FLORENCE SCHOOL OF REGULATION

ROBERT SCHUMAN CENTRE

POLICY BRIEF

High gas prices in Europe: a matter for policy intervention?

Introduction

The dramatic surge in electricity and gas prices recently experienced across Europe was due to a combination of factors. These include a decline in gas supply to Europe, meeting rising post-pandemic demand (especially in Asia) and supply shocks around the globe. In October 2021, the TTF spot price signalled a +216% increase with respect to July levels, while forward contract prices experienced a relatively lower – but still dramatic – increase (+155% with respect to July levels for Calendar 2022 contracts).

European gas storages can normally provide the necessary flexibility and contribute to hedging price spikes. However, in the course of 2021 hesitation to fill storages through the summer period led to particularly low storage levels (-22% on 30/9/2021 compared to 30/9/2020, and -15% with respect to the average in the last 10 years).

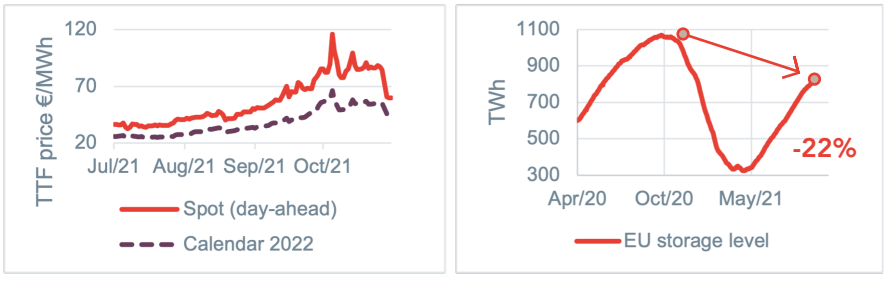

Figure 1 Spot and forward price dynamics at the TTF hub in the period July 21 to October 21 (left panel). European storage filling levels from summer 2020 until the beginning of winter 2021 (right panel). Source: EEX and AGSI platform, AGSI+ (gie.eu)

Issue 2022/06
January 2022

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The surge in natural gas prices has important redistributive effects, both within Europe and between European and non-European suppliers. The consequences of this sudden surge have triggered reflections on the need for a revision of European natural gas policies aimed at increasing security of supply and, more generally, reducing European gas procurement costs.[1]

Various measures are currently being discussed to achieve these objectives, ranging from establishing a centralised gas procurement mechanism to coordinating storage facility usage across Europe. A recent communication from the European Commission[2] envisages a number of possible measures, including a voluntary joint gas procurement mechanism and coordinated usage of storage facilities.

In this policy brief we analyse these measures and assess their likely implications for the European gas market.

The paper is organised as follows. In section 1 we review the structure of the wholesale European gas market and explain its price setting mechanism. In section 2 we discuss policies based on centralisation of gas procurement in Europe. In section 3 we discuss potential improvements to the current security of supply regulation in the natural gas sector. Section 4 summarises the policy implications of our analysis.

1. The EUropean gas wholesale market

Between April 2019 and March 2020, Europe imported about 82% of its natural gas demand: 59% was imported via pipeline and 23% was shipped as liquified natural gas (LNG) and regasified in Europe.[3]

The European gas market features a high degree of competition between pipeline suppliers and LNG suppliers: as Table 1 shows, its import and regasification capacity largely exceeds natural gas demand in Europe. This implies that supply via any given route can to a large extent be substituted by other supply routes.

	GWh/day
Pipeline import capacity*	16.250
Russia	*9.180*
Norway	*4.780*
Algeria	*1.870*
Libya	*420*
Regasification capacity	6.575
Total import capacity (pipeline + LNG)	**22.825**
Storage withdrawal capacity	**19.919**
Demand (Apr 2019-Mar 2020 average)	**14.107**
Demand (Apr 2019-Mar 2020 peak)	**24.245**
** TAP capacity is not considered as it did not contribute to EU supply in the period considered*	

Table 1 Import and regasification capacities compared to gas demand in the period April 2019-March 2020. Source: ENTSOG and GIE System Development Map 2019/2020 and AGSI platform, **AGSI+ (gie.eu)**

LNG is a marginal source of gas for Europe, which acts as a balancing market for the (global) LNG supply. This implies that the final price paid by European consumers reflects the wholesale LNG market price, while price differentials between market hubs are driven by transmission tariffs. In other words, all non-LNG suppliers sell pipeline gas at a price that sets them at a competitive equilibrium with LNG, given the tariff structure.

