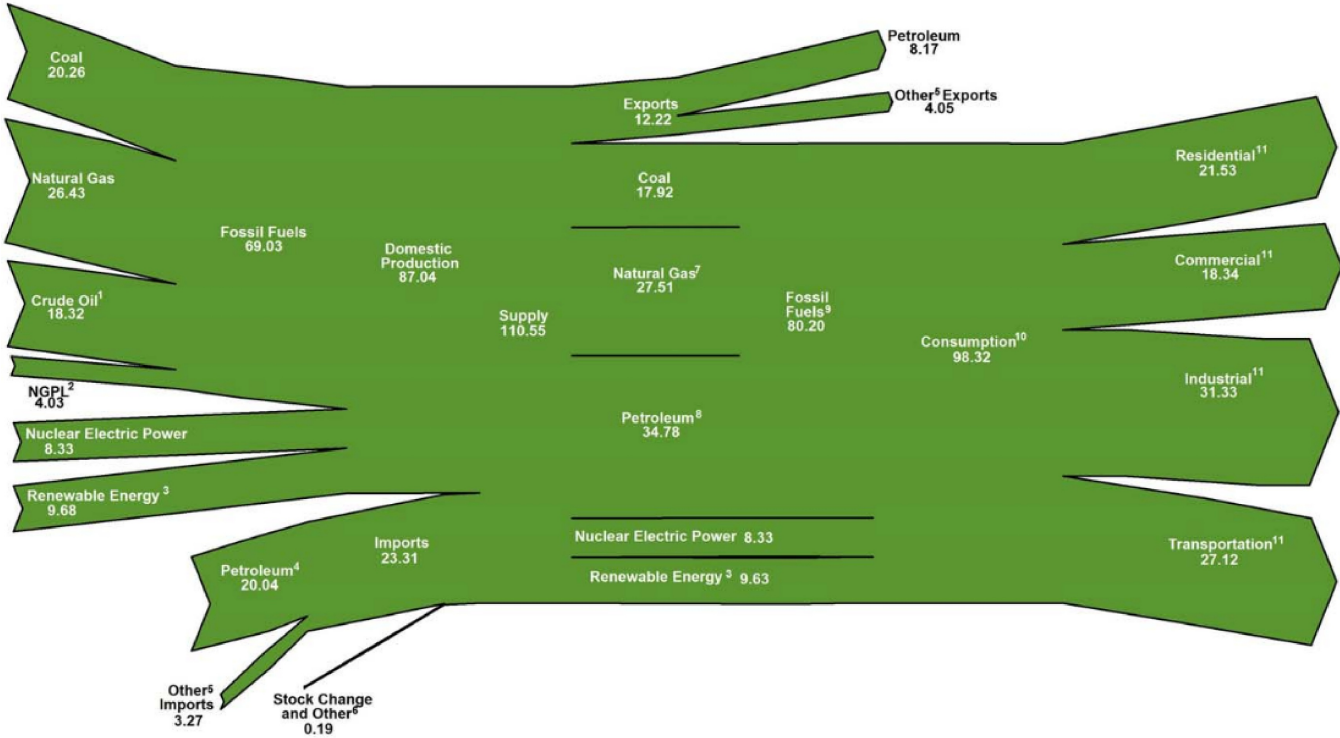


U.S. Energy Flow, 2014

(Quadrillion Btu)



A quad is a unit of energy equal to 10^{15} (a short-scale quadrillion) BTU, or 1.055×10^{18} joules (1.055 exajoules or EJ) in SI units.

The unit is used by the U.S. Department of Energy in discussing world and national energy budgets. The global primary energy production in 2004 was 446 quad, equivalent to 471 EJ. [2]

Some common types of an energy carrier approximately equal 1 quad are:

8,007,000,000 Gallons (US) of gasoline

293,083,000,000 Kilowatt-hours (kWh)

293.08 Terawatt-hours (TWh)

33.434 gigawatt-years (GWy)

