



IHS ENERGY

CRUDE OIL AND REFINING MARKETS: FINDING A NEW BALANCE

Prepared for: CCQTA – COQA Joint Meeting

June 9, 2016
Edmonton

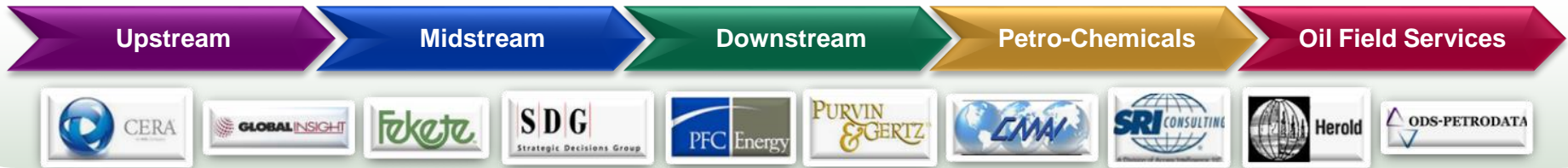
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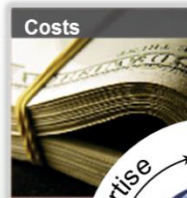


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- Regulatory & Compliance Support
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- Strategic Due Diligence & Valuation
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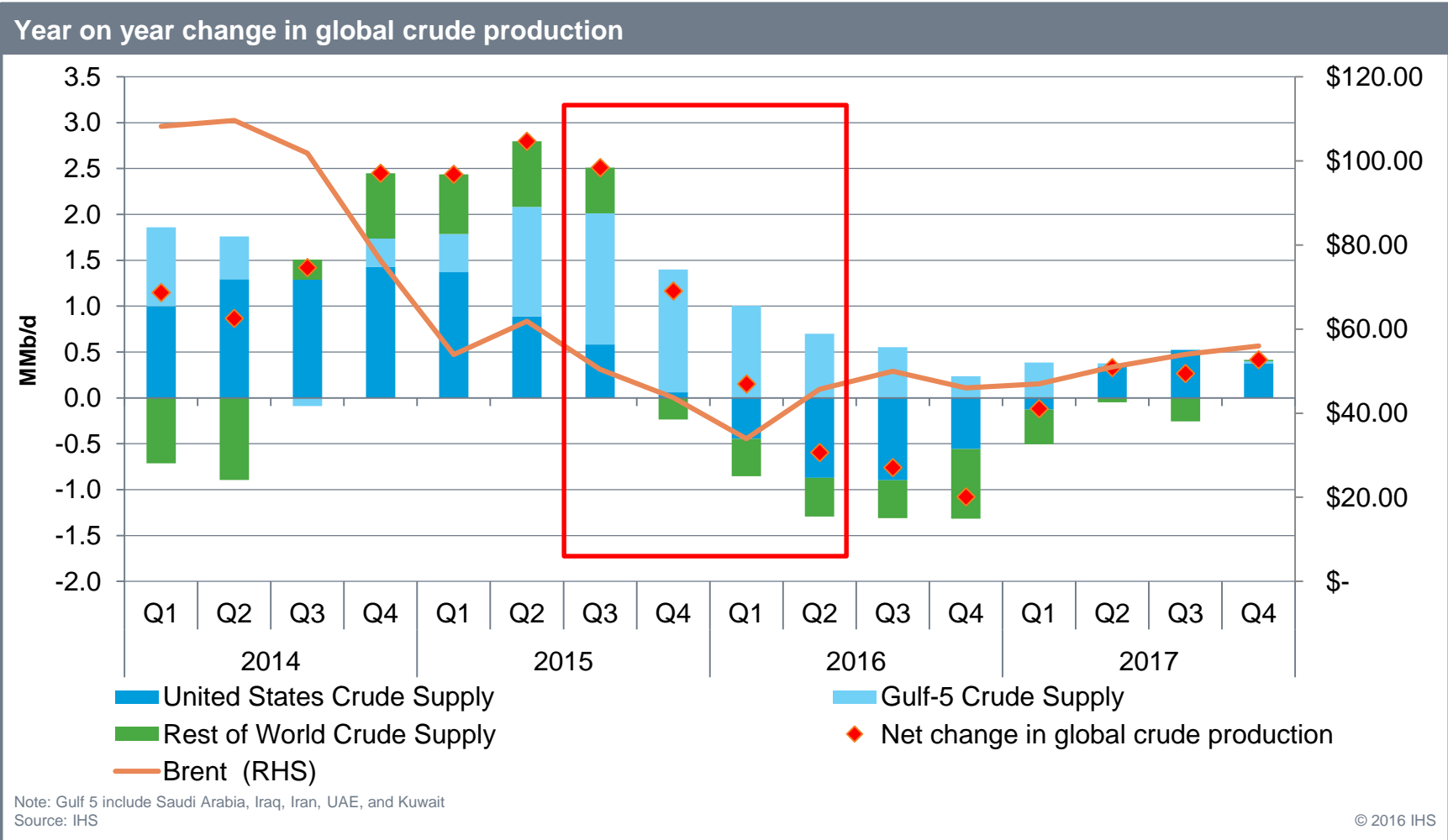
- Energy Market Analysis
- Country & Macroeconomic Forecasting

Market forecast to balance in 2016, as risks remain for price recovery

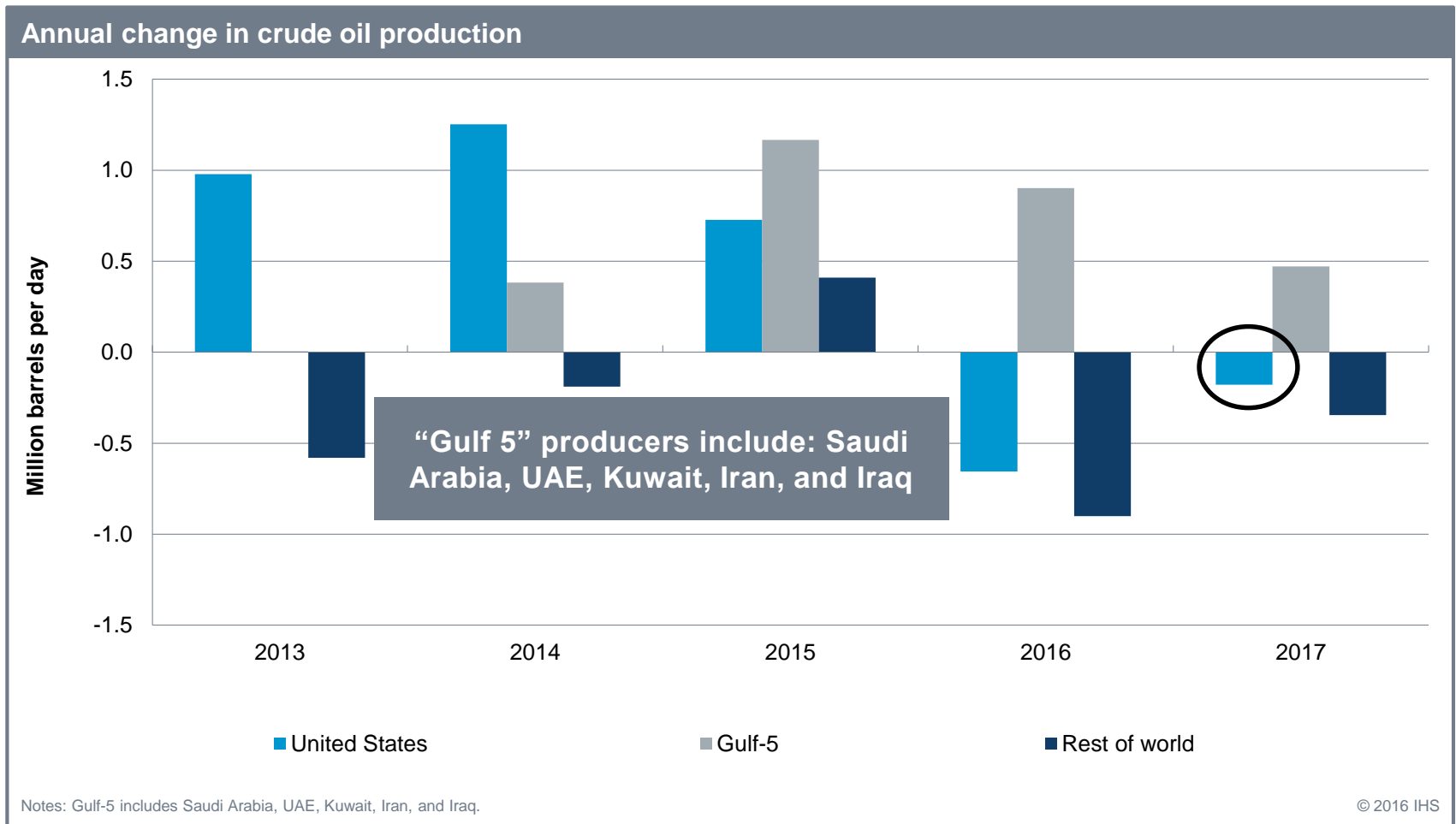
- **The world oil market will transition from glut to rough balance in the second half of this year.** Since start of price decline an average of just 1.4% (~1.4 MMb/d) of global production needed to be removed to balance the global market. This balance is expected to occur in mid 2016.
- Sustained price levels will likely stress enough producers to achieve the balance
- **In contrast to many other areas, output of low-cost oil from the “Gulf-5” producers will rise.**
 - Saudi Arabia’s abandonment of supply management is the driver of these production increases. The G-5 comprises Saudi Arabia, UAE, Kuwait, Iran, and Iraq.
- **Dated Brent forecast to rise toward \$60/bbl by end-2017 as demand and supply roughly balance.**
 - Rising G-5 output and ample inventories will help restrain upward price pressure.
- **Paradoxically, more low-cost Middle East supply creates conditions for upward price spikes.**
 - The flipside of further growth in Saudi output is a thinner spare production capacity—a key market shock absorber.