This price setting mechanism has ensured very low prices in some periods, and it equally appears to be one of the main reasons for the price spikes observed today: as soon as tightening in the LNG market conditions led to a dramatic increase in the LNG price, European gas prices started rising.[4]

2. Centralisation of gas procurement

The recent gas price dynamics invite a wider reflection on possible safeguard measures for consumers, and whether there is a need for greater involvement at the European

1 See in particular the proposals put forward by the Spanish government in *"Non-paper on energy and electricity markets,"* available at https://www.politico.eu/wp-content/uploads/2021/09/20/20210920-Non-Paper-on-Energy-markets.pdf

2 COM(2021) 660, *"Tackling rising energy prices: a toolbox for action and support,"* available at https://eur-lex.europa.eu/legal-content/EN/TXT/?uri=COM%3A2021%3A660%3AFIN&qid=1634215984101

3 Source: ENTSOG and GIE System Development Map 2019/2020, available at https://www.entsog.eu/sites/default/files/2021-01/ENTSOG_GIE_SYSDEV_2019-2020_1600x1200_FULL_047.pdf

4 More details can be found in a recent study by the Oxford Institute for Energy Studies: "*Why Are Gas Prices So High?*" September 2021, available at https://www.oxfordenergy.org/wpcms/wp-content/uploads/2021/09/Why-Are-Gas-Prices-So-High.pdf

level in negotiations on gas procurement.[5] The concept builds on an analogy with the recent experience of collective purchase of Covid-19 vaccines, which to some extent proved how Europe, as a centralised 'political' institution, can have a stronger negotiating position towards suppliers when it acts as a single buyer of collective goods.

On the other hand, the 'single buyer' scheme recalls the old market dynamics typical of the natural gas sector in Europe until the mid-2000s, based on long-term contracts negotiated bilaterally by national monopolists (backed by their respective governments) directly with foreign suppliers at prices that had no market benchmark, and were therefore indexed to the prices of substitute commodities such as coal and oil.

After twenty years of liberalisation, re-applying this model to the overall European market framework would be problematic and thus not particularly appealing, for the following reasons:

- Competition in procurement of natural gas, and in the wholesale and retail market segments, implies that the ability of a would-be single buyer to supply the EU demand by committing to long-term fixed-price contracts is limited. Should the natural gas spot price decrease, for instance, individual market participants would be able to sell gas at lower prices than the centralised single buyer simply by procuring gas on the spot market.
- A global market for natural gas is nowadays established, which gives suppliers *i)* alternatives to long-term contracting and *ii)* a price reference to market their production.

On this basis, centralisation of gas procurement in Europe appears to be not only difficult to implement but also potentially very inefficient once established. Moreover, the existence of a liquid global market for natural gas is likely to make such a measure poorly effective.

3. Improvements to current security of supply policies

The natural gas market has nowadays reached a very high level of maturity and integration. However, there are still areas where harmonisation at the European level of existing policy measures can constitute an improvement of the market design. One such area we identify is security of supply, which is covered by Regulation (EU) 2017/1938 ("SoS Regulation") and is based on the following 'pillars':

- Cooperation between EU countries in regional groups to assess common supply risks (Common Risk Assessments) and to develop joint preventive and emergency measures. EU countries prepare and regularly update so-called *preventive action plans* and *emergency plans,* which outline the measures needed to remove or mitigate the gas supply risks identified in their national and common risk assessments. These plans also indicate which measures should be taken in the case of a gas supply disruption and playbooks for EU countries to follow in order to avoid gas supply disruptions and to guide an effective response in the event of an emergency.
- Solidarity mechanisms that come into effect only in the event of an extreme gas crisis. These mechanisms are aimed at ensuring that vulnerable consumers are protected in the event of a gas shortage, and *inter alia* require Member States to reach bilateral agreements with their neighbours on actions to be taken in the case that a gas shortage occurs

We can identify two main areas where a review of SoS measures can be beneficial to the current European design:

- Price caps and scarcity pricing rules
- Storage allocation rules

We discuss these areas in more detail in the following sections.