36,000,000 Tonnes of coal

970,434,000,000 Cubic feet of natural gas

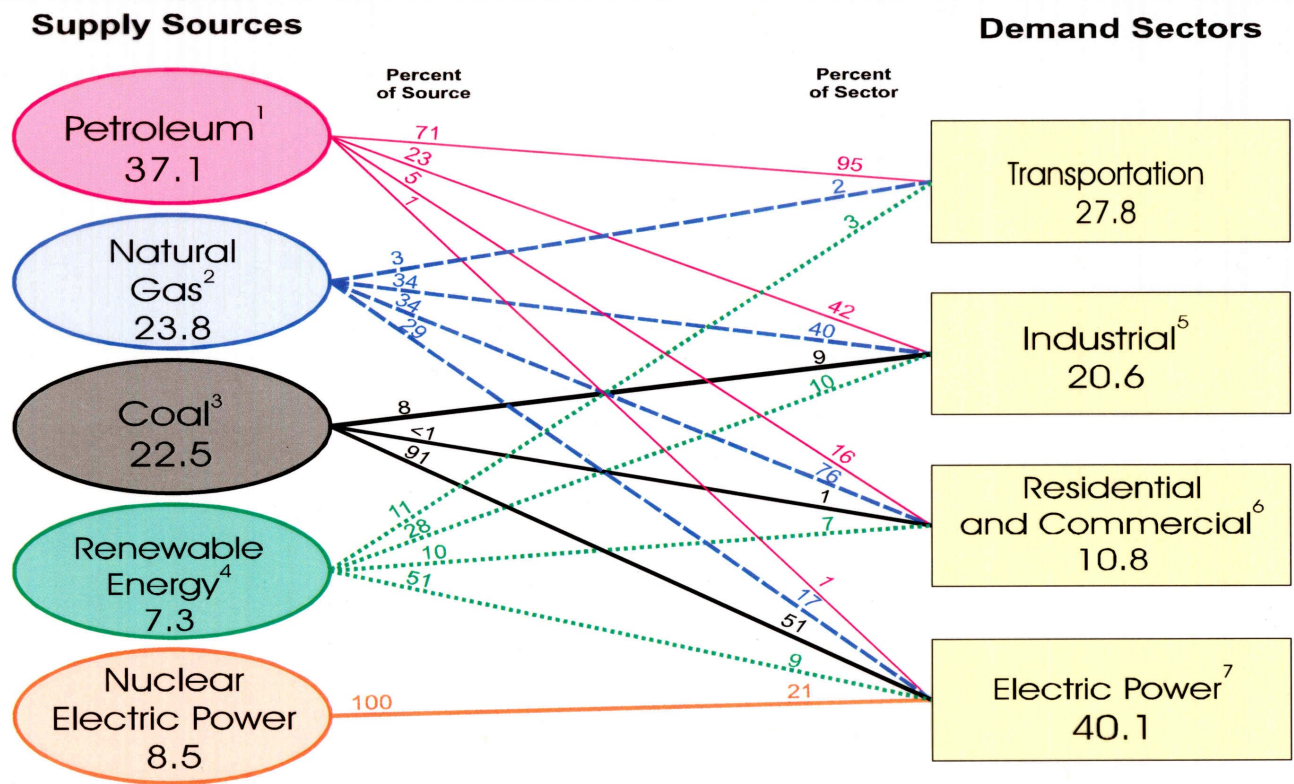
5,996,000,000 UK gallons of diesel oil

25,200,000 Tonnes of oil

252,000,000 Tonnes of TNT

13.3 Tonnes of Uranium-235

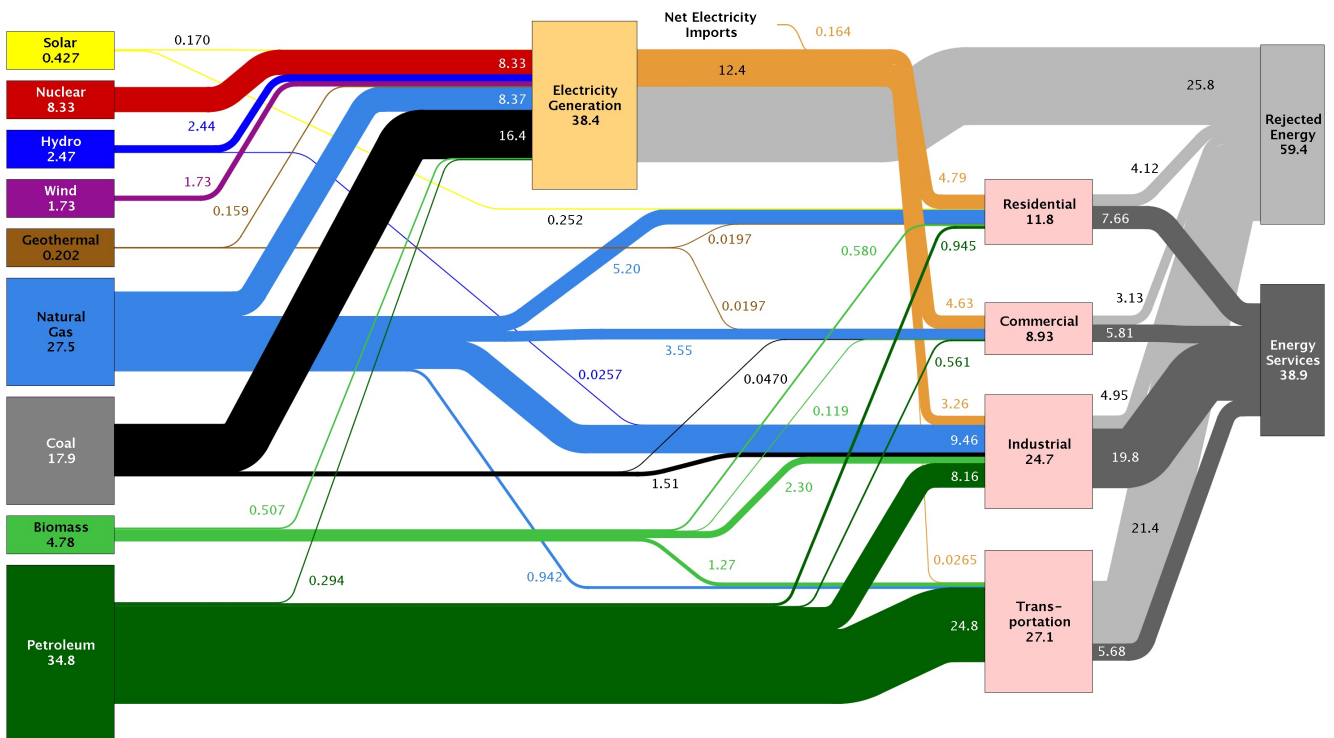
Figure 2.0 Primary Energy Consumption by Source and Sector, 2008
(Quadrillion Btu)



¹ Does not include the fuel ethanol portion of motor gasoline—fuel ethanol is included in "Renewable Energy."
² Excludes supplemental gaseous fuels.
³ Includes less than 0.1 quadrillion Btu of coal coke net imports.
⁴ Conventional hydroelectric power, geothermal, solar/PV, wind, and biomass.
⁵ Includes industrial combined-heat-and-power (CHP) and industrial electricity-only plants.

⁶ Includes commercial combined-heat-and-power (CHP) and commercial electricity-only plants.
⁷ Electricity-only and combined-heat-and-power (CHP) plants whose primary business is to sell electricity, or electricity and heat, to the public.
 Note: Sum of components may not equal 100 percent due to independent rounding.
 Sources: Energy Information Administration, *Annual Energy Review 2008*, Tables 1.3, 2.1b-2.1f, 10.3, and 10.4.

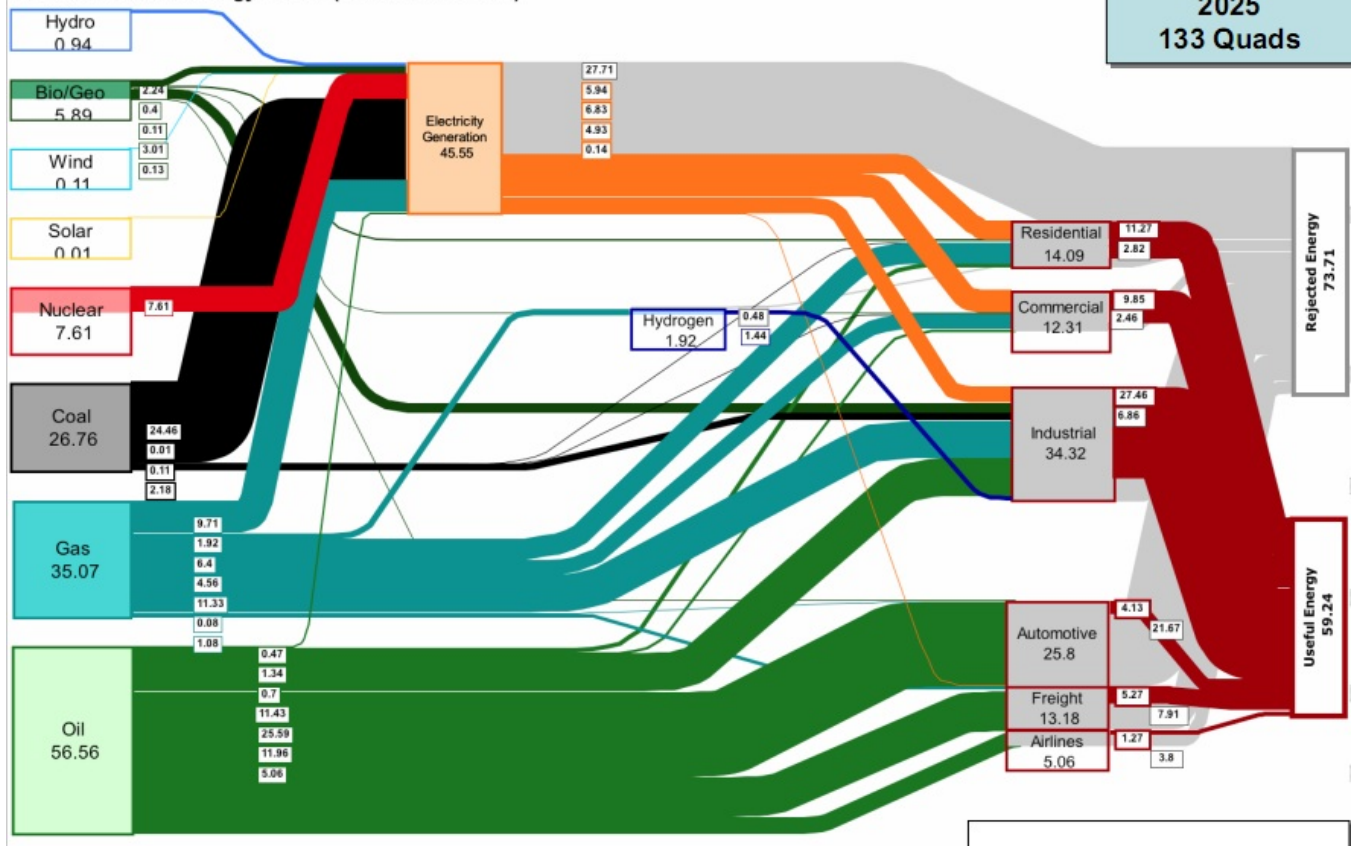
Estimated U.S. Energy Use in 2014: ~98.3 Quads



