

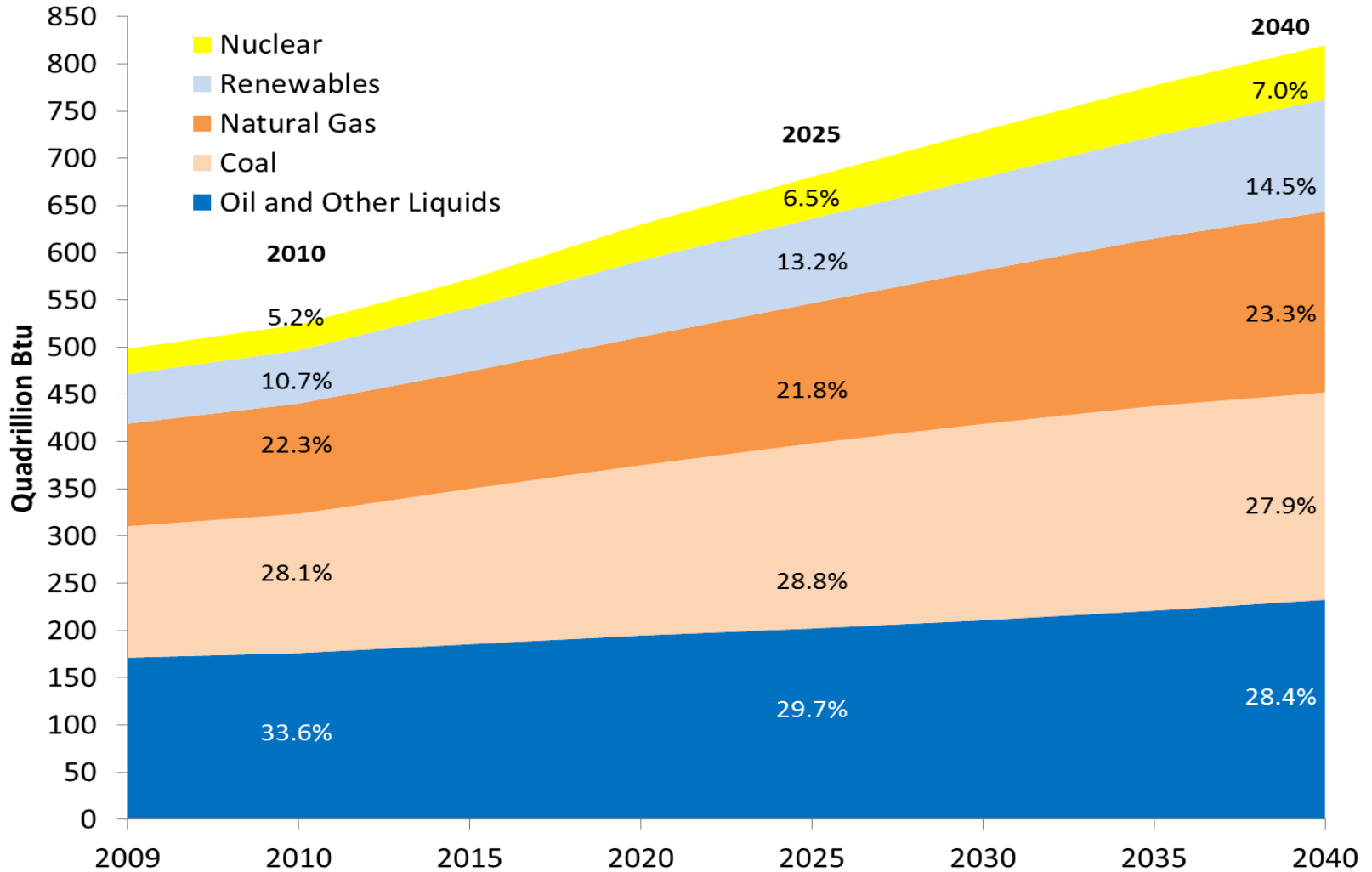
The North American Energy Renaissance

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Future Global Energy Demand

