FINANCING PUTIN'S WAR

Petras Katinas, 04/2024

LEVERAGING INTERDEPENDENCE:

An LNG price cap would have cut Russia's LNG export revenues by 60% in 2023

CREA
Centre for Research on Energy and Clean Air

Leveraging interdependence: An LNG price cap would have cut Russia's LNG export revenues by 60% in 2023

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The views expressed in this report are those of the authors and should not be attributed to any of the aforementioned.

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Key findings

- In 2023, 13% of the EU's LNG imports by volume were from Russia. This amounted to 17.25 bcm, excluding transshipments to non-EU Member States.
- Imports of Russian LNG accounted for 5% of EU gas consumption, showing the bloc's relatively low reliance on it. Russia, however, is heavily reliant on the EU market, which was the destination for half of all its LNG exports in 2023.
- In 2023, Russia's Yamal LNG project exported 26 bcm of LNG, 72% of which was destined for Europe. 86% of exports from the Portovaya and Vysotsk facilities (4.5 bcm) went to Europe.
- In 2023, G7+ countries retained their dominance in shipping Russian LNG. Carriers owned or insured in G7+ countries transported 93% (EUR 15.5 bn) of Russian LNG globally.
- Implementing a global LNG price cap level of 17 EUR/MWh would have slashed Russia's revenues by 60% in 2023, leading to a drop of EUR 10 bn in their total LNG export revenues. Alternatively, if only the EU imposed a price cap, Russia’s total LNG export revenues in 2023 would have decreased by 29% — a loss of EUR 5 bn.

Introduction

Russia's full-scale invasion of Ukraine and the ensuing energy crisis almost immediately underscored the European Union's energy security vulnerabilities. The EU's heavy reliance on fossil fuels, mainly those imported from a single supplier willing to exploit its position for political ends, revealed an urgent need for diversification in energy imports.

The invasion also became pivotal to the EU's energy policy as Member States swiftly reduced their dependence on Russian coal, oil, and petroleum products. Despite these efforts, Russian liquefied natural gas (LNG) imports into the EU have surged significantly since the invasion. This influx not only grants Russia considerable political leverage over EU Member States but also funds their invasion of Ukraine.

In light of these developments, the EU, which previously committed to eliminating Russian fossil fuels, must uphold its pledge by reducing Russian fossil fuel imports and ultimately severing ties with Russia. This would halt the flow of funds fueling Russia's war on Ukraine and diminish the country's sway over the EU.

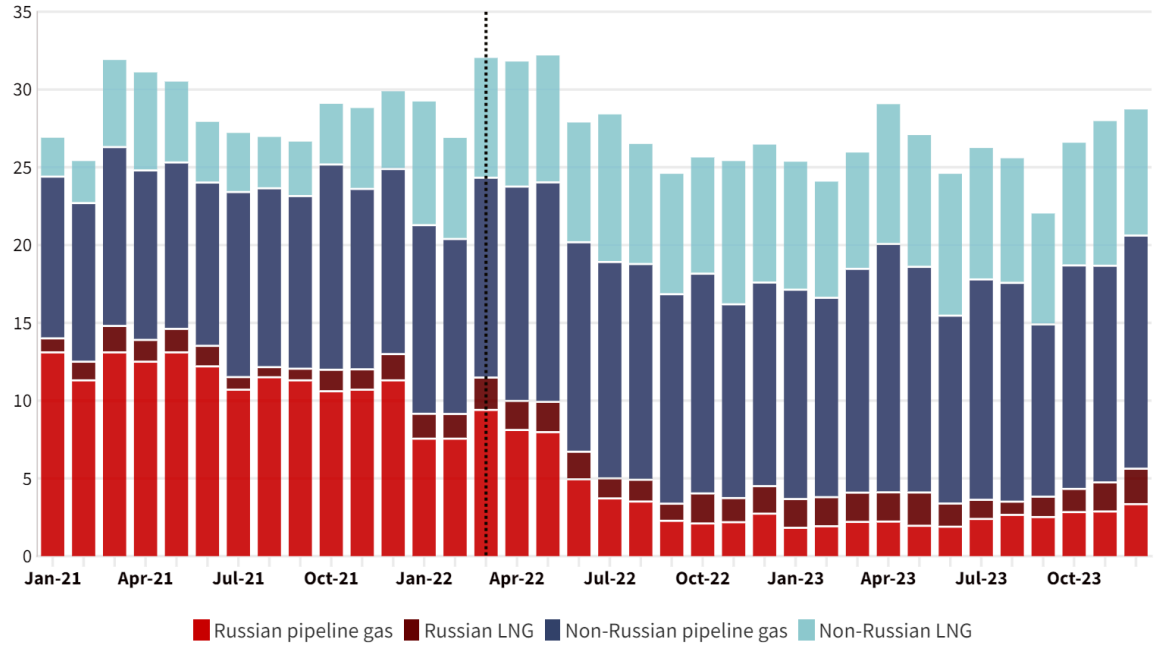
EU countries paid EUR 8.2 bn for Russian LNG in 2023

In 2021, 46% of the EU's fossil gas imports came from Russia. However, since the full-scale invasion of Ukraine, this share has fallen significantly, to 24% in 2022 and 16% in 2023, partly due to supply disruptions and coercive tactics like Gazprom's demand for payments in rubles. Supply cuts have also prompted the EU to find alternatives for fossil gas, a crucial step for diversifying supply but which led to a surge in extra LNG imports amidst the full-scale invasion.

