Oil market outlook: The start of a new normal

October 2017
The rebalancing is in full swing: 75% of the overhang is gone

OECD crude overhang vs five-year average

Floating storage

The OECD crude overhang has declined by over 100 mb since January, while the products overhang is now falling fast

Floating storage has declined sharply as the curves have flattened and differentials have risen

Source: IEA, Energy Aspects analysis
OPEC destocking coming to an end

Saudi crude stocks
Mb

Iranian floating storage
Mb

*Saudi crude stocks have fallen by nearly 100 mb since their peak in Q4 16, and the destocking has boosted exports*

*Around 35 mb of Iranian floating storage has also been drawn down since Q4 16*

Source: JODI, Reuters, Energy Aspects analysis
Products stockdraws leading the charge, forward cover basis even tighter

**Chinese total products stocks**
Mb

- 2017
- 2016
- 2015

**German diesel stocks**
Mb

- 2017
- 2016
- 5-year average

In theory, China stockpiled over 1 mb/d in H1 17, but several new pipes and tanks have started up

Stocks are falling across the rest of the world with product draws gaining momentum in recent weeks

Source: NBS, China Customs, IE, Energy Aspects analysis
Global oil demand has risen by 5.5 mb/d in the last three years, so an additional 200 mb of stocks is required.

Backwardation is forcing a quick liquidation of inventories both offshore and onshore.

Source: IEA, EIA, Energy Aspects analysis
Unsurprisingly, physical differentials and crude structure are on fire

Argus USGC medium crude spreads
$ per barrel

Brent and Dubai prompt timespreads
$ per barrel

Light-heavy crude differentials have tightened further amidst continuing OPEC cuts and declining LatAm output

Brent and Dubai structure have firmed across the curve in recent weeks amidst strong fundamentals

Source: Argus, Energy Aspects analysis
Even light crude differentials firm despite Libya, Nigeria and US shale

Nigerian differentials to Dated Brent
$ per barrel

Libya, Nigeria, and US output, y/y change
Mb/d

Light crude differentials have firmed since mid-July as strong naphtha has helped absorb the excess

The strength in light crudes is all the more remarkable given the recovery in Libyan, Nigerian and US production

Source: Argus, MEES, EIA, Energy Aspects analysis
Crude being pulled higher by products

Heating oil cracks vs WTI
$ per barrel

Brent cracking margins
$ per barrel

Product cracks started strengthening even before Hurricane Harvey, led by distillates

Strong products demand and the drawdown in products stocks are buoying products cracks

Source: Argus, Reuters, Energy Aspects analysis
Products strength comes despite near-record runs and even before Harvey

Global refinery runs
Mb/d

Refinery additions vs demand growth
Mb/d

Global refinery runs have risen by over 0.7 mb/d y/y in the year to August, with December runs set to hit a record...

...but since 2014, global refinery and splitter capacity additions have lagged behind demand growth

Source: Government sources, Energy Aspects analysis
As capacity closures and spec changes reduce available refining capacity

Asia fuel specifications

By the end of 2016, the lack of capacity additions had started to catch up with the market and product stocks gradually began drawing. A slew of product spec changes over the last two years—in China, India, Pakistan, Indonesia and the US amongst others—also contributed to tightening refining capacity as several simple refineries were effectively made redundant.

Note: (1) Gasoline (2) Diesel Source: Company reports, Energy Aspects research
China focuses on clear blue skies, for now

Global refinery runs, y/y change
Mb/d

Chinese runs and estimates
Mb/d

East of Suez runs had underperformed the West of Suez in H1 17 amidst a huge maintenance slate...

...but now, despite the start-up of new refining capacity, Chinese runs will be capped amidst low export quotas

Source: Government sources, Energy Aspects analysis
Stellar demand growth to still outpace runs increase...

Global oil demand growth by product, y/y change

Global oil demand growth by region, y/y change

Global oil demand growth has been extremely uniform, discouraging opportunistic yield shifts

We forecast 2017 global oil demand growth at 1.7 mb/d y/y, from 1.8 mb/d in 2016, and at 1.5 mb/d y/y in 2018

Source: Government agencies, JODI, Bloomberg, Energy Aspects analysis
DEMAND (2/4)

...despite constant fears that oil demand is allegedly dead

Volvo and Tesla dominate the narrative with the fear that producers will sell reserves now given lack of future demand

Electric cars are just 0.5% of China’s conventional car fleet, but government now mandates the sale of far more EVs

Source: Energy Aspects analysis,
Image Source: Adapted from - Elon Musk photo by Steve Jurvetson, Flickr / Avatar, Electric Car and Power Station vectors by Freepik.com / Logos from company websites - All retrieved online
Pivot to fiscal policy means diesel is leading growth rather than gasoline
LatAm declines and Middle East demand both bottoming out

Brazil oil demand, y/y change
Mb/d

Middle Eastern oil demand, y/y change
Mb/d

**Brazilian oil demand declines are starting to peter out, even though the economic backdrop remains shaky**

**Strong demand outside of Saudi Arabia continues, while a delay to pricing reforms may help Saudi demand recover**

Source: ANP, JODI, Energy Aspects analysis
OPEC has been more disciplined than many expected

OPEC compliance rates
%

Unplanned upstream outages
Mb/d

OPEC compliance has beaten market expectations, averaging 106%, led by GCC and Venezuela outages

Unplanned outages also on the rise, with Iranian South Pars condensate production down through November

Note: Compliance of five largest producers (ex. Iran, which was given a ceiling not a cap)
Source: Kpler, Energy Aspects analysis
But OPEC exports to rise in October as refinery maintenance rises

