

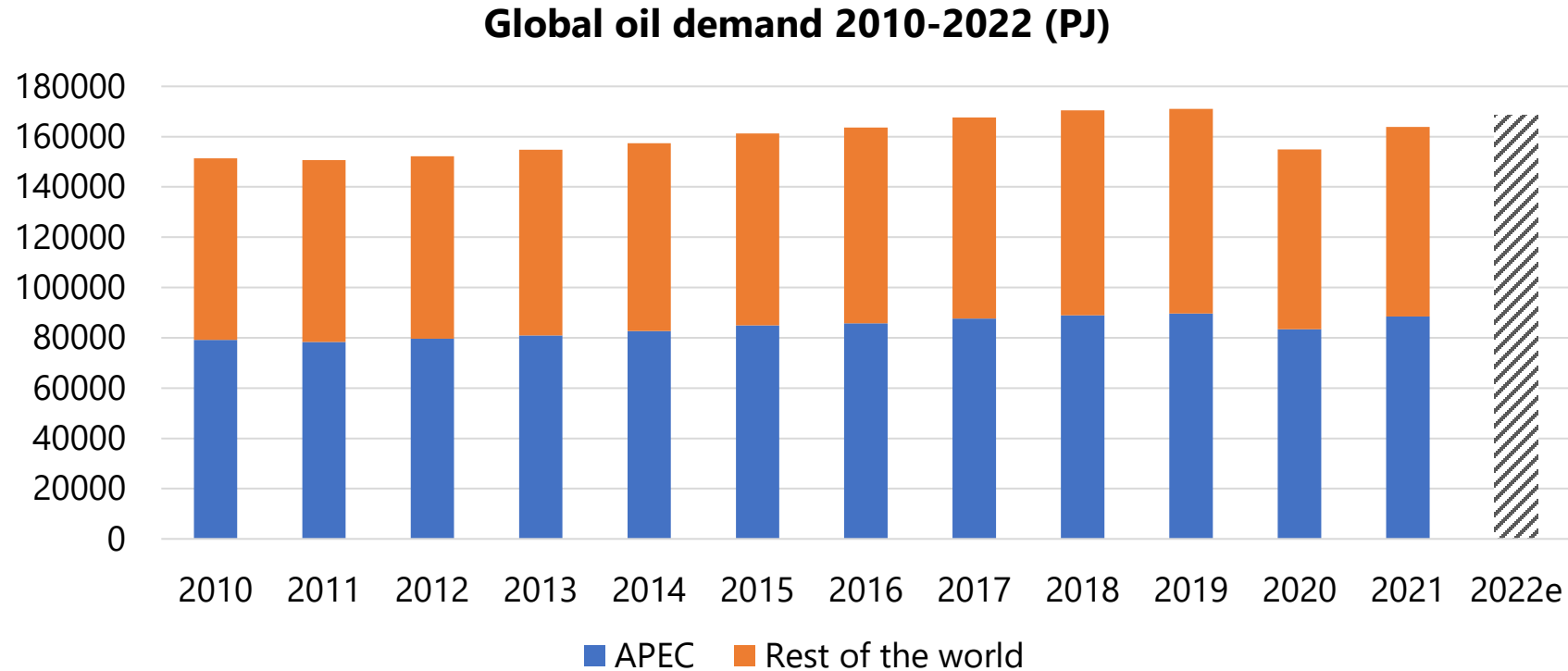
Upstream Oil and Gas Investment in APEC Region

APEC Expert Group on Clean Fossil Energy (EGCFE) Meeting
20 April 2023 (GMT+9) - Online

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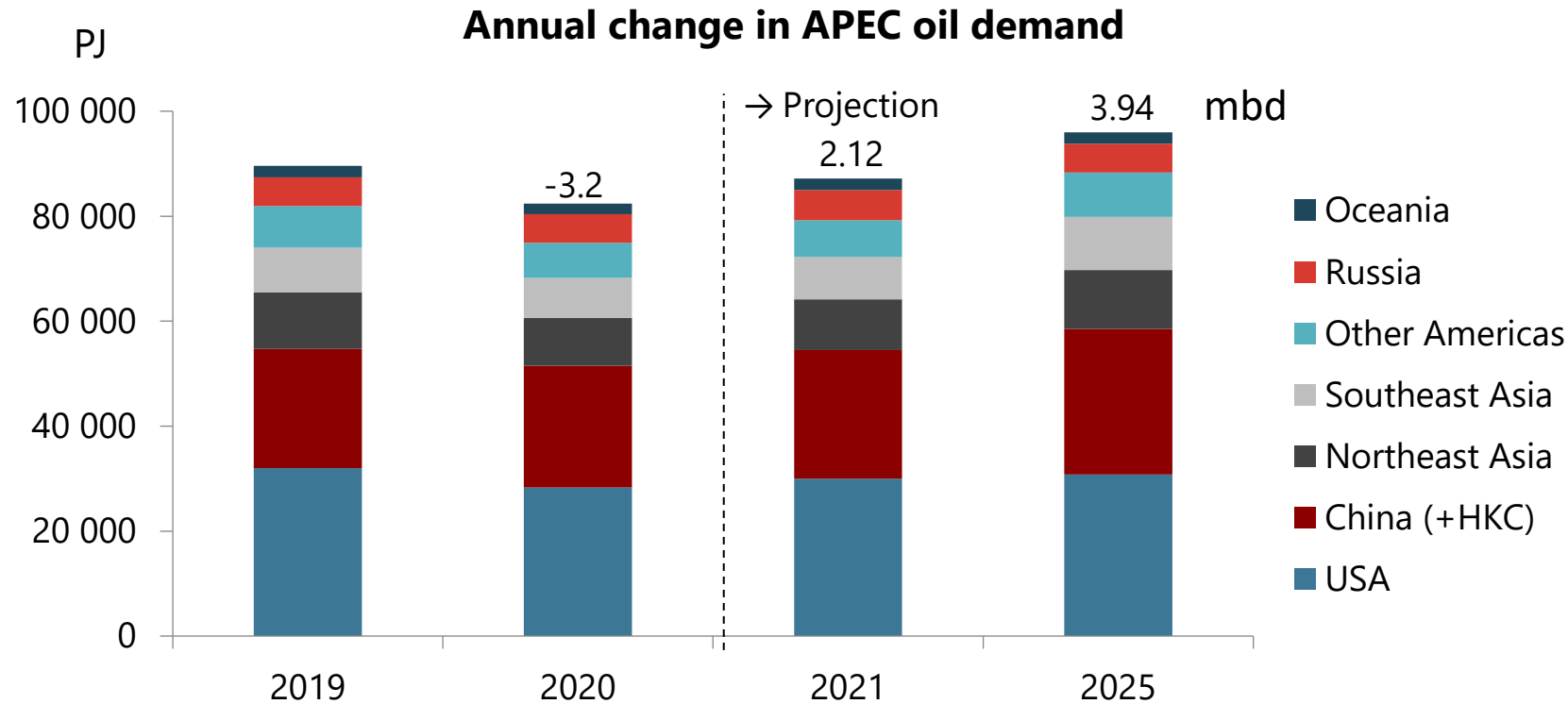
World and APEC oil demand rebounded in 2021 and 2022



Source: APERC Analysis using EGEDA, IEA data. Note: () APERC calculations using IEA and EIA data.*

- Global oil demand declined by 9.4% in 2020 due to COVID-19 but rebounded in 2021 and 2022.
- In 2021, oil demand rebounded by 5.5%, and continued to increase by an estimated 0.8% in 2022.
- In 2022, oil demand remained about 1.5% below 2019 levels.

