

Pennsylvania's Energy Industry

Global Perspective



PIOGA/Independent Oil and Gas Producers

- PIOGA: largest and most diverse association of oil and gas businesses, over 900 members
- Represent conventional and Marcellus/Utica shale producers
- Pennsylvania activity:
 - Conventional natural gas/coal-bed methane well
 - Shallow oil wells
 - Unconventional/Shale wells



Quest for Energy



Quest for Energy

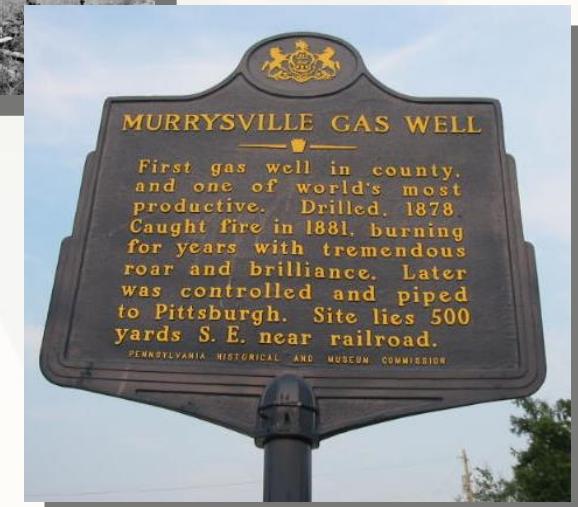
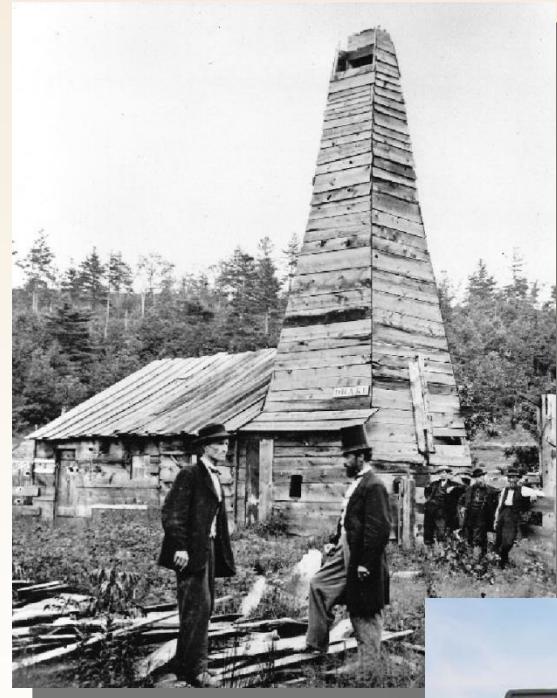


