

Geopolitics of Energy

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ΠΑΝΕΠΙΣΤΗΜΙΟ ΠΕΙΡΑΙΩΣ

UNIVERSITY OF PIRAEUS

The
Economist

DECEMBER 6TH-12TH 2014

Economist.com

Technology Quarterly

Shinzo Abe's last chance

Boost your business with a drone

P.D. James, queen of the sleuths

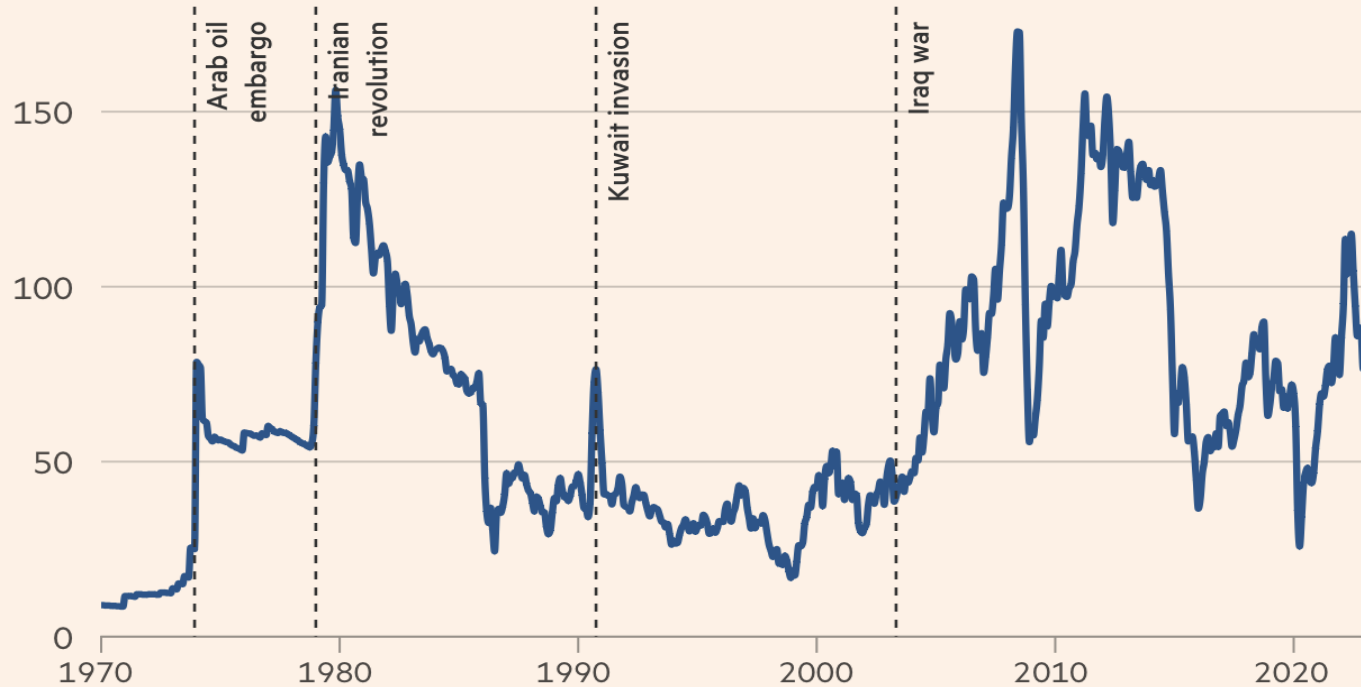
Our books of the year

Sheikhs v shale

The new economics of oil



Real oil prices (\$ per barrel)

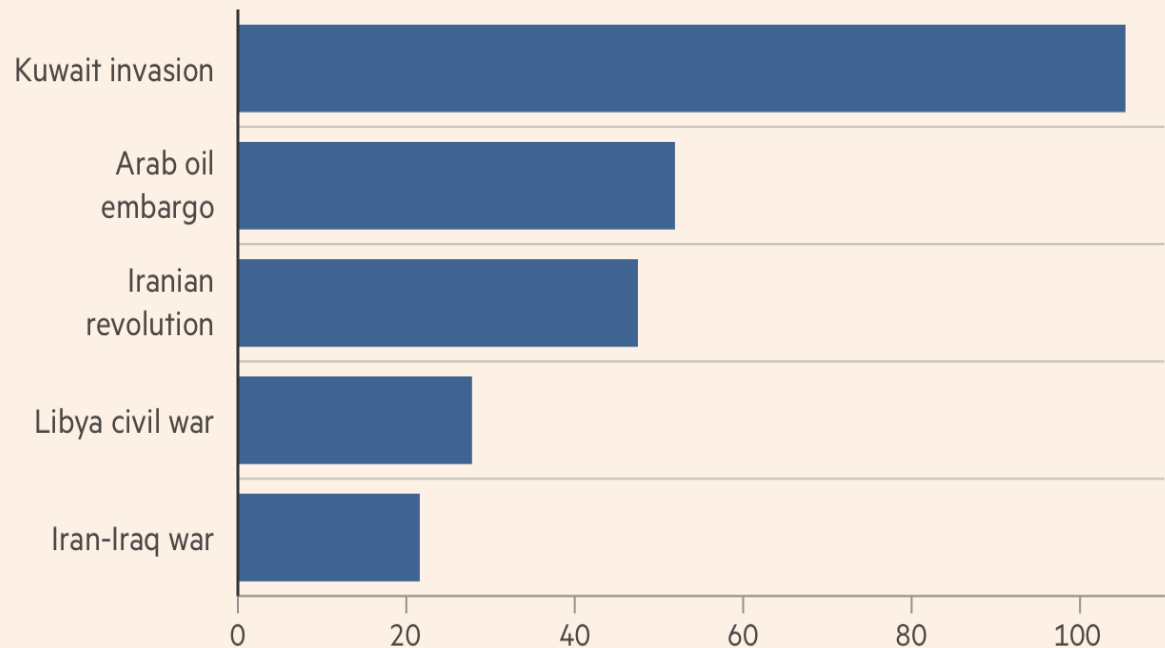


FINANCIAL TIMES

Source: World Bank, Bloomberg • Brent crude price deflated by US CPI

Past oil shocks have caused big price jumps

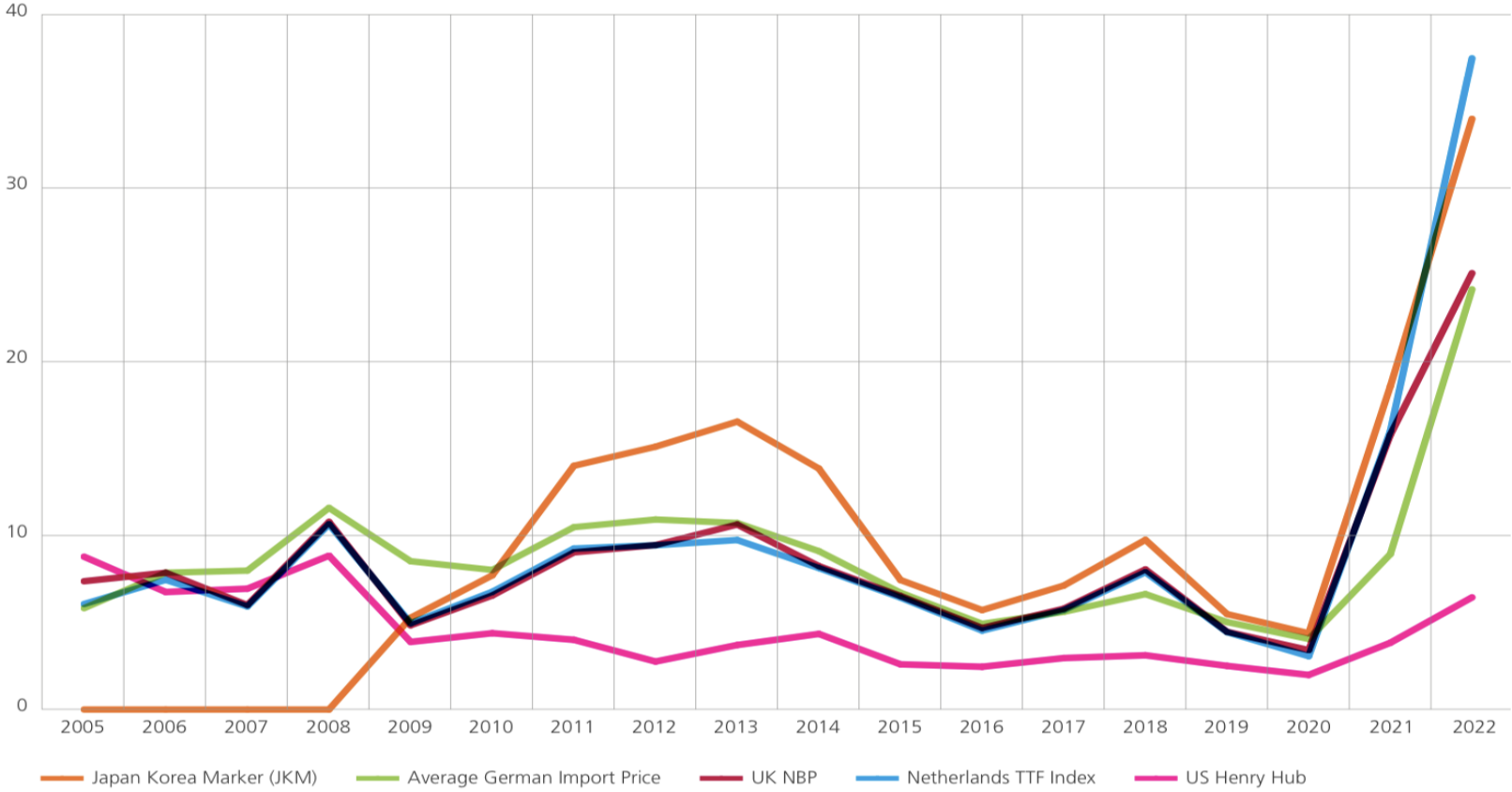
% change in average monthly oil prices three months after the onset



FINANCIAL TIMES

Source: World Bank

\$/mmBTU



Oil a New Soviet Weapon In Economic and Political Offensive Against West

**U.S. Moving Toward Policy Revision to Meet
Threat of Reds' Increased Production and Exports
—Officials Uncertain of Main Danger of Barter
Deals That Open Way to Infiltration.**

By RAYMOND P. BRANDT
Chief Washington Correspondent of the Post-Dispatch.

WASHINGTON, June 3.

SHARPLY INCREASED PRODUCTION and steadily rising exports of Russian oil have confirmed fears in American official and private circles that the Kremlin has begun an economic and political offensive against the West with petroleum as a powerful weapon.

In the words of one official, "Oil is Russia's largest, easiest and most flexible export." Both in production and marketing, the Communists have decided advantages over the competitive, capitalistic producers, who have billions of dollars invested in the overseas trade.

Fidel Castro's seizure of American-owned refineries in Cuba to process Russian crude oil dramatized the need for a new Ameri-

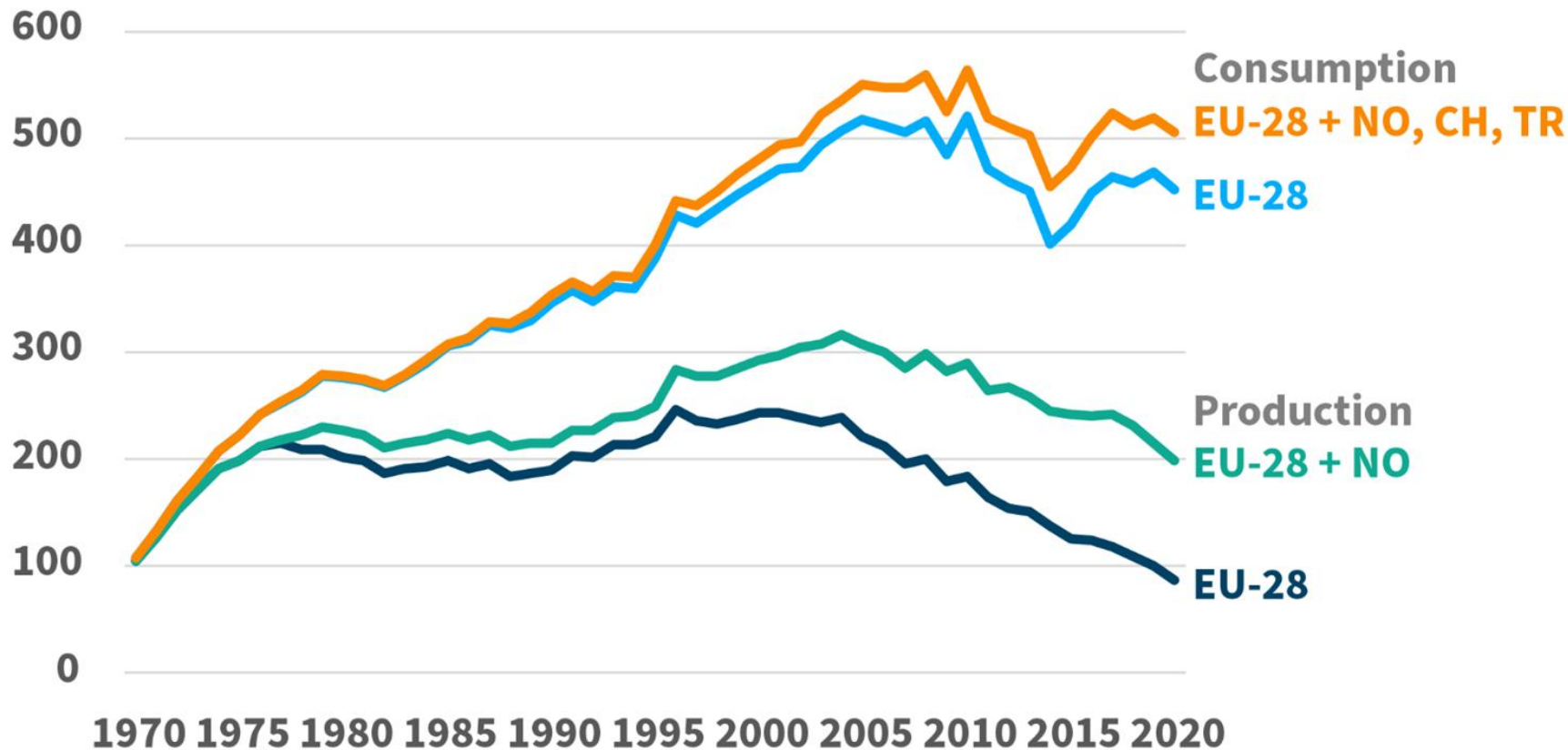
tions to maintain their refusal to lend money to foreign governments for the extraction of oil. The World Bank, in which the United States has the largest minority interest, is maintaining this position on its loans, and the Development Loan Fund, an affiliate of the International Co-operation Administration, has made no such outlays.

The Export-Import Bank, a govern-

For many decades, debate has raged about how much political power Moscow would gain from Europe's importing oil and natural gas from the Soviet Union and now Russia, as in this article from 1961.

