Crude Oil Market Fundamentals

CANADA'S OIL & NATURAL GAS PRODUCERS

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Crude Oil Benchmarks

The composition of crude oil varies greatly, and it is typically graded on its density (measured in API gravity – light, medium, heavy) and sulfur content (< 0.5% = 'sweet'; > 0.5% = 'sour'). As such, there are numerous global crude oil benchmarks, based on the various grades, that are used as a reference point for buyers and sellers. The two major global benchmarks are West Texas Intermediate (WTI) and Brent.

- **West Texas Intermediate (WTI)** – A major North American crude oil benchmark. WTI is a light sweet grade of crude oil, benchmarked to crude oil produced in western Texas with an API gravity of around 40 degrees and priced at Cushing, Oklahoma.
- **Brent** – A major global crude oil benchmark. Similar to WTI, Brent is based on a blend of light sweet crude oils produced in the North Sea with an API gravity of around 40 degrees.
- **Western Canadian Select (WCS)** – A blend of Canadian heavy and bitumen sour crude oils, mixed with sweet synthetic and condensates with an API gravity of around 21 degrees. WCS is priced at Hardisty, Alberta and is often used as the representative price for Canadian heavy crude oils.
- **Edmonton Par** – A light, sweet blend of conventionally produced crude oils in western Canada, and is priced at Edmonton, Alberta. Edmonton Par is also referred to as Mixed Sweet Blend (MSW) and Edmonton Light.

Source: Canada Energy Regulator

Summary of Crude Oil Market Fundamentals

Global Crude Oil and Liquids Supply

- Based on the latest short-term forecasts (at the time of this publication) from the International Energy Agency (IEA) and the US Energy Information Administration (EIA), global crude oil and liquids production is expected to average 102.8 MMB/d in 2024, up 0.9% or 0.9 MMB/d year-over-year. OPEC is expected to account for roughly 30% of the total supply in 2024, compared to about 70% for non-OPEC countries. OPEC's voluntary supply cuts remain critical to maintaining market balance into 2024. Consequently, based on its latest agreement, the group is expected to maintain supply cuts into 2024.

Global Crude Oil and Liquids Demand

- On the demand front, oil demand growth is expected to slow in 2024. Average forecasts call for 103.2 MMB/d in 2024, a record high, and up 1.5% or ~1.6 MMB/d year-over-year. By comparison, global demand is expected to have grown by 2.1% or 2.1 MMB/d in 2023.

Global Crude Oil and Liquids Supply/Demand Balance

- According to the IEA outlook, global crude oil and liquids supply growth will outpace demand growth in 2024, leading to supply surpluses. Most supply growth is expected to be driven by non-OPEC countries, namely the United States, Brazil, Guyana, and Iran. Meanwhile, global demand growth is expected to slow with the end of the pandemic recovery and the softening of economic growth.
- Despite softer prices in December, based on futures pricing, West Texas Intermediate (WTI) and Brent are expected to average approximately US$70/B and US$74/B in 2024, respectively.

WCSB Supply and Egress

- The amount of egress capacity out of the Western Canadian Sedimentary Basin (WCSB) influences Canadian crude oil prices. Delays in the Trans Mountain Expansion Project (TMEP) have led to dwindling spare pipeline capacity amidst increasing supply and refinery outages, leading to weaker Canadian crude oil differentials. However, with TMEP tentatively poised to be in service in Q2/2024, Canadian crude oil differentials should become more stable and less volatile.

Source: International Energy Agency – Oil Market Report (Dec 2023), US Energy Information Administration – Short-Term Energy Outlook (Jan 2024), National Bank Financial. Futures pricing as of Jan 8th, 2024.

Global Crude Oil and Liquids

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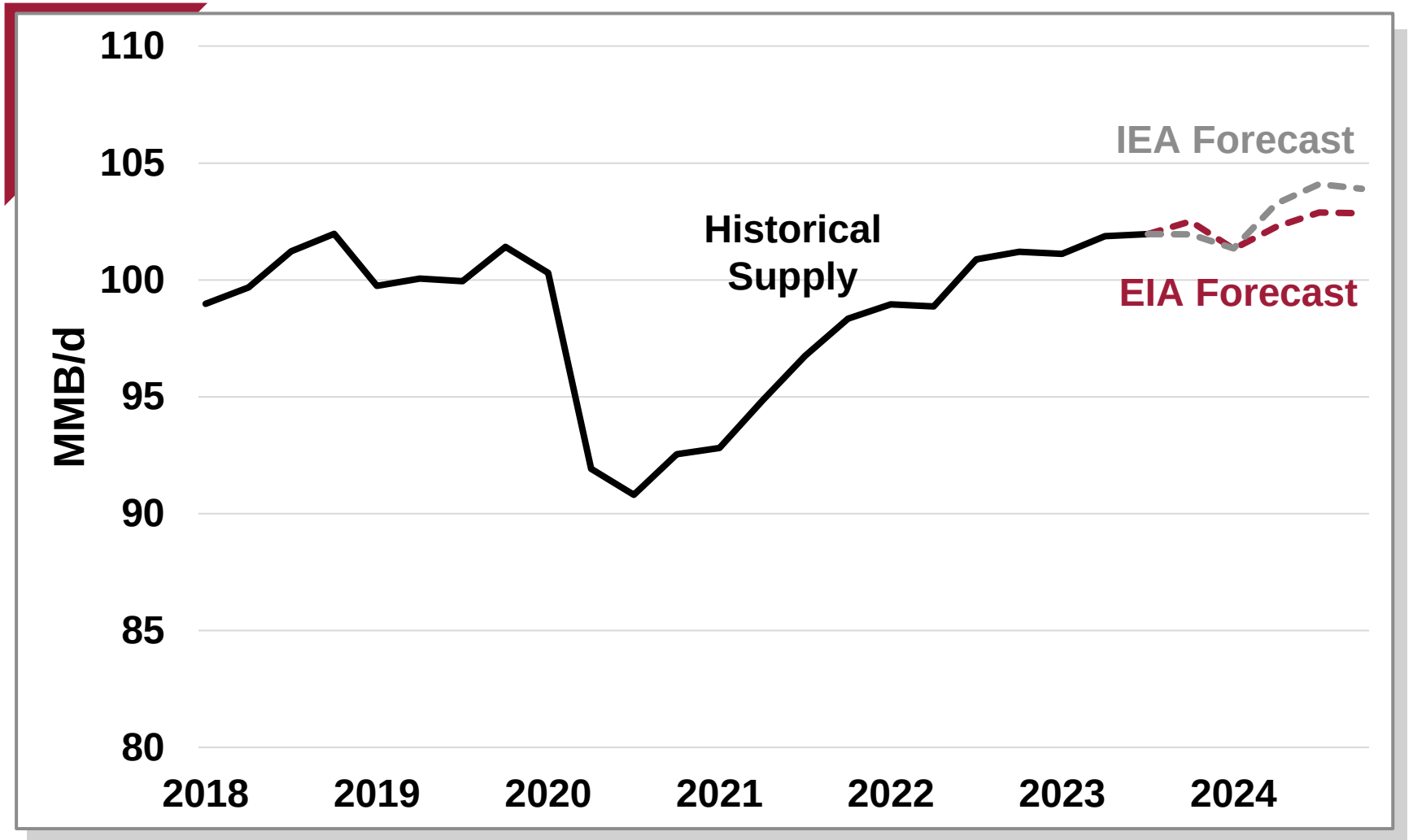
Short-Term Global Crude Oil and Liquids Supply Outlooks[1] | Quarterly | 2018 to 2024e

