The Reemergence of the U.S. as a Global Petroleum Producer

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A Major Event

- The month of October, 2013 was notable.
  - For that month the U.S. produced more petroleum domestically than it imported.
    - First time since March of 1995.
- Symbolic of the reemergence of U.S. petroleum production.
  - An industry that had been in decline.

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The Halcyonian Days are Here

- I.E.A Projections:
  - By 2014 U.S. will produce more oil & gas than ever before.
  - Domestic petroleum production will surpass imports in 2014.
  - U.S. will surpass Saudi Arabia in production before 2020.
  - Net exporter of oil by 2030.
- BP Energy Outlook – U.S. will be energy independent by 2035.

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How Did the U.S. Get Here?

- What factors have brought about such a change from a decade ago?
  - U.S. production has drastically increased since 2009.
  - Domestic consumption has fallen.
  - Imports have declined.

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The Birth of an Industry

- First commercial well in 1859 near Titusville, PA. Oil boom followed.

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The Birth of an Industry

- Oil boom quickly spread throughout Appalachian Basin & Ohio River Valley.
- Early 20c. national boom.
  - California – 1880
  - Kansas - 1892
  - Central Texas – 1894
  - Oklahoma - 1905
  - Louisiana - 1906
  - East Texas – 1930

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The Birth of an Industry

- Long Beach, CA in 1926.

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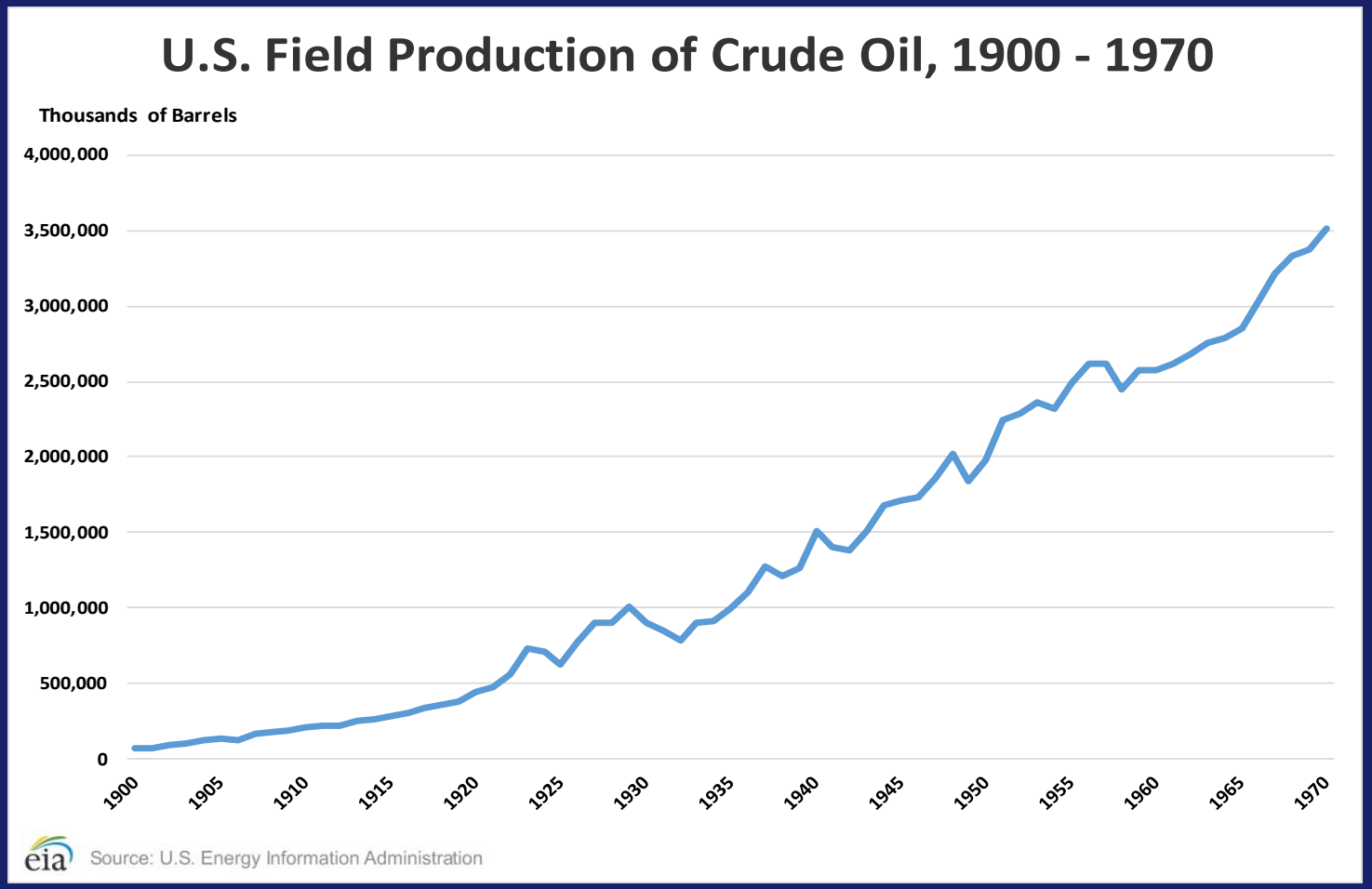
U.S. Production Booms



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1970: U.S. Dominates

- U.S. ranked 1st in global production.
  - Produced 9.6 million bbl/d.
  - Total of 3.517 billion barrels.
- By comparison:
  - Russia – 6.3 million bbl/d.
  - Saudi Arabia – 3.8 million bbl/d.
  - Venezuela – 3.7 million bbl/d.

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Slow Decline

- From 1971 onwards U.S. production gradually declined.
  - 1975 – Russia surpassed U.S. in production
  - 1976 - Saudi Arabia too.
  - 1989 – Daily production fell below 8 million barrels.
  - 1998 – Fell below 6 million bbl/d.

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Rise of U.S. Imports

- U.S. Consumption of petroleum steadily increases.
  - 1980: 17,056 thousand bbl/d.
  - 2005: 20,802 thousand bbl/d.
- U.S. imports steadily climb.
  - 1980: 5,263 thousand bbl/d.
  - 2005: 10,126 thousand bbl/d.