Source: LLNL 2015. Data is based on DOE/EIA-0035(2015-03), March, 2014. If this information or a reproduction of it is used, credit must be given to the Lawrence Livermore National Laboratory and the Department of Energy, under whose auspices the work was performed. Distributed electricity represents only retail electricity sales and does not include self-generation. EIA reports consumption of renewable resources (i.e. hydro, wind, geothermal and solar) for electricity in BTU-equivalent values by assuming a typical fossil fuel plant "heat rate." The efficiency of electricity production is calculated as the total retail electricity delivered divided by the primary energy input into electricity generation. End use efficiency is estimated as 65% for the residential and commercial sectors 80% for the industrial sector, and 21% for the transportation sector. Totals may not equal sum of components due to independent rounding. LLNL-MI-410527

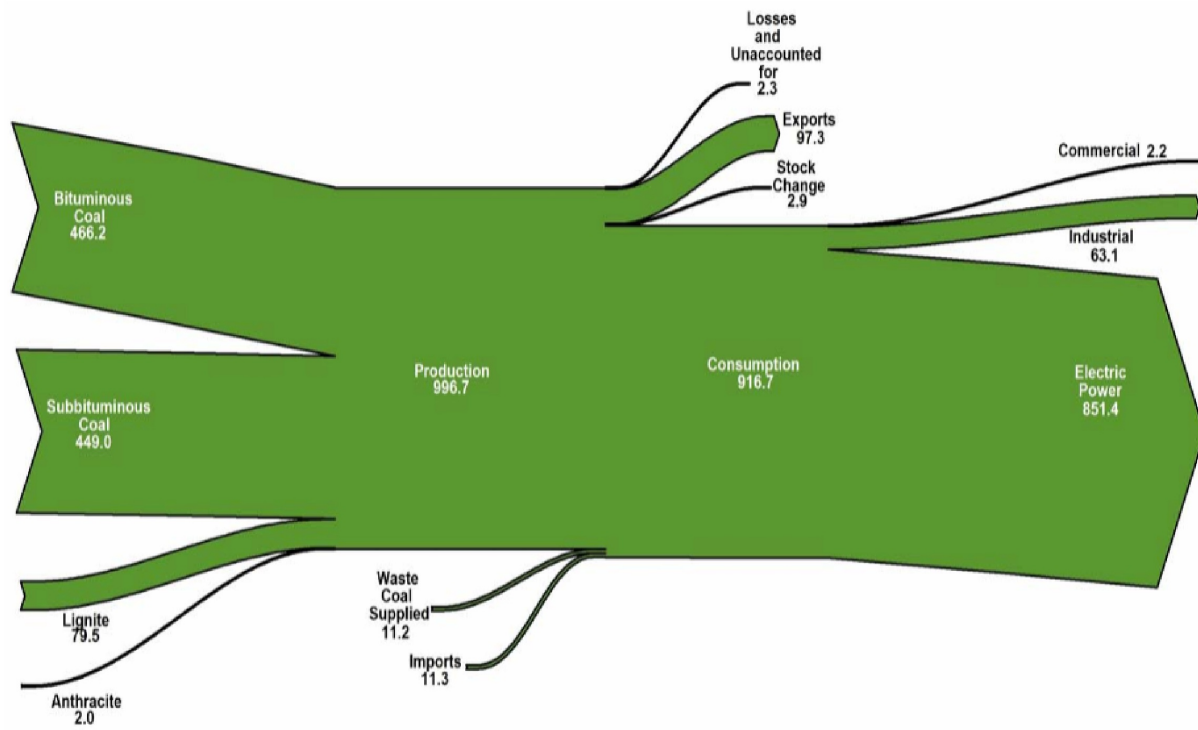
Estimated Future Energy Flows (≈ 133 Quads/Year)

