



Russia's invasion of Ukraine: Its impact on energy markets and lessons learned

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Russia's invasion of Ukraine in February 2022 has had a profound effect on global energy markets. Price volatility, supply shortages, security issues and economic uncertainty have contributed to what the International Energy Agency (IEA) is calling "the first truly global energy crisis, with impacts that will be felt for years to come".¹

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¹6 ways Russia's invasion of Ukraine has reshaped the energy world," World Economic Forum, Nov. 8, 2022, found at <https://www.weforum.org/agenda/2022/11/russia-ukraine-invasion-global-energy-crisis/>; "World Energy Outlook 2022," International Energy Agency, p.3, found at <https://iea.blob.core.windows.net/assets/c282400e-00b0-4edf-9a8e-6f2ca6536ec8/WorldEnergyOutlook2022.pdf>.

Agenda

- Impact of Russia's invasion of Ukraine on energy markets
 1. Changing trade flows and supply
 2. Rising energy prices
 3. Energy policy changes
 4. Impacts on renewables
- Lessons Learned

Changing trade flows and supply

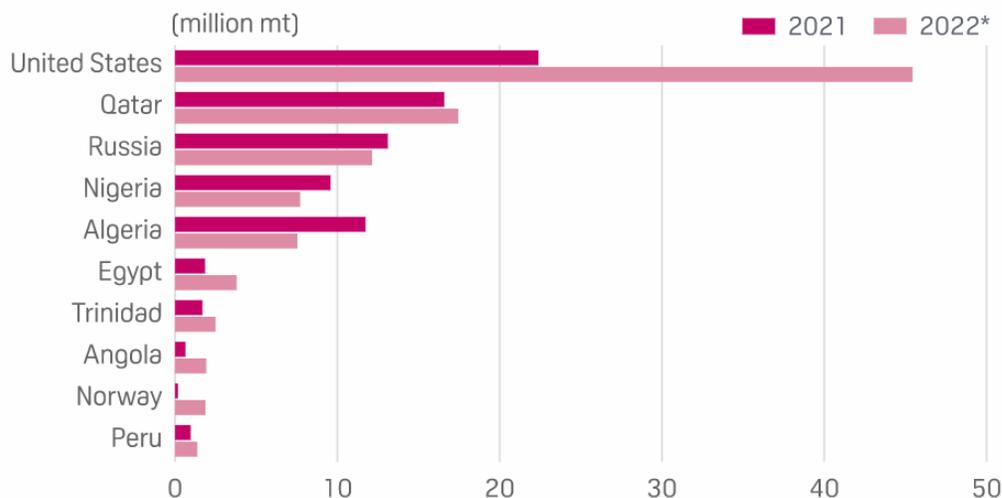
Natural gas pipeline flows from Russia to EU and Türkiye



Russia's gas exports to the EU drastically cut – by 80% between May and October 2022.

World Energy Outlook 2022, p.92.

European LNG supply sources



*2022 = Jan-Oct
Source: S&P Global Commodity Insights

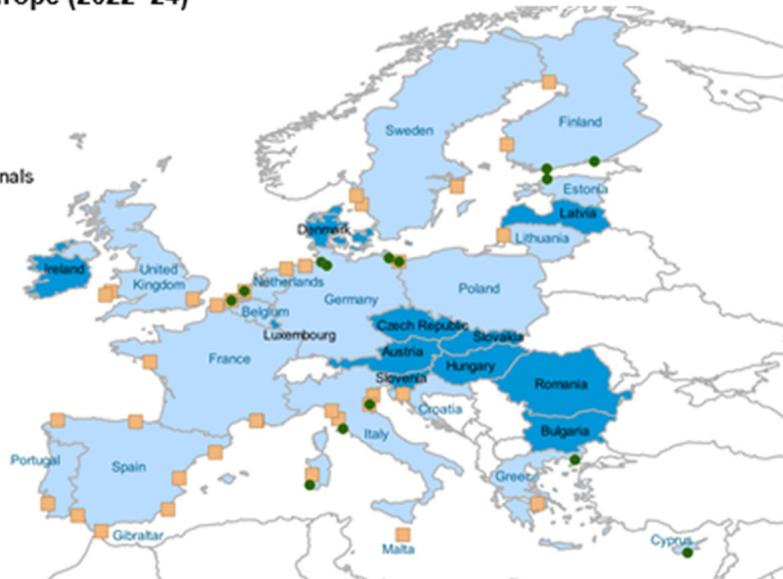
US exports to Europe increased by over 100% in 2022 as compared to a year earlier.

