



**September 9, 2024**



# The TXOGA Chartbook serves as an essential resource for our members and those keen on comprehending the data that narrate ongoing developments within the economy and the oil and gas sectors, both internationally and domestically, including specific trends in Texas.

## Key points for the week of September 9, 2024

- ▶ **U.S. economic indicators were mixed.** The unemployment rate fell by 0.1 percentage points to 4.2% in August, but non-farm payroll growth remained weak and was revised downward for July. Business conditions, as measured by the ADS Index from the Philadelphia Federal Reserve, improved and stayed aligned with GDP growth. Yields on high-yield corporate bonds held steady at 13.2%, while 30-day Fed Funds futures remained unchanged at 5.0%. This suggests that financial market expectations for a 0.25% Fed Funds rate cut this month remain on track.
- ▶ **Oil market fundamentals tightened further, yet prices continued to fall.** West Texas Intermediate (WTI) crude oil dropped by nearly \$6 per barrel week-over-week (w/w) to under \$68 per barrel as of September 6, despite OPEC+ delaying supply increases by at least two months. Notably, U.S. crude oil inventories fell by 7.6 million barrels w/w as of August 30, placing this change in the top 5% of all weekly inventory shifts on record since 1982, according to the Energy Information Administration (EIA). U.S. crude oil inventories have cumulatively dropped by 42.4 million barrels (9.2%) over the past 11 weeks, reaching the bottom of the 5-year range. As highlighted in the [Chart of the Week](#), mean reversion analysis has provided insights into oil and natural gas prices, affirming the reversion of oil prices while also noting recent increases in natural gas futures prices.
- ▶ **U.S. natural gas prices rose as storage levels fell further within the 5-year range.** U.S. natural gas exports and domestic consumption stayed historically strong, leading to a 7.1% w/w increase in prices to \$2.28 per mmBtu as of September 6. Near-term futures prices fell below their historical mean, while futures contracts for December 2024 delivery are 37% higher at \$3.11 per mmBtu.

# TXOGA Chart of the Week: Analysis of oil and natural gas price mean reversion

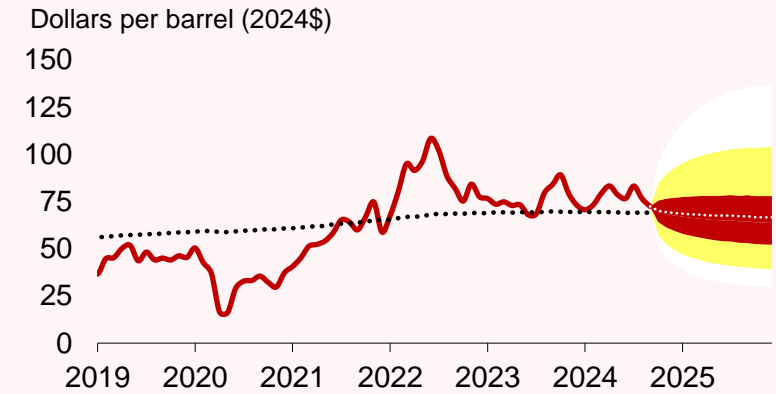
## › Defining terms

- Mean reversion analysis is useful for assessing short-term markets, as fundamental factors often cause prices to revert to their mean over time, even though the timing of this reversion can be uncertain..
- These analyses are not forecasts but instead compare futures prices (represented by the dotted white line) with a mean reversion target (dotted black line) and confidence intervals based on historical data.
- Historical price variation and the tendency for prices to return to their mean help inform these confidence intervals (represented by the red, yellow, and white ranges).

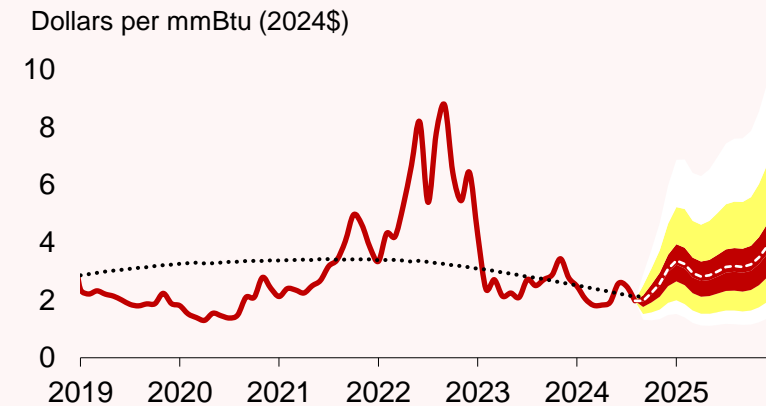
## › Recent price behavior

- As oil prices decreased in early September, the historical mean reversion target also declined. As of September 6, it has aligned with near-term futures prices. For WTI crude, the futures curve remains in backwardation (i.e., futures prices are currently lower than spot prices), with historically-based confidence intervals suggesting greater potential for upside than downside.
- For natural gas, we have observed over the past several weeks that storage levels slipped within their historical range. Futures prices for December delivery are 50% higher than prices for delivery in October. Since August 27, 2024, natural gas futures prices for prompt-month delivery have increased by 18.7%, with the December contract remaining 37% higher than October's. Historically-based confidence intervals similarly indicate greater upside potential.