2025
133 Quads

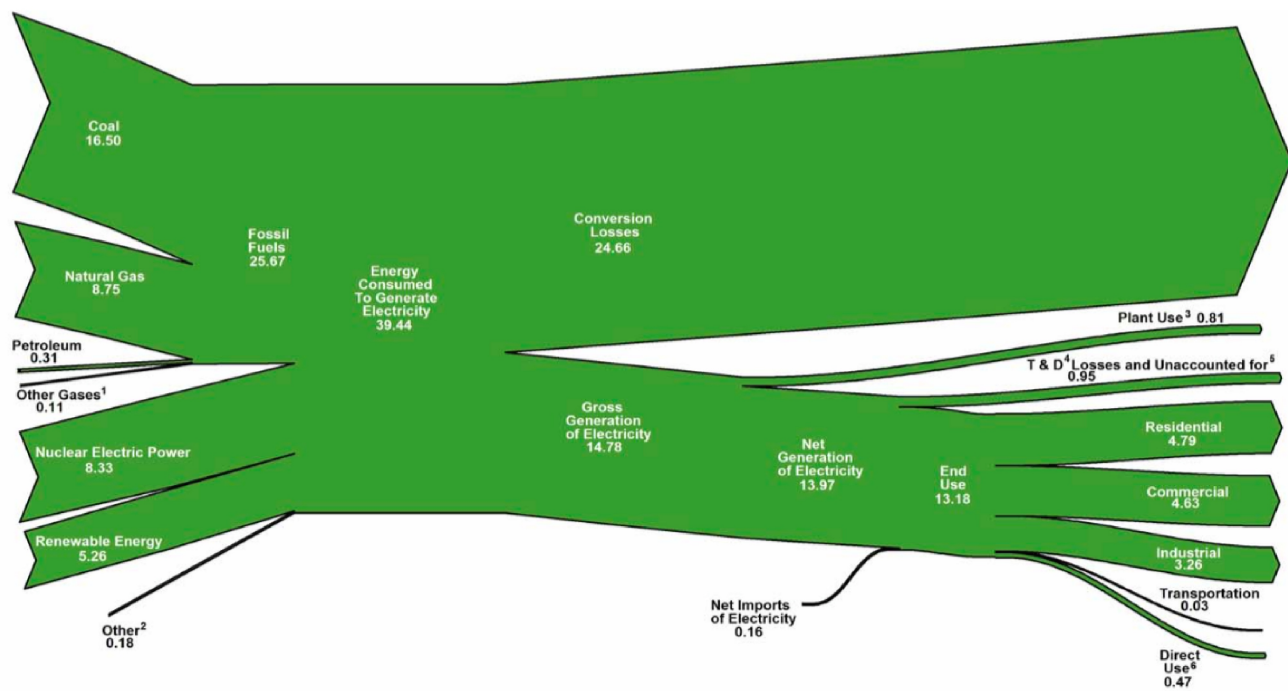


U.S. Coal Flow, 2014

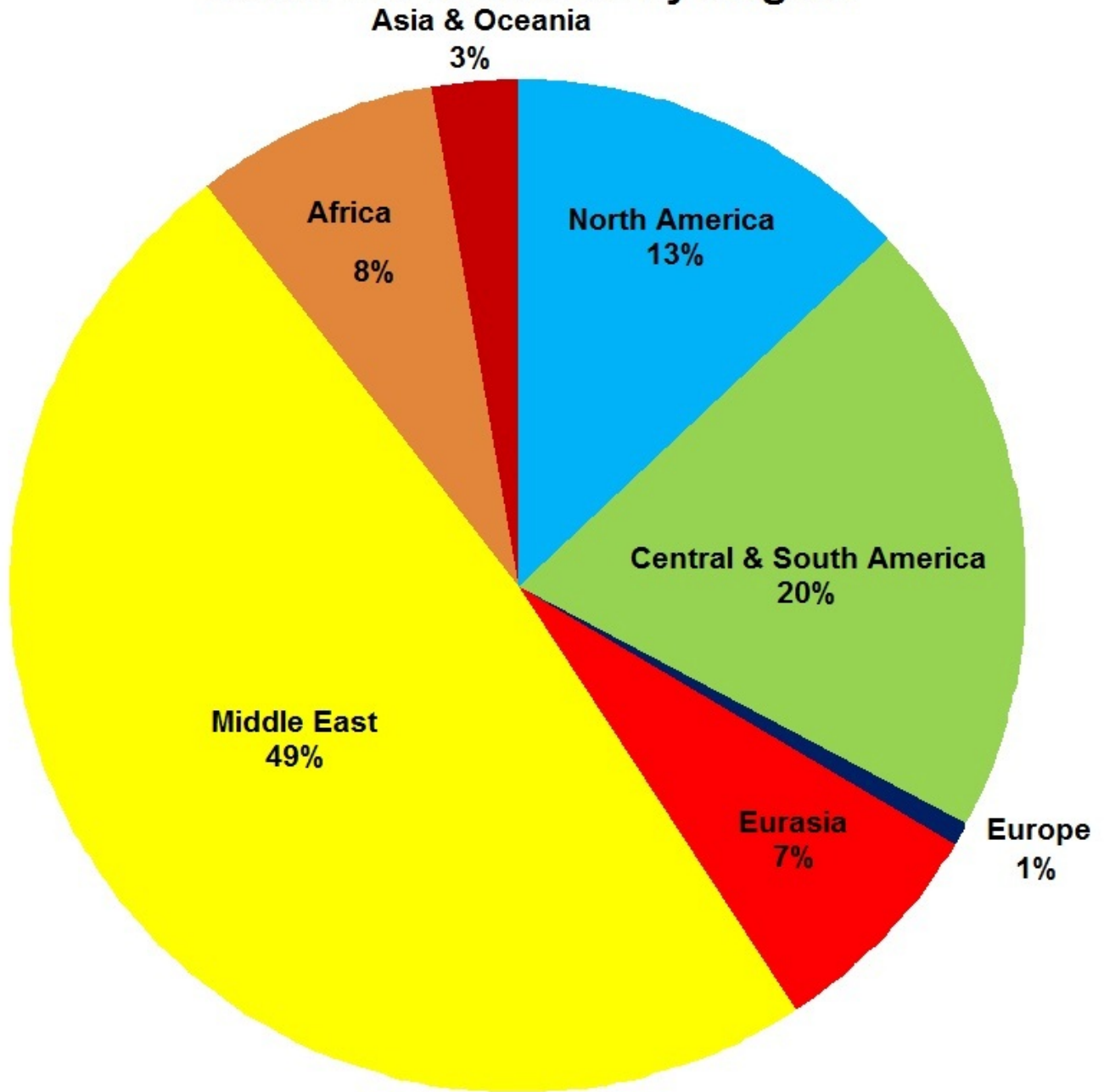
(Million Short Tons)



U.S. Electricity Flow, 2014 (Quadrillion Btu)



