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REKK POLICY BRIEF 06 2022

NOVEMBER 2022

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EUROPE WITHOUT RUSSIAN PIPELINE GAS

POSSIBILITIES FOR PHASING OUT RUSSIAN GAS FROM THE EU ENERGY SUPPLY FOR THE WINTERS OF 22/23 & 23/24

The aim of this policy brief is to assess the impact of a full Russian gas cut scenario on the EU27 gas bill, supply mix and utilization of LNG infrastructure in the current (2022/23) and the next storage year (2023/24).[1]

POLICY RECOMMENDATIONS

Filling up storage for the winter of 2023/24 will be a significant challenge. Without strong action on both demand and supply, the EU gas bill could increase threefold compared with 2021. This suggests that **temporary measures taken by the EU should extend at least until spring 2024.**

We suggest implementing measures to ensure **at least a 30% storage stock at the end of the winter 2022/23**. This is necessary to avoid very significant price increases in 2023.

Full use of all demand- and supply side options is required to keep prices low. We suggest 15% savings in buildings and industry and 35% savings in electricity and heat production. Pipelines entering the EU are already used up to capacity, and only some LNG terminals have spare capacity due to lack of connecting infrastructure (e.g. UK, ES, GR).

In case of low storage level in March 2023 the LNG terminal utilization rate will be high all summer, resulting in the unusual pattern of high summer prices followed by lower prices in autumn and winter remains. This might disincentivise storage on a commercial basis. Therefore, it would be **beneficial to start filling up the storages earlier and leave longer time for fill-up in the autum of 2023 than in 2022 in order to avoid fierce competition among European buyers for spot LNG.**

Despite utilisation of demand- and supply side measures, **some bottlenecks remain in the EU resulting in significant price differences.** This should be addressed to ensure intra-EU solidarity. Most serious bottlenecks are still between Western Europe (France, Netherlands) and Germany. Any increase in transmission capacity here could help LNG to reach the Central-Eastern European markets. The extension of the congested LNG terminals in Greece, Lithuania and Poland may also help the CEE region.

1 A storage year means a one-year period starting in April and ending in March next year.

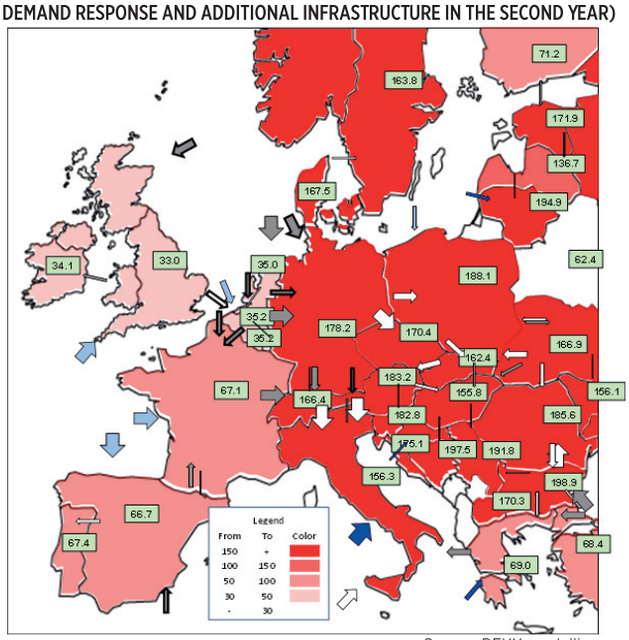
ANALYSIS

Our previous analysis in May 2022 showed, that if a restricted amount of Russian gas is still allowed to the European market in line with the REPowerEU policy, **Europe is able to substitute two thirds of the pre-war Russian gas supply level in 2022/23, using various supply options and existing and already planned infrastructure.** We assumed that all PCI pipeline projects planned for 2022 (Baltic Pipe, GIPL, IGB, SK-PL) and new LNG capacities in Germany Greece, Finland and the Netherlands come online until Q1 2023. We also assumed some limited increase of gas production in the Netherlands and some RES gases, which had only marginal impact. With all these measures in place the EU27 could arrive to a similar level of gas supply bill as in 2021, though at a somewhat lower consumption level (-10%) that is a voluntary reaction of consumers to the price increase. The results supported that the REPowerEU agenda is doable and if implemented will achieve its goals. Our analysis in May warned that **the full Russian supply cut could not be substituted by focusing on the supply side only, without substantial additional demand reduction (23%).** Based on our previous modelling and depending on the weather, there is no serious risk of supply disruptions, and heating in the winter is ensured.

