OIL AND GAS MARKETS
IN 2019 AND BEYOND

Bob Tippee, Editor, Oil & Gas Journal
Rice Global E&C Forum Monthly Roundtable
March 8, 2019
THE AGENDA

• **OIL AND GAS MARKETS THIS YEAR, GLOBAL AND US**
  • *OGJ’s Forecast & Review, Jan. 7, 2019*
  • *Conglin Xu, Senior Editor-Economics; Laura Bell, Statistics Editor*
  • **Update: Midyear Forecast, July 1, 2019**

• **What will make the forecast wrong?**

• **Oil, gas, and energy in the future (Green New Deal?)**
Growth in oil demand is slowing.

Growth dominated by China, other non-OECD (developing countries).

Quarterly growth

Source: OGJ Forecast & Review, Jan. 7, 2019
OPEC is yielding to non-OPEC supply: North American unconventionals, Brazil

Source: OGJ Forecast & Review, Jan. 7, 2019
WILL OPEC+ KEEP MARKET BALANCED? (MMBD)

<table>
<thead>
<tr>
<th></th>
<th>2019</th>
<th>Vs. 2018</th>
</tr>
</thead>
<tbody>
<tr>
<td>Demand</td>
<td>100.6</td>
<td>+1.4</td>
</tr>
<tr>
<td>Non-OPEC supply</td>
<td>61.9</td>
<td>+1.5</td>
</tr>
<tr>
<td>OPEC NGL</td>
<td>7.0</td>
<td>NC</td>
</tr>
<tr>
<td>Need for OPEC crude</td>
<td>31.7</td>
<td>-0.1</td>
</tr>
<tr>
<td>OPEC crude</td>
<td>31.5</td>
<td>-1.0</td>
</tr>
<tr>
<td>Stock change</td>
<td>-0.2</td>
<td>-0.9</td>
</tr>
</tbody>
</table>

Key uncertainties:
- Demand growth (and, therefore, global economy)
- OPEC restraint after agreement expires in June

Source: IEA Oil Market Report, December 2018 with OGJ projection for OPEC crude

Main changes in IEA February:
- Non-OPEC supply--64.4
- Stock change--+0.3
Vienna, Dec. 2016: Cuts of 1.2 MMb/d by 12 OPEC members, 600 Mb/d by 10 nonmembers, effective Jan. 2017. Production surged late 2018 to compensate for losses from Venezuela, others, expected from Iranian sanctions scheduled for November but waived for 6 months (until May, one month before OPEC meets).
THE OIL MARKET’S UNCERTAIN VARIABLES

• **MIDDLE EASTERN unrest**
  • US disengagement
  • Exhaustion of rentier economics in Saudi Arabia, UAE
    • Saudi turbulence (Yemen quagmire, Jamal Khashoggi murder, economic and cultural reform, Aramco IPO)
    • Blockade of Qatar and weakening of GCC
    • Iranian expansionism (Yemen, Syria, Iraq, Lebanon) and sanctions
    • Maneuvers for influence by Russia, China, Turkey
• **Venezuelan collapse**
• **Global economic growth — or contraction?**
• IMO 2020
The IMO 2020 Rule

International Maritime Organization regulation effective Jan. 1, 2020

Lowers sulfur limit in marine bunker fuel to 0.5 wt % from 3.5 wt %

Lower limits already apply in four emission control areas (ECAs)

What happens to ~3.4 million b/d of high-sulfur fuel oil?

What happens to sweet-sour price spreads?

Source: Ken Cowell et al., Muse, Stancil & Co., in OGJ, July 2, 2018
IMO 2020 COMPLIANCE OUTLOOK

- Refinery runs will rise
- Sweet-sour crude spreads will increase
- Prices of distillate-range products (diesel) will rise

Source: “Ship compliance will determine IMO 2020 market impact,” Chris Cote, ESAI Energy LLC, OGJ, Jan. 7, 2019
### US Oil Demand

<table>
<thead>
<tr>
<th>Product</th>
<th>2019</th>
<th>2018</th>
<th>Change</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Amount MMb/d</td>
<td>Change %</td>
<td>Amount MMb/d</td>
</tr>
<tr>
<td>Motor gasoline</td>
<td>9.370</td>
<td>+0.6</td>
<td>9.311</td>
</tr>
<tr>
<td>Jet fuel</td>
<td>1.780</td>
<td>+3.5</td>
<td>1.720</td>
</tr>
<tr>
<td>Distillate</td>
<td>4.200</td>
<td>+1.7</td>
<td>4.130</td>
</tr>
<tr>
<td>Residual</td>
<td>0.320</td>
<td>+0.6</td>
<td>0.318</td>
</tr>
<tr>
<td>LPG + ethane</td>
<td>3.150</td>
<td>+5.4</td>
<td>2.990</td>
</tr>
<tr>
<td>Other products</td>
<td>2.060</td>
<td>+0.5</td>
<td>2.050</td>
</tr>
<tr>
<td>TOTAL</td>
<td>20.880</td>
<td>+1.8</td>
<td>20.519</td>
</tr>
</tbody>
</table>

