

Short term crude market outlook: global curtailments and pipe dreams

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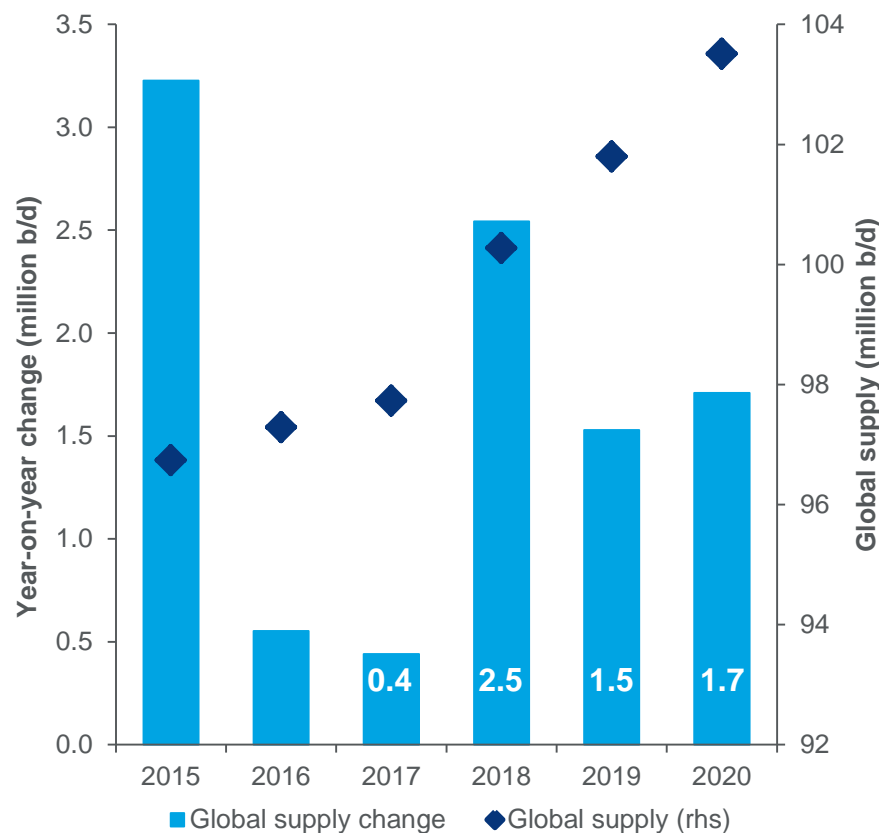




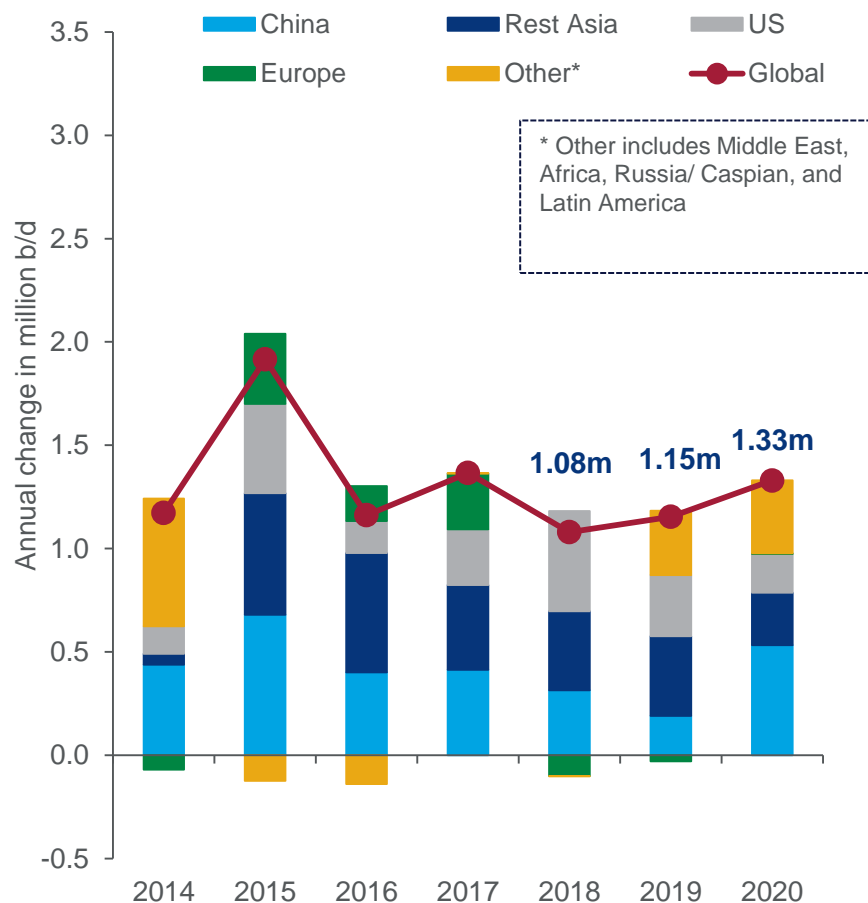
Stronger global supply outlook: US and Iran upgraded, Canadian outlook cuts in 2019

