A large graphic on the right side of the page features a dark blue diamond shape with a white outline, positioned in the upper left. To its right, there are two large, stylized geometric shapes: a red one at the top right and a blue one at the bottom right, both with white outlines and pointing towards the center.

September 2023



Key Points

Global, U.S. and Texas Economies

- GDP growth – at the global, U.S. and Texas levels – broadly improved over the past quarter and fueled major upward revisions by the International Monetary Fund and other official sources
- The outlook has shifted from one of almost certain recession this year to a “soft landing” scenario with steady 2024 growth
- Texas GDP has outperformed analysts’ 2023 forecasts; TXOGA expects growth of 4.3% y/y in 2023 and 3.3% y/y in 2024

Oil Markets

- Consistent with our past reports, the data have continued to show: 1) record-high global demand in 2023 and 2024, 2) global supply growth led by U.S. and Texas, and 3) historically low U.S. crude oil ending stocks (currently at their lowest since 1985)
- Although futures prices are slightly below recent price levels, confidence intervals based on past prices show the potential for greater upside than downside

Natural Gas Markets

- Also consistent with our past reports, domestic natural gas prices have remained historically low, thanks to strong production that has been ample to meet demand above the top of the five-year range as well as record-high exports in Q3 2023. Strong production has supported working gas storage levels near the top of its five-year range
- Natural gas futures prices exceed recent price levels, and confidence intervals based on past prices show the potential for greater upside than downside

Global, U.S. and Texas Economies

- Indicators point towards continued U.S GDP growth
- A “soft landing” in 2023 followed by steady growth in 2024 have become the IMF’s main expectations

Oil Markets

- Global oil demand is expected to set record high levels in 2023 and again in 2024
- Oil demand has remained solid in the U.S. and other advanced economies but is reaching record highs across emerging markets per EIA
- The U.S. and other non-OPEC sources lead global oil supply growth
- Texas’ share of U.S. oil drilling rose through the first eight months of 2023
- Texas broke its oil production records in June, July and August—and has increasingly driven U.S. supply
- U.S. crude oil inventories have fallen to their lowest since 1985
- Crude oil prices historical mean reversion analysis: futures prices have remained in line with recent ones

Natural Gas Markets

- U.S. natural gas production and exports lead the world
- Texas has driven the highest share of U.S. natural gas drilling in a decade
- Texas’ natural gas production is estimated to have hit record highs in August 2023
- Texas’ natural gas flows in June 2023: Half of production was consumed in-state and equal to the combined exports to Mexico and Europe
- U.S. natural gas inventories have remained near the top of their 5-year historical range
- Natural gas price historical mean reversion analysis: futures prices appear higher
- Texas’ oil and natural gas industry's record \$19.5 billion in quarterly wages underscores its resilience amidst labor and cost challenges
- Extraordinary productivity: Texas’ oil and gas industry employment in Q1 2023 was 30% higher than it was in 2005 but produced 200% more output

Global, U.S. and Texas Economies

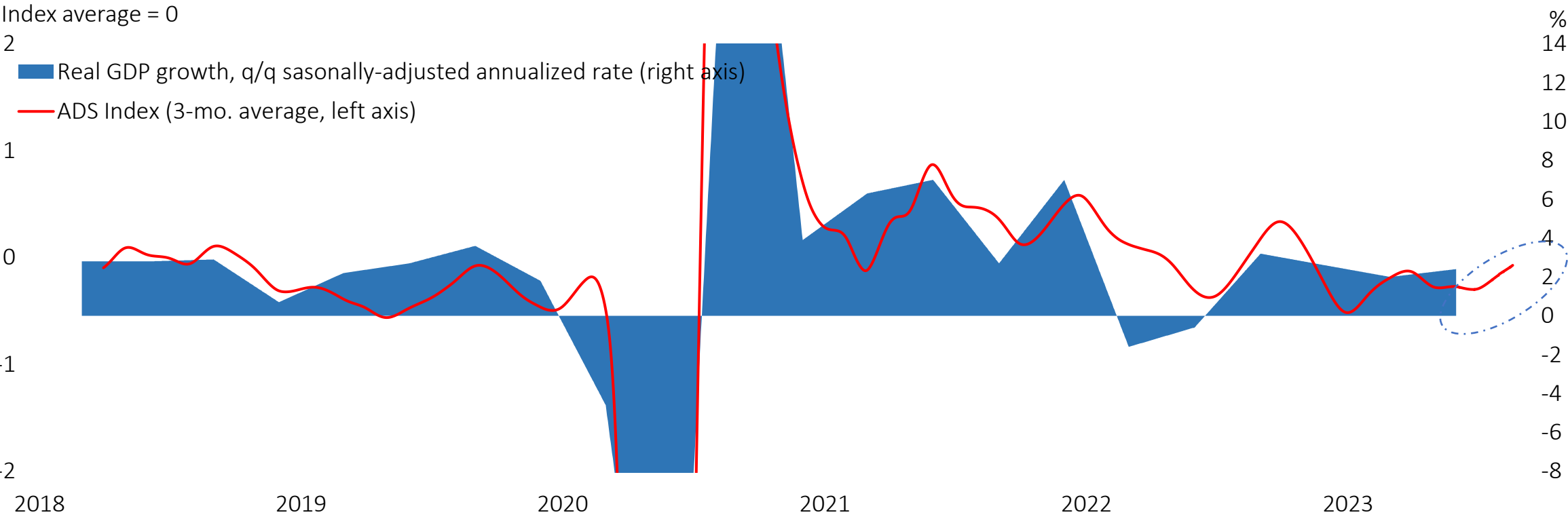




Indicators point towards continued U.S GDP growth

Business conditions supporting U.S. GDP growth have solidified according to the Philadelphia Federal Reserve Bank’s Aruoba-Diebold-Scotti (ADS) index, which has historically been a leading growth indicator based on several components*

