

How Energy Crisis of 2022 Impacted Hydrocarbon Flows

Bariş Sanlı

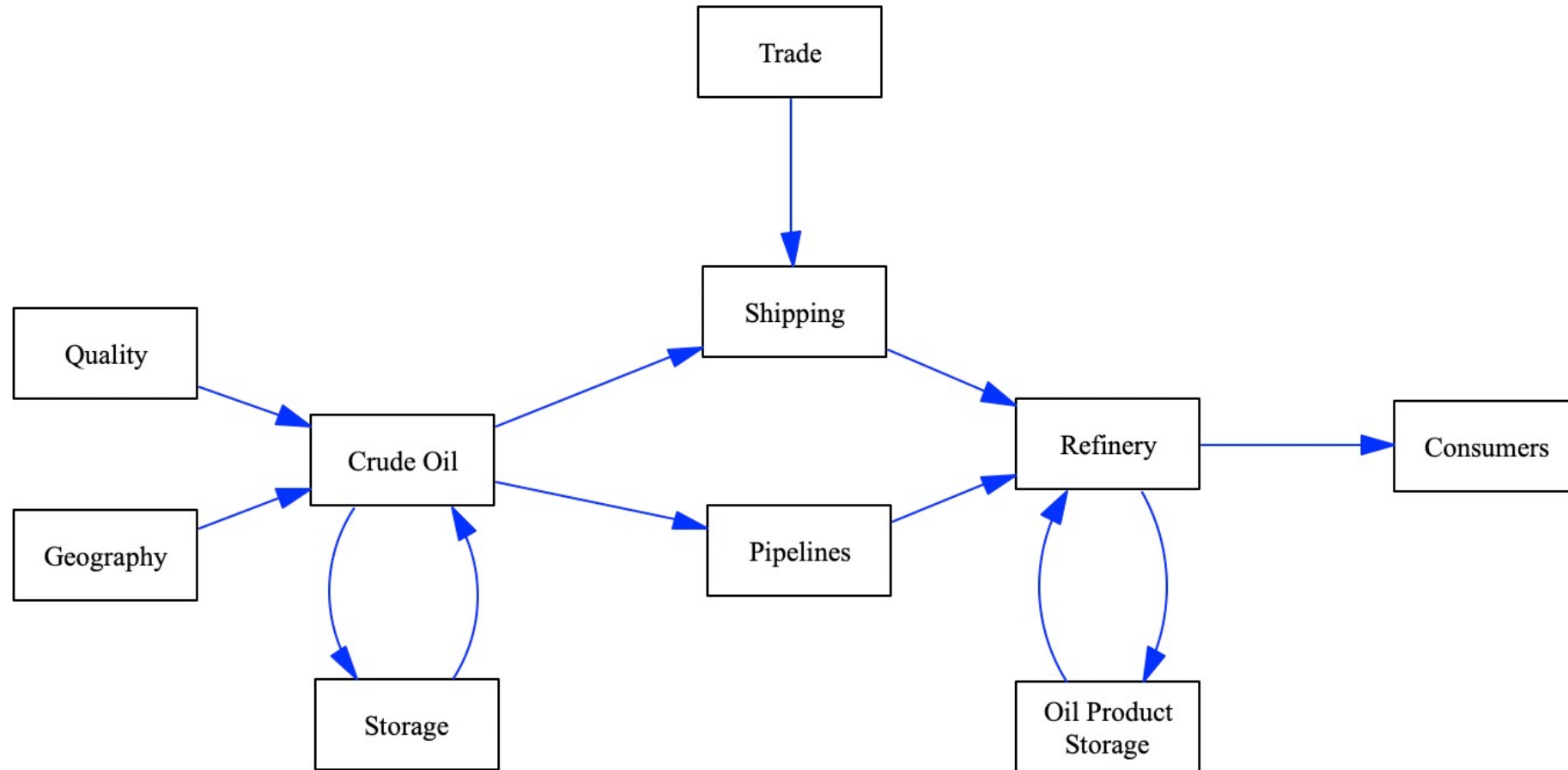
Bilkent Energy Policy Research Center

Summary

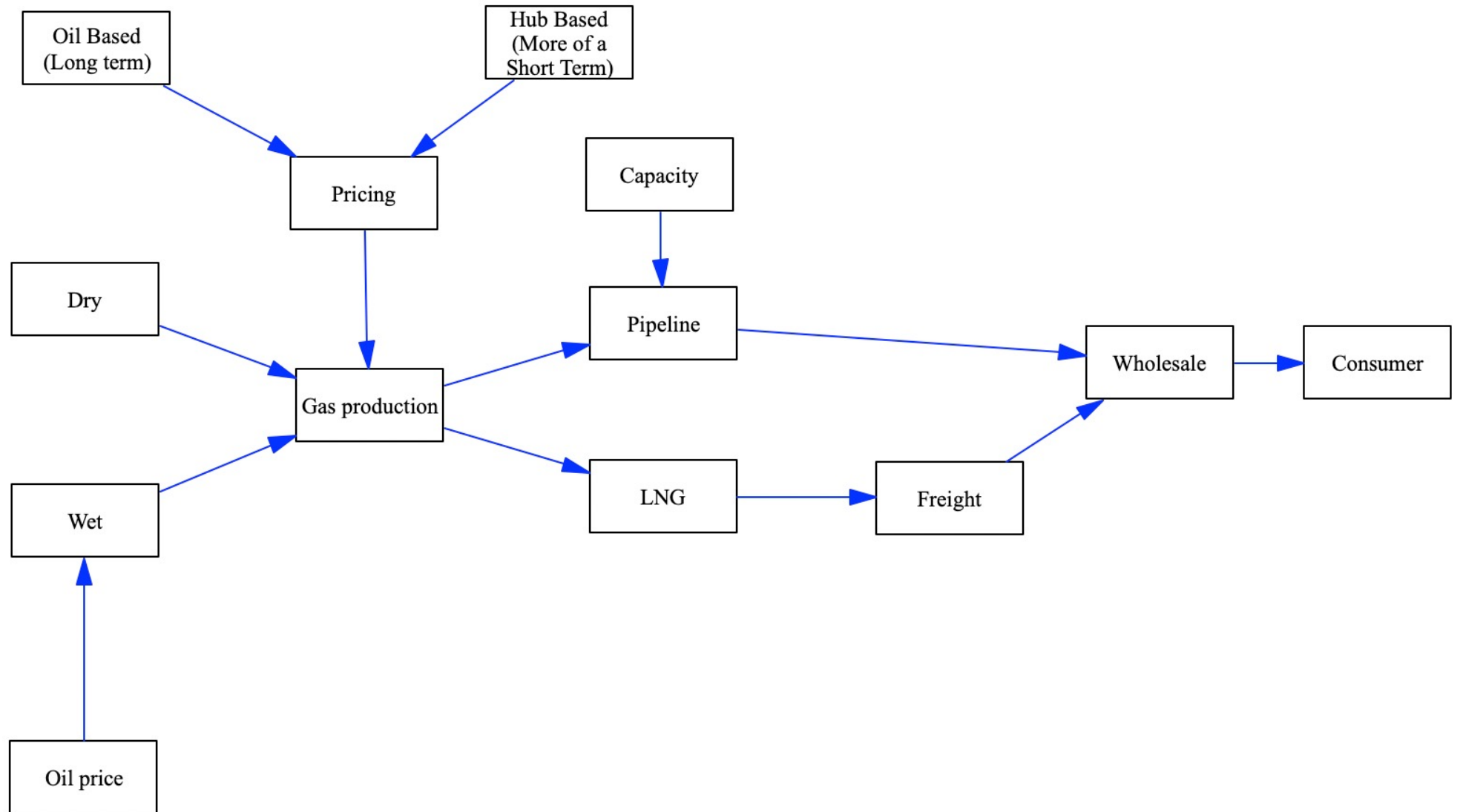
- Major concerns
 - Oil and Gas flows
 - European dependency
- Oil flows
 - To India and China (With 30% discounts)
- Gas flows
 - Complicated
 - More US LNG to Europe
- Sanctions
 - Creative ways (Latvian Blend)
 - Geography (Land locked countries)

Basics

Oil



Gas



Oil – Periodic Table

Platts periodic table of oil

Hover over the categories on the right and the cells below to explore.

Crude quality has increased in importance with the Energy Transition. Below is an interactive chart of 150 crude selected by the S&P Global Platts Pricing & Market Insight team. It represents the most diverse and key streams in global oil markets. [Click here to read more](#)

Refineries

- Jamnagar
- Ulsan
- Ruwais
- Port Arthur
- Zhenhai
- Pernis
- Paraguana

Producing regions

- Europe
- Africa
- Asia-Pacific
- North America
- OPEC+
- Russia/Central Asia
- Middle East
- Latin America/Caribbean

Grades

- Light sweet
- Medium sweet
- Heavy sweet
- Light sour
- Medium sour
- Heavy sour

Key Platts benchmarks

- AGS
- Dated Brent
- Urals
- Dubai
- Oman

Trg 0.00% 73.10°	Cos 0.04% 48.20°	ADCo 0.11% 58.40°	Nio 0.13% 40.00°	EF 0.17% 45.20°	As 0.18% 47.00°													QtL 1.22% 41.30°	Pos 1.67% 31.50°	Lav 1.93% 34.00°	Kir 2.23% 34.30°	Kw 2.52% 31.00°	Bashvy 4.20% 23.60°
Alg 0.00% 68.70°	Ag 0.04% 47.90°	Sah 0.10% 43.20°	QI 0.13% 36.00°	WTIM 0.15% 42.00°	Ose 0.20% 39.60°	Nem 0.21% 38.80°	SP 0.26% 58.40°	LLS 0.33% 36.70°	ES 0.37% 36.70°	WTI 0.40% 39.60°	Mas 0.51% 34.10°	CPC 0.54% 46.20°	SiL 0.57% 35.10°	UmL 0.70% 38.90°	Mb 0.79% 40.70°	Ol 0.89% 38.70°	ArEL 1.00% 39.20°	Ur 1.70% 31.30°	UZa 1.84% 33.90°	Ban 2.45% 31.80°	ArM 2.54% 30.90°	My 3.33% 21.80°	
NWSC 0.01% 63.00°	Nk 0.04% 42.40°	Ba 0.10% 42.80°	Cab 0.12% 32.60°	BH 0.17% 39.30°	Tro 0.18% 34.50°	Eko 0.21% 38.90°	QDFC 0.26% 57.00°	Dr 0.29% 33.00°	PI 0.37% 33.20°	BNB 0.40% 37.50°	TEN 0.43% 33.80°	Fo 0.54% 37.30°	ESPO 0.55% 34.70°	FG 0.66% 36.70°	BUr 0.87% 32.30°	Jl 0.87% 32.30°	Das 1.11% 39.20°	Om 1.38% 30.50°	ArL 1.96% 33.30°	Db 2.13% 30.40°	BasL 3.16% 28.80°	KL 3.89% 21.30°	
EFC 0.04% 55.00°	BHo 0.04% 38.60°	Sha 0.09% 42.20°	Daq 0.11% 32.30°	Az 0.14% 35.00°	BL 0.18% 32.80°	Jb 0.25% 37.60°	Zaf 0.25% 30.90°	Esp 0.33% 32.20°	Lul 0.35% 30.50°	Ko 0.37% 31.70°	Med 0.47% 32.90°	TN 0.52% 34.20°	Lz 0.58% 32.00°	Og 0.75% 35.60°	JSv 0.80% 28.00°	Th 0.90% 32.30°	Eu 1.03% 35.40°	Ma 1.82% 30.00°	Sue 1.64% 29.90°	ALS 2.37% 28.10°	ArH 2.75% 27.80°	WCS 3.59% 20.90°	
Alb 0.02% 51.70°	Dul 0.08% 37.60°	Aga 0.10% 37.40°	Chm 0.13% 26.90°	Er 0.16% 34.80°	Eg 0.17% 27.30°	Gal 0.23% 36.30°	For 0.28% 30.30°	WR 0.31% 30.00°	Dj 0.34% 27.60°	Paz 0.41% 25.60°	Gir 0.42% 29.70°	Hi 0.53% 33.00°	Gr 0.59% 29.00°	Hu 0.64% 28.30°	Sat 0.81% 27.00°	Mos 0.87% 28.30°	HBI 1.15% 35.20°	Cu 1.38% 28.80°	IrHvy 1.77% 29.50°	VnMdm 1.85% 27.00°	Miss 2.05% 27.60°	Sor 3.38% 19.20°	
ArSL 0.04% 50.60°	Rab 0.07% 33.40°	Se 0.09% 34.50°	Dar 0.12% 25.00°	Escr 0.17% 33.50°	CS 0.20% 26.30°	CLOV 0.25% 32.80°	Us 0.27% 29.00°	Mer 0.32% 28.80°	VG 0.33% 17.00°	Eb 0.40% 19.80°	Sch 0.44% 24.90°	Hd 0.53% 24.40°	RnHvy 0.61% 22.80°	Cpt 0.70% 19.10°	Vs 0.83% 24.30°	Lo 0.87% 23.30°	IrL 1.46% 33.60°	Ca 1.41% 17.50°	Or 1.63% 23.30°	VH1 1.85% 23.50°	RGh 2.50% 24.00°	D16 4.10% 16.00°	
Tap 0.03% 44.60°	Dob 0.07% 28.50°	Min 0.09% 33.90°	Py 0.13% 19.30°	Co 0.14% 30.70°	Esc 0.19% 24.10°	Bo 0.24% 30.60°	Qin 0.28% 16.50°	Boz 0.29% 16.90°	Yom 0.34% 16.70°	Vnc 0.37% 17.40°	Cl 0.47% 23.30°	Dal 0.51% 23.20°	Juba 0.56% 17.10°	Kr 0.70% 14.00°	Sh 0.84% 24.20°	Li 0.90% 22.50°	Al 1.27% 19.60°	Rub 1.33% 12.70°	Per 1.78% 13.50°	Na 1.96% 19.00°	VH2 2.60% 16.00°	Sq 3.50% 9.00°	

S&P Global
Platts

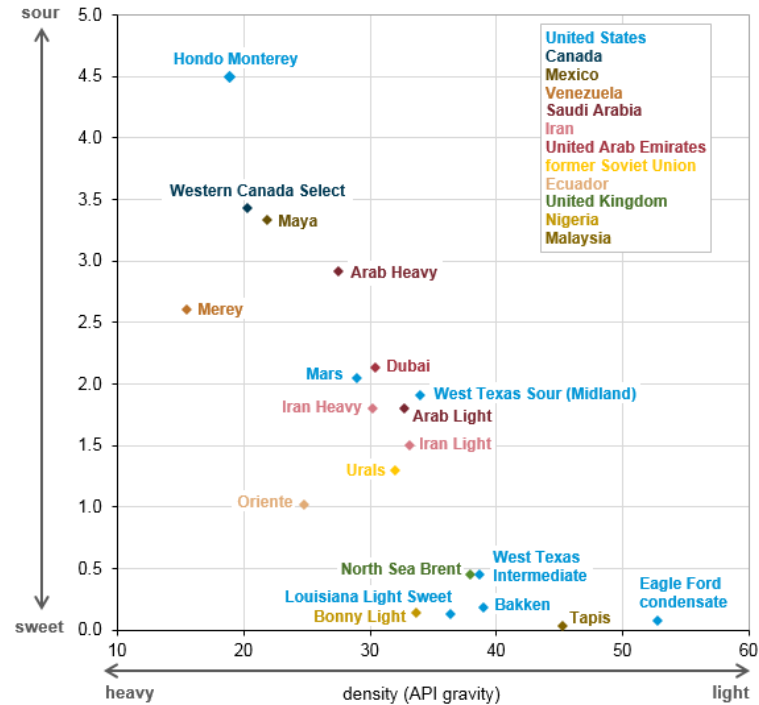
Source: S&P Global Platts, Haverly Systems. Developed and designed by Mart na Klančičar, Eklayva Gupte and Andrew Cr tchlow. © 2020 S&P Global Platts, a division of S&P Global Inc. All rights reserved.

Oil Quality

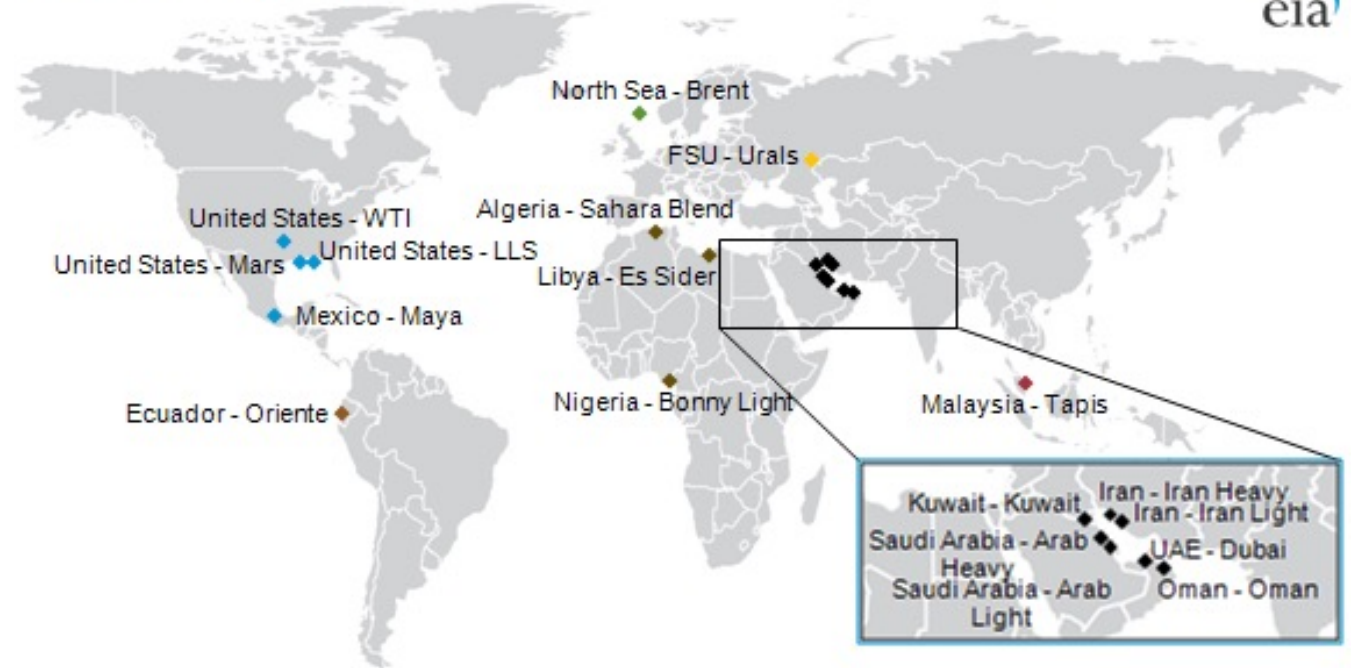
Heavier ————— Weight (API Gravity) ————— Lighter



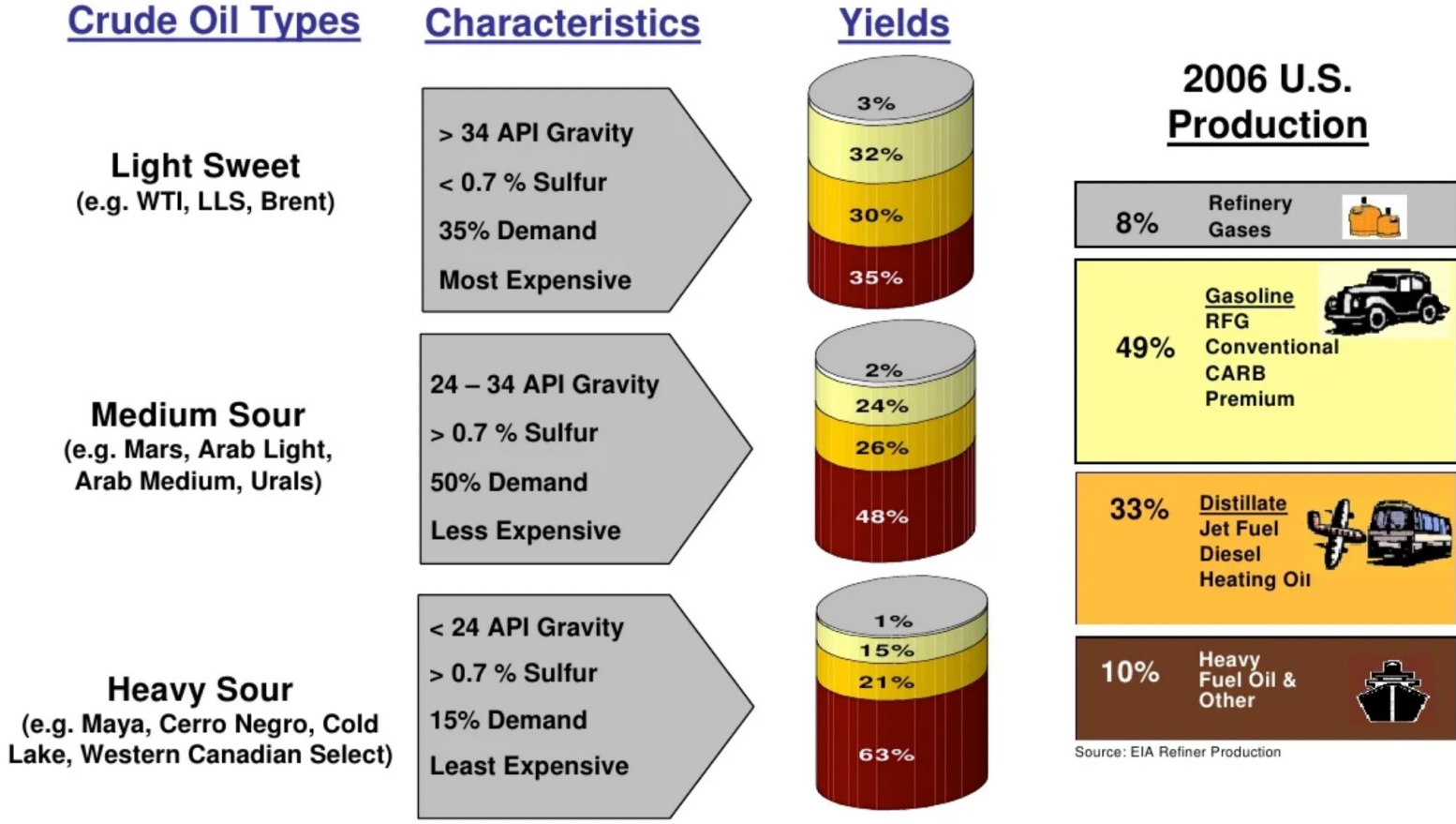
Density and sulfur content of selected crude oils
sulfur content (percent)



Select crude oil price points



Heavier the oil, less value of the products



CL=F (What is oil price?)

Crude Oil Jul 22 (CL=F)

NY Mercantile - NY Mercantile Delayed Price. Currency in USD

[★ Add to watchlist](#)

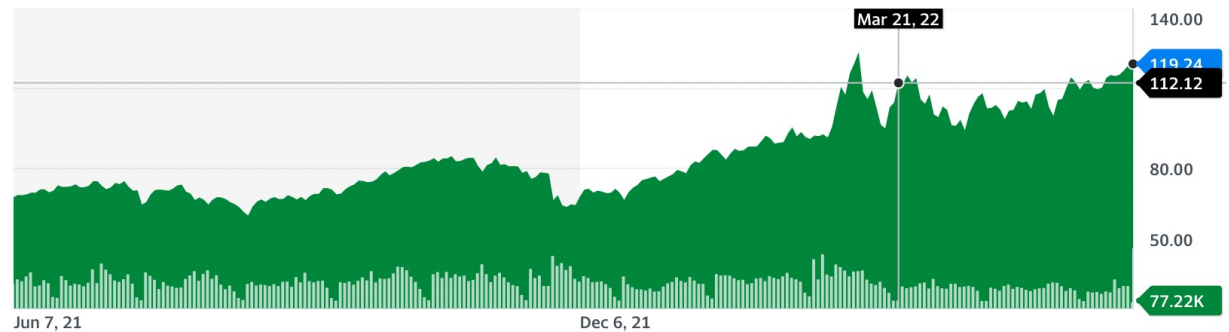
119.24 +0.37 (+0.31%)

As of 05:11AM EDT. Market open.