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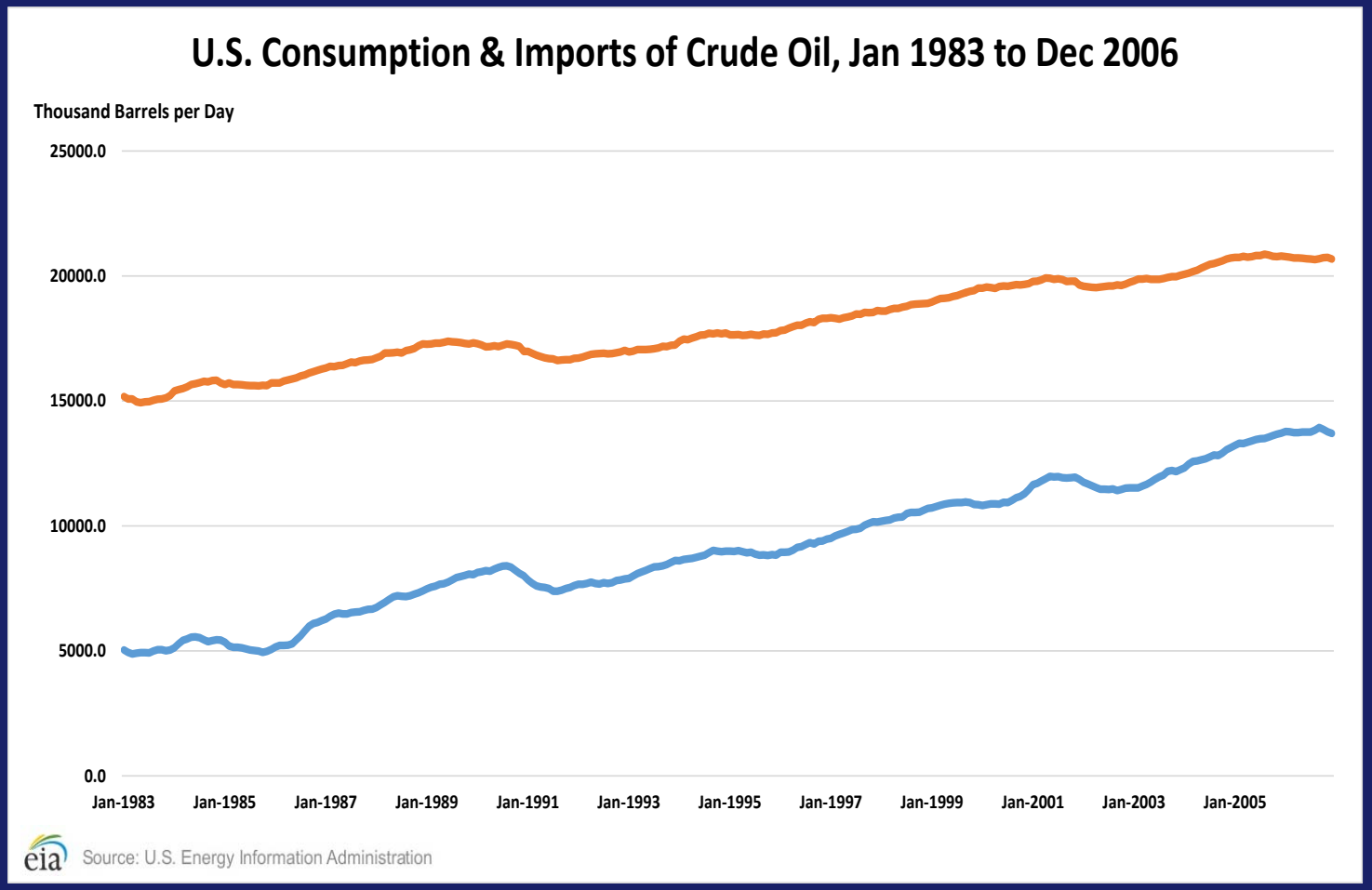
The Rise of U.S. Imports



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2005-7: A Low Point

- 2005: imports reached 3.7 billion barrels.
  - Over 3.69 billion barrels for 2006.
  - 3.66 billion in 2007.
- Production has declined steadily since 1970.
  - Dropped 47% to 1.8 million barrels.
  - Output on par with 1947.
- Consumption: 20.7 million bbl per day.

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U.S. Imports Decline

- Imports steadily declined starting in 2007.
  - Dropped 3.8% in 2008, 9.7% in 2009.
  - Fell a further 16.9% between 2011 and 2013.
- By 2013 annual imports 3.5 billion bbl.
  - A decline of 21% from 2007.
  - Lowest amount of petroleum since 1996.

