A photograph of the Grand Canyon at sunset, with warm orange and red light illuminating the canyon walls and the sky. The text is overlaid in white.

US SHALE: IMPLICATIONS FOR US CRUDE OIL EXPORTS BY ADDING TWO SAUDI ARABIA'S IN TWO DECADES

Bjørnar Tonhaugen

Rystad Energy

Marine Money Geneva Forum, 28 May 2019



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INTRODUCTION

Office locations



Rystad Energy: Independent energy consulting and business intelligence data firm established in 2004, headquartered in Oslo with offices across the globe.

Databases: Covering energy fundamentals, upstream, oilfield services and renewable energy industries.

Analytics: Alongside the database suite we offer an extensive library of market reports, commentaries and fact sheets.

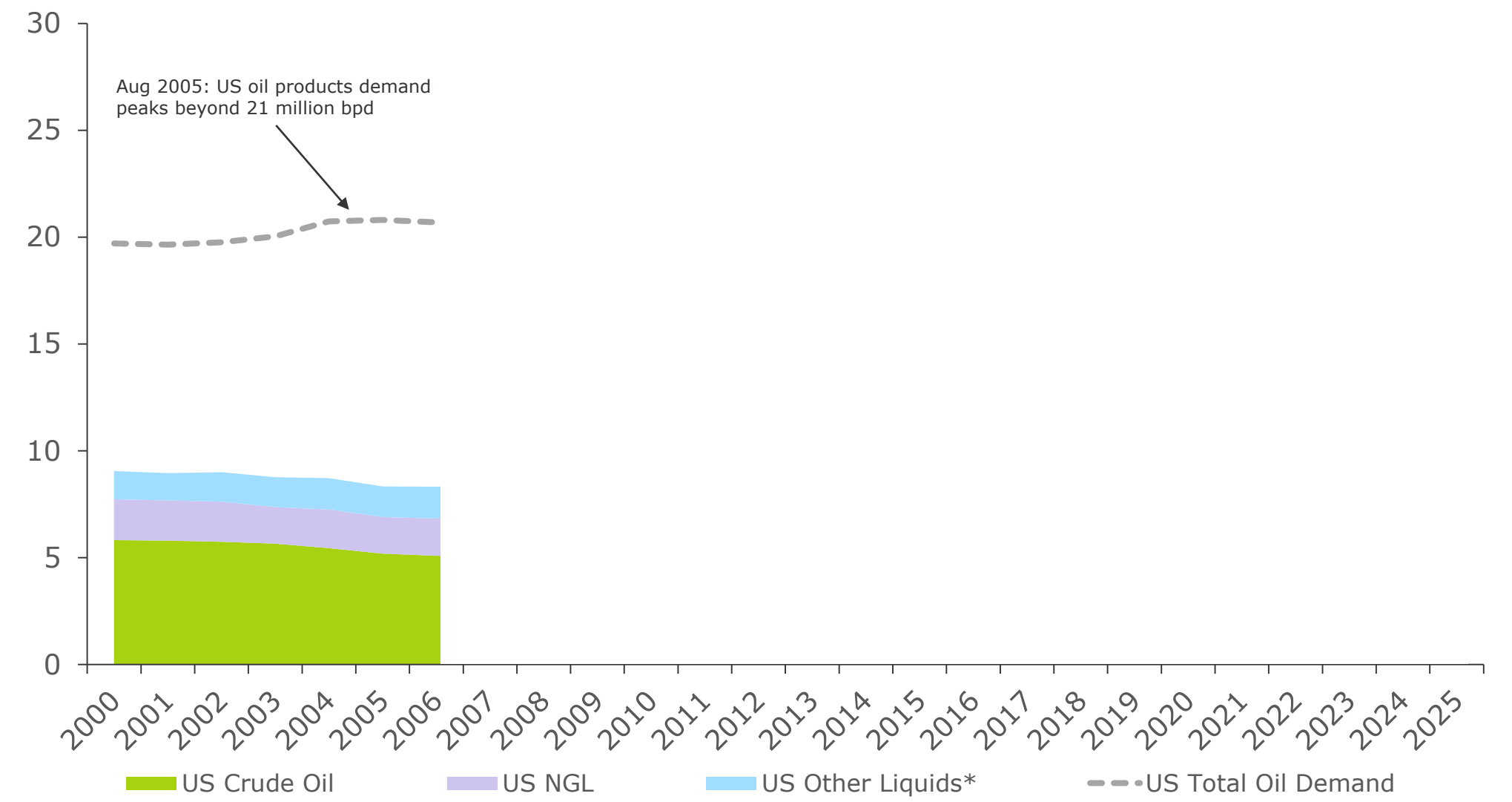
Consulting: A leading advisor on strategy, markets and business development within the energy space globally.



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America's incredible path towards oil dominance

Million barrels per day of production



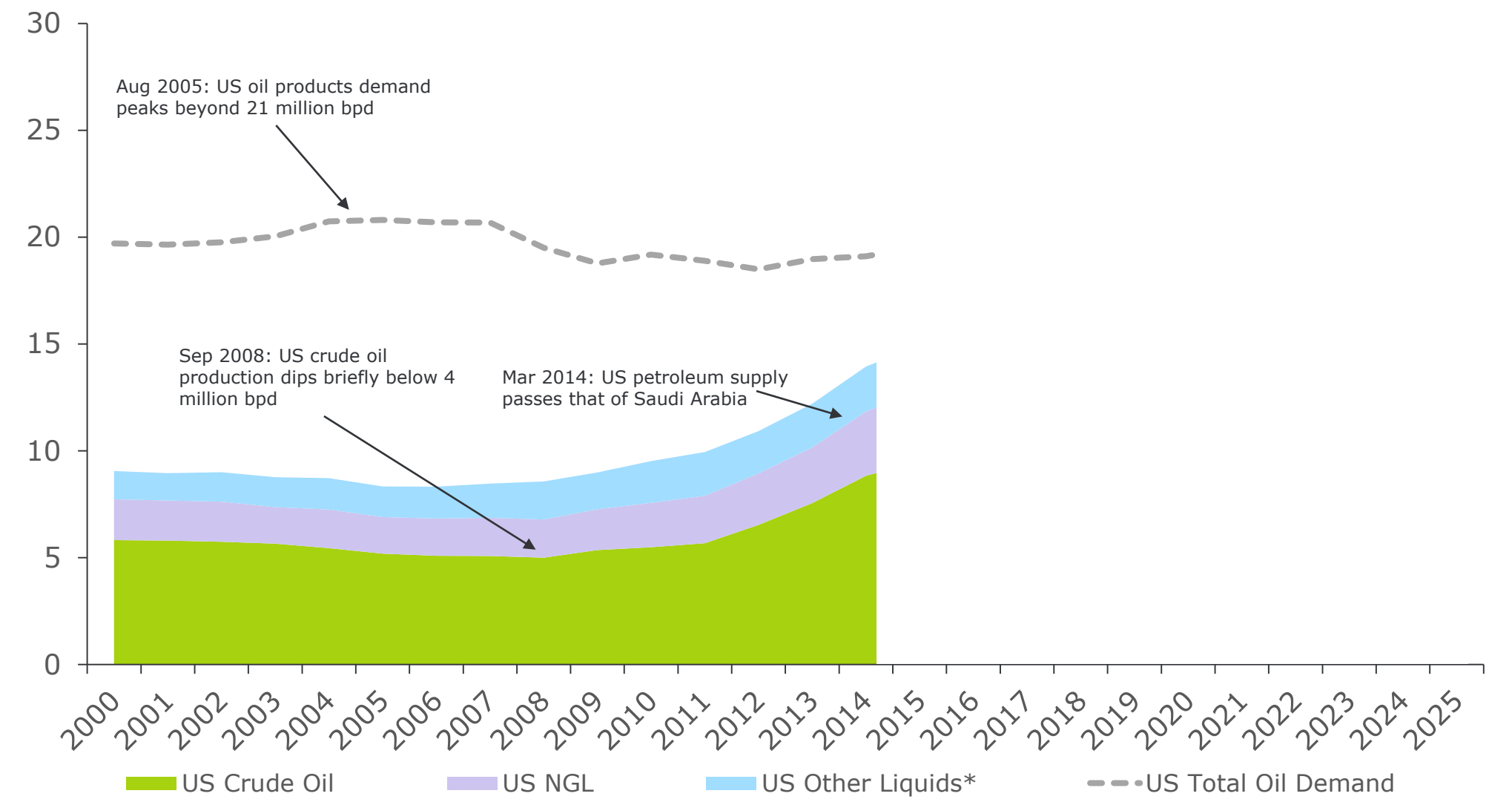
*Other liquids includes ethanol, biodiesel and processing gains.