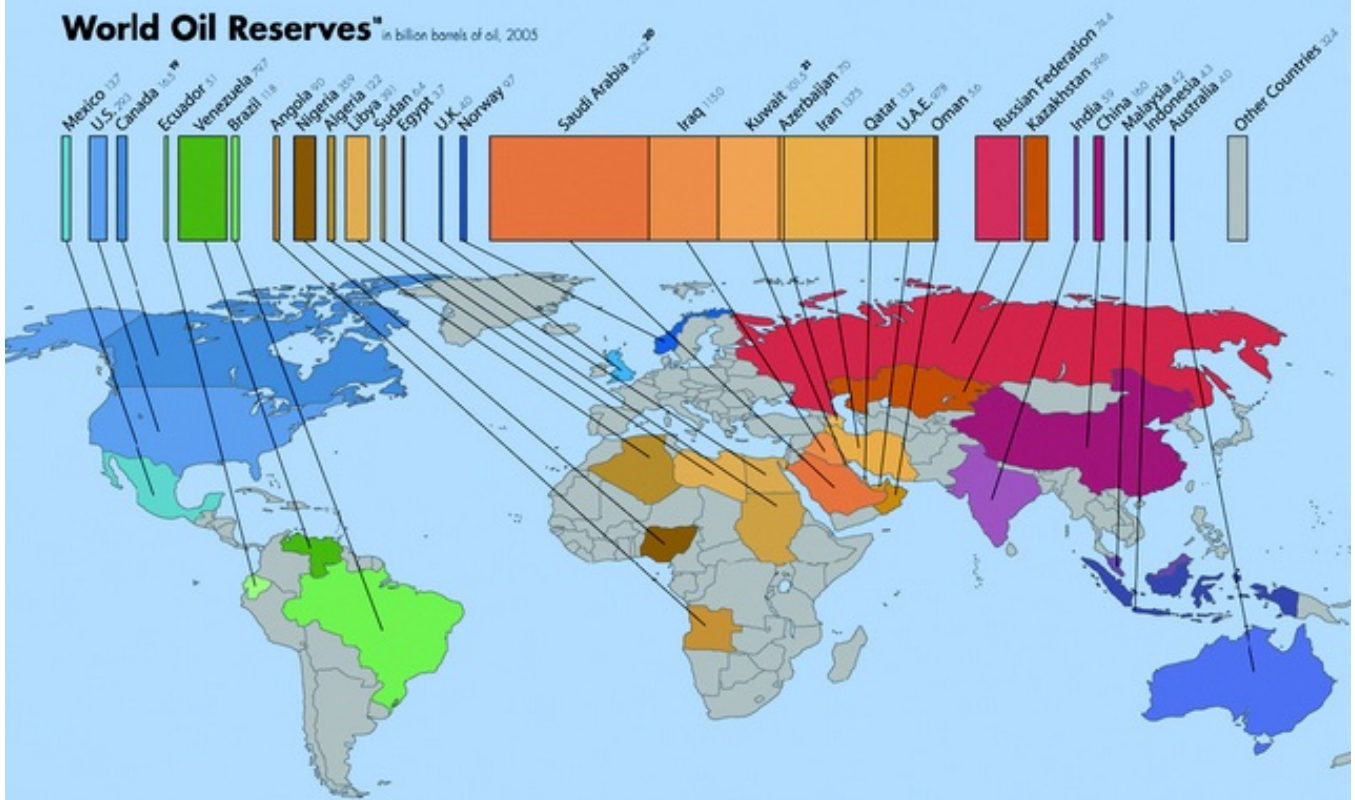
World Oil Reserves by Region



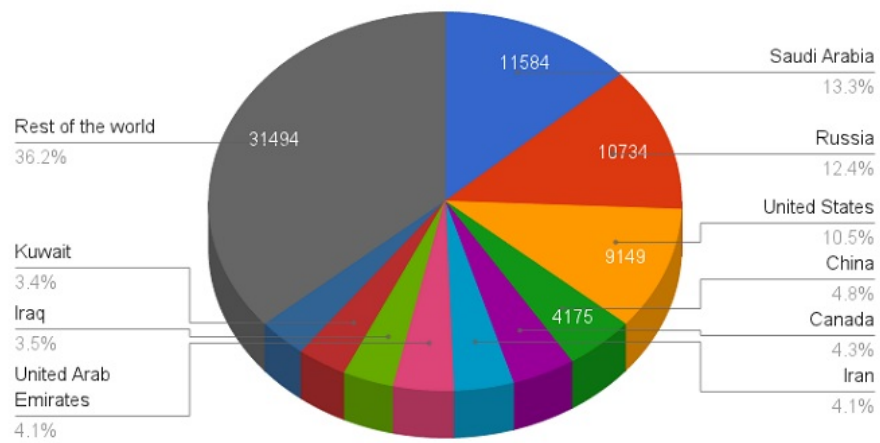
Data source: US Energy Information Administration (2013)

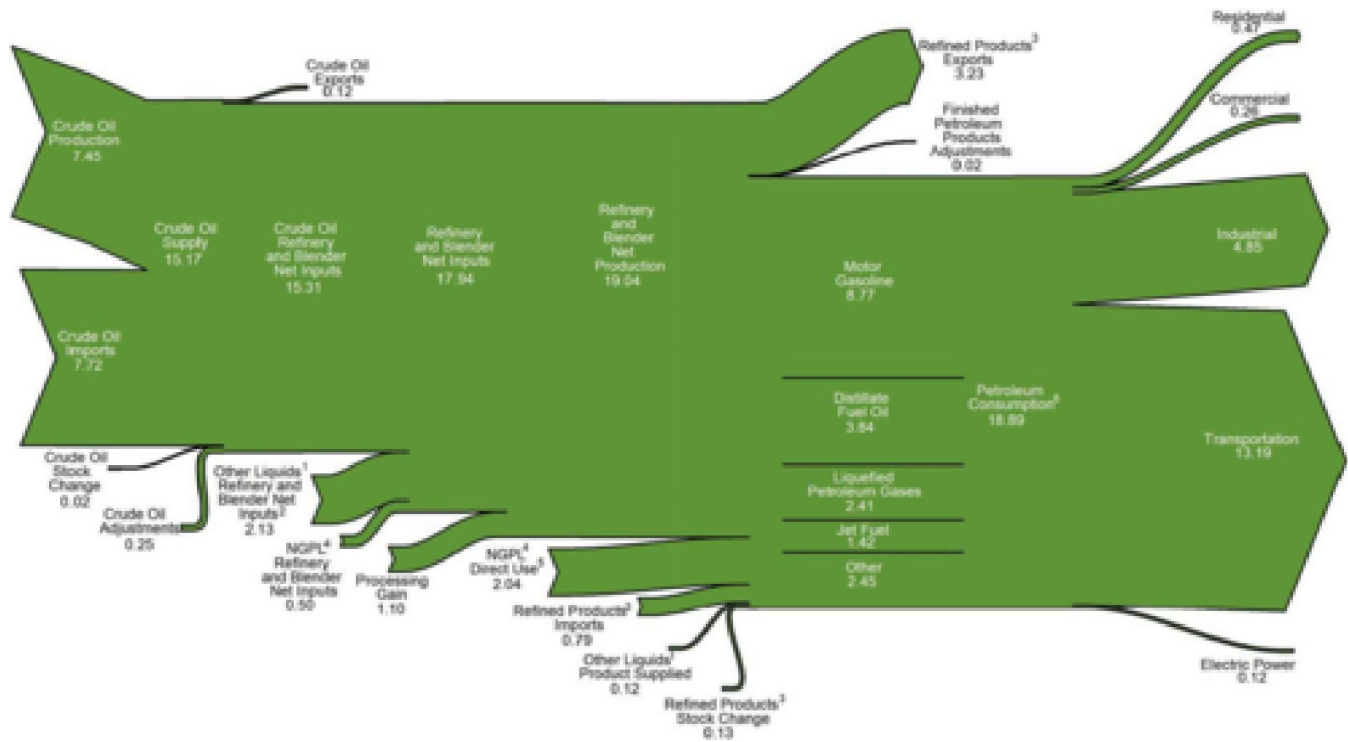
Reserves are the estimated quantities of crude oil, which are, with reasonable certainty to be recoverable

World Oil Reserves* in billion barrels of oil, 2005



World's top ten oil producers (2012)