### WTI crude oil price mean reversion analysis

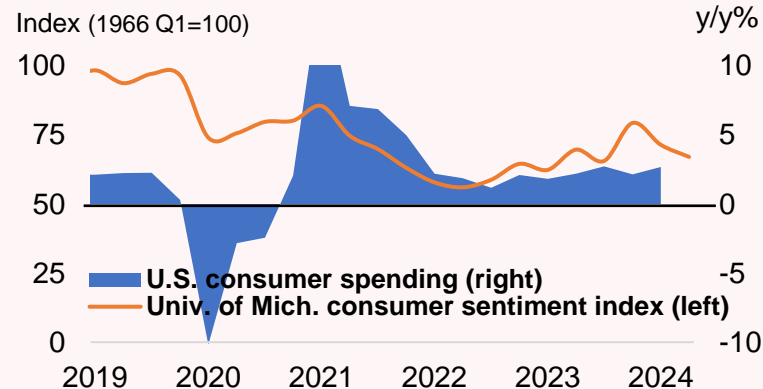


### Natural gas price mean reversion analysis



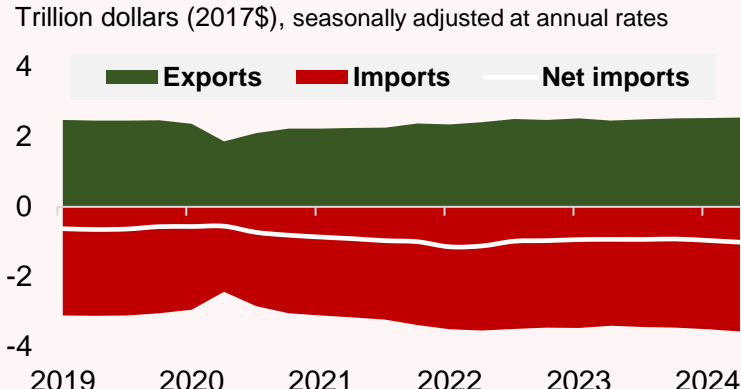
# U.S. economic indicators

## Consumer sentiment vs. spending



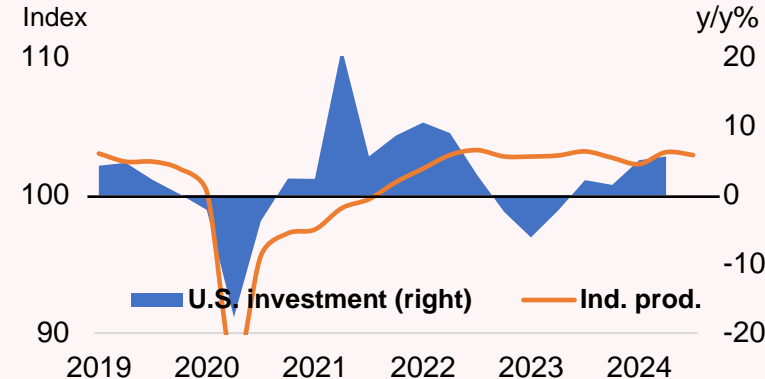
Consumer spending was revised upwards by 0.2% y/y to 2.7% y/y in Q2 2024 per the Bureau of Economic Analysis. Consumer sentiment rose in August by 2.1% m/m, according to the University of Michigan's survey. This historically implies consumer spending growth for Q3 2024.

## Real net exports of goods and services



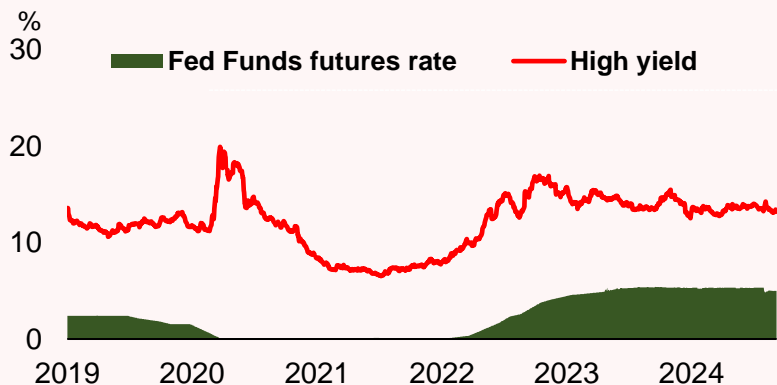
U.S. trade deficit was revised to be slightly wider in Q2 2024. The U.S. real trade deficit ran at an annualized rate of \$1.01 trillion in Q2 2024 per BEA. On a nominal basis, the trade surplus for petroleum and products was revised upwards by \$5.6 billion to \$32.6 billion Q2 2024, which was still below the \$52 billion surplus in Q1 2024.

## Industrial production and investment growth



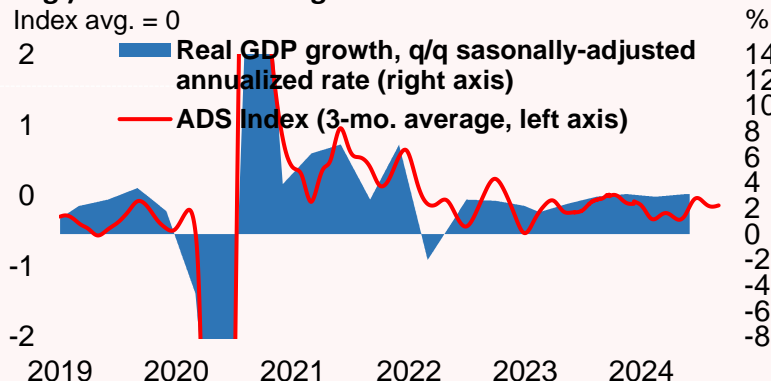
U.S. economywide investment growth was revised downwards by 0.8% y/y to 5.0% y/y for Q2 2024. This growth remained consistent U.S. industrial production, per the Federal Reserve Board – and continues to suggest investment growth in Q3 2024.

## Fed Funds rate and CCC and lower corporate bond yields



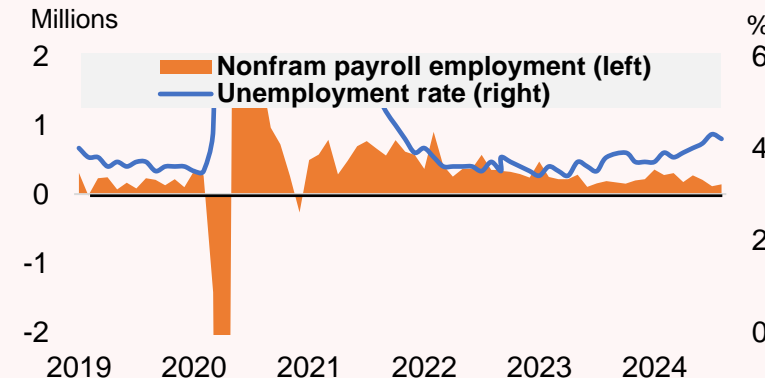
Steady bond premium for low credit quality. High yield (HY) rates reflect debt costs for firms with below-investment grade credit quality. For the week ended Sep. 6, HY rates remained steady w/w at 13.2%, while Fed Funds futures rate remained at 5.0%, resulting in a premium for low credit quality of 8.2%.

## Aruoba-Diebold-Scotti Business Conditions Index (qtr. avg.) vs. U.S. real GDP growth



The ADS index stabilized. The ADS business conditions index, published by the Philadelphia Fed. Res. Bank, is a leading indicator of GDP growth. A rolling 3-month average of the ADS index has accurately reflected real GDP growth and, with readings as of August 31, remained consistent with further growth in Q3 2024.

## Nonfarm payroll employment & unemployment rate



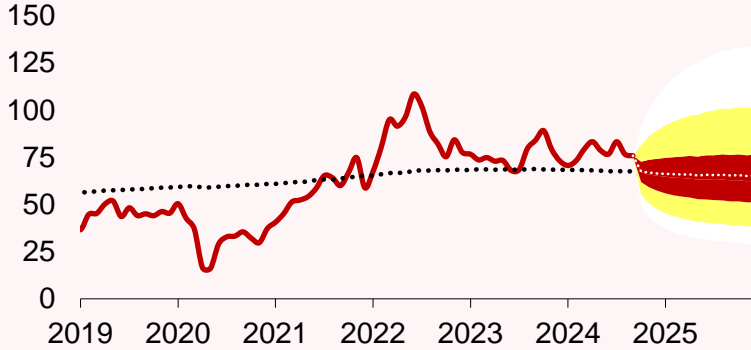
Labor market conditions remained weak in August. The employment situation is a lagging indicator of GDP growth. Non-farm payrolls were revised down by 22% to 89,000 in July and came in at 142,000 for August. The U.S. unemployment rate fell by 0.1% m/m to 4.2% in August per BLS,



