



Brussels, 27.3.2023  
SWD(2023) 73 final

**COMMISSION STAFF WORKING DOCUMENT**

*Accompanying the document*

**REPORT FROM THE COMMISSION TO THE EUROPEAN PARLIAMANT AND  
THE COUNCIL**

**on certain aspects concerning gas storage based on Regulation (EU) 2017/1938 of the  
European Parliament and of the Council**

{COM(2023) 182 final}

The staff working document provides additional details on the:

- measures taken by Member States to achieve their filling targets, and
- analytical background assessing the potential effects of storage requirements on the market price of gas in the EU.

## **Part 1**

### **Measures to ensure the Member States' storage sites are filled**

#### **1. Examples of measures listed under the Storage Regulation<sup>1</sup>(Article 6b(1))**

Article 6b(1) of the Storage Regulation states that Member States must take all measures needed to meet the gas filling targets set out in Article 6a. These measures may include:

- (a) requiring gas suppliers to store minimum volumes of gas in storage facilities, including in underground gas storage facilities and/or in LNG storage facilities, those volumes to be determined on the basis of the amount of gas supplied by gas suppliers to protected customers;
- (b) requiring storage system operators to tender their capacities to market participants;
- (c) requiring transmission system operators or entities designated by the Member State to purchase and manage balancing stock exclusively for carrying out their functions as transmission system operators and, where necessary, imposing an obligation on other designated entities for the purpose of safeguarding the security of gas supply in the case of an emergency;
- (d) using coordinated instruments, such as platforms for the purchase of LNG, with other Member States to maximise the utilisation of LNG and to reduce infrastructure and regulatory barriers to the shared use of LNG to fill underground gas storage facilities;
- (e) using voluntary mechanisms for the joint procurement of natural gas;
- (f) providing financial incentives for market participants, including for storage system operators, such as contracts for difference, or providing compensation to market participants for the shortfall in revenues or for costs incurred by them as a result of obligations on market participants, including storage system operators which cannot be covered by revenue;

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<sup>1</sup> Regulation (EU) 2022/1032 of the European Parliament and of the Council of 29 June 2022 amending Regulations (EU) 2017/1938 and (EC) No 715/2009 with regard to gas storage (Text with EEA relevance) PE/24/2022/INIT, OJ L 173, 30.6.2022, p. 17–33

(g) requiring storage capacity holders to use or release unused booked capacities, while still obliging the storage capacity holder not using the storage capacity to pay the agreed price for the whole term of the storage contract;

(h) adopting effective instruments for the purchase and management of strategic storage by public or private entities, provided that such instruments do not distort competition or the proper functioning of the internal market;

(i) appointing a dedicated entity tasked with meeting the filling target in the event that the filling target would not otherwise be met;

(j) providing discounts on storage tariffs;

(k) collecting the revenues needed to recover the capital and operational expenditures related to regulated storage facilities as storage tariffs and as a dedicated charge incorporated into transmission tariffs collected only from exit points to final customers located within the same Member States, provided that revenues collected through tariffs are not larger than the allowed revenues.

## 2. Summary and assessment of the measures taken by Member States to fulfil the storage obligations and assessment of their effectiveness

The summary is based on the replies of Member States to a questionnaire. In this questionnaire, all Member States were invited to describe the main measures taken to meet the filling target, in particular the measures listed in Article 6b(1) of the Gas Storage Regulation. They were also asked how effective the measures to reach the filling targets have been.

Not all Member States provided an answer to the questionnaire.

Measure (As suggested in 6b of the Regulation)	Adopted by	Take-up of measure	Impact 1: Major 2: Significant 3: Minor	Perceived impact by Member State
1 Minimum volume in gas storage	BE CZ DE ES HR HU IT LV PT SI SK	BE sets no minimum storage obligation, so as to maintain market forces on the storage market.	CZ: 3 NL: 2 BE: 3 PT: 1 ES: 1 IT: 2 SK: 2	PT: sufficient measure to reach filling target.  CZ: supplies for protected customers amount to 5% of storage capacity.  IT: early measure raising awareness of market players.  NL, BE, DK: burdensome for gas suppliers to supply

				protected customers. Last resort measure.
2 Tender of capacities	AT BE CZ DE DK ES FR HR HU IT LV NL (part.) PT	This measure is taken via <b>auctions</b> in all Member States except PT, where it is done by allocation.  ES: capacity required to fulfil minimum storage obligations is allocated directly. The remaining storage capacity is allocated through auctions.	CZ: 3 NL: 3 AT: 1 BE: 1 PT: 1 ES: 2 DK: 2 IT: 3	CZ, NL: tendering storage capacity is not enough to ensure storage is filled.  AT, BE, PT, ES: necessary condition to attract market parties.
3.1 Balancing stock managed by TSO	AT BE HR HU IT PT	NL, LT, SI find it <b>unnecessary</b> to keep balancing stock.	CZ: 3 NL: 2-3 AT: 2 BE: 3 PT: 1 ES: 2 IT: 2	BE: only limited gas volumes.  PT: contributes to security of supply.  CZ: balancing stock does not use gas storage capacities, but accumulation of TSO.  IT: incentivises market participants when price signals are not an incentive.
3.2 Obligations imposed on designated entities	AT CZ DE ES HU IT LV LT PT RO	HU, LV have <b>state entities</b> for strategic gas stock.  PT, CZ, ES, RO <b>oblige market parties</b> to maintain minimum stocks of natural gas.  IT applies <b>information obligations</b> to electricity TSO and infrastructure operators.  NL, BE, SI believe security of supply is best achieved by <b>market forces</b> .  LT obliges designated entities to store gas earmarked for protected customers and for the production of electricity in the event of isolated operation of Lithuania's electricity system.	PT: 1	DK: state-owned TSO has experience in procuring strategic storage. Imposing obligations on market participants is too burdensome.