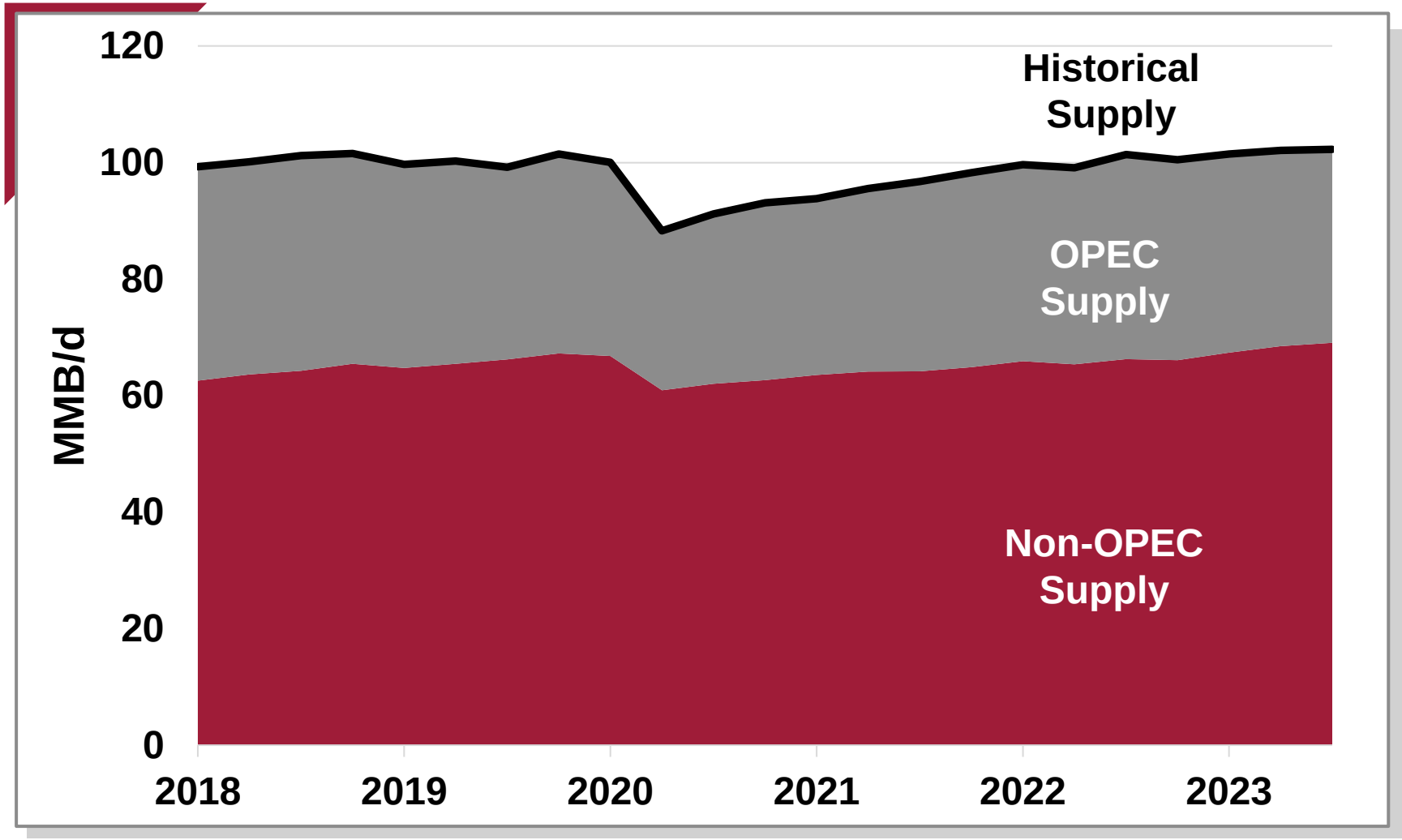


- Based on the current short-term outlooks from the IEA and EIA, on average, global crude oil and liquids supply is expected to average 102.8 MMB/d in 2024, up 0.9% or 0.9 MMB/d from 2023 levels.
- The 2024 supply growth is half that of the previous year. On average (IEA and EIA), global supply is expected to have increased to 101.7 MMB/d in 2023, up 1.8% or 1.8 MMB/d from 2022 levels.

Source: International Energy Agency – Oil Market Report (Dec 2023), US Energy Information Administration – Short-Term Energy Outlook (Jan 2024)

[1] OPEC only provides a supply forecast for non-OPEC volumes in its Monthly Oil Market Report

Global Crude Oil and Liquids Supply by OPEC and Non-OPEC | Quarterly | 2018 to Q3/2023*

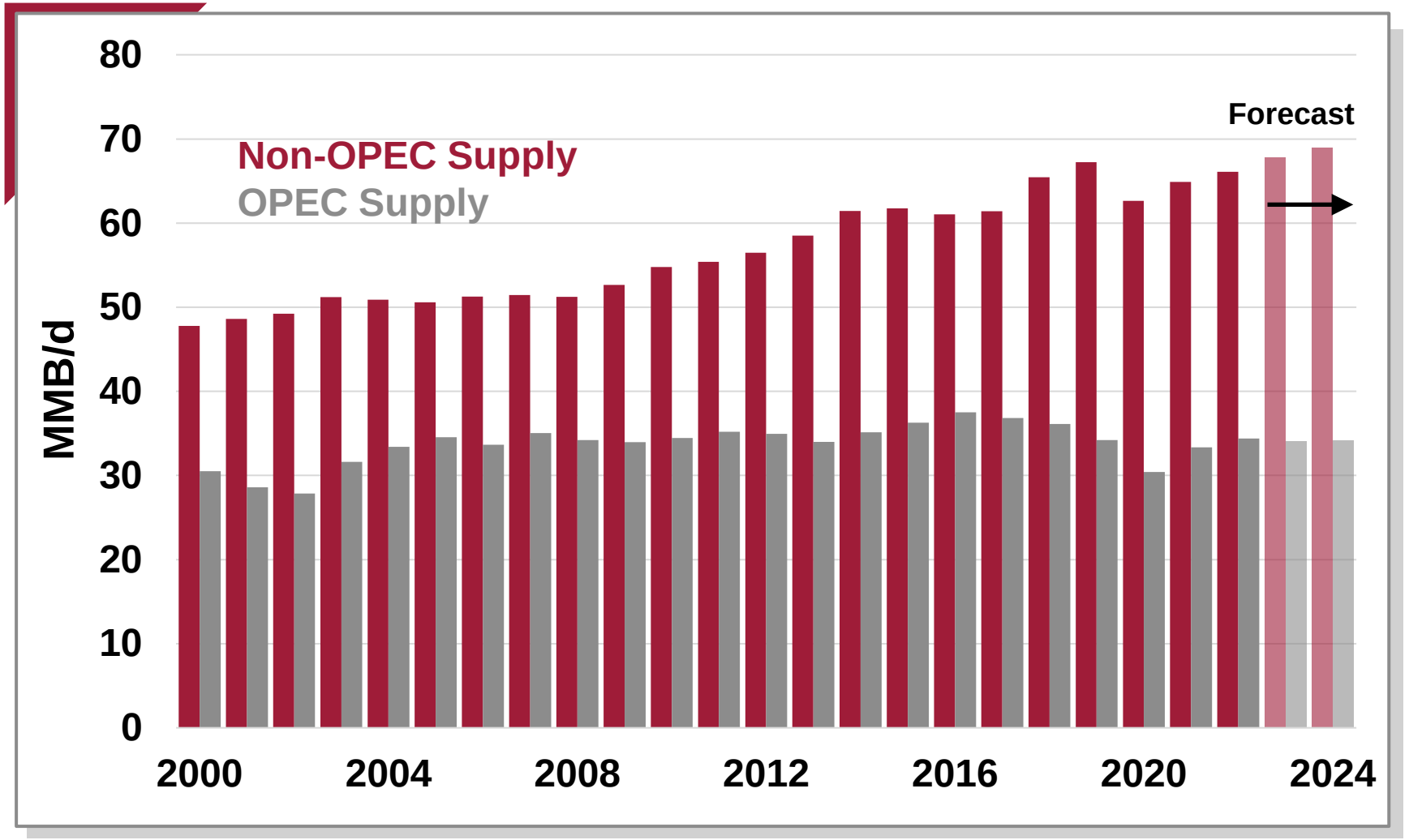


- In 2024, OPEC is expected to account for roughly 30% of total supply, compared to about 70% for non-OPEC countries.
- Russia, along with several smaller producing countries, make up part of a broader organization called OPEC+. When Russia's production of roughly 9.5 MMB/d is included along with other smaller producers, OPEC+ accounts for closer to 50% of the total global supply.
- Despite the smaller market share, OPEC remains the balancing force in the market, as the cartel has exerted its influence on pricing via voluntary supply cuts.

Source: International Energy Agency – Oil Market Report (Dec 2023)

