

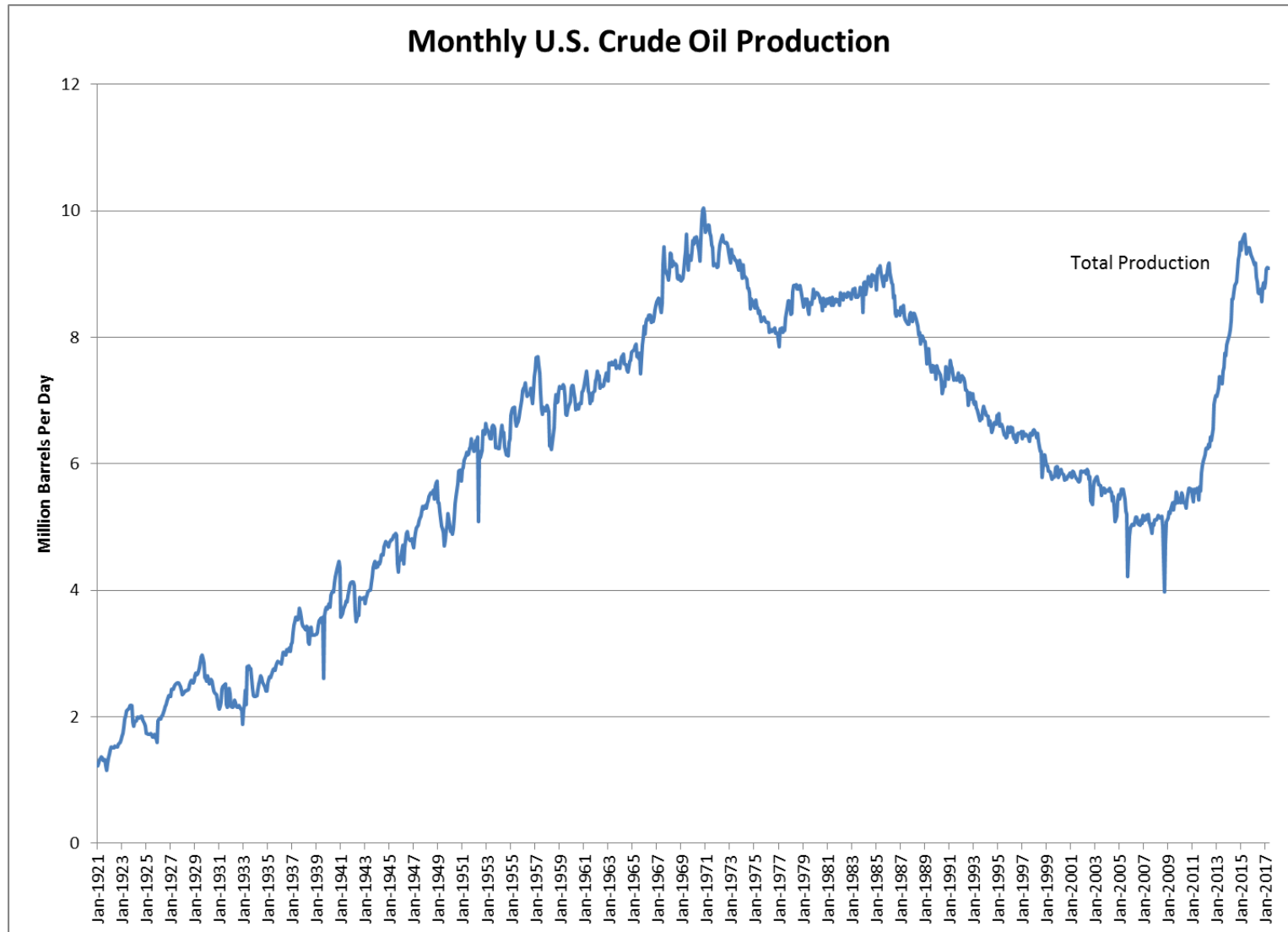


# Pacific Northwest Economic Region Presentation

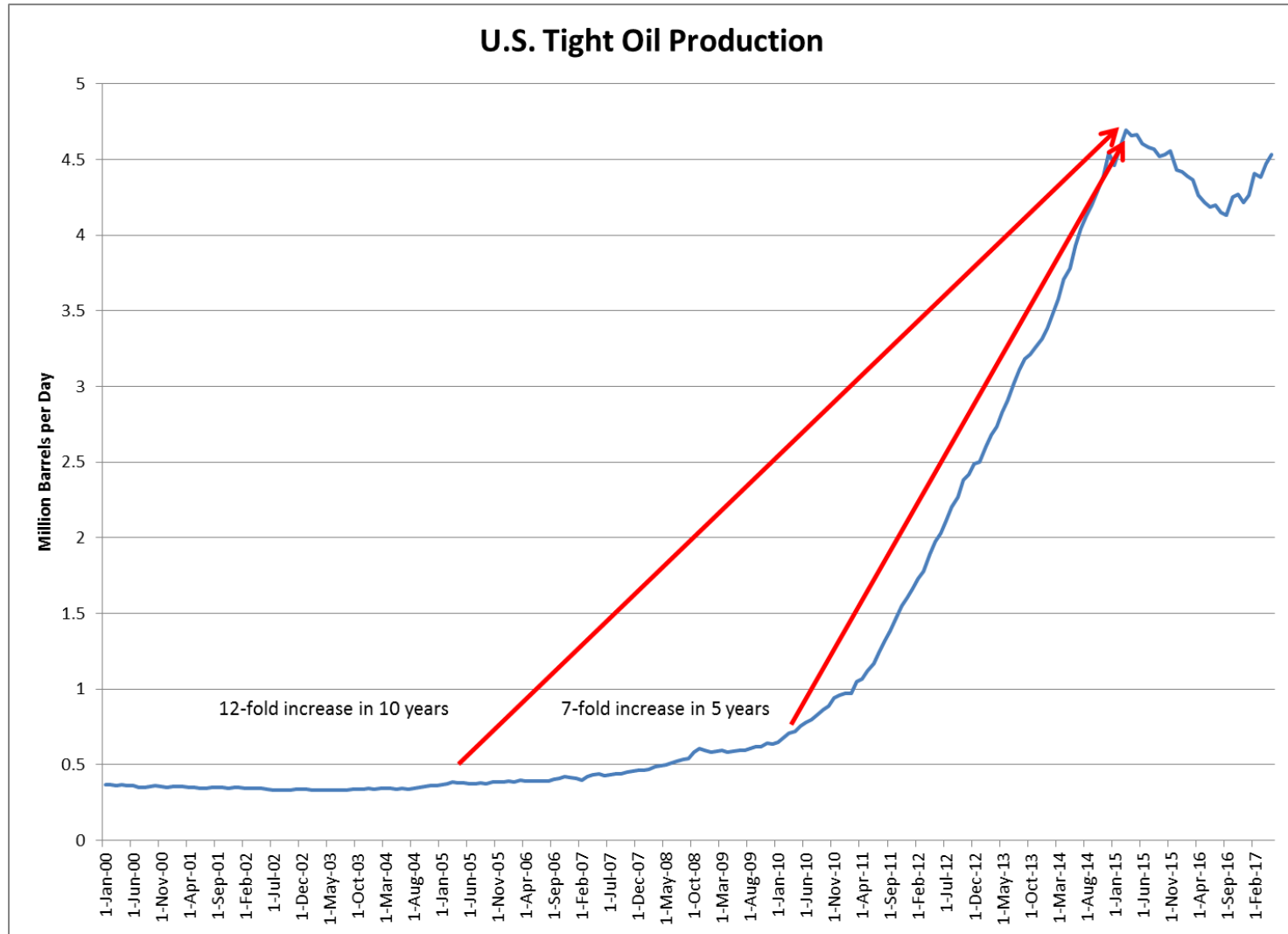
Robin Rorick  
Group Director, Midstream & Industry Operations  
July 25, 2016

- The US energy renaissance has transformed the U.S. into a energy superpower
  - Now the world's largest producer of oil and natural gas
  - 30 years of decline reversed
- The whole petroleum transport system of the U.S. has been reversed
  - Pre-Shale (2005) – Move crude inland from production and import centers on the coast
  - Post-Shale (2006-today) – Move crude to the coasts from inland production and import centers
- How was this done?
  - Rapid Innovation driven by market dynamism through:
    - Crude by Rail
    - New shipping routes
    - Pipeline reversals

