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# The shifting sands of Liquefied Natural Gas in Europe

October 2023



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## Executive summary

Following the Russian invasion of Ukraine in February 2022, Europe has seen a paradigm shift away from dependence on Russian pipeline gas supplies, with imports of Liquefied Natural Gas (LNG) increasing to offset this reduction. Last winter, unseasonably warm weather and high gas prices helped to reduce gas demand across the EU and UK, which, combined with reduced international competition, particularly from China, helped maintain gas security of supply to Europe. As we approach a second winter with heavily reduced volumes of Russian pipeline gas being supplied to Europe, we take a look at the evolving dynamics of the European LNG market in both the short and long-term.

With only minimal growth in global LNG supplies expected before 2025, the global market for LNG remains tight. Ahead of this winter there are a range of swing factors that could influence the ability, and necessary price, for Europe to secure sufficient volumes of LNG. LNG's role as the marginal plant for gas supply means that price increases are passed through to consumers. The key swing factors are:

- **Demand** – Long range forecasts indicate that the early part of this winter will be relatively mild, suppressing gas demand from heating. However, the softening in gas prices since last winter is likely to result in a slight resumption of gas demand from some sectors.
- **Competition for imports** – As the Chinese economy continues its recovery following repeated COVID-19 lockdowns, gas demand is expected to grow. It remains to be seen whether this growth in gas demand will be met from global LNG markets or through domestic production and trans-Siberian pipeline imports from Russia. The high likelihood of an El Niño event during the winter could help to keep LNG demand from other East Asian economies suppressed through warmer conditions across the North Pacific.
- **Stability of exports** – Over the last 18 months Europe has largely sourced its increased LNG demand from the US, with this Transatlantic partnership showing no sign of being reduced. However, recent events, including the worker strikes in Australia and the Israel-Hamas conflict, have highlighted the price risk associated with any perceived instability to exports.

As part of the measures to ensure gas security of supply in both the short and long-term, the EU and UK have seen a shift in policy to support the build out of import infrastructure, at both the EU-wide and individual nation level. Additionally, there has been a pivot towards securing more long-term deals with key LNG importer nations, with the aim to reduce exposure to spot market price volatility.

In the short to medium-term the build out of European LNG import infrastructure is important for security of supply and, with 30-40% lower CO<sub>2</sub> emissions than oil and coal, LNG is seen as a relatively 'cleaner' fossil fuel. However, in the context of Europe's net zero targets, there is a clear need to balance the immediate need for LNG imports against the long-term need to decarbonise. The development of further LNG infrastructure should therefore be conducted with a realistic long-term strategy for the re-purposing and decarbonisation of those facilities.

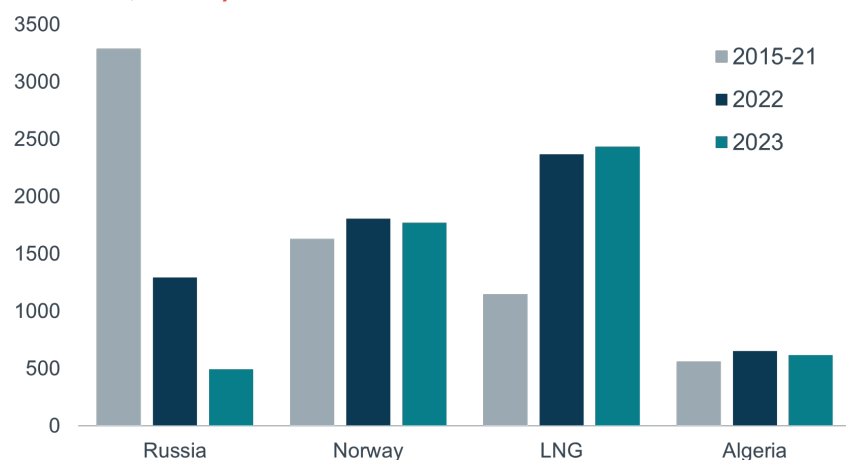
# Introduction

Last winter the unseasonably warm weather helped the UK and EU avoid gas shortages and the accompanying price shocks, with European gas storage inventories ending the winter at 55.7% full,<sup>1</sup> setting a new record for the highest end-of-winter levels. However, as discussed in our paper "[Crisis behind, challenge ahead: European gas storage levels for 2023](#)",<sup>2</sup> published in March 2023, European gas supplies are far from secure ahead of this winter, with significant swing factors still at play. As we look ahead to a second winter with heavily reduced levels of Russian pipeline gas being supplied to Europe, one of the key variables in the stability and security of European gas supplies and prices will be the supply of LNG.

Following the Russian invasion of Ukraine in February 2022, Europe has seen a paradigm shift in gas imports with a substantial reduction in Russian pipeline flows and an accompanying increase in LNG imports as the primary supply side balancer (Figure 1). There is only minimal growth in global LNG supplies expected in 2023 (12.8MT from Tortue FLNG, Tangguh T3, and Arctic LNG T1) and, as a result, increased demand for LNG, particularly from Europe, has led to tighter global competition for cargoes of the fuel, driving up gas prices across international markets.

