

The Evolution of Midstream Energy
Infrastructure: Poised for the Transition

EPISODE 3

Crude Market Overview

JANUARY 2023

CONFIDENTIAL

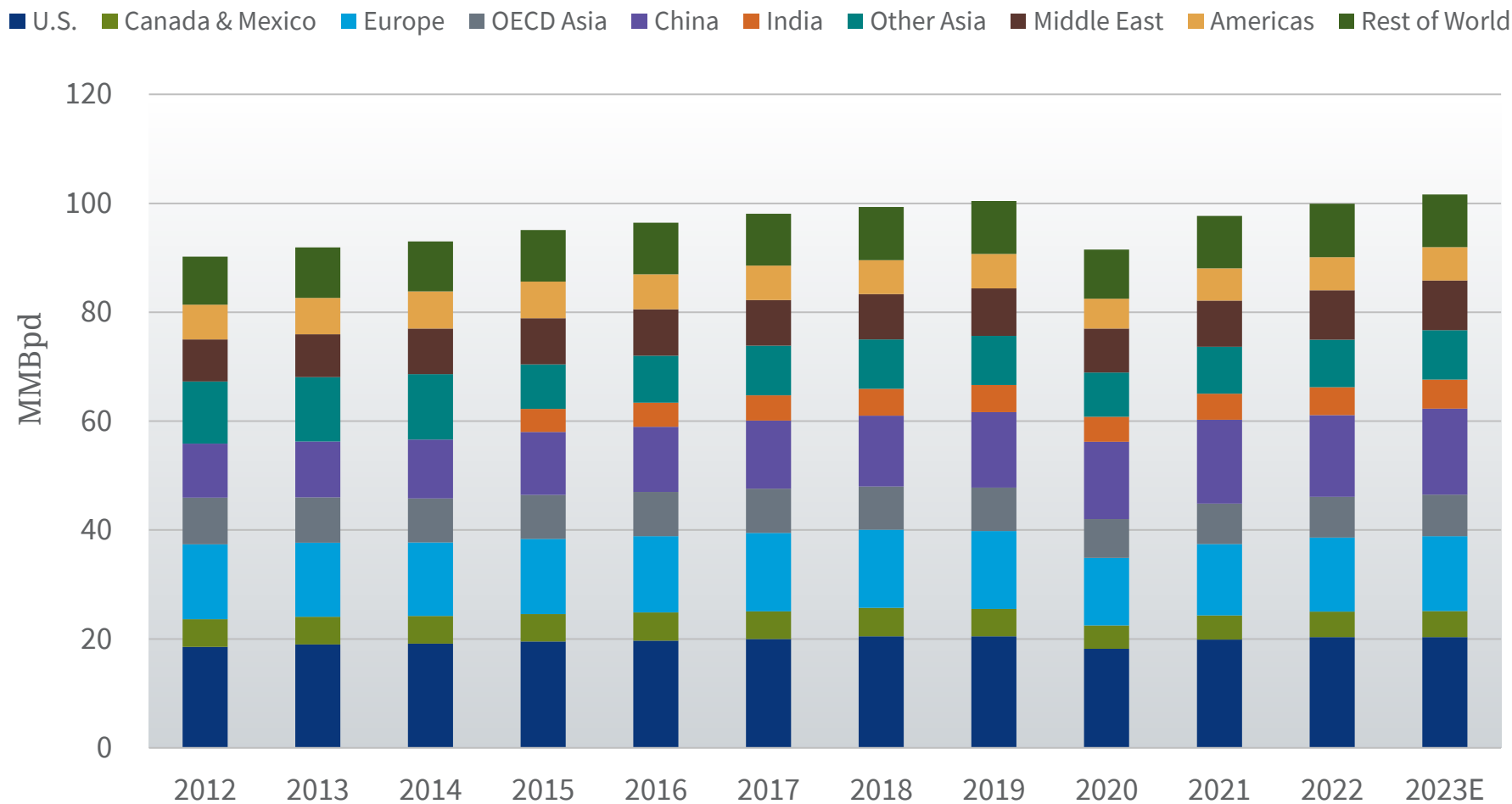


Global oil demand correlates to GDP growth.

Prior to 2020, China grew annual demand at a 5x faster rate than the rest of the world.

COVID-19 impacts reduced demand 9% in 2020, erasing most of the gains in the prior 8 years.

The IEA expects global demand to reach a new record in 2023 at ~102 million barrels per day (MMBpd).