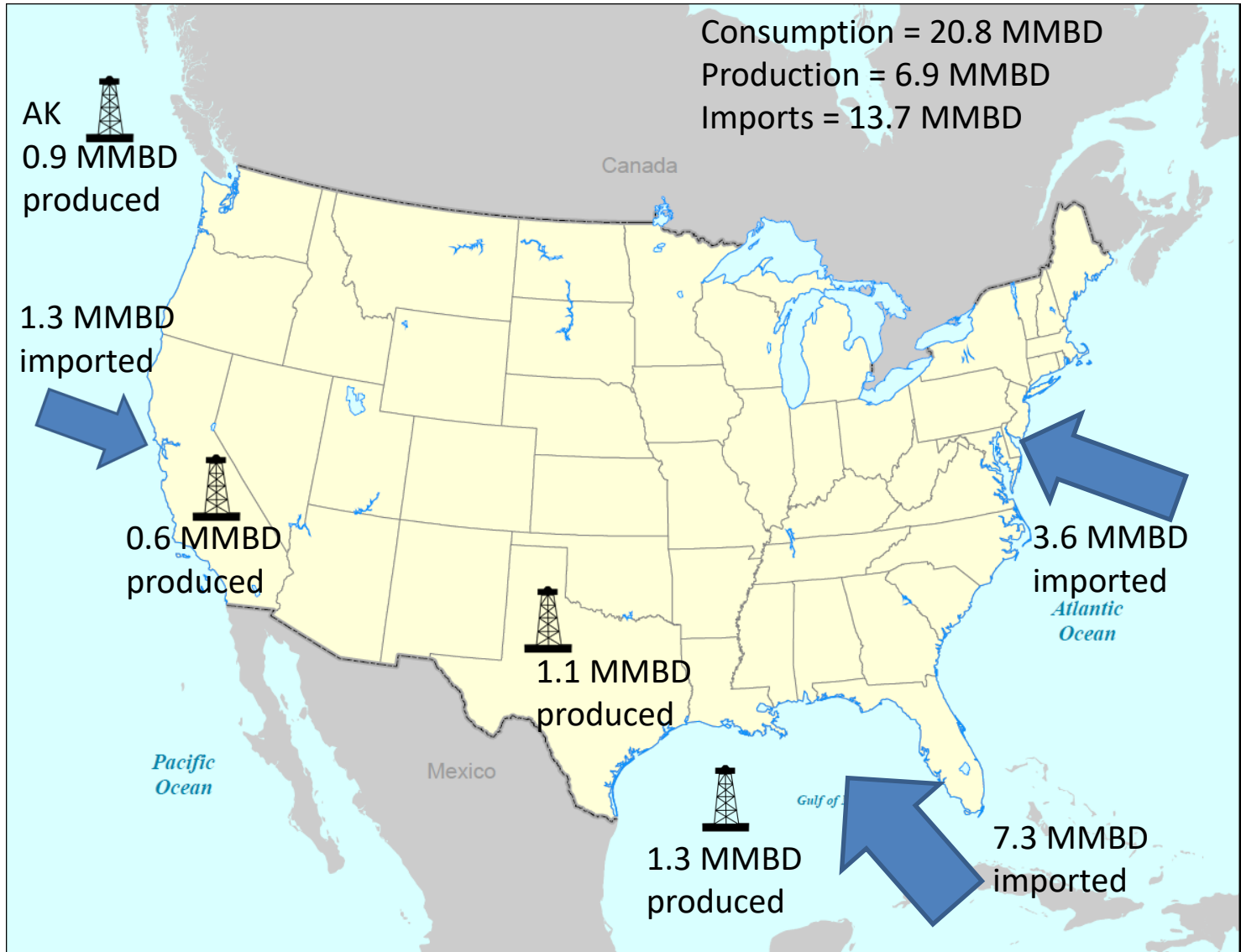
# The Flood: Tight Oil Production Reverses a 30 Year Decline