<https://www.spglobal.com/commodityinsights/en/market-insights/blogs/lng/102622-europe-lng-russian-gas-ukraine-war>

Europe's LNG import capacity expansion

LNG import capacity into Europe (2022–24)

- Regasification plants
 - existing
 - existing/expansion
 - under construction
- Countries
 - EU-27 and UK with LNG import terminals
 - Other EU-27 and UK

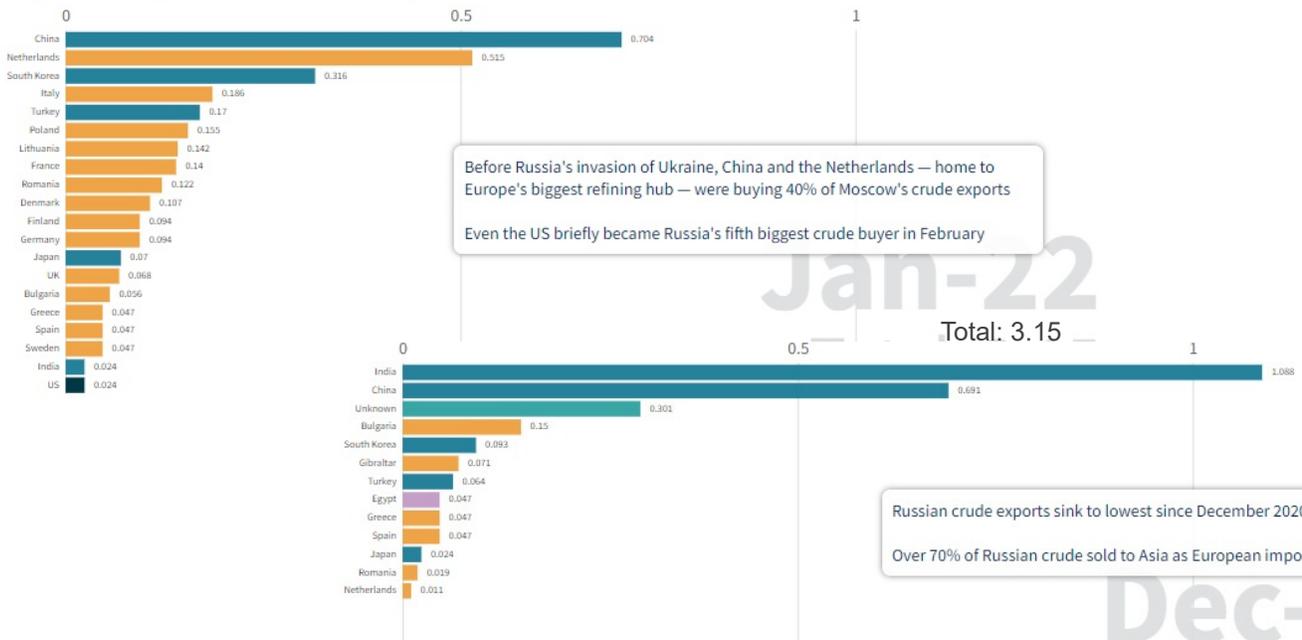


LNG import capacity expected to expand by one-third by the end of 2024.

<https://www.eia.gov/todayinenergy/detail.php?id=54780>

Russian seaborne crude exports by destination (million b/d)