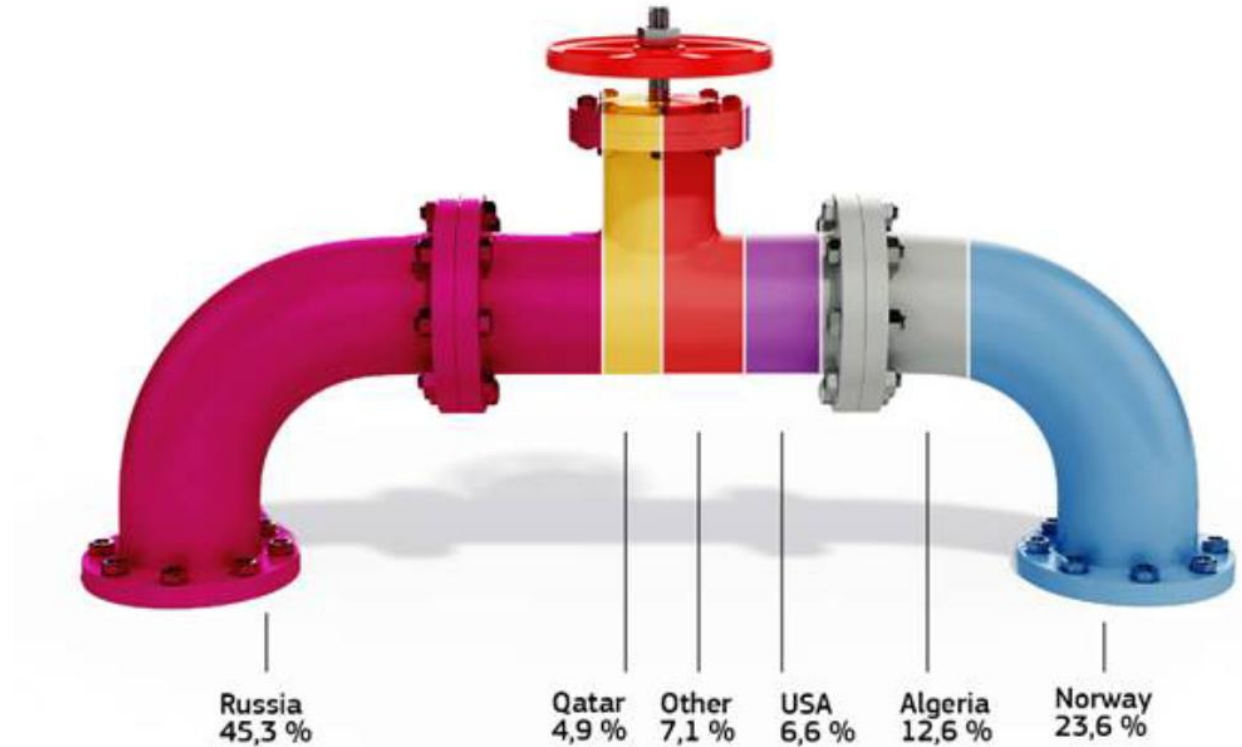
Europe's Gas Supply and Demand Balance

billion cubic meters (bcm)

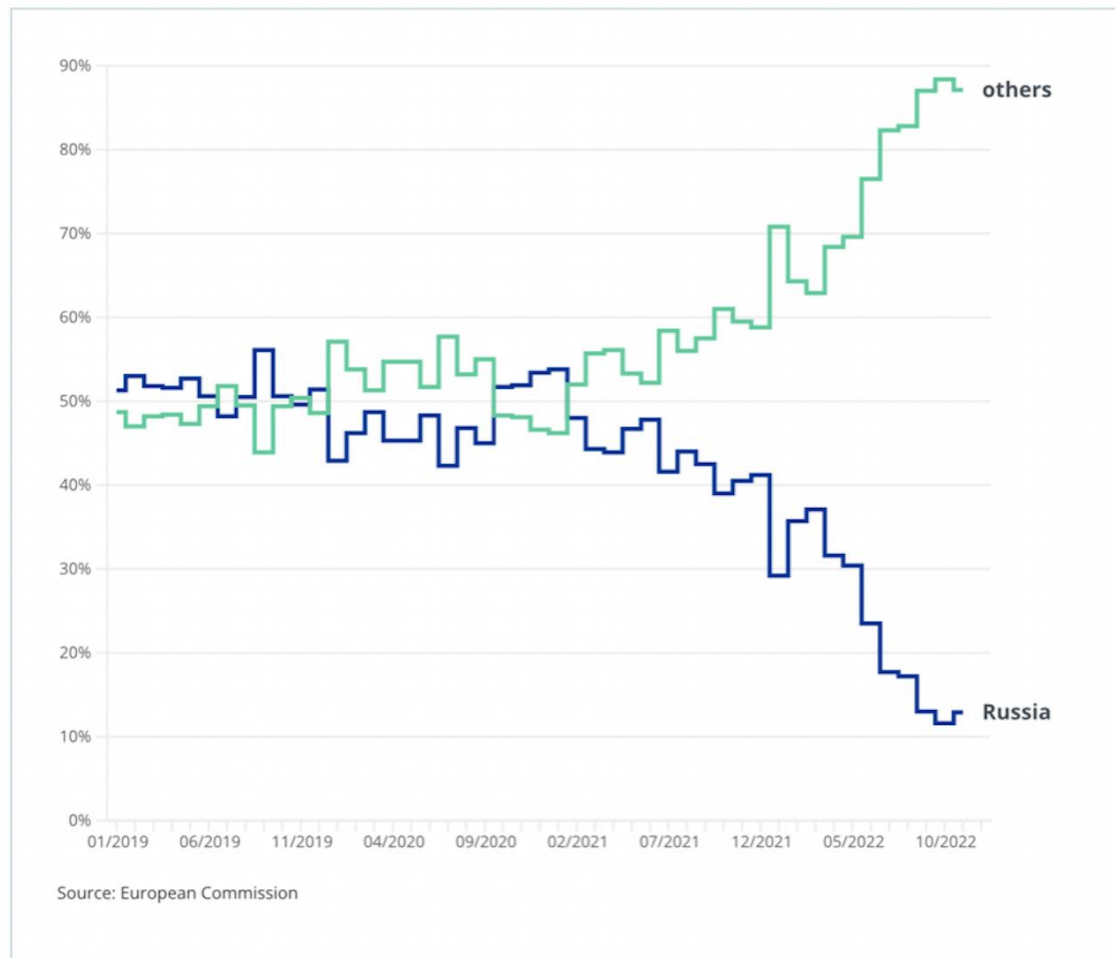


Source: BP Statistical Review of World Energy, July 2021.

Share in EU natural gas imports, 2021



Source: European Commission



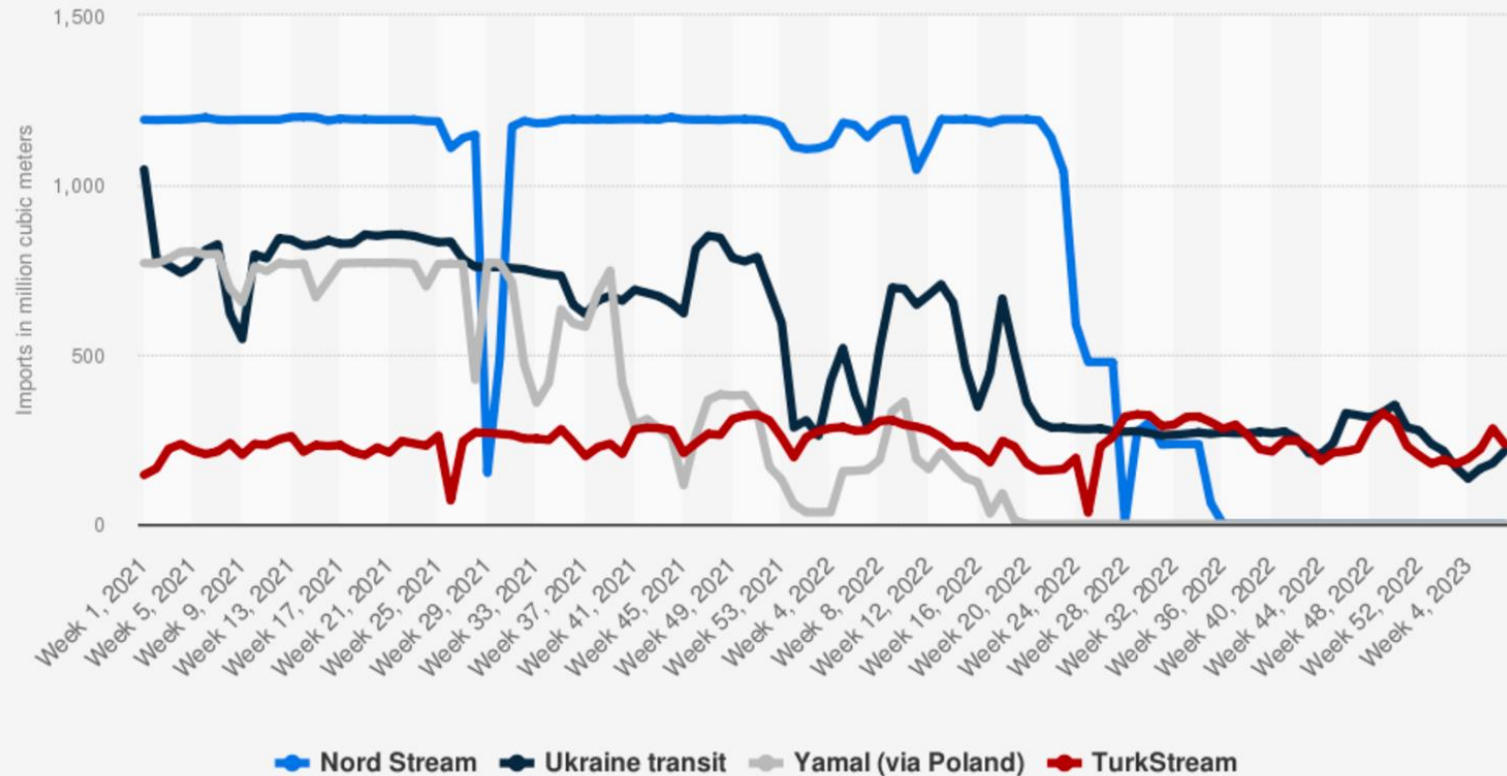
The EU's diversification away from Russian gas

Europe's gas-pipeline network

Theoretical capacity of selected pipelines



Natural gas import volume from Russia in the European Union (EU) and the United Kingdom (UK) from week 1, 2021 to week 7, 2023, by exporting route (in million cubic meters)



Source: Bruegel; ENTSO-E



North stream 2: Putin's signature project is now destroyed



A specialized barge lays pipe under the Baltic Sea in 2019 for the controversial Nord Stream 2 pipeline, which is meant to carry additional Russian gas to Germany



Receiving station for the Nord Stream 2 gas pipeline, near Lubmin, Germany

Mystery leaks reported from Nord Stream gas pipelines



Sources: European Network of Transmission System Operators for Gas (ENTSOG); Danish and Swedish maritime authorities
Prasanta Kumar Dutta | Reuters, Sept. 27, 2022



Gas leaking from the Baltic pipeline after the September 2022 explosion

European LNG import terminals

The map displays the locations of LNG import terminals across Europe, categorized by their operational status and the type of facility. A legend in the top left corner defines the symbols: blue solid circles for 'Operational' terminals, blue circles with a white outline for 'Under construction' terminals, and pink solid circles for 'Planned' terminals. A second legend below the first uses square markers: dark blue for 'FSRU/offshore' and pink for 'Planned FSRU/offshore'. The map shows a high density of operational and under-construction terminals along the western and northern coasts of Europe, particularly in the UK, France, and the North Sea region. Planned terminals are scattered across the continent, including in the Baltic Sea, the Mediterranean, and the Black Sea. A text box over Germany states: 'Germany is in final stages of negotiations to secure three floating storage regasification units (FSRU) that would provide 27bn cubic metres of gas a year'. Country labels include FINLAND, NORWAY, SWEDEN, LITHUANIA, POLAND, GERMANY, FRANCE, UK, PORTUGAL, SPAIN, ITALY, GREECE, TURKEY, and MALTA.

● Operational
○ Under construction
● Planned

■ FSRU/offshore
■ Planned FSRU/offshore

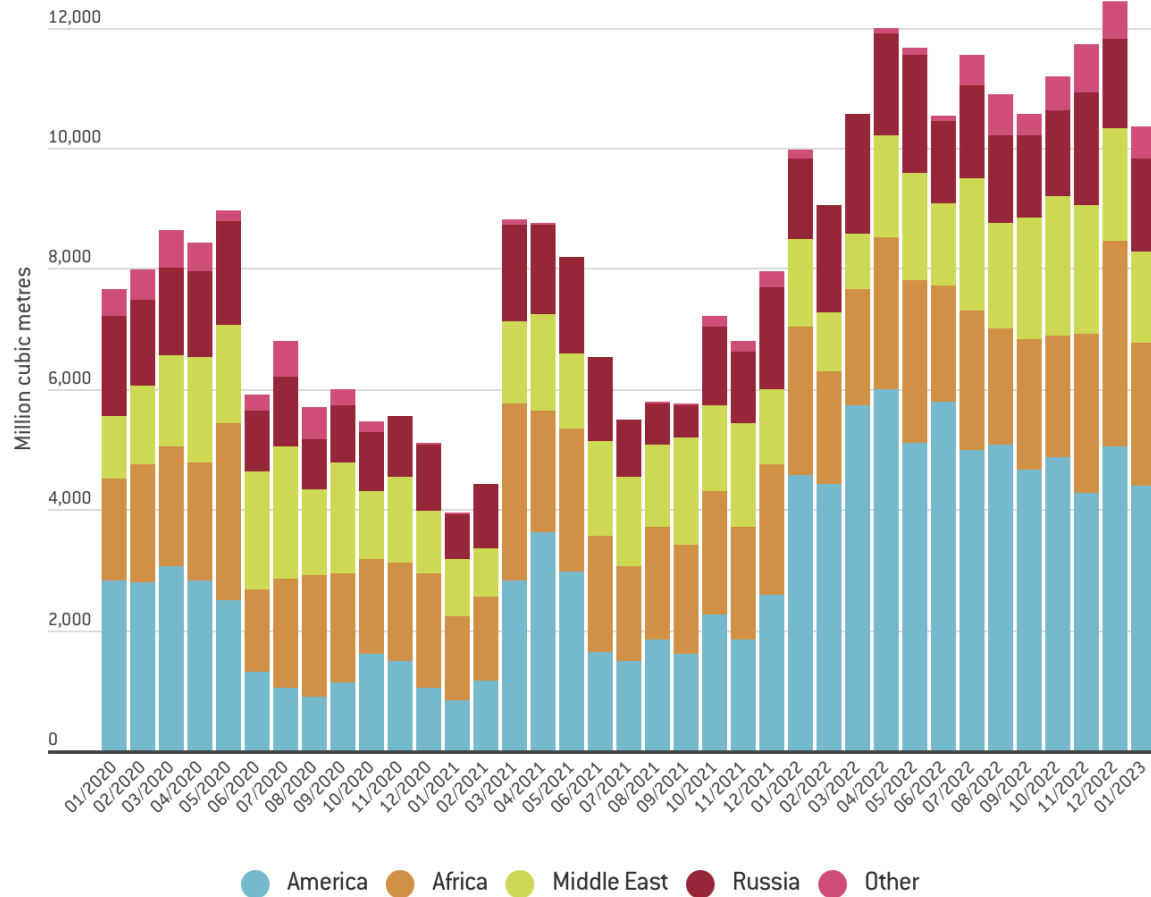
Germany is in final stages of negotiations to secure three floating storage regasification units (FSRU) that would provide 27bn cubic metres of gas a year