From supply growth to declines: the impact of low prices is here



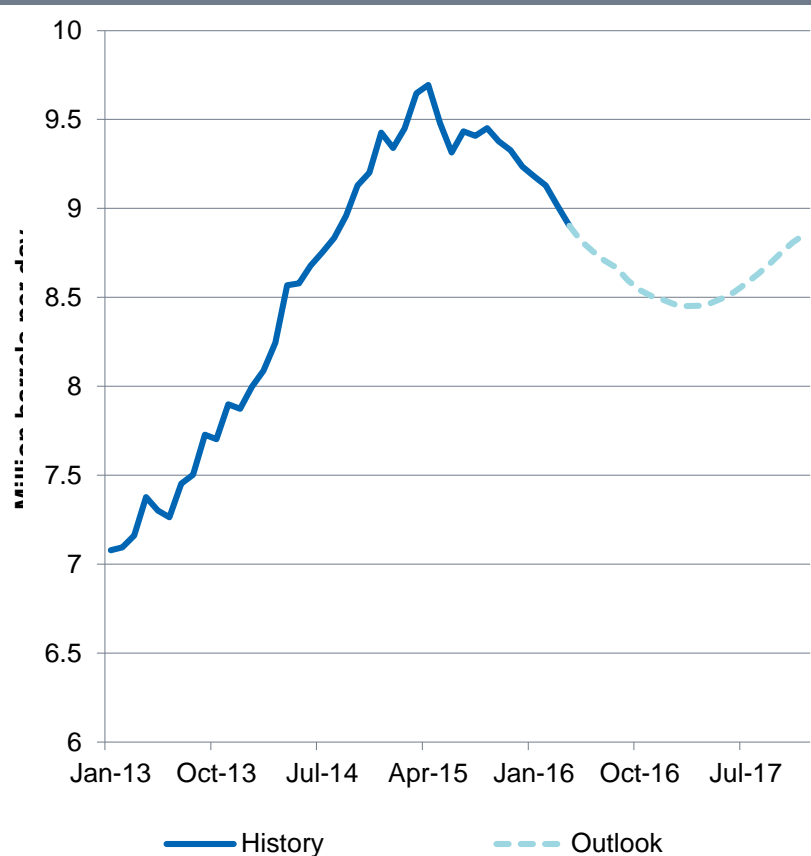
Crude production outside of the “Gulf 5” producers to fall this year and next



US crude oil production

Declines expected to continue through the end of 2016 as sharp drop in activity reverberates across the US onshore

Monthly US crude oil production



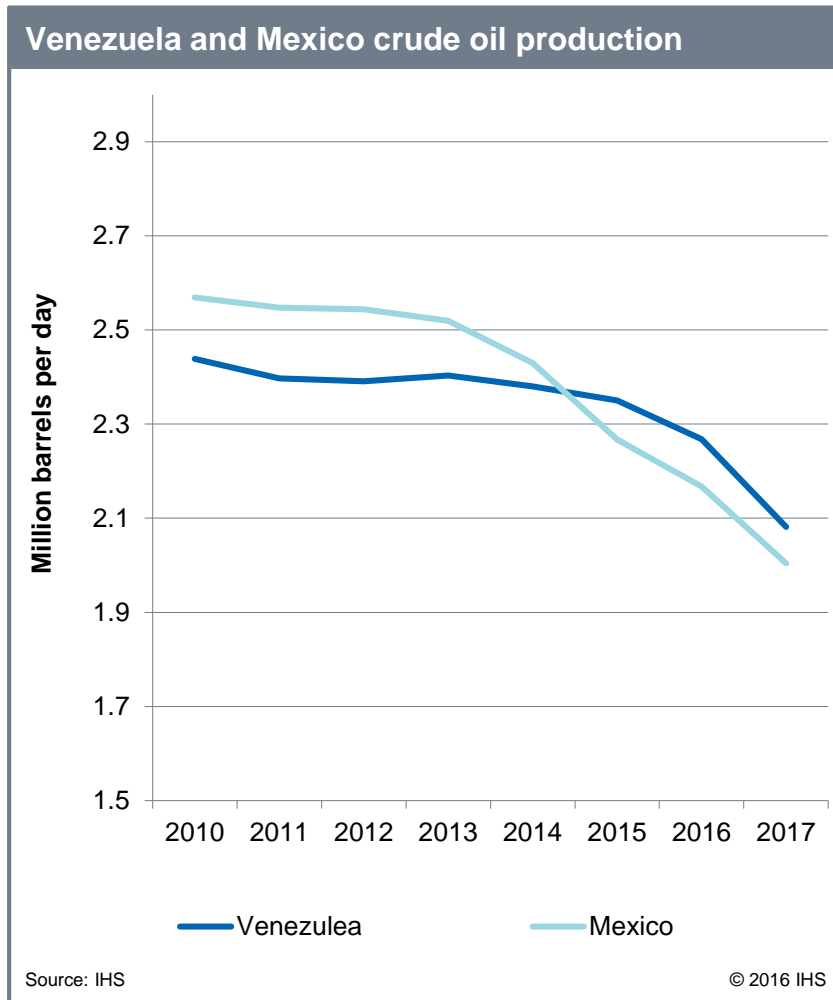
Source: IHS, EIA

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Key elements of our US crude production outlook include:

- Production bottoms out at just below 8.5 MMb/d.
- Rig activity levels reach a low point soon and increase in late 2016 and 2017.
- Steady, though not aggressive, drilled but uncompleted (DUC) liquidation throughout 2016 and 2017.
 - Excess DUC inventory should be depleted by early 2018.
- Further gains in well productivity in key plays (e.g. Wolfcamp, Bone Spring, SCOOP) and in efficiencies.
- No near-term signs of sweet spot exhaustion.
 - For oil plays, we expect to see this first in the Bakken, but not until 2019 or 2020).