4 Coordinated instruments	IT	<p>IT has signed a <b>Memorandum of Understanding with EL</b>, allowing EL shippers to book storage capacity of up to 1.14 TWh in IT.</p> <p>CZ, NL, LT, PT, SI, SK consider <b>the current purchasing system to be sufficient.</b></p> <p>BE reports that it <b>does not yet apply such instruments.</b></p> <p>AT: A small share of the strategic gas reserve is currently stored in a Slovakian gas storage facility. Strategic and commercial gas volumes from other countries can of course be stored in Austrian gas storage facilities and are.</p>	NL: 3 BE: 2 IT: 2	<p>NL: no link with filling of gas storage.</p> <p>IT: reduces the financial exposure of gas market players when there is volatility on the EU gas market.</p>
5 Voluntary joint procurement mechanisms	None	Same response as for measure 4.	BE: 2	NL: this is up to market participants.
6 Financial incentives for market participants	AT CZ DK ES NL (part.)	<p>NL, ES, DK incentivise market participants to <b>fill gas storages.</b></p> <p>AT subsidises companies to diversify gas procurement.</p>	NL: 2 BE: 1 DK: 2	<p>BE, DK: helps attract market participants.</p> <p>NL: should only be measure of last resort.</p>
7 Unused booked capacities	AT BE CZ DE DK (under consideration) FR HR IT	<p>BE applies <b>finés</b> if market participants do not fill booked storage.</p> <p>CZ applies “UIOLI” rules on gas storage capacities.</p> <p>AT: the storage entity must temporarily deprive storage user of unused capacities.</p> <p>FR compels gas suppliers that have booked capacities in essential underground gas storage facilities to fill these capacities to at least 85% by November 1. Failure to comply with this obligation can lead to a fine up to twice the value of the missing gas.</p>	CZ: 2 NL: 2 BE: 2 HR: 1 ES: 3 IT: 1	<p>NL: can prevent hoarding of storage capacity, but it does not help reach filling targets.</p> <p>CZ: UIOLI discourages booking of storage capacities and it degrades the commercial value of gas storage.</p> <p>ES: contracted and unused volumes are very small.</p>

		<p>HR automatically cedes unused capacity to other storage entities, or to the state energy entity HEP.</p> <p>ES: unused capacity in excess of 27.5 days of consumption does not benefit from the capacity tariff discount.</p>		
8 Strategic storage	<p>AT CZ DK ES HU IT LV</p>	<p>All these countries have procured (or are procuring) a <b>state strategic reserve</b> to be used by the government in case of emergency.</p> <p>NL, BE do <b>not see the added value</b> of strategic storage.</p> <p>CZ has a state-controlled reserve of 2.3 TWh, designed exclusively to supply protected customers.</p> <p>HR considers its storage capacity <b>too small</b> for strategic storage.</p> <p>In ES, the strategic stockholding organisation (CORES) is authorised to store gas, but has not seen the need to do so yet. In ES, storage is filled by commercial parties. Additionally and in the event of an emergency, Enagas GTS is able to buy gas to fulfil the underground storage targets set under the COM if necessary after approval of the Royal Decree Law 6/2022 and 20/2022.</p> <p>PT is considering a strategic reserve, form as yet unknown.</p> <p>AT obliged the distribution area manager to procure the strategic gas reserve and the distribution area manager is also the owner of the strategic gas reserve. AT aims to increase strategic storage levels to 20 TWh – or the equivalent of 2 winter months’ consumption.</p> <p>LV Ministry of Economics has initiated the creation of Energy</p>	<p>CZ: 2 NL: 3 BE: 3 ES: 3 DK: 1</p>	<p>CZ: insufficient amount of strategic reserves, more financial resources and/or financial tools required to expand strategic storage.</p> <p>AT: Strategic gas reserves cover demand from the previous January and can be topped up. In 2022, the reserve was topped up to 20 TWh and thus covered more than 20% of annual demand.</p> <p>NL, BE: expensive, provide little added value.</p> <p>ES: operators supplying final customers are best placed to build up strategic reserves.</p> <p>DK: state-owned TSO holds strategic stock.</p>

		Security Reserves. Goal: 1.8 – 2.2 TWh in 2023.		
9 Appointment of a dedicated entity	BE (under discussion) DE ES HR IT NL SE (under discussion) SK	NL has granted a subsidy for state-owned entity EBN to ensure filling, in the event the subsidy scheme for capacity holders does not deliver.  DE’s market area manager takes over storage capacity of users who do not reach filling target alone.  HR state energy entity HEP has reached an agreement with two entities, which volunteered to cede capacity to the state entity.  SE is currently discussing an obligation to the TSO to ensure filling of the gas storage, as a measure of last resort.  ES has already incorporated this measure in national Law (DT2 of the Royal Decree Law 6/2022), so it is no longer under discussion. Now the Technical Manager of the System (Enagas GTS) is entitled to acquire gas for storage, in the event that traders fail to inject sufficient gas to meet the requirements.  SK ministry of Economy can fill storage through the largest gas entity in the country, in the event that market participants do not fill the storage to the required level.  Countries that do not take this measure point out they have <b>reached filling targets</b> .	DE: 1 NL: 2 BE: 2 HR: 1-	DE: essential instrument to ensure targets are reached.  NL, BE: this should be a measure of last resort.
10 Discounts storage tariffs	BE DK ES IT	CZ, NL, AT: <b>no regulated storage tariffs</b> , storages operate based on negotiated third party access.  ES has a transitional measure for this from 1 April 2022 to 31 March 2024. Storage capacity contracted for more than 20 days of firm	NL: 3 BE: 1 ES: 2 DK: 3	NL: little added value, damaging to business model of storage system operators.  BE, ES: incentivising market participants to buy storage capacity, combined with measures 2 and 6.