Sources: ICIS; OIES; FT research
© FT

Sources: ICIS; OIES; FT research
© FT



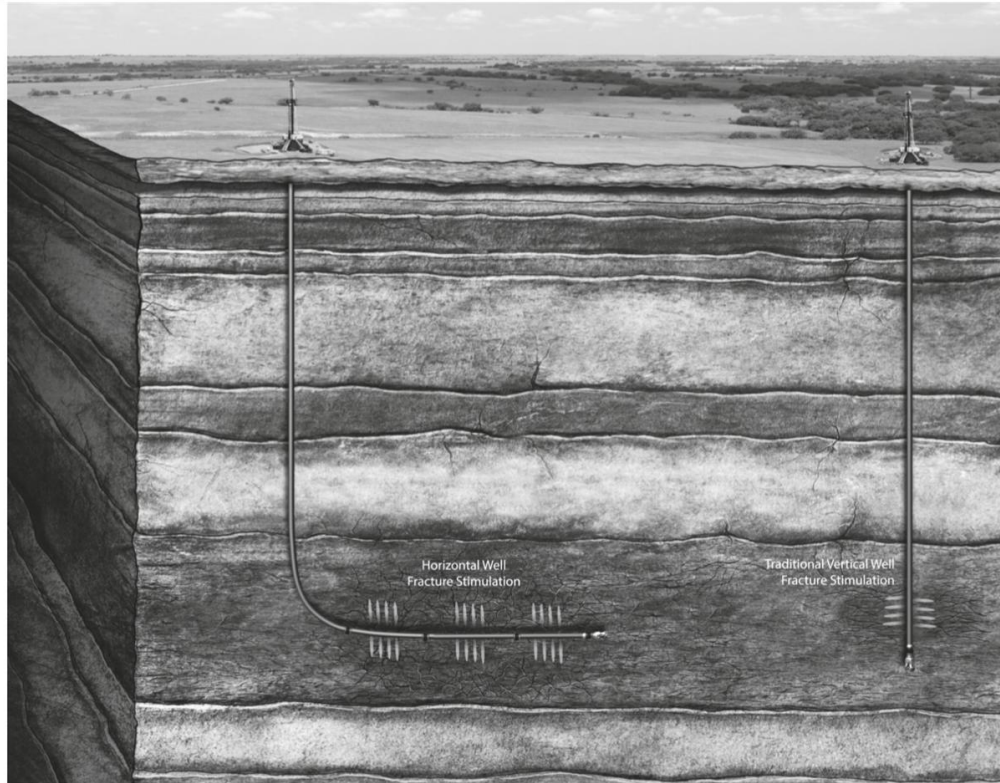
The Gate Terminal in the Netherlands is a critical entry point for liquefied natural gas, a vital fuel for Europe. Gate Terminal



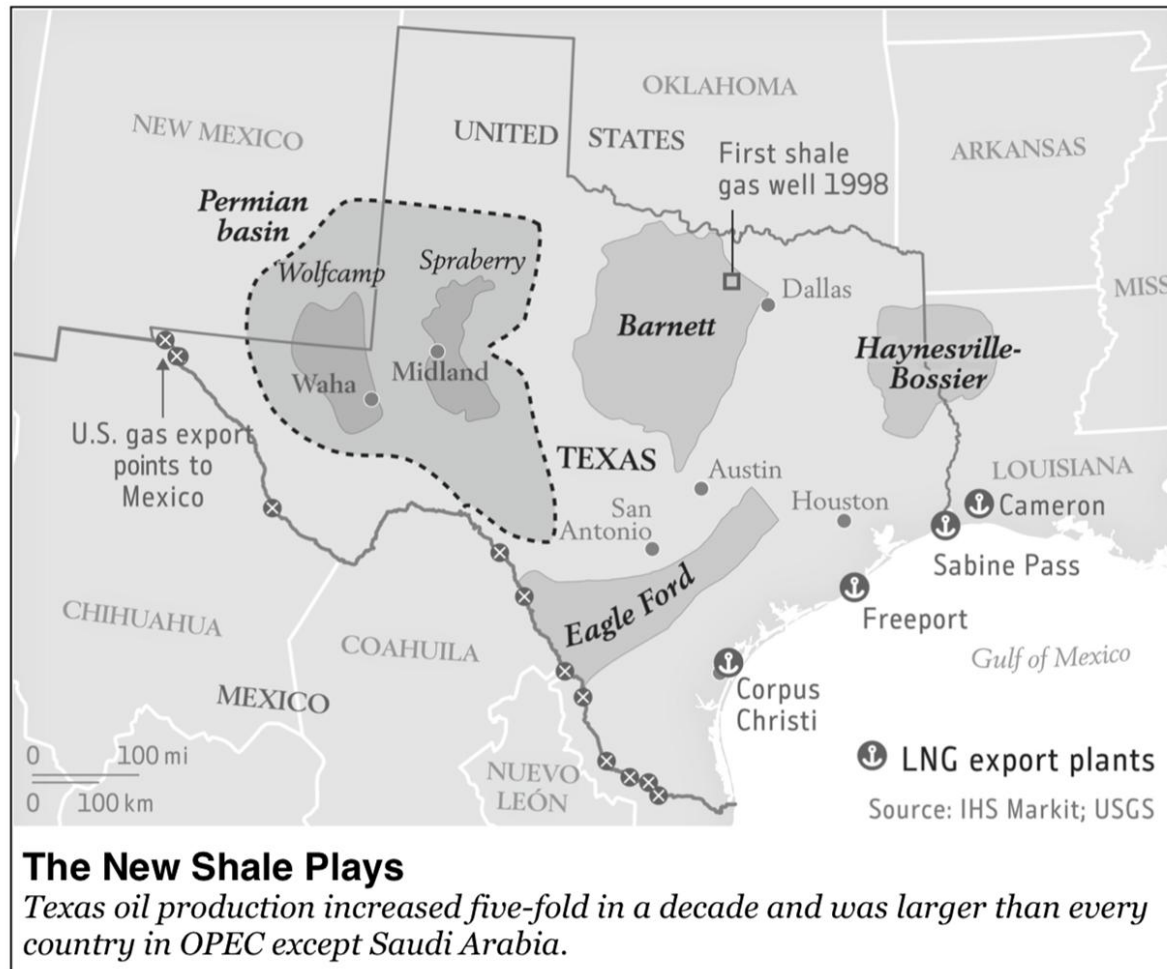
EU27 LNG monthly imports by region of origin



A floating storage and regasification unit. The ships offer the fastest way for Europe to boost LNG imports © Claudine Klodien/Alamy



The Permian Basin in West Texas and New Mexico is now the world's second-largest producing area, propelling the United States to become the world's largest oil producer in 2018, ahead of Saudi Arabia and Russia. Horizontal drilling taps multiple zones containing shale oil.





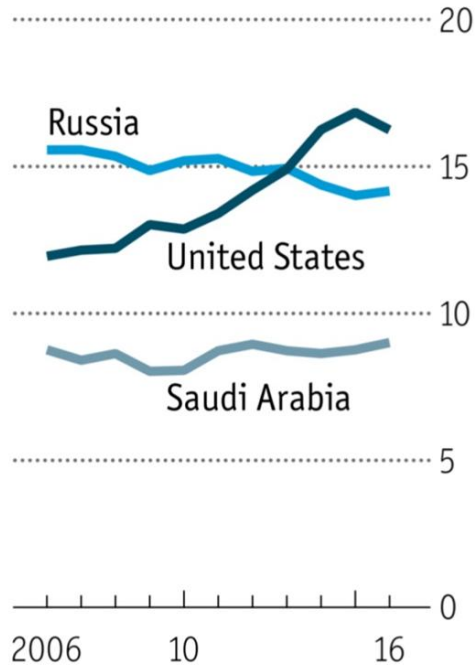
Ships at Cheniere Energy's Sabine Pass terminal being loaded with liquefied natural gas. Cheniere



In 2016, a tanker passed through the expanded Panama Canal carrying the first cargo of U.S. liquefied natural gas (LNG) to China. Oil and gas exports now loom large in U.S.-China trade battles.

Pumped

Oil and gas production
As % of world total



Source: BP

Estimated petroleum and natural gas production in selected countries
quadrillion British thermal units

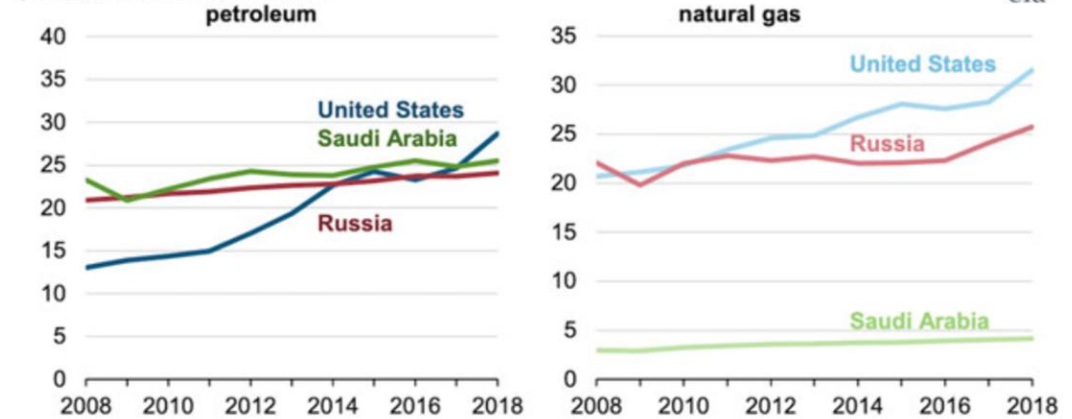
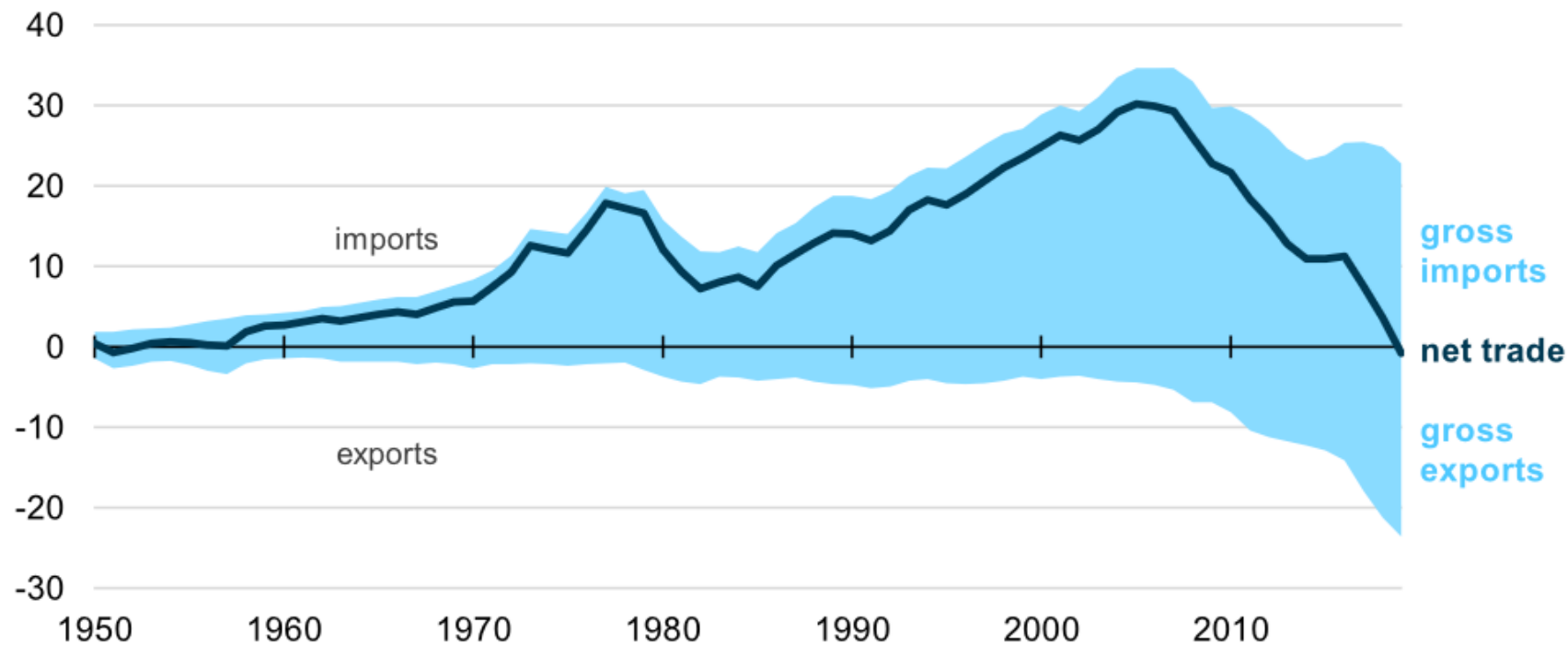


Fig. 11.1 Estimated petroleum and natural gas production in selected countries (Source U.S. Energy Information Administration, based on International Energy Statistics. Note Petroleum includes crude oil, condensate, and natural gas plant liquids)

U.S. total energy exports exceed imports in 2019 for the first time in 67 years

U.S. total energy trade (1950-2019)

quadrillion British thermal units



Source: U.S. Energy Information Administration, [Monthly Energy Review](#), Tables 1.4a, 1.4b, and 1.4c



Russia: Pivoting to the East



The Power of Siberia is the first gas pipeline built to supply Russian gas to China. Image courtesy of Gazprom.



Gas supply to China through the Power of Siberia pipeline was started in December 2019. Image courtesy of Gazprom.