Despite the UK having only had a small direct dependence on Russian gas (4% of domestic gas consumption in 2021),<sup>3</sup> in 2022 ~60% of UK natural gas supplies were from imports,<sup>4</sup> leaving it exposed to rising global gas prices. In the UK, LNG is often the marginal plant for setting wholesale gas prices, and therefore the increasing global competition and higher prices required to secure LNG cargoes directly impacts upon UK gas and power prices.

**Figure 1: Europe national gas imports (average weekly volumes, mcm)**



Source: ENTSOG, Cornwall Insight

In this paper we discuss the current and future evolution of the LNG market landscape in Europe to provide an understanding of the dynamics and variables that will affect European gas security in the coming, and future, winters.

<sup>1</sup> [GIE](#)

<sup>2</sup> "[Crisis behind, challenge ahead: European gas storage levels for 2023](#)" - Cornwall Insight

<sup>3</sup> [IEA](#)

<sup>4</sup> [DESNZ](#)



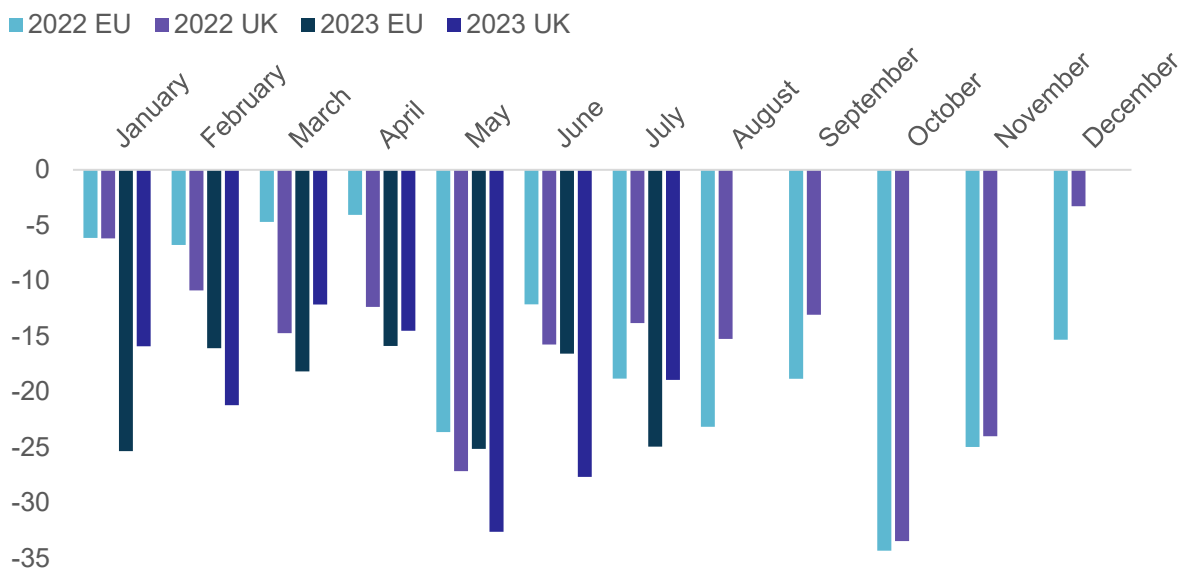
## Evolving LNG landscape

Over the last 12 to 18 months there has been a dramatic shift in the global LNG market landscape in response to the Russian invasion of Ukraine. Whilst Europe has so far been able to secure sufficient LNG supplies to meet demand there remain substantial swing factors at play ahead of this winter.

### Demand elasticity

The first of these swing factors relates to the scale of the demand, with both the uncharacteristically warm weather and high gas prices resulting in reduced demand across the EU and UK last winter (Figure 2). National Gas' *Winter Outlook 2023*<sup>5</sup> highlights that, whilst the softening in gas prices compared to last winter is likely to result in a slight increase in domestic and industrial demand, demand is still expected to be suppressed compared to winter 2021-22. Additionally, the gradual recovery of French nuclear output is expected to reduce the gas demand for power generation.

**Figure 2: Percentage change in EU and UK monthly gas demand from industry and households in 2022 and 2023, relative to the 2019-21 average**



Source: Bruegel, Cornwall Insight

### Competition for imports

Another major swing factor is global competition for available LNG cargoes. In the first half of 2023, LNG imports were dominated by countries in East Asia and Europe, with China, Japan, and South Korea the biggest three global importers, followed by the UK, France, and Spain – the three nations where the majority of European regasification capacity resides. This highlights that global competition for LNG cargoes is currently dominated by these two regions. Despite importing between two and three times the

<sup>5</sup> [National Gas](#)

absolute volumes of LNG of the leading European importers, the East Asian economies have seen an overall year-on-year (y-o-y) decrease in LNG imports during the first half of 2023, led by a substantial decrease in the y-o-y demand from Japan. In contrast, Europe has seen a y-o-y growth in LNG demand, with the largest y-o-y increases in the Netherlands, Germany, and the UK.

