February 2024

Finland and the Baltics without the Balticconnector: market impact and outlook for the rest of winter 2023-24

Overview

Early in the morning of 8 October 2023, the Balticconnector pipeline connecting Finland and Estonia was taken offline following a sudden drop in pressure.[1] An investigation subsequently established that an anchor dragging along the seafloor ruptured the pipeline,[2] with Finnish authorities near certain that the Hong Kong-flagged *Newnew Polar Bear* vessel was responsible for the damage. The investigation remains ongoing as Finnish authorities seek cooperation with China over the matter, which was discussed between the Finnish and Chinese Presidents as recently as 10 January 2024.[3] According to the Finnish and Estonian transmission system operators (TSOs), the Balticconnector will be offline for repairs until at least April 2024.[4] Many market participants view this as an overly optimistic timeline, but in December the Finnish TSO reaffirmed that an April 2024 restart is still achievable, although it will require "success in the planning and repair work".[5] Despite losing access to Finland's two LNG terminals, the Baltic countries of Estonia, Latvia, and Lithuania remain relatively well supplied given their continued access to gas storage in Latvia and the Lithuanian LNG terminal at Klaipeda; the Finnish market, conversely, has required quick and drastic changes to adapt to the new supply situation.

This paper explores the impact of the outage on the Finnish and Baltic gas markets, focusing on Finland as the most-affected country in the region. The paper's main contention is that through the quick actions of both traders and infrastructure operators, a worst-case scenario in which gas supply is so scarce that customers are cut off has likely been averted, as the sendout capacity at Finland's Inkoo LNG terminal is sufficient to cover peaks in demand. That said, there is very limited flexibility in the Finnish gas and power markets, meaning events such as ice buildup impeding the delivery of LNG or a nuclear outage straining the power system are likely to result in a sharp increase in prices, potentially forcing marginal users out of the market in order to bring the system back into balance.

The paper begins with a short introduction to the Finnish market, covering the significance of gas both in overall energy consumption and in the power generation stack, as well as the source of the region's gas imports. The paper then covers the immediate reaction of traders in the region, who have booked capacity that previously would have gone unused at Inkoo, securing supply for the winter. This section also discusses the potential for ice buildup to hinder the delivery of LNG to Finland, which is the most serious risk the market faces this winter.

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[1] 'Balticconnector gas pipe off line for suspected leak', https://direct.argusmedia.com/newsandanalysis/article/2497145
[2] 'Anchor likely damaged Balticconnector: authorities', https://direct.argusmedia.com/newsandanalysis/article/2502145
[3] Kauranen, A., and Lee, L., 2024. Finnish, Chinese presidents discussed pipeline damage, Finland says. *Reuters*, 10 January. https://www.reuters.com/world/europe/finnish-chinese-presidents-discussed-pipeline-damage-finland-says-2024-01-10/
[4] 'Balticconnector gas pipe off line until at least April', https://direct.argusmedia.com/newsandanalysis/article/2497909
[5] 'Finland sticks to Balticconnector repair timeline', https://direct.argusmedia.com/newsandanalysis/article/2521414

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This is followed by a detailed look at gas consumption before and after the Balticconnector incident and consideration of why there has been a relative lack of change, including an analysis of regional price divergence between Finland and its southern neighbours. This section also examines in detail the power and heat sectors, exploring how they can drive higher gas consumption during events such as cold weather and nuclear outages, as seen in December 2023.

The following section examines capacity additions across the regional power market in the past year, and particularly how higher nuclear output could weigh on gas-fired generation. A final section considers the consequences of the Balticconnector outage for the Baltic countries, covering why they are relatively much more secure than Finland. The paper then concludes with an assessment of the prospects for the rest of the winter, and how the region might adapt going forward.

1. Introduction to the Finnish gas market

1.1 Supply dynamics

Historically, Finland was completely dependent on Russia for its supply of natural gas, having neither domestic production nor any pipeline connections to other countries; gas supplies entered Finland only at the Imatra interconnection point on the Russian border, and via two small-scale off-grid LNG terminals which also received Russian gas. In the period from 2017 to 2022, the maximum monthly flow from Russia to Finland at Imatra was 131 GWh/d (12 million cubic metres per day, or mmcm/d), and the period 2017-2019 saw monthly flows of 44-131 GWh/d (4-12 mmcm/d).[6]

The commissioning of the Balticconnector pipeline 2020 finally created a link to Estonia, allowing some diversification of supply, although this diversification was initially limited as Russia still supplied 74 per cent of all gas imports to Finland and the Baltics in 2021.[7] The Balticconnector is bi-directional between Inkoo (Finland) and Paldiski (Estonia), with a maximum daily capacity of 71 GWh/d towards Finland and 78 GWh/d towards Estonia, equating to an annualised capacity of roughly 2.6 bcm per year.[8]

Following the commissioning of the Balticconnector, the period from January 2020 to May 2022 saw Finland receive part of its pipeline imports from Russia at Imatra (with monthly average flows in a range of 25-103 GWh/d) and part of its imports via the Balticconnector (with monthly average flows mostly in the range of 5-35 GWh/d). From June to December 2022, Finland's only pipeline imports were via the Balticconnector, with monthly average flows of 15-30 GWh/d.

These imports via Balticconnector continued in Q1 2023 with monthly average flows of 29-44 GWh/d, but fell to an average of less than 1 GWh/d from April 2023 onwards as cargoes delivering to the new Inkoo Floating Storage and Regasification Unit (FSRU) became more regular.[9] The daily sendout capacity at Inkoo is a maximum of 140 GWh/d,[10] which is sufficient to replace the previous imports of Russian pipeline gas via Imatra and still leave sufficient volumes for re-export via the Balticconnector. This dynamic of LNG imports via Inkoo being divided between the Finnish market and re-exports via the Balticconnector continued throughout 2023, until the closure of the Balticconnector on 8 October.

[6] ENTSOG, 2024. *Transparency Platform*. https://transparency.entsog.eu/#/map
[7] Author's own calculation based on ENTSO-G data. ENTSO-G, 2024. *Transparency Platform*. https://transparency.entsog.eu/#/map
[8] Elering, 2024. Balticconnector technical information. https://elering.ee/en/balticconnector#tab1
[9] ENTSOG, 2024. *Transparency Platform*. https://transparency.entsog.eu/#/map
[10] GasGrid Finland, 2022. Indicative capacity requirements of the Floating Storage and Regasification Unit for Q1-Q3 2023. *Press Release*, 28 September. https://gasgrid.fi/en/2022/09/28/indicative-capacity-requirements-of-the-floating-storage-and-regasification-unit-2/

Figure 1: Map of the gas grid in Finland and the Baltic states

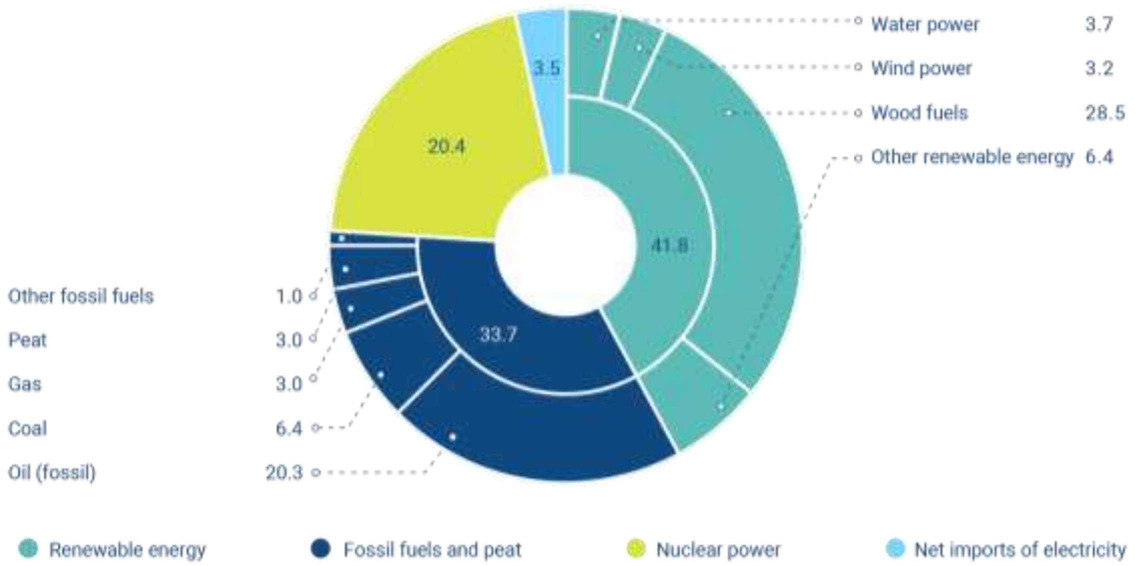
Source: GasGrid Finland.[11]