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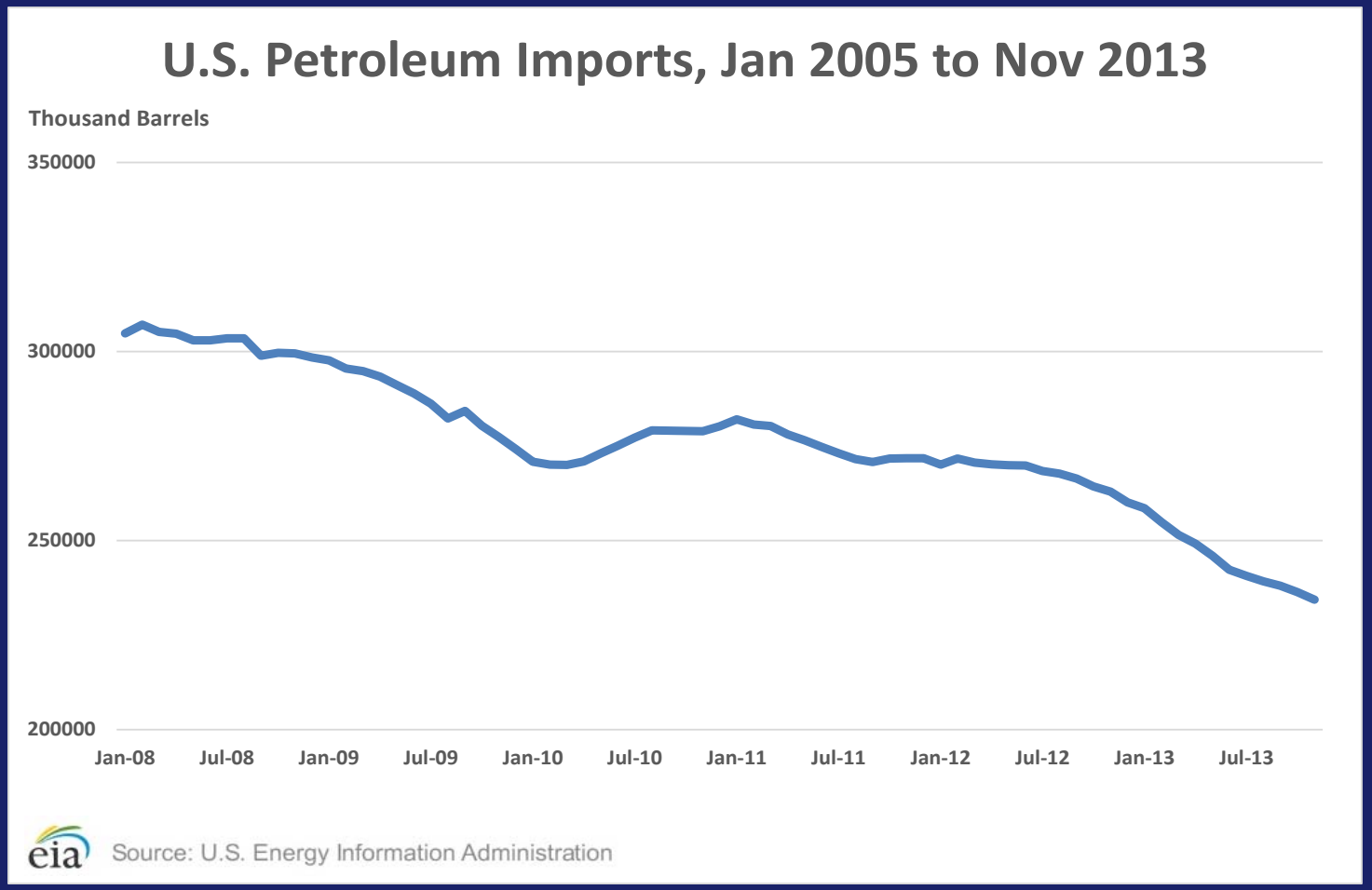
U.S. Imports Decline



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Causes of the Decline

- U.S. Consumption fell significantly.
  - 2007: 20.7 million bbl per day.
  - 2013: 18.7 million bbl per day.
  - Decline of 9.7%.
  - Annual consumption level on par with 1996.
- Where do the declines occur?

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Transportation Sector

- Accounts for 70% of U.S. petroleum usage.
  - Usage fell 9.1% from 2007 to 2012.
    - Gasoline consumption declined 6.6%.
    - Miles driven by Americans declined.
      - Dropped 2.5% from 2008 to 2012
  - Not limited to transportation.
    - Industrial consumption: -10.9%.
    - Residential consumption: -15.0%.
    - Commercial consumption: -2.5%.

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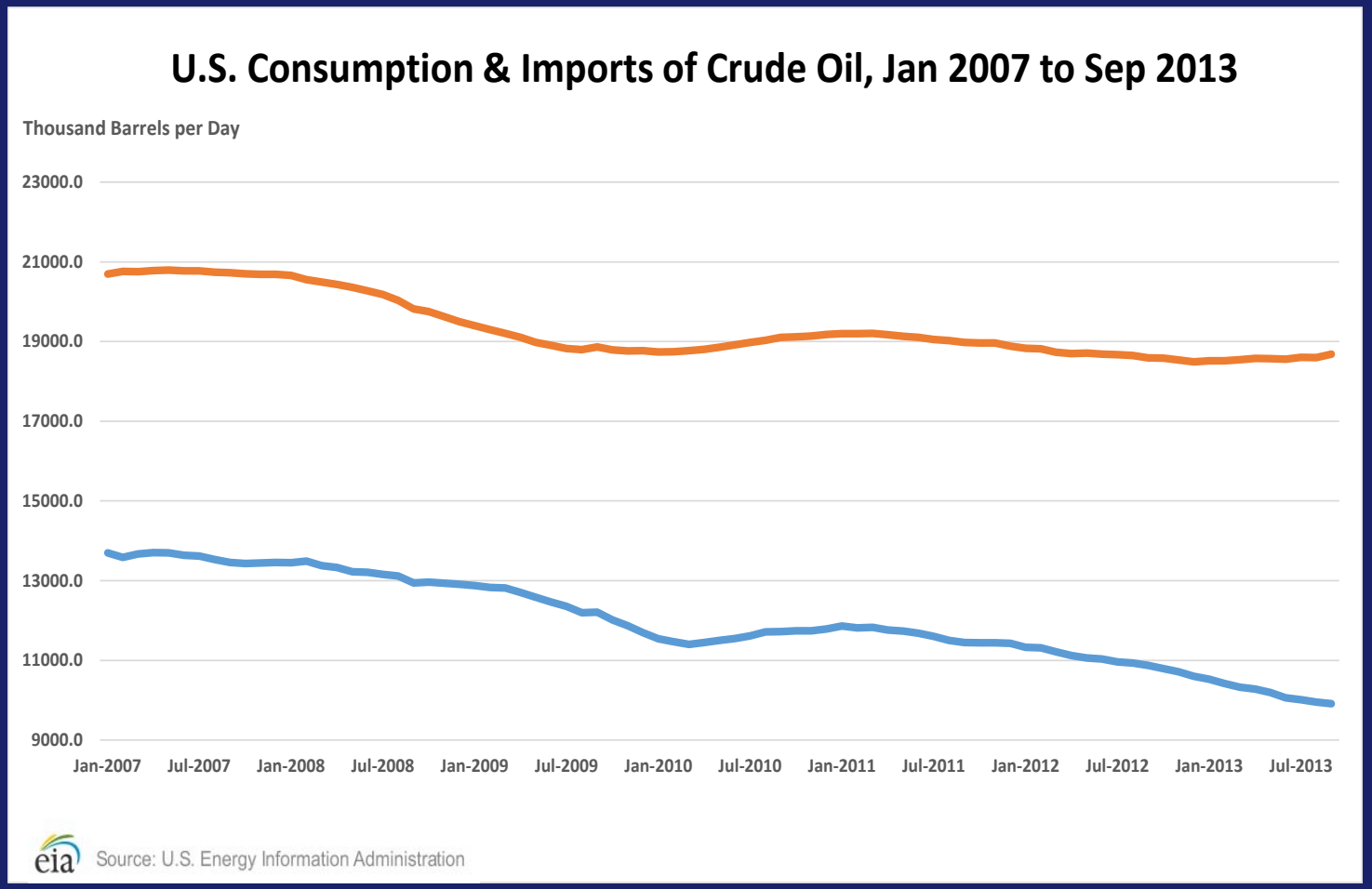
Consumption & Imports