Repeated lockdowns in response to COVID-19 kept Chinese LNG demand relatively suppressed in 2022 (19% lower than 2021) but, with China now having re-opened, economic growth could drive a resurgence in the demand for LNG, increasing global competition and prices. In the first half of 2023, China saw a y-o-y increase of 6% in gas demand, but this was not mirrored in the Chinese demand for LNG (flat y-o-y), with gas demand growth instead being met by greater domestic production and higher pipeline imports from Russia. This shift could prove beneficial to Europe as it could reduce the expected increase in global competition for LNG cargoes that would drive up prices.

Another factor in Europe's favour this winter could be the weather for the Pacific region. The latest meteorological forecasts suggest that there is a high likelihood of an El Niño event during the winter,<sup>6</sup> resulting in warmer conditions across the Northern Pacific and reducing winter gas demand in key global markets, in particular the US and Japan where temperatures could be ~2°C above normal levels.<sup>7</sup>

## Stability of exports

Alongside competition for imports, another potential swing factor is changes to export volumes. As previously discussed, there has been minimal y-o-y change in global LNG exports in 2023 so far, with only small amounts of additional export capacity expected to come online before 2025. This indicates that there is no real potential for any notable upswing in export volumes, but the threat of downswings remains.

The export market is currently dominated by the US, Australia, and Qatar, which contribute >60% of global exports between them. Although absolute US LNG export levels have not changed significantly since the Russian invasion of Ukraine, there has been a noted shift in the destination of these cargoes, from <40% of exports being destined for Europe in December 2021 to ~70% by June 2023. As a result, the majority of the increase in EU LNG imports is accounted for by the greater volumes now being received from the US (Figure 3).

Recent events, from the worker strikes at the Chevron-owned Wheatstone LNG facility in Australia to the Israel-Hamas conflict, have highlighted the potential for disruption to exports. The Wheatstone and nearby Gorgon facilities account for ~5% of global LNG supplies. Whilst Europe is not the recipient of notable volumes of Australian LNG, substantial disruptions of supplies to China and Japan (Australia's biggest customers for LNG) would act to push up global prices, inevitably impacting upon the European market. It should be noted that industrial action was suspended without resulting in any material change to LNG delivery schedules from the Australian facilities. However,

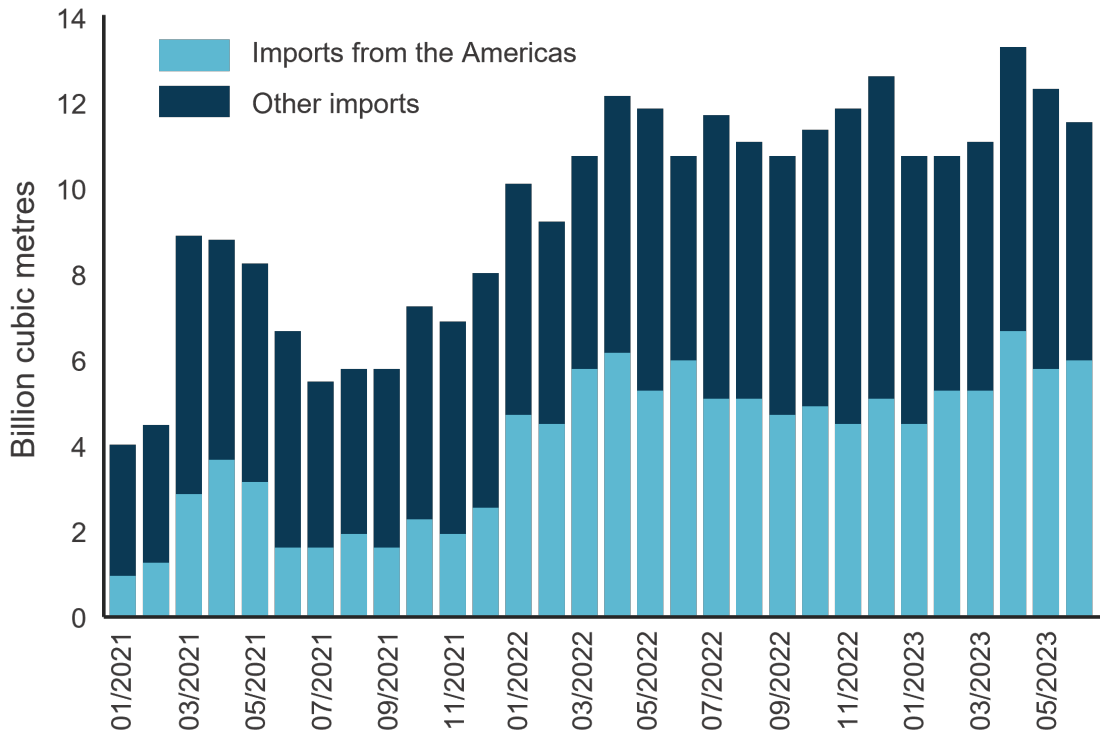
<sup>6</sup> [\*Australian Bureau of Meteorology\*](#)

<sup>7</sup> [\*ECMWF\*](#)



the threat of the strikes was still sufficient to cause a >10% increase in European gas prices, highlighting the lack of resilience in the system.