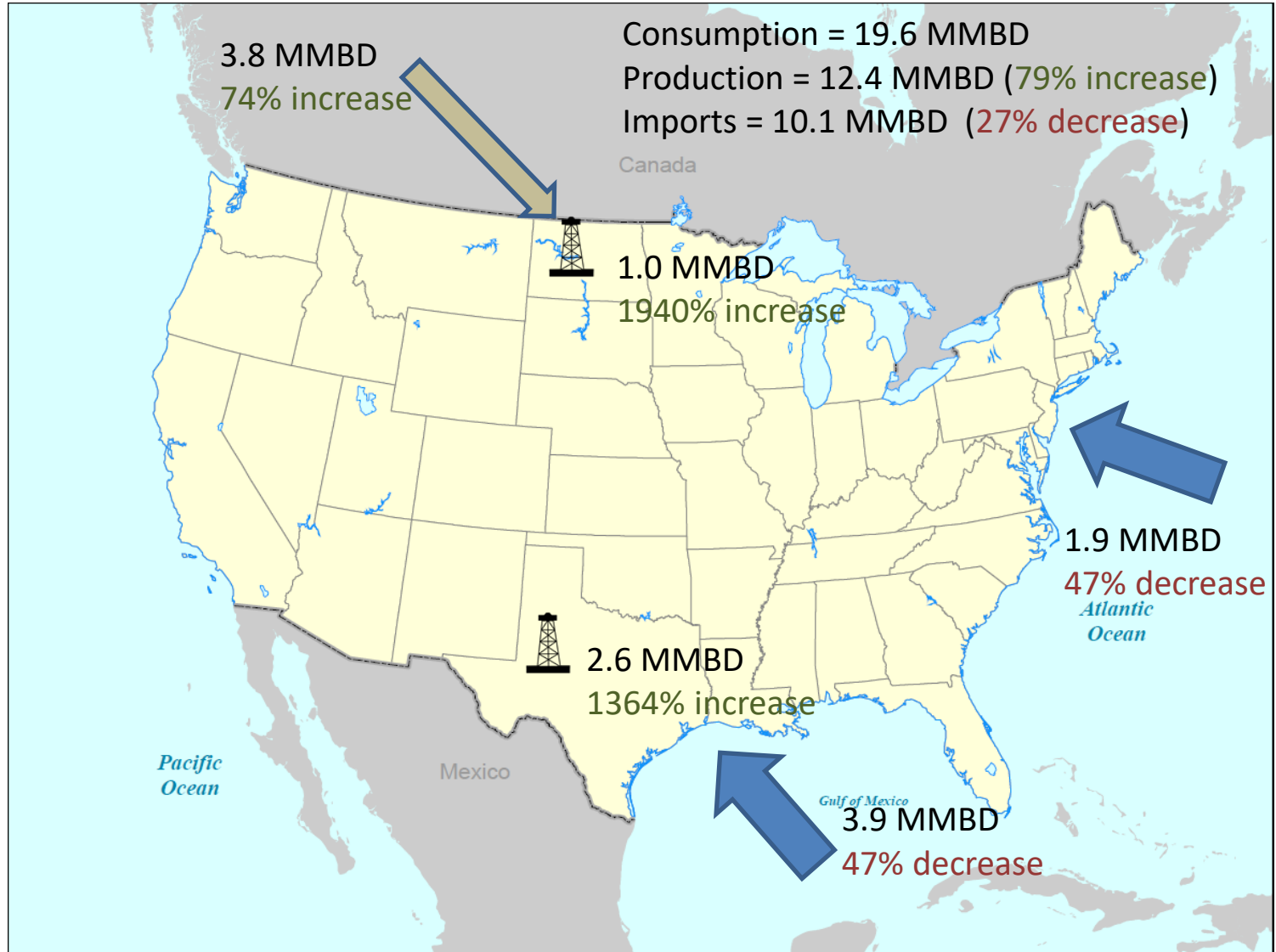
# The Flood: Tight Oil Production Increases 7-fold in only 5 Years



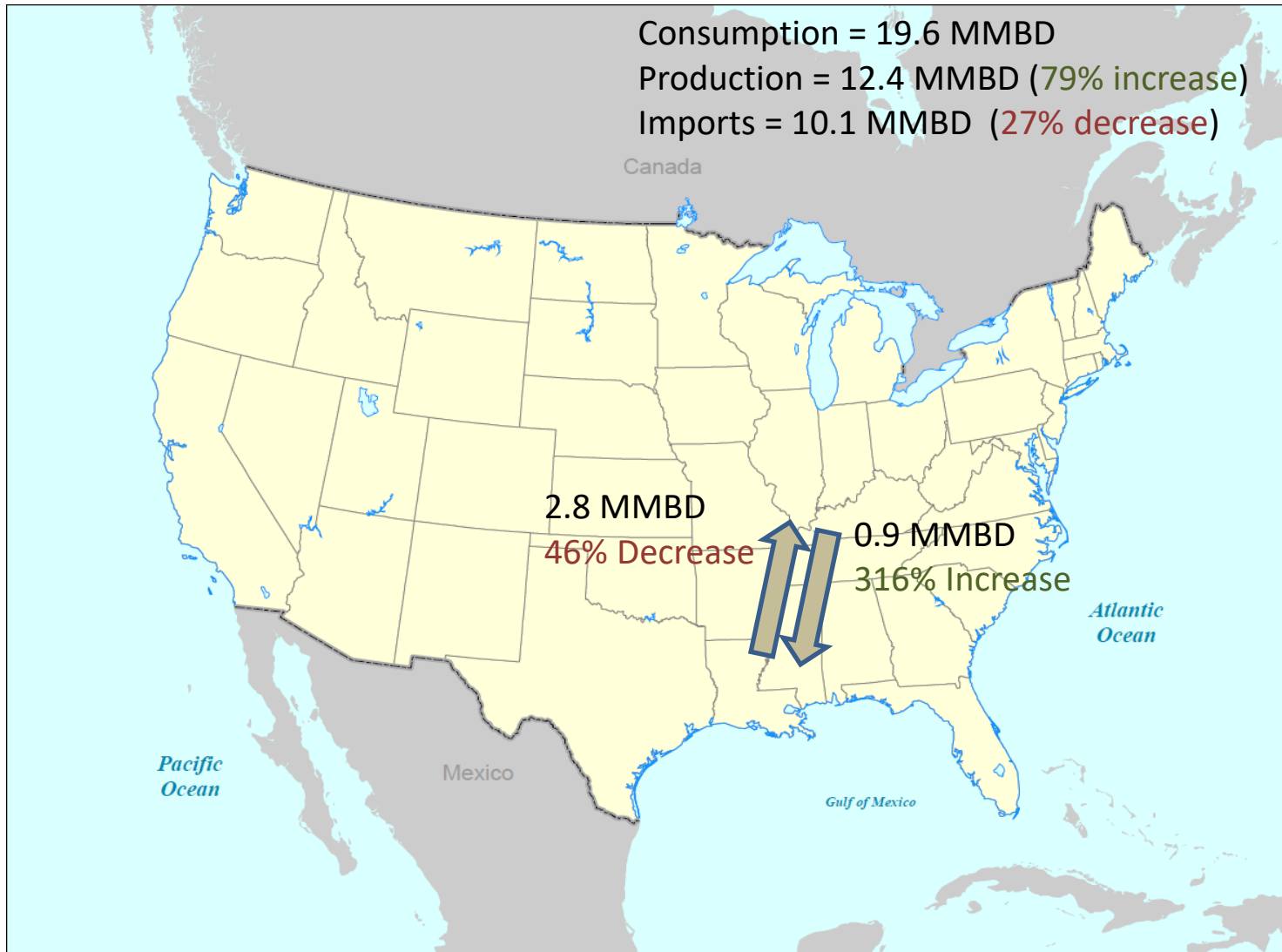
# Pre-Shale (2005) Crude Oil Supply: Production and Imports Focused on Coasts