[11] GasGrid Finland, 2024. *Gas market integration*. https://gasgrid.fi/en/gas-market/gas-market-integration/#aiming-towards-integrated-gas-market

1.2 Demand dynamics

Finland is not particularly reliant on gas for its overall energy consumption: gas made up just 5.5 per cent of total energy consumption in 2021, and its share shrank to just 3 per cent in 2022 as gas prices reached historic highs. The country is much more reliant on wood fuels, given an abundance of national forests and forestry-related industries, as well as nuclear energy (see pie chart below). Finland consumed 11.8 TWh of gas in 2022 (just over 1 bcm), well down from 25.1 TWh in the previous year.[12] Finnish gas use is in long-term decline, having been as high as 50 TWh as recently as 2010.[13]

Figure 2: Total energy consumption by energy source 2022



Source: Statistics Finland via the Finland State Treasury.[14]

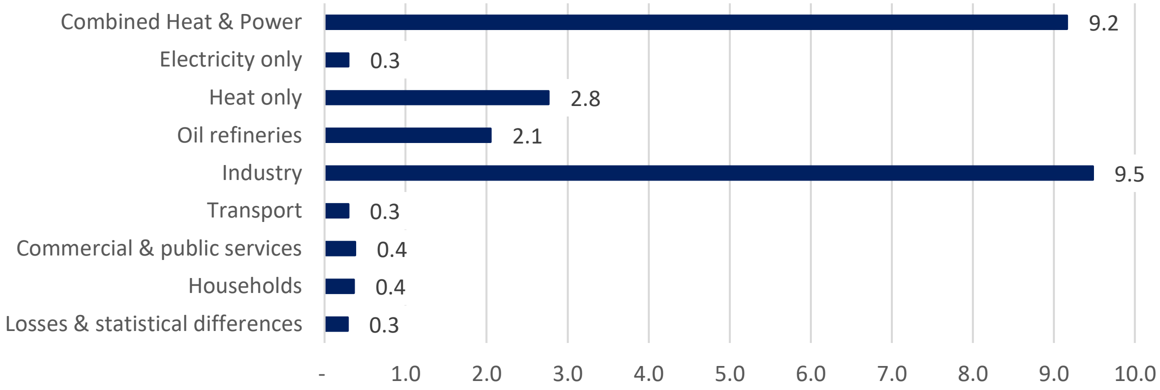
The most recent data from Eurostat on Finnish gas consumption shows that it is concentrated in key sectors (see figure 3). Of the 25.1 TWh of Finnish gas consumption in 2021, 12.3 TWh (49 per cent of the total) was transformed into heat and power, mostly in combined heat and power (CHP) plants. A further 9.5 TWh (38 per cent of the total) was consumed in industry, along with 2.1 TWh (8 per cent of the total) that was consumed by the energy sector in oil refineries. This leaves just 1.0 TWh (4 per cent of the total) consumed in households, commercial & public services, transport, agriculture, forestry, fisheries, and 'other', with the remaining 0.3 TWh (1 per cent) accounted for by distribution losses and statistical differences. When industrial gas consumption is broken down by sector, it is clear that the paper industry, iron & steel sector, and chemicals & petrochemicals sector are the major consumers, accounting for almost 90 per cent of Finland's industrial gas consumption in 2021 (see figure 4).

[12] GasGrid Finland, 2023. *Annual Report 2022*. https://gasgrid.fi/wp-content/uploads/Gasgrid_Finland_Annual-Report_2022.pdf (see page 23)

[13] Energiavirasto, 2023. Sähkön riittävyys Suomessa hyvä tänä talvena (Sufficient electricity in Finland is good this winter). *Press Release*, 30 November. https://energiavirasto.fi/-/sahkon-riittavyys-suomessa-hyva-tana-talvena - see page 3 the additional information provided in the PDF document at the end of the press release, 'Operational Reliability of Gas in 2023'. The data was originally supplied by GasGrid Finland and Gasum.

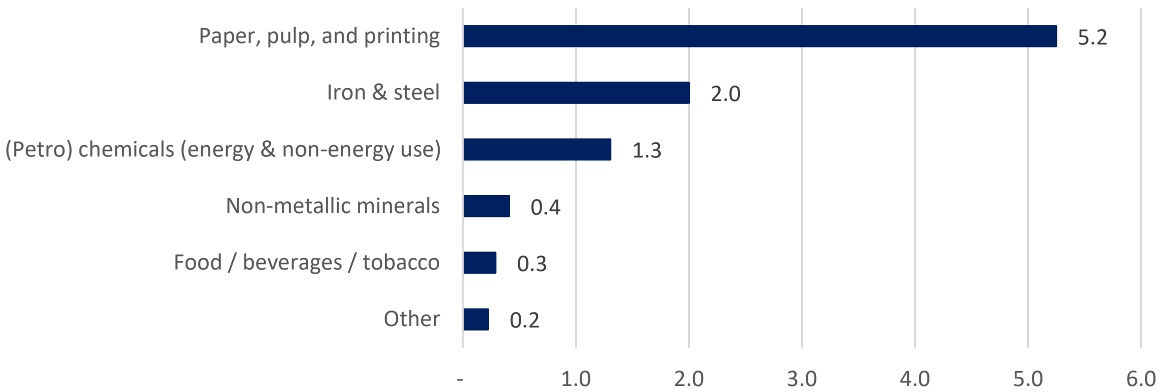
[14] Statistics Finland, 2023. *Energy consumption: statistics - Total Energy Consumption by Source*. Graph published by the State Treasury of the Republic of Finland. https://www.treasuryfinland.fi/annualreview2022/energy-consumption-statistics/

Figure 3: Finnish Gas Consumption by Sector in 2021 (TWh)



Source: Data from Eurostat, graph by the author.[15]

Figure 4: Finnish Industrial Gas Consumption by Sector in 2021 (TWh)



Source: Data from Eurostat, graph by the author.[16]

Although a significant share of Finland's total gas consumption is accounted for by transformation into heat and power, gas is far from the largest source of Finland's heat and power generation, both at large-scale plants and in residential buildings.

There is very little direct household heating by gas in Finland, in contrast to much of Europe, with the large majority of buildings using either district heating or heat pumps. Indeed, more than 1.4 million heat pumps have been deployed in a population of just 5.6 million people. Of the 42.7 TWh of energy consumed in the heating of Finland's residential buildings in 2022, district heat, electricity, and wood each provided 10.4-12.8 TWh, with a further 6.8 TWh provided by 'ambient energy' (heat pumps). By contrast, gas provided just 170 GWh, although gas is used in a secondary sense, via gas-fired district heating and gas-fired electricity.[17] Consequently, households accounted for just 2 per cent of Finnish gas consumption in 2022.[18]

[15] Eurostat, 2024. *Supply, transformation, and consumption of gas (nrg_cb_gas).* https://ec.europa.eu/eurostat/databrowser/product/view/nrg_cb_gas

[16] Eurostat, 2024. *Supply, transformation, and consumption of gas (nrg_cb_gas).* https://ec.europa.eu/eurostat/databrowser/product/view/nrg_cb_gas

[17] Statistics Finland, 2024. *11zr -- Heating of residential buildings by building type, 2008-2022.* *https://pxdata.stat.fi/PxWeb/pxweb/en/StatFin/StatFin__asen/statfin_asen_pxt_11zr.px/*

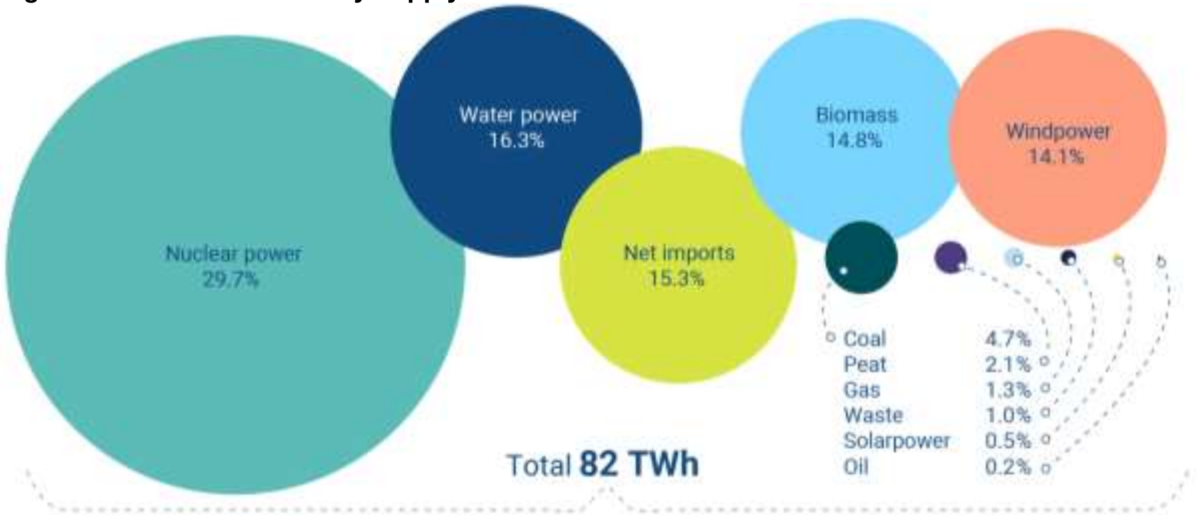
[18] Energiavirasto, 2023. *Verkkotoiminnan julkaisut - Verkkotoiminnan tunnusluvut - Maakaasuverkkotoiminnan tekniset tunnusluvut 2022 (excel).* (Network operation publications - Network operation key figures - Natural gas network operation