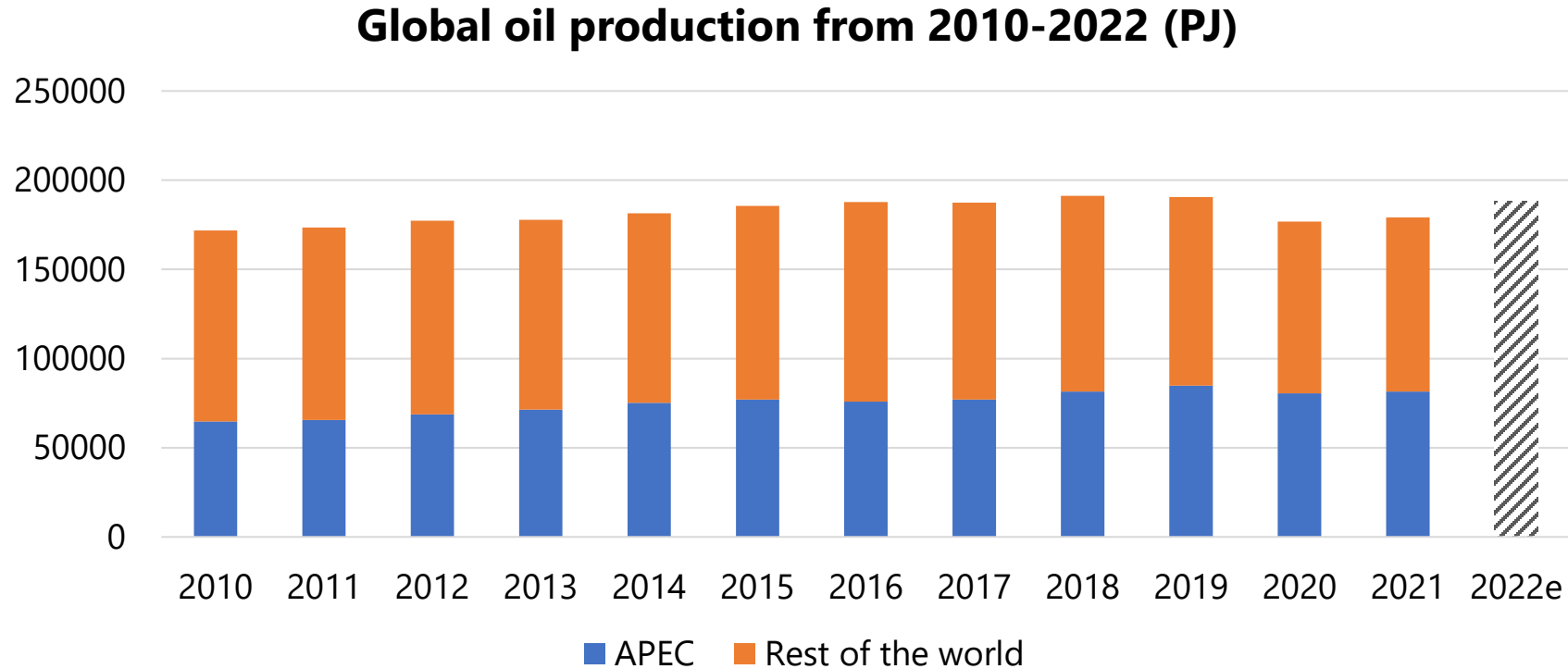
Oil demand outlook in APEC



Source: EGEDA, APERC Analysis

- In APEC, total oil demand is expected to increase 7% above the 2019 level by 2025.
- From 2019 to 2025, China's and Southeast Asia's oil demand increases by 18% and 16%, respectively.
- The USA is the only sub-region in APEC for which we expect a decline (down 3.7% through 2025).

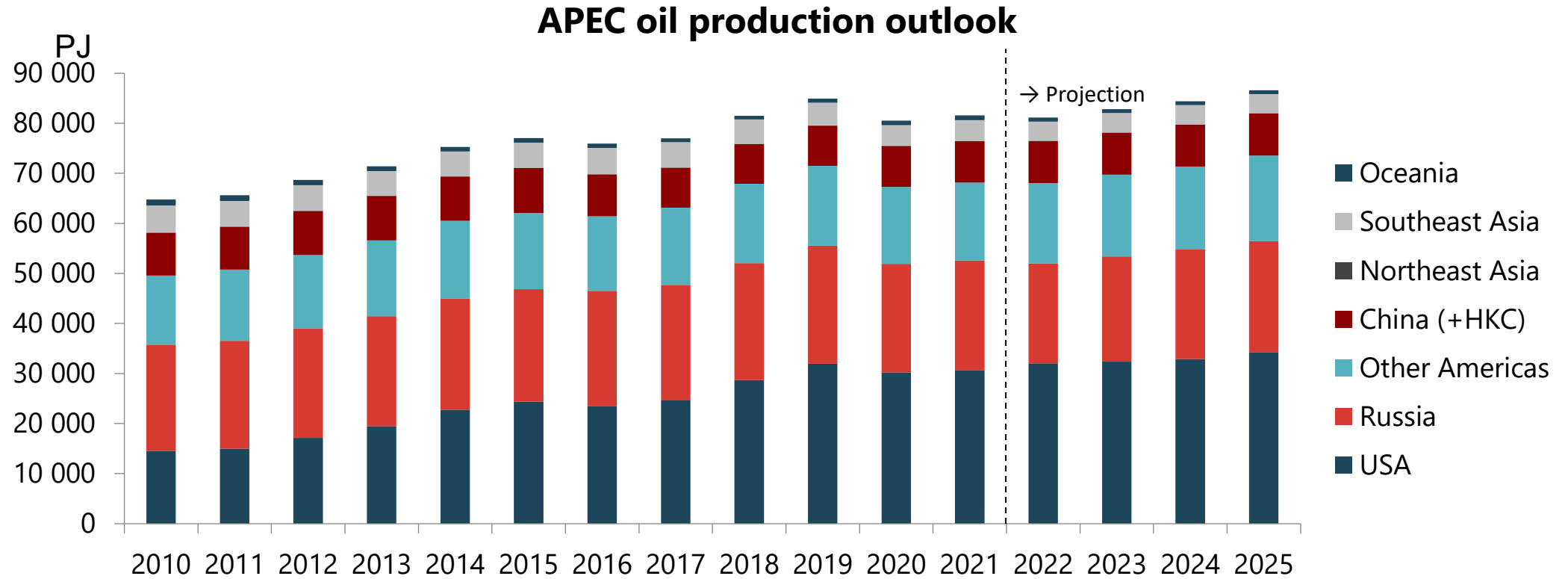
Global oil production



Source: APERC Analysis using EGEDA, IEA data. Note: (*) APERC calculations using IEA and EIA data.

- Global oil production declined by 7.8% in 2020 due to COVID-19.
- In 2021, oil production remained weak, increasing by only 1.3% y-o-y and remaining 6.1% below 2019 levels.
- Global oil production increased by 5% in 2022, remaining 1.4% below pre-COVID levels.