Pace of global oil demand growth is maintained through 2020

Global liquids supply



Global oil demand

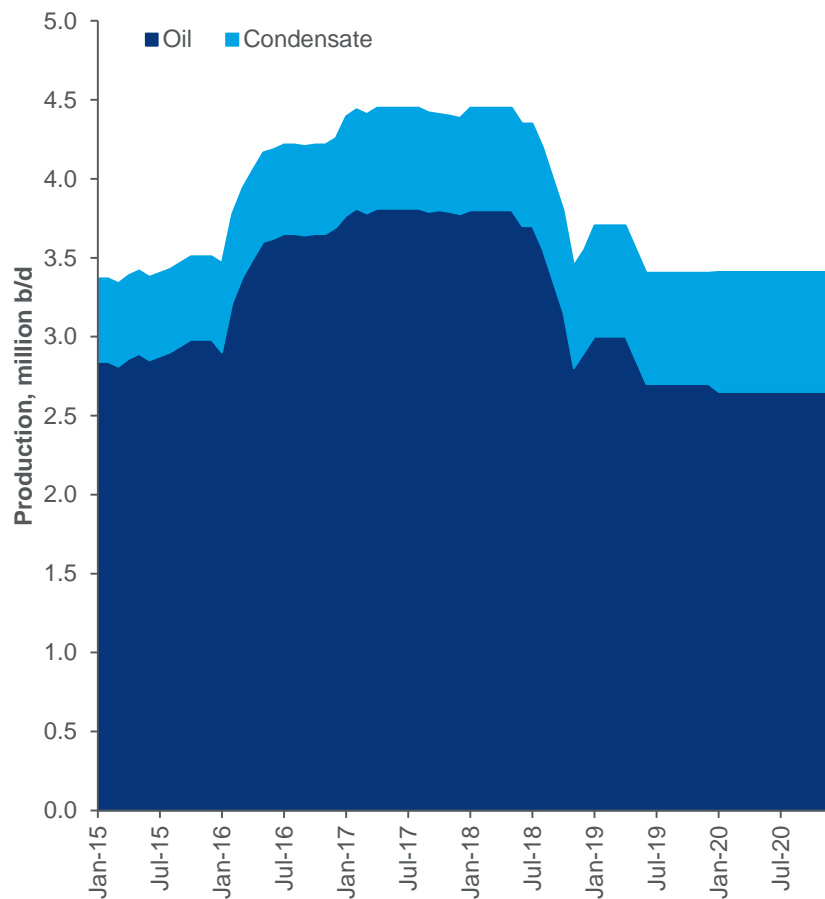




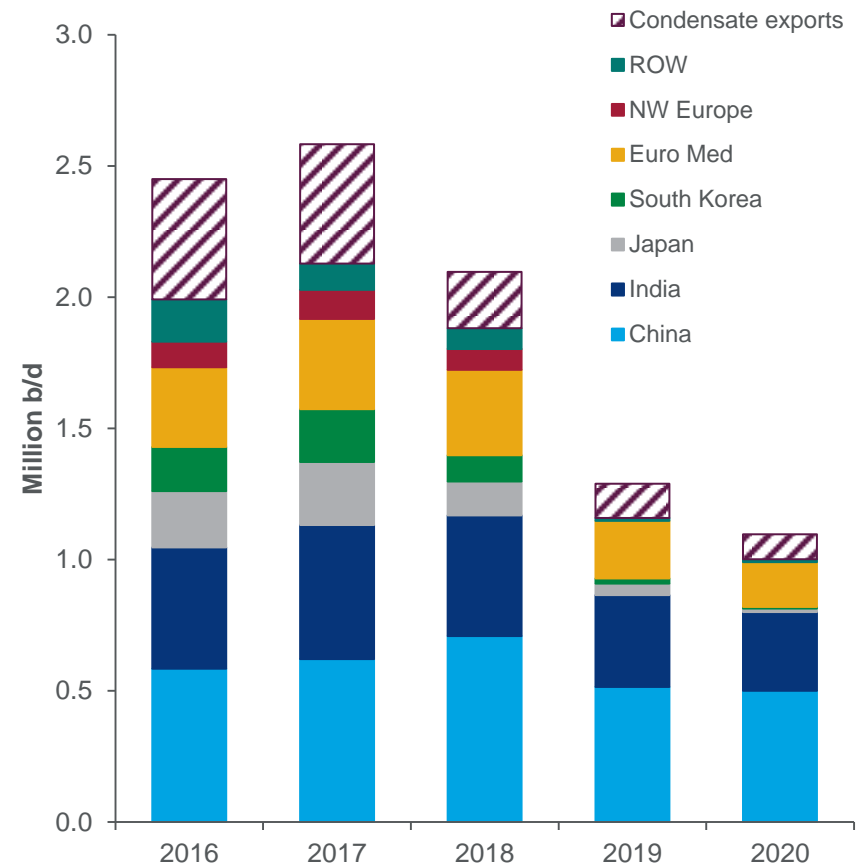
Iran: US sanctions waivers push up exports until May 2019

Production revised up during six month waiver period; exports assumed to drop if no renewal of waivers next year

Iran liquids production



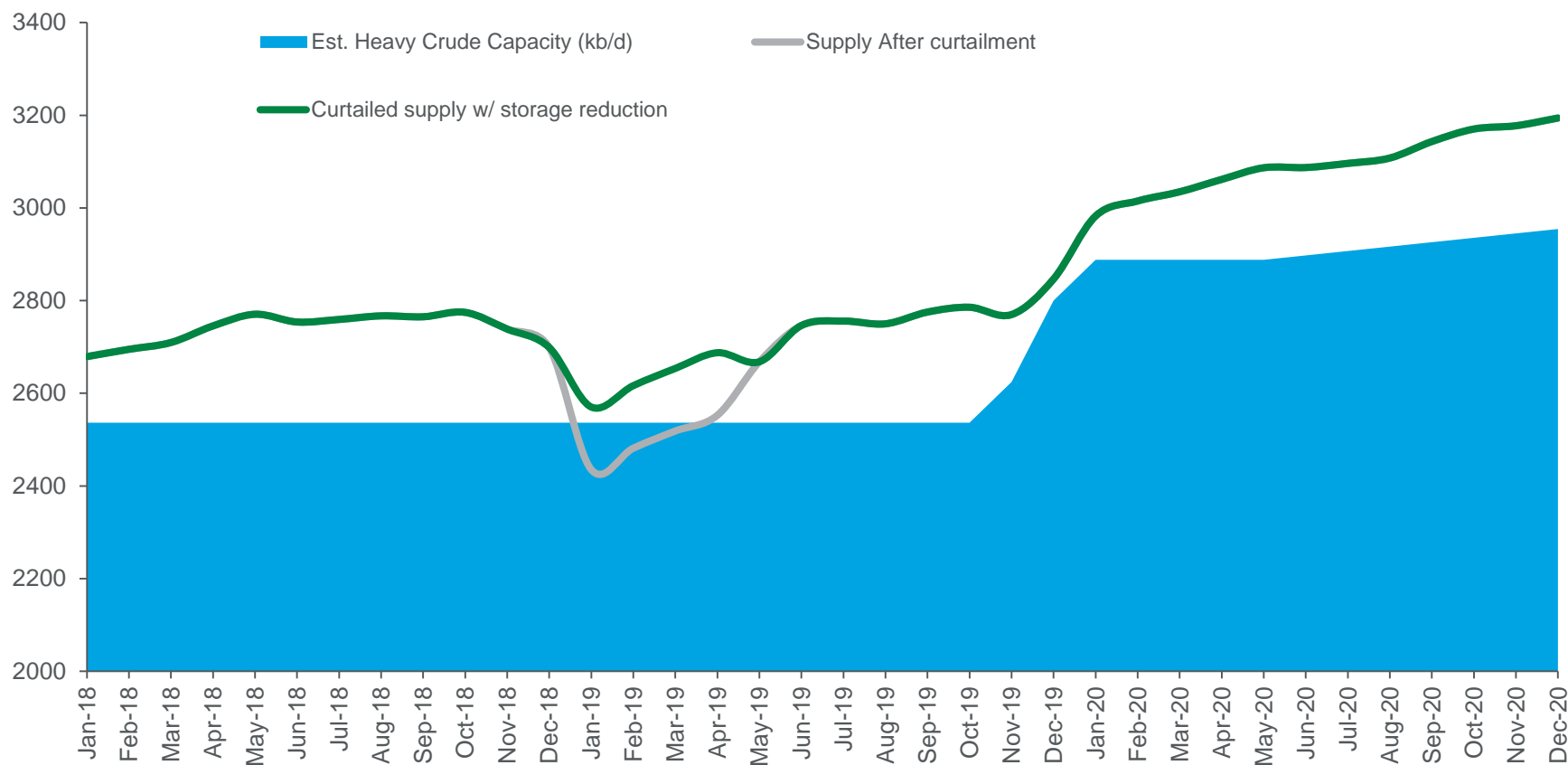
Iran crude and condensate exports



Alberta government announces production curtailment of 325 kb/d beginning in 2019

