

Risks of the German gas plans

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Comprehensive political risk report identifying the risks involved with German preparations and plans to curtail Russian gas supplies

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Executive Summary

Frank Stengs

Natural gas is essential to the German economy. Yet, with the war in Ukraine, the central role of natural gas in Germany has become problematic, particularly because of the significant reliance on Russia. In a statement in September [Chancellor Scholz said](#): “Germany has prepared for Russia to largely cut off gas supplies because of the war against Ukraine”. These preparations are by no means a guarantee for gas security. At the time of writing, [commodities trading firm Trafigura](#) has extended a EUR 3 billion loan to supply gas to German gas trader SEFE, which comes under the time that Germany is struggling to replace Russian gas supplies. Hence, this mini-report will hold the plans under scrutiny and careful analysis.

The report will identify the risks involved with German preparations and plans to curtail Russian gas supplies and seek imports elsewhere or reduce demand domestically. In order to do so, it starts off with an overview of the current German gas supply chain, which includes 1) a list of its main suppliers and infrastructure, 2) the challenges for diversification, and 3) its demand structure. It is followed by an analysis on the impacts of the curtailment of Russian gas supplies on the economy and industry. This section also uncovers the central role of natural gas in the German industry and wider economy. The third section is devoted to an overview of the new German plans and the final section will analyze the risks involved. It has outlined 4 major (new) risks that are related to the plans: 1) capacity risks (relating to the sufficiency of import capacity), 2) market risks, 3) dependency risks (relating to new suppliers and path dependency), and 4) funding risks (relating to additional costs and the political consequences).



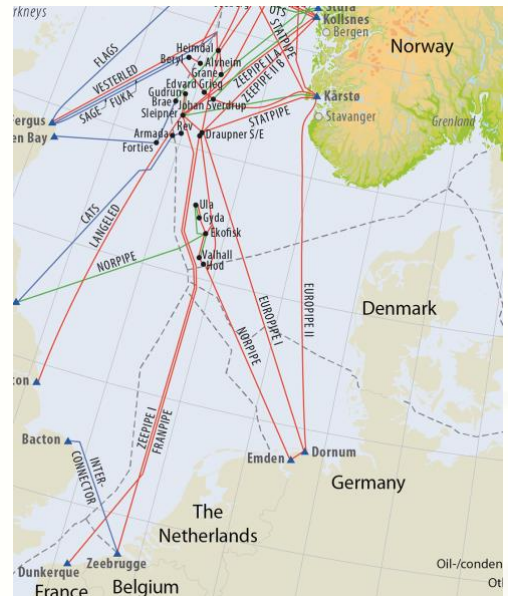
1. An overview of the German gas supply chain

Nathan Alan-Lee

IMPORTS

As of 2019, Germany depended on natural gas imports for roughly [97%](#) of its total demand, which in 2021 held at [96 billion cubic meters](#) (bcm) of gas. Within the realm of imports, Germany has three primary suppliers which control the market. The largest, up until the renewed invasion of Ukraine, was Russia which as of 2020 [supplied 55.2%](#) of Germany's import demand. Following came Norway, which supplied 30.6%, and the Netherlands, which supplied 12.7%. The remaining 1.5% came from other EU countries. Until recently, all gas was imported through pipelines and LNG import infrastructure was non-existent.