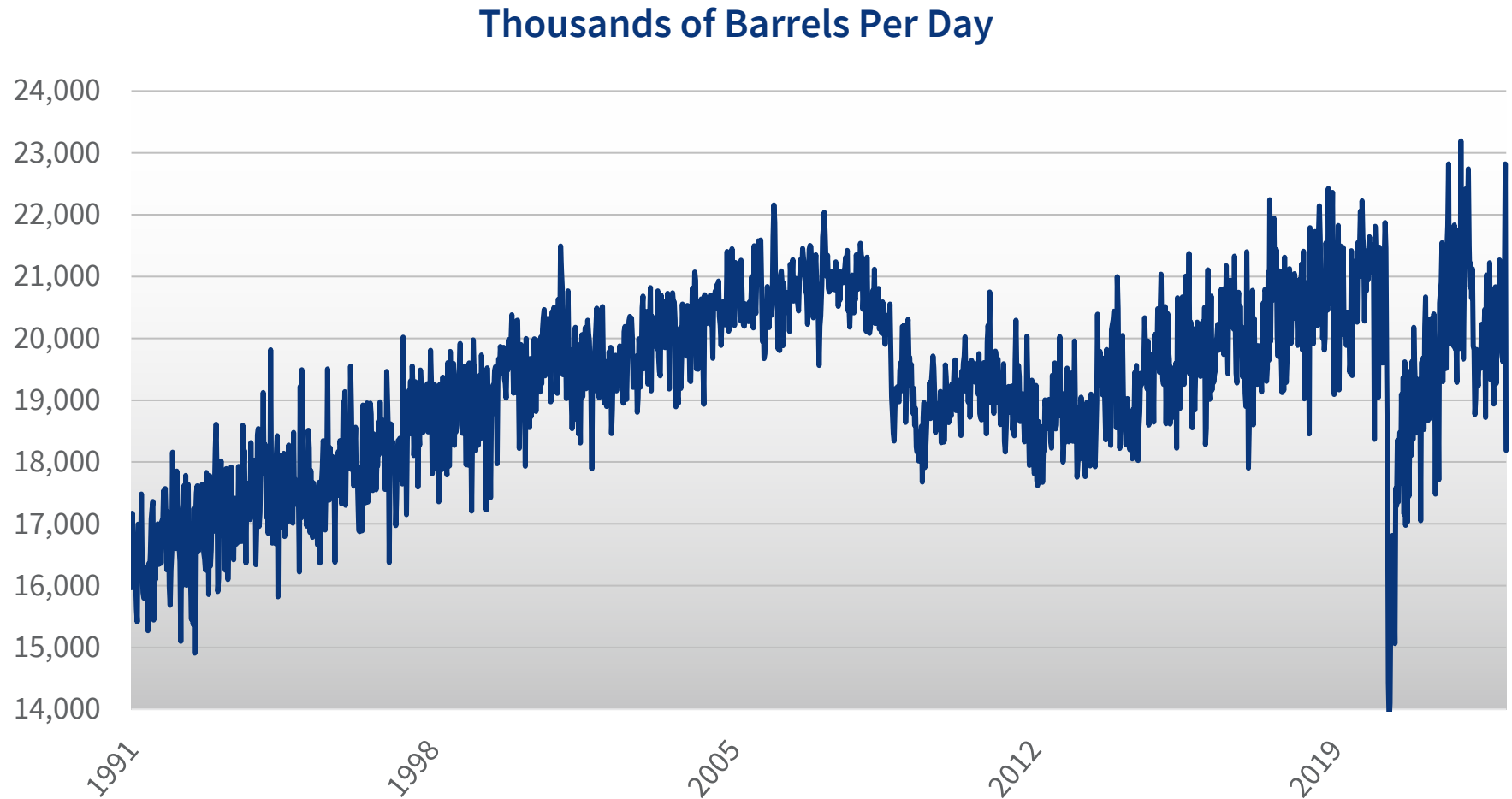


Source: International Energy Agency (IEA), "Oil Market Report", December 2022



Petroleum demand has shown relative inelasticity over the previous 30 years excluding the recent near-term volatility from the COVID-19 related restrictions.

The U.S. consumes ~25% of the 100 million barrel per day market.



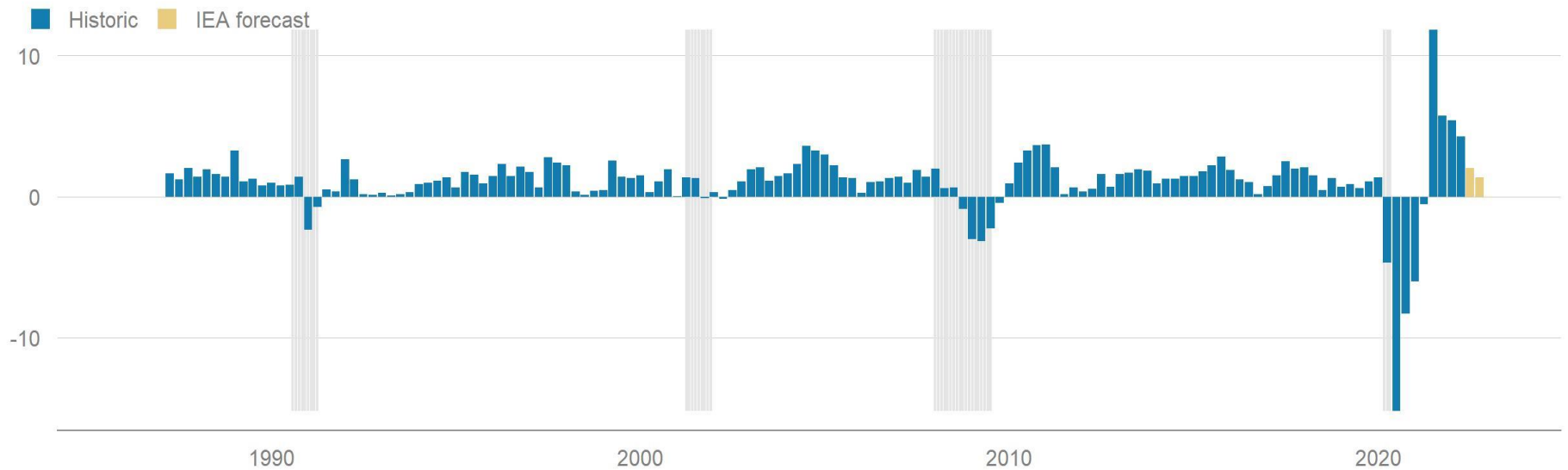
Source: EIA, Weekly Data through December 2022



Historically there has been little change in global oil demand during recessions.

