Global Commodity Price Outlook: Near Term Oil Market Dynamics

An overview of the key factors affecting oil markets through 2020

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Global Oil Overview

Key Characteristics of Supply and Demand
Global Oil Supply Overview

Global Oil Supply Breakdown

- World oil production averaged 91.7 million barrels per day (mbd) in 2015, up from 83.2 mbd in 2010.
- Members of the OPEC cartel accounted for 42 percent of liquids supply.

Source: BP
Global Oil Supply Overview

Top 12 World Oil Producers, 2015

- The United States was the world’s largest producer of crude oil and natural gas liquids in 2015.
- Both Canada and Mexico rank among the top 12 producers globally, making North America the world’s second largest oil producing region after the Middle East.

<table>
<thead>
<tr>
<th>Country</th>
<th>Million Barrels per Day</th>
</tr>
</thead>
<tbody>
<tr>
<td>US</td>
<td>12.7</td>
</tr>
<tr>
<td>Saudi Arabia</td>
<td>12.0</td>
</tr>
<tr>
<td>Russia</td>
<td>11.0</td>
</tr>
<tr>
<td>Canada</td>
<td>4.4</td>
</tr>
<tr>
<td>China</td>
<td>4.3</td>
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<tr>
<td>Iraq</td>
<td>4.0</td>
</tr>
<tr>
<td>Iran</td>
<td>3.9</td>
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<tr>
<td>UAE</td>
<td>3.9</td>
</tr>
<tr>
<td>Kuwait</td>
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</tr>
<tr>
<td>Venezuela</td>
<td>2.6</td>
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<tr>
<td>Mexico</td>
<td>2.6</td>
</tr>
<tr>
<td>Brazil</td>
<td>2.5</td>
</tr>
</tbody>
</table>

Source: BP
Global Oil Supply Overview

Proved Oil Reserves, 2015

- Total global proved oil reserves were 1.7 trillion barrels at the end of 2015, equal to 50 years of supply at current production levels.
- More than 71 percent of proved reserves were in OPEC nations and approximately 90 percent were held by national governments.

Source: BP
Global Oil Demand Overview

Top 12 Oil Consumers

- US: 19.4 million barrels per day
- China: 12.0 million barrels per day
- India: 4.2 million barrels per day
- Japan: 4.2 million barrels per day
- Saudi Arabia: 3.9 million barrels per day
- Brazil: 3.2 million barrels per day
- Russia: 3.1 million barrels per day
- Korea: 2.6 million barrels per day
- Germany: 2.3 million barrels per day
- Canada: 2.3 million barrels per day
- Iran: 1.9 million barrels per day
- Mexico: 1.9 million barrels per day

The United States was the world’s largest oil consumer by a wide margin in 2015.

Source: BP
Global Oil Demand Overview

Global Oil Demand by Region, 2011 to 2016

Oil demand in emerging market economies is growing rapidly, and now accounts for the overwhelming majority of global oil demand growth.

Demand outside the OECD surpassed OECD demand in 2013.

Source: IEA
Global Oil Demand Overview

Oil Demand Breakdown, 2014

- 90.6 mbd

- 55% Transport
- 13% Petrochemicals
- 8% Buildings
- 6% Power Generation
- 5% Other Industry
- 13% Other

- More than half of the oil consumed globally is for transportation.
- Petrochemicals and other industry account for an additional 20 percent.
- Oil is also the world's most important fuel measured in terms of primary energy demand. It accounts for 31 percent of the world's energy diet, more than coal or gas.
- While it plays a meaningful role in multiple sectors, oil is the dominant transport fuel.

Source: IEA
The Oil Market in 2016

1. Where are we, and how did we get here?
2. How have markets reacted?
The Oil Price Collapse

Downward Oil Price Cycles Since 1980

- The world just experienced one of the most severe oil price collapses in history—certainly post-1980.
- Prices fell by more than 70 percent between June 2014 and February 2016, after which they basically stabilized.
- This followed a period of historically high prices from 2007 to 2008 and again from 2011 to mid-2014.

Source: Oil price data from EIA
Current Oil Market Balance

Global Oil Market Balance, 2011-2016

- The oil price collapse was caused by a large imbalance between supply and demand between 2014 and the first half of 2016.
- The market now appears to be rebalancing much more quickly than originally anticipated.
- It is important to understand how we got here, and how durable this balance will be.
Oil Price Collapse: Supply Factors

U.S. Tight Oil Production by Play, 2000 - 2015

- The U.S. added 4 million barrels per day of oil supply to the global market between mid-2010 and mid-2015.
- This was the equivalent of adding another Iraq or Canada to the market.
- The U.S. shale industry on its own would be the world’s fourth largest oil producer.

Source: EIA
Oil Price Collapse: Supply Factors

The growth in shale was had a muted impact on the market for the first four years, because it was offset by the sudden onset of multiple global oil supply disruptions.

These included the Libyan Civil War, Iran Sanctions, and turmoil in Iraq, Sudan, Syria, and multiple other places.

Source: IEA
Oil Price Collapse: Demand Factors

Year-Over Year Change in Global Oil Demand

- There was a significant slowdown in global oil demand growth in late-2013 and into 2014.
- There were a combination of factors: high prices took their toll, as did weak economic conditions in China and Europe.

Source: IEA
Oil Price Collapse: Demand Factors

Year-Over Year Change in Global Oil Demand

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Source: IEA
Oil Price Collapse: OPEC

OPEC Crude Supply and Call on OPEC

- Based on current expectations for supply and demand, OPEC will have restored demand for its crude to pre-2014 levels by the end of 2016.
- This outcome is the result of both demand and supply factors.