		consumption will be charged a zero tariff for storage.		DK: zero tariffs for storage are helpful, but not pivotal.
11 Capital and operational expenditures	CZ ES HU IT LV	<p>IT: storage costs covered by auctions revenue. Remaining costs are covered by the transmission tariff on exit points to reach national final consumers.</p> <p>LV: storage has its own tariffs, set by government agency.</p> <p>ES calculates storage service fees on an annual basis, based on expected demand, capital and operating costs.</p> <p>HU: the recognised costs are calculated on a case-by-case basis, taking into account the committed/expected capacities, to achieve the sales revenue needed for operation, based on the methodical guide to calculating fees.</p> <p>NL: no need for this.</p>	NL: 3 ES: 2	CZ, NL: no regulated storage facilities.



## Part II

### Analysis of gas prices, gas consumption, storage levels and storage injections

#### A. Introduction

The purpose of this document is to analyse the extent to which the Storage Regulation may have influenced (i) gas consumption (or gas savings); and (ii) gas prices, in addition to its impact on storage filling levels and storage injections.

This document provides a descriptive analysis of the different variables, which may help shed some light and provide some detail on the circumstances affecting gas prices, consumption and storage.

#### B. Analysis

First, we analyse EU gas consumption, gas prices, storage levels and storage injections individually.

#### Consumption

**Figure 1: Monthly gas consumption in petajoules**

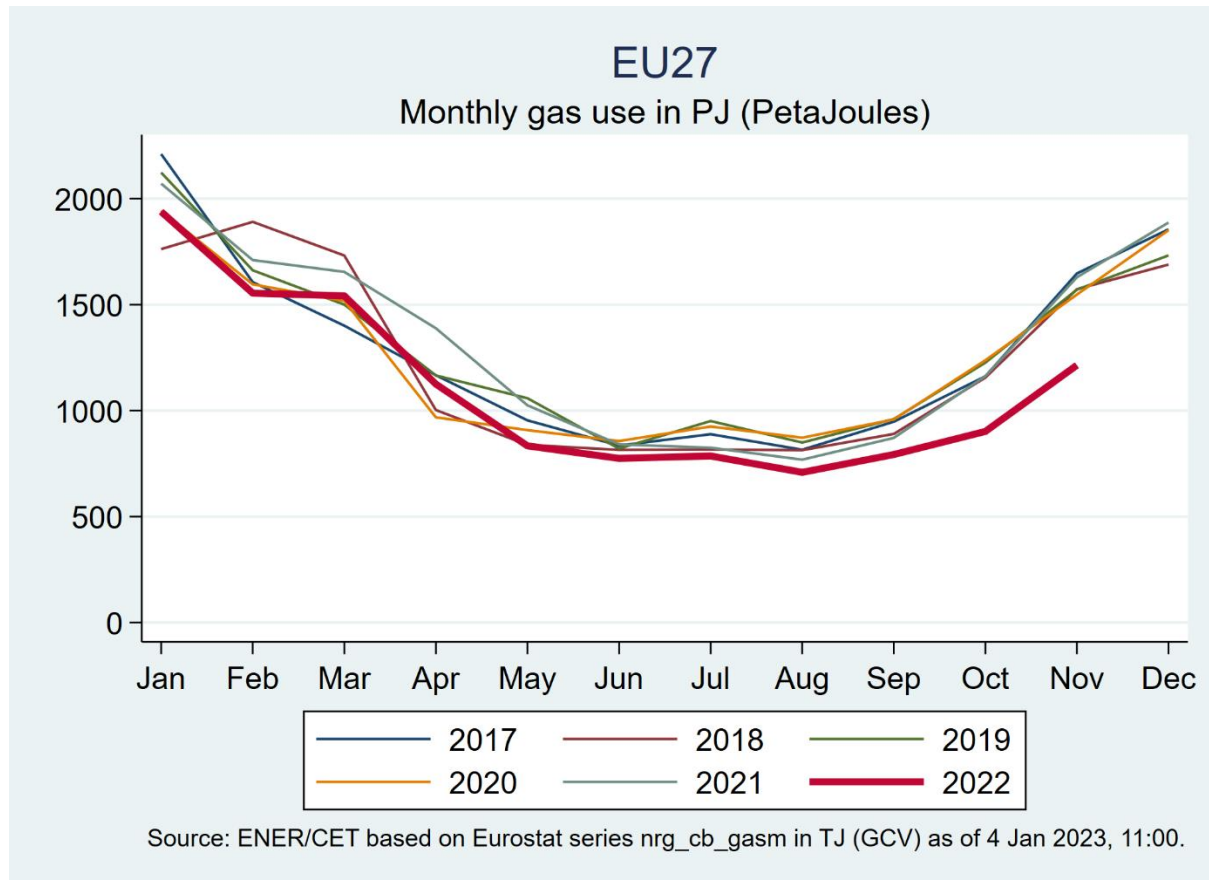


Figure 1 shows that, since May 2022, EU domestic gas consumption has been below the monthly average over the five preceding years, and that the gap has gradually widened. For the later months of the year, gas consumption was substantially lower than even in the lowest recent year for that month. This finding is confirmed by Table 1, which shows that gas consumption in the first 4 months of the year was roughly in line with the previous years' average, before falling to a significantly lower level.