Oil demand and recessions

Change in global oil consumption (yoy; mb/d) and US recessions

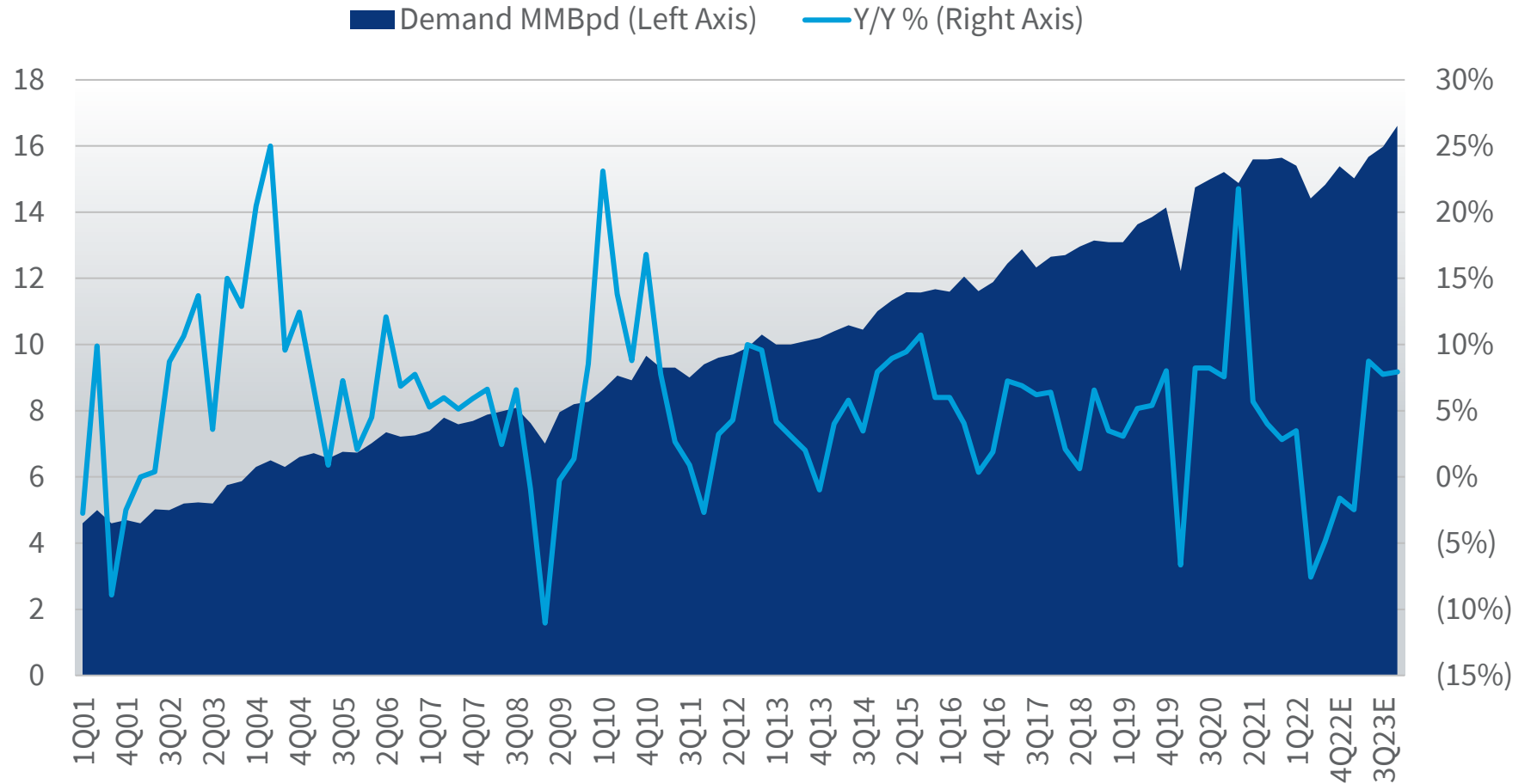


Source: IEA, Morgan Stanley Research

Source: IEA: Morgan Stanley Research, "The Oil Manual", April 21st, 2022



China's Zero COVID policies have stalled demand growth, but the government has recently loosened restrictions and increased refined product export quotas which could increase demand in 2023. The IEA forecasts Chinese demand growth of ~6% next year.