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U.S. Production Increases

- Held fairly stead from ’06 thru ’08, then jumped 6.8% in ’09.
  - First increase in U.S. production since 1991 (18 years).
- Continued to climb steadily, in ’10 & ’11 then skyrocketed in ’12 & ’13.
- Since ’08 U.S. production has jumped 47.2%.

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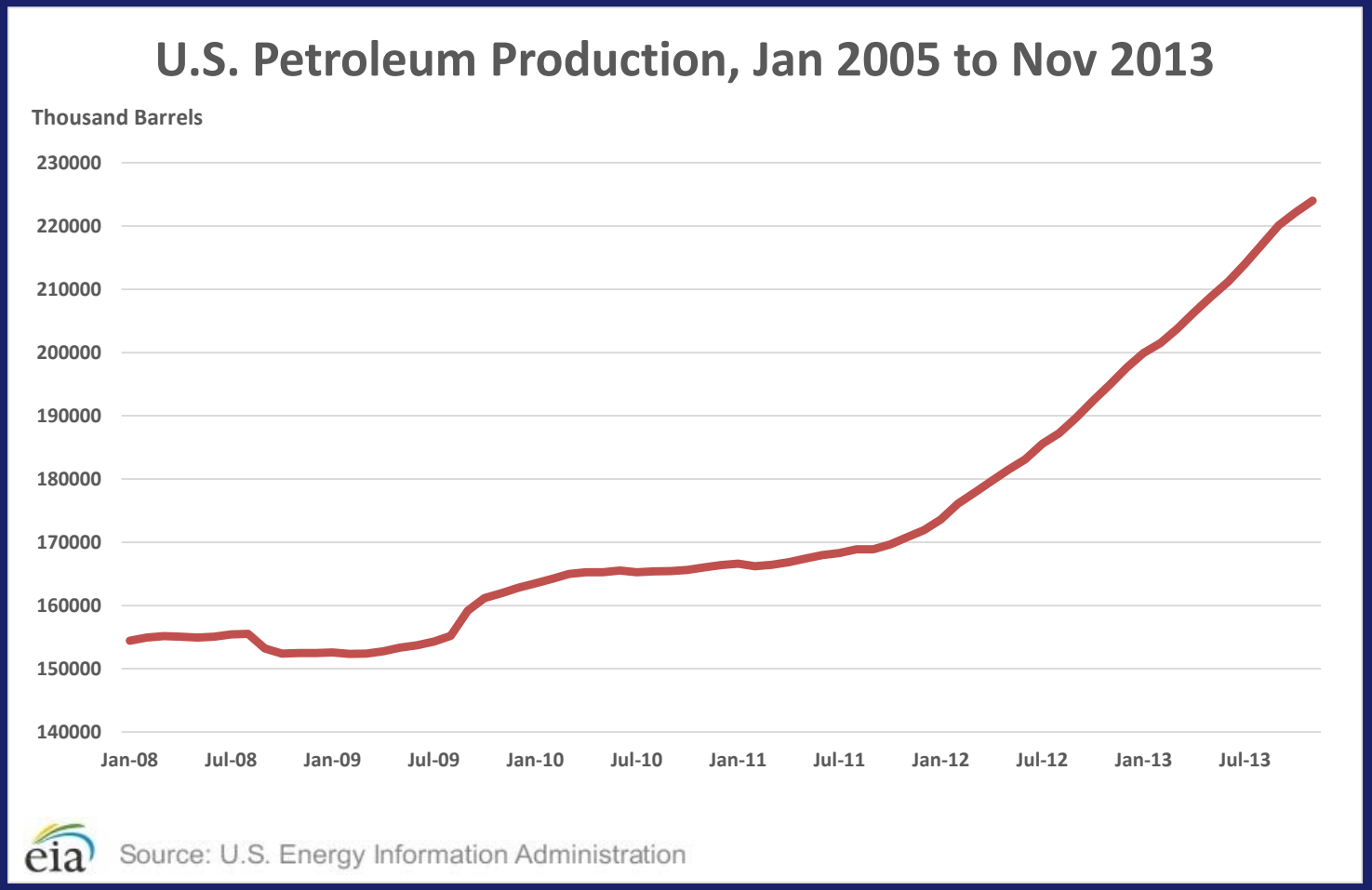
U.S. Production Increases