Natural gas fired roughly 10 per cent of district heating production in 2021, but its share dropped to just 3 per cent in 2022 as plants switched to alternative fuels, mostly coal and oil, due to high gas prices.[19] This shift to alternative fuels in district heating was prevalent throughout the region, notably in Estonia where companies were given temporary exemptions allowing them to burn fuel oil.[20]

Electricity production in Finland fell only slightly between 2021 and 2022, from 69.3 TWh to 69.1 TWh. However, the use of gas for power generation fell from 3.7 TWh to 0.9 TWh, with the share of gas in power generation falling from 4.3 to 1.1 per cent. [21] By contrast, nuclear constituted the largest share in 2022, at just under 30 per cent, while hydro, wind power, biomass, and net imports each held similar shares, which demonstrates a substantial diversification of power generation by source.[22]

Finnish gas-fired plants are mostly used for peaking rather than baseload, meaning their importance to the system is much higher on individual days, as will be discussed later. Heating and power plants accounted for 16 per cent of Finnish gas consumption in 2022 – a sharp decline compared to 2021.[23]

Figure 5: Finland's electricity supply in 2022



Source: Statistics Finland via the Finland State Treasury.[24]

In the industrial sector, data from Statistics Finland show that total energy use in industry in Finland declined from 141.6 TWh in 2021 to 128.3 TWh in 2022, while gas consumption in industry declined from 9.4 TWh to 7.0 TWh. In the chemical sector, gas use halved to 1.4 TWh from 0.7 TWh, and in the forestry (inclusive of paper) sector gas consumption fell from 5.3 TWh to 3.9 TWh. The combined decline of 2.1 TWh year-on-year in those two sectors accounted for 87.5 per cent of the year-on-year decline in Finland's industrial gas use in 2022, and was a response to the exceptionally high prices

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technical key figures 2022 (excel). https://energiavirasto.fi/verkkotoiminnan-julkaisut Direct download link: https://energiavirasto.fi/documents/11120570/12862527/Maakaasuverkkotoiminnan+tekniset+tunnusluvut+2022.xlsx/62e37490-6bca-d9e0-306e-03b392848684?t=1695797207498

[19] Finnish Energy, 2023. District heating in Finland 2022. *Presentation, November 2023*. https://energia.fi/wp-content/uploads/2023/11/District_heating_2022.pdf (see slide 15)

[20] 'Estonia urges switch from gas to other fuels', https://direct.argusmedia.com/newsandanalysis/article/2358985

[21] Statistics Finland, 2024. *12vp -- Supply of electricity by energy source, 1990-2022. https://pxdata.stat.fi/PxWeb/pxweb/en/StatFin/StatFin__ehk/statfin_ehk_pxt_12vp.px/*

[22] Finnish Energy, 2023. Energy Year 2022 – Electricity. *Presentation, 12 January*. https://energia.fi/wp-content/uploads/2023/08/Electricity_Year_2022.pdf (see slide 8)

[23] Energiavirasto, 2023. *Verkkotoiminnan julkaisut - Verkkotoiminnan tunnusluvut - Maakaasuverkkotoiminnan tekniset tunnusluvut 2022 (excel).* (Network operation publications - Network operation key figures - Natural gas network operation technical key figures 2022 (excel). https://energiavirasto.fi/verkkotoiminnan-julkaisut

[24] Statistics Finland, 2023. *Energy consumption: statistics – Electricity production 2022*. Graph published by the State Treasury of the Republic of Finland. https://www.treasuryfinland.fi/annualreview2022/energy-consumption-statistics/. These figures were subsequently revised by Statistics Finland, with the share of gas changing from 1.3 per cent to 1.1 per cent.

seen during 2022. Consequently, the share of gas in Finland's industrial energy consumption fell from 6.6 per cent in 2021 to 5.5 per cent in 2022. [25]

In the forestry sector (which includes the paper industry and is a sector strongly associated with gas consumption), wood fuels provided 69 per cent of energy use, followed by electricity (12.5 per cent), heat (7 per cent), and gas (5.3 per cent) in 2022. In both the chemical sector and machinery manufacture sector, gas provided just 3.1 per cent of energy consumed in 2022. However, the share of gas in energy consumed in both the manufacturing of basic metals and in 'other manufacturing' was higher (9.2 per cent in both cases).[26]

The key point to be made is that Finland is not particularly dependent on gas in any sector, and that Finland's gas consumption fell in 2022 on the basis of fuel-switching in sectors that were able to do so: most notably in power generation and in the forestry and chemicals sectors in industry. However, this is not to suggest that gas supplies are inconsequential for Finland, especially given the role of gas in providing fuel supply to power plants at times of peak demand. Moreover, some of the price-driven fuel-switching that occurred in 2022 (most notably from gas to coal and oil in power generation) is likely to reverse now that prices have fallen and stabilised since late 2023.

2. Market reaction

Russia's invasion of Ukraine in February 2022 and the subsequent curtailment of Russian pipeline gas supplies to Europe brought seismic changes to the regional market, as Lithuania, Latvia, and Estonia all banned Russian gas imports by the start of 2023.[27] Finland has not passed any law against the import of Russian gas, but Gazprom cut off state-owned supplier Gasum in May 2022 for its refusal to transition to payments in rubles.[28] Gasum subsequently terminated the contract in May 2023,[29] making the resumption of Russian pipeline imports highly unlikely, even if not illegal.

Gasum continues to import Russian LNG via small-scale terminals, however, because a lack of sanctions means Gasum has no legal means to stop purchases under its contract with Gazprom; it also has take-or-pay obligations which mean Gasum would pay for the shipments regardless of whether it received them or not. Finland's environment and climate minister, Kai Mykkanen, said in January 2024 that he hopes to ban imports of Russian LNG as soon as 2025.[30]

In a further diversification effort, Finland's state-owned TSO, GasGrid Finland, paid €460mn to lease the *Exemplar* FSRU for ten years.[31] The *Exemplar* was installed at the port of Inkoo (50km west of Helsinki), which is also the starting point of the Balticconnector pipeline, and began commercial operations with three import cargoes between 29 December 2022 and 17 January 2023, before a pause in operations. Imports resumed on 2 April 2023, from which point onwards the imports became regular deliveries.[32] LNG cargoes of Russian origin are banned in the terminal's rulebook.

Sendout from Inkoo, along with the smaller-scale Hamina terminal (which, unlike Finland's other small-scale LNG import terminals at Pori and Tornio, can regasify directly into the gas grid), became Finland's main source of gas. Some of the gas brought in through Inkoo remained in Finland for domestic consumption and the rest was re-exported via the Balticconnector for sale in the Baltics or for injection

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[25] Statistics Finland, 2024. *11wy -- Energy use in manufacturing by industry (TOL 2008), 2007-2022.* https://pxdata.stat.fi/PxWeb/pxweb/en/StatFin/StatFin__tene/statfin_tene_pxt_11wy.px/
[26] Statistics Finland, 2024. *11wy -- Energy use in manufacturing by industry (TOL 2008), 2007-2022.* https://pxdata.stat.fi/PxWeb/pxweb/en/StatFin/StatFin__tene/statfin_tene_pxt_11wy.px/
[27] See author's previous research paper for OIES on the Baltic gas market and its efforts to quit Russian gas: A'Hearn, 2022. The Baltic gas market: a microcosm of Europe's struggle to quit Russian gas. *Oxford Energy Insight No.123*, September. https://www.oxfordenergy.org/publications/the-baltic-gas-market-a-microcosm-of-europes-struggle-to-quit-russian-gas/
[28] 'Gasum's Russian gas supply to halt from tomorrow', https://direct.argusmedia.com/newsandanalysis/article/2333587
[29] 'Gasum terminates gas supply contract with Gazprom', https://direct.argusmedia.com/newsandanalysis/article/2451887
[30] Hartikainen, J., 2024. The government plans to ban the import of Russian LNG next year. *Helsingin Sanomat*, 5 January. https://www.hs.fi/politiikka/art-2000010098034.html
[31] 'Inkoo terminal could lack users: Ministry of finance', https://direct.argusmedia.com/newsandanalysis/article/2400218
[32] Kpler LNG Platform. [subscription required]

into the Inčukalns storage facility in Latvia. Balticconnector flows still pointed towards Finland at an average of 34 GWh/d in January-March 2023 due to a lack of commercial interest in Inkoo's cargo slots owing to concerns that sea ice could impede the delivery of cargoes to Inkoo during the winter.[33] But as vessels started arriving regularly at Inkoo from April onwards, Balticconnector flows flipped towards Estonia on all but six days in April-December.