Piloting to the East

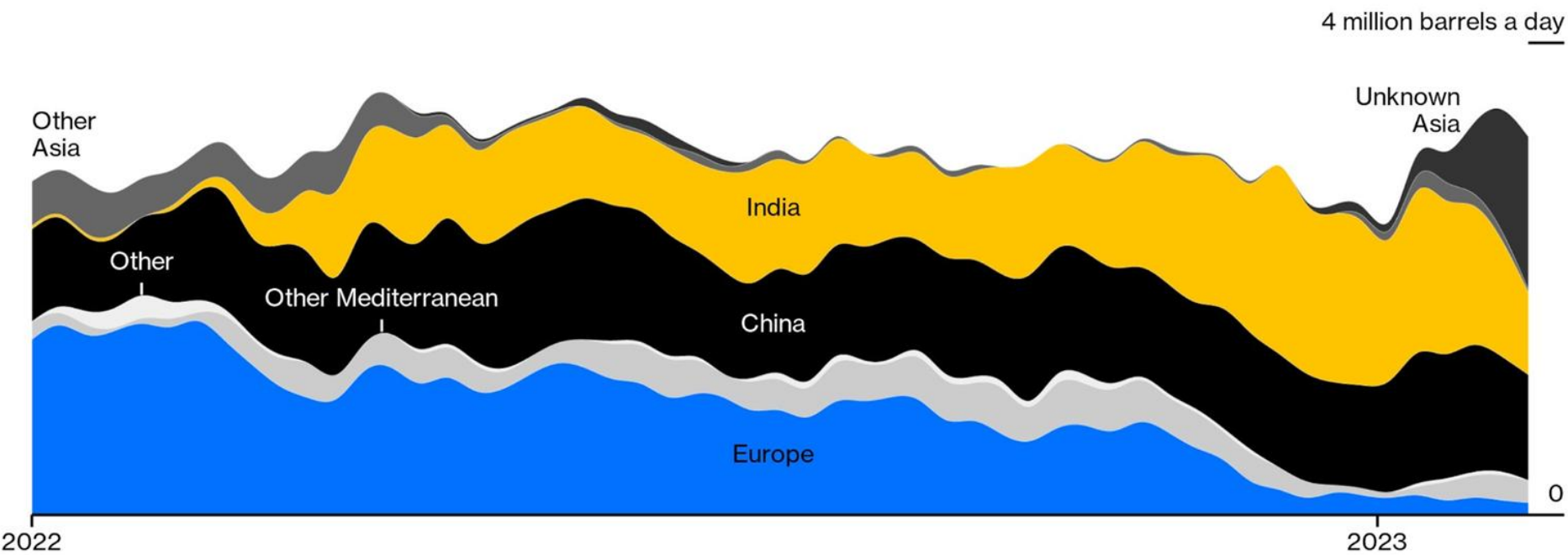


Trans-Mongolian Route for Power of Siberia 2



Buyers of Russia's Crude Oil

India has provided the most important lifeline for Moscow's crude sales

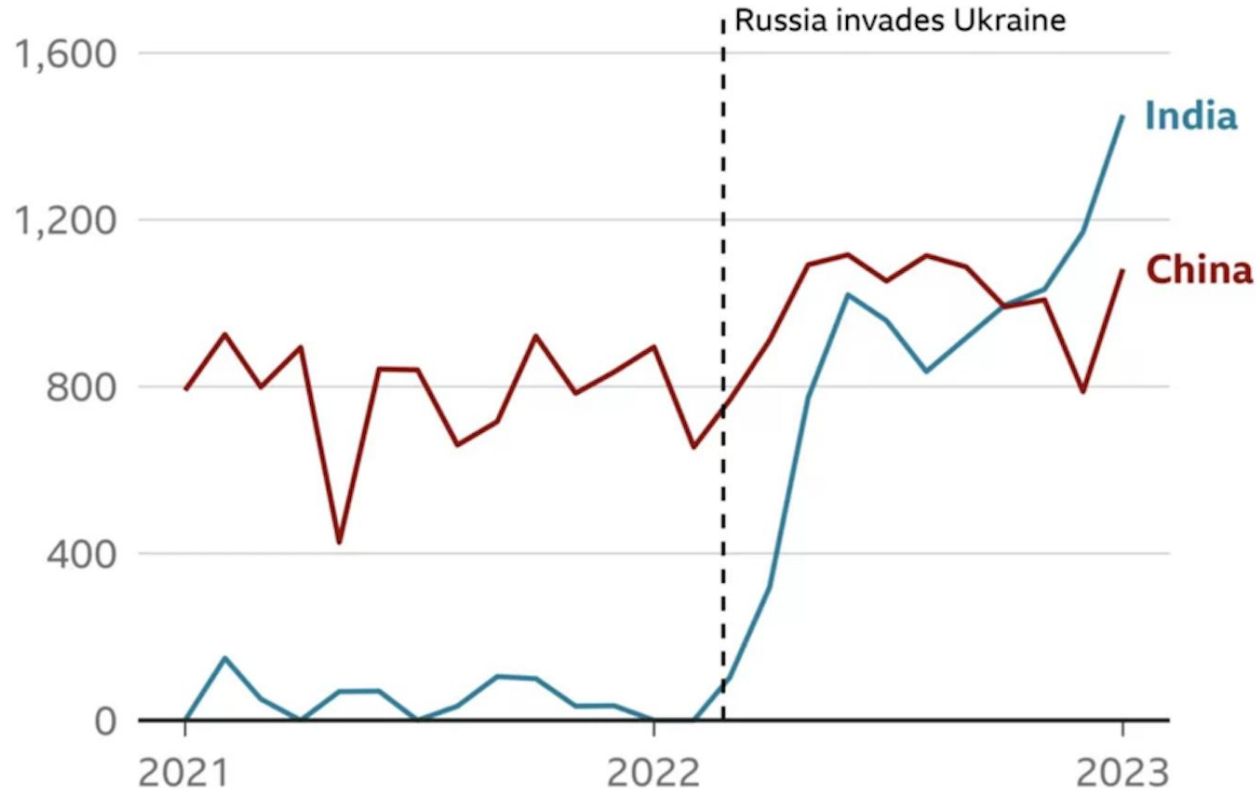


Source: Vessel tracking data monitored by Bloomberg
Note: Four-week average flows of Russian crude. Recent history suggests that most of the barrels heading to “Unknown Asia” destinations will end up in India, with some heading to China. “Other Med.” is mostly shipments to Turkey.

BloombergOpinion

Russia oil exports to India and China

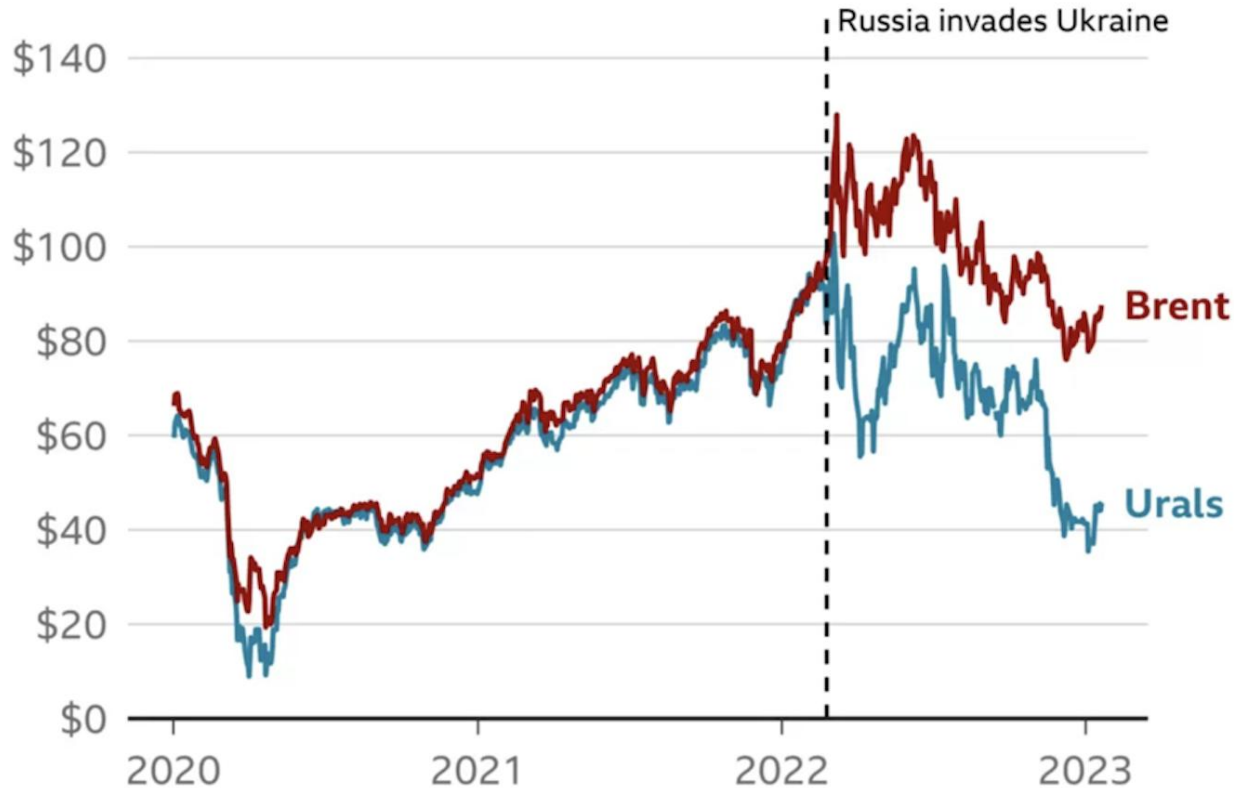
Thousands of barrels per day



Source: Kpler

Price of Russian oil dropping faster than Brent

US dollars per barrel



Where Turkey gets its gas



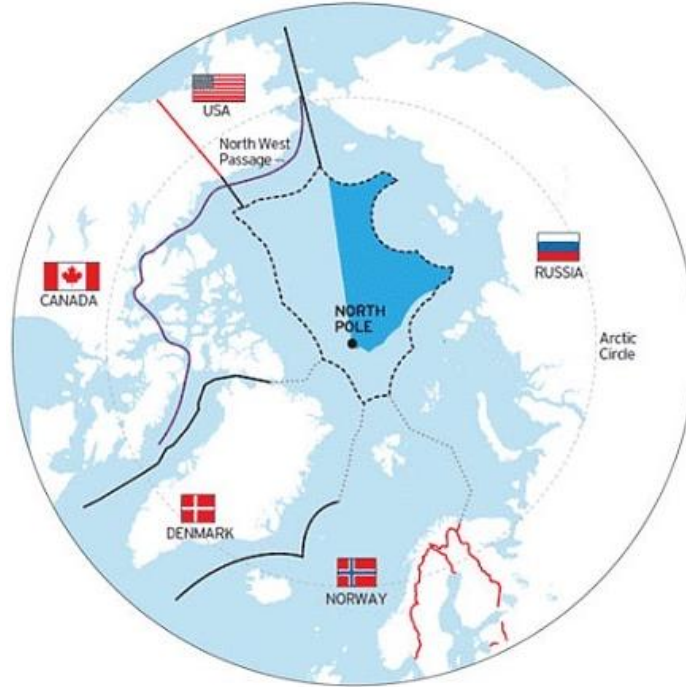


At the “*end of the land*” on a remote Arctic peninsula. Russia will become one of the world’s major exporters of LNG, capable of cutting through the ice eastward to Asia or westward to Europe ³⁵

Estimated Undiscovered Oil and Gas in the Arctic and Potential Trade Routes



Russian Continental Shelf Claims in the Arctic



Resource
competition
in the Arctic

Source: Division for Ocean Affairs and the Law of the Sea, Office of Legal Affairs, United Nations, "Outer limits of the continental shelf beyond 200 nautical miles from the baselines: Submissions to the Commission: Submission by the Russian Federation," at www.un.org/depts/los/clcs_new/submissions_files/rus01/RUS_CLCS_01_2001_LOS_2.jpg.



11. The consequences of melting Arctic ice for shipping.



“Icebreaker gap” benefits Russia



Chokepoints and U.S. Encroachment



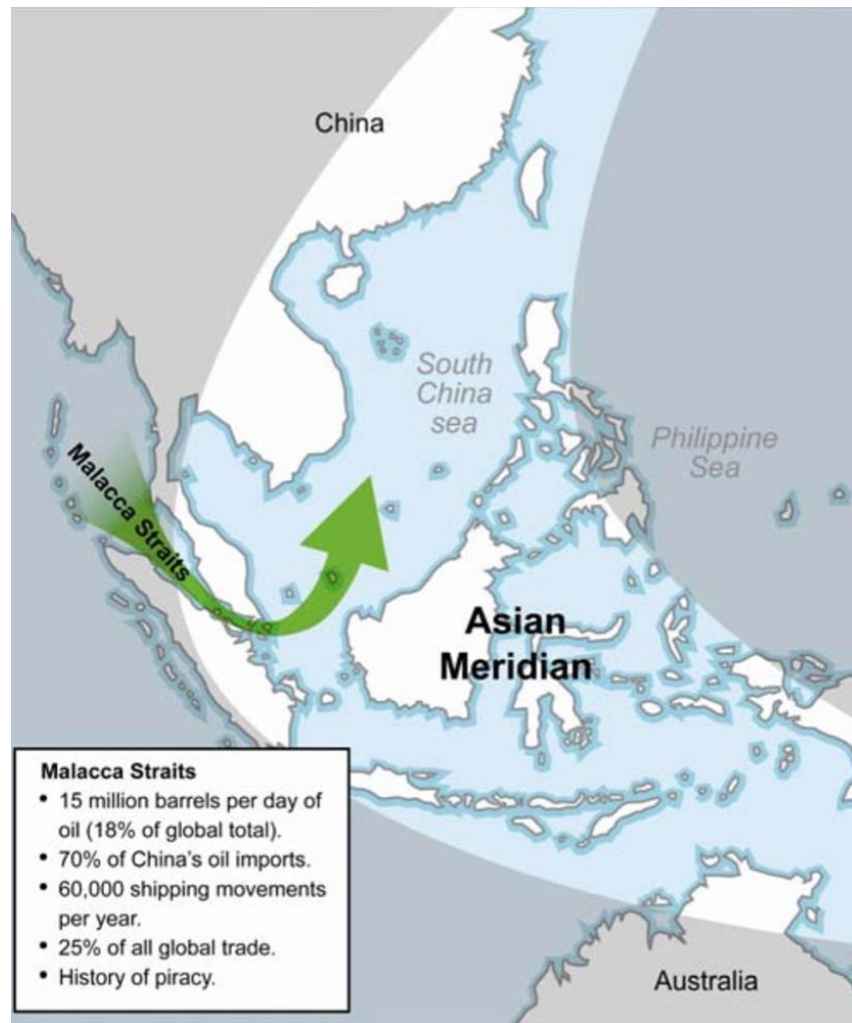
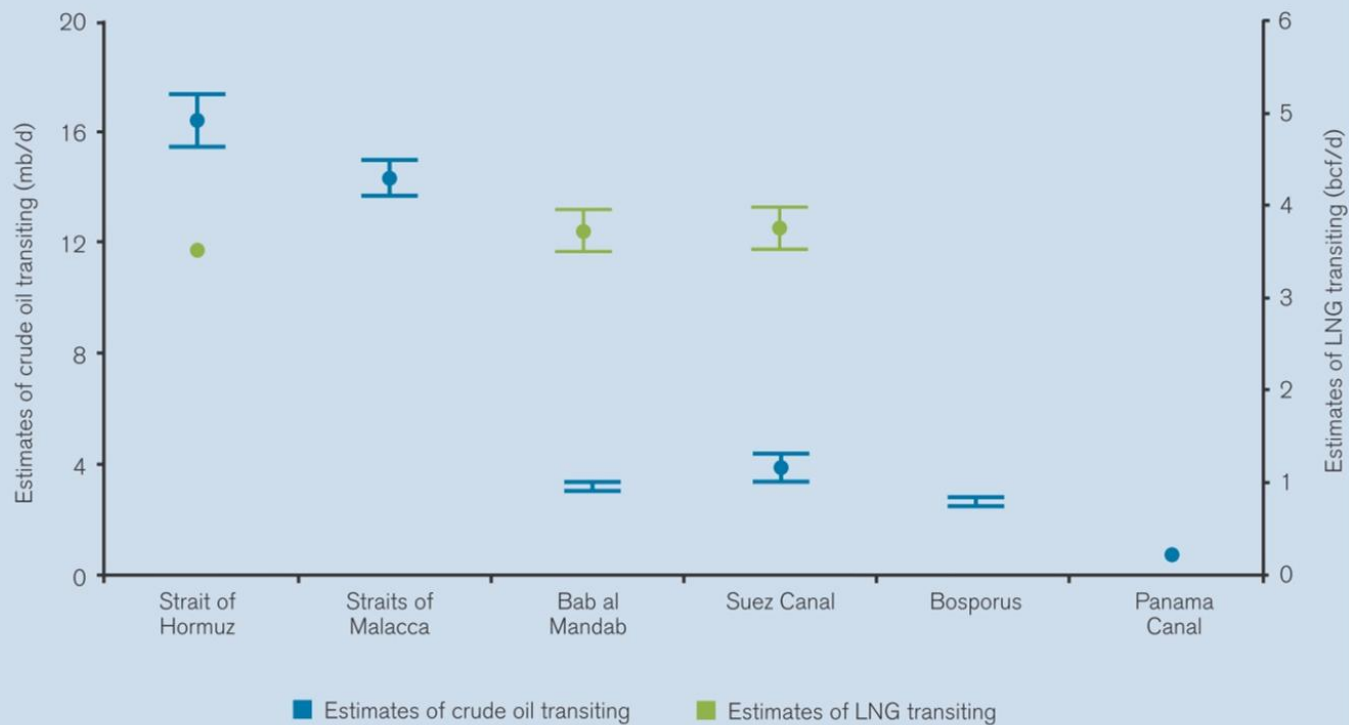


Figure 4.13: Estimated volumes of oil and gas through key choke points, 2010

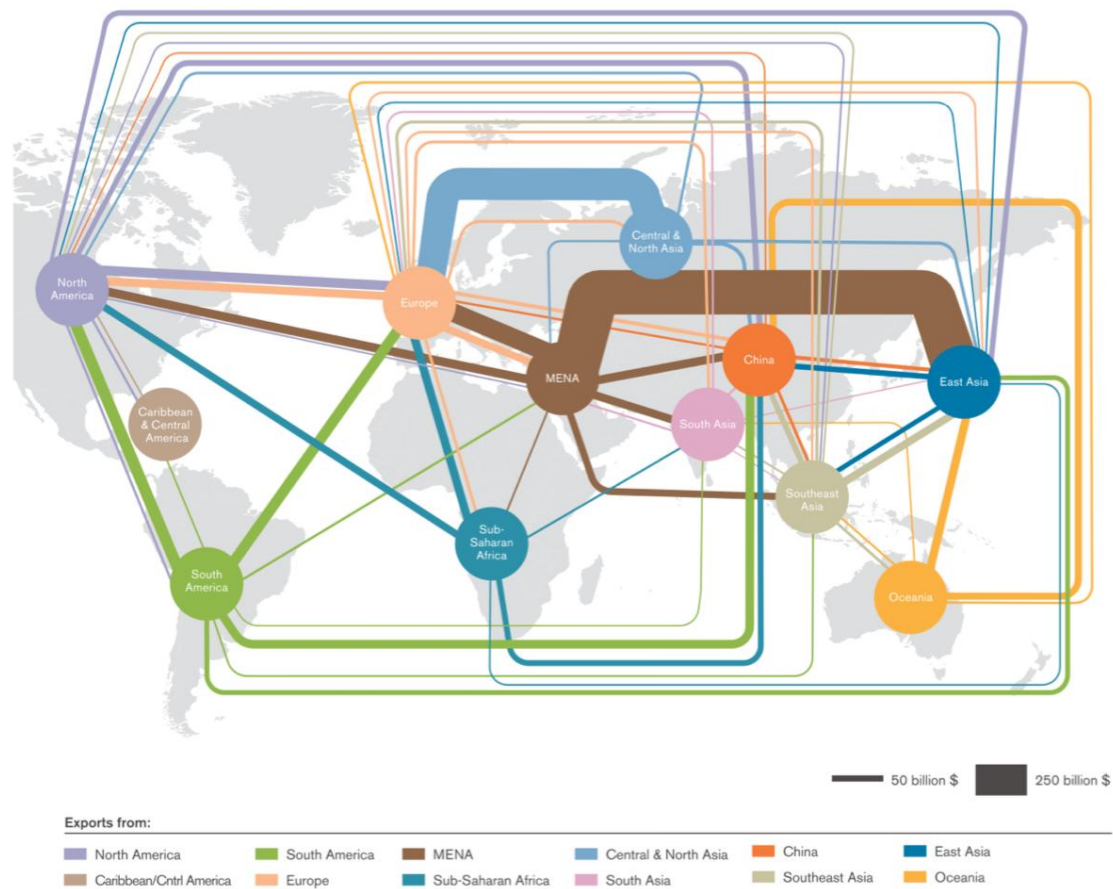


Source: Stevens and Emmerson (2011).