Petroleum in Pennsylvania

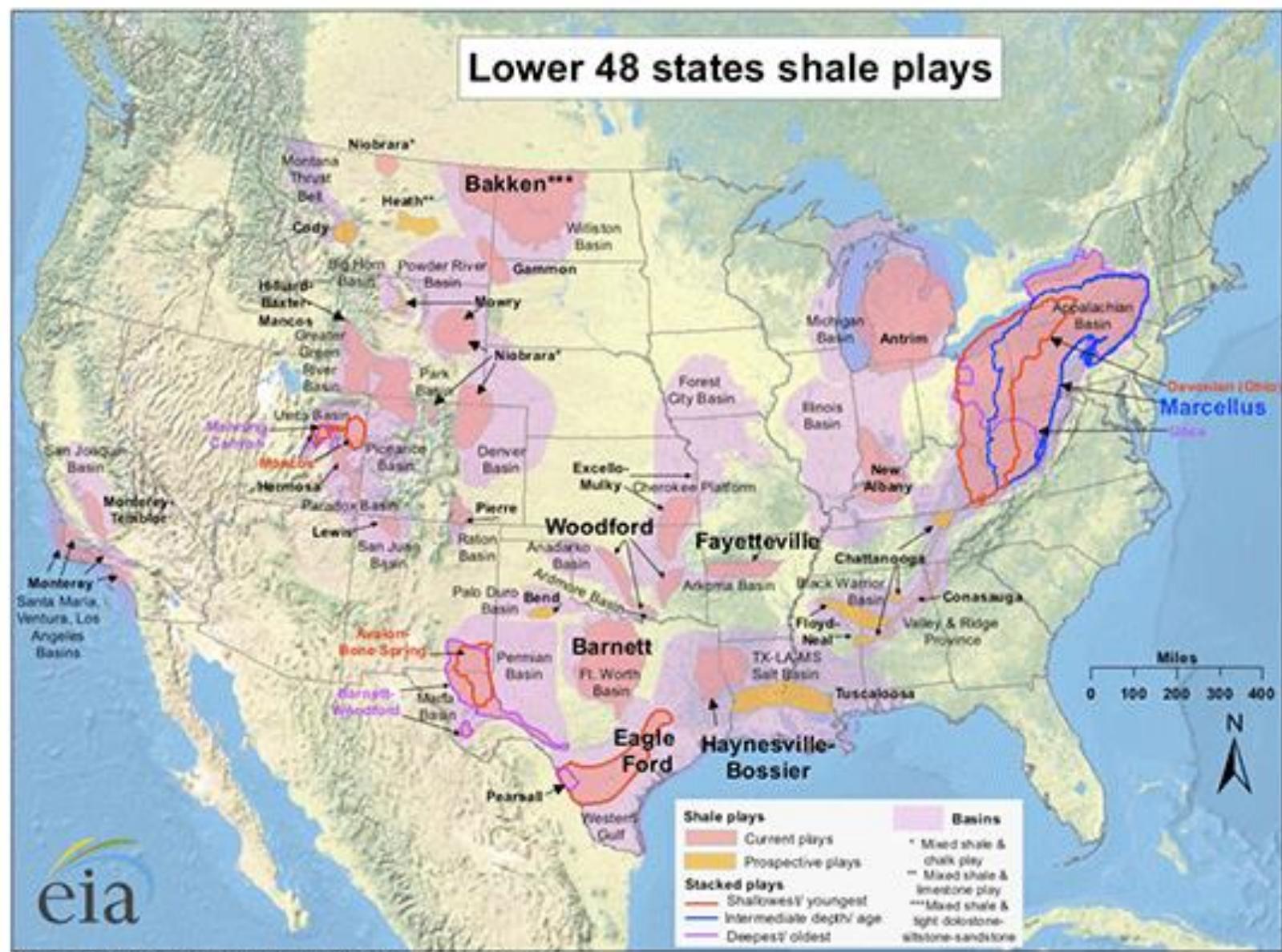


Pennsylvania Oil and Natural Gas History

- Fueling Pennsylvania for more than 150 years
- 1859: Drake Oil Well near Titusville, “The start-up that changed the world”
- 1878: Haymaker Well in Murrysville, First commercial natural gas well in U.S.
- 350,000 vertical wells drilled
- 100,000 wells remain in production today



