

Macro View of Oil Markets & Market Disruptors

Dale Bradford

VP Worldwide Drilling & Services

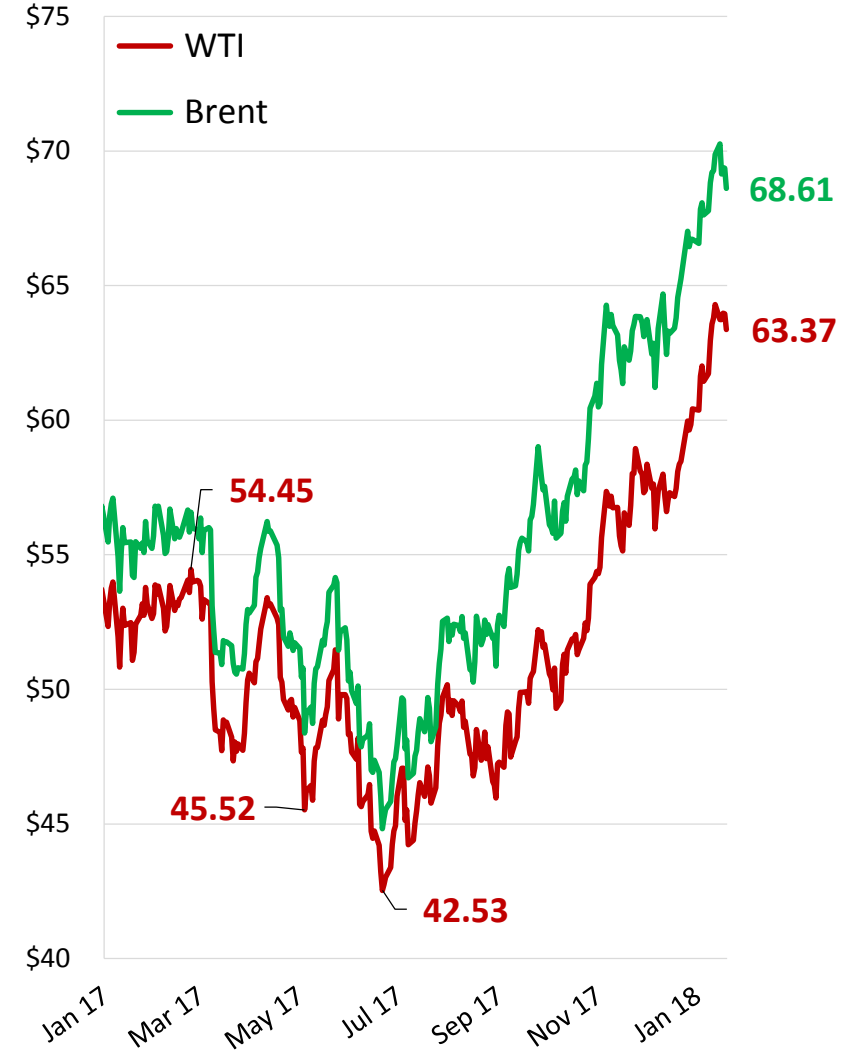
Murphy Exploration & Production Company

Historical Crude Oil Prices (2008 – 2018)