**OPEC crude exports**

<table>
<thead>
<tr>
<th>Mb/d</th>
<th>Oct 16</th>
<th>Jan 17</th>
<th>Apr 17</th>
<th>Jul 17</th>
<th>Oct 17</th>
</tr>
</thead>
<tbody>
<tr>
<td>Total</td>
<td>28</td>
<td>26</td>
<td>24</td>
<td>28</td>
<td>24</td>
</tr>
<tr>
<td>Total (ex Nigeria + Libya)</td>
<td>22</td>
<td>20</td>
<td>18</td>
<td>18</td>
<td>18</td>
</tr>
</tbody>
</table>

**Refinery maintenance**

<table>
<thead>
<tr>
<th>Mb/d</th>
<th>Aug 17</th>
<th>Oct 17</th>
<th>Dec 17</th>
<th>Feb 18</th>
</tr>
</thead>
<tbody>
<tr>
<td>Africa</td>
<td>0.2</td>
<td>1.0</td>
<td>0.6</td>
<td>1.2</td>
</tr>
<tr>
<td>Middle East</td>
<td>0.0</td>
<td>0.0</td>
<td>0.4</td>
<td>0.6</td>
</tr>
</tbody>
</table>

*Exports remain lower than Q4 16, despite recoveries in Libya and Nigeria, with the Saudis cutting further in August*

*OPEC exports to rise in October amidst heavy refinery works, particularly in Saudi Arabia*

Note: Compliance of five largest producers (ex. Iran, which was given a ceiling not a cap)
Source: Kpler, Energy Aspects analysis
Extension of production deal will soon be in focus

Libyan production
Mb/d

Saudi and Iraqi output, y/y change
Mb/d

Nigeria could be included in the deal, but adding Libya is unlikely especially given recent volatility in Libyan production

Even Iraqi compliance has been better than expected, but whether they agree to an extension remains a question

Source: MEES, Energy Aspects analysis
Supplies set to rise strongly next year

Non-OPEC supply by region, y/y change

Mb/d

- NAM
- LatAm
- Asia
- FSU
- ME
- Europe
- Africa
- Forecast

US production will lead growth next year along with Canada, Brazil and the FSU

OPEC output

Mb/d

Fears are that OPEC will ramp up output to Q4 16 levels as soon as the deal is over, although we believe this is unlikely

Source: Energy Aspects analysis
But fears of massive shale growth receding somewhat

US crude production
Mb/d

Non-OPEC supply, y/y change
Mb/d

Source: Company reports, EIA, Energy Aspects analysis

US production growth has stalled amidst shortage of frac crews and focus on profitability

2017 US production growth estimates have been tempered, although expectations are high for next year
Profitability in focus for shale producers, so something has to give

Performance of North American E&P vs Brent
Normalised to 1 Jan 2016

Liquids production from FCF companies
%

Despite higher oil prices, investors have shunned NA producers, with many names down by 20-30% on the year

The percentage of liquids production generated from FCF positive companies has plunged to near-record lows of 6%

Source: Company reports, Bloomberg, Energy Aspects analysis
‘Growth at any cost’ is no longer being rewarded

H2 17 Capex and production trends for large caps
$ billion and thousand boe/d

<table>
<thead>
<tr>
<th></th>
<th>Capex - $ billion</th>
<th>Production thousand boe/d</th>
</tr>
</thead>
<tbody>
<tr>
<td>Anadarko</td>
<td>2,004</td>
<td>1,626</td>
</tr>
<tr>
<td>Apache</td>
<td>1,876</td>
<td>906</td>
</tr>
<tr>
<td>Continental</td>
<td>965</td>
<td>535</td>
</tr>
<tr>
<td>Devon</td>
<td>549</td>
<td>1,095</td>
</tr>
<tr>
<td>EOG</td>
<td>1,927</td>
<td>1,395</td>
</tr>
<tr>
<td>Hess</td>
<td>1,440</td>
<td>1,016</td>
</tr>
<tr>
<td>Marathon</td>
<td>1,375</td>
<td>492</td>
</tr>
<tr>
<td>Murphy</td>
<td>458</td>
<td>322</td>
</tr>
<tr>
<td>Noble</td>
<td>1,235</td>
<td>729</td>
</tr>
<tr>
<td>Oxy</td>
<td>1,769</td>
<td>1,533</td>
</tr>
<tr>
<td>Pioneer</td>
<td>1,425</td>
<td>963</td>
</tr>
<tr>
<td>Whiting</td>
<td>611</td>
<td>188</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>15,633</strong></td>
<td><strong>10,800</strong></td>
</tr>
</tbody>
</table>

Despite stated efficiency gains, growth still driven by rising Capex profile. To meet growth targets, Capex still needs to rise, which will worsen free cashflow trends if prices stay flat. Either output will be downgraded, or prices must increase to meet optimistic expectations for US growth.
Declines accelerating in mature medium/heavy fields

Indonesian oil production API and heavy output %

Source: SKK Migas, Pemex, Energy Aspects analysis

Ramp-up of light Banyu-Urip field and declines at heavy Duri field have yielded a four-degree API shift since 2014

After a brief respite, declines at Ku, a 22 API field, are accelerating, whilst Zaap, a 12 API field, is plateauing
2018 balances now show a small decline in stocks

Global implied stockbuilds
Mb/d

US storage capacity utilisation
%

Stockdraws will accelerate in H2 17, with 2018 now expected to see small stockdraws biased towards H2 18

The market’s stance on 2018 balances is gradually changing and becoming more positive, especially with ullage available

Source: EIA, Energy Aspects analysis
Quality issues and lack of new projects to create long-term headaches

We expect the four major shale basins to grow by 0.5 mb/d in total each year until 2020

2019 project additions are the lowest this decade, just when underlying declines have doubled

Source: EIA, DrillingInfo, Regulatory Data, Energy Aspects analysis
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