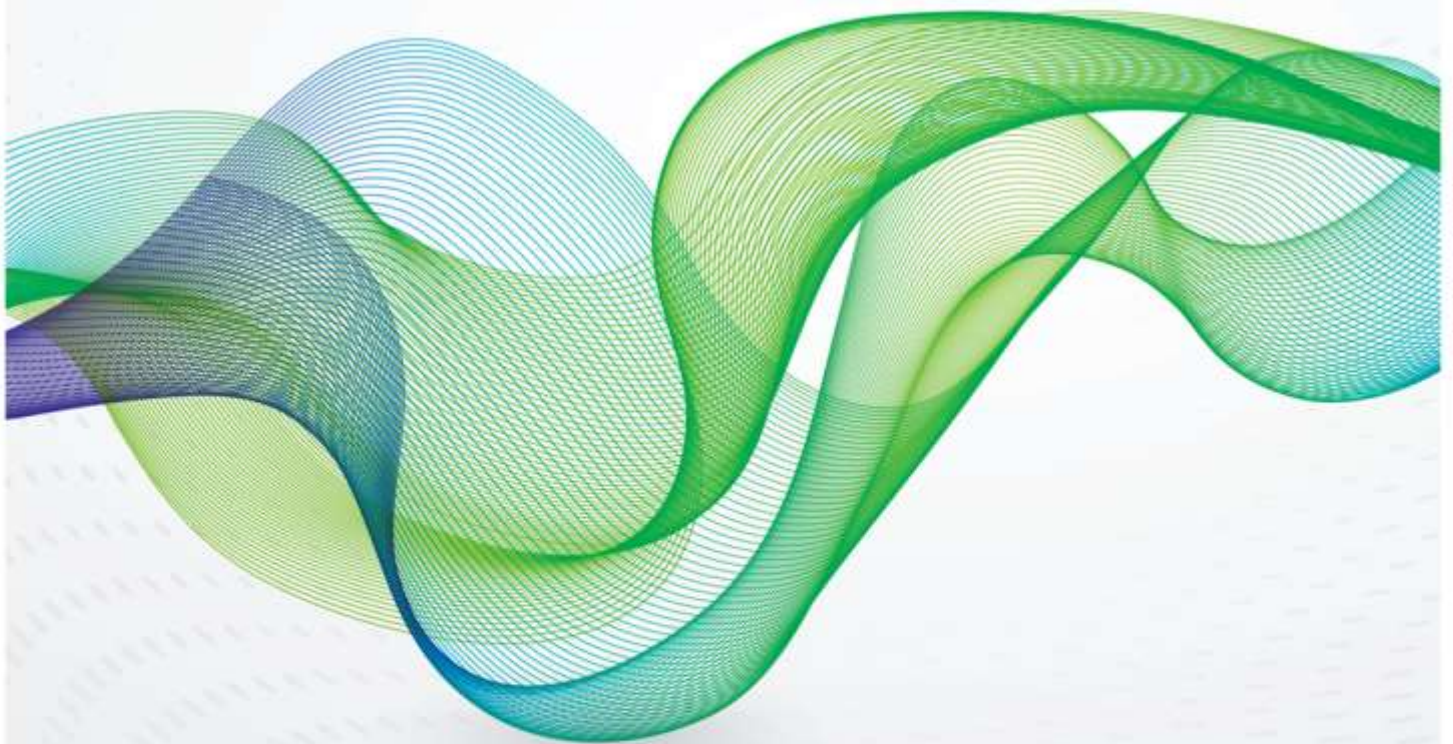
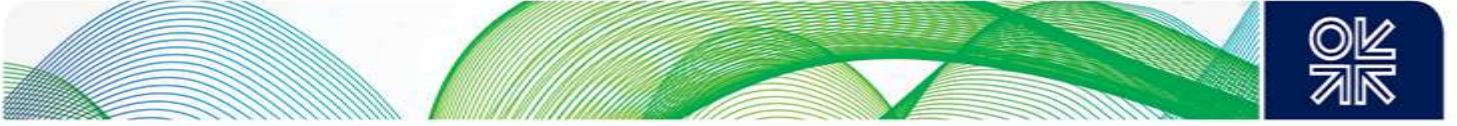


February 2024

LNG Shipping Chokepoints: The Impact of Red Sea and Panama Canal Disruption





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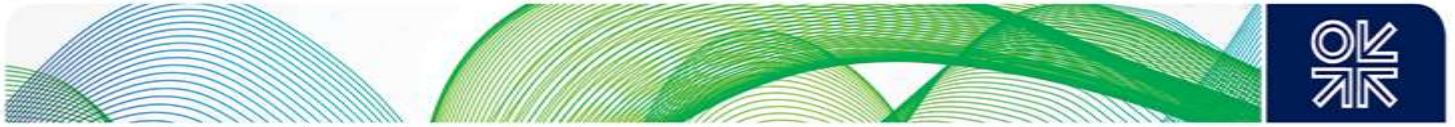
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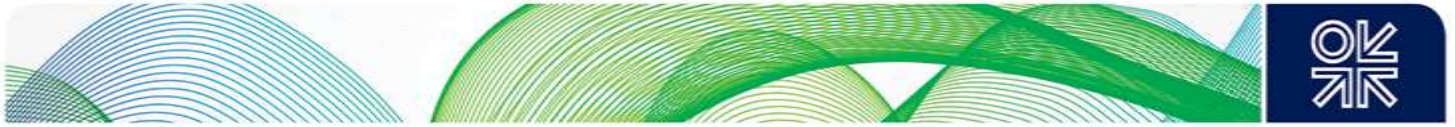
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Executive Summary

Due to droughts and restrictions on vessel transits at the Panama Canal, the volume of LNG shipped via the Panama Canal declined by two-thirds between August 2023 and January 2024, and could fall to zero in February. As a result of Houthi attacks on vessels in the Red Sea, no LNG cargoes have traversed the Red Sea since 12 January 2024. This paper analyses the impact of curtailments in LNG shipping via these chokepoints in terms of the exporters affected and the impact on the global LNG market, and European LNG imports in particular. The key points of this paper are:

- In 2023, 8 per cent of global LNG exports were delivered via the Suez Canal and 2.5 per cent via the Panama Canal. The disruption at these ‘chokepoints’ affects the equivalent of just over 10 per cent of global LNG trade, but does not prevent shipping between the Atlantic and Pacific Basins.
- After accounting for diversions, the re-routing of cargoes via longer routes and consequent curtailment of LNG shipping capacity could reduce global LNG supply (which was 400 mt in 2023) by 5.4 mt (1.35 per cent) year-on-year. The reduction falls to 0.9 per cent when accounting for new supply from West Africa, which will ramp up in the second half of 2024.
- That minor reduction in global supply is relatively limited compared to fluctuations in global LNG demand, and could explain the limited reaction in European and Asian benchmark LNG prices.
- The disruption primarily affects LNG deliveries to Europe from Qatar, and deliveries to Asia from the United States, Russia, Algeria, and Egypt. As a consequence, cargoes are being re-routed via the Cape of Good Hope (South Africa), or diverted to other markets.
- The longer routes imply greater shipping costs (daily charter costs and fuel costs for vessels) and a smaller volume of LNG that can be delivered by each vessel over a given period of time. These increased operational costs (in time and money) represent an ‘inter-basin LNG shipping premium’ that will be borne by the exporters. These additional costs will only be recouped through higher sales prices if the disruption causes LNG import prices in Europe and Asia to rise.
- Exports to Asia from the United States and Russia are continuing via the Cape of Good Hope, while exports to Asia from North Africa have virtually ceased. Exports to Europe from Qatar were sustained in January, but have fallen in February, suggesting some diversions of cargoes to Asia.
- From a European perspective, LNG supply from Qatar could potentially decline by 7.6 mt (50 per cent), due to a combination of cargo diversions to Asia and reduced effective shipping capacity for the remaining volume delivered to Europe. One-third of that reduction in supply from Qatar could be offset by North African LNG supply diverted from Asia to Europe, and another 1.5 mt could be sourced from new export projects in West Africa in the second half of 2024.
- The easing of drought restrictions, following the start of the Panamanian rainy season in May, could allow more efficient use of LNG carriers for US exports to Asia. That additional LNG shipping capacity could also make more US LNG available to Europe in the second half of 2024. This impact could be enhanced if additional Qatari LNG supply to Asia reduces Asian demand for spot LNG cargoes from the United States, allowing more US spot cargoes to be delivered to Europe.
- The fact that benchmark LNG prices in Europe and Asia in February were the lowest since April 2021, suggests that the market perceives the impact of the disruption to be both limited, and insufficient to outweigh the bearish short-term global LNG market outlook.
- The cumulative impact of the disruption will grow, as each subsequent LNG delivery with a longer round-trip time is ‘later’ than it would have otherwise been. The extent to which this is ameliorated depends on the extent of cargo diversions and reduction in inter-basin shipping through trading and portfolio optimisation. The current curtailments at Panama and the Red Sea could therefore illustrate both the extent of potential improvements in efficiency in LNG shipping and its limitations.

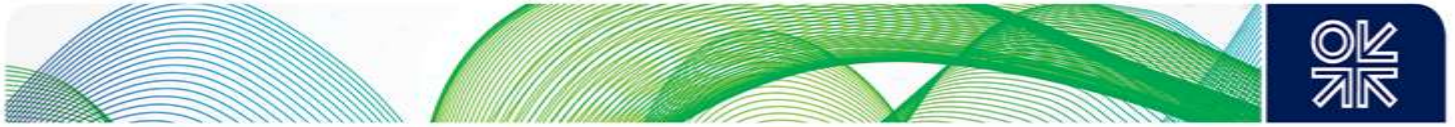
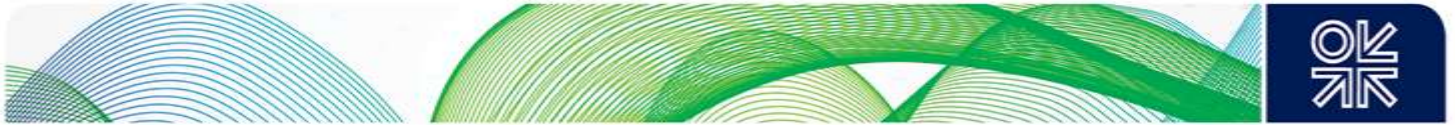


Table of Contents

Acknowledgements	ii
Executive Summary	iii
Table of Figures	vi
1. Introduction	1
2. Curtailment of all forms of shipping via the Panama Canal and Red Sea	2
2.1. Curtailment of all forms of shipping via the Panama Canal	2
2.2. Curtailment of all forms of shipping in the Red Sea.....	3
3. Curtailment of LNG deliveries via the Panama Canal	5
3.1. The impact of Panama curtailments on LNG shipping, and the US in particular	5
3.2. US LNG deliveries to Asia by route	6
3.2. US LNG between Europe and Asia	7
3.3. The impact of shipping distances.....	8
4. The impact of Red Sea disruption on LNG shipping	9
4.1. How many LNG carriers per day usually pass through the Suez Canal?.....	9
4.2. When did LNG shipping via the Red Sea cease?	9
4.3. Which LNG exporters and importers are most affected by Red Sea disruption?	10
4.4. What volume of LNG is affected by the disruption at Panama and the Red Sea?	10
5. The impact on Qatari LNG exports	11
5.1. Qatari LNG export volumes by destination in 2023	11
5.2. Qatari LNG exports since 12 January 2024.....	12
5.3. Shipping distances from Qatar to Europe and Asia.....	13
5.4. Which European regasification terminals receive Qatari LNG?	13
5.5. The implications of longer shipping distances for Qatari LNG.....	13
5.6. Conclusions regarding Qatari LNG	14
6. The impact on Russian LNG exports	15
6.1. Exports from Yamal LNG to Europe and Asia	15
6.2. The Northern Sea Route and trans-shipment in NW Europe for deliveries via Suez	15
6.3. Yamal LNG export volumes by destination	16
6.4. Yamal LNG exports since 12 January 2024	17
6.5. Shipping distances from Zeebrugge to Asia via Suez and Cape of Good Hope	17
6.6. The implications of longer shipping distances for Russian LNG	17
7. The impact on North African LNG deliveries to Asia	18
7.1. North African LNG exports to Europe and Asia	18
7.2. The suspension of Algerian LNG exports to Asia?	18
7.3. The suspension of Egyptian LNG exports to Asia?	19
7.4. Implications of North African cargo diversions.....	19
8. Overcoming the inter-basin ‘shipping premium’	20



8.1. The potential for additional Atlantic Basin supply to Europe.....	20
8.2. Potential for optimisation within portfolios and through trading	21
9. The market response	22
9.1. Decline and stabilisation of shipping rates.....	22
9.2. Benchmark gas prices showing muted response to Red Sea disruption	23
9.3. Europe-Asia spreads remain relatively narrow	24
10. Waves of impact: measuring LNG at the point of import, not export.....	25
10.1. First wave: cargoes diverted	25
10.2. Second wave: late arrival of re-routed cargoes	25
10.3. Third wave: impact of longer round-trips.....	26
11. Implications for and the global LNG market	27
11.1. Impact on Europe of reduction in Qatari LNG supply	27
11.2. Could a reduction in Qatari LNG exports notably tighten the global LNG market?	28
12. Conclusion.....	29
Appendix: Map of Middle Eastern shipping points and LNG export terminals	31

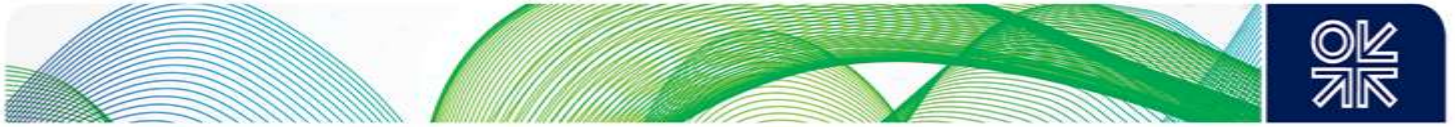
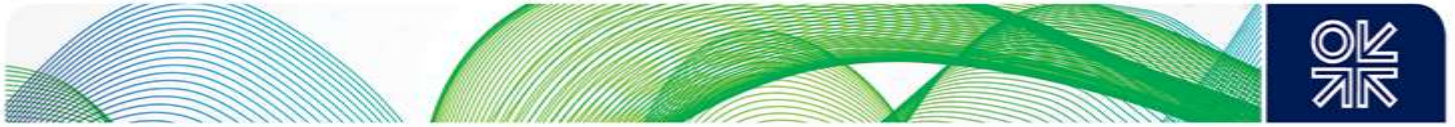


Table of Figures

Figure 1: Daily transit calls at the Panama Canal (vessels/day).....	2
Figure 2: Daily transit calls at Bab al-Mandab southern entrance to the Red Sea (vessels/day).....	3
Figure 3: Daily transit calls at the Suez Canal northern entrance to the Red Sea (vessels/day)	4
Figure 4: Daily transit calls at the Cape of Good Hope (vessels/day)	4
Figure 5: Monthly LNG shipping via the Panama Canal (number of cargoes and mt of LNG).....	5
Figure 6: Monthly number of laden LNG carriers traversing the Panama Canal by cargo source	6
Figure 7: US LNG annual exports to Asia by delivery route, volume (mt) and share of total (%)	6
Figure 8: US LNG monthly exports to Asia by delivery route, volume (mt), share of total (%).....	7
Figure 9: Weekly US LNG exports by destination since 2 January 2023 (mt per week)	8
Figure 10: Monthly US LNG exports by destination (share of total)	8
Figure 11: Number of LNG carriers that traversed the Suez Canal in 2023, by export and import.....	10
Figure 12: Global LNG exports by route (mt per year)	11
Figure 13: Qatari LNG exports by destination (mt per week)	11
Figure 14: Round-trip shipping distances from Ras Laffan to European regasification terminals and the potential reduction in deliveries to those terminals in 2024	14
Figure 15: Yamal LNG exports by destination (mt per week)	16
Figure 16: North African LNG exports by destination (mt per week)	18
Figure 17: Weekly LNG exports from non-US Atlantic Basin suppliers by destination continent (mt per week).....	20
Figure 18: TTF prices by month of delivery since 1 September 2023 (USD/MMBtu).....	23
Figure 19: Argus price assessments for LNG delivered to NE Asia & NW Europe (USD/MMBtu)	24
Figure 20: Premium of Argus North-East Asia LNG delivered price assessment over Argus North-West Europe LNG delivered price assessment (USD/MMBtu).....	24
Figure 21: EU plus UK weekly LNG imports by source (mt per week)	26
Figure 22: EU plus UK LNG imports by source – three-week rolling average (mt per week)	26



1. Introduction

In the second half of 2023, droughts led to lower water levels and a subsequent reduction in LNG shipping via the Panama Canal, with monthly vessel transits falling by more than half between August 2023 and January 2024. This primarily impacted US LNG shipments to Asia, of which a considerable number were re-routed via the Suez Canal. Then, on 19 November 2023, Houthi rebels in Yemen began attacking ships passing through the Red Sea. In response, the US and UK began air strikes against the rebels on 12 January 2024. Since that date, no laden LNG carriers have passed through the Red Sea. As of 26 February 2024, there are no LNG tankers operating in the area, either at the Suez Canal (the northern entrance to the Red Sea) or to the south, at the Bab al-Mandab and Gulf of Aden.

The practical effect of the curtailment of LNG shipping via Panama and cessation of shipping via the Red Sea is that the movement of LNG cargoes between the Atlantic and Pacific Basins requires a lengthy voyage around the Cape of Good Hope (South Africa) or Cape Horn (Chile). This adds to shipping costs (in terms of vessel chartering and fuel costs) and reduces the efficiency of the LNG carrier fleet (due to each delivery requiring a longer round-trip time). The additional cost – in both time and money – of moving cargoes between the Atlantic and Pacific Basins via the Cape of Good Hope or Cape Horn represents an ‘inter-basin shipping premium’.

This paper analyses the disruption in terms of the exporters affected (primarily the United States, Qatar, Algeria, Egypt, and Russia) and the impact of the disruption on global LNG market tightness and on European LNG imports in particular.

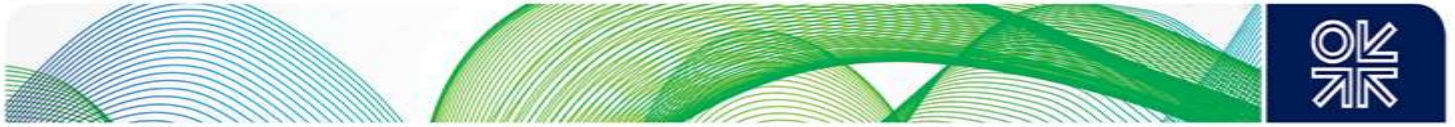
The paper begins by examining the reduction of all forms of shipping via the Panama Canal and Red Sea, before then assessing the impact on LNG shipping in particular, including the identification of the suppliers most affected, and the volume of LNG shipping impacted by the disruption. For each of the five LNG exporters primarily affected by the disruption, the following questions are addressed:

1. What are their current export volumes?
2. How are those volumes split between Europe, Asia, and elsewhere?
3. What volumes of export are impacted by the Panama Canal and Red Sea disruption?
4. Are LNG carriers being re-routed via the Cape of Good Hope, or diverted to other destinations?
5. What are the implications for shipping distances?
6. If cargoes are not diverted to other markets, how much shipping capacity (effective export capacity) is lost due to the longer round-trip times?

The subsequent section assesses the potential for the impact of the disruption to be alleviated through additional supply in the Atlantic Basin, and optimisation and trading to overcome the ‘inter-basin shipping premium’ on moving cargoes between the Atlantic and Pacific Basins. The muted market response is then considered in terms of daily charter rates for LNG carriers, benchmark gas and LNG prices in Europe and Asia, and the relatively narrow spread between those European and Asian prices.

Next, the forward-looking analysis identifies three (chronological) waves of impact of the Red Sea disruption are proposed, between the immediate aftermath of the disruption in the second half of January, the late arrival of LNG cargoes in late January and the first half of February, and then the growing cumulative impact due to longer round trips delaying subsequent cargoes from February/March onwards. Finally, the implications of the disruption and its impact are analysed with regard to both European LNG imports and the tightness of the global LNG market.

The key conclusion is that the market has thus far borne the costs of the ‘inter-basin shipping premium’, and continued to send cargoes to their originally-intended destinations via longer routes. The longer that continues, the greater the cumulative impact. However, the longer the disruption continues, the more likely we are to see optimisation within, and trading around, portfolios to reduce the number of inter-basin deliveries. Moreover, the Panama Canal disruption is likely to ease after the rainy season begins in May, while new Atlantic Basin supply from West Africa is also due to launch and ramp up during 2024. These factors, combined with a broader bearish market outlook, explains the lack of benchmark LNG price response to the disruption of LNG shipping via key chokepoints.

