Ad-hoc analysis – gas supply security in Europe with a focus on winter 2022/2023

18/03/2022

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Introduction
Natural gas supply structure and dependence on Russian imports
Market and supply situation 2021/2022
Scenarios regarding supply in winter 2022/23
Policy responses in Germany and at European level
Summary and conclusions

Introduction

The Russian war of aggression against Ukraine has shaken the very foundations of Germany and the European Union. It will have a lasting impact, leading to profound changes and affecting various areas of business and society.

In the short and medium term, the focus will be on matters of energy supply security due to the very high level of dependence on energy imports from Russia as a result of many decades of thriving trade relations with the country. This is specifically true for the natural gas sector, where the shares of Russian imports are particularly high and the situation is aggravated by the fact that, in the short term, it will be difficult to replace Russian natural gas by energy supplies from other countries. In this respect, Russian natural gas accounts for more than half of the natural gas consumed in Germany and more than one third of the natural gas consumed in Europe.

Against this background, Europe is particularly vulnerable to intended or unintended disruptions regarding the import of Russian natural gas. Therefore, Europe and the USA responded to the invasion of Ukraine with sanctions of unprecedented scale but initially refrained from banning the import of Russian gas and other energy sources. The USA have in the meantime also sanctioned the import of oil, liquefied natural gas and coal from Russia; but while there are plans in Europe and Germany to minimise the dependence on Russian imports as quickly as possible, Europe and Germany have not yet provided for any sanctions in this regard.

However, adequate economic sanctions against Russia are still under debate in the EU and the emphasis of the political discussions increasingly shifts to sanctioning Russian natural gas supplies to the EU. At the same time, there is the risk that Russia itself may at any time decide to cease supplying the EU with natural gas.

Irrespective of which of the both scenarios is considered more likely, it is currently of utmost importance to analyse the consequences for the energy industry and the ensuing derivations of import disruptions from Russia.

Against the background of this dynamic development, GEODE commissioned the BBH group to examine – together with Heiko Lohmann and Prof. Joachim Müller-Kirchenbauer – the effects of disruption scenarios for the energy industry contextualising the options for action, risks and remaining issues.

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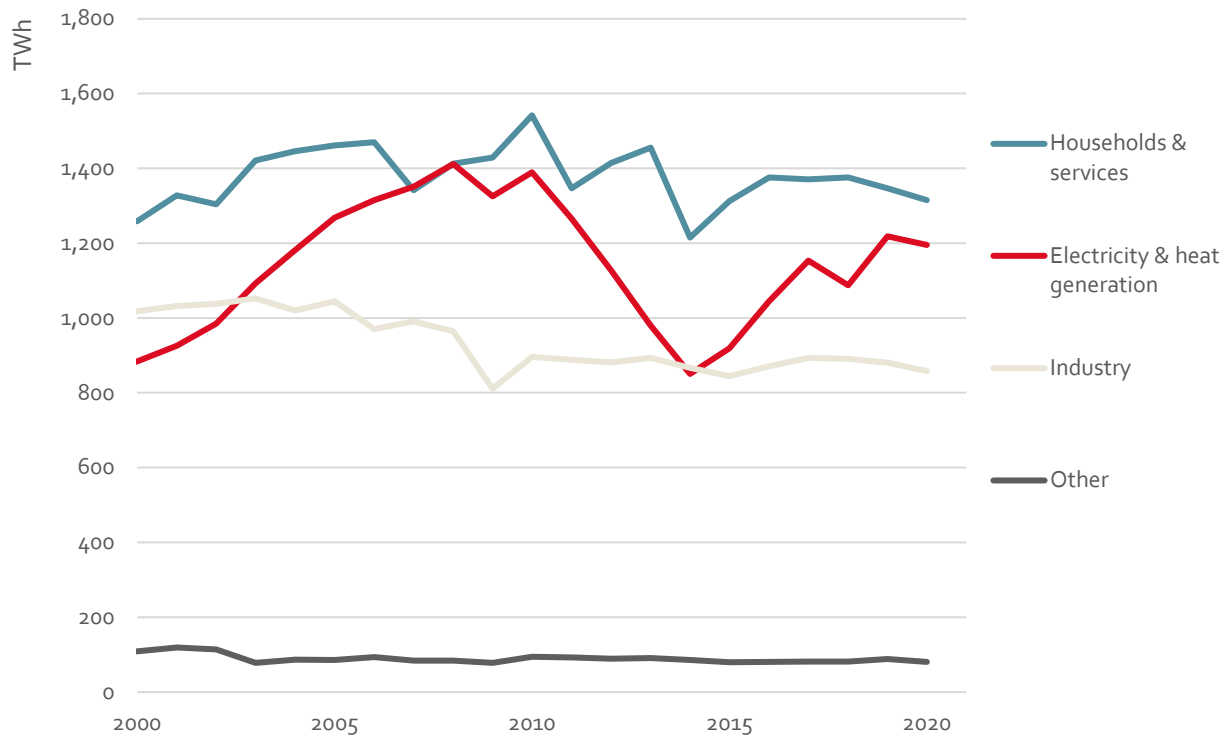
Sectoral structure of natural gas demand in Europe

Natural gas demand in Europe (EU27)



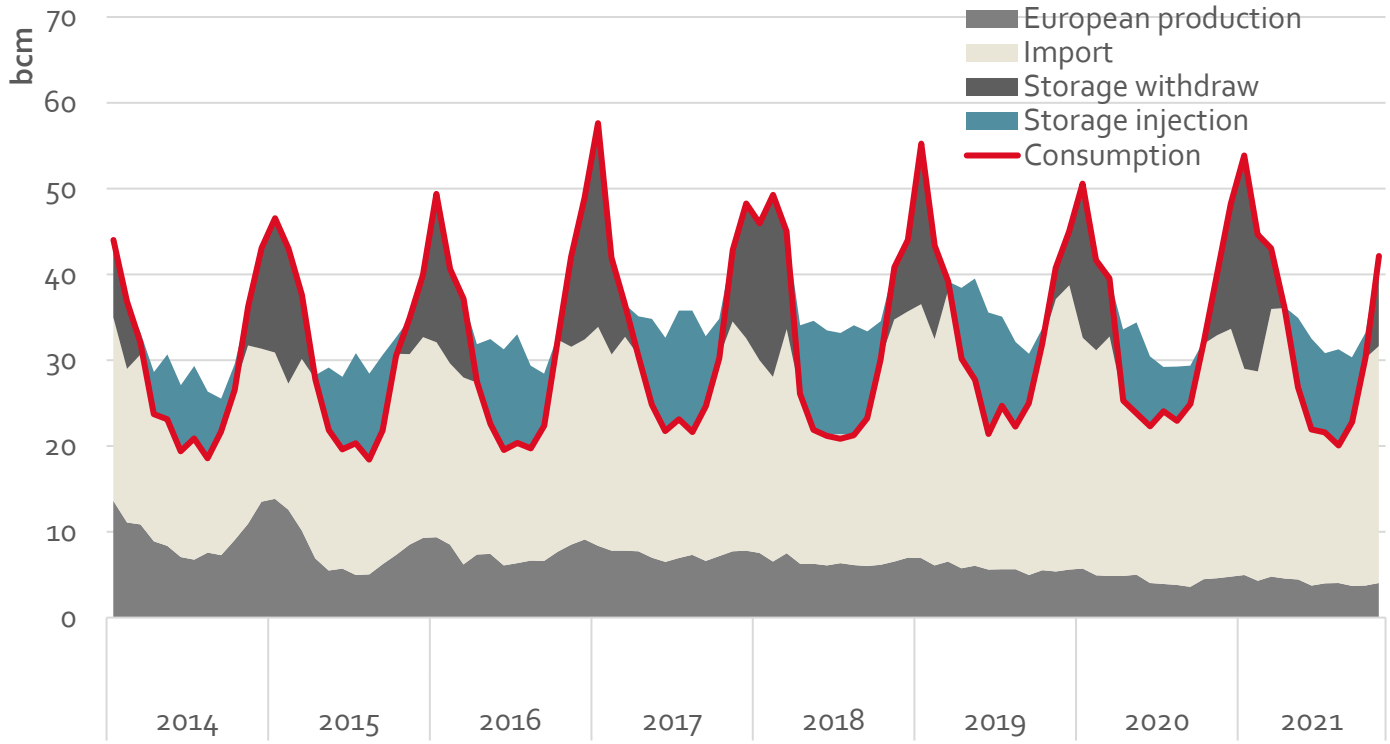
Source: Eurostat 2022

- Household customers as well as the trade, commercial and service sector account for the major share of the natural gas demand in Europe. Natural gas is mostly used for heating purposes.
- The generation of electricity and district heating accounts for the second-largest share of natural gas consumption.
- In this sector, consumption most significantly decreased between 2010 and 2014, which is due to the increasing share of renewable energy sources in the generation of electricity. Since 2016, consumption in this area has increased due to the systematic shutdown of coal-fired power plants all over Europe and the decommissioning of nuclear power plants, particularly in Germany.
- Industrial gas consumption has been almost stable throughout the last decade, with the industry ranking third in terms of gas consumption in the EU.

→ Since 2014, the demand for gas has been increasing, particularly in the electricity generation sector.

Monthly gas supply balance in the European Union, 2014-2021

Monthly gas supply balance in the EU27, 2014-2021



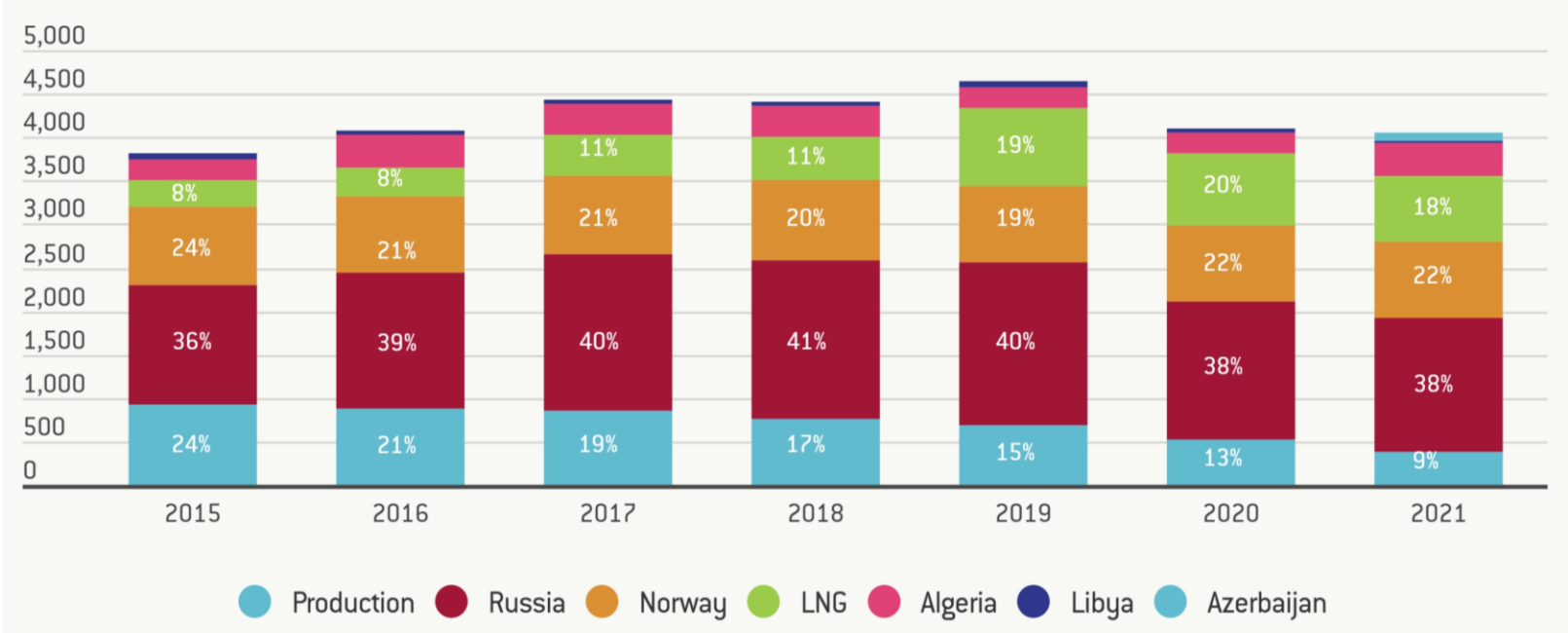
Source: Eurostat [NRG_CB_GASM] (2022)

- A large share of natural gas is used for heating, which is why demand is characterised by a strong seasonality.
- The EU supply structure rests on three pillars: (1) production within Europe, (2) imports and (3) natural gas storage facilities.
- Natural gas production in the EU has been on the decline for years. The last time that larger volumes were produced was from 2014 to 2016 in order to compensate for strong fluctuations in demand.
- Due to the decline in EU production, imports – in combination with natural gas storage facilities – have gained in significance.
- In the event of import disruptions, storage facilities play a key role in security of supply

→ There are three pillars of natural gas supply in Europe: (1) production within Europe, (2) imports, and (3) natural gas storage facilities. Due to a decline in production within Europe, imports and natural gas storage facilities play a key role.

