

Emergency plans and solidarity: Protecting Europe against a natural gas shortage

September 2022

- Russia's war on Ukraine and its decision to cut natural gas exports to Europe threaten to create a natural gas shortage in the European Union despite high gas storage levels. An ambitious reduction in energy demand will be necessary to reduce this risk. Even if the European Union lowers consumption sufficiently on aggregate, individual countries could face risks of shortfalls.
- In the event of a shortage, national emergency plans shield certain customer groups from rationing. In most EU countries, these include households, critical infrastructure, and heating systems, while firms would have to bear the brunt of the adjustment. Emergency rationing could thus imply large economic costs. Spreading energy savings across all sectors of the economy and over a longer period could mitigate the potential damage.
- Cross-border solidarity obligations between EU members are meant to provide additional protection against rationing. However, the framework suffers from a lack of agreements about technical details and could prove challenging to implement in practice.
- In order to prepare for the winter, the options available to governments include:
 - Ensuring the price mechanism incentivises energy savings across all sectors of the economy while providing income support to the most vulnerable members of society.
 - Initiating campaigns for voluntary reductions in gas and electricity consumption.
 - Reducing practical obstacles to saving energy, such as delayed information about heating costs.
 - Restricting certain uses of gas or electricity.
 - Boosting and incentivising investments in energy efficiency.
 - Clarifying and expanding emergency plans and EU solidarity arrangements.

Russia has dramatically cut its deliveries of natural gas to the European Union in the run-up to its war of conquest against Ukraine, as well as in retaliation for subsequent Western sanctions. In mid-September, deliveries were 78% lower than a year ago (Zachmann, Sgaravatti and McWilliams, 2022). As a result, spot market prices for European gas skyrocketed and temporarily reached more than 300 EUR/MWh, compared to around 40 EUR/MWh a year ago (EEX, 2022).

The decline in Russian gas exports to Europe threatens to create a natural gas shortage this coming winter (Biol, 2022; European Commission, 2022a). This policy brief argues that filling storage will be insufficient to eliminate that risk. Unless EU countries reduce demand now, they might have to ration gas this winter. The emergency plans and solidarity provisions in place for a shortage offer strong protection for households and social services but would leave firms bearing the brunt of the burden of adjustment. The economic and employment costs could be severe, which underlines the need to reduce demand across all sectors of the economy now and prevent rationing during the winter. To this end, governments should consider all instruments in their toolbox, including appeals to the public, soft pressure from governments, and outright bans on certain uses of energy. Policies intended to provide support in the face of high energy costs should move away from lowering prices for all customers while still ensuring strong protection for the most vulnerable members of society (Van Dender et al., 2022). Moreover, solidarity between EU members is well-established on paper but could prove challenging to implement. It needs to be made operational by putting the necessary bilateral agreements in place or agreeing on EU legislation to this effect.

Storage and supply are limited

Replenishing gas storage levels to prevent a shortage in winter is a salient approach in the public debate, but it offers only a partial solution. EU gas storage levels currently stand at above 90%, with most member states exceeding the 80% target set by the European Commission for November 2022 (GIE, 2022). This equals about 100 billion cubic meters (bcm) of gas, while the European Union typically consumes about 290 bcm between November and April. In most countries, gas reserves are seasonal rather than strategic: storage capacity is limited and declines in winter amid continued imports. If imports from Russia cease and the European Union does not reduce its gas consumption, it risks a shortage in early 2023 (see Figure 1).

Europe is trying to find alternative suppliers and has made some recent progress by relying more on Algeria and Norway, which has increased production compared to last year and opened a new pipeline to Poland in September 2022. The share of liquified natural gas (LNG) in total gas imports has also increased, from around 22% in 2021 to 40% in recent weeks (European Commission, 2022b; Zachmann, Sgaravatti and McWilliams, 2022). However, there is little room left for additional increases before the winter. Competition on the world market for the limited supply is fierce, regasification capacity is limited, and the existing LNG infrastructure is heavily concentrated in the coastal states of Western Europe, which means that pipeline bottlenecks may prevent the gas from reaching customers in Eastern Europe that are particularly vulnerable to a supply cut from Russia (McWilliams and Zachman, 2022).