[Summary](#) [Chart](#) [Historical Data](#) [Futures](#)

1D 5D 1M 6M YTD **1Y** 5Y Max

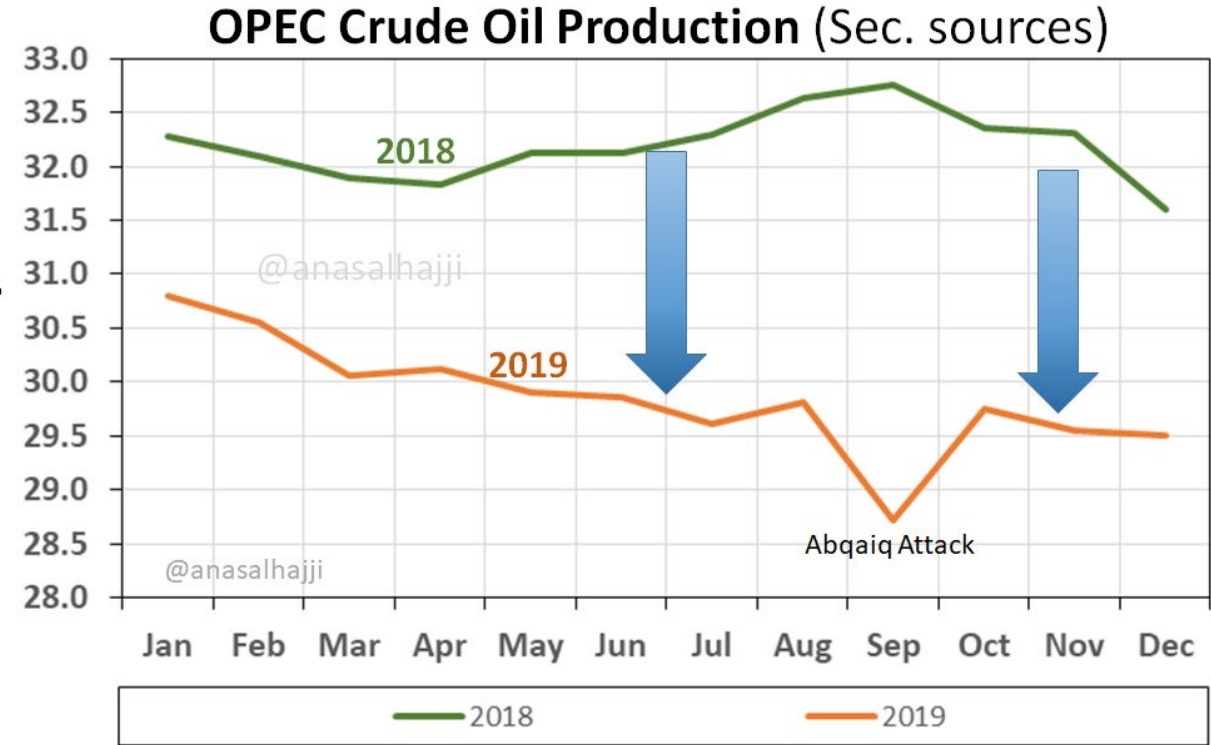
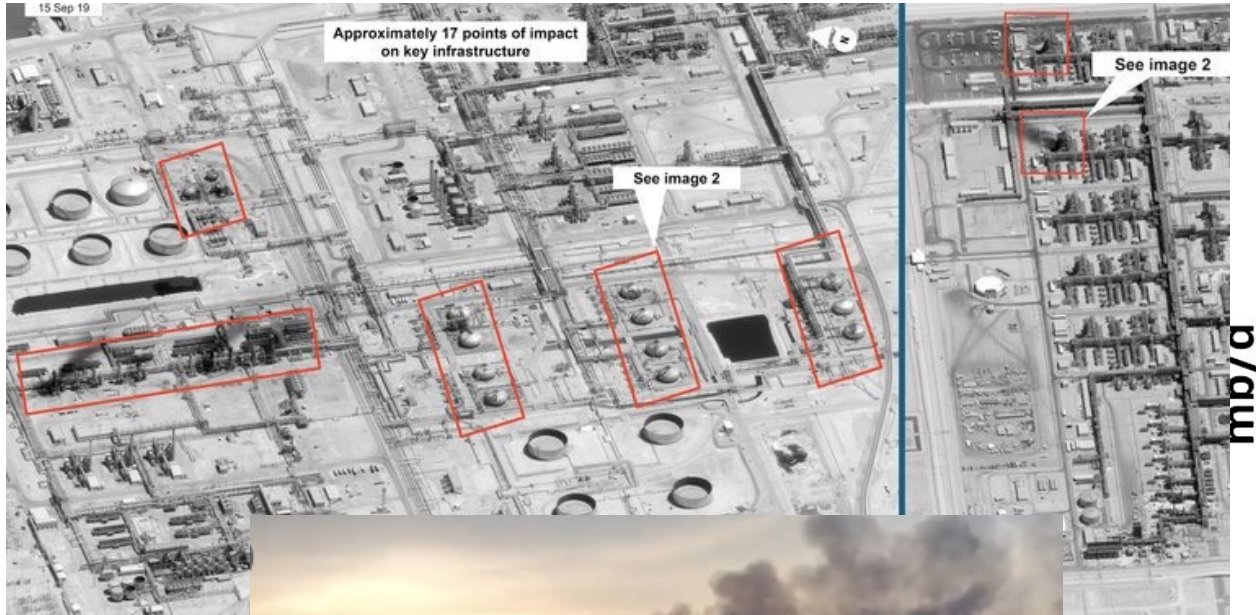
[Full screen](#)



Pre. Settlement	N/A	Last Price	118.87
Settlement Date	2022-06-21	Day's Range	118.96 - 120.99
Open	120.82	Volume	47,294
Bid	119.27	Ask	119.28

Incidents

Abqaiq/Dammam Attacks – Sept 14, 2019



Source: OPEC, 2018-2019

First Covid then Russia



The **#Covid19** pandemic is the biggest shock to the global energy system in over 70 years.

Global energy demand is set to fall 6% in 2020, seven times greater than the drop in the wake of the 2009 crisis.

@IEA's new Global Energy Review has more →
[iea.li/2YhHb0Z](https://www.iea.org/2YhHb0Z)



Fatih Birol ✓ @fbirol · May 13

Russia's invasion of Ukraine has fuelled a global energy **crisis**, underscoring the importance of energy security in decision-making. But the world doesn't need to choose between solving the energy **crisis** & the climate **crisis**

Some of my thoughts on this ↓

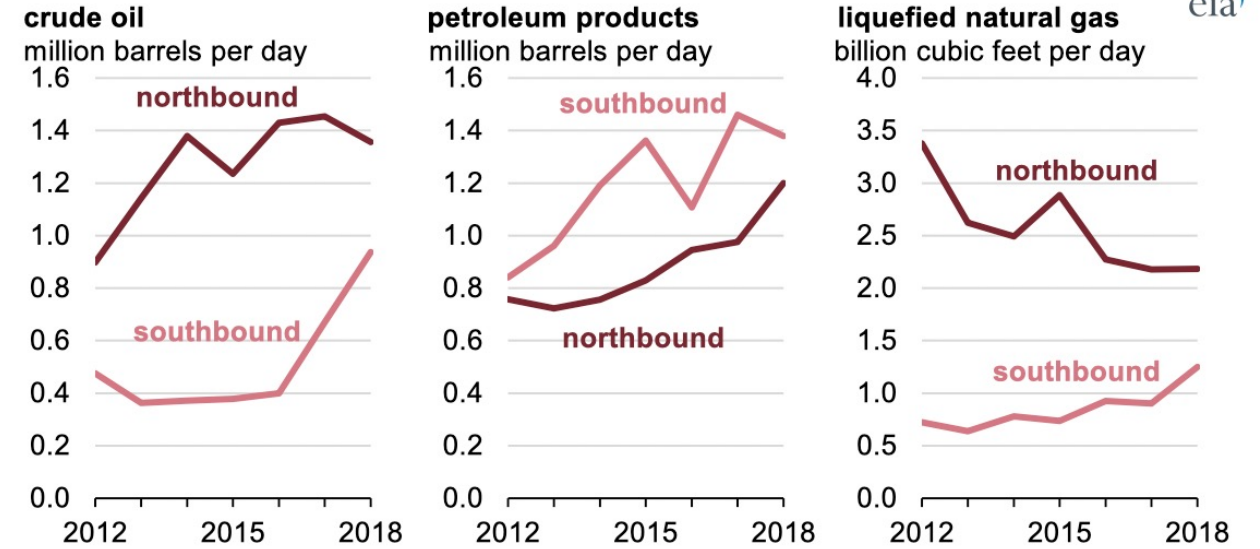


Suez – Mar 23, 2021

Suez Canal and SUMED Pipeline chokepoints



Suez Canal and SUMED pipeline flows of selected energy products (2012-2018)



Source: U.S. Energy Information Administration, based on Lloyd's List Intelligence, Clipper Data, and Suez Canal Authority (with EIA conversions)



<https://www.eia.gov/todayinenergy/detail.php?id=40152>

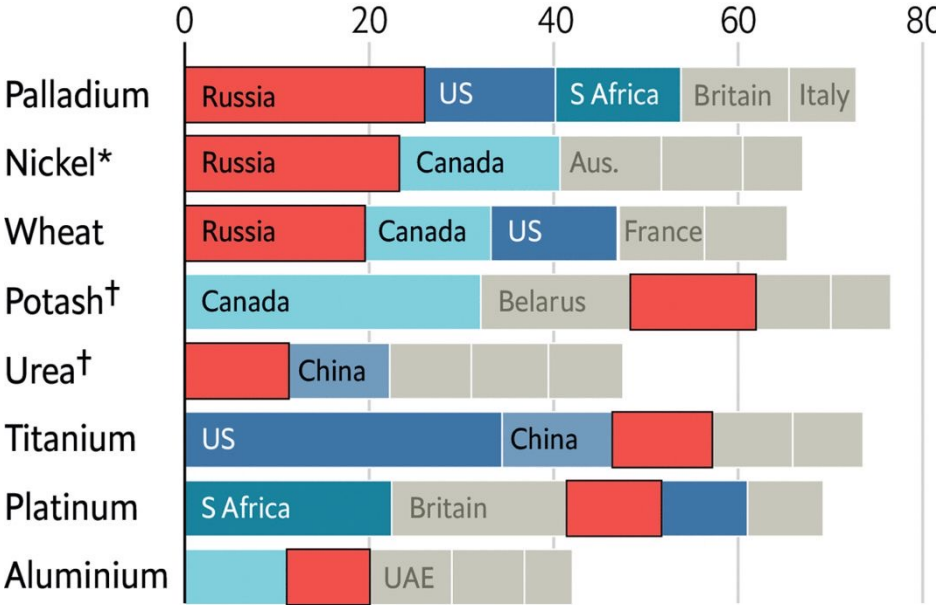
Russia

Russia's Role

The Russian footprint

Share of global exports by value, 2020, %

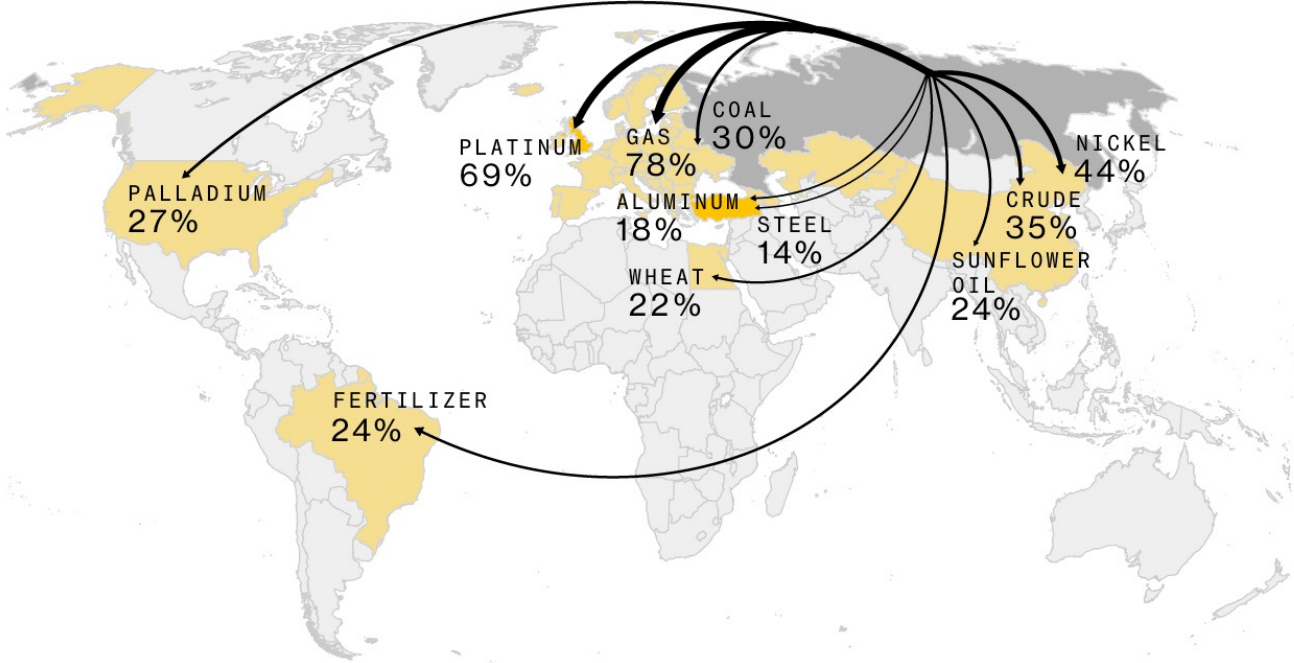
Top five exporters of each commodity



*Unwrought nickel and nickel mattes †Fertilisers

Source: The Centre for Prospective Studies and International Information

The share of Russian exports that go to each destination

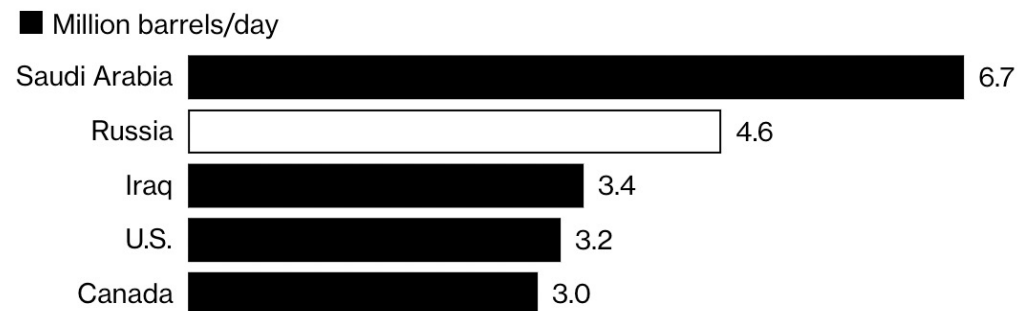


Note: Coal figures combine thermal and metallurgical; liquefied natural gas and pipeline gas are also combined.

Sources: UN Comtrade Database (metals); International Energy Agency (coal); UN's Food and Agriculture Organization (wheat; sunflower oil); Joint Organisations Data Initiative; Bloomberg; Eurostat; BP; (crude); Trade Data Monitor; Green Markets, a Bloomberg company (fertilizer); BP (gas)

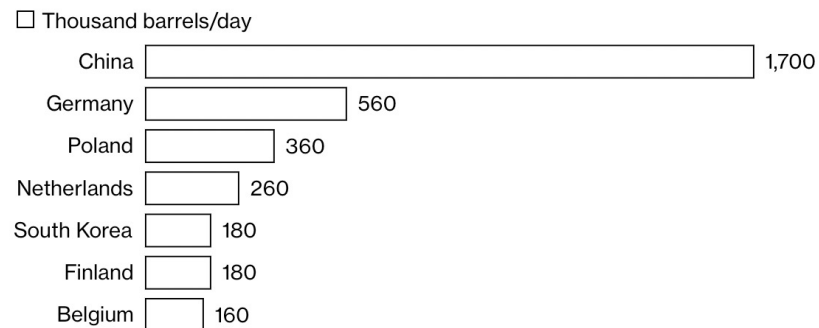
Petroleum

Russia Is Second-Biggest Crude Exporter



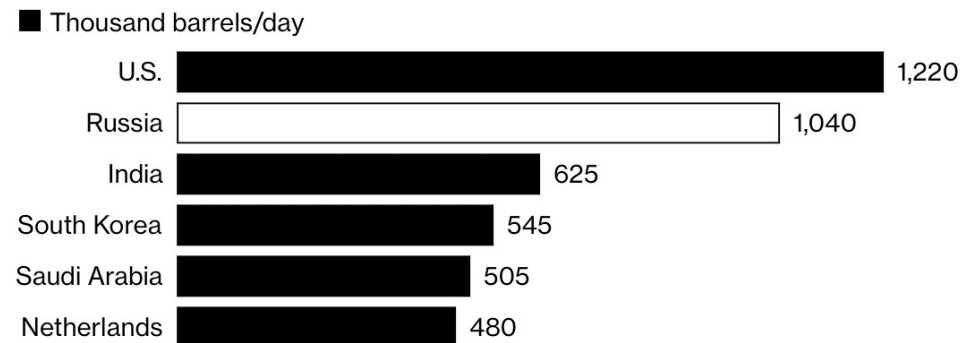
Source: Joint Organisations Data Initiative (JODI). Data are for 2020.

China and Europe Are Key Destinations for Russian Crude



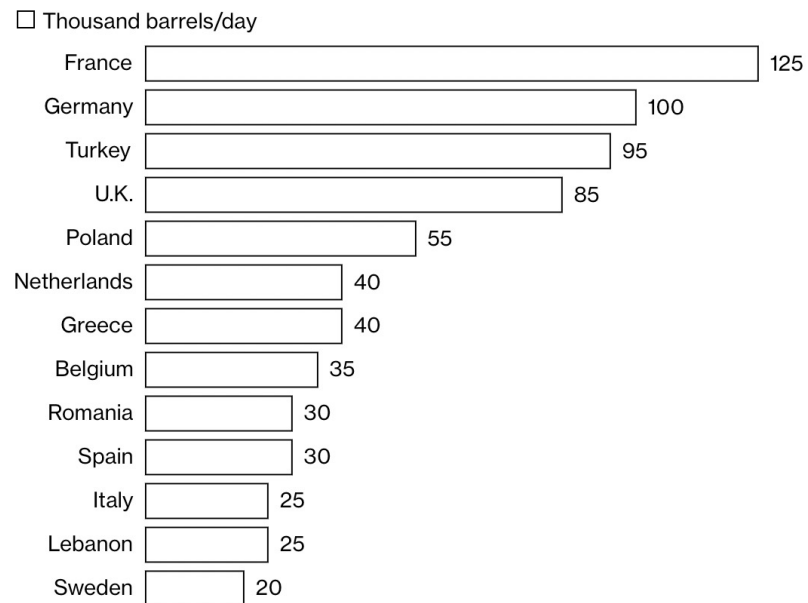
Sources: BP for China, vessel tracking data monitored by Bloomberg for South Korea and Eurostat.
Note: Figures are rounded to the nearest 10K barrels/day. Data are for 2020.

Biggest Exporters of Gasoil and Diesel



Source: Joint Organisations Data Initiative. Data are for 2020.

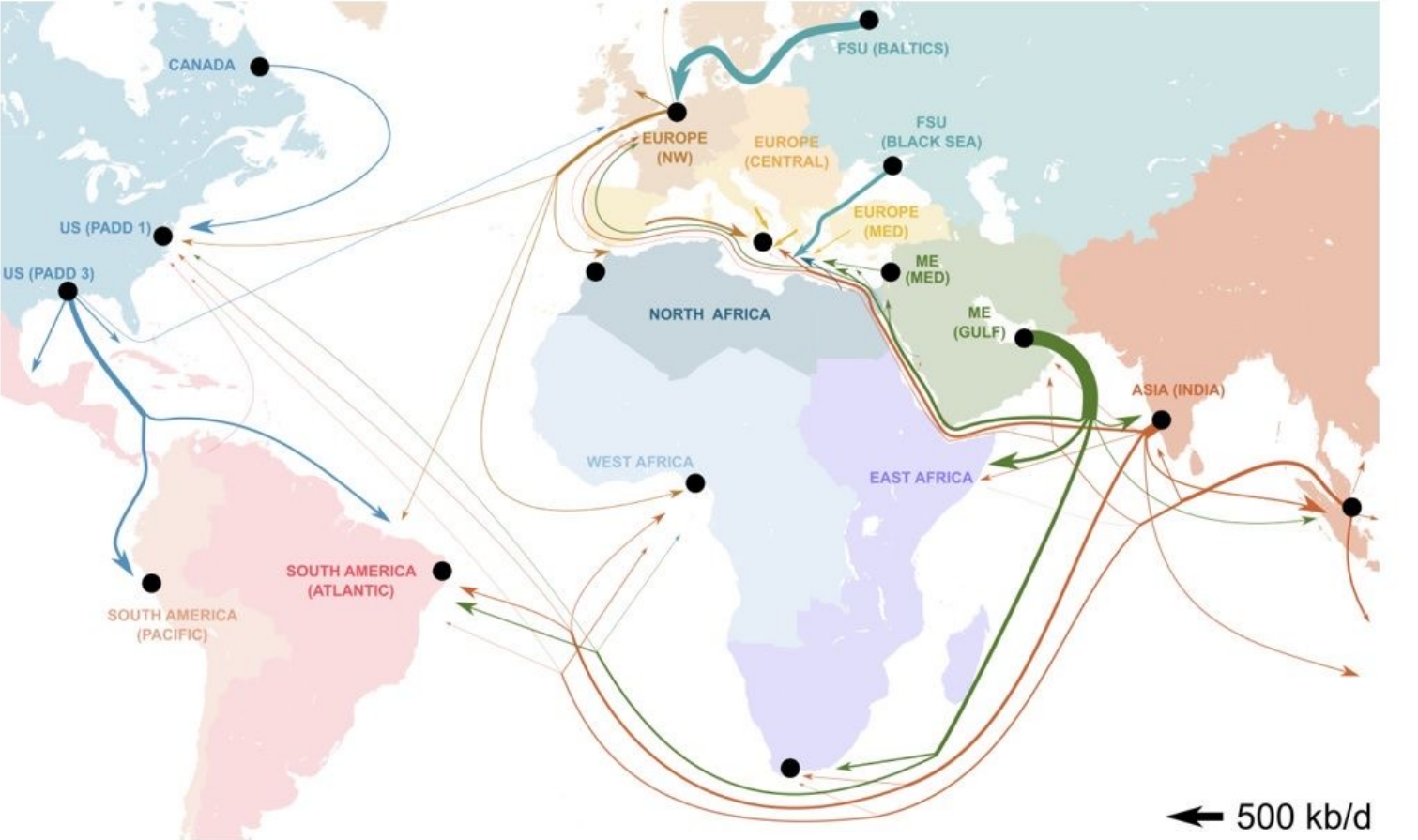
Europe Guzzles Russian Gasoil and Diesel



Source: Eurostat and Vortexa. Note: Figures are rounded to the nearest 5K barrels/day. Data are for 2020.