# U.S. oil market indicators

## WTI crude oil price mean reversion analysis

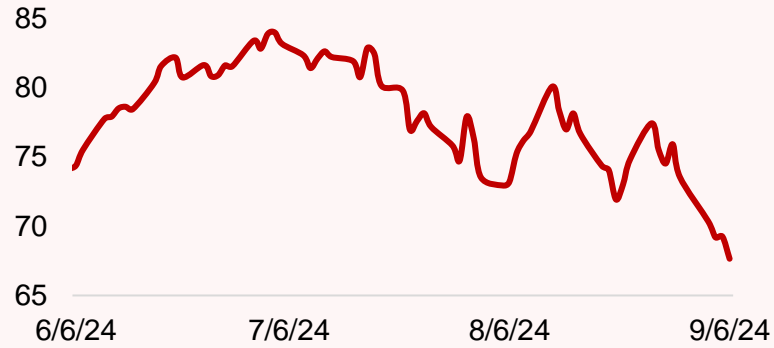
Dollars per barrel (2024\$)



**Futures prices have aligned with the historical mean reversion target.** The futures strip remains backwardated (that is, futures prices currently are lower than spot prices). Confidence intervals based on past prices show the potential for greater upside than downside.

## WTI crude prompt month futures prices

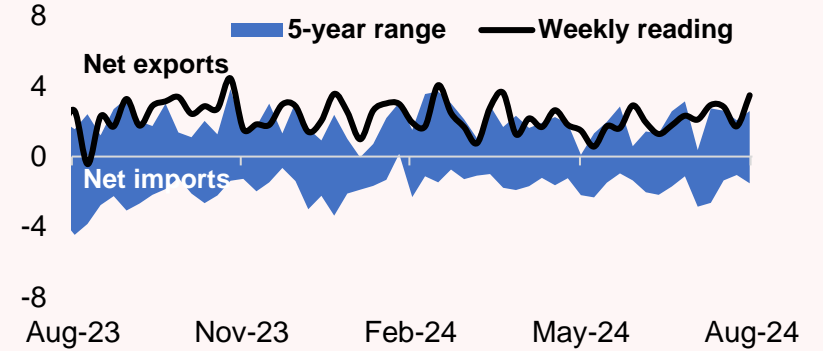
Dollars per barrel



WTI crude oil prices fell by nearly \$6 per barrel w/w to under \$68 per barrel as of September 6, as concerns for economic growth, OPEC+ supply compliance, and a 0.7% w/w increase in the US dollar's foreign exchange rate outweighed Middle East geopolitical uncertainties and historically low U.S. crude oil inventories.

## U.S. petroleum net exports (imports)

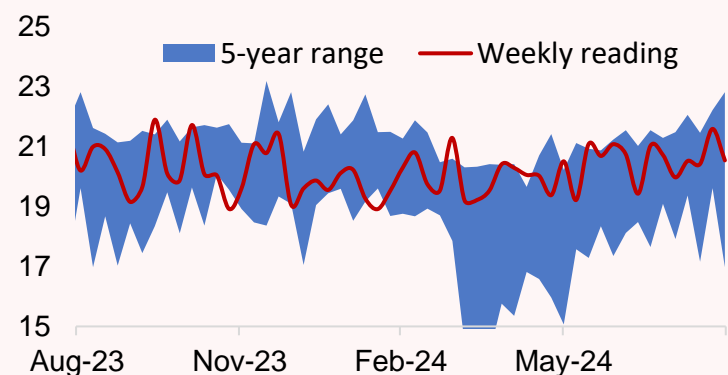
Million barrels per day, mb/d



**Petroleum net exports rose.** The U.S. was a petroleum net exporter of 3.5 mb/d for the week ended Aug. 30, up by 1.8 mb/d from the prior week.

## U.S. petroleum demand

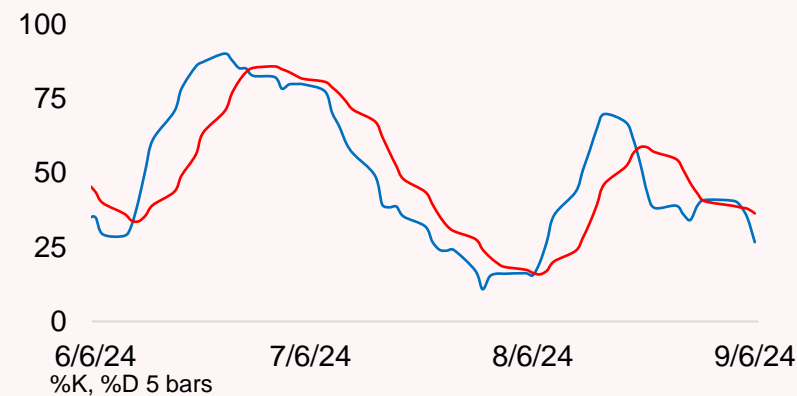
Million barrels per day (mb/d)



**Petroleum demand decreased.** U.S. petroleum demand, as measured by deliveries, fell by 1.1 mb/d w/w to 20.5 mb/d for the week ended Aug. 30.

## WTI crude prompt month futures slow stochastic

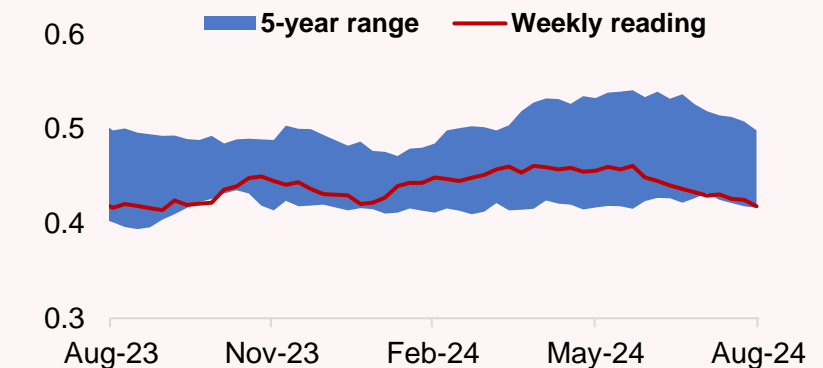
Index level



Price momentum fell during the week ended Sep. 6.

## U.S. ending stocks of crude oil (excluding the SPR)

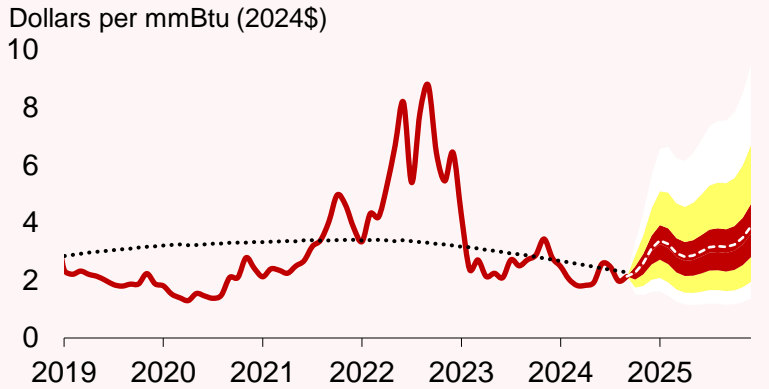
Billion barrels



**Inventories decreased.** U.S. ending stocks of crude oil excluding the Strategic Petroleum Reserve (SPR) decreased by 6.9 million barrels (mb) for the week ended Aug. 30 and to the bottom of the 5-year range.

