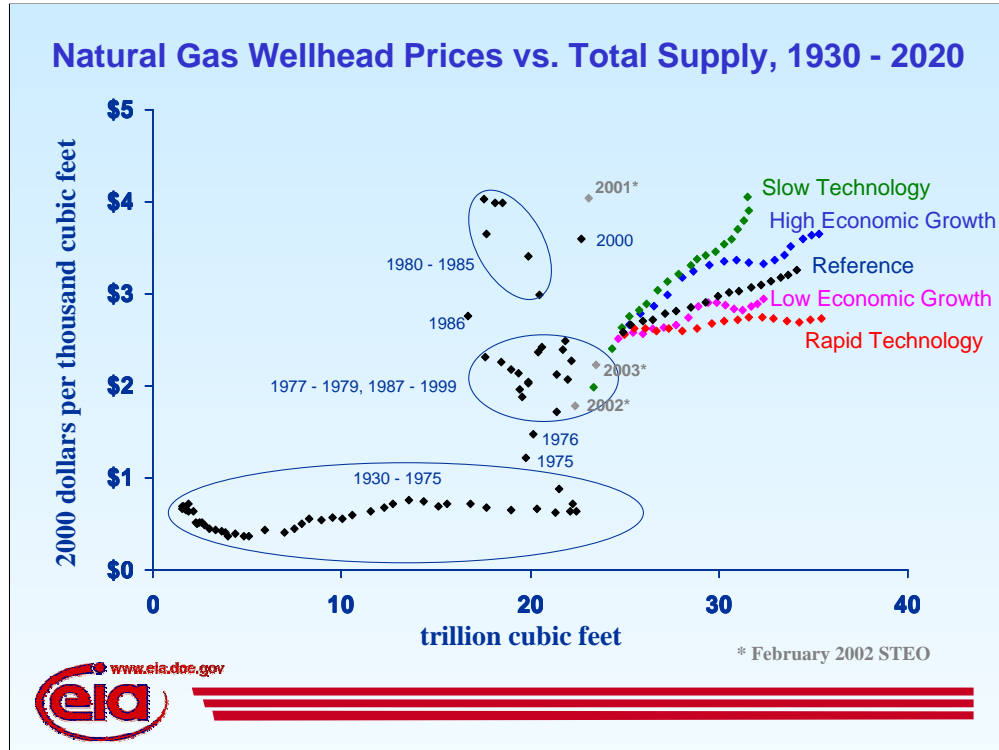
The highest producing region throughout the forecast is the offshore. Innovative use of cost-saving technology in recent years and the expected mid-term continuation of recent huge finds, particularly in the deep waters of the Gulf of Mexico, support the projections.

Both the Southwest and the Mid-continent regions grow at about the same rate as the total U.S. production, generally maintaining their regional share.

The Northeast continues to be the second lowest producing region throughout the forecast, but shows the greatest growth in percentage terms. The majority of gas production from the Northeast is from unconventional sources.







To provide a different prospective on the forecast, this graph shows the average natural gas wellhead price, plotted against total supply, including imports, for history, our reference case forecast, and (to demonstrate some of the uncertainty in our forecast) four of our side cases. Under the reference case, technologies are assumed to increase at historical rates. Rapid and slow technology cases are generated by increasing and decreasing the technology parameters in the model by 25 percent. Macroeconomic growth is 3.0 percent in the reference case, 2.4 in the low and 3.4 in the high growth case.

**History:** \* bottom circle - market under price regulation

\* as natural gas prices were deregulated, gas prices rose

\* top circle - high oil prices pulled gas prices with them (oil/gas prices coupled)

\* then we entered into a decade of relatively stable prices (middle circle)

**STEO:** The significance of the 2000/2001 price spike can be seen clearly in the graph. However, our latest Short-Term forecast for 2002 and 2003 (at \$1.86 and \$2.23 per Mcf) are much more in-line with recent historical trends. This graph also provides a perspective of the rapid growth in expected consumption (and therefore supply) over our forecast.

Natural gas projections vary significantly under alternate technology and economic growth assumptions. In 2020, average prices and total supply range from a high of \$4.06 per Mcf with total supply at 31.5 tcf in the slow technology case to a low of \$2.73 per Mcf with total supply at 35.4 tcf in the rapid technology case. It is also interesting to note that in the slow technology case, you can see the demand feedback--when prices reach high levels, demand for gas starts to back off.

## Summary

**In summary, with relatively abundant gas resources and with oil and gas E&P technological improvements continuing at historical rates -- particularly for offshore and unconventional gas-- domestic gas production is projected to increase by 2 percent per year on average over the forecast period. A similar rate of increase is expected for the price, from a base price representing the average over the last 5 years of the 1990's -- \$2.18/mcf in 2000 dollars.**

**With an even more rapid growth in imports (2.4 percent per year), largely from Canada, sufficient supplies will be available to satisfy the growing demand for natural gas, primarily from electric generators, without significant increases in the general price trajectory. However, the forecast is based on many assumptions, which may or may not materialize, leaving much room for uncertainty. In addition, the variation off of the general price trajectory in any future year could be significant, as happened in 2001.**