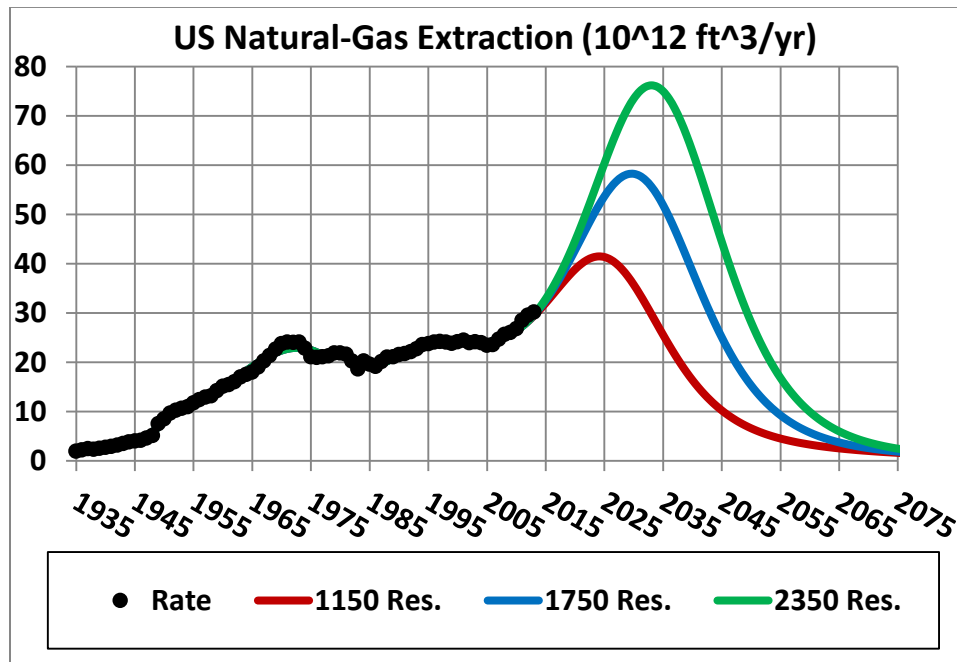


# Availability of Natural Gas in the United States

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The area under the curve is the total amount that will be extracted.  
The area under the data points to 2013 is about 1373 trillion cubic feet.

Crucial information for the future of the United States is how much natural gas can be extracted each year in the future. Natural gas is the fossil fuel that puts the least carbon dioxide in the atmosphere when it is burned for fuel. However, this is apparently not true for natural extracted by fracking (<http://oilprice.com/Energy/Energy-General/New-Study-Finds-Higher-Methane-Emissions-from-Fracking.html>).

Collecting extraction data for natural gas is made somewhat difficult in that there are several different sources of it. All of the sources are methane, one of the most potent greenhouse gases. In the atmosphere methane has a half-life of about 7 years; it reacts with oxygen to produce carbon dioxide and water vapor, both greenhouse gases.

Accurate extraction data for previous years back to 1900 are available online from the federal Energy Information Agency (EIA). The EIA also estimates proven reserves and unproven resources for natural gas. One can fit a depletion function to the extraction data and project the fit into the future if a reasonably accurate estimate of the amount to be extracted in the future is known.

The EIA estimated value of proven reserves for 2013 is 963 trillion cubic feet (1 cubic foot = 1000 BTU when burned). When one uses this value to fit the data it is clear that the estimated reserves value is much too low. The graph shows three fits to the extraction data for reserves values of 1150, 1750 and

2350 trillion cubic feet. EIA data and reserves for shale gas extraction favors the red curve in the graph, which peaks about year 2024, only 10 years from now. The green curve for the high reserves value of 2350 trillion cubic feet peaks at about year 2034, only 20 years from now. Changing the reserves value by large amounts does not change the peak year by very much because the extraction is occurring at a very high rate. It is not wise for the U.S. to convert electric-power plants to natural gas instead of accelerating electricity generation from renewable sources. Similarly it is not wise to convert cars to natural gas instead of producing more electric cars.

If we were wise we would greatly slow down natural-gas extraction so that we have it longer and that it will not contribute to global warming so much.

The EIA 2009 estimated value of unproven resources is 6400 trillion cubic feet. It is reasonable to expect that much of that will never be extracted because extraction gets more difficult and causes more environmental damage as it progresses. At some time renewable energy will be less expensive and less destructive. But, if 6400 trillion cubic feet were to be extracted in the current rising extraction, it would peak at about year 2040, only 26 years from now.

There is movement among power companies to convert coal-burning plants to natural-gas plants and among trucking companies to convert diesel-burning trucks to natural gas. That is a short-term solution. The graph makes clear why I and many others are not switching from gasoline cars to natural-gas cars. When the national infrastructure is in place for charging electric cars and electricity is generated mainly from renewable energy sources, both of which are underway, it will be necessary to have all cars being powered by electricity.

There are many environmental problems with the current main method of extracting natural gas, fracking; the two main ones are huge amounts of toxin-laced water inserted into the ground and the triggering of many earthquakes. Triggering earthquakes is especially dangerous in California where fracking is getting underway.

To learn more about extraction of natural gas in the United States see [http://www.roperId.com/science/minerals/USGasBoom\\_Bust.htm](http://www.roperId.com/science/minerals/USGasBoom_Bust.htm) and <http://www.roperId.com/science/minerals/ShaleGas.htm>, and about extraction of all fossil fuels worldwide see <http://www.roperId.com/science/minerals/FossilFuels.htm>.