Storage obligation in the EU27 — distorting markets or solving a market failure?

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Storage obligation in the EU27 —distorting markets or solving a market failure?

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INTRODUCTION

The energy crisis in Europe starting in 2021 prompted a number of regulatory responses in the EU27 Member states as well as overarching measures in Europe. One of these responses was the so-called storage regulation,[1] introduced in 2022 stipulating a mandatory fill-up target by 1 November each year and intermediate targets as well. For some Member States which have significant storage compared to their annual consumption, this target is not related to the storage capacity itself, but to the 35% of annual gas consumption in the 2017–2021 period. The target for 2022 was 80%, for the subsequent years it was set at 90%. The regulation was to be applied until 31 December 2025.

In March 2025, the Commission prepared an evaluation of the Regulation,[2] which listed how the Member States delivered the storage targets. According to the evaluation, in 2024 all MSs met the intermediate targets except for Denmark: by 1 November, Danish storage was 75% full instead of the 90% target. The reason for failing was a set of technical issues (Unplanned maintenance and problems with commissioning offshore production infrastructure) as well as market distortion caused by the Germany storage levy. However, as the Commission assessment suggested, energy security was not jeopardized in Denmark.

Market participants raised their concerns over the extension of the storage obligation, as they feared the 90% target creates an artificial demand for 2025 and result in price spikes like in 2022. While some openly suggested to scrap the regulation and let the market participants perform the storage activity without additional obligations (IOGP, Energy Traders Europe), others urged the Commmission to keep the regulation with more flexible targets (Europex, Eurogas, GIE).

Table 1. Opinion of stakeholders on the storage regulation

Organisation	For/against	Date	Evaluation of the obligation
Europex	For, with modifications	14. 03. 2025	Support extension until 2027, monitor markets
Eurogas	For, with modifications	10. 04. 2025	Support the extension, but introduce additional flexibility and reduced targets. Prepare impact assessment of the regulation before prolonging.
GIE	For, with modifications	19. 03. 2025	Follow a more flexible approach
Energy Traders Europe	Against	10. 03. 2025	Storage filling targets should not be extended beyond 2025
IOGP	Against	03. 2025	Opposes any extension of storage obligation

Source: REKK data collection

1 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

2 REPORT FROM THE COMMISSION TO THE EUROPEAN PARLIAMENT AND THE COUNCIL on solidarity and certain aspects concerning gas storage based on Regulation (EU) 2017/1938 of the European Parliament and of the Council COM/2025/98 final

A provisional agreement was reached by EU Member States[3], which allowed for a looser regulation:

- the 90% target can be reached from 1 October to 1 December, and
- storage refilling trajectories are indicative only for Member States
- to some extent, Member States may deviate from the target, if market conditions and technical constraints do not allow it
- the Commission will have the option to further reduce the target, if market conditions are unfavourable

The concrete regulation have not been published as of July 2025.

BACKGROUND

Market-based non-regulated storage activity is driven by the price expectations of energy traders, i.e. the difference between winter and summer natural gas forward prices. As natural as demand is highly seasonal, gas prices for winter forwards tend to be higher than gas prices for summer forwards. When this relationship holds, injecting gas in the summer and withdrawing in the winter is rational and market participants may earn inter-temporal arbitrage.

Since the introduction of the storage obligation, winter-summer spreads have been positive (i.e. winter product was more expensive than the summer product). From October 2024 to March 2025, storage spreads plunged into the negative territory, which means that the 2025 summer forwards were more expensive than the 2025–2026 winter product, making the storage activity economically unviable. Storage spreads have recovered in April 2025, but the issue can resurface in the future, making the question worthwhile: do market participants store enough gas in absence of such obligations or not? (Figure 1)

Before 2022, there has been no overall European target for storage utilisation. Some Member States already had a minimum volume obligation even before the regulation in place[4]. However, even in the absence of such requirement, storages have started the withdrawal season with nearly 90% full. In 2021, Gazprom storages have not been utilised as usual, resulting in 75% fill-up of storage sites by 1 November. Since the introduction of the storage regulation, utilisation has been over 95% in 2022–2024. (Figure 2)

The regulation has a clear effect on the utilisation of storage facilities, but the full economic assessment of the regulation needs to answer the following questions:

- What is the effect of the regulation on the natural gas prices in Europe?
- How much does it cost to keep the regulation in place?
- How much storage would happen in absence of the storage regulation?