Curtailment serves as effective cap on West Canada production through 2019

Alberta Heavy crude curtailment impact (kb/d)

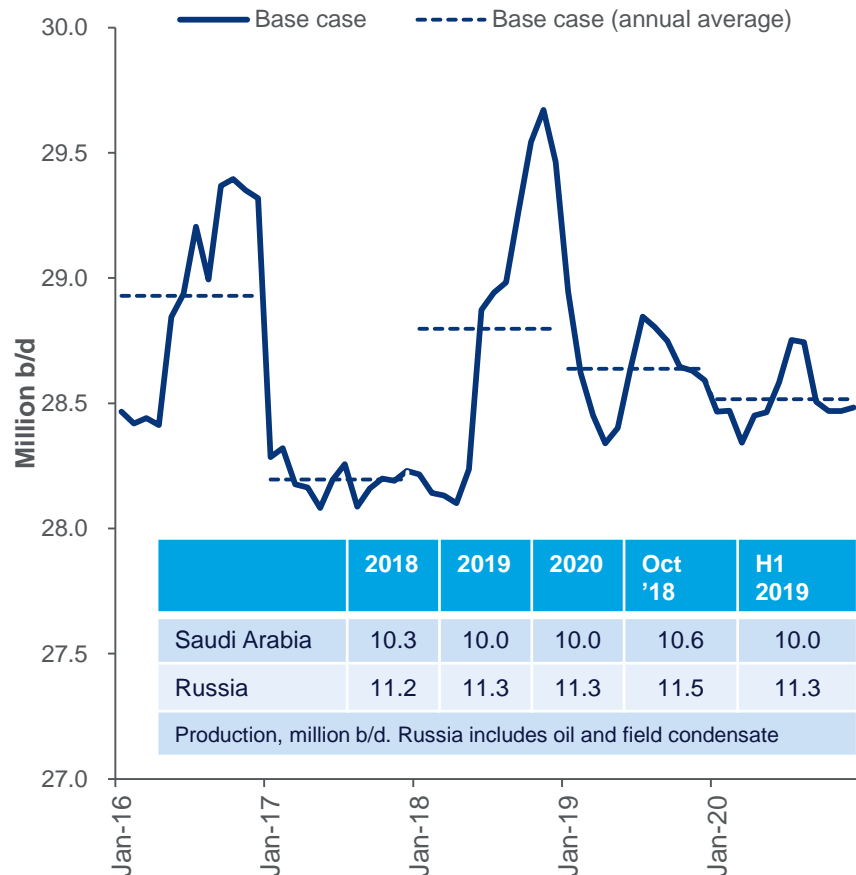


Note: Capacity utilization shown at 95% supply volumes shown after dilution and local refining consumption

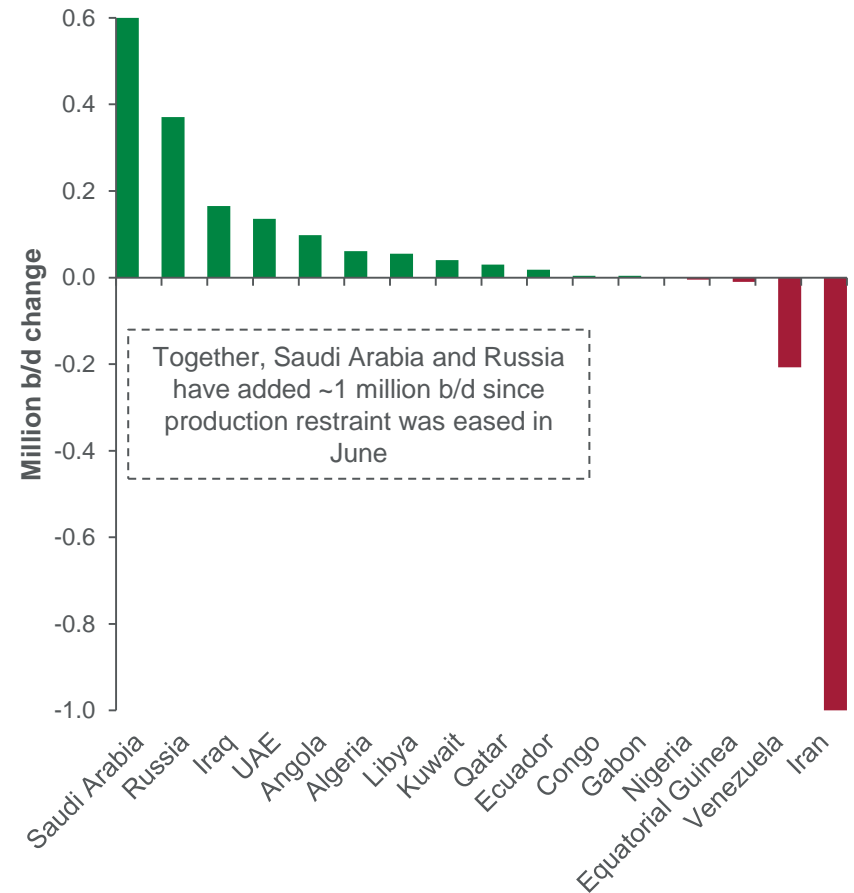
Saudi Arabia and Russia have added substantial volumes to the market

Helping to offset anticipated losses from Iran and continued declines in Venezuela