We see four main questions:

1. **At what cost can the 90% storage target be reached without any Russian gas supply for the next storage year 2023/24?**
2. **How should the European storage stocks be depleted over time?** Are they tools for short-term inter-seasonal arbitrage, or should we consider the effect on the gas bill of the following year as well?
3. **How will the gas demand develop in the EU?**
4. **How will Asian prices influence the EU27 gas bill?**

FIGURE 1. AVERAGE ANNUAL GAS PRICE, EUR/MWH (JP 75, STORAGE 30% WITH DEMAND RESPONSE AND ADDITIONAL INFRASTRUCTURE IN THE SECOND YEAR)



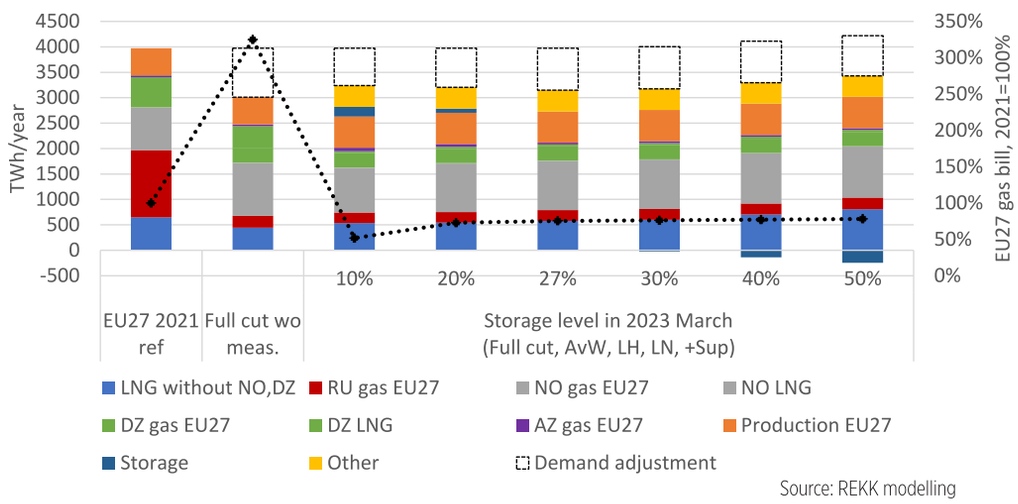
Source: REKK modelling

To answer these questions, **we modelled two consecutive years from April 2022 to March 2023 and April 2023 to March 2024 and looked at their combined gas bill for the EU 27.** We calibrated the first gas year up to October 2022 as much to reality as possible.

Demand was assumed to be 15% lower than the 2021 consumption for the building sector and industry, and 35% in the power and heat sector.[2] In 2022 European demand fell by 10% in the first three quarters, but the demand reduction did not come from where we expected it. Power production could not switch away from gas due to lack of availability of nuclear and hydro capacities. Some sectors of the industry stopped producing, due to high gas prices but might ramp up again if prices fall.

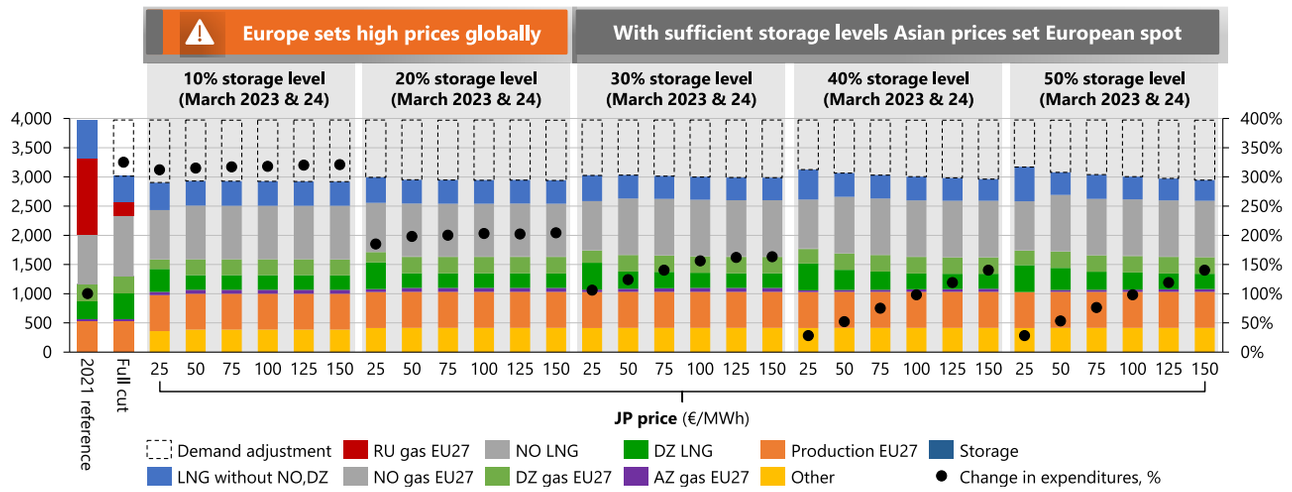
[2] Result of power sector modelling switching gas-fuelled electricity generation to coal based generation and RES-E with the assumption of low nuclear and low hydro availability.