Ambitious demand adjustment measures are key

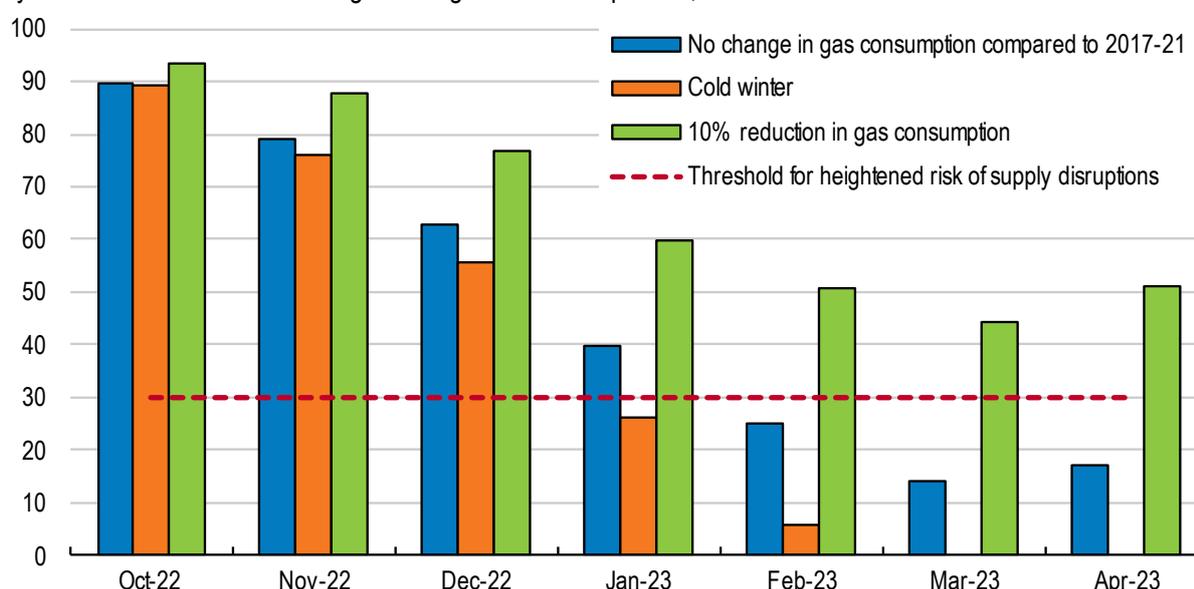
In view of these limitations, policymakers will need to put into place more ambitious policies to reduce gas demand, although there is some uncertainty about the exact amount. Consumption would have to shrink by between 10 and 20%, depending on gas flows from Russia, deliveries from alternative suppliers, and winter temperatures (Figure 1) (Kennedy, 2022; McWilliams and Zachman, 2022). A further consideration is the fact that the United Kingdom typically imports substantial amounts of gas throughout winter and may need to rely on EU storage due to its very limited own storage capacities. Gas consumption in the EU has recently fallen compared to previous years as high prices hit industrial consumers. To what extent this

trend will continue during the heating season will depend on households, which are usually less exposed to developments in the wholesale market (Ari et al., 2022; Bachmann et al. 2022).

The European Union has recently adopted a regulation to reduce gas demand voluntarily by 15% between August 2022 and March 2023 (EU Regulation 2022/1369). In the case of a severe gas supply disruption, the European Union can make demand reduction compulsory by declaring a “Union alert” on the security of supply. However, the regulation includes wide-ranging exemptions on reduction obligations that limit its effectiveness. In a move to lower the gas demand from power generation, EU energy minister have also agreed on a binding target to reduce gross electricity consumption by 5% during peak hours and a voluntary target to reduce it by 10% overall (Council of the EU, 2022). (Council of the EU, 2022). In addition, the European Commission has proposed numerous policies designed to quickly reduce dependence on Russian fossil energy in its “REPower EU” programme (European Commission, 2022c).

Figure 1. Without demand reductions, Europe risks gas supply interruptions

Stylised scenarios of EU and UK gas storage level developments, %



Note: Assuming 90% storage levels at the end of September 2022, no imports from Russia, imports from other sources at 30 bcm/month, and domestic production at average 2019-21 levels. “No change” assumes consumption at the average 2017-21 levels. “Cold winter” assumes consumption at the maximum 2017-21 levels. “10% reduction” is relative to the 2017-21 average consumption.