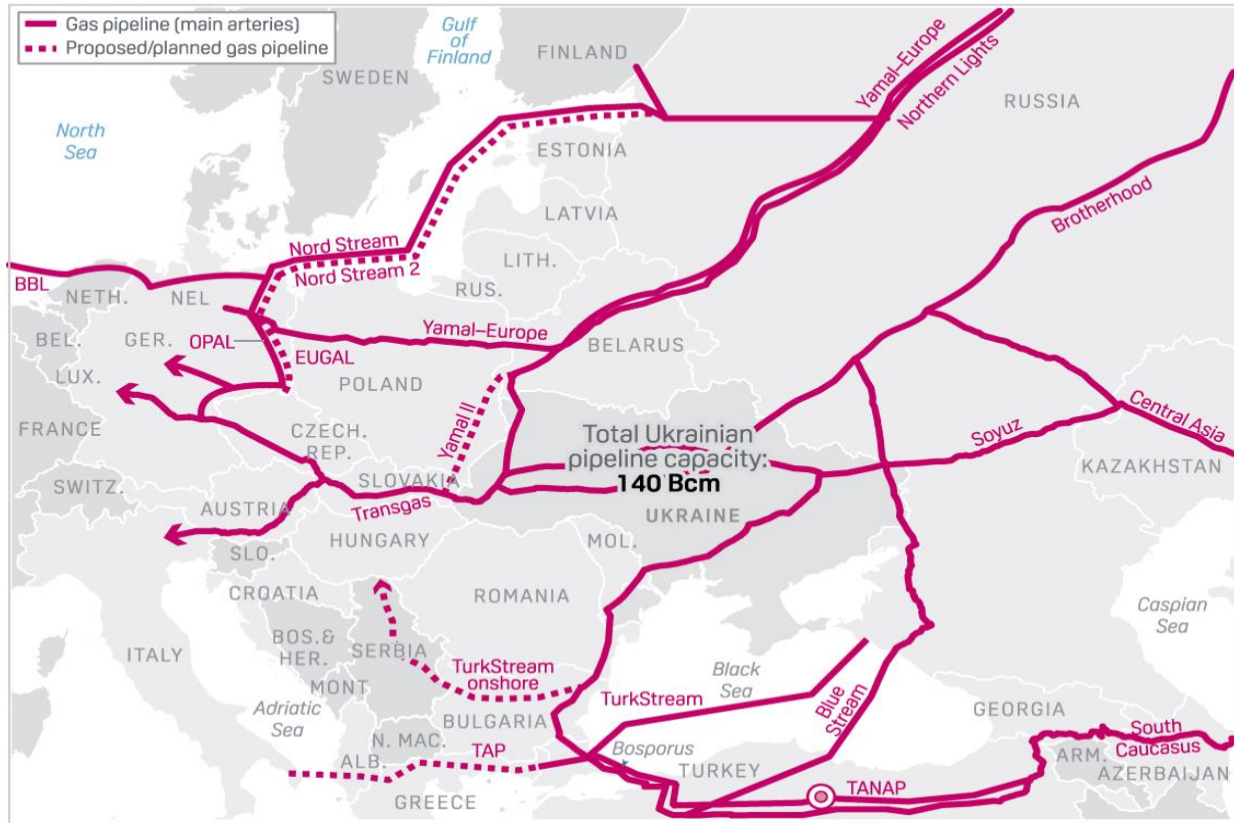
The existing pipeline infrastructure is dominated by Russia and Norway. Norway itself boasts three gas pipelines to Germany from their North Seas gas fields. The oldest pipeline, [Norpipe](#), was established in 1977 with a capacity of [11.7 bcm/year](#) and terminates in the coastal city of Emden. The second oldest [Europipe I](#), established in 1995, holds a capacity of [16.8 bcm/year](#) and the newest [Europipe II](#), established in 1999, holds a capacity of [26 bcm/year](#). Both of the latter pipelines terminate in Dornum. Though the combined capacity could cover well over half of Germany's demand, [supply is limited](#), due to maturing gas fields and the contingency on making new discoveries.



Russian supply comes via the Baltic Sea as well as overland through Belarus, Poland, Ukraine, Slovakia and the Czech Republic. Some of the highest capacity pipelines are the Nord Stream I & II, though Nord Stream II was never operational. Nord Stream I, which was commissioned in 2011, had a capacity of [55 bcm](#), until [its destruction](#) in September 2022. Likewise Nord Stream II, which was due to be commissioned in 2021, would also have had a capacity of [55 bcm](#). The overland route is based on the Yamal and Brotherhood pipeline networks which both originate in Siberia. The Yamal pipeline, which was [commissioned in 2006](#), has a capacity of [33 bcm](#), whereas the so-called “Brotherhood” pipeline is a larger network of infrastructure, passing through Ukraine, and in total has a capacity over [100 bcm](#), though much of this capacity was due to be replaced by the Nord Stream pipelines. With the collapse of the Nord Stream pipelines, the overland routes now account for the remaining Russian gas imported to Germany.



EUROPE'S GAS PIPELINE TIES TO RUSSIA



Source: S&P Global Platts

Since the escalation of the war in February, Germany has taken last minute measures to expand their LNG import and regasification capacity. In May, Germany announced its first four floating storage and regasification units (FSRUs) which will be installed in [Wilhelmshaven](#), and then in [Brunsbuttel](#), these units were scheduled to be operational by the end of 2022. [As of November 15th](#), the construction of the Wilhelmshaven LNG terminal has been finished.