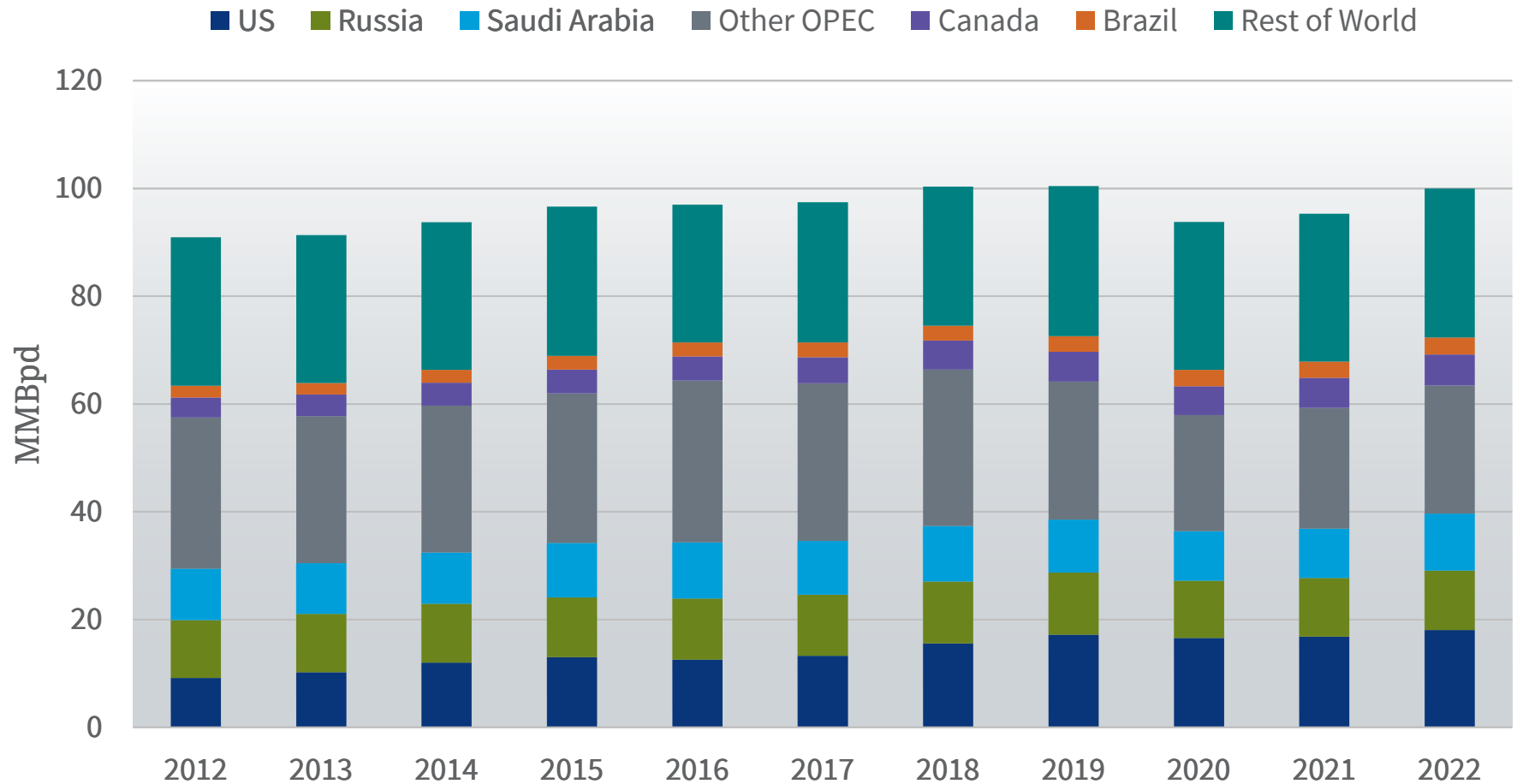


Source: International Energy Agency (IEA), "Oil Market Report", December 2022



Approximately 100 million barrels of hydrocarbon liquids are produced around the world each day. As of 2022, the U.S. is the world's single largest producer at 18 MMBpd, followed by Russia and Saudi Arabia at ~11 MMBpd each.

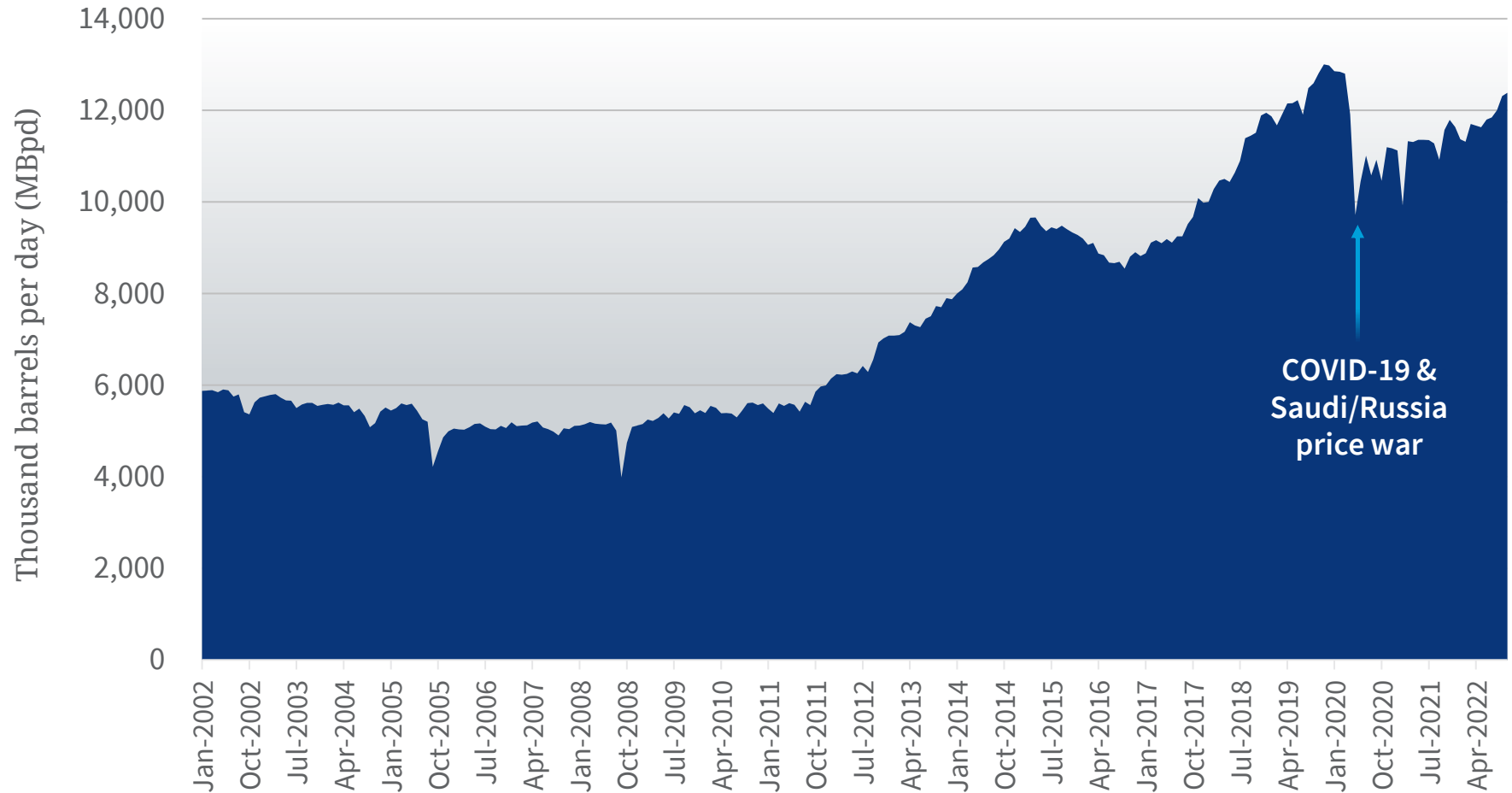
Global crude production fell 7% in 2020 in response to COVID-19 and has not since recovered to 2019 levels.