OPEC + Russia crude supply, excluding Iran



OPEC and Russia crude production change, April to October 2018

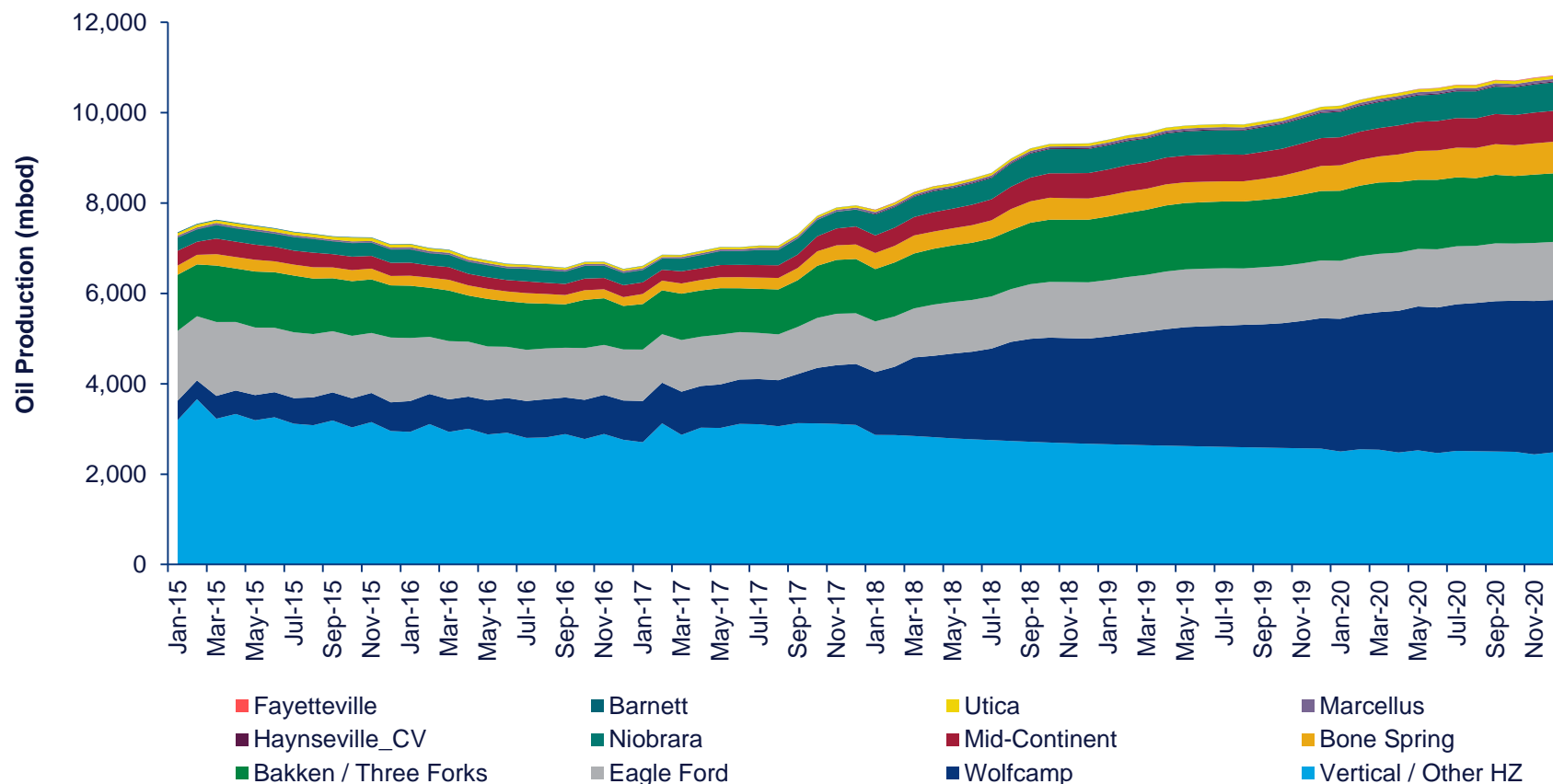


US L48 Crude Outlook: Persistent market access woes

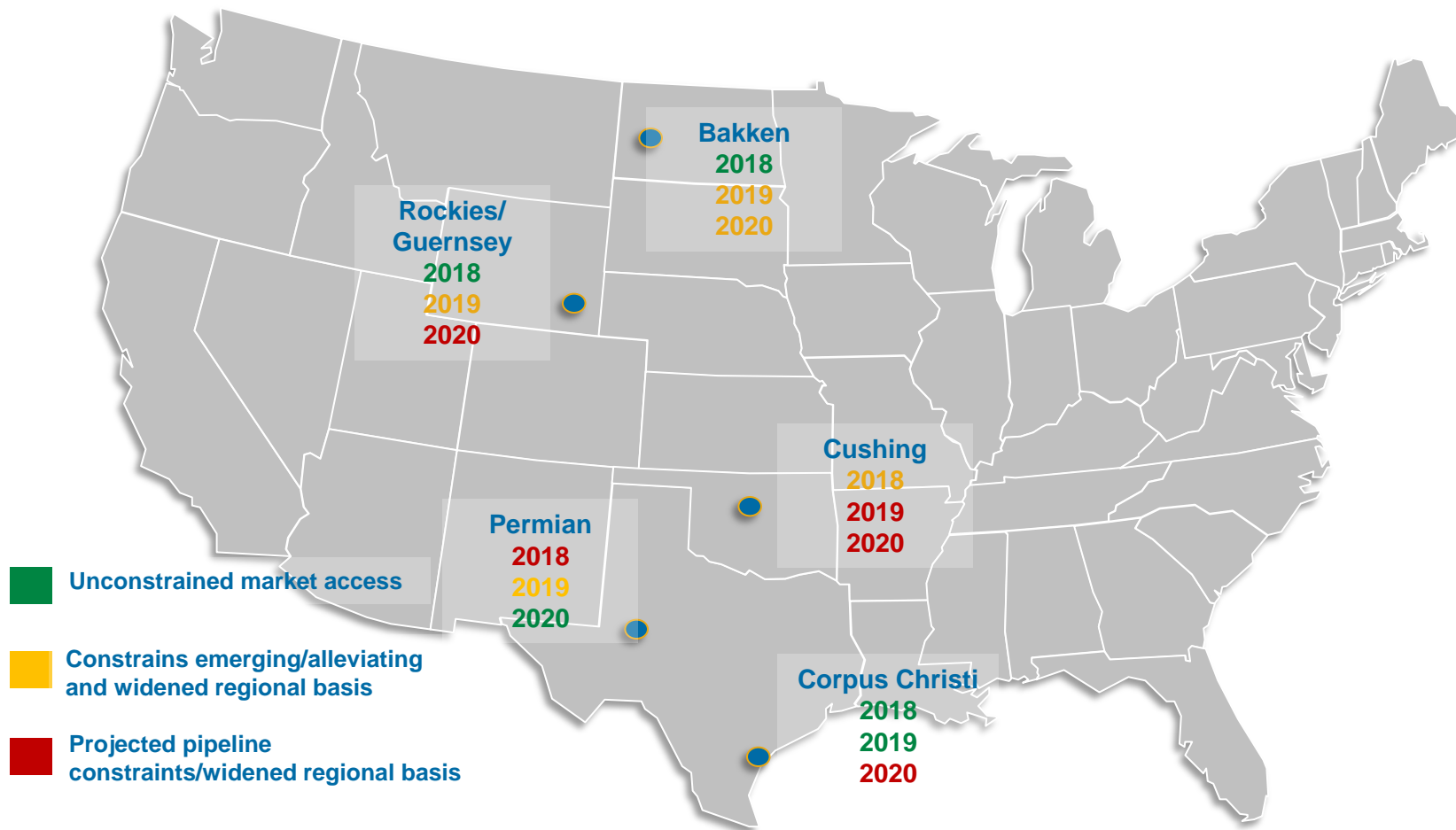
US Lower 48 Crude and Condensate outlook: year-on-year growth forecast at 1.5 million b/d in 2018 and 1.1 million b/d in 2019