Before the Balticconnector outage, no cargo slots at Inkoo had been booked for the period between late November 2023 and mid-March 2024. Similar to winter 2022-23, firms had intended to cover Finnish gas demand through imports from the Baltics via the Balticconnector. The volumes intended for import into Finland via the Balticconnector in winter 2023-24 would most likely have originated from either seasonal withdrawals from the Inčukalns storage facility in Latvia or from LNG imports in Lithuania at Klaipeda. In effect, the combination of the Balticconnector pipeline and Inkoo FSRU transformed Finland from a gas 'island', connected only to Russia, into a full participant in the Baltic regional gas market. It is in this context that the damage to the Balticconnector pipeline caused a swift reaction in the market, forcing firms to book capacity at Inkoo that had previously been deemed too risky.

In response to gas suppliers scrambling to book the remaining slots at Inkoo, the terminal operator Floating LNG Terminal Finland (FLTF, wholly owned by TSO Gasgrid Finland) quickly established a new winter terminal schedule, and with the approval of the Finnish energy regulator, Energiavirasto, made crucial changes to the terminal's rulebook. These changes temporarily allowed the principle of joint use to be applied to remaining fourth-quarter and first-quarter slots, which were merged into one combined period.[34] Joint use allows several firms to use the terminal and share the gas that is delivered between them. FLTF also introduced renominations at Inkoo's connection point to the grid in order to increase flexibility for shippers and "to better meet the needs of gas users during the winter season".[35] Additional late spot slots can also be allocated by FLTF if deemed necessary.

Following an auction in early November 2023, FLTF allocated all six slots on offer for the new winter schedule: three each were sold to Gasum and regional supplier Eesti Gaas.[36] Each slot is designed to take cargoes of 800 GWh, but different sizes can be accommodated with advanced notice to FLTF; each slot is roughly two weeks in length. Following these bookings, every slot at Inkoo was allocated for the 2023-24 gas year, as summer slots had been in high demand during annual auctions earlier in the year. On 5 December 2023, Eesti Gaas confirmed it had signed a contract for three LNG shipments from Norway for delivery to Inkoo over the winter, with negotiations ongoing for a fourth. All three cargoes will be delivered on ice-class vessels.[37] Gasum also confirmed to the author in January 2024 that it had "secured sufficient ice-classified vessels for all our delivery slots for the winter".[38]

The Finnish National Emergency Supply Agency (NESA) moved the risk assessment of gas supply security to the alert level on 27 October 2023, a decision taken based on the reduced infrastructure standard availability. [39] According to NESA, the alert level is the middle step on a three-step scale, and is introduced over a gas supply disruption or abnormally high gas demand that threatens to upset Finland's gas balance, but which the market is able to handle without resorting to non-market-based measures. At the alert level, NESA and other authorities monitor the gas market and the security of gas infrastructure more closely. NESA already declared the first level on 6 May 2022, when pipeline imports of Russian gas were soon due to end.

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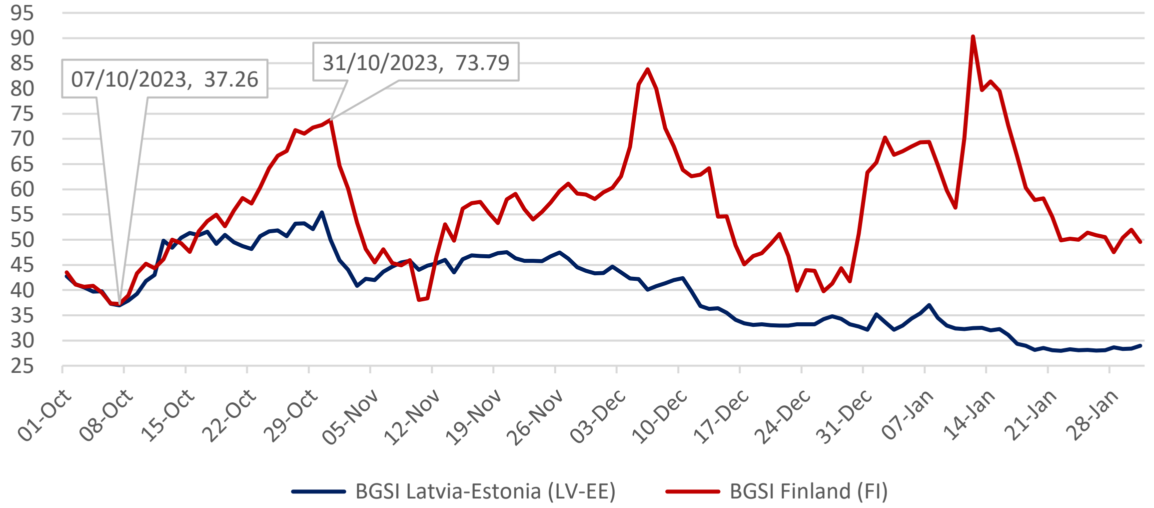
[33] 'Market has ice concerns for Finland's Inkoo LNG', https://direct.argusmedia.com/newsandanalysis/article/2420607
[34] 'Finland's Inkoo LNG operator plans rule changes', https://direct.argusmedia.com/newsandanalysis/article/2499354
[35] 'Gasgrid proposes new Inkoo LNG schedule, rules', https://direct.argusmedia.com/newsandanalysis/article/2501162
[36] 'Finland's Inkoo LNG winter slots sell out', https://direct.argusmedia.com/newsandanalysis/article/2506436
[37] 'Elenger signs for LNG deliveries to Finland's Inkoo', https://direct.argusmedia.com/newsandanalysis/article/2515933
[38] 'Gasum delivers LNG cargo from SEFE to Inkoo', https://direct.argusmedia.com/newsandanalysis/article/2526351
[39] NESA, 2023. NESA raising its risk assessment concerning the security of gas supply. *Press Release*, 30 October. https://www.huoltovarmuuskeskus.fi/en/a/nesa-raising-its-risk-assessment-concerning-the-security-of-gas-supply

3. Price reaction

The GET Baltic regional exchange covers three market areas (Finland, Latvia-Estonia, and Lithuania), and publishes volume-weighted average prices for each of these market areas and for all three combined, which it refers to as the Baltic-Finnish Natural Gas Price Index (BGSI).[40] Immediately after the Balticconnector was taken offline on 8 October 2023, the Finnish market area BGSI (BGSI FI) jumped by 11 per cent, and continued to rise as the month went on. Between 7 and 31 October 2023, the Finnish market area BGSI rose by 98 per cent, from 37.26 EUR/MWh to 73.79 EUR/MWh.

The sustained rise in Finnish prices contrasted those in the neighbouring Latvia-Estonia market area, where prices increased in the immediate days following the Balticconnector incident but then stabilised from 12 October onwards. Significant price disparities between the two markets opened up over the course of October, reflecting the relative tightness of the Finnish market due to a lack of supply options in comparison to the Baltic countries which still had access to gas stored at Inčukalns and stable supply from the Klaipeda LNG terminal (see price graph below).

Figure 6: Finnish and Latvia-Estonian day-ahead gas prices (EUR/MWh)



Source: GETBaltic[41]

This lack of storage-driven supply-side flexibility in Finland, and the flexibility offered to the Latvia-Estonia market area by the Inčukalns storage facility, have resulted in Finnish prices being much more volatile than those in Latvia-Estonia in the winter to date. While Finnish prices dropped from these highs in the first half of November, mostly as a result of strong wind power generation, they jumped back up in December as the weather turned colder. The Finnish BGSI price reached a high of 83.83 EUR/MWh on 6 December, the highest for any day since 22 February; around the same period overnight temperatures in the capital, Helsinki, dropped as low as -17°C, with temperatures further north in less-populated areas falling towards -30°C.