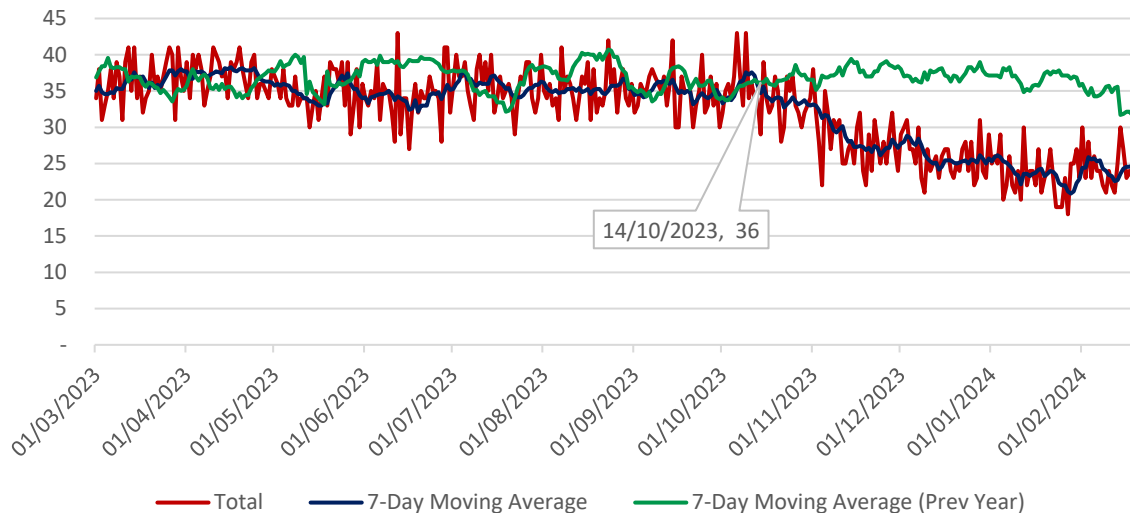


2. Curtailment of all forms of shipping via the Panama Canal and Red Sea

2.1. Curtailment of all forms of shipping via the Panama Canal

As Figure 1 below illustrates, the volume of shipping of all types via the Panama Canal has been curtailed since October 2023, due to droughts, concerns over water levels in the canal, and restrictions imposed by the Panama Canal Authority.

Figure 1: Daily transit calls at the Panama Canal (vessels/day)



Data source: PortWatch¹

As illustrated by the map in the appendix, the Panama Canal is not a single channel from coast to coast, but consists of the artificial Lake Gatún in its central part, with short canals at either end. At each end there are three parallel canals, of which two are the (narrower) originals and one (wider) is the expansion, which was opened in 2016.² It is through this, newer, wider, canal that LNG carriers pass at either side of Lake Gatún.

Lake Gatún is 26m (85 feet) above sea level, and requires constant replenishment from river tributaries, especially during the rainy season that usually lasts from May to December.³ Accessing Lake Gatún requires vessels to traverse three locks at each side of Lake Gatún. But every time a ship passes through the lock system, water is lost out to the Atlantic and Pacific Oceans. Therefore, the Panama Canal system is susceptible to drought causing water levels in Lake Gatún and the lock systems to fall, especially if the rainy season does not provide sufficient replenishment. One method of water conservation is to limit the passage of vessels through the lock systems.

On 25 July 2023, the Panama Canal Authority (PCA) announced that, in response to ‘the ongoing effects of the dry season’ it would reduce the cap on the number of vessels allowed to traverse the canal to 32 per day.⁴ Then, on 31 October 2023, the PCA reported that the country had experienced drought related to El Niño, and that October 2023 was the driest since records began in 1950. Consequently, the PCA announced tighter restrictions on the number of vessels that would be allowed to traverse the canal each month.

¹ PortWatch, 2024. *Trade Disruptions in the Panama Canal*.

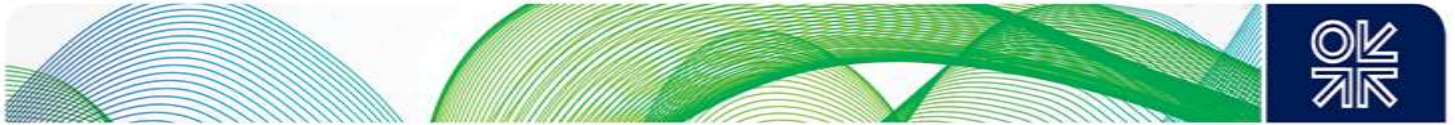
<https://portwatch.imf.org/pages/44d73fd00bbc4f73a16d46d5beb11b4d>

² Panama Canal Authority, 2024. *Discover the Expanded Canal*. <https://pancanal.com/en/discover-the-expanded-canal/>

³ World Bank, 2024. *Climate change knowledge portal: Panama*.

<https://climateknowledgeportal.worldbank.org/country/panama/climate-data-historical>

⁴ Panama Canal Authority, 2023. Panama Canal maintains competitive draft for the following months. *Press Release*, 25 July. <https://pancanal.com/en/panama-canal-maintains-competitive-draft-for-the-following-months/>



According to the announcement, the number of reservation slots would be reduced from 25 (1-7 November), to 24 (8-30 November), 22 (December), 20 (January 2024), and 18 (February 2024).⁵ Better news followed on 15 December 2023, when the PCA announced that as a consequence of more rainfall and the impact of water-saving measures being better than expected, the number of reservation slots would be raised from 22 in December to 24 in January.⁶ However, as the data from PortWatch⁷ in Figure 1 illustrates, the seven-day moving average number of vessels per day traversing the Panama Canal remains substantially lower year-on-year, with the decline in shipping via the Panama Canal predating the decline in shipping via the Red Sea by several months.

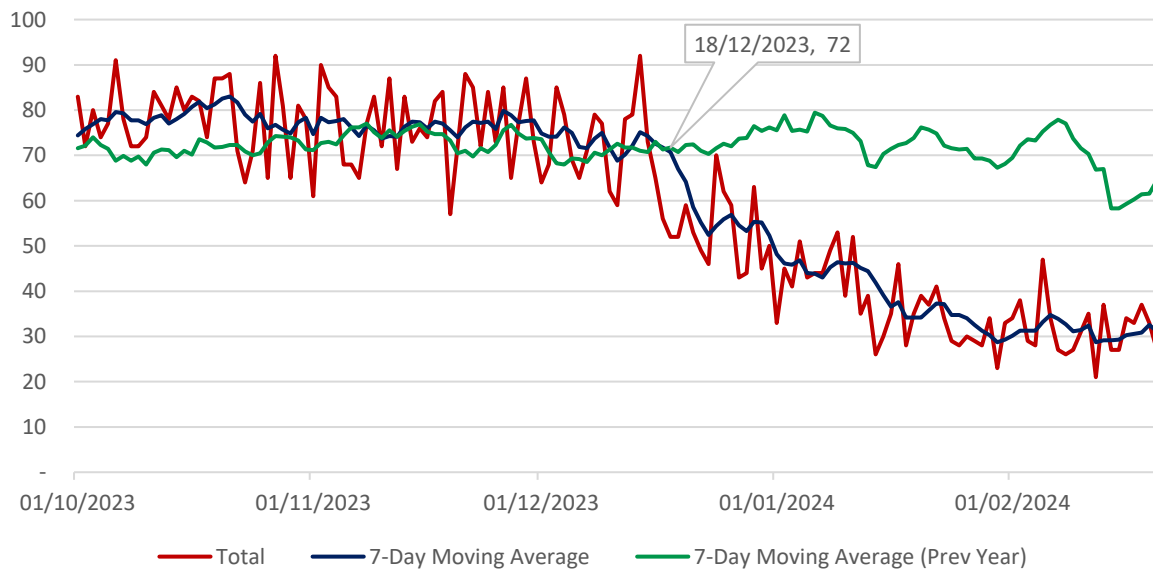
2.2. Curtailment of all forms of shipping in the Red Sea

As illustrated by the map in the appendix to this paper, the Red Sea is accessed via the Suez Canal at its northern end and via the Bab al-Mandab at its southern end. The Houthi rocket attacks have been concentrated around the Bab al-Mandab.⁸

According to data from PortWatch, shipping through the Red Sea at the Bab al-Mandab did not begin to decline until the 18 December 2023, with a renewed decline from 12 January 2024. Between 1 October and 18 December, the number of vessels passing through the Bab al-Mandab was generally at least 60 per day, and seven-day moving average number was at least 70.

However, since then, the number of vessels passing through has falling steadily. The seven-day moving average fell below 60 vessels per day on 21 December, below 50 on 1 January, and below 40 on the 15 January. The latest data shows the seven-day moving average falling to 30 vessels per day from 29 January and remaining at similar levels through the first three weeks of February, down from 58-77 vessels per day a year earlier.

Figure 2: Daily transit calls at Bab al-Mandab southern entrance to the Red Sea (vessels/day)



Data source: PortWatch⁹

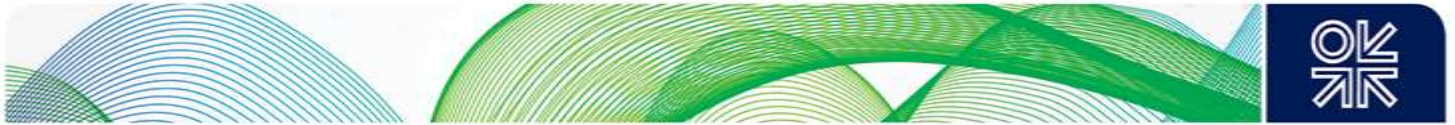
⁵ Panama Canal Authority, 2023. The driest month of October since 1950. *Press Release*, 31 October. <https://pancanal.com/en/the-driest-month-of-october-since-1950/>

⁶ Panama Canal Authority, 2023. The driest month of October since 1950. *Press Release*, 31 October. <https://pancanal.com/en/the-driest-month-of-october-since-1950/>

⁷ PortWatch is a collaborative project between the IMF and the Environmental Change Institute at the University of Oxford

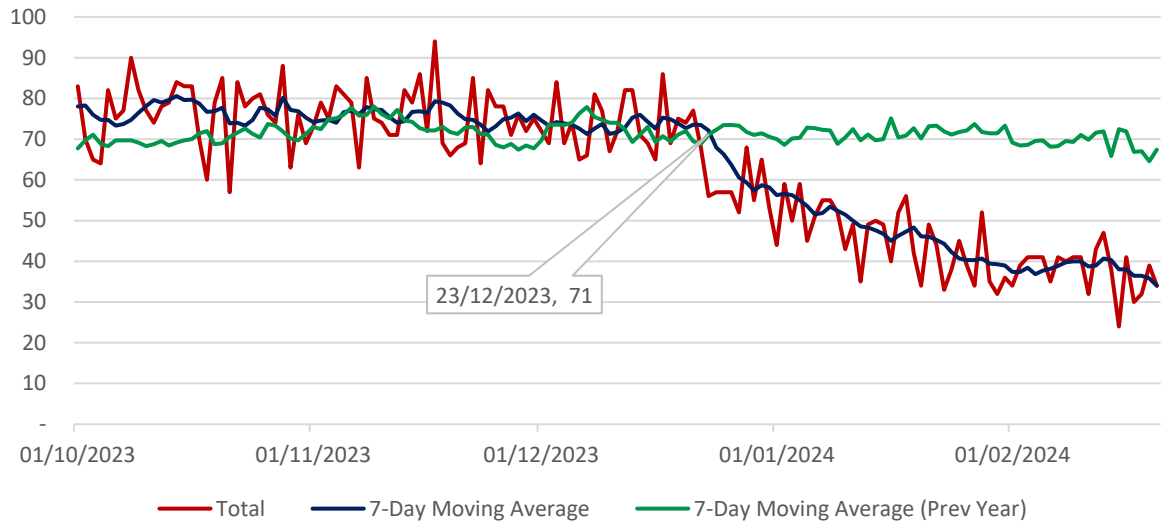
⁸ BBC, 2024. Tracking Houthi attacks in the Red Sea. *BBC News*, 20 January. <https://www.bbc.co.uk/news/world-middle-east-68031732>

⁹ PortWatch, 2024. *Trade Disruptions in the Red Sea*. <https://portwatch.imf.org/pages/573013af3b6545deae50ed1cbaf9444>



The volume of shipping through the Suez Canal is slightly higher, as it includes vessels passing from the Mediterranean to ports in Egypt, Israel, Jordan, and Saudi Arabia in the northern part of the Red Sea. Between 25 January and 20 February, the seven-day moving average number of vessels passing through the Suez Canal was 34-41 vessels per day, down from 65-72 a year earlier.

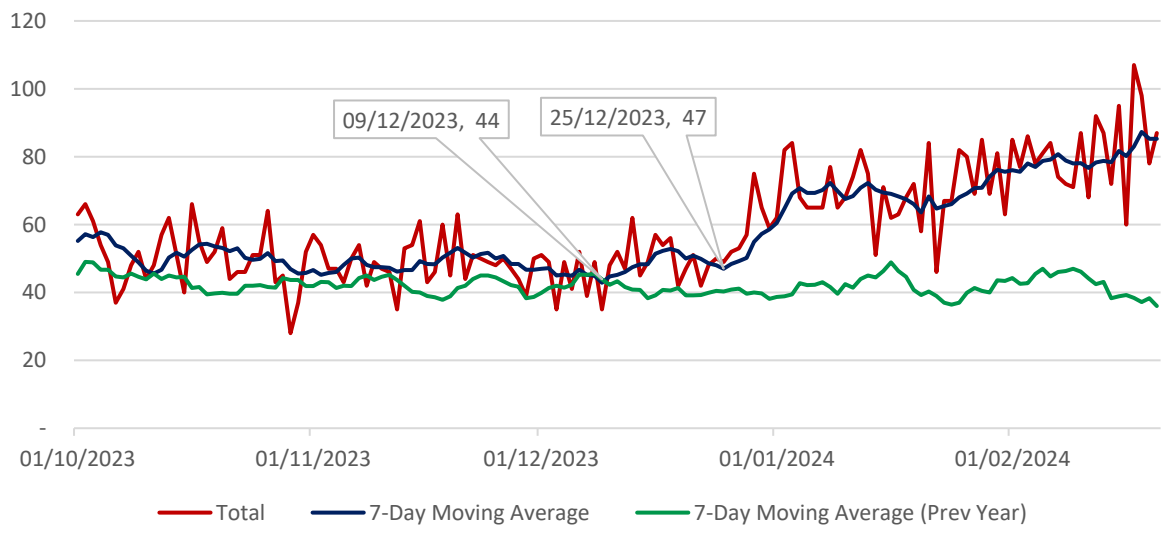
Figure 3: Daily transit calls at the Suez Canal northern entrance to the Red Sea (vessels/day)



Data source: PortWatch¹⁰

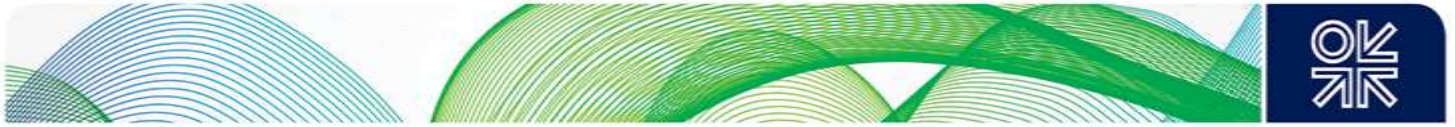
A significant proportion of vessels that can no longer pass through the Red Sea are being redirected round the Cape of Good Hope, at the southern tip of Africa. From early October to late December, the seven-day moving average was for 45-55 vessels per day transiting the Cape of Good Hope. During January that seven-day moving average fluctuated between 60 and 72 vessels per day, rising to 76 on 30-31 January, and peaking at 87 per day on 18 February.

Figure 4: Daily transit calls at the Cape of Good Hope (vessels/day)



Data source: PortWatch¹¹

¹⁰ PortWatch, 2024. *Trade Disruptions in the Red Sea*. <https://portwatch.imf.org/pages/573013af3b6545deaeb50ed1cbaf9444>
¹¹ PortWatch, 2024. *Trade Disruptions in the Red Sea*. <https://portwatch.imf.org/pages/573013af3b6545deaeb50ed1cbaf9444>



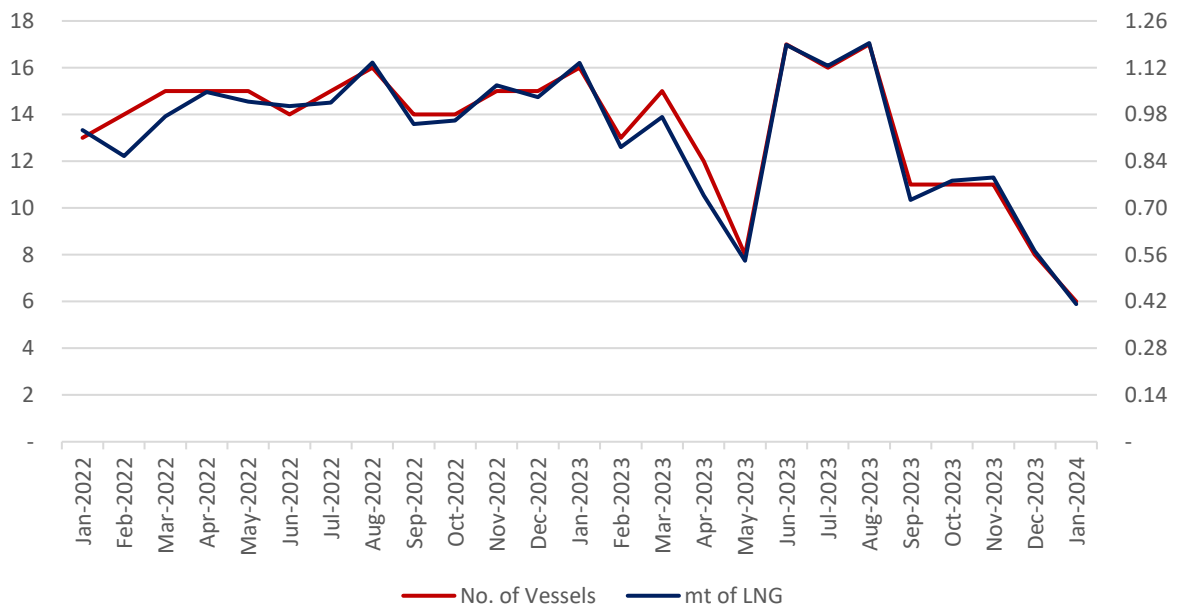
The curtailment of shipping via the Panama Canal from October 2023 onwards likely contributed to shipping via the Cape of Good Hope being higher year-on-year before the Red Sea disruption. By February 2024, with transit via the Bab al-Mandab 35-40 vessels a day lower than usual, transit via the Suez Canal 30 vessels per day lower than usual, and transit around the Cape of Good Hope 30-50 vessels per day higher than usual, the situation suggests that most of the vessels being diverted from the Red Sea route are being re-routed via the Cape of Good Hope, but with some cargoes being diverted to other markets. This is most likely with regard to fungible commodities, such as LNG.

3. Curtailment of LNG deliveries via the Panama Canal

3.1. The impact of Panama curtailments on LNG shipping, and the US in particular

While total shipping via the Panama Canal declined by around one-third between August 2023 and January 2024, the decline in LNG shipping in that same period was around two-thirds. In January 2024, just seven laden LNG carriers¹² traversed the Canal. No laden LNG carriers have passed through the Panama Canal between 28 January and 25 February 2024.

Figure 5: Monthly LNG shipping via the Panama Canal (number of cargoes and mt of LNG)



Data from Kpler LNG Platform [subscription required]. Please note this graph shows only laden (not ballast) and whole cargoes only.

This disruption primarily affects US LNG exports to Asia, as illustrated in the breakdown of the sources of the LNG cargoes that traversed the Panama Canal in the past two years (Figure 6). From January 2022 to March 2023, 12-15 US LNG cargoes per month traversed the Panama Canal, falling to eight in May, and rebounding to 15-17 per month in June-August 2023. This fell to 8-10 per month in October-December 2023, seven in January 2024, and none in the period 1-25 February. Conversely, in the calendar year 2023, just eight non-US LNG cargoes passed through the Panama Canal (seven from Trinidad & Tobago and one from Peru), the last of which traversed the Panama Canal on 19 November.