Diesel

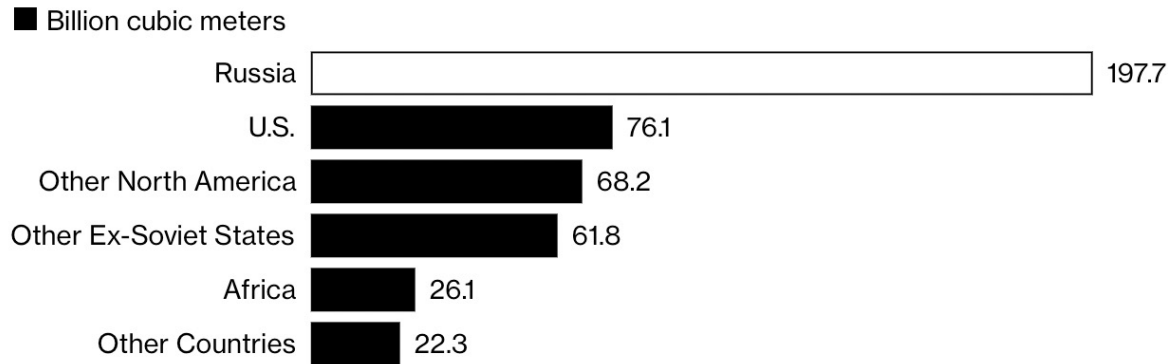
Fig 1: World Gasoil/Diesel Main Trade Flows in 2021



Source: FGE

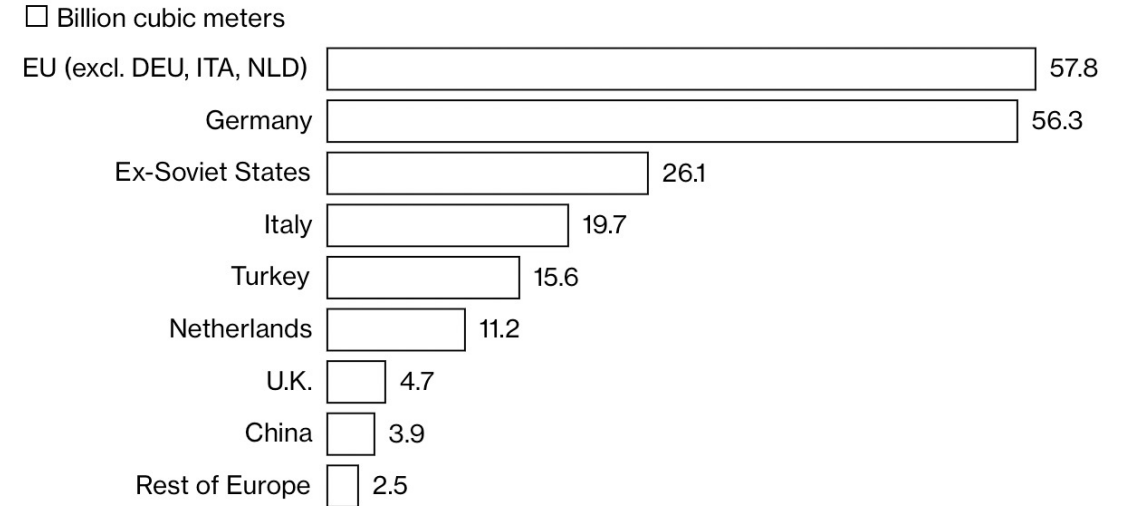
Gas

Russia Exported 44% of Pipeline Gas in 2020



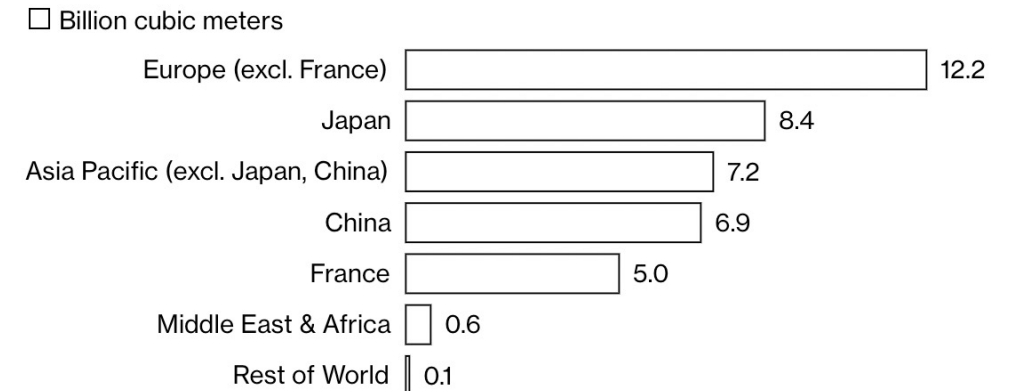
Source: BP's Statistical Review of World Energy

Buyers of Russia's Pipeline Gas



Source: BP's Statistical Review of World Energy. Note: Data are for 2020.

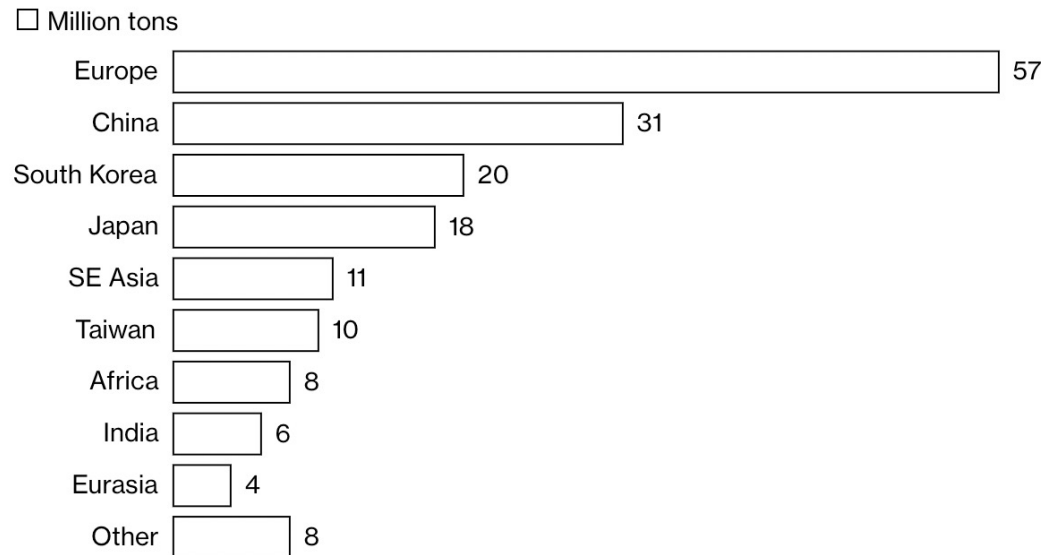
Asia and Europe Buy Lots of Russian LNG



Source: BP's Statistical Review of World Energy. Note: Data are for 2020.

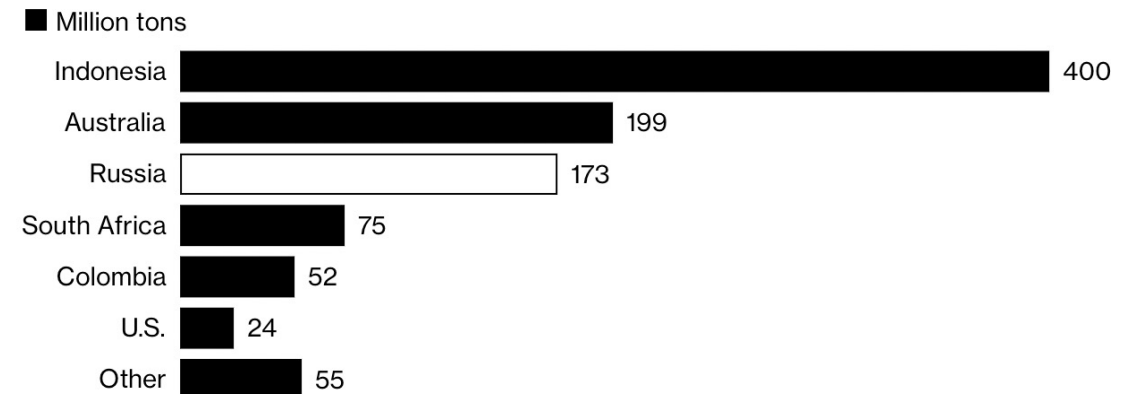
Coal

Europe, China Are Top Buyers of Russia's Thermal Coal



Source: International Energy Agency, 2021 Coal Report. Data are for 2020.

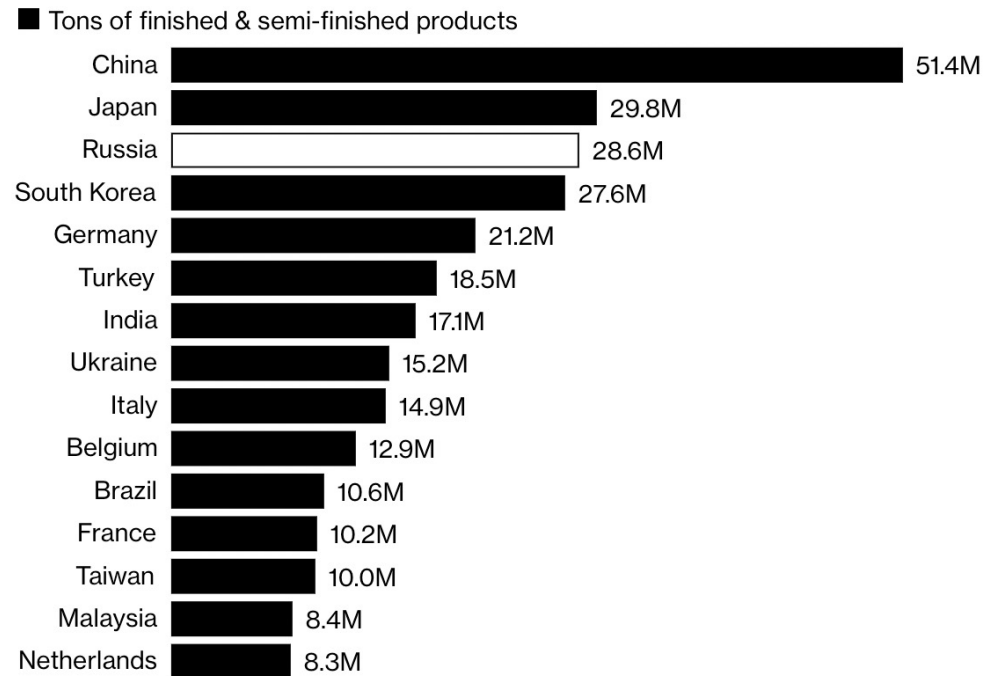
Russia Ranks Third in Thermal Coal Shipments



Source: International Energy Agency, 2021 Coal Report. Data are from 2020.

Steel and Aluminum

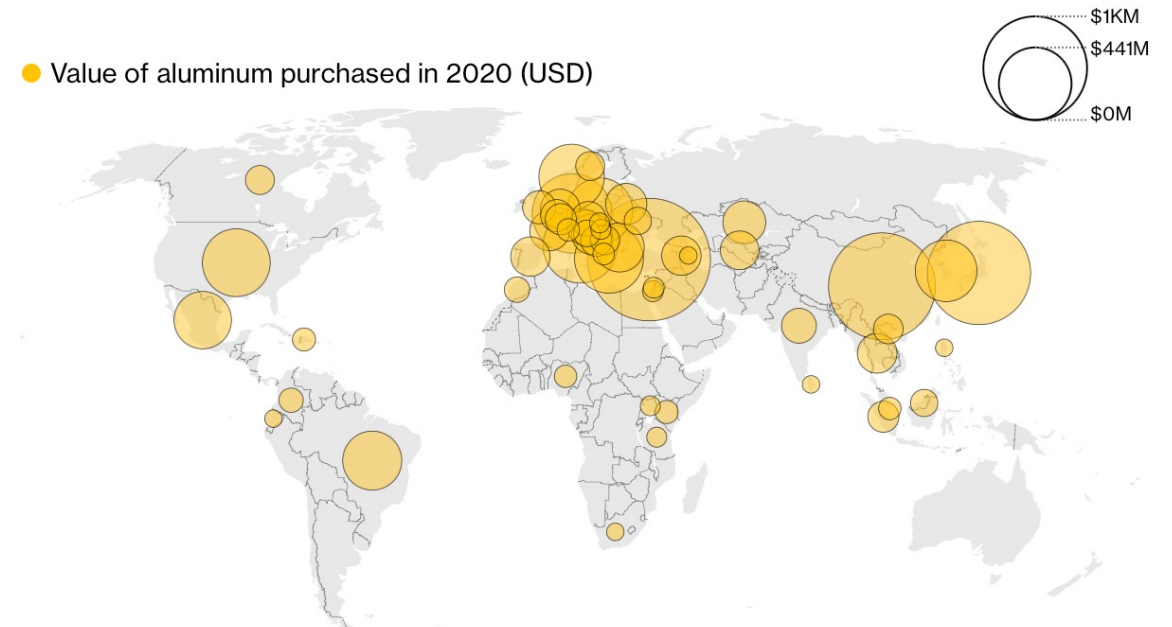
Top Steel Exporters in 2020



Note: Worldwide total was 396 million tons.

Source: World Steel Association

Turkey, China, Japan Are Among Top Buyers of Russian Aluminum

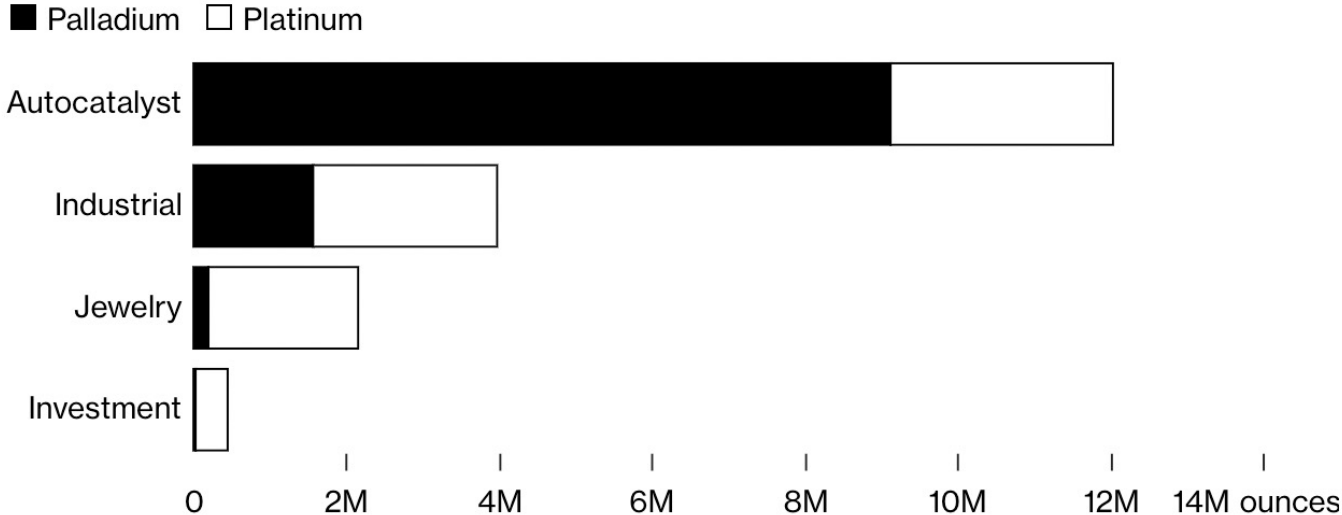


Note: About \$194 million in aluminum (3.3% of the global total) was purchased by unspecified Asian buyers and is not displayed.

Source: UN Comtrade Database

Platinum, Palladium

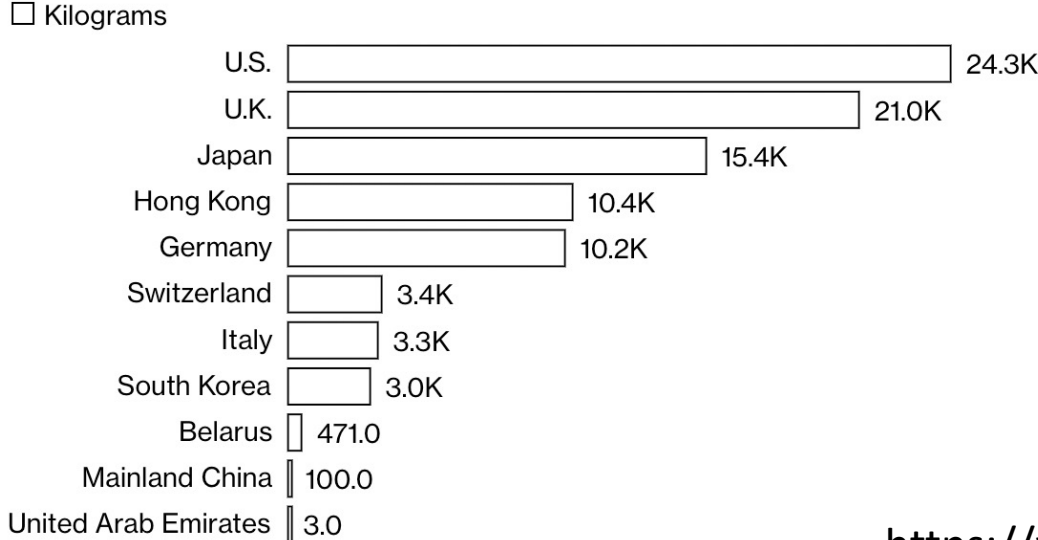
Where the Metals Go



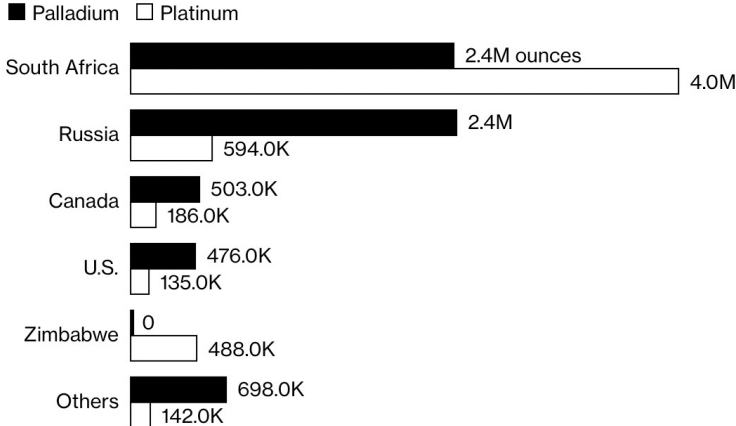
Note: Totals are worldwide volume for 2021

Source: Metals Focus

U.S., U.K. Are Top Importers of Russian Palladium



Top Producers of Palladium and Platinum in 2021

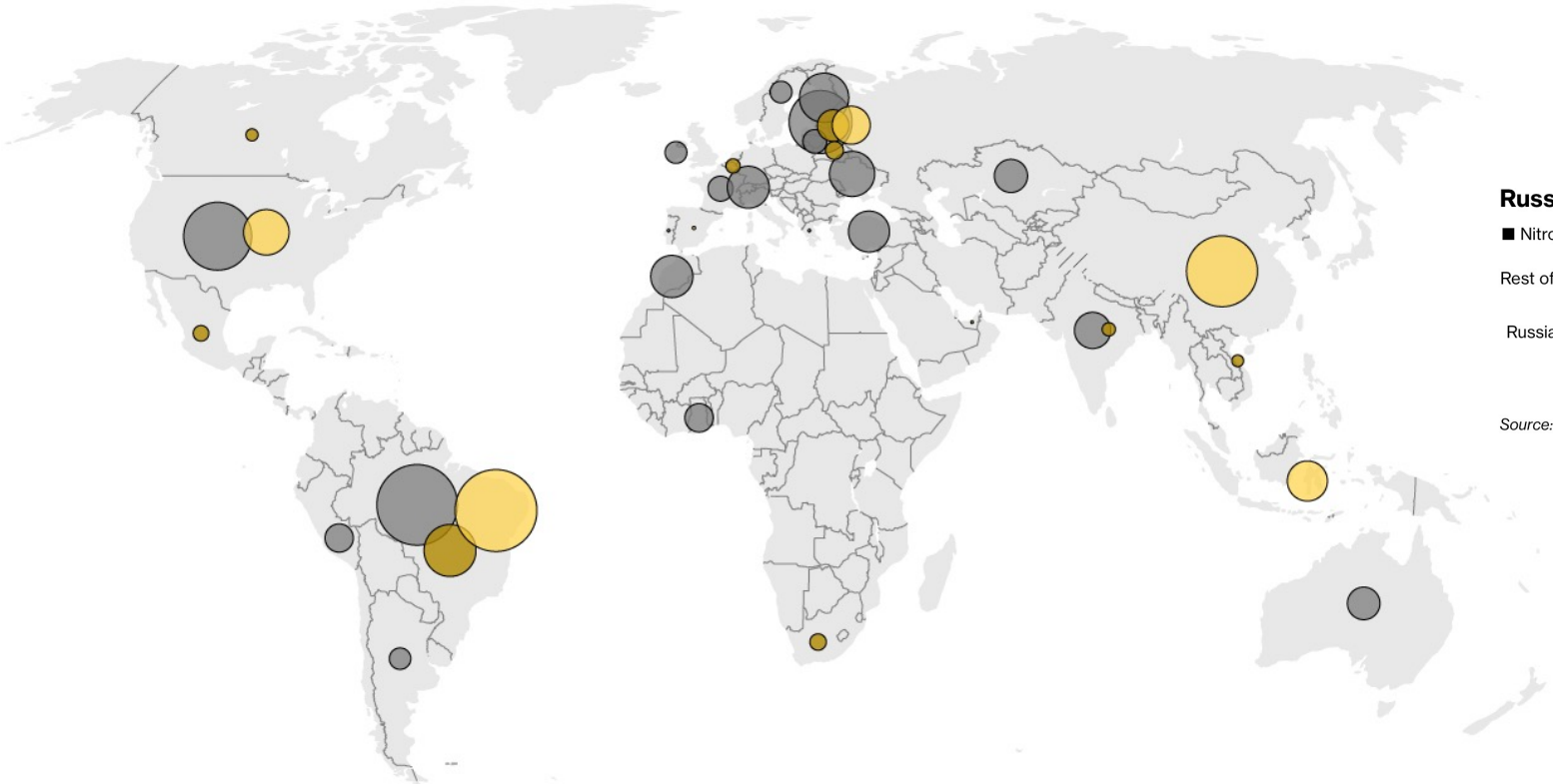


Source: CPM Group. Note: Zimbabwe's palladium wasn't reported separately and is included in "Others."