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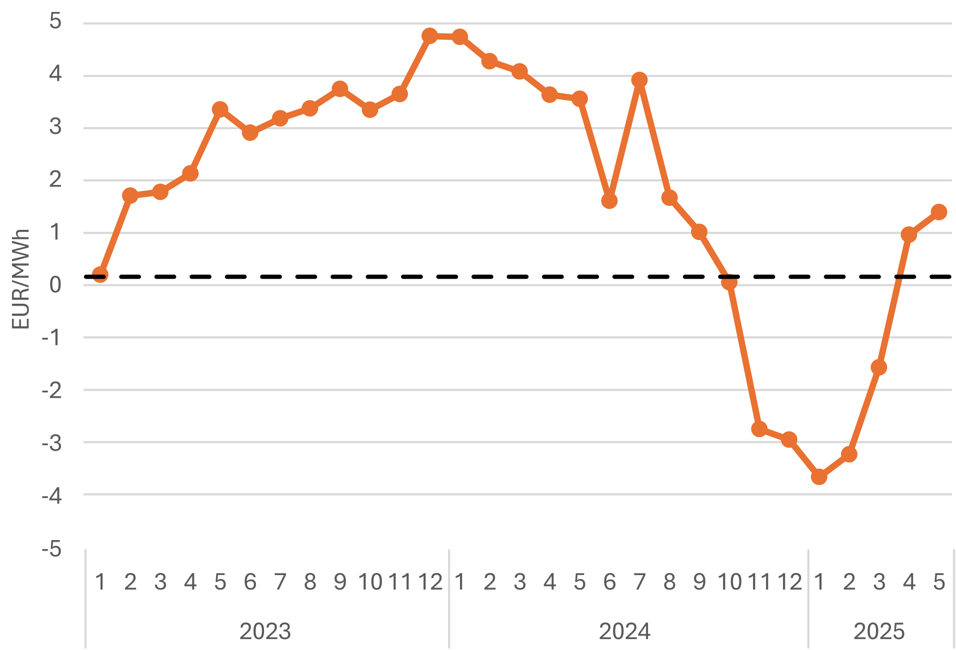
3 Commission welcomes political agreement on gas storage extension

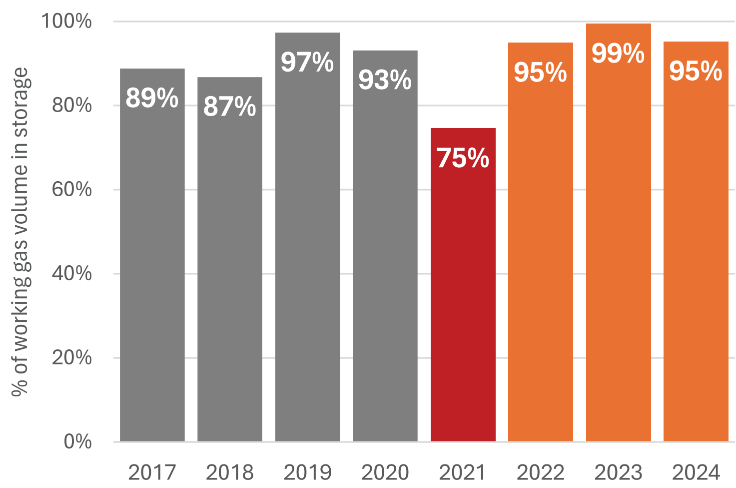
4 BG, CZ, HU, PT, SK. See VIS 2023 Study on the impact of the measures included in the EU and National Gas Storage Regulations. page 47–49

Figure 1. TTF Storage spreads



Source: MEKH market monitoring report

Figure 2. Share of working gas volume in EU27 storages on 1 November



METHODOLOGY

Modelling was performed using EGMM, a partial equilibrium natural gas market model.