Tanker damaged in attack off the straits of Hormuz

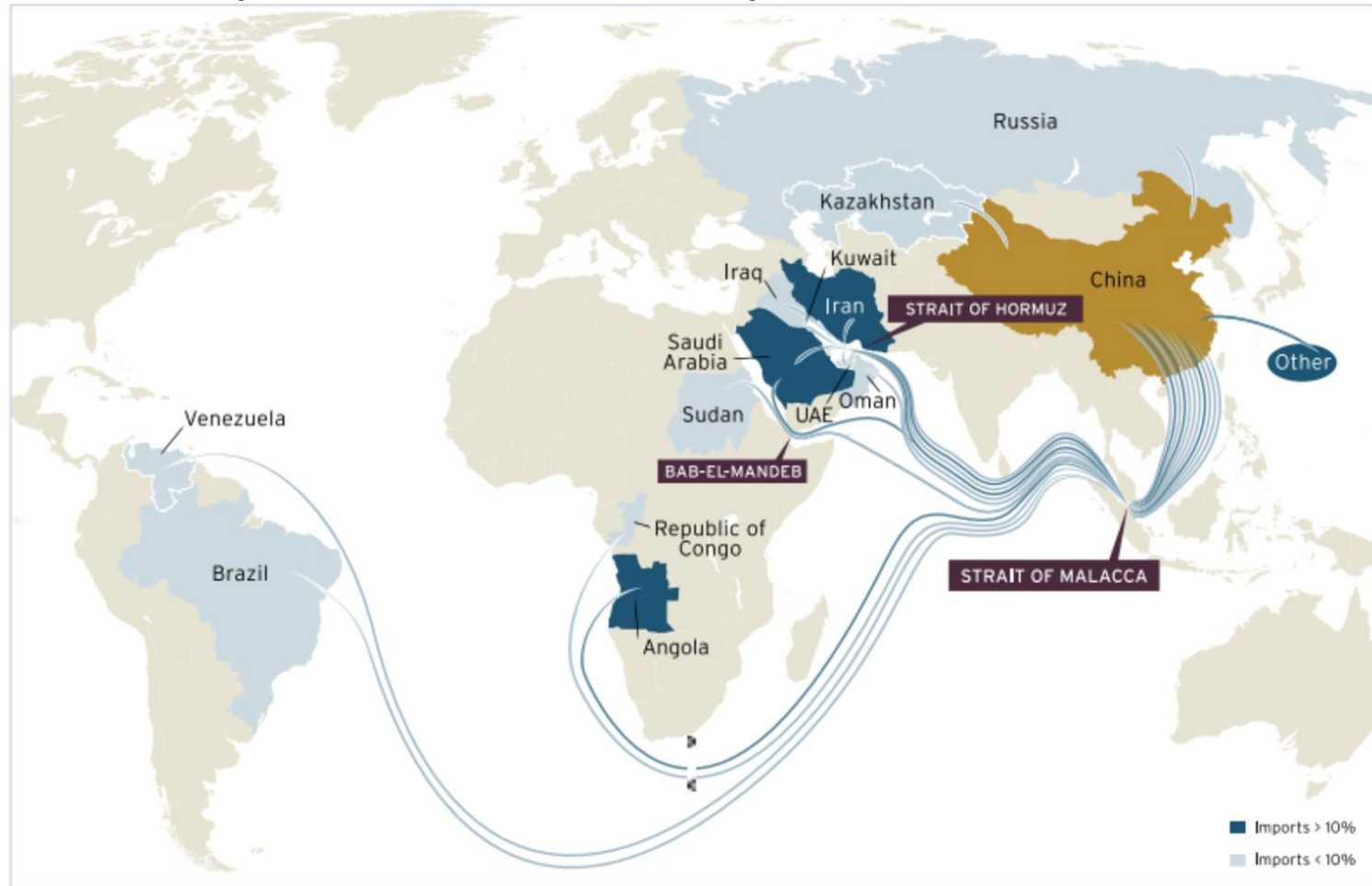


Figure 1.2: Resource trade between regions, by value, 2010



Sources: Chatham House Resource Trade Database, BACI, COMTRADE. Resource trade flows between regions worth more than 10 bn \$ in 2010.

China imports: Trade vulnerability and the Malacca dilemma



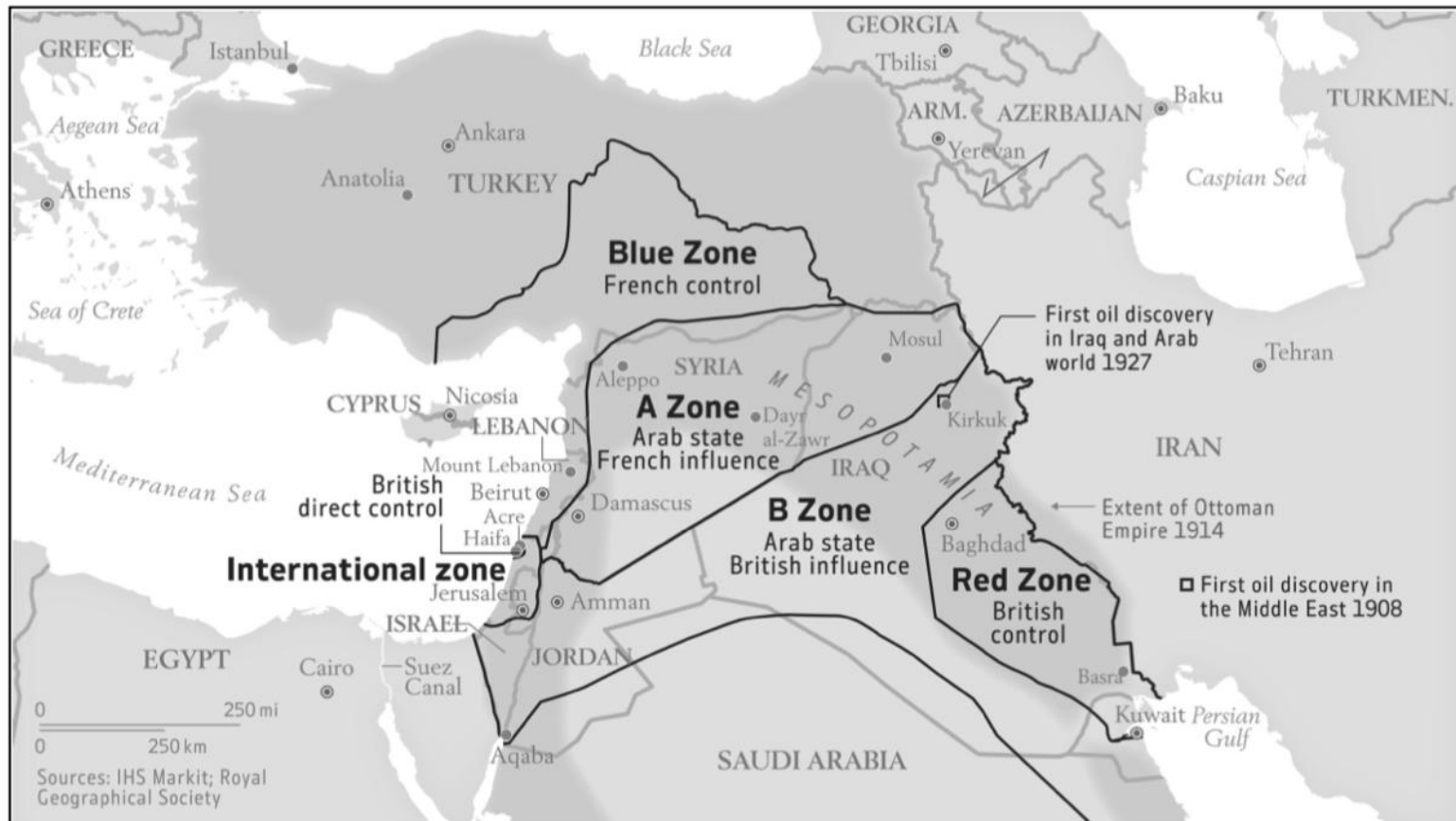


China's Belt and Road Initiative

Launched in 2013, the “BRI” aims to promote “connectivity” and reorder the global economy.



Piraeus port as part of the maritime Silk Road



Sykes-Picot Agreement 1916

The British and French drafted this interim map during World War I for the Middle East after the end of the Ottoman Turkish Empire.



An ISIS jihadist in a 2014 propaganda video declares, “We’ve broken Sykes-Picot,” as a bulldozer erases the border between Iraq and Syria. The U.S. defense secretary said ISIS’s lightning offensive across Iraq was “beyond anything we’ve seen.”



Persian Gulf

The oil heartland of the Middle East produces about 60 percent of the oil that is sold in international markets.



BLOOD and OIL

THE MIDDLE EAST
IN WORLD WAR I

A Film by Marty Callaghan





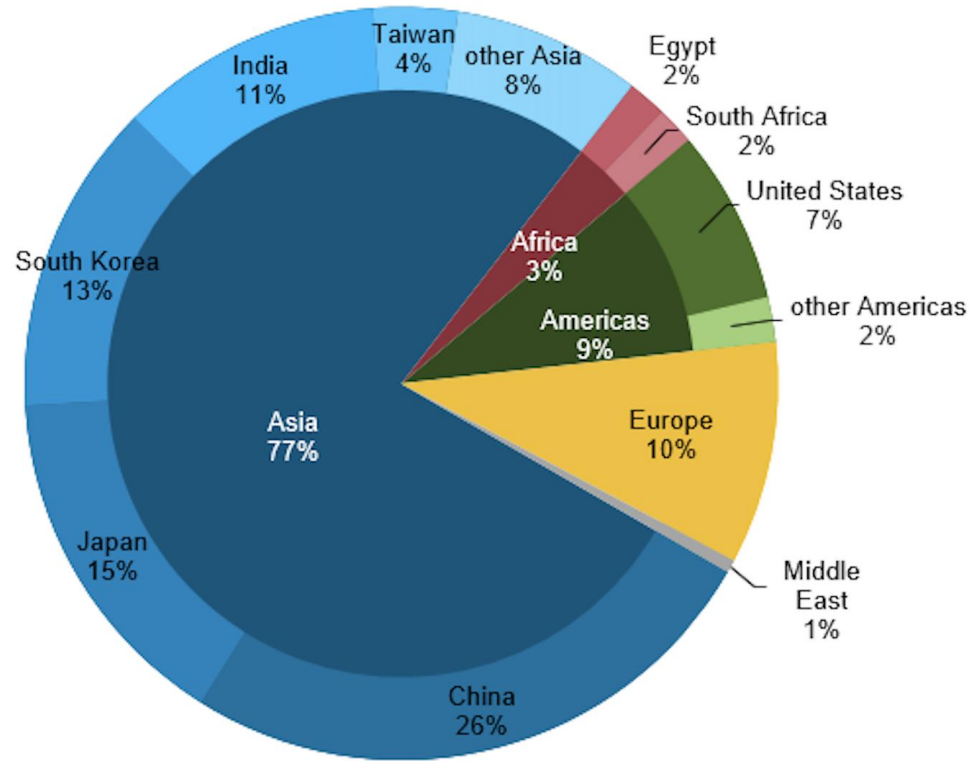
Coalition forces enter Kuwait in March 1991. Asharq Al-Awsat



Houthi militants in Yemen cheer the launch of a ballistic missile aimed at Saudi Arabia. The Yemen civil war led to a huge humanitarian crisis.

Aramco oil refineries damaged





Source: Graph by the U.S. Energy Information Administration, based on data from Global Trade Tracker
eia Note: Totals may not add up because of independent rounding.