**Figure 3: EU LNG imports (January 2021 – June 2023)**



Source: Bruegel, Cornwall Insight

Similarly, the resurgence of conflict between Israel and Hamas has also sparked concerns over disruption to global LNG exports, with fears that the potential involvement of Iran in the conflict could cause instability in the Strait of Hormuz, through which roughly a quarter of global LNG cargoes pass. Alongside the damage sustained to the Balticconnector,<sup>8</sup> the Israel-Hamas conflict saw a surge in European gas prices (Figure 4). In the week between 7 and 13 October 2023 the UK National Balancing Point (NBP) day-ahead prices increased 97% and the Dutch Title Transfer Facility (TTF) day-ahead prices increased 70%.

In 2022, 50% of UK LNG imports came from the US, with a further 30% from Qatar, and the remainder from a collection of different exporters (e.g., Angola, Peru, etc.). Looking forward, it is therefore important that both the EU and UK cement long-term deals with these key exporter nations. Historically, the majority of European LNG imports have been secured on the spot market, but the signing of longer-term deals (Box 1) would reduce exposure to spot market

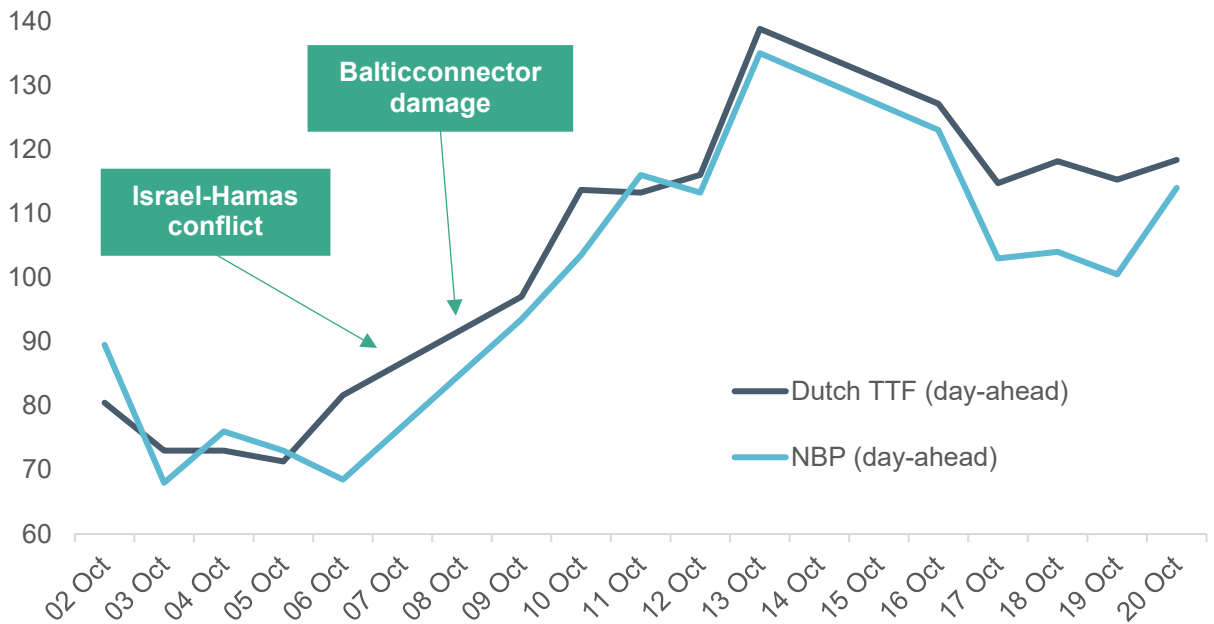
**Box 1: Centrica and Delfin sign long-term agreement**

- Centrica and Delfin Midstream Inc. have agreed a long-term Sale and Purchase Agreement for 1mt/yr of LNG for 15 years.
- Once operations start in 2027, Centrica will take delivery of around 14 LNG cargoes per year, which could provide enough energy to heat one in twenty UK homes for 15 years.
- The \$8bn deal, marks an additional move to bolster the UK's energy security.

<sup>8</sup> A bi-directional natural gas pipeline between Finland and Estonia.

price volatility, allowing both the importer and exporter to lock in prices. An inherent risk to reliance on spot market LNG cargoes is that when other competing markets are able to match, or better, prices in Europe, then those other markets can draw away volumes. Securing long-term contracts is therefore imperative to mitigate this exposure risk. In December 2022, the 'UK-US Energy Security and Affordability Partnership'<sup>9</sup> was signed, under which the US should provide at least 9-10bcm of LNG to UK terminals in 2023, almost double the volumes in 2021.