**Table 1: Monthly gas consumption in petajoules**

<b>Month</b>	<b>2017</b>	<b>2018</b>	<b>2019</b>	<b>2020</b>	<b>2021</b>	<b>2022</b>	<b>2017-2021 avg.</b>	<b>2022 v avg.</b>
<b>1</b>	2211	1762	2123	1944	2071	1939	2022	<b>-4%</b>
<b>2</b>	1606	1891	1662	1596	1710	1554	1693	<b>-8%</b>
<b>3</b>	1401	1732	1500	1518	1655	1542	1561	<b>-1%</b>
<b>4</b>	1167	1003	1166	968	1388	1125	1138	<b>-1%</b>
<b>5</b>	954	838	1058	908	1025	834	957	<b>-13%</b>
<b>6</b>	835	815	821	856	840	775	833	<b>-7%</b>
<b>7</b>	889	816	951	925	825	786	881	<b>-11%</b>
<b>8</b>	815	813	849	872	769	709	824	<b>-14%</b>
<b>9</b>	948	890	960	958	871	793	925	<b>-14%</b>
<b>10</b>	1162	1156	1226	1237	1163	902	1189	<b>-24%</b>
<b>11</b>	1647	1573	1571	1548	1629	1214	1594	<b>-24%</b>
<b>12</b>	1855	1689	1732	1851	1887	-	1803	<b>-</b>

*Source: ENER/CET based on Eurostat series nrg\_cb\_gasm in TJ (GCV) as of 4 Jan 2023, 11:00.*

## Prices

**Figure 2: Month ahead Title Transfer Facility (TTF) gas prices (EUR/MWh)**

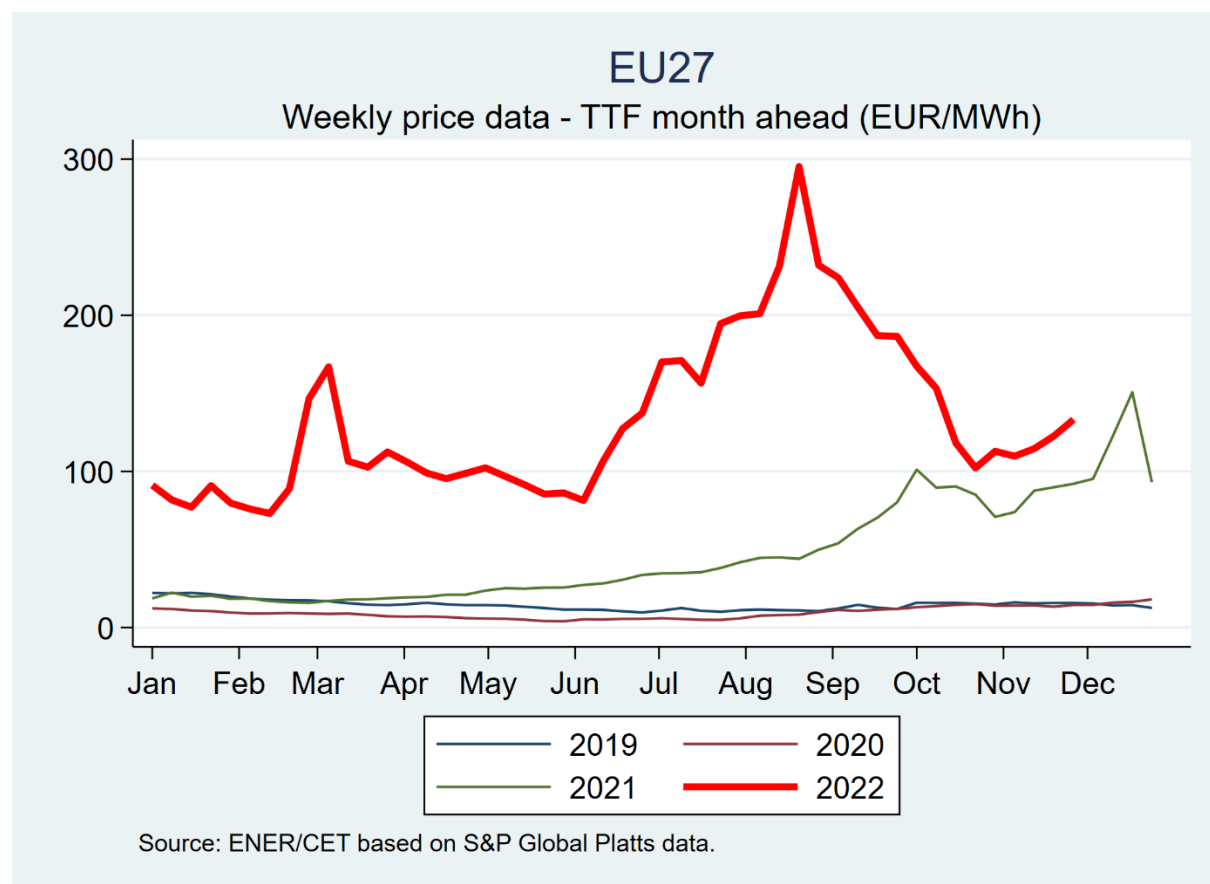


Figure 2 shows that prices remained rather flat in 2019-2020, with early 2020 prices being even lower than the previous years. Prices started to increase in the spring and summer of 2021 and then spiked dramatically (compared to past levels) several times, in: October 2021, December 2021, March 2022 and August 2022.

The August 2022 price spike was the highest and longest lasting, beginning in early June and lasting until approximately mid-October. This would indicate that, even if the price rise was driven primarily by storage refilling, it was probably not caused by the Storage Regulation, which was adopted and entered into force at the end of June.