The role of gas imports in European gas supply

Annual natural gas production and imports in the EU27 (TWh)



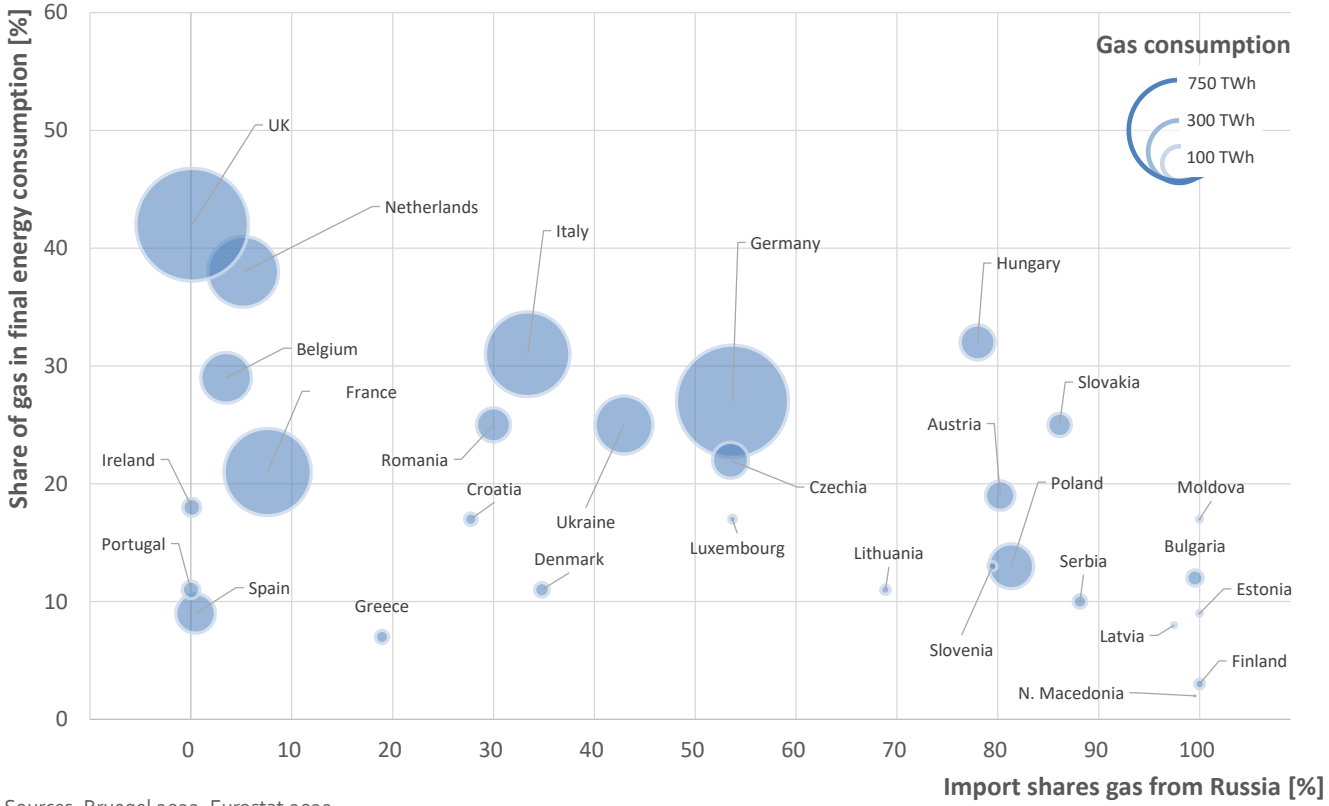
Source: Bruegel 2022

- There are three main sources for covering gas demand in the EU: (1) Russia (2) Norway and (3) LNG
- Production within Europe (excluding Norway) has been on a sharp decline for years. Only 9% in 2021.
- The share of imports from Russia in EU supply (pipeline + LNG) is consistently above 35%.
- With a share of 15%, Russia is also the third largest LNG supplier behind the USA (25%) and Qatar (23%).

→ Russia covers about 35-40% of gas demand in Europe and is thus the single largest supplier.

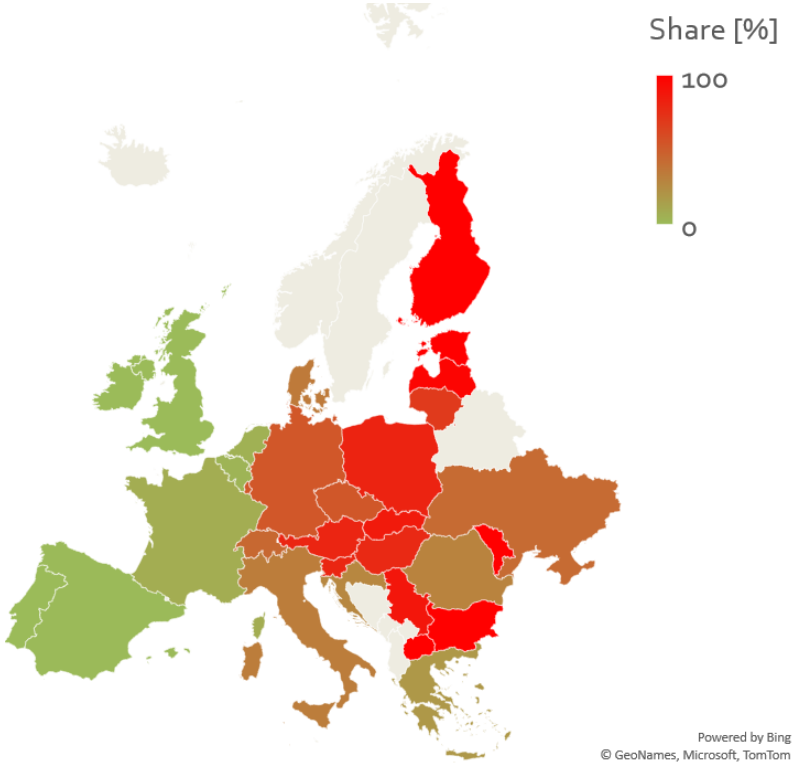
European dependence on Russian gas imports in 2021

Share of gas in final energy consumption and share of imports from Russia



Sources: Bruegel 2022, Eurostat 2022

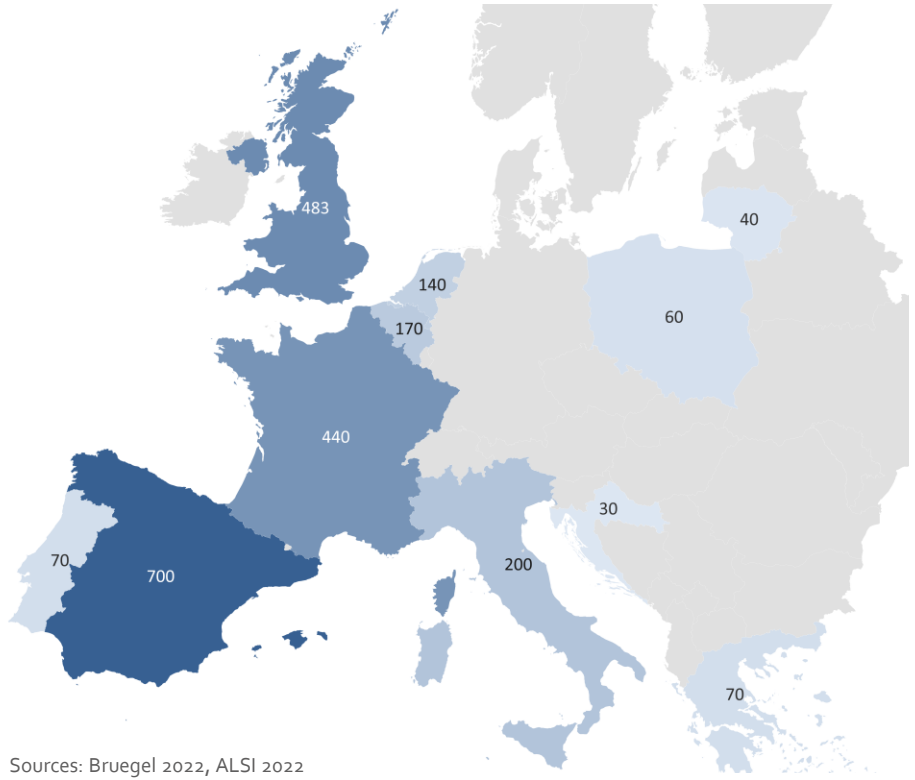
Share of Russian gas supplies



→ German import dependence is 54%. Import dependence is much greater particularly in our neighbouring countries in Central and Eastern Europe.

LNG infrastructures in Europe

Regional distribution of LNG capacities 2021 [TWh/a]



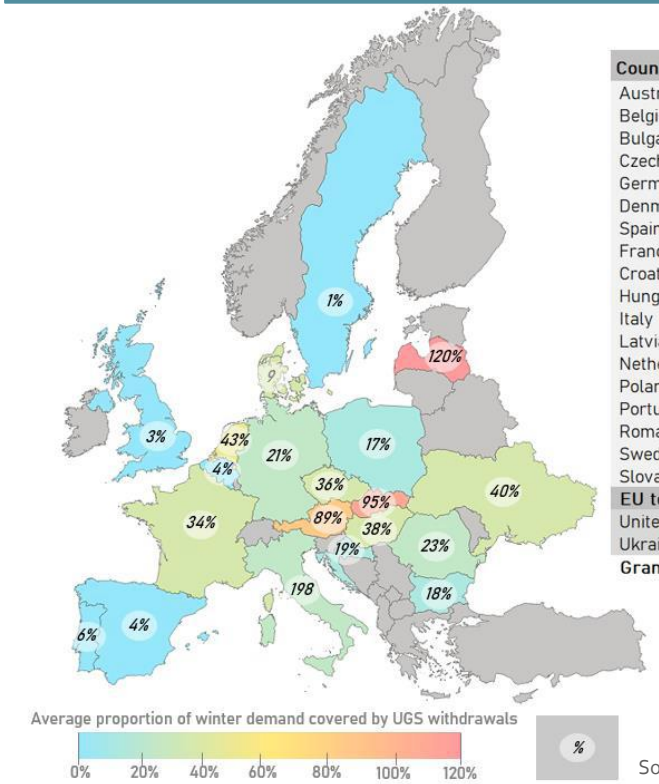
Sources: Bruegel 2022, ALSI 2022

- LNG imports currently cover approximately 20% of European natural gas demand.
- LNG infrastructures are located primarily in the south and southwest of Europe.
- In Eastern Europe, only Croatia, Poland and Lithuania have LNG capacity.
- Spain and France together account for 60% of Europe's total LNG capacity.
- The pipeline between Spain and France has an annual transport capacity of only 80 TWh.

→ LNG capacities are concentrated in the south and west of Europe. There is hardly any LNG capacity in the northeast.

The role of natural gas storage facilities in Europe

Natural gas storage facilities and their contribution to winter supply in Europe



Country	WGV (TWh)	% of EU total
Austria	96	9%
Belgium	9	1%
Bulgaria	6	1%
Czech Republic	36	3%
Germany	241	22%
Denmark	9	1%
Spain	34	3%
France	129	12%
Croatia	5	0%
Hungary	68	6%
Italy	198	18%
Latvia	22	2%
Netherlands	144	13%
Poland	36	3%
Portugal	4	0%
Romania	33	3%
Sweden	0.01	0%
Slovakia	39	3%
EU total	**1106**	
United Kingdom	10	
Ukraine	318	
Grand total	**1434**	

Source: ACER 2022

- The largest natural gas storage capacities are in Germany, Italy, the Netherlands and France.
- The significance of natural gas storage facilities varies across Europe.
- While storage facilities make a substantial contribution to winter supply in e.g. Germany, the Netherlands and Austria, they are of minor significance in Sweden, Spain and Belgium.
- However, on average, supplies drawn from storage facilities covered about 26% of the EU's gas demand in the past winters.