Output from Venezuela and Mexico will decline in the near-term



• Venezuela

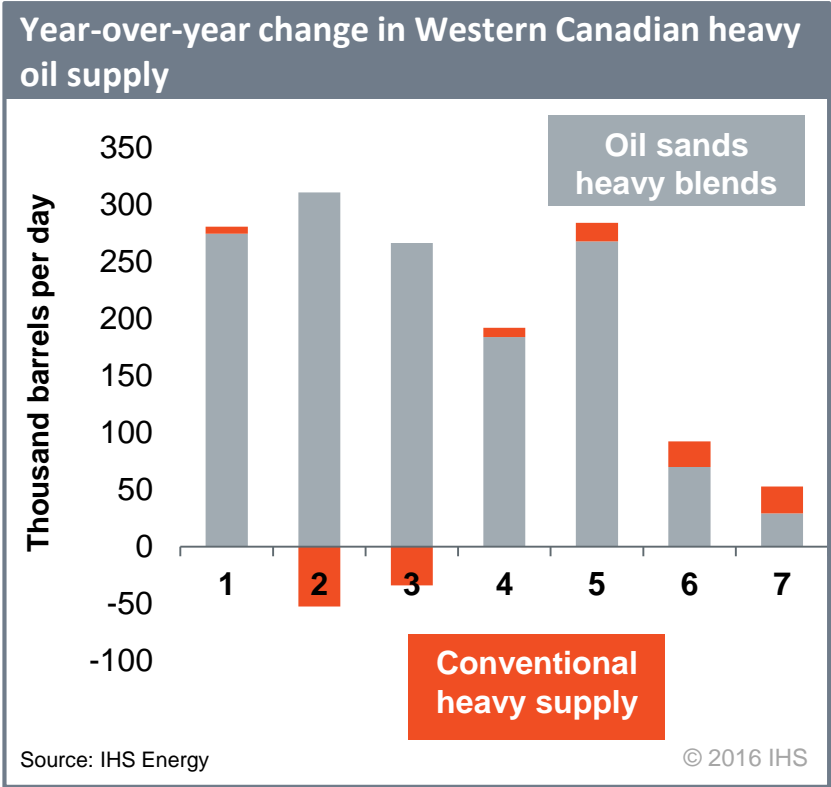
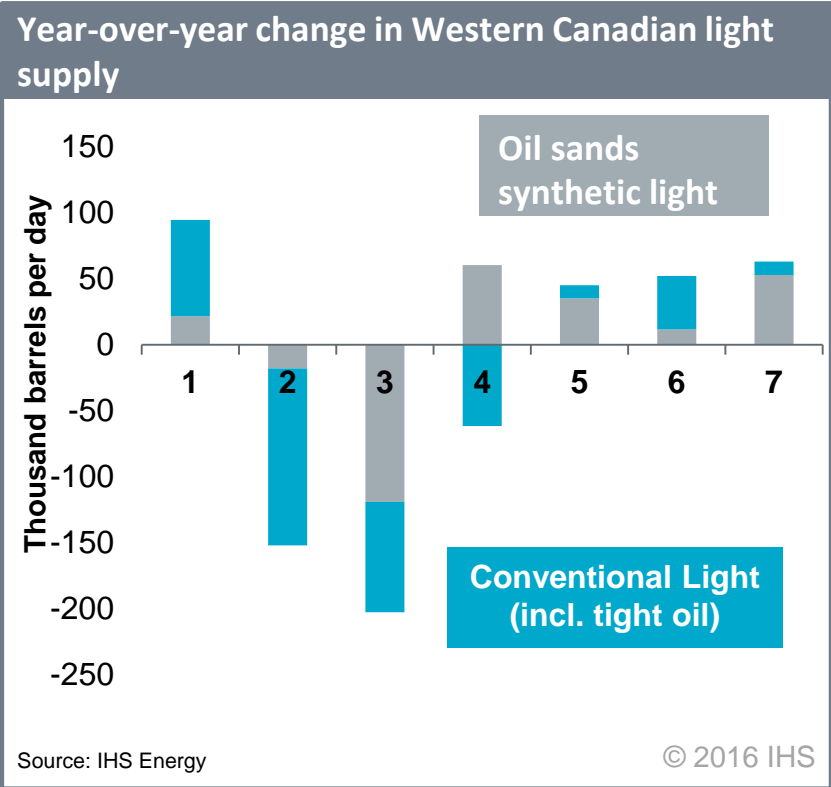
- Venezuela's economy is eroding and its political system is in chaos
- Domestic oil sector faces myriad challenges, which are likely to impede oil production
 - Late payments to service companies
 - More difficulty accessing capital

• Mexico

- Mexico's main fields (e.g. Cantarell) remain in steep decline
- Country's historic energy reforms are unlikely to result in appreciable new supply additions until next decade
 - New deepwater projects, in particular, will take several years to develop and bring online

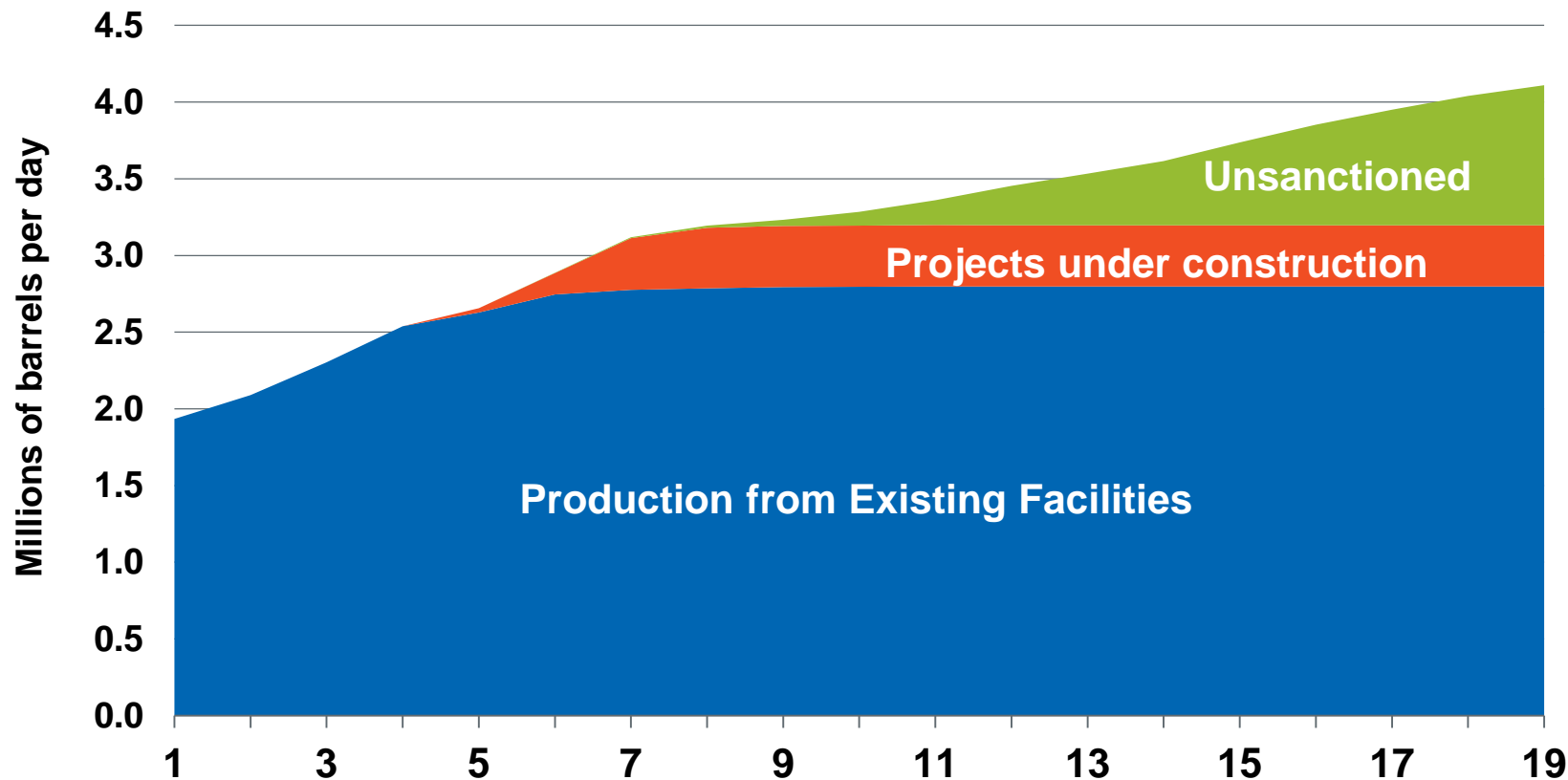


Lower oil prices are not impacting Western Canadian heavy and light supply equally



Longer-term growth will continue, but the scale depends on the timing when new projects move into construction