The world will require 56 percent more energy in 2040 than in 2010

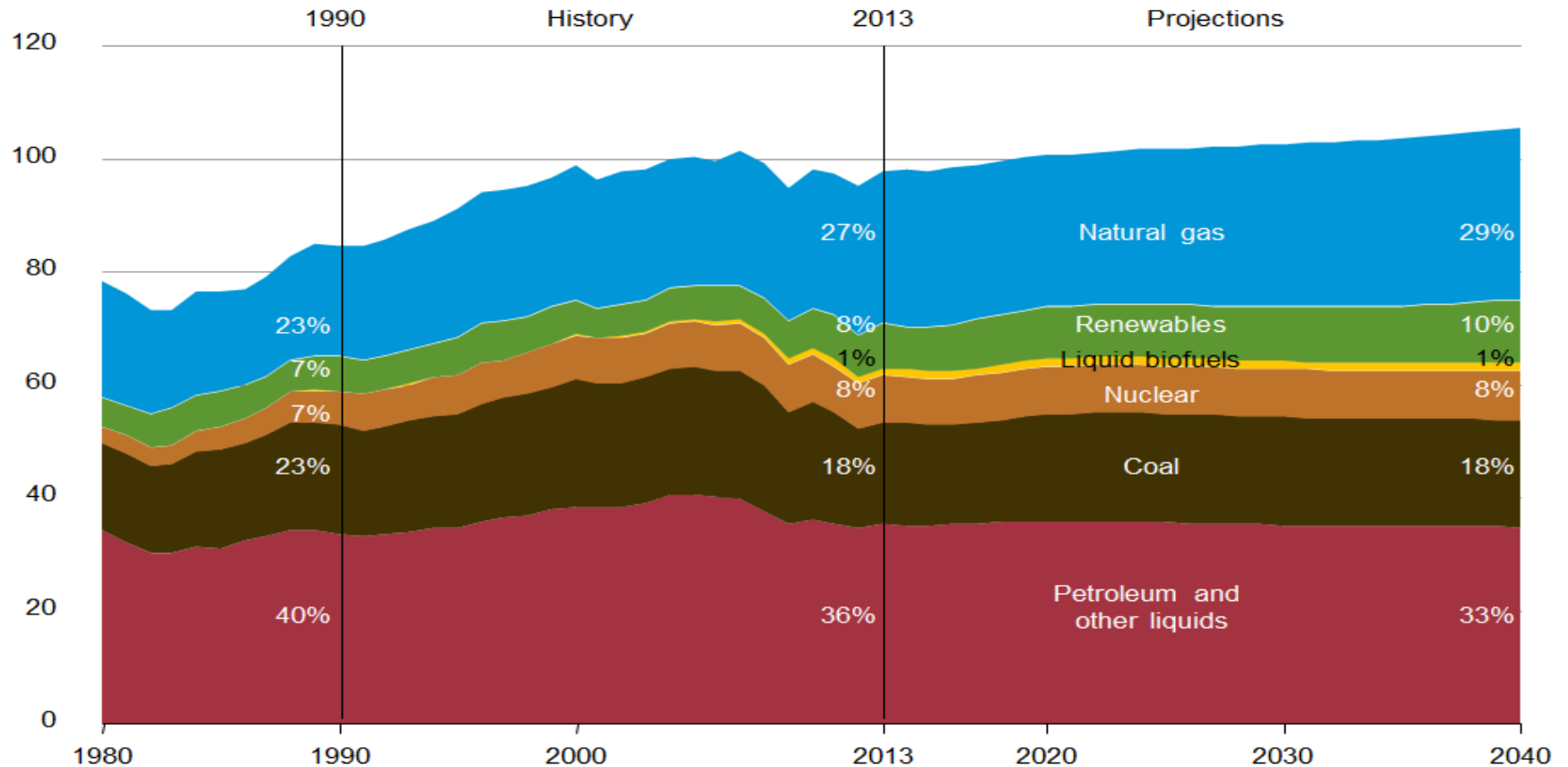


Future U.S. Energy Demand