In contrast, Latvia-Estonian prices fell in early November, rebounded slightly and then remained stable for much of November, before declining more or less continuously from late November onwards. This has resulted in significant price disparities on individual days as large as 44 EUR/MWh on 6 December and 58 EUR/MWh on 12 January (see graph above).

[40] The BGSI for the Finnish market area is referred to as 'BGSI FI', the BGSI for the Estonia-Latvia market area is referred to as 'BGSI LV-EE', the BGSI for the Lithuanian market area is referred to as 'BGSI LT', and the BGSI for all these market areas combined is referred to simply as 'BGSI'. See: GET Baltic, 2024. *Trading Data: Fulfilled Trades on a Daily Market*. https://www.getbaltic.com/en/market-data/trading-data/?period=day&graph=trades&area=23&show=price&display=table

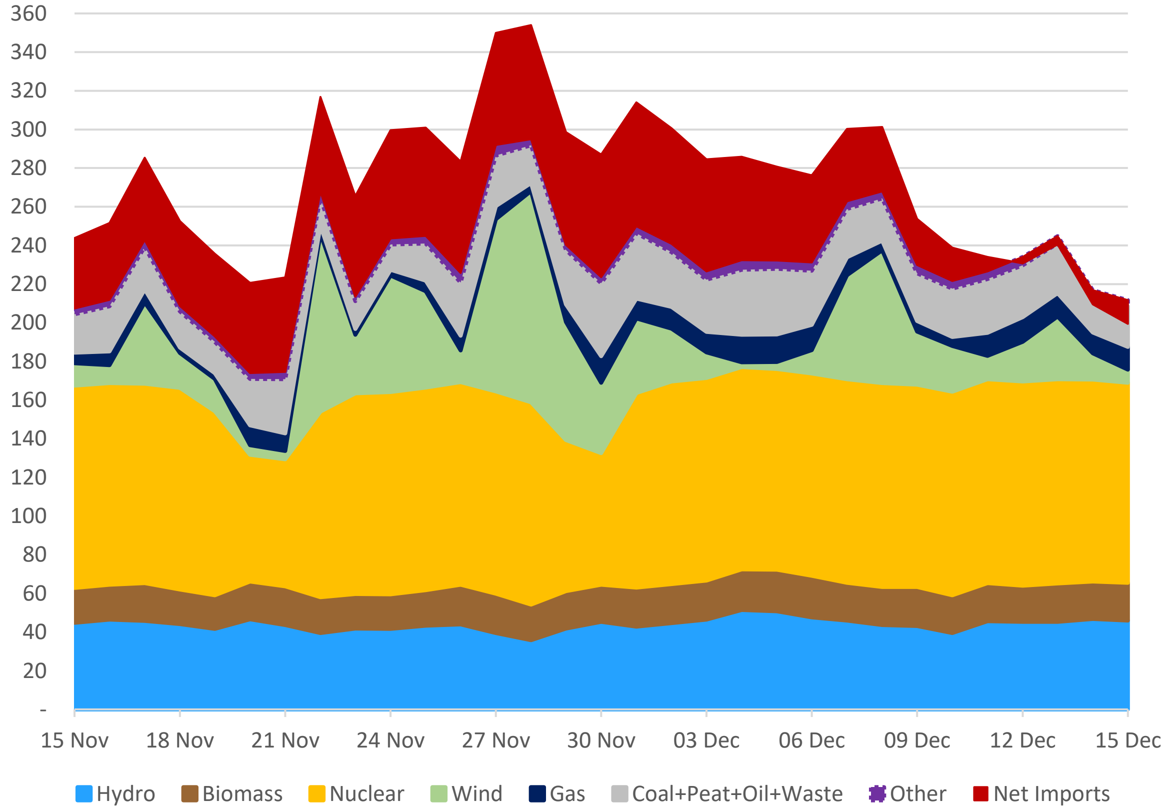
[41] GET Baltic, 2024. *Trading Data: Fulfilled Trades on a Daily Market*. https://www.getbaltic.com/en/market-data/trading-data/?period=day&graph=trades&area=23&show=price&display=table

A key driver behind the Finnish gas price volatility was higher electricity prices brought on by cold spells of weather in the region: higher power prices incentivised more gas to be used for power generation, particularly from CHP operators which can sell both their heat and power production. Given that gas is increasingly used for peak rather than baseload power generation, looking at the share of gas in the Finnish generation mix across an entire year only tells part of the story. Gas takes on a much more important role in periods characterised by cold temperatures, weak renewable generation, or nuclear outages, of which the period from 22 November to 8 December was a prime example.

On 1 November 2023, daily supply to the Finnish electricity grid (domestic generation plus net imports) reached 306 GWh/d, surpassing 300 GWh/d for the first time since 25 January 2022. In the weeks that followed (2-21 November), daily supply to the Finnish grid fell back, averaging 242 GWh/d and ranging from lows of 211 GWh/d to 294 GWh/d. Indeed, in the whole of November and December 2023, total Finnish power demand exceeded 300 GWh/d nine times, on 1 November and then eight times in the 17 days from 22 November to 8 December first.[42] [43]

Most of these peak demand days had demand levels of 300-306 GWh/d (1 & 25 November, 2, 7, & 8 December), with two higher days of 314-317 GWh/d (on 22 November and 1 December), and two absolute peaks of 350-354 GWh/d on 27-28 November. This peak was the first time Finnish electricity supply had surpassed 320 GWh/d since December 2021, and only the second time since at least 1 January 2021 that total supply had exceeded 349 GWh/d. This underscores how substantial (and unusual) the 27-28 November peak was in terms of Finnish electricity supply in recent years.

Figure 7: Finnish electricity supply by source (including net imports) from 15 November to 15 December (GWh/d)



Source: Data on power generation and physical cross-border flows from ENTSO-E transparency Platform.

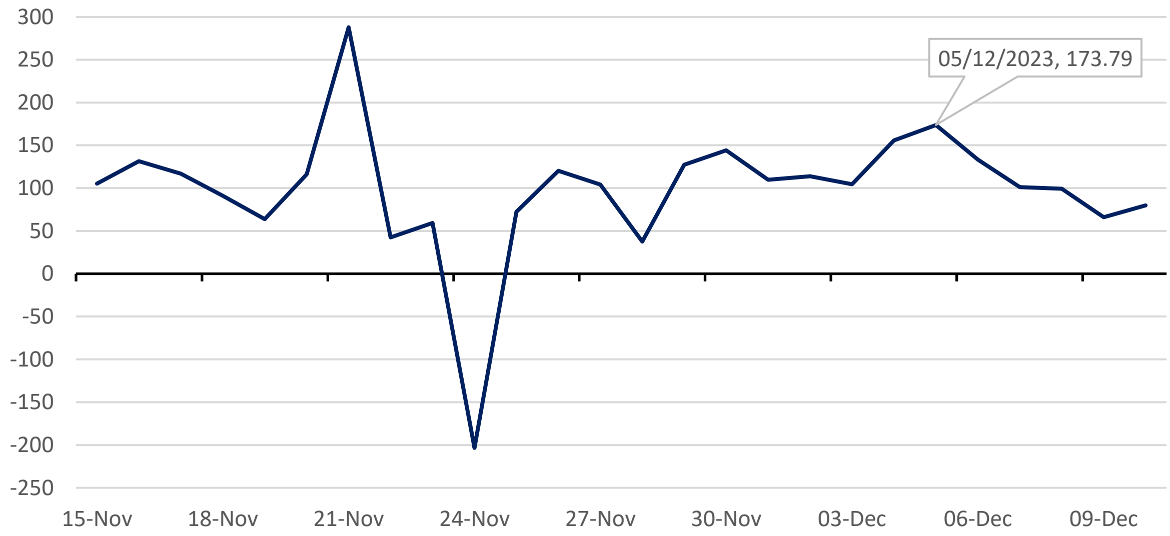
[42] 'Cold weather causes Baltic gas burn to soar', https://direct.argusmedia.com/newsandanalysis/article/2516090
[43] ENTSO-E, 2024. *Transparency Platform*. https://transparency.entsoe.eu/dashboard/show

As illustrated in the graph above, some of these peaks in demand were largely met by strong wind power supply (22, 27, 28 November). But other peaks in demand (1-2 and 7-8 December), the dip in nuclear power output (29-30 November), and the dip in wind power output (3-6 December), had to be met using dispatchable power generation sources, of which gas is one of several.