DIVERSIFICATION CHALLENGE

Currently, Russia's supply share has [greatly decreased](#) with the stoppage and then destruction of Nord Stream I, though gas still transits through [the Yamal-Europe](#) and [Brotherhood pipelines](#). Germany's remaining partners will have limited ability to take up this slack, due to supply constraints and the capacity of existing infrastructure. Germany has been able to produce [roughly 5%](#) of its natural gas needs domestically, though this number has been steadily decreasing considering the viability of Germany's reserve size. An alternative is Germany's sizable [shale gas reserves](#). However, the initial investment costs and the potential environmental impact make the pursuit of this option highly unlikely.

Another diversification challenge is Germany's effective reliance on a network of gas pipelines, and lack of liquid natural gas (LNG) import capacity. LNG offers a far more flexible and varied approach to importing gas, particularly in view of gas sourcing. The [major players](#) in LNG exports are the US, Qatar, Australia, and to some extent Russia. However, as

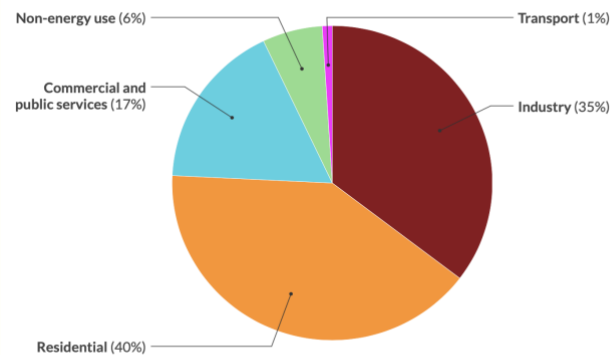


technology and infrastructure improve, there are many other countries which could step into this market. The LNG trade-off comes with the infrastructural demand of regasification and the strain on shipping ports. As seen off the coast of Spain in [October 2022](#), port capacity was a key bottleneck. To address this, Germany will have to make major reinvestments into their port infrastructure.

DEMAND

Residential consumers make up the largest share of German gas demand, accounting for [40% of demand](#), closely followed by industry which accounts for 35% of demand. The remaining amount is found in transport, commercial and public uses, and non-energy use. While residential use is largely tied to heating, other industries depend on gas for production. Among these dependencies are the productions of [petroleum products](#), [chemical products](#), [basic metals](#), [paper products](#) and [non-metallic minerals](#). An example in the German case has been the production of aluminum which is highly impacted by the ongoing energy crisis.

Natural gas use by sector in Germany



In residential energy consumption and as industrial feedstock, substituting natural gas with other agents would not be easy or cheap.

Source: IEA



2. Impact of the Russian invasion and volatile markets on the German economy and industry

Suraj Rajesh and Maheen Rasul

EFFECTS ON THE GERMAN ECONOMY

The trajectory of Germany's national economy, like other countries in the EU, is closely tied to inflation and, by extension, the war in Ukraine. The German economy is expected to grow by just [1.6% in 2022](#) and decline by [0.6% in 2023](#). The effects of the war have dampened the rebound of private spending, worsened supply chain bottlenecks, and caused rising energy prices which have particularly affected its industrial sector. The disruption and consequent shutdown of the Nord Stream 1 pipeline have put further pressure on its energy supply, with prospects of a complete shutdown of the Russian energy supply still probable. The slowdown in growth and looming recession are caused primarily by three factors, previous energy dependency on Russia, the size of its energy-intensive manufacturing industry (18.29% of its GDP) and interest rate hikes.

According to the German Federal Statistical Office, energy import prices increased by [135.1% in September 2022](#) compared to the same period in the previous year, pushing overall inflation in Germany to 11.6% in October. Energy products are more expensive by [43.0%](#) within a year, food prices have increased by [20.3%](#), and prices of goods increased by [17.8%](#) year-on-year. The price increase has put severe pressure on industrial output; the Purchasing Managers Index (PMI) for manufacturing, which is an index of the prevailing direction of economic trends in the manufacturing sector, [fell to 45.1](#), its lowest since May 2020 and an additional fall from [47.8](#) in September.

