Short and Medium-Term Oil Market Outlook

*EIA 2018 Workshop on Financial and Physical Energy Market Linkages*

September 27, 2018
Views on a page

1. We see material upside risk from current price levels during 4Q due to supply disruptions and Iran sanctions.

2. But unless there are even further disruptions than those baked into our balances, the balance should weaken through end-2019. Therefore, we see prices averaging between $70-80/b in Q4 and next year.


5. In the medium term, we forecast Brent prices at $75 in 2020 and $80 in 2025, around $15 higher than the curve.

Source: Bloomberg, Barclays Research
Synchronous global backdrop drove robust demand growth

Time frames of synchronous global economic growth are consistent with acceleration in demand growth and rising oil prices (Jan 1998-Dec 2018)

Global Oil Demand Growth and Oil Prices

Source: Haver Analytics, IEA, EIA (Imported nominal average acq. cost), Barclays Research

Restricted - External
But now, China growth fears and trade tensions add headwinds

Emergent Chinese growth fears

Trade indicators turn negative

Source for all charts: CNBS, Haver, Bloomberg, Markit, Barclays Economics Research
But higher oil prices could turn into a headwind for demand growth

Sharply higher oil prices weighed significantly on demand growth in Q1 last year and Q2 this year

Subsidies removal, additional taxation and a strengthening USD are all having an outsized effect on local-currency retail fuel prices

Note: The chart on RHS shows average retail gasoline prices in local currency indexed at 2005 level. Source for all charts: IEA, EIA, Bloomberg, Barclays Research
And supply growth outside OPEC remains strong

Despite Petrobras’s problems and retail price intervention, production still set to grow strongly

US tight oil production is the main source of growth

Non-OPEC supply growth exceeding demand

Source for all charts: EIA, IEA Bloomberg, Barclays Research
Therefore, we still see the market balance in slight surplus next year.

The severe supply deficit from 2017 to 3Q18 has helped support prices

Source: IEA, EIA, Barclays Research

Oil market balance and prices

- Stock change + misc (LHS)
- Brent Price (RHS)

Source: IEA, EIA, Barclays Research
The Permian remains constrained through mid next year but still holds large potential.

Permian takeaway capacity constraints in the region will prove transitory.

However, capital discipline continues to keep spending in check.

Large opportunity set vs other plays in terms of remaining liquids reserves:

- Wolfcamp
- Bone Spring
- Eagle Ford
- SCOOP/STACK
- Bakken/Three Forks
- Niobrara

Remaining liquid reserves (bn barrels) by play and breakeven:

- <$40/bbl
- $40-$50/bbl
- $50-$60/bbl
- >$60/bbl

Permian large opportunity set vs other plays in terms of remaining liquids reserves.

Inventory cushion erodes and JCPOA exit raises tension

Key oil transit chokepoints and infrastructure are at risk of disruption in the months ahead

Source: S&P Global Platts, EIA, Barclays Research

Baku-Tbilisi-Ceyhan pipeline (BTC)

Iraq-Turkey pipeline

Iraq-Syria pipeline closed

Iraqi Pipeline through Saudi Arabia (IPSA) closed

Trans-Arabian Pipeline (Tapline) closed

Suez/SUMED: 5.5 mb/d

SuMed Pipeline

Iraq Strategic Pipeline

East-West pipelines (also called Putline)

Bab el-Mandeb - 4.8 mb/d

 Strait of Hormuz: 18.5 mb/d

Source: S&P Global Platts, EIA, Barclays Research
Iran’s exports fall 800 kb/d and we expect a further decline

Three angles to Iran-related price effect: trade, medium-term investment, geopolitics; medium-term implications most market moving, in our view

Iran exports and key sanctions dates

Jan 2012: First full month of NDAA implementation

March: EU For. Ministers agree to enforce ban on import of Iranian crude and products

July: EU P&I Club grace period expires

Oct: EU prohibits storing on EU tanker and blacklists oil-related entities.

Jan. 2014: P5+1 Joint Plan of Action goes into effect

May 2018: US withdraws from JCPOA, reimposes sanctions

Jan. 2016: Iran reaches implementation day

Source: IEA, Petro-logistics (exports), Barclays Research
Despite disruption risks, we think prices are likely to remain rangebound between $70-80/b in 2019 and 2020

Conventional spare capacity estimates and other offsets likely understated

<table>
<thead>
<tr>
<th>Short order supply</th>
<th>mb/d</th>
<th>Other supply</th>
<th>mb/d</th>
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<tr>
<td>Iraq</td>
<td>0.17</td>
<td>UAE</td>
<td>0.3</td>
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<tr>
<td>Kuwait</td>
<td>0.15</td>
<td>Russia</td>
<td>0.3</td>
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<td>UAE</td>
<td>0.29</td>
<td>Saudi Arabia</td>
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</tr>
<tr>
<td>Total</td>
<td>1.14</td>
<td>Total</td>
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Grand total wellhead supply spare capacity: 2.7