\$US/BBL



\$US/BBL



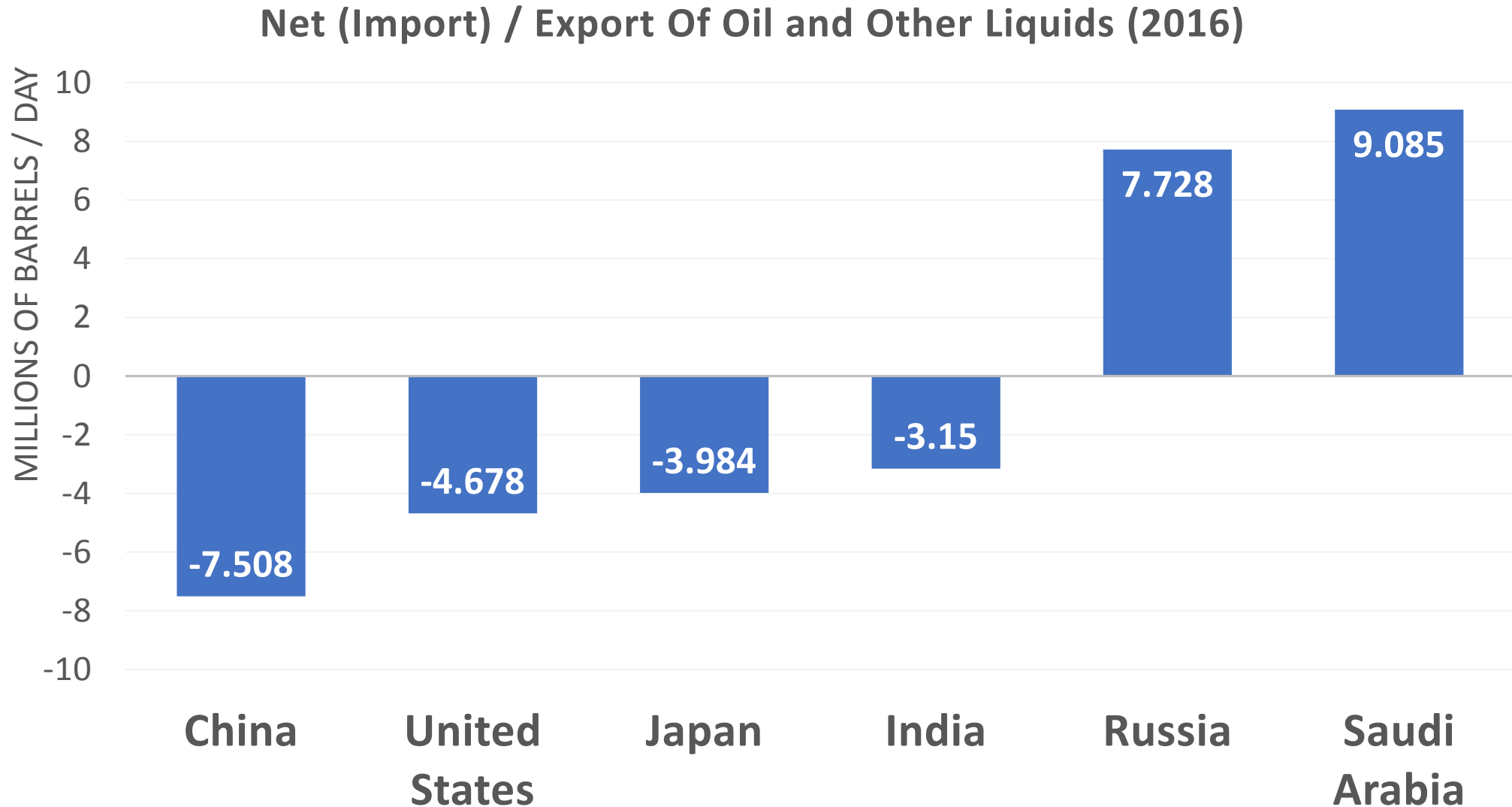
Updated January 19, 2018 (NYMEX WTI, ICE Brent)

Ten Countries Produce 69% of World Oil

- Vast Majority of Oil from Top Ten Producers
- The Remaining 185 Countries Produce the Balance...