¹² Six whole cargoes and one partial cargo

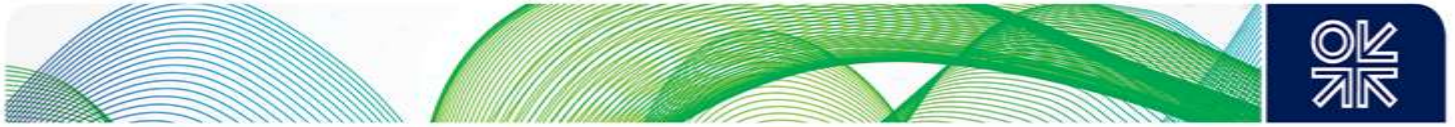
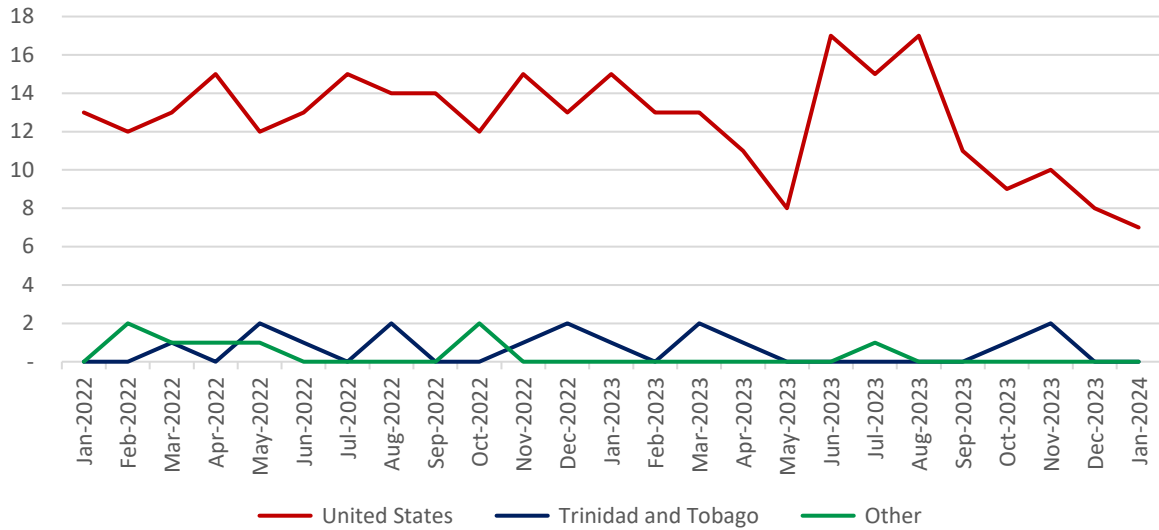


Figure 6: Monthly number of laden LNG carriers traversing the Panama Canal by cargo source



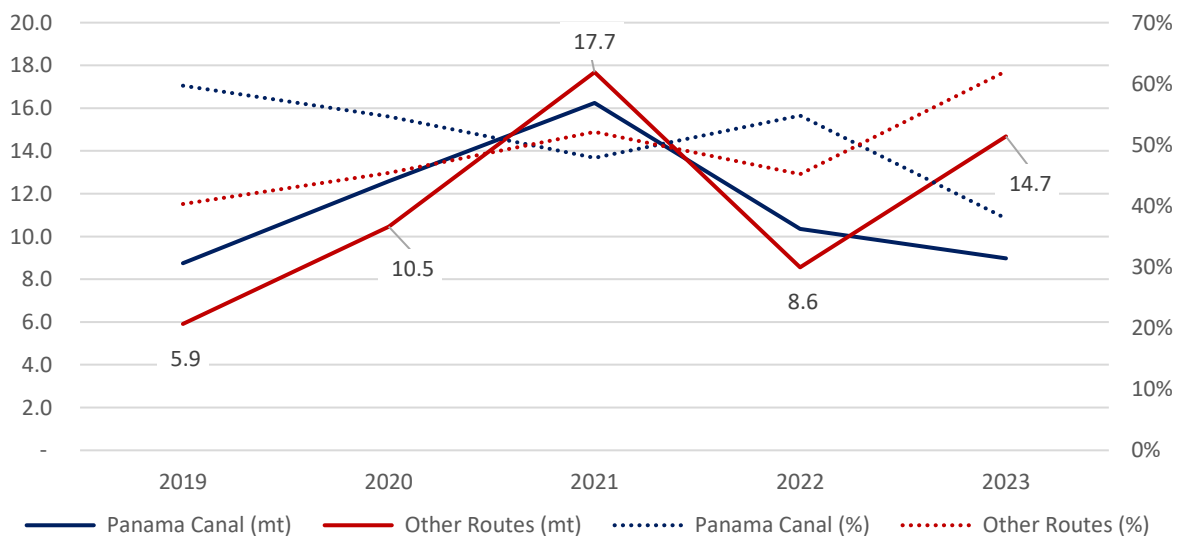
Data from Kpler LNG Platform [subscription required]

3.2. US LNG deliveries to Asia by route

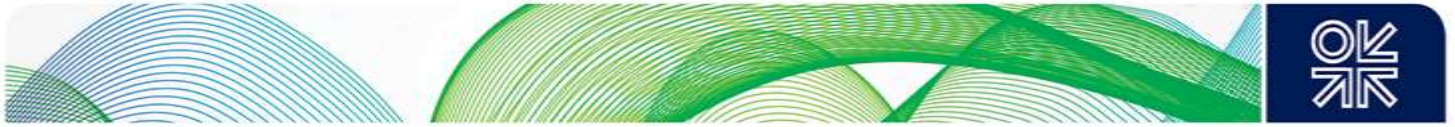
Even prior to the curtailment of shipping via the Panama Canal, LNG deliveries from the United States to Asia via non-Panama routes were normal, and should not be seen solely as a reaction to the curtailment of shipping via Panama. Between 2019 and 2023, between 5.9 and 17.7 mtpa of LNG was delivered from the United States to Asia (measured at the point of export) by routes other than the Panama Canal, with the share of those deliveries in total US LNG exports ranging from 40 to 52 per cent in 2019-2022, rising to 62 per cent in 2023.

In 2019-2022, the volumes delivered via the Panama Canal and by other routes rose and fell in parallel, following the overall trend of rising and falling US LNG exports to Asia. In 2023, the Panama Canal restrictions saw the share of deliveries via the Panama Canal fall from 63 per cent in February 2023 to 21 per cent in November 2023, 25 per cent in December 2023, and 23 per cent in January 2024.

Figure 7: US LNG annual exports to Asia by delivery route, volume (mt) and share of total (%)



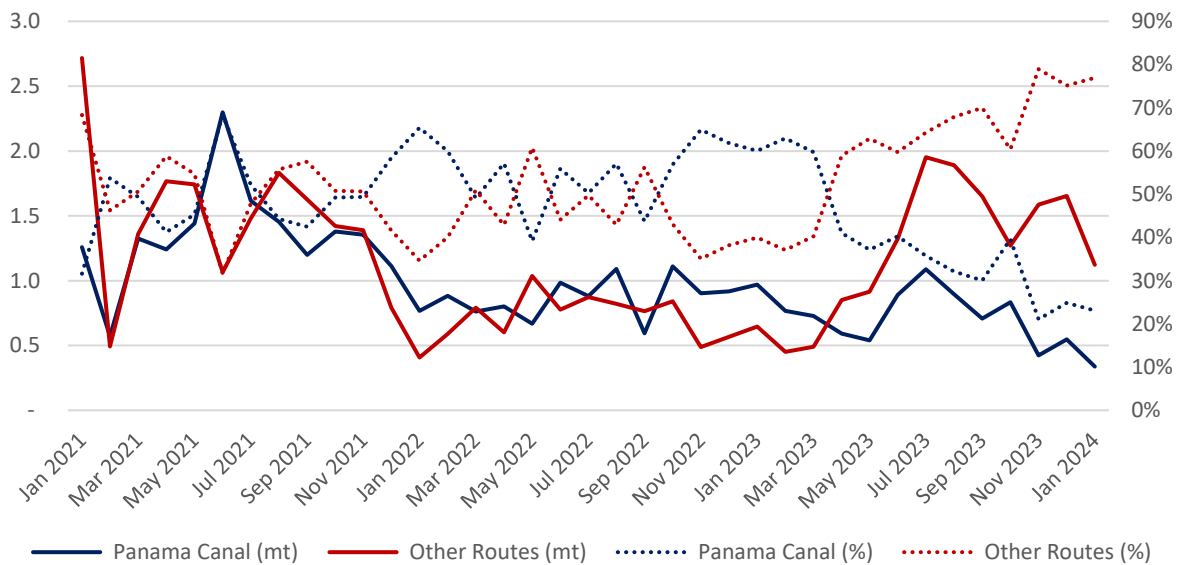
Data from Kpler LNG Platform [subscription required]



In absolute terms, US LNG exports to Asia in 2023 totalled 23.7 mt, of which 8.98 mt were delivered via the Panama Canal, 8.65 mt via the Suez Canal, and 6.03 mt via ‘Other Routes’ (primarily the Cape of Good Hope). The key point is that, prior to the Red Sea disruption, US LNG deliveries to Asia via both the Suez Canal and the Cape of Good Hope were sizeable, and the increase in deliveries via the Cape of Good Hope has offset the decline in deliveries via Suez. Therefore, US deliveries to Asia via ‘the long route’ away from Panama is not new, but the shift from Suez to the Cape has added even more distance to those non-Panamanian deliveries.

In the period between January 2021 and November 2023, US LNG deliveries to Asia via the Cape of Good Hope averaged 0.45 mt per month and 20 per cent of the total deliveries to Asia in that month. They exceeded 1.05 mt and 33 per cent of total US LNG deliveries to Asia just twice.¹³ Those historic peaks were repeated in December 2023 (1.4 mt – 63 per cent) and January 2024 (1.1 mt – 77 per cent).

Figure 8: US LNG monthly exports to Asia by delivery route, volume (mt), share of total (%)



Data from Kpler LNG Platform [subscription required]

This delivery of US LNG to Asia via the Cape of Good Hope represents an inefficient use of LNG shipping capacity that could theoretically be improved by the greater use of swaps and portfolio optimisation. This represents scope for improvement that could offset capacity constraints caused by the loss of Qatari access to the Red Sea for deliveries to Europe.

3.2. US LNG between Europe and Asia

With the Suez Canal route closed, US LNG exports now face a choice between a relatively short journey to Europe or a much longer journey to Asia round the southern tip of Africa. Since the deliveries of US LNG to Asia via the Panama Canal began to decline in July 2023, the volume of US LNG exports to Europe rose from less than 1 mt per week in July 2023 to an average of 1.25 mt per week in the period October-December 2023. That average of 1.25 mt per week was sustained in the first half of January (prior to the Suez Canal disruption) and in the weeks between 15 January and 25 February. Between July 2023 and January 2024, the share of Europe in total US LNG exports rose while the share of Asia fell, back to the relative shares seen in the first part of the year (see Figure 9 and Figure 10).

¹³ March-April 2021, with volumes of 1.25-1.5 mt and shares of 42-29 per cent

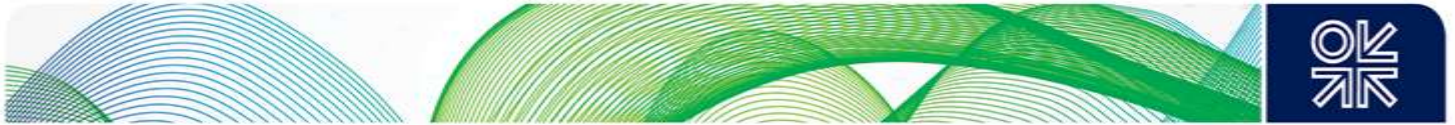
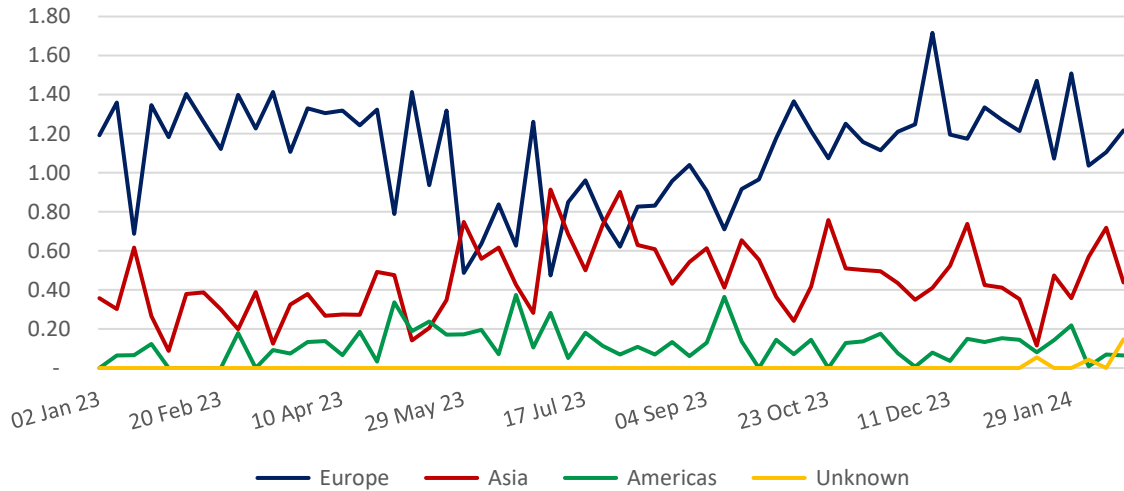
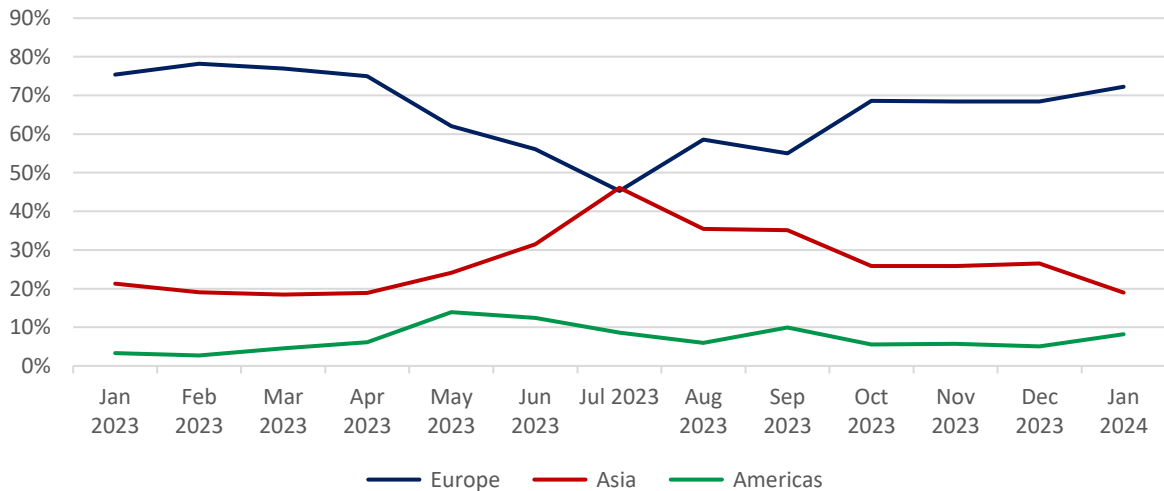


Figure 9: Weekly US LNG exports by destination since 2 January 2023 (mt per week)



Data from Kpler LNG Platform [subscription required]. Data up to week 19-25 February 2024.

Figure 10: Monthly US LNG exports by destination (share of total)



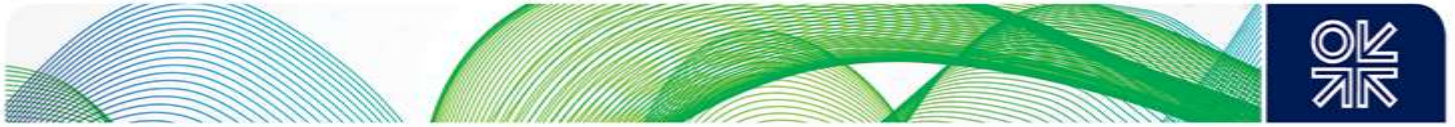
Data from Kpler LNG Platform [subscription required].

3.3. The impact of shipping distances

From Corpus Christi on the US Gulf Coast, it is just over 5,000nm (14 days) to Rotterdam. By contrast, the distance from Corpus Christi to Hong Kong is about 11,000nm (28 days) via the Panama Canal, 13,300nm (34 days) via the Suez Canal, and 14,500nm (37.5 days) round the Cape of Good Hope.

Longer distances not only mean higher shipping costs, but also reduce the effective capacity of the shipping fleet, because the vessels spend more time in transit, both laden outbound and returning ballast.¹⁴ For example, assuming three days in port during the round-trip, an additional 3.5 days each way from Corpus Christi to Hong Kong via the Cape of Good Hope rather than Suez Canal increases the round-trip time from 71 days to 78 days. This reduces the number of possible round-trips per year from 5.14 to 4.62 – a reduction of 10 per cent.

¹⁴ Data from Kpler LNG Platform. [subscription required]



Given that the United States shipped 8.7 mt of LNG to Asia via the Suez Canal in 2023, a 10 per cent reduction in that volume would imply a decrease of 0.87 mt. If all other deliveries remained unchanged, and the number of LNG carriers available to ship LNG to Asia remained constant, this constraint on shipping capacity would reduce US LNG exports by 1 per cent year-on-year in 2024.

Even prior to the disruption in the Red Sea and the restrictions at the Panama Canal, shipping distances alone made Europe a more commercially attractive destination than Asia at price parity. The restrictions at the Panama Canal since 31 July 2023 (and especially since 31 October 2023) may have influenced the continuous increase in US LNG supplies to Europe in the second half of 2023.

In this context, re-routing cargoes from the Suez Canal to Cape of Good Hope may not make the journey from the US Gulf Coast to North-East Asia prohibitive, but may be sufficient to change the cost calculations and divert some US LNG cargoes from Asia to Europe, as we have seen in mid-January. Such cost calculations will depend partly on shipping rates and partly on the price spread between Europe and Asia. The smaller the 'Asian premium', the less the incentive to undertake longer round-trip deliveries, unless obligated to do so by destination restrictions in term contracts.

4. The impact of Red Sea disruption on LNG shipping

4.1. How many LNG carriers per day usually pass through the Suez Canal?

Data from the Kpler LNG Platform records the port calls of LNG carriers, and the number of port calls at the Suez Canal serve as a proxy for the number of LNG carriers passing through the Red Sea.

According to Kpler, the number of laden LNG carriers that made port calls at the Suez Canal (travelling north to south or south to north) fell from 519 in 2021 to 465 in 2022 and 434 in 2023. Across those three years combined, the average was 39 per month, ranging from a high of 63 (January 2021) to a low of 25 (February 2022). In 2023, the monthly averages ranged from 29 to 41, with an average of 36 across the year as a whole.

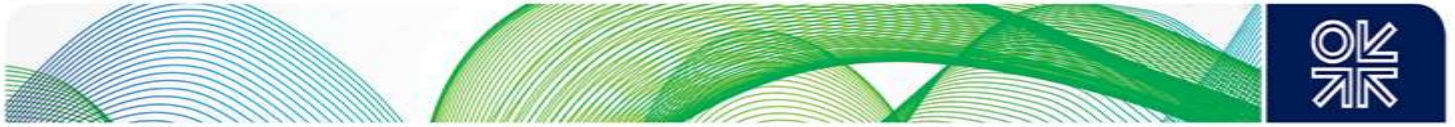
4.2. When did LNG shipping via the Red Sea cease?

In the period between 1 and 12 January 2024, eight laden LNG carriers passed through the Suez Canal, of which five were Qatari deliveries to Europe and three were Russian cargoes from the Yamal LNG liquefaction plant for delivery to Asia (one trans-shipped at Murmansk and two re-loaded at Zeebrugge). One vessel passed through the Suez Canal on 2 January, three on 6 January, two on 11 January, and one on 12 January. One ballast vessel (the *Clean Horizon*), traversed the Suez Canal after that date (16 January), on route to Zeebrugge having delivered a cargo of Russian LNG to Rudong (China). No other LNG carriers – laden or ballast – have passed through the Suez Canal since that date.

All three of those vessels that passed through on 11-12 January subsequently declared their intended return journey port calls as Las Palmas (on the Canary Islands) or Walvis Bay (in Namibia), which imply return journeys via the Cape of Good Hope. The same is true of the *Clean Horizon*, which, having reloaded at Zeebrugge on 24 January, travelled around the Cape of Good Hope on route to Shanghai.

On 15 January, Reuters reported that Qatar had halted LNG shipments via the Red Sea, while it assessed the security situation.¹⁵ At the time of writing (26 February), ship tracking data from Kpler states that there are no vessels declared for the Suez Canal, and no LNG carriers in the area of the Suez Canal, Red Sea, Bab al-Mandab, or Gulf of Aden. It is likely that, having fallen to zero in mid-January, LNG shipping via the Red Sea will remain at that level until the security situation improves.