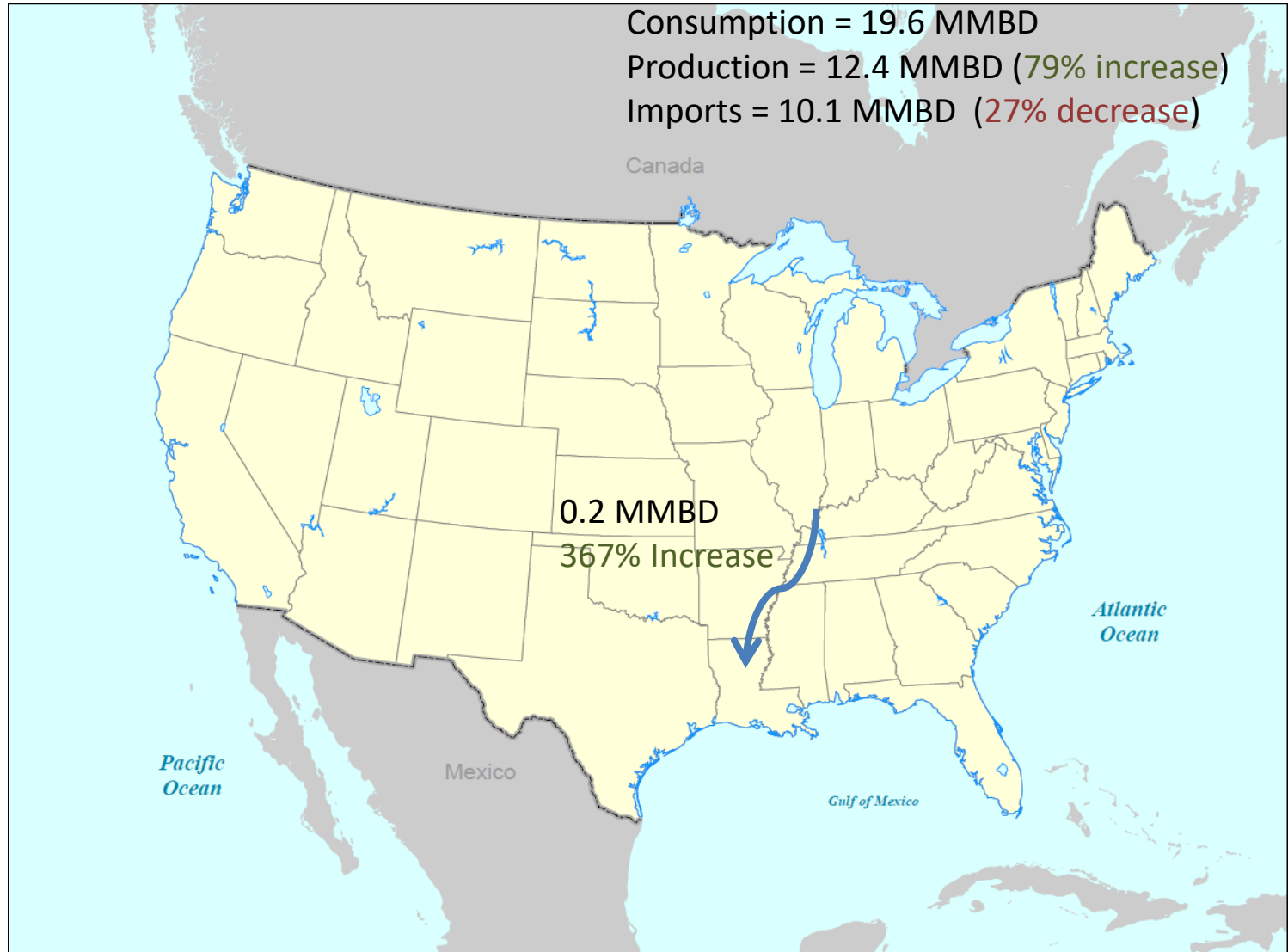
## Post-Shale (2016) Crude Oil Supply: Production and Imports Shift from Coast to Heartland