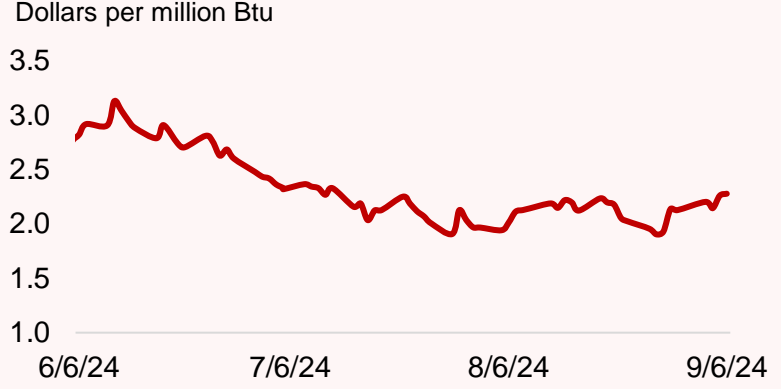
# U.S. natural gas market indicators

## Natural gas price mean reversion analysis



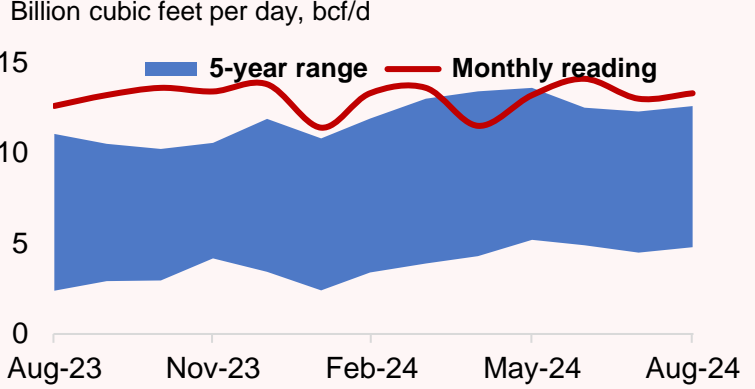
Near-term natural gas futures prices have fallen below the historical mean reversion target but rise by 37% between the October and December contracts. Confidence intervals based on past prices show the potential for greater upside than downside.

## Natural gas prompt month futures prices



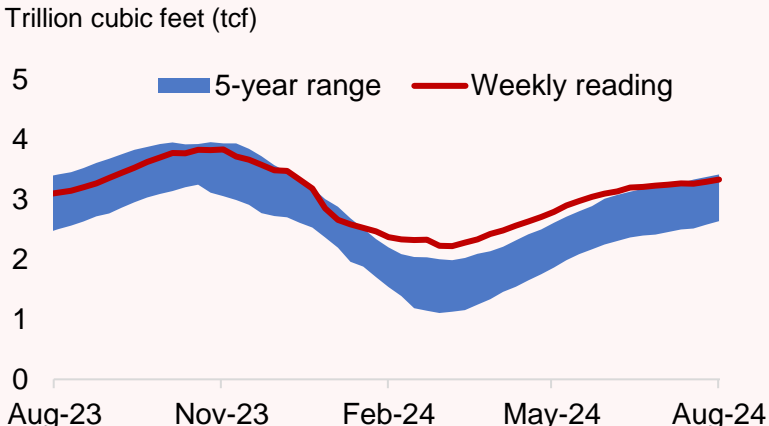
Natural gas prices at Henry Hub rose by 7.1% w/w to \$2.28 per million Btu for the week ended September 6.

## U.S. natural gas net exports



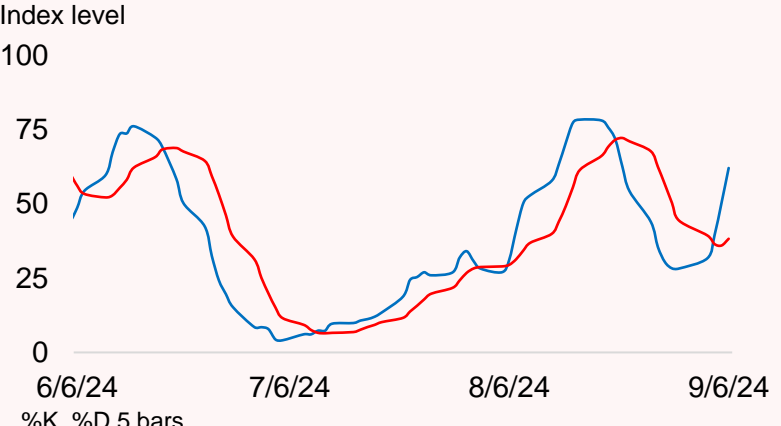
Natural gas net exports of 13.3 bcf/d, as projected for August by EIA, slowed from a revised record-high 14.1 bcf/d in June.

## U.S. weekly working gas storage



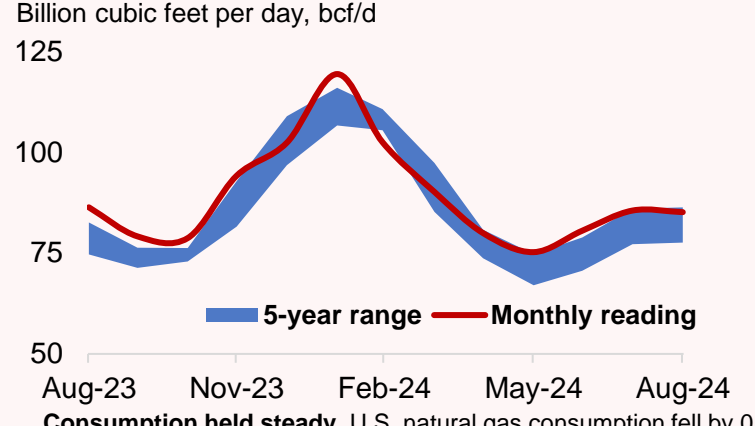
Storage continued to recede into the 5-year range. Working gas in underground storage rose by 1.1% w/w to 3.33 tcf as of Aug. 23 but fell below the 90<sup>th</sup> percentile within the 5-year range, down from above the 5-year range four weeks ago.

## Natural gas futures slow stochastic



Natural gas price momentum turned positive during the week ended September 6.