EU's fossil gas import routes

2021-2023

Volume in billion cubic metres | bcm



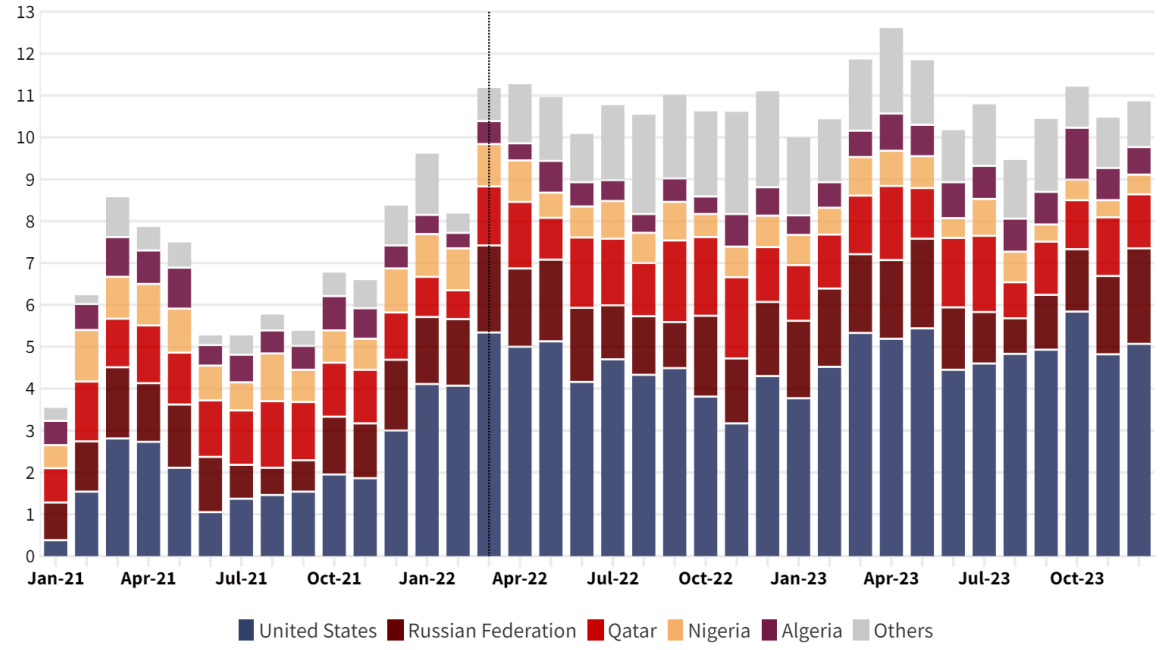
Source: CREA analysis • Dotted line represents the beginning of the full-scale invasion

In 2022, annual imports of liquefied natural gas (LNG) into the EU increased significantly by 63%, reaching 126 bcm. Imports from Russia, including transshipment, also saw a notable rise of 36% year-on-year, amounting to 20 bcm, which accounted for 15% of the EU's total LNG imports. After the United States, Russia was the second-highest exporter of LNG to Europe in 2022.

EU's monthly LNG imports by origin country

2021-2023

Volume in billion cubic meters | bcm



Source: CREA analysis • Dotted line represents the beginning of the full-scale invasion

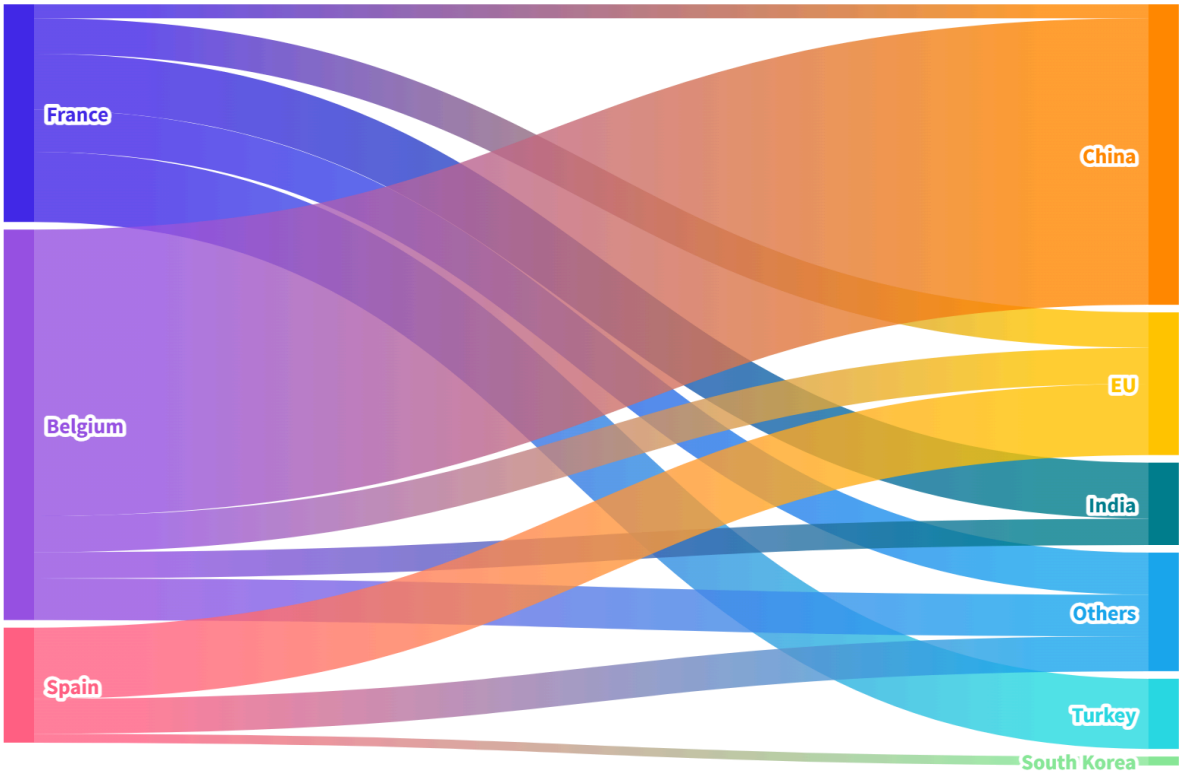
Despite tensions in the LNG market, the gas sector stabilised in 2023. EU storage facilities fulfilled the European Commission's goal to fill 90% of their capacity before the heating season. Many even exceeded it. Reduced gas consumption in most countries due to energy-saving measures and reduced demand contributed to this outcome. Meanwhile, Russian LNG exports to the EU (including transshipments) remained steady at 20 bcm, valued at EUR 8.3 bn.