Aruoba-Diebold-Scotti Business Conditions Index and U.S. real GDP growth



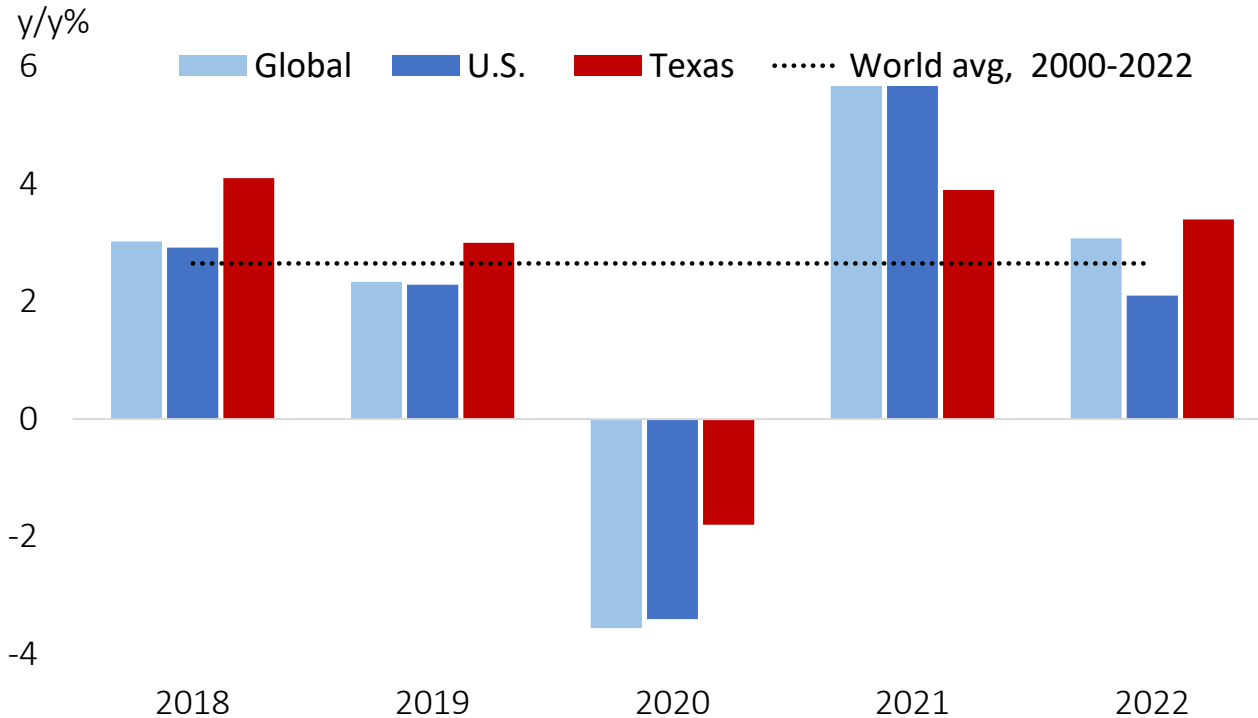
* The ADS Index includes weekly initial unemployment claims (source: DOL); monthly payroll employment (BLS); monthly industrial production (FRB); monthly real personal income less transfer payments (BEA); monthly real manufacturing and trade sales (BEA, CB); quarterly real GDP (BEA)

A “soft landing” in 2023 followed by steady growth in 2024 have become the IMF’s main expectations

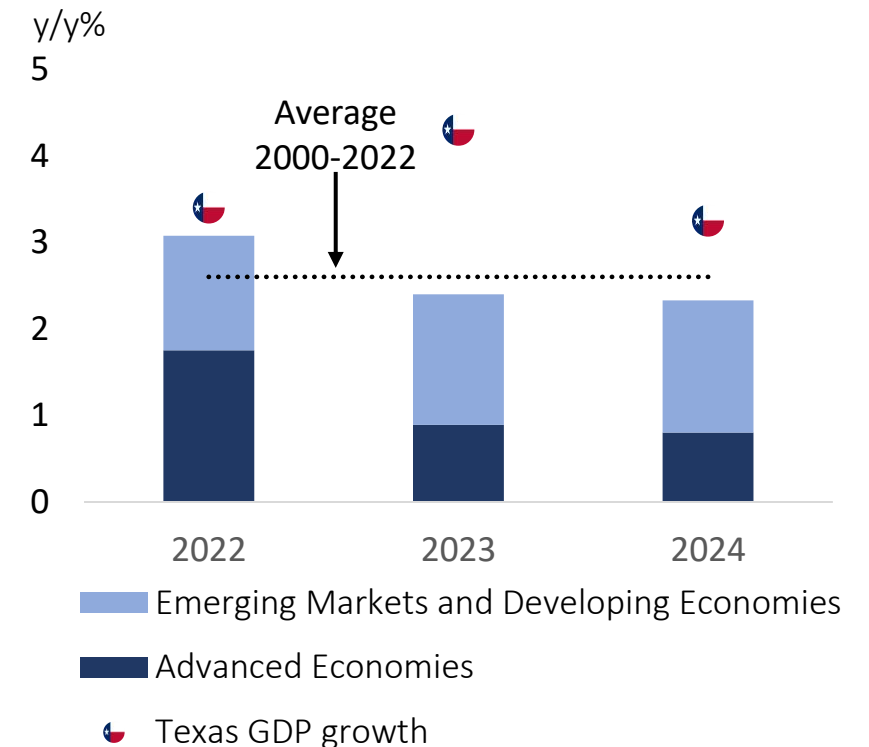


- The GDP growth outlook for the global, U.S. and Texas economies has broadly improved for this year – including large upward forecast revisions by the International Monetary Fund (IMF) – and fueled optimism for solid growth in 2024
- Texas GDP has outperformed analysts’ [forecasts](#) so far in 2023, and TXOGA estimates Texas’ GDP growth of 4.3% y/y in 2023 and 3.3% y/y in 2024

Global, U.S. and Texas real GDP growth*



Global GDP outlook and regional contributions





Global oil demand is expected to set record high levels in 2023 and again in 2024

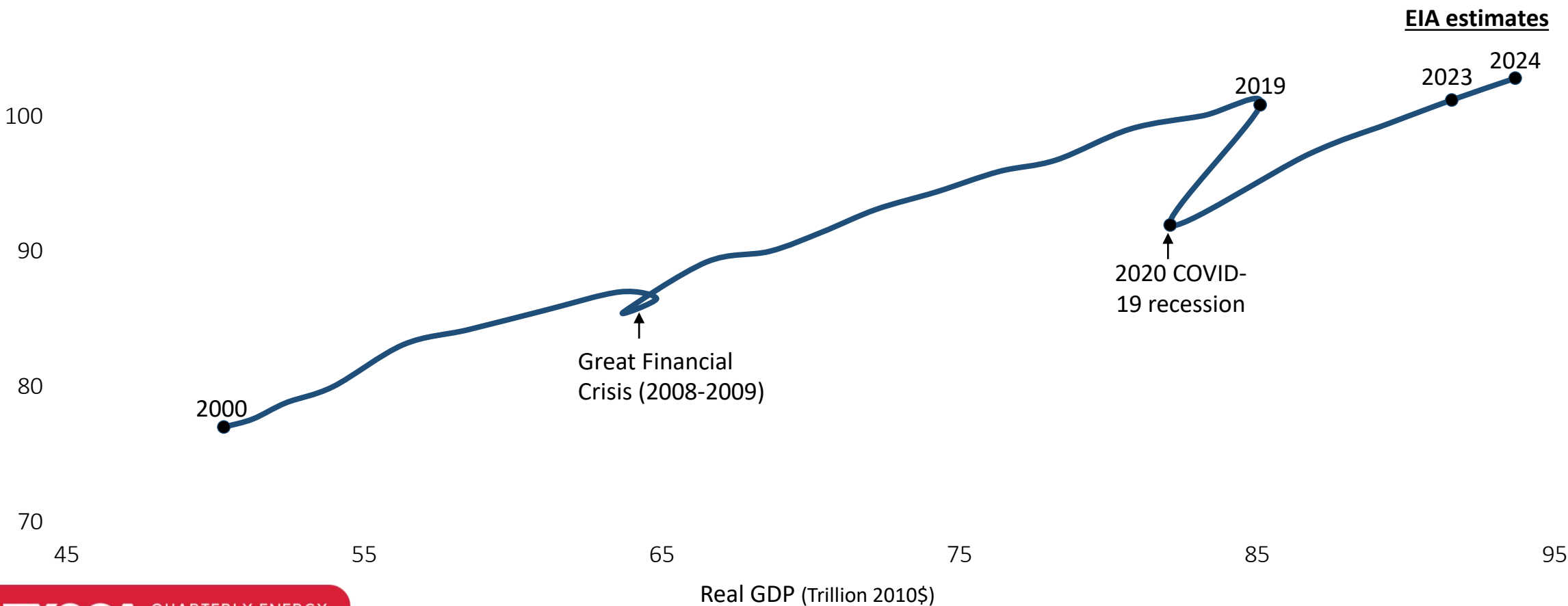


- ▶ Global oil demand and economic growth have continued to correspond closely with one another