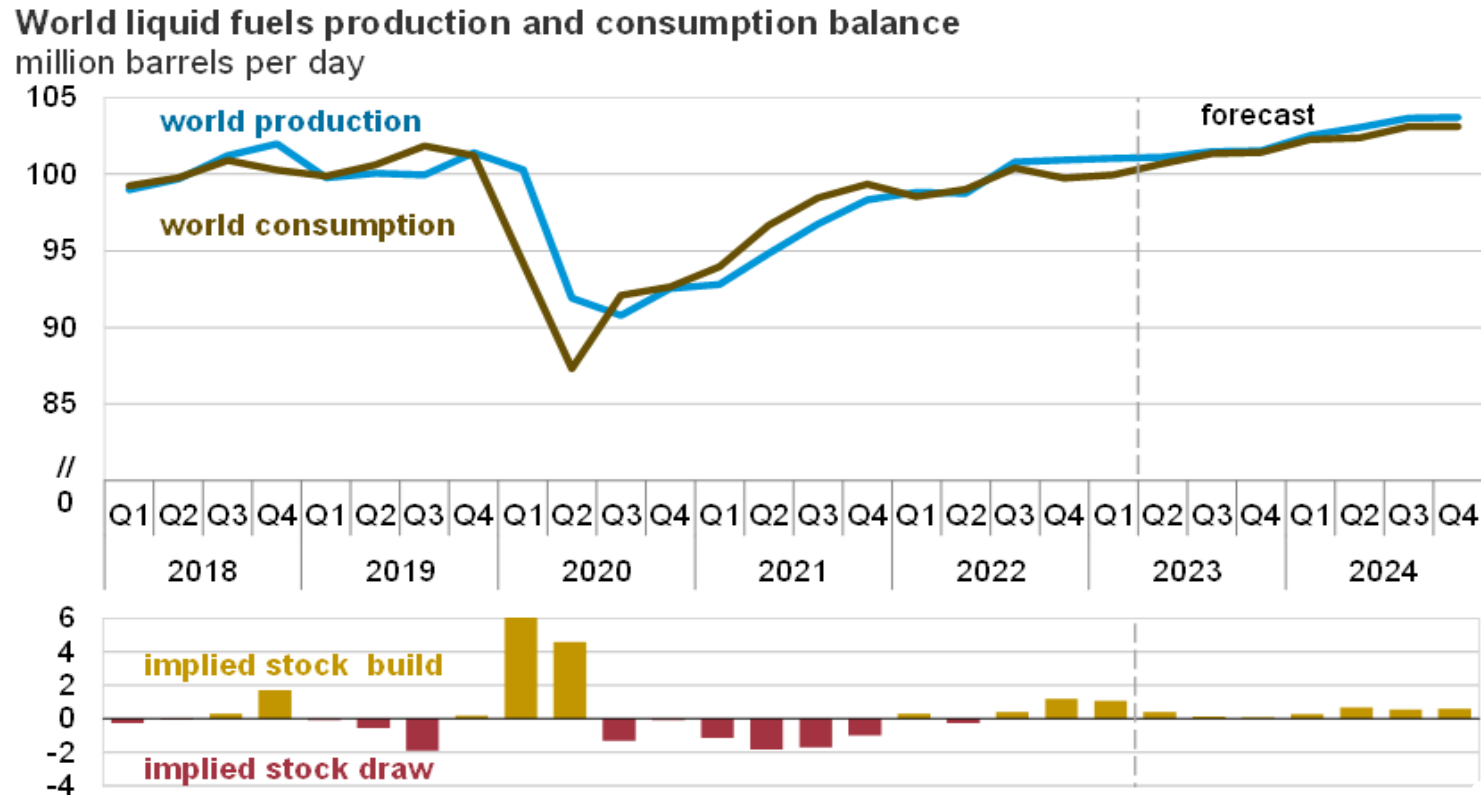
APEC oil production outlook



Source: APEC Energy Demand and Supply Outlook 8th Edition

- In 2021, APEC economies accounted for 46% of world production. The US has driven production growth over the last decade.
- According to EIA, USA crude production is set to rise 5.5% to 12.5 million bpd this year and another 1.7%, to 12.8 million bpd, in 2024.
- A key uncertainty is Russia's production outlook due to geopolitical tensions.

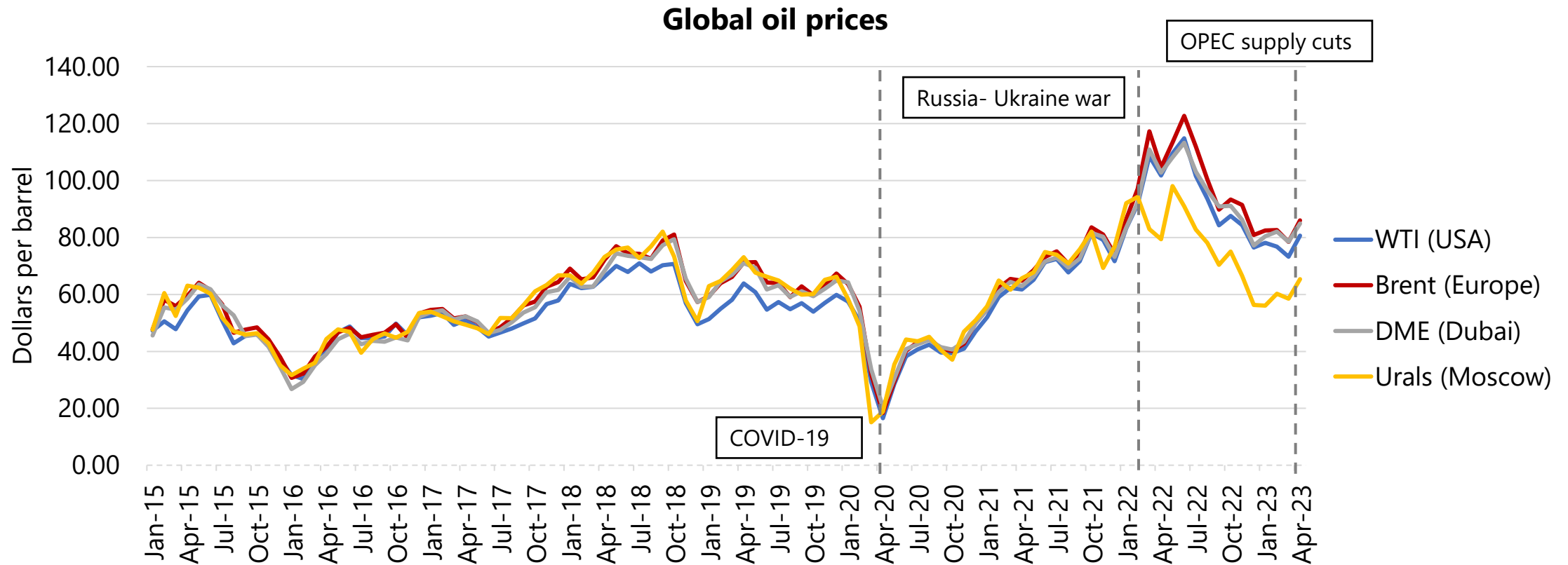
World liquid fuels production and consumption balance



Data source: U.S. Energy Information Administration, Short-Term Energy Outlook, April 2023

- Increased tightness and supply capacity constraints from under-investment in 2020 and 2021 led to inventory withdrawals in 2021.
- In 2022, market tightness was further exacerbated due to the Russia-Ukraine war.