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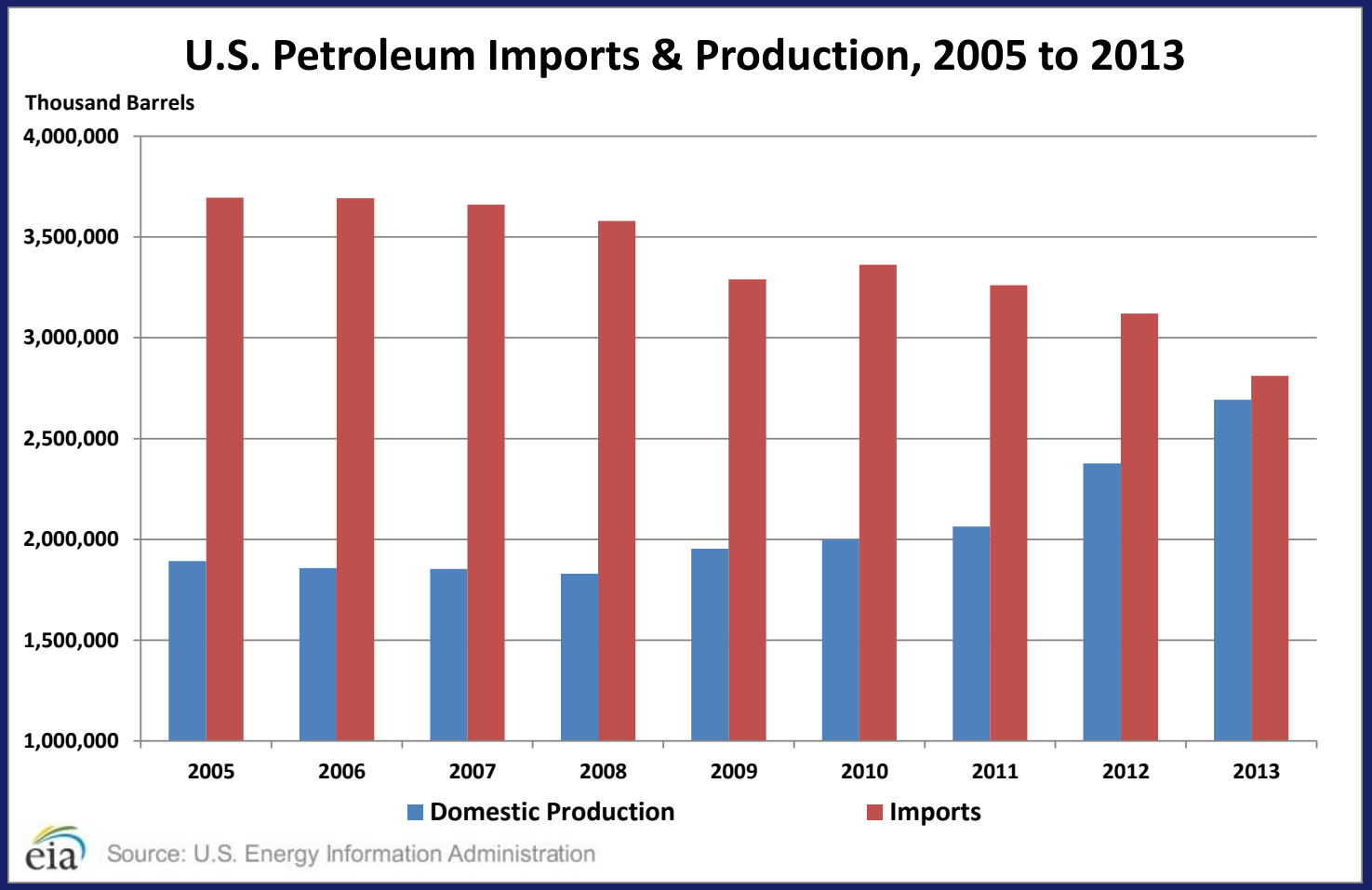
The Gap Narrows



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Where is it Coming From?

- Production increases occur in a number of states.
  - Oklahoma, New Mexico, Colorado, Wyoming, and Kansas.
- Only two states are really significant.
  - North Dakota.
  - Texas.