# Transporting the US Energy Renaissance to Market: Pipelines transporting more crude north to south due to increased shale production

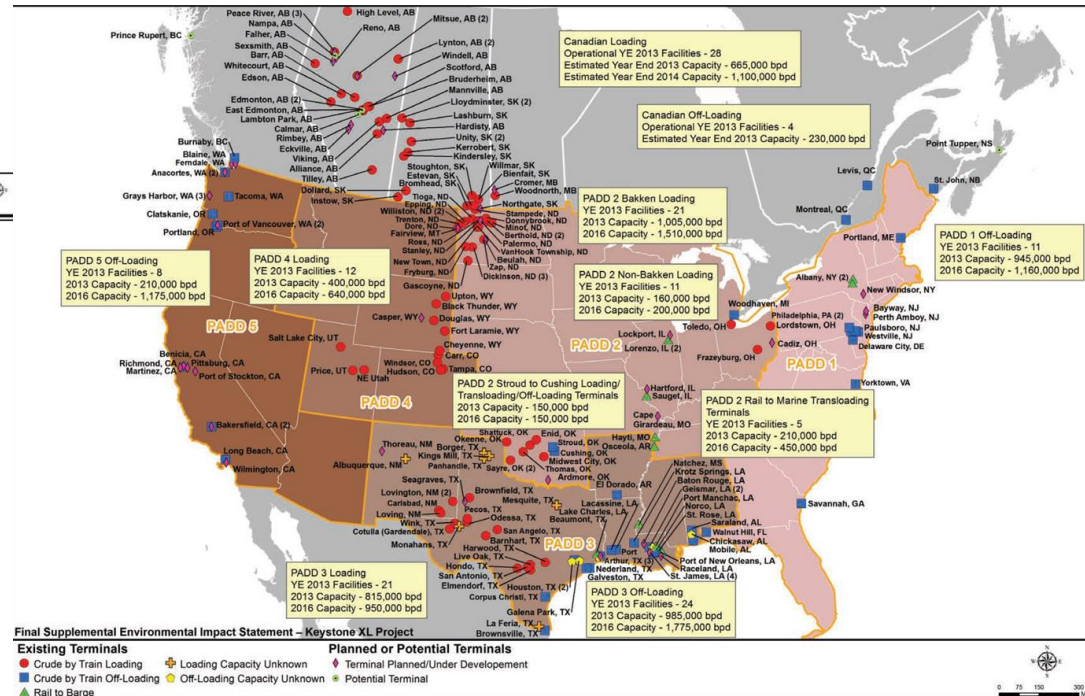
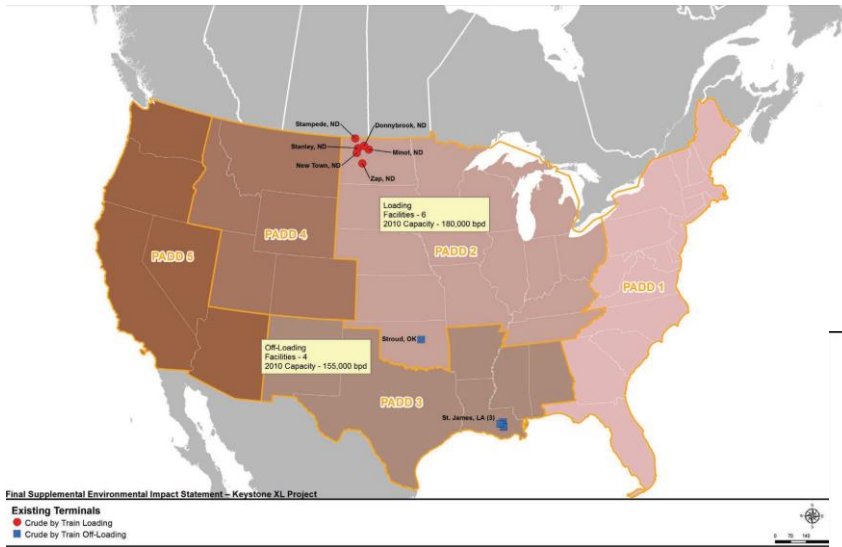