Global oil prices: higher and volatile

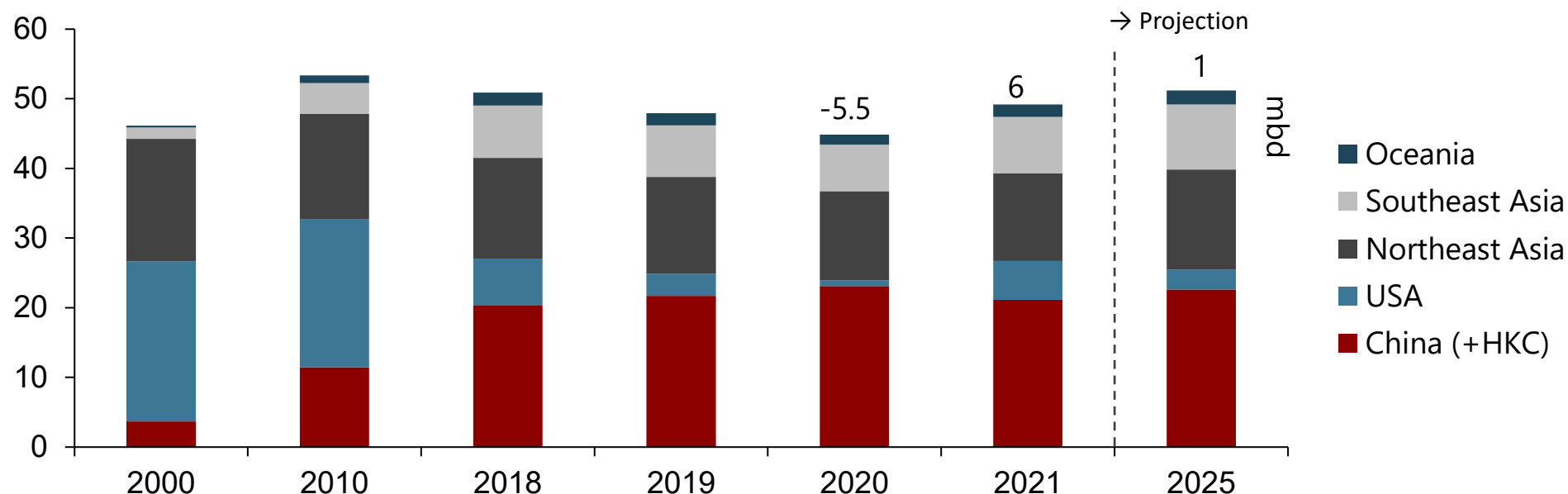


Source: Investing.com

- In April 2020, oil prices dropped below \$20/bbl due to a collapse in demand from COVID-19.
- In 2021, prices recovered and remained above \$50/bbl driven by a demand rebound from economic recovery.
- In Feb 2022, prices jumped from \$90/bbl following Russia's invasion of Ukraine and supply constraints.
- In 2H2022 and 1Q2023, prices eased again on economic concerns and surging Covid cases in China.

Net imports of crude oil and petroleum products

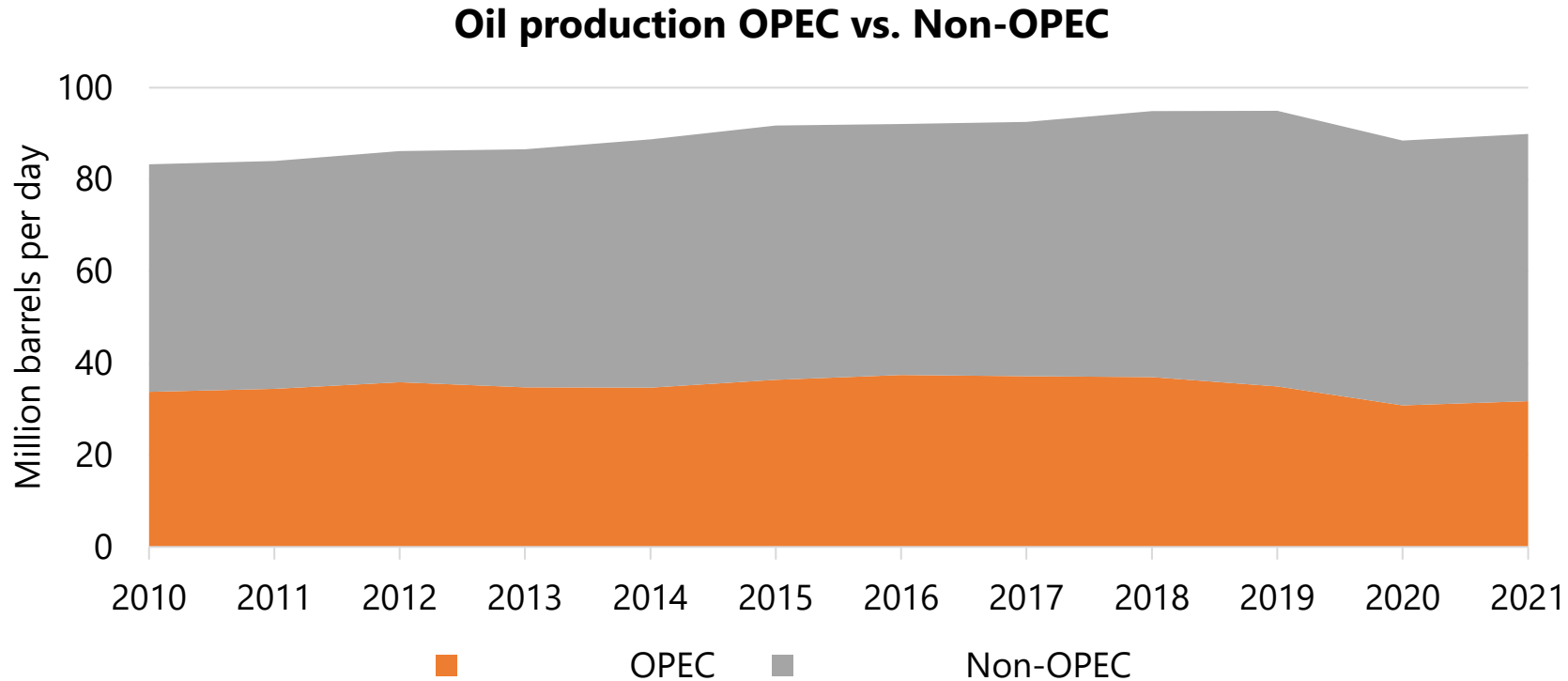
Net imports of crude oil and petroleum products in REF, (EJ)



Source: APEC Energy Demand and Supply Outlook 8th Edition
Note: (*) change in Million barrels per day.

- APEC net imports rebounded by 6 mbd in 2021 and are expected to increase by 1 mbd from 2021 to 2025.
- China accounts for 45% of APEC net imports in 2025, up from 8% in 2000.
- USA net imports are expected to drop by 87% in 2025 relative to 2000 due to an increase in domestic production.