**Kingdom of Saudi Arabia, including 50% of the Neutral Zone (shared with Kuwait)

Source: Rystad Energy UCube, Rystad Energy research and analysis

America's incredible path towards oil dominance

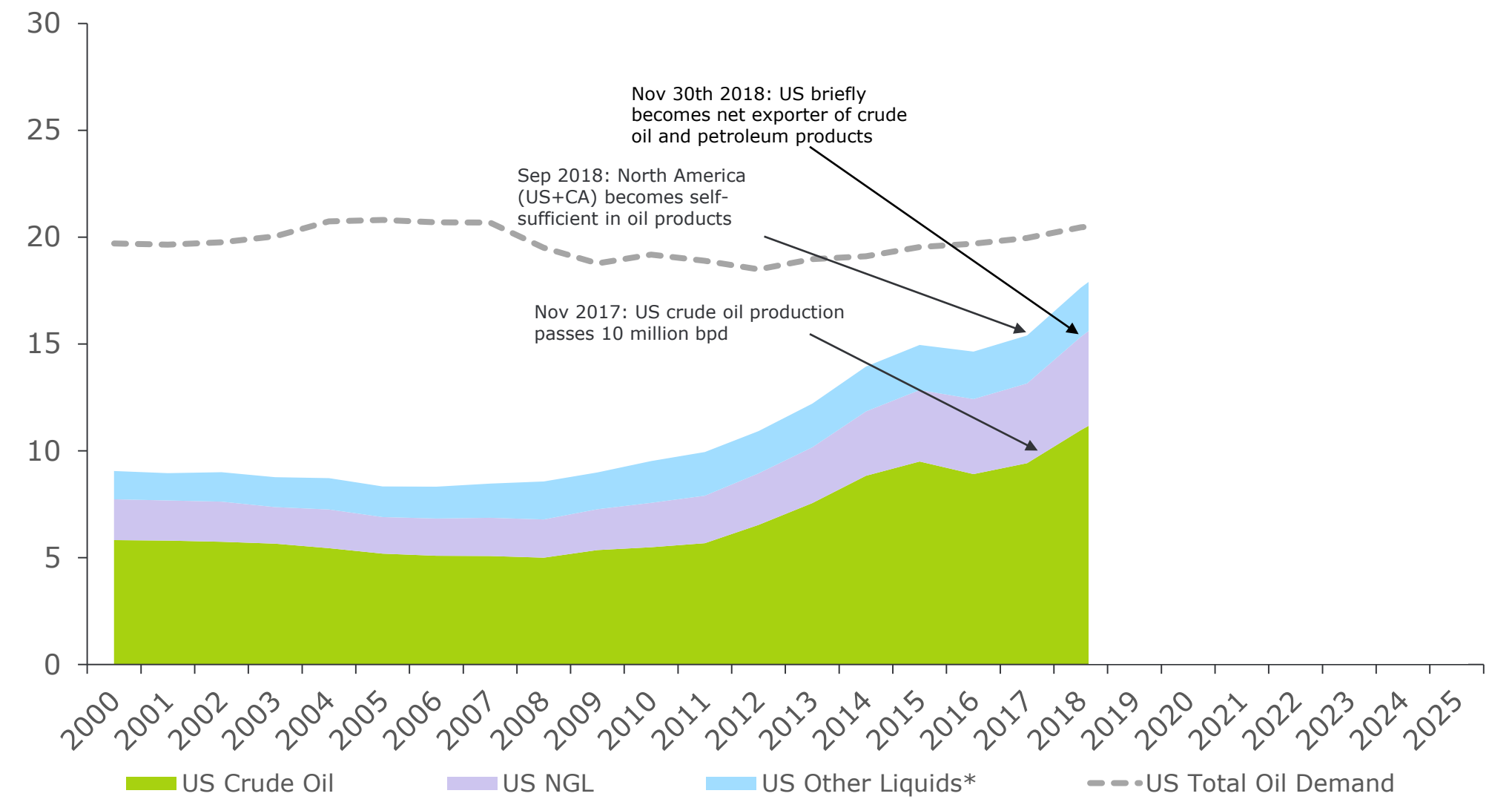
Million barrels per day of production



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America's incredible path towards oil dominance

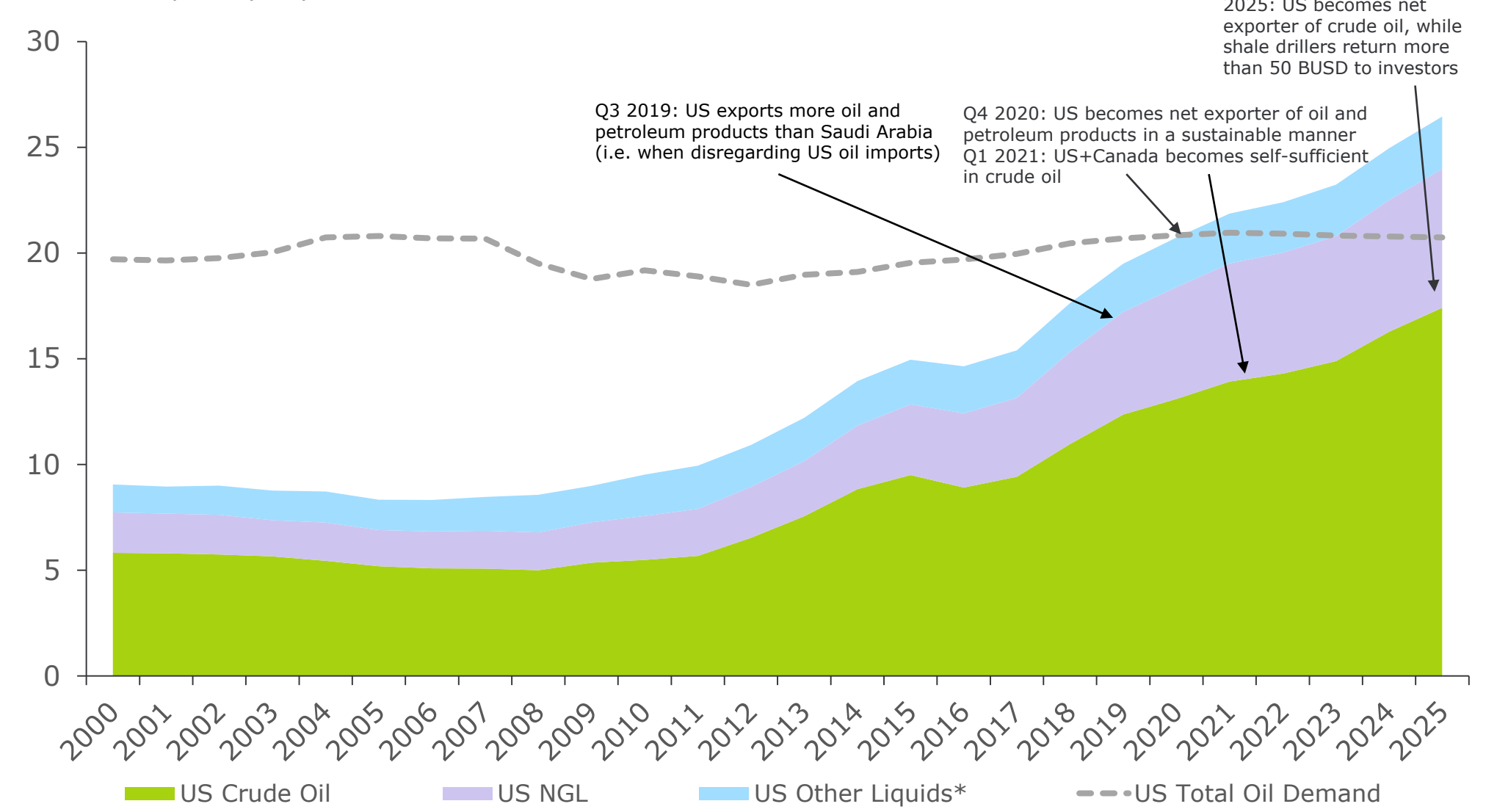
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America's incredible path towards oil dominance