→ Natural gas storage facilities play a key role in winter supply: On average, supplies drawn from storage facilities covered about 26% of the EU's gas demand in the past winters.

Summary

Natural gas demand is characterised by a strong seasonality, as natural gas is the most important energy source for heat supply in Germany and Europe. Heating homes accounts for about 38% of natural gas consumption. With a share of 35%, electricity and district heating generation is the second largest consumer of natural gas. Since 2016, natural gas has become more important in these areas due to the systematic shutdown of coal-fired power plants across Europe and the decommissioning of nuclear power plants, particularly in Germany.

European **natural gas supplies** rest on three pillars:

(1) Production within Europe: Production in Europe has been on the decline for years Thus, the share of natural gas produced within Europe (excluding Norway) amounted to 24% in 2015. In 2021, it was only 9%.

(2) Imports: Due to the decline in production, the share of imports has steadily increased over the past years. In this regard, dependence on supplies from Russia in particular has increased. Imports from Russia account for 30-40% of all gas imports into Europe, for 54% of imports into Germany and for far more than 75% of imports in a number of countries in the east and southeast of Europe. LNG imports currently cover approximately 20% of European demand. However, LNG infrastructures are located primarily in the South and West of Europe.

3) Natural gas storage facilities: The largest natural gas storage capacities are in Germany, Italy, the Netherlands, and France. Together with imports, natural gas storage facilities play a key role in covering the demand during the winter. On average, supplies drawn from gas storage facilities covered about 26% of the EU's gas demand during the heating periods in the past winters.

In view of possible disruptions in Russian natural gas supplies, we will take a closer look at the structural links between natural gas supply and demand In this regard, we will focus on the situation in 2022, which resulted from the developments in the gas sector in 2021.

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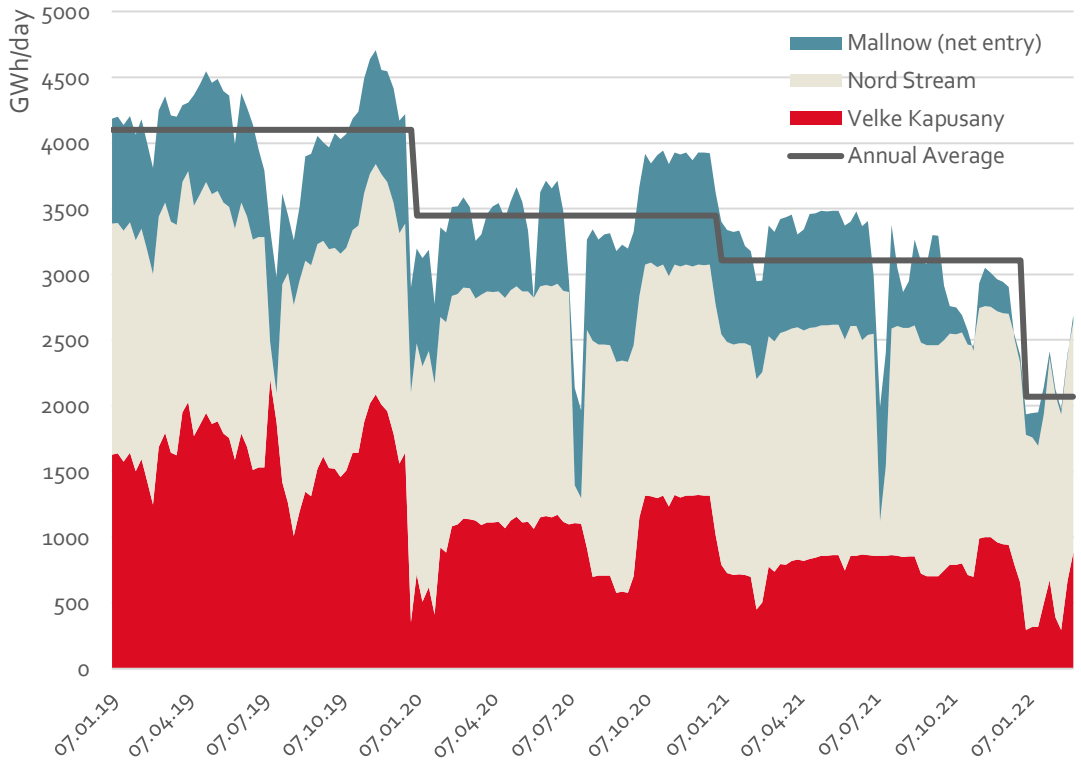
Russian gas deliveries at a record low already in 2021

Main routes for Russian gas

Gas deliveries from Russia via the main pipeline routes from 2019 to February



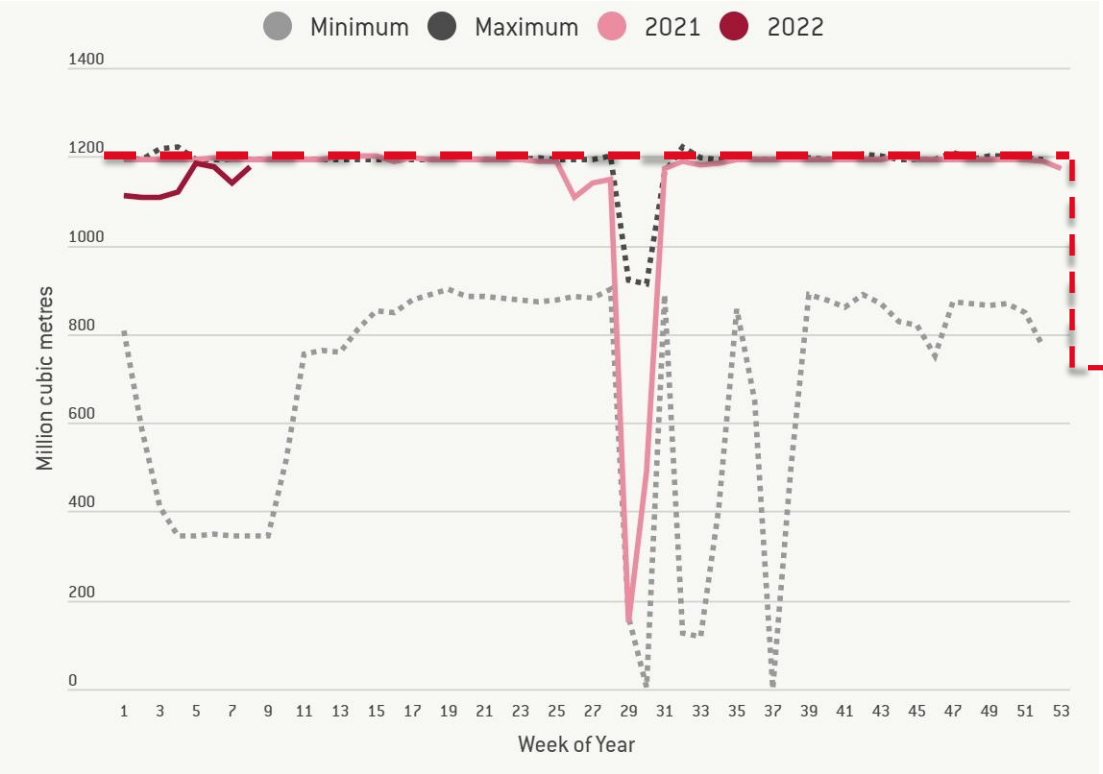
Sources: Montel 2022; Entsog 2022

→

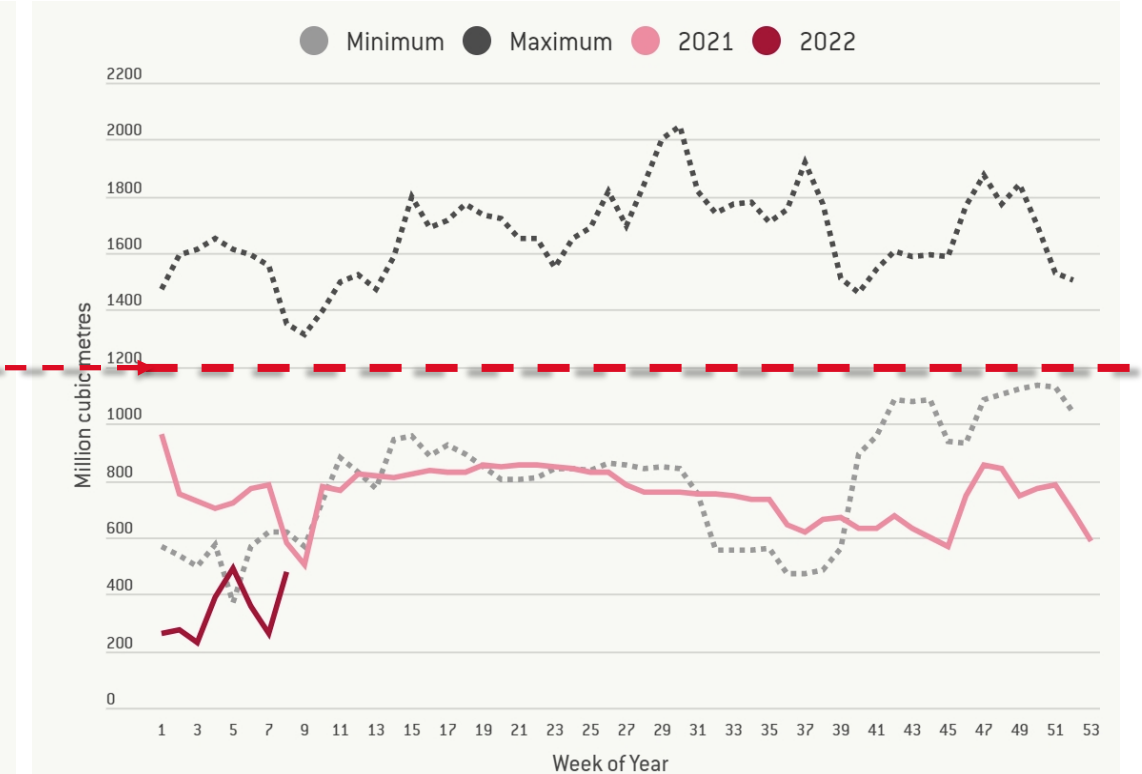
Deliveries from Russia hit a record low already in 2021 – they were about 10% below their average in 2019. Russia did not supply any natural gas quantities to the European (spot) markets beyond the volumes agreed on the basis of long-term supply contracts.

Transport route Nord Stream 1 vs. transit via Ukraine

Imports via Nord Stream 1



Imports via Ukraine



Source: Bruegel 2022

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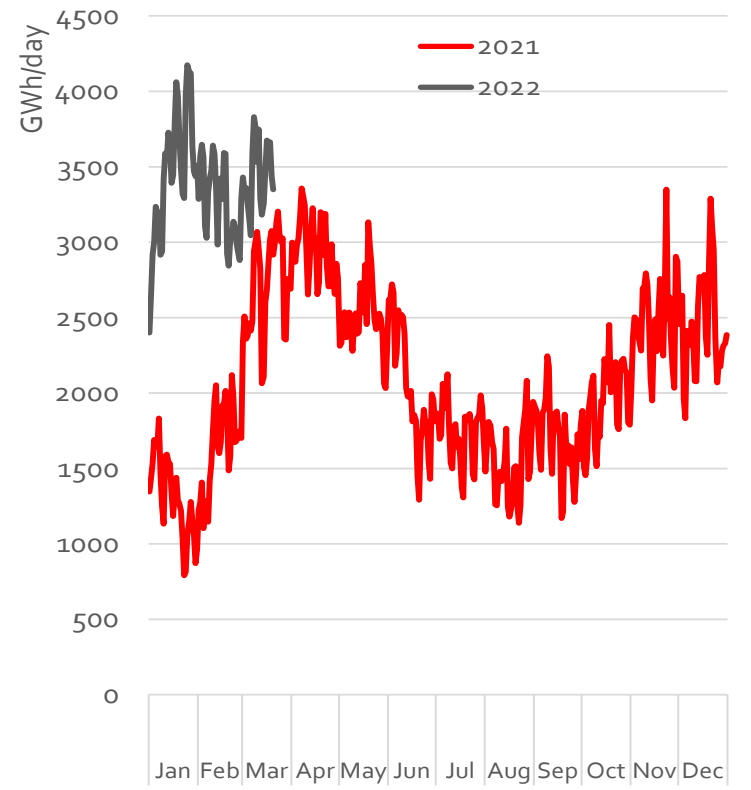
Disruptions of Nord Stream 1 could potentially be compensated through the Ukrainian pipeline route – provided that Russia reroutes the corresponding quantities