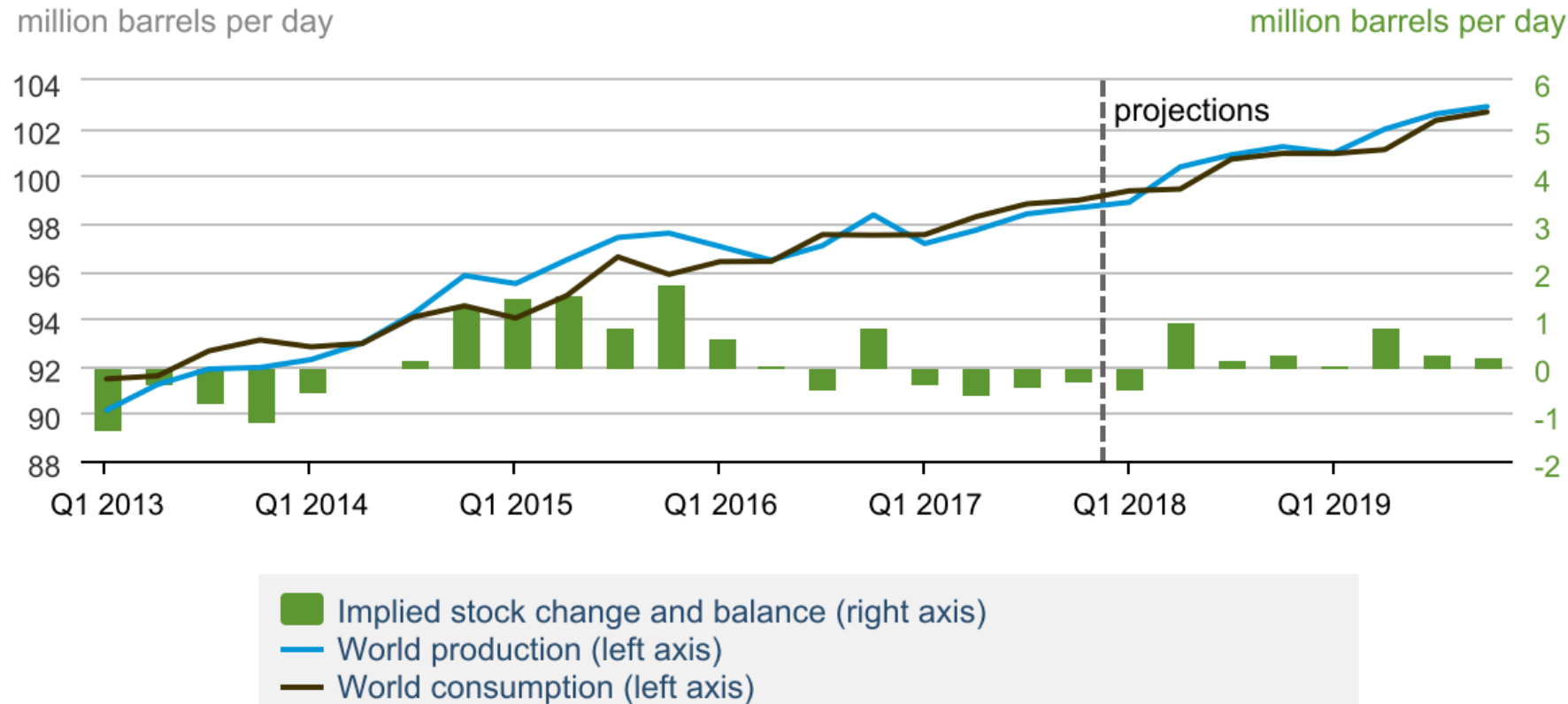
Country	Million barrels per day	Share of world total
United States	14.85	15%
Saudi Arabia	12.39	13%
Russia	11.24	12%
China	4.87	5%
Canada	4.59	5%
Iraq	4.45	5%
Iran	4.21	4%
United Arab Emirates	3.77	4%
Brazil	3.24	3%
Kuwait	3.07	3%
Total top 10	66.68	69%
World total	97.23	

Four of the Top Six Consumers Are Net Importers



Tight Global Balance of Supply & Demand

World liquid fuels production and consumption balance



- Balance within 2%
- Volatility of Oil Prices is Caused by Low Responsiveness of Supply and Demand to Price Changes in the Short Term
- Only OPEC has Spare Capacity – Less in Recent Years
- Market Sensitive to Disruptions

Uncertainty About Future Supply Drives Market

- Global Commercial Inventories are ~3 Billion Barrels...What are We Worried About?
- Unplanned Production Outages
- Destabilizing Events – Conflict, Severe Weather, Political, Economy
- Disruptive Technology – Renewables, Electric Cars, Vehicle Efficiency, etc.