OPEC vs. Non-OPEC production growth

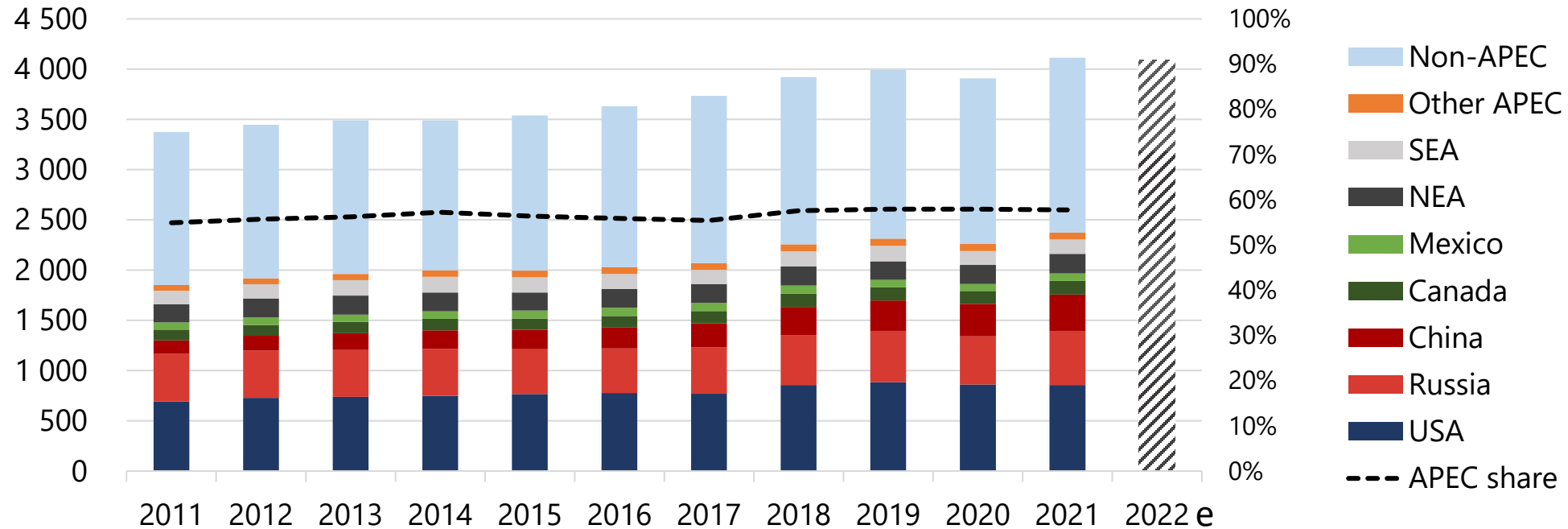


Source: BP Statistical Review of World Energy

- In 2021, OPEC accounted for 35% of global oil production.
- In 2021, OPEC and non-OPEC oil production grew by 2.9% and 0.8%, respectively.
- Non-OPEC economies are expected to account for a higher percentage of oil production gains in 2023 and 2024, a reversal of the last two years due in part to OPEC's announced production cuts.

World and APEC gas demand

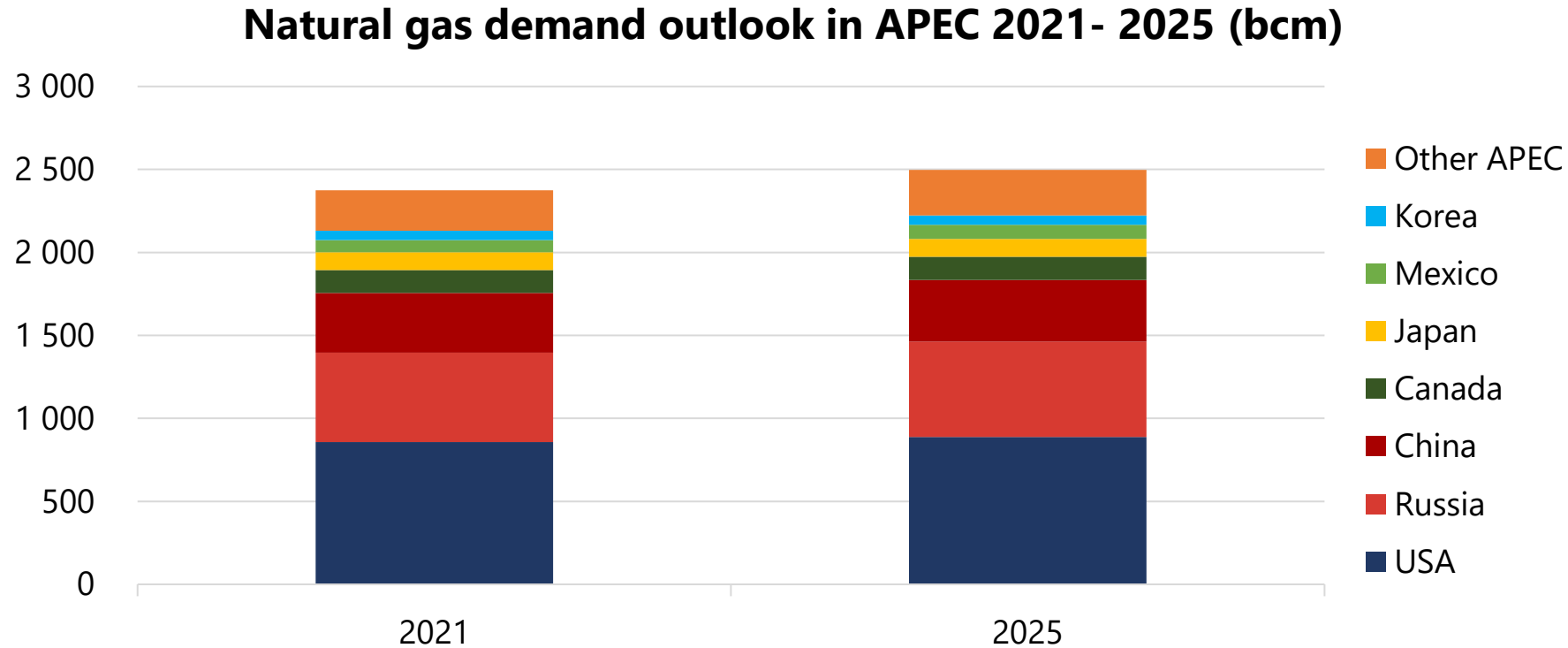
Natural gas consumption in APEC, 2011- 2022



Source: IEA, Natural Gas Information 2022; CEDIGAZ. Note: APERC analysis. 2022 is an estimate based on historic trends

- In 2021, APEC and global natural gas demand rebounded by 4.9% and 5.1% respectively, exceeding pre-COVID levels.
- In 2021, all sub-regions in APEC saw an increase in demand except for the USA.
- In 2022, it is estimated that global natural gas demand will decline by 0.5% due to high prices and geopolitical tensions among other factors.

Natural gas demand outlook in APEC

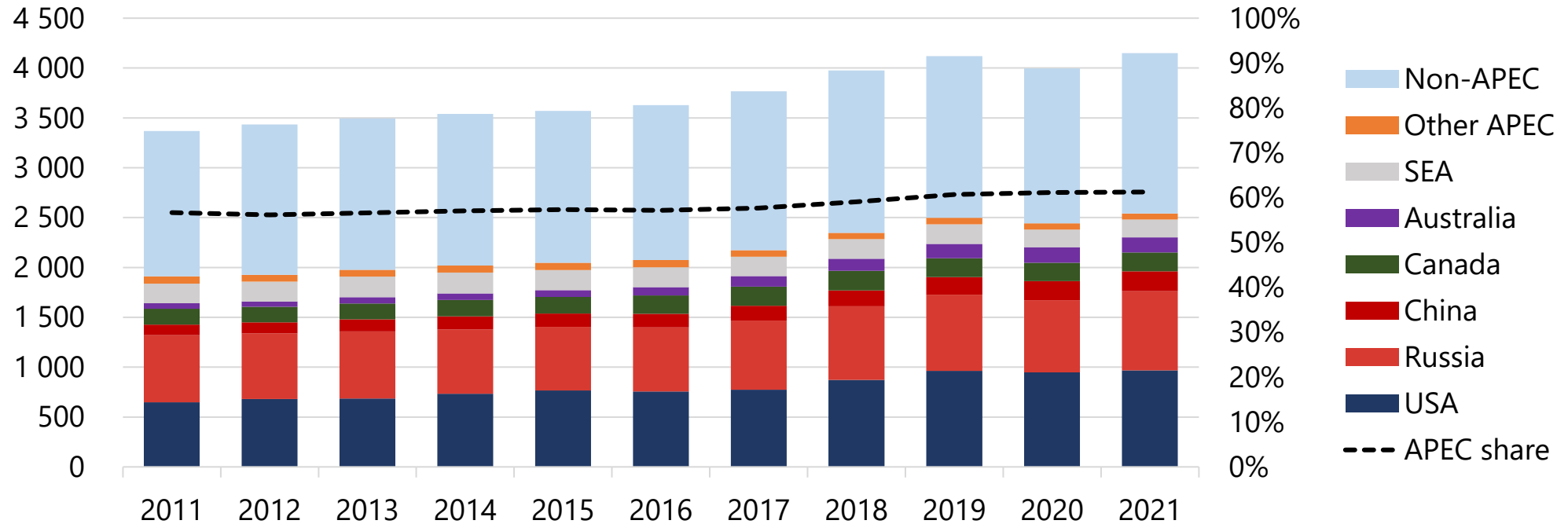


Source: IEA, Natural Gas Information 2022; CEDIGAZ

- From 2021 to 2025 natural gas demand is expected to grow by 4.9%, reaching 2 498 bcm.
- China drives gas demand with a 3.2% increase through 2025.
- Availability and affordability of supplies will affect future demand growth in emerging economies across APEC.