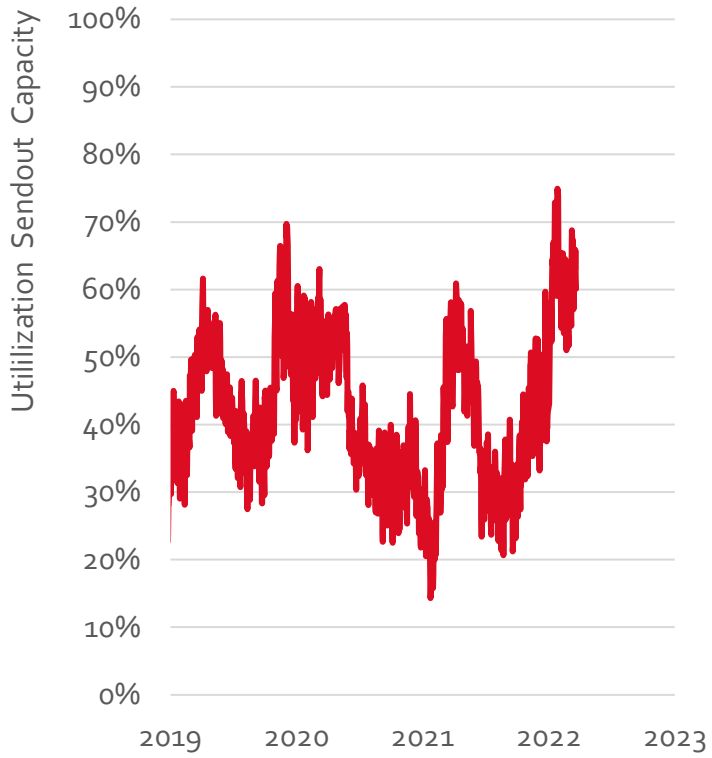
LNG imports and capacities in Europe

LNG sendout 2021/2022



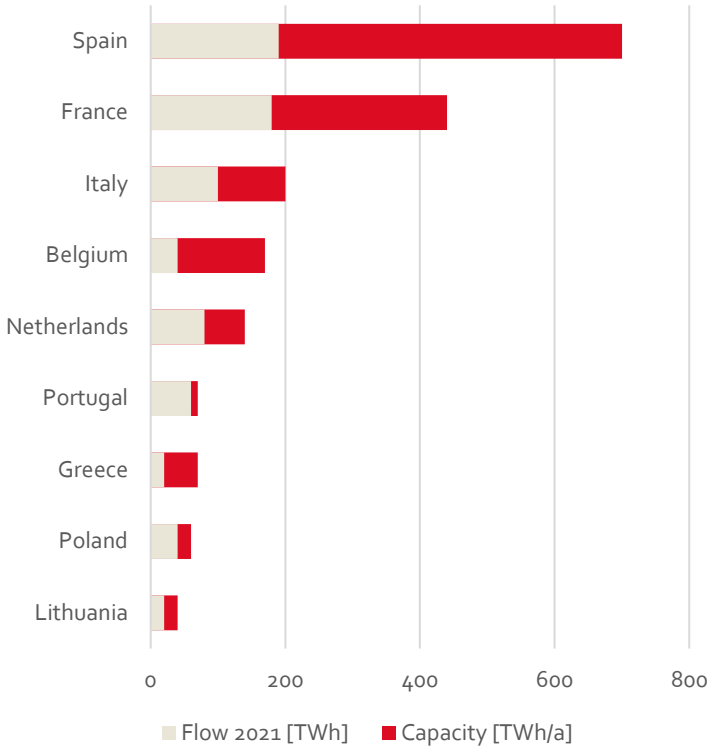
Source: ALSI 2022

Capacity utilisation LNG sendout



Source: ALSI 2022

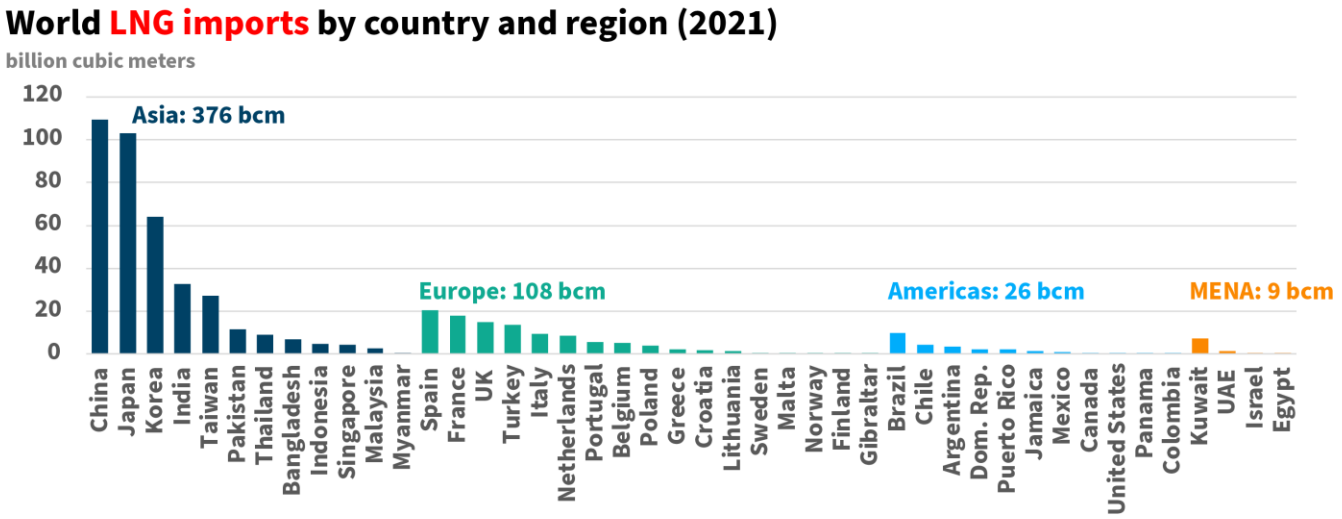
Main LNG capacities and flows in the EU 2021



Sources: Bruegel 2022, ALSI 2022

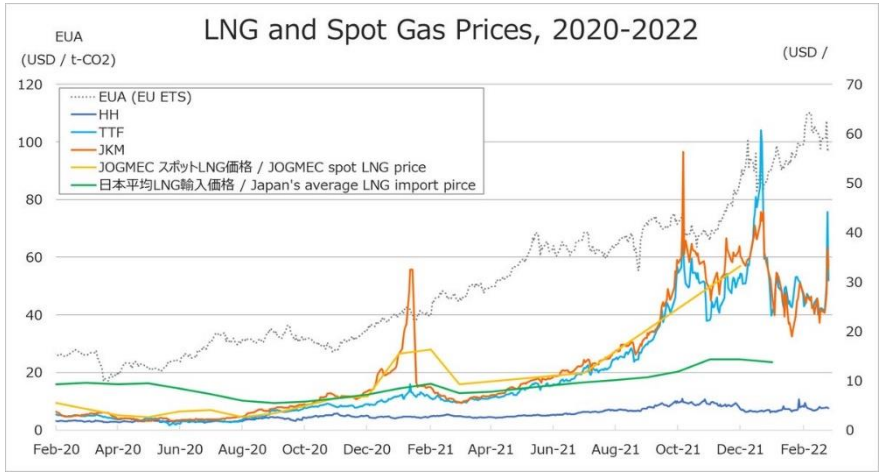
- LNG quantities are sharply increasing in 2022.
- LNG capacity utilisation in the EU was almost 80% at the beginning of 2022.
- The main LNG capacities are located in Spain, France, and Italy.

The European LNG market in relation to the world market



Source: Kpler LNG Service

Source: Tsafos 2022



Source: Global LNG HUB 2022

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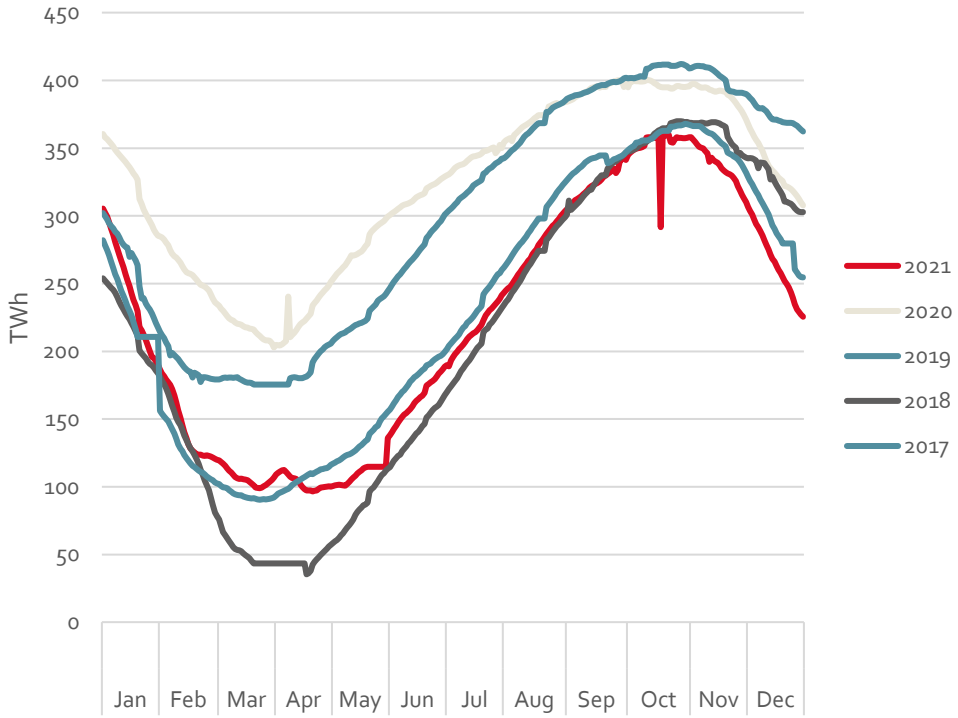
- Russia also plays a significant role in the European LNG market.
- With a share of 15%, Russia was the third largest LNG supplier in 2021 behind the USA (25%) and Qatar (23%).
- Europe accounts for about one-fifth of the world market. However, Asia accounts for the biggest share (72%) of the LNG market.
- There is fierce competition among bidders for LNG quantities impacting prices worldwide.