Source: International Energy Agency (IEA), "Oil Market Report", December 2022



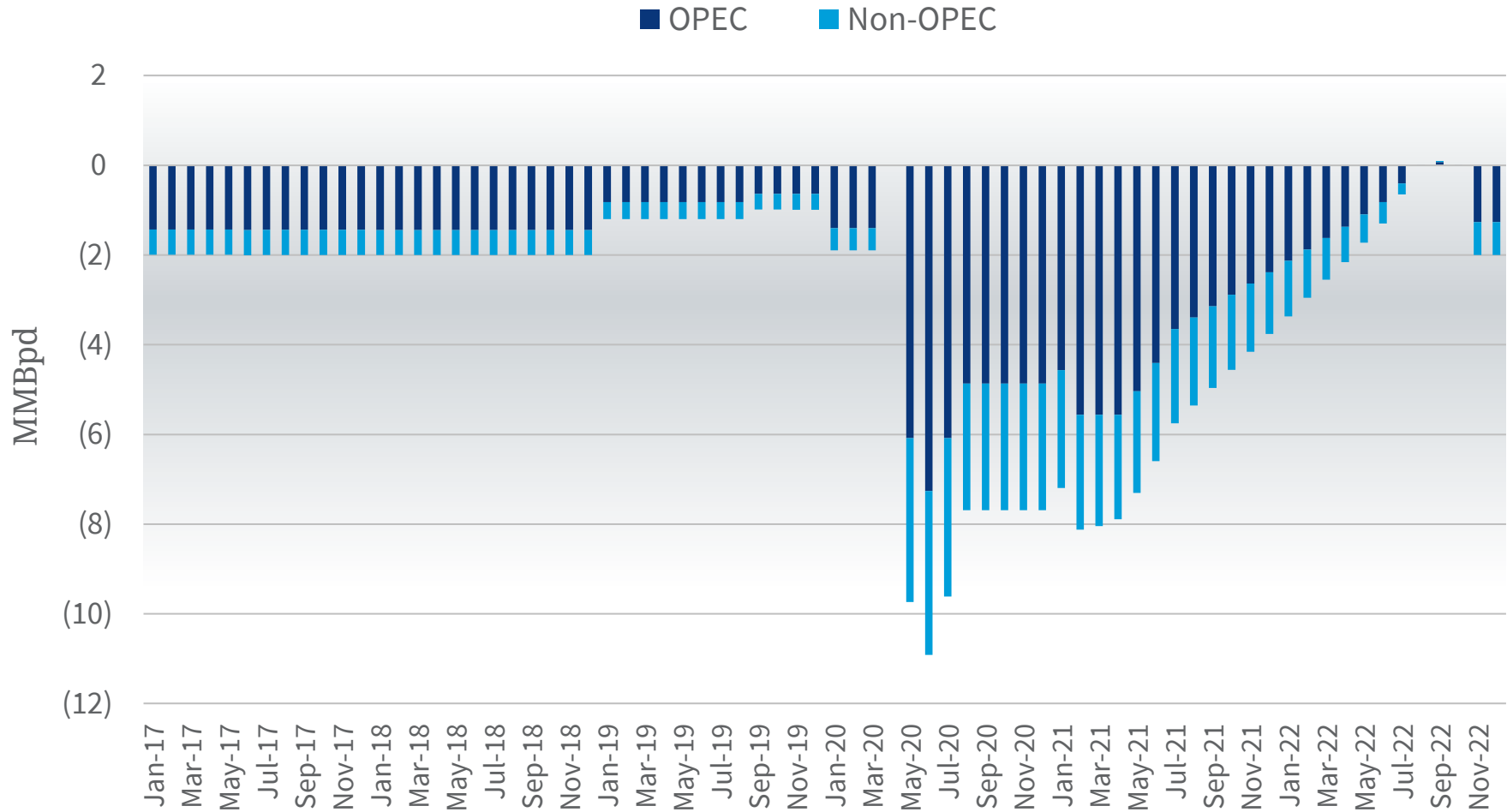
U.S. crude production peaked at 13 MMBpd in 2019 but fell 25% in 2020 as a result of COVID-19's impact on demand and the price war between Saudi Arabia and Russia. Current production is ~12.4 MMBpd, 5% below peak, due in part to upstream financial discipline.