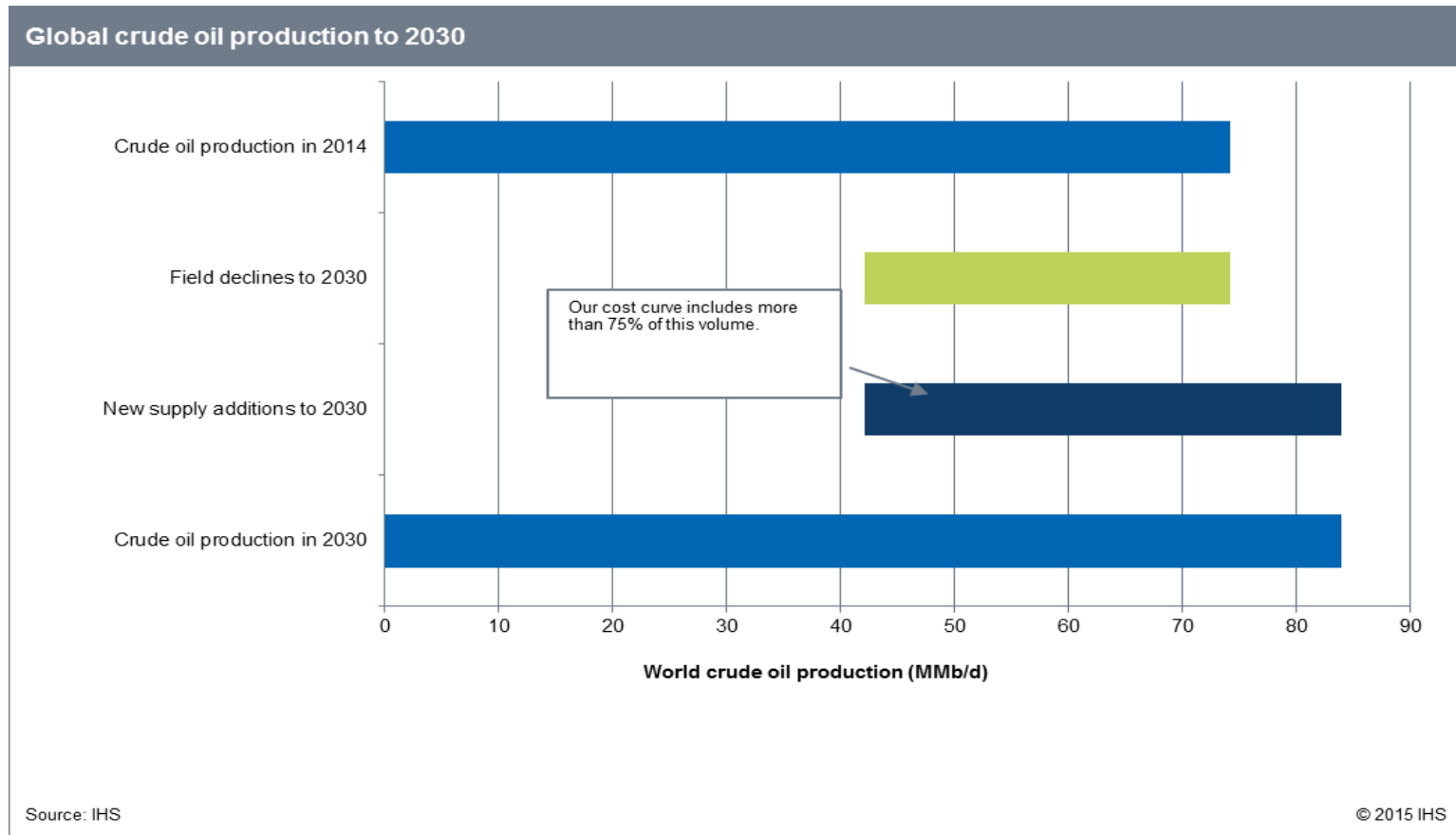
Canadian oil sands raw bitumen production by stage of project to 2030



Source: IHS Energy

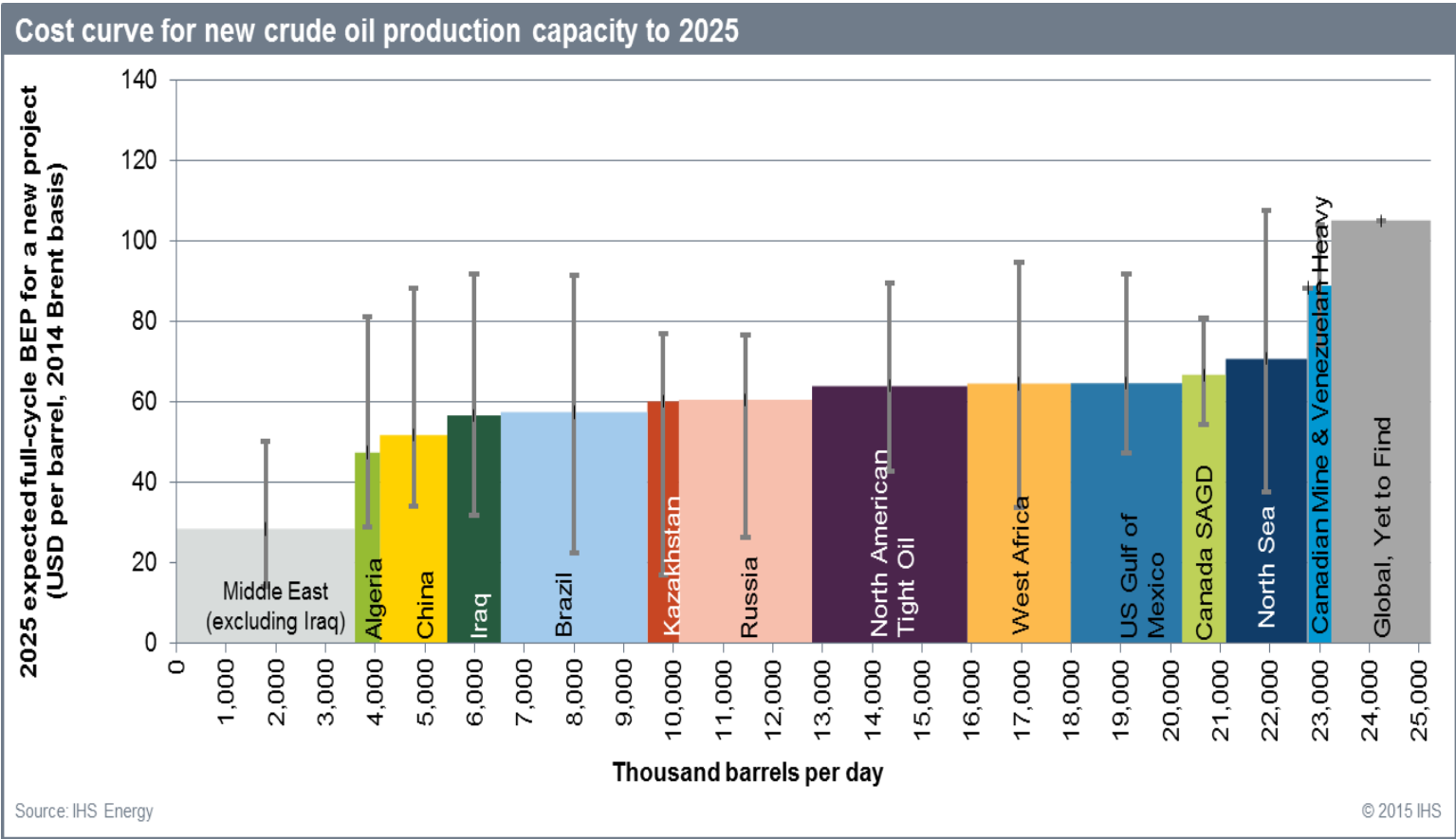
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Roughly 40 million b/d of new crude production is needed by 2030 to offset declines and meet new demand