Russian LNG accounted for 5% of total EU gas consumption in 2023

Acknowledging that not all EU Member States possess the physical infrastructure to import LNG is imperative. According to Gas Infrastructure Europe (GIE), only 12 of 27 EU countries had the necessary facilities for LNG importation in 2023. Moreover, it is essential to note that LNG terminals in certain countries do not automatically imply that the imported gas is exclusively consumed within those countries. LNG can be regasified and transported via pipelines to other EU countries or transshipped, where the LNG is unloaded and re-exported in liquid form to another destination.

A portion of Russian LNG imported into the EU bypassed its gas system and was transshipped to other global destinations. It was made possible due to long-term contracts between Novatek and EU companies. While most transshipped gas did not enter the EU gas system, it enabled Russia's access to global markets, particularly in the Asia-Pacific region. CREA analysis found that 22% (4.4 bcm) of the EU's Russian LNG imports were transshipped globally, with 8% (1.6 bcm) going to EU Member States in 2023.

Russia's LNG Transshipment Destinations
January-December 2023
Volume in billion cubic meters | bcm

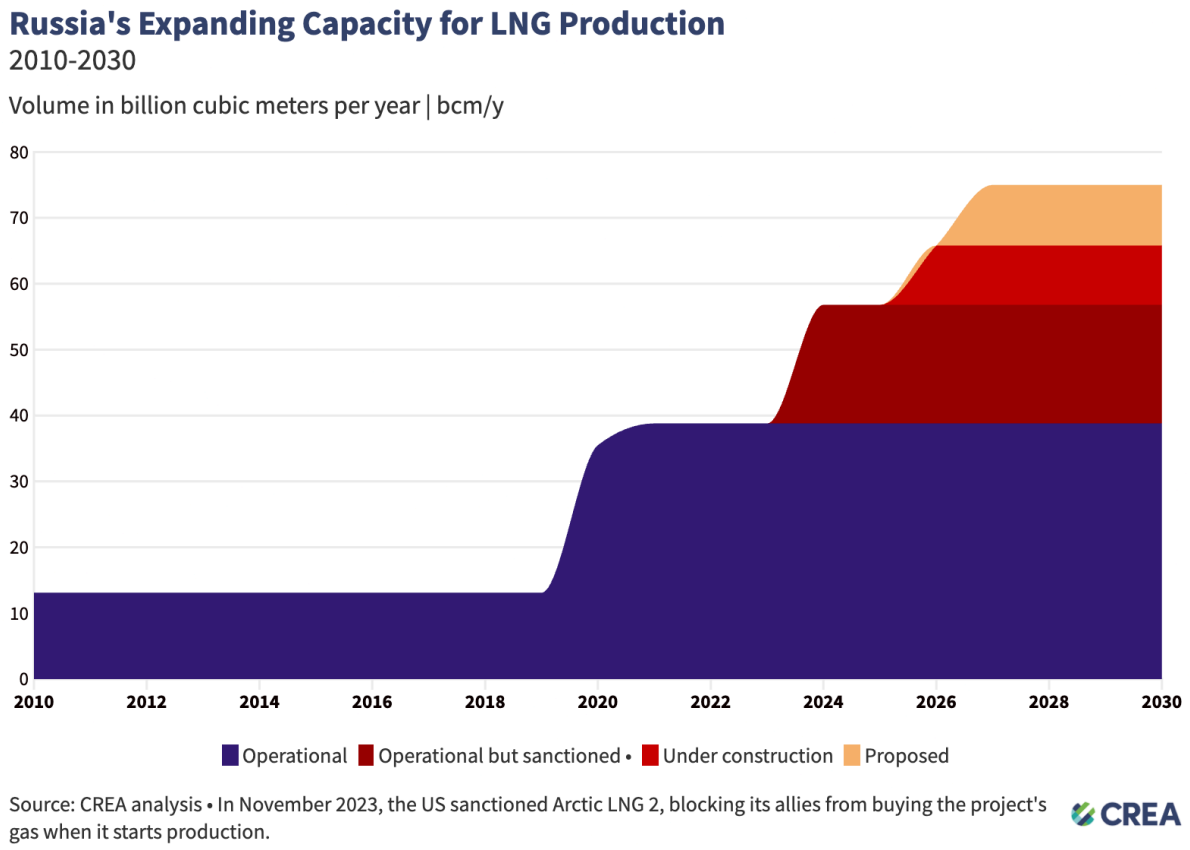


Source: CREA analysis

Excluding Russian LNG transshipments to non-EU Member States, 17.25 bcm of Russian LNG reached the EU gas system in 2023. This volume represents 13% of the EU's total LNG imports and 5% of the total gas consumption.

The challenges for Russia's aim to double LNG production by 2030

Even before their full-scale invasion of Ukraine, expanding LNG production was a focal point of Russia's energy policy. Government documents indicate that the country's priorities lay in liberalising and expanding the LNG market — particularly in the Arctic — with a desire to tap into its vast fossil gas reserves, estimated at 85 trillion cubic metres. Russia hopes to more than double its current liquefaction capacity (40 bcm), to 94 bcm by 2030, with ongoing projects set to boost capacity to 60 bcm by 2026. Russia has eased taxation norms to attract potential investors, suggesting they could exempt investors from export duties (ED), mineral extraction tax (MET), etc.