Region: Asia/Oceania, Europe, Middle East, Africa, Americas



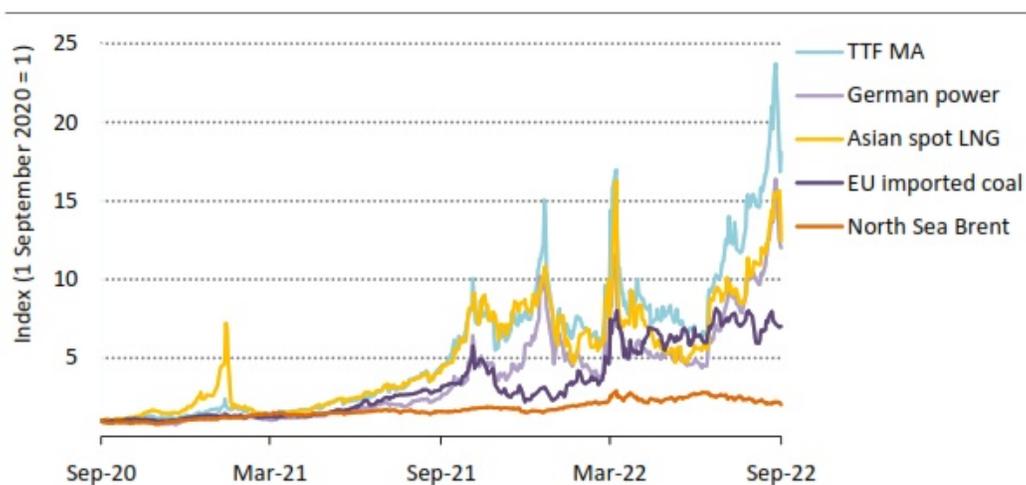
Before Russia's invasion of Ukraine, China and the Netherlands — home to Europe's biggest refining hub — were buying 40% of Moscow's crude exports
Even the US briefly became Russia's fifth biggest crude buyer in February

Russian crude exports sink to lowest since December 2020
Over 70% of Russian crude sold to Asia as European imports dry up

<https://www.spglobal.com/commodityinsights/en/market-insights/latest-news/oil/072122-interactive-global-flow-tracker-recording-changes-russian-oil-exports>

Rising energy prices

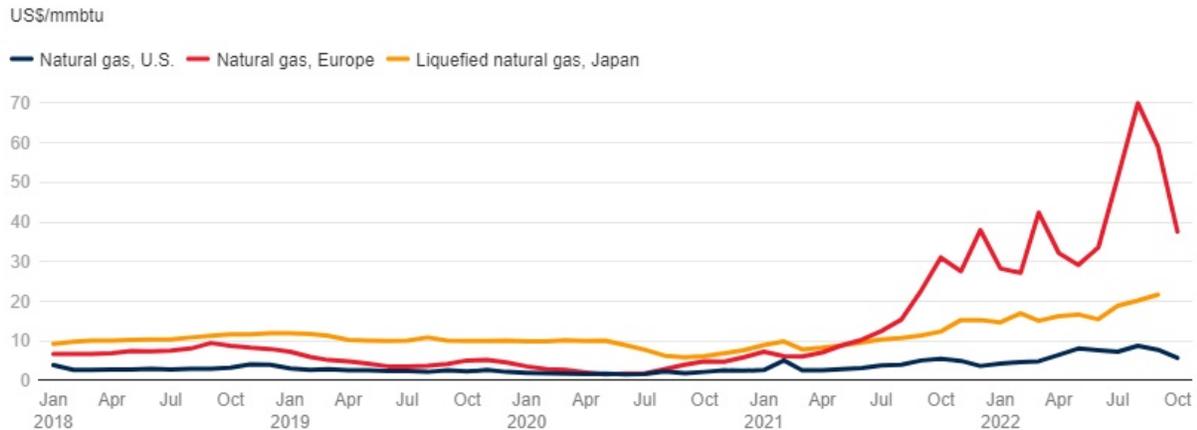
Energy price indicators for oil, coal, gas, and electricity



IEA, CC BY 4.0.

Russia's invasion of Ukraine has roiled global energy markets.

Natural gas prices in Europe, Asia and the U.S., Jan 2020-Oct 2022



Note: Monthly data, last observation is October 2022 for natural gas, EU and natural gas, US and September 2022 for LNG Japan.