The ECB has increased its interest rate from - 0.5% to +1.5% in the last four months, further reducing manufacturing activity and slowing down growth. Although it is important to note that [GDP grew 0.3%](#) in the 3rd quarter of 2022, beating forecast expectations. It was mainly driven by private consumption expenditure. However, inflation also rose to a high of 11.6%, which is expected to propel another interest rate [increase to 2%](#).

The Statistical Office also reported that Germany's trade balance was reduced to a deficit of [1 billion euros](#) in May before recovering to a [3.7 billion surplus](#) in September; however, it is still low compared to the 6.8 billion euros (calendar and seasonally adjusted) surplus in December 2021. The fall in trade surpluses is a trend which existed before the war. However, the significant increase in import prices, standing at [29.8%](#) in September 2022, accelerated the process, even though the value of exports grew by [20.2%](#).

Employment remains healthy, with [1.30 million](#) people unemployed in September 2022, which was a decrease of [147,000 \(10.2%\)](#), compared with September 2021. The unemployment rate was unchanged at [3%](#) when seasonally adjusted. However, unemployment is expected to increase in 2023 due to firms freezing hirings, layoffs and bankruptcies, which has increased [34% year-on-year](#) in September 2022.



The German industry is heavily dependent on Russian fossil fuels. Germany originally had made trade with Russia the bedrock of its energy strategy, with plans to strongly rely on imported gas in its transition towards a climate neutral economy. Since the war, Germany has been in a conundrum. Its central bank estimate translates into a slump in output of about [5 per cent](#) points compared to [Germany's](#) March baseline. The central bank estimates [Germany's adverse](#) effects would come largely from higher commodity costs. Research institutes advising the [German](#) government said that potential widespread sanctions, counter-sanctions and a complete ban on energy will cost Germany approximately 220 billion euros (239 Billion USD), i.e. the equivalent of 6.5% of annual output, over the next two years. According to the Bundesbank, the [Germany's Central Bank](#), the losses amounted to 165 billion euros this year and would amount to 115 billion euros in the next one. Only the 2022 forecast includes the rationing effects.

Findings from the Bundesbank's models can be added up to show the full impact of the war on the [German](#) economy. The underlying assumption in the models is that while the fighting will intensify, it will remain contained to Ukraine. They also include an embargo on fossil fuels, an increase in Brent crude above 170\$ a barrel, strong increase in coal and gas, and moderate increase for non-energy commodities. While the import ban is assumed to remain until 2024, the Bundesbank does consider global shifts in supply and demand and excludes consequences of any financial-market disruptions. It also elucidates that fiscal stimulus could be significantly stronger than currently anticipated if the crisis escalates. The German central bank also forecasts that output in the euro area will be 1.75% less this year than the European Central Bank's 3.7% forecast in March. Next year's hit should be smaller, before the damping effects of the war as in 2024.

EFFECTS ON THE GERMAN INDUSTRY

A range of gauges have become gloomy in a country which is powered by its manufacturing sector. Goods production accounts for about 22% of [Germany's](#) economic activity, compared with 11% in France for instance. Kiel Institute slashed its 2022 growth outlook for [Germany](#) by nearly half to 2.1% as shock waves from the war offset resurging demand following the pandemic alongside inflation accelerating to 5.8%, the highest level since the country's 1990 reunification. An index of [German](#) manufacturing fell further in March and a key business climate survey decreased by a record. According to a survey of 3700 companies by business lobby DIHK, 78% reported that the war was hurting their business, and more than 50% complained about increasing prices or disruptions in supply chains.

Germany's industrial base, still recovering from the impact of the Covid-19 pandemic and unprecedented supply-chain challenges, is now taking a major beating as the Ukraine crisis is significantly impacting German powerhouse car, chemical and precision-machinery manufacturers. As the conflict increases energy costs to new peaks and a wave of inflation happens, a plethora of companies like BMW, BASF and ThyssenKrupp have warned that their revenues will fall, while others have refrained from even making such forecasts.

[According to ZEW](#), "the use of gas by manufacturing companies in Germany is concentrated in six industrial sectors: first, basic chemicals and other chemicals (using 59 TWh in 2021);



second, metal production and processing, as well as metal foundry (using 36 TWh); third, glass and ceramics together with the processing of stones and earth (using 29 TWh); fourth, food and tobacco production (using 27 TWh); fifth, the paper industry (using 19 TWh); and last, mechanical and vehicle engineering (using 14 TWh)".