Source: IEA
The Oil Market in 2016

1. Where are we, and how did we get here?
2. How have markets reacted?
Short Term Demand Response

U.S. Vehicle Miles Traveled

- U.S. driving is now at its highest level in history, and the rate of growth is much faster than anything we have seen in decades.
- The large increase in VMT is correlated with the drop in prices that began after July 2014. This is in keeping with historical precedent.
- The increase is also coming through in per capita data.
- Not just a U.S. story.

Source: EIA
Short Term Demand Response

U.S. Motor Gasoline Demand

- The increase in VMT is translating directly into higher gasoline demand in the United States.
- U.S. motor gasoline demand is running at record levels in 2016.
- This runs counter to the idea that developed countries are structurally incapable of contributing to demand growth and the idea that the U.S. has hit some kind of peak demand.
- Could still be true, but data is not so convincing right now.

Source: EIA
Short Term Demand Response

Chinese Demand Growth: Refined Products

- Demand growth in China is estimated to be 6.5 percent in 2015, or roughly 740,000 barrels per day.
- This is the highest level since the 2010 post-financial crisis recovery. Only other year since 2000 that was higher was 2004.
- Key Point: It is increasingly consumer-driven demand, i.e., gasoline. More sustainable.

Source: IEA
Short Term Supply Response

Rigs Drilling for Oil in the Key U.S. Shale Plays

› Drilling activity in the key U.S. shale regions collapsed between November 2014 and May 2016.

› We are just now seeing a slight rebound.

Source: Baker Hughes
Short Term Supply Response

Projected Growth in 2015 Lower-48 Crude Supply

- Prior to the price collapse, the Department of Energy was expecting lower-48 crude production to grow by 500,000 barrels per day between January and December 2015.
- The expectation now is for a 240,000 barrel per day contraction.
- This is a swing of nearly 750,000 barrels per day.

Source: EIA
Short Term Supply Response

Projected Growth in 2015 Lower-48 Crude Supply

- The outlook for 2016 has changed even more dramatically—from growth of 550,000 barrels per day in January 2015 to a decline of 1.1 million barrels per day in June 2016.

- This represents a swing of 1.7 mbd.

Source: EIA
Medium Term Supply Response

Global Upstream Oil Investment

- More than $225 billion in global upstream investment has already been wiped out since 2014 based on industry survey response data.
- 2015-2016 was the first two-year drop in the Barclays survey since 1986-87 and the largest drop in its history.
- These cuts will impact much more than shale: global deepwater, oil sands, etc.
- The impact of these cuts is hard to gauge, but estimated at between 2.0 and 4.0 mbd in 2020.

Source: Barclays
Medium Term Demand Response

Year-Over-Year Change in U.S. Fuel Economy

- U.S. fuel-economy standards have been an key underlying assumption about the pace of global demand growth going forward.
- Achieving the standards will cut more than 3 million barrels per day from baseline U.S. oil demand by 2030.
- But the standards are based on sales, not production. And the annual targets assume a certain vehicle mix. This mix is changing, and fuel-economy performance is lagging.

Source: Barclays
Wildcards

Oil Production: Nigeria

- Nigerian oil production has fallen by at least 600,000 barrels per day since mid-2015 amid widening sabotage and violence.
- Niger Delta militants have vowed to cut production to zero.
- Oil export earnings fell from $86 billion in 2013 to $39 billion in 2015.
- Oil export revenue accounted for 60 percent of government revenue in 2014.

Source: IEA and EIA
Wildcards

Oil Production: Venezuela

› Oil production in Venezuela is down by 200,000 barrels per day since mid-2014 amid widening economic stress.

› Moody’s is now predicting that PDVSA—and ultimately the Venezuelan government—will default on its debt in 2016.

› Oil exports typically account for 96 percent of export revenues and 40 percent of government revenue. Oil export earnings fell from $70 billion in 2013 to $32 billion in 2015.

Source: IEA and Forbes
Where are we headed?
1. The Market is Likely to Be Volatile

Annualized Oil Price Volatility

› The current oil market is the most volatile it has been since the financial crisis.

Source: EIA
2. The Market is Changing

OPEC Spare Capacity

- OPEC spare capacity is now at extremely low levels as Saudi Arabia and other GCC countries abandon their prior role as swing producers and instead opt to maximize market share.
- This commitment appears unwavering for the time being.

Source: EIA
2. The Market is changing

OECD Inventories and Days Forward Cover

- OECD inventories have swelled from 2.6 billion barrels in 2014 to more than 3.1 billion barrels—an increase of 500 million barrels.
- An additional several hundred million barrels have been added to non-OECD inventories.
- The overhang will dampen any sharp price increases. But it is also finite, and not the same as spare capacity.

Source: EIA
2. The Market is Changing

Shale Oil Resources by Country

- Estimates of shale oil are suggest a permanent shift.
- The U.S. Department of Energy recently estimated global shale oil resources to be 420 billion barrels of oil equivalent—equal to 34 years of global oil consumption.
- For comparison, total proved reserves in Saudi Arabia are currently 260 billion barrels.

Source: DOE, EIA
3. The Glut will not Last Forever

Annualized Oil Price Volatility

The most recent IEA projections suggest that the normal market dynamics will eliminate 75 percent of the inventory overhang by 2021.

In fact, this is likely to happen sooner based on the latest developments.

Source: IEA