The U.S. will require 9 percent more energy in 2040 than in 2013

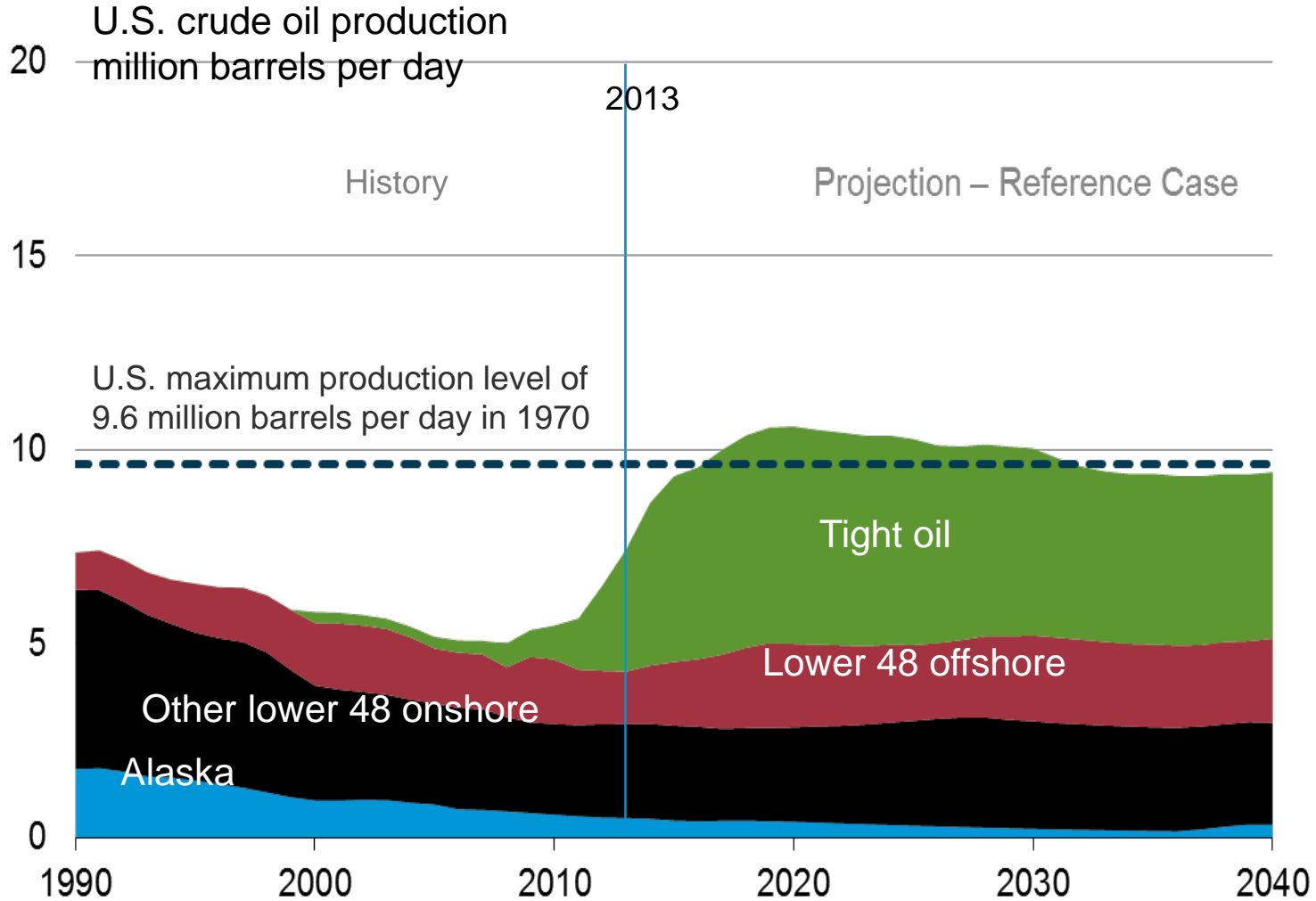
Figure 18. Primary energy consumption by fuel in the Reference case, 1980-2040