Global oil demand and GDP*

Million barrels per day (mb/d)

110



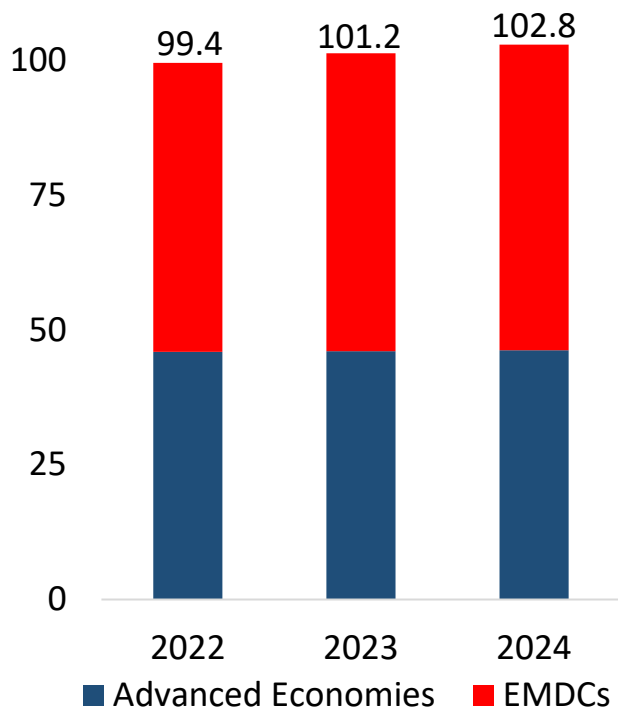


Oil demand has been solid in the U.S. and other advanced economies and reached record highs across emerging markets per EIA

- ▶ Led by emerging markets and developing economies (EMDCs), record-high global oil demand in 2023 (101.2 mb/d) and again in 2024 (102.8 mb/d) could be achieved per EIA

Global oil demand by region

Million barrels per day (mb/d)



Global Oil Consumption Nears All-Time Highs

Oil Market Report - August 2023

International Energy Agency (IEA), August 2023

Global oil demand has never been healthier



UBS, August 16, 2023

Balancing OPEC Optimism, China's Economic Woes



FXEMPIRE, August 11, 2023

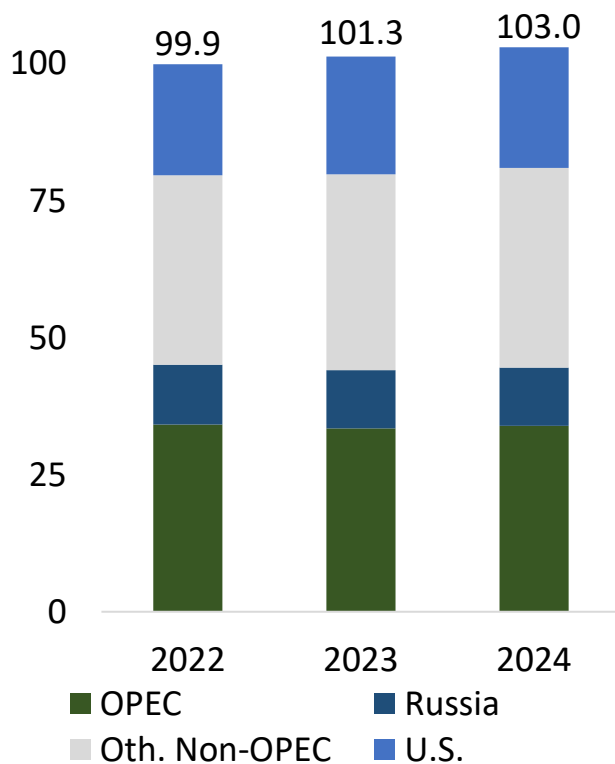
The U.S. and other non-OPEC sources lead global oil supply growth



- EIA expects record-high global oil supply in 2023 (101.3 mb/d) in 2023 and again in 2024 (103.0 mb/d)
- The U.S., Canada, Brazil, Guyana and Norway are prospective sources of production growth per EIA

Global oil supply by region

Million barrels per day (mb/d)



Opec-Plus Cut Restores Spare Capacity Cushion

Oil Market Report - August 2023

International Energy Agency, August 2023

US crude output to rise to record 12.76 million bpd in 2023 - EIA



U.S. Energy Information Administration, August 2023

Texas crude production sets new record as U.S. demand climbs to ...

World Oil, August 1, 2023

New Mexico's Record Oil Output To Generate \$3.5 Billion Budget Surplus

OilPrice.com, August 24, 2023

Canada on track to reach record oil production growth, analysts say

True North, August 23, 2023



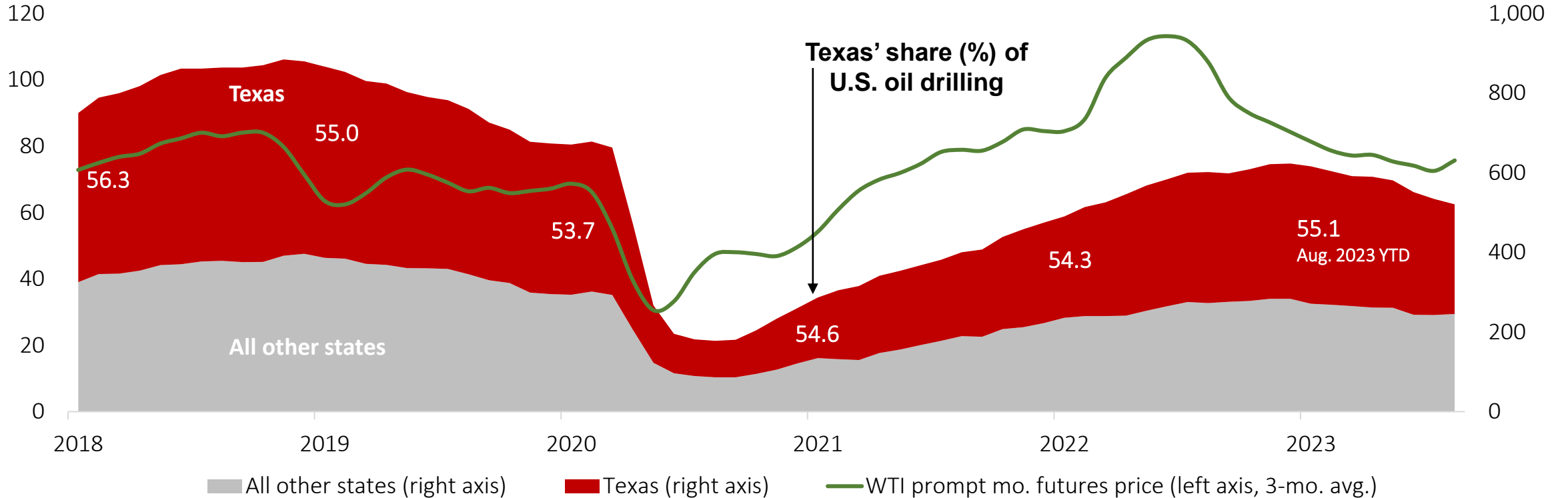
Texas' share of U.S. oil drilling rose through the first eight months of 2023



- Crude oil prices have historically driven drilling activity, and the historical correspondence between prices and drilling has strengthened so far in 2023
- Texas accounted for 55.1% of U.S. oil drilling in the first eight months of the year, its highest since 2019

Crude oil prices and drilling activity

Dollars per barrel (2023\$)



■ All other states (right axis)

■ Texas (right axis)

— WTI prompt mo. futures price (left axis, 3-mo. avg.)