Million barrels per day of production

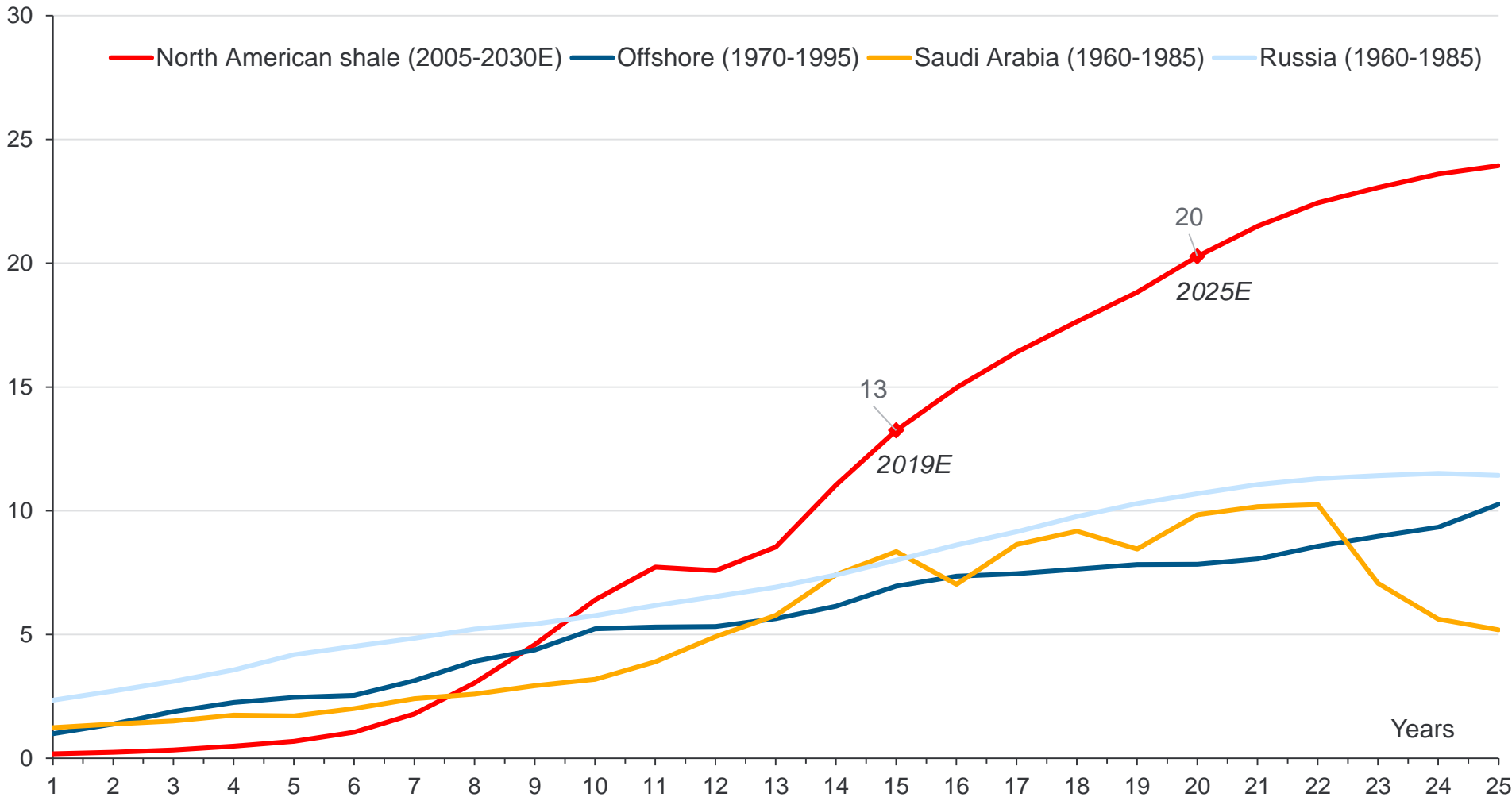


*Other liquids includes ethanol, biodiesel and processing gains.
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Source: Rystad Energy UCube, Rystad Energy research and analysis