Strong Q3 performance leading to upward adjustments to the base

US L48 onshore crude/condensate outlook



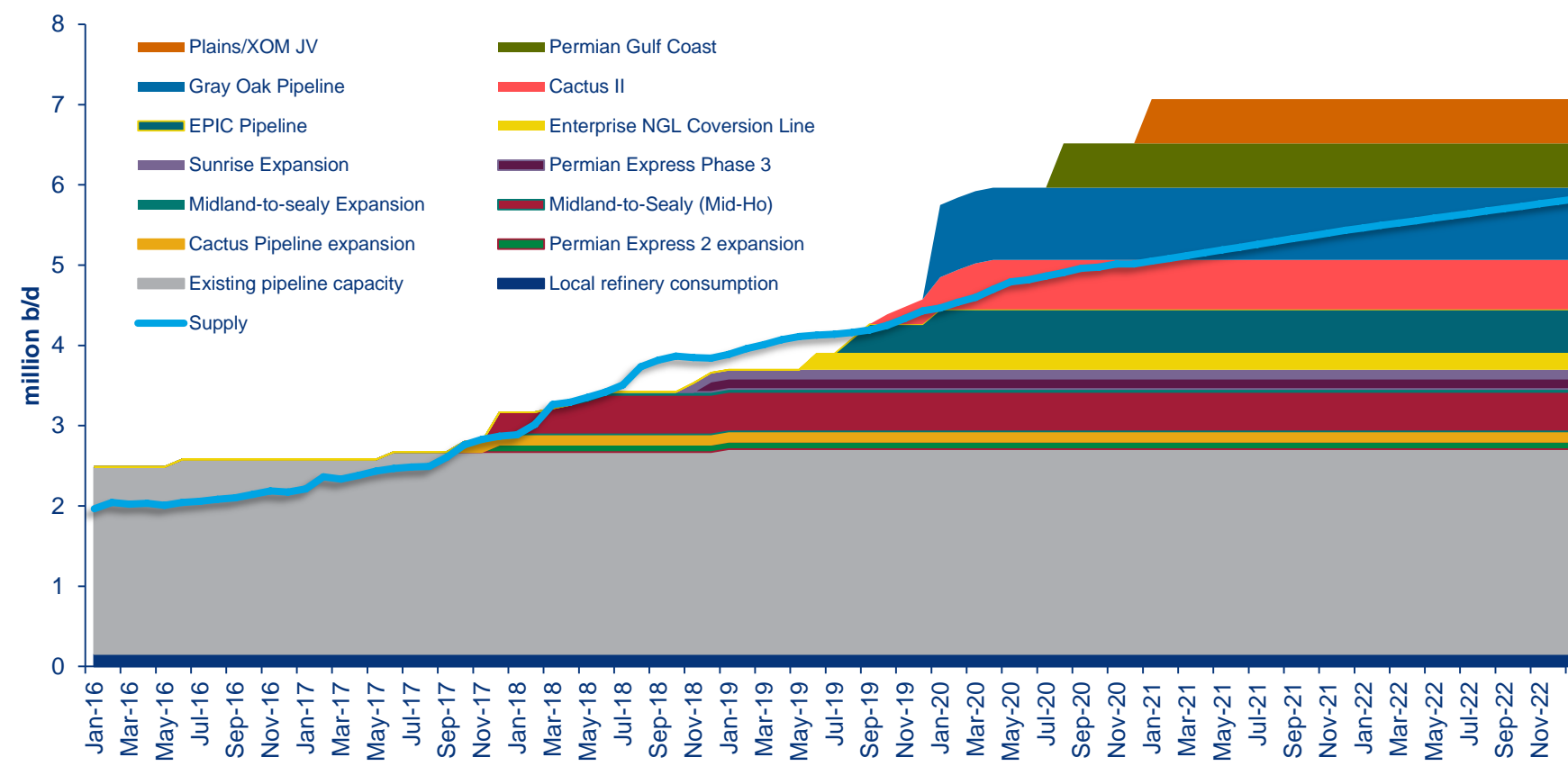
Robust production growth comes at a price: market access concerns loom into 2019 and 2020 beyond the Permian