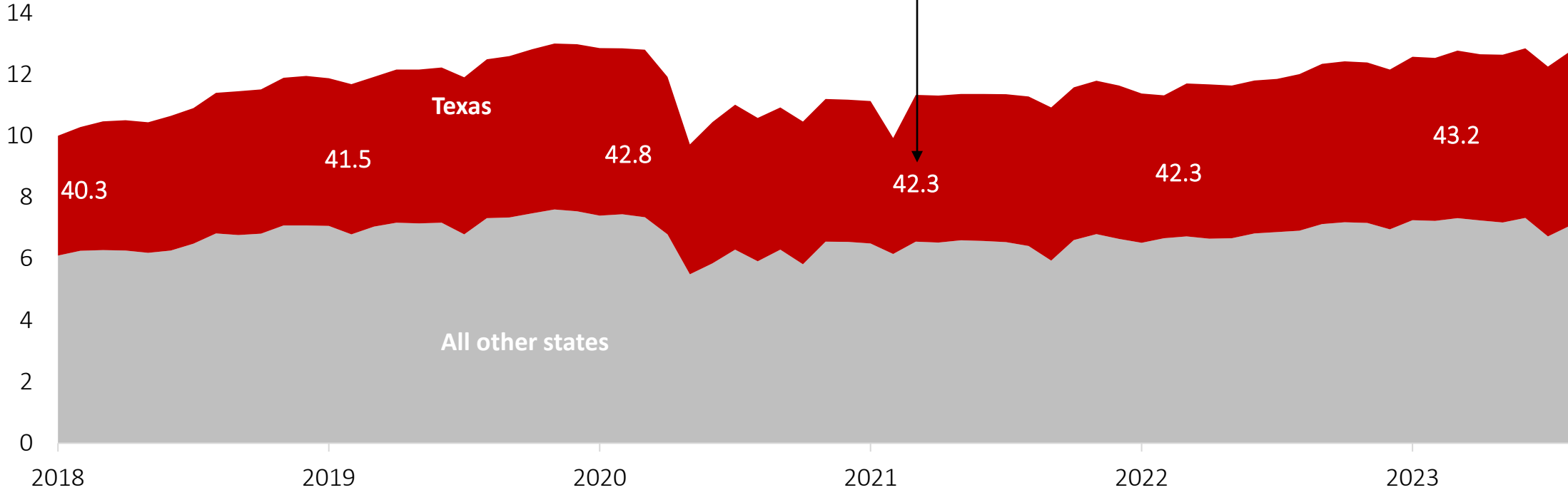
Texas broke its oil production records in June, July and August—and has increasingly driven U.S. supply



- ▶ Texas has driven 43.2% of U.S. oil production through the first eight months of 2023, which is its highest since at least 1981
- ▶ TXOGA estimates that Texas produced a record-high 5.5 million barrels per day (mb/d) of crude oil in June and July 2023, and TXOGA estimates that production rose to 5.7 mb/d in August 2023

U.S. and Texas crude oil production

Million barrels per day (mb/d)



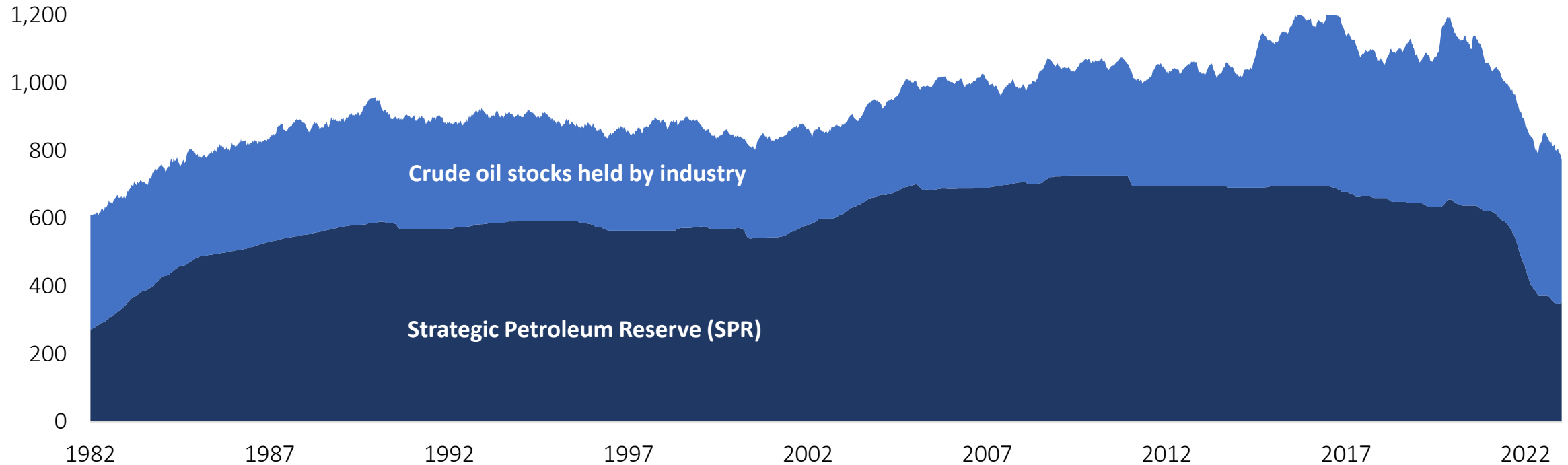
U.S. crude oil inventories have fallen to their lowest since 1985



- ▶ U.S. ending stocks of crude oil (excluding the SPR) equated to 25.4 days of supply per EIA as of August 25, 2023
- ▶ The largest change in U.S. crude oil stocks over the past year has been from sales of the SPR, which stands at half the level that was held in 2012 to 2017 despite some stock building so far in 2023