The North American shale revolution dwarfs all other oil supply revolutions

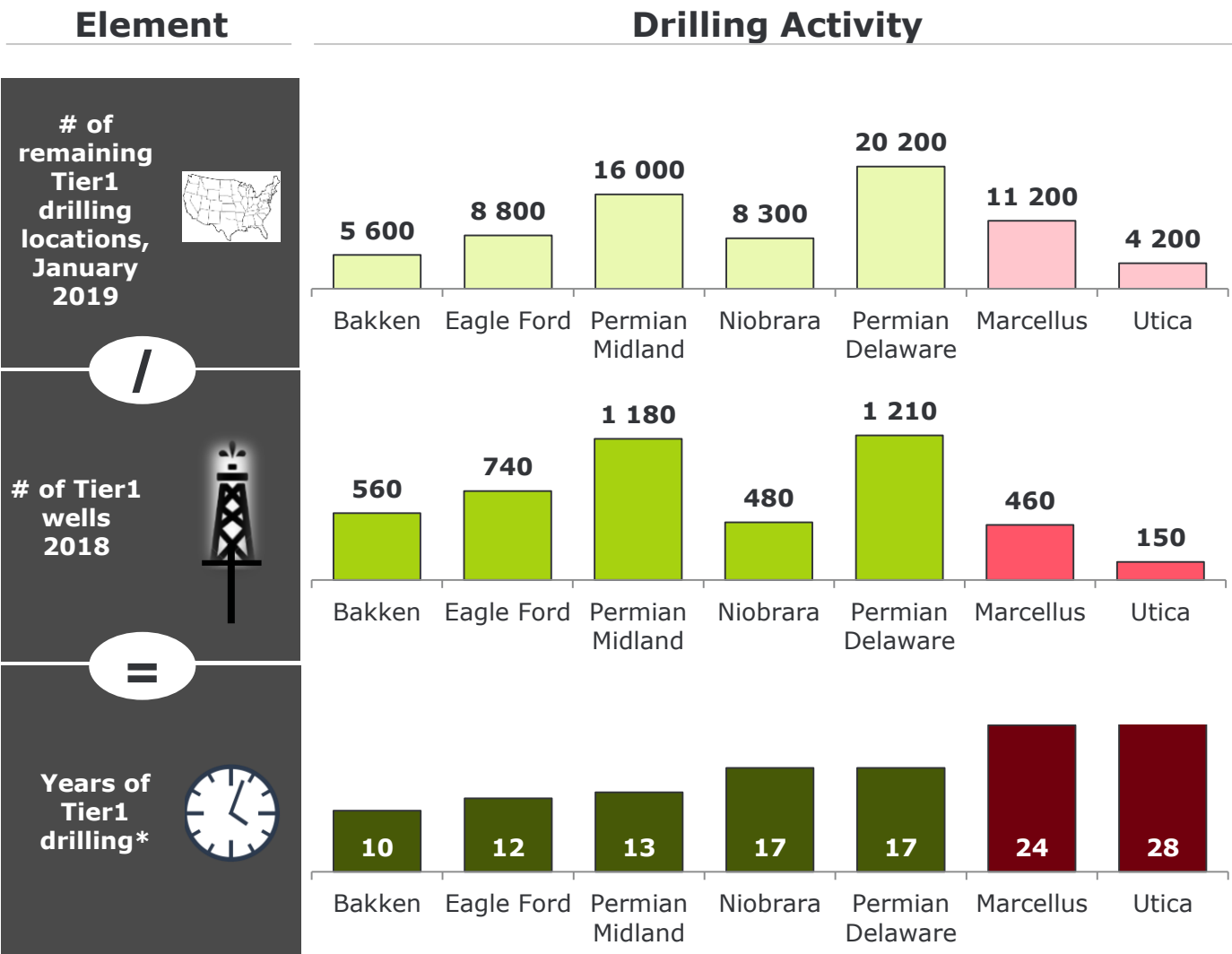
Oil supply “revolutions” in perspective

Million barrels per day



Source: Rystad Energy UCube May 2019

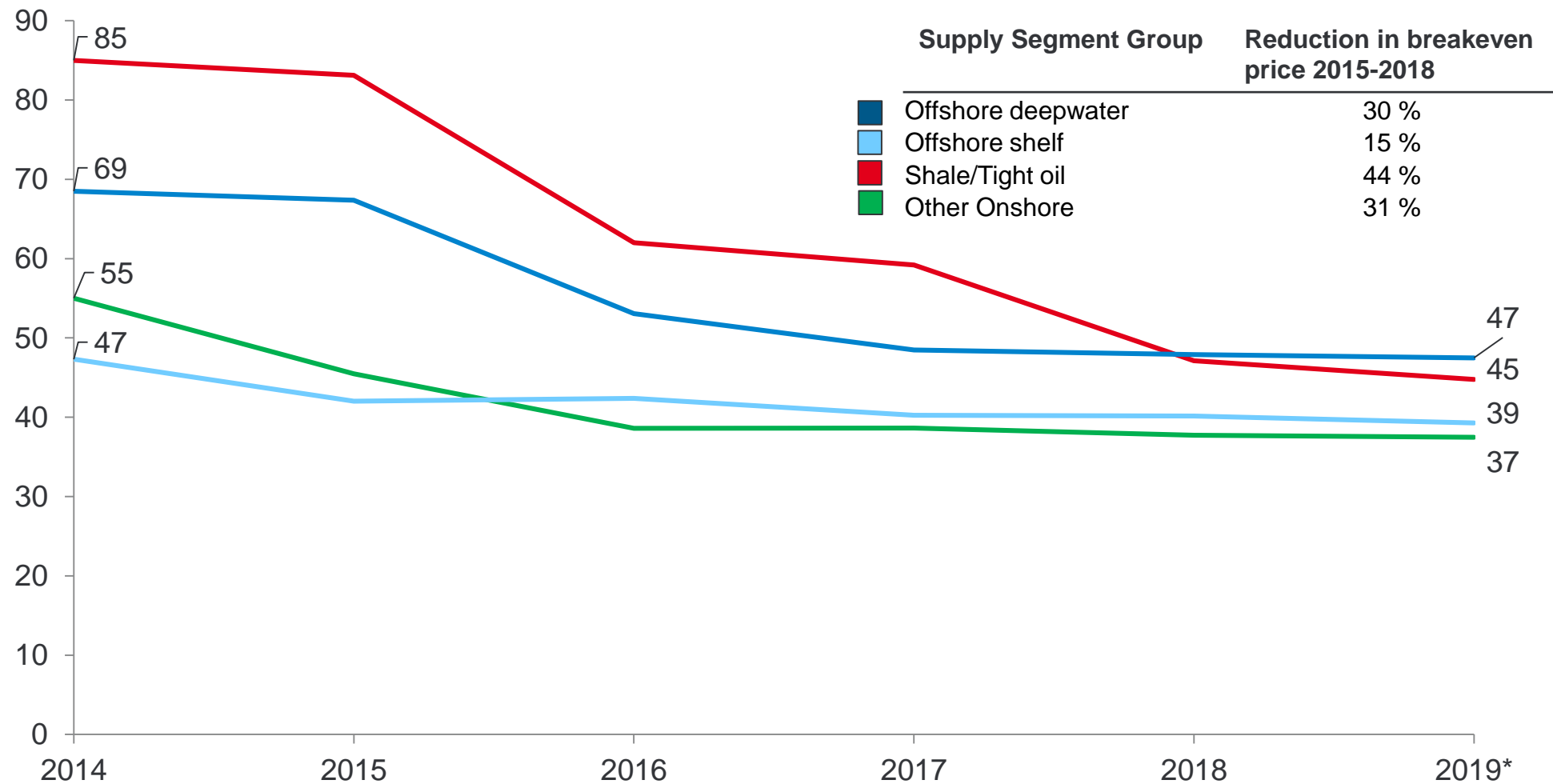
There's between 10 and 25 years left of Tier 1 ("best") drilling locations across US shale plays!



*Based on the drilling pace of 2018
Source: Rystad Energy research and analysis

Breakeven oil prices are sub-\$50 now also for Shale..

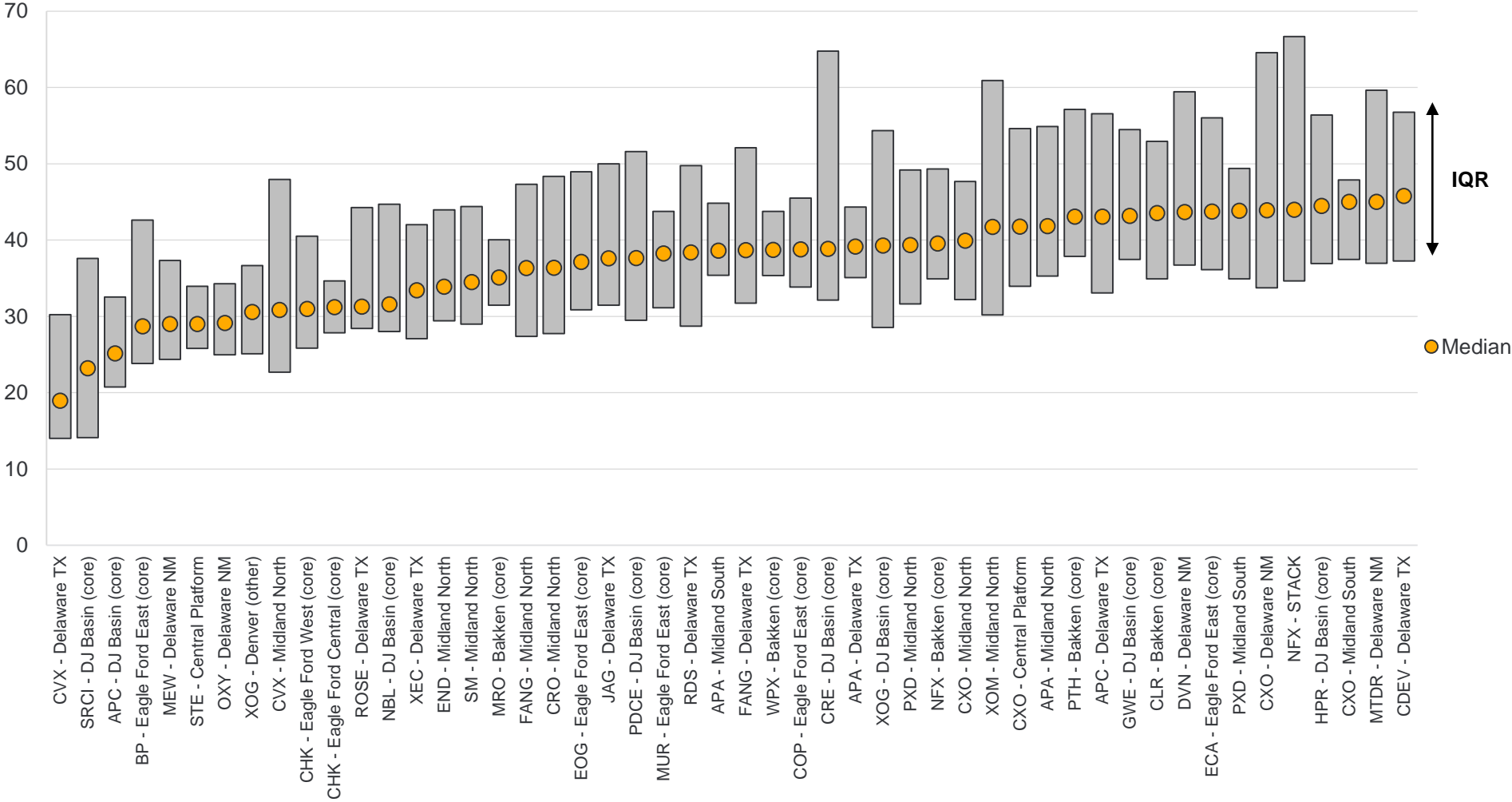
Development in Brent breakeven oil prices by Supply Segment (2014-2019*)
USD per barrel