Natural gas production in APEC and the world

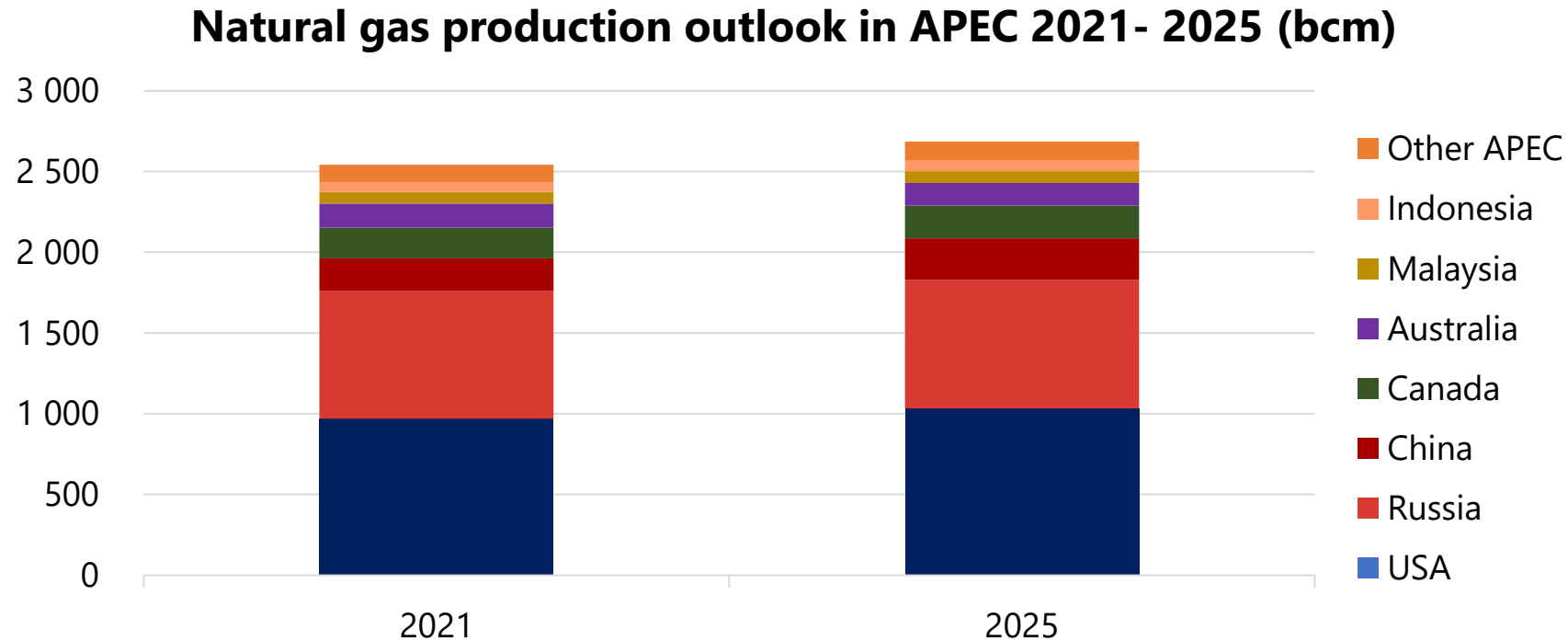
Natural gas production in APEC, 2011- 2022 (bcm)



Source: IEA, Natural Gas Information 2022; CEDIGAZ. Note: APERC analysis. 2022 is an estimate based on historic trends.

- In 2021, APEC and global natural gas production increased by 4.0% and 3.7% respectively.
- APEC accounts for a share of 61.3% of global natural gas production.

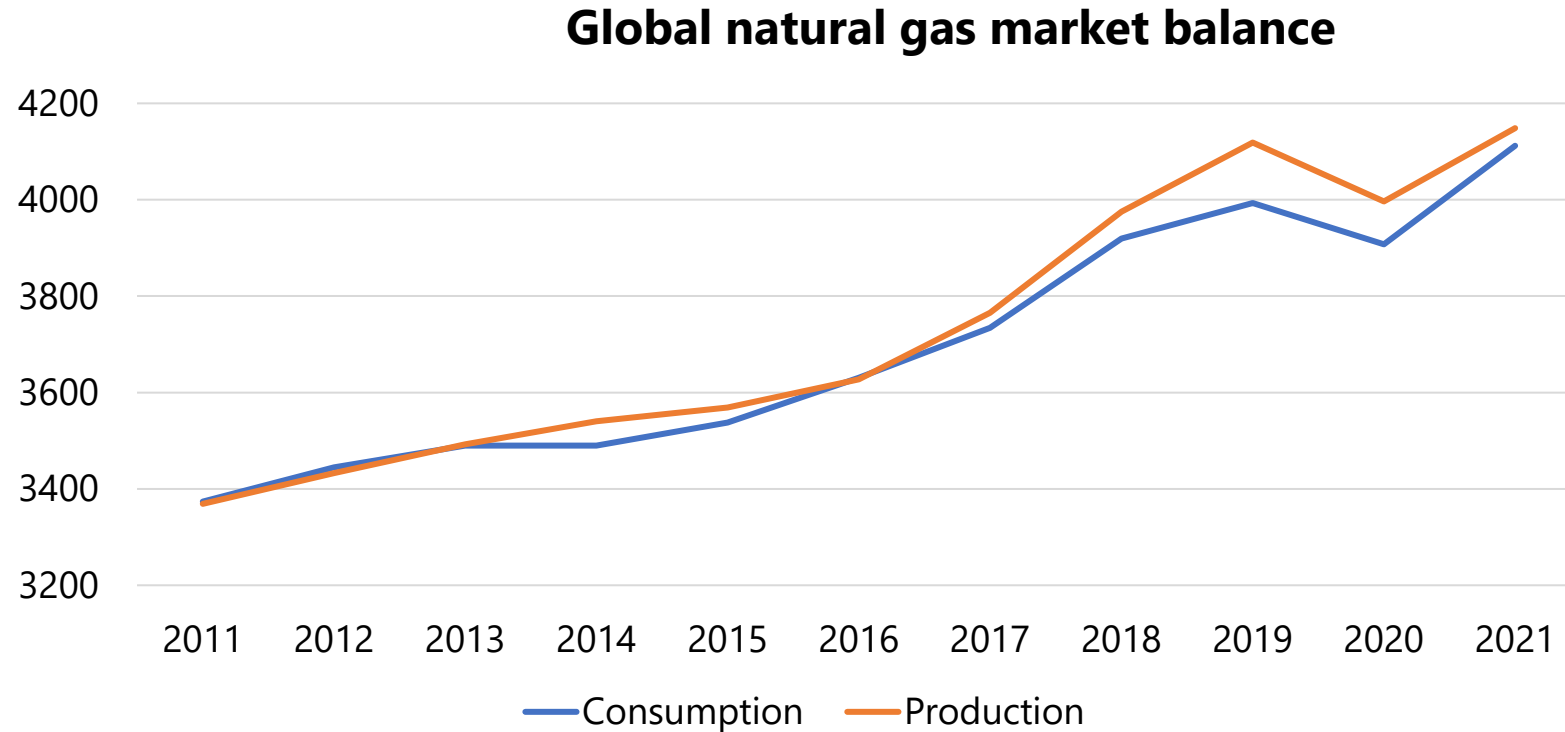
Natural gas production outlook in APEC



Source: IEA, Natural Gas Information 2022; CEDIGAZ

- From 2021 to 2025, natural gas production is expected to increase by 5.4% reaching 2 686.2 bcm.