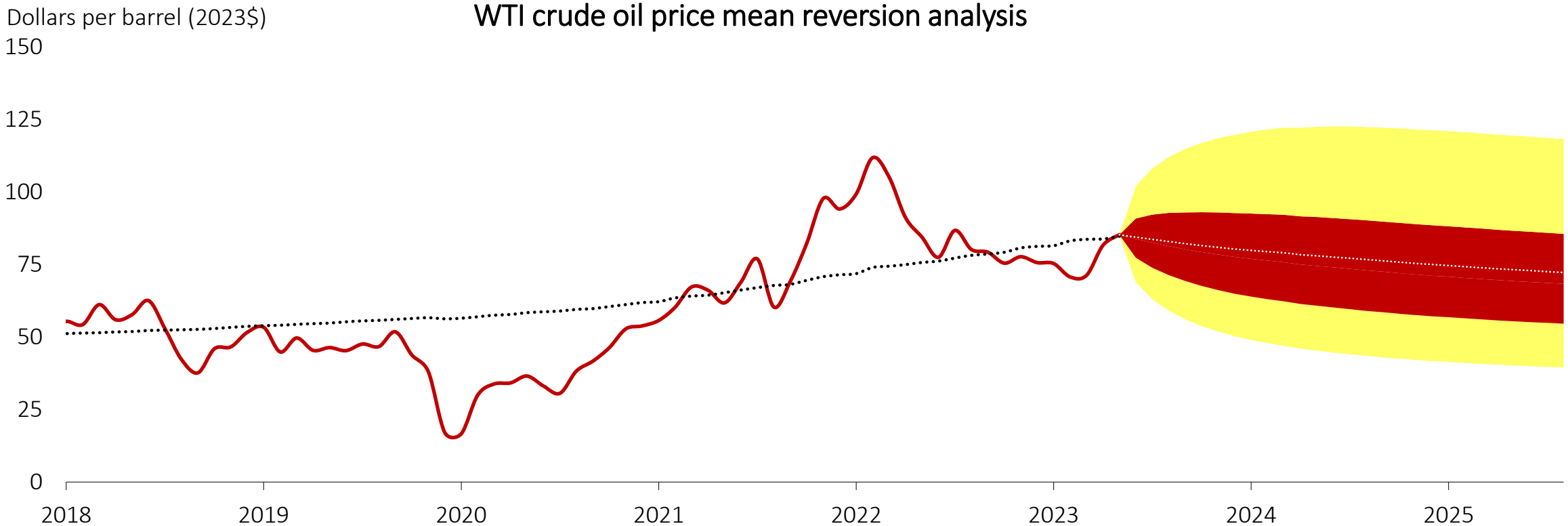
U.S. crude oil stocks

Million barrels



Crude oil prices historical mean reversion analysis: futures prices have remained in line with recent ones

- Mean reversion analysis can be useful to assess short-term markets. It is not a forecast but rather shows how futures prices compare with historically based confidence intervals and an estimated mean reversion target, which also is based on past data
- Prices have been aligned with the MR historical target. Futures prices remain slightly backwardated, and confidence intervals based on past prices show the potential for greater upside than downside



Natural Gas Markets

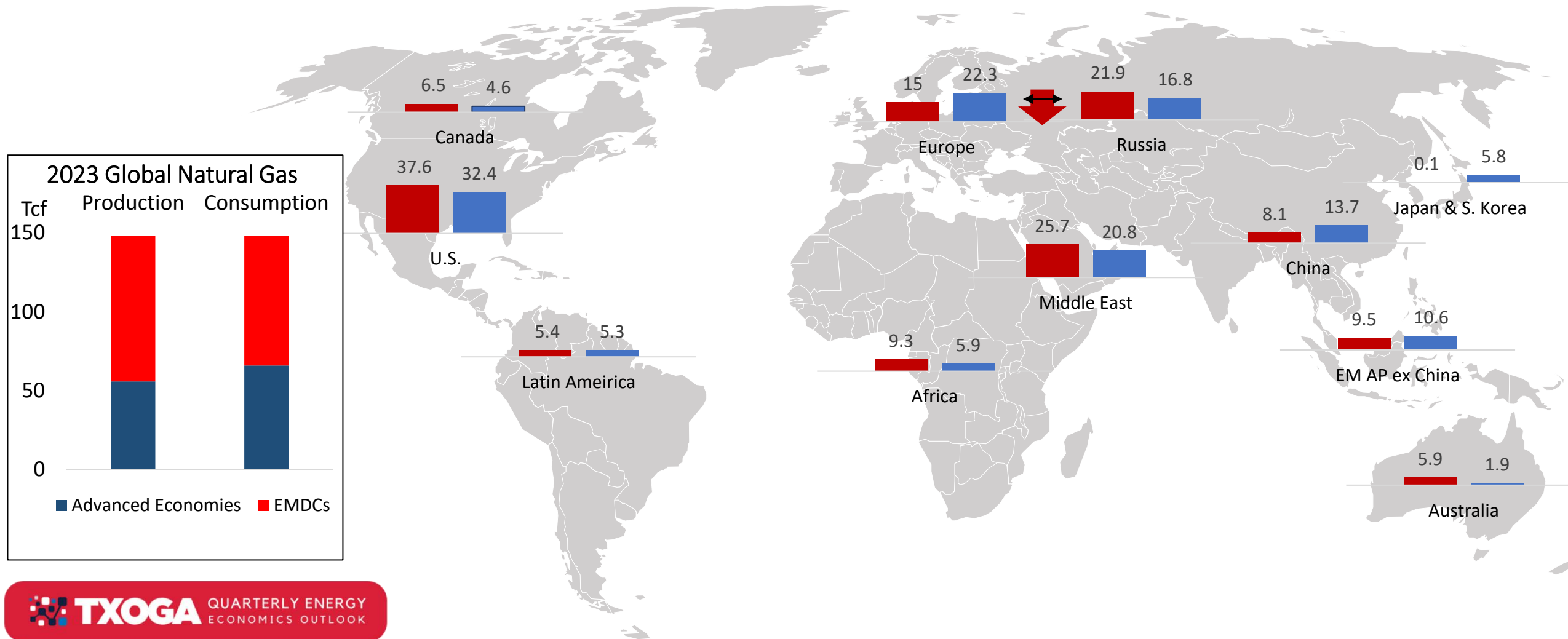


U.S. natural gas production and exports lead the world



➤ Data through Q3 2023 have shown U.S. production that exceeded estimates from earlier in the year

2023 Global natural gas **production** and **consumption** – Trillion cubic feet (Tcf)



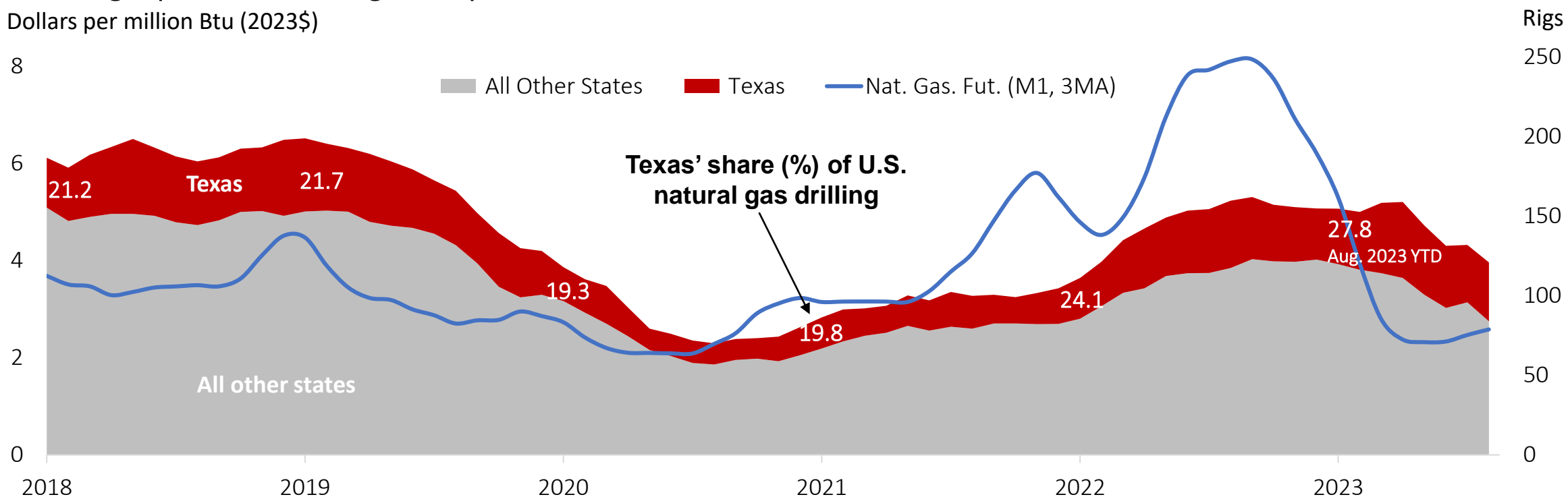
Texas has driven the highest share of U.S. natural gas drilling in a decade