Source: Bruegel; Eurostat; GIE; IEA; ONS; and OECD calculations

If the European Union manages to reduce its aggregate gas consumption sufficiently, individual countries could still face shortfalls as the EU internal gas grid has limited transmission capacity between member states. In many countries, the demand reduction seen in the first months of 2022 will not be sufficient to offset supply shortages if Russia stops delivering gas. If countries do not want to risk exhausting their gas reserves before May 2023, they will have to make additional efforts (McWilliams and Zachmann, 2022). The magnitude of the challenge varies considerably by country. For example, Spain and Portugal do not need to reduce their demand for their own sake, and their gas supply does not directly depend on Russia. By contrast, south-eastern and eastern European countries will have to reduce consumption drastically, because of their historically high reliance on Russian gas and limited access to alternative sources. Moreover, even countries that do not rely on Russian gas might be affected by shortages in the rest of Europe, for example through higher prices on the integrated EU energy market and because they could face a risk of no longer being able to import gas-generated electricity from their neighbours. In 2020, Italy,

Finland and Poland imported the largest amounts of electricity in the EU, but Spain and Portugal were also among the net importers (IEA, 2022).

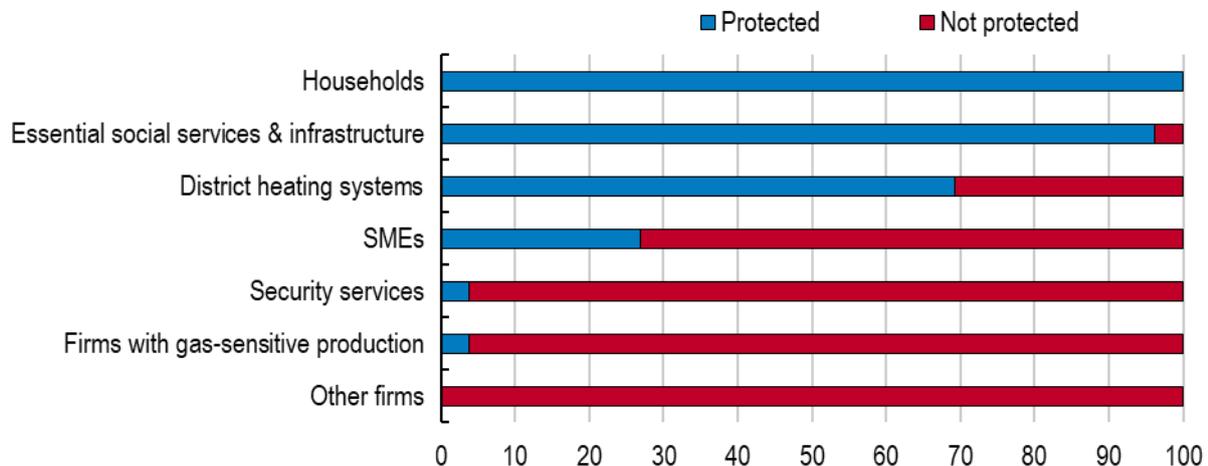
Emergency plans and solidarity mechanisms

What happens if demand reduction turns out to be insufficient and gas must be rationed? National emergency plans define which consumers will lose access (European Commission, 2022d). These plans define three levels: early warning, alert, and emergency. The first two levels of crisis are managed by gas providers and rely mainly on regulating demand via the price mechanism. The emergency level gives the state the option to intervene through non-market-based measures. As a last resort, this includes reducing the gas supply to certain customer groups, while "protected customers" should still be supplied in full.

According to the current plans, which were due to be updated by the end of September, EU countries typically protect households, social services, essential infrastructure, and district heating systems from cuts (Figure 2) (European Commission, 2019). By contrast, firms would have to bear the brunt of the adjustment. The order in which unprotected customers are supplied is not specified in emergency plans, although the European Commission suggests prioritising customers that provide socially critical products like food or medicine, as well as those that could have large downstream effects on value chains (European Commission, 2022e). In countries like Germany, the decision is left to the regulator, who will decide on a case-by-case basis (Bundesnetzagentur, 2022).

Figure 2. Households are protected against gas cuts, but most firms are not

Share of EU member states with regulation that protects customer groups against gas cuts, %



Source: OECD calculations based on national gas emergency plans.