¹⁵ El Dahan, M., Chow, E., and Mills, A., 2024. QatarEnergy halts Red Sea LNG shipping amid attacks, seeking security advice. *Reuters*, 15 January. <https://portwatch.imf.org/pages/573013af3b6545deab50ed1cbaf9444>



4.3. Which LNG exporters and importers are most affected by Red Sea disruption?

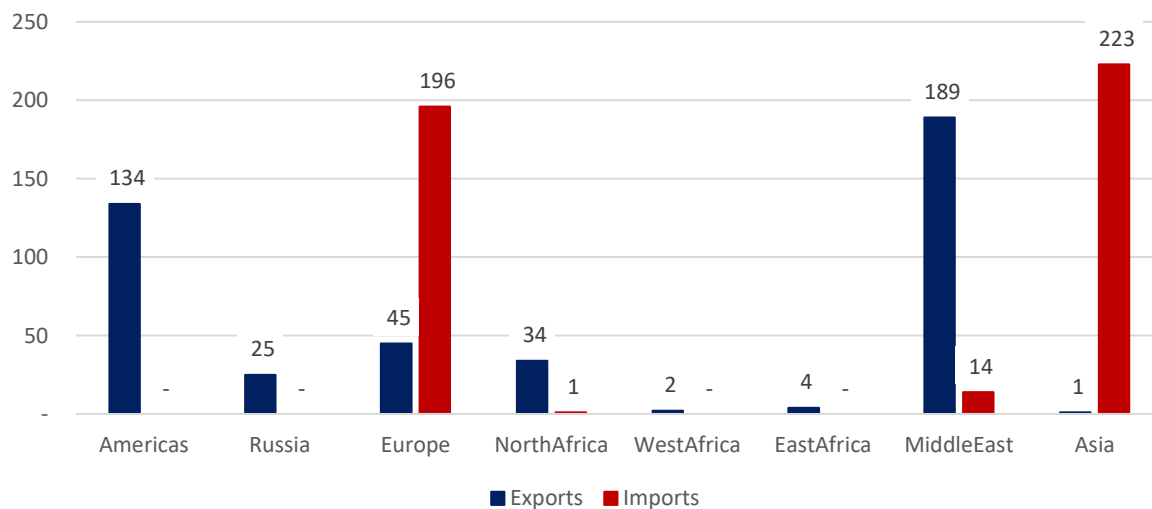
Of the 434 LNG cargoes that passed through the Suez Canal in 2023, a combined 240 (55 per cent) traversed the Suez Canal from north to south, destined for the Middle East (Jordan or Kuwait) or Asia. In the opposite direction, 195 cargoes (45 per cent) traversed the Suez Canal from south to north, destined for Europe (EU-27 and the UK).¹⁶

In terms of export cargoes that passed through the Suez Canal from north to south, 130 were sourced from the United States, and four from elsewhere in the Americas. The 45 cargoes that originated in Europe (EU-27, UK, and Turkey) were re-exports, of which 34 (75 per cent) were re-loaded at Zeebrugge in Belgium and a further seven (15 per cent) were reloaded at Montoir in France, plus two each from Spain and Turkey. In addition, 34 cargoes from North Africa (Algeria & Egypt) and 25 cargoes from Russia were joined by two cargoes delivered from Nigeria to India.

In terms of exports that traversed the Suez Canal from south to north, Qatar accounted for 180 cargoes, Oman 8 cargoes, and UAE one cargo. In addition, four cargoes originated from Mozambique and one from Indonesia. This gives a total of 194 cargoes, of which 93 per cent originated in Qatar.

Overall, the south-to-north export flow is overwhelmingly Qatari cargoes destined for Europe, while the north-to-south flows are more diverse, with cargoes from the United States taking the largest share (54 per cent), with the rest mostly split between Russian cargoes (direct from Yamal), European reloads, and North African cargoes (10-19 per cent each).

Figure 11: Number of LNG carriers that traversed the Suez Canal in 2023, by export and import



Data from Kpler LNG Platform [subscription required]

4.4. What volume of LNG is affected by the disruption at Panama and the Red Sea?

In 2023, total, global gross LNG exports amounted to 412.3 mt. Of that volume, 32.4 mt was delivered via the Suez Canal, 10.3 mt via the Panama Canal, 2.3 mt via the Northern Sea Route, and 367.3 mt via 'Other Routes'. Therefore, deliveries via the Suez Canal accounted for 7.9 per cent of total LNG shipping in 2023, while shipping via the Panama Canal accounted for a further 2.5 per cent. Given the ongoing curtailment of LNG shipping via the Panama Canal, the fact that LNG shipping via those two canals accounted for just over 10 per cent of global LNG shipping in 2023 means that disruption to those flows is potentially significant to the global LNG market, but not critical.

¹⁶ Since January 2022, Turkey has imported just five LNG cargoes via the Suez Canal, of which three arrived in Nov-Dec 2022 and two in Jan-Feb 2023. Those five cargoes were sourced from Qatar, Oman, Mozambique, and Indonesia.

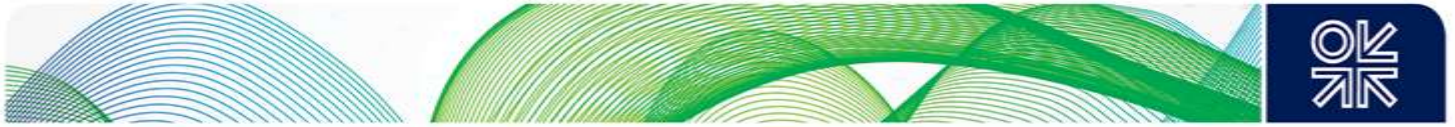
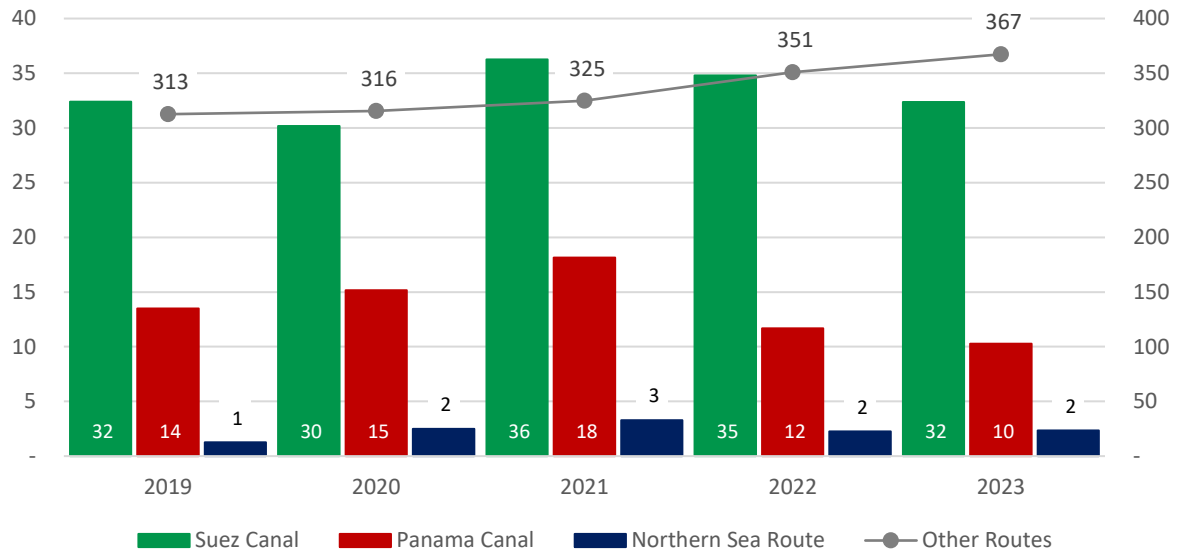


Figure 12: Global LNG exports by route (mt per year)



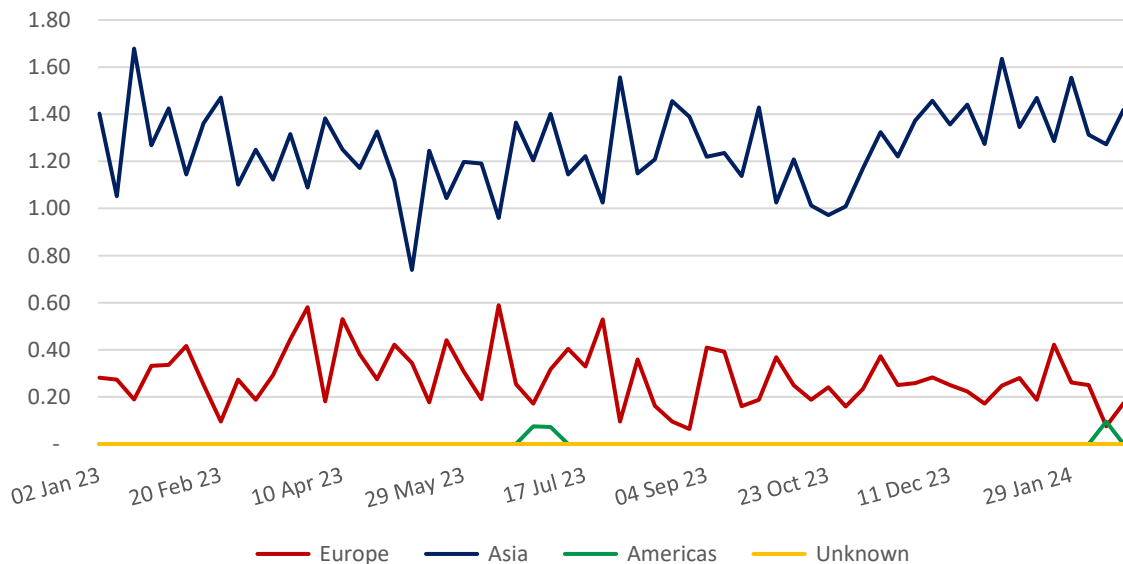
Data from Kpler LNG Platform [subscription required]

5. The impact on Qatari LNG exports

5.1. Qatari LNG export volumes by destination in 2023

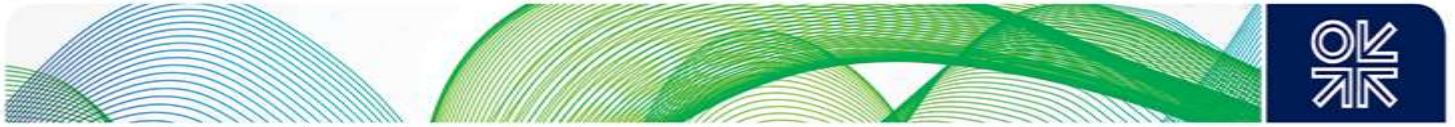
In 2023, Qatar exported 79.8 mt of LNG, of which 15.1 mt (19 per cent) was delivered to Europe, almost exclusively via the Suez Canal. In the 60 weeks between the week commencing 2 January 2023 and the week commencing 19 February 2024, all but four weeks saw Qatari LNG exports between 1.19 and 1.82 mt, at an average of 1.54 mt, which may be considered a 'normal' level of Qatari LNG exports.¹⁷

Figure 13: Qatari LNG exports by destination (mt per week)



Source: Data from Kpler LNG Platform [subscription required]. Data up to week 19-25 February 2024.

¹⁷ Data from Kpler LNG Platform. [Subscription required].



Of those weekly Qatari export volumes in 2023, an average of 0.29 mt was delivered to Europe and 1.24 mt delivered to Asia. In 2023 as a whole, 1,053 cargoes left Ras Laffan, of which 818 were delivered to Asia, 56 to the Middle East (Kuwait and UAE), and two to Argentina. The remaining 177 were delivered to Europe, at an average of 3.4 cargoes per week. Of the 177 cargoes delivered to Europe, only one did not pass through the Suez Canal. Throughout 2023, Asia was the primary market for Qatari LNG exports.

In December 2023, Qatari exports averaged 0.23 mt to Europe and 1.38 mt to Asia. In the six weeks between 15 January and 25 February (since the cessation of LNG shipping in the Red Sea), those volumes have remained similar: 0.23 mt to Europe and 1.39 mt to Asia, with the remaining 0.02 mt to the Americas. In that period between 15 January and 25 February, the volume of cargos loaded (1.63 mt per week) was slightly higher than the average for 2023 as a whole (1.53 mt). The week 12-18 February was notable as only the third week since at least 1 January 2009 that no cargoes destined for Europe were loaded at Ras Laffan, although two were loaded on 20-21 February.

The monthly cargo loadings do not show much change between December 2023 and January 2024. The total number of cargo loadings in December 2023 (95) and January 2024 (96) were similar, as were the number of cargoes destined for Asia (80 in December and 79 in January), for the Middle East (2 in December and 4 in January), and for Europe (13 in both December and January). A further 73 cargoes were loaded in the period 1-25 February, with 92 planned for February as a whole.

Taken together, these data suggest that total Qatari cargo loadings and export volumes (measured at the point of export) have not been negatively impacted by the disruption. The fact that exports destined for Europe are continuing suggests an acceptance of re-routing via the Cape of Good Hope, although the weekly cargo loadings destined for Europe could decline if cargoes begin to be diverted to other markets, and the longer round trips begin to negatively impact effective shipping capacity.

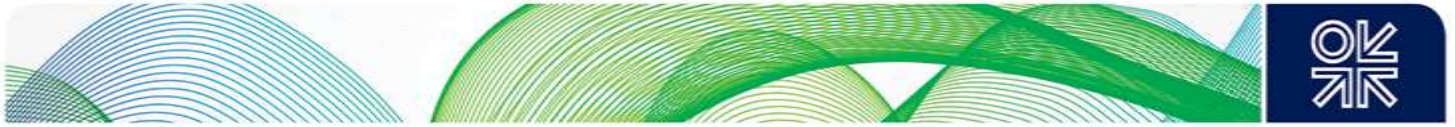
5.2. Qatari LNG exports since 12 January 2024

Analysis of individual cargoes illustrates the re-routing that took place since January 2024. Of the 21 cargoes destined for Europe that were loaded between 1 January and 25 February, the *Fraiha* (loaded at Ras Laffan on 1 January) and *Al-Kharsaah* (loaded on 2 January) passed through the Suez Canal on 11-12 January, but returned to Qatar via the Cape of Good Hope. These followed two other cargoes (*Al-Gattara* and *Al-Rayyan*) that left Ras Laffan on 27/31 December, passed through the Suez Canal on 6/11 January, delivered cargoes to Italy/ Spain, and returned via the Cape of Good Hope.

In 7-15 January, four cargoes left Ras Laffan for Europe, declared for Suez, and then diverted round the Cape of Good Hope. These were the *Al-Huwaila* (7 January), *Al-Nuaman* (10 January), *Al-Ghariya* (10 January), and *Mesaimmeer* (15 January). Thereafter, the 15 vessels that left Ras Laffan made directly for the Cape of Good Hope.¹⁸ In the last few days of February, one more cargo is scheduled for delivery to Europe (the *Zekreet* on 27 February), while three scheduled for departure have not declared their destination. If one of those three is delivered to Europe, this implies 10 cargoes for Europe in February, down from 13 in both December 2023 and January 2024. This could imply the diversion of 25 per cent of Qatari cargoes from Europe to Asia, while the remainder are re-routed via the Cape of Good Hope.

A clear chronology can be established regarding Qatari LNG cargoes bound for Europe: 1) the vessels that left Ras Laffan on 1-2 January passed through the Suez Canal on 11-12 January and made their return journeys via the Cape of Good Hope, 2) vessels that left Ras Laffan between 7 and 15 January declared for Suez but diverted to the Cape of Good Hope, and 3) vessels that left Ras Laffan after 15 January made directly for the route round the Cape of Good Hope, which is consistent with the Qatari announcement on 15 January noted in the introduction to this paper.

¹⁸ *Al-Sheehaniya* and *Al-Khor* (20 January), *Al-Bahiya* (21 January), *Celsius Glarus* (23 January), *Umm Al-Amad* (25 January), *Al-Rekayyat* (26 January), *Al-Shamal* (29 January), *Maran Gas Mystras* (1 February), *Al-Ghashamiya* (3 February), *Al-Kharaitiyat* (7 February), *Al-Wakrah* (8 February), *Tembek* (10 February), *Stena Clear Sky* (12 February), *Al-Thumama* (20 February), and *Grace Dahlia* (21 February).



5.3. Shipping distances from Qatar to Europe and Asia

While the shipping distances to North-West Europe and North-East Asia are comparable when the Suez Canal is available, the difference between the two is stark when deliveries to Europe require a trip round the Cape of Good Hope. The journey from Qatar to Rotterdam is 6,500 nautical miles (nm) (17 days) via Suez Canal, but 11,000nm (29 days) round the Cape of Good Hope.¹⁹ From Qatar to Asia, it is 5,000nm (13 days) to Hong Kong and 6,500nm (17 days) to Tokyo via Sri Lanka and Singapore.²⁰

This could encourage Qatari volumes to divert to Asia where possible, subject to contractual/destination restrictions, the ability of the seller to find a counterparty, the spread between European and Asian spot LNG prices, and the ability to secure regasification capacity in Asia. While the data from Kpler on LNG shipping highlights the re-routing of deliveries from Qatar to Europe away from the Red Sea route, as discussed above, the extent to which Qatari LNG export sales have shifted from Europe to Asia will only become clear in the coming weeks and months.

5.4. Which European regasification terminals receive Qatari LNG?

Within Europe, the supply of Qatari LNG is relatively concentrated. In 2023, 93 per cent of Qatari LNG supply to Europe (14.1 mt) was landed at six European regasification terminals: Rovigo (Italy), Zeebrugge (Belgium), South Hook (UK), Swinoujscie (Poland), Fos Cavaou (France), and Barcelona (Spain). Two of these terminals alone – Rovigo (4.8 mt, or 31 per cent of the total) and Zeebrugge (3.3 mt, 21 per cent) – accounted for just over half the European imports of Qatari LNG in 2023. South Hook, Swinoujscie, and Fos Cavaou each accounted for 11-12 per cent (1.7-1.8 mt), and Barcelona 6 per cent (0.9 mt). The remaining 7 per cent (1.1 mt) was landed at Gate Rotterdam (Netherlands), Isle of Grain and Dragon (UK), Cartagena (Spain), and Piombino (Italy).

The relative impact of the curtailment of Qatari LNG supply will be felt particularly strongly in Italy, where Qatar was the single-largest LNG supplier in 2023 (41 per cent of total supplies) and in Poland, where Qatar was the second-largest LNG supplier in 2023 (38 per cent of the total). In the UK, Qatar was also the second-largest supplier, but supplied only 14 per cent of total LNG imports. In France and Spain, Qatar was far from the largest supplier, providing 8 per cent and 5 per cent of total imports, respectively. Finally, Belgium is a different case, given that 20 per cent of its imports were re-exported in 2023, namely Russian cargoes trans-shipped for delivery to Europe. If those trans-shipped volumes are excluded, Qatar supplied 39 per cent of Belgium's net LNG imports in 2023. Therefore, the curtailment of Qatari LNG supply to Europe will have its greatest impact on Italy, Poland, and Belgium, where Qatar accounted for roughly 40 per cent of net LNG imports in 2023.

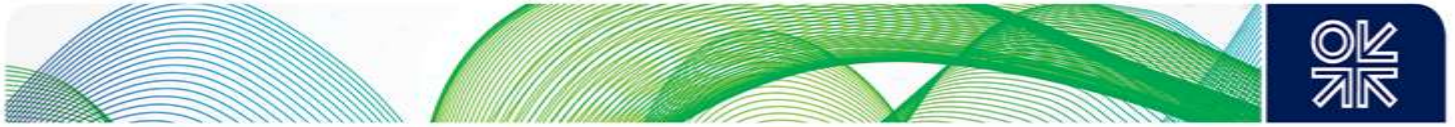
5.5. The implications of longer shipping distances for Qatari LNG

To gain a more precise understanding of the extent of the curtailment of volumes delivered due to longer journey times, it is possible to use ship tracking data (from Kpler) to examine the actual number of days between loading at Ras Laffan and discharging at European regasification terminals in 2023 and the first half of January 2024, for LNG carriers that made their deliveries via the Suez Canal with no diversions to deliver partial cargoes to other regasification terminals on route. This can then be compared with the data for scheduled port calls for LNG carriers that have already departed Ras Laffan and are currently on route to deliver cargoes to Europe via the Cape of Good Hope.

As of 26 February, eight Qatari cargoes have been delivered via the Cape of Good Hope, with the first arriving on 9 February. The first Qatari LNG carrier to make the complete round-trip from Ras Laffan to Europe and back via the Cape of Good Hope is due to arrive back at Ras Laffan on 5 March, after a 55-day round-trip. The remaining seven cargoes are expected to have round-trip times of 63-73 days. A further seven cargoes are en route, with the earliest having departed Ras Laffan on 26 January. Calculations can be made specifically for Rovigo, Zeebrugge, Swinoujscie, and Barcelona. South Hook and Fos Cavaou are not scheduled to receive any Qatari cargoes in February. However, the physical

¹⁹ Author's estimate based on Google Maps

²⁰ Data from Kpler LNG Platform. [subscription required]. Number of days based on a constant speed of 16 knots.



shipping distance from Ras Laffan via the Cape of Good Hope to South Hook is similar to Zeebrugge and the shipping distance to Fos Cavaou is similar to the distance to Barcelona, and so Zeebrugge and Barcelona can be used as a basis for calculations for South Hook and Fos Cavaou.