*2023 data is up to Sep 2023

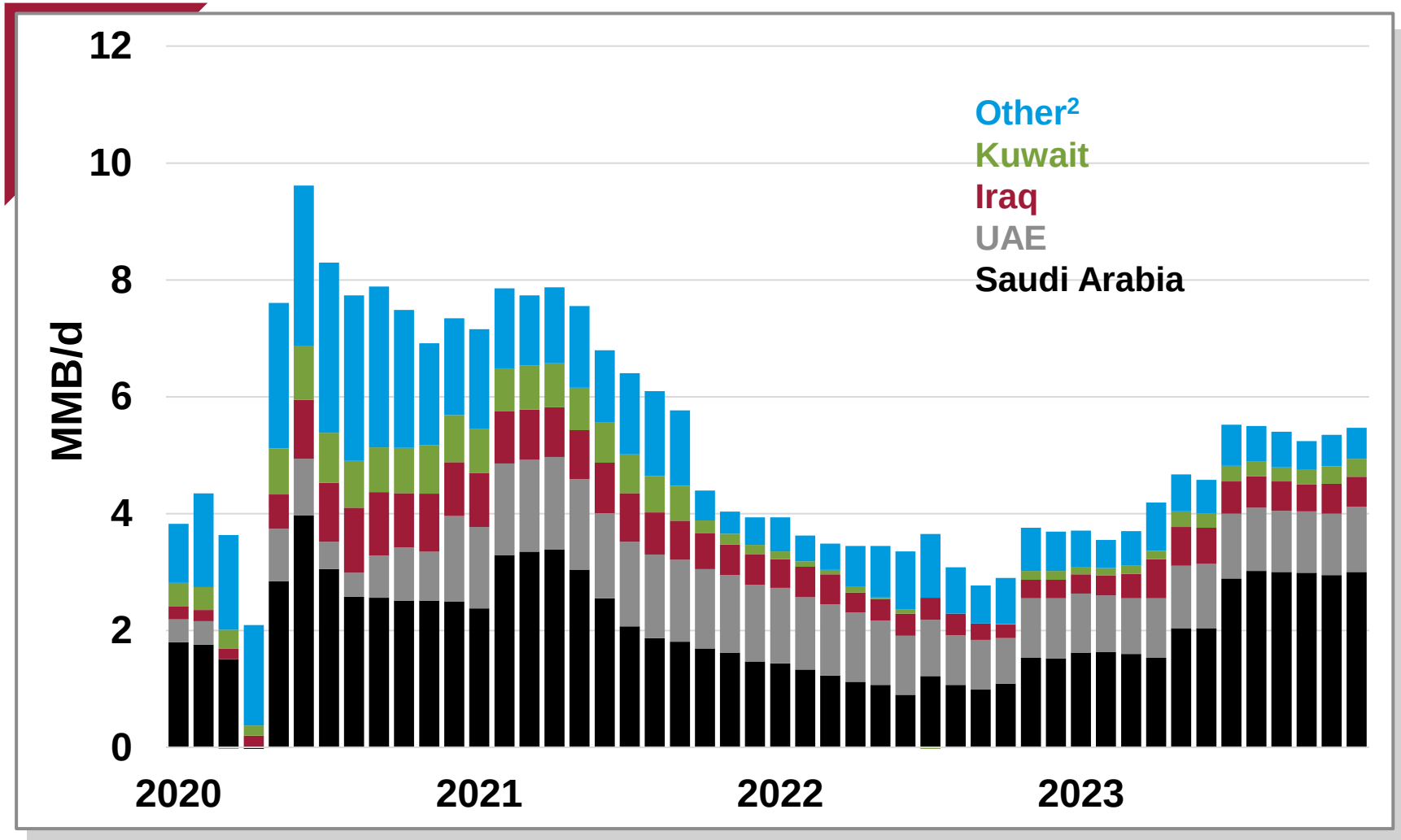
Non-OPEC *vs.* OPEC Supply Growth | Annual | 2000 to 2024e



- Between 2000 and 2023, non-OPEC supply has grown by over 40% to roughly 68 MMB/d from 48 MMB/d, predominantly driven by the United States.
- Over the same period, OPEC supply has increased by only 12% to roughly 34 MMB/d from 31 MMB/d. However, voluntary production cuts have been in effect since 2020 to stabilize the global supply/demand balance.
- Strong growth from non-OPEC countries has limited the cartel's ability to grow volumes and, should it continue, may necessitate an extension of voluntary production cuts in 2024 to ensure market stability.

Source: International Energy Agency – Oil Market Report (Dec 2023), US Energy Information Administration – Short-Term Energy Outlook (Jan 2024)

Estimated OPEC Spare Production Capacity[1] | Monthly | 2020 to 2023

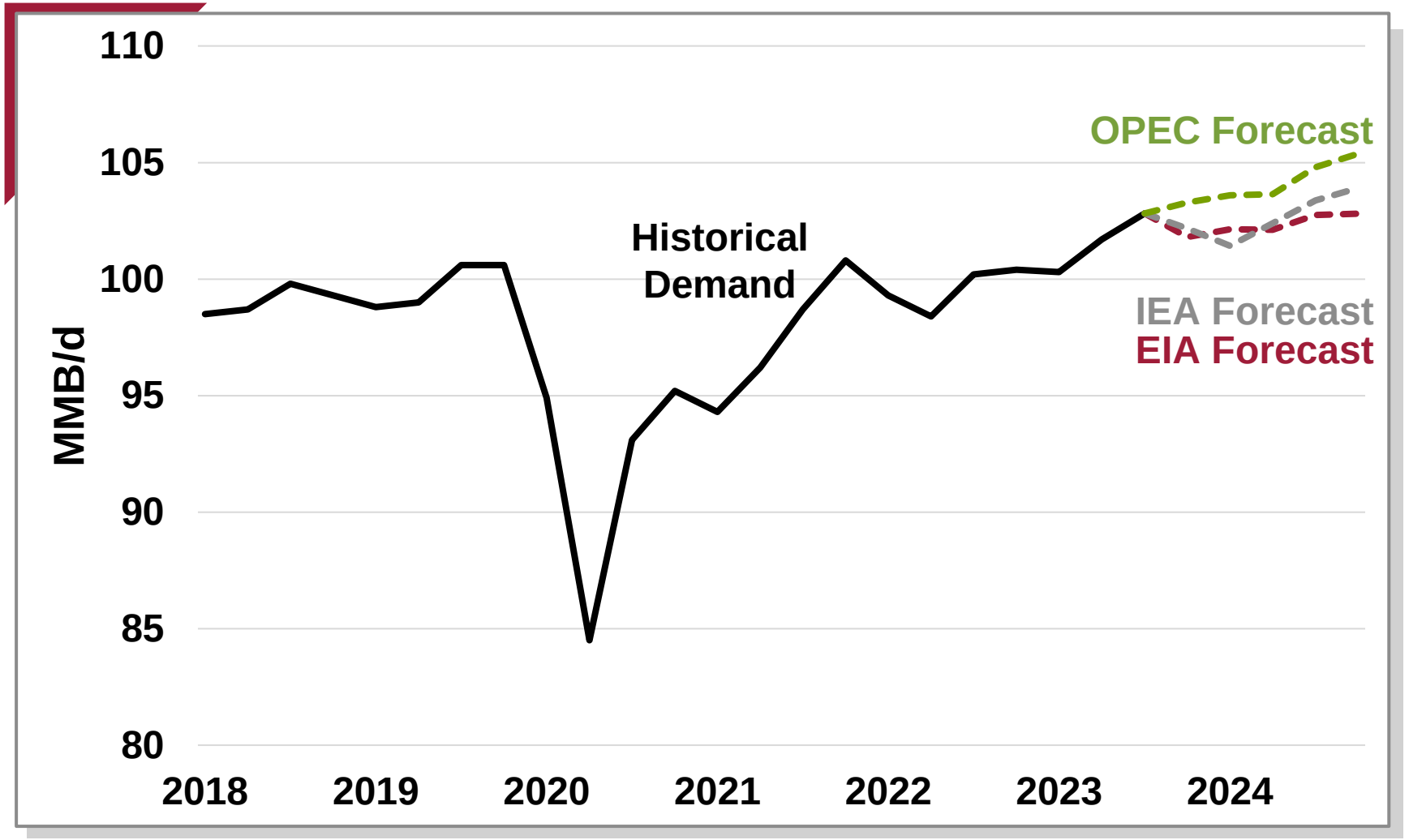


- In response to demand destruction caused by COVID in 2020, OPEC and select non-OPEC oil-producing countries (OPEC+) announced voluntary production cuts to stabilize global oil markets. Supply cuts have remained in place since.
- Based on its latest agreement in November 2023, OPEC+ (incl. Russia) will be withholding a combined 2.2 MMB/d of production from Jan 1st, 2024 through Mar 31st, 2024, over and above the 5.3 MMB/d in estimated spare capacity from collective OPEC+ members.
- Saudia Arabia has been shouldering the bulk of the OPEC+ supply cuts.

Source: Bloomberg, International Energy Agency, OPEC

[1] Estimates based on a survey by Bloomberg News of companies and oil market contacts in OPEC-member countries
[2] Other is comprised of Nigeria, Gabon, Equatorial Guinea, Congo, Angola, Algeria, Libya, and Venezuela