Source: World Bank. • [Embed this chart](#) • [Download image](#)

<https://blogs.worldbank.org/developmenttalk/commodity-markets-outlook-nine-charts>

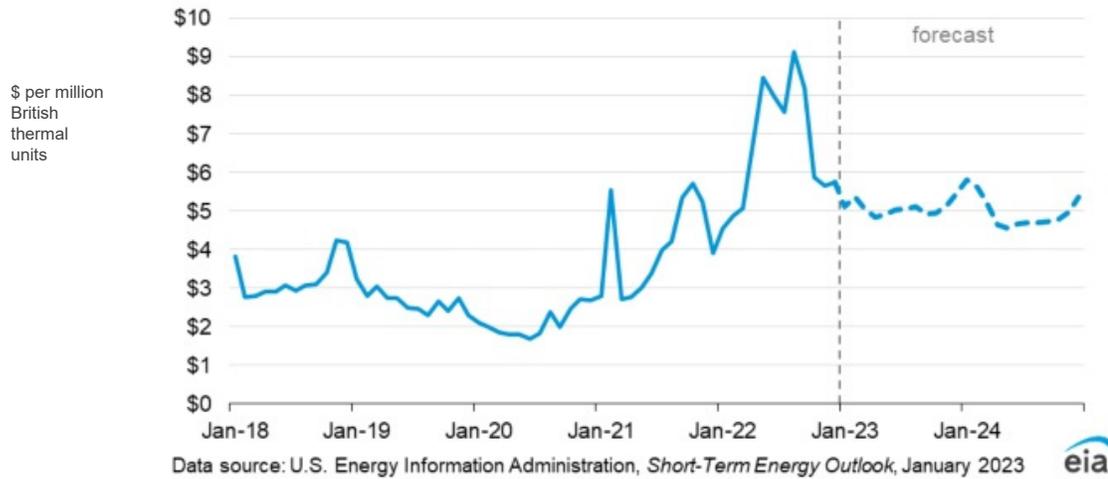
U.S. energy market indicators

U.S. energy market indicators	2022	2023	2024
Brent crude oil spot price (dollars per barrel)	\$100.94	\$83.10	\$77.57
Retail gasoline price (dollars per gallon)	\$3.97	\$3.32	\$3.09
U.S. crude oil production (million barrels per day)	11.86	12.41	12.81
Natural gas price at Henry Hub (dollars per million British thermal units)	\$6.42	\$4.90	\$4.80
U.S. liquefied natural gas gross exports (billion cubic feet per day)	10.7	12.1	12.6

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

Increases in the supply of oil and gas are expected to bring prices down in 2023 and 2024.

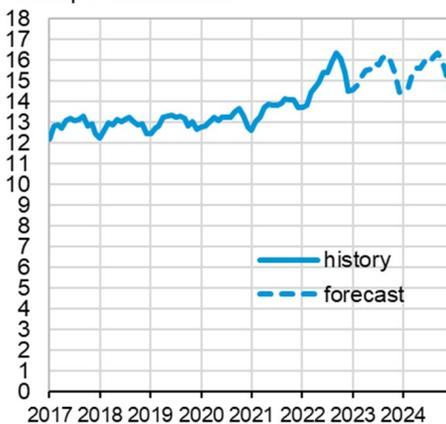
Monthly Henry Hub natural gas price



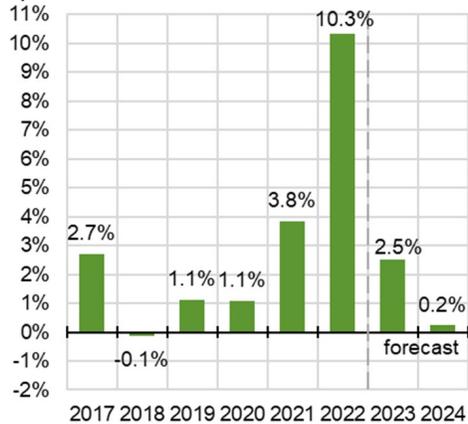
Prices expected to fall in 2023 due to continued increases in U.S natural gas production.