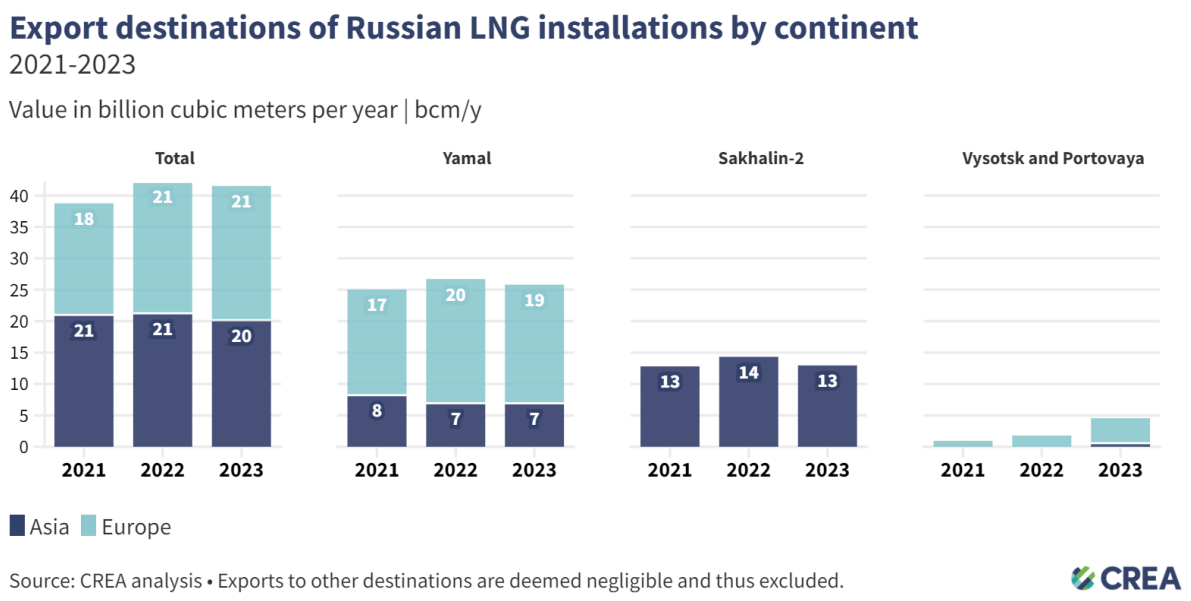
Multiple factors are driving this expansion of LNG production. Russia has openly declared its strategic objective of capturing a larger global LNG export market share, chasing

heightened export revenues. Moreover, the expansion of LNG facilities serves as a crucial means to supply gas to remote regions in Russia that are otherwise difficult to access. Additionally, significant shifts in the geopolitical landscape have led to Russia losing a considerable portion of its strategic and premium European gas market.

Russia's LNG projects remain focused on European markets

Historically, Russia predominantly exported natural gas to Europe via pipelines. In 2009, Gazprom inaugurated its first LNG terminal, Sakhalin-2, located in the Russian Pacific, focusing on expanding into Asia's LNG market. In 2018, Russia established the Yamal LNG facility in the Arctic, which, along with smaller installations in Vysotsk and Portovaya, primarily targeted European markets — a trend that persisted into 2023.

The Yamal facility is Russia's largest LNG project, and the vast majority of its output has been directed towards European markets. In 2023, out of the 26 bcm of LNG exported from Yamal, 72% was destined for Europe, while the remainder was exported to Asia. The combined LNG exports from Portovaya and Vysotsk amounted to 4.5 bcm, with 86% directed to Europe.



Russia's reliance on European markets extends beyond meeting the heightened LNG demand in Europe or offsetting losses incurred from disrupted pipeline gas supplies.

Europe's geographical proximity, compared to Asia, is one factor that explains Russia's dependence on this market. The location of LNG facilities and transport services provided by European countries significantly shape Russia's export strategies. This also underlines the EU's leverage to control and restrict Russia's revenues from LNG exports provided European policy makers use the tools at their disposal.

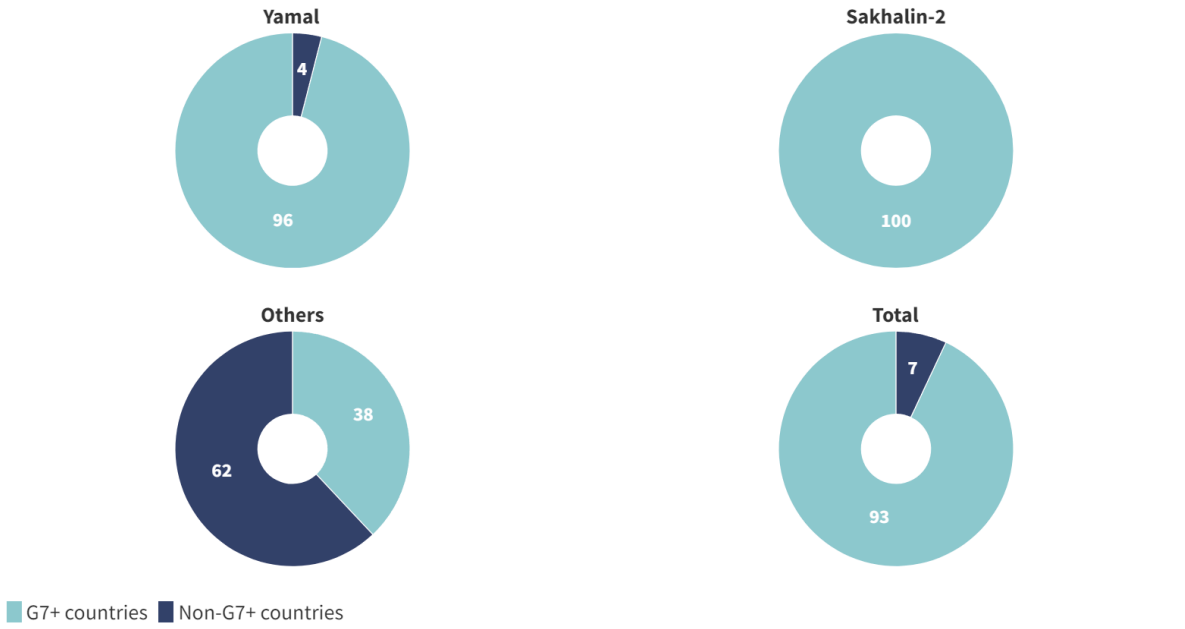
The G7+ maritime industry handles 93% of Russia's LNG exports

Russia's reliance on the European LNG market extends beyond proximity. The reliance is also based on their global LNG shipping needs, which depend on cargo insurance availability and a limited supply of LNG-carrying vessels — a shortage Russia is grappling with. In 2022, carriers owned or insured in G7+ countries[1] transported 96% of LNG shipments from Russia. In 2023, despite a slight decrease to 93%, G7+ countries retained significant control over the shipping of Russian LNG, facilitating the transport of Russian LNG valued at EUR 15.5 billion.