Saudi Arabia's crude oil exports by destination, 2020

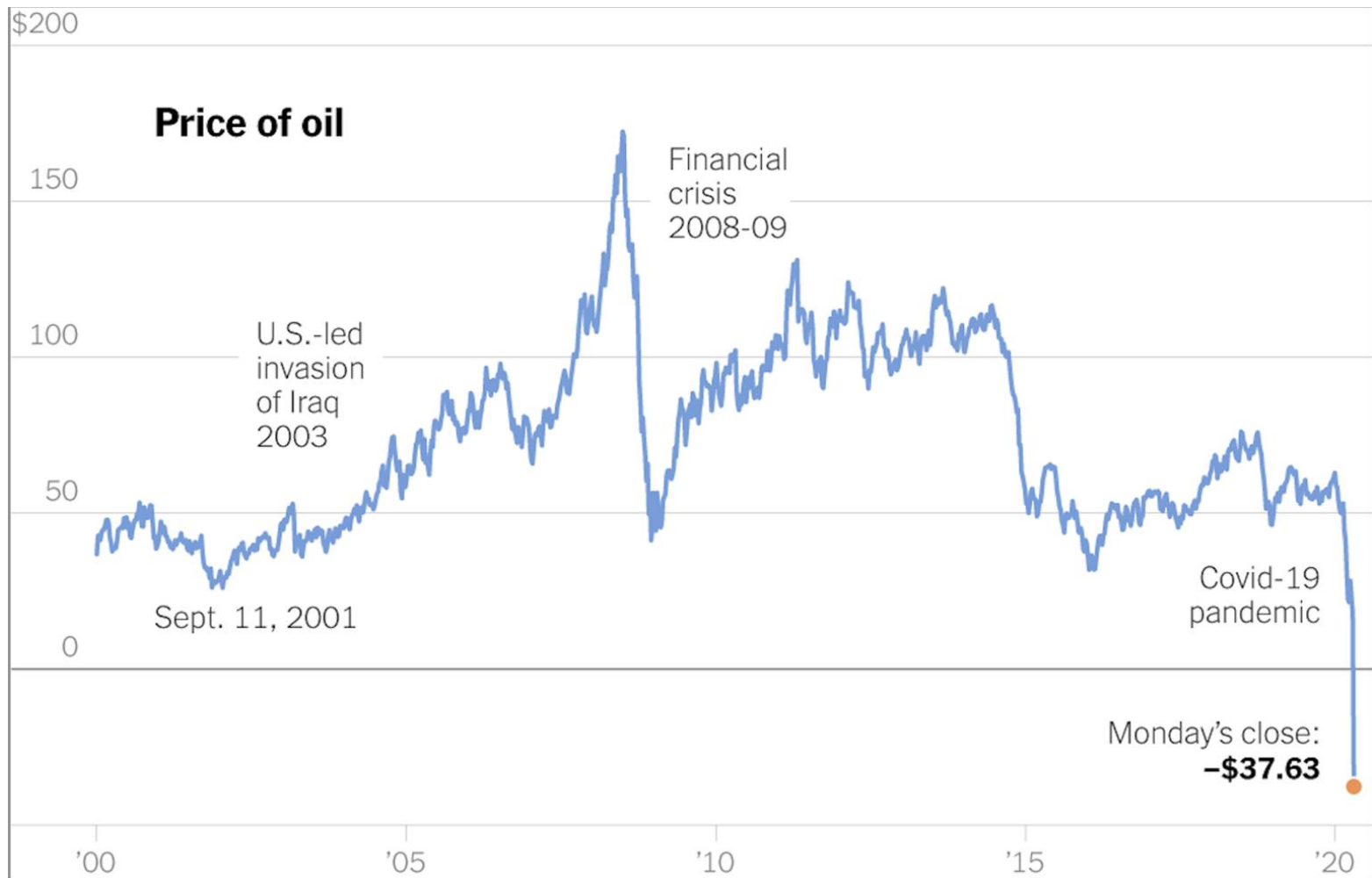
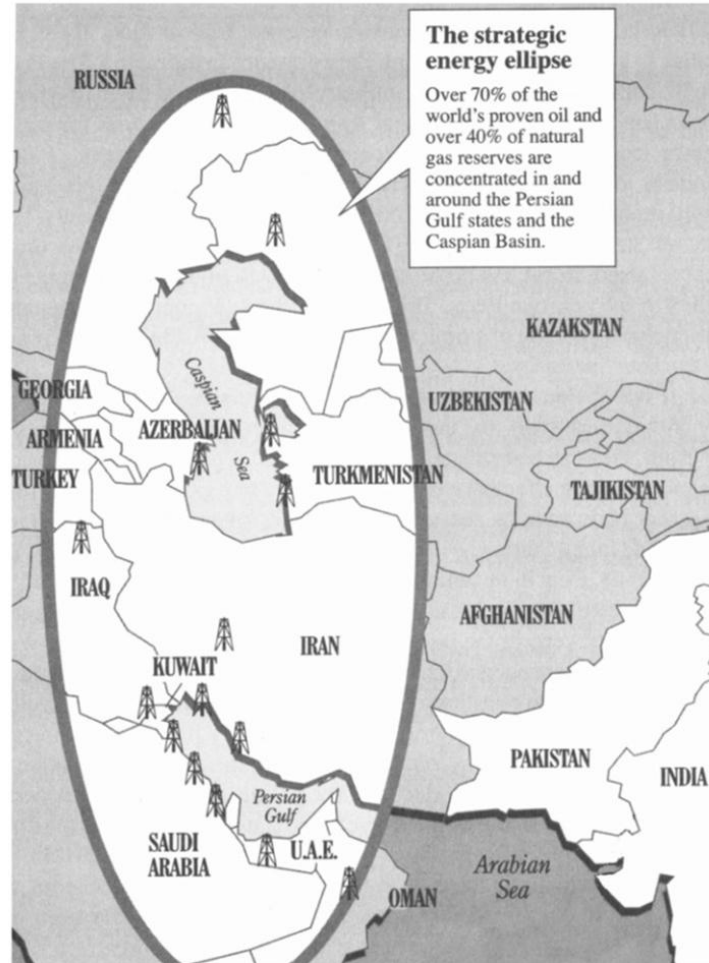
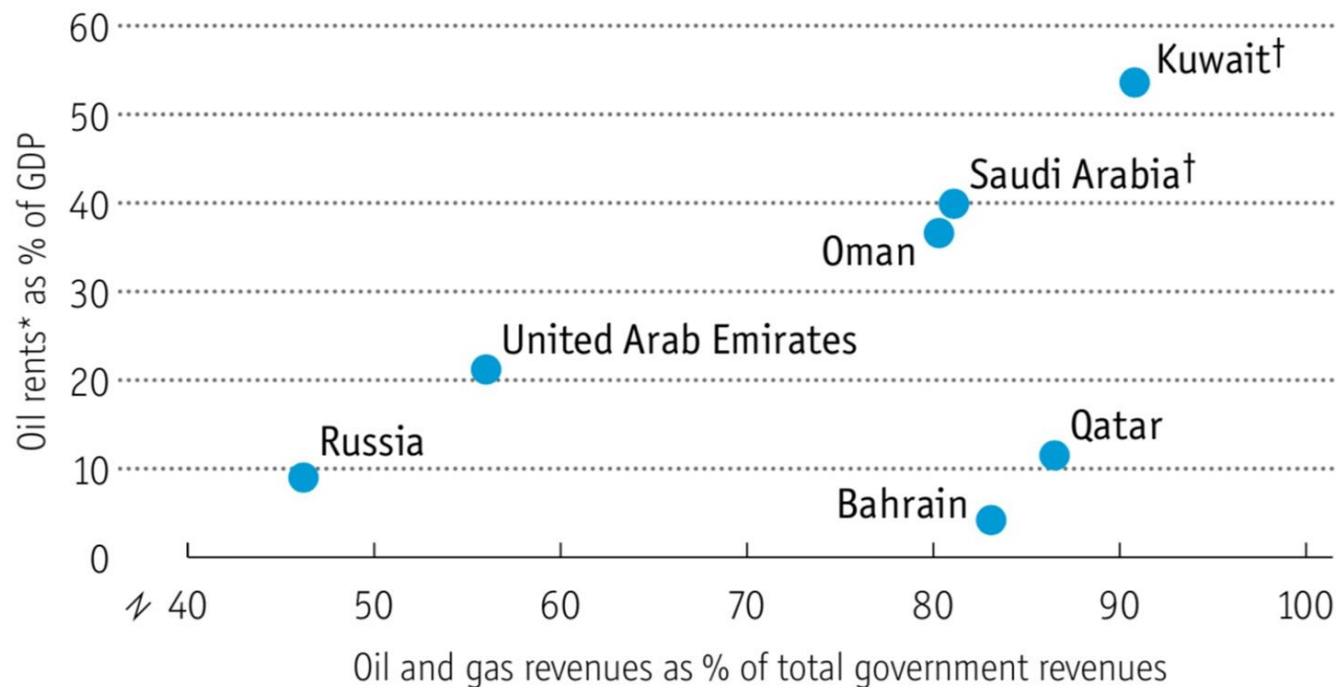


Figure 1: The Strategic Energy Ellipse



Hooked on the black stuff

2012-16 averages



Sources: Haver Analytics; World Bank

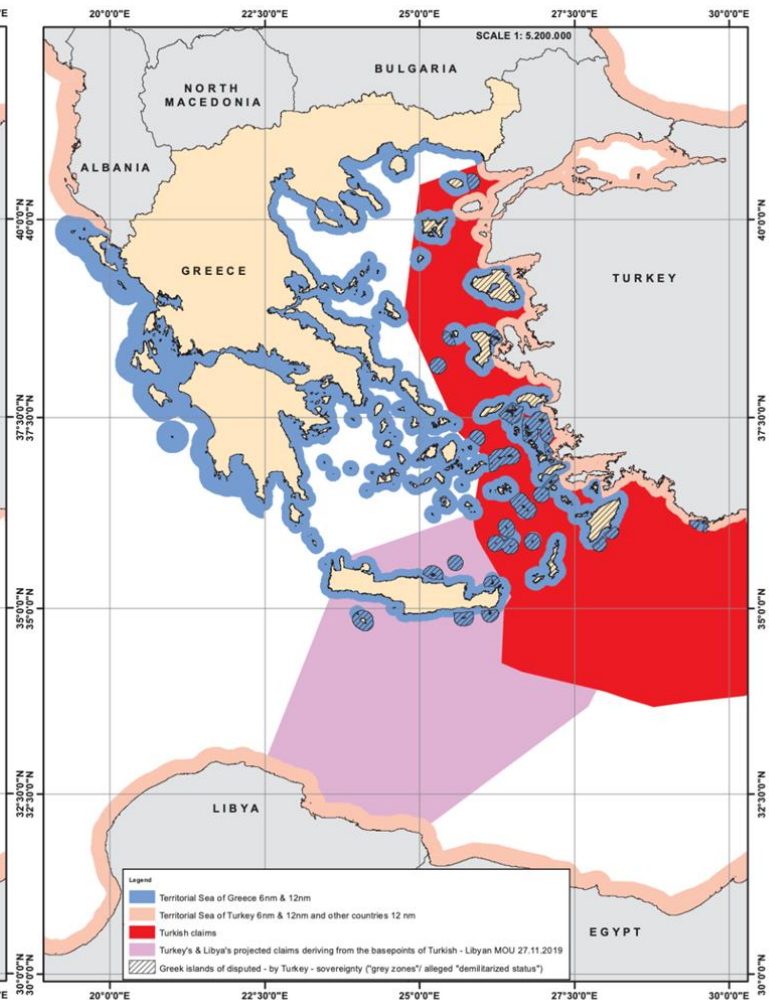
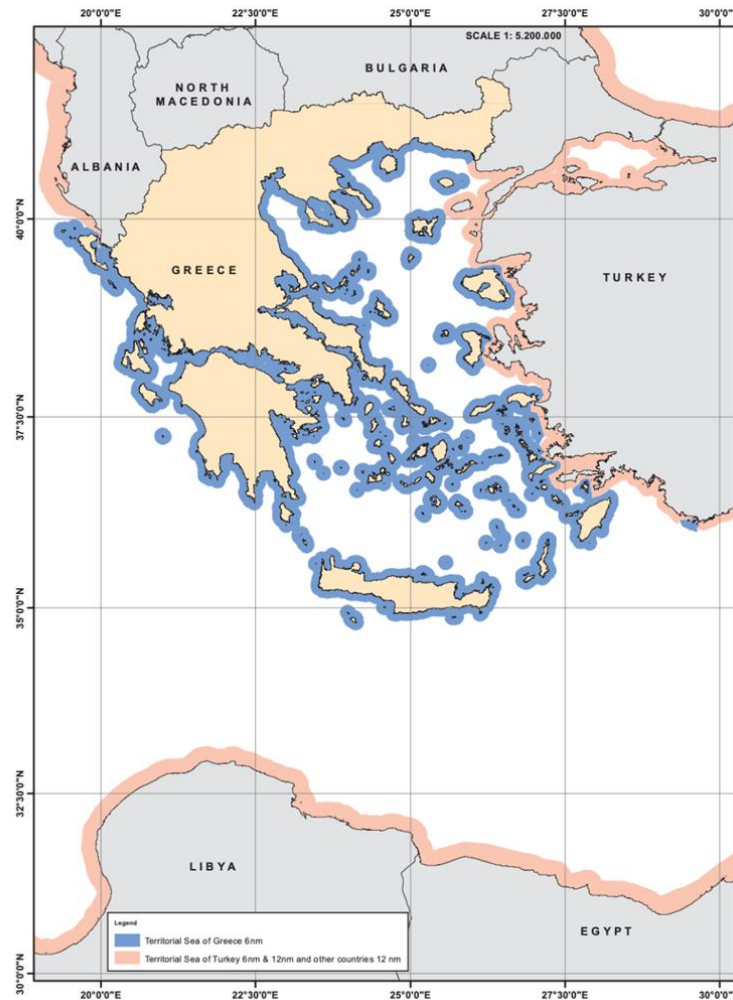
*Sale price minus production cost

†Oil revenues only

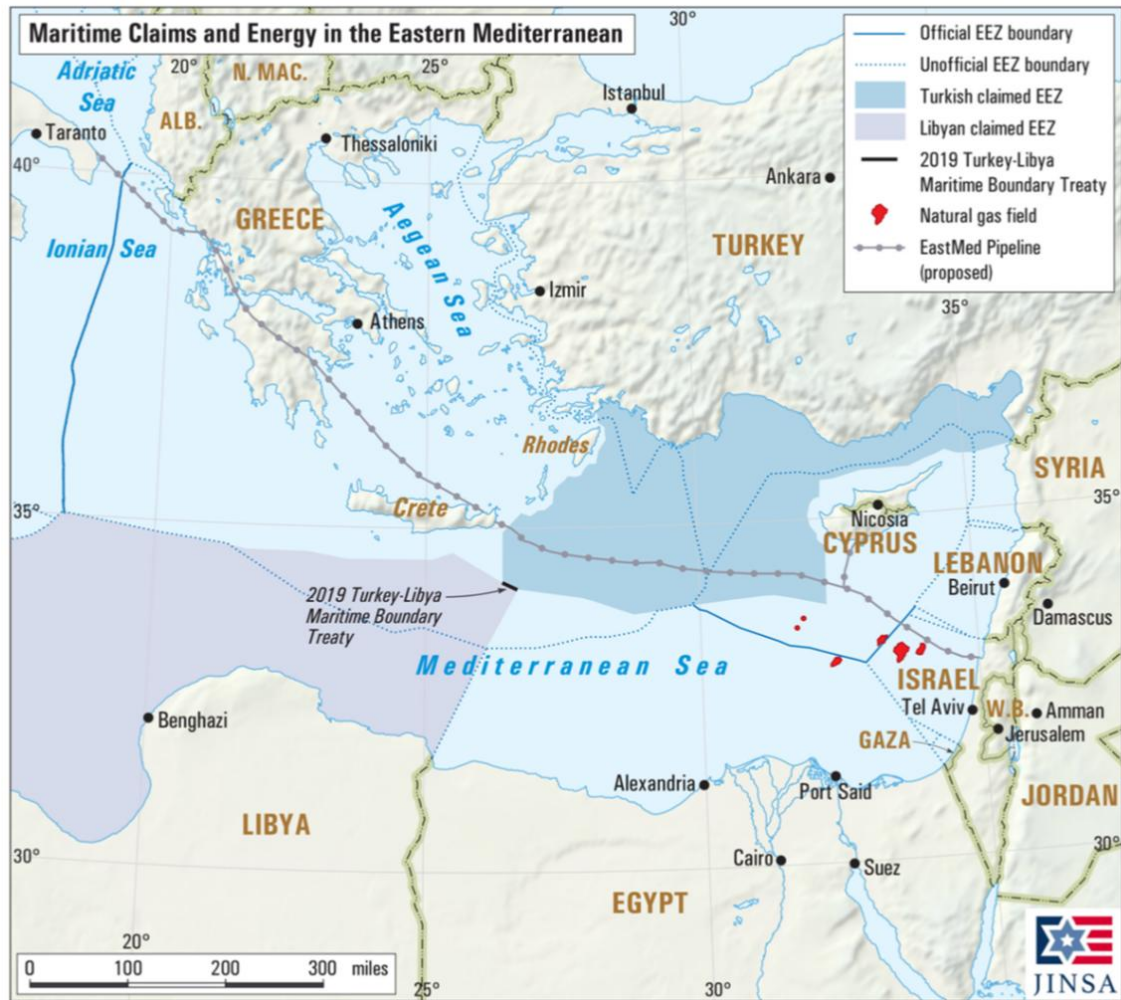


Israel's giant Leviathan natural gas field, started up at the end of 2019, marked the rise of the "*Eastern Med*" as a new energy province and possible exporter to Europe





Comparative mapping of Turkish claims/visions 1972-2022



Offshore is the new frontier for wind power





Solar costs have fallen an extraordinary 85% over a decade,
and deployment has grown enormously

China supplied 70% of the world's solar cells



Workers are seen at a solar-panel maker in Hangzhou, Zhejiang province, on Aug. 26. Photo: IC