Figure 14: Round-trip shipping distances from Ras Laffan to European regasification terminals and the potential reduction in deliveries to those terminals in 2024

	Rovigo	Zeebrugge	South Hook	Swinoujscie	Fos Cavaou	Barcelona	Total
2023 Average Days Per One-Way Trip	19.5	21.0	23.5	25.5	18.0	17.0	20.8
Scheduled Number of Days Per One-Way Post-Jan 2024	33.0	29.5	29.5	36.0	33.0	32.0	32.2
Extra Number of Days	13.5	8.5	6.0	10.5	15.0	15.0	11.4
	-	-	-	-	-	-	-
Round Trip via Suez	42.0	45.0	50.0	54.0	39.0	37.0	44.5
Round Trip via Cape	69.0	62.0	62.0	75.0	69.0	67.0	67.3
Round Trips per Year via Suez	8.7	8.1	7.3	6.8	9.4	9.9	8.2
Round Trips per Year via Cape	5.3	5.9	5.9	4.9	5.3	5.4	5.4
	-	-	-	-	-	-	-
Volume delivered in 2023 (MMcm of natural gas)	6,338	4,308	2,389	2,355	2,219	1,219	18,828
Volume delivered in 2024 (MMcm of natural gas)	3,858	3,127	1,927	1,696	1,254	673	12,534
Year-on-Year Decline (MMcm of natural gas)	2,480	1,181	462	659	965	546	6,294

Source: Data on shipping distances and volumes delivered from Kpler. Calculations by the author.

Taking Rovigo as an example, 2023 saw an average of 19.5 days between loading at Ras Laffan and discharging at Rovigo. For cargoes loaded at Ras Laffan in Jan-Feb 2024, currently en route via the Cape of Good Hope, and scheduled to arrive at Rovigo in Feb-Mar 2024, the one-way journeys are set to average 33 days – an increase of 13.5 days over the journeys made via the Suez Canal in 2023.

By doubling the number of days required to make the one-way trip (to make it a round-trip), plus three days in total at port at Ras Laffan and Rovigo, the round trip via Suez in 2023 averaged 42 days, but this is set to rise to 69 days for trips via the Cape of Good Hope in since the cessation of LNG shipping via the Red Sea. This number of days per round trip suggest it was possible for each vessel to make 8.7 round trips in 2023, but this will fall 5.3 round trips per year via the Cape of Good Hope.

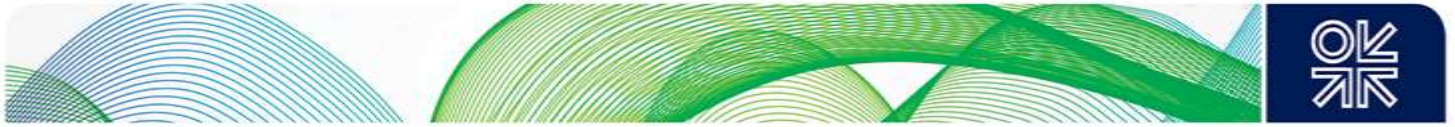
Rovigo received just under 6.4 Bcm of natural gas in the form of LNG from Qatar in 2023. If the number of round trips per vessel falls from 8.7 to 5.3, and the number of vessels bringing LNG from Ras Laffan to Rovigo remains constant, then the volume of LNG delivered to Rovigo could fall to 3.9 Bcm in 2024 – a decline of 2.5 Bcm year-on-year.

When this same set of calculations is applied to the other five European regasification terminals listed in Figure 14, the total volume of Qatari LNG received in 2023 (18.8 Bcm) could fall by 6.3 Bcm (33 per cent), to 12.5 Bcm in 2024, if deliveries continue to be made via the Cape of Good Hope.

Finally, given that the six regasification terminals listed in Figure 14 received 93 per cent of Qatari LNG supply to Europe in 2023, a 33 per cent reduction could see the total volume of Qatari LNG supply to Europe fall from 20.2 Bcm in 2023 to 13.5 Bcm in 2024 – a reduction of 6.7 Bcm.

5.6. Conclusions regarding Qatari LNG

The calculations above suggest that, if the same number of vessels are used to bring Qatari LNG to Europe as in 2023, the longer round-trip times could see the volume of Qatari exports to Europe fall by 6.7 Bcm (4.9 mt) in 2024, which would equate to around 6.1 per cent of Qatar’s total exports. At the



time of writing (26 February), the early indicators from LNG carrier vessel tracking data show that Qatari cargo loadings destined for Europe are being sustained at a rate of 2-3 cargoes per week, down from 3-4 cargoes per week in 2023. This suggests that while most volumes are continuing to be delivered (albeit more slowly), some volumes are also being diverted to other destinations away from Europe. If a portion of Qatari cargoes are diverted from Europe to Asia, this will exacerbate the year-on-year decline in Qatari LNG deliveries to Europe caused by longer shipping times. These trends will become clearer in the coming weeks and months, if the Red Sea disruption persists.

If 25 per cent of Qatar's 15.1 mt of exports to Europe in 2023 are diverted to other markets, this would imply a drop of 3.8 mt. If the remaining 11.3 mt is reduced by one-third due to longer round-trip times using a fixed number of LNG carriers, the volume of Qatari LNG supplied to Europe could fall to 7.5 mt. The overall impact would be Qatari LNG supply to Europe falling by half, while the total volume of Qatari LNG supplied to the global market would fall by 3.8 mt (just under 5 per cent of Qatar's total exports in 2023). This alone would imply a decline in total gross global LNG supply of 0.9 per cent year-on-year.

6. The impact on Russian LNG exports

6.1. Exports from Yamal LNG to Europe and Asia

The geography of Russia's LNG exports to Asia means that the cessation of LNG shipping via the Red Sea also has an impact on Russian LNG exports. Russia has two large-scale LNG export terminals: Sakhalin-II on the island of Sakhalin in Russia's Far East (which delivers exclusively to the Asian market) and Yamal LNG on the Yamal Peninsula in North-West Russia. Exports from Yamal are divided between Europe and Asia as destination markets. Since Yamal reached its full capacity in 2019, the share of Yamal in annual exports from Yamal and Sakhalin-II combined rose from 62 per cent in 2019-2020 to around 66 per cent in 2021-2023.²¹

6.2. The Northern Sea Route and trans-shipment in NW Europe for deliveries via Suez

Deliveries to Europe accounted for 67 per cent of total exports from Yamal by destination in 2021, rising to 73-74 per cent in 2022 and 2023. Conversely, the Asian share stood at 33 per cent in 2021, but fell to 26-27 per cent in 2022 and 2023 in the context of higher European prices. Of the volumes delivered to Asia, 52 per cent were delivered directly to Asia via the Northern Sea Route along Russia's Arctic coastline in 2021, with the share of the Northern Sea Route falling to 42-43 per cent in 2022 and 2023.

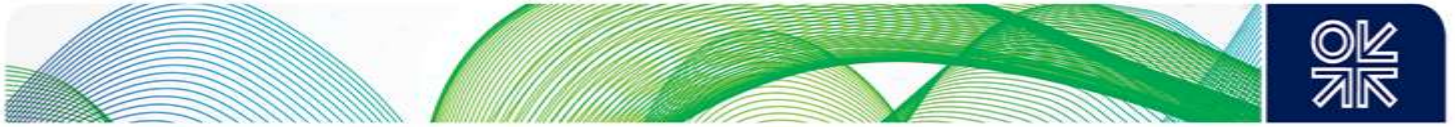
Conversely, the share of Yamal exports to Asia delivered via the Suez Canal stood at 43 per cent in 2021, rising to 55 per cent in 2022 and 51 per cent in 2023. The share of 'other routes' fluctuated between 3 and 7 per cent in 2021-2023.²²

The deliveries from Yamal to Asia via the Suez Canal require trans-shipment. Sometimes this takes place at the Russian port of Murmansk, using the Saam Floating Storage Unit (since 2023). Otherwise, cargoes are delivered to European regasification terminals, namely Zeebrugge (Belgium) or Montoir (France) for ship-to-ship transfer. In addition, at Zeebrugge, the trans-shipment process means that cargoes are offloaded into the terminal's storage tanks, and then reloaded onto other LNG carriers. In the case of both ship-to-ship and trans-shipment, ice-class LNG carriers transport cargoes from Yamal LNG to Murmansk, Zeebrugge, or Montoir, with cargoes reloaded onto standard LNG carriers for onward delivery.

For this reason, Russian LNG deliveries to Asia via Suez and the Red Sea are reported as deliveries from Murmansk, Zeebrugge, or Montoir to Asia. The Northern Sea Route is only passable during half the year, when ice cover is at its lowest. In 2023, this was between June and November. In 2021 and 2022, the navigation season also began in June but extended into December. It is also notable that

²¹ Data from Kpler LNG Platform. [subscription required]

²² Data from Kpler LNG Platform. [subscription required]



even when the Northern Sea Route is being used, Russian LNG continues to be delivered to Asia via the Suez Canal.²³

Therefore, Yamal accounts for around two-thirds of Russia’s large-scale LNG exports (and 63 per cent of total Russian LNG exports). Deliveries to Asia account for 26-27 per cent of Yamal exports, meaning that Yamal deliveries to Asia account for 17-18 per cent of Russia’s large-scale LNG exports. On an annual basis, the fact that 51-55 per cent of Yamal deliveries to Asia are made via Suez, means that – again, on a purely annual basis – around 9-10 per cent of Russia’s large-scale LNG exports are impacted by the Red Sea disruptions.

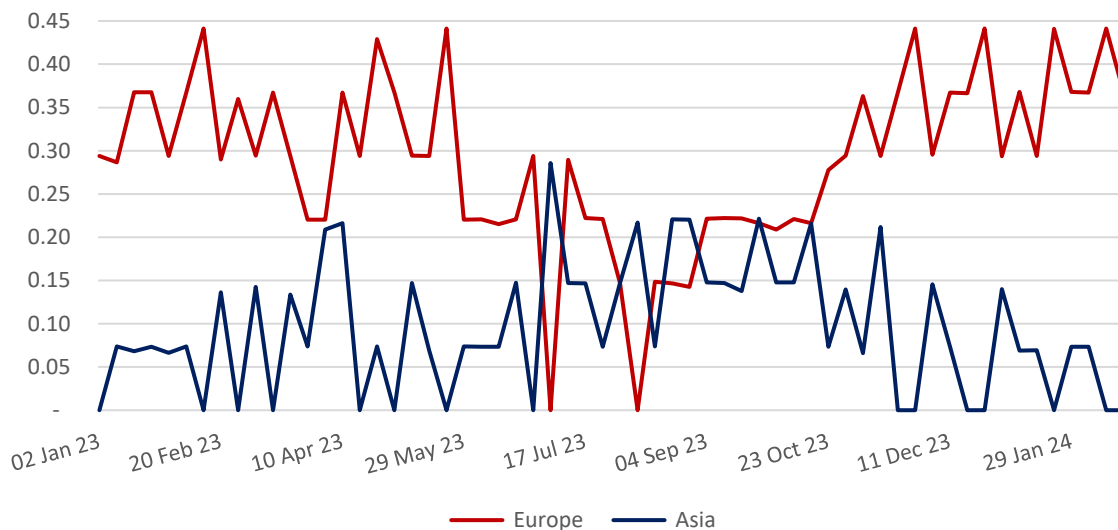
However, it should be noted that this disruption has a disproportionate impact in the period from December to May, when the shipment of LNG from Yamal to Asia via the Northern Sea Route is not possible. For example, in 2023, LNG shipments from Yamal to Asia via Suez ranged from 0.07 mt (August) to 0.44 mt (April). Therefore, while the impact of disruption to Russian LNG shipments via the Red Sea will be most strongly felt in the coming months (February to May), the impact will not completely dissipate even once the Northern Sea Route navigation season begins in June.²⁴

6.3. Yamal LNG export volumes by destination in 2023

In 2023, Yamal LNG exported 19.9 mt of LNG, of which 14.6 mt (73 per cent) was delivered to Europe and 5.3 mt (27 per cent) to Asia. This equates to 0.28 mt per week to Europe and 0.10 mt per week to Asia. The four largest recipients of LNG from Yamal in 2023 were Spain (5.0 mt), Belgium (4.5 mt), China (4.1 mt), and France (3.6 mt) – they accounted for 86 per cent (17.2 mt) of the total exports from Yamal LNG in 2023. Of the 4.5 mt delivered to Belgium at Zeebrugge, 1.24 mt was reloaded onto LNG carriers chartered by Yamal LNG, 0.44 mt onto LNG carriers chartered by PetroChina, which holds a long-term SPA with Yamal LNG, and 0.13 mt onto LNG carriers chartered by Gunvor, which holds a term SPA with Novatek.²⁵

The key point regarding exports from Yamal LNG is that the SPA with PetroChina (reportedly 3.0 mtpa DES from 2018 to 2040) is the only contract associated with the project that is certain to deliver to Asia, and is likely underpinning the continued deliveries from Yamal to China via the Cape of Good Hope.

Figure 15: Yamal LNG exports by destination (mt per week)

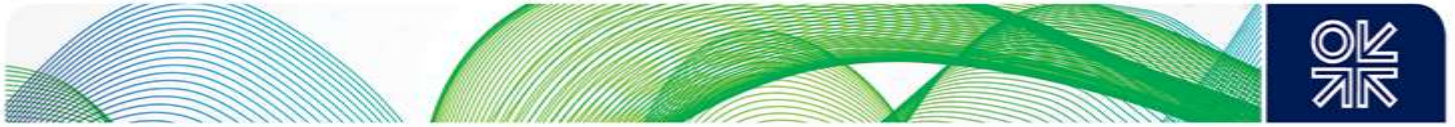


Source: Data from Kpler LNG Platform [subscription required]. Data up to week 12-18 February 2024.

²³ Data from Kpler LNG Platform. [subscription required]

²⁴ Data from Kpler LNG Platform. [subscription required]

²⁵ Data from Kpler LNG Platform. [subscription required]



6.4. Yamal LNG exports since 12 January 2024

Recent cargo loadings illustrate the impact on Russian LNG flows to Asia, at a time when the Northern Sea Route is closed to navigation. Between 1 January and 25 February, 48 cargoes were loaded at Yamal LNG, including 10 in the period 1-12 January, and 38 in the period 13 January to 18 February.

Of the ten cargoes exported in 1-12 January, seven were delivered to Europe, and three were transferred ship-to-ship for delivery to Spain (on the *Shaolin*), Taiwan (on the *Yenisei River*), and China (on the *LNG Geneva*). The *Yenisei River* reached the Strait of Gibraltar on 15 January, before diverting to the Cape of Good Hope, while the *LNG Geneva* declared for Port Said (Suez Canal) on 8 January before updating to the Cape of Good Hope on 15 January. Of the 38 cargoes exported from 13 January to 25 February, two were transferred ship-to-ship for onward delivery to Asia via the Cape of Good Hope. These were the *Clean Vision* (13 January) and *Clean Horizon* (17 January). The remaining 36 cargoes were shipped to Europe, mostly to Zeebrugge, Montoir, Dunkerque, or to one of several terminals in Spain, where only Zeebrugge saw any of those full-sized cargoes re-exported.

In the period 1-12 January, two cargoes were re-exported from Zeebrugge after trans-shipment, both delivered to China via the Cape of Good Hope. The *Trader ii* and *Lena River* reached Port Said at the entrance to the Suez Canal on 12 and 15 January respectively, before turning around and sailing to Asia via the Cape of Good Hope. In the period 13 January to 25 February, two cargoes were re-exported from Zeebrugge to Spain, three to China, and one to Taiwan, all via the Cape of Good Hope.²⁶

6.5. Shipping distances from Zeebrugge to Asia via Suez and Cape of Good Hope

The impact on shipping distances due to these diversions is substantial. The distance from Zeebrugge to Hong Kong via the Suez Canal is 9,800nm (25.5 days), but the journey to Hong Kong via the Cape of Good Hope is around 13,000nm (34 days) – a 33 per cent increase over the Suez Canal route.²⁷

Using real-world examples, cargoes that arrived in China from Zeebrugge in 2023 had an average journey time of 28 days, covering an average distance of 10,400nm. The first, and thus far only, cargo to deliver LNG from Zeebrugge to China departed Zeebrugge on 30 December 2023 and discharged its cargo in Qidong 37 days later, on 6 February, after a journey of 14,500nm. Cargoes that arrived in China from the Russian ship-to-ship transfer point in Murmansk faced average journeys of 38 days, or 13,800nm. This is compared to journeys of 9 days (2,750nm) from Yamal LNG to Zeebrugge.

Given that Europe is so much closer to Yamal than Asia, it is hardly surprising that the majority of Yamal LNG exports are destined for the European market. However, it is worth recalling that in addition to the 3 mtpa SPA between Yamal LNG and PetroChina for supply from Yamal LNG, the Yamal LNG project company is 30 per cent Chinese-owned (20 per cent CNPC and 10 per cent Silk Road Fund).

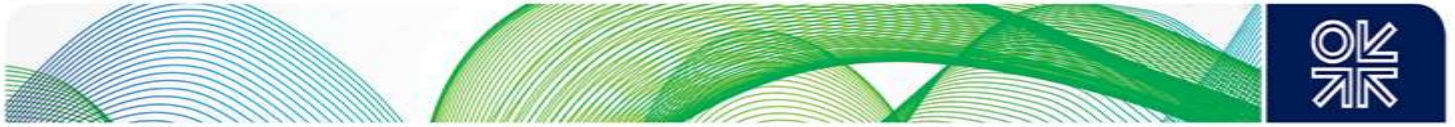
The fact that LNG from Yamal continues to flow to Asia (China in particular) even when the Northern Sea Route is closed highlights the importance of contractual destination restrictions, which mean that cargoes must be physically delivered. It is for this reason that Russian cargoes from Zeebrugge are willing to make the long journey to Asia via the Cape of Good Hope, just as Qatari DES cargoes are willing to make the long journey to Europe, also via the Cape of Good Hope.

6.6. The implications of longer shipping distances for Russian LNG

As with the Qatari example, if it is assumed that there is no diversion of Russian cargoes destined for Asia to alternative markets, and the number of LNG carriers remains constant, the 2.7 mt of LNG delivered from Yamal LNG to Asia via the Suez Canal in 2023, and the 1.7 mt delivered from Zeebrugge, will face journeys that are, on average 9 days longer in either direction, adding 18 days to the round-trip. Assuming a total of three days in port for loading and unloading, for the cargoes from Yamal, this

²⁶ Data from Kpler LNG Platform. [subscription required]

²⁷ Data from Kpler LNG Platform. [subscription required]



is an increase in the round-trip from 79 days to 97 days (+23 per cent) and for cargoes from Zeebrugge, an increase in the round-trip from 31 to 40 days (+29 per cent).

For cargoes from Yamal trans-shipped at Murmansk, a round-trip time of 79 days equates to 4.6 round trips per year, while the longer-round-trip of 97 days equates to 3.8 round trips per year (-17 per cent). For cargoes trans-shipped at Zeebrugge, a round-trip of 31 days equates to 11.8 round trips per year, while a round-trip of 40 days equates to 9.1 round trips per year (-23 per cent).

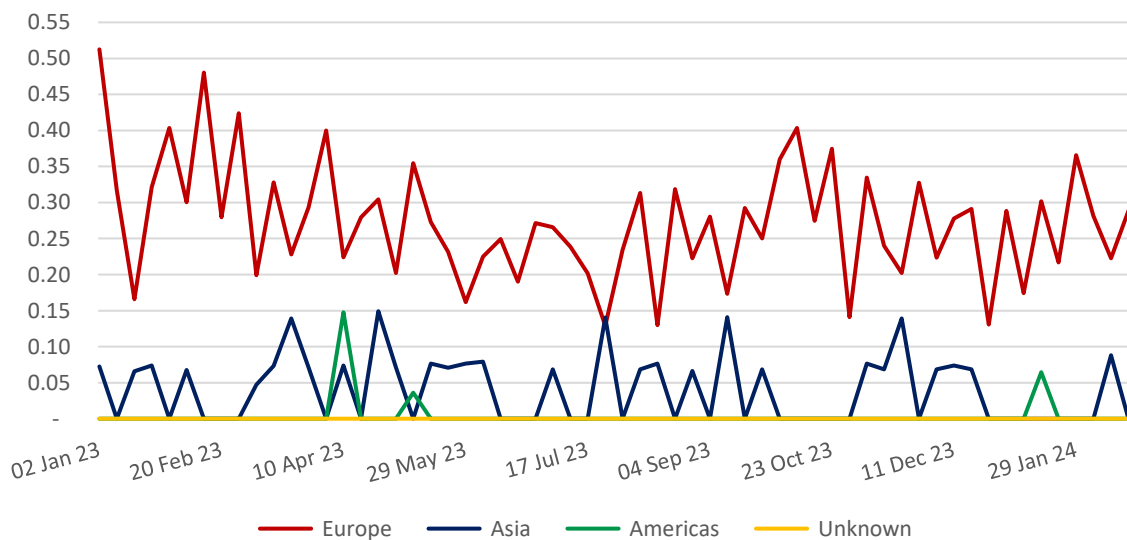
If all other factors are held constant, this would imply deliveries from Yamal to Asia via Murmansk declining from 2.7 mt in 2023 to 1.9 mt (-0.4 mt) in 2024 and deliveries from Yamal to Asia via Zeebrugge declining from 1.7 mt in 2023 to 1.3 mt in 2024 (-0.4 mt). Therefore, sustaining the re-routing from the Suez Canal to the Cape of Good Hope, without diverting cargoes to other markets, could see exports from Yamal LNG decline by 0.8 mt (4 per cent) year-on-year.