EGMM (European Gas Market Model) is a competitive, dynamic, multi-market partial equilibrium model that simulates the operation of the wholesale natural gas market across the whole of Europe. The detailed mathematical description of the model was published and is openly accessible in Energy Policy 2023 Volume 173[5]. It includes a supply-demand representation of EU27 countries, United Kingdom, Switzerland, the Contracting Parties of the Energy Community and Turkey, including gas storage and transportation linkages. Large external markets, including Russia, Norway, Libya, Algeria, Azerbaijan, Iran and LNG (Liquified Natural Gas) exporters are represented exogenously with market prices, long-term supply contracts and physical connections to Europe. The European Gas Market Model algorithm reads the input data and searches for the simultaneous supply-demand equilibrium (including storage stock changes and net imports) of all local markets in all months, respecting all the constraints detailed above.

In short, the equilibrium state (the "result") of the model can be described by a simple no-arbitrage condition across space and time. However, it is instructive to spell out this condition in terms of the behaviour of market participants: consumers, producers and traders. Infrastructure operators (transmission system operator (TSO), storage and LNG operator) observe gas flows and their welfare is not factored in the equilibrium.

First, the model was calibrated to fit the 2024 April–2025 March time period with regard to main indicators of the European gas market. Energy economic models are highly influenced by the input parameters and the assumptions made. In order to capture the workings of the market, a number of input parameters need to be collected, compiled and fed to the model.

The model outputs recreated the volume of EU27 consumption, production and storage patterns, as well as the supply structure. (Figure 3)

Second, a set of scenarios were drafted along three main dimensions:

i. the expectation of traders on summer-winter spreads. Assuming **Negative spreads**, traders anticipate that the gas will be cheaper in winter months and more expensive in summer months. Considering **Positive spreads**, traders expect that the gas will be cheaper in summer months and more expensive in winter months.

ii. the presence of storage obligations. In **cases without storage obligation**, there is no requirement to use the storages and market participants make their decisions based on expectations only. In **cases with storage obligation**, a 90% fill-up rate in all European storages.

iii. global LNG market environment: the availability and price of spot LNG cargos is the drives of natural gas prices in Europe. Global LNG market is characterised by JKM (Japan–Korea Marker) price assumptions. We have considered three distinct price scenarios: **low JKM** (20 €/MWh) showing oversupplied LNG markets; **medium JKM** (40 €/MWh) showing balanced LNG markets and **high JKM** (60 €/MWh) showing tight LNG markets.

Altogether 12 scenarios were modelled.

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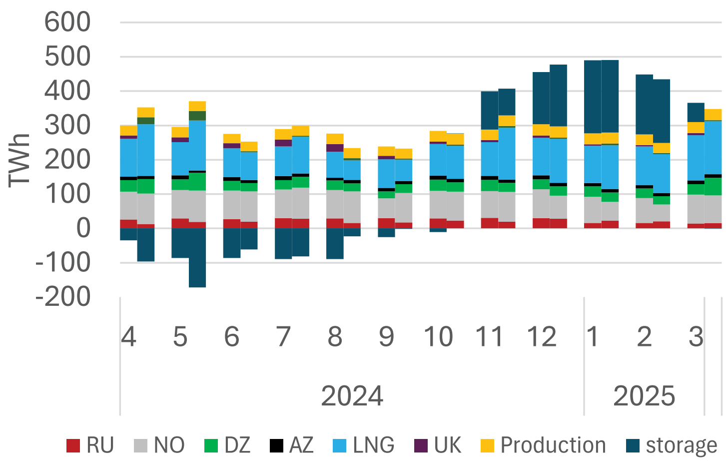
5 Péter Kotek, Adrienn Selei, Borbála Takácsné Tóth, Balázs Felsmann (2023): What can the EU do to address the high natural gas prices? Energy Policy, Volume 173, 2023, 113312, ISSN 0301-4215, https://doi.org/10.1016/j.enpol.2022.113312. The model description is available in Annex 3.