Although the highest peak occurred in mid/late August, after the entry into force of the Storage Regulation, there are reasons to doubt that the Regulation caused the price spike:

- the first storage target is 1 November 2022, and prices had fallen substantially before that date;
- Member States had strong incentives to fill storage levels irrespective of the EU Storage Regulation, and several Member States (including the EU's largest gas consumer, Germany) adopted storage regulations of their own, in some instances stricter than the EU's;
- there are other plausible explanations for the price peak (see Figure 5 and Figure 6).

## Storage

**Figure 3: Storage levels (TWh)**

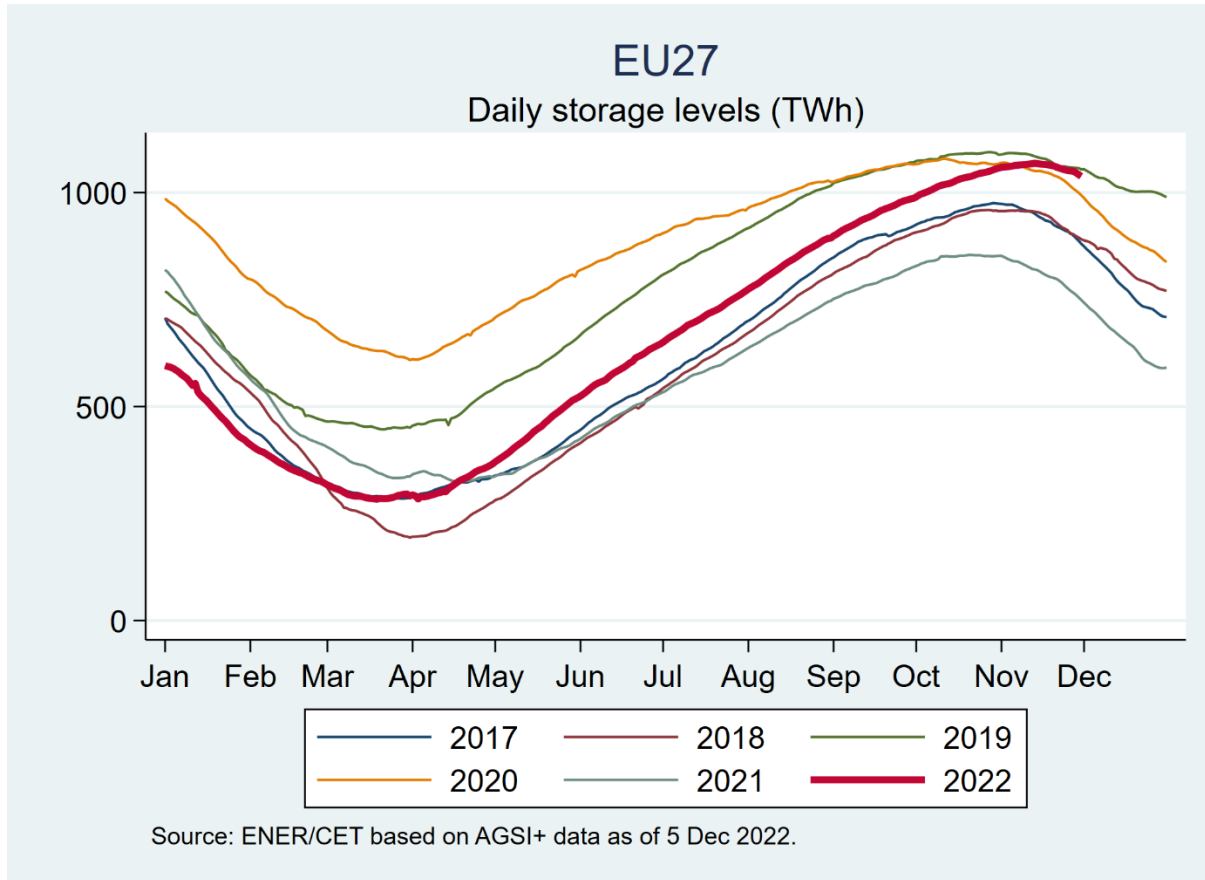
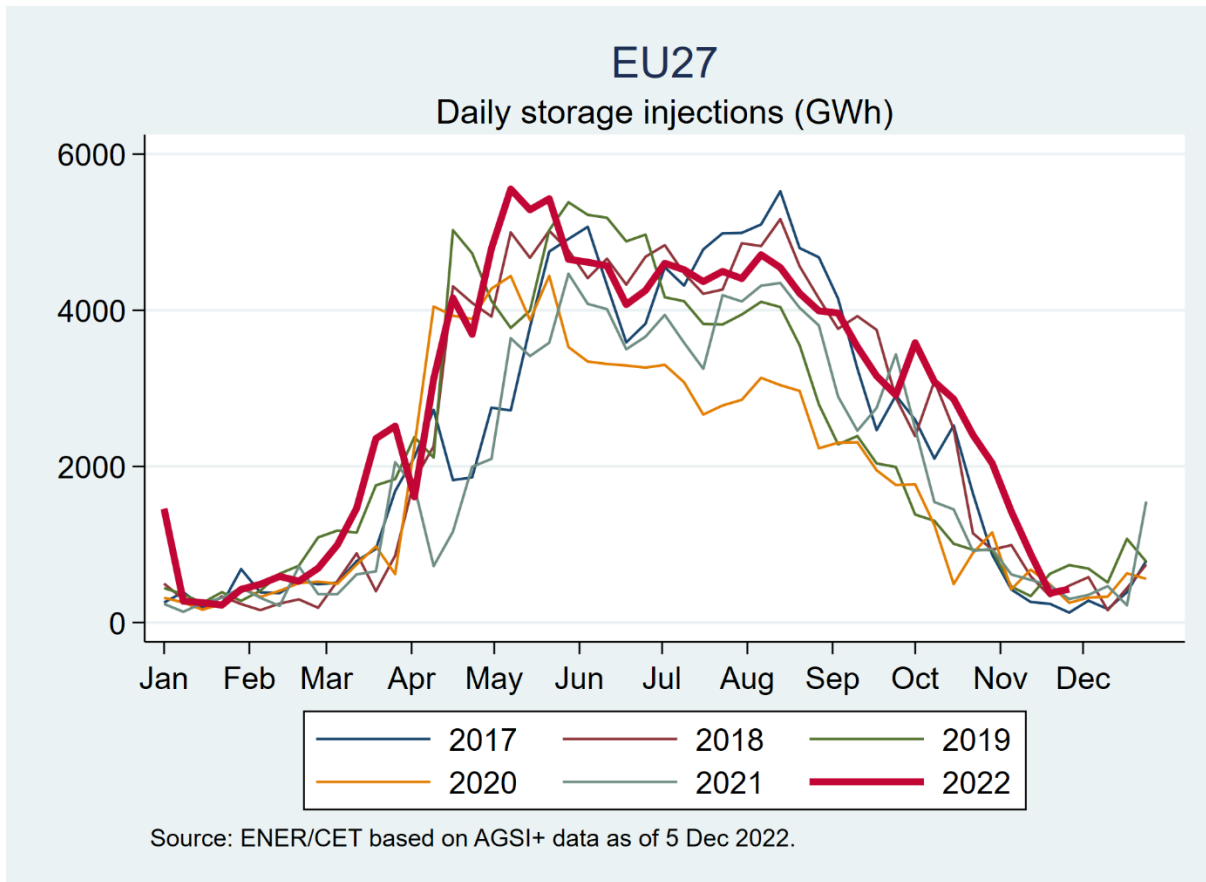