Thomas Edison's electric car failed to gain traction

INSANE MODE

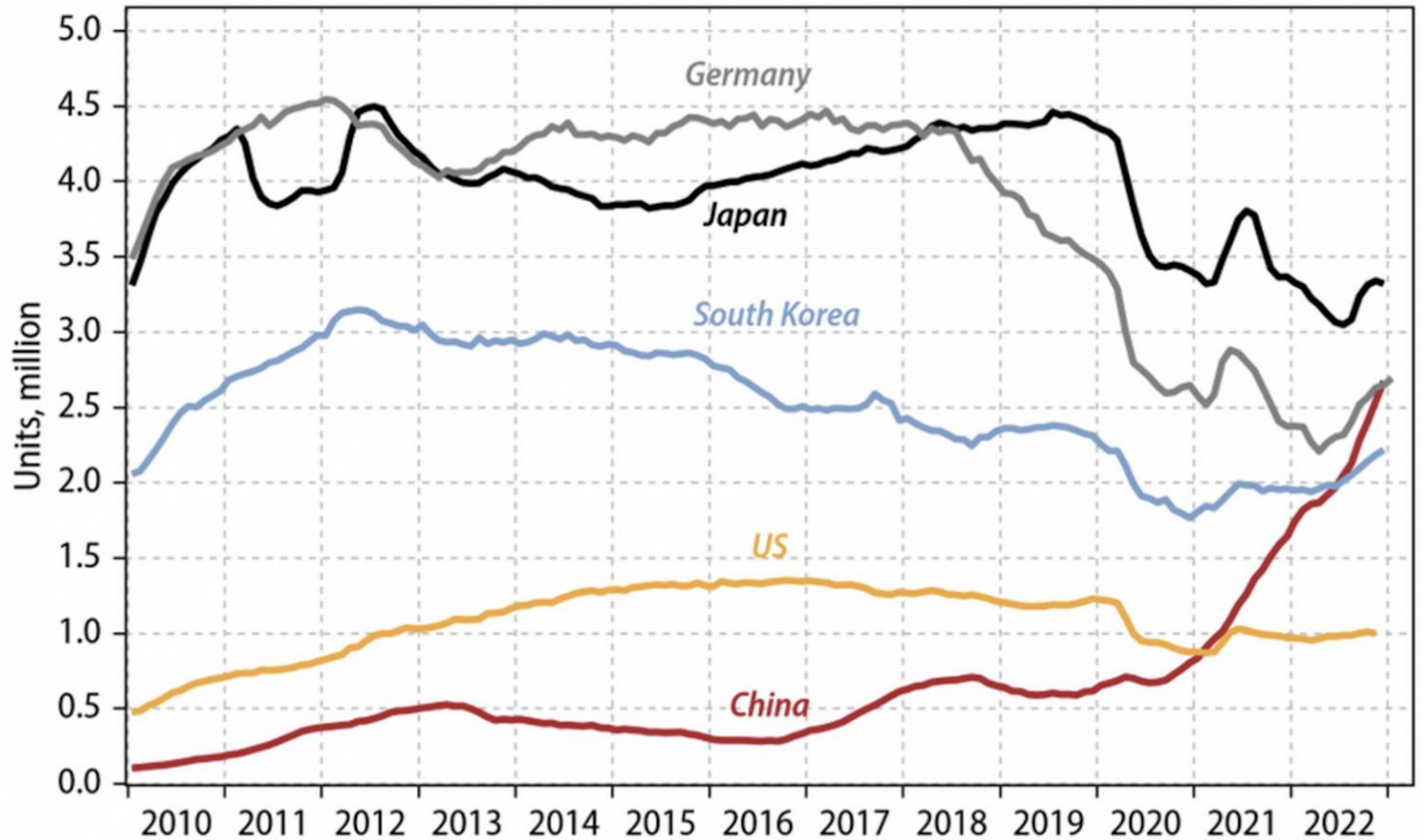
How Elon Musk's Tesla
Sparked an Electric Revolution
to End the Age of Oil



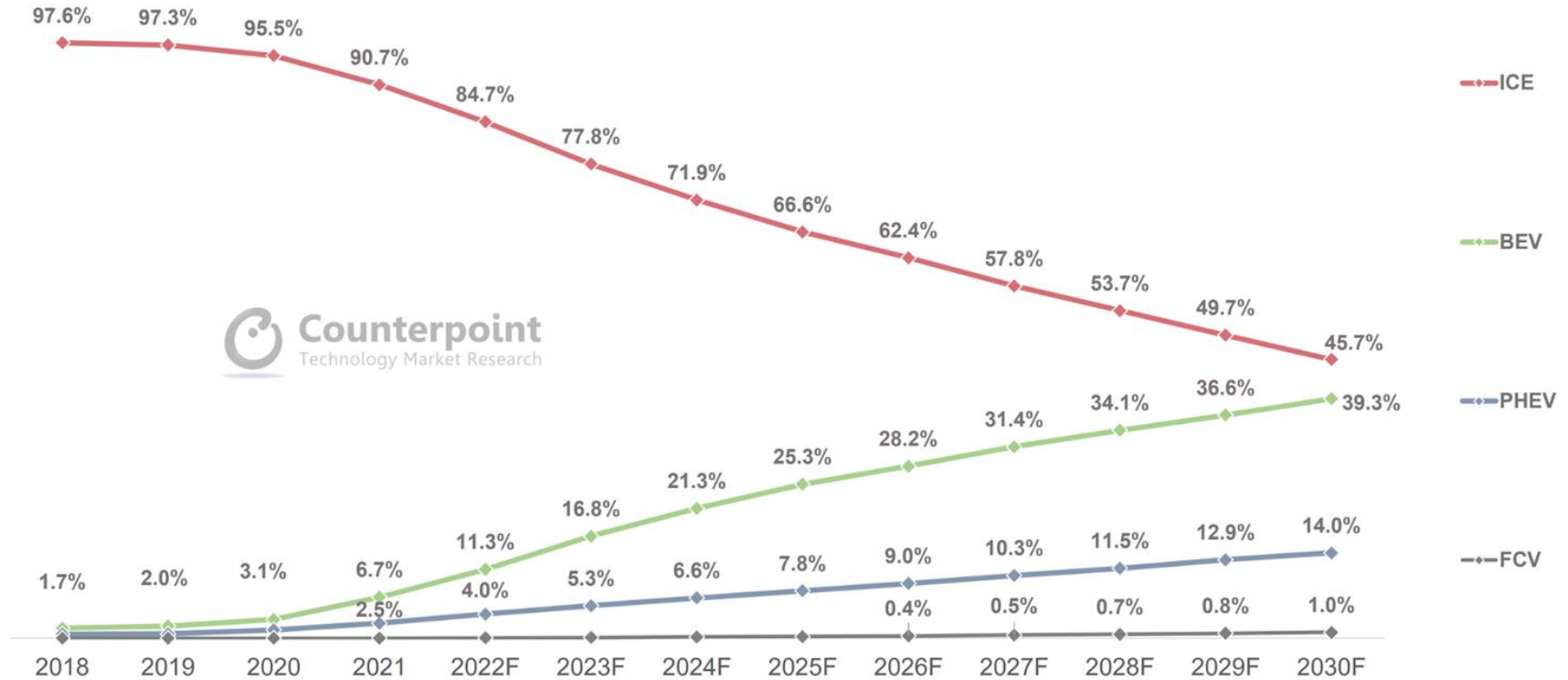
HAMISH MCKENZIE

The electric car
revolution has
geopolitical implications

Exports of passenger cars; rolling 12m sum



Global PV Sales Share Forecast by Powertrain



Source: Counterpoint Research Passenger Vehicle Forecast, April 2022



Electric Shock

Interpreting China's Electric Vehicle Export Boom

CSIS BRIEFS



CHINA'S TAKOVER

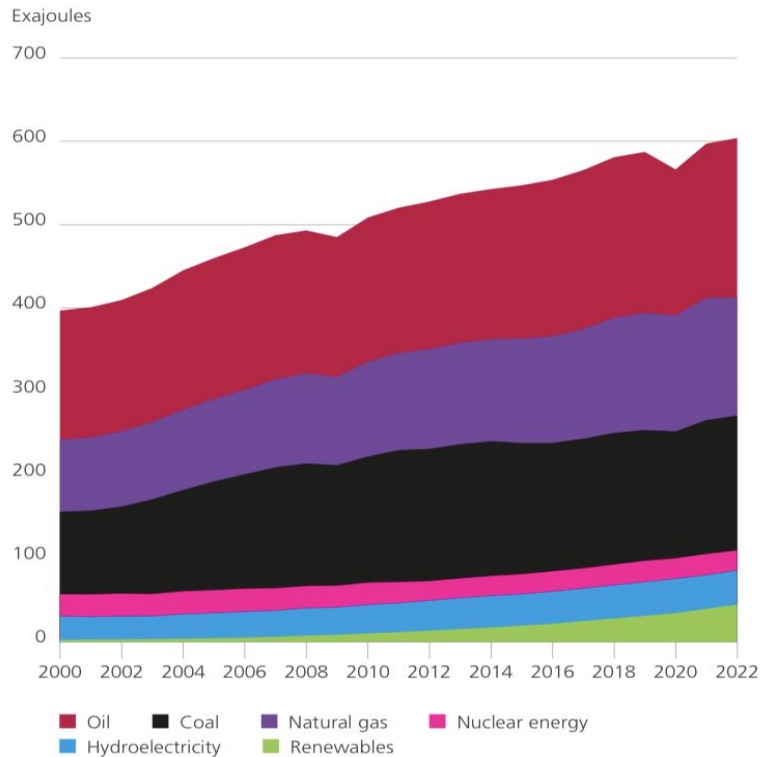




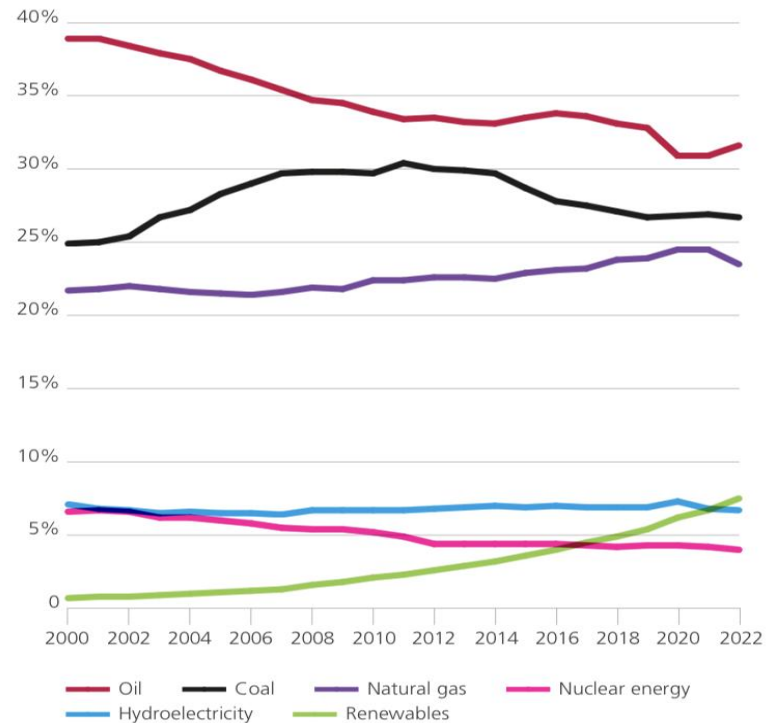
The birthplace of the Industrial Revolution: wood replaced with coal

P Primary energy World consumption*

World consumption

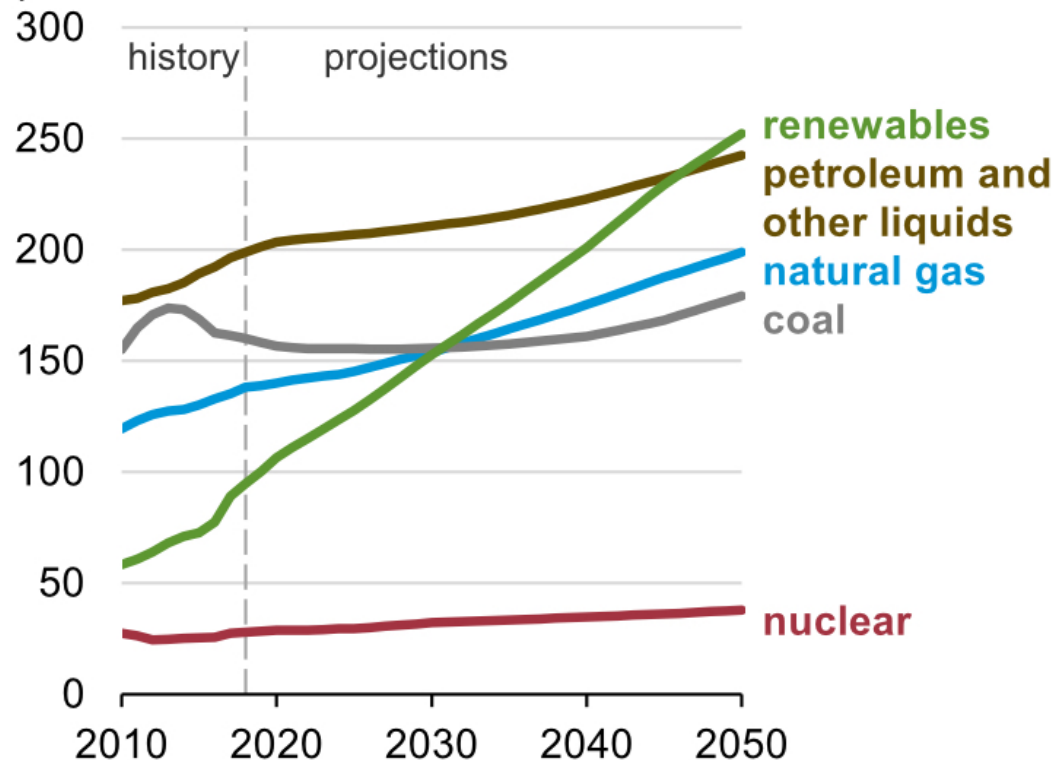


Share of global primary energy

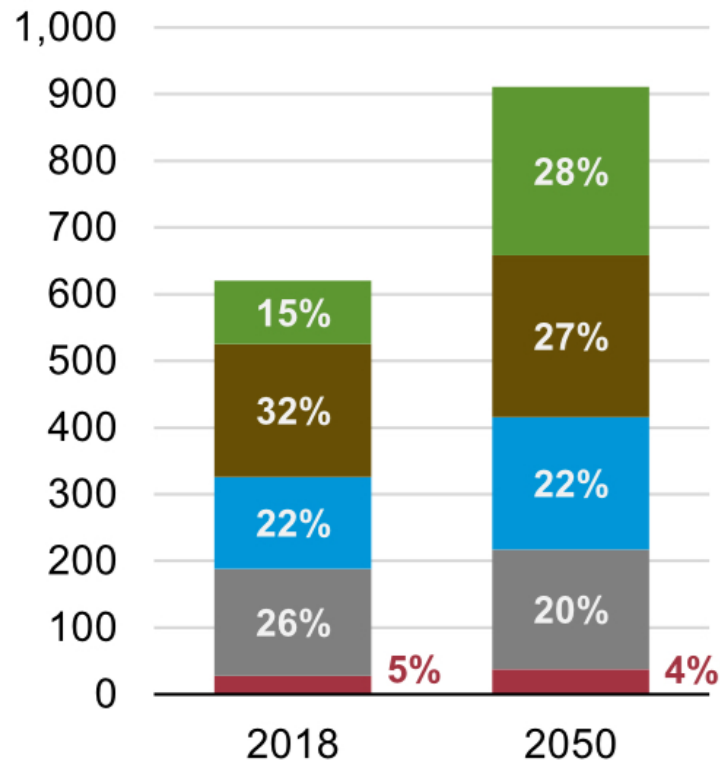


Global primary energy consumption by energy source (2010-2050)

quadrillion British thermal units



quadrillion British thermal units



Source: U.S. Energy Information Administration, *International Energy Outlook 2019* Reference case