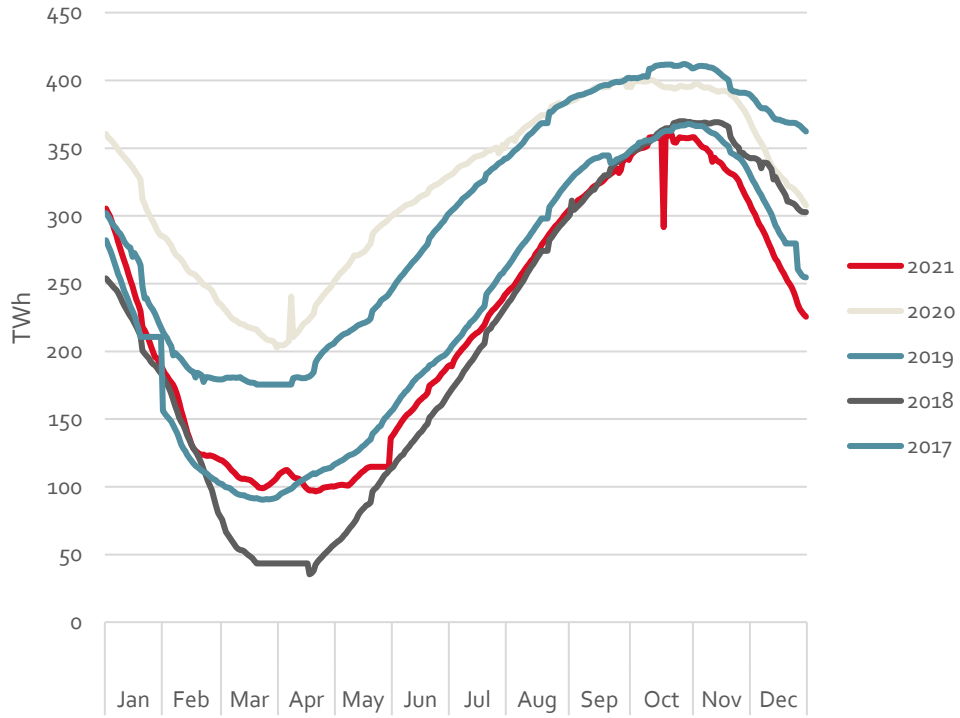
Storage filling levels over the course of 2021: Conduct of Gazprom vs. other operators

Filling level of storage facilities not controlled by Gazprom



Source: AGSI 2022

Filling level of storage facilities controlled by Gazprom

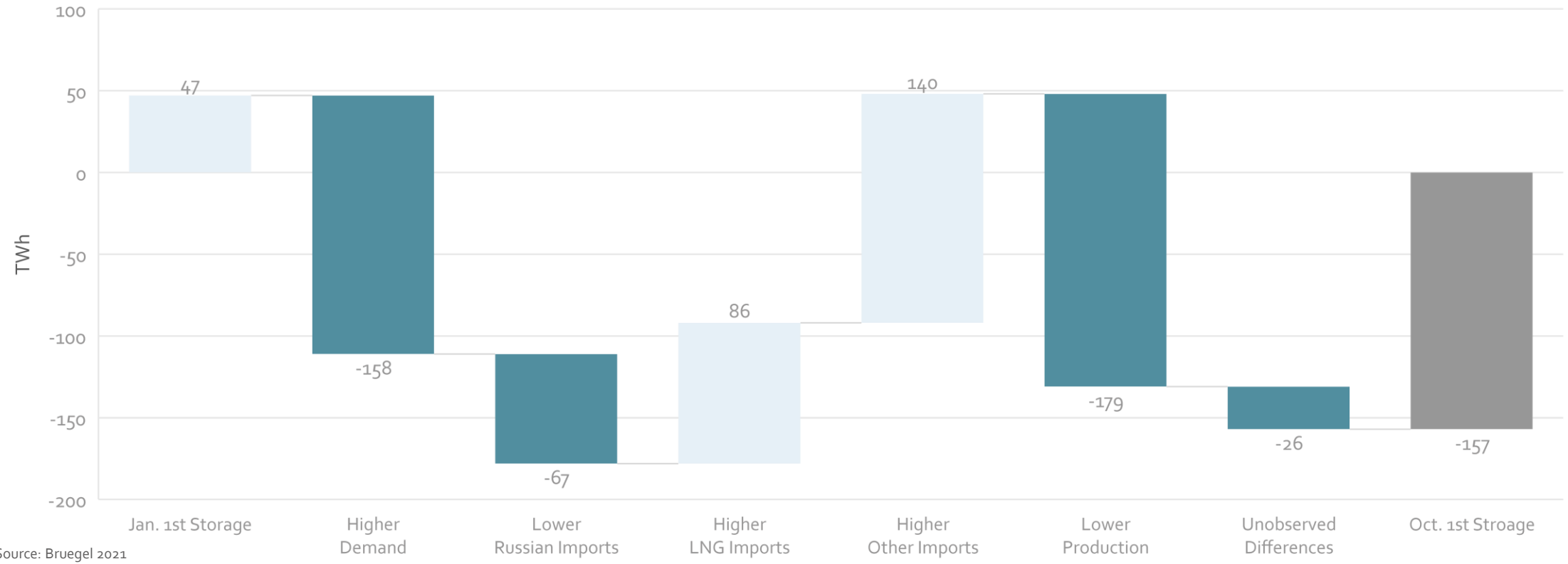


Source: AGSI 2022

→ Since April 2021, there have been "strategic" deviations between the storage filling levels of the facilities controlled by Gazprom and the storage filling levels in the rest of the market

Situation of gas storage facilities in Europe

Breakdown of the European gas storage balance in relation to the average of the years 2016-2022 compared to 2021

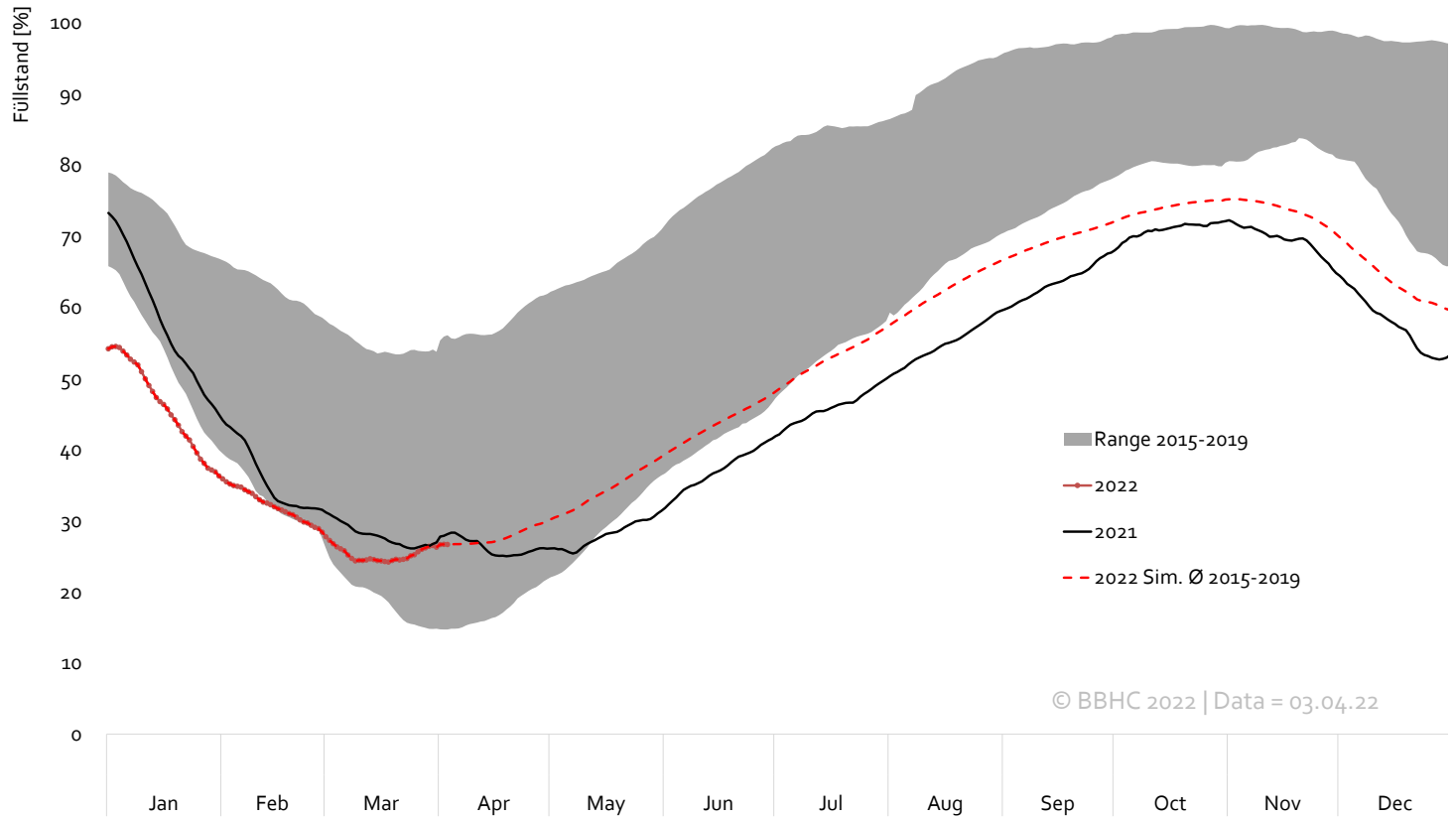


Source: Bruegel 2021

→ Higher gas demand and low production within Europe are the main reasons for the vulnerability to Russian supply disruptions

Storage filling levels in Germany

Filling levels of German gas storage facilities



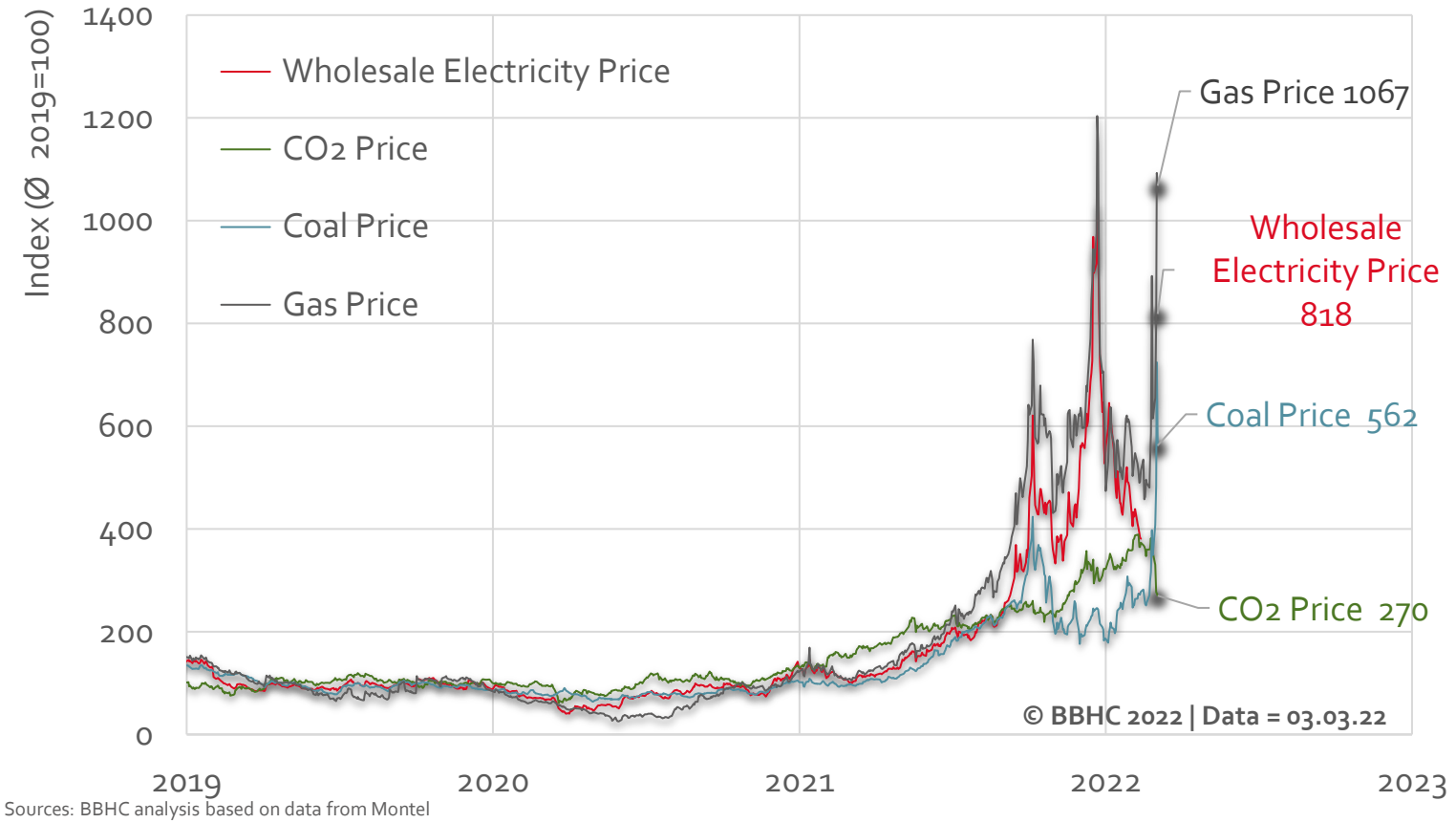
Sources: AGSI 2022; BBHC analysis

- Gas storage capacity in Germany: 25% of the annual consumption
- Storage filling levels in 2021/2022 at an all-time low
- Even without further reductions in Russian supplies, the market situation and the storage filling levels will likely be strained again in Q4 2022.
- Topping up the storage facilities in the current situation is not possible without regulatory intervention.

→ Topping up the storage facilities in the current situation is not possible without regulatory intervention.

The entire energy market was already strained in 2021.

Development of energy prices from 2019 to 2022



Sources: BBHC analysis based on data from Montel

- The situation in the commodity markets was generally strained over the course of 2021.
- Not only the developments in the gas market, but also the coal and CO_2 markets were turbulent.
- As a result of these developments, electricity prices soared to a record high.
- The relationship between coal, CO_2 and gas prices was in favour of electricity generation from coal ("switching price")
- In 2022, the costs of coal-fired electricity generation are lower than the costs of gas-fired electricity generation, which means that there is already an economic incentive to reduce the use of natural gas.