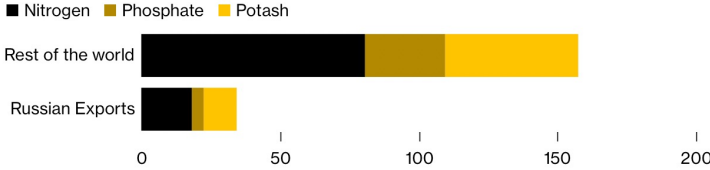
Fertilizer

Largest Buyers of Russian Fertilizers

● Nitrogen ● Phosphate ● Potash



Russia Accounted for Almost a Fifth of 2021 Fertilizer Exports

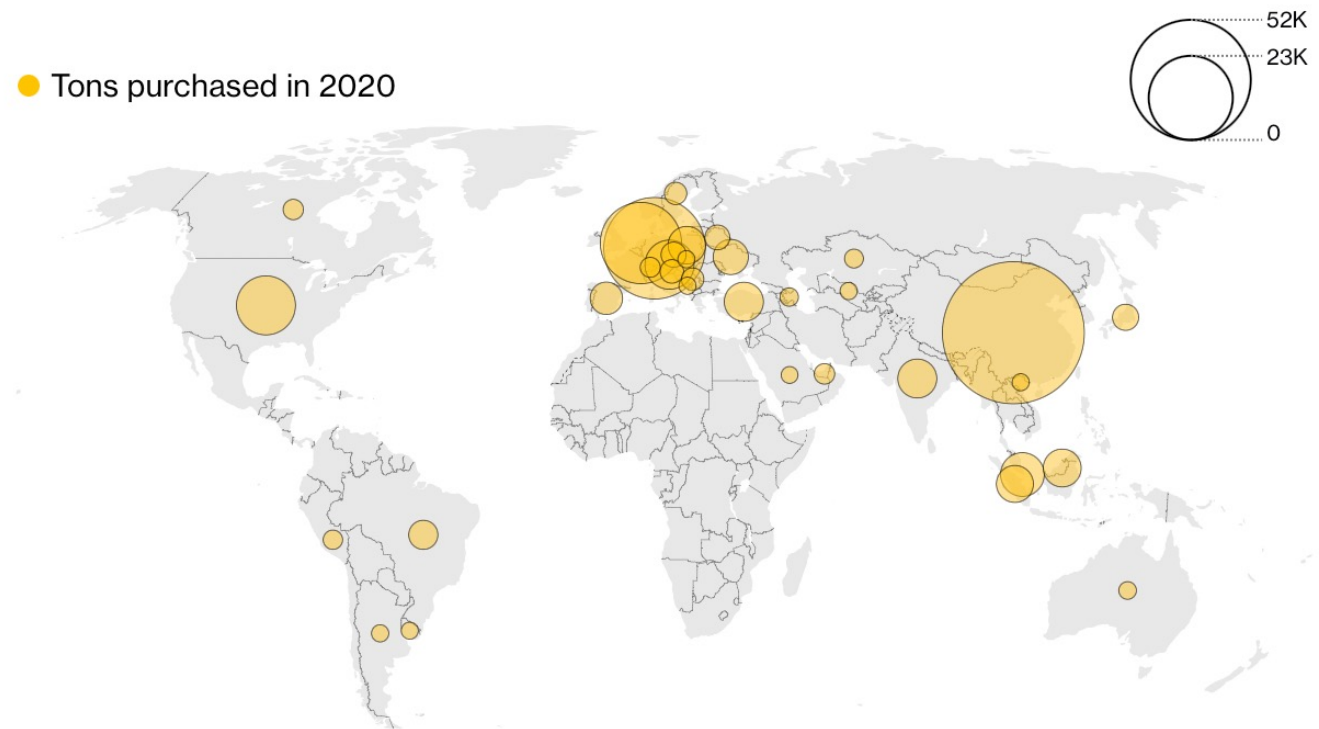


Source: Trade Data Monitor, Green Markets, a Bloomberg company. Data are in million metric tons.

Sources: Trade Data Monitor; Green Markets, a Bloomberg company

Nickel

Russia's Nickel Customers



Note: About 3,461 tons (3% of the global total) went to unspecified Asian buyers and are not displayed.

Source: UN Comtrade Database

IEA (International Energy Agency)

IEA Gas Plan

A 10-Point Plan to Reduce the European Union's Reliance on Russian Natural Gas

Fuel report — March 2022



Action 1



No new gas supply contracts with Russia

Impact: Taking advantage of expiring long-term contracts with Russia will reduce the contractual minimum take-or-pay levels for Russian imports and enable greater diversity of supply.

Action 3



Introduce minimum gas storage obligations to enhance market resilience

Impact: Enhances the resilience of the gas system, although higher injection requirements to refill storage in 2022 will add to gas demand and prop up gas prices.

Action 5



Maximise generation from existing dispatchable low-emissions sources: bioenergy and nuclear

Impact: An additional 70 TWh of power generation from existing dispatchable low emissions sources, reducing gas use for electricity by 13 bcm.

Action 7



Speed up the replacement of gas boilers with heat pumps

Impact: Reduces gas use for heating by an additional 2 bcm in one year.

Action 9



Encourage a temporary thermostat adjustment by consumers

Impact: Turning down the thermostat for buildings' heating by 1°C would reduce gas demand by some 10 bcm a year.

Action 2



Replace Russian supplies with gas from alternative sources

Impact: Around 30 bcm in additional gas supply from non-Russian sources.

Action 4



Accelerate the deployment of new wind and solar projects

Impact: An additional 35 TWh of generation from new renewable projects over the next year, over and above the already anticipated growth from these sources, bringing down gas use by 6 bcm.

Action 6



Enact short-term measures to shelter vulnerable electricity consumers from high prices

Impact: Brings down energy bills for consumers even when natural gas prices remain high, making available up to EUR 200 billion to cushion impacts on vulnerable groups.

Action 8



Accelerate energy efficiency improvements in buildings and industry

Impact: Reduces gas consumption for heat by close to an additional 2 bcm within a year, lowering energy bills, enhancing comfort and boosting industrial competitiveness.

Action 10



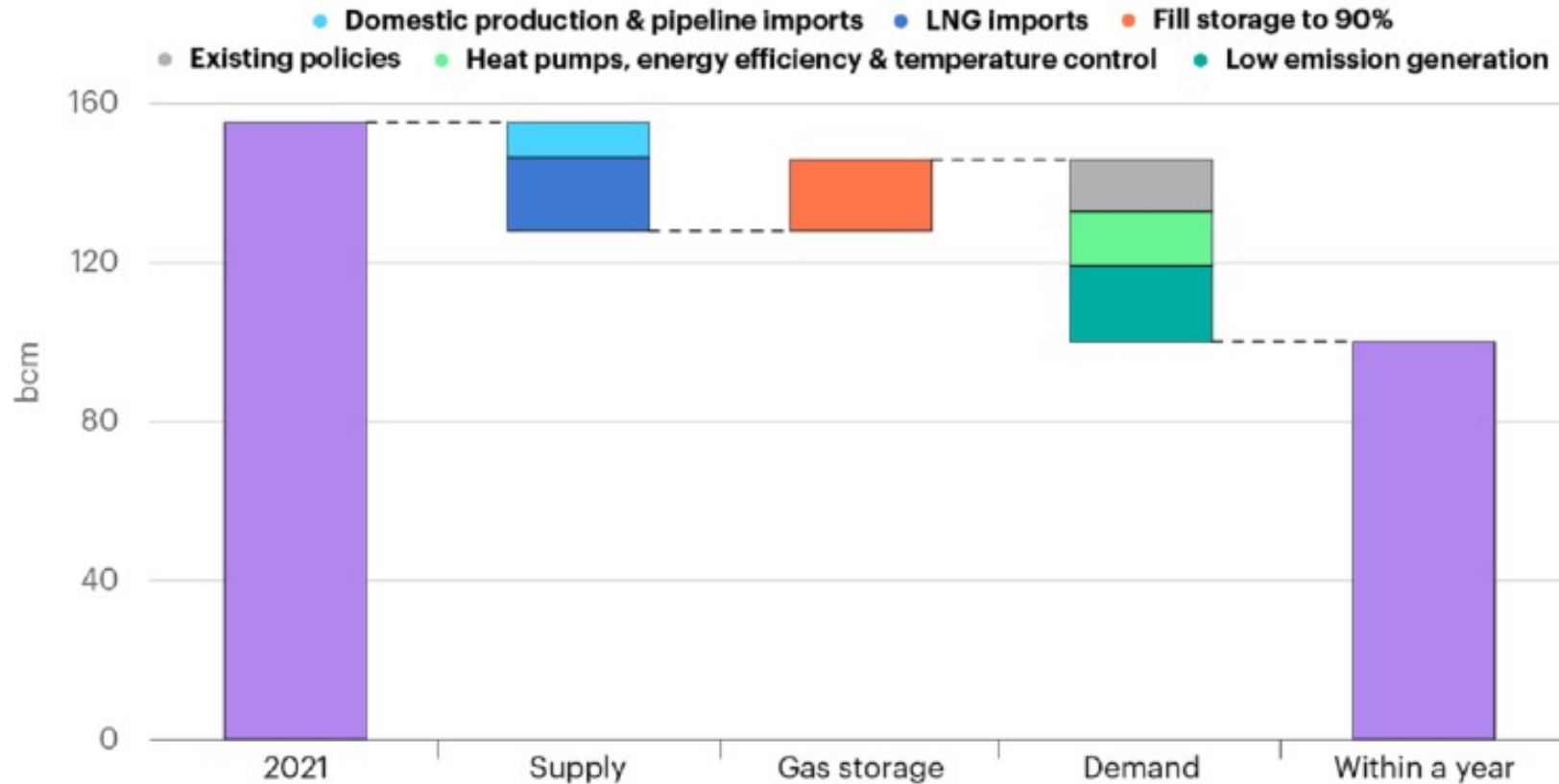
Step up efforts to diversify and decarbonise sources of power system flexibility

Impact: A major near-term push on innovation can, over time, loosen the strong links between natural gas supply and Europe's electricity security. Real-time electricity price signals can unlock more flexible demand, in turn reducing expensive and gas-intensive peak supply needs.

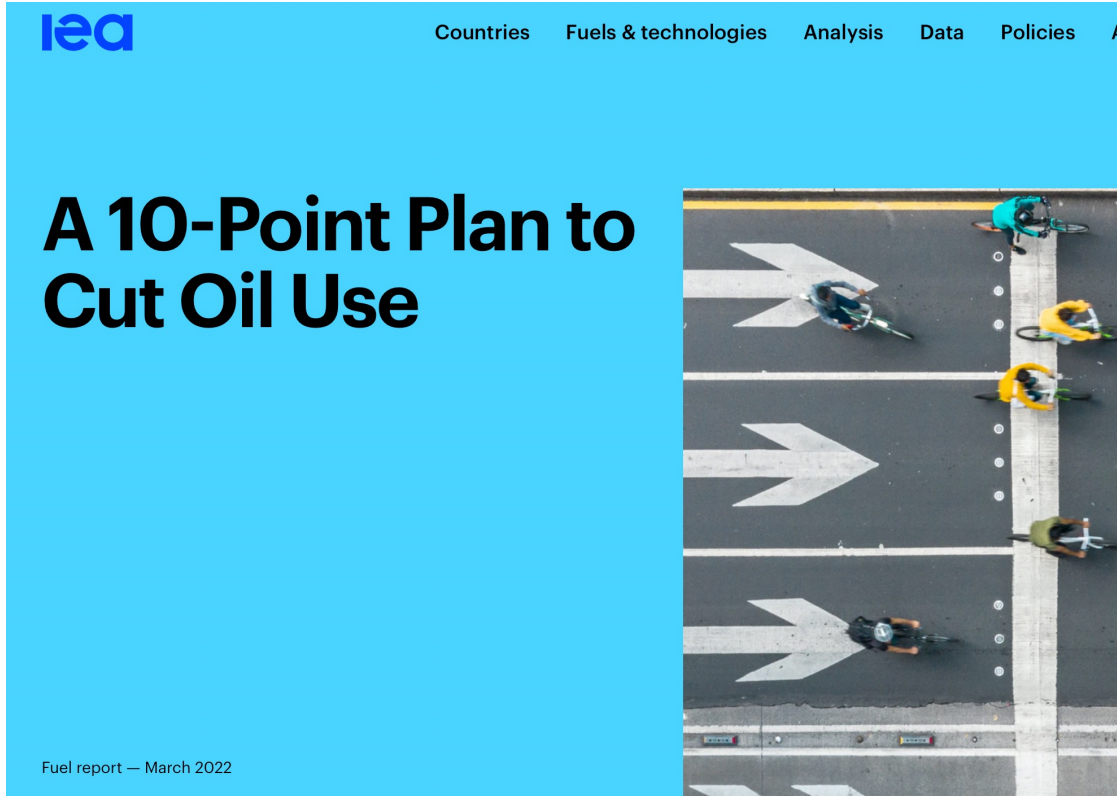
Impact of Gas Plan

EU gas imports from Russia

A 10-Point Plan to Reduce the European Union's Reliance on Russian Natural Gas

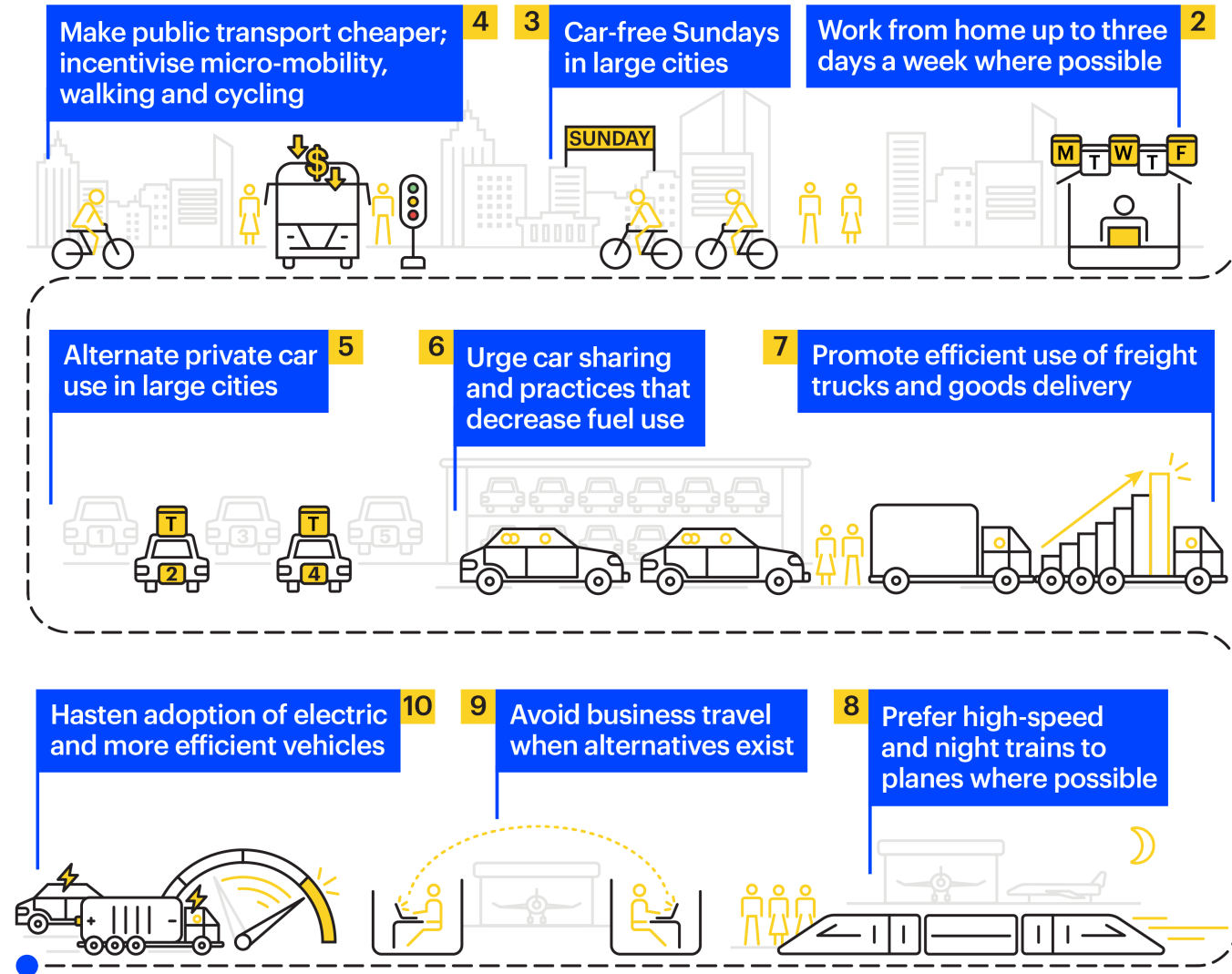


IEA Oil Plan



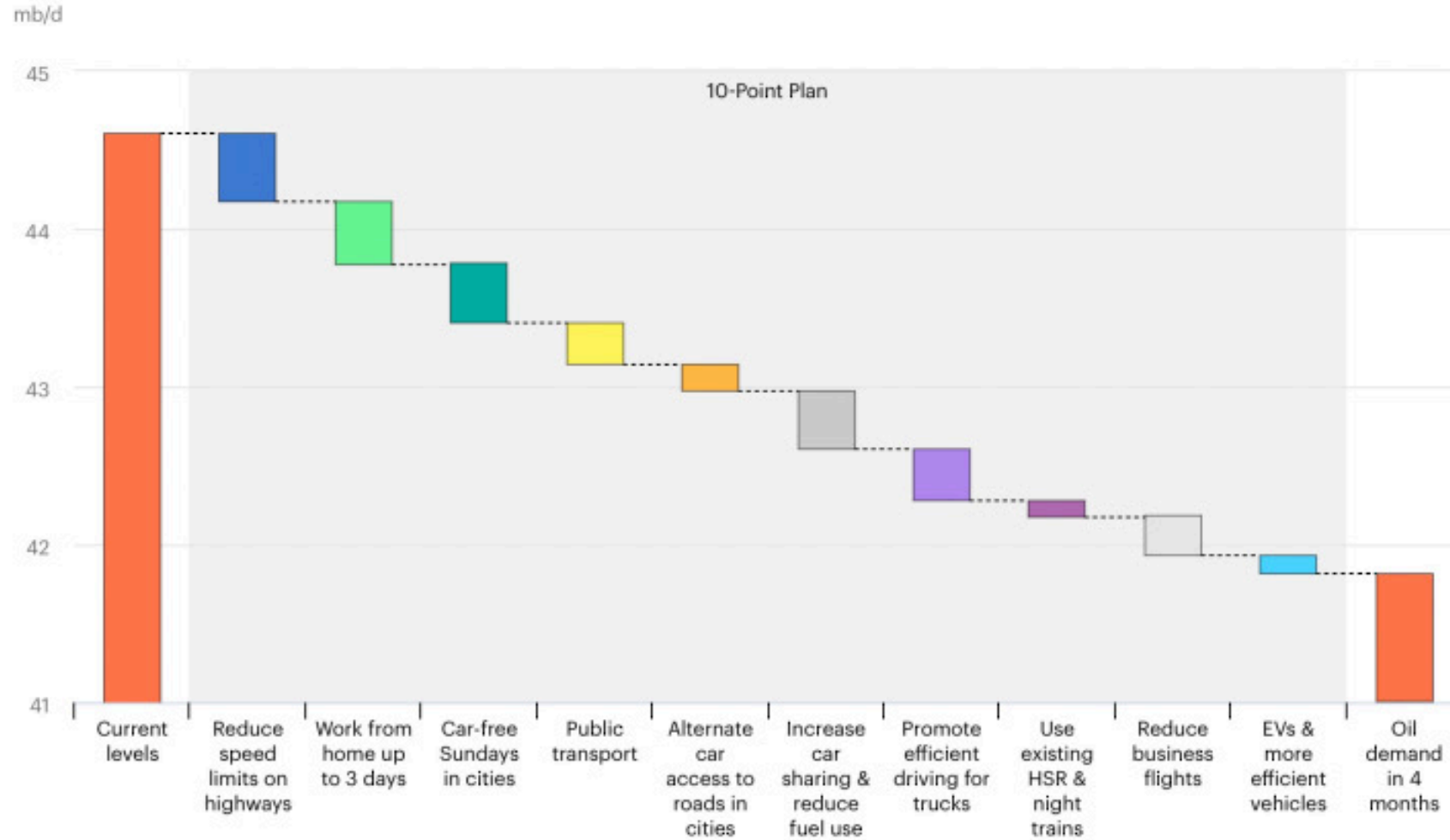
A 10-Point Plan to Cut Oil Use

iea.org



<https://www.iea.org/reports/a-10-point-plan-to-cut-oil-use>

Impact of Oil Plan



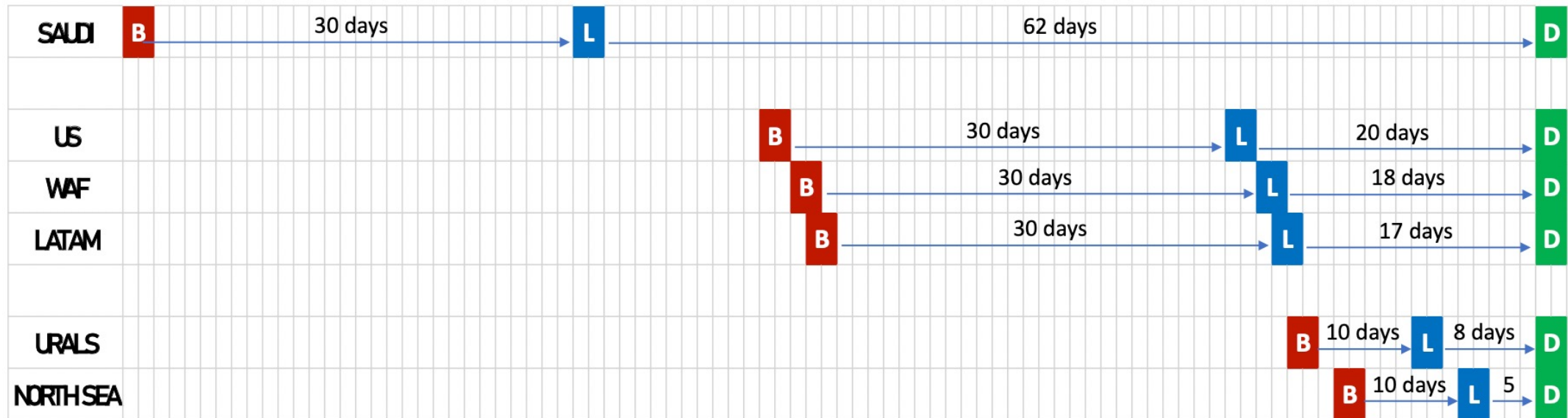
Impact on flight times



				DELAY
AIR FRANCE	Beijing	→	Paris	11h 55m + 6h 05m
JAPAN AIRLINES	London	→	Tokyo	11h 55m + 4h 30m
FINNAIR	Helsinki	→	Tokyo	9h 30m + 3h 30m
FINNAIR	Singapore	→	Helsinki	11h 50m + 1h 25m
UNITED	Chicago	→	New Delhi	14h 35m + 1h 00m
QANTAS	Sydney	→	London (via Darwin)	23h 20m + 30m