Global natural gas market balance

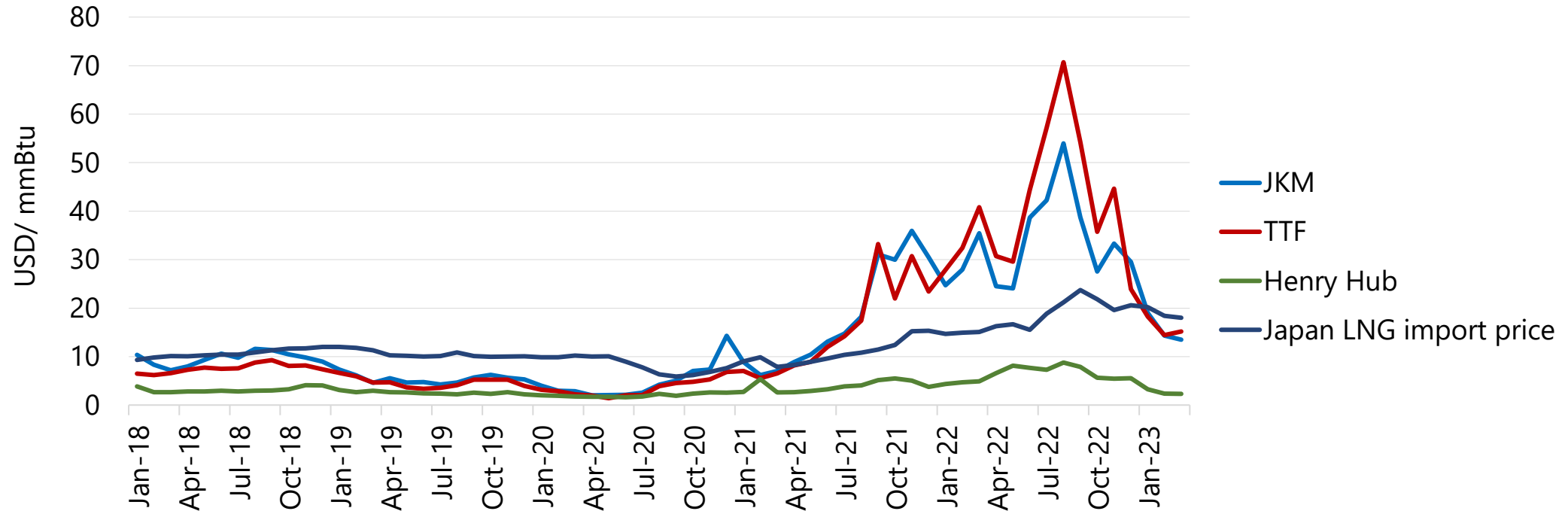


Source: IEA, Natural Gas Information 2022; CEDIGAZ

- From 2019 to 2021 the gap between natural gas demand and supply has declined by 70%.
- Natural gas markets have been tightening since 2021 and are forecast to remain tight through 2023.