*The 2019 number as of May 2019
Source: UCube May 2019

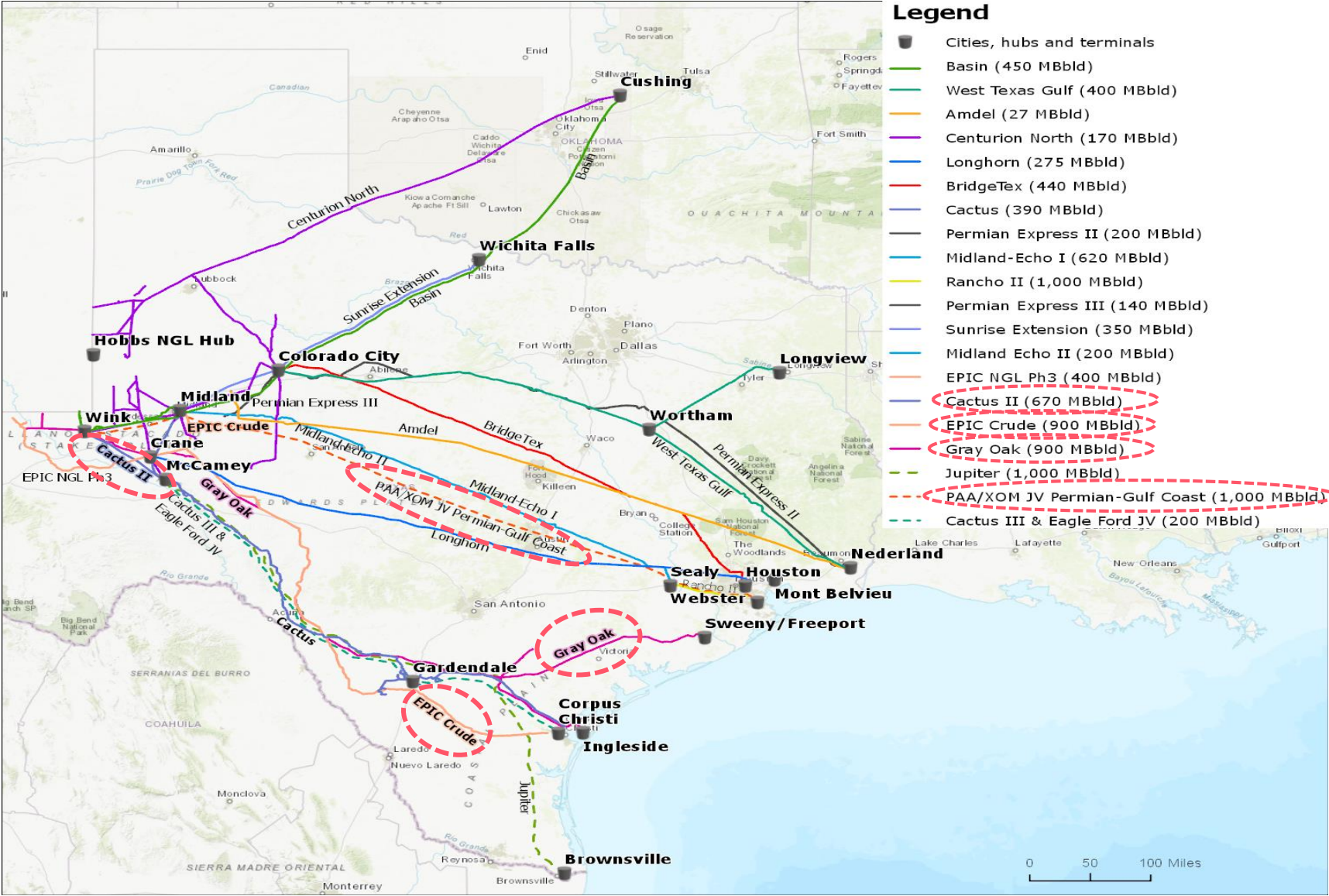
And top acreage positions have median breakeven prices below \$50 WTI

WTI breakeven oil prices in 2017-2018 for 50 most commercial acreage positions with significant current activity*
Dollars per barrel



*Includes acreage positions with at least 30 horizontal oil well completions in 2017-2018, which produced for at least 4 months (for breakeven price validation purposes)
** Combined, acreages from the chart account for 42% of total US Shale oil horizontal activity in 2017-2018
Source: Rystad Energy ShaleWellCube Premium

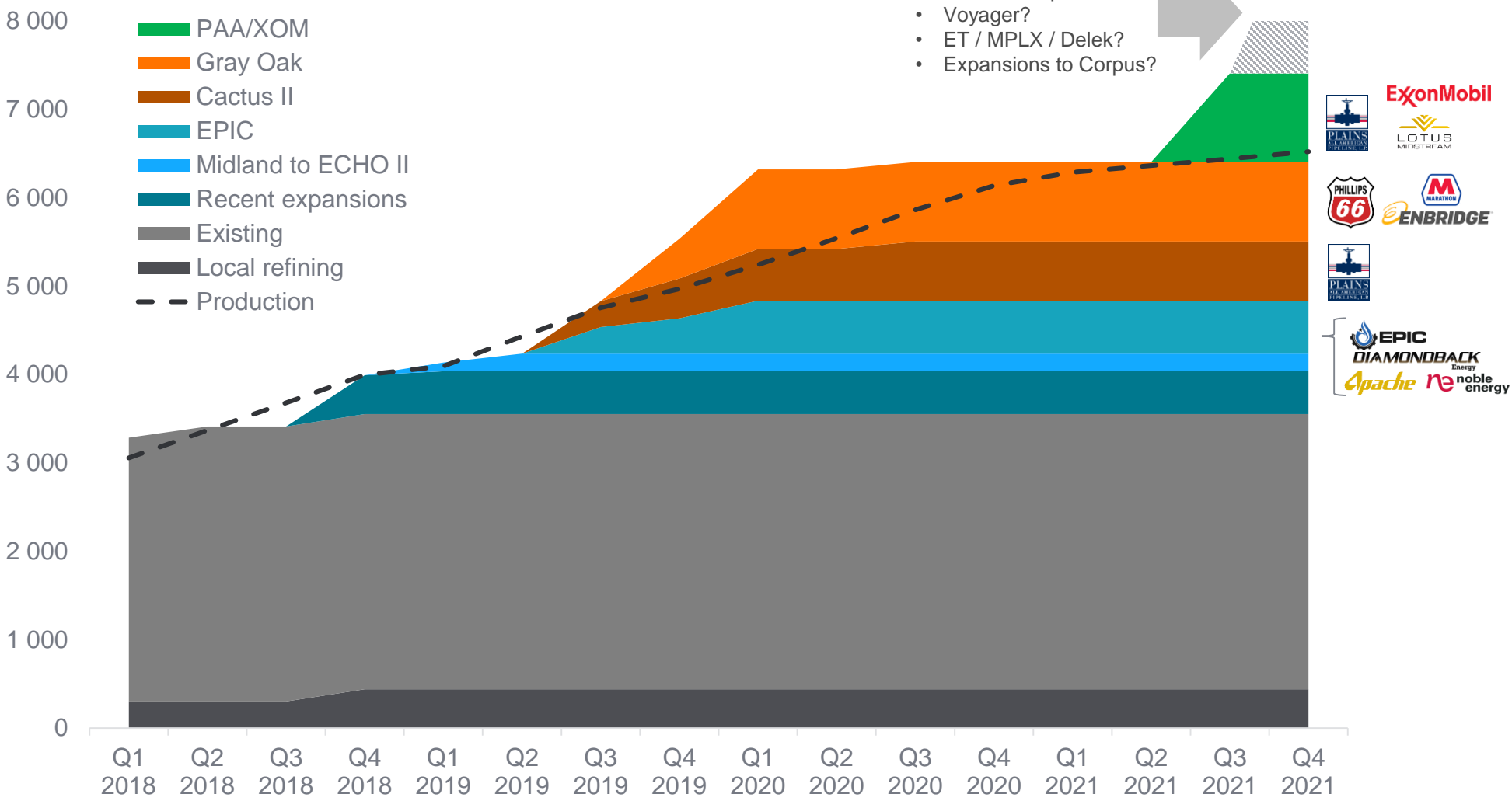
Permian Basin, outbound crude pipelines - with expansions due during 2019-21 highlighted