Future barrels are going to be more expensive to find and produce

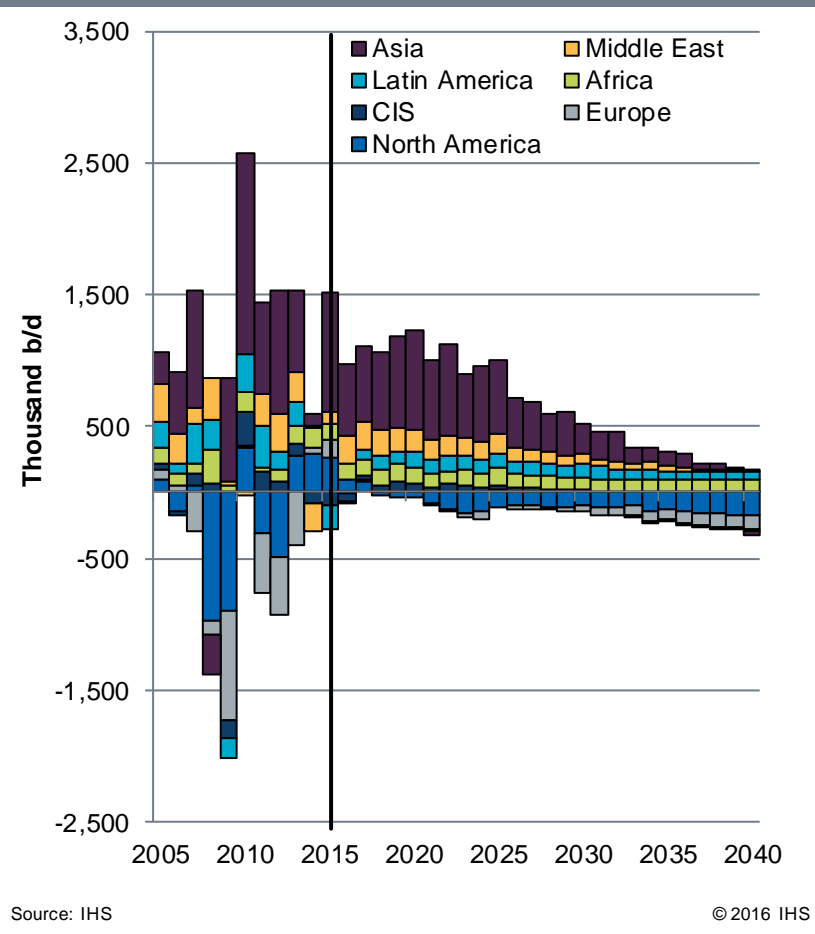


Source: IHS

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Refined products demand growth will average 1.1 million b/d through 2020 following 1.2 million b/d in 2015

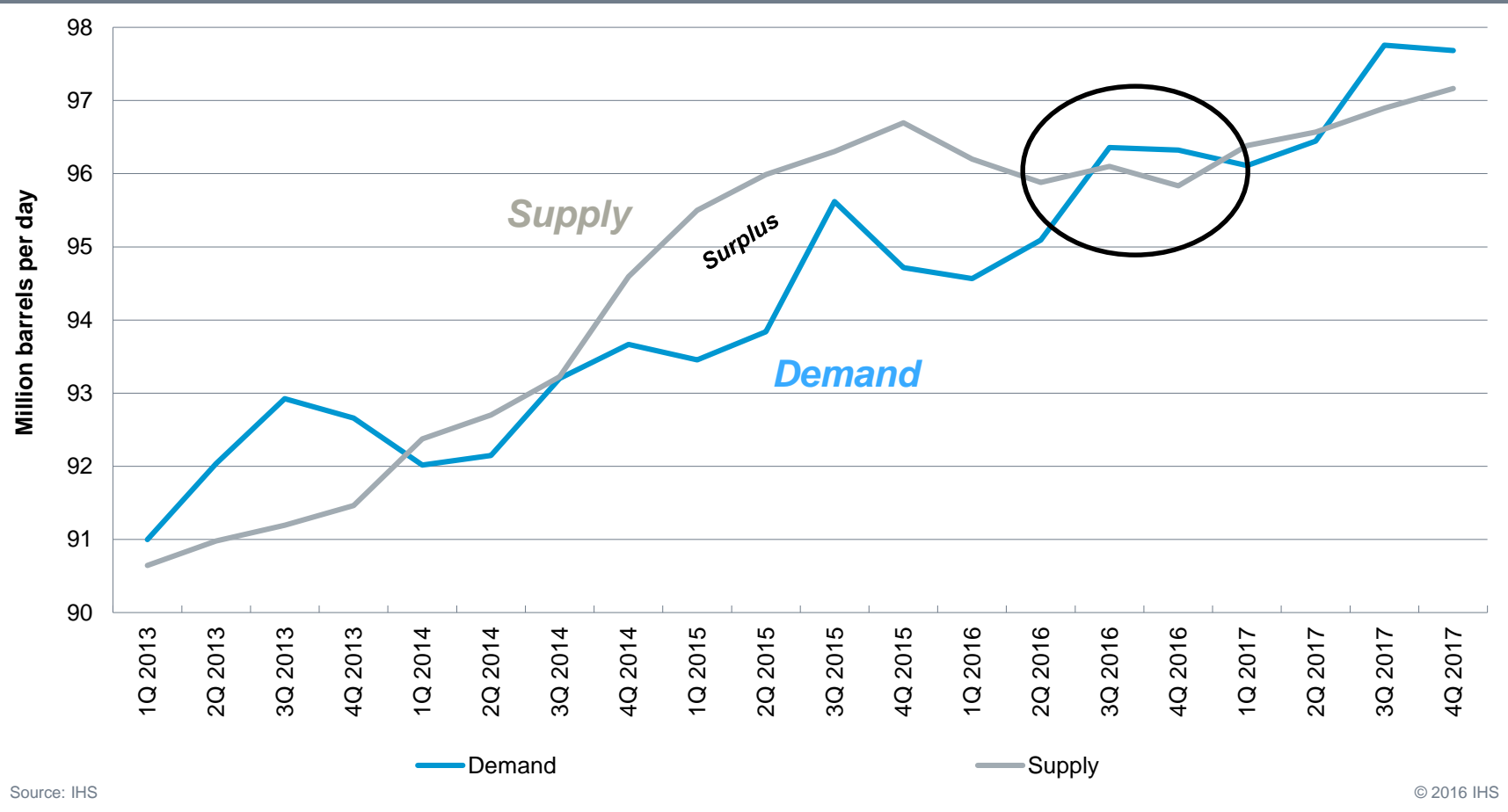
World refined product demand change by region



- Low-sulfur bunker fuel requirements in 2025 result in a spike in diesel demand; the duration of the spike is limited by rapid adoption of scrubber technology, enabling continued fuel oil usage
- Excluding the effects of the bunker specifications, gasoline and diesel combined see average demand growth of less than 0.3% from the early 2020s onward as efficiencies and fuel substitution limit gains and GDP growth decelerates
- In contrast, jet/kero and naphtha see average annual growth around 1%
- Asia retains a dominant share of global demand growth through most of the forecast, supported by tremendous gains in China's car fleet over the long term

Global oil market poised to move from glut to rough balance in second half of 2016