Gas-fired power generation rose form 4 GWh/d on 28 November to 14 GWh/d on 30 November, and remained at a level of 10-14 GWh/d until 6 December. After falling back to 5 GWh/d in 8-10 December, it surged again to 11-13 GWh/d in 11-15 December. Power generation from oil, coal, peat, and waste also rose in this period, from less than 25 GWh/d up to 20 November to daily peaks of 27-38 GWh/d during the period 30 November to 5 December. It was not until 10 December, when the surge in Finnish electricity demand had passed, that Finland's net electricity imports also subsided.[44]

These supply and demand dynamics – with net imports and dispatchable sources used to balance fluctuations in both demand and wind power supply – are reflected in the Finnish day-ahead power prices, illustrated below. The fact that day-ahead Finnish power prices peaked on 5 December for delivery on 6 December, the same day that the Finnish BGSI gas price reached its highest point, demonstrates the tight correlation between gas and power prices, despite the relatively small share of gas in Finland's power generation mix.

Figure 8: Finnish day-ahead power prices for day of delivery (EUR/MWh)



Source: Nord Pool[45]

This necessary period of strong gas-fired generation demonstrates one of the Finnish gas market's main risks this winter: if the weather remains particularly cold and gas heating plants and CHPs are forced to run at high utilisation rates, already limited available supply could become stretched further, causing gas prices to increase significantly as they did in early December. This leaves Finland particularly exposed to gas and power price spikes, and could force marginal industrial users out of the market during such periods.

[44] ENTSO-E, 2024. *Transparency Platform*. https://transparency.entsoe.eu/dashboard/show

[45] Nord Pool, 2024. *Day-ahead prices - Finland*. https://www.nordpoolgroup.com/en/Market-data1/Dayahead/Area-Prices/FI/Daily/?view=table

4. Demand response

A demand response might have been expected in the wake of the price spike triggered by the long Balticconnector outage, particularly given Finland's limited supply options. In fact, there was little change. Gas consumption averaged 34 GWh/d on 1-7 October, and actually increased slightly to 42 GWh/d on 8-31 October before rising further to 47 GWh/d in November-December. Demand hit a yearly high at just over 78 GWh on 4 December, close to the maximum it can reach on a given day considering the average sendout profile of Inkoo under the new winter schedule plus sendout from Hamina which is limited to a maximum of roughly 6 GWh/d.[46] Sustained consumption at around 70 GWh/d in early December caused Gasgrid to undertake balancing management measures, with the TSO emphasising to market participants "the importance of minimising the imbalance to ensure gas adequacy and maintain security of supply".[47]

One explanation for the lack of demand response to the price increase is that as the heating season began in earnest towards the end of October, district heating was switched on. Heating companies may have already secured supply for the winter at lower prices, meaning the surge did not affect their operations; in addition, once temperatures reach a certain level district heating must run regardless of fuel costs, as households need to have access to heat. Higher gas burn for power generation, as discussed above, was also a strong driver of increased Finnish gas consumption. It is also worth noting that while Finnish industrial gas demand fell in 2022 in response to higher prices (as discussed earlier), it is possible that as prices fell back in 2023 some of that industrial gas demand recovered, and may have been curbed by the latest round of Finnish gas price volatility since the closure of the Balticconnector. However, this cannot be verified due to the lack of prompt available data on consumption broken down by sector.

Demand in the Baltics, too, changed little in the aftermath of the Balticconnector incident, increasing in November-December from October in both Latvia and Estonia. District heating and power generation are again likely to be the main drivers behind this increase. Demand fell by around 14 per cent on the month in Lithuania in November, although this was almost certainly due to the closure of one of ammonia producer Achema's units at its Jonava plant on 31 October for seven months of maintenance.[48] Lithuanian consumption then recovered in December to reach its highest for any month all year, similar to the other Baltic countries and Finland.

5. Greatest risk to supply: ice buildup

Perhaps the greatest risk to gas supply in Finland this winter is the possibility of ice buildup in Finnish waters, which could hinder the delivery of LNG to Inkoo. Traders frequently cite ice as the primary reason why Inkoo went unused in its first months of operation between January and March 2023, and why prior to the Balticconnector outage no slots had been booked for most of the ice season between December 2023 and March 2024. Ice can damage the special coating on the hull of LNG carriers which reduces water resistance; seawater could then corrode the hull and thus potentially require more frequent dry-docking for repair – extra repainting and more downtime means "lost money" for the shipper, one trader told the author.[49] Some firms are reluctant to deliver to Inkoo, citing problems with insurance and risk. Ice buildup can be quick and hard to predict, making accurate risk assessment difficult. Inkoo is also far removed from all other large-scale European terminals except Klaipeda, which limits optionality for traders and makes Inkoo a less attractive destination.

[46] Data from Gasgrid Finland, available here: https://direct.argusmedia.com/integration/dataanddownloads/downloadfile/551148
[47] 'Cold weather causes Baltic gas burn to soar', https://direct.argusmedia.com/newsandanalysis/article/2516090
[48] 'Achema to close one ammonia unit at Jonava', https://direct.argusmedia.com/newsandanalysis/article/2504433
[49] 'Winter ice complicates Finnish Inkoo's LNG imports', https://direct.argusmedia.com/newsandanalysis/article/2508281

The Finnish Transport and Telecommunications agency, Traficom, notes that, in accordance with Finnish-Swedish Ice Class Rules (FSICR), vessels operating in Finnish waters are categorised according to one of six 'ice classes': IA Super, IA, IB, IC, II, and III: [50]

> Ice classes II and III are vessels that do not meet the requirements of the ice class regulations. A ship that has Finnish ice class II may have a classification notation indicating ice strengthening that is meant for easier ice conditions than those encountered in the Northern Baltic. Ships with ice class II may be eligible for icebreaker assistance under mild ice conditions if they have sufficient deadweight. Ships with ice class III are never eligible for icebreaker assistance.

This multiplicity of risk factors makes most sellers without ice-class vessels unwilling to ship to Inkoo, significantly reducing the pool of eligible sellers. This pool is restricted further by the ban on Russian vessels from delivering to Inkoo under the terminal rules: Novatek has several Arc-7 ice-class vessels which it uses to deliver from its Yamal terminal, but these are ineligible to ship to Inkoo. "There are a handful of ice-class vessels available in Europe," one trader told the author. Another trader added: "Most are owned by Novatek and Gazprom, and a couple are owned by Equinor, which leaves only Equinor valid in this equation." A third trader said less than 10 ice-class conventional ships are available for LNG, and that only a few have an A1 (IA) rating.[51] It comes as no surprise, then, that the Eesti Gaas will ship its three confirmed cargoes from Norway's Hammerfest liquefaction terminal on ice-class vessels.[52]

The reluctance to ship LNG on non-ice-class vessels remains, despite the fact that most normal LNG vessels would be classified as 'class II', making them eligible for ice-breaking assistance as long as conditions are not severe. Finnish-Swedish rules define ice class II vessels as "ships that have a steel hull and that are structurally fit for navigation in the open sea and that, despite not being strengthened for navigation in ice, are capable of navigating in very light ice conditions using their own propulsion machinery". These vessels can receive free ice-breaking assistance, which is generally provided on a first-come, first-served basis, the Finnish Transport Infrastructure Agency (FTIA) told the author.[53]

Depending on the extent of ice buildup, the FTIA can limit the minimum size and ice class of ships entitled to icebreaker assistance. These restrictions are set "in order to ensure smooth winter navigation and the safety of navigation in ice", Finnish transport and communications agency Traficom said. "Assistance for ships with inadequate engine output or ice strengthening would be both difficult and time-consuming."[54]

Restrictions were in place at Inkoo on 7 January-4 April 2023, but only for vessels below ice class II and below 2,000 deadweight tons (DWT) in size, so most LNG vessels would still have qualified for icebreaker assistance. In winter 2023/24, restrictions limiting icebreaker assistance to vessels of ice-class II and 2,000 DWT or more were imposed at Inkoo on 9 December 2023, nearly a month earlier than in the previous ice season. These restrictions were strengthened to cover only ice-class I vessels of 2,000 DWT from 13 January 2024. Similar restrictions were imposed at Hamina from 7 January 2024. That said, the ice season in 2022/23 was considered mild by historical standards, with the fourth-lowest ice levels since 2000.[55] Therefore, it is not surprising that the restrictions were imposed earlier in winter 2023/24.