Source: Rystad Energy research and analysis, Railroad Commission of Texas

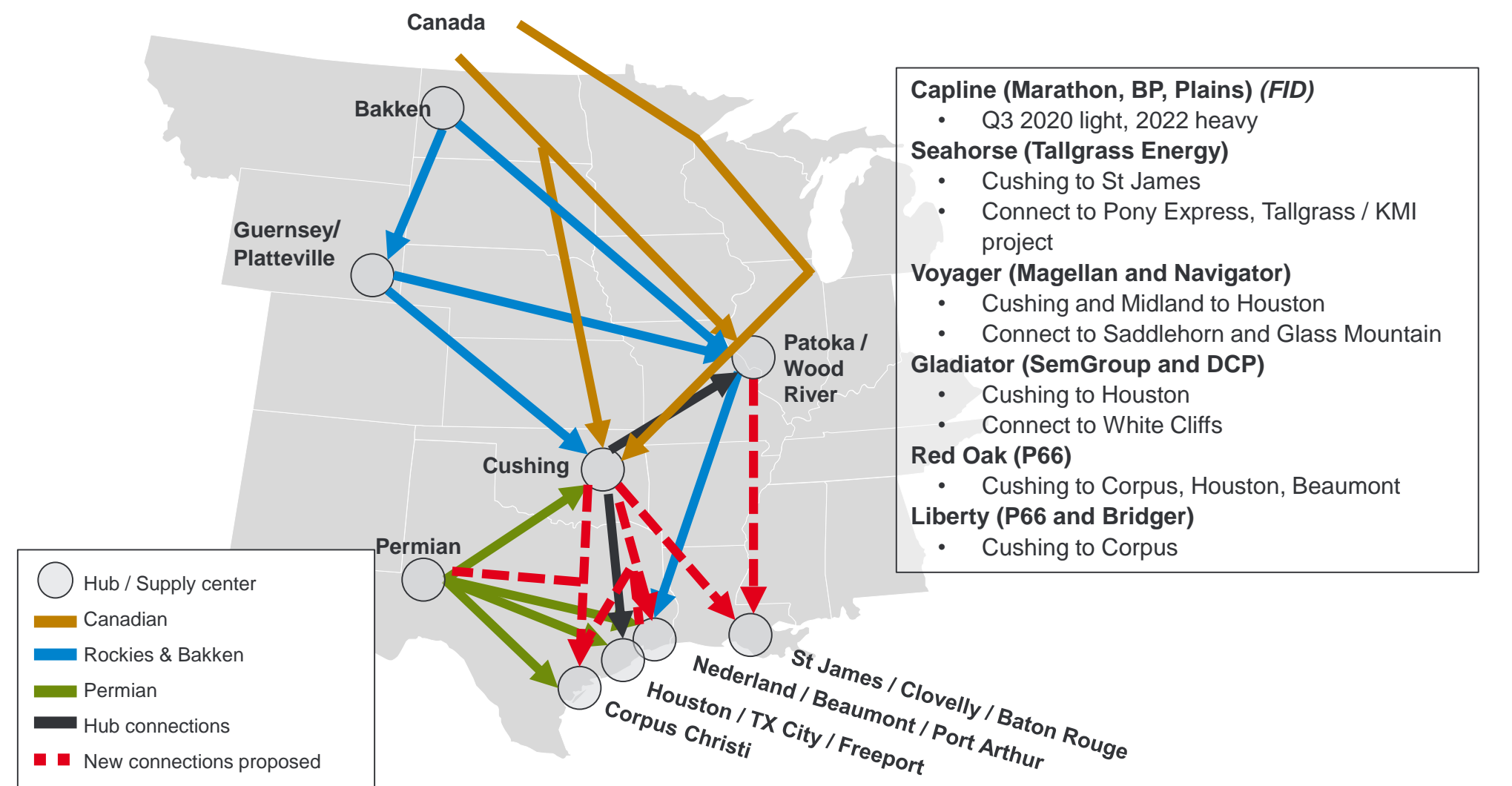
Pipeline capacity will catch up with the Permian in 2019 but developers are wary of an overbuild

Permian Basin: oil production and takeaway capacity outlook
Thousand barrels per day



Source: Rystad Energy

New pipelines will debottleneck Cushing, connect new hubs and bring more barrels to the coast