## U.S. natural gas consumption



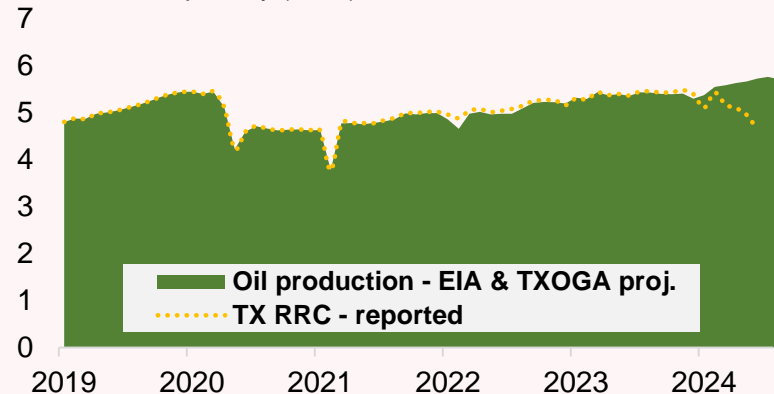
Consumption held steady. U.S. natural gas consumption fell by 0.4 bcf/d m/m to 85.1 bcf/d in August per EIA but remained near the top of the five-year range.



# Texas' oil and natural gas production

**Texas crude oil production, Jan. 2019 – Aug. 2024**

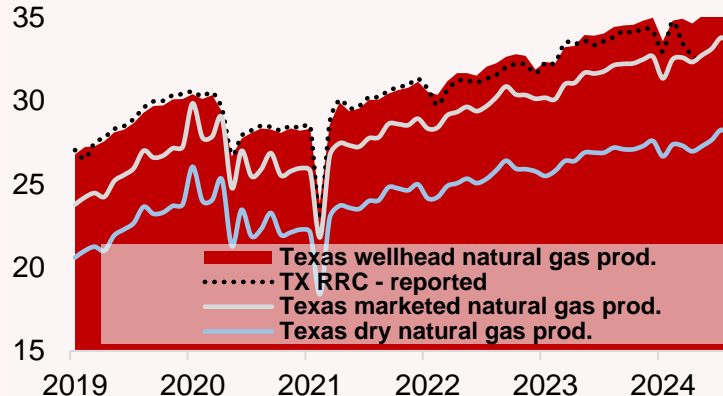
Million barrels per day (mb/d)



**Record-high oil production.** Texas' oil production rose to 5.73 mb/d in June per EIA, and TXOGA estimates that grew to 5.76 mb/d in July and edged down to 5.72 mb/d in August.

**Texas natural gas production, Jan. 2019 – Aug. 2024**

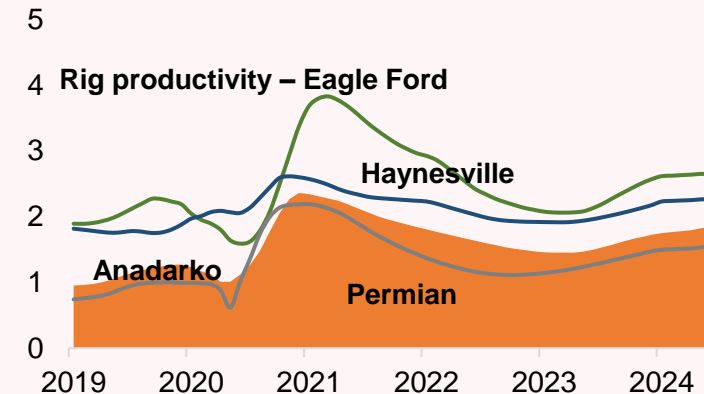
Billion cubic feet per day (bcf/d)



**Record-high natural gas production.** Texas produced record highs of 35.5 bcf/d of natural gas gross withdrawals and 33.1 bcf/d of marketed production in June per EIA. TXOGA estimates that Texas' marketed production was 33.2 bcf/d in August with 27.7 bcf/d of dry gas production.

**Texas rig productivity by basin – new monthly prod. per rig**

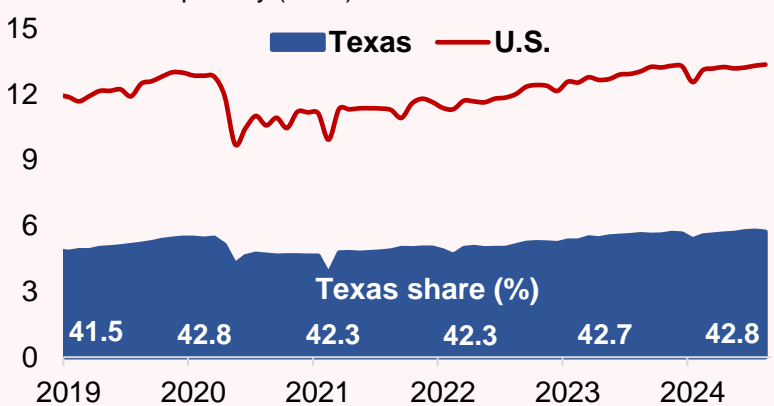
Thousand barrels per day oil-equivalent, kb/dae



**Strong productivity to start the year.** EIA estimates of rig productivity for July 2024 show continued increases year-over-year across the major Texas basins, including the Anadarko (+20.1% y/y), Eagle Ford (+20.6% y/y), Permian (+20.1% y/y), and Haynesville (+13.9% y/y).

**U.S. and Texas crude oil production, Jan. 2019 – Aug. 2024**

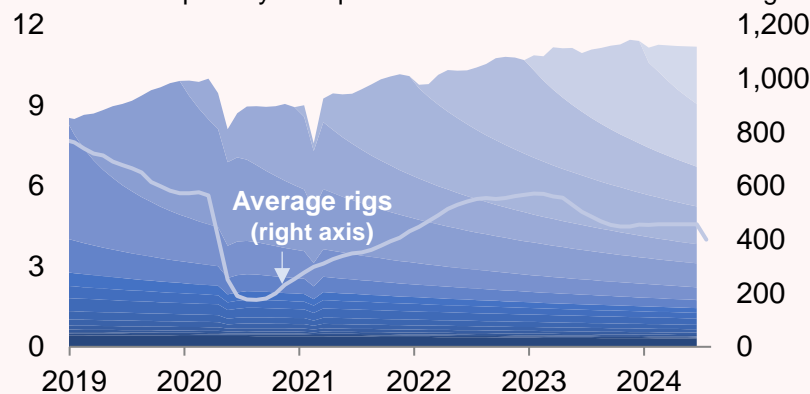
Million barrels per day (mb/d)



**Texas' share increased.** Texas accounted for an estimated 42.8% of U.S. crude oil production year-to-date through August by TXOGA's estimates.

**Texas shale basin wellhead oil & natural gas production**

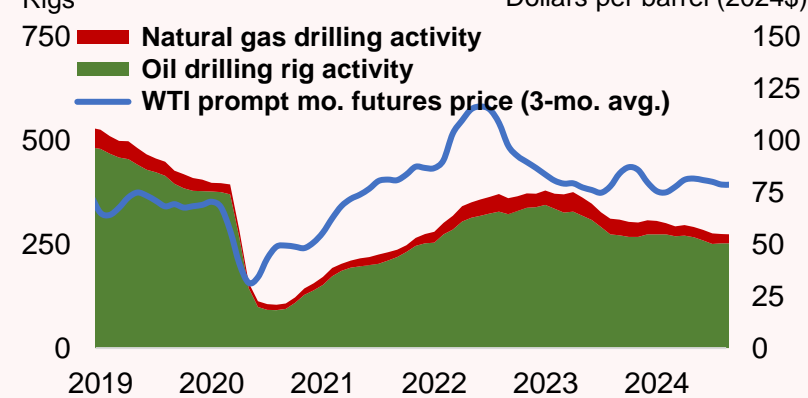
Million barrels per day oil-equivalent



**EIA estimates July 2024 production growth across Texas shale basins** has continued to grow year-over-year in the Permian (+8.0% y/y) but fallen in the Eagle Ford (-4.5% y/y), Haynesville (-9.5% y/y), and Anadarko (-2.1% y/y) regions.