RESULTS

Results are focusing on the comparison of with and without storage obligation cases in various conditions more specifically the expectation on summer-winter spreads and global LNG environment.

Figure 5 shows the volume of gas stored in EU27 storage facilities. Dotted lines indicate the scenarios when storage no obligation is in place, while solod lines show the scenarios with obligation present. Colours indicate the global LNG market by the levels of JKM (green: low, orange: medium, red: high). When spreads are negative (i.e. winter monthly prices are below summer monthly prices), market participants would not fill up storages up to 90% in absence of the regulation. Some storage activity would occur, but this would not ensure the 90% stocks by 1 November. When spreads are positive however, market participants are incentivised to fill up close to 90%.

Figure 3. Supply structure in the EU27 (left column: historical; right column: modelled)



Source: Bruegel, Eurostat, AGSI and REKK modelling

Storage use does have an impact on wholesale prices as well. As an illustration, the effect of the obligation on German annual wholesale prices is shown on Figure 6. Blue bars indicate the scenarios without obligation while orange bars show the obligation case. When assuming negative spreads, storage obligation has a price decreasing effect of 0.2–0.7 €/MWh. With positive spreads however, the effect is only 0–0.1 €/MWh. Price effects in other EU countries are similar to the German case.

Figure 4. Modelled scenarios

In order to evaluate the performance of the storage obligation, both the benefits and the costs of such a regulation need to be listed and quantified. On the one hand, the obligation has a clear price decreasing effect, which has an obvious effect by decreasing the "natural gas bill" of European consumers. On the other hand, the obligation puts direct costs on energy traders or entities in charge of procuring, managing and storing gas in the European storage facilities. The costs can be divided into two main categories: (i) the cost of additional gas stored, as required by regulation (ii) the storage and transmission fees associated with the additional storage activity. In theory, if the potential benefits outweigh the costs, the regulation may be beneficial. However, this assumes that transaction costs between the stakeholders are negligible, as the benefits are realised at the consumers, while the cost are primarily realised by the energy traders.

Figure 7 shows the benefits and costs in monetary terms for one modelled year in the EU27. Benefits indicated with blue stacked bars are the total decrease in cost due to the regulation, calculated as the product of total gas consumption in the EU27 and the price change between the with obligation and without obligation cases. Costs indicated with orange stacked bars are the sum of (i) additional cost of gas procured due to the obligation (ii) additional storage and transmission fees. The net of costs and benefits is shown with white markers. It is apparent that the net of costs and benefits is highly depending on the international market conditions as well as the expectations of market participants. In case of negative spreads, both the costs and benefits are considerably higher compared to positive spreads. In tight LNG markets, the obligation has overall positive net effects. With oversupplied LNG market—low LNG prices—stock building may be unnecessary as costs outweigh the benefits. These results highlight the insurance nature of the regulation: if markets are tight, the additional reserves serve as a valuable source of supply. Moreover, the additional cost associated with the obligation is 0.2–1.5 Bn EUR/year for the EU27. comparing this to the total cost of gas procurement, it makes up around 1%—which is a low cost for such an important insurance.