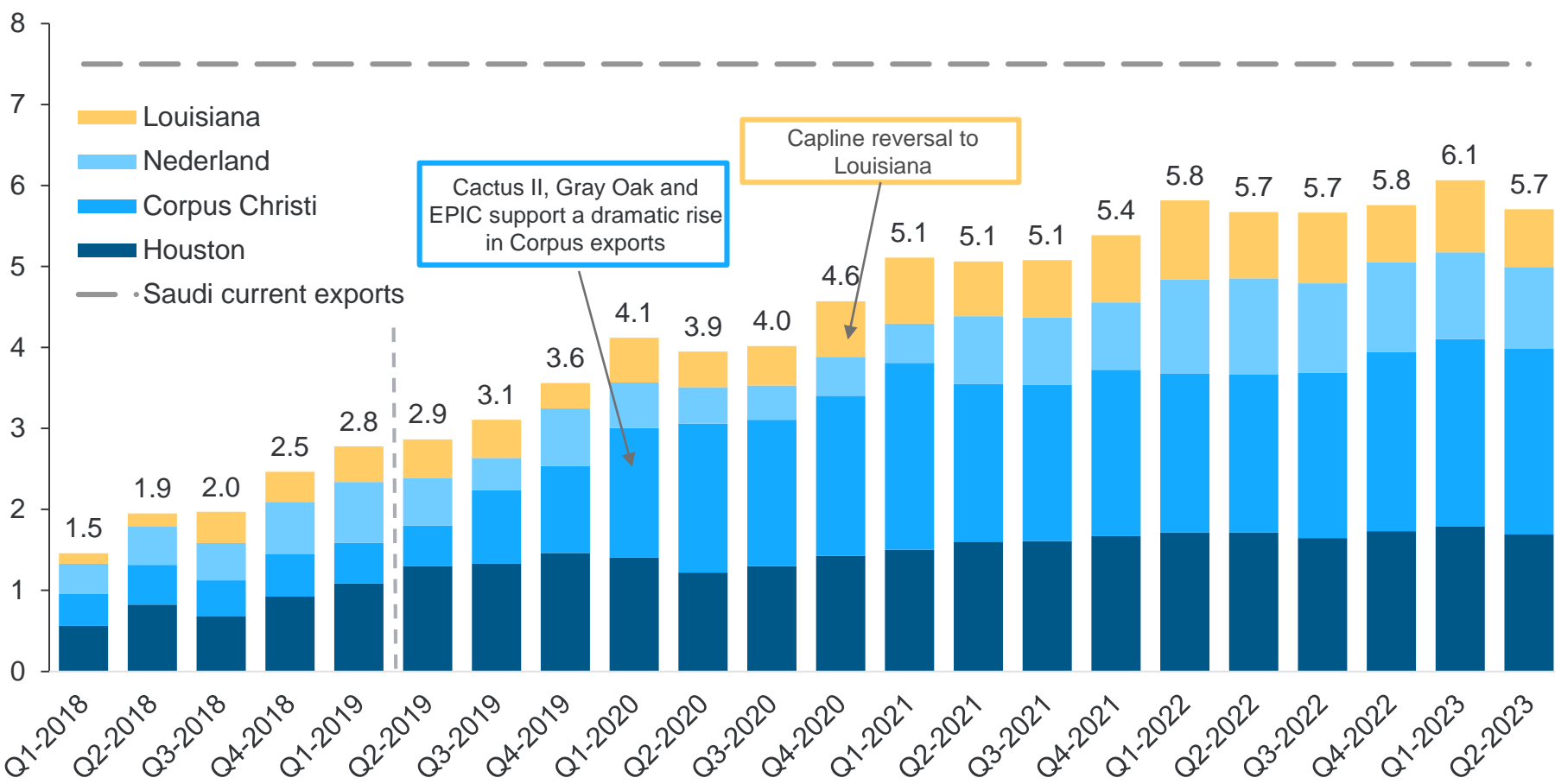
VLCC projects will help facilitate export growth, but the market will only support the first movers

Port	Operator	Owners	Status	In-service date	Comment
Louisiana	LOOP LLC	LOOP LLC	In-service	Jan-18	Loaded 3 VLCCs in 7 days in Dec 2018, ~850 kbd
Corpus Christi, TX	Moda Midstream	Moda Midstream	In-service	Dec-18	Partially loaded VLCC
Corpus Christi, TX	Buckeye	Buckeye, P66, Marathon Oil	FID	Dec-19	Partially loaded VLCCs—connections to Cactus, Gray Oak
Corpus Christi, TX	Carlyle Group	Carlyle Group, Port of Corpus Christi	Pre-FID	2020+	Army Corps of Engineers has recommended a full EIS, which could add up to 18 months. Target 2020 partial loading, 2021 full loading, subject to EIS delay
Corpus Christi, TX	Trafigura	Trafigura	Pre-FID	2021+	Filed federal permits in July 2018. Upon permitting, Trafi estimates 18 months of construction
Houston, TX	Enterprise	Enterprise	Pre-FID	2021+	Filed federal permits in February 2019, est. processing time is 356 days. Expect VLCC load speed of 85,000 bbl/hour.
Freeport, TX	Enbridge	Enbridge, Oiltanking	Pre-FID	2021+	Filed federal permits in February 2019. Will be fed by Gray Oak and Seaway pipeline
Louisiana	Tallgrass	Tallgrass	Pre-FID	2021+	Would be fed by Seahorse pipeline (oil from Bakken and Rockies). Tallgrass did not mention the terminal in latest earnings call

Source: Rystad Energy research and analysis

US crude exports will top 5 million b/d in 2021, with nearly half of exports loaded in Corpus

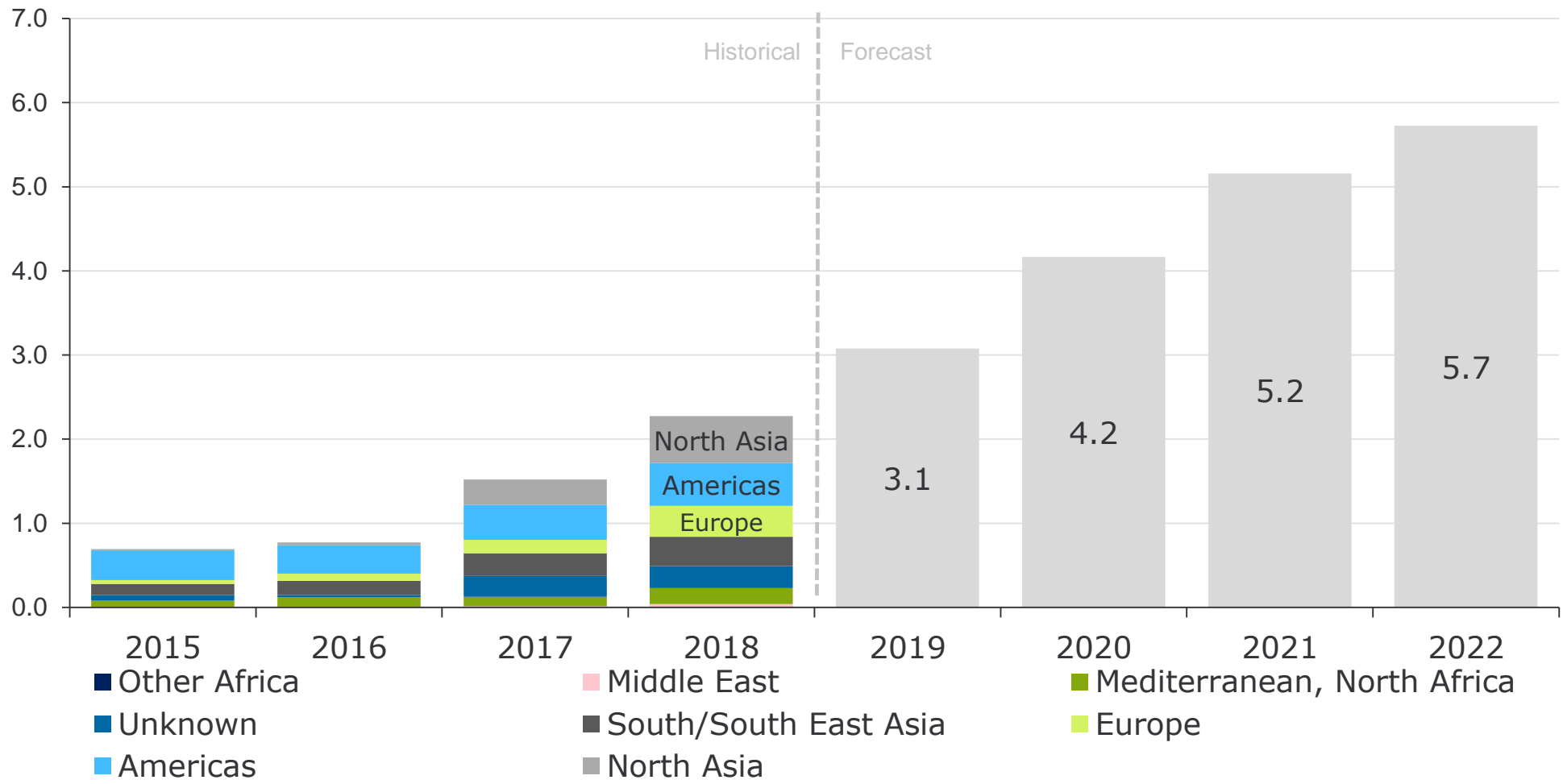
US Gulf Coast crude oil exports by hub
Million barrels per day



Source: Rystad Energy

US crude exports expected to continue its climb to +5 mmbbl per day by 2021 mostly to...