→ The invasion of Ukraine and the resulting supply problems and risks coincide with an energy market situation that is generally strained.

Summary

Already in 2021, Russian supplies were significantly lower than in previous years. While Russia met its long-term supply commitments, it did not supply any additional quantities via the spot markets. As a consequence of these supply shortages, natural gas prices in the European markets were subject to strong price movements already in the course of 2021. Compared to the average in the year 2019, prices partly increased by a factor of ten. Against the background of these price movements, the reduction in Russian supplies is likely to be motivated by geostrategic considerations.

Strong price movements were also recorded in the international LNG market, which also experienced supply shortages and a rise in demand, especially in Asia. There is an international price competition for available LNG quantities. As a result, the growing LNG trade leads to price convergence in the world markets for pipeline gas and LNG. LNG imports into the EU in 2021 were lower than in previous years. As a result, the reduced supply from Russia had to be compensated by drawing on supplies from gas storage.

The suspicion that Russia acts out of geostrategic motives is reinforced when looking at the management of gas storage facilities controlled by Gazprom. The filling levels of the storage facilities run by Gazprom are consistently lower than those of the other storage facilities in Europe. All in all, the storage filling levels of the European natural gas storage facilities were thus well below the level of previous years.

The low storage filling levels make the European natural gas industry even more vulnerable to a potential stop of imports of Russian gas. In this context, it is to be assumed that at the moment and also in the course of 2021, all existing market flexibilities for substituting natural gas are/were already drawn on. This applies in particular to the electricity sector, because the generation of electricity from coal was and is cheaper than gas-fired generation due to the current coal and CO_2 prices. As a result, the generation of electricity from gas already declined in 2021 leading to a corresponding increase in the generation of electricity from coal.

Considering the overall supply situation in 2022 and in particular in the winter 2022/2023, there are three key areas of action with regard to the European gas supply:

(1) **Natural gas storage facilities**: The historically low storage levels leave no room for manoeuvre in the event of any supply disruptions. The filling levels of the existing storage capacities at the beginning of the heating season are decisive for the security of supply in winter.

(2) **Imports**: The availability of additional and larger LNG imports to Europe should be examined and volumes should be secured.

(3) **Demand**: Options other than price signals further contributing to reductions in demand (i.e. elasticities, switching from gas to coal) should be evaluated and made accessible at an early stage.

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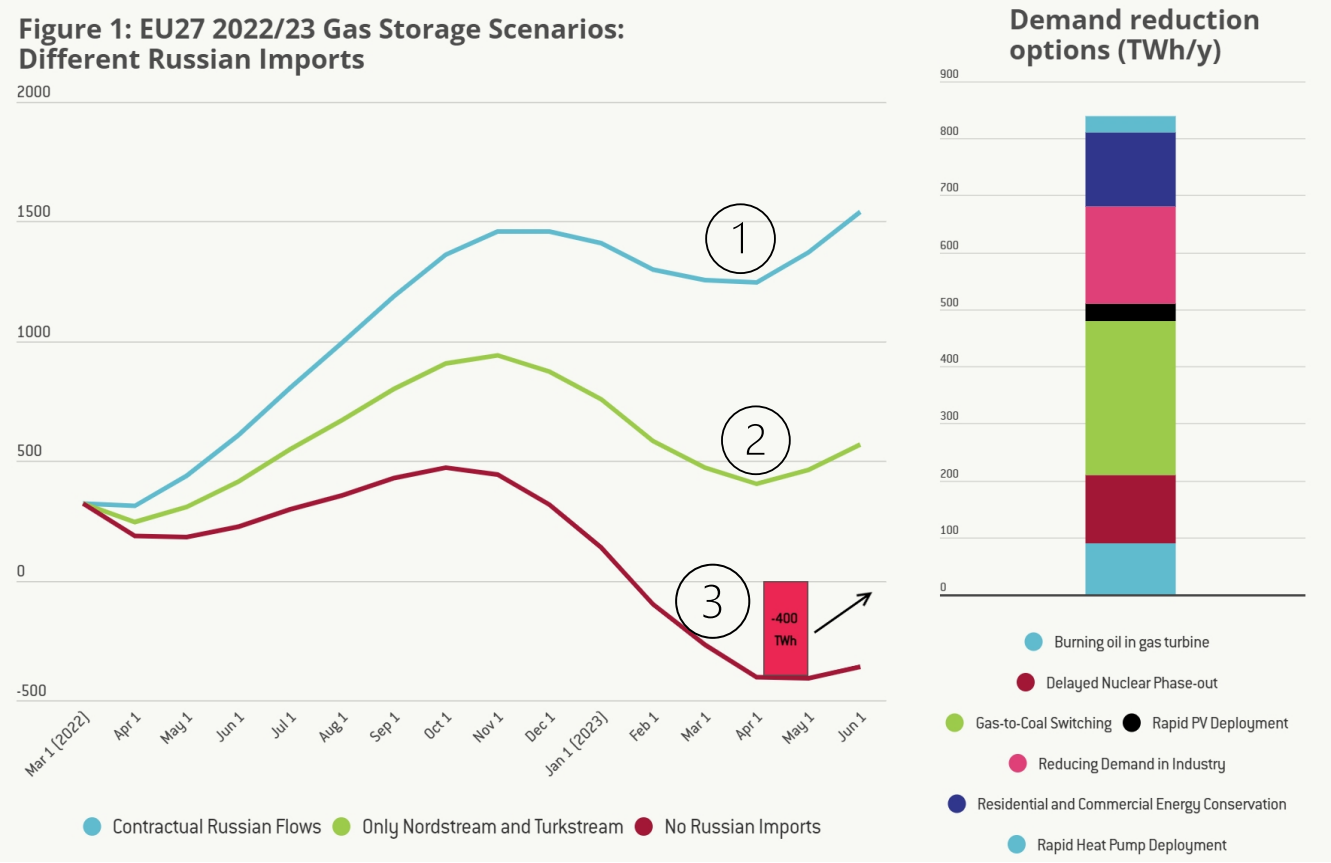
Bruegel's analysis of possible scenarios in the event of Russian supply disruptions



Sources: Bruegel 2022

All scenarios begin with 320 TWh of EU-wide storage on 1 March 2022. Monthly demand is set according to the average across 2018-2021. The scenarios assume that imports from North Africa, Norway and Azerbaijan remain at similar levels to the last few months. For LNG, record import levels, approaching the technical maximum capacity of regasification terminals, are assumed. Russian imports are considered as follows:

(1) **Average Russian imports:** Russian exports to the EU market closely resemble 2021, which we consider roughly equal to Gazprom's long-term contractual obligations.

(2) **Limited Russian imports:** The Nord Stream 1 and Turkstream pipelines would operate (60 TWh/month), while Ukraine transit, Yamal and flows to the Balkans are stopped.

(3) **No Russian imports:** Even record high non-Russian imports would not be enough to sufficiently refill storage ahead of next winter. Europe would need to reduce demand by at minimum 400 TWh (or 10%-15% of annual demand). This is possible. A portfolio of exceptional options could abate at least 800 TWh.

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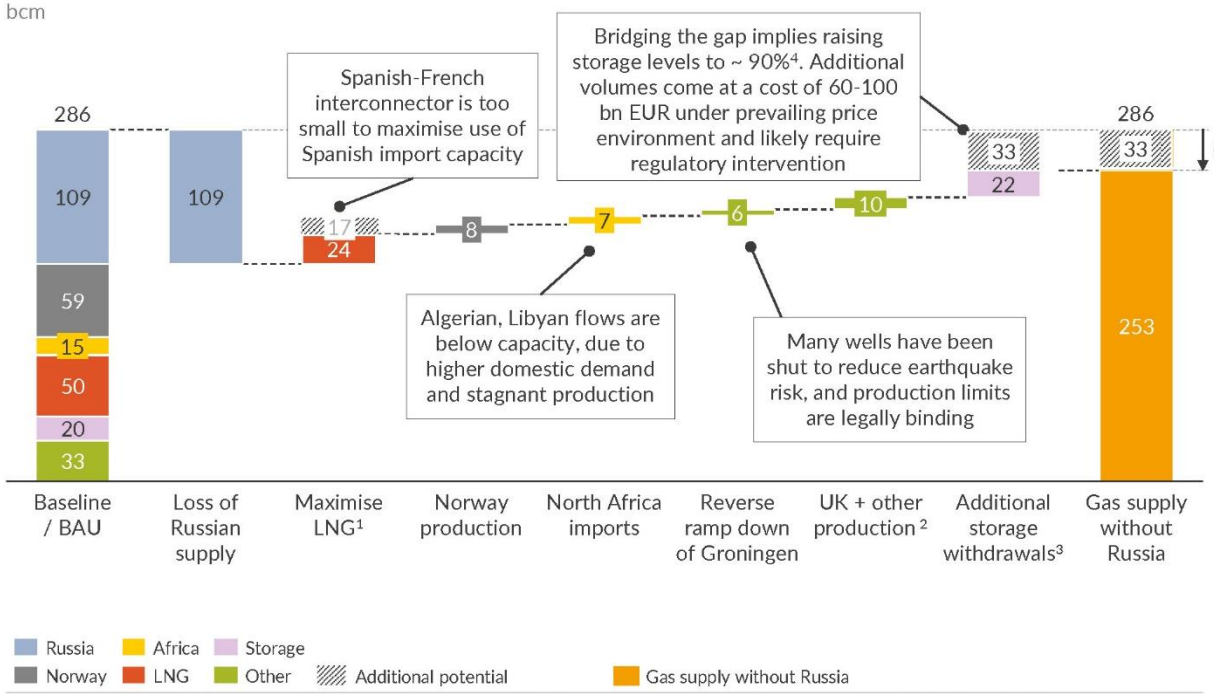
- In the event of a total loss of gas supplies from Russia, a demand reduction and/or substitution of supply by approx. 400 TWh is required.
- According to the authors of this analysis, there is a potential of 800 TWh.
- The greatest potential for substitute supplies lies in the fuel switching from gas to coal and the temporary postponement of the nuclear phase-out.

Aurora's analysis of the loss of supplies from Russia in winter 2022/23

3 Coping next winter without Russian gas requires storage refill at cost of >60bn EUR, likely requires regulatory intervention

European supply measures required in event of no Russian gas supply in the period October 2022 – March 2023
bcm



1) Includes maximum increase in pipeline flow from Spain to France 2) Includes Romania and Poland 3) Assumes withdrawals in winter 2022-23 are in line with the lowest since 2015 (winter 2018-19) 4) Initial 22bcm fills storage facilities to 60% at start winter 2022-23, additional 33bcm fills storage to 90%, assumes stocks would end winter at 20%
Source: Aurora Energy Research

AURORA

- European wholesale gas customers would need to compete on the LNG spot market to secure significant additional volumes, at a substantial cost
- Norway, the UK and elsewhere have limited scope to increase production
- The Dutch Groningen field is planned to be primarily shut in winter 2022-23, but if kept online, it could add some supply
- The gap left after these options is 33 bcm (12%) of projected supply for winter 2022-23 but could be reduced further depending on the level of storage going into winter
- Ensuring sufficient storage levels before next winter likely requires regulatory intervention given high risk for storage operators
- Gas infrastructure, especially for west-to-east flows may become a major constraint

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- In the event of a total loss of Russian gas supplies, Aurora, too, assumes that there will be a supply gap of approx. 330 TWh in March 2023.
- The basic prerequisite for this are sufficient storage filling levels at the beginning of the winter. Otherwise, the gap would be wider.

Summary

The scenarios of the think tank Bruegel show that only partial losses of the supplies from Russia can be compensated for. In this context, it is to be emphasised that in all scenarios the maximum utilisation of the regasification capacities is assumed. According to the scenarios, a full disruption of supplies would result in a supply gap of approx. 400 TWh in March/April 2023. This gap would require demand-side measures to compensate for the shortfall quantities.

The authors consider the potential for substitute supplies and demand reductions to amount to 800 TWh. According to them, the by far greatest potential lies in the fuel switching from natural gas to coal and, respectively, oil. It remains unclear to what extent this is additional potential that has not already been unlocked through the existing market incentives. Furthermore, the authors state that the natural gas demand can be significantly reduced by postponing the nuclear phase-out and accelerating the expansion of wind and PV energy.