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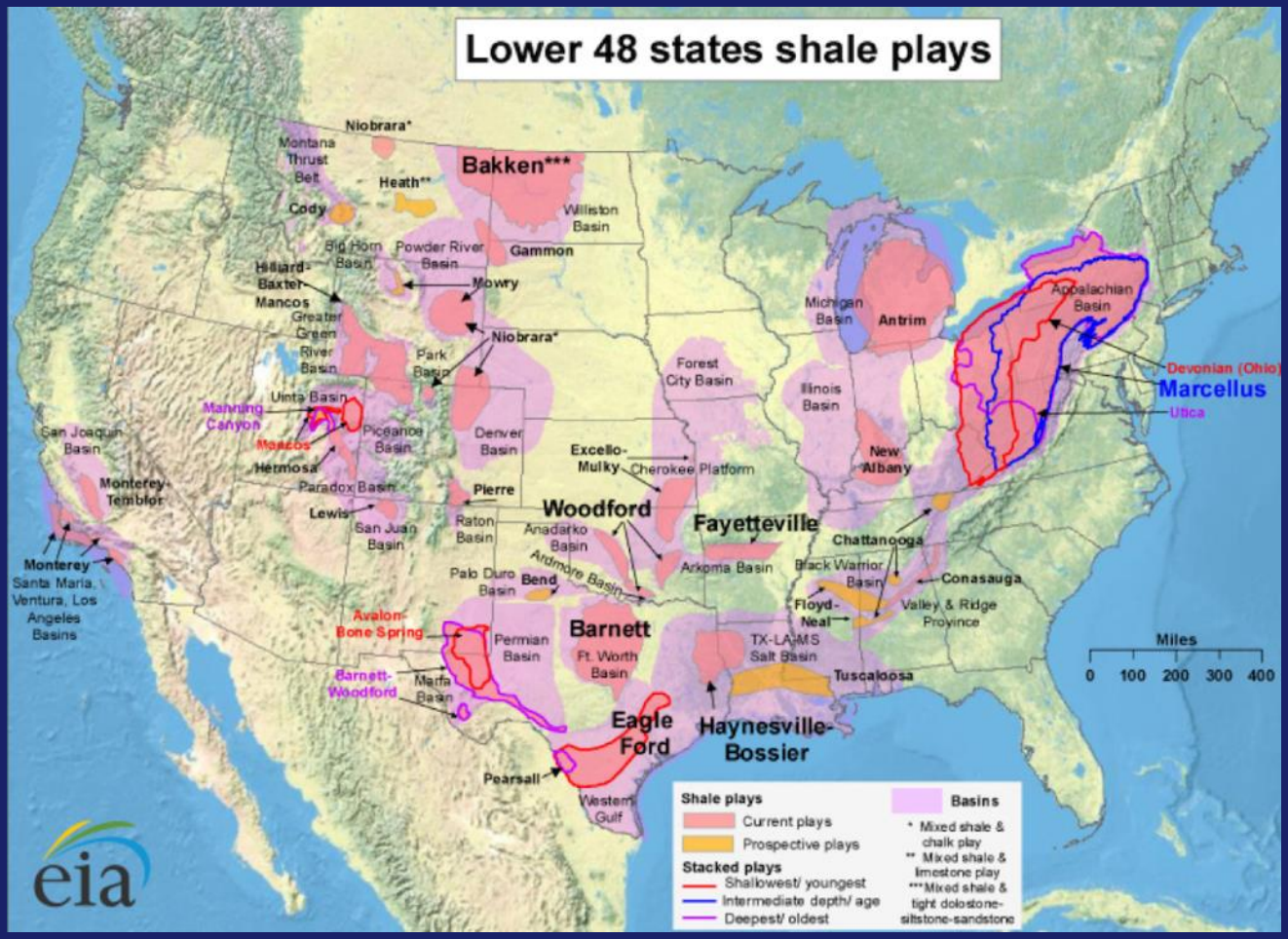
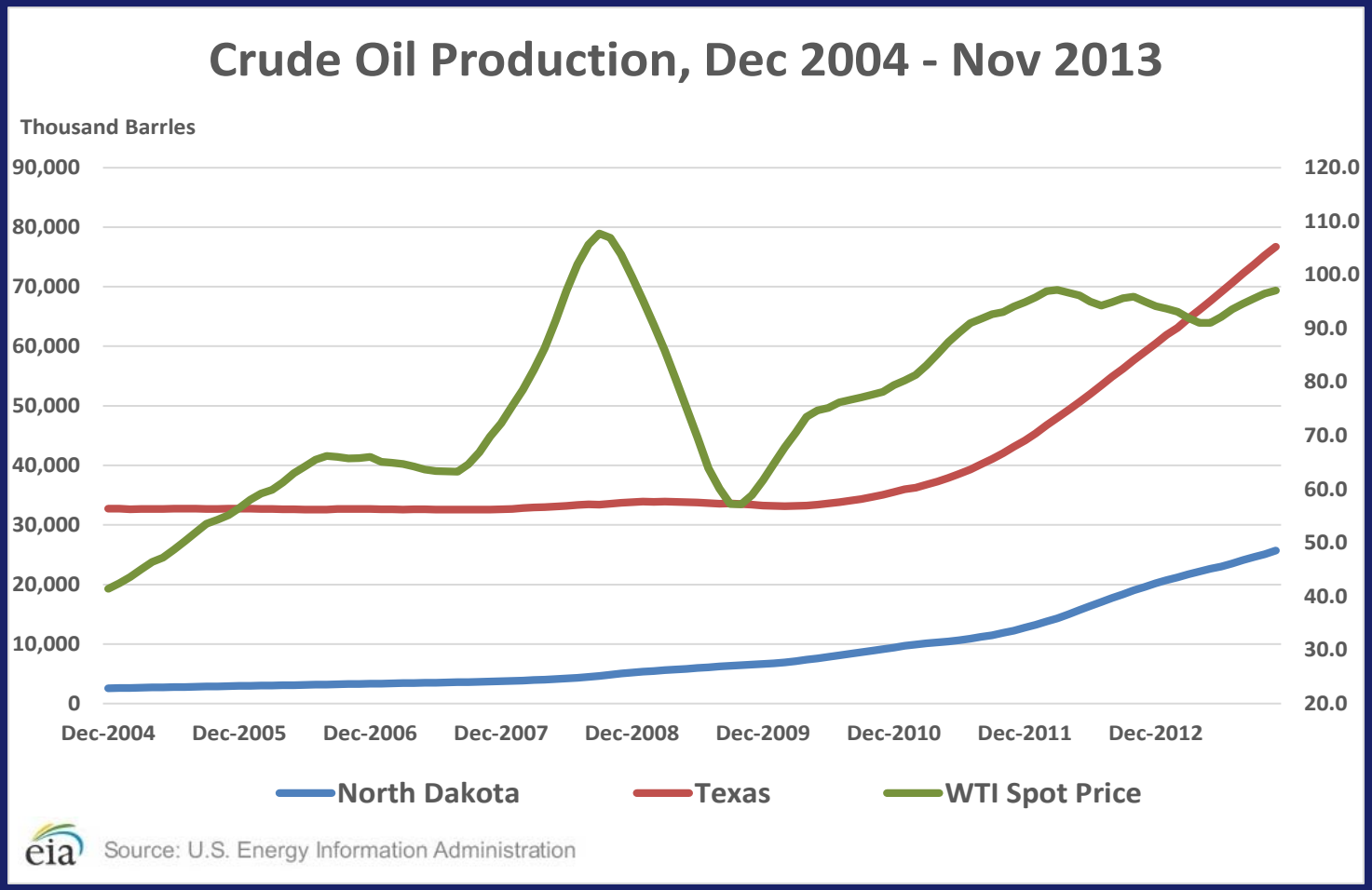
That's Where the Oil Is!



U.S. Production Increases



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Oil Reserves

- Just how much is there?
  - Bakken & Three Forks – 7.4 billion barrels from USGS.
    - Produces 862,987 barrels per day.
  - Eagle Ford – 3 billion barrels.
    - Produces 677,407 barrels per day.
  - Woodford – 500 million barrels.