Source: U.S. Energy Information Administration (EIA), "Crude Oil Production", December 2022



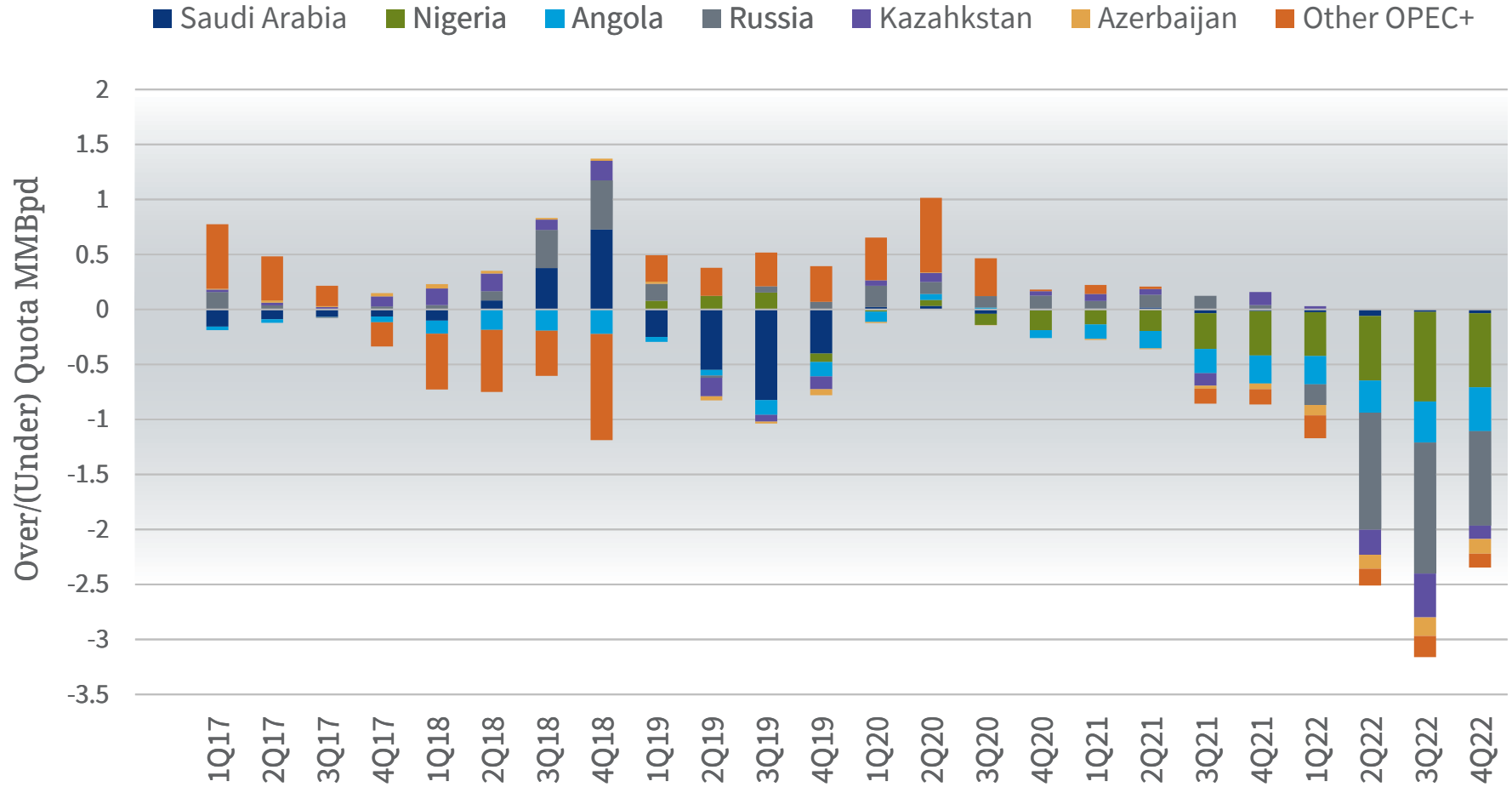
Since the beginning of 2017, OPEC+ has removed an average of 3.6 MMBpd of production from the global market to stabilize prices.



Source: International Energy Agency (IEA), "Oil Market Report", December 2022



Since 2021, several members of the OPEC+ cartel have under-produced their quotas by as much as 3 MMBpd cumulatively. Their under-performance calls into question what the true amount of OPEC+'s spare capacity is and whether it can increase supply to meet rising demand.