## Transporting the US Energy Renaissance to Market: Waterborne Movements - Increased North to South Flow





# Transporting the US Energy Renaissance to Market: Expansion of Crude by Rail



Annual rail movements  
of crude increase nine  
fold between 2011 and  
2014

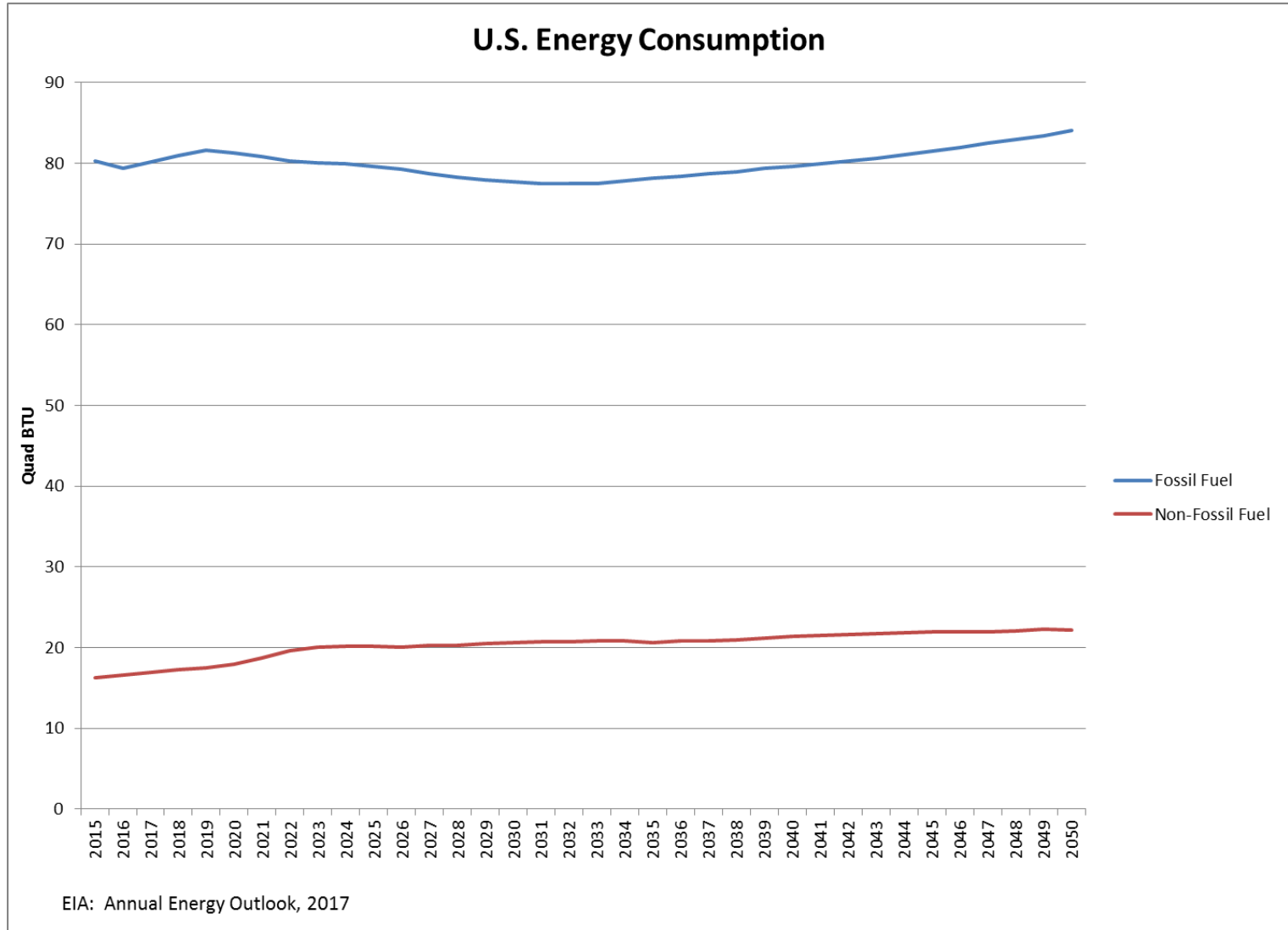
## How the US Energy Renaissance was Accommodated: New Waterborne Routes