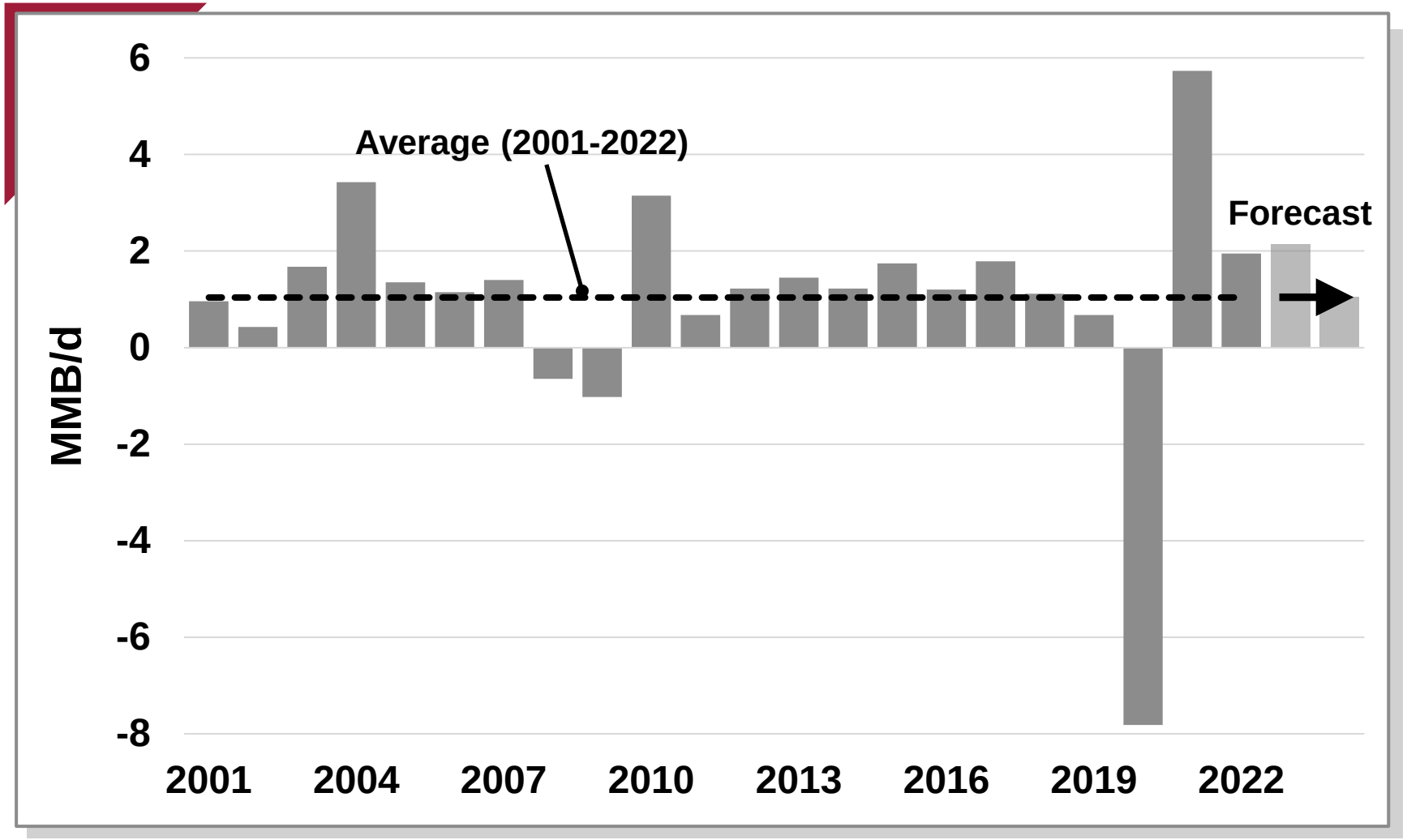
Short-Term Global Crude Oil and Liquids Demand Outlooks | Quarterly | 2018 to 2024e



- Based on the average of the latest short-term outlooks from the IEA, EIA, and OPEC, global crude oil and liquids demand is expected to average 103.2 MMB/d in 2024, up 1.5% from 2023 levels or ~1.6 MMB/d.
- Demand growth in 2024 varies by agency. In MMB/d annual growth, the IEA, EIA, and OPEC are forecasting 1.1, 1.4, and 2.3, respectively.
- Global demand growth is expected to slow in 2024 compared with 2023. Average global demand is expected to have increased to 101.8 MMB/d in 2023, up 2.2% or 2.2 MMB/d from 2022 levels.

Source: International Energy Agency – Oil Market Report (Dec 2023), US Energy Information Administration – Short-Term Energy Outlook (Jan 2024), OPEC – Monthly Oil Market Report (Dec 2023)

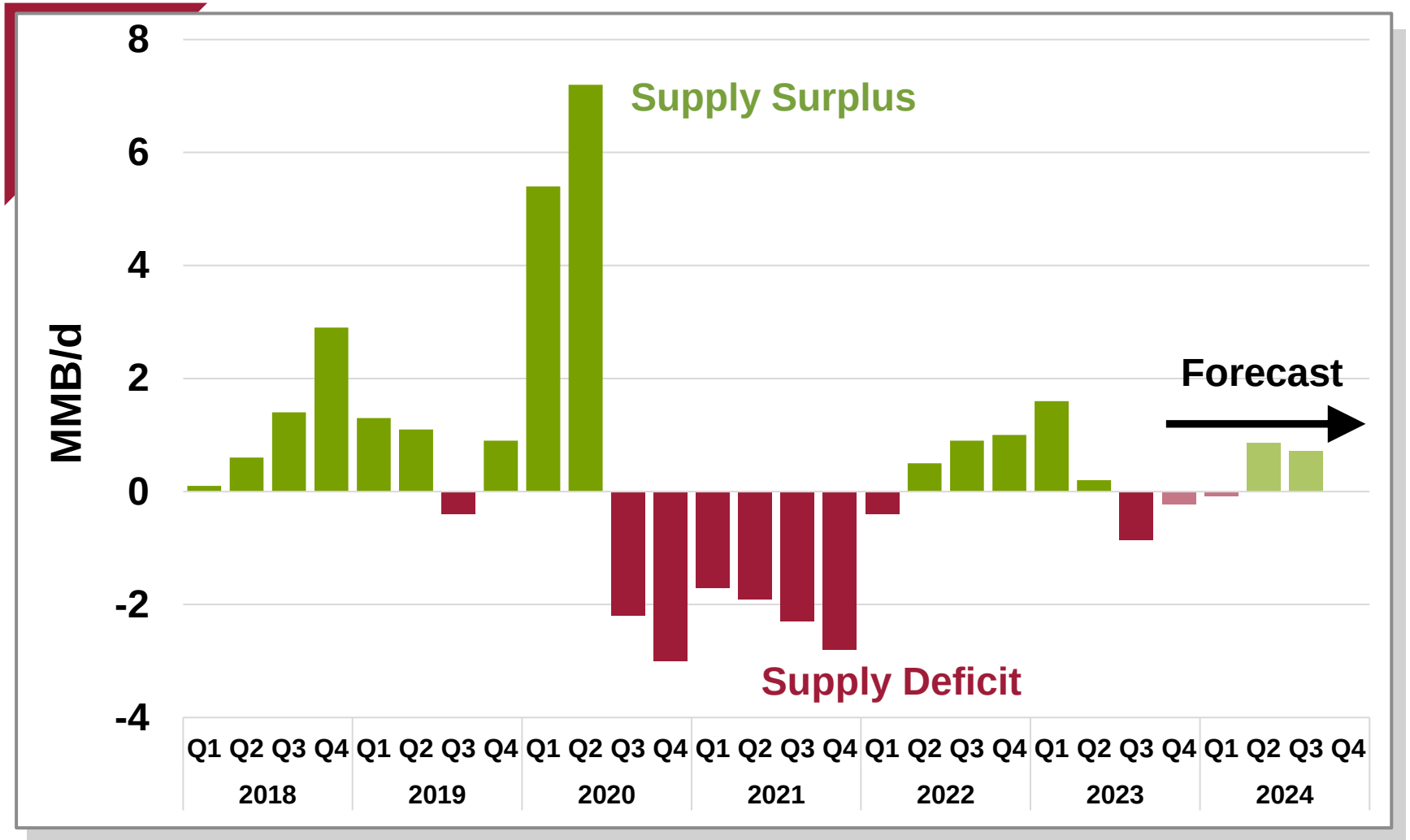
Annual Demand Growth – IEA | 2001 to 2024e



- According to the IEA, global annual demand growth is poised to slow to roughly 1.1 MMB/d in 2024 from 2.1 MMB/d in 2023, following a strong rebound in demand post-pandemic, which is now done.
- The IEA's 2024 demand growth expectations align with the historical annual average of approximately 1 MMB/d from 2001 to 2022.
- The EIA and OPEC (not shown) forecast 2024 annual demand growth of 1.4 MMB/d and 2.3 MMB/d, respectively, slightly above the 2001 to 2022 historical average.