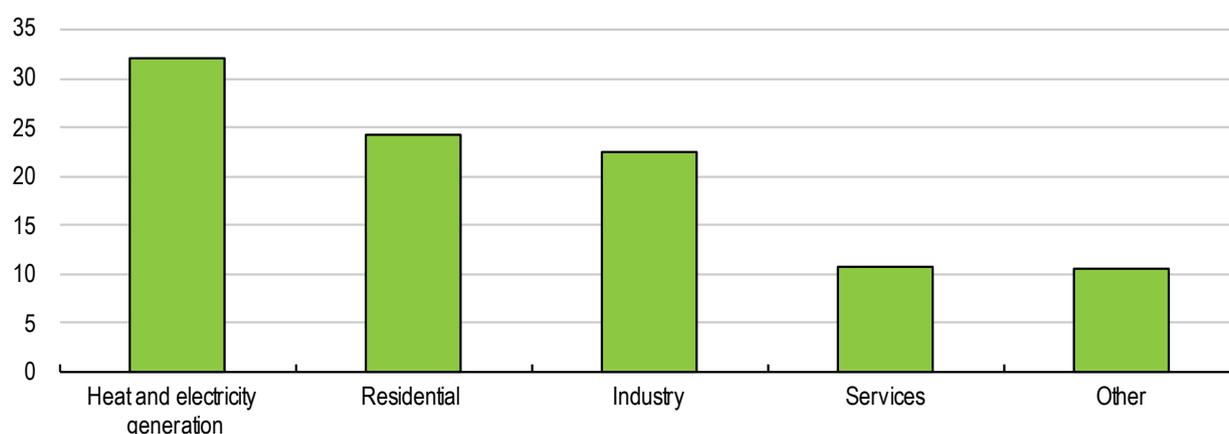
Gas-fired power plants are generally not defined as protected customers. Their access to gas is subject to individual decisions. However, countries like Germany, Greece, Italy, the Netherlands, and Poland specify exemptions for "critical" power plants (European Commission, 2019). Others, like Denmark, plan to import electrical power from neighbouring countries in the case of a gas shortage, which illustrates the need to ensure that the different EU emergency plans are consistent in aggregate (Energinet, 2022).

Protected consumers make up a substantial share of consumption. Households, which are fully protected, accounted for 24% of EU gas consumption in 2020 (Figure 3), with an even higher share in winter. Transformation, which comprises heat and electricity generation and is therefore partially protected from cuts, accounted for 32%. Industry, services, and other consumers, which are mostly unprotected, jointly

amounted to 42%. In case of a shortage, the gas reduction needed would therefore be focused on a narrow base of consumers, unless heat and electricity production is curtailed.

Figure 3. Transformation and households account for the largest shares of gas consumption

% of EU inland natural gas consumption, 2020



Note: Data covers EU member states that are also members of the OECD, except for LTU and LVA. Heat and electricity generation includes all transformation processes. Other includes agriculture, energy industry own use, non-energy use, transport, and consumption not elsewhere specified.

Source: IEA Natural gas supply and consumption database.

EU solidarity provisions aim to provide additional protection across borders. They oblige EU members to ensure that households, social services, infrastructure and heating systems everywhere in the European Union are able to access gas, even in the worst-case scenario of a severe shortage (EU Council Regulation 2017/1938). If an EU member state requests solidarity, connected member states are obliged to reduce gas supply to non-protected customers and pump the gas that has been saved to a member state in need. In return, natural gas providers are entitled to financial compensation. Flows must be ensured until the demand of protected customers in the requesting member state is satisfied (Fleming, 2019).

Cross-border solidarity can be invoked only when the maximum level of warning is declared. The authority to declare such an emergency remains in the hands of member states themselves. The details of gas-sharing under the solidarity mechanism have to be specified in bilateral agreements between neighbouring countries. However, as of now, only six such agreements have been concluded). The list includes Germany and Denmark; Germany and Austria; Estonia and Latvia; Lithuania and Latvia; Italy and Slovenia; as well as Finland and Estonia (European Commission, 2022e). The European Commission has therefore proposed harmonised clauses that would be directly applicable in the absence of bilateral agreements, but these have not yet been signed into law.

As long as the coverage of bilateral agreements is sparse and there is no additional European legislation to fill that gap, solidarity may face practical and political challenges. An agreement on and enforcement of common standards (e.g. minimum acceptable interior temperature standards) across the European Union may help alleviate this problem. Solidarity could be crucial not just to avoid major disruptions in individual countries, but also to help limit the severity of disruptions in the extreme scenario of widespread shortages.

What can European countries do?

While emergency plans and solidarity provisions are crucial in ensuring that citizens and critical infrastructure will not lose access to energy, they can only serve as measures of last resort. Rationing the gas consumption of firms would imply large economic costs and unpredictable cascading effects along supply chains. Governments should thus aim to start energy savings now and spread them across all sectors of the economy, rather than risk burdening firms with the costs of a sudden emergency adjustment in March. High prices will and already are incentivising demand reductions. However, some government support policies blur or weaken the price signal. To this extent, they merit a review as they may discourage energy savings and can be fiscally costly. In addition, governments have a wide range of measures at their disposal, including appeals for voluntary reductions and restrictions on certain uses of gas or electricity, as well as investment in energy efficiency.