Figure 3 shows that, in January 2022, storages were at the lowest level for that month for six years. By the end of the withdrawal season, they were still low, but higher than in 2018. Since May 2022, storage levels increased essentially in line with past years (except 2019) until September 2022 (parallel lines). Thereafter, they increased faster and stayed higher than in past years until the end of November.

This would suggest that the adoption of the Storage Regulation did not cause a faster than usual refilling of storage levels, as there was no change from the past trends in July or August. The higher storage levels in the autumn is more likely to have been caused by lower consumption due to the mild weather.

Figure 4 below on storage injections confirms this explanation.

**Figure 4: Storage injections (GWh/day)**



Storage injections were in line with past years except in May, October and early November, when they were higher. The increase seen in May was before the Storage Regulation was adopted, and in October and November it was after the price spike (see previous section) and therefore unlikely to have caused it.

## Imports

**Figure 5: Monthly gas imports from Russia (bcm): LNG, pipeline and total supplies**

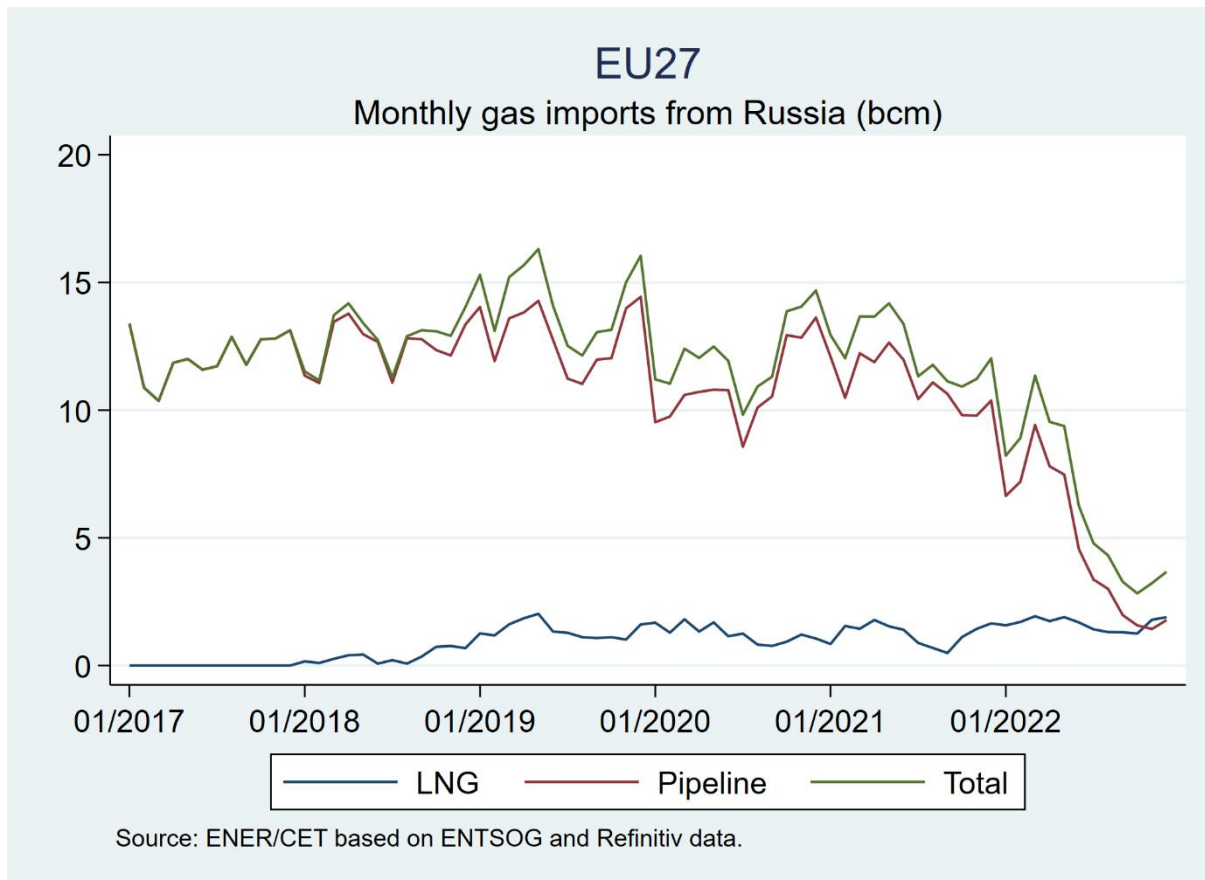