[1]'G7+' refers to the G7 countries, EU member states, Australia, Norway, and Switzerland.

Russian LNG shipments by vessel ownership and insurance
January-December 2023

Value in percent



Source: CREA analysis

Russia is almost entirely reliant on LNG tankers from G7+ countries. According to the 2023 World LNG Report by the International Gas Union (IGU), the global LNG fleet comprised 668 vessels. In 2023, Russian LNG exports were facilitated by 101 LNG carriers, constituting approximately 15% of the global LNG fleet. Concurrently, Russian entities possess, oversee, or hold a stake in 49 carriers with a total cargo volume of 4 bcm, including two sanctioned floating storage units (FSU) and one floating storage regasification unit (FSRU), representing 7% of the globally traded LNG.

The analysis shows that Russian LNG exports heavily depend on third-country-owned vessels and European insurance, which provides substantial leverage to impose sanctions on this commodity from Russia.

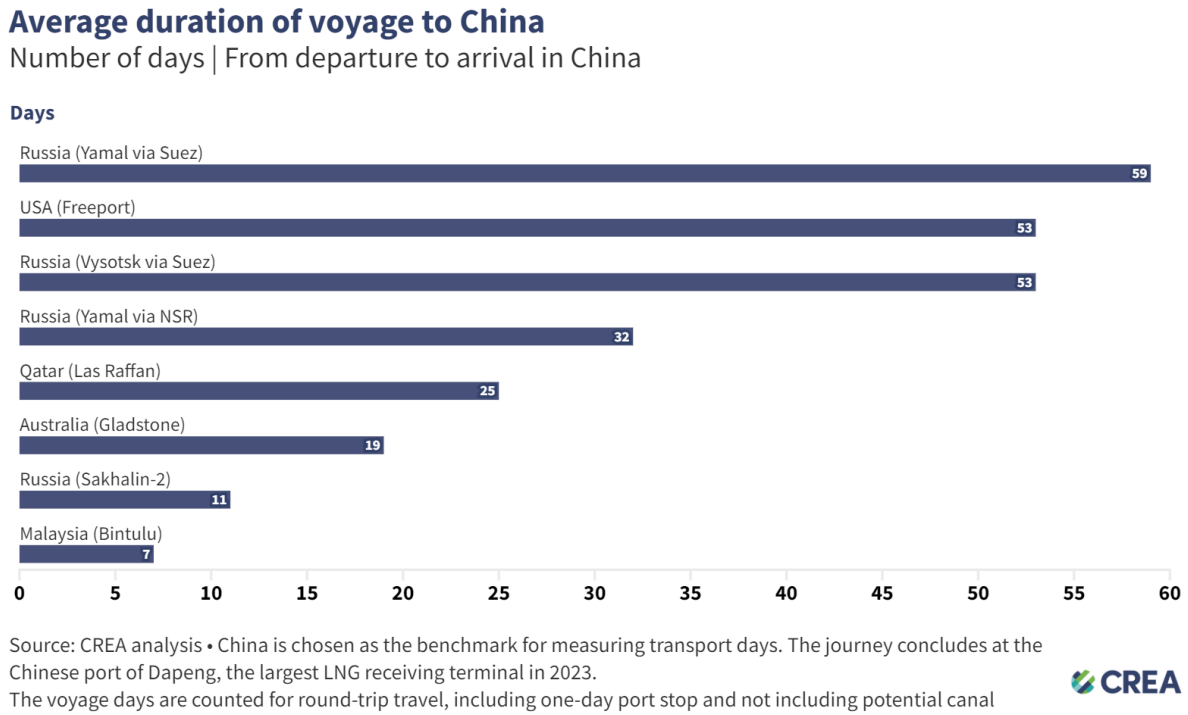
Redirecting LNG to Asia poses significant logistical challenges

Three of Russia's four primary LNG projects are situated in the European half of the country, naturally connecting them to European markets. Shifting the export direction from West to East for these projects would pose significant logistical challenges.

Russia has two main options for rerouting its LNG exports from European to Asian markets. The route via the Suez Canal is more protracted and expensive, potentially making it less appealing than routes from other competing LNG exporting countries. If Russia redirected shipments from the Yamal and Baltic Sea LNG facilities to Asia via the Suez Canal, the round-trip duration would be double that of their chief competitors — Qatar, Australia, and Malaysia.

The extended trip could make Russian LNG less attractive to Asian buyers. Buyers usually prefer LNG from geographies in closer proximity, like Qatar, Australia, and Malaysia. Faster shipping and lower costs make imports from them more appealing.

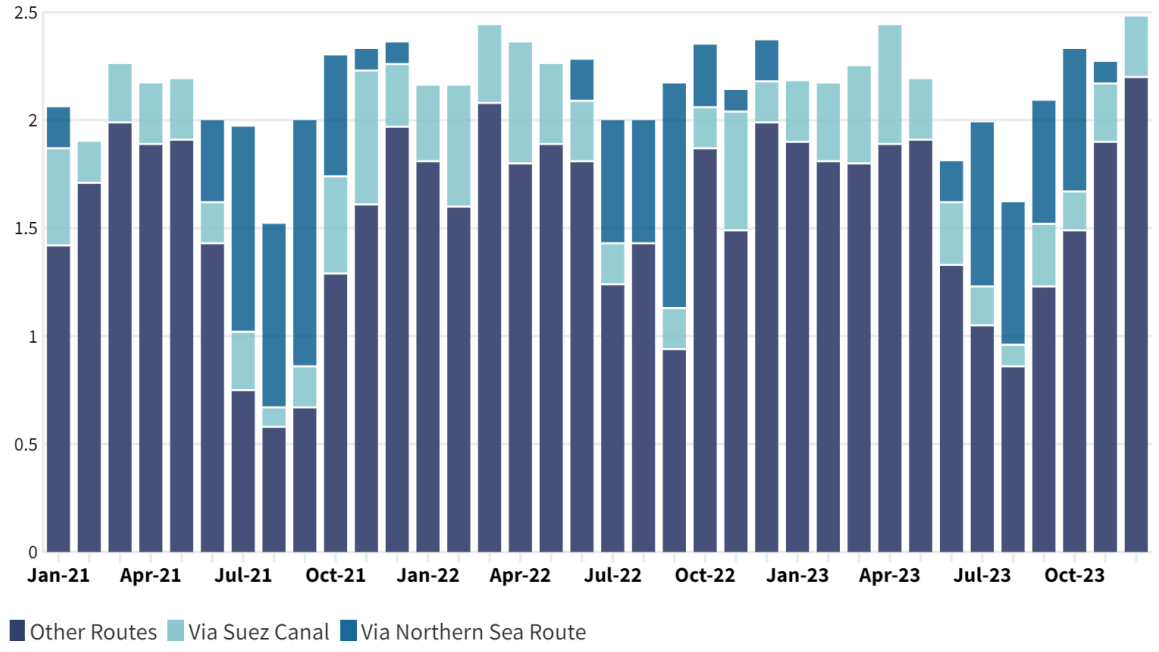
LNG exports from Yamal and installations in the Baltic Sea could be directed via the Northern Sea Route (NSR), a shorter path, to enhance their attractiveness for the Asian market. Nonetheless, the transit time for LNG exports from Russia to China remains considerably longer than average voyages from countries like Australia or Malaysia, whose primary market is Asia.