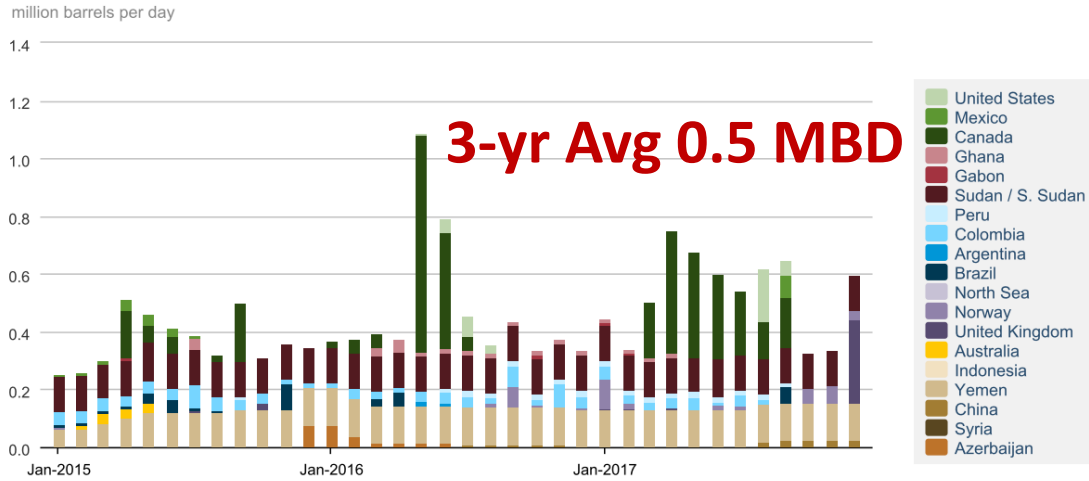


57X

*4Q 2017 Daily
NYMEX Futures
Trading to Physical
Trading Ratio*

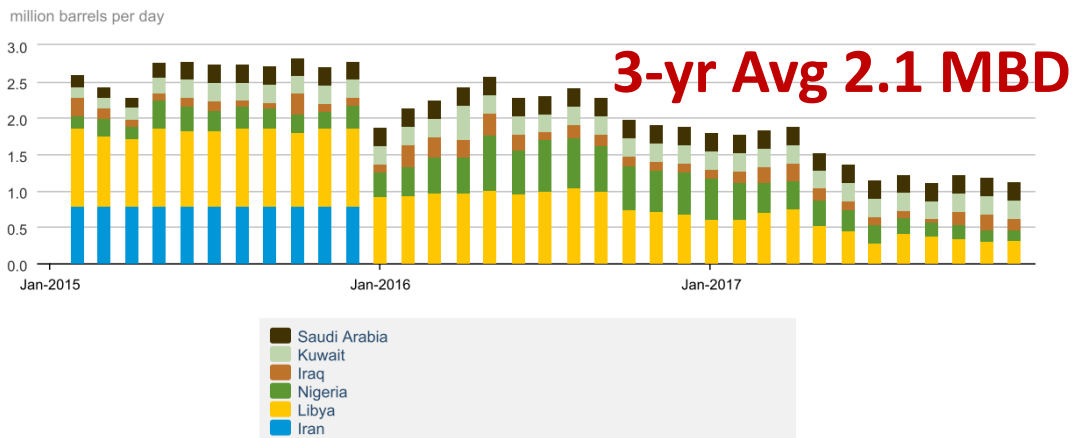
Impact of Production Outages or Restoration

Estimated unplanned Non-OPEC liquid fuels production outages



For 2014, unplanned outages in the United Kingdom and Norway are included in North Sea
 Source: Short-Term Energy Outlook, January 2018