3.1 Price caps and scarcity pricing rules

In the case of gas shortages, gas prices should reach a regulatory-set maximum price level

5 From the "*Non-paper on energy and electricity markets*" publication: "[…] While we cannot reduce our dependency in the short term, we can and should increase our bargaining power. This requires a centralised European platform to purchase natural gas."

corresponding to the cost of unserved energy, i.e. the price level that makes consumers indifferent between consumption and curtailment.[6] When dealing with scarcity pricing rules, it is important to note that inhomogeneities in the cost of unserved energy across Member States could distort the market functioning in the case of a gas shortage – 'driving' gas towards systems featuring a higher price cap and ultimately leading to inefficiencies.

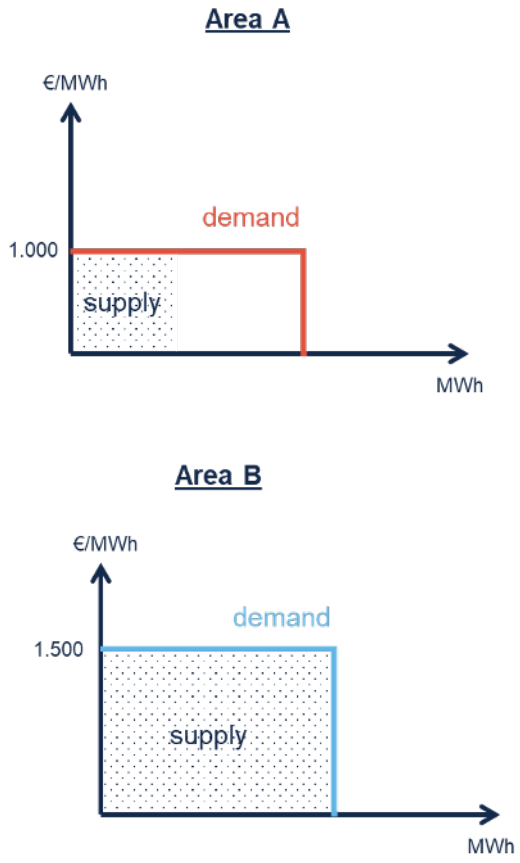

Figure 2 Inhomogeneities in regulatory determined price caps imply that in the case of gas shortages, gas is diverted to market areas with higher price caps

Let us consider the case of two market areas, A and B, with price caps set at 1,000 €/MWh and 1,500 €/MWh respectively, and let us assume that in the case of a gas shortage consumers in both markets are willing to pay up to 1,500 €/MWh to avoid curtailment, i.e. the cost of unserved energy is 1,500 €/MWh. Furthermore, let us assume that demand is equal to 100 MWh in both market areas but only 150 MWh of supply is available. Since area A is bound to a maximum price of 1,000 €/MWh, the market outcome will be such that the wholesale prices will be 1,000 €/MWh in area A and 1,500 €/MWh in area B and the demand will only be curtailed in area A.

On the other hand, if the price cap is set consistently with the cost of unserved energy, namely at the 1,500 €/MWh level, the two market areas will reach an equilibrium. Given that the market outcome is not distorted by the definition of the price caps, solidarity mechanisms to protect vulnerable consumers could be applied to adjust flows between market areas, if deemed necessary.

The above considerations apply in the case of a physical gas shortage. It remains to be seen how often this situation is expected in practice, given the level of storage and flexibility of demand at the European level.

3.2 Storage allocation rules

The SoS Regulation does not include coordinated measures at the European level regarding the utilisation of storage facilities. In this respect, the following areas might benefit from a review of the existing regulation.