The scenarios presented by the power analytics provider Aurora are not directly comparable with the scenarios of Bruegel. This is because the latter has chosen the heating season from October 2022 to March 2023 as the period of observation. The main differentiating feature in this context is Aurora's assumption that the storage facilities are filled to 60% by the beginning of the winter. By contrast, Bruegel's scenario starts with filling levels of approx. 28% and examines the effects over the period from March 2022 to spring 2023.

On the other hand, however, Aurora takes into account the pipeline constraints between Spain and France. Aurora thus assumes a lower LNG supply potential within Europe.

Based on these conditions, Aurora also expects a supply gap of a similar magnitude. Aurora's analysis shows that a storage filling level of 60% at the beginning of the winter would lead to a supply gap of 330 TWh. According to Aurora, this gap could be closed if the storage facilities were filled to 90% at the beginning of the winter. Bruegel's analyses, however, precisely show that it is impossible to reach a storage filling level of 60% by 1 October in the event of an immediate loss of supplies from Russia – even based on an optimistic assumption regarding LNG.

In summary, the scenarios illustrate the gravity of the current situation and reveal Europe's dependence on the supply of natural gas from Russia. There are hardly any options for action to avoid cutting demand in the event of a disruption of supply. The potential of fuel switching and the contribution of LNG remain unclear.

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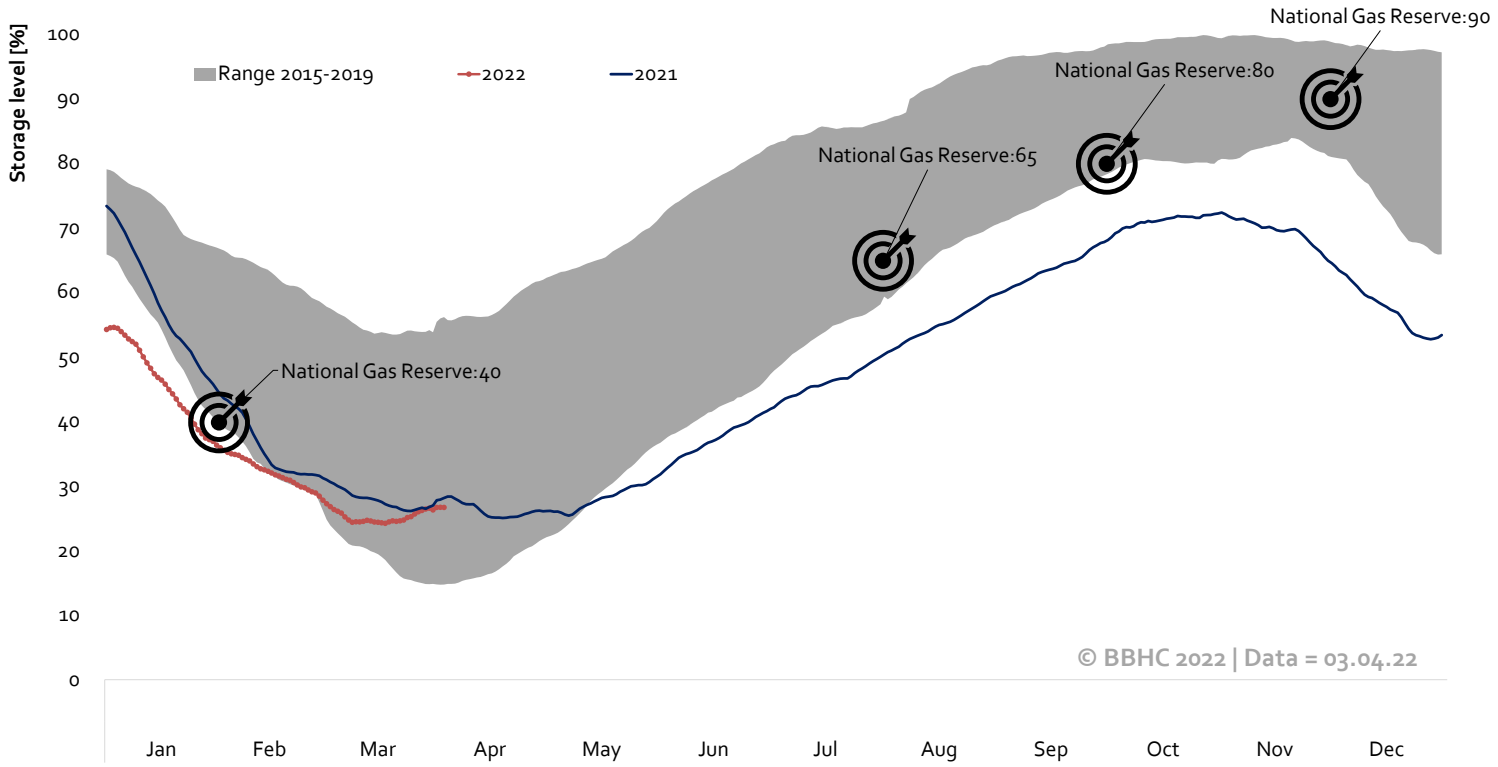
Storage filling levels and political interventions (1/2): Proposals of Germany and the European Commission

Filling levels of German gas storage facilities and intended national storage reserve



Sources: AGSI 2022; BBHC analysis

Germany:

- Draft law on the creation of a "national gas storage reserve" of 28/02/2022 by the Federal Ministry for Economic Affairs and Climate Action (BMWK)
- Planned to be passed in the course of April and to enter into force on 01/05/2022

European Commission

- REPowerEU (08/03/2022): Gas storage facilities in the EU are to be filled to a minimum of 90% by 1 October.
- Legislative proposal of the Commission planned for April

→ In the interest of security of supply, storage filling levels are to be regulated swiftly at German and European level.

Storage filling levels and political interventions (2/2): Proposals of Germany and the European Commission

Rough calculation of the costs for filling the storage facilities in 2022

	EU	Germany	Unit
Storage capacity	1111	245	TWh
Filling level (as of: 22/03/22)	291	61	TWh
Filling level in percent	26,2	24,8	%
Estimated storage filling level at the end of the gas season	222	49	TWh
Target filling level of 90%	1000	221	TWh
Gas demand for target filling level of 90%	778	172	TWh
Costs for filling storage facilities based on different gas prices			
€25/MWh	19	4	billion euros
€50/MWh	39	9	billion euros
€100/MWh	78	17	billion euros
€200/MWh	156	34	billion euros

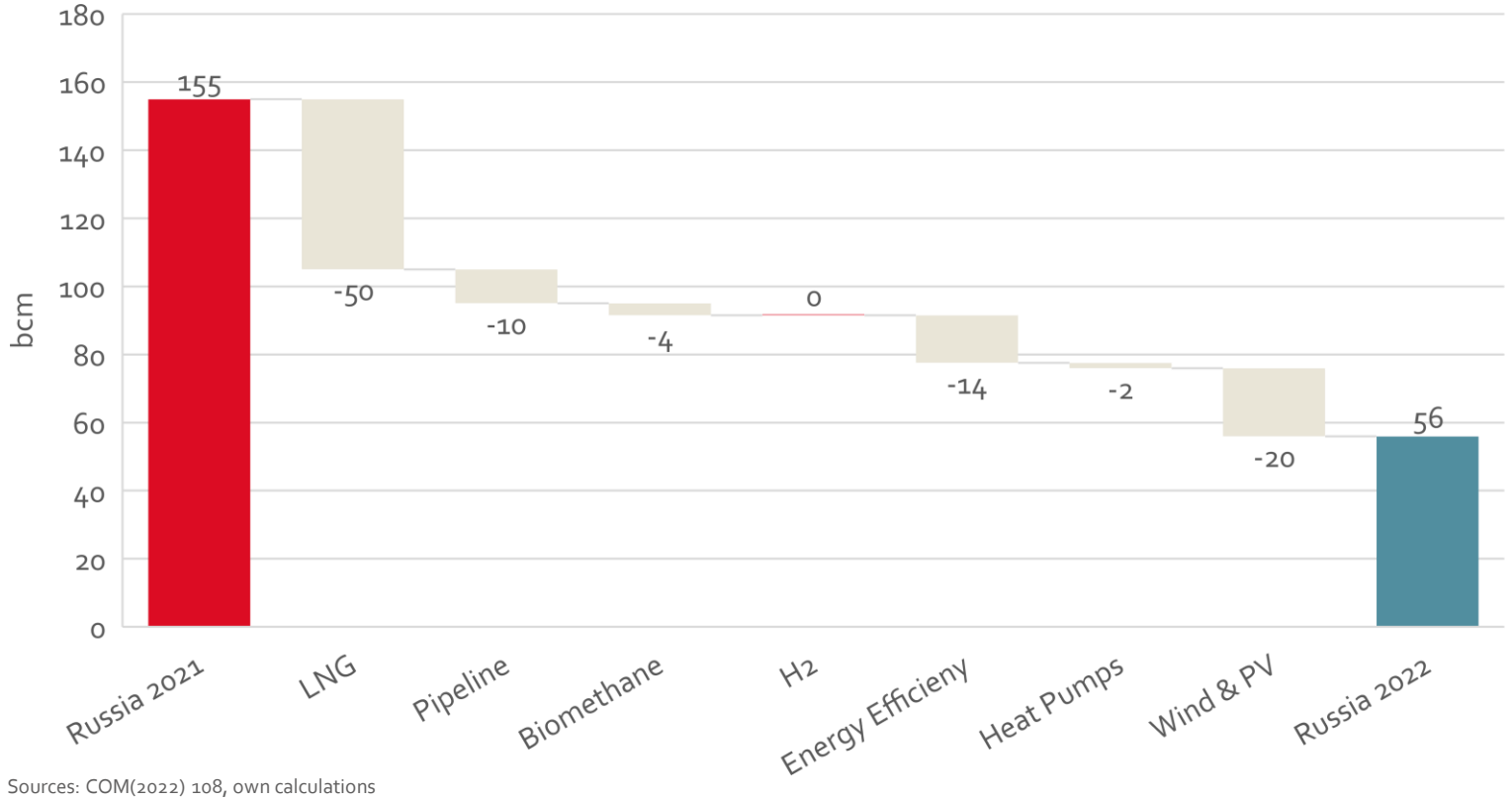
Sources: AGSI 2022 own calculations

- In both proposals, the target storage filling level amounts to 90%.
- While this level is to be reached by 1 December according to the German proposal , the Commission's proposal sets out that the storage filling level of 90% is to be reached already by 1 October.
- The estimated costs for achieving the minimum storage filling levels range from €10 billion to €20 billion for Germany and, respectively, €40 billion to €80 billion for Europe.

→ Filling the storage facilities and the costs and risks associated therewith can only be managed by means of political measures. Ideally by measures coordinated at European level.