The FTIA could choose to exempt individual vessels from these restrictions and prioritise them if they are deemed "transports critical to Finland's emergency energy or food supply or essential industry",

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[50] Traficom, 2024. *Ice Classes of Ships*. https://www.traficom.fi/en/transport/maritime/ice-classes-ships?toggle=Finnish%20ice%20classes
[51] 'Winter ice complicates Finnish Inkoo's LNG imports', https://direct.argusmedia.com/newsandanalysis/article/2508281
[52] 'Elenger signs for LNG deliveries to Finland's Inkoo', https://direct.argusmedia.com/newsandanalysis/article/2515933
[53] 'Winter ice complicates Finnish Inkoo's LNG imports', https://direct.argusmedia.com/newsandanalysis/article/2508281
[54] ibid
[55] Finnish Transport Infrastructure Agency, 2023. The winter of the icebreaking season 2022–2023 was mild and the season lasted 167 days. *Press Release*, 2 June. https://vayla.fi/en/-/the-winter-of-the-icebreaking-season-2022-2023-was-mild-and-the-season-lasted-167-days

after consultation with the National Emergency Supply Agency (NESA). Exemptions are made on a case-by-case basis, depending upon prevailing ice and weather conditions. There have been some discussions between NESA, the Finnish government, and the FTIA over whether to give priority to LNG vessels this winter as a matter of national security, but the bodies stopped shy of telling the author whether any formal understanding on this issue had been reached.

These rules mean using a normal LNG tanker to deliver to Inkoo carries significant risk — if ice becomes thick and stronger restrictions are imposed, then the tanker would be unable to reach the terminal unless given an exemption by FTIA. In extreme scenarios, even tankers designed for some ice navigation, but which are not classified at the highest level, could be restricted. Firms are therefore likely to only consider high ice-class vessels, the limited availability of which will increase their price.

Ultimately, the weather conditions will determine whether or to what extent LNG deliveries to Inkoo are impeded, meaning the stability of supply in the 2023-24 winter remains somewhat unsure. While all winter slots at Inkoo have been booked, theoretically ensuring supply, whether this supply can actually be delivered is a different question. The FTIA and NESA could choose to prioritise these LNG shipments if heavy restrictions are put in place, but avoiding such prioritisation is preferable because it “mixes the system and forces other vessels to await icebreaking assistance even longer”, NESA told the author. It must also be remembered that LNG is not the only critical supply being delivered to Finland at the same time, NESA added.[56] However, if vessels of the highest ice-class are used, then with the help of some assistance there should be no danger of cargoes being completely unable to deliver.

6. Power capacity additions

One important factor in winter 2023/24 that will limit the call on gas for power generation compared with the previous year is the increase in nuclear and renewable power generation capacities.

The most crucial event was the commissioning of the 1.6 GW Olkiluoto 3 (OLK3) nuclear reactor, which began regular commercial operations in April 2023.[57] This will provide a large amount of consistent baseload power, reducing space for gas in the generation stack regardless of the intermittency of renewable generation. Finland’s nuclear power generation of 4.1 GW in November 2023 was drastically higher than 2.76 GW in November 2022, and nuclear output continued to climb in December to record a record high of 4.31 GW.

However, OLK3’s operation has been marked by several unplanned outages which have reduced its availability at times, such as on the evening of 19 November 2023 when it disconnected from the grid owing to a turbine fault and did not return to near full capacity until 22 November.[58] [59] This caused Finnish power prices to spike (most notably on 20 November for delivery on 21 November, as illustrated earlier in Figure 6), bringing more gas online to cover the shortfall. While outages remain uncommon and Finnish nuclear production is stronger than ever, their potential can still present some instances where gas becomes more important in the generation stack. Given Finland’s still relatively large reliance on imports particularly during peak hours, it also remains vulnerable to outages in neighbouring countries, especially in Sweden. An unplanned outage at one of the reactors at the Swedish Forsmark nuclear plant, along with some domestic Finnish coal outages, contributed to Finnish day-ahead power prices soaring to a new record high.[60]

Finnish nuclear plants also remain reliant on Russian fuel, which could present a potential supply risk were Russia to suddenly halt shipments. Russia is one of the world’s largest suppliers of nuclear fuel,

[56] Personal correspondence with Jukka Etelavuori of NESA on 20/11/2023
[57] ‘Regular generation starts at Finnish OL3 nuclear plant’, https://direct.argusmedia.com/newsandanalysis/article/2439979
[58] ‘Finnish power prices jump following nuclear outage’, https://direct.argusmedia.com/newsandanalysis/article/2511225
[59] ENTSO-E, 2024. *Transparency Platform - Actual Generation per Generation Unit*. https://transparency.entsoe.eu/generation/r2/actualGenerationPerGenerationUnit/show
[60] ‘Finnish power spot surge driven by lower wind, imports’, https://direct.argusmedia.com/newsandanalysis/article/2526308

meaning finding replacement shipments quickly could be difficult, although operators do keep fuel reserves for scenarios such as this.

Finland also added nearly 1.3 GW of wind power in 2023, bringing total installed wind capacity to 6.94 GW from 5.67 GW at the end of 2022, according to the Finnish wind association.[61] While wind generation is by its nature intermittent, meaning strong production is not guaranteed on a consistent basis, when the wind does blow strongly it can drive Finnish power prices extremely low or even negative, leaving little incentive for operators to switch gas-fired power plants on. All else remaining equal, more wind capacity should mean less gas in the generation mix.

One potential risk for wind turbines in Finland, however, is the possibility of icing causing production to be curtailed. This already happened in mid-November 2023, when 250 MW was unavailable for two days. Roughly 850 MW was curtailed across Sweden, Finland and Norway combined in this period.[62] Particularly cold weather could therefore result in more gas being needed to fill the gap if wind is curtailed, although this will depend on the profitability of gas relative to alternative fuels such as coal.

To offset these risks, state-owned utility Fortum's 565 MW Meri-Pori coal plant will also return to the grid reserve from 1 March 2024 through to the end of 2026, for use during power supply emergencies only, and has continued to run fairly strongly so far in winter 2023/24.[63] Furthermore, the Finnish power TSO, Fingrid, assessed the country's electricity supply for the 2023-24 winter as satisfactory, owing to a rise in domestic generation capacity and continued import availability from Sweden and Estonia. Available domestic power generation capacity increased to 12.8 GW for winter 2023-24 from 11.3 GW in the previous winter, mostly a result of the commissioning of OLK3, bringing its net domestic power balance in the event of peak consumption down to just -1.5GW compared with -3.1 GW in winter 2022-23. This is despite total import capacity falling to 3.4 GW from 3.7 GW previously.[64]

7. Security of supply in the Baltics

This paper chose not to cover the Baltic countries in depth because the Balticconnector becoming unavailable has not drastically changed market fundamentals in these markets. If anything, it may mean that the region is better supplied this winter than it otherwise would have been because more gas will remain within the Baltics as it cannot be shipped northward, potentially putting downward pressure on Baltic prices. Much of the gas that was brought in through Inkoo in the summer of 2023 was sent southwards for storage in Latvia, with the intention to then withdraw this gas and reimport it back into Finland over the winter. Without this option, the gas will have to either remain in storage or be sold into the Baltic markets. The cost of the stock transfer product at Inčukalns, which allows users with leftover gas at the end of the withdrawal period for which they have not booked a two-year product to roll these stocks into the new storage cycle, will more than double for the 2024-25 cycle.[65] This could incentivise firms to sell some of their stored gas before then.

Stocks at Inčukalns started the withdrawal season on 15 October 2023 at their highest level since 2014, at just under 21.7 TWh.[66] This leaves the market well supplied for the winter, particularly given that consumption in the three Baltic countries in October 2022-March 2023 only totalled just over 22 TWh.[67] While winter 2022-23 was relatively mild, and gas prices were so historically high that there was a strong incentive for users to reduce consumption as far as possible, stocks at Inčukalns would still be able to cover a large majority of demand in winter 2023-24 even if consumption increases year on year.