- Natural gas drilling and production in Texas has historically responded to the prices of natural gas and natural gas liquids
- Texas represented 30.7% of U.S. natural gas drilling in August 2023, which was the highest share since 2013

Natural gas prices and drilling activity

Dollars per million Btu (2023\$)



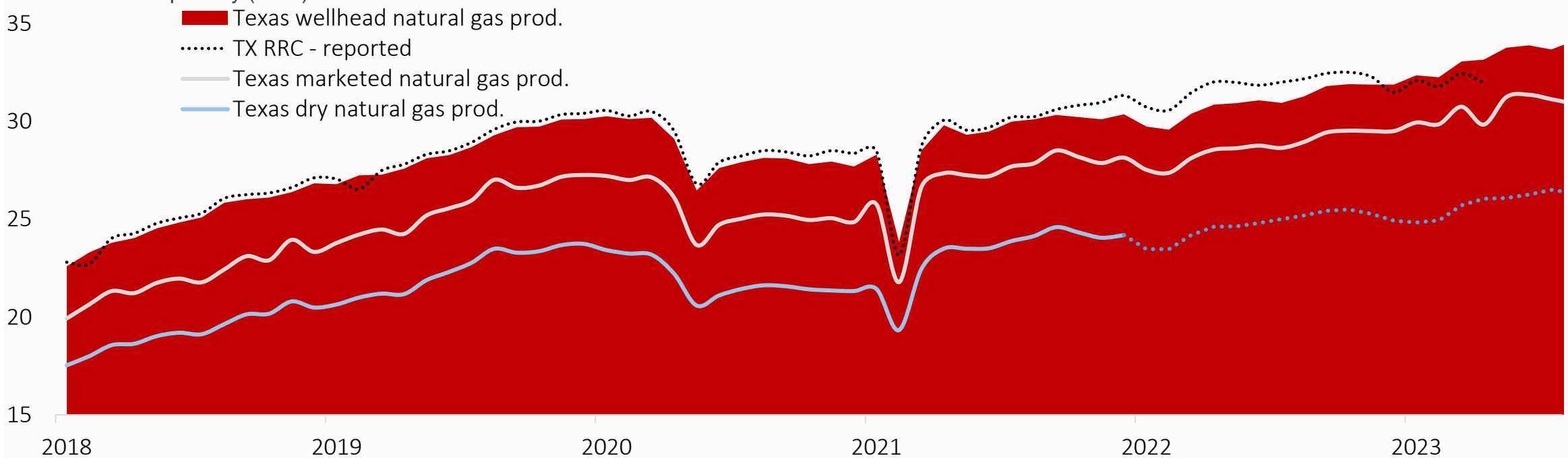


Texas' natural gas production is estimated to have hit record highs in August 2023

- ▶ For June 2023, EIA's latest data showed record Texas' gross withdrawals of 33.9 bcf/d and marketed production of 31.4 bcf/d
- ▶ For August 2023, TXOGA estimates that Texas produced a record 34.1 bcf/d of gross production, including 30.9 bcf/d of marketed production, 26.35 dry gas production, and 3.2 mb/d of natural gas liquids (NGLs)

Texas natural gas production, January 2018 – August 2023

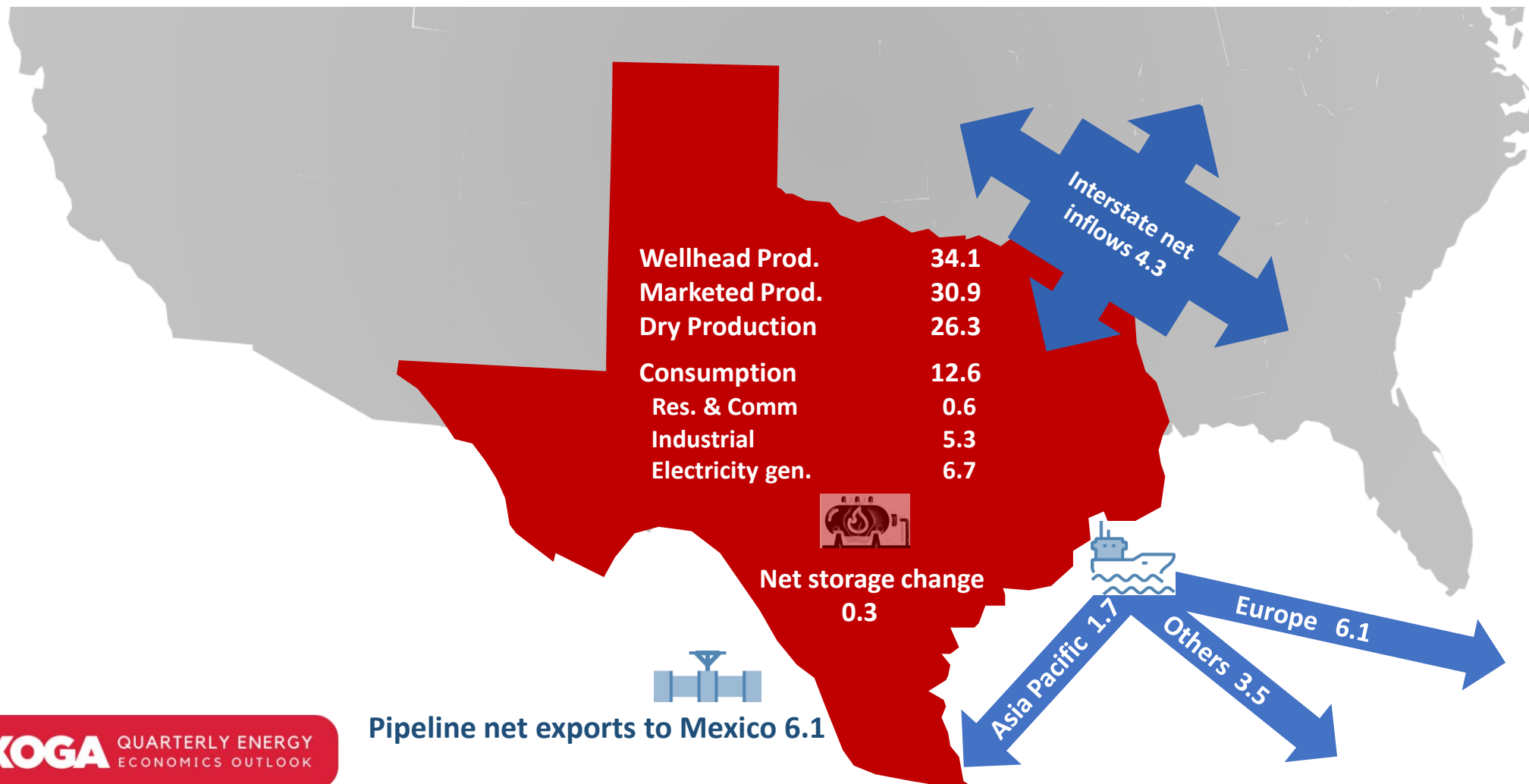
Billion cubic feet per day (bcf/d)





Texas' natural gas flows in June 2023: About half of production was consumed in-state and on par with combined exports to Mexico and Europe

- ▶ TXOGA estimates that Texas produced 26.3 billion cubic feet per day (bcf/d) of dry natural gas in June, 12.6 bcf/d (48%) of which was consumed in-state and 0.3 bcf/d (1%) entered storage. Net inflows from other states added 4.3 bcf/d to supply
- ▶ Texas' natural gas net exports included 6.1 bcf/d to Mexico via pipeline and 11.3 bcf/d via LNG, over half of which went to Europe