World oil (liquids) demand and supply by quarter



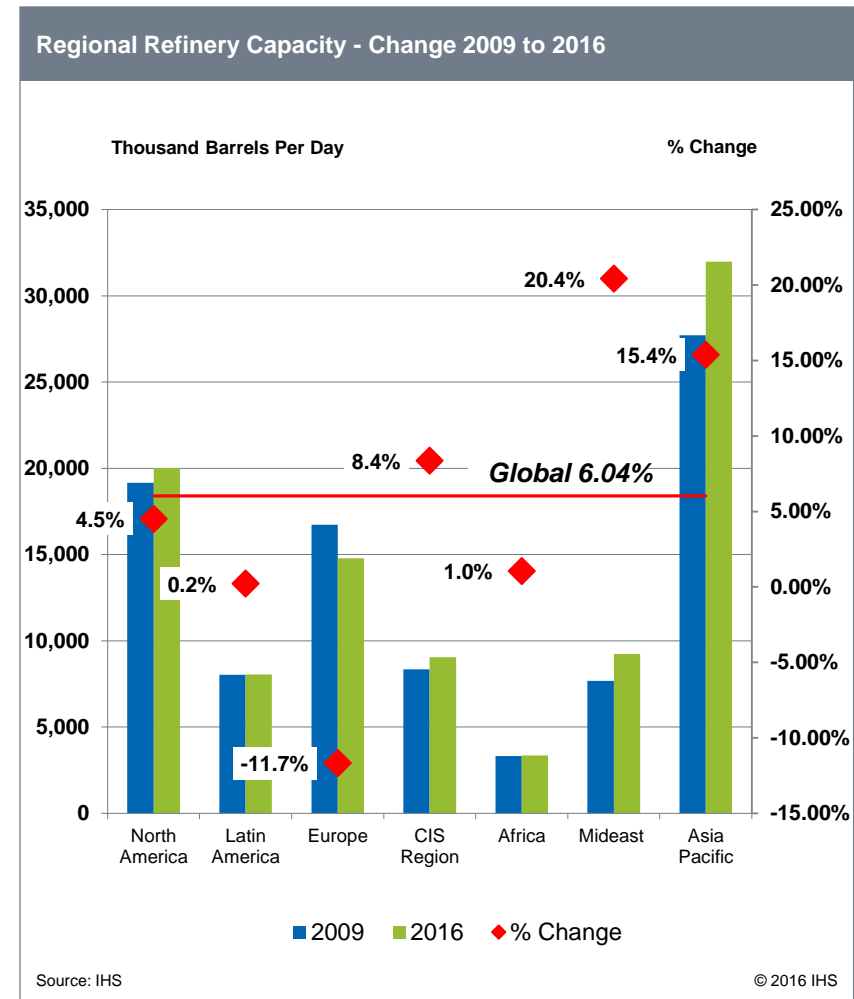
Refining Market

Fundamental shift toward export refining capacity

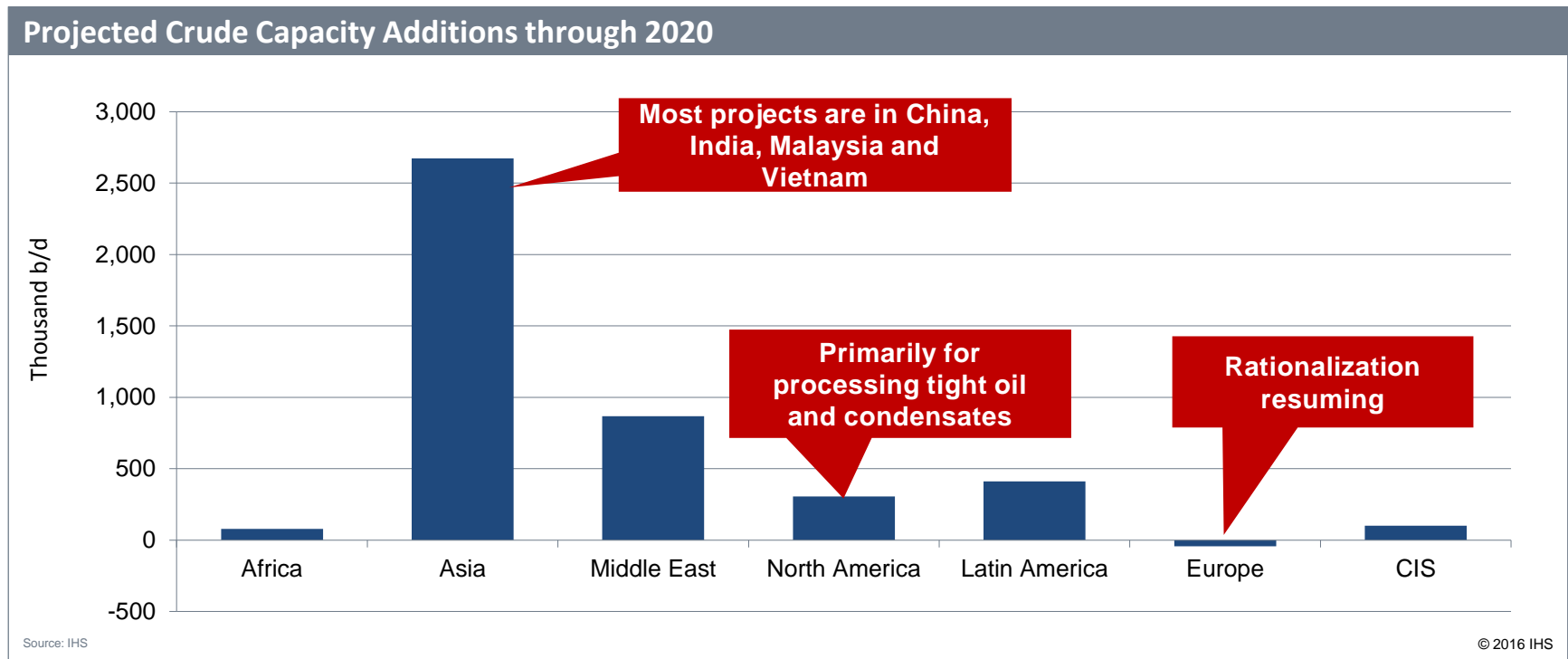
- Shifts in global demand and growth in large export refining capacity is resulting in a shift in refining centres.
- Net 14.2 million B/D of crude capacity (and associated conversion capacity) is expected on-stream by 2040 to meet demand.
- Diesel demand growth slower than prior forecasts, and with a slightly higher growth than gasoline. Shifts require a modification in conversion capacity outlook.
- Delayed cokers capacity has reached end of current cycle – no new North American coking capacity expected on stream prior to 2025