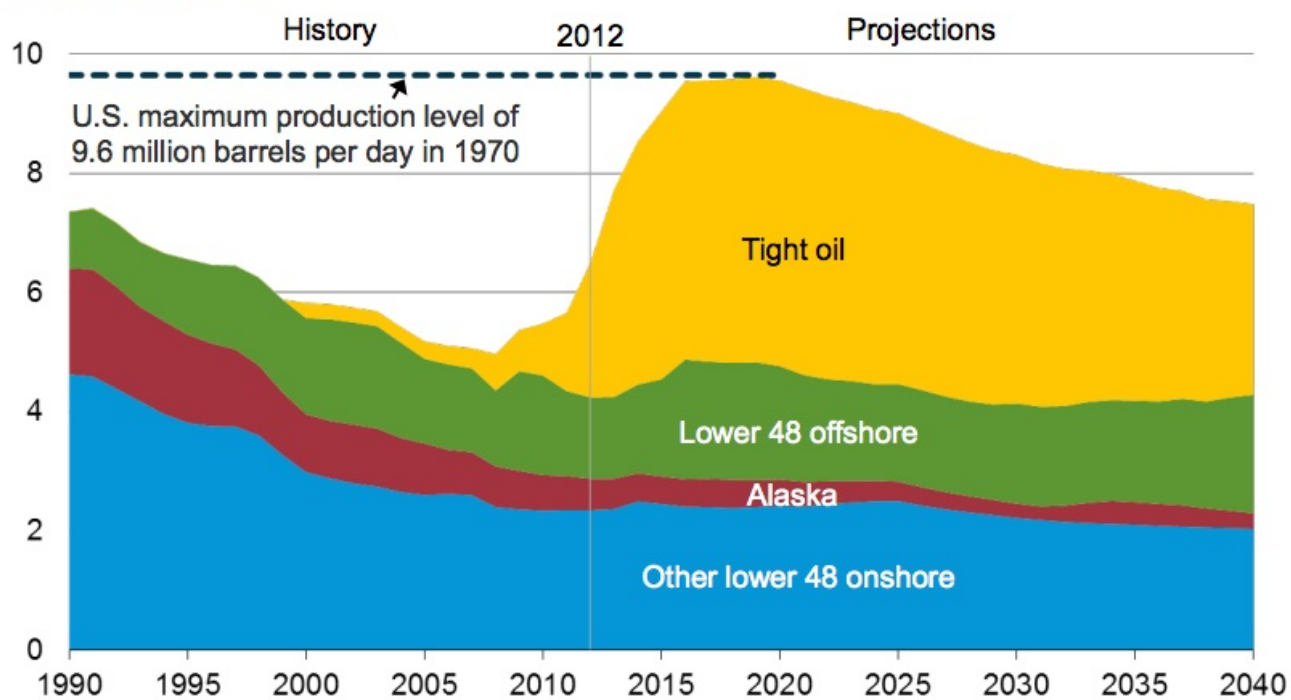


Lower 48 states shale plays

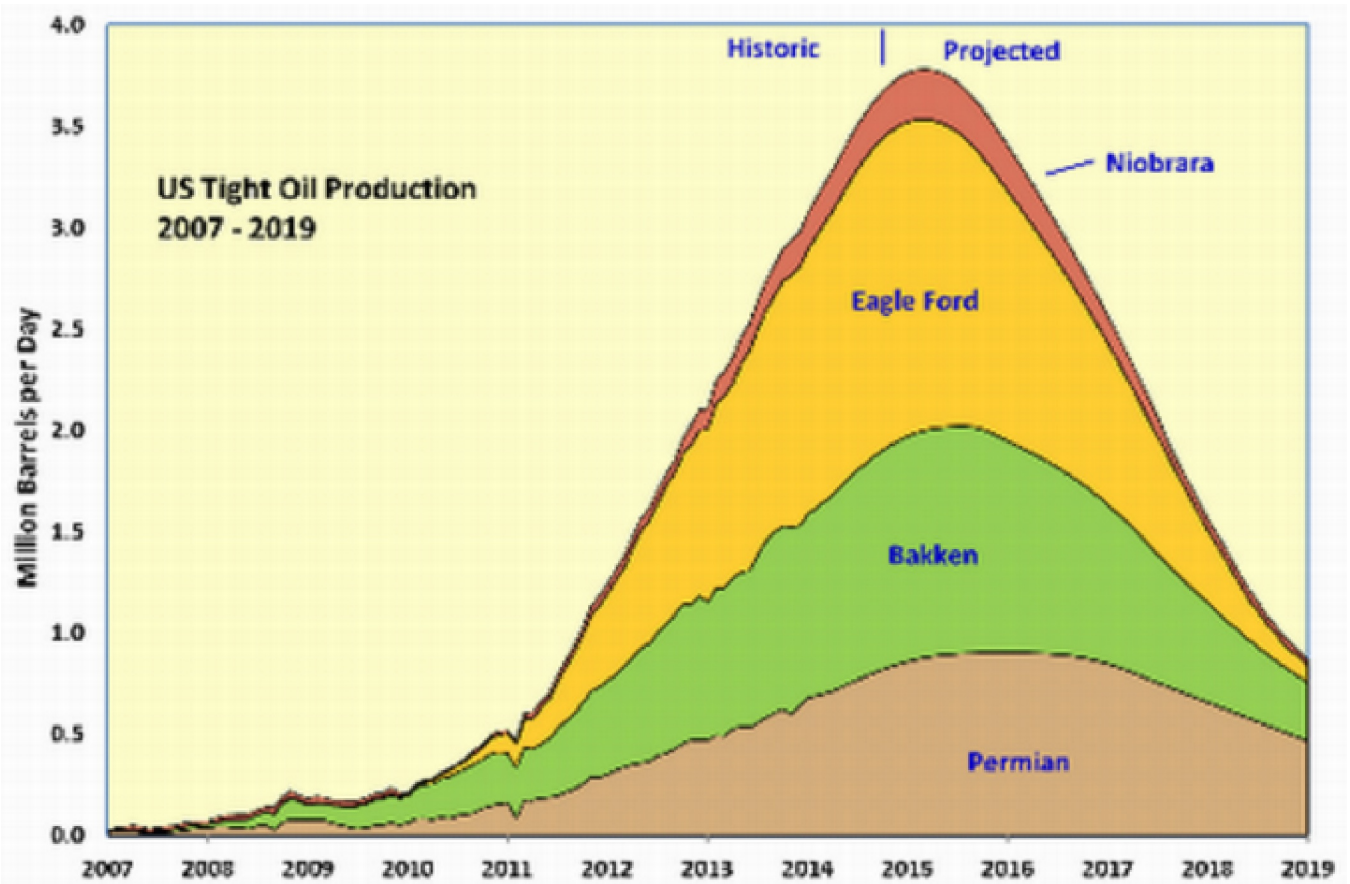


Source: Energy Information Administration based on data from various published studies.
 Updated: May 9, 2011

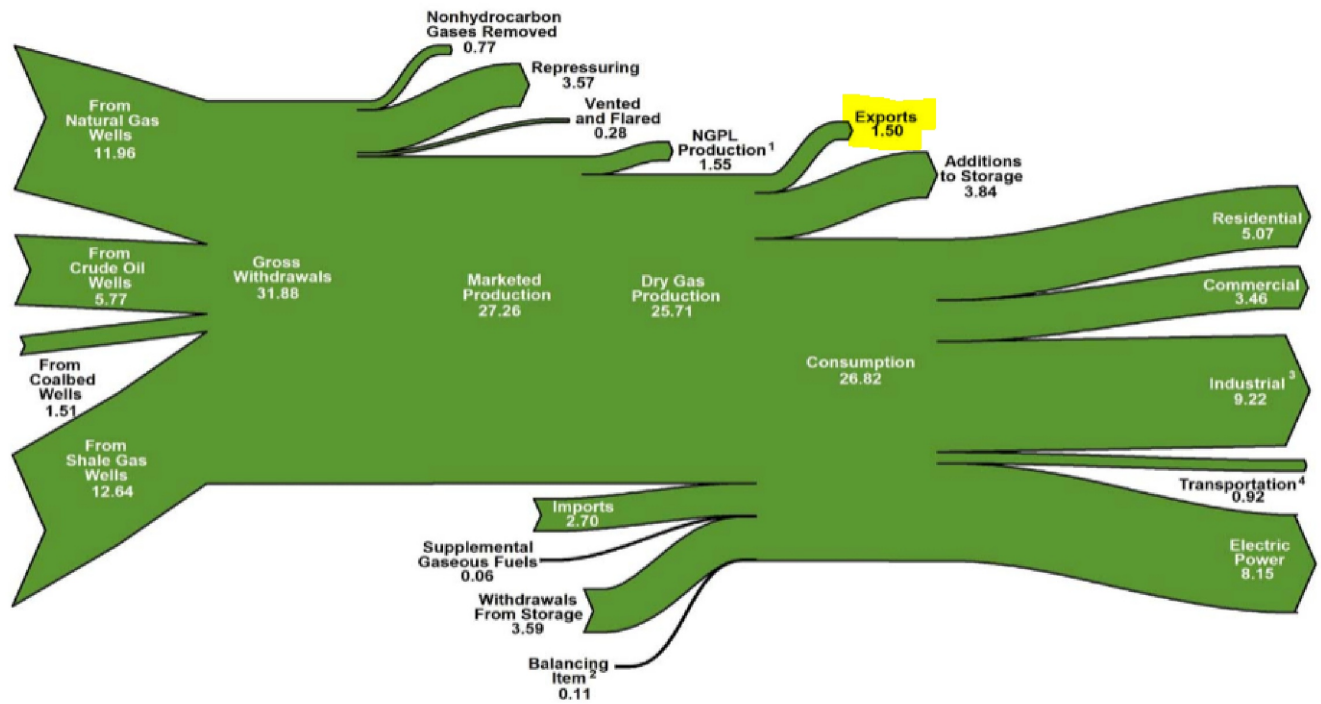
U.S. crude oil production
million barrels per day