7. The impact on North African LNG deliveries to Asia

7.1. North African LNG exports to Europe and Asia

In 2023, Algeria and Egypt exported a combined 16.8 mt of LNG, down slightly from 17.3 mt in 2022. The volumes exported to Europe were relatively stable (14.35 mt in 2022 and 14.25 mt in 2023), as were the volumes exported to Asia (2.8 mt in 2022 and 2.4 mt in 2023) and the Americas (0.16 mt in 2022 and 0.18 mt in 2023). Therefore, exports to Europe accounted for 83 per cent of North African LNG exports by destination in 2022, and 85 per cent in 2023. This suggests that, within those relatively stable exports, there is a limited volume (2.4 mt in 2023) of North African LNG that – if diverted from Asia to Europe – could offset the loss of some of the Qatari cargoes. The weekly export data suggests that the diversion of North African exports from Asia to Europe has already begun, as illustrated below.

Figure 16: North African LNG exports by destination (mt per week)

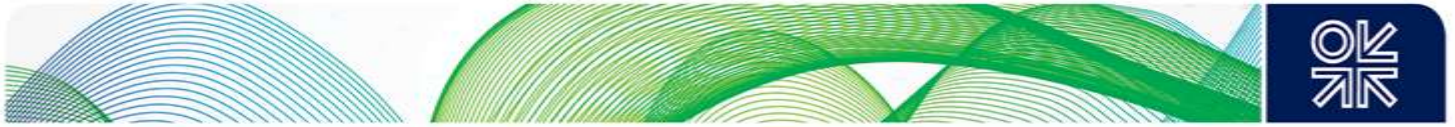


Source: Data from Kpler LNG Platform [subscription required]. Data up to week 12-18 February 2024.

7.2. The suspension of Algerian LNG exports to Asia?

Algeria has two LNG export terminals: Bethioua and Skikda. In Q4 2023, Algeria delivered just three cargoes to Asia (China, South Korea, and India), of which two were delivered via Suez and one via the Cape of Good Hope. The vessels used were the *Shaolin*, *Gaslog Santiago*, and *Amberjack LNG*.

The *Shaolin* (controlled by PetroChina) left Bethioua on 5 November, passed through the Suez Canal on 12 November, discharged a cargo at Tianjin on 1 December, and then remained in Asia to reload a cargo elsewhere in China for onward delivery to Japan. The *GasLog Santiago* (controlled by GasLog)



loaded at Bethioua on 12 November, travelled via the Cape of Good Hope (on 1 December), and discharged its cargo in South Korea on 24 December. It then headed south to load a cargo in Australia on 19 January for delivery to Asia. The *Amberjack LNG* (controlled by Cheniere) loaded a cargo at Bethioua on 19 November, passed through the Suez Canal on 25 November, and discharged its cargo in India on 7 December. It returned ballast via the Suez Canal on 16 December, but continued past Algeria to load a cargo at Sabine Pass on 2 January for subsequent delivery to Spain. Algerian LNG has not been delivered to Asia since the *Amberjack LNG* delivery to India loaded its cargo on 19 November. However, on 13 February, the *Clean Destiny*, loaded a cargo at Bethioua and declared for Chittagong (Bangladesh) and is currently (26 February) on route to the Cape of Good Hope.

7.3. The suspension of Egyptian LNG exports to Asia?

Egypt has two LNG export terminals: Damietta and Idku. Exports from Damietta were halted from 25 May 2023 to 6 January 2024, while Idku saw just one cargo exported between 11 May and 6 October. In the period between 6 October 2023 and 11 February 2024, just four Egyptian cargoes were exported to Asia (two to China and one each to South Korea and Pakistan) all in November-December 2023, all via the Suez Canal. These deliveries were made using three vessels.

The first – *Adam LNG*, controlled by Shell – made a delivery to Pakistan via Suez, returned ballast via Suez, and then made another trip via Suez to deliver a cargo to China. During its latter trip, it left Egypt on 21 December 2023, passed through Suez the following day, and discharged its cargo in China on 15 January. It then did not return to Egypt, but travelled south to Australia to load its next cargo.

The other two vessels that delivered Egyptian LNG to Asia in Q4 2023 – the *Bw Pavilion Leeara* and *Qogir*, controlled by TotalEnergies – passed (laden) through the Suez Canal on 8 and 18 December, and discharged their cargoes in China and South Korea on 4 and 13 January. The *Bw Pavilion Leeara* then travelled round the Cape of Good Hope to the US Gulf Coast to load its next cargo, while the *Qogir* travelled south to load its next cargo in Australia.

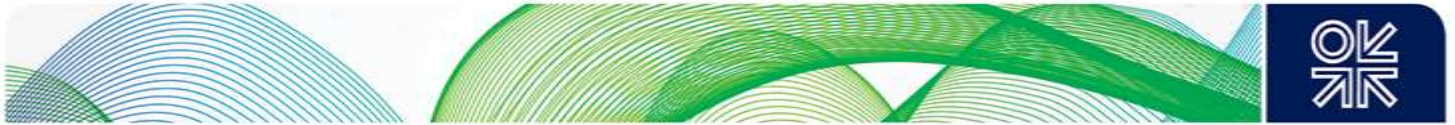
These examples suggest that the shipping of LNG from North Africa to Asia has mostly halted, with deliveries via Suez generally not being replaced by longer deliveries via the Cape of Good Hope. Secondly, a common element in these examples is that since December, vessels used to deliver LNG to Asia in November-December 2023 subsequently did not reload in North Africa, but were used by their controllers to load cargoes elsewhere, for deliveries that did not involve traversing the Red Sea. This could be an early sign of those larger market participants, who have the ability to optimise their portfolios, starting to do so. This places North African LNG exports in contrast with supplies to Europe from Qatar and supplies to Asia from Russia, which are continuing but via the Cape of Good Hope.

7.4. Implications of North African cargo diversions

In contrast to the re-routing of Qatari deliveries to Europe and Russian deliveries to Asia away from the Suez Canal to the Cape of Good Hope, the diversion of North African LNG cargoes from the Asian market to the European market does not imply any curtailment of supply to the global LNG market as a whole, on the basis of curtailed effective LNG shipping capacity.

Furthermore, if the entire volume exported from North Africa to Asia in 2023 (2.4 mt) is indeed diverted to Europe in 2024, this would offset around one-third of the potential 7.5 mt decline in Qatari LNG supply to Europe discussed earlier. At the same time, the fact that 3.8 mt of that decline in Qatari LNG supply to Europe in 2024 could be attributed to cargo diversions for sale in Asia, the increased Qatari supply to Asia would more than offset the loss of North African supply to Asia by 1 mt.

From an inter-basin LNG market perspective, the loss of 2.4 mt of North African supply, the gain of 3.8 mt of Qatari supply, and the potential loss of 0.8 mt of supply from Yamal LNG would, when taken together, equate to a net gain of 0.6 mt year-on-year for the Asian market. Conversely, if Europe were to lose 7.5 mt of Qatari supply and gain 2.4 mt of North African supply, it would still find itself short by 5.1 mt year-on-year. Under such circumstances, it is possible that additional volumes would be sourced from the Atlantic Basin, primarily spot cargoes from the United States and new supply from West Africa.



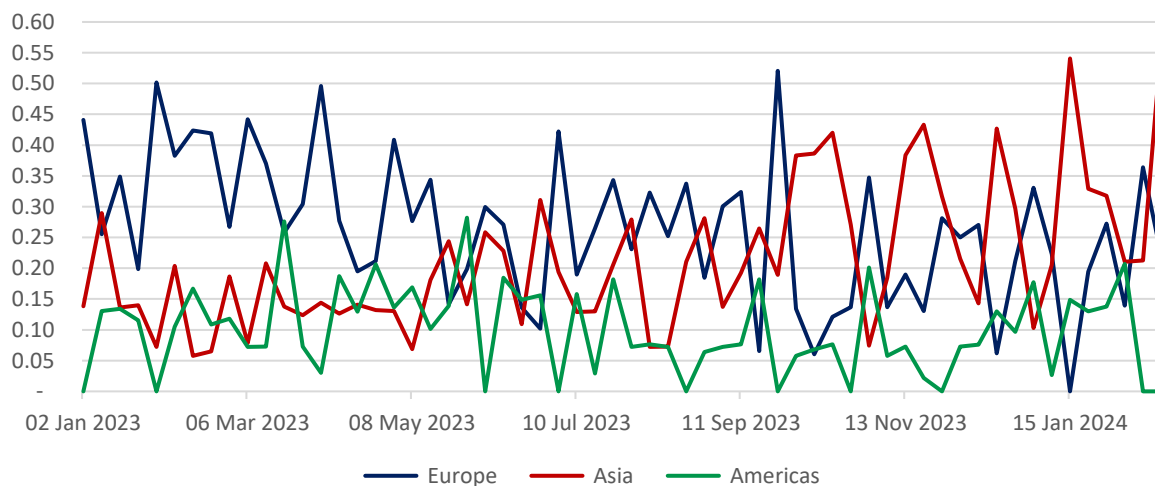
8. Overcoming the inter-basin ‘shipping premium’

8.1. The potential for additional Atlantic Basin supply to Europe

Aside from Europe potentially receiving greater volumes from the United States, Russia (from Yamal), and from North Africa, the narrowing price spreads between Europe and Asia could see some volumes from elsewhere in the Atlantic basin (Trinidad & Tobago, Nigeria, Equatorial Guinea, Cameroon, and Angola). In 2023, those countries exported a combined 14.06 mt to Europe, 10.35 mt to Asia, and 5.16 mt to the Americas.

As yet, diversions of (non-US) Atlantic Basin cargoes from Asia to Europe are not happening. While there has been growth in deliveries to the Americas from Trinidad & Tobago, deliveries from Trinidad & Tobago to Europe have remained stable at a rate of three cargoes every five weeks since mid-August 2023. Deliveries from West Africa have been on a general decline from a high of 1.48 mt in February 2023 to 0.46 mt in October 2023, and have since recovered slightly to 0.6 mt in January 2024. The most recent weekly data shows exports from West Africa to Europe in a range of 0.06-0.22 mt (one to three cargoes) per week since the beginning of November, with the exception being four cargoes (0.26 mt) in the first week of January 2024.

Figure 17: Weekly LNG exports from non-US Atlantic Basin suppliers by destination continent (mt per week)



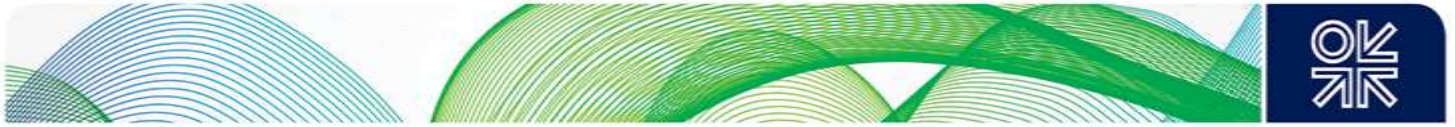
Source: Data from Kpler LNG Platform. Graph by the author. Non-US Atlantic Basin LNG suppliers are Trinidad & Tobago, Nigeria, Cameroon, Equatorial Guinea, and Angola. Data to 18-25 February.

In terms of new supply in the region, two new projects in West Africa are set to launch in 2024. Tango FLNG, off the coast of the Republic of Congo, received first gas into the FLNG unit on 28 December 2023. The liquefaction capacity will be 1 Bcma (0.74 mtpa) from Q1 2024, and a second 3.5 Bcma unit is planned for 2025. The entire volume will be marketed by Eni.²⁸

Off the coast of Senegal-Mauritania, the Greater Tortue Ahmeyim (GTA) project has a planned capacity of 2.3 mtpa. BP will be both the operator and sole offtaker from the project, with cargoes contributing to their global supply portfolio. The FLNG vessel, *Gimi*, arrived in situ on 15 February 2024.²⁹ First cargoes are expected from Q2 2024. Taken together, and assuming a ramp-up period that means they do not reach full capacity until mid-2024, these two could just over 1.5 mt of Atlantic Basin supply in H2-2024.

²⁸ Eni, 2023. Eni started the gas introduction into Tango FLNG facility, Republic of Congo. *Press Release*, 28 December. <https://www.eni.com/en-IT/media/press-release/2023/12/eni-started-gas-introduction-tango-flng-congo.html>

²⁹ BP, 2024. GTA LNG project reaches major milestone with arrival of FLNG vessel. *Press Release*, 15 February. <https://www.bp.com/en/global/corporate/news-and-insights/press-releases/gta-lng-project-reaches-major-milestone-with-arrival-of-flng-vessel.html>



The other new project that could influence the volume of LNG available to Europe is Arctic LNG 2 in north-western Russia. The project is planned to have three trains of 6.6 mtpa, and the first train is now complete, with Novatek reportedly beginning production.³⁰ Novatek holds a 60 per cent stake in the project, while four foreign shareholders (CNOOC, CNPC, TotalEnergies, and the Japanese consortium of Mitsui and JOGMEC), each hold 10 per cent stakes. In December 2023, those foreign shareholders declared *force majeure*.³¹ The project cannot begin shipments until the issue of LNG carriers is solved, with western sanctions delaying, or preventing entirely, the provision of Arctic-class LNG carriers to the project. Even if the project does launch in 2024, albeit at a reduced capacity due to the smaller-than-planned fleet of suitable LNG carriers, the sanctions against the project mean that Novatek is likely to face difficulties marketing its production in Europe.

Setting aside Arctic LNG 2, the addition of 3 mtpa of West African supply to the portfolios of BP and Eni could contribute to the wider possibility of portfolio players optimising their portfolios to bring more Atlantic Basin cargoes to the European market (thus avoiding the longer trip to Asia round the Cape of Good Hope), to offset the reduction in Qatari supply.

8.2. Potential for optimisation within portfolios and through trading

While re-routing cargoes via the Cape of Good Hope will increase journey times and by extension reduce the volume of deliveries that can be made using a given number of LNG carriers, another means of overcoming the ‘inter-basin shipping premium’ imposed by longer journeys is the reallocation of LNG cargoes within supply portfolios, and trading around those portfolios.

Several European portfolio players hold liquefaction capacity at Ras Laffan in Qatar, and/or DES supply contracts with QatarEnergy (Qatargas), but also hold capacity at other liquefaction capacity in the Atlantic Basin (Shell, TotalEnergies, and Eni). For them, it could be possible to reallocate their Qatari cargoes to Asia and Atlantic Basin cargoes to Europe.

This is more difficult for others, particularly utility buyers, with smaller supply portfolios primarily constructed to serve their ‘home’ market, for whom a significant proportion of their supply is sourced from the holding of liquefaction capacity at Ras Laffan, and whose regasification capacity is only in Europe (such as Centrica, EDF, Edison, Endesa, OMV, Orlen, and RWE). For them, it could become necessary to trade around their portfolios, buying and selling cargoes, rather than reallocating cargoes within their own portfolios.

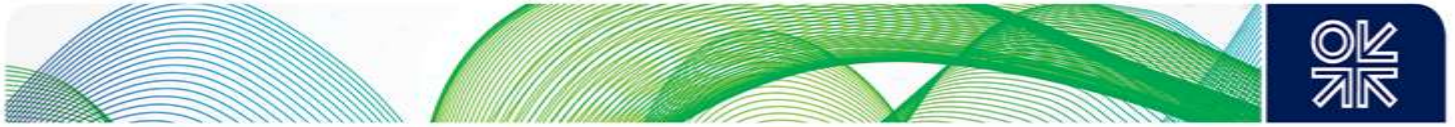
For other major suppliers that sell into both the Atlantic and Pacific Basins, there are also opportunities to reallocate cargoes within their portfolios or trade around those portfolios, buying cargoes in one basin and selling equivalent cargoes in the other basin. This will naturally involve other market participants, such as those focused on trading, such as Gunvor, Trafigura, and Vitol, who add liquidity to the market.

The major driver of this activity will be shipping costs (based on charter rates and fuel costs) relative to the inter-basin price spreads, and the commercially-effective use of LNG shipping capacity. If the price spread is sufficiently narrow, and the ‘shipping premium’ (in terms of both cost and use of shipping capacity) for moving cargoes from one basin to another is sufficient high, the optimisation of portfolios is a logical commercial response.

However, there are limits to which such optimisation is feasible. A significant proportion of term LNG SPAs have destination restrictions, meaning that cargoes must be delivered from Point A to Point B. Even if a portfolio player does wish to reallocate cargoes from one basin to another, or market participants wish to buy cargoes in one basin and sell equivalent cargoes in the other basin (thus effectively shipping from one basin to another ‘on paper’), they may face constraints in terms of cargo

³⁰ Čučuk, A., 2024. Report: Production starts at Russia’s Arctic LNG 2 despite US sanctions. *Offshore Energy*, 3 January. <https://www.offshore-energy.biz/report-production-starts-at-russias-arctic-lng-2-despite-us-sanctions/>

³¹ Soldatkin, V., 2023. Foreign shareholders freeze participation in Russia’s Arctic LNG 2 - Kommersant. *Reuters*, 25 December. <https://www.reuters.com/business/energy/foreign-shareholders-suspend-participation-russias-arctic-lng-2-project-2023-12-25/>



size, delivery dates, prices, or even LNG spec.³² The extent to which all market participants are able to accommodate these constraints within their supply portfolios, or find counterparties with whom to trade despite these constraints, will determine the extent of the physical optimisation of LNG cargoes on the global market, in response to the 'inter-basin shipping premium'. Finally, it is worth recalling that shipping distances are not the only determinant of LNG delivery destinations. If they were, even more US and Russian Yamal LNG would have been delivered to Europe rather than Asia prior to the current disruption in the Red Sea.

As a consequence, even if the inter-basin shipping premium and narrower inter-basin price spreads result in a greater degree of optimisation and trading than prior to the closure of the Red Sea, the optimisation will not be total. LNG carriers will continue to make long journeys round the Cape of Good Hope, from the United States and Russia to Asia, and from Qatar to Europe. Therefore, it is possible that if a proportion of the pre-crisis inter-basin flows are subject to optimisation and trading, and a proportion endure the longer shipping routes, the two will, to a certain extent, offset one another. Indeed, the expectation that this will happen may be a further contributory factor in the lack of European and Asian price response to the physical disruption of LNG shipping.

9. The market response

9.1. Decline and stabilisation of shipping rates

According to data from Refinitiv, daily charter rates for LNG carriers (reported weekly) declined continuously from November 2023 to 19 January 2024, before prices stabilised. For a 160,000 m³ capacity Tri-Fuel Diesel-Electric (160k TFDE) LNG carrier, the daily rates declined from USD 150,000 per day in the Atlantic Basin and USD 180,000 per day in the Pacific Basin in the week commencing 24 November to USD 35,000 per day in the Atlantic Basin and USD 45,000 per day in the Pacific Basin in the week commencing 19 January. Since then, prices have largely stabilised, standing at USD 41,000 per day in the Atlantic and USD 45,000 per day in the Pacific for the week commencing 16 February.³³

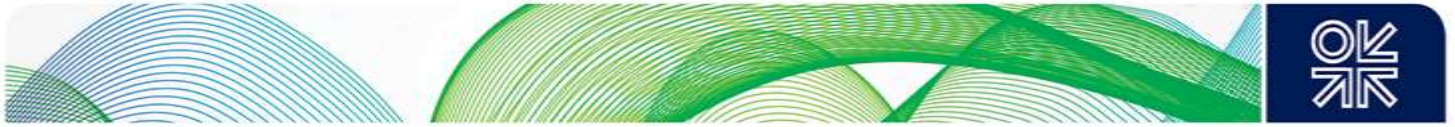
This decline in shipping rates since November 2023 has been influenced by several factors. Firstly, the global volume of 'floating storage' (the volume of LNG held on LNG carriers that have been idling offshore for at least 10 days) fell from a peak of just over 2 mt on 21-24 October to 1.3 mt on 26 November, 0.94 mt on 12-13 December, and 0.25 mt on 8 January. In Europe alone, the floating storage fell from 0.78 mt on 4 November to zero on 3-8 December. This unwinding of LNG shipping capacity being used as floating storage effectively increased transportation capacity, pushing down charter rates.

At the same time, the diversion of a significant proportion of US LNG exports from Asia to Europe (as discussed above) since the end of July 2023, back to ratios seen in the first four months of 2023, has reinforced the price-driven shift in US LNG exports from Asia to Europe that was seen in 2022. Because the distance from the US to Europe is so much shorter, shipping capacity is being used more effectively. This trend has been augmented by the impact of LNG shipping from North Africa being diverted from Asia to Europe since December 2023, again with the impact of more efficient use of shipping capacity.