**Figure 4: Day-ahead European gas prices (p/th) for the Dutch TTF and UK NBP**



Source: Cornwall Insight, Marex Spectron

<sup>9</sup> [GOV.UK](https://www.gov.uk/government/news/uk-us-energy-security-and-affordability-partnership)

## Policy support for LNG

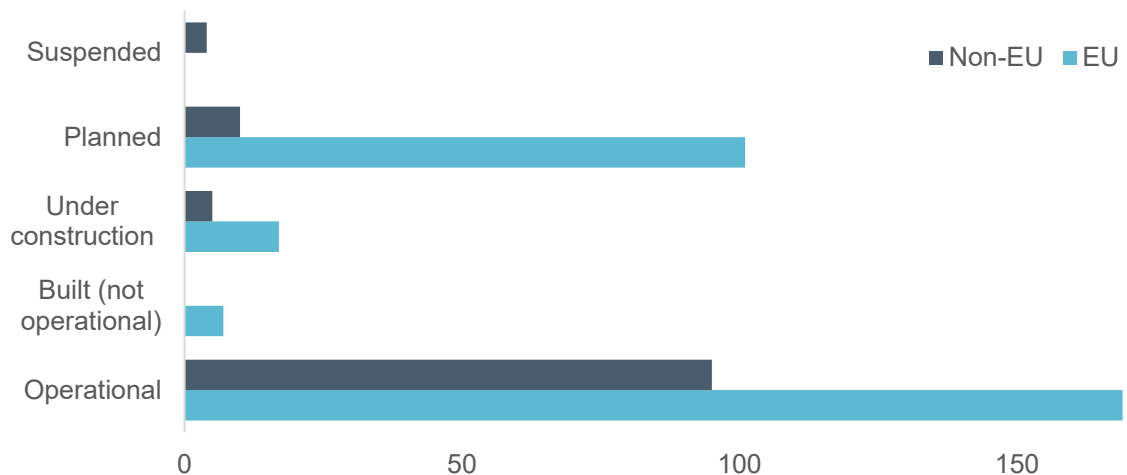
As discussed, the Russian invasion of Ukraine has seen a shift in European dependence on LNG and an intensification of the rhetoric around consolidating energy security in Europe. The European pivot away from Russian pipeline gas supplies to LNG at a relatively short notice has required rapid and responsive policy and regulatory changes to support the increased influx of LNG volumes needed by the EU and UK.

### The European pivot

Figure 3 highlights the significant uptick in LNG imports in the last year and a half, with an average of 11.2bcm per month imported into the EU in 2022 and 2023, compared with 6.6bcm per month in 2021. To support this increase, the EU and its member states have made consolidated efforts to ensure the necessary infrastructure is in place (Figure 5), with LNG viewed as an integral part of on-going security of supply measures. The EU has reportedly invested ~€10bn in diversifying gas imports through LNG and pipeline to date. In a relatively short period, Europe has rapidly accelerated the level at which it imports LNG, but as discussed, the global supply network and resource of LNG was not well positioned to facilitate this significant uptick in demand.

Presently, there is a clear disparity between operational capacity connected with the EU versus that of pipeline projects. However, the European Commission highlight that ensuring all EU countries have access to liquified gas markets is a key objective of the EU's energy union strategy.<sup>10</sup>

**Figure 5: Annual regasification capacity of LNG large scale import terminals in EU and non-EU (Albania, Russia, Turkey, UK) countries (bcm/year)**



Source: European Commission, GIE

The EU's overall LNG import capacity is significant (around 157bcm in regasified form per year) – enough to meet ~40% of total gas demand. However, access to LNG

<sup>10</sup> [European Commission](#)

infrastructure is uneven across the EU and current projects planned to support the roll-out of LNG import capacity are below the levels needed to meet gas demand in Europe. The European Commission acknowledge that present infrastructure has created import bottlenecks in terms of the amount of volume that EU import terminals can house at any one time.

To mitigate this, several EU countries are investing in new or additional LNG import terminals to support the upturn in LNG imports to Europe in the medium-term. For example, Germany has implemented simplified means for licensing of LNG terminals and commissioned their first floating terminal last year at Wilhelmshaven, followed by a second floating terminal at Brunsbüttel which came online earlier this year, and with a further two floating terminals expected at the back end of 2023. Similarly, Gate terminal (The Netherlands) and its other shareholders announced their final investment decision to expand Gate terminal's storage and regasification capacity. The expansion consists of a new LNG storage tank of 180,000m<sup>3</sup> and additional regasification capacity of four billion m<sup>3</sup>/yr. The new capacity is already signed out under long-term commercial agreements and is expected to be ready for operation in the second half of 2026.

And whilst individual economies like Germany are helping to support the roll-out of LNG, the European Commission also has its own directives to enable a smoother pivot to the widespread adoption of LNG throughout the EU. Trade with the US has been signposted as a critical enabler of allowing LNG to flow freely to Europe (Figure 6), acknowledging the US is the largest gas producer globally and actively increasing its LNG export infrastructure.