quadrillion Btu



Source: EIA, Annual Energy Outlook 2015

U.S. Energy Revolution

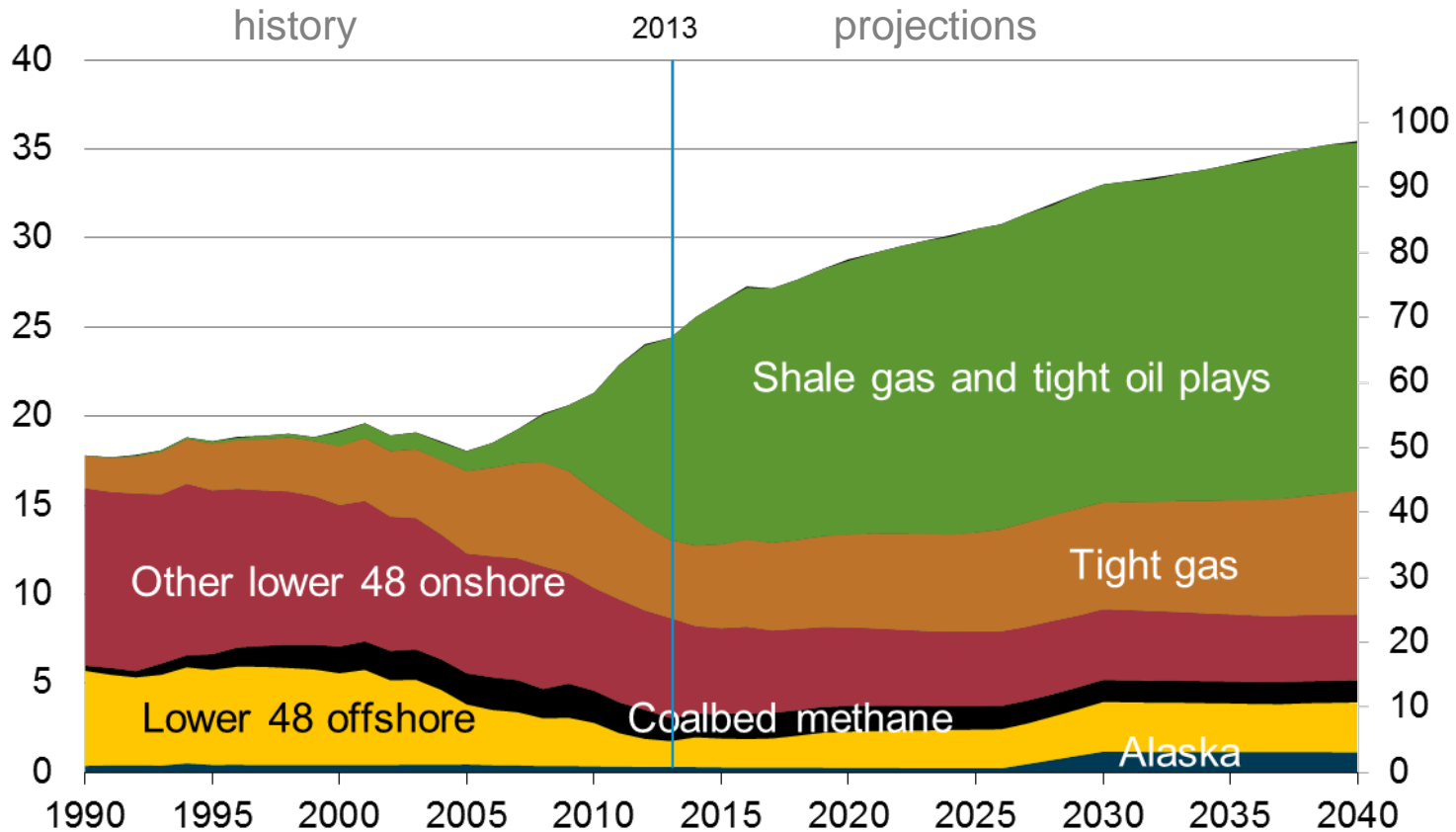


Source: EIA, Annual