CRUDE QUALITY MATTERS:
A BRIEF UPDATE

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Crude Quality Issues

Forecasts of large growth in US tight oil production for years to come are unrealistic. The demand side will limit tight oil growth because of **crude quality**:

- Mismatch between the quality of crude produced in the US and refineries’ capabilities world-wide, including all expected growth in coming years.

- Mismatch between products’ yields from US tight oil and products demanded in the future.

- Refiners do not like light-heavy blends compared to actual crudes.
Most of the Increase in Non-OPEC Production is from Unconventional

IEA’s View of Oil Supply Growth

- It is compensating for a different quality crude
- This large increase despite high decline rates
- Extra heavy depends on tight oil

Source: IEA, 2018 and EOA, 2019
Most of US Tight Oil Production Additions were Light Crude & Condensates

* Lower 48

Was the recent decline in production related to demand issues?

Source: EIA, 2019 and EOA, 2019 * Lower 48
Most of Production Additions in Texas were Light Crude & Condensates

Texas Crude Oil and Condensates Production by API Gravity

Source: EOA, 2019 and EIA 2019
Crude Quality Matters: Import Replacement of Same Quality: Light Sweet

Source: EIA, 2019 and EOA, 2019

Under the US export ban on crude, shale replaced imports from Algeria and Nigeria

Saudi Arabia cut exports to US to reduce storage overhang

Iraq compensated for Saudi cut and Venezuelan decline

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Crude Quality Matters: Imports are Heavier

Percentages of US Total Imported Crude Oil by API Gravity

Without the impact of Venezuela, it would have been close to 57%.

54.5%

Source: EIA, 2019 and EOA, 2019
Blending Light With Heavy is A Problem

Comparison of Yields of Blended Crude with Original Crude of the Same API

Blending 50%-50%
Bakken: API 42.9°
WCS: API 20.3°

%)

Source: Statoil, 2018, Repsol, 2018, and EOA, 2019 * Advanced and complex refinery

EOA ENERGY OUTLOOK ADVISORS
Global Refineries Produce More Middle of the Barrel Products than the U.S.

Comparison of Yields Among Regions and Countries

Source: IEA, 2018, EIA, 2018, and EOA, 2019
Crude Quality Matters to Future Demand

If most growth in production is condensates from tight oil, it cannot produce enough diesel and kerosene to meet the predicted demand.

IEA’s Change in Global Oil Products Demand (2016-2040)

Can US condensates compensate for Iranian condensates?

Demand issues again!

Source: IEA, 2018 and EOA, 2019
Comments on Medium Term

Looking at global refinery expansion in the next five years:

- Only about 30% of new refining capacity can take light crude, which is equal to less than 25% of expected growth in US shale oil production! Where will the 75%+ of shale go?

- If shale production is growing by more than growth in global demand, where will the additional production go? Where will the heavier oil come from to cover the remaining 70%?

- Some countries are building their own refineries to utilize their own crude. Where will U.S. shale go?

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