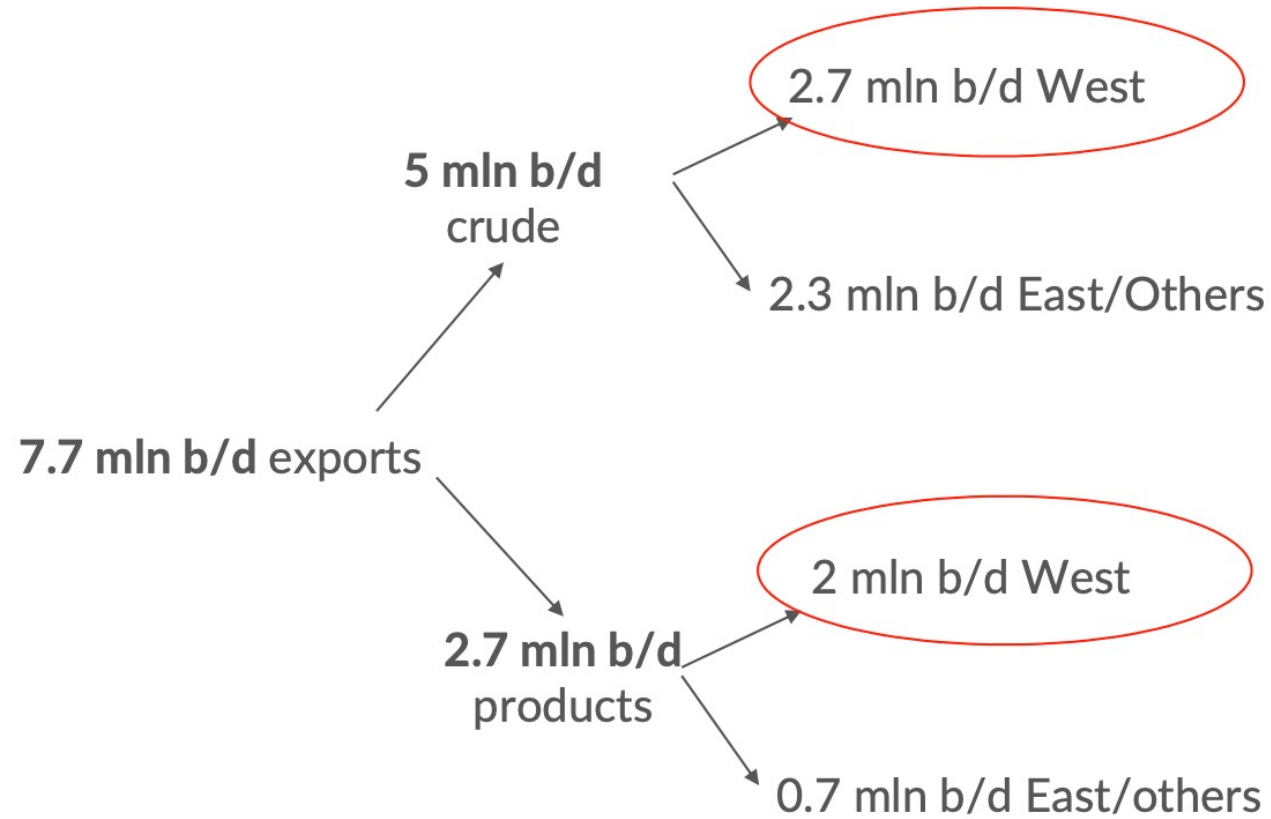
Oil

Buying, Loading, Delivery



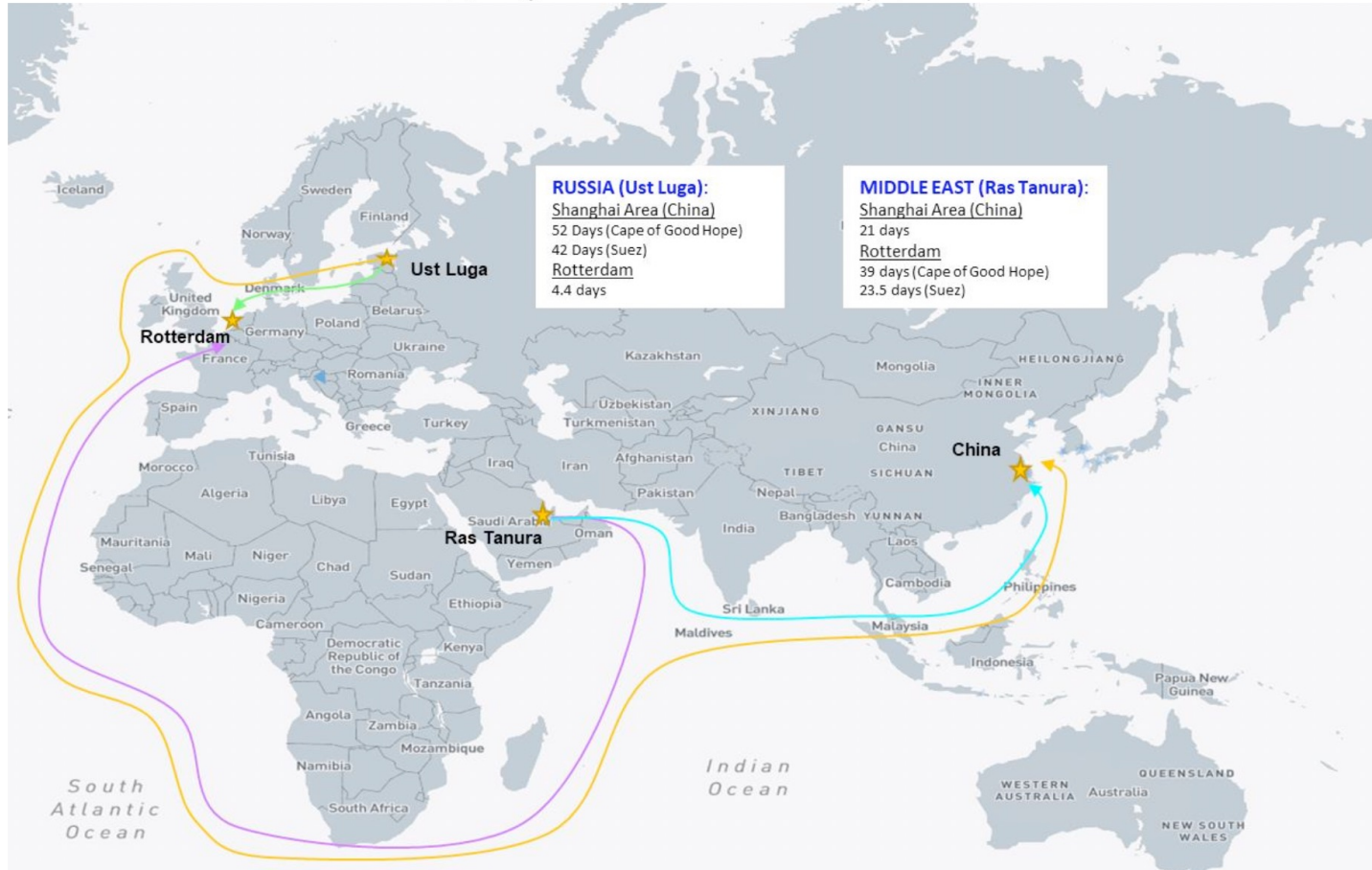
B uying Decision **L** oading **D** elivery

Russian exports



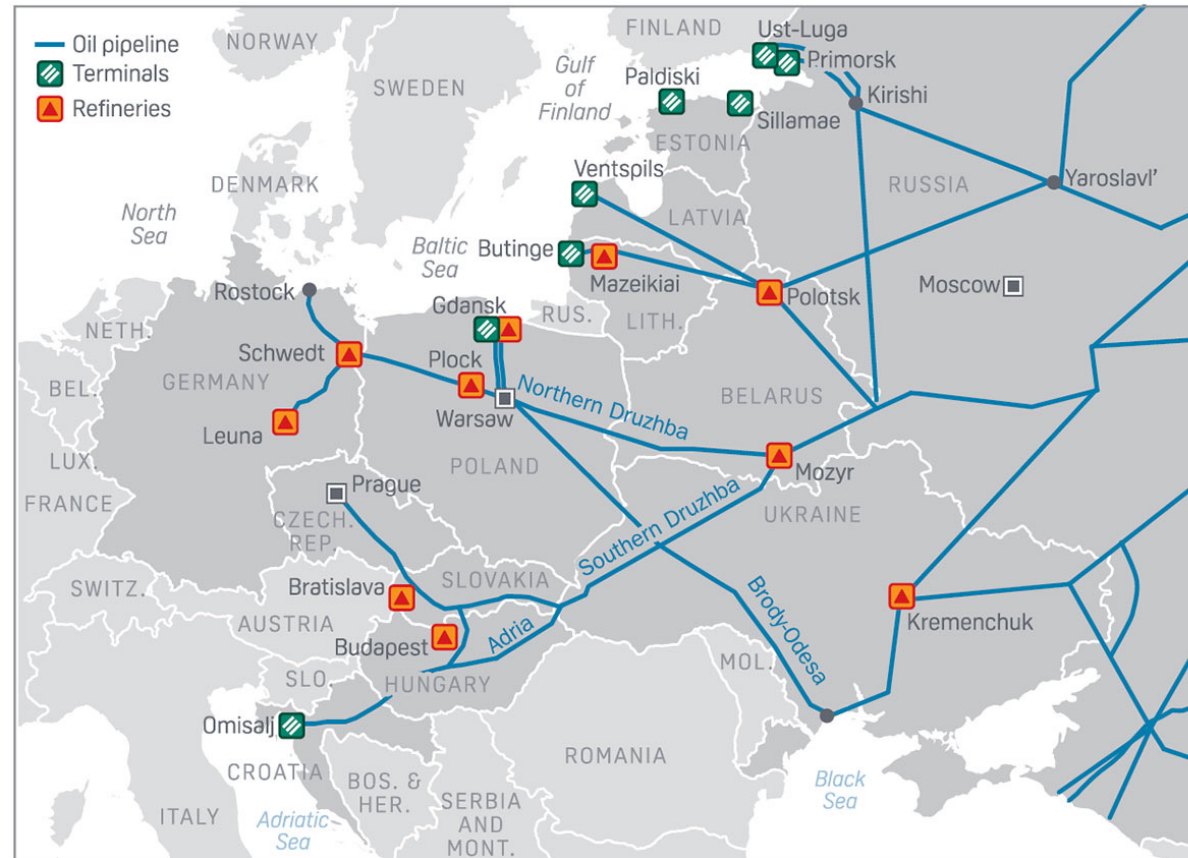
Shipping Times

Shipping times between key ports



Druzhba Pipeline

CENTRAL EUROPE'S OIL INFRASTRUCTURE

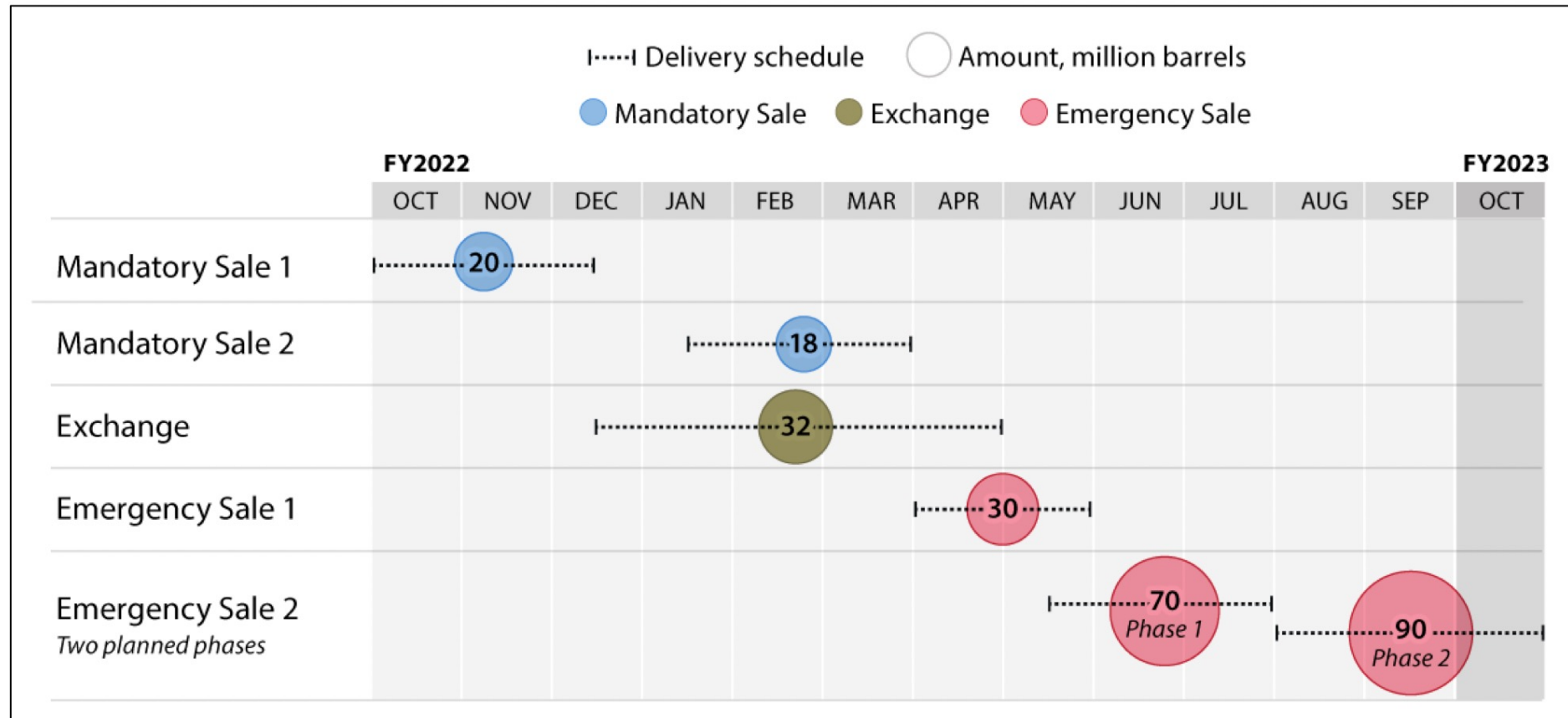


Source: S&P Global Platts

Oil Stock Releases

Figure 1. SPR Oil Releases

October 2021–October 2022



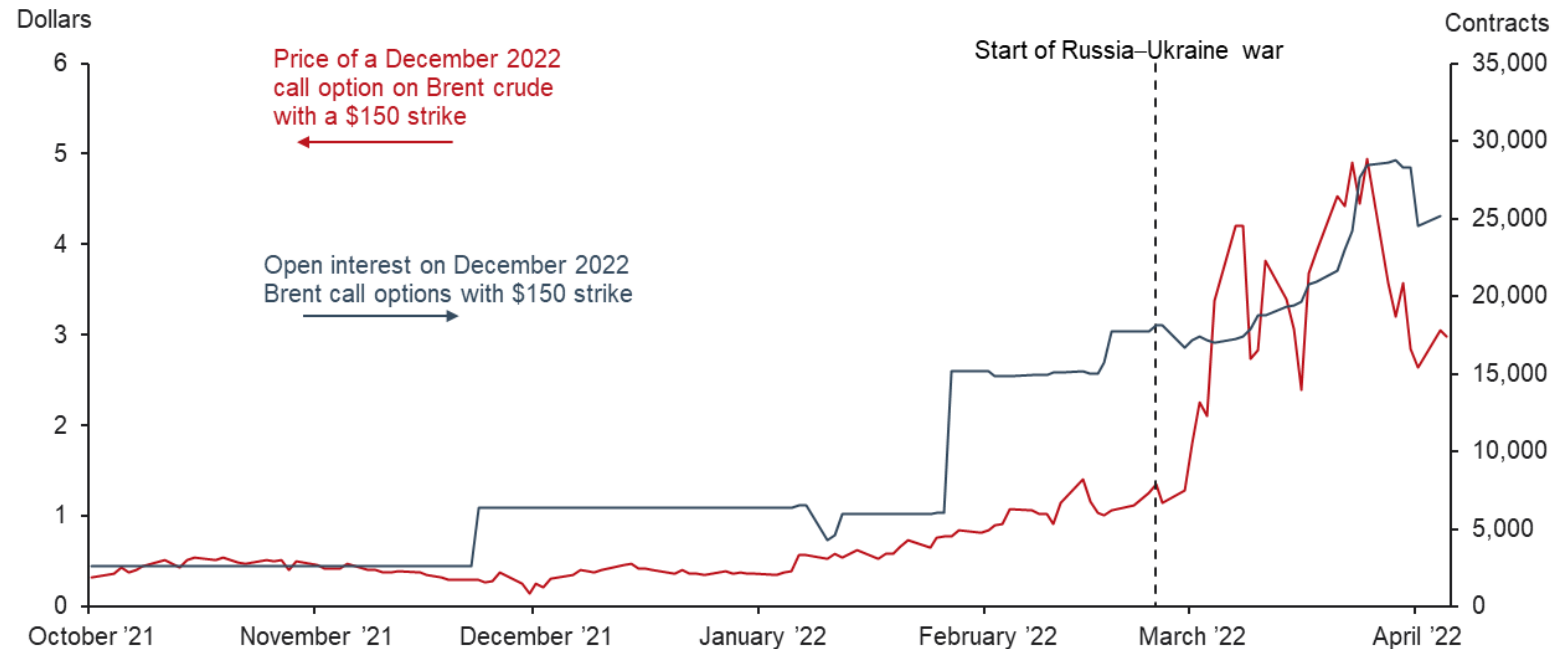
Source: CRS, information from Department of Energy announcements.

Notes: Schedules include early delivery options.

<https://crsreports.congress.gov/product/pdf/IN/IN11916>

Paper Barrels

Chart 2
Large Purchases of Out-of-the-Money Options on Brent Crude Increase

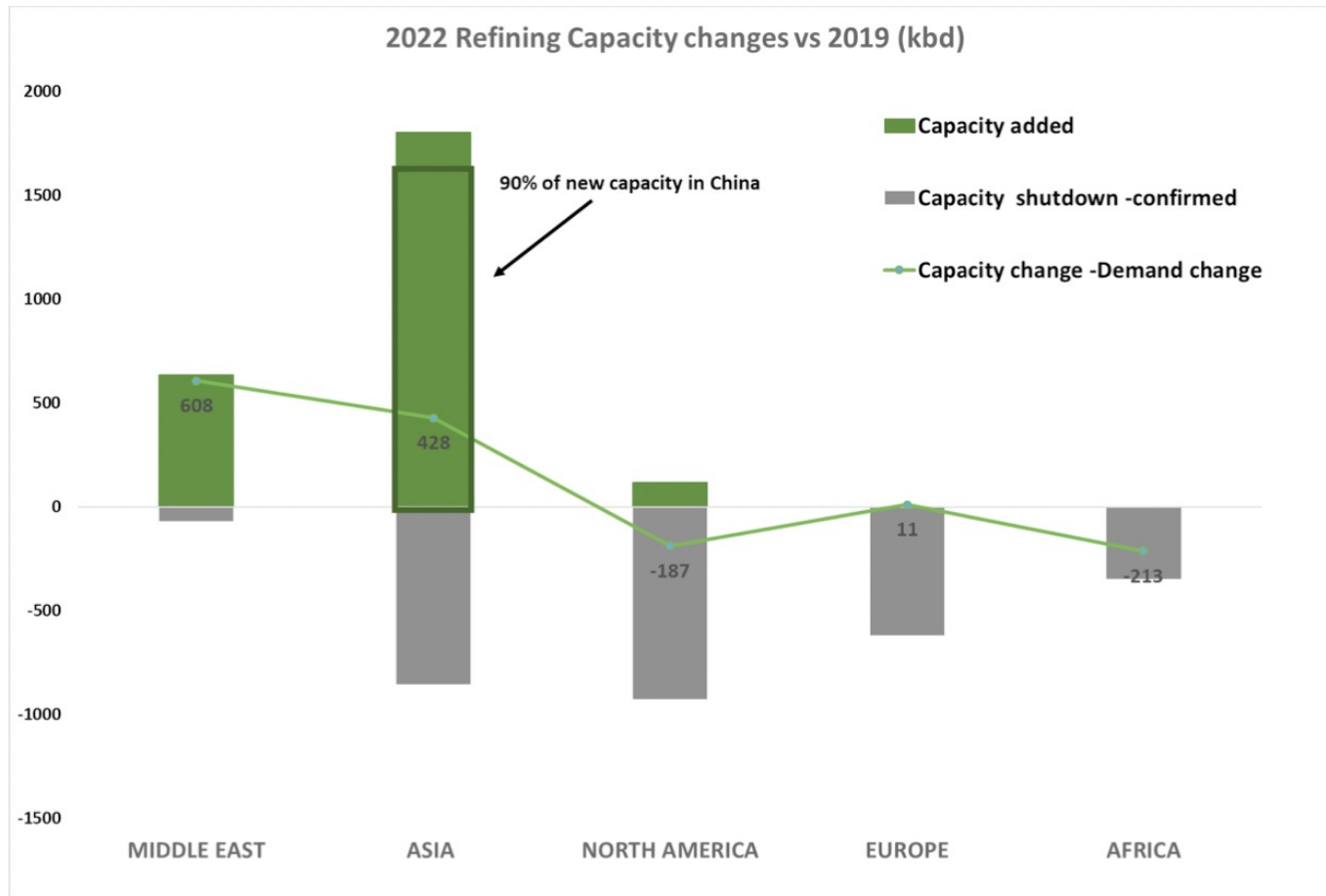


NOTES: Open interest measures the number of contracts outstanding and not yet liquidated. Brent crude in the spot market averaged \$97.13 in February 2022, the month Russia invaded Ukraine. Data are through April 5, 2022.

SOURCES: Federal Reserve Bank of Dallas; Bloomberg; ICE Futures Europe Commodities.

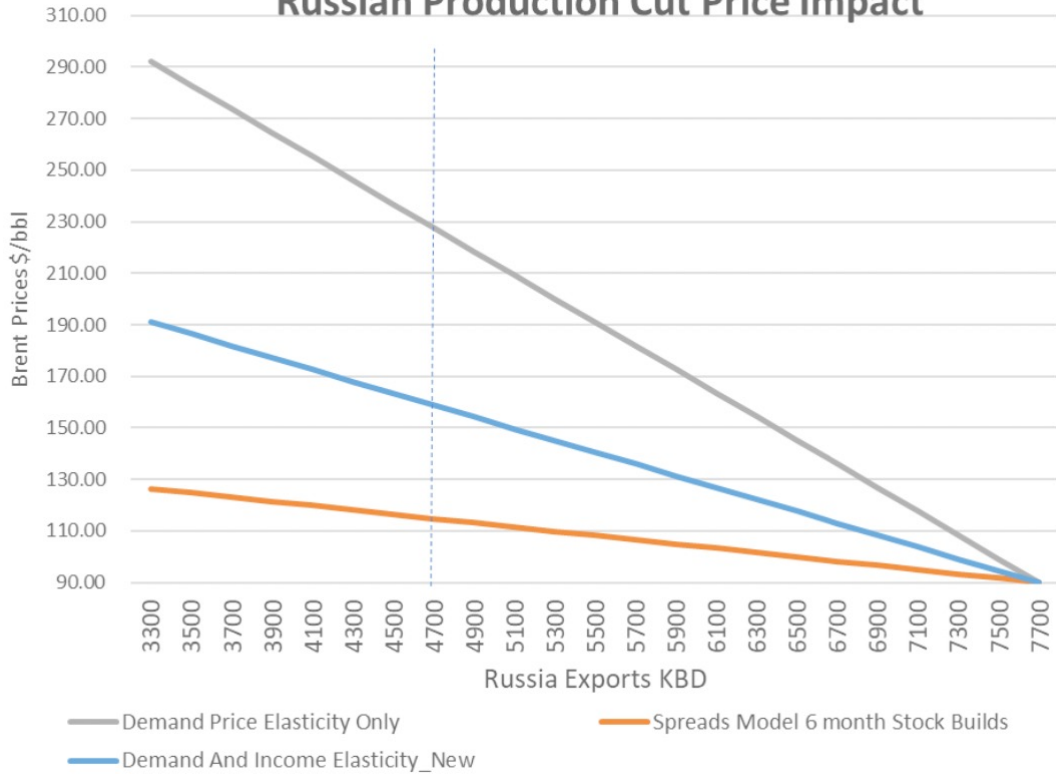
Federal Reserve Bank of Dallas

Refinery and stocks

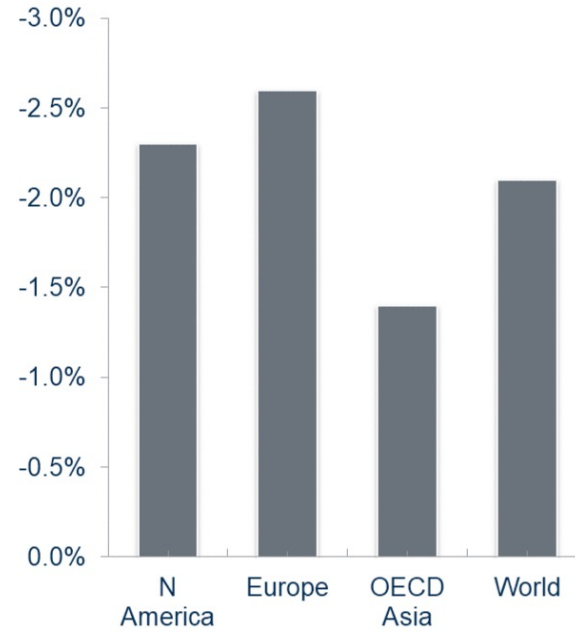


The economical side

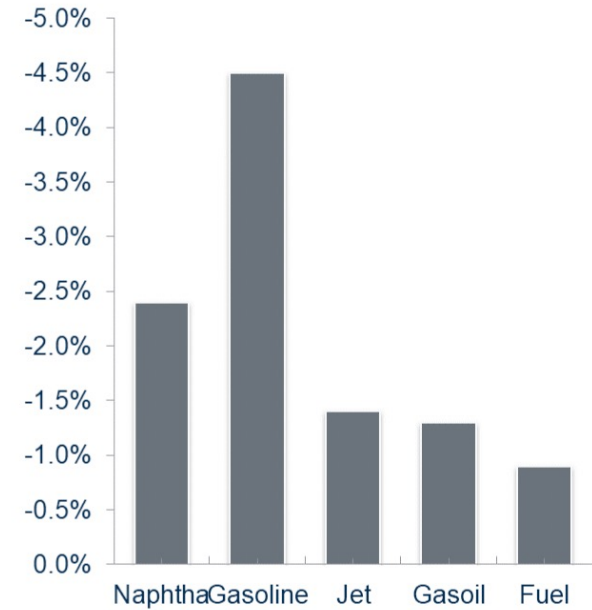
Russian Production Cut Price Impact



Price Elasticity Coefficients: Regional



Price Elasticity Coefficients: Products

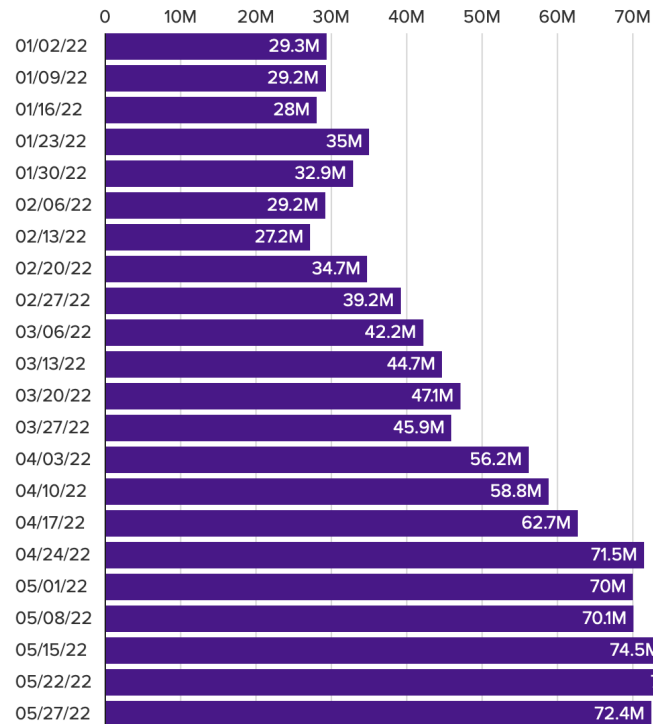


Sanctions and Latvian Blend

- What is “Russian origin”
- 49.99% Russia + 50.01% other?
- “The point is to market a barrel in which only 49.99% comes from Russia; in Shell's eyes, as long as the other 50.01 percent is sourced elsewhere, the oil cargo isn't technically of Russian origin, the Bloomberg report said.”