Change in Regional Refining Capacity

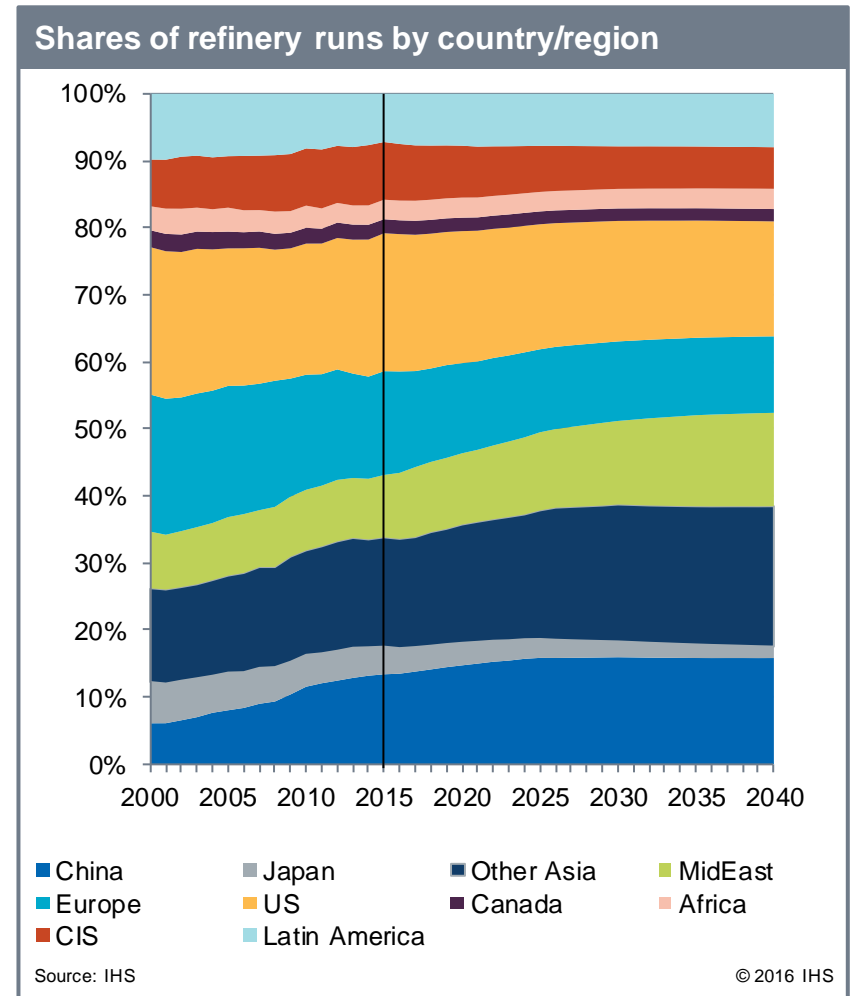
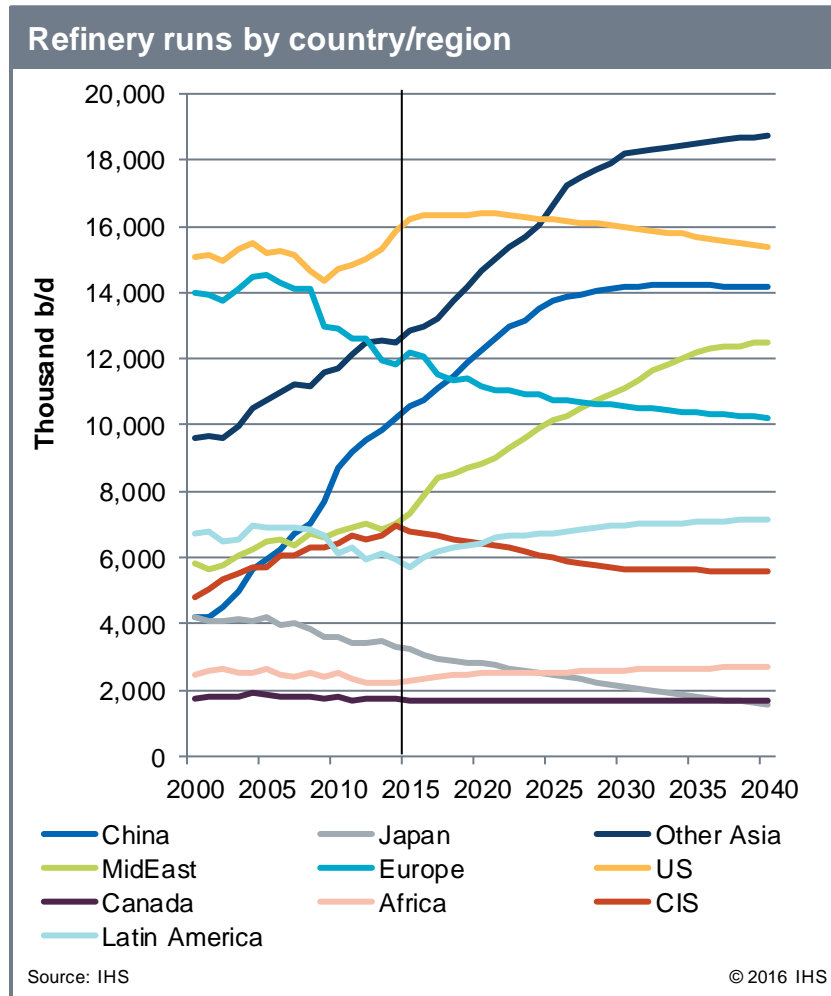
- Significant ineffective refining capacity has been closed worldwide since 2009
- Significant refinery capacity will be added in Asia and the Middle East over the remainder of this decade
- Capacity rationalization and capacity conversion to produce the desired product slate are the trends for future capital investment in refining industry globally



Significant refinery capacity will be added in Asia and the Middle East over the remainder of this decade

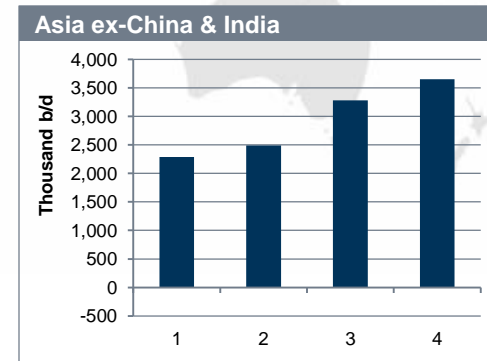
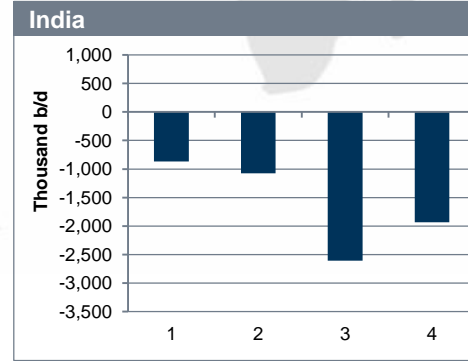
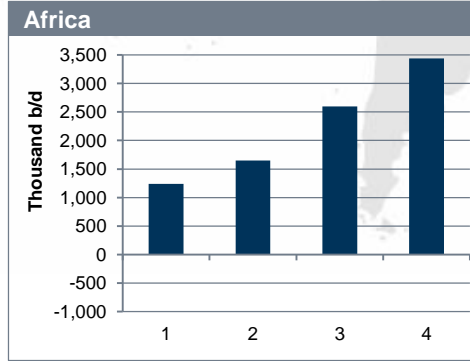
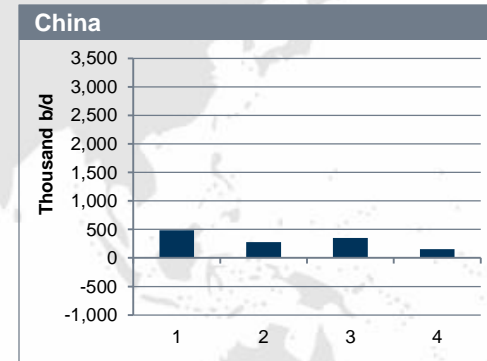
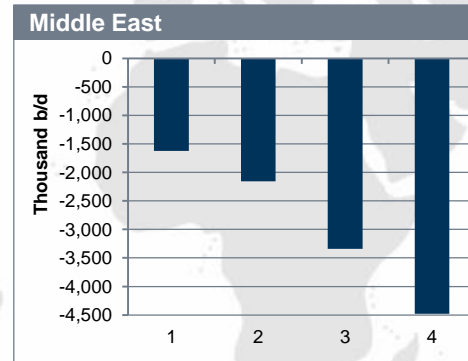
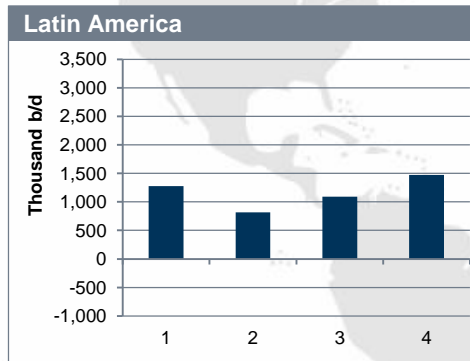
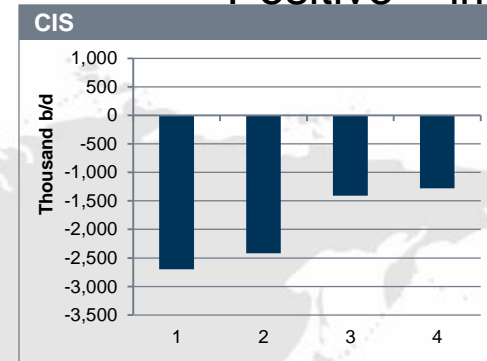
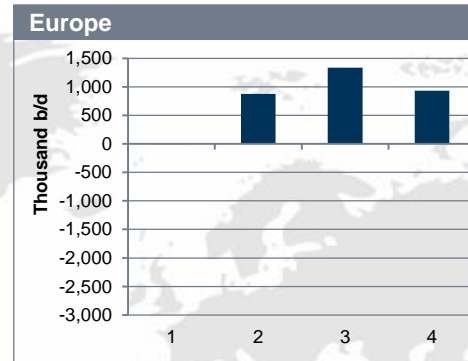
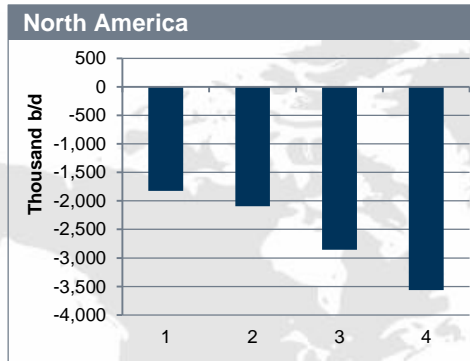