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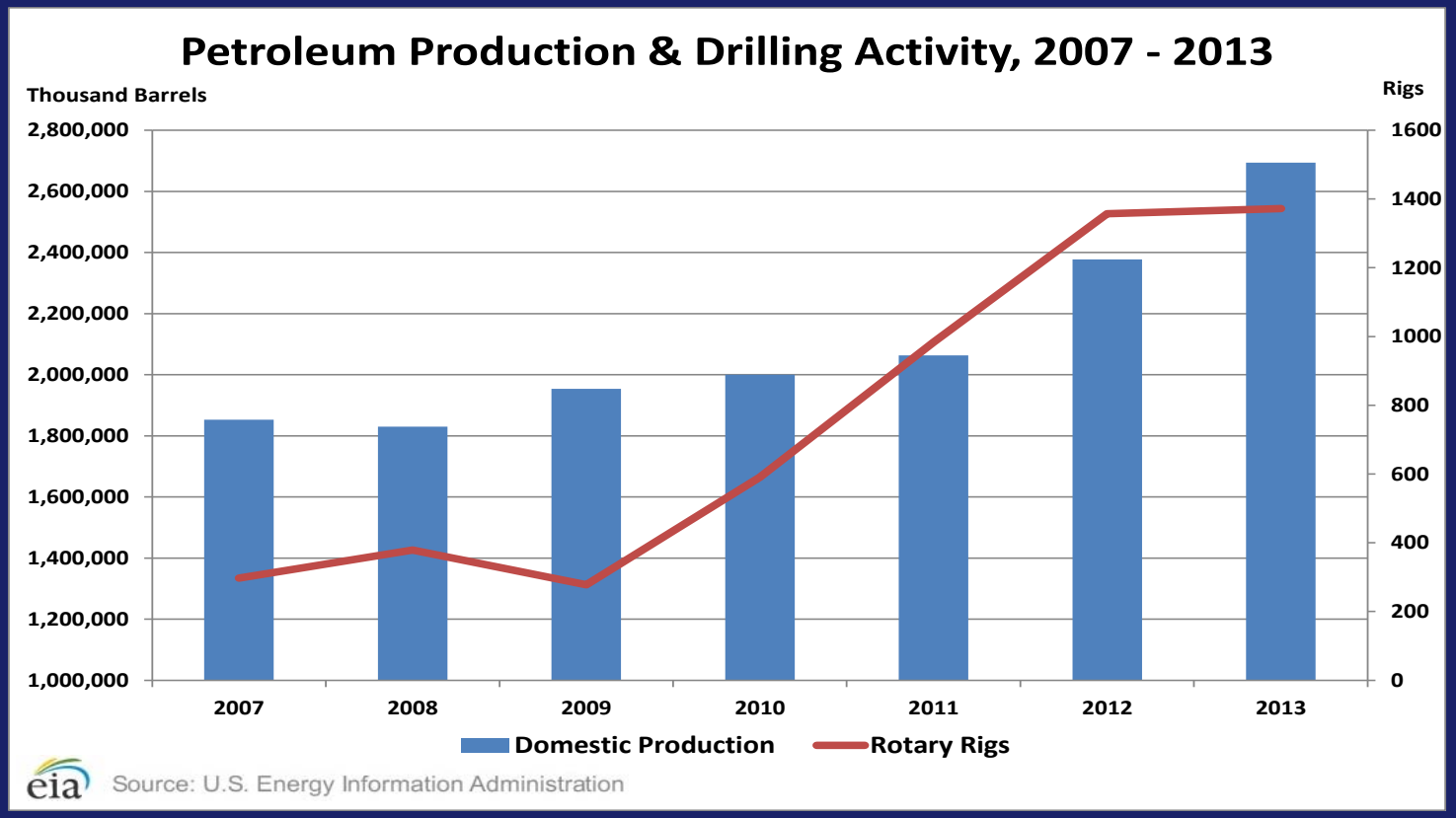
Drilling Activity

- Drilling activity has expanded.



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Drilling Activity

- Night lights image from NASA's Suomi satellite.

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Import Prices

- How have the rise in U.S. production and decline in imports and consumption impacted import prices?
- Initially not much of one.
  - Strong global demand, especially from Asia
  - Lower production from several OPEC nations
  - Global Supply Shocks.

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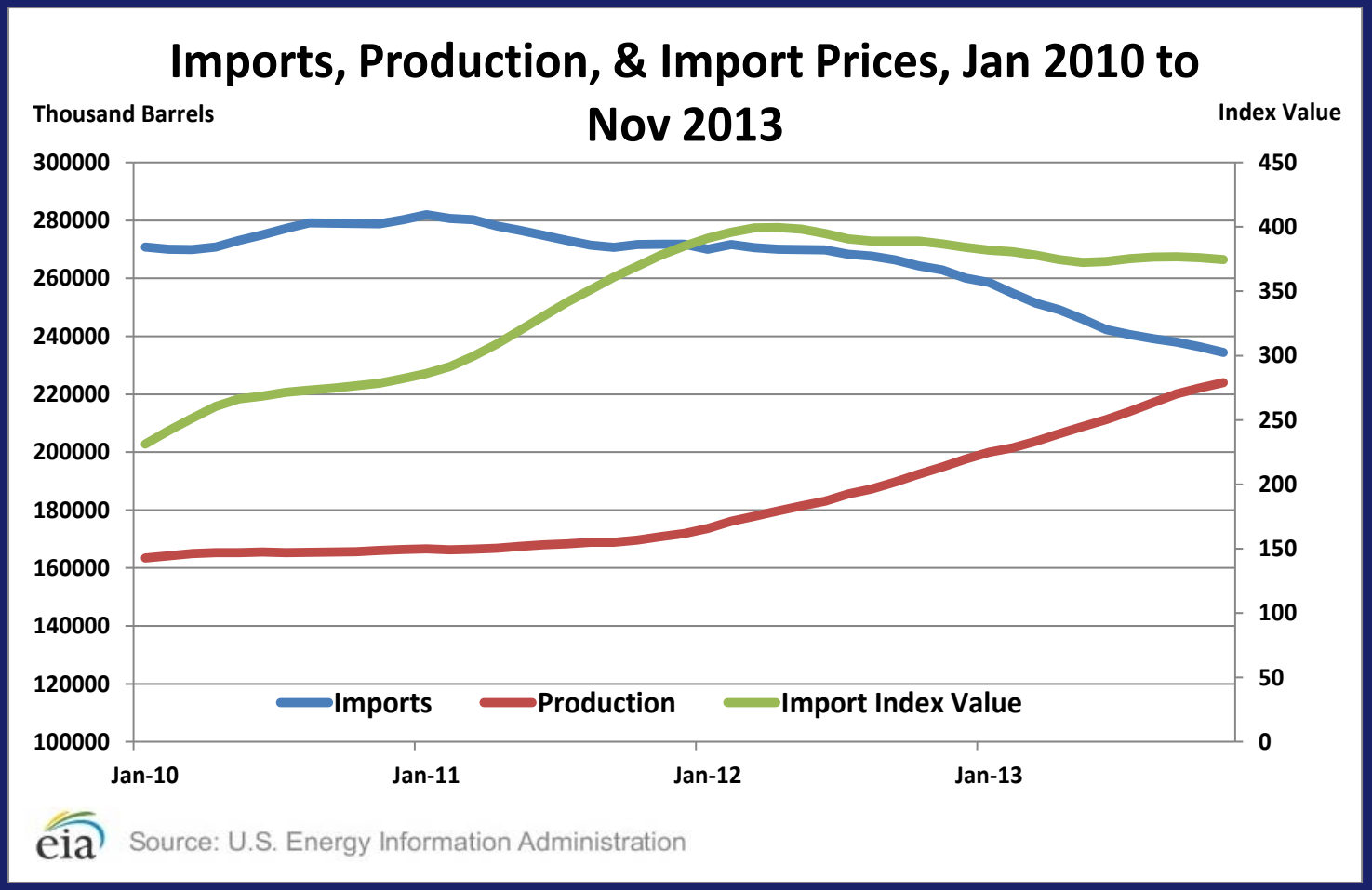
Import Prices