Source: OGJ Forecast & Review, Jan. 7, 2019

**Gasoline is no longer the growth market**
US OIL SUPPLY

Unless oil prices crash, growth constraint is physical until Permian pipelines open in 2H 2019

<table>
<thead>
<tr>
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<th>Change</th>
<th>2018</th>
<th>Change</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Amount MMb/d</td>
<td>%</td>
<td>Amount MMb/d</td>
<td>%</td>
</tr>
<tr>
<td><strong>Crude &amp; cond.</strong></td>
<td>12.070</td>
<td>+10.7</td>
<td>10.900</td>
<td>+16.6</td>
</tr>
<tr>
<td><strong>NGPL</strong></td>
<td>5.000</td>
<td>+14.2</td>
<td>4.380</td>
<td>+15.8</td>
</tr>
<tr>
<td><strong>TOTAL FIELD</strong></td>
<td>17.070</td>
<td>+11.7</td>
<td>15.280</td>
<td>+16.3</td>
</tr>
<tr>
<td>Renewables, oxygenates</td>
<td>1.220</td>
<td>-0.8</td>
<td>1.230</td>
<td>+3.4</td>
</tr>
<tr>
<td>Proc. gain, etc.</td>
<td>1.120</td>
<td>-0.9</td>
<td>1.130</td>
<td>+1.7</td>
</tr>
<tr>
<td><strong>TOTAL SUPPLY</strong></td>
<td>19.41</td>
<td>+10.0</td>
<td>17.64</td>
<td>+14.0</td>
</tr>
</tbody>
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Source: OGJ Forecast & Review, Jan. 7, 2019
<table>
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<th>2019</th>
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</thead>
<tbody>
<tr>
<td></td>
<td>Amount MMb/d</td>
<td>Change %</td>
<td>Amount MMb/d</td>
</tr>
<tr>
<td>Crude imports</td>
<td>7.700</td>
<td>-1.9</td>
<td>7.850</td>
</tr>
<tr>
<td>Product imports</td>
<td>2.250</td>
<td>-0.9</td>
<td>2.270</td>
</tr>
<tr>
<td>TOT. IMPORTS</td>
<td>9.950</td>
<td>-1.7</td>
<td>10.120</td>
</tr>
<tr>
<td>Crude exports</td>
<td>2.800</td>
<td>+33.3</td>
<td>2.100</td>
</tr>
<tr>
<td>Product exports</td>
<td>5.890</td>
<td>+6.1</td>
<td>5.550</td>
</tr>
<tr>
<td>TOT. EXP’TS</td>
<td>8.690</td>
<td>+13.6</td>
<td>7.650</td>
</tr>
<tr>
<td><strong>NET IMPORTS</strong></td>
<td><strong>1.26</strong></td>
<td></td>
<td><strong>2.47</strong></td>
</tr>
</tbody>
</table>

Source: OGJ Forecast & Review, Jan. 7, 2019

*Net-exporter status is in view*
US REFINING

High refinery utilization reflects margins widened by US crude price discount to Brent

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<th>Change</th>
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<th>Change</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Amount</td>
<td>%</td>
<td>Amount</td>
<td>%</td>
</tr>
<tr>
<td>Crude runs</td>
<td>17.03</td>
<td>+0.7</td>
<td>16.92</td>
<td>+2.0</td>
</tr>
<tr>
<td>Total inputs</td>
<td>17.20</td>
<td>-0.3</td>
<td>17.26</td>
<td>+2.1</td>
</tr>
<tr>
<td>Refining cap.</td>
<td>18.62</td>
<td>+0.1</td>
<td>18.60</td>
<td>+0.2</td>
</tr>
<tr>
<td>Cap. utilization</td>
<td>92%</td>
<td></td>
<td>93%</td>
<td></td>
</tr>
</tbody>
</table>
## US Gas Production and Trade