U.S. residential electricity prices

U.S. monthly nominal residential electricity price
cents per kilowatthour



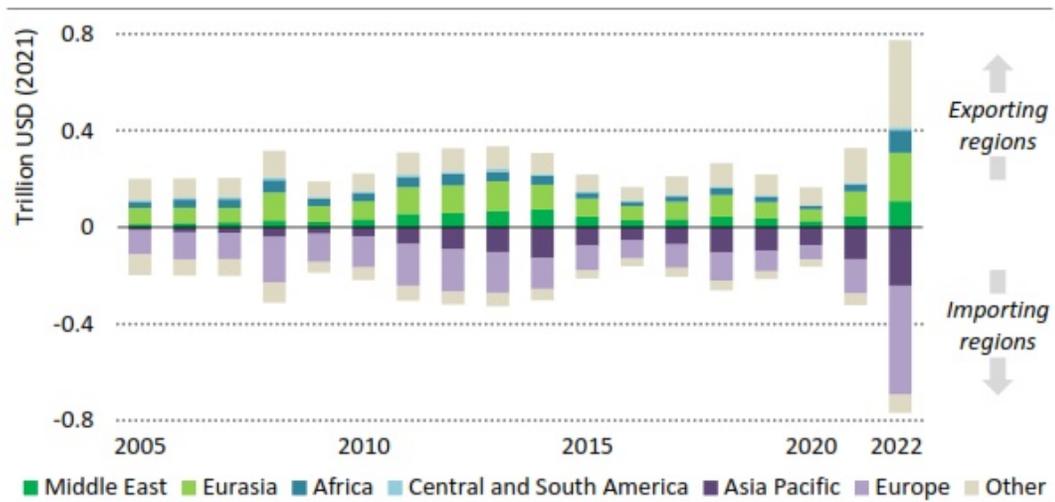
Annual growth in nominal residential electricity prices
percent



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

Residential electricity prices increased by 10.3% in 2022.

Value of natural gas trade, 2005-2022



IEA. CC BY 4.0.

In 2022 there was a massive transfer of wealth from consumers to producers.

World Energy Outlook, 2022, p.38.

Energy policy changes

Recent policy changes and announcements in the electric sector

Region/country	Policy change	Authority
European Union	Phase out coal-fired power plants in Czech Republic, Slovenia and Romania (emergency law).	Governments (January and June 2022)
United States	Inflation Reduction Act grants and tax credits for renewables, nuclear power and CCUS.	Federal government (in law August 2022)
China	New plan for Renewable Energy Development: higher targets for renewables.	National Development and Reform Commission (June 2022)
Canada	2030 Emissions Reduction Plan outlines a sector-by-sector path to reach its emissions reduction target of 40% below 2005 levels by 2030 and net zero emissions by 2050.	Federal government (June 2022)
Korea	Increase renewables in electricity generation to over 20% and nuclear power to over 30%, and decrease coal-fired power by 2030 under New Energy Policy Direction.	State Council (July 2022)
Japan	Restart nuclear power plants aligned with the 6 th Strategic Energy Plan and the Green Transformation (GX) policy initiative.	Ministry of Economy, Trade and Industry (Aug 2022)

World Energy Outlook 2022, p.291, 478.

Europe responds to U.S. Inflation Reduction Act

- Numerous countries including Britain, France, Germany, Japan, and South Korea are worried that the IRA will lure investment away from their countries to the U.S.
- Europe has responded with its own industrial policy. It will:
 - Relax rules for national funding
 - Make aid more accessible
 - Targeted subsidies will be used to set up production facilities for renewable technologies in strategic value chains
 - EU funds will be made available for member states that lack the financial resources to participate

Von der Leyen announces 'Inflation Reduction Act' plan for Europe, January 18, 2023, <https://www.pv-magazine.com/2023/01/18/von-der-leven-announces-inflation-reduction-act-plan-for-eu/>

Behavior change

Wrapping up warm

Percentage of households on a given number of days after Aug 31 who have switched on the heating



Note: Households with Tado smart thermometers
Source: Tado

Europeans have responded to government calls to reduce energy consumption.