3.2.1 Storage reservation price

Some Member States allocate storage capacity via auctions where the minimum bid price (reservation price) is the average cost, while others use the marginal cost.

This might lead to distortions in the utilisation of storages across Europe, for instance if we consider the case where the expected winter-summer price differential falls above the marginal cost of storage use but below the average cost. Storage facilities in Member States adopting the average-cost rule would end up being underutilised despite the price differential signalling a positive value of storage. Market participants could in fact inject gas in the summer period and withdraw it in the winter period, paying the marginal/incremental cost for the storage injection-withdrawal cycle and obtaining the winter-summer spread as revenue.

An efficient use of storage facilities would therefore require the adoption of a marginal-cost rule across all the Member States.

6 In the electricity sector, this is termed the 'value of lost load' and is harmonised across markets.

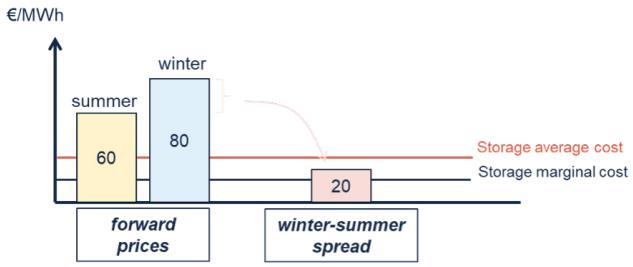

Figure 3 Efficient use of storage capacity requires the reservation price to be equal to the marginal cost of storage use. The numbers are purely representative

3.2.2 Regulatory-set minimum storage filling levels

While some Member States impose no constraints on the utilisation of storages, others require that a minimum filling level is reached at the end of the summer period as a security of supply measure.

In order to assess the opportuneness of extending such measures to the European level, we recognise that the objectives of these measures can be two-fold:

a. To ensure gas availability through the winter period (i.e. at peak demand)

b. To mitigate the winter-summer price differential

The relevance of the measures to each objective is discussed below.

Ensuring natural gas availability through the winter period

Table 1 displays the total import and regasification capacity at the European level and compares it to the level of European demand in the period April 2019-March 2020. As import and regasification capacity represents about 94% of the peak demand, regulatory provisions aimed at ensuring a minimum storage filling level might not be justified by the objective of ensuring supply through the winter period, since flexibility can be provided by alternative supply sources.[7] Moreover, it is likely that the market will be able to guarantee security of supply, given that only a limited portion of the storage capacity is needed for this purpose.

However, we note that while this conclusion holds at the European level, careful assessments might be required in selected Member States where import and regasification capacity fall materially short of peak demand.

Furthermore, should the aim of regulatory-set minimum filling levels be to ensure gas availability through the winter period, this means that consumption is favoured over curtailment at the cost of unserved energy (see also section 3.1.). As a consequence, if a Member State decides to impose a minimum filling level rule, coordination at the European level will need to be developed so that the corresponding quota of demand is given priority over neighbouring countries in the event of a gas shortage. This would in fact avoid gas flows to be diverted to neighbouring countries with the same wholesale gas price level (namely, the cost of unserved energy).

Mitigating the winter-summer price differential

Policy measures aimed at ensuring a minimum filling level might be expected to result in a reduction of the volatility of the winter-summer price differential if the size of storage capacity (compared to European demand) is large enough to set the gas price at least in some periods of the year.

Indeed, the aggregated size of European storages is about 1.106 TWh and they have a withdrawal capacity of 19.919 GWh/day (see also Table 1). As is displayed in Figure 3, this value is about 82% of the peak demand observed in the period April 2019-March 2020 (24.245 GWh/day). In other words, storages could supply the entire European demand for 55 consecutive days (starting from a 100% filling level).

We note that obtaining such a mitigation effect on the winter-summer price differential would require:

- Coordinated usage of storage facilities across Europe; and
- A higher degree of public intervention compared to the current market setting, also in cases where security of supply is not at risk.