Russian oil

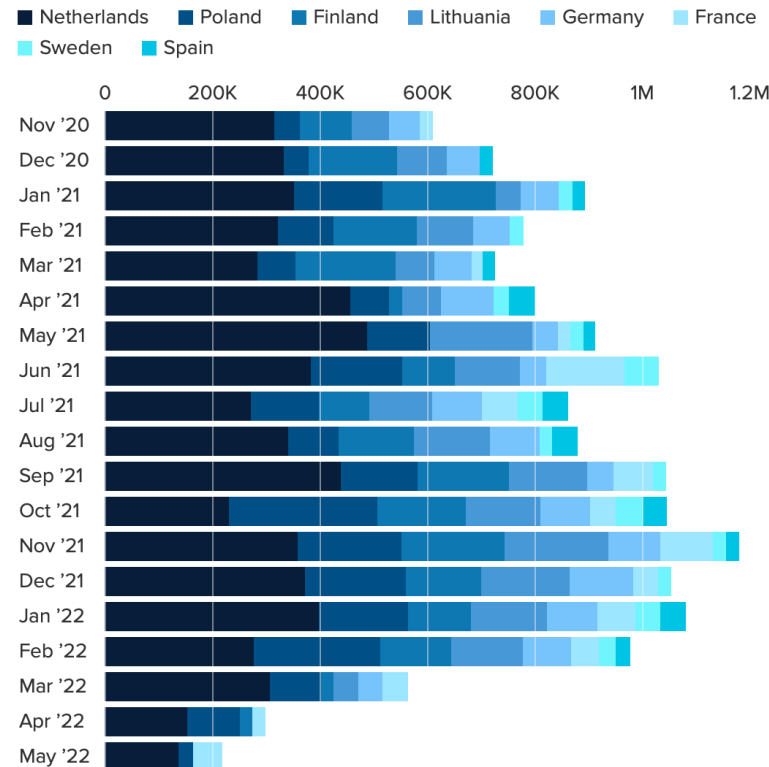
The amount of Russian oil 'on the water' has more than doubled since the beginning of 2022



Note: Barrels of oil
Chart: Gabriel Cortés / CNBC
Source: Kpler



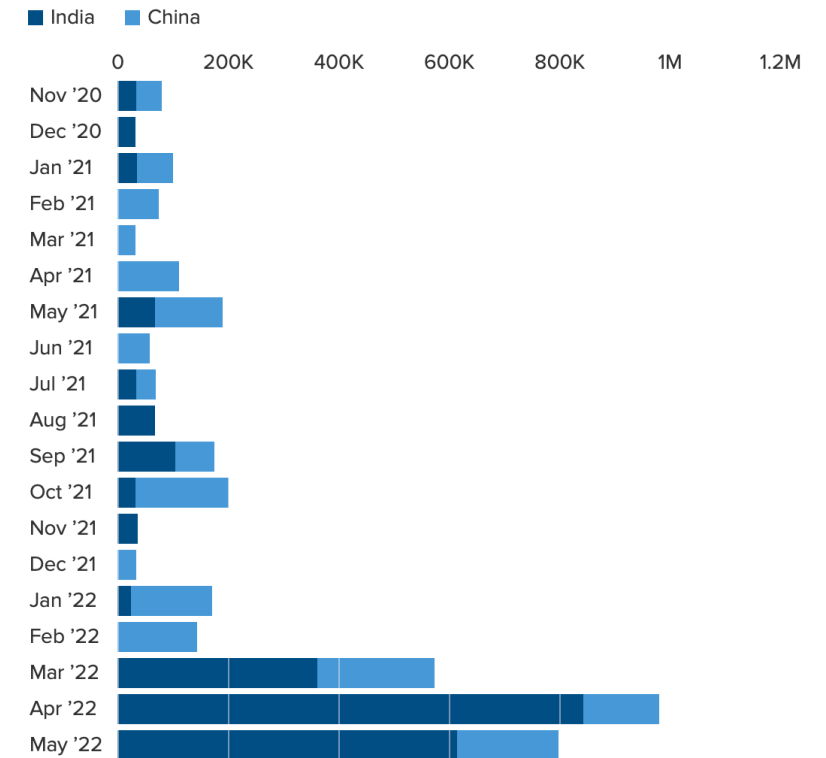
Russian oil exports to Northwest Europe have plunged more than 80% from their peak in Nov. 2021



Note: Barrels of oil per day
Chart: Gabriel Cortes / CNBC
Source: Kpler



Indian imports of Russian oil are nine-times what they were 12 months ago

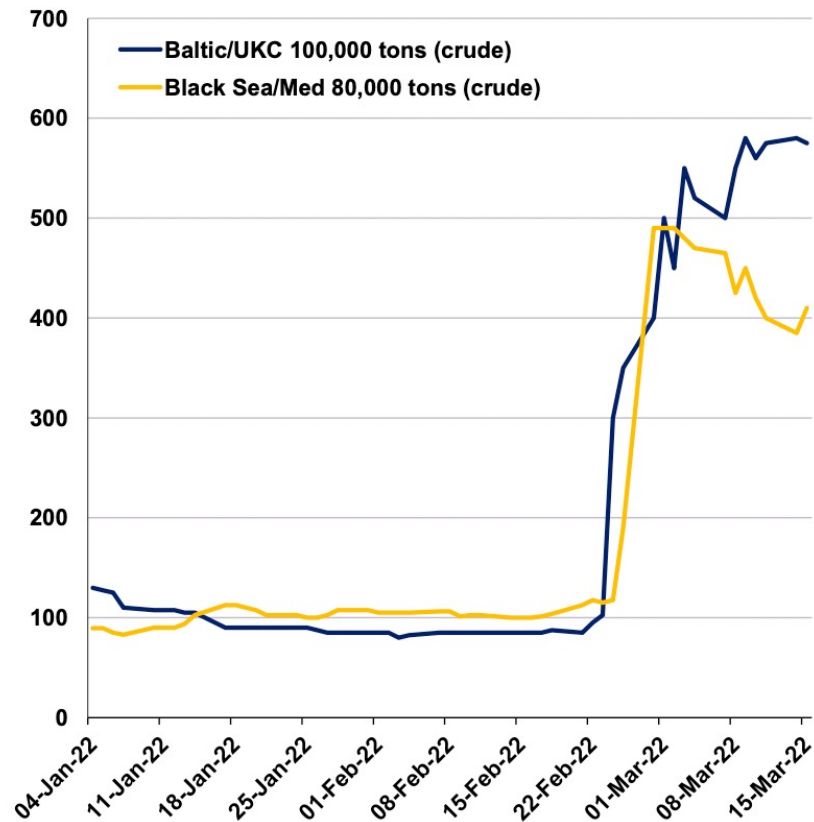


Note: Barrels of oil per day
Chart: Gabriel Cortes / CNBC
Source: Kpler

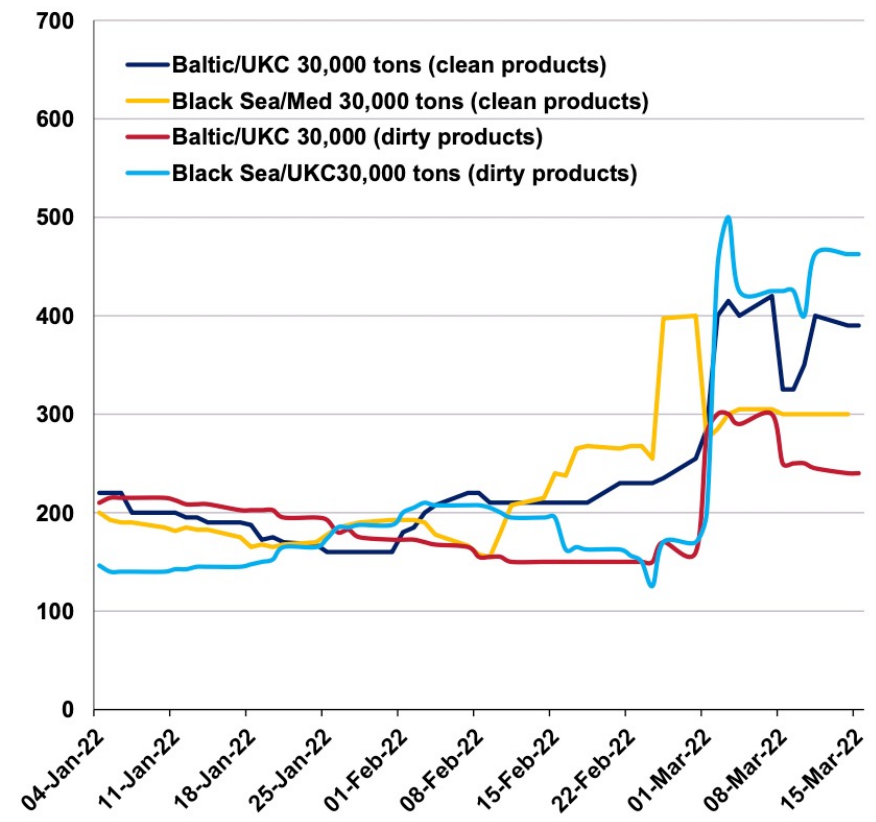


Freight Costs

Crude Freight Costs (WS)



Clean and Dirty Product Freight Costs (WS)



Russian Fleet

The Russian fleet only forms a small portion of the global fleet but is a significant source of ice class tonnage

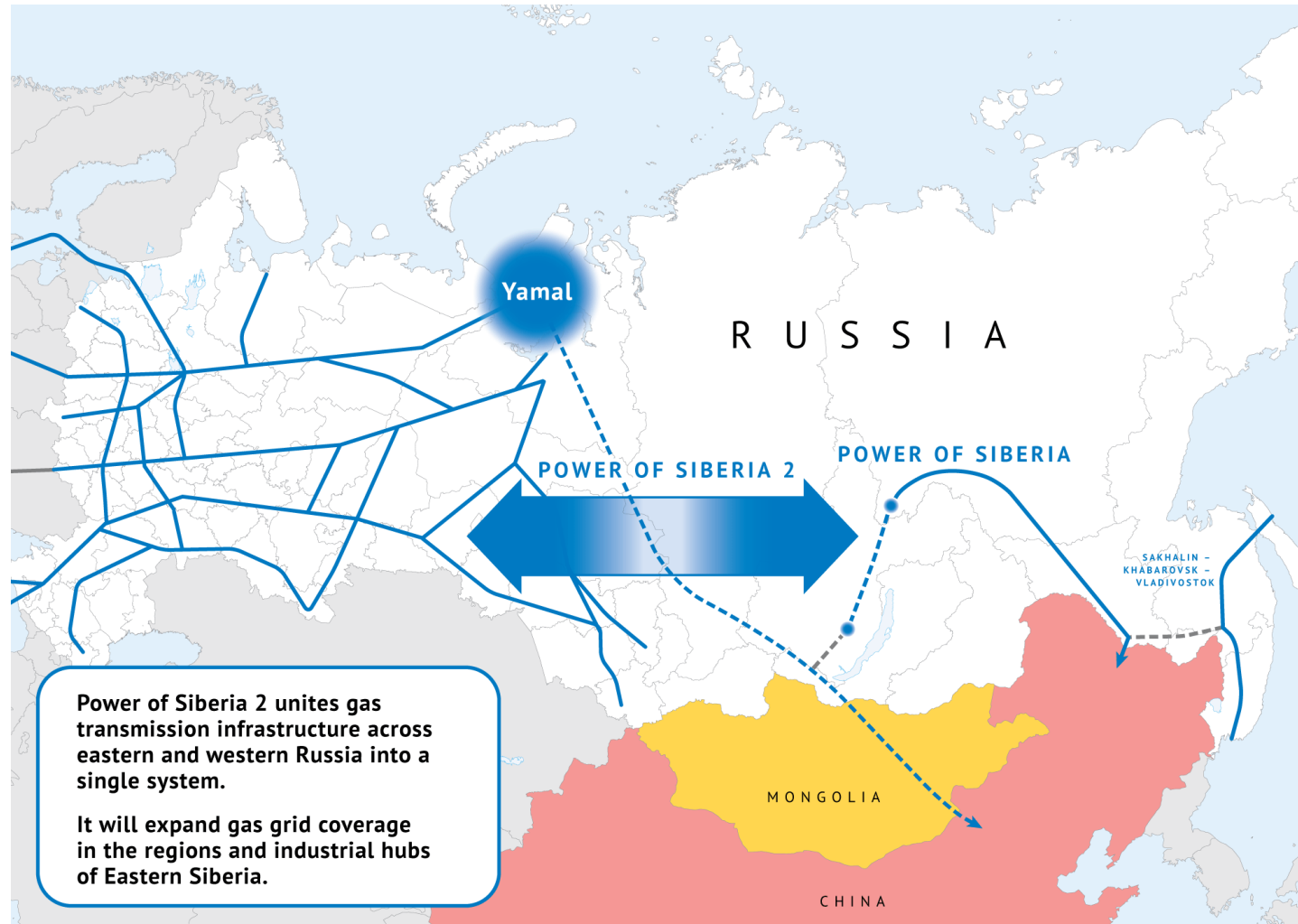
Existing Russian Deep Sea Tanker Fleet over 25,000 dwt*				
	SCF	Other Russian Fleet	% of Global	Global Fleet
VLCC	2	0	0.2%	845
Suezmax	11	0	1.8%	626
Aframax	42	6	7.1%	674
LR2	11	1	2.9%	411
LR1	6	1	1.8%	382
Panamax	5	0	7.5%	67
MR	32	3	2.0%	1743
Handy	0	5	1.1%	444
Total	109	16	2.6%	4748

* Excluding bunker vessels, chemical tankers and small tankers/barges

SCF Ice Class Fleet			
	SCF	% of Global	Global Ice Class Fleet
Suezmax	2	4.0%	50
Aframax	25	22.9%	109
LR2	9	20.5%	44
LR1	0	0.0%	57
Panamax	5	27.8%	18
MR	51	24.1%	212