Source: International Energy Agency – Oil Market Report (Dec 2023), US Energy Information Administration – Short-Term Energy Outlook (Jan 2024), OPEC – Monthly Oil Market Report (Dec 2023)

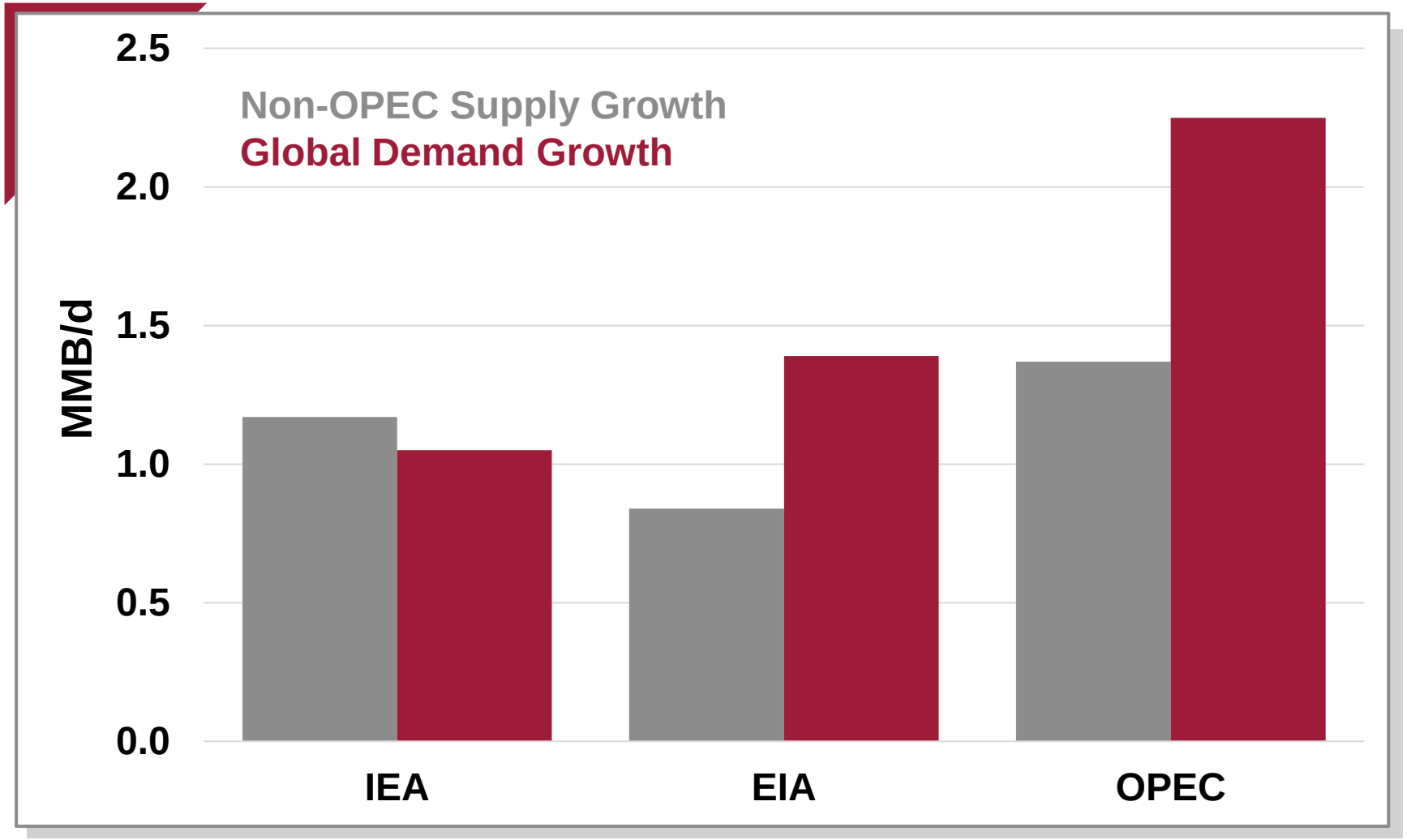
IEA Short-Term Global Crude Oil and Liquids Supply/Demand Balance Outlook | Quarterly | 2018 to 2024e



- Based on the latest monthly IEA Oil Market Report (Dec 2023), global crude oil and liquids supply is expected to outpace demand, leading to supply surpluses in Q2 and Q3/2024.
- Meanwhile, global demand growth is expected to decelerate in 2024 in the face of macroeconomic headwinds. The latest forecast from the IMF sees global GDP slowing to 2.9% in 2024, compared to 3.0% in 2023 and 3.5% in 2022.
- However, it should be noted that the IEA expects global oil demand to reach a record high of over 103 MMB/d in H2/2024.

Source: International Energy Agency – Oil Market Report (Dec 2023), International Monetary Fund

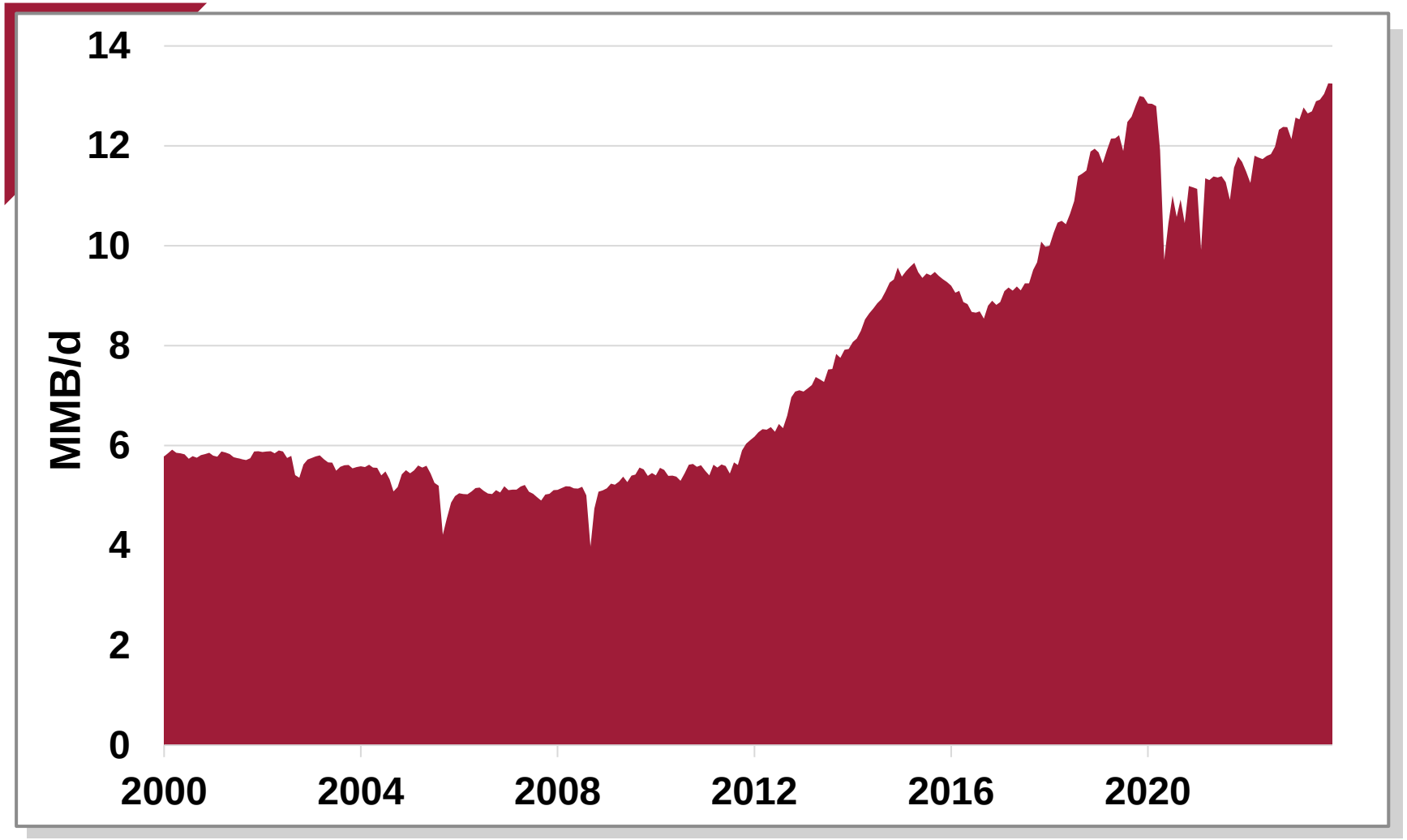
Non-OPEC Supply *vs.* Global Demand Growth Outlooks | 2024e



- A key differentiator in various agency outlooks is demand growth, whereas supply growth is more aligned. The IEA is the most bearish on demand and is therefore predicting a loose oil market in 2024. Meanwhile, the EIA and OPEC see a shortfall (i.e., tight market).
- In 2024, the IEA expects non-OPEC supply growth to outpace global demand growth by approximately 0.12 MMB/d, leading to supply surpluses. In this case, OPEC would have to continue its current cuts for 2024 to balance the market.
- Major sources of expected supply growth in 2024 include the United States, Brazil, Guyana, and Iran.

