Investment and challenges in the petrochemical and refining sector

*Ninth IEA-IEF-OPEC Symposium on Energy Outlooks*
*Riyadh, Saudi Arabia*
*Dr. Ian Mead*
Key takeaways

• Changes resulting from the new International Maritime Organization (IMO) requirements are projected to stabilize at a new equilibrium in a few years.

• In large part, the development of Hydrocarbon Gas Liquids (HGL) markets has been a story of investment in midstream infrastructure and logistics.

• Clear, well-defined data on final products and infrastructure investment are needed to identify trends for forecasting, analysis, and other purposes.
New IMO fuel specification changes for ocean-going vessels go into effect in 2020

Global marine fuel sulfur limits
percent by weight

- **July 2012**: from 4.5% to 3.5%
- **July 2010**: from 1.5% to 1.0%
- **July 2015**: from 1.0% to 0.1%
- **January 2020**: from 3.5% to 0.5%

Limit on open seas
Limit within Emission Control Areas

Source: U.S. Energy Information Administration
Effect of the new regulation will peak in 2020 as markets adjust and settle on a new equilibrium

U.S. ocean-going marine vessel fuel consumption in AEO2019 Reference case

quadrillion British thermal units

Source: U.S. Energy Information Administration, Annual Energy Outlook 2019
U.S. share of world crude oil output remains steady, while NGPL share rises to 45% of global total by mid-2020’s

**Global crude oil production**

<table>
<thead>
<tr>
<th>Year</th>
<th>United States</th>
<th>Non-U.S.</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>2017</td>
<td>60</td>
<td>60</td>
<td>120</td>
</tr>
<tr>
<td>2020</td>
<td>60</td>
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<td>2030</td>
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<tr>
<td>2050</td>
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**Global NGPL production**

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<th>Total</th>
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</thead>
<tbody>
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<td>12</td>
<td>16</td>
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<tr>
<td>2020</td>
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Source: U.S. Energy Information Administration, Annual Energy Outlook 2019
NGPL barrel projected to become lighter with ethane constituting 43% by 2050

U.S. natural gas plant liquids production (Reference case)

Source: U.S. Energy Information Administration, Annual Energy Outlook 2019
Growth in NGPL production provides cost-advantaged feedstock to petrochemical industry

U.S. petrochemical industry feedstock consumption

million barrels per day

Source: U.S. Energy Information Administration, Annual Energy Outlook 2019 and analyst judgement
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