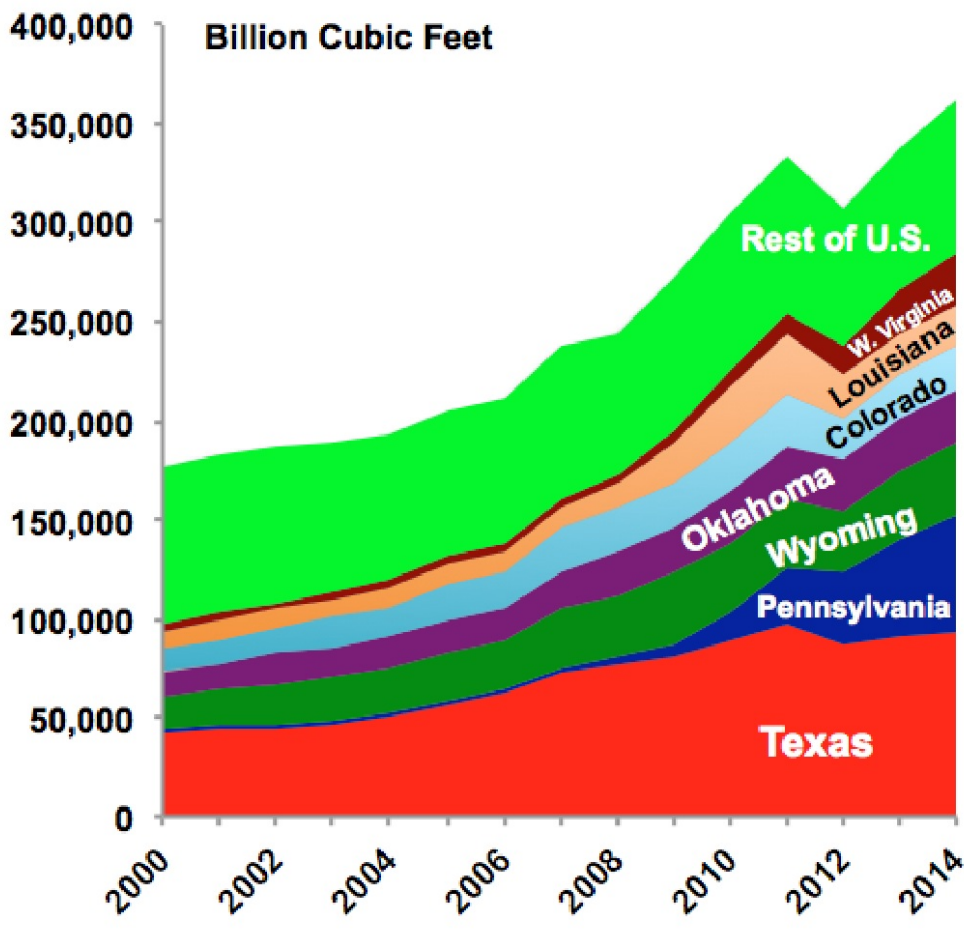


Source: EIA, Annual Energy Outlook 2014 Early Release



U.S. Natural Gas Flow, 2014 (Trillion Cubic Feet)



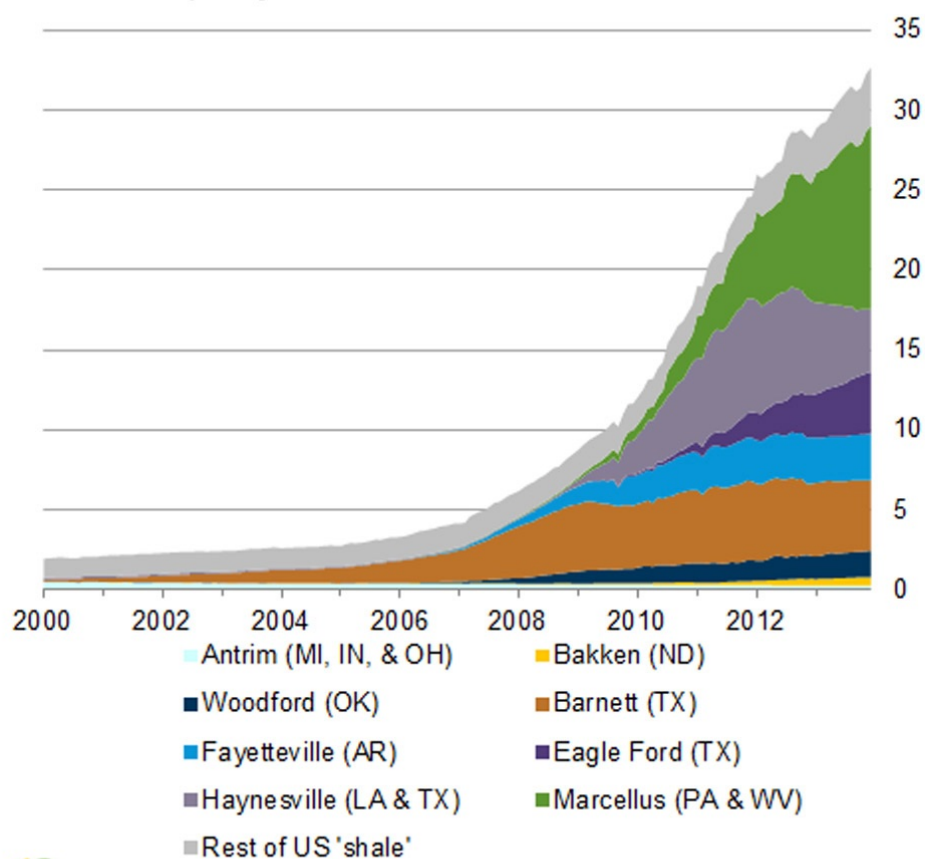


In 2000, Texas and Pennsylvania held a combined 24% of U.S. proven gas reserves. They now hold 43%.

Since 2008 alone, thanks to the Marcellus shale play, West Virginia has increased its share of U.S. gas reserves from 1% to 7%.