Figure 5 above plots the volume of gas imports from Russia in billion cubic metres (bcm). It shows that imports of LNG (blue line) have increased slowly since early 2018, while imports by pipeline (maroon line) have fallen sharply since early 2022. Total import volumes fell to about one-third of past average levels by mid-2022.

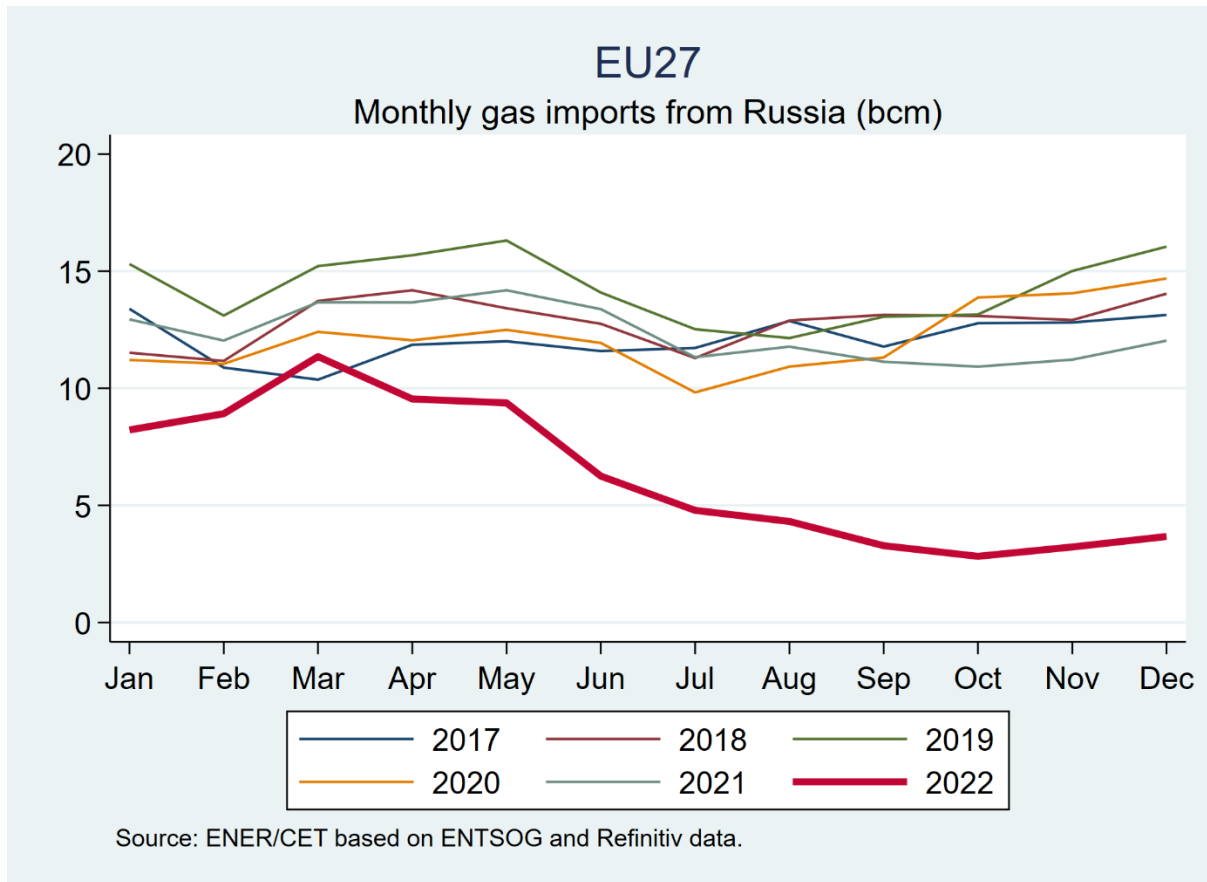
Figure 6 below plots total monthly imports by year. It shows that imports from Russia have been below the past average range since October 2021, with the gap widening substantially from June 2022.

**Figure 2** shows that prices peaked in October 2021, December 2021, March 2022 and August 2022. The August 2022 peak was by far the highest and longest lasting, the upward trend having started in June 2022.

The parallel trend in price increases and import volumes is striking. The initial drop in imports from Russia in October 2021 may explain the peak prices in October and December 2021, while the steep fall in imports from June 2022 may explain the beginning of the summer 2022 price peak<sup>2</sup>.

<sup>2</sup> The fourth peak identified in Figure 2, in March 2022, may be explained by the beginning of Russia's war on Ukraine on 24 February 2022.

**Figure 6: Total monthly gas imports from Russia (billion cubic metres)**



**Storage injections and prices**

Having analysed the different variables individually, we now analyse the combined effect of gas prices and gas storage injection levels.

Figure 7 depicts the ratio of 2022 values over the 2019-2021 average, for both storage injections and prices.