LNG

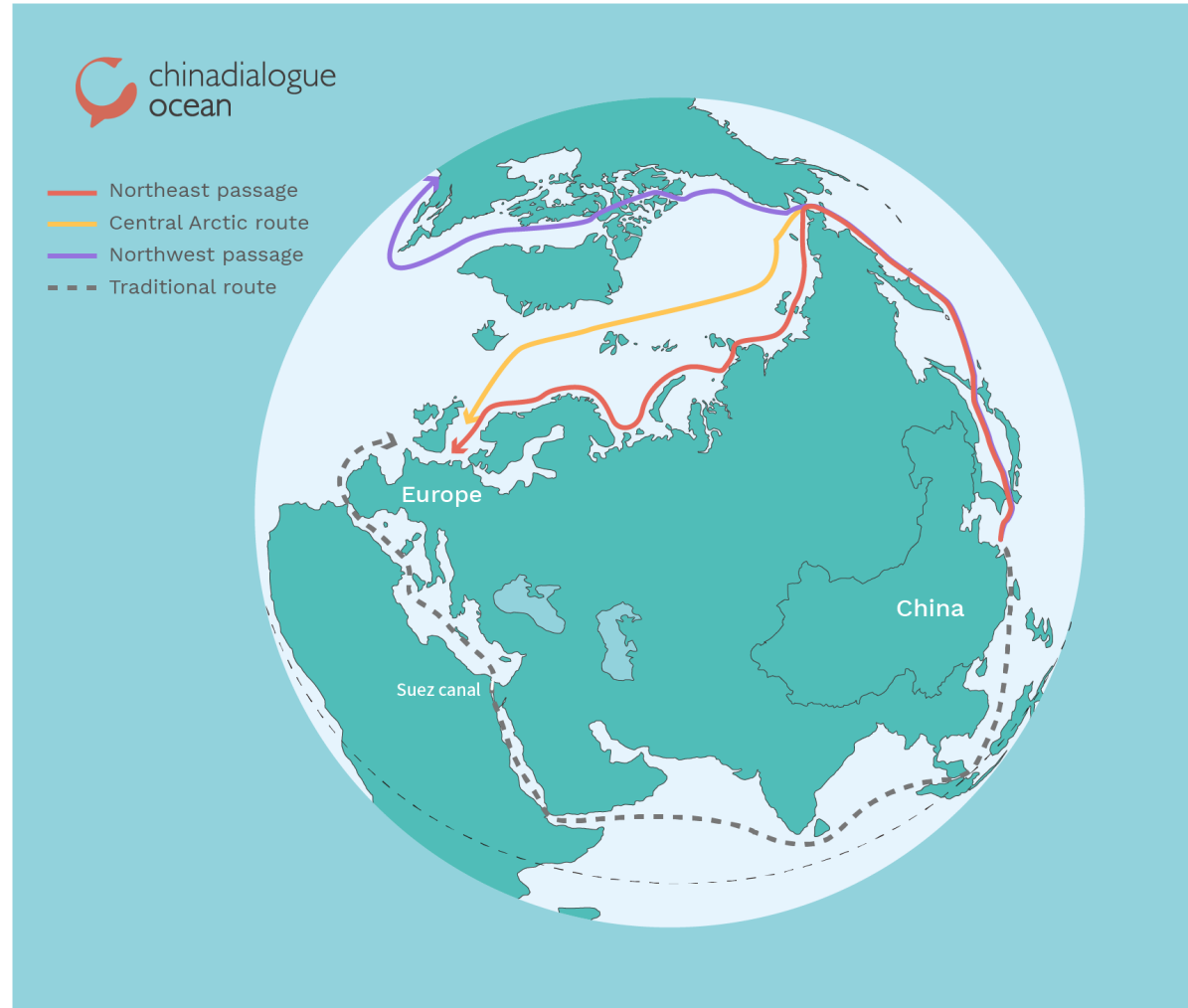
Russian Gas Pipelines



NordStream 1-2

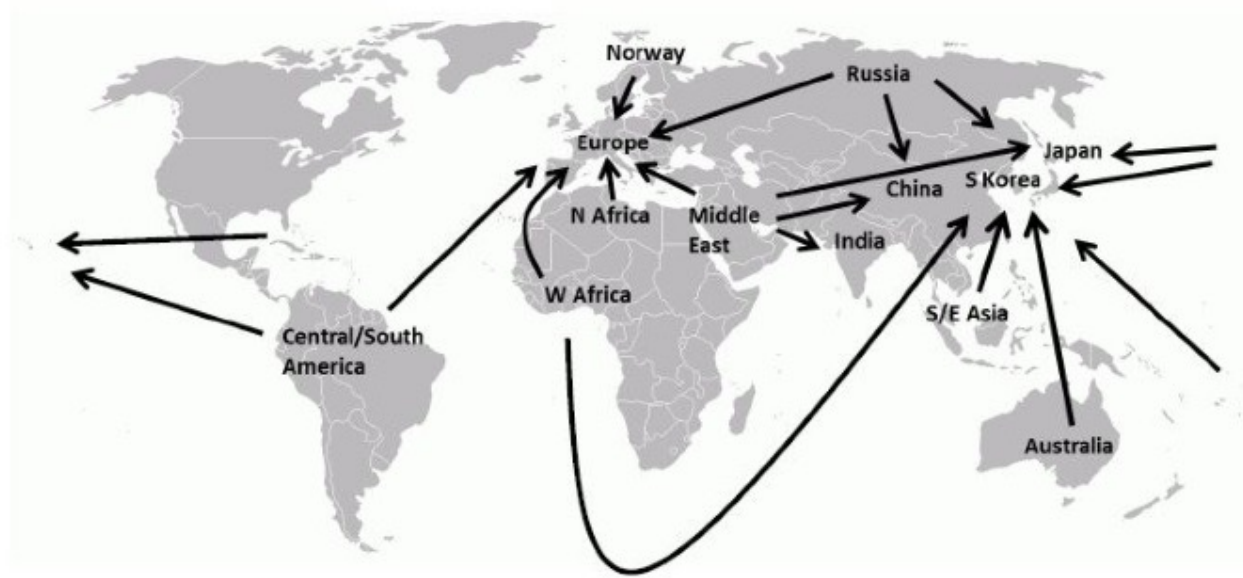


Arctic Route



2017 LNG Trades

Liquefied Natural Gas Trade



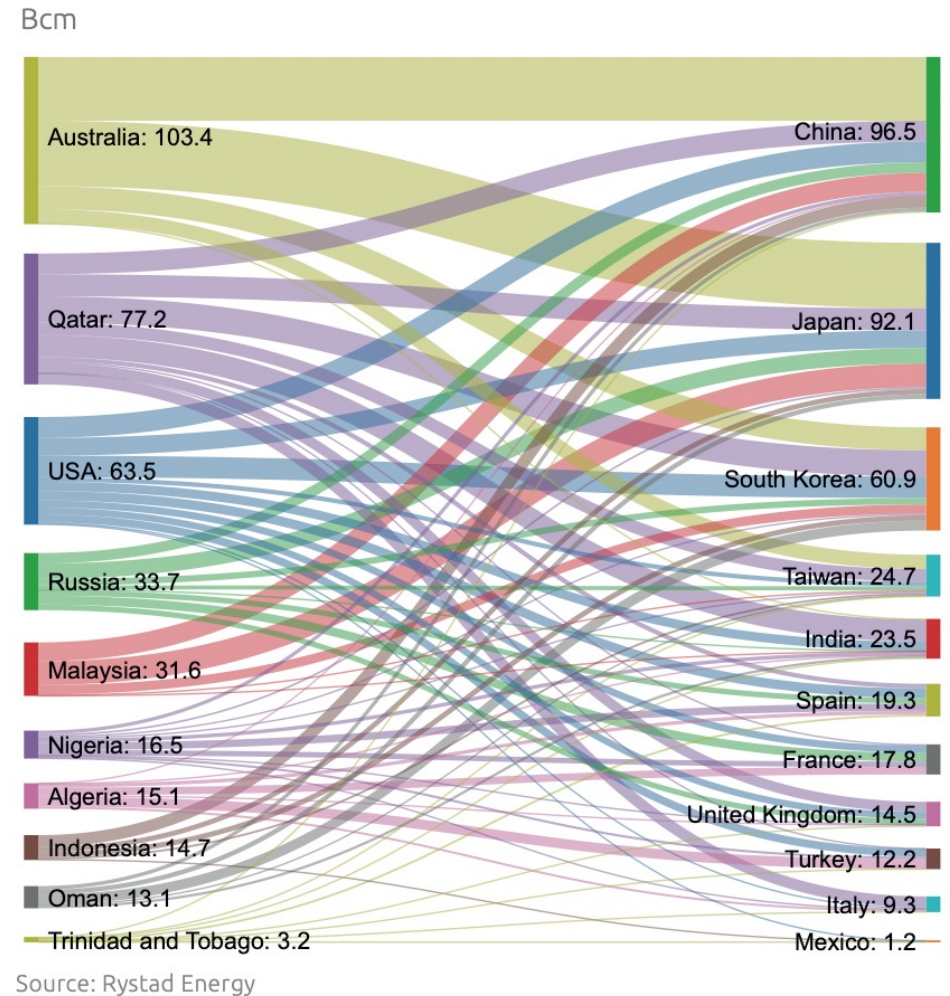
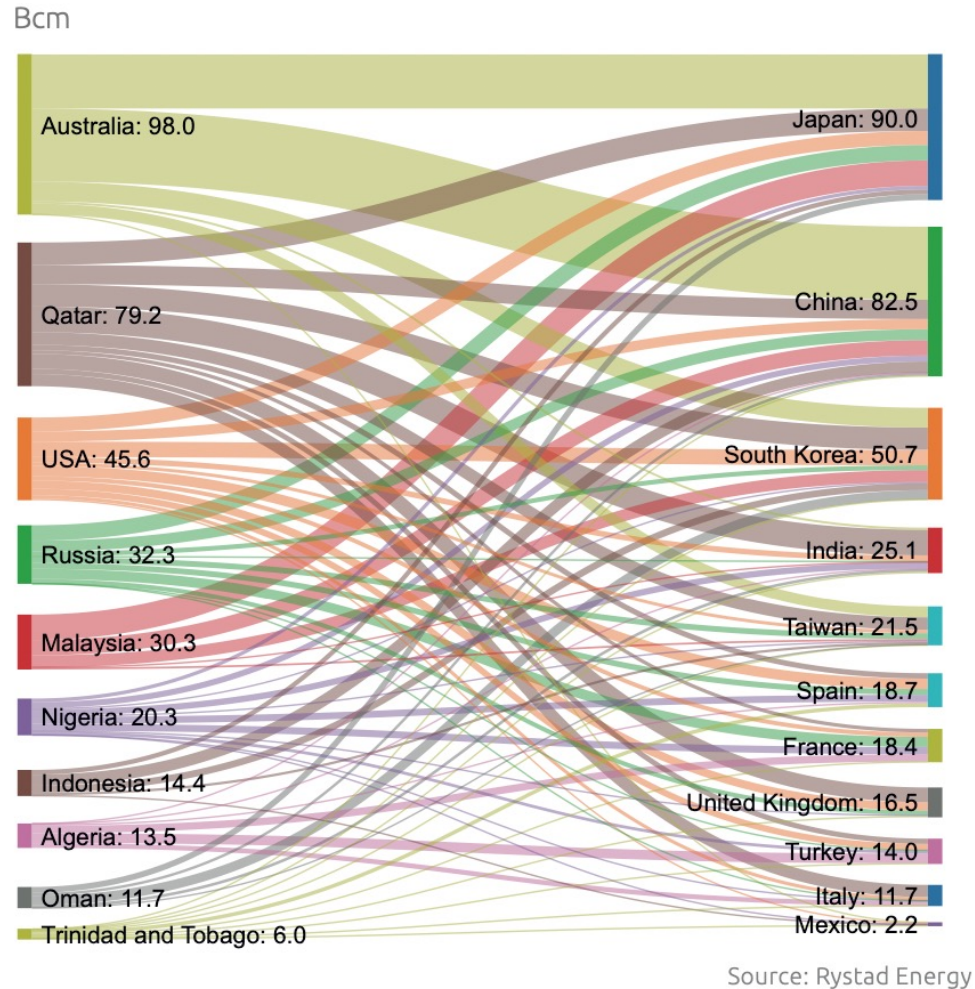
Major LNG Exporters 2017

Qatar	78 mln tonnes
Australia	56 mln tonnes
Malaysia	27 mln tonnes
Nigeria	20 mln tonnes
Indonesia	19 mln tonnes
Algeria	12 mln tonnes

Major LNG Importers 2017

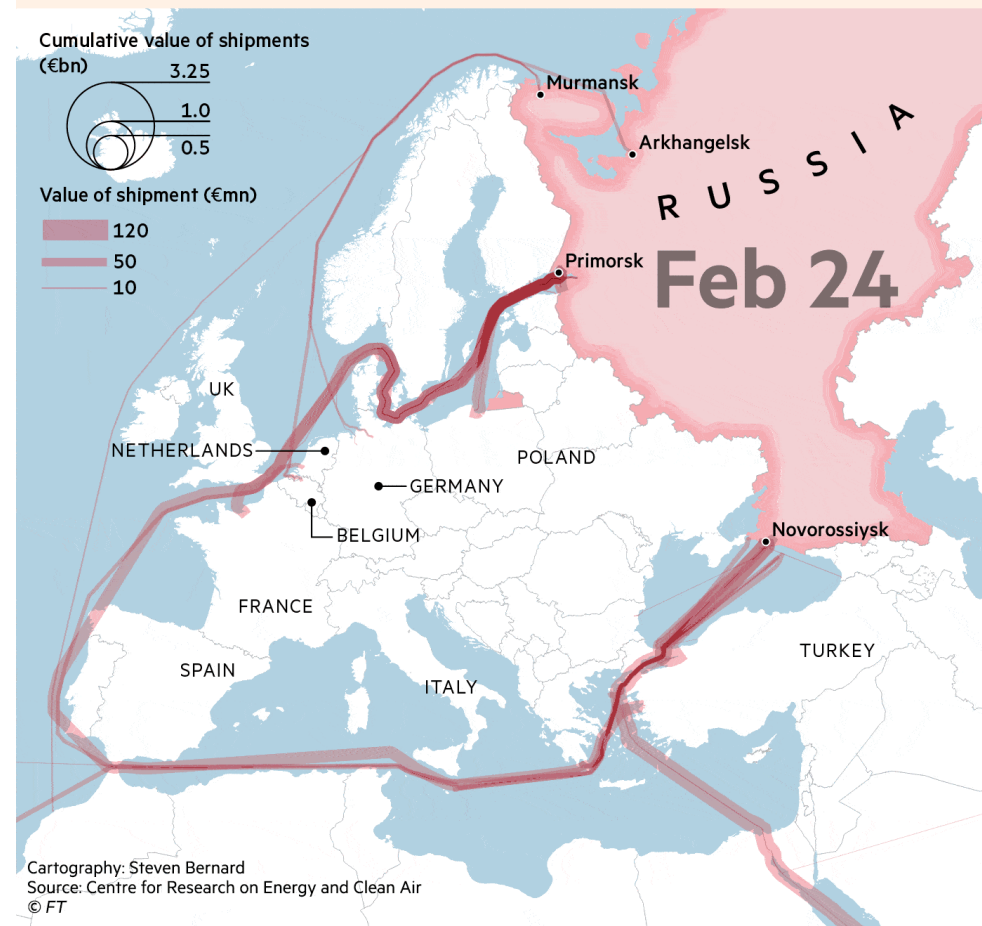
Japan	84 mln tonnes
China	39 mln tonnes
S Korea	38 mln tonnes
India	19 mln tonnes
Taiwan	17 mln tonnes
Spain	15 mln tonnes

2020 – 2021 LNG Trade Flows



EU's imports from Russia

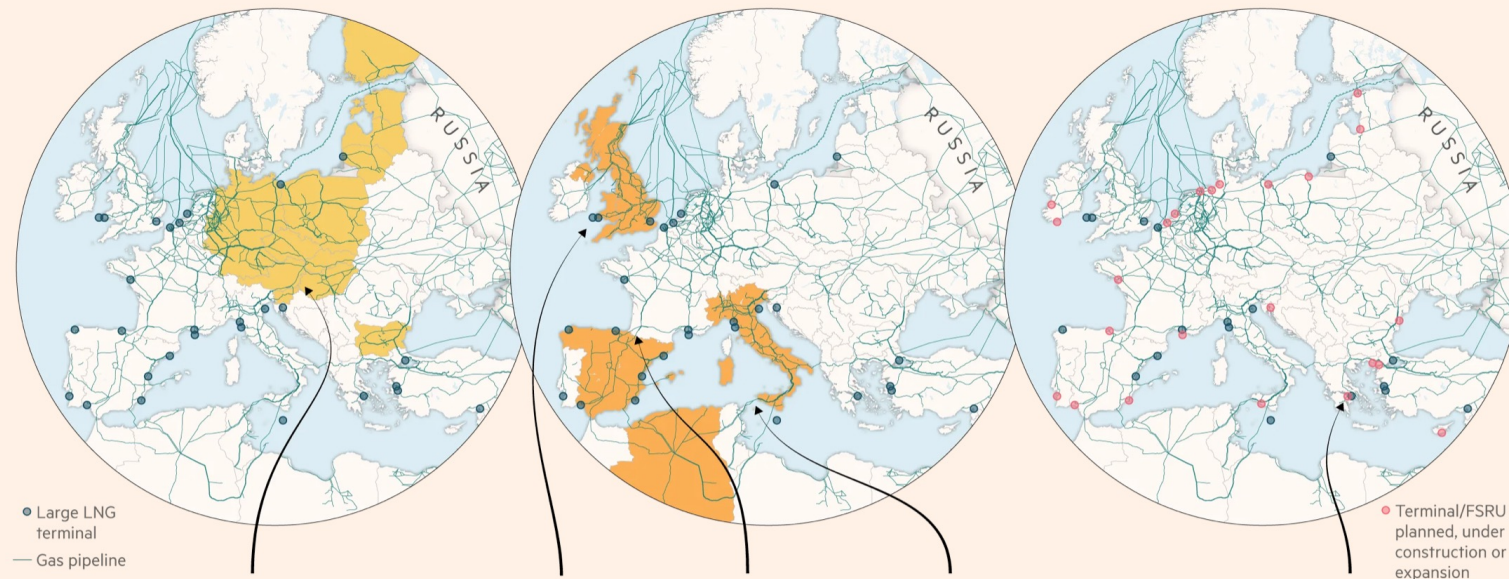
The EU has imported €43bn of fossil fuels from Russia since the invasion of Ukraine



EU Gas Strategy

How Europe could increase imports of LNG

LNG is shipped to terminals in Europe, converted back into gas and distributed via pipeline to neighbouring countries. But infrastructure issues will have to be overcome for supply to be increased



EU countries that rely on Russia for more than half their gas either have no LNG terminals or limited spare capacity

The UK has several large LNG terminals with spare capacity, and via pipeline connections to Europe it may be possible for the UK to re-export gas to the EU

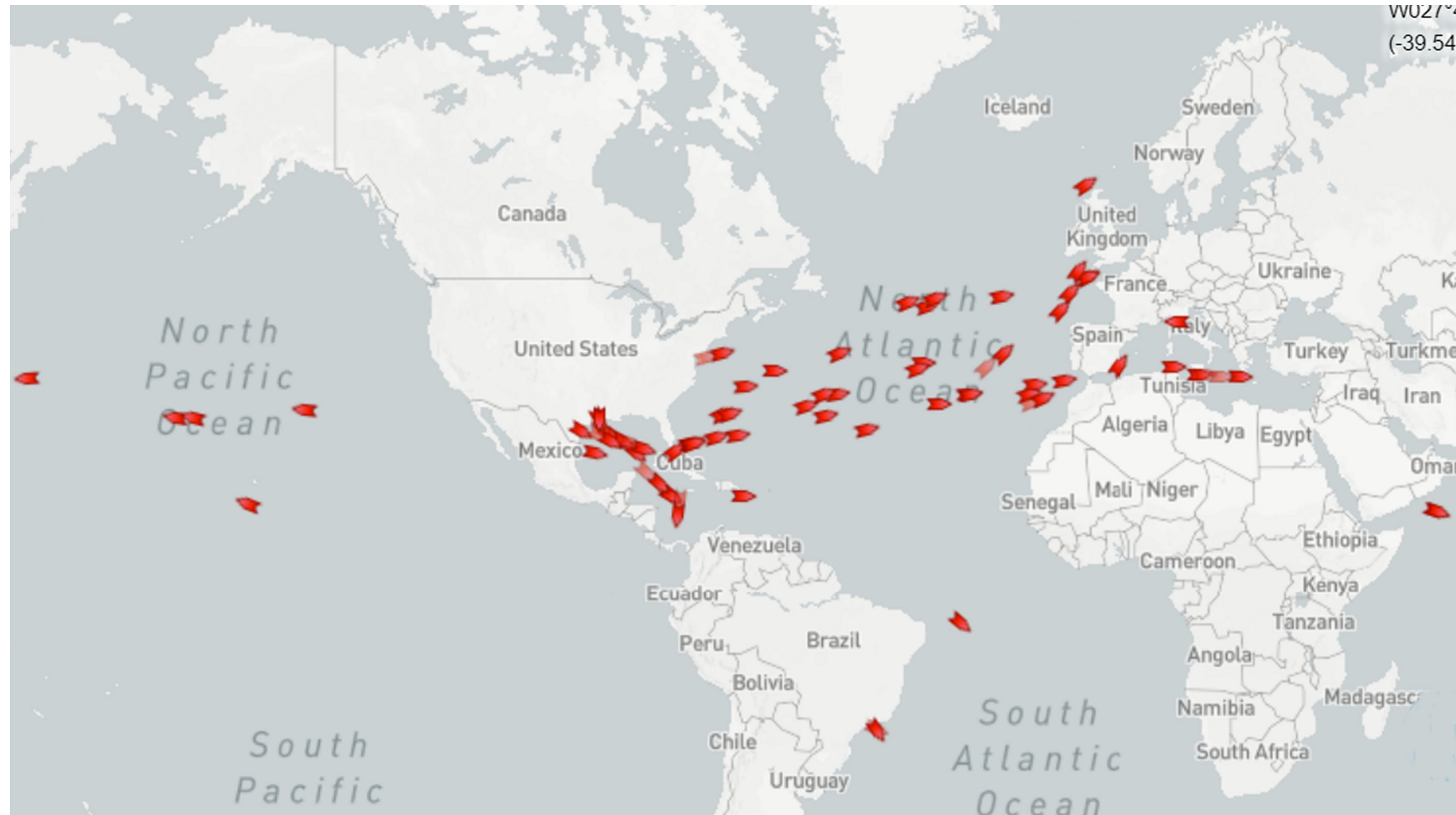
Spain has the most terminals, and accounts for a substantial share of the EU's LNG import capacity. But limited pipeline connections to France restrict its ability to redistribute gas

Spain and Italy both have pipeline connections with Algeria. If Spain is able to import more LNG, Algeria could potentially redistribute some gas to Italy. From there it could be piped on to Europe

There are plans to build or expand terminals across Europe but this could take years. Floating storage and regasification units offer a more immediate solution. Some could be operational this year

Sources: Oxford Institute for Energy Studies; Bruegel; EntsoG; Global Energy Monitor; Gas Infrastructure Europe; FT research
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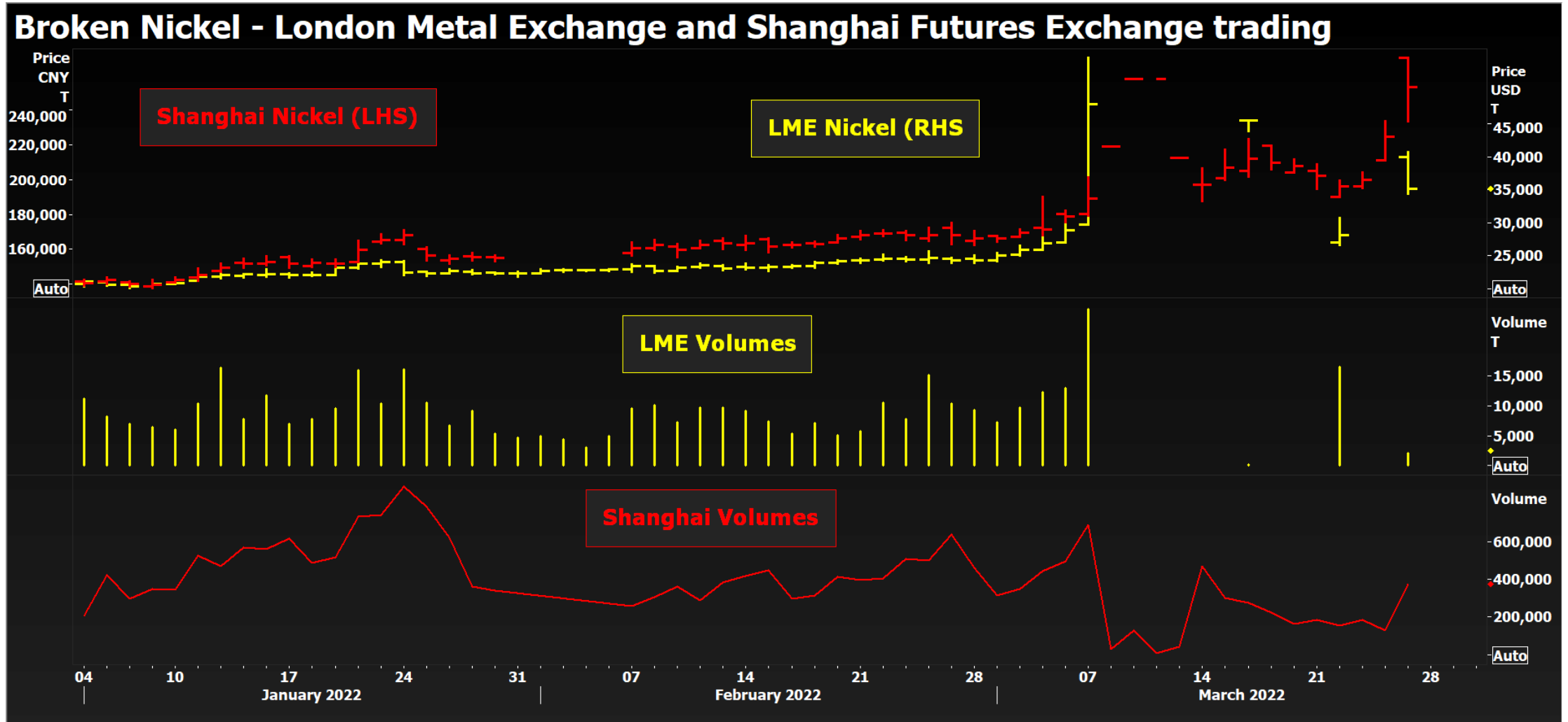
Recent flows



<https://www.freightwaves.com/news/armada-carrying-us-lng-heads-to-europe-but-it-wont-be-enough>

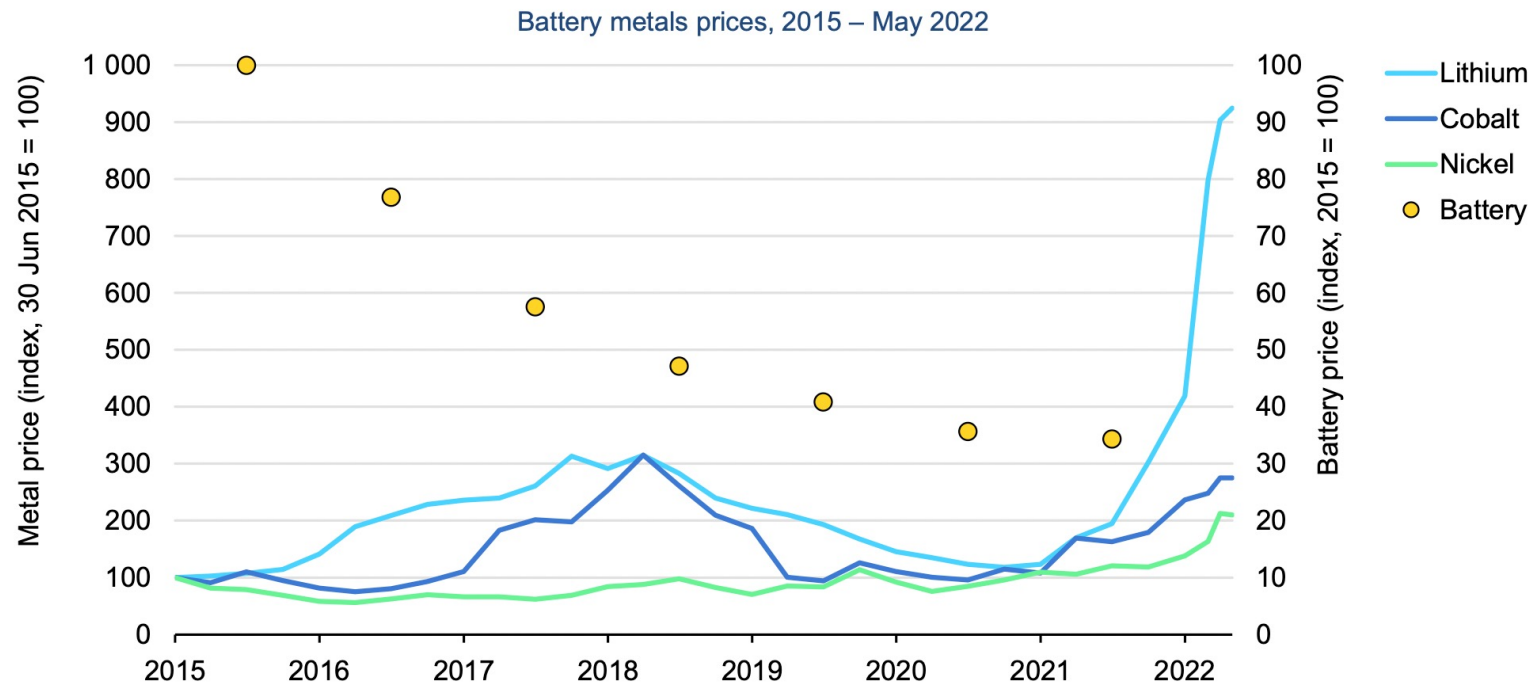
Energy Transition

8 Mart



Energy Transition Metals

Battery metal prices increased dramatically in early 2022, posing a significant challenge to the EV industry

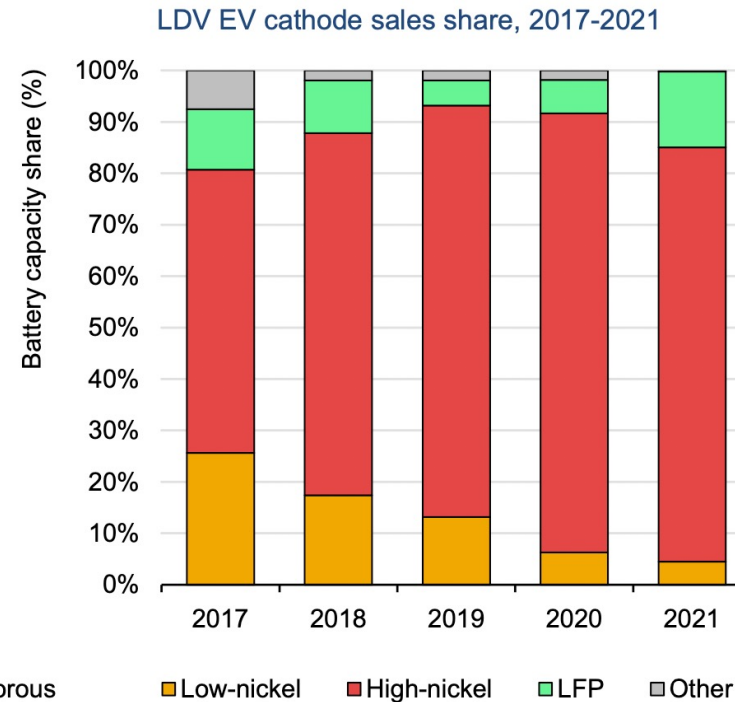
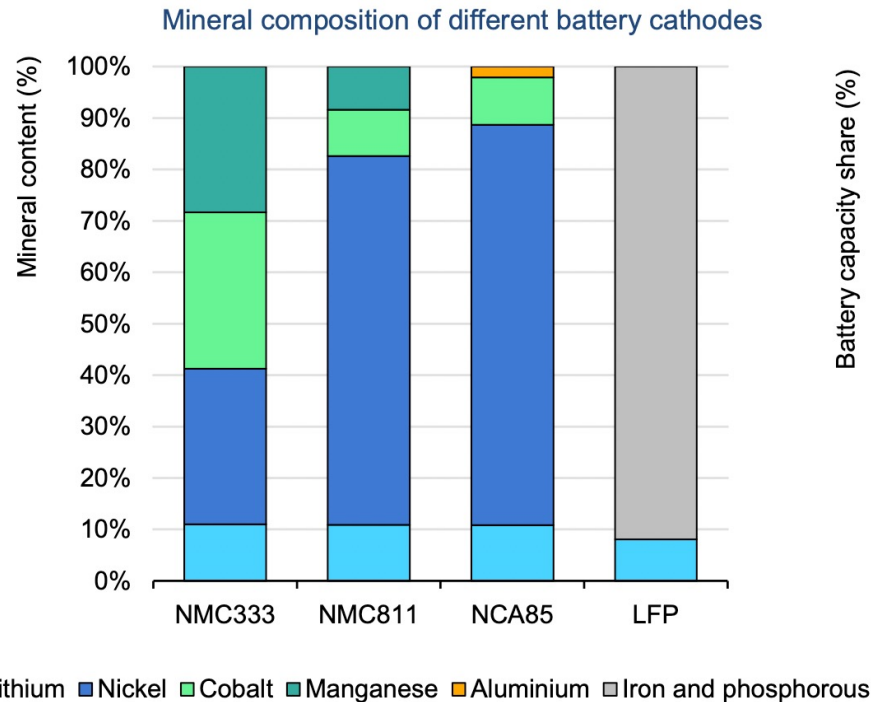


Sources: IEA analysis based on [S&P Global](#).