Global natural gas prices

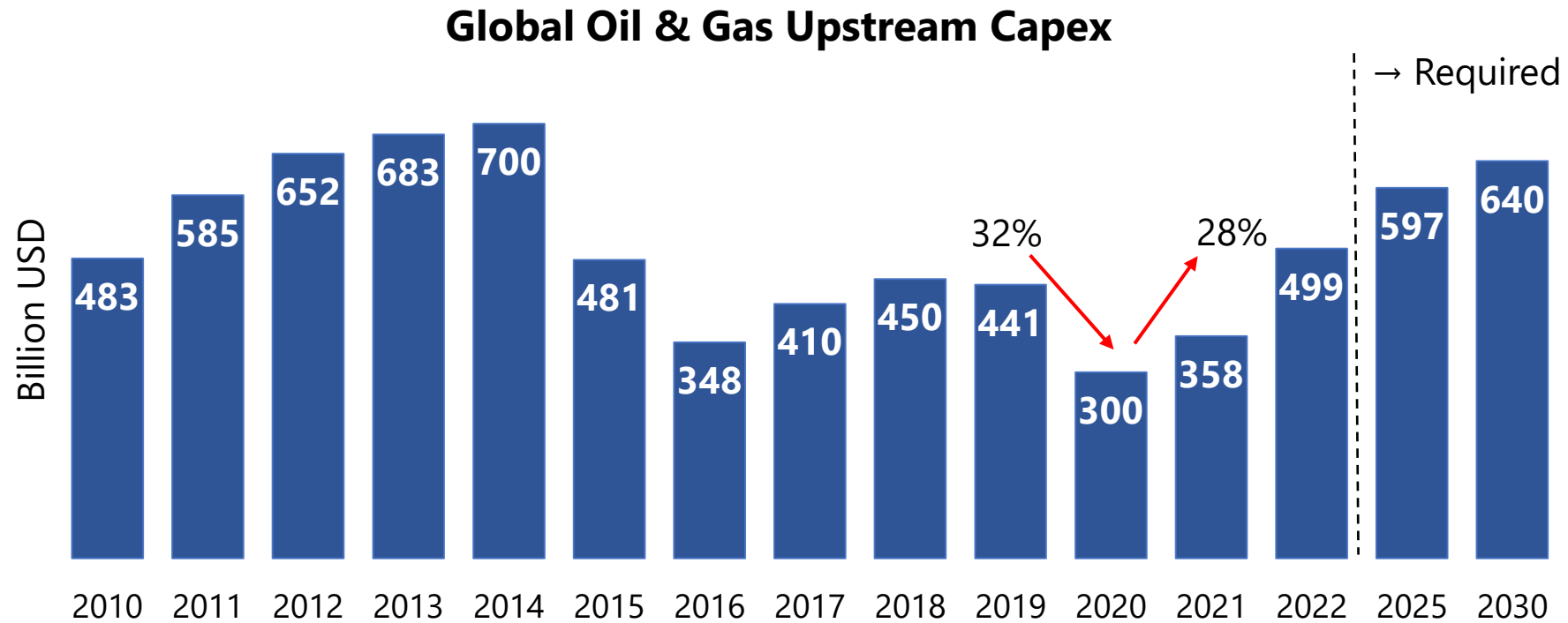
Global natural gas prices



Source: Investing.com

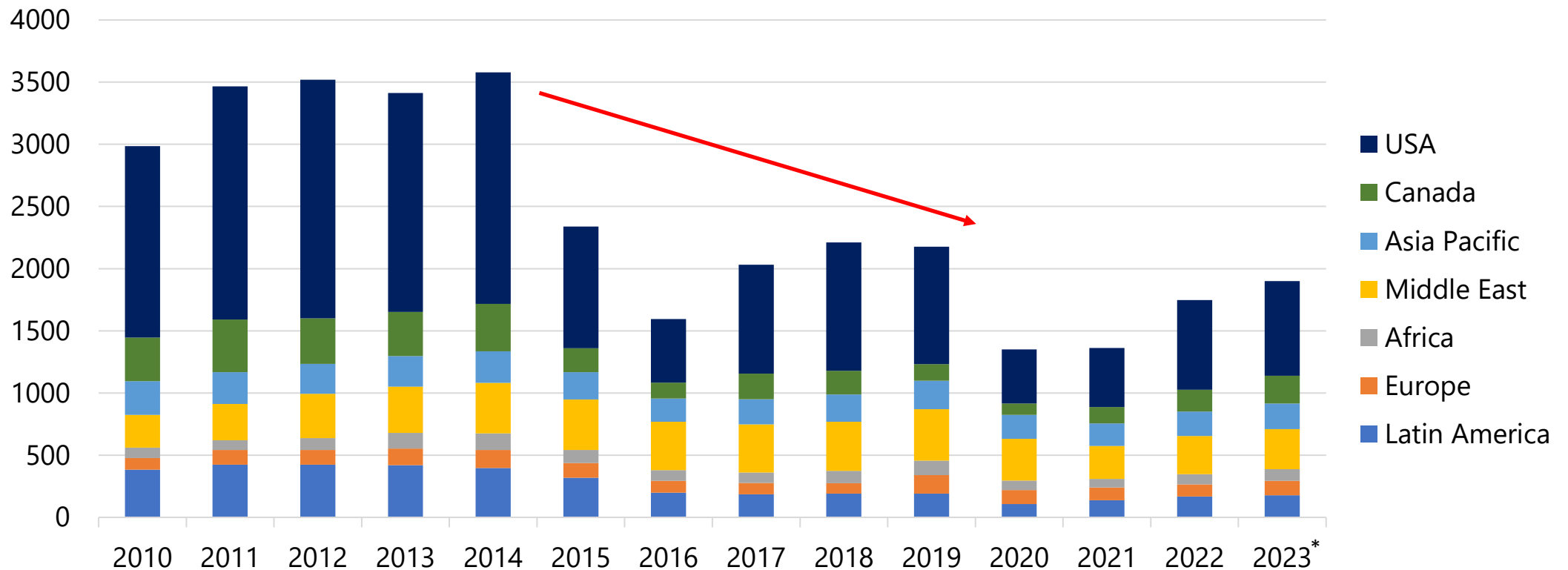
- European and Asian natural gas prices spiked to record highs in August 2022 due to the tight supply market and the Russia-Ukraine war.
- Milder than normal winter in Europe, increased LNG imports, and lower gas consumption in all sectors have led to increased inventories and a drop in prices.
- European gas prices have reached their lowest level since the summer of 2021 but remain two to three times higher than the historical average.
- Elevated prices reflect tight gas supplies in all major markets except the USA.

Global investments in oil and gas: historic and required



- In 2020 and 2021, investment reached decade low levels due to increased political/ long-term demand uncertainty and market volatility, among other factors.
- In 2022, oil investments rebounded, increasing by 28% and exceeding 2019 pre-COVID levels after a 32% drop in 2020.
- According to the International Energy Forum, annual upstream investments will need to increase to \$640 bn in 2030 to maintain a market balance.

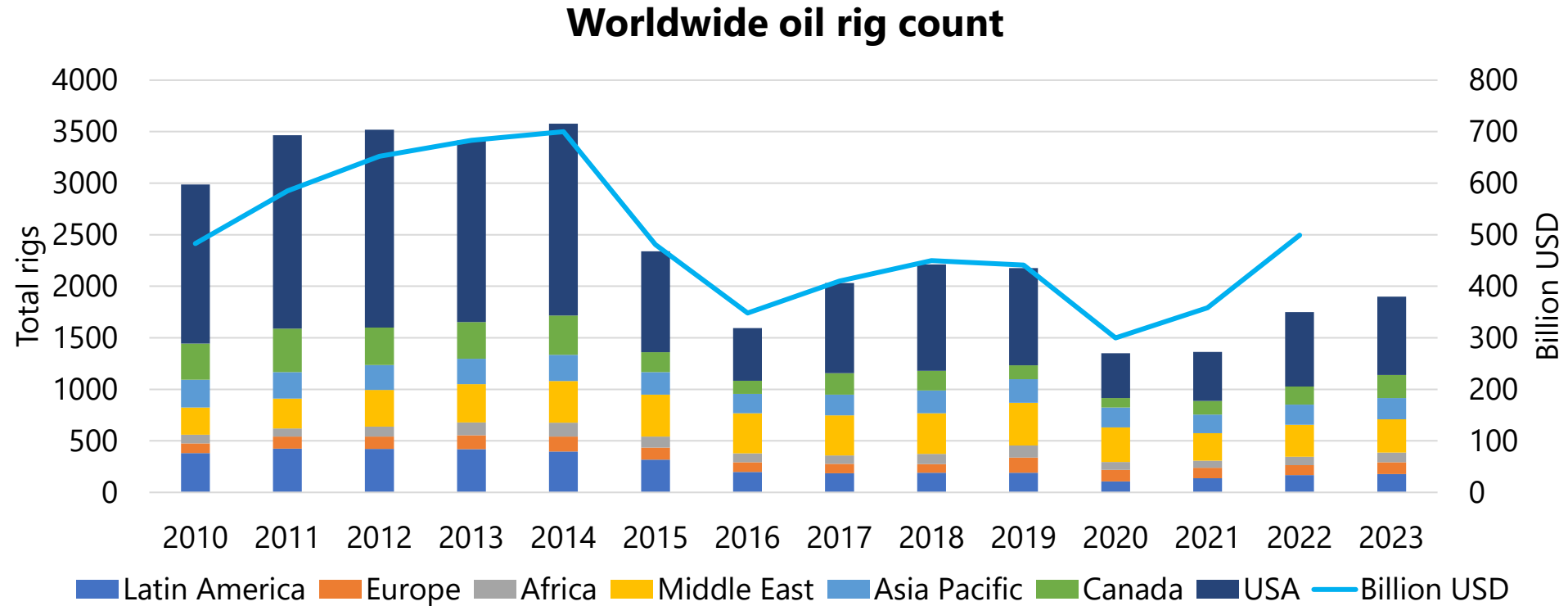
Worldwide oil rig count



Source: Baker Hughes. Note: *data up to March 2023.

- In 2014, the highest upstream oil investment and rig count of the past decade were recorded.
- In 2020, the lowest upstream oil investment and rig count of the past decade were recorded.
- In 2021, both investments and rig count increased slightly.
- In 2022, rig count increased y-o-y but remained 19.8% below 2019 levels.

Increased spending due to a rise in inflation



Source: Baker Hughes, IEF, S&P. Note: *data up to March 2023.

- Higher costs across the value chain increase spending but not additional production growth.
- Cost inflation increased by 15-20% y-o-y in 2022 and was included in total spending.
- A higher cost environment will require more investment to ensure supplies.

Key points

- Demand for oil and natural gas is expected to continue rising through 2025.
- Despite high oil and gas prices in 2021 and 2022, drilling activity remained well below historic levels.
- Oil and gas investments increased in 2021 and 2022, but cost inflation diminished the effectiveness of those increases.
- Despite the increases, total oil and gas investment remains less than the estimated level required to meet future oil and gas demand.
- Insufficient upstream investments leads to higher oil and gas prices and could encourage reliance on less expensive fuels with higher carbon emissions, such as coal.
- Under-investment in oil and gas also increases the market power of major oil and gas exporters, like members of OPEC, that restrict production as a means of increasing their revenues.
- Under-investment in oil and gas reduces energy security in the near-term.

Thank you.