Utilising the NSR for Yamal LNG to reach Asia comes with its own set of obstacles. Firstly, seasonal constraints limit its operational window to June-December. To tackle NSR seasonality, Russia requires special Arc-7 ice-class LNG carriers. CREA analysis found that currently Russia has connections to 15 Arc-7 ice-class carriers whose combined capacity is 1.48 bcm per round-trip voyage.

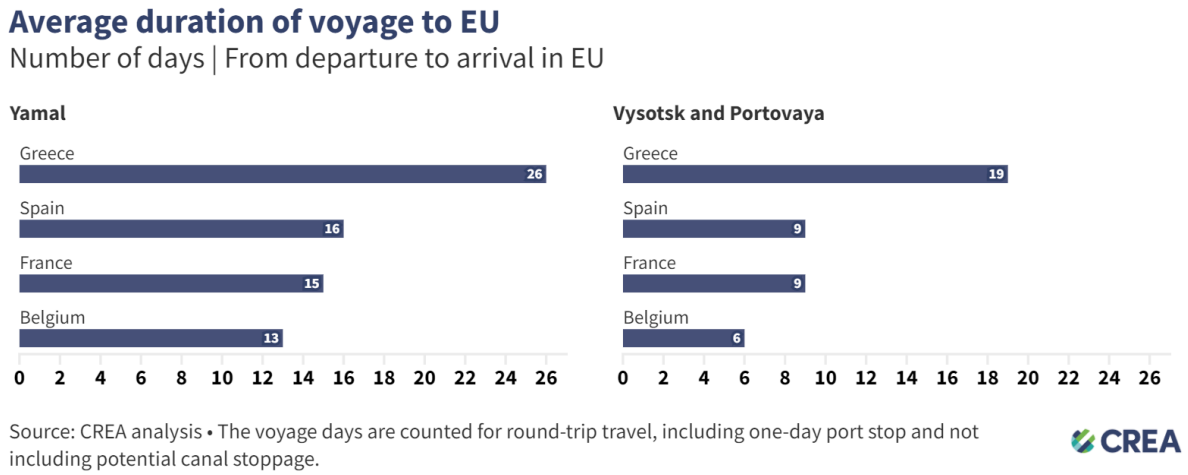
LNG exports from Yamal installation by sea route
2021-2023

Volume in billion cubic meters | bcm



Source: CREA analysis

This capacity adequately meets the needs to transport LNG to Europe and is complemented by other LNG carriers. However, the distances to European markets via the NSR are shorter compared to Asian markets. This proximity to Europe helps Russia maximise its profits from the European market, which would be hard to replace with sales to Asian markets and require greater access to LNG tankers for transportation of longer routes.



However, if Russia were to reverse its total exports to Asia via NSR, it would need to export approximately 30 bcm to Asia from all installations in the European part of Russia. Considering that one round trip to China via NSR takes about one month[2], these ships can transport up to 18 bcm per year. The existing number of Arc-7 ice-class tankers that Russian exporters have access to would likely be unable to move all their cargo to Asia via the NSR.

Conventional LNG carriers typically boast a capacity of 2.5 billion cubic metres per voyage. However, due to seasonal limitations and their technical capabilities, these vessels would likely have restricted access to the Northern Sea Route (NSR), necessitating LNG transportation to Asia via the Suez Canal. Theoretically, these conventional LNG carriers could export the remaining 12 bcm of Russian LNG from Europe to Asia. However, the associated transport costs would be considerably higher, compelling Russia to offer significant discounts to attract Asian buyers.

As a result, maximising LNG diversion from Europe to Asia is essential to hit Russia's export revenues. With the current capacity of the Russian fleet, the Sakhalin-2 facility would rely on ships from other countries for exports. Additionally, the currently sanctioned Arctic LNG-2 facility would only be serviced with additional bookings of Arc-7 ice-class carriers, which might not be completed and delivered due to sanctions affecting payment processing.

[2] Assuming ice thickness does not exceed 2.1 metres and is navigable by Arc-7 ice-class LNG carriers, eliminating the need for an additional icebreaker.

Policy recommendations: Leveraging G7+ influence to limit Russian LNG revenues

The reliance on G7+ services provides Ukraine's allies significant leverage in regulating Russian LNG prices and introducing a price cap. Russian LNG exporters would be compelled to sell at the capped price or at a discounted rate to access insurance services offered by G7+. Such a proposition would ensure a consistent flow of LNG to importing countries, prevent abrupt spikes in natural gas prices, and diminish Russia's revenues from this commodity.