7 This conclusion is further support by a recent study by Artelys, "*An updated analysis on gas supply security in the EU transition*," January 2020, which concludes that i) EU gas infrastructure is expected to be resilient by 2030 to a wide range of potential extreme supply disruptions, and ii) planned investment projects (4th PCI list) are not necessary to safeguard security of supply. The full study is available at https://www.artelys.com/wp-content/uploads/2020/01/Artelys-GasSecurityOfSupply-UpdatedAnalysis.pdf

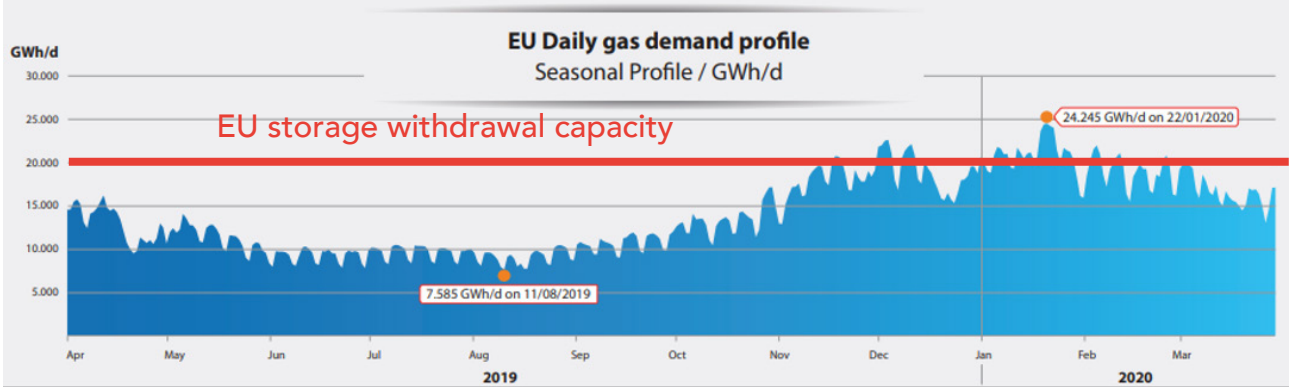

Figure 4 Daily gas consumption profile in the period April 2019-March 2020 compared with EU storage withdrawal capacity. Source: ENTSOG and GIE System Development Map 2019-2020

4. Conclusions

The recent dynamics in natural gas prices have led some to call for wide-ranging reviews of the European market model, such as a centralised model for gas procurement. However, such radical changes to the European market model are likely to be ineffective given the current market structure, while at the same time they would expose European consumers to the risk of unnecessary costs in the future.

We instead advise the legislator to focus on improving areas of the European market where there is still room for integration and coordination while retaining the basic current market design. We have identified one such area to be security of supply, in particular regarding:

a. Harmonisation of price caps and scarcity pricing rules

b. Harmonisation of storage capacity allocation rules

In particular, the marginal cost should be used as the reservation price for storages across Europe to ensure efficiency.

Furthermore, the capacity allocation rules and particularly the mandatory storage filling provisions are unlikely to impact security of supply at the EU level. However, they might prove beneficial in reducing the winter-summer price differential and therefore the occurrence of significant price spikes, regardless of the real scarcity or the need to have gas volumes in store.

While this holds at the European level, at the national level it might be that mandatory storage filling provisions are not only effective in reducing the winter-summer spread but are also justified by security of supply concerns. In these cases, EU-wide agreements should ensure that the corresponding demand is met in the country where the gas is stored in the event of a (EU-wide) gas shortage

It's important to underline that our analysis has not taken into account transmission network constraints. A detailed analysis considering network effects is outside the scope of this policy brief, but we consider our conclusions remain valid even using this simplification given the very low level of congestion observed across the European gas network.

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Published by
European University Institute (EUI)
Via dei Roccettini 9, I-50014
San Domenico di Fiesole (FI)
Italy

Co-funded by the
Erasmus+ Programme
of the European Union

doi:10.2870/260985
ISBN:978-92-9466-145-6
ISSN:2467-4540
QM-AX-22-006-EN-N