For example, a price ratio of 1 means that 2022 prices were equal to the 2019-2021 average. A ratio greater than 1 mean that prices were higher in 2022; a ratio of 5 would mean that prices were 5 times higher in 2022 than the 2019-2021 average.

**Figure 7: Storage injections (blue) and prices (maroon) in 2022 relative to the 2019-2021 average**

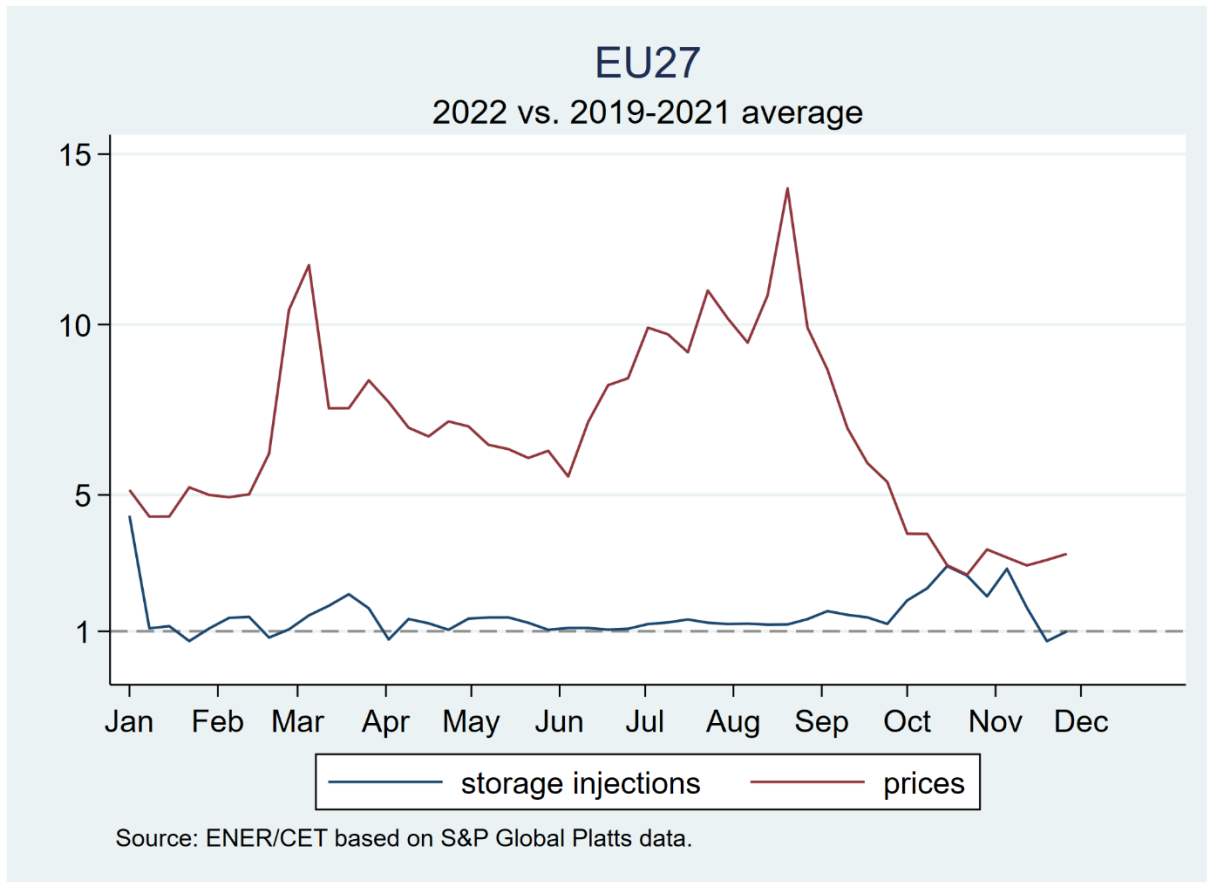


Figure 7 shows that relative price peaks do not tally with relative storage injection peaks.

Therefore, in summary:

- It is impossible to ascertain with certainty whether any reductions in gas use (i.e. ‘gas savings’) were caused by the Storage Regulation or by high prices and a response to Russia’s war on Ukraine.
- It is impossible to ascertain with certainty whether any price increases were caused by the Storage Regulation or by the need to fill storages in response to reduced supplies from Russia<sup>3</sup>.

Instead, by analysing the timeline of the Storage Regulation, consumption levels, prices, storage levels and injections, and imports, it’s possible to collect evidence for and against different hypotheses. The evidence analysed supports the assessment made in Section C, but there is no statistical proof of causality.

<sup>3</sup> As well as a host of other factors, such as the weather, global demand and the availability of alternative electricity sources.



### **C. Data sources**

The following data were used in this analysis:

- gas consumption (monthly): Eurostat series nrg\_cb\_gasm in TJ (GCV) as of 4 Jan 2023, 11:00;
- gas prices (weekly): TTF month ahead in EUR/MWh from S&P Global Platts;
- gas storage levels (daily): AGSI+ data as of 5 Dec 2022 in TWh;
- gas storage injections (daily converted to weekly): AGSI+ data as of 5 Dec 2022 in GWh;
- gas import volumes (monthly): ENTSOG and Refinitiv data in mcm, converted to bcm.

To conduct the analysis, the data were processed as follows:

- Data on storage injections were converted to weekly data by averaging across 7-day periods starting on 1 January each year. This serves two purposes: (i) it makes the diagram more readable by removing noise (excessive vertical movement); (ii) it makes the gas storage injection data directly comparable to the gas price data for the last section of the analysis.
- The data for 29 February 2020 (the only leap year in the range) was removed for comparability.