Figure 5. Natural gas in EU27 storage facilities, TWh/month

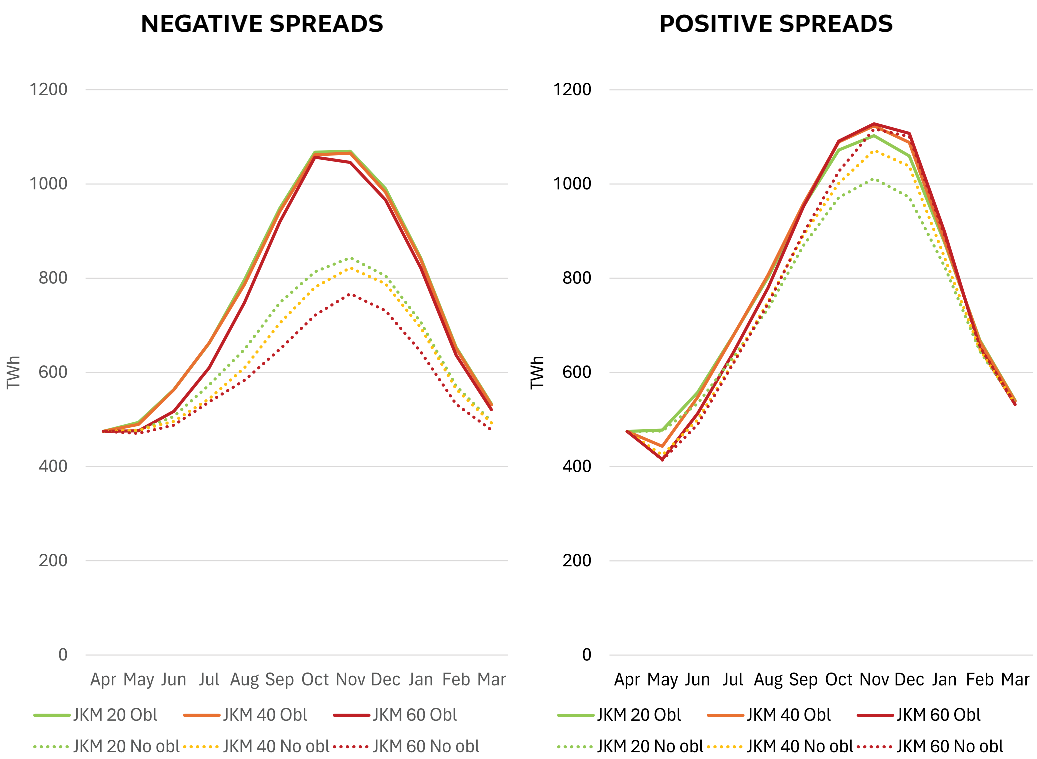


Figure 6. Average annual wholesale gas price in Germany, EUR/MWh

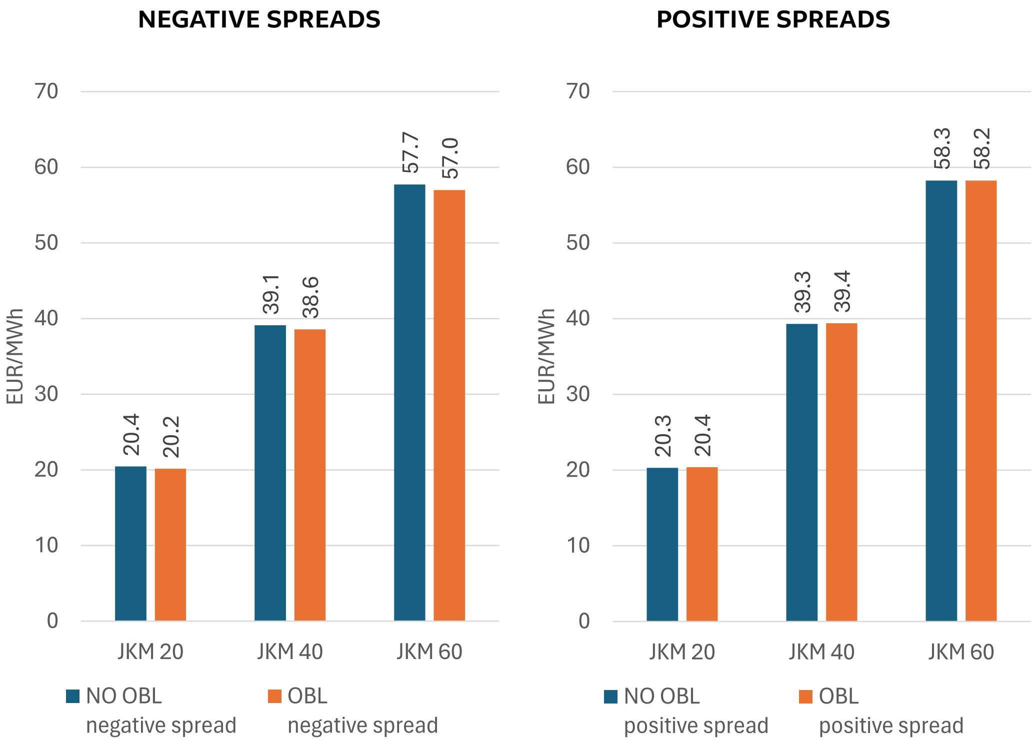
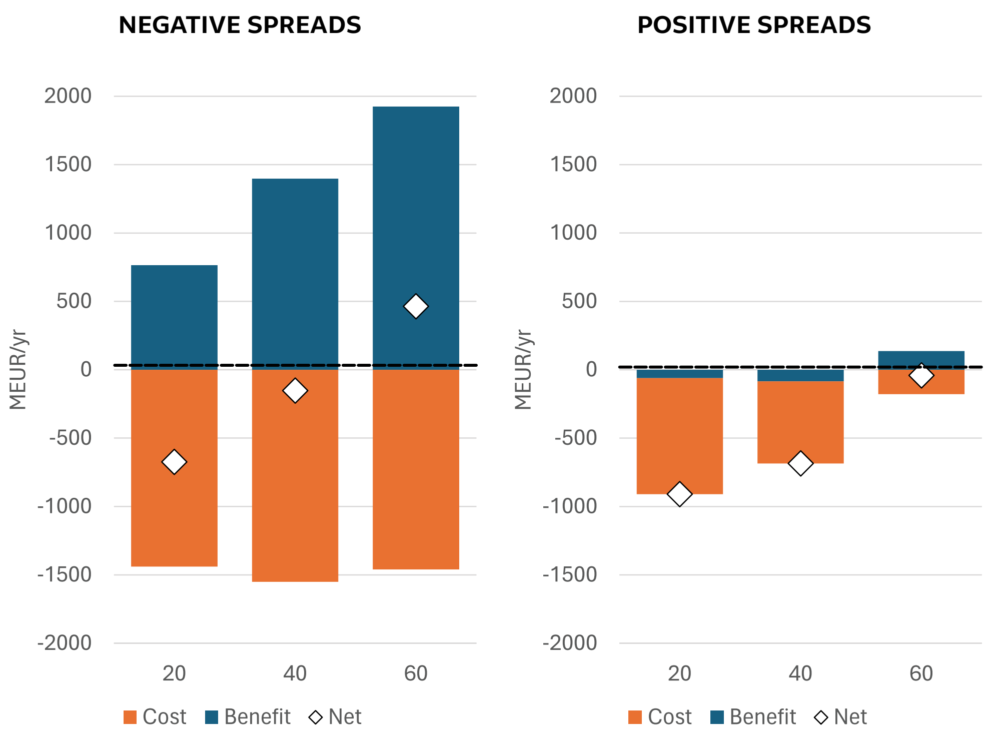


Figure 7. Costs and benefits of the storage obligation



CONCLUSIONS

To sum up, whether a storage obligation should be in place depends largely on the state of the LNG market. In times of oversupply and low JKM prices, such an obligation may impose unnecessary costs, making it more efficient to let market players manage storage activity and bookings on their own. However, in a balanced or tight market with higher JKM prices—such as the current situation—a storage obligation proves beneficial, acting as a form of insurance against price spikes. Given today's tighter market conditions, maintaining the storage obligation is both useful and prudent. While the associated costs for the EU27 range between €0.2 and €1.5 billion per year, this represents only about 1% of the total gas expenditure—an acceptable premium for enhanced energy security.