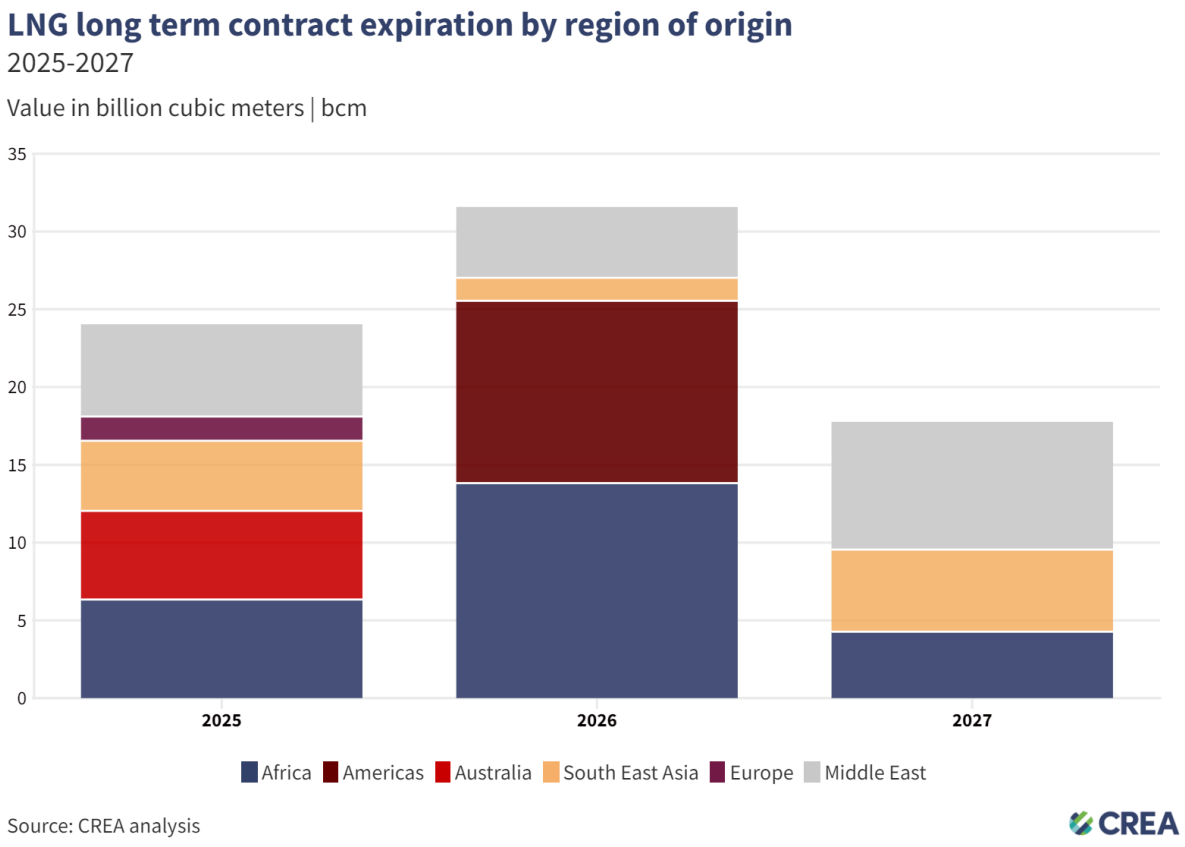
According to Russian government sources, the cost of LNG production in Russia varies between 12 and 22 EUR/MWh (Megawatt-hour), depending on the facility. The Moscow International School of Management estimates production costs at the Yamal facility to be approximately 15 EUR/MWh, including transportation.

CREA's policy recommendations are:

- **Implement an LNG price cap policy at the price cap level of 17 EUR/MWh, which exceeds Russia's estimated average production cost but also serves as a deterrent against them significantly reducing exports.** According to CREA's calculations based on 2023 values, applying the suggested price cap globally would have cut Russia's total LNG export revenues by 60%, equivalent to EUR 10 bn, while only enforcing it within the EU would have reduced Russia's total LNG export revenues by 29%, resulting in a drop of EUR 5 bn.
- **We propose introducing a global price cap on Russian LNG without setting an expiry date for it.**
- When implementing a price cap, it is necessary to account for recent European natural gas price trends. Establishing a price cap below the LNG market rate might encourage traders to acquire more Russian LNG — due to the price difference between the cap and the market price. It could potentially result in an uptick in Russian LNG imports. **To address the risk of an increase of Russian LNG imports by the EU, Member States should be subjected to an import cap that limits their Russian LNG imports to no higher than their average annual imports for the**

last three years (2020-2023). This import cap would be in addition to the price cap and would apply only to EU countries.

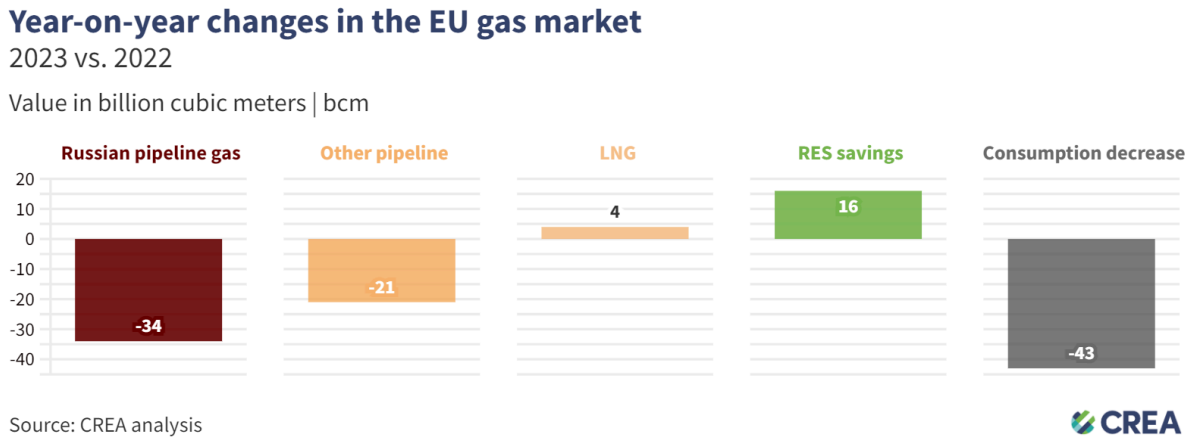
- **We propose that Russian LNG is prohibited from being resold and must be used solely to meet the importing country's fossil gas needs.**
- **CREA proposes that the EU price cap is introduced immediately, until the end of 2027 — the end date of a complete phase-out of Russian gas.** This timeline is driven not solely by the RePower EU initiative but also by an anticipated increase in global liquefaction capacity and the expiration of several non-Russian long-term contracts, offering countries opportunities to explore alternative supply sources.