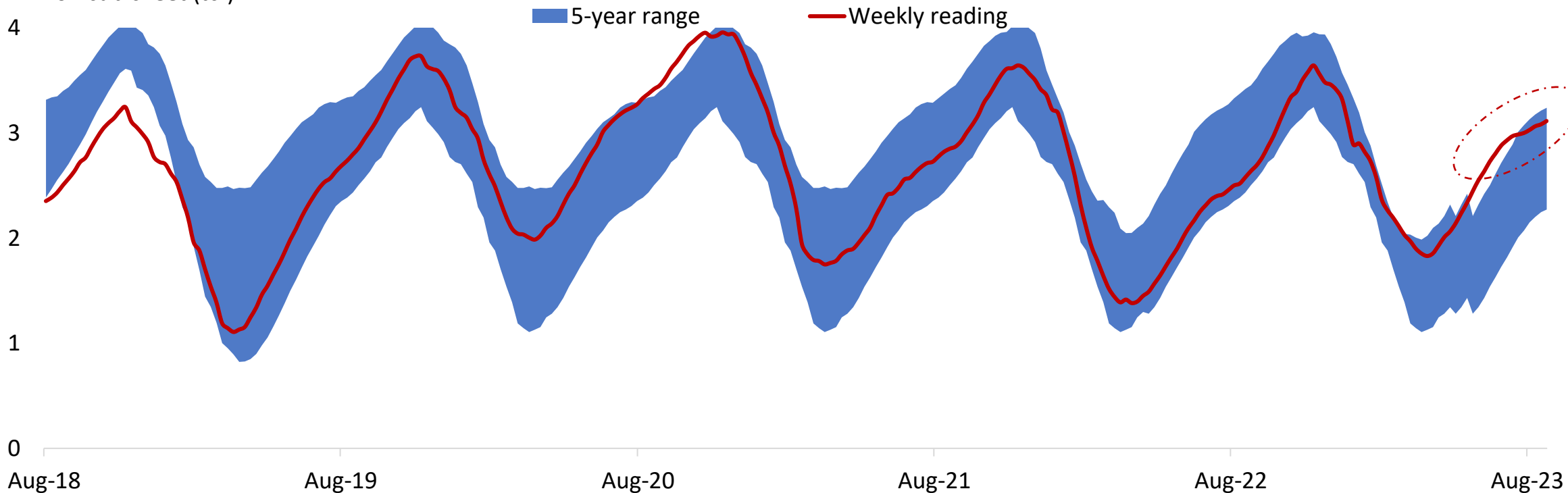


U.S. natural gas inventories have remained near the top of their 5-year historical range

- ▶ Financial markets in which natural gas prices are established have reacted to historically strong inventories
- ▶ The rate of natural gas injections into storage slowed in August 2023

U.S. working gas in underground storage

Trillion cubic feet (tcf)

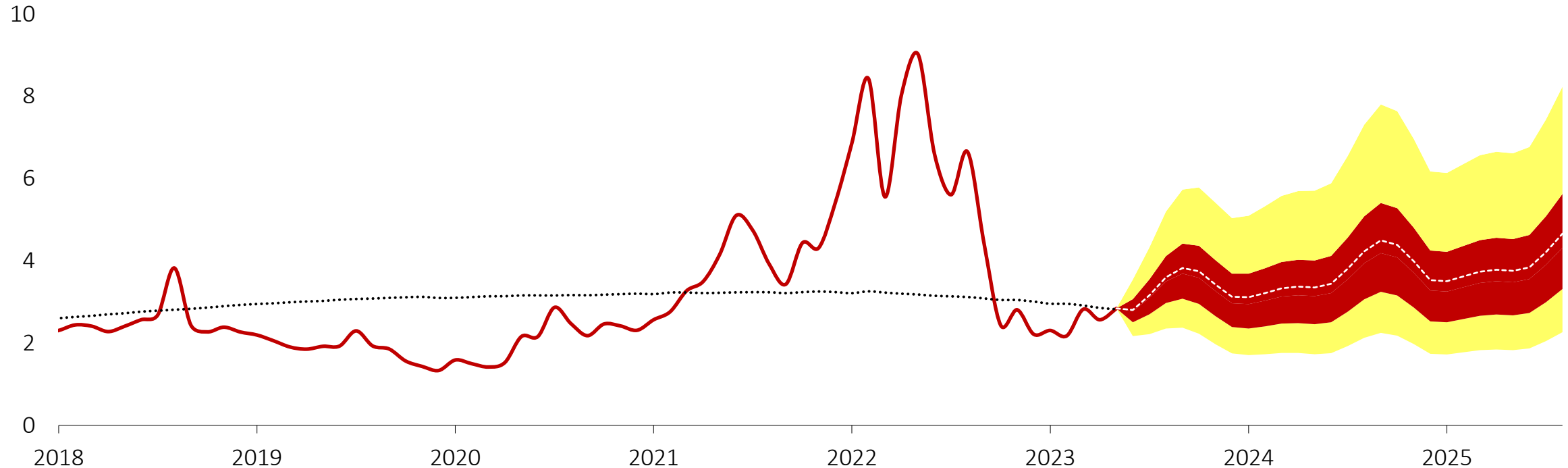


Natural gas price historical mean reversion analysis: futures prices appear higher

- ▶ Natural gas futures prices were in line with their mean reversion target
- ▶ Historical variation has continued to show more potential upside than downside

Natural gas price mean reversion analysis

Dollars per million Btu (2023\$)



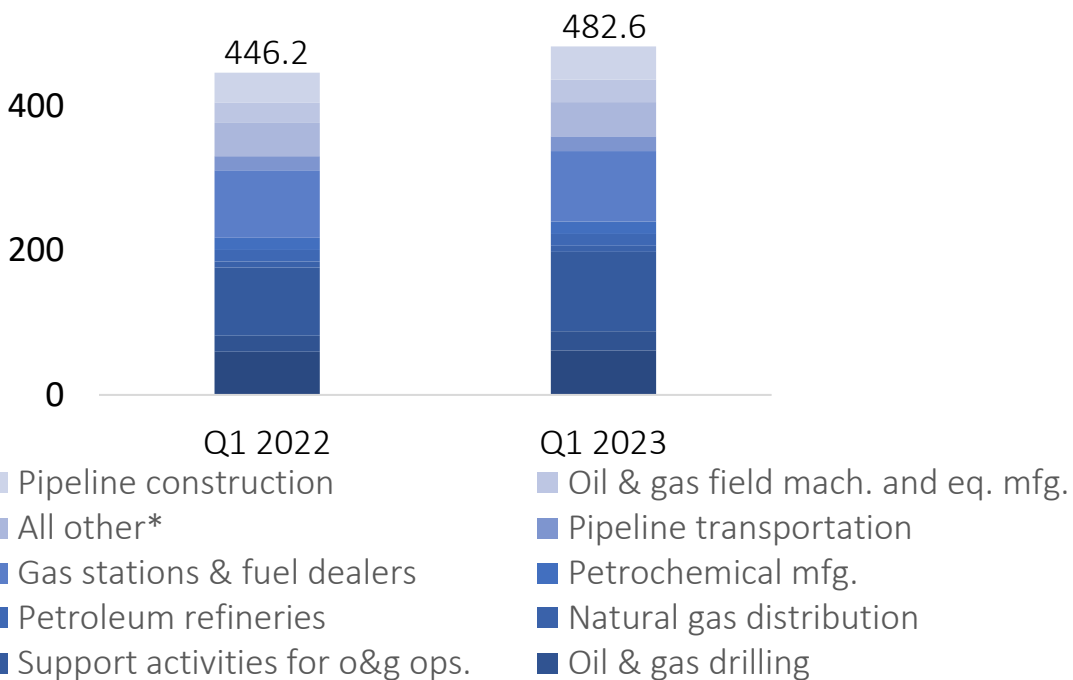


The Texas' oil and natural gas industry's record \$19.5 billion in quarterly wages underscores resilience amid labor and cost challenges