Permian basin and looming coastal concerns

Permian basin crude takeaway outlook: NGL pipes to the rescue

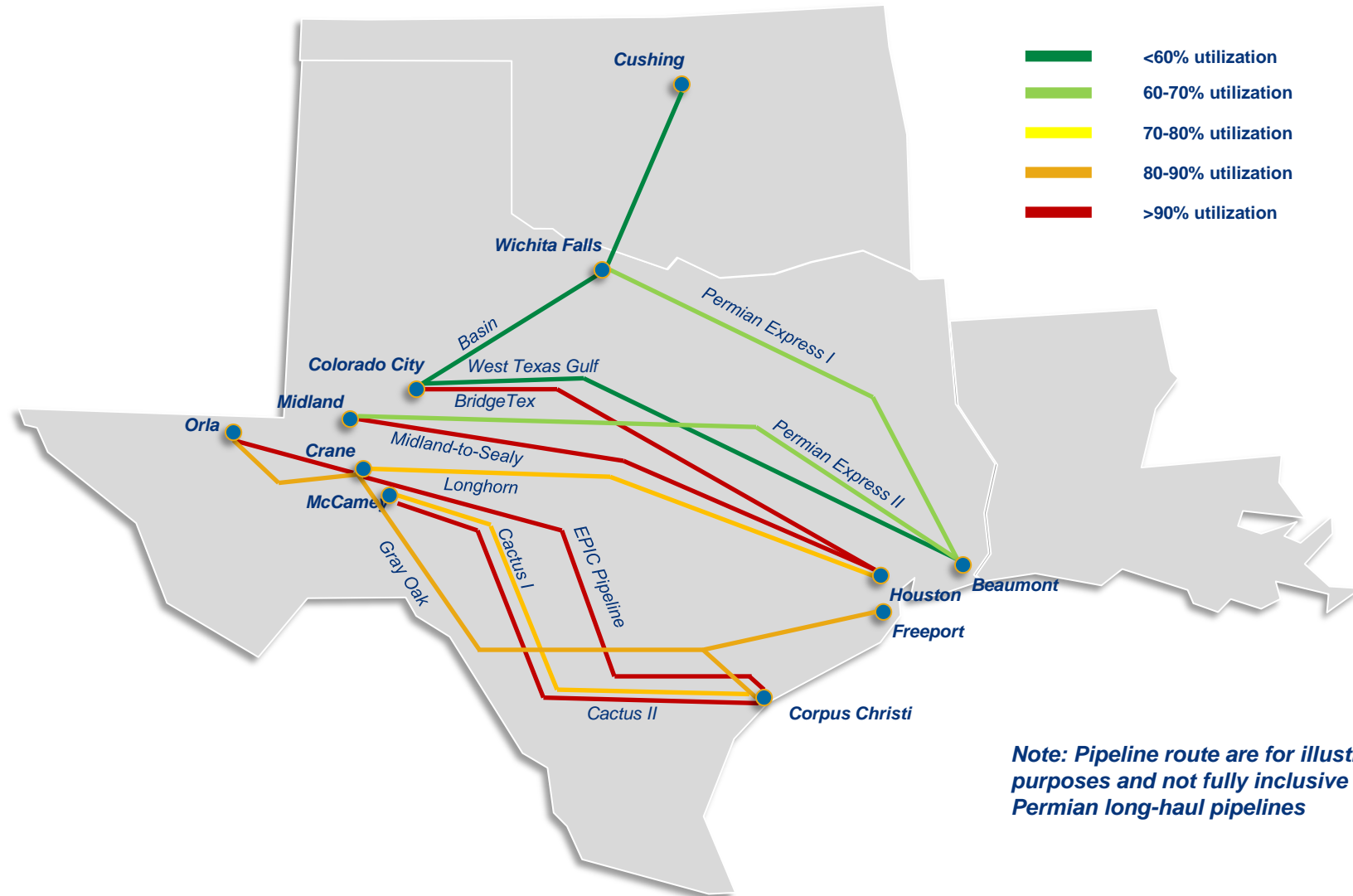
Permian Supply vs. Takeaway capacity



2020 Permian pipe utilization forecast: over-pipe scenario broadly lowers most pipe utilization rates

Corpus Christi bound lines see strong utilization

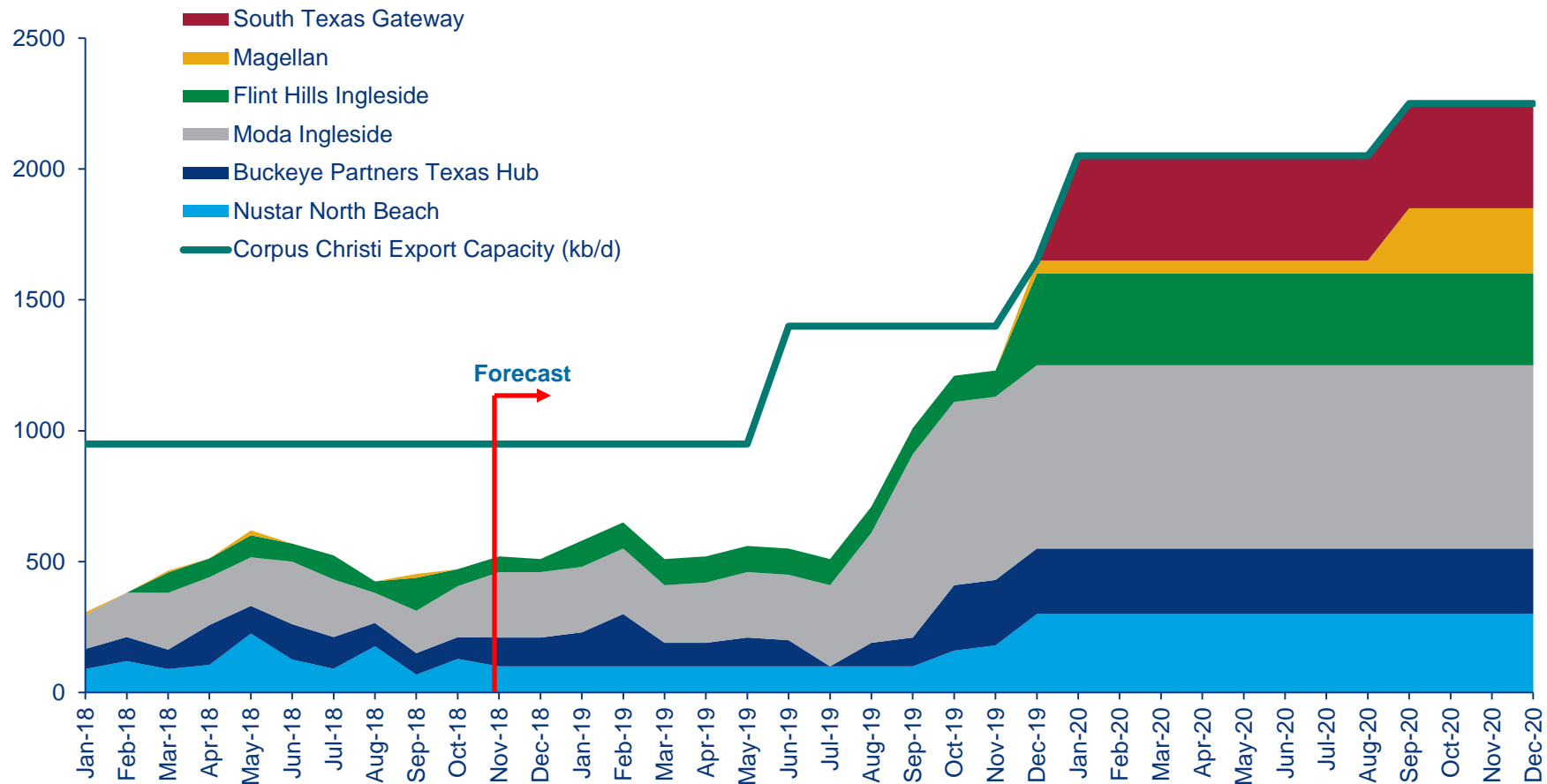
Major Permian long haul pipeline utilization forecast 2020





Permian volume surge into Corpus Christi forecast to create coastal export bottleneck

Corpus Christi export terminal volume forecast (kb/d)