The fact that shipping rates in early February 2024 were back at levels last seen in May 2023 may also reflect LNG shipping rates simply 'bottoming out', with current Atlantic Basin rates of around 40,000 USD/day well within the range of 30,000-70,000 USD/day seen as monthly averages in February in each of the past five years (2019-2023). The fact that charter rates have not spiked may reflect a cautious response from charterers, as they refrain from leasing new capacity until they are more certain that the present disruption in the Red Sea will persist for some time and that the re-routing justifies the leasing of such additional shipping capacity.

³² Such as the balance between pure methane, other hydrocarbons (such as propane and butane), and other gases (such as nitrogen and carbon dioxide). This balance will be reflected in the Gross Calorific Value of the cargo.

³³ Data from Affinity Charter Rate Assessments (Weekly USD/Day), via EIKON Refinitiv [subscription required].

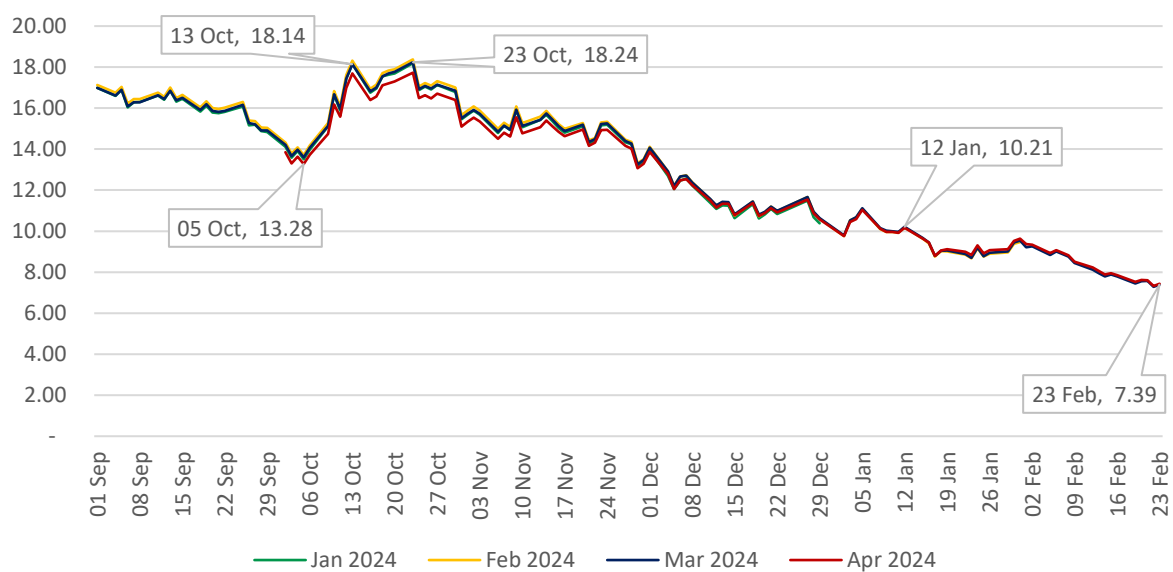


9.2. Benchmark gas prices showing muted response to Red Sea disruption

During the early phase of the disruption in the Red Sea, between mid-November and mid-January, European benchmark gas prices continued their decline, as they continued to fall back from the mid-October spike that followed the Hamas attack on Israel and the Israeli military response in Gaza. As illustrated below, TTF forward prices followed a downward trend from 23 October to 17 January.

Despite the onset of the US-UK air strikes from 12 January, and the complete cessation of LNG shipping through the Red Sea from that date, European benchmark gas prices have continued the decline that began in late October 2023. TTF forward prices that reached a winter peak of over 18 USD/MMBtu on 23 October fell consistently below 10 USD/MMBtu from 15 January, below 9 USD/MMBtu from 7 February, and below 8 USD/MMBtu from 13 February.

Figure 18: TTF prices by month of delivery since 1 September 2023 (USD/MMBtu)



Data source: Argus Direct [subscription required]

The fact that prices have been either stable or falling in recent weeks suggests that other bearish demand-side factors, such as relatively mild weather as Europe moves closer to the end of winter, substantial European gas storage stocks for the time of year, and macro-economic headwinds that lend credence to an outlook of only modest recovery in industrial gas demand, along with the stabilisation of European LNG imports from the United States at a sustained high level, are allowing the European market to remain sanguine, and prices to reflect that market sentiment.

The landed price of LNG in North-Western Europe (reported by Argus) surpassed 8 USD/MMBtu on 30 April 2021, fell briefly below that level on 19 May 2021, and then did not fall below 8 USD/MMBtu again until a run of seven consecutive trading days from 24 May to 2 June 2023. Prices rose above 8 USD/MMBtu thereafter, and did not fall below 8 USD/MMBtu until 9 February 2024. It therefore appears that Europe is on the cusp of landed LNG prices being sustained below 8 USD/MMBtu for the first time since April 2021, that is, before the start of the European gas price crisis.

In North-East Asia, the delivered price of LNG reported by Argus since January 2023 has followed the same trajectory as the landed price of LNG in North-Western Europe, with prices below 9 USD/MMBtu since 15 February 2024 – the first sustained period of prices below 9 USD/MMBtu since April 2021.

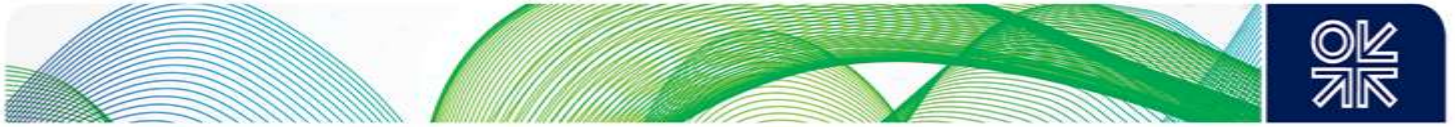
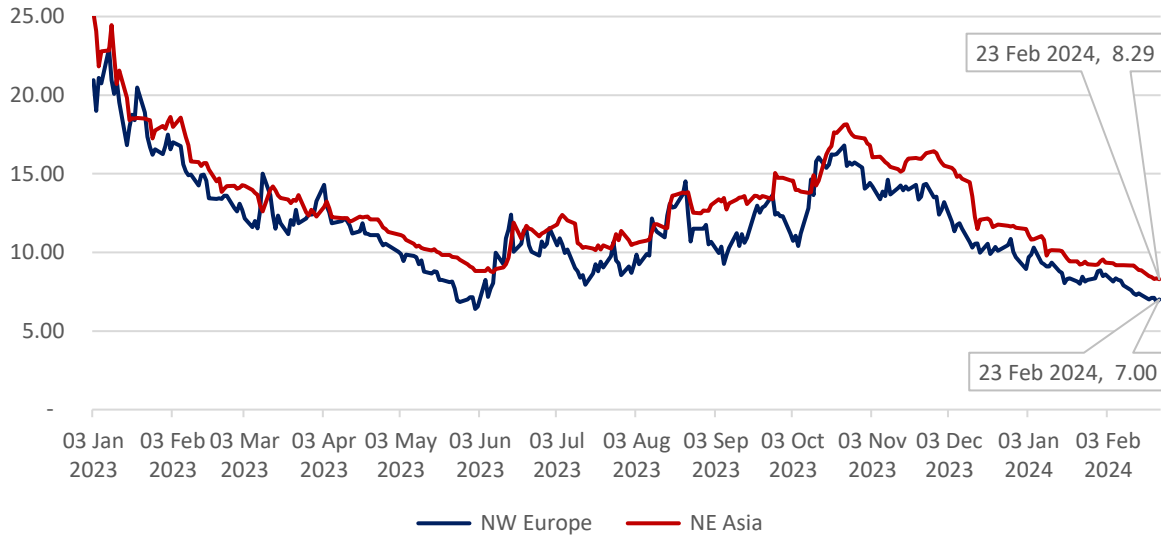


Figure 19: Argus price assessments for LNG delivered to NE Asia & NW Europe (USD/MMBtu)

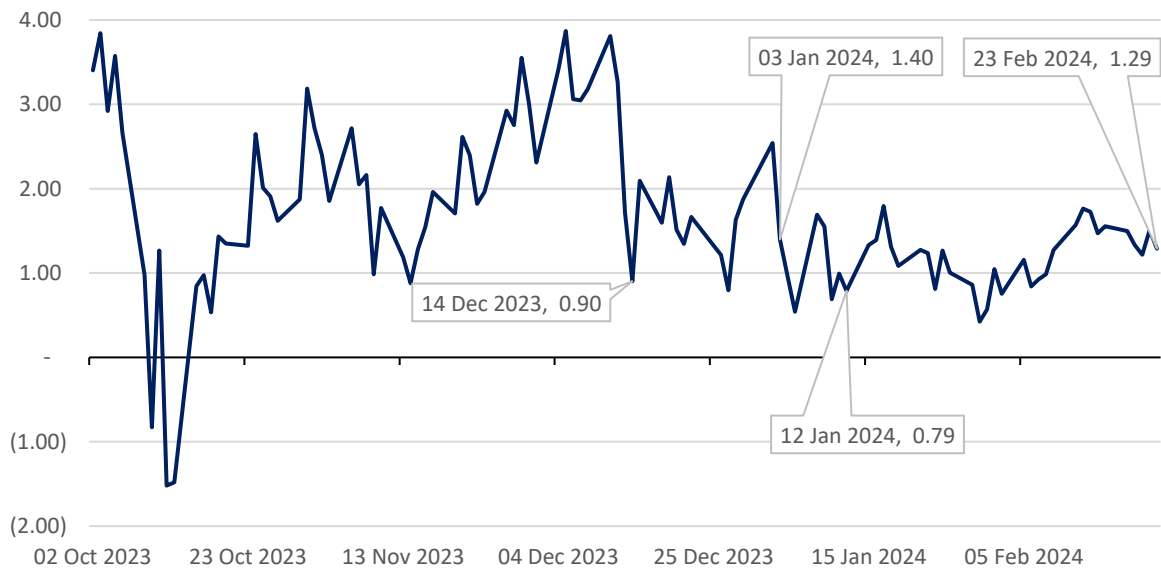


Data source: Argus Direct [subscription required]

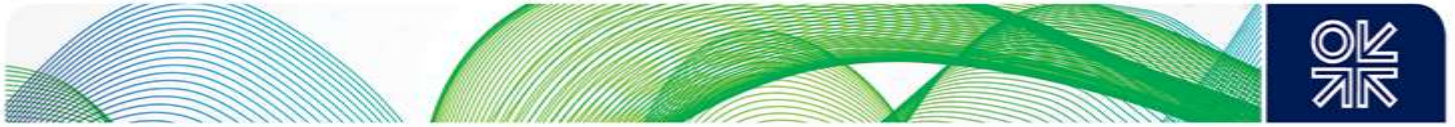
9.3. Europe-Asia spreads remain relatively narrow

Due to the curtailment of LNG shipping via the Panama Canal and Red Sea, two of the world's largest LNG exporters face an 'inter-basin shipping premium' in reaching what may be considered their 'secondary' markets (US LNG to Asia and Qatari LNG to Europe). Despite this, there has not been a spike in LNG benchmark prices in Europe or Asia. Instead, the decline in both benchmarks between November and February has allowed the differential to narrow to a level that is usually considered sufficient to attract LNG cargoes to the Asian market (around 1.00-1.50 USD/MMBtu). Yet prices remain high enough to absorb the extra shipping costs generated by lengthy detours around the Cape of Good Hope. Indeed, it may take prices falling further to motivate a greater degree of optimisation to reduce physical flows between the Atlantic and Pacific Basins.

Figure 20: Premium of Argus North-East Asia LNG delivered price assessment over Argus North-West Europe LNG delivered price assessment (USD/MMBtu)



Data source: Argus Direct [subscription required]



10. Waves of impact: measuring LNG at the point of import, not export

10.1. First wave: cargoes diverted

Overall, the early indicators since 12 January 2024 are that to a significant extent, those commercial entities that are shipping LNG cargoes from Qatar to Europe, North-Western Russia to Asia, and the United States to Asia (the latter via a non-Panama Canal route), who have all ceased to deliver cargoes via the Red Sea, appear to be willing to re-route those deliveries via the Cape of Good Hope. The exception is supply from North Africa to Asia, which has now mostly halted.

For example, weekly Qatari LNG exports destined for Europe remain in a corridor of 0.2-0.4 mt per week, as they were for much of 2023. Likewise, the weekly volumes of US LNG exports intended for delivery to Asia (also 0.2-0.4 mt per week) are back in the range seen for much of the period from January to May 2023, albeit a decline from peaks seen in June-July.³⁴

In terms of delivery routes not affected by the Red Sea disruption, Qatari LNG supply to Asia and US LNG supply to Europe in late January 2024 were notably higher than in early October 2023 (before the first disruptions began), but were not significantly higher than in late December 2023. This suggests that the share of cargoes being delivered by longer routes round the Cape of Good Hope (from the US to Asia and from Qatar to Europe) as a proportion of total LNG exports from the US and Qatar has fallen since October but is stable relative to December 2023.

Therefore, the 'first wave' of impact of the Red Sea disruption was visible in the vessel-tracking data, as cargoes were re-routed away from the Red Sea in mid-January.

10.2. Second wave: late arrival of re-routed cargoes

Regarding European LNG imports from Qatar and Asian imports from the United States and Russia, as measured at the point of arrival, the 'second wave' impact was likely to be felt several weeks later, from late January to late February and early March, due to the longer time it takes to deliver those cargoes via the Cape of Good Hope, and so it proved.

Taking the specific case of Qatari LNG deliveries to Europe, and the extension of the journey time from an average of 17 days via the Suez Canal to 29 days via the Cape of Good Hope, the next wave of impact was always likely to be felt from late January onwards. That is the time period in which cargoes that left Ras Laffan between 7 and 29 January, having expected to undertake journeys via the Suez Canal of around 17 days and arrive in Europe between 24 January and 15 February, instead have taken journeys of 29 days via the Cape of Good Hope to arrive in Europe between 5 and 27 February. In effect, the period from late January to late February is the first month in which a group of Qatari cargoes to Europe effectively arrived, on average, 12 days late.

A 'real world' example of this is the delivery of Qatari LNG to Rovigo, Italy (the largest European destination for Qatari LNG in 2023). The expected journey times (estimated by Kpler, based on a speed of 16 knots) are 12 days via the Suez Canal and 31 days via the Cape of Good Hope. Three cargoes left Ras Laffan on 11, 16, and 26 January, destined for Rovigo. They should therefore have arrived on 23 January, 28 January, and 7 February. Instead, re-routed via the Cape of Good Hope, those cargoes arrived on 12, 18, and 24 February (17-22 days late).

This dynamic is already visible in the data on weekly European LNG imports by source, and the three-week rolling average of those weekly imports: the week commencing 29 January was the first since December 2016 (and only the sixth such week since January 2008) that Europe did not receive a single LNG cargo from Qatar in a calendar week, while the late-arriving cargoes are visible from the week commencing 5 February.^{35 36}

³⁴ Data from Kpler LNG Platform. [subscription required]

³⁵ Europe is defined as the EU-27 plus UK. Turkey received just one LNG cargo from Qatar in 2022, and none since then.

³⁶ Data from Kpler LNG Platform. [subscription required]

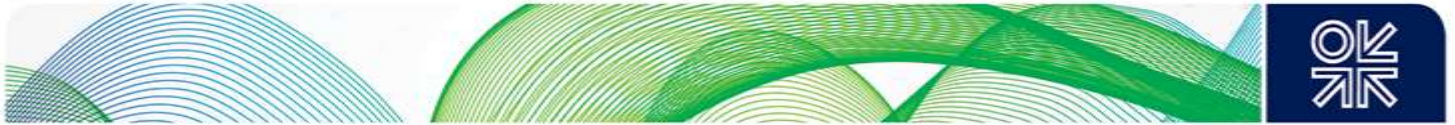
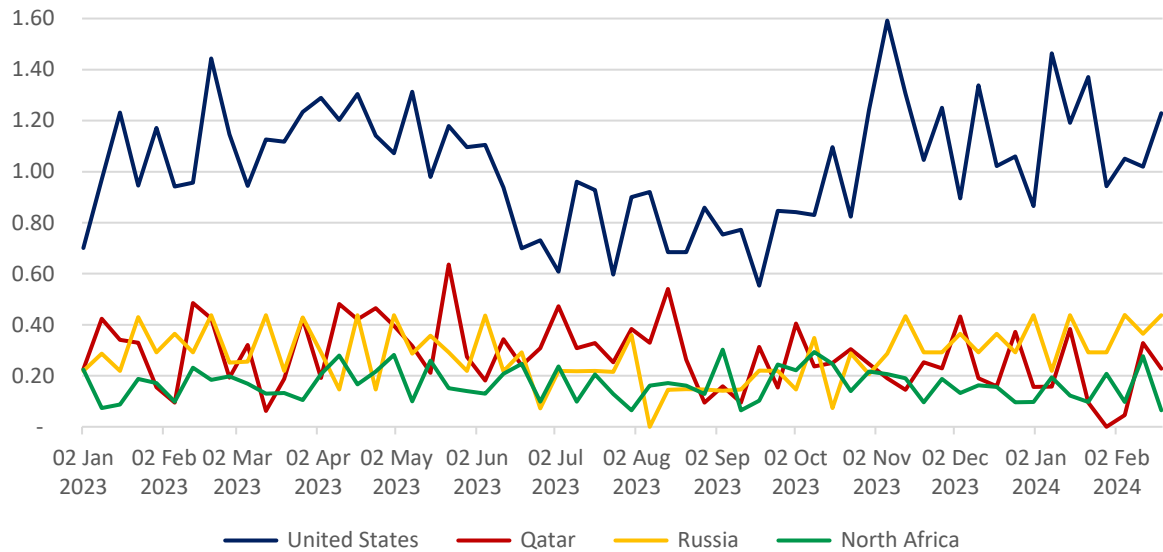
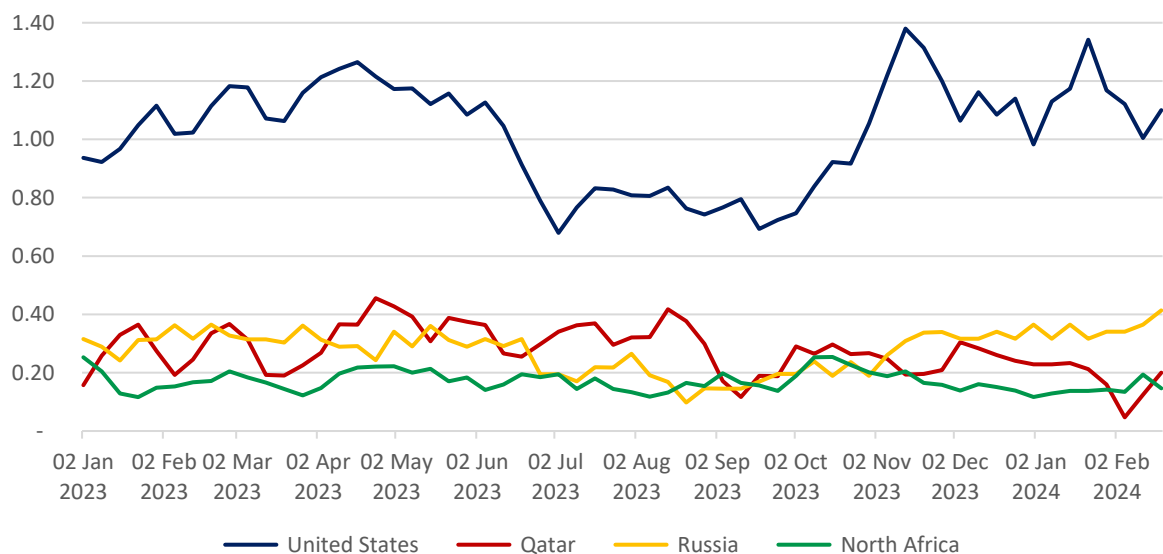


Figure 21: EU plus UK weekly LNG imports by source (mt per week)



Data from Kpler LNG Platform [subscription required]. Data up to 19-25 February 2024.

Figure 22: EU plus UK LNG imports by source – three-week rolling average (mt per week)

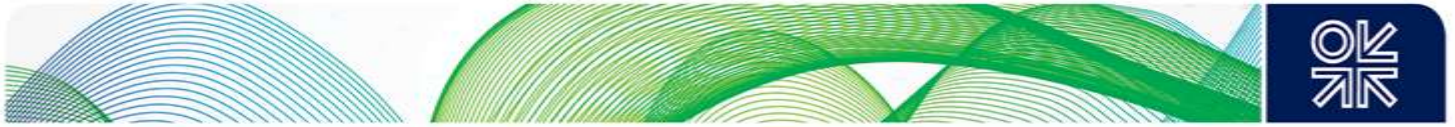


Data from Kpler LNG Platform [subscription required]. Data up to 19-25 February 2024.