- According to CREA's analysis based on data from the International Group of Liquefied Natural Gas Importers (GIIGNL), a significant increase in global LNG liquefaction capacity and supply will be expected between 2025 and 2027. An estimated 73 bcm will become available globally upon the expiration of long-term contracts. Around 43 bcm of this supply is strategically located in regions with

convenient access to the EU, like Africa and the Middle East. The most significant chunk of LNG currently supplied via contracts, about 24 bcm, will expire in 2025, with roughly 12 bcm coming from Africa or the Middle East.

- **CREA also suggests a ban on transshipment services for Russian LNG.** This policy would not affect consumers in importing Member State countries. It would specifically prohibit imports of Russian LNG to European ports that would then be re-exported to non-EU destinations. This ban would prevent Russia from logistically benefiting from EU facilities to unload LNG and re-export to other non-EU destinations. Additionally, it would delay the export of Russian LNG to Asia, increase shipment costs, and pressure Russian LNG traders to offer gas at a more significant discount, thus lowering the revenue that finances the invasion of Ukraine.
- **Furthermore, we strongly recommend that EU Member States prioritise investments in renewable energy.** This strategic approach would decrease dependence on third countries for energy and bolster EU energy security. CREA's analysis shows that additional power generation from solar and wind in 2023 resulted in significant savings of 16 bcm of gas and EUR 6.4 bn.



Methodology

Transshipments: Countries importing LNG may re-export it to destinations within or outside the EU or transfer the goods at or near ports via ship-to-ship (STS) transfer. We developed our modelling approach to exclude transhipped Russian LNG using the information on spot purchases or long-term contracts with specific countries. Where we do not have this information available for specific countries, we assume that, of the total gas re-exported, the proportion of Russian gas transshipped is equal to that of Russian gas imported. Data on LNG exports is based on Kpler data.

Pricing: CREA used data from Kpler on LNG transported volumes and applied CREA's pricing model to calculate the value of Russian LNG exports. Fossil gas prices are also calculated using the CREA pricing model. Fossil gas is sold via various contracts, including fixed-price, indexed to average gas prices, and other spot prices. This means that the revenue to the exporter is not directly proportional to the current spot price. To estimate prices of fossil gas trades, we first derive the historical monthly average prices for imports from Eurostat and UN COMTRADE data since the trade values are indicated in physical and monetary terms. We then fit models between these historical prices and average monthly spot prices (for a range of fossil commodities and time lags) for the given month to provide estimates of exported gas prices. More detail on CREA's gas price model can be seen here.

Shipment days of travel: We use the Kpler freight calculator to calculate the travel days of a voyage. To determine the average duration of an LNG voyage, we consider an LNG tanker with an average laden speed of 19 knots and a ballast speed of 16 knots. The journey is calculated as a round trip, including one day in port. This assumption is conservative, as ships often spend more than one day in port, potentially extending the voyage duration. Berthing in channels is separate from the calculation of the days of travel. In calculating the journey to Asia, particular emphasis is placed on the voyage to China's Dapeng port. This port is significant as it was the largest LNG importing port in China in 2023, and it facilitates a precise comparison of distances among various LNG exporters worldwide.

LNG price cap: We simulated the potential impact of imposing a price cap on Russian LNG exports in 2023. The effect has been calculated as the total difference between CREA's estimated EUR value of each LNG shipment from Russia and EUR value if the goods were

sold at the set price cap level. This model assumes that the price cap would have impacted all LNG exports from Russia.

Gas-fired power generation is assumed to have an average net thermal efficiency of 50%. Therefore, an electricity output of 1 MWh implies 2 MWh of gas demand. To convert a million tonnes (MT) to cubic metres of LNG, we use the formula MT*2.28 = 1 m^3 of LNG. CREA analysts use the conversion factor between cubic metres of LNG to bcm based on Gasunie metrics.

Gas price units: The prevailing convention for energy production price is in USD/MMBtu (Million British Thermal Units). To convert these prices to EUR/MWh, a standard conversion ratio of 1 MWh to 3.412 MMBtu is applied. The currency conversion is based on the 2023 average exchange rate of 1 USD = 0.9243 EUR.

Data sources: Information regarding Russia's LNG capacity, production, or breakeven cost has been gathered from multiple sources, including the Moscow Management Institute, ARC Energy Research Institute, the Energy Strategy of the Russian Federation to 2035, the Strategy for the Development of the Russian Arctic Zone, the Long-term Programme for the Development of Liquefied Natural Gas Production in the Russian Federation, and Novatek presentations.

CREA collected publicly available information and used data from the International Group of Liquefied Natural Gas Importers (GIINGL) and the International Gas Union (IGU) to analyse long-term contracts and the shipping industry.

Definitions

This analysis employs the terms 'Europe' and 'EU'. 'Europe' refers to countries within the European Union, the United Kingdom, Norway, Switzerland, and Turkey. On the other hand, 'EU' pertains explicitly to the European Union.

The term 'fossil gas' used in this briefing refers to fossil methane, i.e. natural gas of fossil origin. All references to renewable energy sources (RES), specifically mean power generation from solar and wind.

About CREA

The Centre for Research on Energy and Clean Air (CREA) is an independent research organisation focused on revealing the trends, causes, health impacts, and solutions to air pollution. CREA uses scientific data, research, and evidence to support the efforts of governments, companies, and campaigning organisations worldwide to move towards clean energy and clean air, believing that effective research and communication are the keys to successful policies, investment decisions, and advocacy efforts. CREA was founded in Helsinki and has staff in several Asian and European countries.