**Texas drilling activity and WTI crude oil futures prices**

Rigs (left axis), Dollars per barrel (2024\$) (right axis)

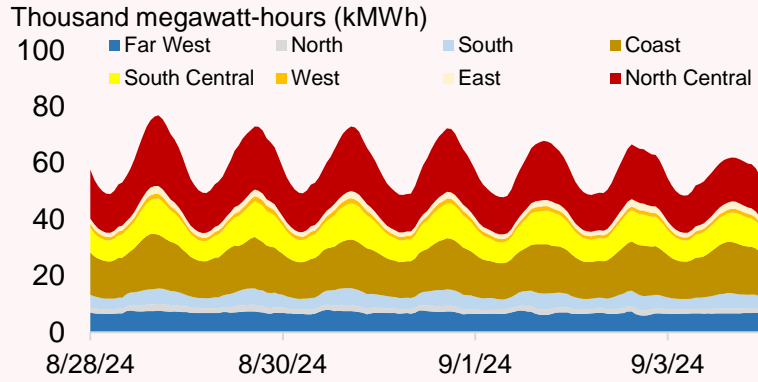


**Texas' drilling rig activity held steady** for the week ended September 6 per Baker Hughes. Texas had 252 oil-directed rigs (up by 1 rig w/w) and 22 natural gas-directed rigs (down by 1 rig w/w).

# Texas Electricity Analysis

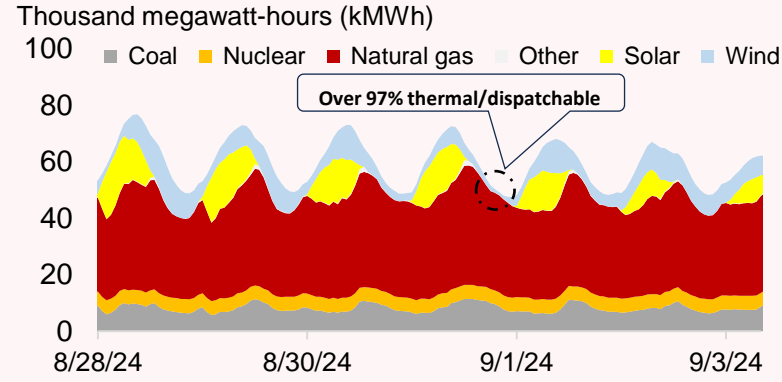


## ERCOT electricity load by region



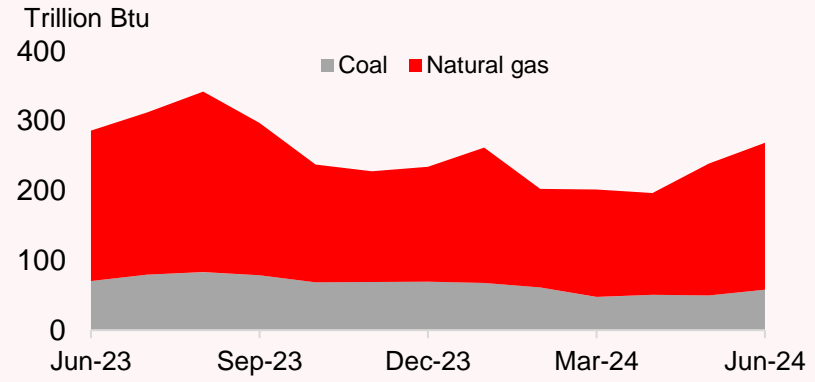
For Aug. 28 to Sep. 3, ERCOT's average hourly electricity load was 59.2 kMWh, down by 11.2% w/w, while the maximum load hourly load of 77 kMWh fell by 9.6% w/w. Variability was the highest in the North Central and South Central regions.

## ERCOT hourly electricity generation by source



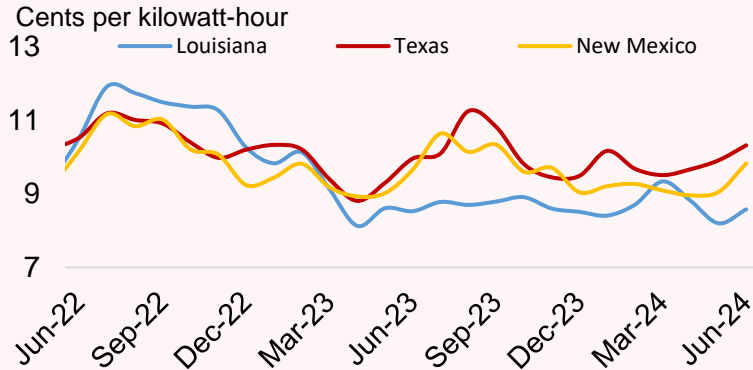
**Thermal and dispatchable resources generated as much as 97.8% of ERCOT's electricity.** ERCOT's hourly electricity generation for the period Aug. 28 to Sep. 3 ranged between 48 and 77 kMWh with a standard deviation of 8.0 kMWh, up by 13.5% w/w. Thermal and dispatchable sources generated 97.8% of the region's power in the morning of Sep. 1, including 70.9% from natural gas.

## Texas electricity plant receipts of natural gas and coal



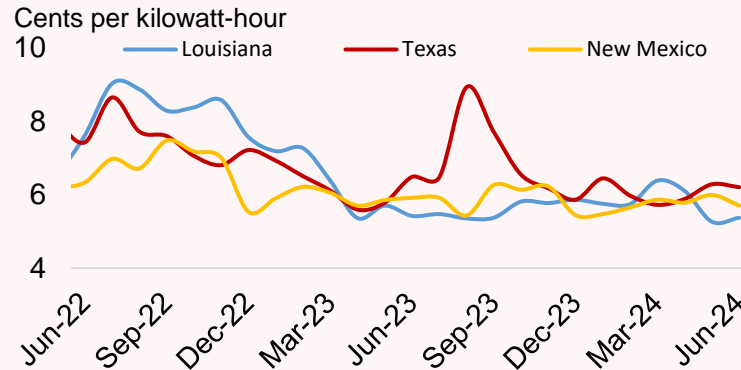
**Texas electricity plant receipts of natural gas and coal increased seasonally but decreased year-over-year by 2.4% y/y and 17.7% y/y, respectively, in June 2024.**

## Electricity prices – average across all end-use sectors



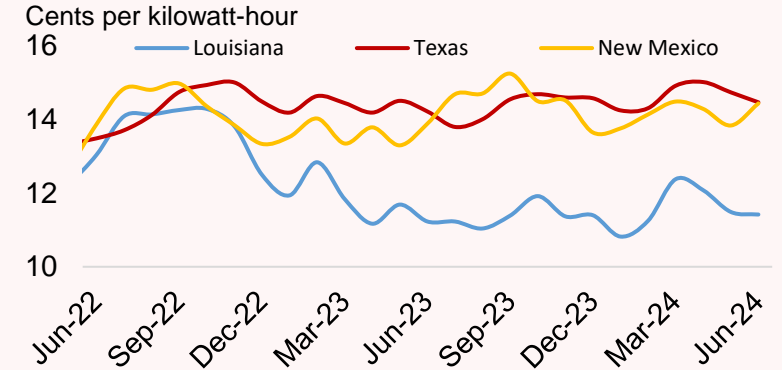
**Texas' electricity prices rose in June.** The average price of electricity in Texas increased by 3.6% y/y in June to 10.32 cents per kWh, compared with 8.58 cents per kWh in Louisiana and 9.83 cents per kWh in New Mexico.