<table>
<thead>
<tr>
<th></th>
<th>2019</th>
<th>Change</th>
<th>2018</th>
<th>Change</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Amount tcf</td>
<td>%</td>
<td>Amount tcf</td>
<td>%</td>
</tr>
<tr>
<td>Production</td>
<td>35.697</td>
<td>+9.1%</td>
<td>32.715</td>
<td>+12.0%</td>
</tr>
<tr>
<td>Pipeline imports</td>
<td>2.612</td>
<td>-8.4%</td>
<td>2.851</td>
<td>-3.8%</td>
</tr>
<tr>
<td>LNG imports</td>
<td>0.073</td>
<td>+5.3%</td>
<td>0.069</td>
<td>-11.1%</td>
</tr>
<tr>
<td>Pipeline exports</td>
<td>3.066</td>
<td>+15.1%</td>
<td>2.665</td>
<td>+8.3%</td>
</tr>
<tr>
<td>LNG exports</td>
<td>2.044</td>
<td>+89.8%</td>
<td>1.077</td>
<td>+52.1%</td>
</tr>
<tr>
<td>Net exports</td>
<td>2.425</td>
<td></td>
<td>0.822</td>
<td></td>
</tr>
</tbody>
</table>

*Exports will grow with LNG project starts*

Source: OGE Forecast & Review, Jan. 7, 2019
US LNG EXPORT PROJECTS, 2016-21

U.S. liquefied natural gas export capacity, 2016–2021
billion cubic feet per day

- Sabine Pass, Louisiana
- Cove Point, Maryland
- Corpus Christi, Texas
- Cameron, Louisiana
- Elba Island, Georgia
- Freeport, Texas

Q1 Q2 Q3 Q4 2016
Q1 Q2 Q3 Q4 2017
Q1 Q2 Q3 Q4 2018
Q1 Q2 Q3 Q4 2019
Q1 Q2 Q3 Q4 2020
Q1 Q2 Q3 Q4 2021
US GAS: MORE GAS, MORE LIQUIDS

Source: US Energy Information Administration, 2018 Annual Energy Outlook
THE LONG TERM: IEA’S WORLD ENERGY OUTLOOK 2018

• NEW POLICIES SCENARIO
  • CURRENT AND PLANNED POLICIES, INCLUDING PARIS 2015 COUNTRY COMMITMENTS

• SUSTAINABLE DEVELOPMENT SCENARIO
  • “A PATHWAY TO MEETING VARIOUS CLIMATE, AIR QUALITY AND UNIVERSAL ACCESS GOALS IN AN INTEGRATED WAY. “
  • ENERGY-RELATED, GLOBAL EMISSIONS OF CO2 PEAK IN 2020 THEN DECLINE IN TRAJECTORY NEEDED TO MEET GOALS OF PARIS CLIMATE AGREEMENT.
LONG-TERM ENERGY IN IEA/WEO 2018

New Policies Scenario
2017-40:
- Oil +10%
- Gas +43%

Sustainable Development Scenario
2017-40:
- Oil -29%
- Gas +11%

Source: International Energy Agency World Energy Outlook 2018
LONG-TERM OIL DEMAND IN IEA/WEO 2018

New Policies Scenario

Sustainable Development Scenario

Source: International Energy Agency World Energy Outlook 2018
LONG-TERM OIL PRODUCTION IN IEA/WEO 2018

Policy is important!

Change vs. 2017:

New Policies +11.4%

Sustainable Development -26.7%

Oil and gas investment still needed because depletion exceeds the demand-decline rate!

Source: International Energy Agency World Energy Outlook 2018
OIL-DEMAND GROWTH LEADER: PETROCHEMICALS

Oil demand for petrochemical feedstocks grows in both scenarios

Net petrochem change: 4.81 MMbd

Source: International Energy Agency World Energy Outlook 2018
LONG-TERM GAS OUTLOOK: ‘NEW POLICIES’

Source: International Energy Agency World Energy Outlook 2018
LONG-TERM GAS OUTLOOK: ‘SUSTAINABLE DEVELOPMENT’

Consumption, production declining by 2040 but still above 2017 levels

Source: International Energy Agency World Energy Outlook 2018
LONG-TERM GAS SENSITIVE TO POLICY (BUT DEMAND GROWS IN BOTH CASES)

Source: International Energy Agency World Energy Outlook 2018
LNG will overtake pipeline share of gas trade in this period

US LNG growing rapidly under uniquely flexible contracts

Economically, gas will act increasingly like oil (but never totally)

Source: International Energy Agency World Energy Outlook 2018
WHAT IT MEANS

• **Oil market remains dependent on supply management**
• **Middle Eastern instability hampers but hasn’t impaired supply management**
• **Shale makes US a net gas exporter, nearly a net oil exporter, a growing exporter of NGL**
• **Long-term oil demand very sensitive to climate-related regulation**
• **Long-term growth in oil demand dominated by petrochemicals**
• **Gas growth means more NGLs, more competition in petrochemical market**
• **Forecasts of carbon-free economy any time soon are unrealistic**
CONTACT INFORMATION

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