Base metals continue to diverge from energy commodities

<table>
<thead>
<tr>
<th></th>
<th>Agriculture</th>
<th>Livestock</th>
<th>Precious Metals</th>
<th>Base Metals</th>
<th>Energy</th>
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<tr>
<td>Total</td>
<td>1.14</td>
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<td>1.14</td>
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Spare capacity levels low but have been worse

<table>
<thead>
<tr>
<th>Govt Inventories</th>
<th>Drawdown rate* (mb/d)</th>
<th>Capacity level (mill. Bbl)</th>
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<tbody>
<tr>
<td>OECD ex-US</td>
<td>2.52</td>
<td>907</td>
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<td>US</td>
<td>1.83</td>
<td>660</td>
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<td>non-OECD</td>
<td>0.78</td>
<td>280</td>
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<tr>
<td>Total</td>
<td>5.13</td>
<td>1847</td>
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</table>

Grand total wellhead supply spare capacity: 2.7

*Drawdown of half the inventory level is assumed over 180 days. Design drawdown of US SPR is 4.4 mb/d for 90 days

Russian output is rebounding

Rosneft Annual Output Growth by Field Type (kb/d)

Spare Capacity and Oil Prices

Sp.Cpy/Demand (inverted)
IMO sulphur cap revision to boost diesel demand by almost 2mb/d y/y in 2020

We expect diesel to replace 1.9 mb/d of HSFO used in marine bunkers in 2020

This will boost diesel demand in an already tight distillates market

Source: Shell, Barclays Research

Source: IEA, Barclays Research
Medium-term oil price outlook:

Full report: [Oil Special Report: Resisting Temptation](#), 4 Sep 2018
OPEC unrest reduces the opportunity set, raises pressure on selected members

No shortage of oil, but a shortage of access

Middle East still the largest share of oil exports

Most MENA countries need prices to stay at or above current levels
The most substantial change from last year is associated with the 1.5 mb/d reduction in supply from key OPEC countries, and the higher required WTI price needed to offset it over a multi-year period.

Though we expect that a price range above $80 will become the new norm next decade, our market balances do not justify those price levels in the next one to two years.

There are many other possible reasons to be bullish during that time frame, but the “supply gap” is not one of them.

Note: WTI discount range from $5-8/b.

Source: Barclays Research
Supply gap thesis is valid but is deferred

2018 oil project FIDs likely to be on par with 2013 when oil was $100/b

And non-OPEC crude and condensate projects approved over 2014-2018 should add 6 mb/d by 2024

Liquids reserves by year of sanctioned projects (Bill. bbl)

Production volumes from projects approved 2014-18 (mb/d)

Source: Woodmackenzie, Barclays Research
Source: Rystad Energy UCube, Barclays Research

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US tight oil resource base assessments keep growing

Reserves estimate up almost 10% y/y; over 90% of the cost base is below $60/b at a 15% IRR

Note: WoodMackenzie assumes 15% cost of capital, WTI equivalent prices, half cycle breakeven. Source: WoodMackenzie, Barclays Research
US productivity improvements: Consolidation, optimization

Average well productivity has increased significantly in the region...

...as the share of Permian-focused large players has increased

Note: Number of horizontal wells brought online by operator category. Source: DrillingInfo, Barclays Research

Note cumulative oil output from average horizontal well in the region. Source: DrillingInfo, Barclays Research
But these gains are assumed to diminish over time.

Longer laterals and increased proppant intensity have also played a part…

…but we expect productivity to peak around 2020-21 as Tier-1 acreage dries out.
We still expect Permian oil output to reach 8 mb/d by 2025

- We expect the share of total horizontal wells brought online in the region by smaller private players to decline from 31% last year to 20% by 2025 owing primarily to continued acreage consolidation in the region.
- We expect the total plowback ratio in the region to decline from 156% last year to slightly over 90% in 2025.
- We also expect the 12-m cumulative oil output from an average horizontal well in the region to increase to 170kb in 2020-21 and slowly decline to around 130kb by 2025.
Brazil and Russia: major non-OPEC supply risks in the outlook

Outside US tight oil, Brazil and Iraq are the major contributors to medium term supply growth though other countries play a supporting role, offsetting other major declines.

**Russian output could be 700 kb/d lower by some estimates**

**Supply growth in context – US provides the lion’s share**

Source for all charts: Skolkovo Institute, IEA, CDU-TEK, Barclays Research
In our base case, we expect global liquids demand to grow to about 107.6 mb/d by 2025

- Our estimates are based on higher world GDP growth, coupled with lower unemployment rates in developed countries and rising per capita income levels in the developing world.
- Electric vehicles gain popularity, primarily due to policy push. We expect 55 mn EVs on the road by 2025, an increase of 10% from our prior estimate.
- Diesel demand is likely to soar at the expense of fuel oil demand, as the International Maritime Organization (IMO) implements a significantly lower sulfur cap for marine bunker fuel.