- The largest wage gains were in oil and gas extraction, drilling of wells, and operational support activities, which combined grew by \$1.9 billion (24% y/y) to \$10.1 billion in Q1 2023, per data from the U.S. Census Bureau and Texas Workforce Commission
- Industry wage growth of 22.0% y/y outpaced job growth of 8.1% y/y, which reflected cost escalation

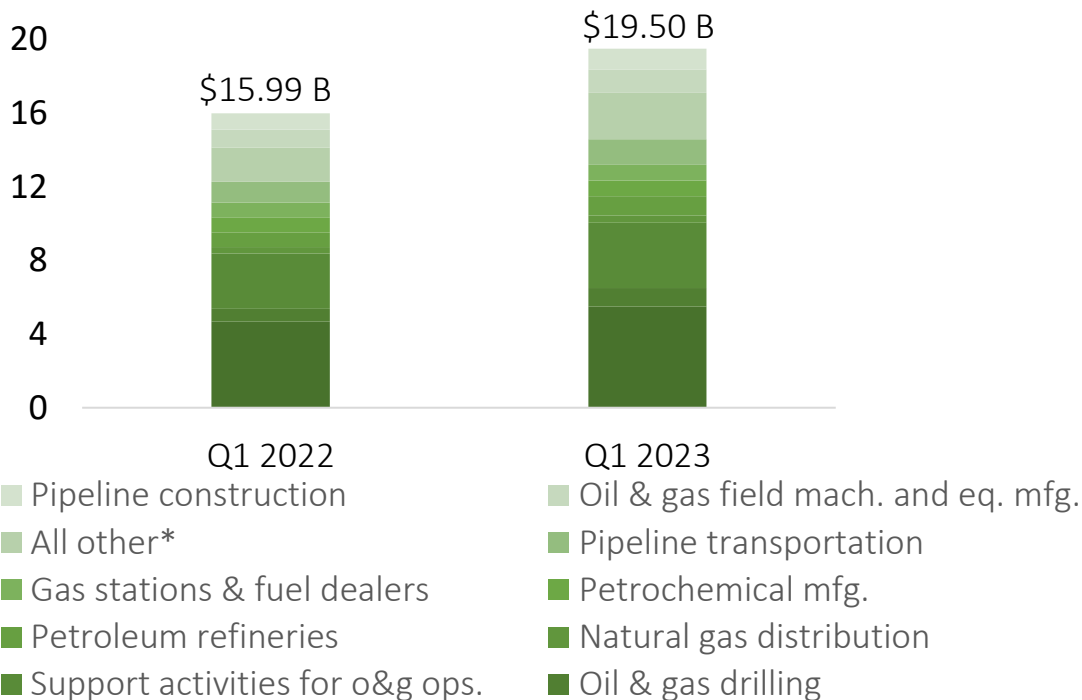
Texas Oil & Gas Industry Employment Rose by +8.1% y/y in Q1 2023

Thousand Jobs
600



Texas Oil & Gas Industry Quarterly Wages Rose by +22.0% y/y in Q1 2023

Billion dollars
24



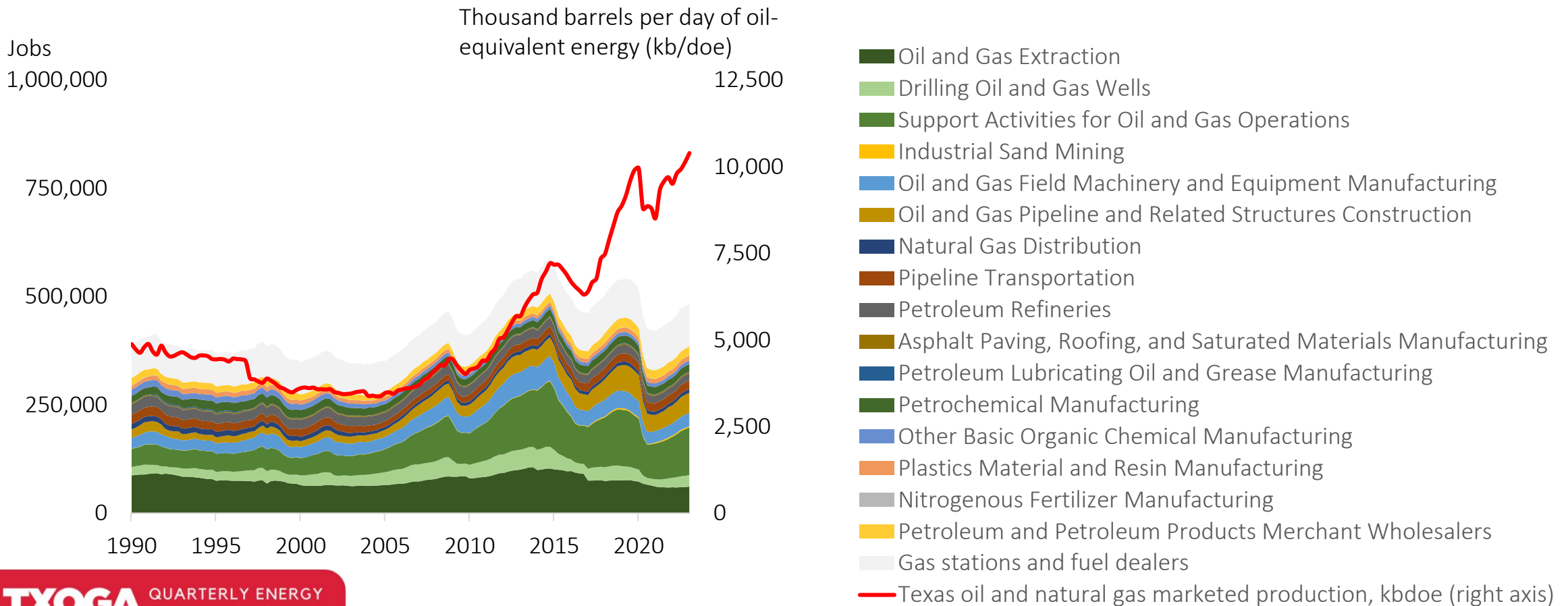
* Other industry segments include petroleum and pet. product wholesalers, fuel dealers, lubricant mfg., asphalt mfg., industrial sand mining, nitrogenous fertilizer mfg., basic organic chem. mfg., plastics and resin mfg.

Extraordinary productivity: Texas' oil and gas industry employment in Q1 2023 was 30% higher than it was in 2005 but produced 200% more output



- ▶ Texas oil and gas employment trended at or below 400,000 jobs between 1990 and 2005, until the energy revolution took hold in 2005
- ▶ Although the energy revolution has been cyclical, Texas' oil and natural gas industry employment in Q1 2023 of over 482,000 jobs was 30.0% higher than it was in 2005 but produced nearly 200% more oil and natural gas marketed production per EIA

Texas' oil and natural gas industry employment (left axis) and production (right axis), 1990 to Q1 2023



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