Source: International Energy Agency – Oil Market Report (Dec 2023), US Energy Information Administration – Short-Term Energy Outlook (Jan 2024), OPEC – Monthly Oil Market Report (Dec 2023)

US Crude Oil Production (Excl. NGLs) | Annual | 2000 to Q4/2023*

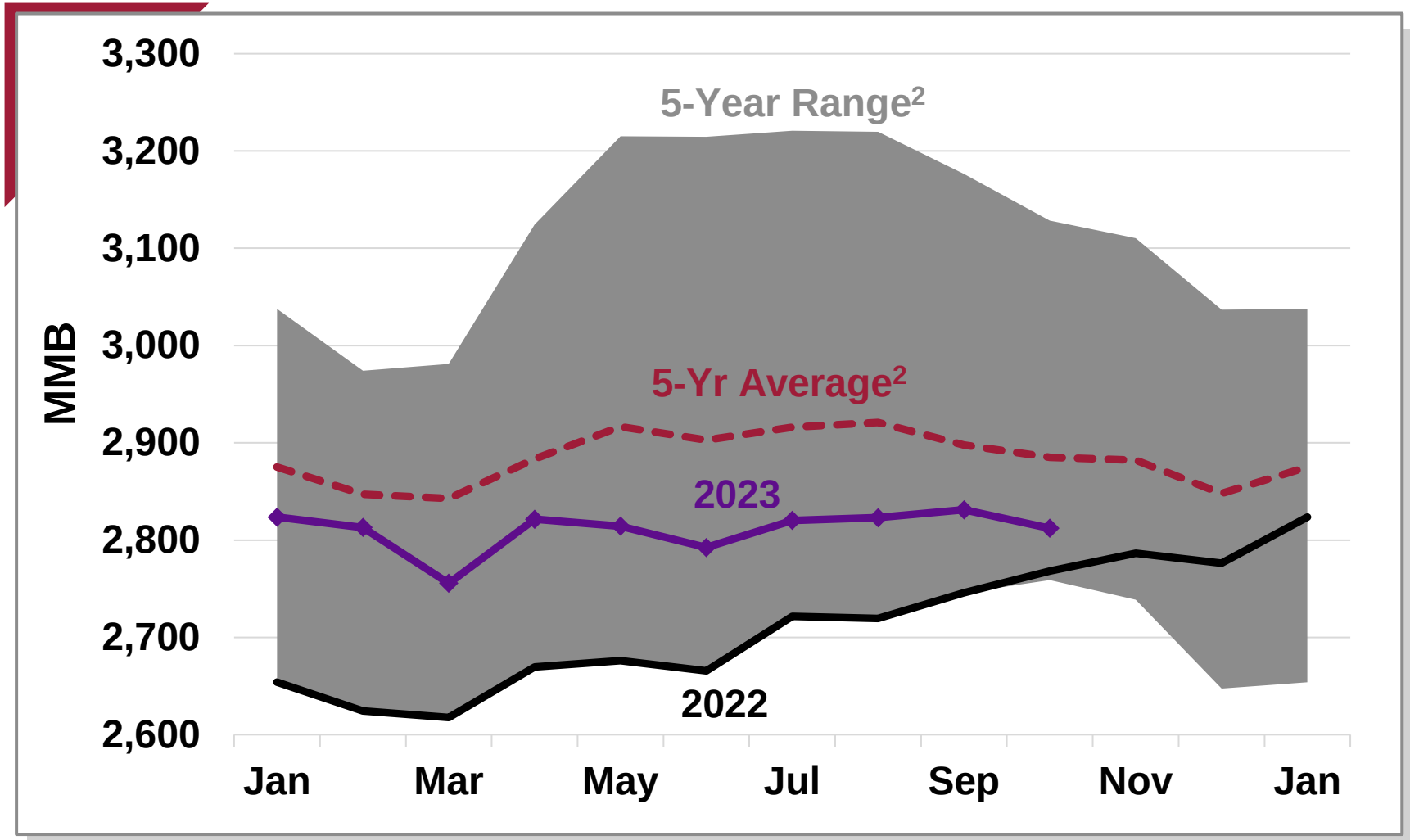


- The United States continues to be a major source of non-OPEC supply growth. As of October 2023, crude oil production was 13.2 MMB/d, up 0.8 MMB/d Y/Y (+7%).
- In August 2023, US crude oil production surpassed its pre-COVID peak of 13 MMB/d. Despite a declining rig count, US volumes surged in 2023, supported by an inventory of drilling but uncompleted (DUC).
- Based on the latest forecasts from the US Energy Information Administration and the International Energy Agency, US crude oil production growth is expected to moderate in 2024.

Source: US Energy Information Administration, International Energy Agency

*2023 data is up to Oct 2023

Total OECD Inventories (Crude Oil and Products[1]) | Monthly | 2018 to 2023

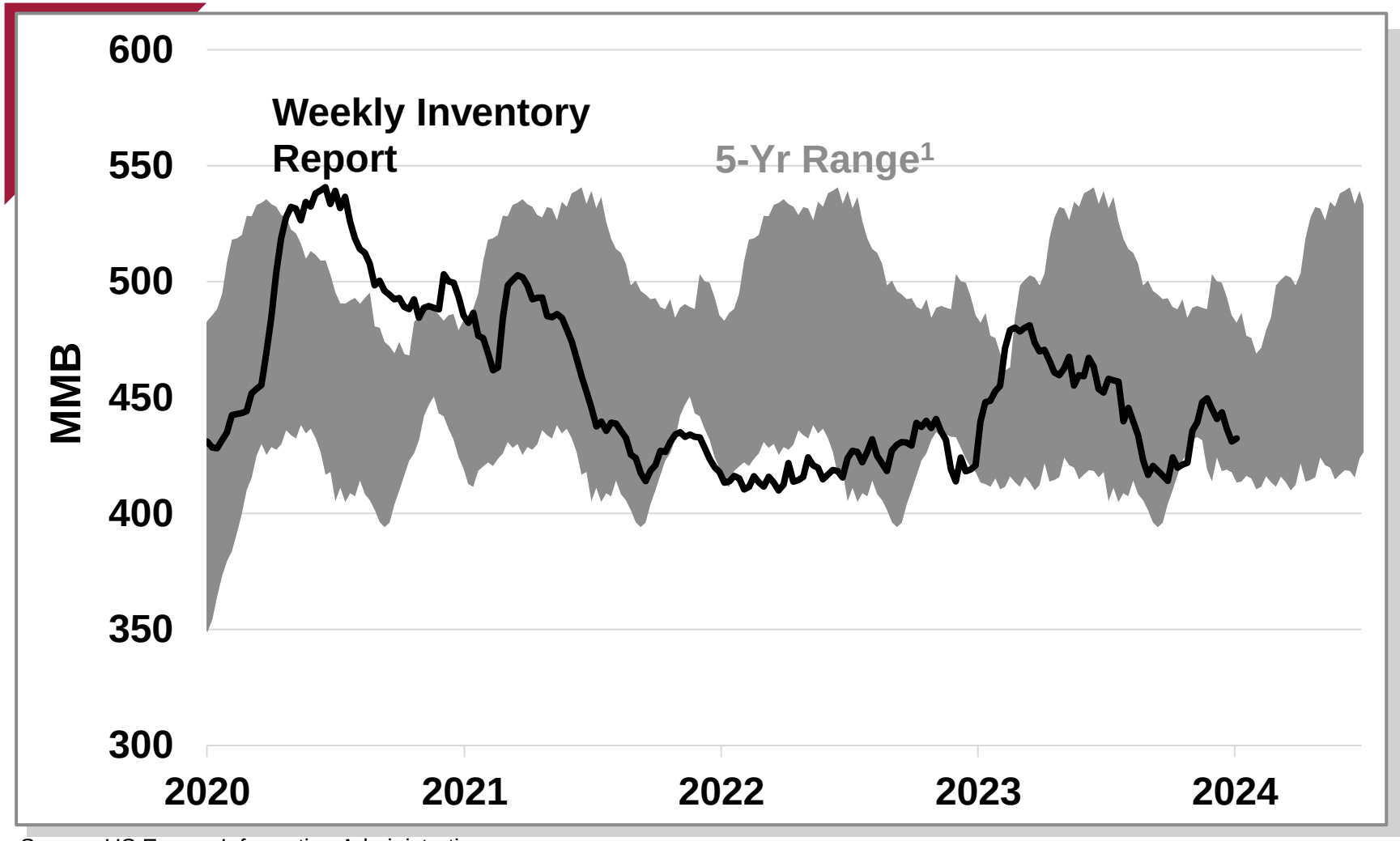


- Crude oil inventories serve as a key indicator for supply and demand, and as a result, can impact crude oil prices.
- The Organization for Economic Cooperation and Development (OECD) is comprised of 38 countries that collectively account for a significant portion of global supply and demand.
- High inventories indicate a loose market and typically lower price levels, while low inventories indicate the opposite – they tend to occur in tight, higher-priced markets.
- Since 2022, OECD inventories have been below the 5-year average, indicating a tighter balance and buoying oil prices.