### Figure 6: European Commission partnership directives with the US

#### Levers to support transatlantic cooperation between the EU and US

Removing unnecessary US LNG licensing barriers to accelerate US exports

Working on reciprocal solutions to provide equivalence for the purposes of access to markets

Developing joint efforts to complete key missing infrastructures and investments in Europe to improve access to LNG

Establish regular consultations and promotion activities with market operators to make US the major gas supplier to Europe

Source: European Commission

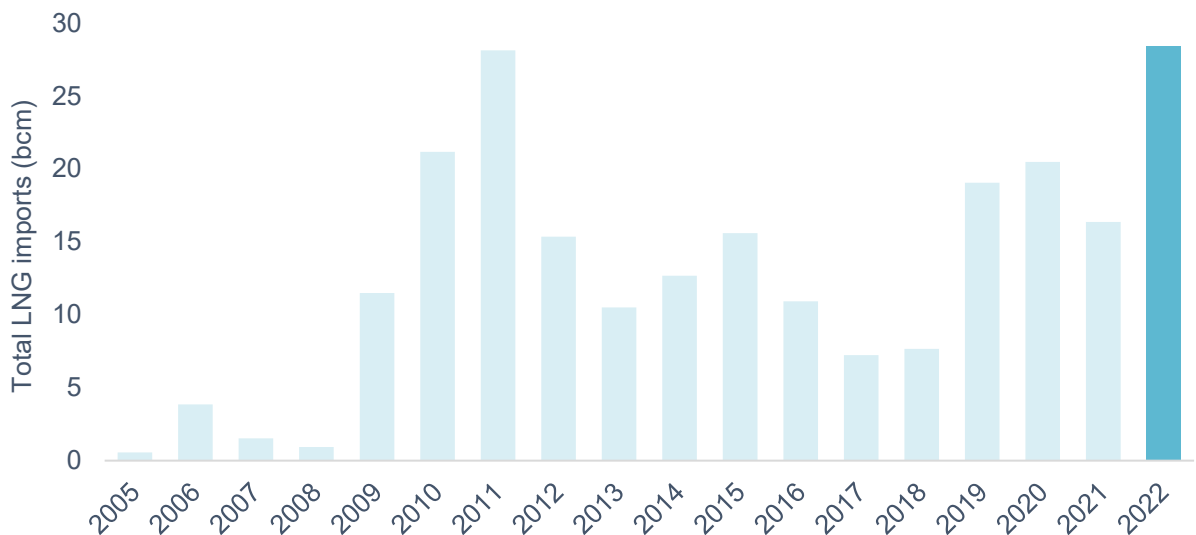
With the EU establishing regular supply volumes from major global exporters such as the US and Qatar, this provides secondary benefits to the UK. Higher levels of LNG throughout the European gas market allows for trade across existing gas infrastructure e.g., via the Interconnector UK (IUK) and Balgzand Bacton Line (BBL) interconnectors with Belgium and the Netherlands, respectively. Should the UK need to import re-gasified LNG, these interconnections allow for a quicker and more efficient means of doing so versus the UK needing to enter the Asian spot market or other Asian markets

to secure volume, which can often be expensive and result in long-lead times from purchase to receipt.

## The UK use case

The UK has had a long-standing relationship with LNG imports, dating back to the early 2000's. The UK, geographically, poses as an ideal location for LNG imports as an island with existing deep-water port infrastructure which allow large LNG cargo vessels to dock. Much of the UK's existing terminal infrastructure was either built or repurposed to support LNG pre-2005. There have been no significant changes to the physical capability of the UK's three operational onshore terminals since 2010 but in 2018 both the Grain LNG and South Hook LNG facilities took the first steps to increasing their capacity by 2025-26. Figure 7 shows that since 2008 there has been a significant ramp-up in import volumes, particularly between 2018-2022 when the average annual LNG import volume was 62% than for the previous five year period.

**Figure 7: Registered UK import volumes of LNG - 2005-2022 (bcm)**



Source: DUKES

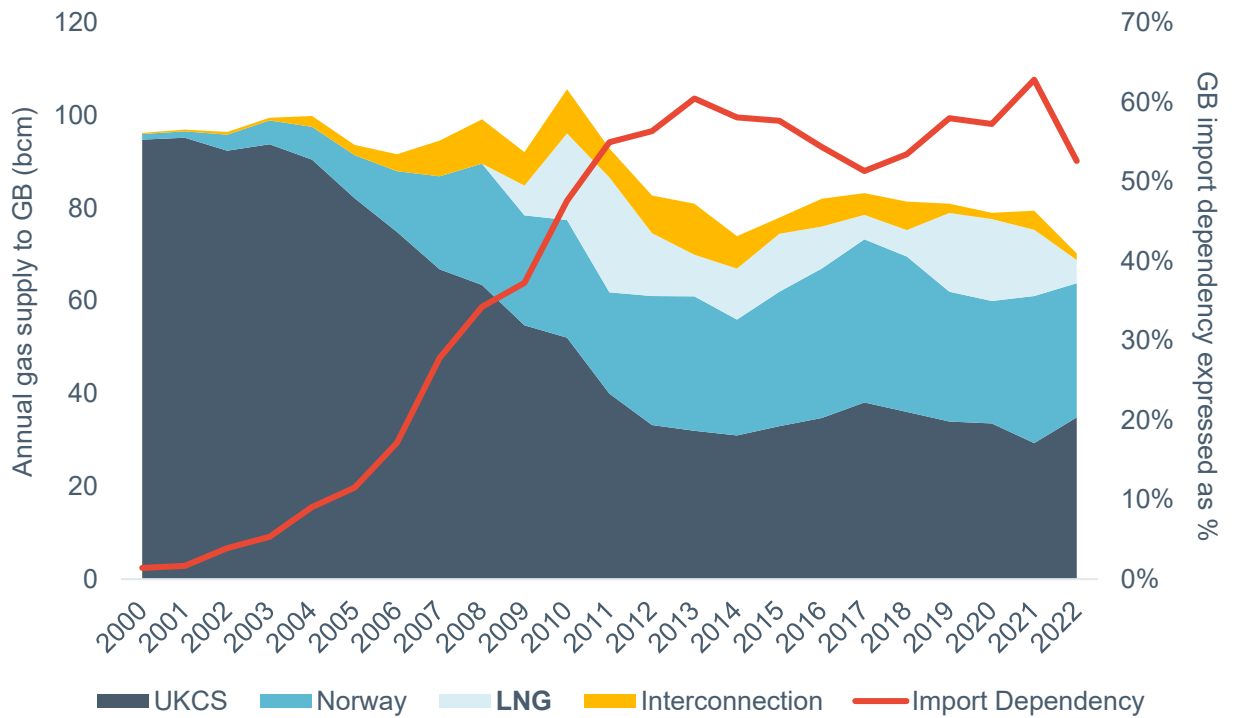
As part of the *British Energy Security Strategy*,<sup>11</sup> published in April 2022, the UK highlighted that it will “provide a key EU entry point for non-Russian gas supplies”, taking advantage of well-developed existing LNG import infrastructure. This infrastructure can be used to accommodate higher volumes of LNG coming into Western Europe and which can either be redistributed domestically or re-gasified and exported to mainland Europe via the IUK and BBL gas interconnectors. Therefore, it is perhaps unsurprising that the annual UK imports of LNG in 2022 were 74% higher than 2021 and accounted for around one third of estimated UK gas demand.