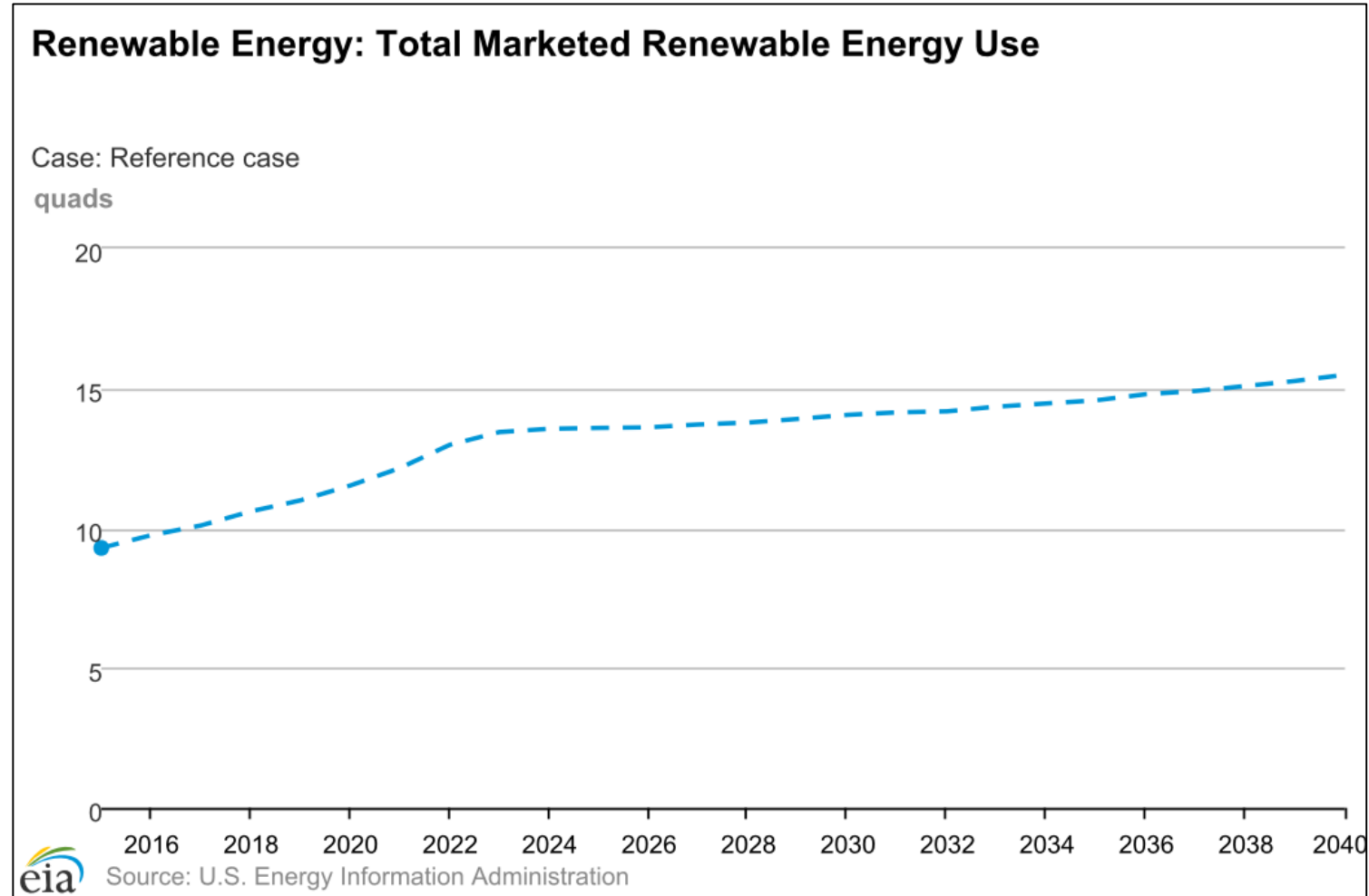
Estimated historical unplanned OPEC crude oil production outages



