The US Oil and Gas Renaissance: Implications for Global Energy Security

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Changing the Energy Landscape

• From Shortage to Abundance - In the span of a little more than a decade, US has become the world’s #1 producer of oil and gas, a major exporter, technology and cost/price leader, and moved energy from a liability to an asset

• In the last 15 years, energy intensity as % of US GDP is down 25%; oil production is up over 70% and net oil imports are down

• Concerns about Peak Demand have replaced Peak Supply

• Continually reminded we are still part of a global market, but energy dominance/realism emphasis promotes energy production and exports as leverage and trade, tax, enviro and foreign policies are impactful

• Integrating growth of renewables and electrification, but still struggling with climate change and the energy transformation
Energy independence within reach?

“Three decades of falling supply and rising demand, turns to rising supply and falling demand.”
(Deutsche Bank, 2012)

1974: We will lay the foundation for our future capacity to meet America’s energy needs from America’s own resources.

1975: We cannot afford prolonged vulnerability to foreign producers. We must act.

1979: We are the generation that will win the war on the energy problem.

1982: Energy independence is the best preparation America can make for the future.

1990: Congress should [...] enact measures to [...] reduce dependence on foreign oil.

1995: The nation’s growing reliance on imports of oil ... threatens the nation’s security.

2006: America is addicted to oil, which is often imported from unstable parts of the world.

2012: Last year, we relied less on foreign oil than in any of the past 16 years.
Make America (feel) wealthy and secure again

- Cheap energy is key strategic advantage – will drive GDP growth, job creation, and reduce trade deficit
- Government bureaucracy stands in the way of growth and innovation; remove obstacles to exploration
- Government should not pick winners and losers; pursue all forms of energy, including fossil fuels
- American energy dominance must be a strategic economic and foreign policy goal of the United States
- Energy independence means not needing to import energy from the OPEC cartel or any nations hostile to our interests
- Persian Gulf allies need to be part of an anti-terrorism strategy
- Paris Agreement on climate was a bad deal for the United States and environmental concerns should not stand in the way of economic opportunity
U.S. primary energy consumption by source and sector, 2017

Total=97.7 quadrillion British thermal units (Btu)

source
- petroleum¹ 36.2 (37%)
- natural gas² 28.0 (29%)
- coal³ 13.9 (14%)
- renewable energy⁴ 11.0 (11%)
- nuclear electric power 8.4 (9%)

sector
- transportation 28.1 (29%)
- industrial⁵ 21.9 (22%)
- residential and commercial⁶ 10.4 (11%)
- electric power⁷ 37.2 (38%)

¹ Petroleum includes natural gas liquids
² Natural gas includes oil shale
³ Includes coalbed methane
⁴ Includes geothermal
⁵ Includes transportation
⁶ Includes transportation
⁷ Includes industrial, residential and commercial

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U.S. Shale Production has Nearly Doubled in Past 5 Years at $60 WTI Avg.

Data source: Baker Hughes; EIA.
The Marcellus Shale alone produces more than Canada or Qatar.
Conventional Production

The Marcellus Shale alone produces more than Canada or Qatar

U.S. shale gas and tight oil resources are widespread but production is concentrated in key plays.

In fact, 95% of recent U.S. oil/gas production increases came from just 7 key basins

• Appalachia
• Bakken
• Niobrara
• Anadarko
• Permian
• Haynesville
• Eagle Ford

Data source: EIA
Policy, technology, and economics affect the mix of U.S. fuel consumption
The United States becomes a net energy exporter after 2020 and remains a net exporter in most cases.

Net energy trade
quadrillion British thermal units

Data source: EIA
The United States become a net exporter of petroleum on a volume basis after 2020 in the Reference case.

U.S. petroleum and other liquids net imports

Data source: EIA
Net exports of natural gas from the United States continue to grow in the Reference Case, led by waterborne trade.

**Natural gas trade (Reference case)**
- trillion cubic feet
- billion cubic feet per day

**Liquefied natural gas exports**
- trillion cubic feet
- billion cubic feet per day

Data source: EIA
NEW ENERGY, NEW GEOPOLITICS?
Abundance of North American energy has major potential geopolitical implications for global oil producers

For big producers: Russia, Saudi Arabia
• Reinforces U.S. shift to Asia
• Adds pressure to reform in Asia
• Complicates Saudi role as market balancer
• Enhances concern over U.S. role in Middle East
• Low prices combine with sanctions to put pressure on Russian finances, investment

For possible reentrants: Iran, Mexico
• Raises stakes for each to get back in market
• Increases pressure on OPEC cohesion
• Accelerates internal pressures for reform

For revenue dependents (e.g., Nigeria, Algeria, Venezuela, Iraq)
• Possible instability in slack oil markets
Saudi Arabia’s Energy Dominance

Data source: IEA
Russia and Saudi Arabia: A New Oil Bromance?

Russian Compliance

Million barrels per day

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Data source: IEA
The New Petrostate

Russia is more of a petro-state than the Soviet Union. Oil and gas equaled more than 50% of budget revenue and 70% of export earnings in 2014.

Oil is about money and politics. Gas is about politics and money.
Supply Side Geopolitical Risks to Oil Are Ever Present

Data source: IEA

Iran
2.5 mb/d

Venezuela
1.0 mb/d

Kurdistan
0.5 mb/d
Key Takeaways

“What changes will we see in energy supply and demand?”

The Global Energy System
No major near-term transformation likely owing to the momentum advantage of existing energy networks

Behavioral Economics
Uncertainty in consumer behavior is a key component of deployment in renewables and mobility developments

Cost Structure Uncertainties
Forecasts for renewable energy have been hampered by rapid improvements in technology and materials

The Climate Challenge
Emission reduction targets agreed at Paris are not sufficient to meet the 450ppm goal
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• Analyzing and explaining the intersection of policy, market, and technological developments
• Collaborating with government, industry, academia and nonprofits leaders
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