Much like the EU however, the UK's existing infrastructure cannot match gas demand requirements. The UK remains one of the largest consumers of gas globally, with heavy reliance on gas in space heating, transport, and power generation. The UK's

<sup>11</sup> [GOV.UK](https://www.gov.uk/government/consultations/energy-security-strategy)

gas supply mix is relatively well varied (Figure 8), but UK NBP gas relies strongly on price points being high enough to attract uncontracted supply, especially LNG, away from other competing markets in Asia and Europe.

**Figure 8: UK annual gas supply, split by source**



Source: DUKES

The UK’s three regasification terminals, like the national transmission system, are part of the UK’s critical energy infrastructure. Under the *National Security and Investment Act 2021*<sup>12</sup> the government therefore has the power to review and block investment or transfers of ownership for these assets, although it is not clear whether this is true for powers of capacity rights to ensure continued market access to such capacity at times of political crisis or severe gas supply shortage.

<sup>12</sup> [legislation.gov.uk](https://legislation.gov.uk)



## Future expectations

With no imminent thawing expected in Russo-European relations, Europe is facing a second winter without significant volumes of Russian pipeline natural gas. So far LNG has filled this void, with the development of policy and regulatory frameworks across the EU and UK to maintain LNG imports and preserve security of supply. Winter 2022-23 brought with it a relative level of fortune amid milder weather and suppressed demand from competing markets, but this cannot be relied upon in future winters.

In the short to medium-term it is likely that LNG will continue to act as a supply-side balancer. However, there remains a range of swing factors that could influence Europe's ability to attract LNG cargoes, and the price necessary to do so in this, and subsequent, winters. Alongside fulfilling the immediate European demand for gas, LNG is also a relatively less polluting option than many alternative fossil fuels such as coal and oil. However, it should be noted that, in the long-term, increasing supplies of LNG in its current form is not consistent with Europe's net zero goals. As a result, the current build-out of the infrastructure necessary to meet short-term energy security goals must be balanced against the longer-term decarbonisation trajectory.

## Global competition and swing factors

As previously discussed, there are a range of potential swing factors that could influence Europe's ability to access sufficient volumes of LNG this winter and beyond, as well as impacting on the price needed to secure these cargoes.

## Downstream consumer demand

In the immediate term the demand for LNG this winter will be highly dependent on the weather and consumer response to softening gas prices. The latest long-range forecasts indicate that Europe is likely to see a mild start to this winter,<sup>13</sup> reducing gas demand for heating. National Gas' *Winter Outlook 2023*<sup>14</sup> forecasts that UK gas demand will see a slight increase from winter 2022-23 but will remain depressed compared to winter 2021-22.

In addition to the role LNG can play in supporting gas demand from a security of supply point of view, it is also important to recognise that LNG is also seeing further adoption from other sectors. LNG is being increasingly targeted as a means of reducing emissions for hard-to-abate sectors such as the maritime and heavy transport sectors. Some market reports suggest that we could have between 8-10MT of demand per annum from the marine sector from 2026 and beyond, as well as an ever-increasing level of BioLNG<sup>15</sup> used in heavy duty transport.

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<sup>13</sup> [ECMWF](#)

<sup>14</sup> [National Gas](#)

<sup>15</sup> A biofuel made by processing organic waste. Biogas is produced through anaerobic digestion of organic waste and the methane component is then separated and liquefied to make BioLNG.