## Industrial electricity prices



**Texas' industrial electricity prices decreased.** Texas' industrial electricity prices averaged 6.20 cents per kWh in June, down by 1.3% m/m and by 4.3% y/y. Rates in New Mexico and Louisiana remained lower at 5.70 cents per kWh and 5.37 cents per kWh, respectively.

## Residential electricity prices



**Texas' residential electricity prices fell from May but rose versus last year.** For Texas' residential consumers, the average price of electricity (14.47 cents per kWh) fell by 1.8% m/m from May but rose by 1.8% y/y from a year ago, remaining above rates in Louisiana (11.42 cents per kWh) and on par with New Mexico (14.44 cents per kWh).



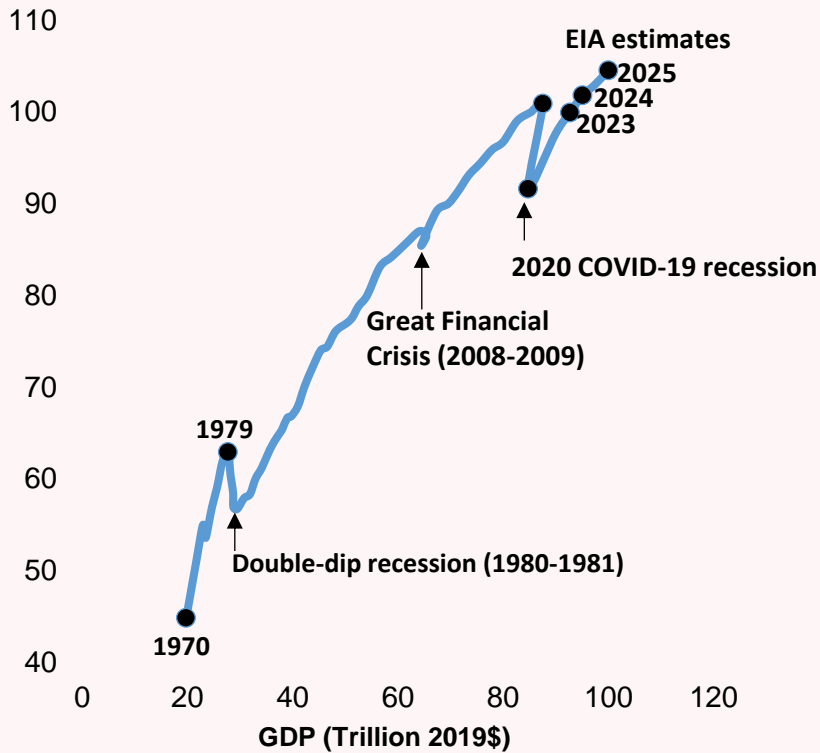
# Global Oil Market Balance Projections to 2025



- **Solid demand and inventory drawdowns.** EIA's August 2024 Short-Term Energy Outlook projects global demand of 102.9 mb/d this year and 104.6 mb/d in 2025 – both record highs.
- **For oil inventories, EIA projects global stock withdrawals to continue through Q2 2025,** including 0.9 mb/d in Q3 2024 and as high as 1.0 mb/d in Q1 2025, corresponding with Brent crude oil prices of \$86 in Q4 2024 and on average in 2025, compared with \$81 per barrel currently.

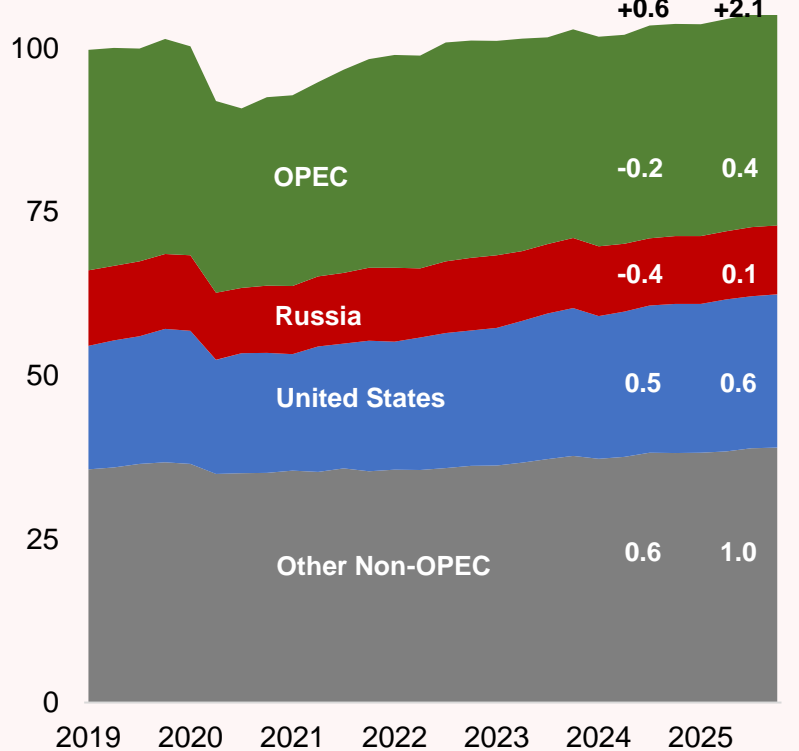
## Global oil demand and GDP

Million barrels per day (mb/d)