Source: International Energy Agency

[1] Products include motor gasoline, middle distillates, fuel oil, and 'other'
[2] The 5-yr range and average represent the highest and lowest weekly inventory level over the equivalent week during the prior 5 years

US Commercial Crude Inventories (Excl. SPR) | Weekly | 2020 to 2024

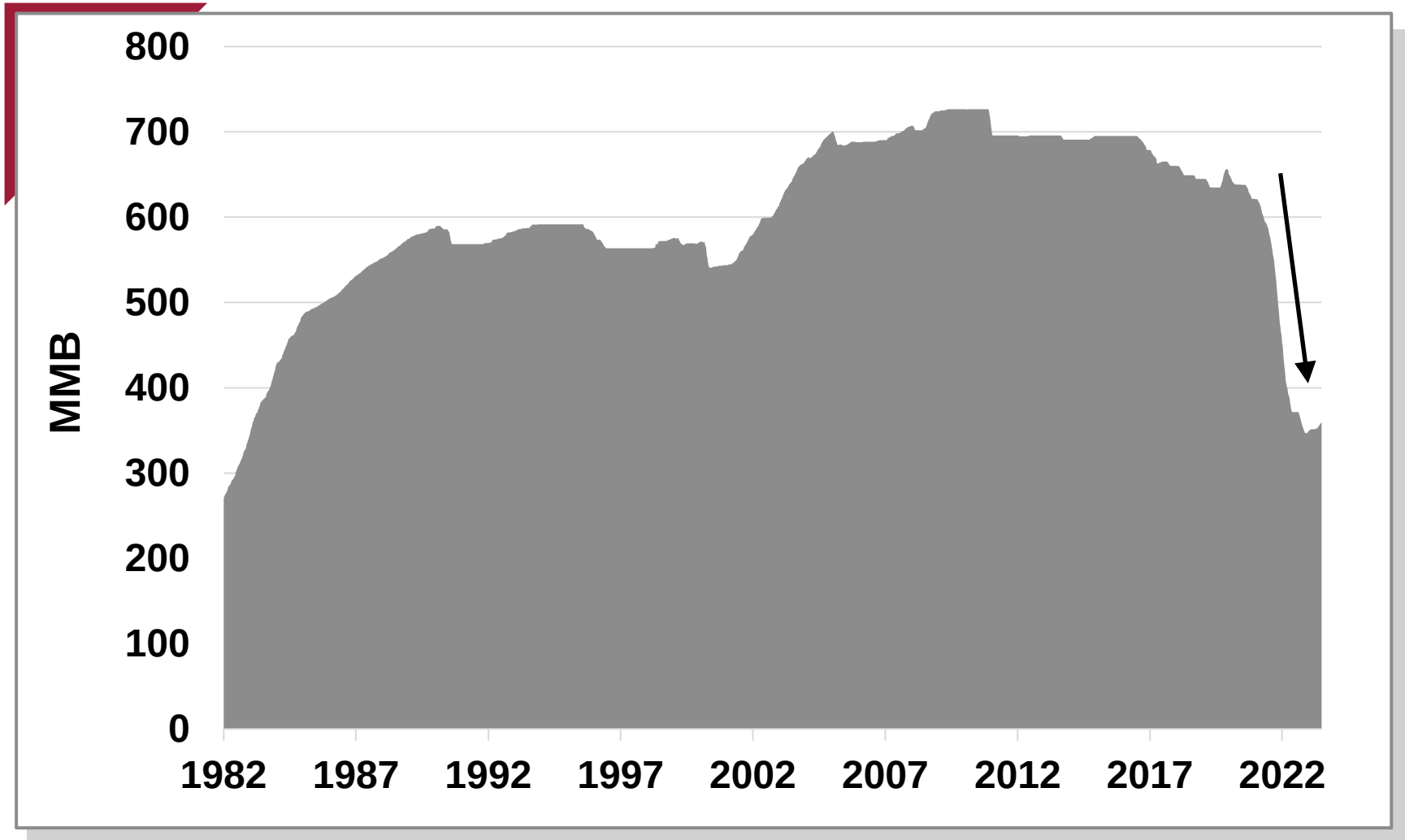


- Similarly, given its standing as the top global oil consumer, US commercial crude inventories are a crucial oil market indicator because they are published weekly and are therefore the most real-time, available public data on inventories. Oil market prices are impacted when the weekly data differs from market expectations.
- In 2022, US commercial crude inventories were at or below the minimum of the 5-year range, implying a tight market and supportive of higher prices.
- The US Strategic Petroleum Reserve (SPR) is not included in this data. In the 2022 energy shock, the SPR was used to add supply to soften prices.

Source: US Energy Information Administration

[1] 5-yr range represents the highest and lowest weekly inventory level over the equivalent week during the prior 5 years

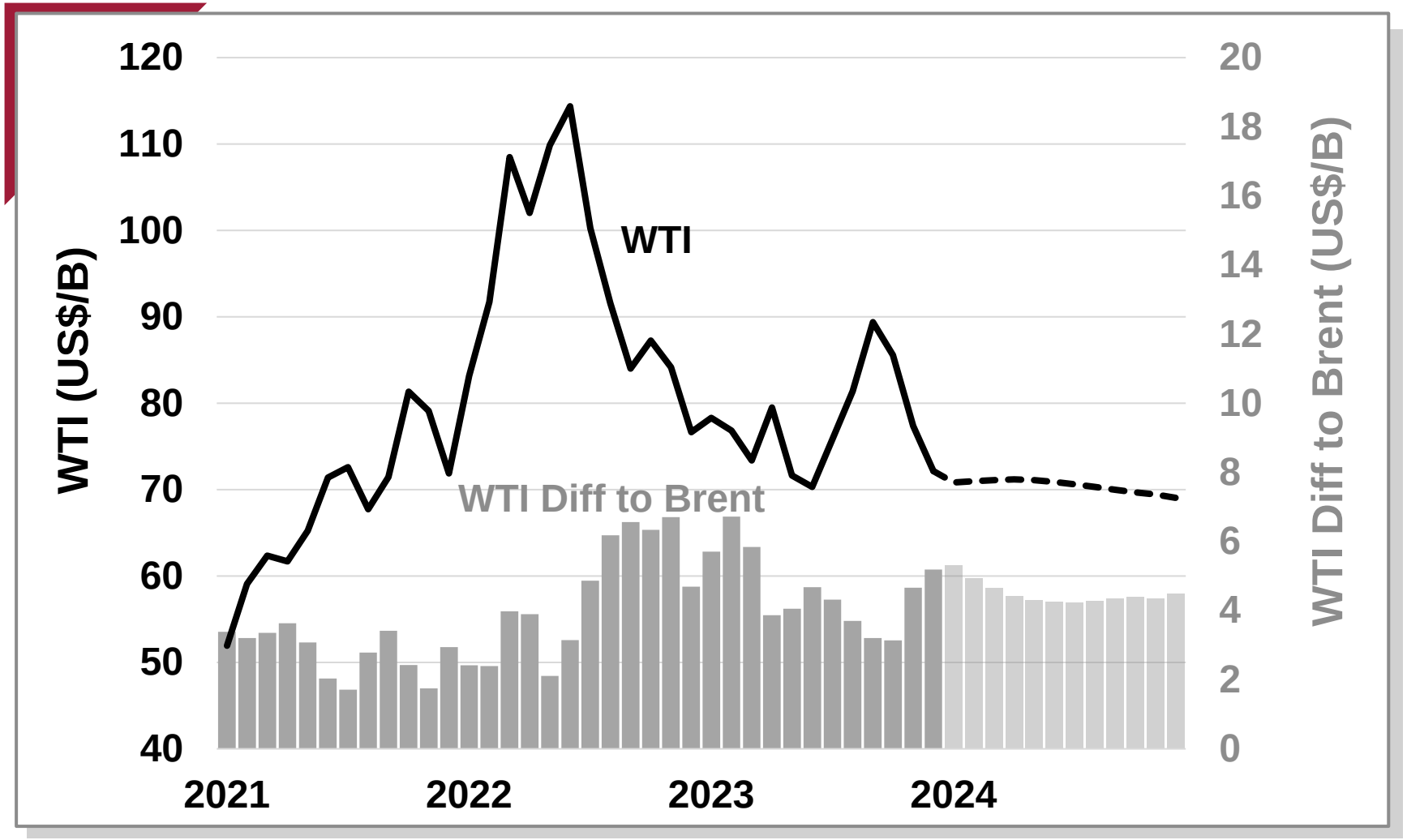
US Strategic Petroleum Reserve | Weekly | 1982 to 2024



- The US Strategic Petroleum Reserve (SPR) is an emergency stockpile of crude oil that was developed in 1975 by the US Department of Energy as a tool to mitigate potential future supply disruptions following the 1973-1974 oil embargo. The SPR currently has an authorized storage capacity of 714 MMB.
- In 2022, the Biden administration authorized the release of 180 MMB from the SPR to combat rising gasoline and other petroleum fuel prices following supply disruptions associated with Russia's invasion of Ukraine. As a result, SPR stockpiles fell to roughly 346 MMB, its lowest level since 1983.

Source: US Energy Information Administration, US Department of Energy

Global Crude Oil Benchmarks | Monthly | 2022 to 2024e



- In 2022, WTI oil price spiked to over US$120/B as a result of the energy crisis spurred by Russia's invasion of Ukraine.
- 2023 has seen more moderate pricing, averaging approximately US$78/B, notwithstanding significant volatility. After reaching as high as ~US$95/B in late September, the front-month oil price fell to a low of ~US$65/B in December due to concerns about slowing global demand amidst growing supplies, particularly in the United States.
- The futures market for WTI and Brent over the next 12 months averages roughly US$70/B and US$74/B, respectively.

Source: Bloomberg, National Bank Financial. Futures pricing as of Jan 8th, 2024.