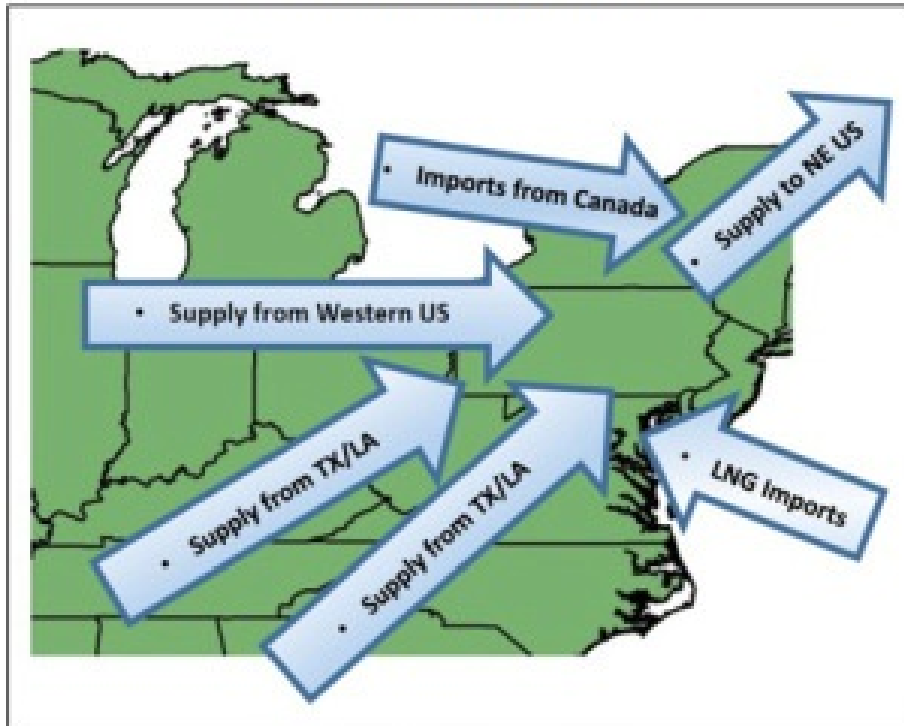
Monthly dry shale gas production

billion cubic feet per day

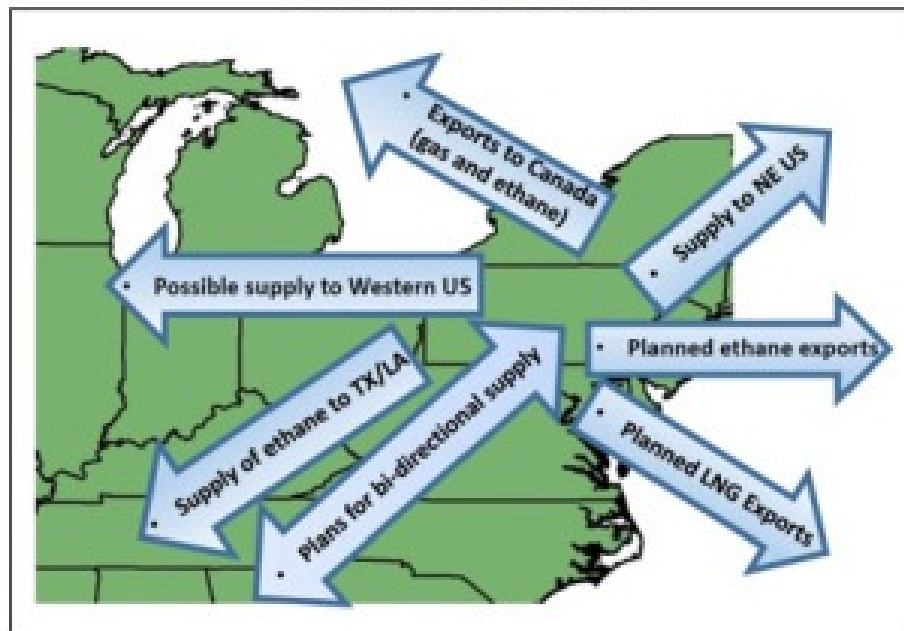


Source: EIA derived from state administrative data collected by DrillingInfo Inc. Data are through February 2014 and represent EIA's official shale gas estimates, but are not survey data. State abbreviations indicate primary state(s).

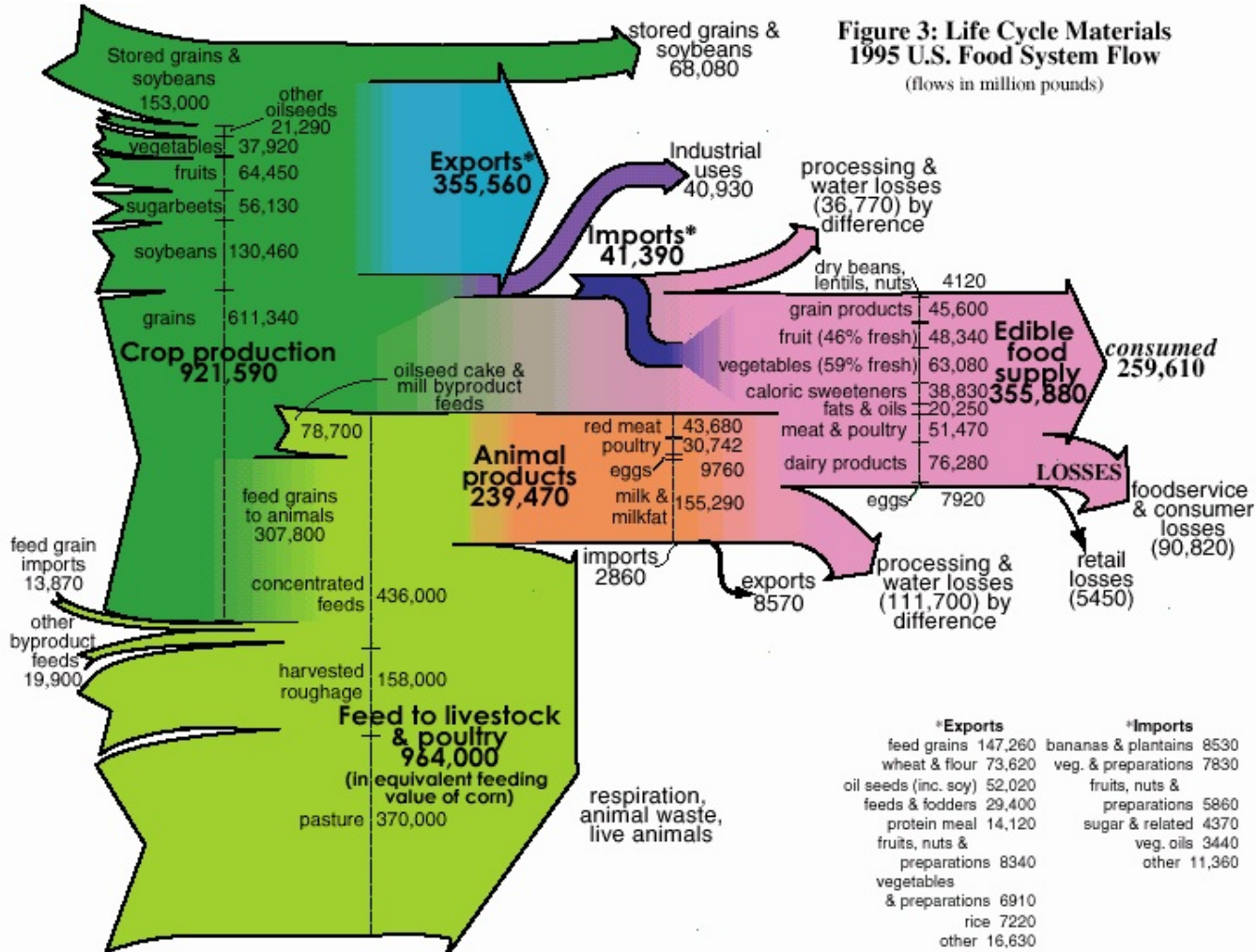
Before Marcellus



After Marcellus



**Figure 3: Life Cycle Materials
1995 U.S. Food System Flow**
(flows in million pounds)



*Exports	*Imports
feed grains 147,260	bananas & plantains 8530
wheat & flour 73,620	veg. & preparations 7830
oil seeds (inc. soy) 52,020	fruits, nuts & preparations 5860
feeds & fodders 29,400	sugar & related 4370
protein meal 14,120	veg. oils 3440
fruits, nuts & preparations 8340	other 11,360
vegetables & preparations 6910	
rice 7220	
other 16,630	