10.3. Third wave: impact of longer round-trips

At the time of writing (26 February), the next, ‘third wave’ of impact on Qatari volumes to Europe will soon be felt, as Qatari LNG carriers arrive back at Ras Laffan for reloading after complete round trips to Europe and back via the Cape of Good Hope. The eight Qatari LNG carriers that have already made deliveries to Europe via the Cape of Good Hope are due back at Ras Laffan between 5 and 24 March for their delayed re-loadings. In this third wave, the longer round-trip times for each delivery will delay the next cargo loading, and then delay the arrival of the next cargo from Qatar to Europe even further.

For example, while a hypothetical cargo loaded at Ras Laffan on 10 January, delivered via the Suez Canal and arriving at Zeebrugge on 27 January, would spend a day in port and then make the return journey to arrive back at Ras Laffan on 14 February. There it could spend two days in port to reload, and then make another 17-day journey to Zeebrugge, delivering a second cargo on 5 March.



Now consider a second hypothetical cargo, also loading at Ras Laffan on 10 January, which travels via the Cape of Good Hope, delivers its cargo to Zeebrugge 12 days late, on 8 February. After a day in port, the return journey would see that vessel arrive back at Ras Laffan on 10 March. After another two days in port reloading before departing on 12 March, and another 29-day journey via the Cape of Good Hope, that vessel would deliver a second cargo to Zeebrugge on 10 April – 36 days later than the second cargo delivered by the first hypothetical vessel that was able to traverse the Suez Canal. This effect will become more and more pronounced with every subsequent cargo.

Assuming both that the Red Sea disruption persists, and that the number of LNG carrier plying the routes between the Atlantic and Pacific Basins remains unchanged, this ripple effect is likely to become increasingly visible in data on European and Asian LNG imports by source from February-March onwards. Specifically, it will be visible as a reduction in Qatari supply to Europe, and supply to Asia from the United States, Russia, Algeria, and Egypt. The longer the Red Sea disruption lasts, the longer this 'third wave' of impact will last, and the greater its cumulative effect will be.

11. Implications for Europe and the global LNG market

11.1. Impact on Europe of reduction in Qatari LNG supply

Thus far, this paper has demonstrated that Qatari LNG cargoes are continuing to flow to Europe, albeit via longer routes and with some cargoes possibly diverted to Asia. If the Red Sea disruption persists for the rest of the year, the supply of Qatari LNG to Europe (15.1 mt in 2023) could be reduced by 25 per cent (3.8 mt) due to diversions to Asia, and the remaining 75 per cent (11.3 mt) could be reduced by one-third (to 7.5 mt) due to longer round-trip times using a fixed number of LNG carriers. Overall, the impact would be Qatari LNG supply to Europe declining by 7.6 mt, from 15.1 mt to 7.5 mt.

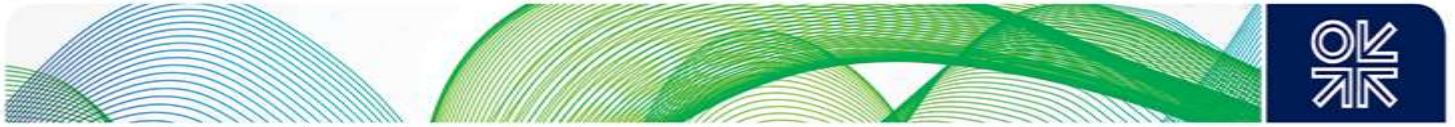
Regarding other suppliers, the cessation of LNG deliveries from North Africa to Asia, with those cargoes redirected to Europe, could imply an additional 2.4 mt of LNG supply for Europe in 2024. Elsewhere, Europe is already the primary market for Russian LNG from Yamal, with the volumes to Asia continuing, in particular under DES contracts for delivery to China. The United States already set a new record for annual LNG exports to Europe in 2023 (56 mt), and every month from October 2023 to January 2024 was a record for that month. Those records reflected both the growth of US LNG exports to record levels and a rising share of Europe in those exports, in the broader context of curtailments of LNG shipping via the Panama Canal. In 2023, Europe accounted for 70 per cent of exports from the United States to Europe and Asia combined, with Europe's share rising to 73 per cent in December 2023 and 78 per cent in January 2024. Quite how much more the United States has to offer Europe depends on the contracts and destination commitments of those offtaking LNG from US export plants, and the extent to which volumes remain committed to the Asian market.

Finally, Atlantic Basin supply from sources other than the United States do not yet appear to be diverting from Asia to Europe, although two new projects in West Africa will add new supply of around 1.5 mtpa to the Atlantic Basin (most likely to Europe) via the portfolios of BP and Eni in the second half of 2024. Therefore, in 2024 as a whole, new supply from West Africa and diversions from North Africa could offset up to 4 mt of the potential 7.5 mt reduction in Qatari supply to Europe. In terms of European total gas supply (measured in Bcm), that loss of 3.5 mt equates to 4.8 Bcm across the year as a whole.

In the next several months before the new West African supply arrives, the implication is that – all other factors being equal – more gas will be withdrawn from European storage in February and March. If this proves to be the case, a greater volume of storage stocks will need to be replenished in the summer of 2024, at a time when new LNG supply from West Africa will help to offset lower volumes from Qatar.

The fact that a 4.8 Bcm drop in LNG supply to Europe in 2024 equates to 1.3 per cent of a European (EU-27 plus UK) market that consumed 380 Bcm in 2023 may explain why the market has not reacted more strongly to the curtailment of Qatari LNG supply to Europe.

In the very near term, considering the period out to the end of winter on 31 March, it helps that European storage stocks remain at robust levels: stocks of 68.3 Bcm on 24 February are slightly higher than the



two previous records for that date (65.9 Bcm in 2020 and 65.8 Bcm in 2023).³⁷ Such stocks provide a buffer that allows quicker withdrawals to offset lower Qatari LNG supply. The European market is also cushioned by receiving more US LNG throughout the second half of 2023 than might otherwise have been the case, due to the curtailments at the Panama Canal.

11.2. Could a reduction in Qatari LNG exports notably tighten the global LNG market?

A key issue raised in this paper is whether longer round-trip times via the Cape of Good Hope, while the number of available LNG carriers remains constant, could effectively curtail global LNG exports, through constraints on shipping capacity. Taking each of the major suppliers affected, the following conclusions are drawn:

- If 25 per cent of Qatar's exports to Europe in 2023 (15.1 mt) were diverted to Asia, the remaining 11.3 mt could face a curtailment of 33 per cent due to constraints on shipping capacity. This would reduce Qatari LNG exports by 3.7 mt.
- Regarding the Russian exports from Yamal LNG, from trans-shipment at both Murmansk and Zeebrugge, shipping constraints arising from re-routing deliveries to Asia via the Cape of Good Hope could curtail Yamal LNG exports by 0.8 mt in 2024.
- If exports from North Africa are simply diverted to Europe, this implies no loss of supply to the global market as a whole.
- Finally, given that the United States shipped 8.7 mt of LNG to Asia via the Suez Canal in 2023, the 10 per cent reduction in those export volumes due to longer round-trips via the Cape of Good Hope would imply a reduction in US LNG exports of 0.87 mt.

Taken together – and assuming no other diversions – global gross LNG supply could be curtailed by around 5.4 mt. For context, global LNG exports in 2023 totalled 420.1 mt.³⁸ When re-exports by importing countries (such as Belgium's re-exports of Russian cargoes) are discounted, this global net supply falls to 400 mt. The potential decline of 5.4 mt in global supply in 2024 would represent a year-on-year decline in total global net LNG supply of 1.35 per cent.

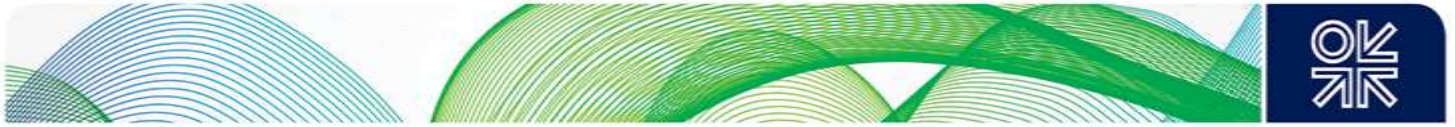
If this decline is partially offset by new West African supply (from Senegal-Mauritania and Republic of Congo) of 1.5 mt in the second half of 2024, the total net decline falls to 3.9 mt (less than 1 per cent). Such a decline is small enough to be absorbed into the general fluctuations in global LNG supply without causing a major pricing impact, as demonstrated in the reaction of benchmark European and Asian LNG prices in the weeks since the Red Sea disruption began.

The most interesting implication of the closure of the Red Sea to LNG shipping is that, if it persists, it could spur renewed efforts to optimise the global LNG market. The shift of US LNG cargoes from Asia to Europe in 2022, amid the decline in pipeline supply to Europe from Russia, increased the efficiency of LNG shipping by reducing the round-trip times for supplies from one of the 'Big Three'.³⁹ Since the curtailment of LNG shipping via the Panama Canal in the second half of 2023, the split between Europe and Asia in US LNG exports has reverted to the ratio seen in early 2023, but exports to Asia continue to account for a substantial share of US LNG exports by destination. However, the closure of the Red Sea now means that two of the leading LNG exporters (United States and Qatar) face an 'inter-basin shipping premium' in accessing their secondary market (in volumetric terms): US supplies to Asia and Qatari supplies to Europe.

³⁷ Gas Infrastructure Europe, 2024. *Aggregated Gas Storage Inventory (AGSI+)*. <https://aqsi.gie.eu/#/>

³⁸ This includes re-exports, which are effectively double-counted. It also includes intra-country flows that do not reach the international market, such as the shipment of LNG from one part of Indonesia to another

³⁹ The 'Big Three' (United States, Qatar, and Australia) were the largest LNG exporters in 2023, accounting for 60 per cent of global LNG exports



12. Conclusion

This paper began by identifying the LNG shipping affected by the Red Sea disruption in terms of both absolute volumes, and the main exporters affected. Having brought the focus onto the United States, Qatar, Russia, Algeria, and Egypt, the impact of their inter-basin exports (Qatar to Europe and the other exporters to Asia) was then quantified, along with the reaction of those exporters in terms of re-routing cargoes and weekly exports by destination. In the sections that followed, the potential for this impact to be offset by a combination of new Atlantic Basin supply from West Africa in the second half of 2024, and the potential for optimisation of portfolios and trading around portfolios by some of the largest LNG market participants was then analysed. That analysis explained the lack of sharp market response in terms of daily charter rates for LNG carriers, the ongoing decline in European and Asian benchmark prices, and the relatively narrow Europe-Asia spreads, in the broader context of the current bearish global LNG market outlook. Finally, the major analytical, forward-looking conclusions of the paper were drawn in terms of the three waves of impact (of which the third is about to make itself felt), and the implications for both European LNG supply and the tightness of the global LNG market.

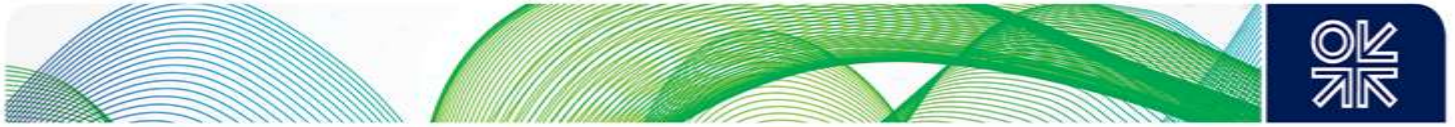
Drawing these threads together, the key conclusion is that, although two of the world's three largest LNG exporters now face an 'inter-basin shipping premium' to reach their secondary markets (United States to Asia and Qatar to Europe), due to the curtailment of LNG shipping via the Panama Canal and Red Sea, the global LNG market has accommodated it, and will continue to do so. This is itself a testament to the development of the global LNG market, in terms of supply volumes in both the Atlantic and Pacific Basins, and in terms of the flexibility offered by a liquid, traded, global market.

The concurrent curtailment of LNG shipping via the Panama Canal and Red Sea may be testing the extent of that flexibility, but the current bearish charter rates and pricing benchmarks suggest that the challenge is being met. However, assuming the closure of the Red Sea persists, the fact that each subsequent LNG delivery will take significantly longer to make via the Cape of Good Hope means that the cumulative impact will grow throughout the year. While the Qatari cargoes to North-Western Europe that departed after 7 January (and were re-routed via the Cape of Good Hope) were somewhat late, by the time those vessels discharge their cargoes, return to Ras Laffan via the Cape of Good Hope, and then make further deliveries to Europe again via the Cape of Good Hope, their deliveries will be later and later still. While the volume of Qatari LNG delivered to Europe in the year-to-date by the end of Q1 may be only slightly lower year-on-year, the year-on-year decline in year-to-date supply is likely to be much more significant by the end of Q3.

Furthermore, the fact that a significant number of vessels are making this longer journey via the Cape of Good Hope suggests that the utilisation of global LNG shipping capacity is not fully optimised, term supply contracts continue to dictate shipping movements, and that swaps are not being used between the Atlantic and Pacific Basins (through either portfolio optimisation or trading) to as great an extent as they could be, which highlights the limitations to such optimisation and trading.

It is quite possible that the market is in a cautious, interim phase, with market participants waiting to see whether the disruption lasts beyond a few weeks, before committing to altering their trading strategies. If the disruption persists, we may see the number of inter-basin swaps rise and the number of physical deliveries via the Cape of Good Hope fall accordingly. If the disruption persists but the number of swaps does not increase, an alternative would be for shippers to seek additional vessels in order to deliver the same number of cargoes over longer round-trip shipping distances. This would cause competition for LNG carriers to intensify, and would be visible in rising shipping charter rates.

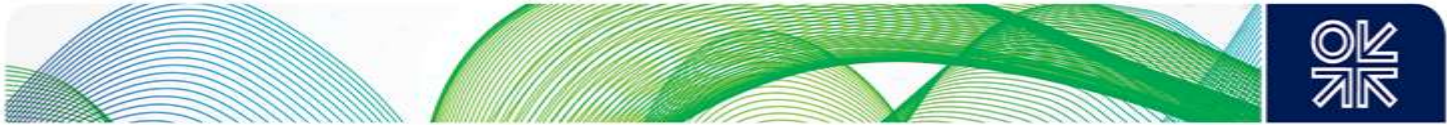
If that does not happen, and the market remains 'rigid' in terms of sub-optimal use of the global LNG carrier fleet to continue delivering US and Russian LNG to Asia and Qatari LNG to Europe via the Cape of Good Hope, the result will be a slight tightening of the market, with global supply slightly constrained by shipping capacity. However, that tightening would be the equivalent of just 1.35 per cent of total global annual supply, of which a portion is likely to be offset by new supply into the Atlantic Basin from West Africa, bringing the impact down to just under 1 per cent of total LNG supply.



That constraint could ease later in 2024, if LNG shipping via the Panama Canal is allowed to return to its previous levels after the rainy season replenishes water levels. The return of the Panama Canal would reduce the round-trip journey times for US LNG deliveries to Asia, allowing more frequent deliveries and, by extension, more supply. That, in turn, could free up LNG carrier capacity to either bring more US LNG to Europe, increase the supply of US LNG to Asia (thus further narrowing the Europe-Asia price spread), or a combination of both.

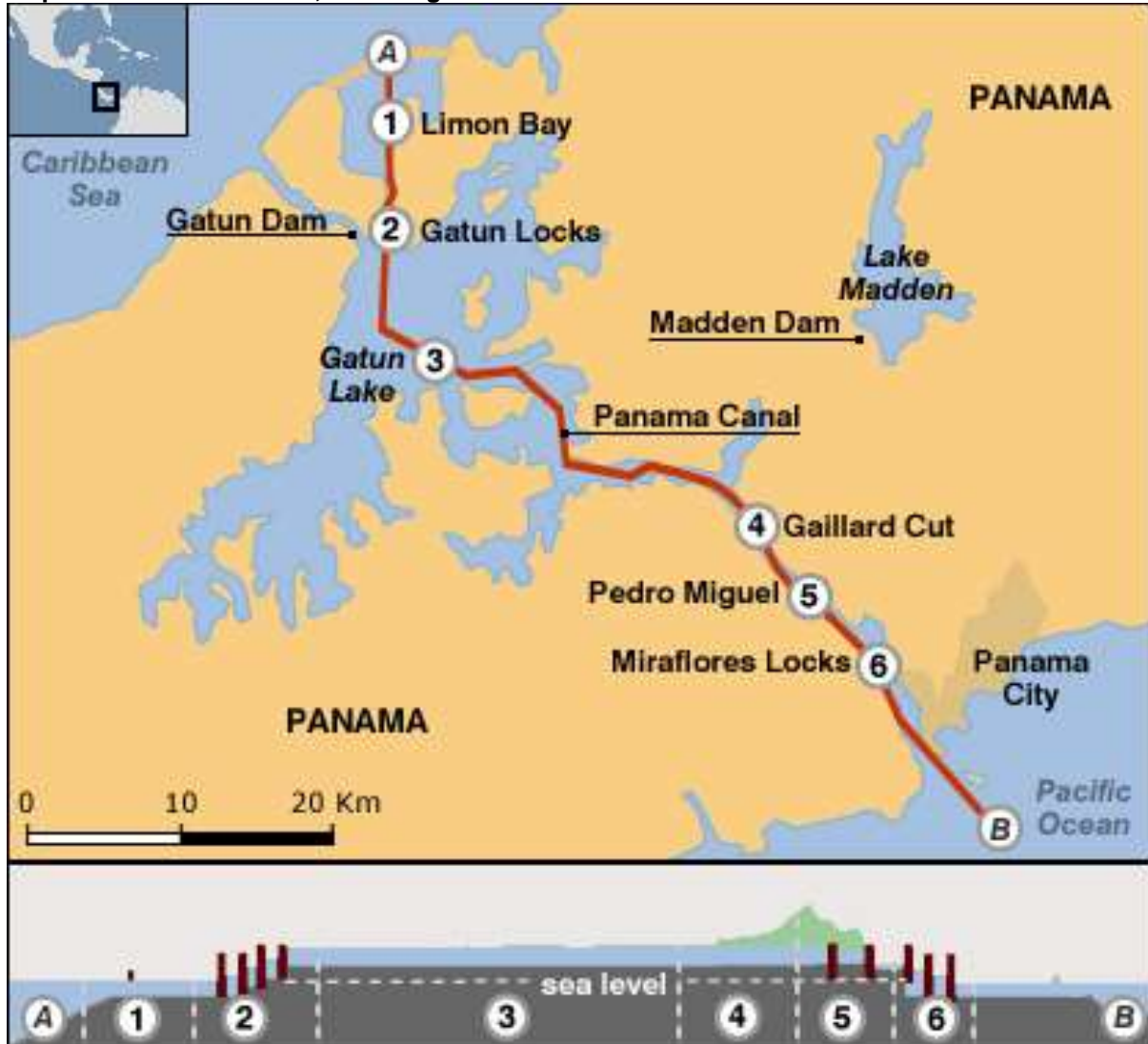
Finally, if the closure of the Red Sea to LNG shipping persists for several months (or even longer), it will illustrate the partial nature of global LNG market flexibility. While Qatari LNG supplied to European counterparties under contracts with fixed delivery destinations will continue to arrive, albeit more slowly and less frequently, the narrowing of inter-basin spreads could tempt more Atlantic Basin cargoes with destination flexibility (namely from the United States) to divert from Asia to Europe. The overall impact would be a slight tightening of the global LNG market, with narrow inter-basin price spreads persisting, along with prices high enough to absorb the higher costs of making inter-basin deliveries via the Cape of Good Hope.

Coming after the curtailment of Russian pipeline supply to Europe in 2022 and the Panama Canal curtailments from mid-2023, the Red Sea disruption may be characterised as inconvenient rather than catastrophic, but it is one more factor contributing to a market that is set to remain relatively tight until the next large wave of LNG supply reaches the global market between 2026 and 2028. Moreover, assuming the disruption in the Red Sea continues, the extent of the cumulative impact in the second half of 2024 will depend on the factors analysed above, and thus remains uncertain.

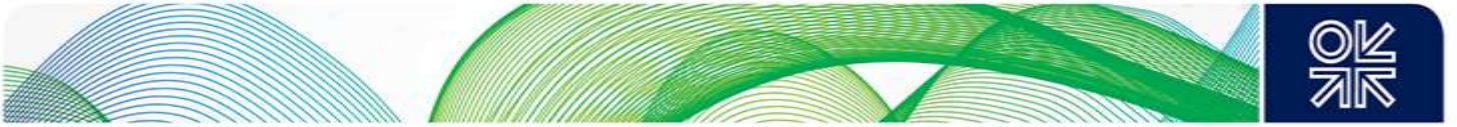


Appendix: Maps of the Panama Canal and Red Sea

Map of the Panama Canal, including locks and sea levels



Source: BBC News, 2006. Q&A: Panama Canal expansion. *BBC News*, 23 October. <http://news.bbc.co.uk/1/hi/world/americas/6074400.stm>



Map of Middle Eastern shipping points and LNG export terminals



Data source: Map from Google Maps, annotated by the author