The gross value added of the [chemicals, metals, and glass & ceramics industries](#) amount to roughly 5 percent of GDP in 2021, of which 3 percent is produced using natural gas as an essential input factor. In the case of [the food and paper industry](#), that amounted to roughly 2 percent of GDP, of which 1 percent could not be generated without natural gas. For the [mechanical and vehicle industry](#), the shares amount to 7% and 1%. These considerations show that in the six gas-intensive industrial sectors output (gross value added) of about 5 percent of GDP would be lost if no natural gas were available. This defines the share of production in natural gas-intensive industries in which natural gas is used as an essential input factor.

Given the current situation, the chemical industry is of particular concern to Berlin. Chemical products make up [10% of Germany's exports](#) and the country hosts one of the largest chemical companies in the world, BASF. Since the chemical industry is so dependent on natural gas, it is more exposed to rising prices than other sectors. On average costs of electricity, oil, and gas account for around [12% of production costs](#) in the chemical industry. In the case of chemicals such as ammonia and chlorine that [accounts for 70%](#).

The industry has been hit hard by the current energy crisis, with [25% of companies](#) having scaled back production in 2022. Production fell by [10.3%](#) in the third quarter and while industry revenues increased [14.7%](#) year-on-year, they declined [1.6%](#) from the previous quarter due to production cutbacks and weakening demand. The German chemical association forecasts a [5% drop](#) in annual production, including pharmaceuticals.

Nevertheless, larger companies have been better able to face the current crisis than small and mid-sized companies. There are two main reasons for this. Firstly, large companies have more options when it comes to production. They can afford to scale back domestically and increase production abroad. [In the case of BASF](#), it has announced plans to permanently scale back its operations in Europe, because of rising energy costs & concerns over regulation. Secondly, large companies have energy trading desks, which can hedge their costs and shield them from rising energy prices. [Companies such as Wacker](#) still receive 50% of its energy through lower-price long-term contracts. Yet, these contracts are slowly coming to an end, pointing toward the challenges in the near future.

As Russia supplies about [two-thirds](#) of Germany's gas, [half of its coal](#) and approximately [one-third of its oil](#), the greatest worry for German industry is that a complete possible shutdown of Russian energy supplies would lead to serious disruption and widespread socio-economic costs. It is important to keep in mind that limited gas supply could also hit less-energy intensive but economically important sectors due to lack of upstream products.



3. German plans for diversification

Ojus Sharma

Germany has decided to replace all Russian energy imports, most notably natural gas, by as soon as mid-2024, a taxing effort given its economy depends on Moscow for the fuel to power its industry. In 2021, Russia accounted for 55% of Germany's gas imports, a level that had [declined to 26% by the end of June 2022](#), due to significantly reduced flows via the Nord Stream 1 pipeline, which is operating at just [20%](#) and stopped after [Gazprom announced](#) its shutdown. Since a landmark strategic shift outlined in a speech by Chancellor Olaf Scholz, Germany has taken numerous measures to tackle the challenge while softening the blow to its economy and citizens.

OVERVIEW BY ENERGY SOURCE:

LNG: Germany has leased [four floating storage](#) and regasification units (FSRUs) to quickly start importing liquefied natural gas (LNG) directly and replace Russian volumes. Two of the FSRUs will be stationed in Wilhelmshaven and Brunsbuettel, able to jointly handle up to 12.5 billion cubic meters a year. Efforts to build fixed terminals at those two locations at a later stage are also underway. The economy ministry has identified the Elbe river port of Stade and Lubmin on the Baltic Sea as the two other recipients of the remaining FSRU. Germany is also [in talks](#) with Qatar and Canada, among others, to raise LNG imports in the medium term. German utilities [have existing supply agreements](#) with Qatar, Australia and the United States.

Taken together, these four units will have an estimated capacity between [20 bcm/year](#). In addition to this, there are plans to construct more permanent land based terminals at these locations, which would further increase the capacity, though this would be a far less immediate solution to the ongoing crisis. In the medium term, there are two more FRSU projects planned for the end of 2023 in [Lubmin and Stade](#), which together with the other terminals would be able to supply roughly one third of Germany's gas demand.

Coal: Germany has [passed a law to bring back oil- and coal-fired](#) power plants into the country's energy mix in case of a critical gas supply situation. This could add 10 gigawatts of reserve capacity on an interim basis in a deal that runs until March 31, 2024.

