Investment in unconventional and conventional, oil and gas production

February 2018
For all the talks of EVs, oil demand is soaring

Global PMI
Index

Global oil demand growth by region, y/y change
Mb/d

The global macroeconomic backdrop remains extremely supportive and should be able to absorb higher oil prices.

We forecast 2018 global oil demand growth at 1.7 mb/d y/y, coming on top of 1.7 mb/d in 2017 and 1.8 mb/d y/y in 2016.

Source: Government agencies, JODI, Bloomberg, Energy Aspects analysis
We have fast forwarded oil demand by 7-8 years

Global oil demand
Mb/d

Global oil demand growth by region, y/y change
Mb/d

Consensus expectations were for oil demand to hit 100 mb/d in 2025-2027, yet we hit 100 mb/d end of 2017

Since 2015, global oil demand growth has been soaring backed by low prices and a buoyant economy

Source: Government agencies, JODI, Bloomberg, Energy Aspects analysis
But the focus remains on electric cars and long term demand

Global gasoline demand
Mb/d

Global road diesel demand
Mb/d

EV demand displacement amounts to 1.4 mb/d by 2030—the majority (1.0 mb/d) affecting gasoline

Relatively robust freight markets continue to support road-diesel demand, which sees a more modest 0.4 mb/d hit

Source: Energy Aspects
Non-OPEC supplies are increasingly biased towards North America

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

US crude production by basin and forecasts
Mb/d

2018 non-OPEC supply set to grow strongly, led by the US, Canada and Brazil

Source: Company reports, EIA, Energy Aspects analysis

US production has picked up markedly since September 2017 and we expect the momentum to continue in 2018
Supplies elsewhere are underperforming

Brazilian crude and NGLs production, y/y change
Mb/d

Asian crude output, y/y change
Mb/d

Brazilian crude production has underperformed relative to expectations amid high declines in the Campos basin

Asian crude production continues to fall sharply as oil majors divert money towards short cycle projects

Source: ANP, Government data, Energy Aspects analysis
Declines stepping up while IOCs move towards short-cycle projects...

A significant backlog of projects has allowed IOCs to grow output despite a drop in exploration activity.

Angolan depletion rates have been rising steadily since 2014 and reached a record high 12% last year.

Source: Company reports, Energy Aspects analysis
...and focus on gas

IOC Q3 17 hydrocarbon production trends

<table>
<thead>
<tr>
<th>Liquids production - mb/d</th>
<th>Gas production, mboe/d</th>
</tr>
</thead>
<tbody>
<tr>
<td>Q3 17</td>
<td>Q3 16</td>
</tr>
<tr>
<td>Exxon</td>
<td>2.28</td>
</tr>
<tr>
<td>BP</td>
<td>2.24</td>
</tr>
<tr>
<td>Shell</td>
<td>1.85</td>
</tr>
<tr>
<td>Chevron</td>
<td>1.72</td>
</tr>
<tr>
<td>Total</td>
<td>1.39</td>
</tr>
<tr>
<td>Statoil</td>
<td>1.13</td>
</tr>
<tr>
<td>Conoco</td>
<td>0.74</td>
</tr>
<tr>
<td>ENI</td>
<td>0.89</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>12.24</strong></td>
</tr>
</tbody>
</table>

* Liquids output for the group rose y/y by 0.27 mb/d (2.2%) in Q3 17, but this was primarily driven by the acquisition of assets. Meanwhile, gas production growth was pegged at 7.5% y/y, reflecting a rapid increase in output from LNG projects.

Source: Company reports, Energy Aspects analysis
Drop in investment shows up from 2019 onwards

New upstream capacity additions (OPEC + non-OPEC)
Mb/d

Refining capacity additions
Mb/d

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

2019 sees nearly 3 mb/d of new refinery capacity additions, just when upstream capacity additions dwindle

Note: Capacity additions excludes US shale
Source: Company reports, Energy Aspects analysis
This publication has been prepared by Energy Aspects Ltd (‘Energy Aspects’). It is provided to our clients for information purposes only, and Energy Aspects makes no express or implied warranties as to the merchantability or fitness for a particular purpose or use with respect to any data included in this publication.

Prices shown are indicative and Energy Aspects is not offering to buy or sell or soliciting offers to buy or sell any financial instrument.

Without limiting any of the foregoing and to the extent permitted by law, in no event shall Energy Aspects, nor any of their respective officers, directors, or employees have any liability for (a) any special, punitive, indirect, or consequential damages; or (b) any lost profits, lost revenue, loss of anticipated savings or loss of opportunity or other financial loss, even if notified of the possibility of such damages, arising from any use of this publication or its contents.

Other than disclosures relating to Energy Aspects, the information contained in this publication has been obtained from sources that Energy Aspects believes to be reliable, but Energy Aspects does not represent or warrant that it is accurate or complete. Energy Aspects is not responsible for, and makes no warranties whatsoever as to, the content of any third-party web site accessed via a hyperlink in this publication and such information is not incorporated by reference.

The views in this publication are those of the author(s) and are subject to change, and Energy Aspects has no obligation to update its opinions or the information in this publication. The analyst recommendations in this publication reflect solely and exclusively those of the author(s), and such opinions were prepared independently of any other interests, including those of Energy Aspects and/or its affiliates. This publication does not constitute personal investment advice or take into account the individual financial circumstances or objectives of the clients who receive it. The securities discussed herein may not be suitable for all investors. Energy Aspects recommends that investors independently evaluate each issuer, security or instrument discussed herein and consult any independent advisors they believe necessary. The value of and income from any investment may fluctuate from day to day as a result of changes in relevant economic markets (including changes in market liquidity). The information herein is not intended to predict actual results, which may differ substantially from those reflected. Past performance is not necessarily indicative of future results.

This communication is directed at, and therefore should only be relied upon by, persons who have professional experience in matters relating to investments.

© Copyright Energy Aspects Ltd (2018). All rights reserved.
No part of this publication may be reproduced in any manner without the prior written permission of Energy Aspects.