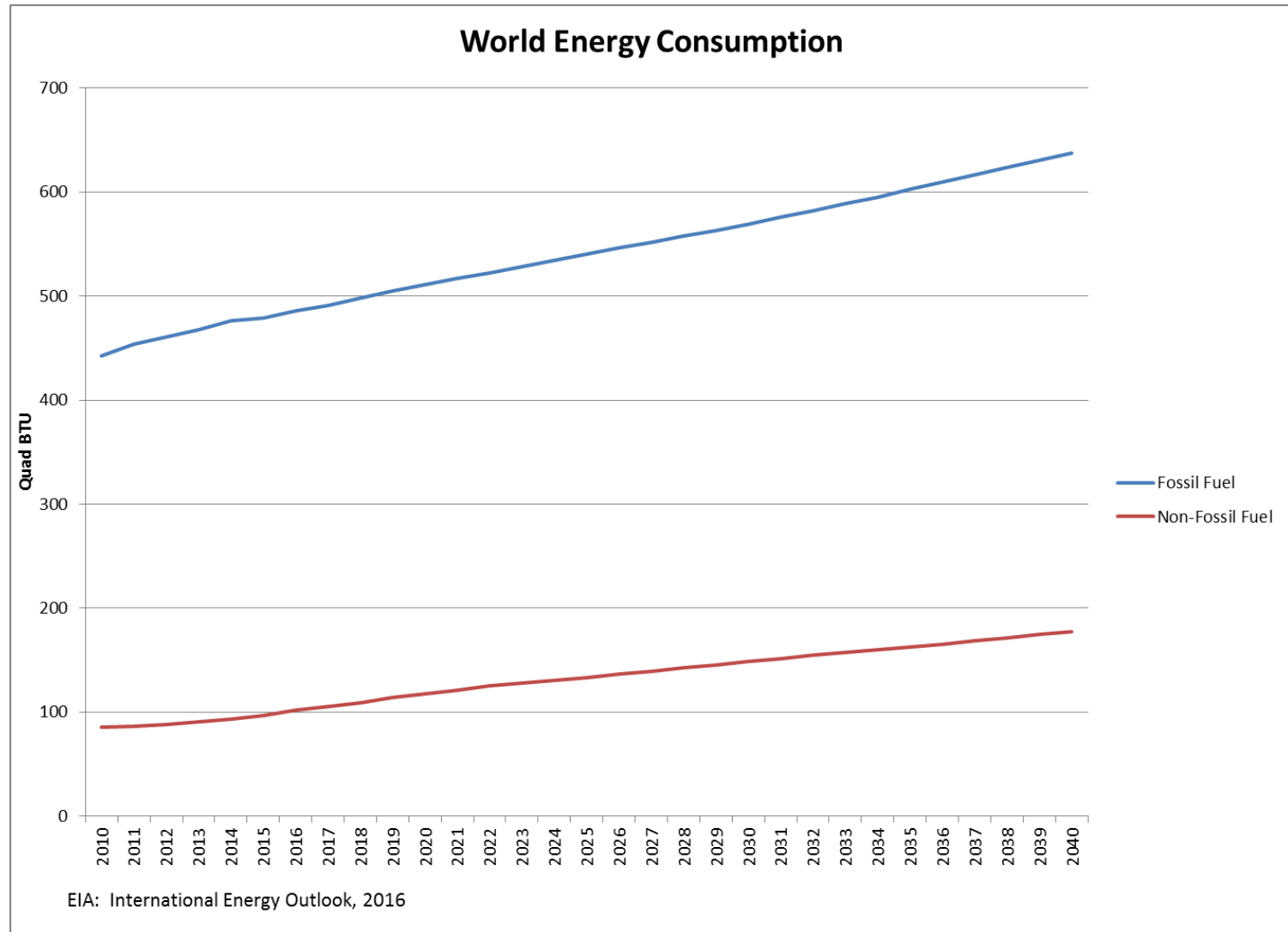
# Transporting the US Energy Renaissance to Market: Pipeline Reversals, Expansions, and New Construction Moving Crude North to South



## Going Forward Fossil Fuels Remain Dominant Energy Source in U.S.



# Going Forward Fossil Fuels Remain Dominant Energy Source Globally



## The Impact of the US Energy Renaissance

- The Shale Revolution has allowed the US to:
  - Increase national security and energy independence by reducing imports of crude and products by 27 percent.
  - Demonstrate energy security by exporting crude oil to 18 different countries in 2016.
  - Grow our economy and assist our allies by serving as a net exporter of petroleum products since 2011.
- The Role of Infrastructure:
  - Infrastructure will continue to play a vital role in the energy renaissance by transporting energy safely and efficiently to consumers
  - Infrastructure development will allow energy products to more competitively reach market, grow our economy and strengthen national security

- Looking forward, EIA estimates:
  - Petroleum exports will increase 50 percent by 2030
  - Natural gas exports will triple by 2025
  - Fossil fuels are forecasted to make up 78% of our world energy consumption in 2040
  - Fossil fuels are forecasted to make up 79% of our U.S. energy consumption in 2050
  - The US will continue to be a dominant energy superpower