Nuclear: Germany's grid operators are carrying out a stress test on behalf of the government to see whether the lifetime of Germany's three remaining nuclear plants, which account for 6% of the country's power mix, can be extended. The reactors - Isar 2, Neckarwestheim and Emsland - are operated by E.ON, EnBW and RWE, who have said a short-term lifetime extension beyond 2022 [is possible without ordering new fuel rods](#).



OVERVIEW BY POLICY

Levies: Germany has imposed [two levies](#), one to help fund the higher gas procurement costs which importers are facing to replace lower Russian volumes, and one to beef up efforts to fill the country's storage facilities. The gas levy will cost an average family of four an additional [annual 480 euros](#) (\$482) a year based on annual consumption of 20,000 kilowatt hours, while [another 13 euros](#) come on top due to the gas storage levy. Both have kicked in from 1 October 2022. To protect consumers somewhat, Germany has announced a [sales tax reduction](#) for a limited period, which will cost the state 10 billion euros.

Storage: Germany is trying to fill its gas storage facilities and has set targets to reach 85% by Oct. 1 and 95% by Nov. 1. Storage levels stood at over [95% in November](#). Its gas market operator Trading Hub Europe has received [15 billion euros from state lender KfW \(KFW.UL\)](#) to fill storage facilities faster.

Bailout: The government has agreed a [15 billion euros bailout for Uniper \(UN01.DE\)](#), Germany's largest importer of Russian gas, to ensure it can continue to operate and fulfill its contracts. Aside from taking a 30% in the group, the government has also said it stands ready to provide further support if operating losses due to lower gas flows and sky-high prices exceed 7 billion euros.

State aid package: At the end of September, Berlin has announced a [€200 billion aid package](#), aimed to help ease the energy crisis for industries and households. The fund is set to last until 2024 and will fund subsidies and price caps. [Industries and companies](#) benefiting from the scheme will pay 70% of their gas use at a subsidized cost of €0.7 per kilowatt-hour. [For private households](#), a price cap of 80% will be introduced in March. [42% of the protection scheme](#) will be used to finance price caps.

Savings Plea: The government and its network regulator are regularly asking citizens and companies to reduce gas consumption. [Consumers need to cut the amount they use by at least 20%](#) to avoid the country from entering a gas supply emergency, at which point rationing would kick in.

Rationing: Network regulator [BNetzA](#), which would be in charge of rationing, is collecting data from around 2,750 companies to determine gas usage and draw up a list of which sectors would have to be switched off first. BNetzA has said it is trying to put together a shutdown list for industry based on six criteria, which include a company's size, economic damage, and how long it would take to restart specific facilities.



4. Risks involved

Frank Stengs

As outlined in the previous sections, natural gas imports and German GDP (to a certain extent) are tied to each other. German industry, in particular, continues to rely on natural gas as an essential input factor for gross added value. A failure to secure sufficient gas supplies might lead to a hollowing out of German industry, with production scale backs and company shutdowns. Because this industry underpins the German export market and its export-focused-economy, securing gas supplies is of central concern to the German government

The German plans and deals aim to mitigate the effects of limited Russian gas supplies. Yet, concerns exist about their viability in the medium and long-term. Reliance on LNG, insufficient import capacity, price caps and new dependencies could be problematic for the future. Hence, this section will be dedicated to exploring the risks involved with the German plans. We have identified 4 major risks: 1) capacity risks (relating to the sufficiency of import capacity), 2) market risks, 3) dependency risks (relating to new suppliers and path dependency), and 4) funding risks (relating to additional costs and the political consequences).

CAPACITY RISKS

With lower than expected consumption and [storage levels standing at almost 100%](#), there was relief about the current status of gas supplies in Germany. It is expected that current supplies will be enough to weather this winter. There have been sounds, however, that next winter will be harder to face without Russian gas. Especially, because LNG import capacity is currently limited and reserves are expected to be depleted after this winter.

As LNG import capacity is being ramped up, it will help mitigate the effects of curtailed Russian gas flows. Each (planned) FSRU will give Germany [about 5 bcm/year](#) of new LNG import capacity. The first three facilities will be [expected to operate](#) at the end of this year and give Germany [almost 20 bcm/year](#) of new LNG import capacity, which is the equivalent of 43% of Russian imports in 2021. Initially, however, the FSRU's will not operate at full capacity as they ramp up.

