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Recent Events Suggest OPEC Still Has Market Power
Putting U.S. Production in Perspective

Global Crude Oil Supply and Demand

- Saudi Oil Production
- US Oil Production
- Rest of OPEC
- Rest of Non-OPEC
- Total NGLs
- Processing Gains
- Global Oil Demand
Saudi-Russia oil alliance is problematical

Navigating the Saudi-U.S. and Saudi-Russian bilateral relationship has proven tricky.

As kingdom’s economic problems worsen, alignment with Russia could strengthen.
Shorter cycle times will leave NOCs with less capital flexibility. NOCs likely to have more difficulty staving off declines in mature fields. Majors are favoring short cycle projects such as shale in the Americas, brownfield extensions and development of satellite reserves. Interest in long cycle projects like Venezuelan heavy oil and Arctic development is sinking. Longer term, any higher oil prices could breed structural decline in oil use, creating intractable problem for OPEC.
Sectoral distribution of oil use has become more limited. Now concentrated in transport which socks consumers more than it damages entire economy.
When it comes to OPEC, U.S. fuel efficiency standards still matter

U.S. Petroleum and Other Liquids Consumption and Production 2014-2030
(Business as Usual Case with and without CAFE Standards)

Source: Daniel Scheitrum, University of Arizona, and Dvlan Yalbir, CFR, based on EIA data
When it comes to OPEC, U.S. fuel efficiency standards still matter.
Global New Investment in Clean Energy by Region

2004 – 2017

$bn

Balance shifts from Europe as largest-investing region to Asia as number one region

Source: Bloomberg New Energy Finance
Average Age of U.S. Nuclear Generators is 37 Years Old

New Technology:
- Small Module Reactors (SMR):
  - “Automatic” Safety Features
  - Scalable Sizing
  - Low Cost
  - Highly Flexible for Renewables
- Generation IV Reactors:
  - 3 Models Under Development
  - Improved Safety
  - Ability to Consume Nuclear Waste
  - High Efficiency and Flexibility

Note: Capacity is net summer; MW is megawatts; MWh is megawatt-hours.
Source: U.S. Energy Information Administration, Monthly Energy Review, Table 8.1, March 2018
New Investment in Clean Energy China
2004 – 2017

$bn

Source: Bloomberg New Energy Finance
Electric Vehicle Sales

- China
- Rest of the world

Data: Bloomberg Intelligence
IEA says the future is electrifying, but what if…

**Electricity generation by selected region**

- **China**: 2016: 7,000 TWh, Growth to 2040: 10,000 TWh
- **United States**: 2016: 5,000 TWh, Growth to 2040: 8,000 TWh
- **India**: 2016: 3,000 TWh, Growth to 2040: 6,000 TWh
- **European Union**: 2016: 4,000 TWh, Growth to 2040: 7,000 TWh
- **Southeast Asia**: 2016: 1,000 TWh, Growth to 2040: 3,000 TWh
- **Middle East**: 2016: 500 TWh, Growth to 2040: 1,000 TWh
- **Africa**: 2016: 300 TWh, Growth to 2040: 700 TWh

**Sources of global electricity demand growth**

- Industrial motors
- Electric vehicles
- Large appliances
- Connected & small appliances
- Cooling
- Other

*India adds the equivalent of today’s European Union to its electricity generation by 2040, while China adds the equivalent of today’s United States*
In the United States, Natural Gas and Renewables are Replacing Coal. Hawaii and California targeting 100% renewables. In midterms, winning governors pledged 100% renewables from: Colorado Connecticut Nevada Maine Oregon Wisconsin
U.S. Power Plant Retirements, January 2007 – August 2018

RETIREMENTS

- Coal
  - 18,442 mw
- Natural Gas
  - 7,909
- Other
  - 1,654
- Conventional Hydroelectric
  - 150
- Wind
  - 80
China dominates **top 10** solar ranking partly because biggest sales market but also due to emerging industrial policies related to China 2025.

It’s not just U.S. shale. China will be a major energy exporter via its technologies. India could copy...
Hydrogen Fuel Cells

Could natural gas distribution companies deliver directly to stationary fuel cells bypassing electricity distribution?

Germany, Japan still making large bets on hydrogen fuel.
By 2040, U.S. will account for roughly 20 percent of global natural gas production.

Rising global natural gas demand will be driven by industrial and power demand in Asia and Africa.
Russia will respond to rising U.S. LNG exports with price cuts

- U.S. LNG exports expected to continue to rise significantly in 2018 to 2025 timeframe.
- Trade war interfering with previous high interest in U.S. gas on gas deals. If LNG exports don’t materialize as substantially as projected, expect lower U.S. prices late 2019 into 2020.
- Still, economics could help. Golden Pass and spot deals could substantially undercut even Russian gas prices.

2007: Lyft/Zimride Car Pooling App
2012: Lyft Ride Hailing App
2013: Uber Ride Hailing App

Source: Texas A&M University
U.S. net energy trade (1990-2050)
quadrillion British thermal units

- History
- Projections

Net imports
Net exports

2018

1990 2000 2010 2020 2030 2040 2050

Low Oil and Gas Resource and Technology
Low Oil Price
Reference case
High Oil Price
High Oil and Gas Resource and Technology
Transportation: Energy Use by Mode: Freight Trucks

Volume (MMb/d oil eq)
Case: Reference case

Source: U.S. Energy Information Administration