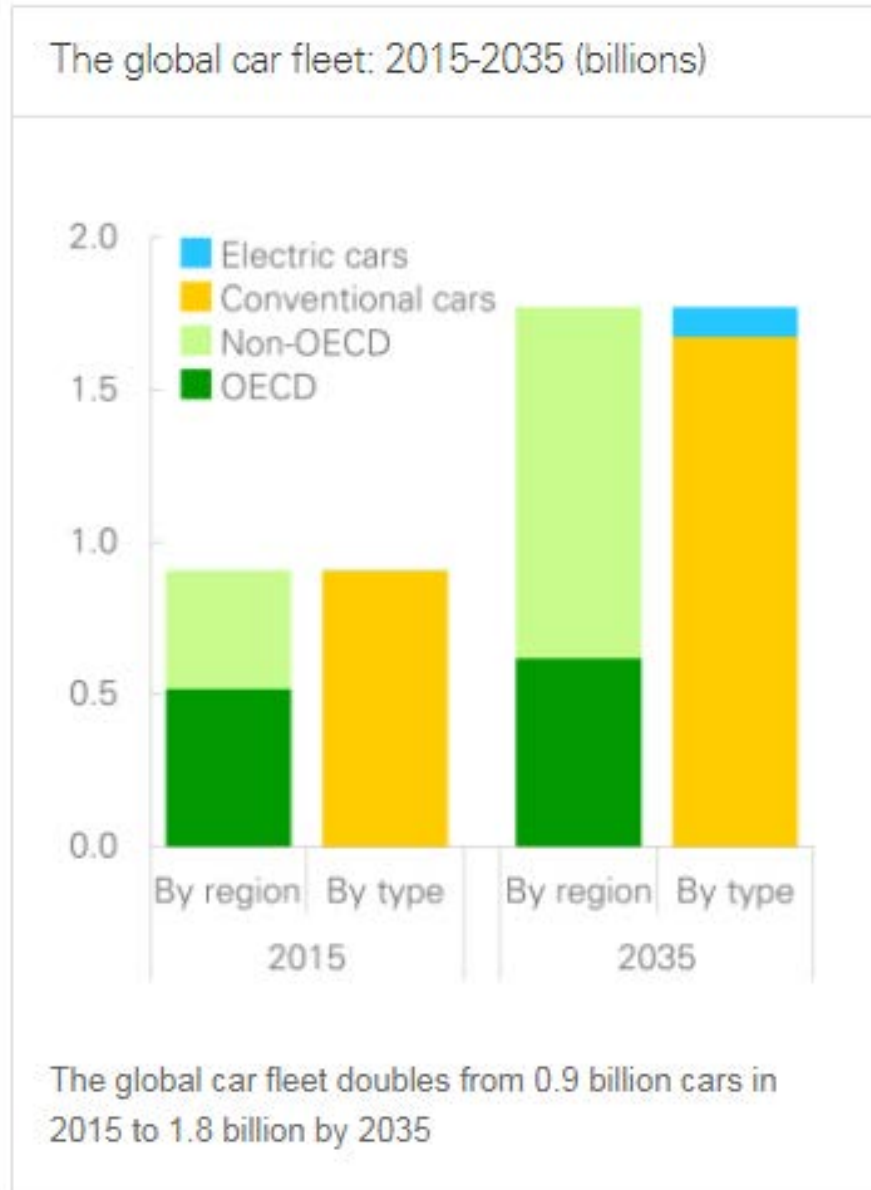
- Unplanned Production Outages 2015-2017 Averaged 2.6 Mb/d
- End of Iran Sanctions Jan 2016 Reduced Outages by ~0.75 Mb/d
- Jan 2018 Outages at 3-yr low of ~1.5 Mb/d

Impact of Renewables

- Current Annual U.S. Renewable Supply 10 QBTU, Growing to 15 QBTU by 2040
- Equivalent to 4.9 Mb/d today and 7.3 Mb/d in 2040



Impact of the Electric Car



- “An average passenger car is expected to achieve almost 50 miles per US gallon in 2035, compared with less than 30 MPG in 2015 - a faster rate of efficiency improvement than in the past.”
- “The growth of electric cars also mitigates the growth in oil demand, but the effect is much smaller: the 100 million increase in electric cars reduces oil demand growth by 1.2 Mb/d. By comparison, this is around a 10th of the impact of the gains in vehicle efficiency.”

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- Imbalance Between Oil “Haves” and “Have Nots” Drives Geopolitical Tension
- Oil Supply and Demand Balance is Inelastic – Responds Slowly to Disruption, Resulting in Short Term Commodity Price Volatility
- High Volume of Futures Trading Relative to Physical Trading – The Market is Driven by “What Might Happen”
- Disruption Comes in Many Forms