Energy Outlook 2015 Reference Case

U.S. Energy Revolution

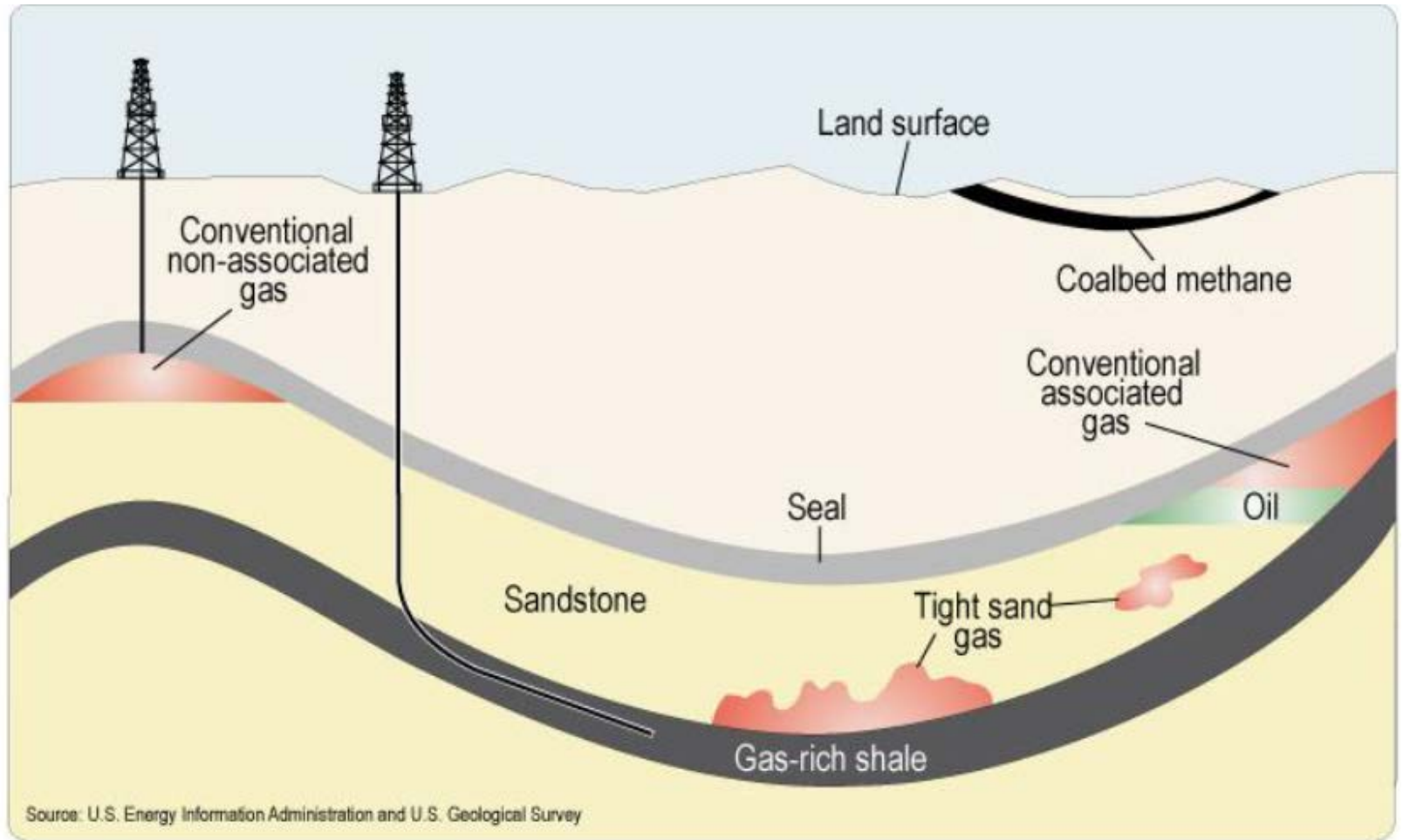
U.S. dry natural gas production
trillion cubic feet