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Change in battery chemistry

High-nickel cathode battery chemistries remain dominant though lithium iron phosphate is making a comeback



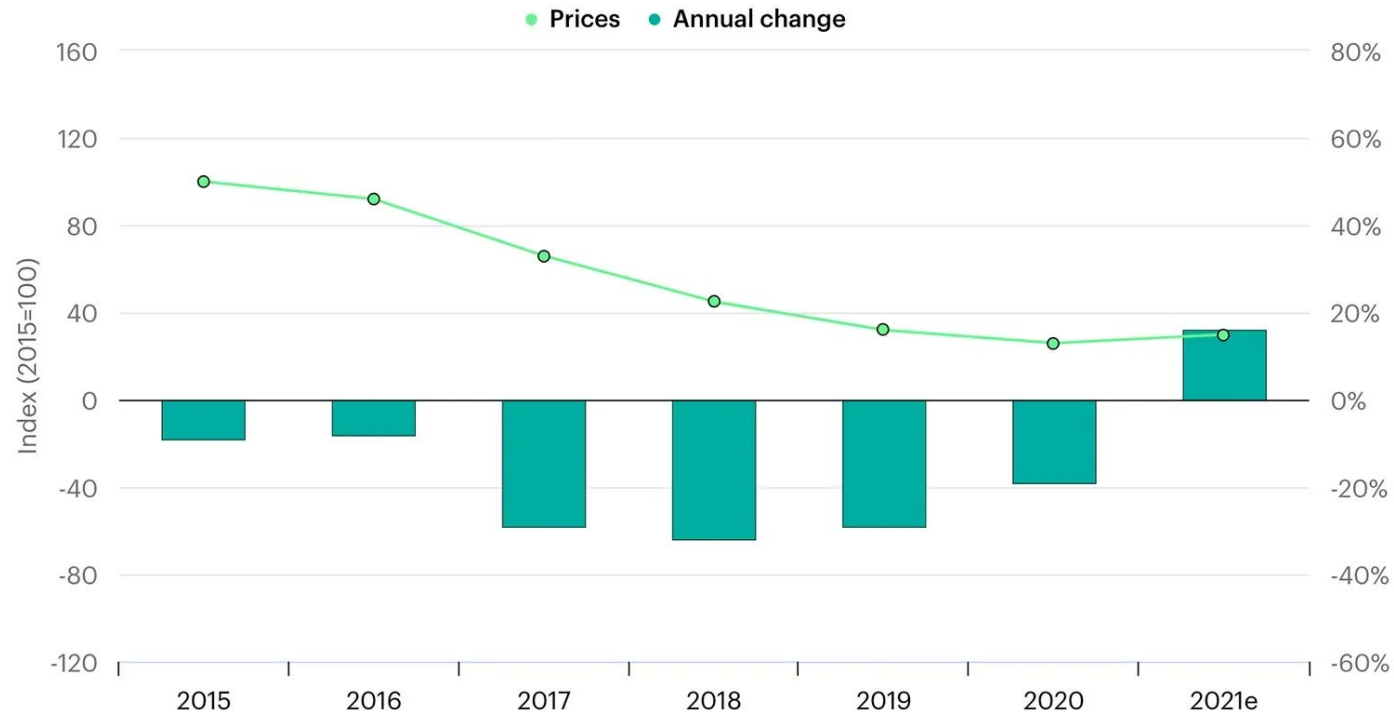
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Notes: LDV = light-duty vehicle; LFP = lithium iron phosphate; NMC = lithium nickel manganese cobalt oxide; NCA = lithium nickel cobalt aluminium oxide. Low-nickel includes: NMC333. High-nickel includes: NMC532, NMC622, NMC721, NMC811, NCA and NMCA. Cathode sales share is based on capacity. Sources: IEA analysis based on [EV Volumes](https://www.iea.org/reports/global-ev-outlook-2022).

Energy Transition

Technology cost trends for solar PV module, 2015-2021

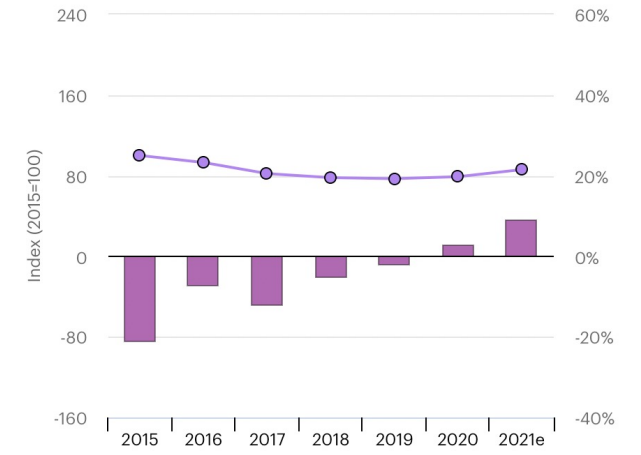
Critical minerals threaten a decades-long trend of cost declines for clean energy technologies



Note: 2021e values are estimates

Technology cost trends for wind turbine, 2015-2021

Open ↗

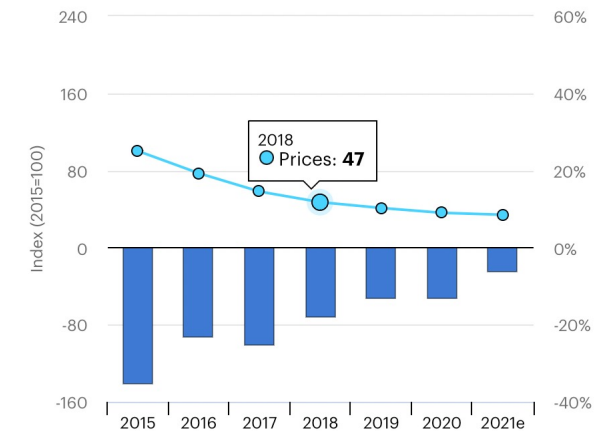


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Prices Annual change

Technology cost trends for lithium-ion batteries, 2015-2021

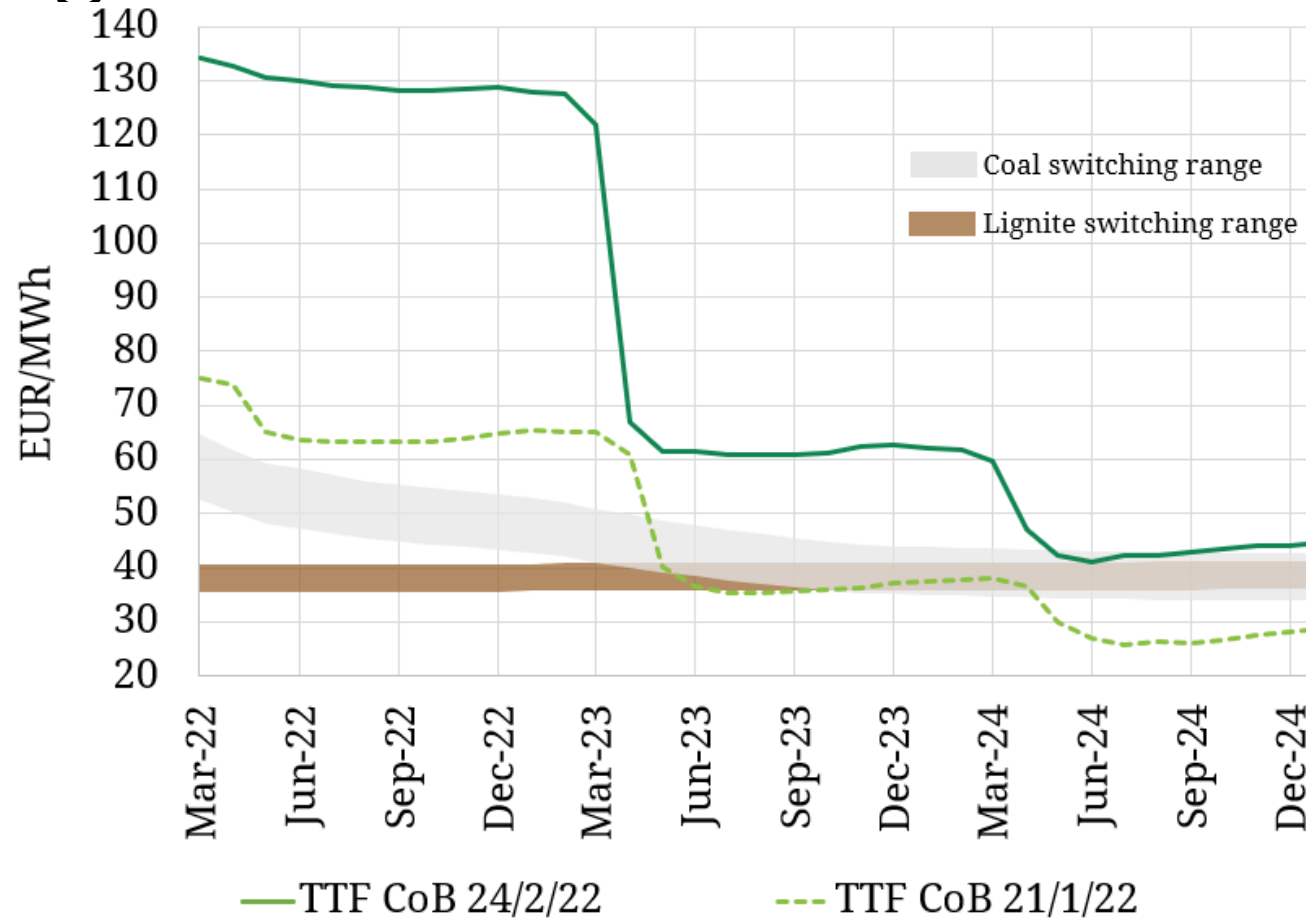
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Prices Annual change

Coal coming back?

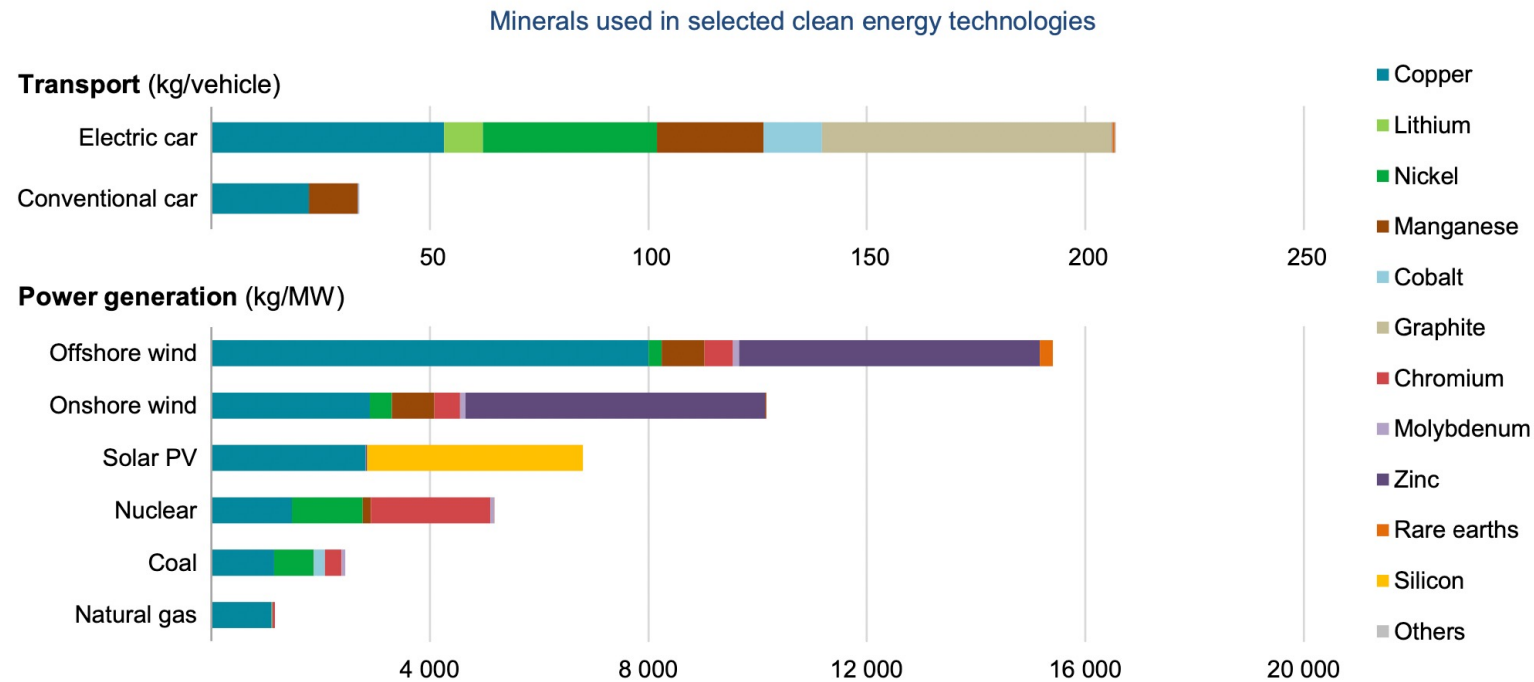


Critical Minerals

Future of physical flows

Need for minerals

The rapid deployment of clean energy technologies as part of energy transitions implies a significant increase in demand for minerals

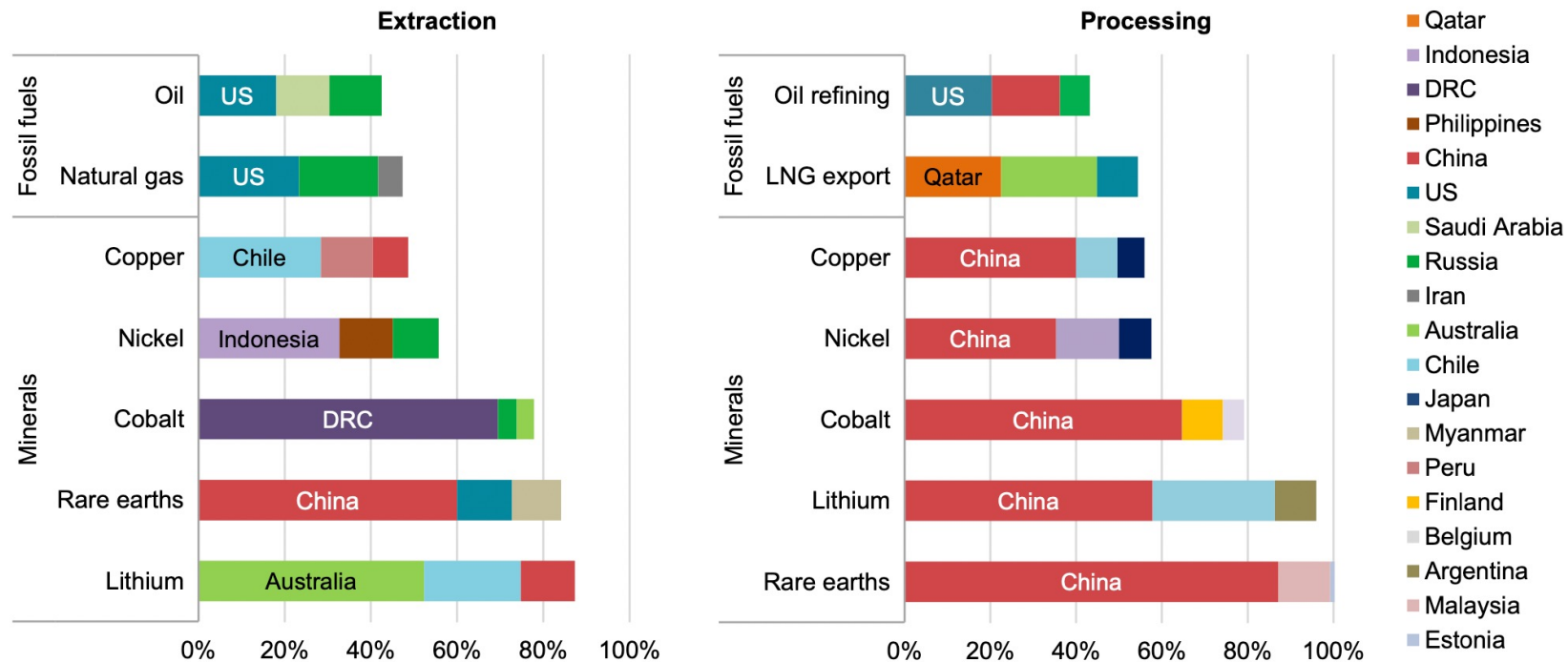


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Notes: kg = kilogramme; MW = megawatt. Steel and aluminium not included. See Chapter 1 and Annex for details on the assumptions and methodologies.

Extraction and Processing

Share of top three producing countries in production of selected minerals and fossil fuels, 2019

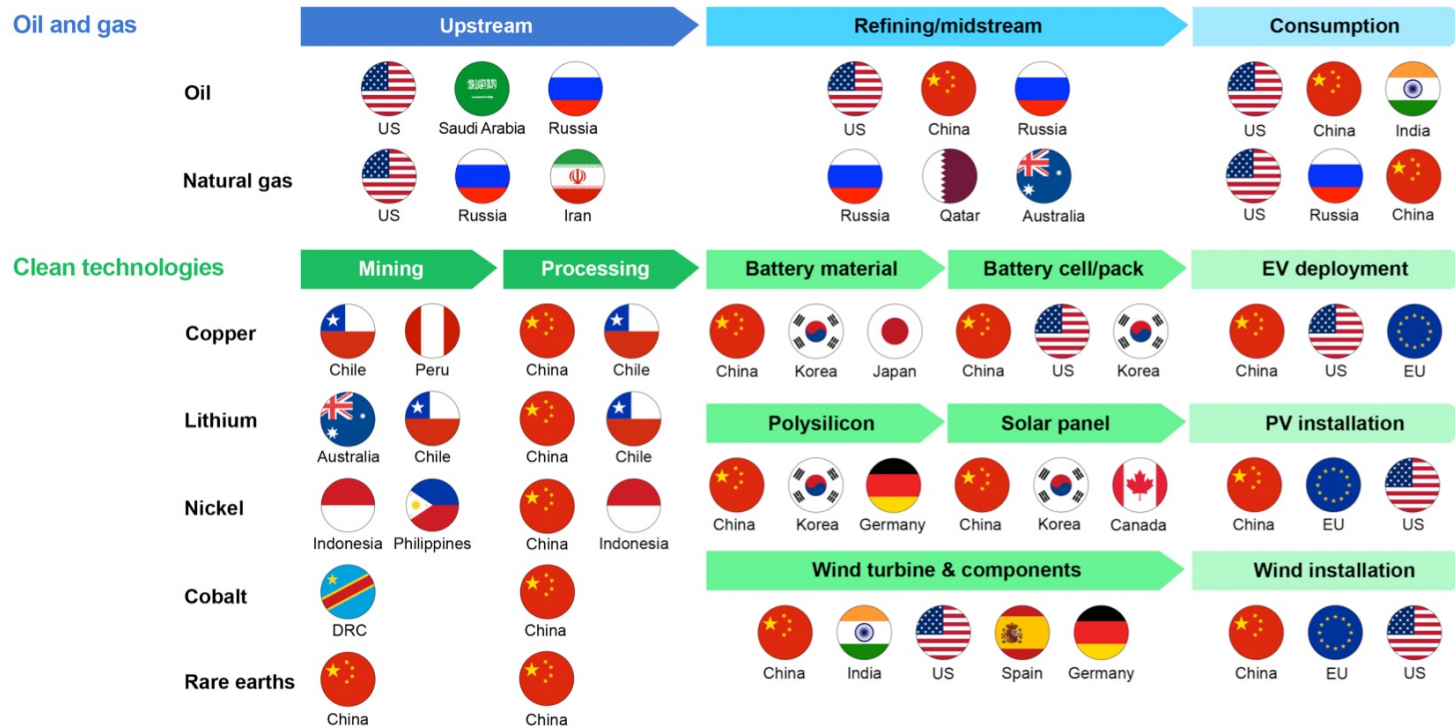


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Notes: LNG = liquefied natural gas; US = United States. The values for copper processing are for refining operations.
Sources: IEA (2020a); USGS (2021), World Bureau of Metal Statistics (2020); Adamas Intelligence (2020).

Supply Chain

Indicative supply chains of oil and gas and selected clean energy technologies



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Final Thoughts

Impacts

- Russian oil in deep discount
 - Hot potato (insurance & freight)
- Russian gas
 - Future of pipelines
- Inter fuel substitutions
 - Coal++, gas? , Electric Cars?
- New Energy Relations
 - US+OECD+EU vs China+India+Russia
- Energy Transition
 - Costs++, Efficiency vs Resiliency, Creating New Dependencies

Thank you

Bariş Sanlı

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