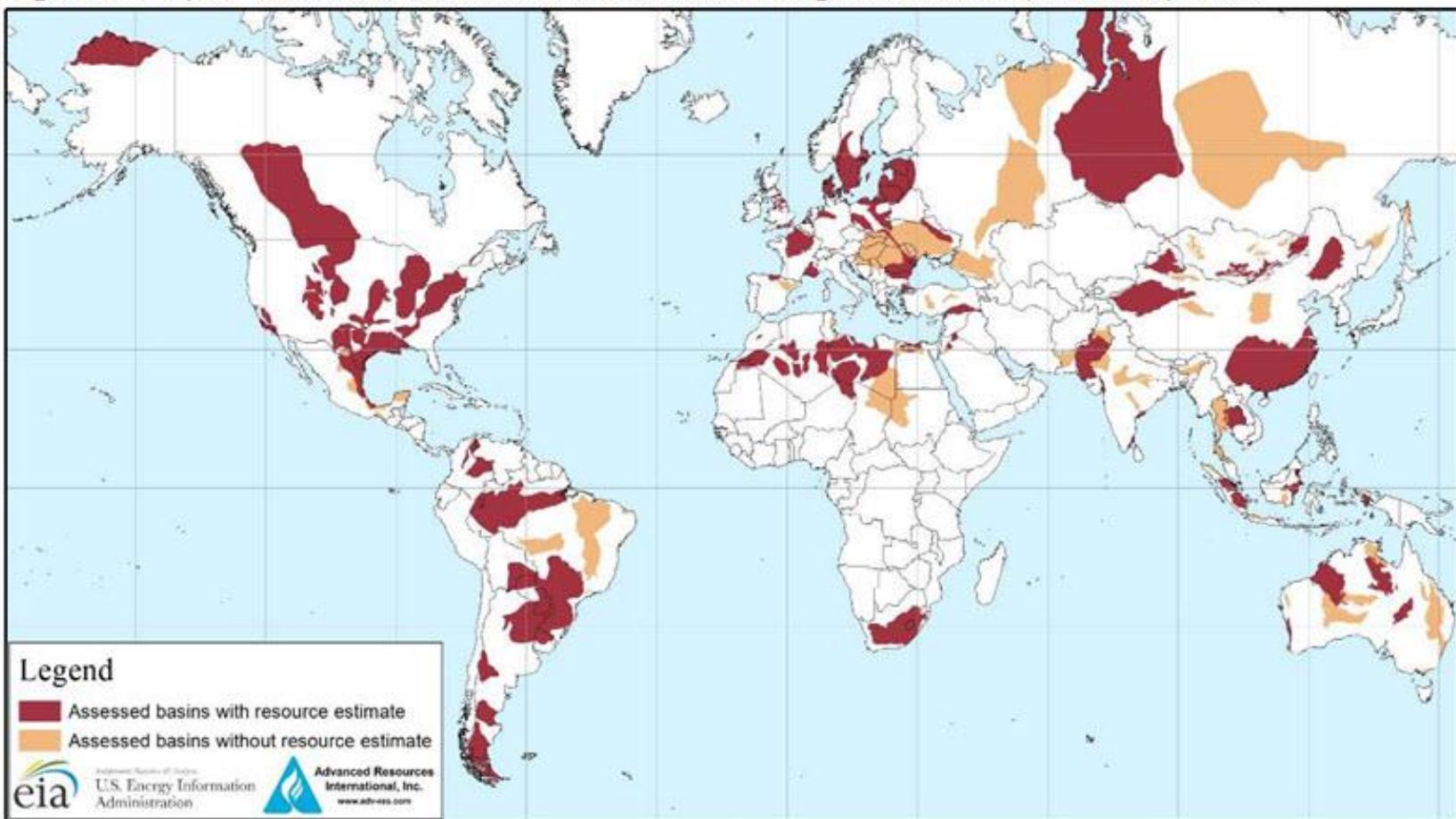
Lower 48 states shale plays



Source: Energy Information Administration based on data from various published studies.
Updated: May 9, 2011



Figure 1. Map of basins with assessed shale oil and shale gas formations, as of May 2013