Weather and availability of gas for the EU internal market will also be big factors in deciding whether capacity will be enough. [A study from the association of German gas storage operators](#), INES, shows that Germany will probably get through this and the next winter, if there are no extremely low temperatures. Yet, even if heavy emptying takes place, extensive refilling could be possible depending on the availability of LNG for the EU internal market.



MARKET RISKS

Improving LNG import capacity allows Germany to diversify its gas imports. While diversification is essential for greater security, it is by no means a guarantee for the security of gas supplies. Rather Germany will be subject to new market risks and dependencies. The latter will be discussed in the next section.

Among the market risks are supply disruptions of the new LNG suppliers. [According to Nikei](#), this year has brought unexpected supply disruptions, including a fire at a Freeport LNG liquefaction plant in the U.S. state of Texas, strikes at a Shell LNG facility in Australia and a force majeure declaration by Malaysian gas producer Petronas after a pipeline leak.

As Asia is the largest import market for LNG, developments there will have a major effect on LNG prices as well and hence German gas security. Similar to Europe, demand will heavily correlate with temperatures and the severity of winter. A mild winter in Asia will result in a wider LNG market, which improves German gas security. A cold winter might do exactly the opposite.

Apart from Asian weather, China's developments will be of particular importance. [China's demand has been lower than normal](#), partly because it increased pipeline imports from Russia and to some extent turned to coal and oil. Lower demand, however, has also been caused by economic slowdown and China's zero covid policy. If China's economy picks up, or if it lets loose of its zero covid policy, LNG prices are likely to rise, given the higher demand.

The continued reliance of Japan on the Russian Sakhalin project is another risk. Japan imports roughly [9% of its LNG](#) from the project. Previously Shell was an operating partner in the project, providing technical knowledge. But as [Shell abandoned the project](#), technical knowledge will seep out as well. Hence it is uncertain whether the current operators can respond appropriately if a disruption occurs. If such a thing is the case, the Japanese will turn to the international market, driving up prices.

DEPENDENCY RISKS

A transition from (Russian) pipeline gas to LNG will also bring new dependencies on the commodity itself and new supplier countries. While these dependencies seem less problematic than a reliance on Russian gas, they can cause significant problems for German gas security. As outlined before, this year has seen a number of supply disruptions, which have impacted the global LNG market.

High prices are a risk of dependency. Because of the tight market, European countries have outbid other countries to secure LNG supplies. There are concerns, however, that some LNG suppliers are making use of the current crisis to ask excessive prices. [In the case of the US](#), some EU officials called it out for profiting from the war and the 'sky-high' gas prices. Qatar has not been called out, but also [profited massively](#) from European revenues. While diversifying imports will likely lead to greater security, the question remains at what cost.



More importantly, Russia continues to be a player in the European gas market. While European imports of Russian pipeline gas have [decreased by 80%](#), imports of Russian LNG have [increased by a whopping 50%](#) in the last nine months. As such it must be asked whether the Russian pipeline dependency will not be translated into a Russian LNG dependency. While this is highly unlikely, Russian supplies do create a wider LNG market. Curtailing Russian LNG supplies will almost definitely lead to higher prices, which are currently not taken into account. If Russian LNG remains being sold on the European market, it could also be problematic for solidarity.

There also is a risk of path dependency when it comes to LNG. As billions of euros are being pumped into LNG infrastructure, this will likely create a lock-in, not only resulting in the continued use of gas, but also the continued purchases of expensive contracts. [According to a report](#), demand reduction and gas savings can save more gas than the imports of all the LNG terminals combined.

FUND RISKS

There are also particular risks related to the funding of German gas plans. These risks relate to the consequences of funding and the additional or unforeseen costs that are involved. High gas prices have already been discussed in the previous sections. Risks of unforeseen costs are particularly applicable to the construction of new infrastructure. The construction of regasification facilities, for instance, is already [twice as expensive as initially expected](#), with the budget going up from 3 billion euro, to 6.56 billion euro.

Yet, funding of projects such as price caps will also be problematic. The risk, however, is less about costs and more political. With its 200 billion euro aid package, companies and households will be relieved from high gas prices. Within the EU, however, [there is a concern](#) that it might kickstart a subsidy race that only Germany can win. Subsidizing gas and introducing price caps, therefore, must be carefully balanced with the interests of other EU countries. Failure to do so might result in less solidarity in the energy crisis.