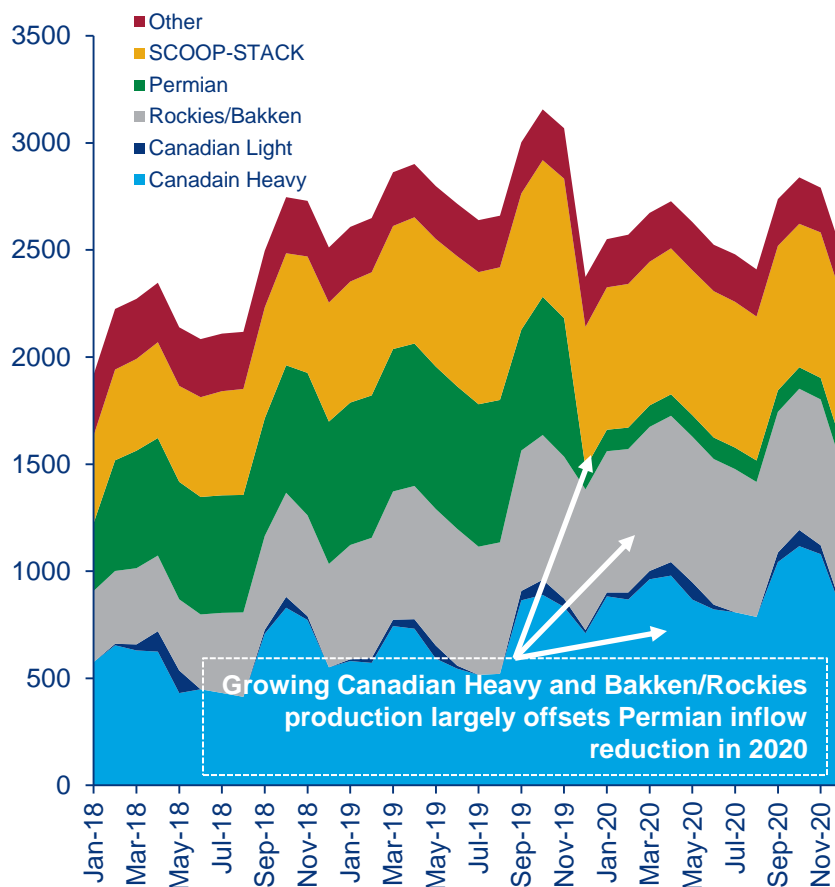
Cushing Constraints



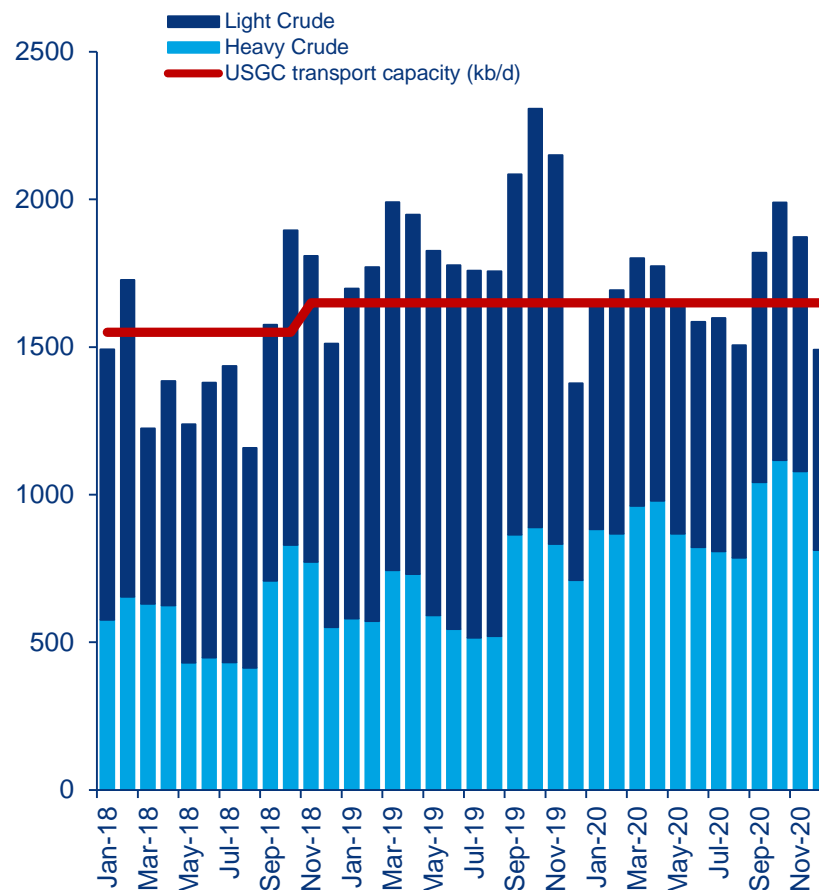
Growing Bakken & Rockies production cascades into the next potential bottleneck and pipeline battleground: Cushing

Midstream companies race to provide solutions for increased demand for transport from Cushing to USGC market

Cushing inflows by supply source (kbd)



Demand for transport from Cushing to USGC market vs. USGC bound capacity (kb/d)