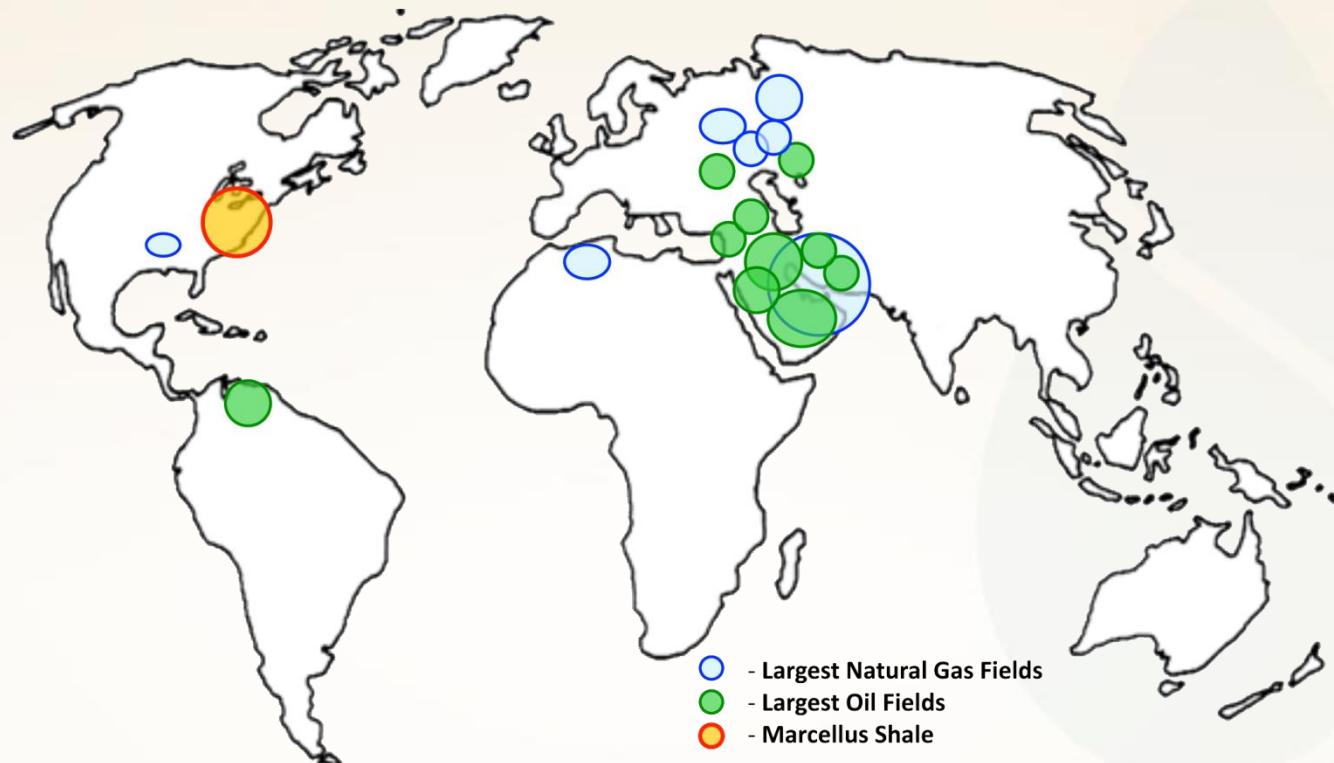


Source: United States basins from U.S. Energy Information Administration and United States Geological Survey; other basins from ARI based on data from various published studies.

How the Appalachian compares...

...to the largest oil and gas fields in the world

Marcellus and Utica reserves could exceed those of the largest oil field in the world (Saudi Arabia) and be the 2nd largest natural gas field (largest in Qatar/Iran)



(Bubble size approximates reserves)

ARI report coverage	2011 Report	2013 Report
Number of countries	32	41
Number of basins	48	95
Number of formations	69	137
Technically recoverable resources, including U.S.		
Shale gas (trillion cubic feet)	6,622	7,299
Shale / tight oil (billion barrels)	32	345

Note: The 2011 report did not include shale oil; however, the *Annual Energy Outlook 2011* did (for only the U.S.) and is included here for completeness. Advanced Resources International (ARI), was released as part of a U.S. Energy Information Administration (EIA) report titled *World Shale Gas Resources: An Initial Assessment of 14 Regions Outside the United States*.



605 CNG stations in the United States



"If you're a business that needs to transport goods, I'm challenging you to replace your old fleet with a clean energy fleet that's not only good for your bottom line, but good for our economy, good for our country and good for our planet."—President Barack Obama, speaking at UPS in Maryland