WCSB Crude Oil

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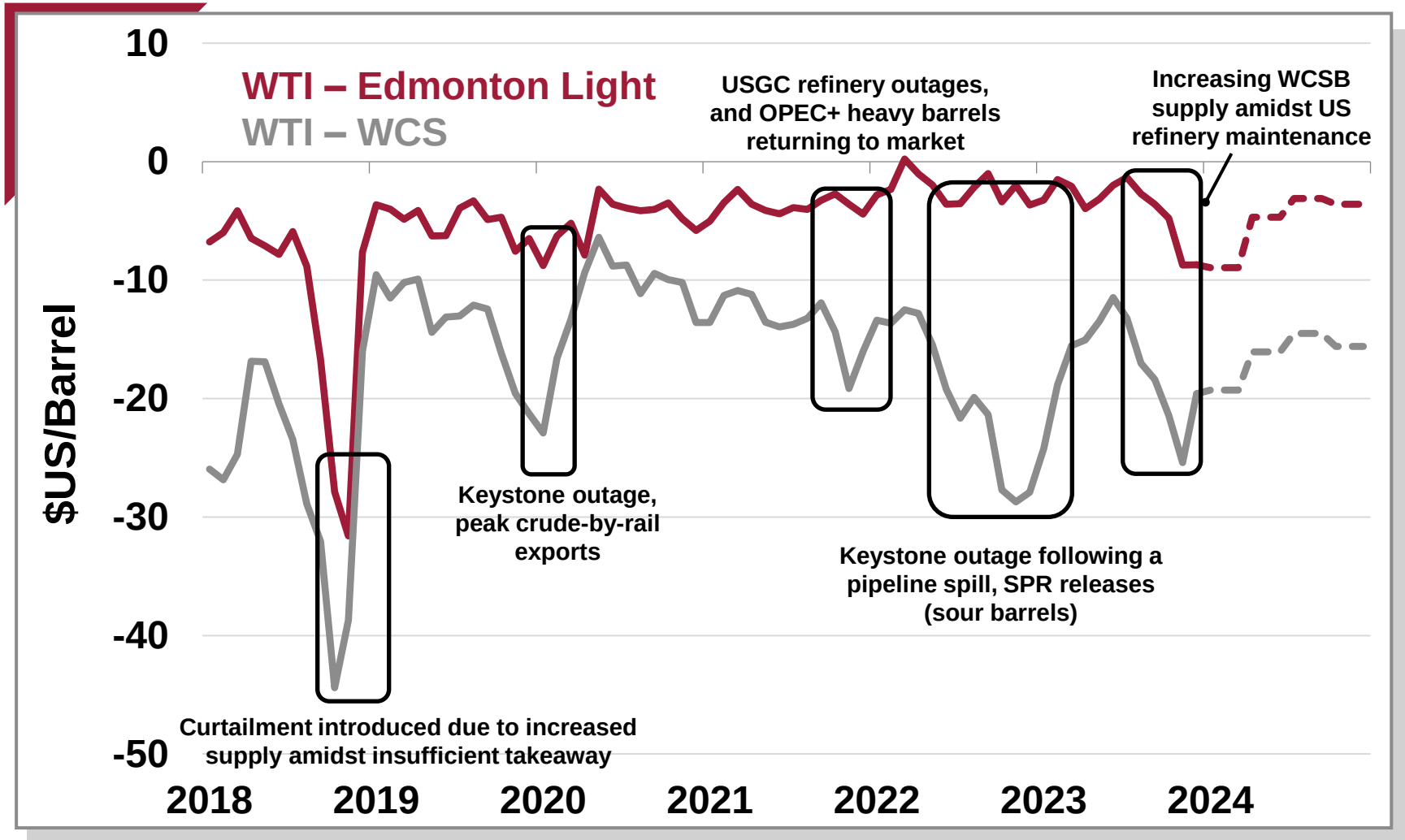
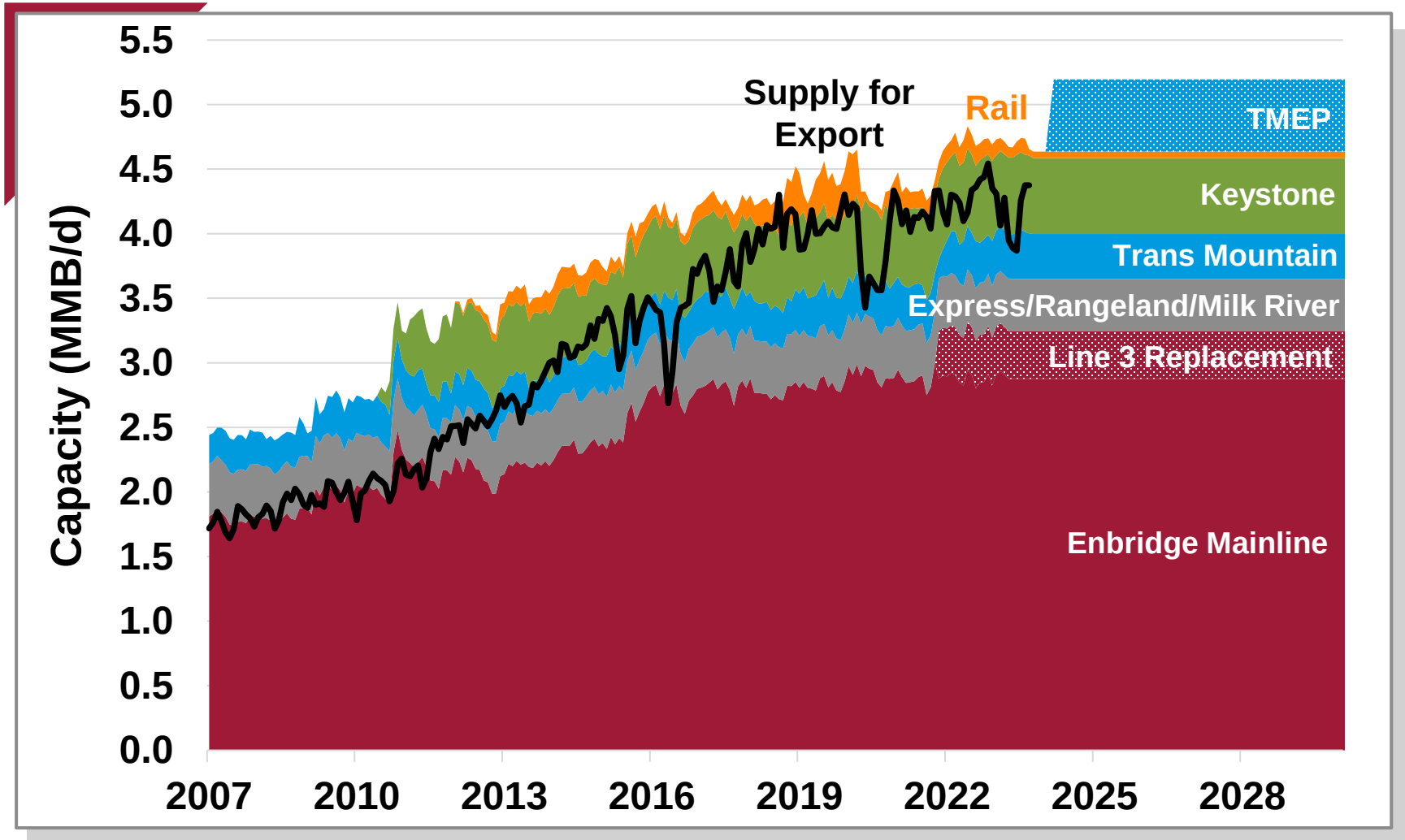
Canadian Crude Oil Benchmarks | Monthly | 2022 to 2024e



- Canadian crude oil price differentials have again come under pressure to close out 2023, largely related to US refinery maintenance. To begin 2024, pipeline capacity is becoming a constraint, as indicated by rising apportionment levels on the Enbridge Mainline.
- Differentials are expected to narrow upon the start-up of Trans Mountain Expansion Project (TMEP) due to 590 MB/d of additional pipeline capacity; the pipeline is tentatively poised to be in service in Q2/2024.
- The forward curves for Edmonton Light and Western Canadian Select (WCS) are pricing differentials relative to WTI of US$(3.60)/B and US$(15.60)/B by year-end 2024.

Source: Bloomberg, National Bank Financial, Enbridge; Futures pricing as of Jan 8th, 2024.

WCSB Egress Outlook *vs.* Supply | Monthly | 2007 to Q3/2023*



- Canadian crude oil benchmarks are negatively impacted when Western Canadian Sedimentary Basin (WCSB) supply approaches egress capacity. With the most recent construction-related delays, line fill for the Trans Mountain Expansion Project (TMEP) is tentatively expected to be in service by Q2/2024.
- Canadian supply (data up to Sep 2023) is approaching pipeline takeaway capacity, as indicated by rising apportionment levels on the Enbridge Mainline. TMEP is thus needed to avoid wider price discounts in 2024.
- Once operational, TMEP should provide sufficient egress capacity and narrower price differentials.

Source: Canada Energy Regulator
Note: Supply for Export is net of Western Canada refinery demand and excludes NGLs

*2023 data is up to Sep 2023