Communication of the European Commission: REPowerEU: A common European approach for more affordable, secure and sustainable energy

REPowerEU measures and estimated substitute for Russian gas supplies until the end of 2022



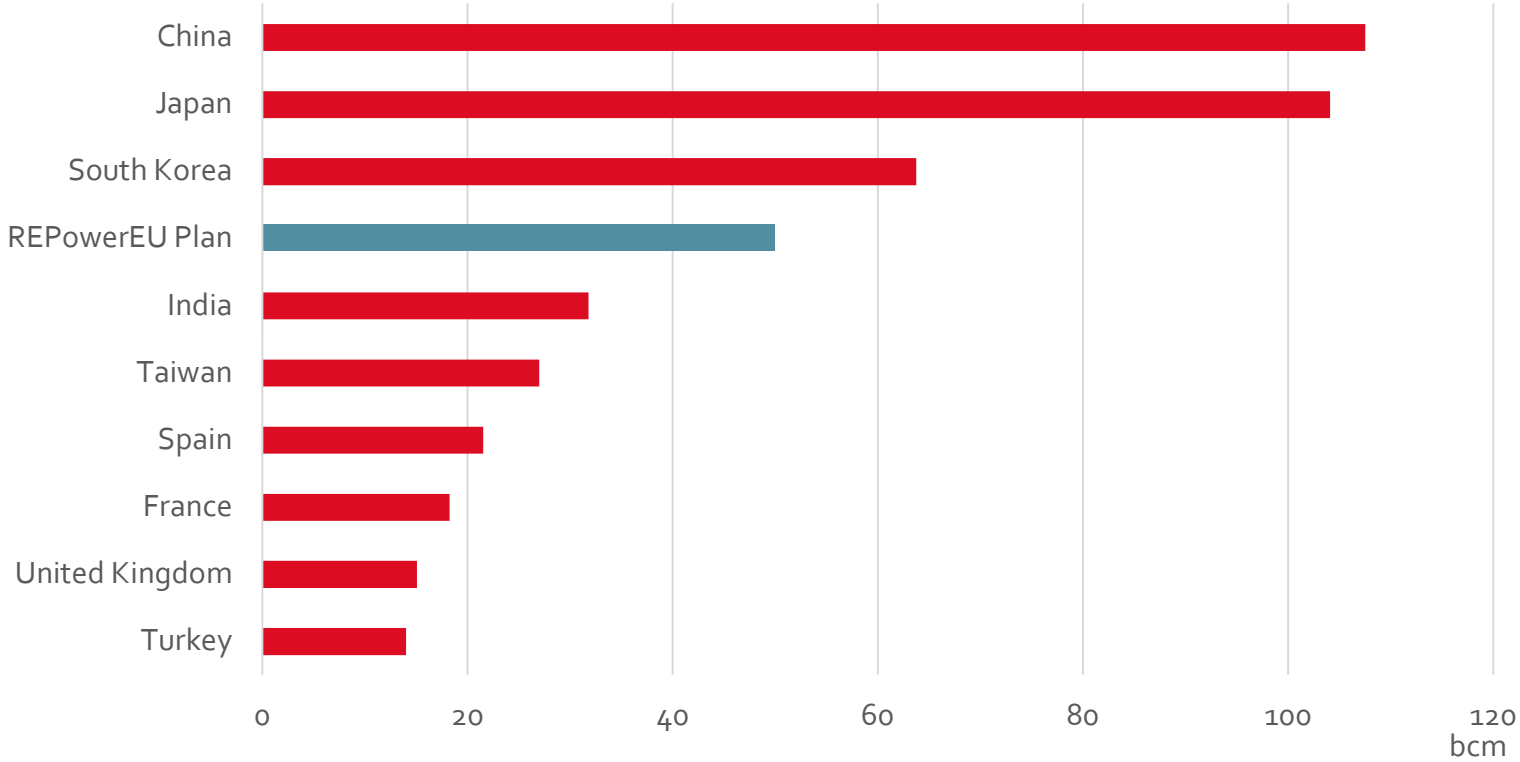
Sources: COM(2022) 108, own calculations

- On 08/03/2022, the European Commission presented the REPowerEU strategy as a response to Russia's invasion of Ukraine.
- In addition to long-term proposals for the period up to 2030, the strategy focuses primarily on short-term measures.
- The European Commission estimates that Russian gas imports could be reduced by approximately two-thirds already within 2022.
- According to the European Commission, diversifying gas supplies via LNG possesses the single greatest potential for achieving this reduction.

→ According to the European Commission's estimate, about one-third of the supplies from Russia could be replaced by LNG alone already in 2022.

LNG volumes of the REPowerEU plans within the context of the LNG market 2021

LNG market 2021 compared with the planned LNG volumes of the REPowerEU programme

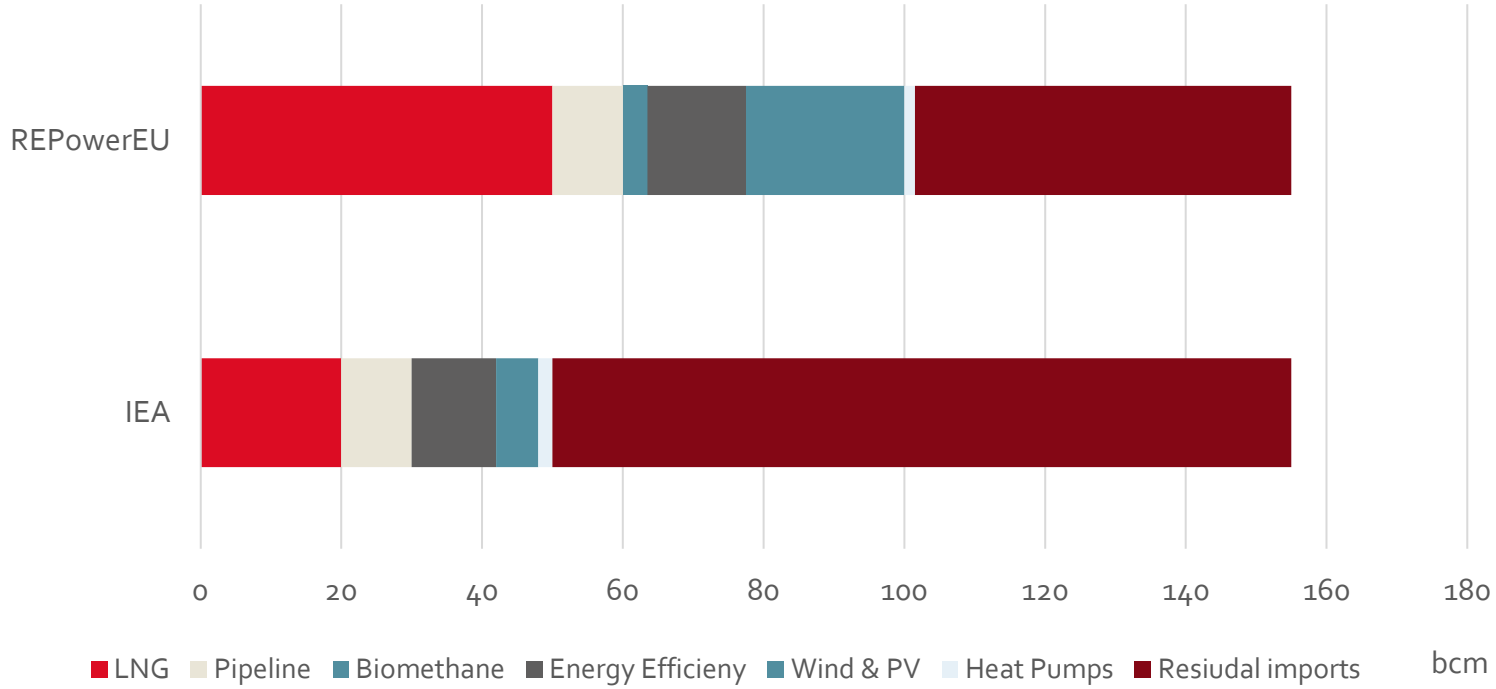


- Given the market situation in 2021, the LNG volumes referred to in the REPowerEU strategy almost equal the demand of South Korea, the third largest LNG import country.
- In terms of the total volume in 2021, the planned import volume corresponds to approx. 10% of additional demand.
- Procuring LNG in these quantities as well as distributing them across the European grids appears to be an extremely ambitious goal.

→ The volume of the planned LNG imports as envisaged in the REPowerEU strategy appears to be unrealistic.

REPowerEU compared to IEA's 10-Point Plan to achieve independence from Russian natural gas imports

REPowerEU plans vs. 10-Point Plan of IEA



- A direct comparison of IEA's 10-Point Plan and the REPowerEU strategy shows divergences primarily as to their assumptions on LNG.
- Whereas the EU strategy is based on the assumption that there is a potential of 50 billion cubic metres (bcm), IEA only sees a potential of 20 billion.
- Further discrepancies can be noted with regard to the potential of photovoltaic and wind energy capacities

Sources: COM(2022) 108, IEA 2022

→ Overall, the REPowerEU plans appear to be wildly optimistic.

Summary

In preparation of scenarios involving a cut-off from Russian gas supplies, policy responses at national and European level have already been provided at short notice. In February, for example, the German Federal Ministry for Economic Affairs and Climate Action (BMWK) prepared a legislative proposal on the regulation of gas storage facilities, requiring Trading Hub Europe, the market area manager, to gradually fill gas storage facilities to 90% by 1 December 2022. The costs for filling the storage facilities are to be passed on via the grid charges. The law is to enter into force in May.

Following up on this, the European Commission presented a legislative proposal as part of its REPowerEU package of 08/03/2022 requiring gas storage facilities across the EU to be filled to 90% of their capacity by 1 October each year. Furthermore, the REPowerEU package proposes a set of ambitious measures which are to minimise the dependence on natural gas imports from Russia in the short term – i.e. by winter 2022 – and in the medium term.

The European Commission estimates that Russian gas imports could be reduced by approximately two-thirds already within 2022. According to the Commission, diversifying gas supplies via LNG possesses the single greatest potential for achieving this reduction. In particular, the plans regarding the diversification using LNG imports appear to be unrealistic. The EU estimates that 50 billion cubic metres of additional LNG could be imported in 2022, which would account for 10% of the worldwide trading volume of 2021. IEA, on the other hand, refers to an import volume of 20 billion cubic metres of additional LNG, which is less than half of the EU estimate.

In addition to the question of whether it is actually possible to procure these volumes on the global LNG market, there is also the question of whether it is possible to distribute the volumes within the gas infrastructure across Europe so as to ensure security of supply in all EU countries. While Spain, having an import capacity of approx. 700 TWh per year, has the greatest potential, the transport capacities between Spain and France are limited to approx. 80 TWh per year. Thus, there are clear constraints in this respect.

Both the EU and IEA identify further options to reduce gas use by increasing energy efficiency and accelerating the expansion of photovoltaic and wind power capacity. However, even if all ambitious measures are successfully implemented, it must be noted that it will not be possible to completely replace gas supplies from Russia in the short term. The EU estimates that it is possible to substitute two-thirds of gas supplies before the winter season 2022/2023, whereas IEA considers a substitute of one-third possible.

Agenda

Introduction

Natural gas supply structure and dependence on Russian imports

Market and supply situation 2021/2022

Supply scenarios in winter 2022/23

Policy responses in Germany and at European level

Summary and conclusions

Summary and conclusions

The German and the European energy system are extremely vulnerable when it comes to the loss of imports from Russia. Energy imports from Russia account for 30-40% of all gas imports to Europe and for far more than 75% of imports to a number of countries in the east and southeast of Europe. More than 50% of German gas imports depend on Russia.

In the current situation, the risk of a voluntary or involuntary disruption of gas supplies remains very high. Energy policy makers and the gas industry should brace themselves for such a scenario. Diversifying gas supplies via imports from non-Russian suppliers is a Herculean task that cannot be accomplished at short notice. What is more, these challenges can only be taken on jointly at European level. One of the most urgent actions required include the swift and efficient regulation of gas storage which creates the prerequisite for ensuring that the storage facilities are filled to maximum capacity before winter. Other questions that need to be addressed as soon as possible include the procurement of LNG and its distribution across Europe – this also requires political action.

In addition to identifying where to procure natural gas, further options with potential must be analysed and unlocked. For example, delaying the coal phase-out (including reserve power plants) and the nuclear phase-out are considered options with potential. In order to unlock this potential, it is essential to create the necessary prerequisites as soon as possible. Mothballed reserve power plants do not replace the generation of electricity in gas-fired power plants.

The time is ticking. Bruegel's scenarios show that even in spring and summer, every kilowatt hour will be decisive to be able to fill the storage facilities to maximum capacity before winter.

Besides concerns about a major physical gas shortage next winter, the energy markets are already experiencing financial system risks due to the sharp increases in prices and volatilities of the past months. There is, partly, a risk that energy traders, energy supply companies and other energy market participants could face liquidity shortfalls, which in the worst case will trigger cascading effects. It must be ensured in that regard that liquidity issues and the cascades resulting therefrom do not pose a risk of causing a breakdown of the energy industry.

Analysis of legal and regulatory requirements at individual level

- **Security of supply with regard to gas grids**
  - Compliance with the applicable provisions under the German Energy Industry Act (EnWG) (sections 16, 16a, 53a) and cooperation agreement (KoV) 13/ Best Practices for the Prevention of Gas Supply Emergencies, e.g. cascade of curtailment at emergency level, lists of curtailments, agreements on interruptible loads
  - Amendments to and specification of the legal framework, e.g. further differentiation with regard to RLM customers? Further options to reduce demand?
- **Security of supply with regard to procurement/sales**
  - To be reflected in procurement and supply contracts, e.g. force majeure => Who is to bear the economic risk?
  - Possibilities of mitigating the economic risks
  - Assessing of whether reducing gas supplies from Russia is possible for the individual company?
- **Profitability with regard to procurement/sales**
  - Avoidance of "liquidity trap" when pre-financing on the energy markets
  - Ensuring that all legal instruments available are employed in the contracts, e.g. advance payments, adjustments on the basis of "revision clauses" (*Wirtschaftsklauseln*), making use of leeway in default supply tariffs
  - Additional burden resulting from mandatory storage quota?