Higher wholesale gas prices have proven effective in reducing industrial gas demand and encouraging substitution away from gas. However, retail prices and demand from small consumers have responded more slowly (Ari et al., 2022; Bachmann et al. 2022). This is due to longer-term contracts but also governments' support policies (European Commission, 2022f). Many governments have introduced such policies to alleviate the burden of high energy prices. While well-intentioned, they are often untargeted. Measures that keep gas prices artificially low for all consumers risk thwarting efforts to reduce consumption. Support schemes should therefore be reviewed. At the same time, governments should ensure that energy does not become unaffordable for low-income households by providing targeted income support (Van Dender et al., 2022). Positive incentives, such as financial rewards for using less gas than in the previous winter, might also be considered.

The price mechanism can greatly encourage energy savings, but governments need to account for practical obstacles and misaligned incentives. For example, tenants in poorly insulated dwellings cannot easily reduce their energy consumption in the short run. Other consumers might be unaware of their consumption and upcoming price changes or the options of smoothing consumption to reduce peak-time gas-fired electricity use. In countries like Germany, heating and hot water bills are available to tenants only with long delays, increasing the risk of delayed adjustment and financial hardship from unexpectedly high bills. Heating bills are also calculated partly based on dwelling size rather than actual consumption in some countries, meaning that a few careless consumers can drive up costs for everyone.

Governments can intensify efforts to help households and firms modernise their buildings, even if the time horizon is shrinking. Doubling the installation rates of heat pumps in the European Union would reduce gas use by about 2 bcm in the first year while insulating an additional 0.7% of the EU's building stock would save another 2 bcm (IEA, 2022b). However, shortages of materials and skilled labour need to be addressed in order for the industry to be able to satisfy the additional demand.

Calls for voluntary savings are another promising avenue. Countries like Spain, Italy and the Czech Republic have started campaigns to raise public awareness, suggesting households lower heating temperatures or shading windows to increase energy savings (Jack and Zimmermann, 2022). Public administrations can act as role models. In Germany, Berlin has started switching off the spotlights of historic buildings and monuments (Zimmermann, 2022). Information campaigns encouraging, for instance, a reduction of room heating temperatures can significantly contribute to saving energy. A decrease in heating temperature by 1° C would reduce gas demand in the European Union by around 10 bcm a year (IEA, 2022b). While the effectiveness of voluntary measures is not easy to evaluate, analyses of Japan's energy conservation efforts after Fukushima suggest that increased public awareness, improved information, and technical assistance for small-scale consumers usefully complemented other measures (Kimuro and Nishio, 2016; Muratoshi et al., 2013). In the United States, comparative information about electricity use has been found to reduce consumption by 2% (Allcott, 2011).

Restrictions on specific kinds of energy use are also increasingly established throughout the continent. For example, in Spain, the government has ordered shops to switch lights off at night (Zimmermann, 2022). French authorities have announced the obligation for air-conditioned shops to shut doors in order to save energy (Henley, 2022). Portugal will limit temperatures for public spaces (e.g. stores, offices) and reduce night-time lighting (Goncalves, 2022). Several cities in Italy, Austria and Poland have reduced street lighting and switched off commercial signs (Zimmermann, 2022). Other proposals include limiting boiler temperatures to a more energy-efficient level such as 60 degrees Celsius (IEA, 2022b). Such restrictions could be especially effective ensuring that customers that are shielded from price developments and protected from supply cuts contribute to lowering overall gas consumption.

Finally, the use of the price mechanism and reinforced measures to reduce consumption should be complemented with increased solidarity among EU members to effectively share the available gas supplies in an emergency. In the past, the European Union showed its capability for meaningful solidarity when it took on common debt to mitigate the economic impact of Covid-19 while largely resisting the temptation to impose export bans on medical equipment vis-a-vis other EU members. In a similar vein, EU members need to pull all available levers to ensure gas can get from where it is still comparatively plentiful to where it is lacking the most. Hence, governments should speed up the conclusion of bilateral solidarity agreements which set out mutual obligations and financial compensations. Technical capabilities and infrastructure and common demand-related standards (minimum temperatures) may also need to be updated to deliver solidarity support in practice.

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