**World oil demand growth by product**

- **PPP-based GDP**
- **Gasoline**
- **Diesel**
- **LPG & Naphtha**
- **Jet/kero**
- **All other**
- **Total oil demand**

Source: IEA, WIND, Bloomberg, Barclays Research
Growing popularity of EVs also weighing on gasoline demand growth

- EV (including battery-electric vehicles (BEV) and plug-in hybrid vehicles (PHEV)) sales grew to more than 1.1mn units last year, more than double the volume sold in 2015 and over 50% higher than 2016.
- We estimate that most of the growth came from China, which accounted for almost two-thirds of worldwide EV sales.
- The growth in China’s EV sales has been robust despite a significant reduction in government subsidies over the past few years.

Source: IEA, ACEA, InsideEVs, Barclays Research

China leads the charge on electric vehicle sales

Source: IEA, ACEA, InsideEVs, Barclays Research
Inventory excess gone, market turns focus to other metrics

OPEC in need of new indicator, as the inventory level is now below the 5-year range

Using days forward inventory + spare capacity cover would be more useful

OECD industry petroleum stock levels

OECD Stocks (Days Cover) vs Price

Source for all charts: IEA, EIA, Barclays Research
Speculative net length still presents downside risk

Net managed money positioning has declined significantly, but remains high

Direct hedging by producers in the futures market has declined

Swap dealer net short positioning suggests producers are hedging with swaps via banks

Source for all charts: Bloomberg, CFTC, Barclays Research
Libyan oil supply still subject to disruption

Despite resolution and return of some supplies, Libya’s output can swing by at least 500 kb/d

Source: IEA, EIA, Barclays Research

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27 12 September 2018
Sanctions accelerating Venezuela’s production decline

We expect crude production to fall below 1.0 mb/d in 2018 and 2019, from 1.4 mb/d now

Small uptick in recent export loadings

Revenues remain depressed, as production declines have offset higher prices

PDVSA controls the lion’s share of production (kb/d)

Source: for all: IEA, EIA, MEES, OPEC, Bloomberg, Barclays Research

Restricted - External

12 September 2018
OPEC production assumptions behind current outlook

Despite Venezuelan output falling below 1 mb/d and Saudi Arabia increasing to no more than 10.6 mb/d, the market still flips to slight surplus

<table>
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<th>2017 Annual Change</th>
<th>Q118</th>
<th>Q218</th>
<th>Q318</th>
<th>Q418</th>
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<th>Q119</th>
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</table>

Source: MEES, IEA, Barclays Research

Restricted - External
Global oil demand growth: A rising tide

- Robust outlook for global economic activity supporting oil demand. We forecast global oil demand growth to be 1.4 mb/d both this year and the next.
- Elasticity higher, due to structural changes in energy commodity pricing in non-OECD countries.
- Energy intensity of global GDP growth has also been declining over the years.

World total products demand y/y change by region (mb/d)

Source: IEA, Bloomberg, Barclays Research
The implementation of IMO regulation significantly disturbs the balance in global petroleum fuel markets in 2020

- Residual fuel oil prices likely to drop significantly. Extent depends on how quickly and at what price levels displaced fuel is absorbed in power generation and industrial heating.
- Assuming that simple hydroskimming refineries in the North-West Europe are just profitable to meet incremental demand, gasoline and diesel prices in the region could move higher by as much as 13% and 20%.
- In addition, the sweet-sour crude oil spread could also blow out by $5 to $15 per barrel.

### Depending on how much HSFO prices drop, light product cracks and sulphur spreads could blow out materially.

<table>
<thead>
<tr>
<th>Scenario</th>
<th>HSFO/Brent ratio</th>
<th>HSFO Price</th>
<th>Diesel Price</th>
<th>Gasoline Price</th>
<th>Diesel-HSFO spread</th>
<th>Sweet-Sour spread</th>
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<tbody>
<tr>
<td>10-year avg.</td>
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<td>60</td>
<td>87</td>
<td>83</td>
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</table>

Note: Assumes $75/b Brent in 2020. All product prices in $/b for NWE. Sweet-Sour spread in the above example is Bonny light vs Urals. Source: Bloomberg, Barclays Research
EV adoption rising exponentially

We expect global EV stock to reach 55mn units by 2025
This offsets more than 1 mb/d of oil demand growth

Source: IEA, Barclays Research

Source: Barclays Research

Restricted - External
Growing petrochemical demand to drive growth in LPG and naphtha consumption

LPG and naphtha are primarily used as petrochemical feedstock

Growing plastics consumption in emerging markets to drive growth in LPG and naphtha

Source: IEA, Barclays Research

Note: Per-capita ethylene and propylene consumption by country. Source: Nexant, Barclays Research
If global economic growth disappoints, demand growth could be significantly below our base case

- Low demand scenario of 4.1% CAGR (vs 5.6% in the base case).
- 23% share of EVs/total car sales, 10pp higher than our base case assumption of 13%.
- 2025 global oil demand would be 3.2 mb/d below the base case.
- Economic growth risks arise from escalating trade war concerns between the US and China and a potentially significant knock-on effect of sharply higher shipping, airline transit, and agricultural costs, due to IMO regulations that are set to kick in in 2020.

Source: IEA, WIND, Bloomberg, Barclays Research
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