billion cubic feet per day



Source: EIA, Annual Energy Outlook 2015 Reference case

Underground Sources of Natural Gas and Oil



Source: modified from U.S. Geological Survey Fact Sheet 0113-01

Hydraulic Fracturing: Straight to the Source

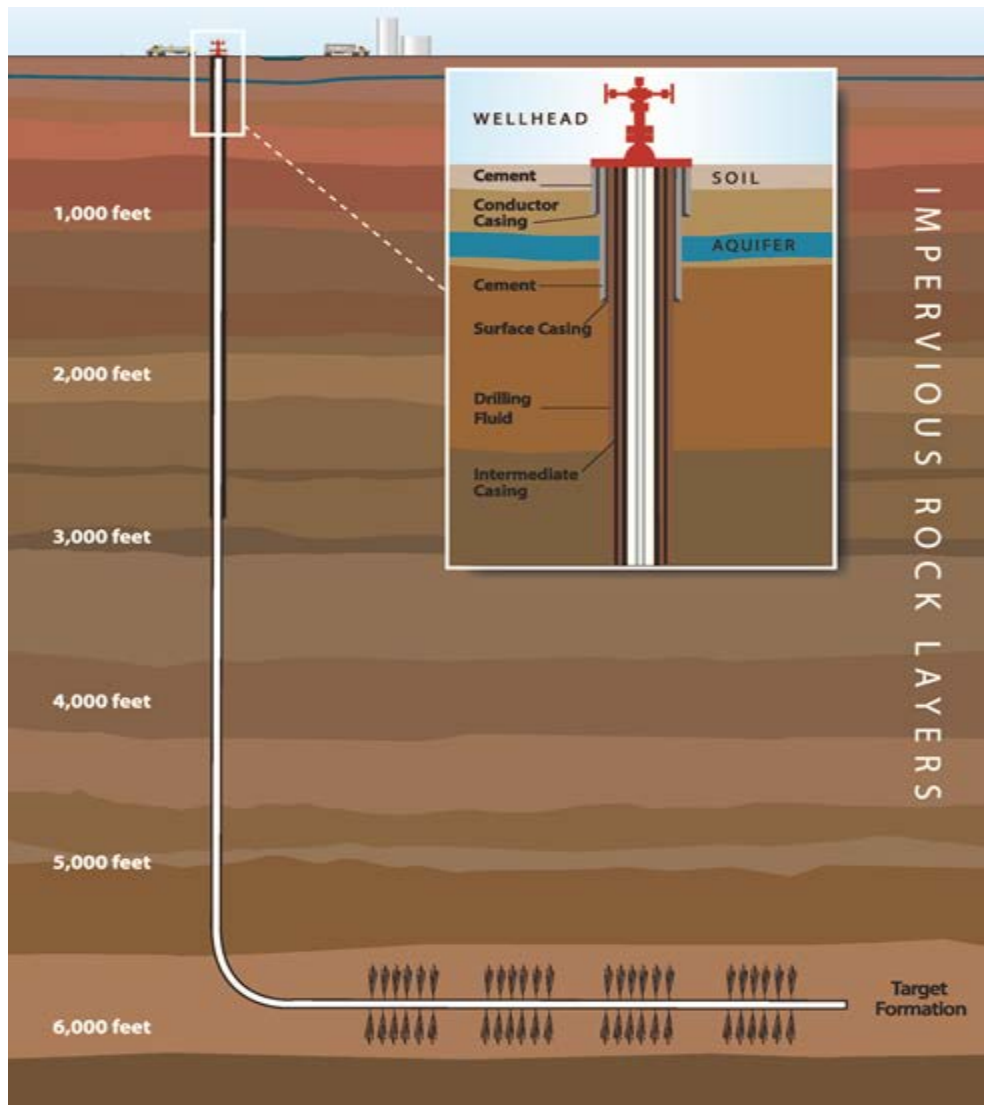


More common to be combined with horizontal drilling.

Is mostly a **mechanical** process of creating cracks in nonpermeable source rocks.

Oil or natural gas is there – it needs stimulation to flow.

Typically 1000's of feet below usable aquifers.