By 2030, over 50% of global refinery runs will be in Asia or the Middle East

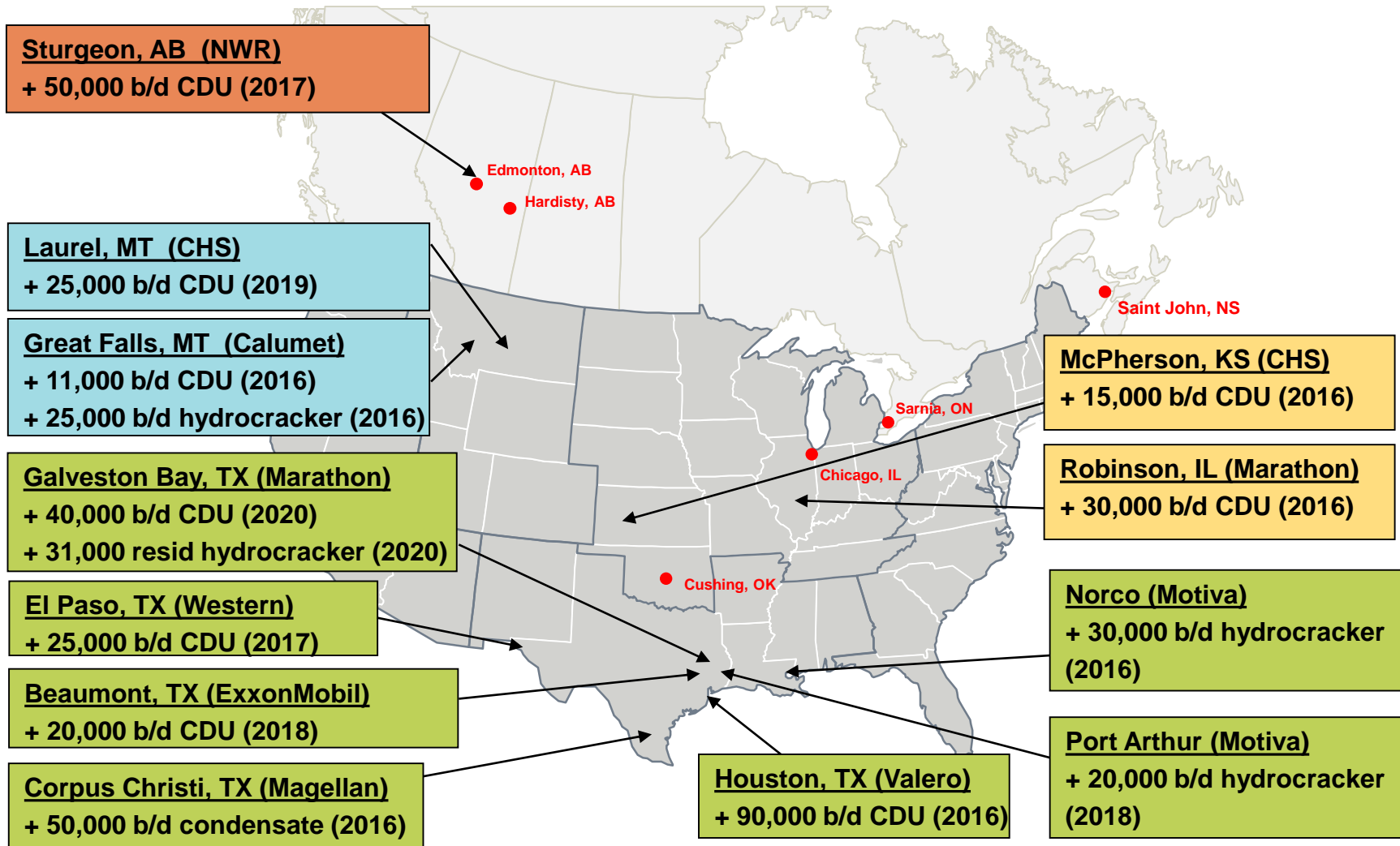


“Globalization of refining” results in more net product trade

Positive = import

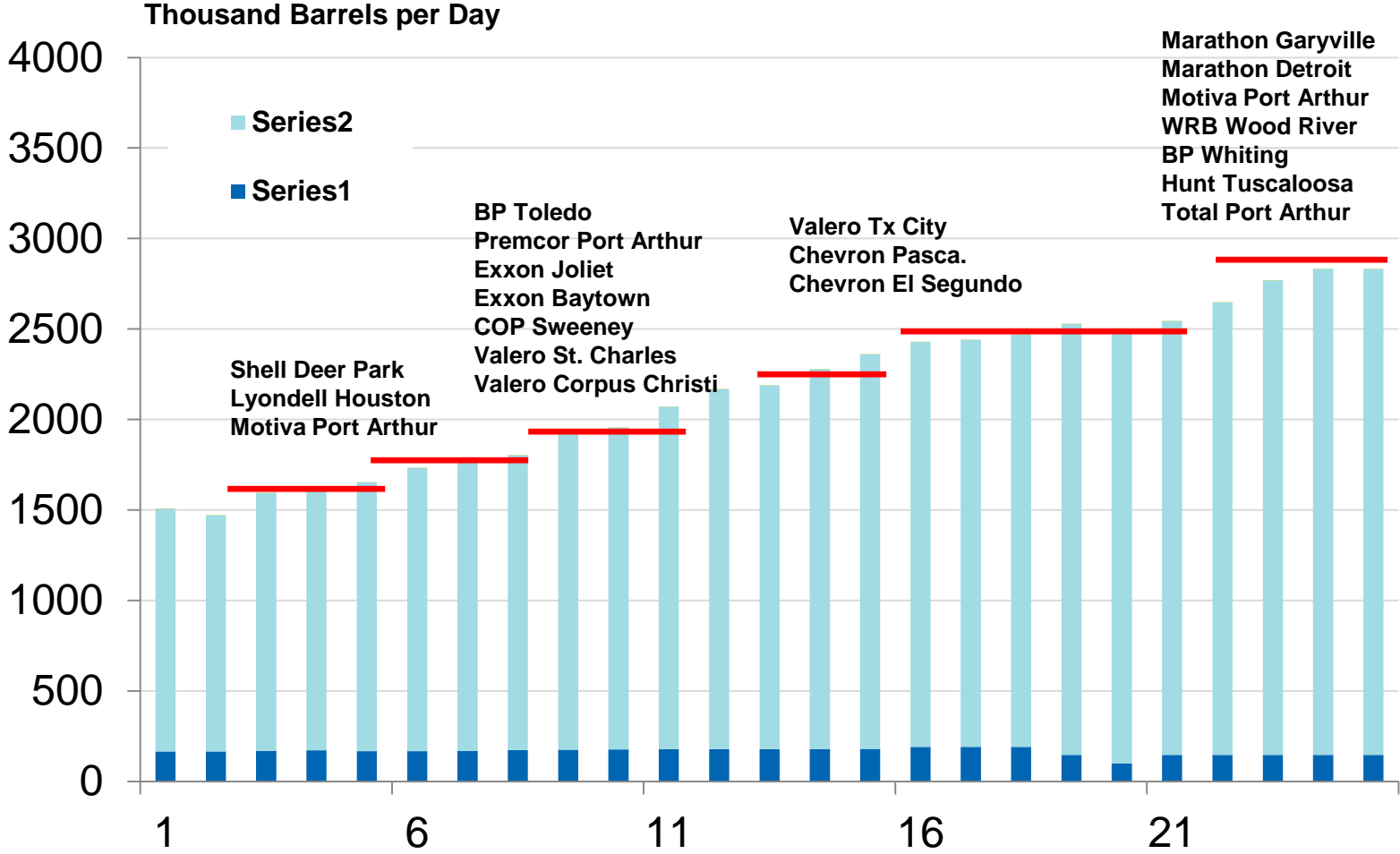


Major North America Refinery Projects





North American coker projects come in waves...



* Growth also due to creep and debottleneck projects, such as adding de-coke valve technology

Summary and Key Takeaways

- The global supply/demand balance is slowly correct -- price increases without correction of the balance won't last.
- Long-term demand trends will require upwards of 40 million B/D of new crude production – higher price levels will be required to support the development
- High capital projects (i.e. oil sands) will likely not shut-in – but growth is tempered after current project come on stream.
- Refining projects focused in demand growth areas in Asia
 - The last wave of North American heavy upgrade projects is complete
 - Focus on tight oil processing

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