## Oil production by country/region

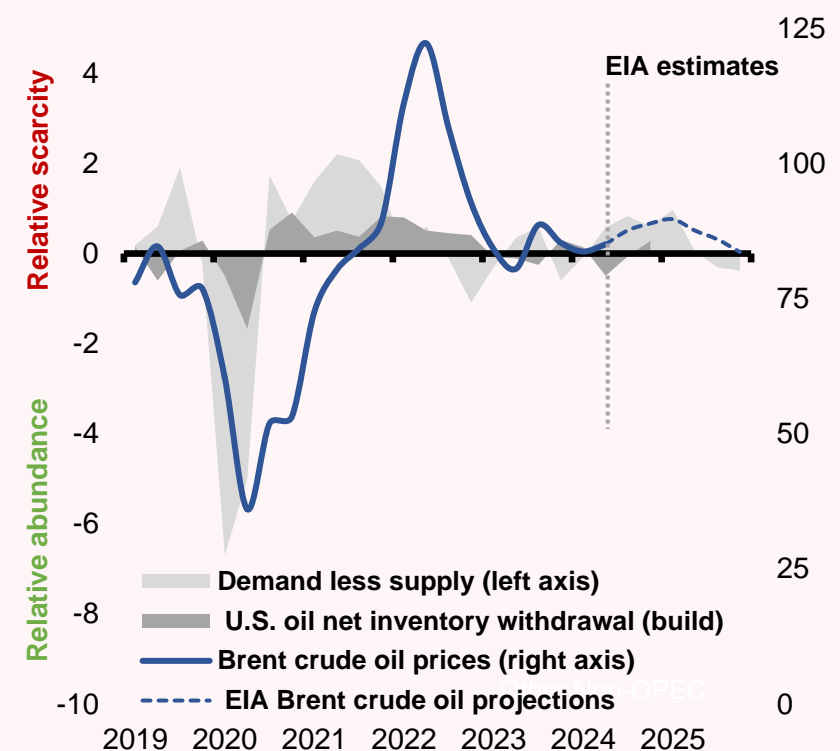
Million barrels per day, mb/d



## Global demand/supply & Brent prices

Million barrels per day (mb/d)

2024\$/Bbl



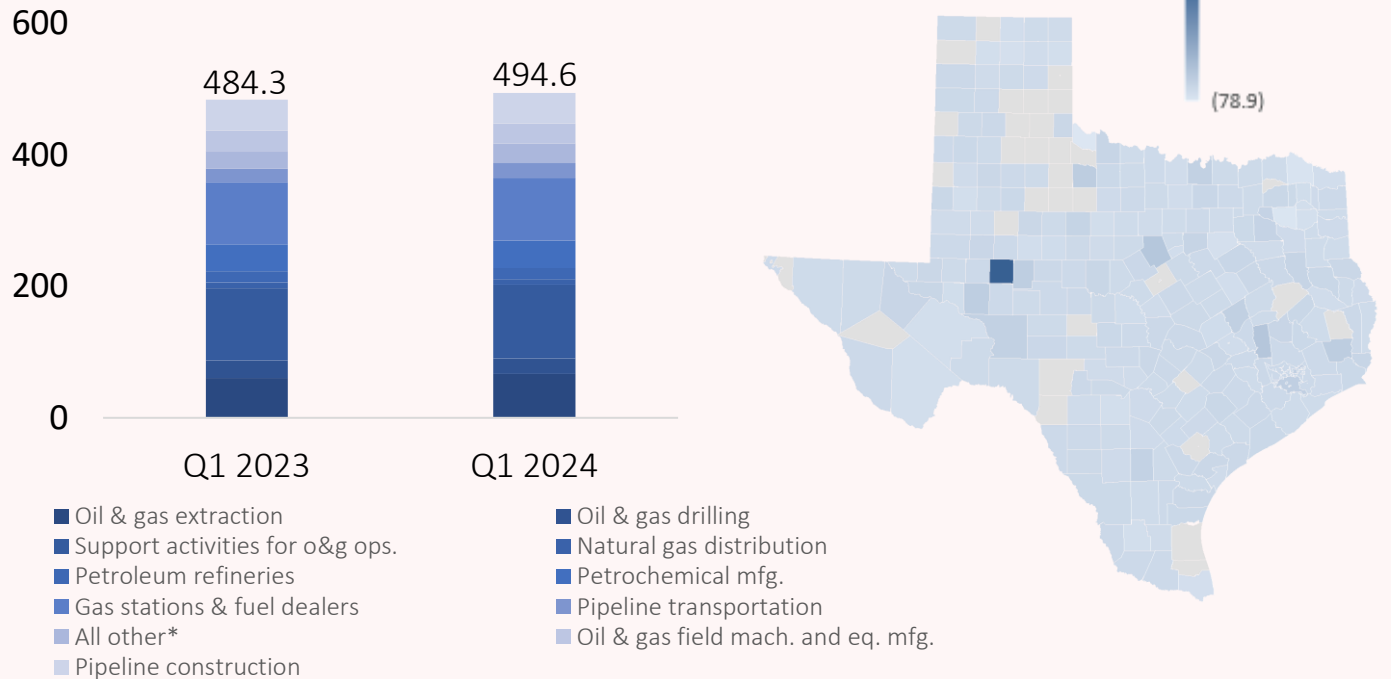
# Texas' oil and natural gas industry wages eclipsed \$20.8 billion in Q1 2024



- ▶ Texas' oil and natural gas industry employment and wages grew by 2.1% y/y and 6.5% y/y, respectively, in Q1 2024, raising the totals to nearly 494,593 jobs and \$20.8 billion in wages – the highest wages since the 2020 pandemic.
- ▶ Two-thirds of the year-over-year job growth occurred in the upstream and supporting services, while another quarter of the job growth occurred in pipeline transportation per the latest data (released on August 20, 2024) from the U.S. Census Bureau and Texas Workforce Commission.

## Texas oil and natural gas industry direct employment rose by +2.1% y/y in Q1 2024

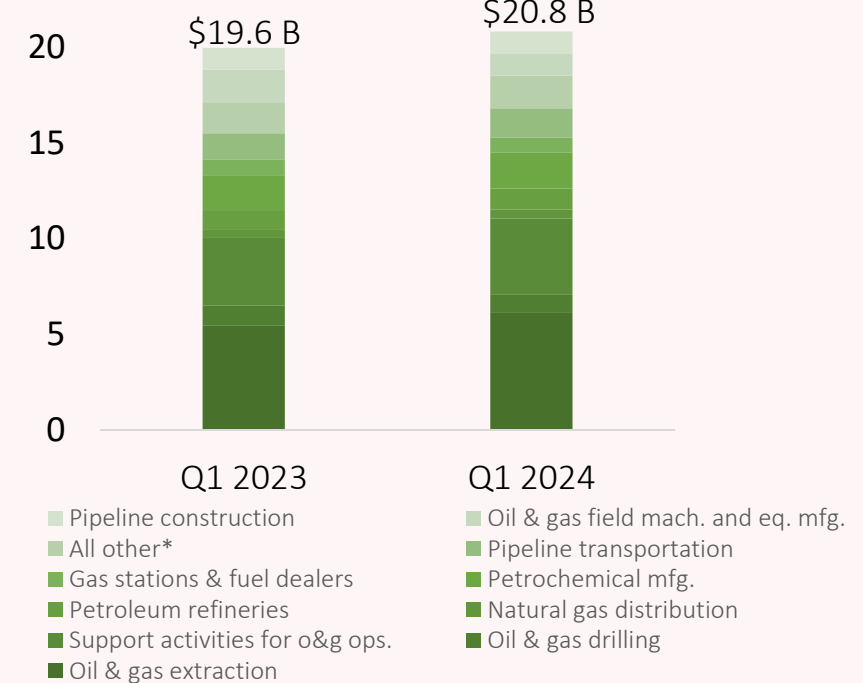
Thousand Jobs



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

## Texas oil and natural gas industry direct wages rose by +6.5% y/y in Q1 2024

Billion dollars



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