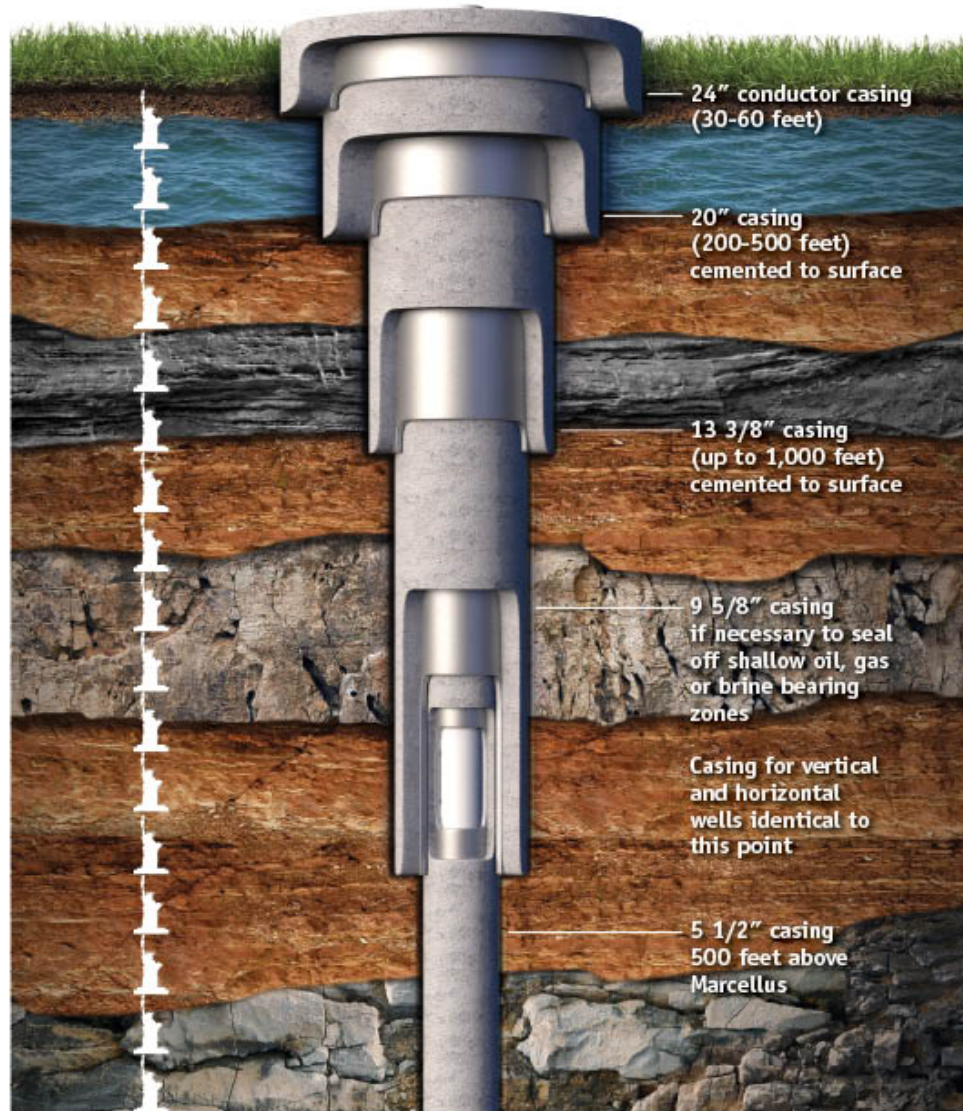


Aquifer

Source
Rock

General Casing Design for a Marcellus Shale Well

The Marcellus Shale is more than a mile below the Earth's surface.
It would take 17 Statues of Liberty on top of one another to reach the formation.



The U.S. Energy Renaissance

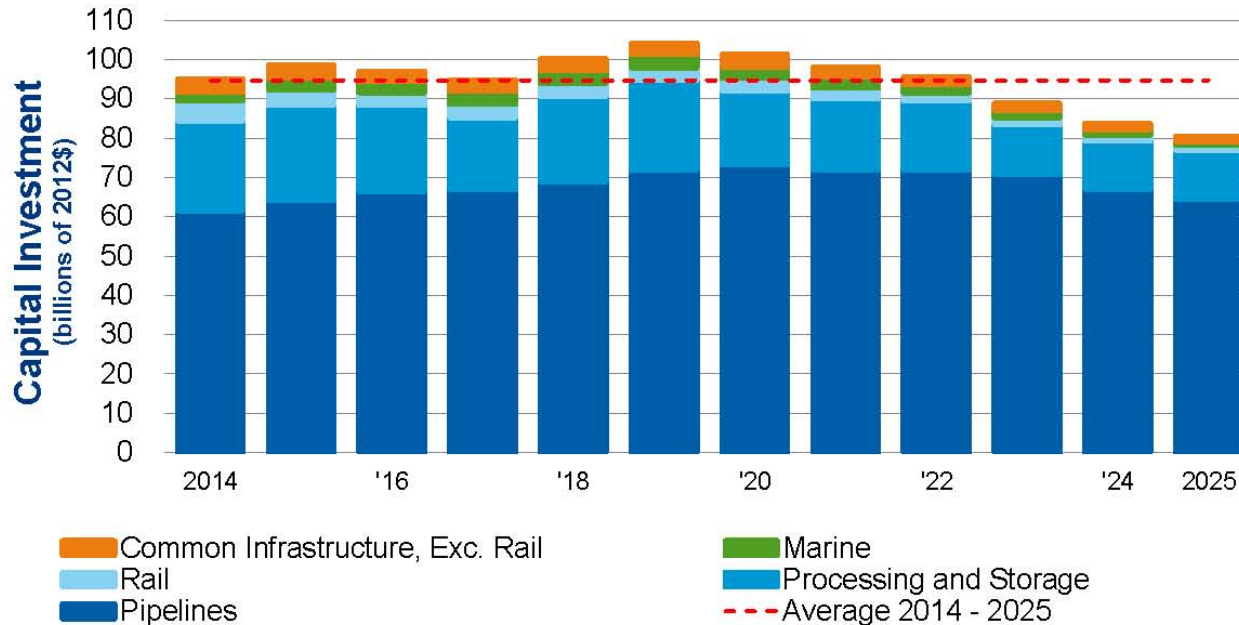
Unconventional development economic benefits:

- Jobs: 2.1 million in 2012; 3.9 million by 2025
- GDP: \$284 billion added in 2012; \$533 billion in 2025
- Government revenue: \$1.6 trillion from 2012-2025
- Trade deficit: reduced \$180 billion annually
- Household income (utility bill savings): \$1200 higher in 2012; \$3500 higher in 2025

From IHS, September 2013

\$1.1 Trillion in Infrastructure Investment

Capital Investment by Transport Mode – High Production Case
(average annual investment = \$94.8 billion)



Source: IHS 2013

Questions?

For more information:

www.api.org

www.energytomorrow.org