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[61] Finnish Wind Power Association, 2023. Wind power in 2023 in Finland. *Presentation*, 31 December. https://tuulivoimayhdistys.fi/media/tuulivoima_vuositilastot_2023_in_english.pdf
[62] 'Icing limits Nordic wind output', https://direct.argusmedia.com/newsandanalysis/article/2508881
[63] 'Finland's Meri-Pori coal unit to return to grid reserve', https://direct.argusmedia.com/newsandanalysis/article/2504058
[64] 'Finland's winter power balance satisfactory: Fingrid', https://direct.argusmedia.com/newsandanalysis/article/2487006
[65] 'Latvia's gas stocks transfer price to more than double', https://direct.argusmedia.com/newsandanalysis/article/2522706
[66] 'Baltics start winter with near decade-high gas stocks', https://direct.argusmedia.com/newsandanalysis/article/2500998
[67] Data from GasGrid Finland, available here: https://direct.argusmedia.com/integration/dataanddownloads/downloadfile/551148

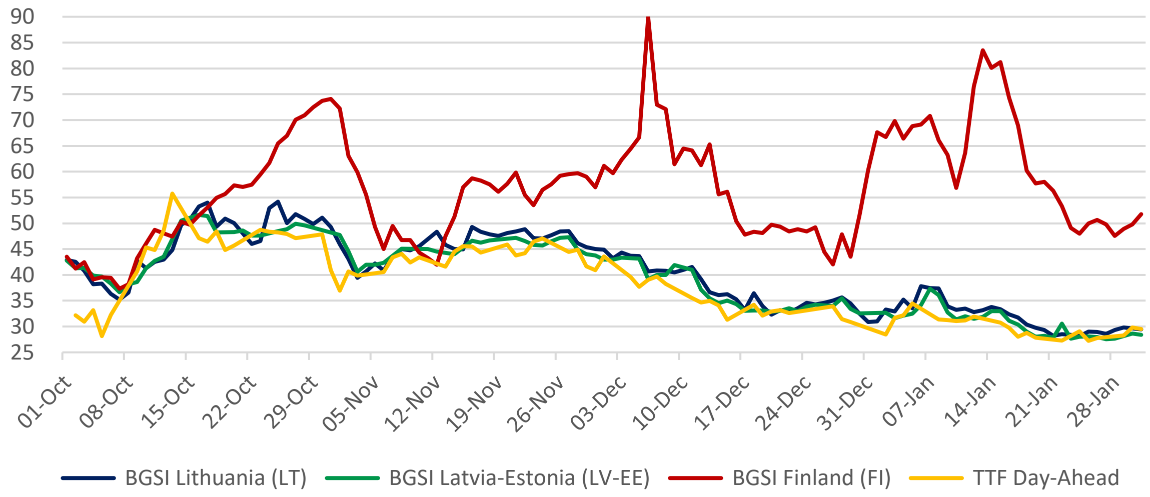
Indeed, Baltic consumption has increased slightly, rising to a combined total of 3.76 TWh in December 2023 from 3.71 TWh in the same month of 2022.[68]

The closure of the second ammonia unit at Achema's Jonava facility between November 2023 and May 2024, which had a technical capacity to consume 20 GWh/d, will limit winter demand in the Baltics. This was already visible in Lithuanian consumption statistics for November, which dropped by roughly 300 GWh from October despite the weather turning colder.[69] Achema is the largest single gas consumer in the region, and accounted for roughly half of total Lithuanian demand when Jonava was fully operational.

Baltic suppliers are confident enough in their security of supply that a total of seven cargo slots at Klaipeda have now been removed from the schedule because of a lack of commercial interest. Two of the cancellations were for December 2023, a further four for first-quarter 2024, and one for April 2024. Some were simply open spot slots that were never booked, while others had previously been booked but were then surrendered and went unbought. Operator KN said this was a result of "market conditions" in the Baltics such as high stocks at Inčukalns and the lengthy Balticconnector outage, but that "in the event of interest, the operator will individually assess the feasibility of accepting the cargo even if the deadlines have passed".[70]

The Baltics are also connected to Poland via the Gas Interconnector Poland-Lithuania (GIPL), with a capacity of around 70 GWh/d (2.4 bcma), which could help to avoid any shortages in case of emergency. The fact that annual gas consumption in Poland is around seven times larger than the combined gas consumption of the three Baltic states suggests that, in case of need, the re-export of gas from Poland to Lithuania via GIPL could considerably ease the Baltic gas balance without leaving the Polish market substantially short. [71] [72] [73]

Figure 9: Lithuanian, Latvian-Estonian, Finnish, and TTF day-ahead gas prices (EUR/MWh)



Source: GETBaltic[74]

[68] ibid

[69] ibid

[70] Eurostat, 2023. *Supply, transformation, and consumption of gas - monthly data - Inland consumption – calculated as defined in MOS GAS (Terajoules).* https://ec.europa.eu/eurostat/databrowser/product/view/nrg_cb_gasm

[71] In 2023, Poland's gas consumption was 204 TWh, while combined consumption in Estonia, Latvia, and Lithuania was 29 TWh. By 21 January 2024, Poland's gas storage stocks (32 TWh) were double those held in Latvia (15 TWh).

[72] Eurostat, 2023. *Supply, transformation, and consumption of gas - monthly data - Inland consumption – calculated as defined in MOS GAS (Terajoules).* https://ec.europa.eu/eurostat/databrowser/product/view/nrg_cb_gasm

[73] Gas Infrastructure Europe, 2024. *Aggregated Gas Storage Inventory*. https://agsi.gie.eu/#/

[74] GET Baltic, 2024. *Trading Data: Fulfilled Trades on a Daily Market*. https://www.getbaltic.com/en/market-data/trading-data/?period=day&graph=trades&area=23&show=price&display=table

Overall, the Baltics are in a much more secure position than Finland, particularly because the port of Klaipeda does not suffer from ice buildup. Between continued deliveries to the Klaipeda LNG terminal, the high stocks at Inčukalns, the connection to the Polish market, and limited industrial demand, the Baltic market is well placed to ensure sufficient supply relative to demand. This is reflected in the regional prices on GET Baltic, which increased slightly when the Balticconnector went offline, but have mostly stabilised since that point, as discussed previously (see figure 9 above). These prices are now driven more by power prices on Nord Pool and movements on Europe's benchmark gas hub, the Dutch TTF,[75] rather than by scarcity of gas, explaining why they hold relatively close to other European prices.

Conclusion: Winter scenario based on current trends in supply and demand

This paper has sought to illustrate the immediate impacts of the Balticconnector outage on the Finnish and Baltic gas markets, and how the swift booking of all capacity made available at Inkoo, along with securing deliveries to the terminal on ice-class vessels, means that a worst-case scenario in which there is a physical shortage of gas has likely been averted. Severe ice buildup could potentially hinder the delivery of LNG to Inkoo, but there should be sufficient ice-breaking capacity to ensure vessels can reach the port, and transport authorities are able to prioritise LNG vessels if deemed necessary.

Renewable and nuclear capacity additions in 2023 will impact the use of gas for power generation over winter, curbing some demand, while significantly higher gas prices in Finland compared with the Baltics will provide strong incentive for marginal users to reduce their consumption where possible.

The author therefore agrees with the conclusion of the Finnish energy regulator, Energiavirasto, that the supply capacity of the Inkoo and Hamina terminals (from which combined maximum sendout capacity is roughly 146 GWh/d, of which 140 GWh/d is from Inkoo alone) is sufficient to cover demand in the winter.[76] Following the end of Russian pipeline gas supplies to Finland in May 2022, the market has adapted to a 'new normal' in terms of consumption, not exceeding 78 GWh on a single day between May 2022 and December 2023, compared with a peak of 179 GWh in 2021. Even when this 'new normal' was blown out of the water in an extreme weather scenario in early January 2024, as temperatures in Helsinki dropped below -20°C and large amounts of gas were needed for heat and power production, sendout from Inkoo jumped to a historic high of 134 GWh on 4 January, ensuring continuity of supply. No users were cut off, and Finland passed through this harsh period of cold without any emergencies. This demonstrates that even during extreme times of peak consumption, sendout from Inkoo is sufficient to meet the needs of the market.

As a reminder, GasGrid Finland retains the aim of bringing the Balticconnector back into operation in April 2024.[77] This would be in time to use the Inkoo terminal to import LNG that could replenish gas storage stocks at Inčukalns, along with LNG imports into Lithuania at Klaipeda. If the Balticconnector restart is delayed, this could slow the rate of early summer storage replenishment at Inčukalns by market participants who intend to re-export those volumes back to Finland for the winter.

Following the eventual return to operation of the Balticconnector, it seems likely that traders will revert to the previous strategy of storing gas in Latvia over the summer and reimporting it into Finland over the winter, so as to avoid potential problems with ice buildup and the additional expense of securing ice-class LNG vessels. Overall, the Balticconnector incident is unlikely to have a long-term effect on the use of gas in Finland or the Baltics, although it could reinforce the attractiveness of installing alternative fuel sources and increasing energy efficiency, to reduce exposure to gas supply and price fluctuations.

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[75] https://www.argusmedia.com/en/methodology/key-prices/argus-ttf-natural-gas

[76] Energiavirasto, 2023. *Kaasun Toimitusvarmuus Vuonna 2023 (Gas Supply Security in 2023).* [published 31 November]. https://energiavirasto.fi/documents/11120570/13026619/Kaasun+toimitusvarmuus+vuonna+2023.pdf/4ccb43b4-fda9-8721-de1a-a36b97a910e1/Kaasun+toimitusvarmuus+vuonna+2023.pdf?t=1701326930857 (see page 4) – In Finnish

[77] Ibid.