What this demonstrates is that not only is the upstream side of the market actively targeting LNG to satisfy demand, but the emergence of LNG as a relatively cleaner fuel alternative in adjacent carbon intensive sectors is emerging. The net result is that in years to come, LNG as a diverse and cleaner fuel source could be one of the most in-demand commodities globally, both in support of future energy security measures and aiding the global shift to decarbonise major carbon emitting economies.

## Competition from Asian markets

As previously described, Europe and Asia have competed strongly for LNG in recent years. This competition came from bidding for LNG volume to satisfy domestic gas demand both during summer months ahead of winter and also on the spot market responding to cold weather events.

Typically, China and other Asian countries have been able to pay a higher premium to secure those volumes, meaning that in a highly competitive bidding environment Western Europe has either lost out or had to pay inflated rates to secure cargoes. This elevated level of competition between these two geographies was evident in the summer of 2022.

Following repeated COVID-19 lockdowns, the expected economic growth in China would drive an increase in gas demand. However, a crisis in the Chinese real estate sector and drops in exports resulted in China entering deflation in July 2023. Despite a rebound in August, the threat of a relapse into deflation remains for the immediate future.

If the Chinese economy and accompanying gas demand does continue its post-COVID-19 recovery then the question remains as to how much of this gas demand growth will be met from the LNG market and how much can be accounted for by increased domestic production and higher pipeline imports from Russia. Another key area of competition could be from economies such as India, which is targeting 15% of its energy mix from gas but saw stifled growth in LNG demand last winter as a result of the high global prices. Could emerging LNG markets such as India become more active in global LNG markets over this winter?

## Uncertainties in exports

The US has been a crucial supplier of European LNG imports during the second half of 2022 and throughout much of 2023, but, as the recent strike action in Australia showed, there always remains the risk of disruption. Geopolitics and foreign policy necessity mean that this risk is low, with transatlantic LNG flows likely to be maintained, but there are inherent risks with becoming increasingly reliant on a small pool of major LNG exporters and not having a diverse range of producers to trade with.

## The role of LNG in decarbonisation

As security of supply concerns lose their initial sharpness in the aftermath of the Russian invasion of Ukraine, buyers and governments are now refocusing on lowering CO<sub>2</sub> emissions. LNG produces 40% less CO<sub>2</sub> than coal and 30% less than oil, which makes it the cleanest of the fossil fuels.<sup>16</sup> It does not emit soot, dust, or particulates and produces insignificant amounts of sulphur dioxide and other compounds considered harmful to the earth's atmosphere. However, LNG is still a fossil fuel and source of significant carbon emissions, not least from its transportation.

LNG industries throughout the value chain have an opportunity to further prolong the demand for LNG through the energy transition by reducing upstream, liquefaction, and shipping emissions, with progress already been made. QatarEnergy and NextDecade plan to fit carbon capture and storage to liquefaction plants, and many developers are considering electric-drive turbines sourced from renewables.<sup>17</sup>

The inherent material properties of LNG mean that it could provide an alternative to other sources of natural gas in the UK, and support the different limbs of the energy trilemma:

- **Affordability** – The variety of different regions that the UK currently sources LNG from (the US, Qatar, Norway, Angola etc.) could allow the UK to benefit from price competition between different exporters.
- **Energy security** – LNG is considered a flexible source of supply and so could be used to 'plug the gaps' when there are shortfalls in renewable output. Additionally, there have been calls to 'repurpose' existing UK LNG terminal infrastructure away from being primarily focused on regasification to a focus on long-term gas storage.
- **Net zero** – Alongside LNG being cleaner than alternative fossil fuels there is also the possibility that it can be used as the 'feedstock' for low-carbon hydrogen, when combined with carbon capture, thus potentially becoming part of a new low-carbon hydrogen economy.

## The call for future investment

The record amounts of imported volume and project approvals provide a clear statement of intent from Western Europe and the UK of how they intend to use LNG in the short-to-medium term. However, what remains to be seen is how these European economies look to balance investment of LNG to support future energy security without saturating the market with import and storage capacity, especially in light of wider decarbonisation goals.

Some market analysts have said Europe could in fact be at risk of having 'huge' excess LNG import capacity by the end of the decade – citing many European

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<sup>16</sup> [\*National Grid\*](#)

<sup>17</sup> [\*General Electric\*](#)

countries have overshot the mark with planned import infrastructures in danger of outstripping demand.

Whilst this does present challenges, the rhetoric and strategic pivot away from Russian pipeline natural gas by Western Europe does demand a significant level of infrastructure deployment to protect its own security of supply considerations. The last 18-months to two years have proven that overreliance on singular economies to support the functioning of energy industry presents significant risk exposure, with the fall-out driving wholesale energy costs higher and leaving end-consumers to front the bill.

The diversity of infrastructure deployment is also an important consideration for the EU, UK, and investors. Not only is it necessary to increase import terminal capacity and the cross-border interconnectivity of the European gas network, to avoid import bottlenecks, but also terminals with multi-purpose functionality which maintain a role in a decarbonised energy system are of equal importance.

# CORNWALL INSIGHT

CREATING CLARITY

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