Import Prices

- From Dec 2009 thru 2011 import prices increased 42.3%.
  - Yet U.S. consumption only rose 0.6%.
  - Domestic imports fell 1.0%.
  - U.S. production increased 5.1%.
- So why did the price increase?

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Truly Global Market

- World supply remained tight in 2010 & 2011. Only increased 3.5%.
- Strong global demand, especially from Asia. Consumption increased 4.5%.
  - Chinese consumption increased 15.4%.
  - Indian consumption increased 9.6%.
  - Asian consumption as a whole up 9.7%.

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Political Unrest

- Supply disruption in Libya, production falls by 1.3 million bbl/d.
  - Equal to 1.7% of global production.
  - Production was slow to return.
- Ousting of Hosni Mubarak in Egypt.
  - Concerns regarding the Suez Canal.
- Tension with Iran.
  - 20% of world's petroleum passes through Strait of Hormuz.

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2012 & 2013

- Import prices leveled off in 2012 then fell through 2013.
  - Declined 2.7%
- Production increased in Canada, Russia, OPEC countries, and the U.S.
- Global consumption slowed, increasing 0.6 % in 2012, compared to 1.3% in 2011 & 3.1% in 2010.

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How Much Oil is There?

- Some estimates of oil reserves in U.S. shale formations.
  - Spraberry/Wolfcamp Field, TX – 100 billion recoverable barrels.
  - Bakken Formation, N.D. – 503 billion bbl.
  - Uinta Basin, Utah – 1.3 trillion bbl.
  - Piceance Basin, Colorado – 1.5 trillion bbl.

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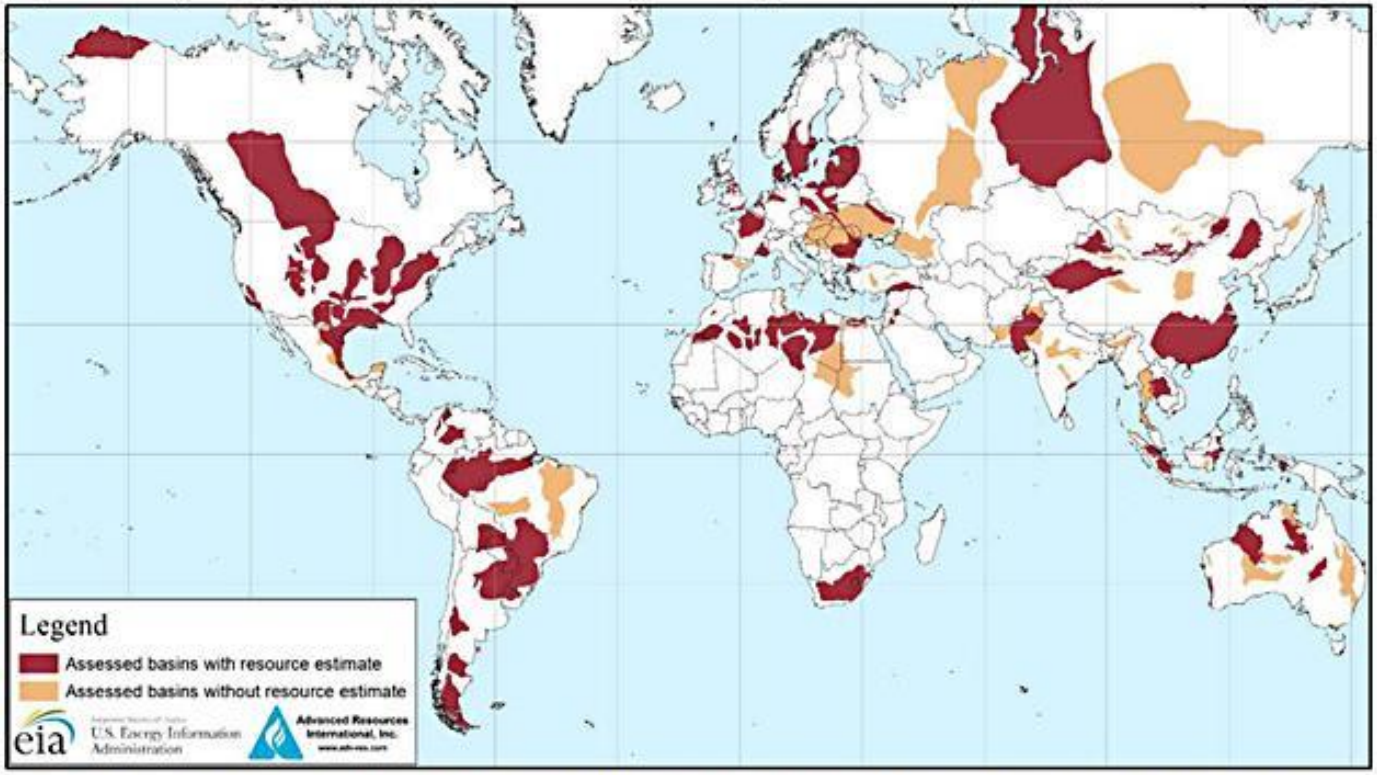
Not Limited to the U.S.

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.

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Not Limited to the U.S.

- 2013 U.S. Department of Energy released global assessment of reserves.
- These are "technically recoverable."
  - Russia – 75 billion barrels.
  - China – 32 billion barrels.
  - Argentina – 27 billion barrels.
  - Libya – 26 billion barrels.

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