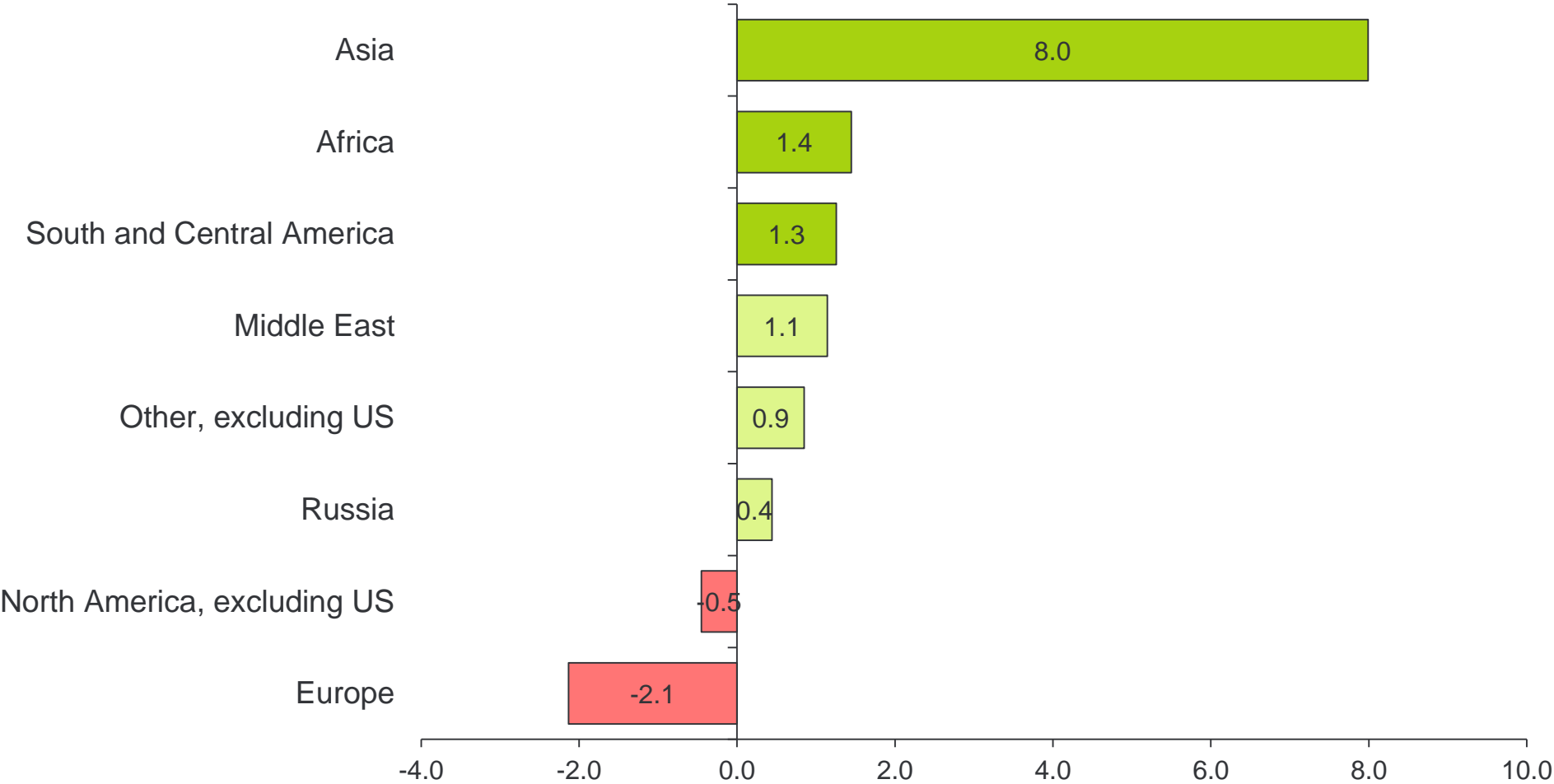
US Gulf Coast oil exports
Million barrels per day



Source: Rystad Energy research and analysis

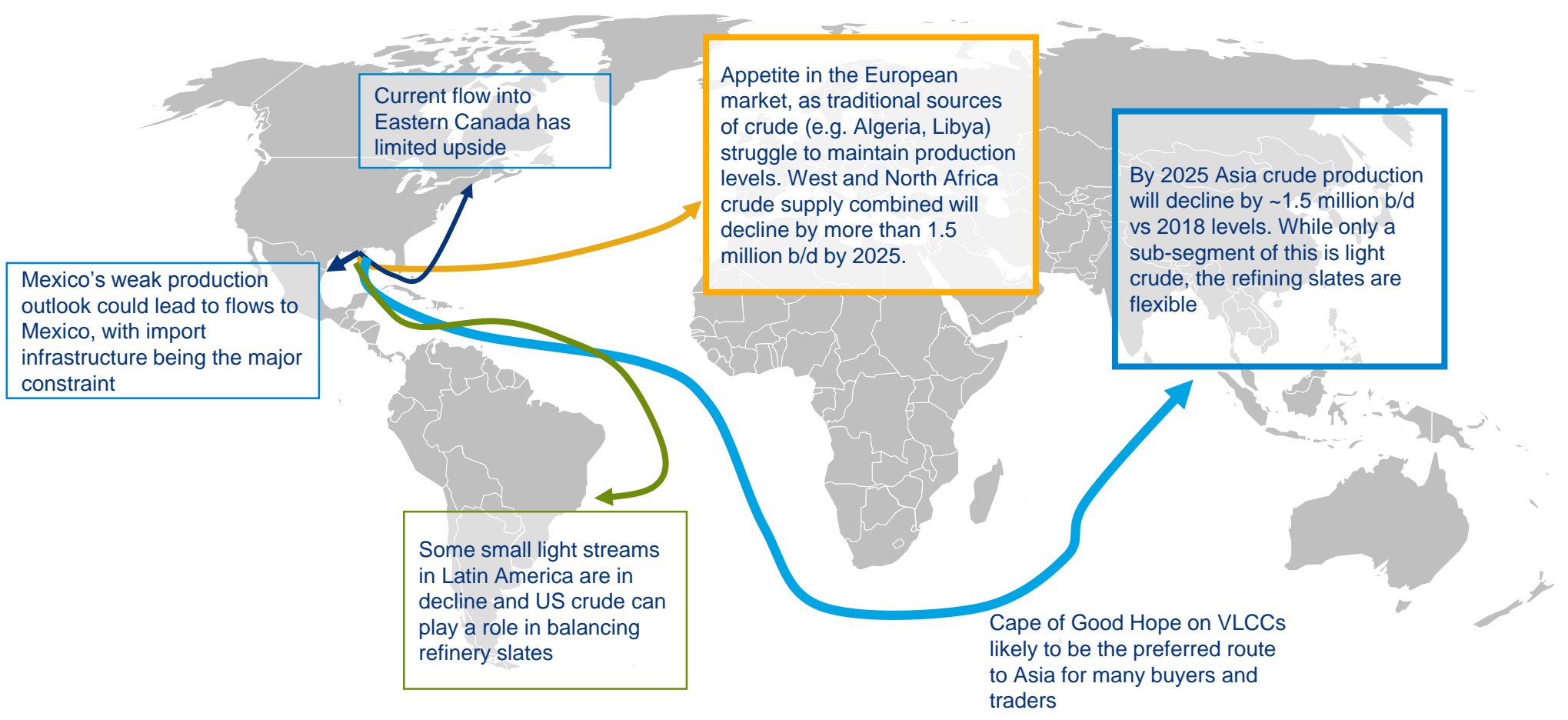
Where is demand growing? Asia (and Africa/LatAm/ME) drive growth during 2019-2030

Cumulative change in global oil demand to 2030 (from 2019)
Million barrels per day



Source: Rystad Energy research and analysis

Incremental US light crude exports will mostly go to Asia and Europe with other pockets of replacement potential



Source: EIA, Rystad Energy



THANK YOU



Bjørnar Tonhaugen

Head of Oil Markets

Bjornar.tonhaugen@rystadenergy.com

+47 24 00 42 00

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