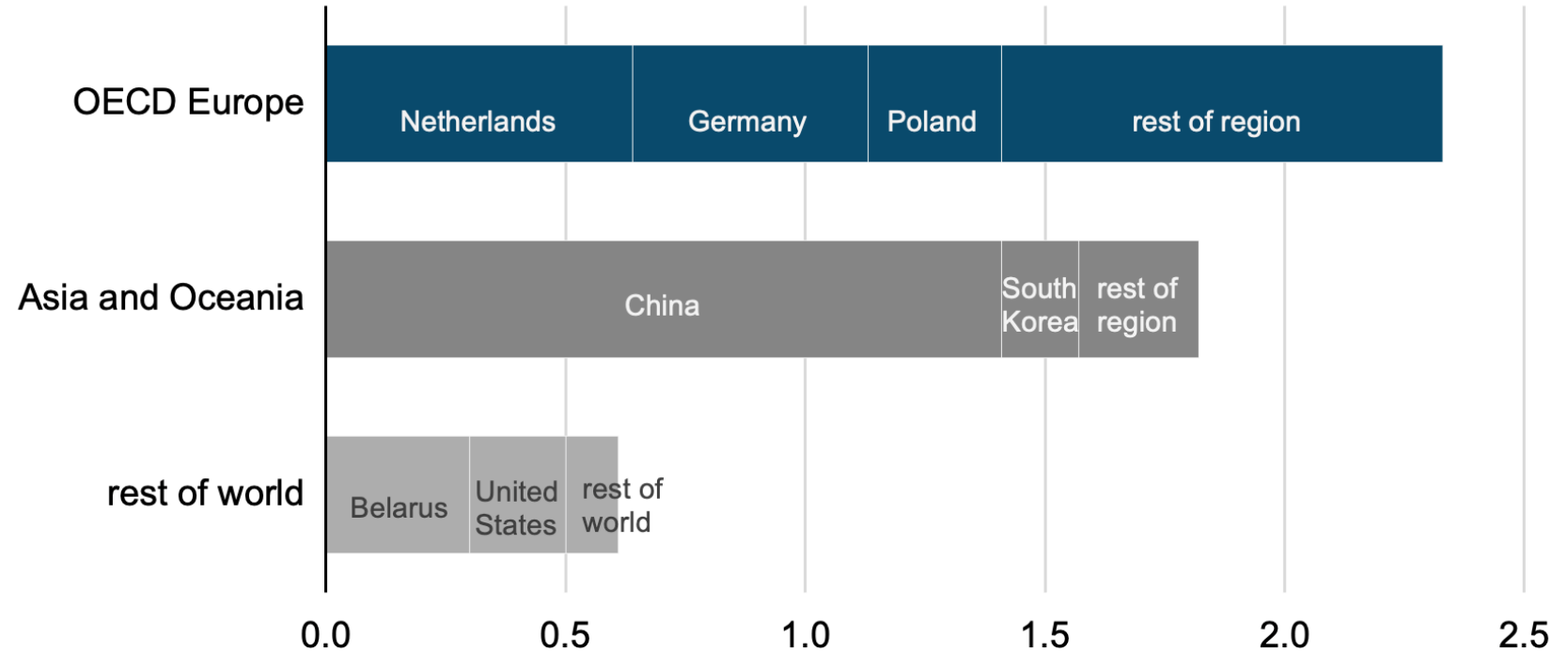
Source: International Energy Agency (IEA), "Oil Market Report", December 2022 & OPEC, "OPEC Monthly Oil Market Report", November 2022



Russia is the 3rd largest oil producer and largest oil exporter.

Prior to its invasion of Ukraine, most of Russia's exports went to OECD Europe and China.

Crude oil and condensate exports from Russia (2021)
million barrels per day



Source: Graph by the U.S. Energy Information Administration, based on Russia's export statistics and partner country import statistics published by Global Trade Tracker

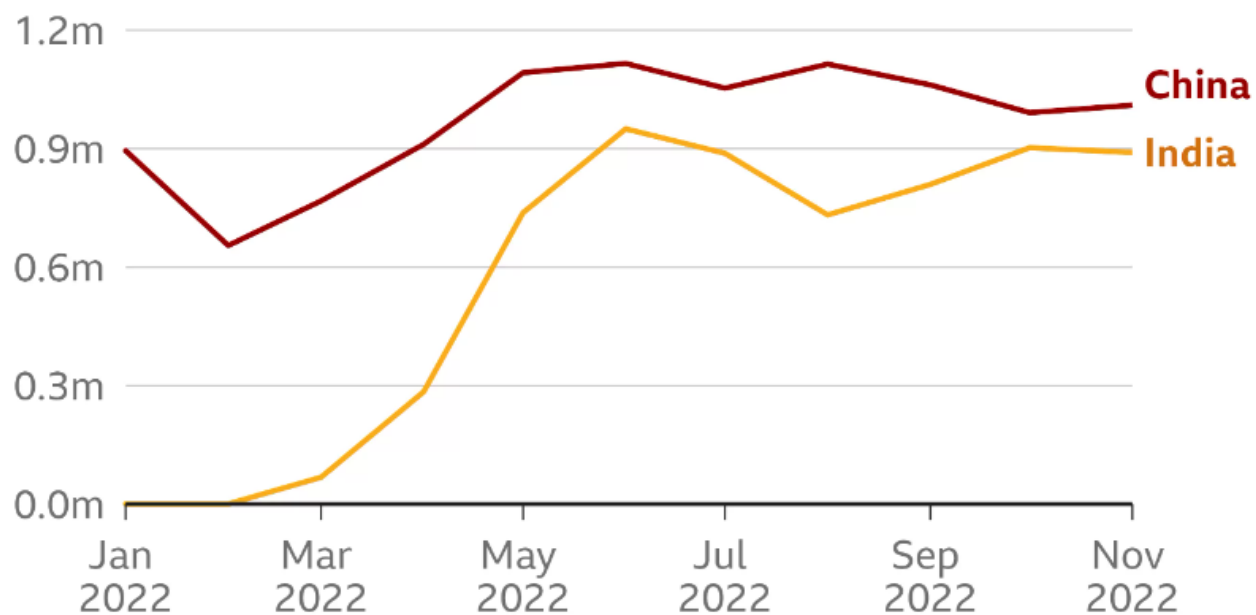
Source: International Energy Agency (IEA), "Oil Market and Russian Supply", March 2022; U.S. Energy Information Administration, "Europe is Key Destination for Russia's Energy Exports", March 14, 2022.