Figure 1. The energy transition framework

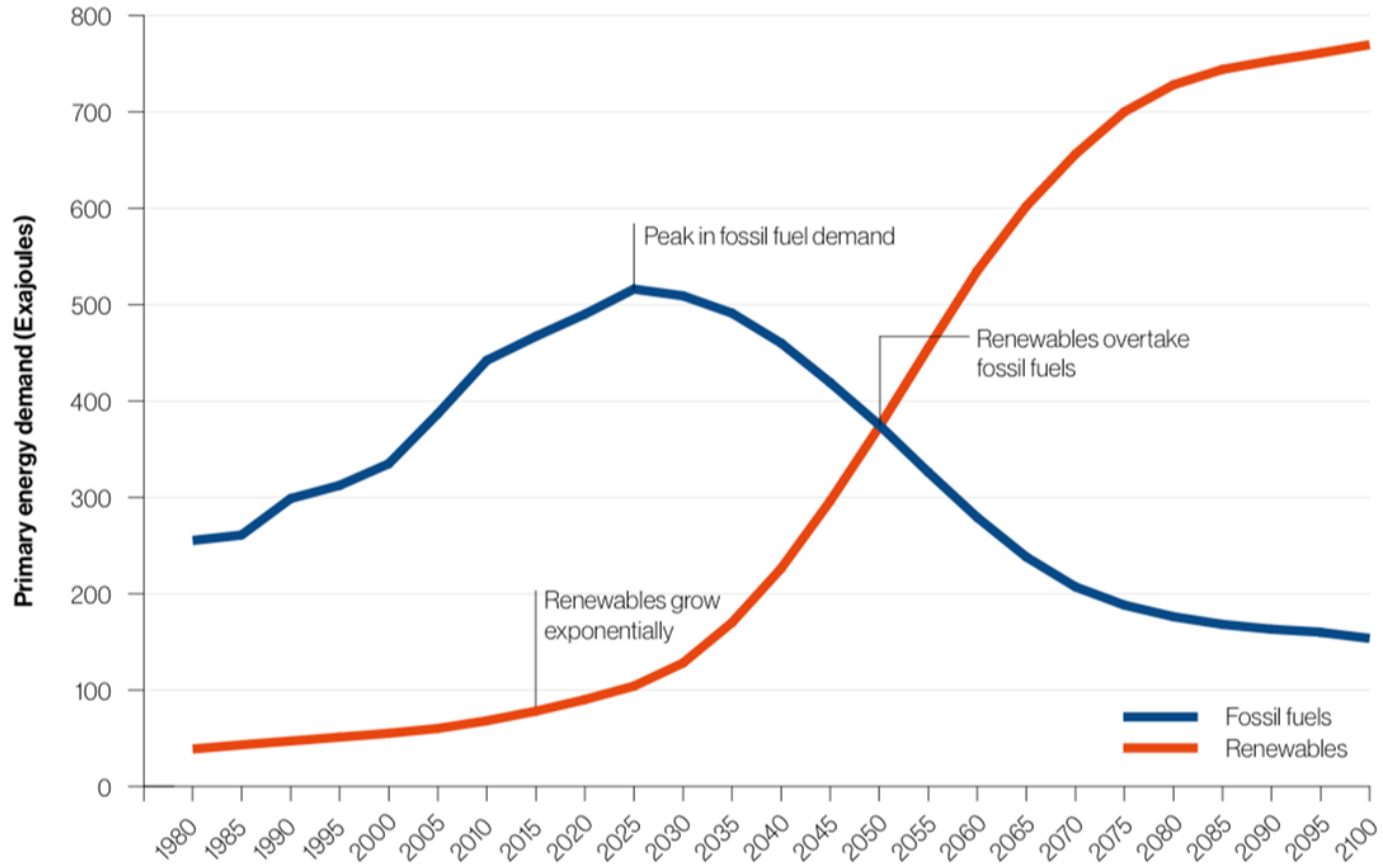
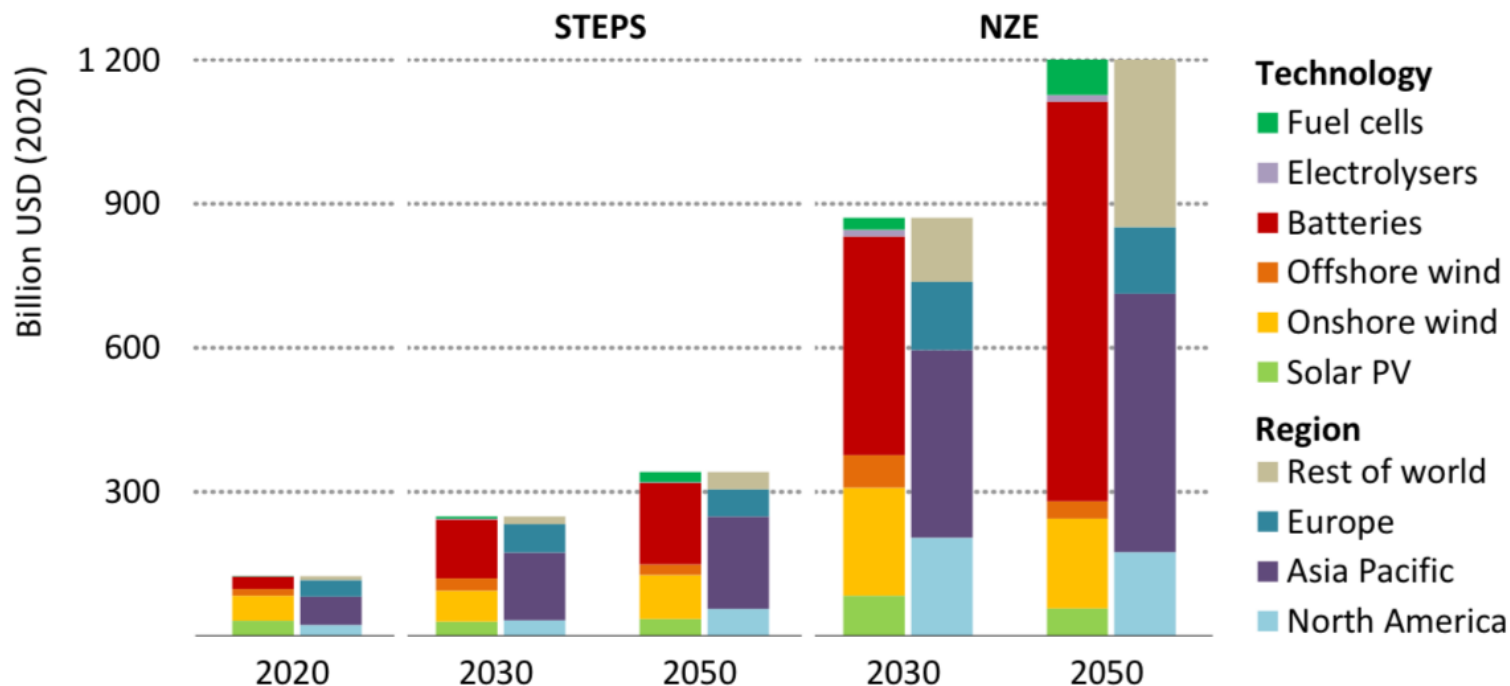


Figure 1.3 ▶ Estimated market size for selected clean energy technologies by technology and region, 2020-2050



IEA. All rights reserved.

There is explosive growth in clean energy technologies over the next decade in the NZE, leading to a clean energy market worth a cumulative USD 27 trillion by 2050

BATTERY MANUFACTURING

CAPACITY BY COUNTRY

Global lithium-ion battery production capacity is **projected to increase eightfold by 2027**.

Here's a look at the top countries for battery manufacturing in 2022 and 2027, based on BloombergNEF's lithium-ion supply chain rankings.

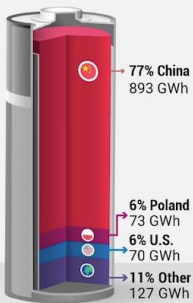


Six of the top 10 battery manufacturing companies are headquartered in China.



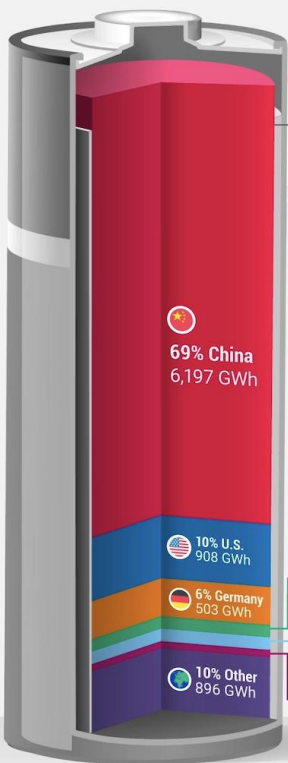
U.S. battery production capacity is projected to grow over 10x by 2027.

2022



Total Capacity
1,163 GWh
(GIGAWATT-HOURS)

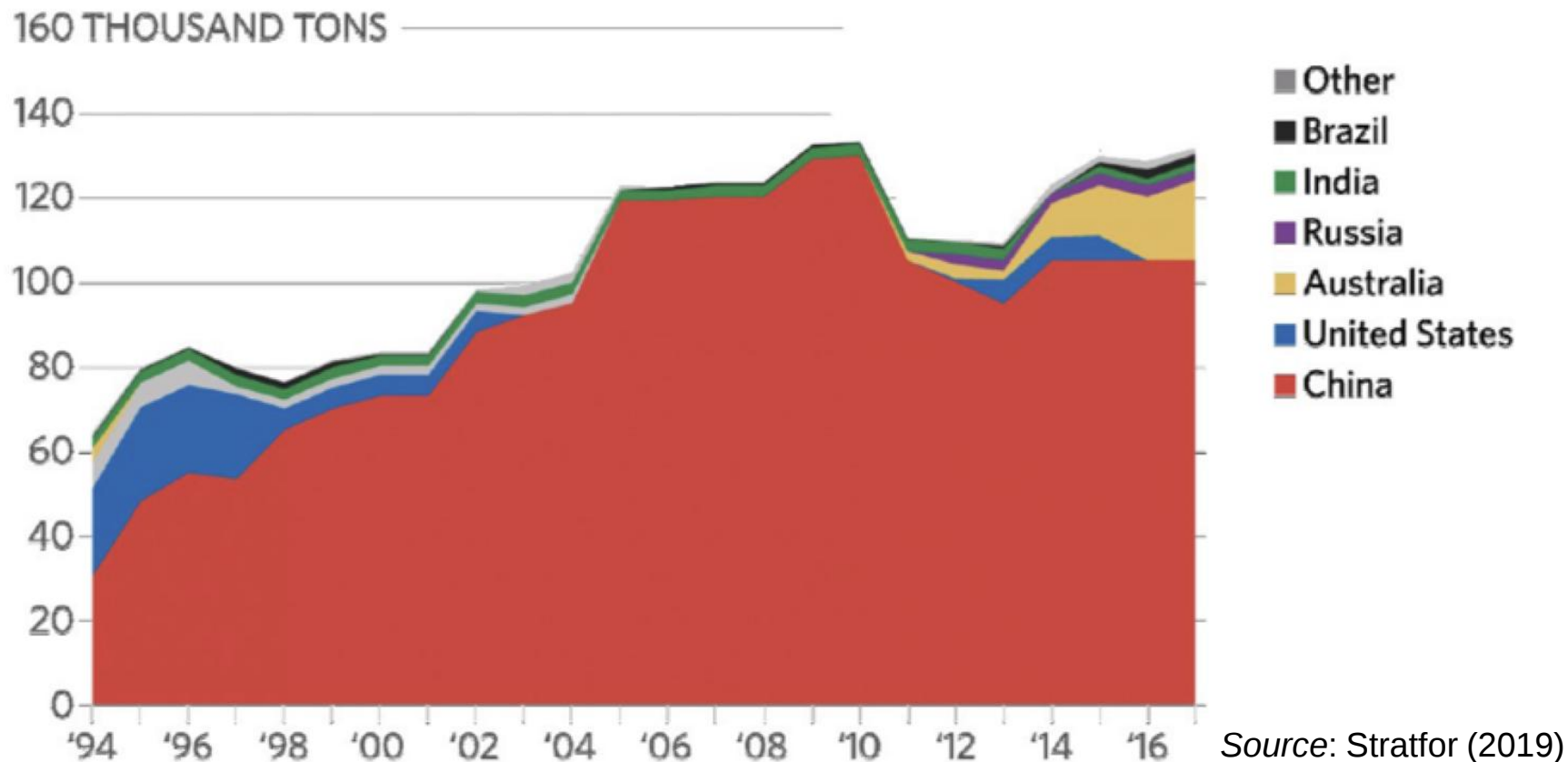
2027P



Total Capacity
8,945 GWh
(GIGAWATT-HOURS)

China's dominance is supported by its control over cathode, anode, and refined battery materials production.

Source: BloombergNEF



World production of rare earths by country

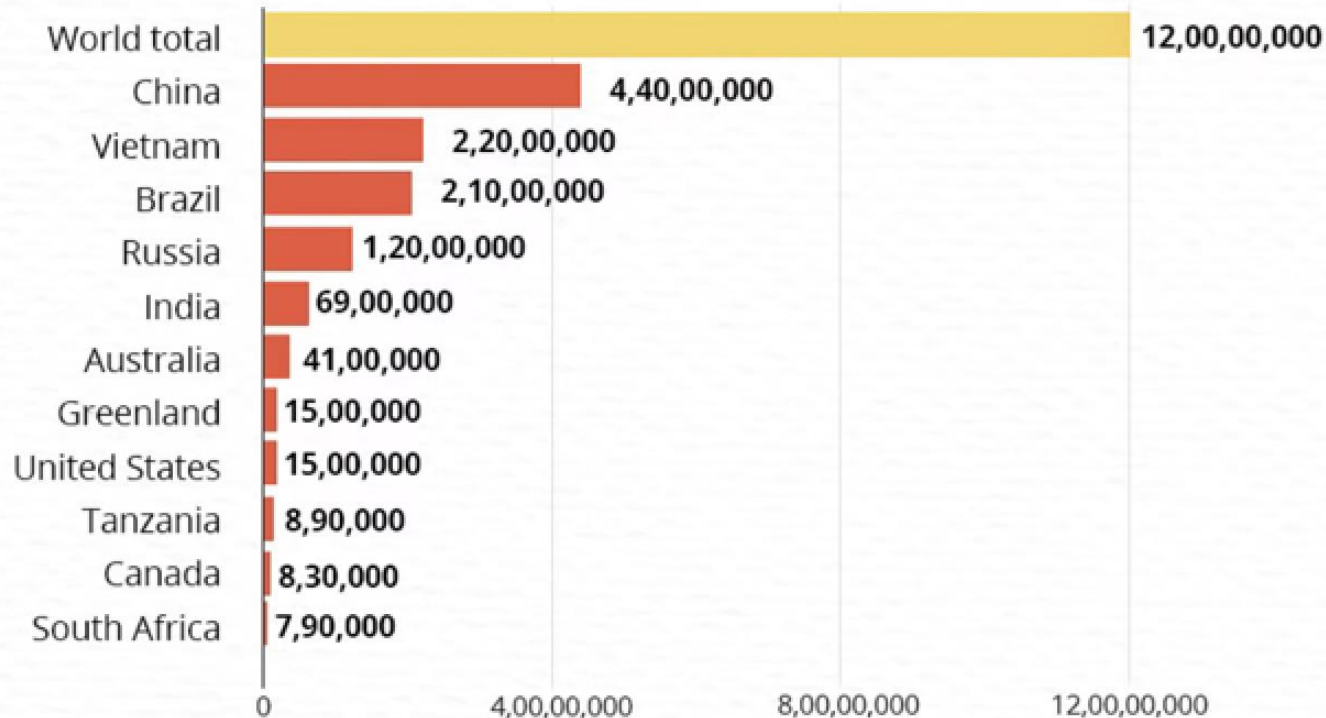


A mining truck drives down a winding canyon road in Xinjiang, China. As demand for rare earth elements increases rapidly, China aims to become the dominant producer and refiner of rare earth elements. (*Photo: Getty images*)



WHERE ARE THE WORLD'S LARGEST RARE EARTH RESERVES

Reserves in metric tonnes of REO (rare earth oxides) as of 2020



Source: U.S Geological Survey



Thank you for your attention!