Exclusive: Europeans dial down the heating, heed calls to save energy, January 18, 2023, <https://www.reuters.com/business/energy/europeans-dial-down-heating-heed-calls-save-energy-2023-01-18/>

Impacts on renewables

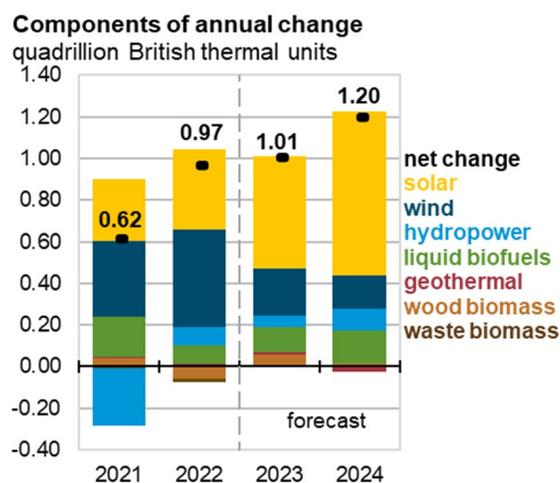
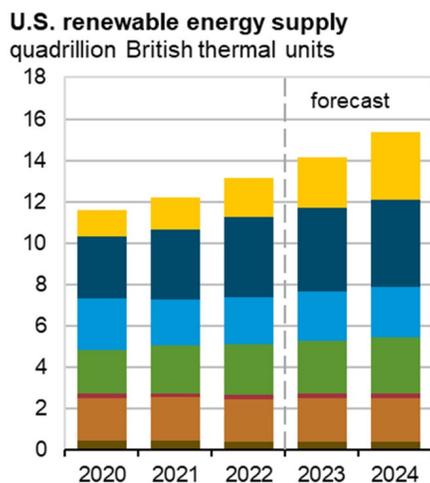
U.S. energy market indicators

Shares of U.S. electricity generation			
Natural gas	39%	38%	37%
Coal	20%	18%	17%
Renewables	21%	24%	26%
Nuclear	19%	19%	19%
U.S. GDP (percentage change)	1.9%	0.5%	1.9%
U.S. CO₂ emissions (billion metric tons)	4.99	4.83	4.81

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

Increases in the supply of oil and gas are expected to bring prices down in 2023 and 2024.

U.S. renewable energy supply



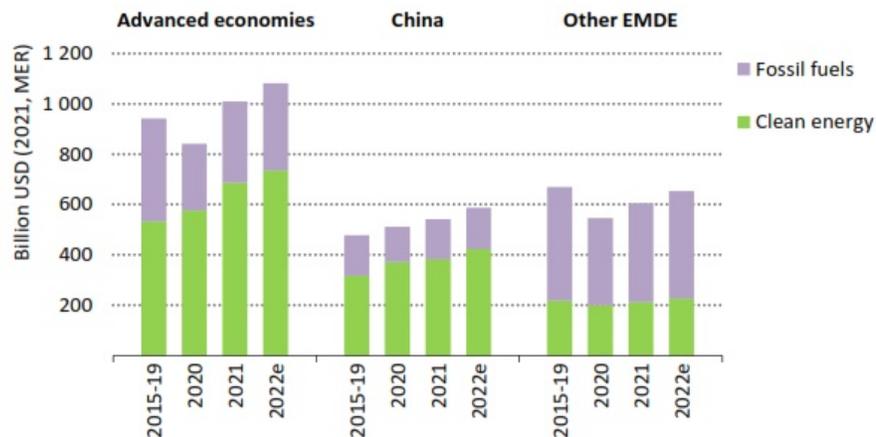
Data source: U.S. Energy Information Administration, *Short-Term Energy Outlook*, January 2023

Note: Hydropower excludes pumped storage generation. Liquids include ethanol, biodiesel, renewable diesel, other biofuels, and biofuel losses and coproducts. Waste biomass includes municipal waste from biogenic sources, landfill gas, and non-wood waste.



Solar .

Global energy investment by region



Note: EMDE = emerging market and developing economies; MER = market exchange rate; 2015-19 indicates average annual figure; 2022e = estimated values for 2022.

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High fossil fuel prices can spur investment in renewables but can also stimulate renewed investment in fossil fuel supply to address energy security.

Lessons learned

- Energy security
 - Energy can be used as a weapon of war
 - Geopolitical disruptions can threaten the availability of key inputs (such as nickel for battery energy storage)
- A greater need for resiliency through diversity of supply
 - Excessive reliance on a narrow set of sources of supply be it fossil, nuclear, or renewable increases the likelihood of crisis
- Crises are a catalyst for technological and behavioral change
 - Energy efficiency, Clean energy, Nuclear power, Demand side engagement
- Transitioning to renewables will take time and political will