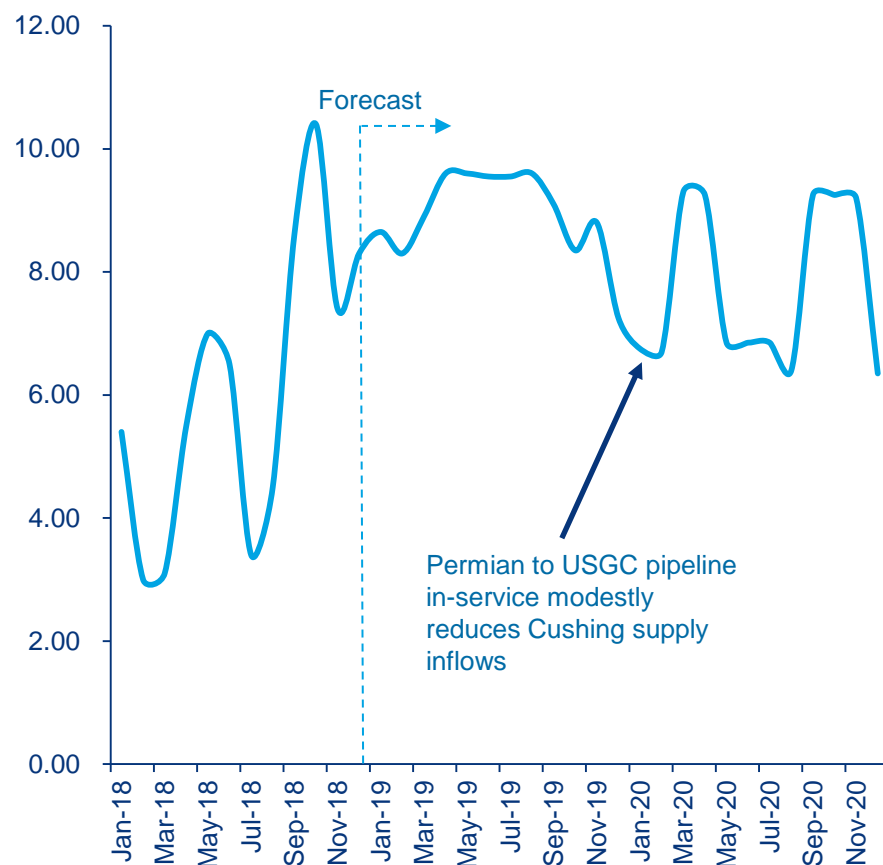




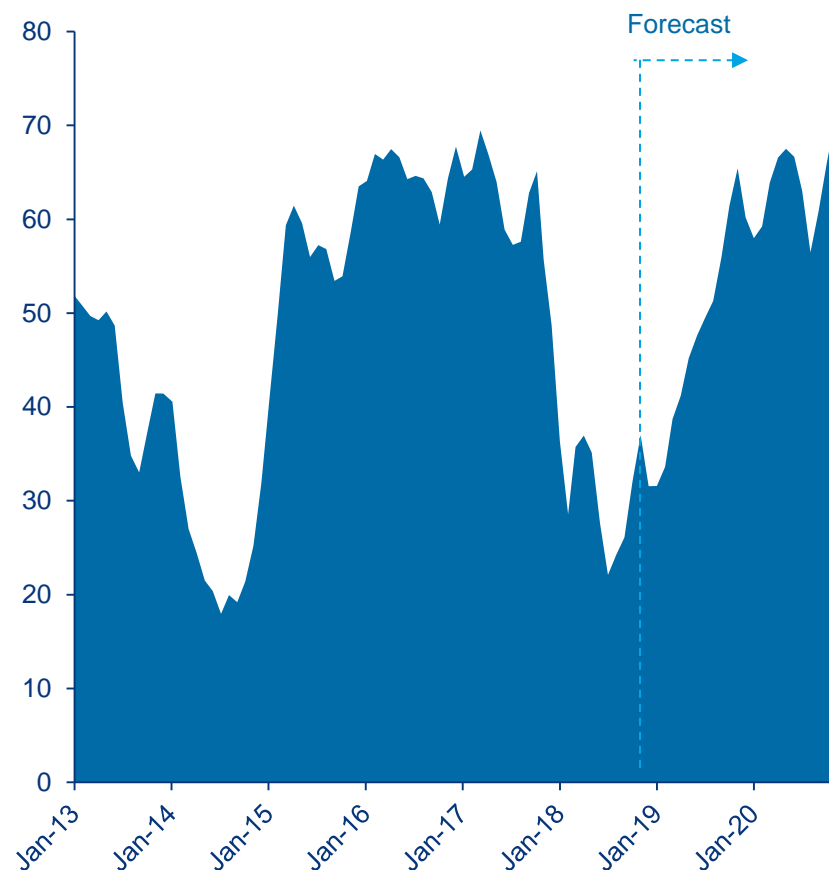
Brent-WTI spread to remain elevated until increased pipeline capacity offers relief for Cushing barrels into USGC market

Currently five projects proposed to alleviate existing and future Cushing bottlenecks – one FID will be needed to relieve forecast Cushing stock builds

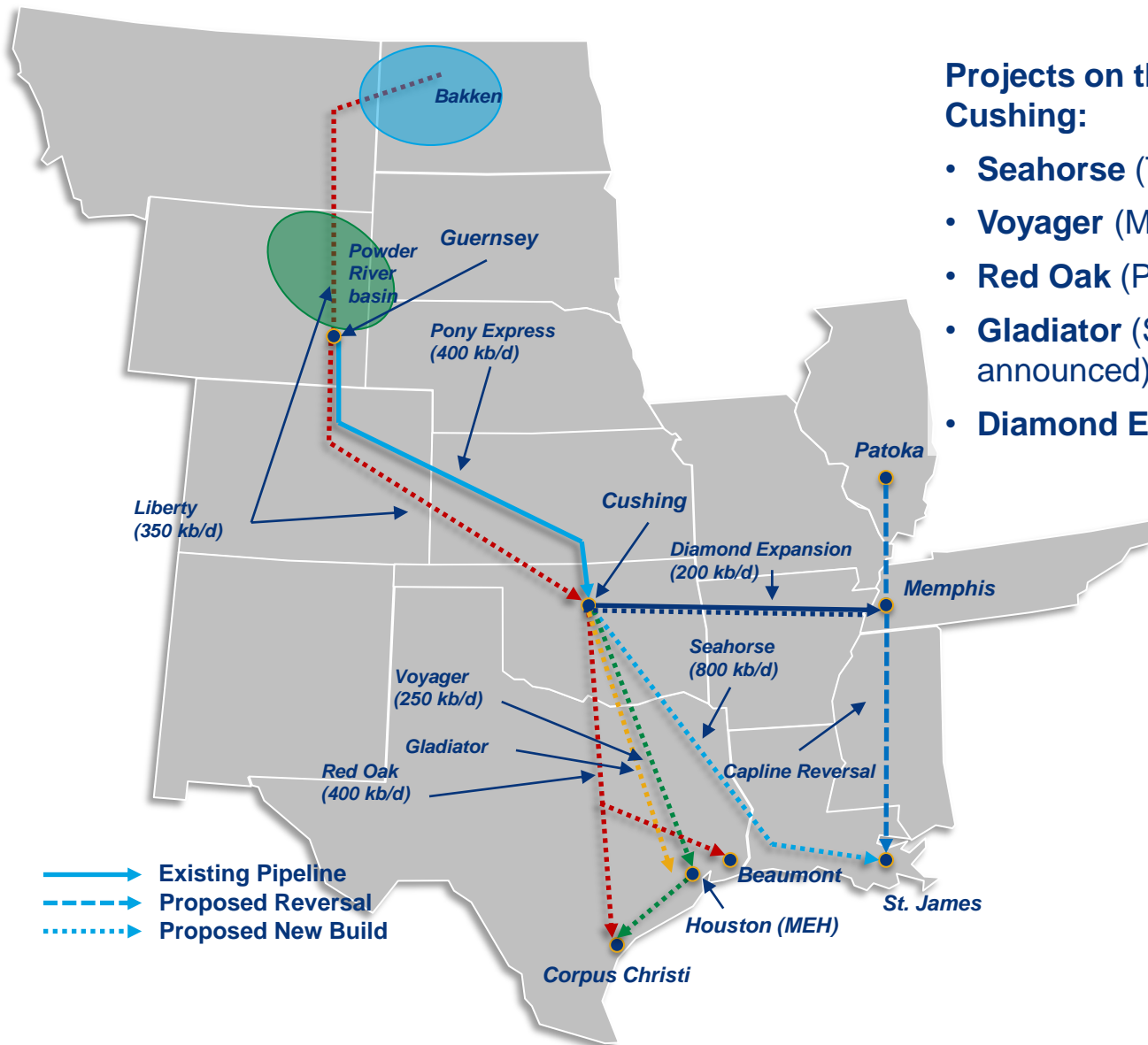
Brent-WTI (\$/bbl)



Cushing stocks (millions bbls)



Midstream companies rapidly progressing Cushing outflow projects in light of increased demand for USGC transport



Projects on the table to debottleneck Cushing:

- **Seahorse** (Tallgrass Energy, 800 kb/d)
- **Voyager** (Magellan, Navigator, 250 kb/d)
- **Red Oak** (Phillips 66, 400 kb/d)
- **Gladiator** (SemGroup, capacity not announced)
- **Diamond Expansion** (Plains, (200 kb/d)



Q&A



A Verisk Business



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