India and China have increased purchases of Russian crude in place of the European Union.

Russian oil imports by India and China

Oil imported, million barrels-per-day



Source: Kpler



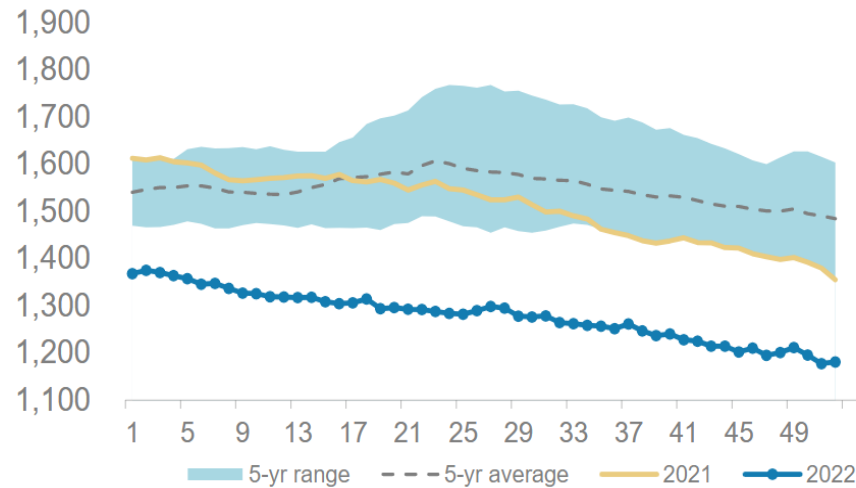
Source: BBC News "Ukraine Crisis: Who is buying Russian oil and gas", December 6, 2022



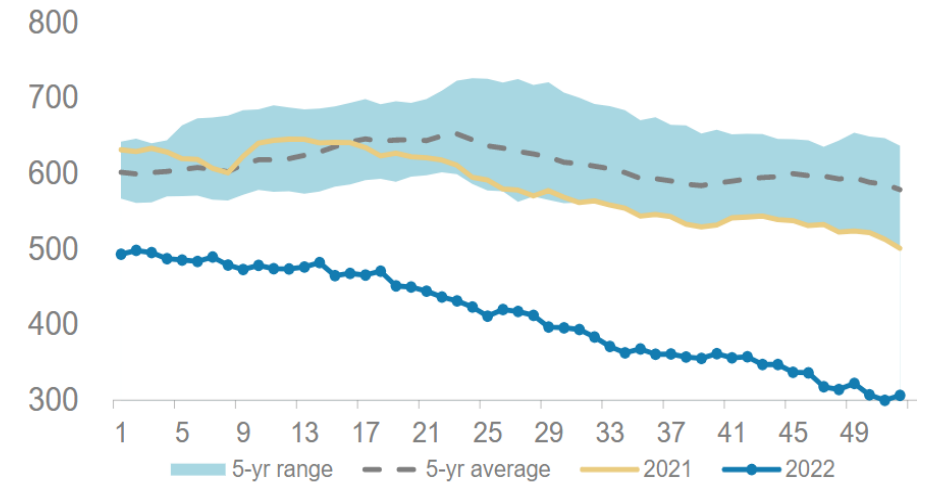
Global inventories remain depressed and well below their 5-year average ranges.

Observable Inventories for Japan, Singapore, Antwerp-Rotterdam-Amsterdam, Fujairah, and the U.S.

Inventories - Total Oil (mln bbl)



Inventories - Crude oil (mln bbl)



Source: EIA, PJK, IE Singapore, PAJ, Genscape, FEDCom/Platts

Source: Morgan Stanley Research, "Observable Oil Inventories in 2022", January 03, 2023

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Gross Domestic Product or *GDP* is the total monetary or market value of all the finished goods and services produced within a country's borders in a specific time period. As a broad measure of overall domestic production, it functions as a comprehensive scorecard of a given country's economic health.

MBpd or *mb/d* is thousand barrels per day.

MMBpd or *mmb/d* is million barrels per day.

NGLs or *Natural Gas Liquids* are hydrocarbons—in the same family of molecules as natural gas and crude oil, composed exclusively of carbon and hydrogen. Ethane, propane, butane, isobutane, and pentane are all NGLs. There are many uses for NGLs, spanning nearly all sectors of the economy. NGLs are used as inputs for petrochemical plants, burned for space heat and cooking, and blended into vehicle fuel.

OECD is the Organisation for Economic Co-operation and Development, an intergovernmental organization with 38 member countries, founded in 1961 to stimulate economic progress and world trade. The majority of OECD members are high-income economies with a very high Human Development Index (HDI) and are regarded as developed countries.

OPEC+ is a loosely affiliated entity consisting of the countries that are members of the Organization of the Petroleum Exporting Countries (OPEC), plus several of the world's major non-OPEC oil-exporting nations, most notably Russia, with the goal of exerting a degree of control over the price of crude oil.

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