FIGURE 2. SUPPLY MIX AND 1ST YEAR'S GAS BILL (TWH/YR AND % OF 2021)



Source: REKK modelling

FIGURE 3. EU27 SUPPLY MIX AND 2ND YEAR'S GAS BILL (TWH/YEAR AND % OF 2021)



Source: REKK modelling

On the supply side, infrastructure projects already being developed were added to the network (Baltic Pipe, PL-SK, IGB, new LNG terminals in NL and DE, FI, GR coming online until Q1 2024). We assumed no Russian gas supply at all, as opposed to 2022, when storages for the upcoming 2022/23 winter are partly filled by Russian gas in the EU27. An important question is the degree to which the EU will compete with Asia for LNG. This summer there was little competition due to lower than expected demand from China, but this might change in the future.

We run scenarios assuming different end of year storage levels (between 10 and 50%) and different Japanese price levels (between 25 and 150 EUR/MWh) representing an oversupplied or a scarce LNG market. For the second year a 90% storage target was set for the EU27 and the Energy Community Treaty Contracting parties. As a sensitivity we checked how results change if gas demand is not reduced at all and if gas flows to the EU are constrained, e.g. UK ban on exports to EU and restriction of availability on Trans-Balkan and Balkan Stream.

RESULTS

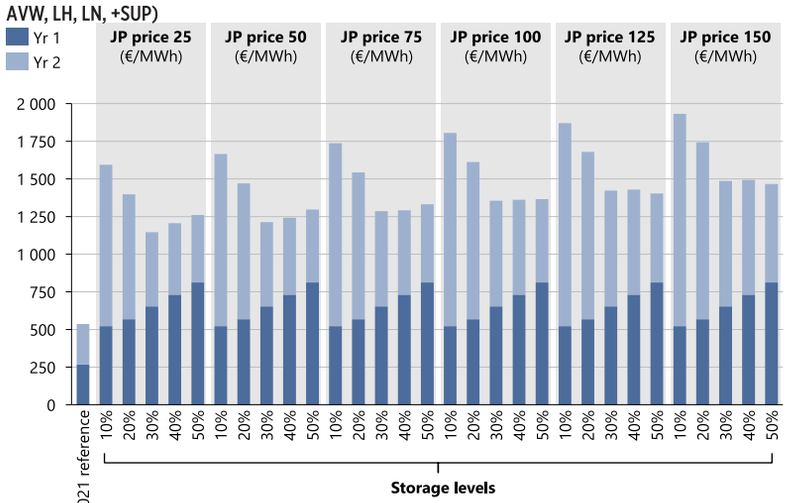
Due to the lack of Russian pipeline gas in the second modelled year, EU markets decouple and serious bottlenecks are identified between West and East, despite demand adjustment and additional infrastructure being implemented. (Figure 1)

To evaluate the results, we assess the gas bill of each modelled year separately, then add up the two years pairwise and compare the combined gas bill.

The first year's gas bill is determined by storage utilisation: Europe may make use of the gas in underground storage facilities to ease the high prices in wintertime. The stocks built up in 2022 can cut the gas bill of the EU27 to 50% of the 2021 gas bill. However, this comes at a price: if only 10% or 20% storage remains, this creates a high injection demand for the 2023 season. If more gas is left in storages, the gas bill can remain below the 2021 figures (at around 75% of the 2021 bill). (Figure 2) This requires that demand and supply side measures are in place, as assumed above.

The second year's gas bill is highly dependent on how much gas remains in storages after the first year. If Europe by the end of the 2022/2023 winter leaves in the storages only low stocks (10-20% of working gas capacity), the gas bill in 2023/2024 increases significantly because of the 90% storage obligations. In these scenarios the total gas bill of Europe is not strongly affected by Japanese prices, as Europe's demand for gas is so high that they are willing to pay exorbitant prices for LNG. Therefore, **the total gas bill of Europe is significantly higher (300% assuming 10% storage stocks and 200% assuming 20% storage stocks) than in the 2021 reference scenario. For the 2023/24 winter, at least 30% storage starting level is needed to avoid a significant increase in costs** and the gas bill will develop depending on Asian prices (Figure 3.). In tight LNG market gas bill may increase by 50%, while in an oversupplied LNG market it may decrease to below 50%.

FIGURE 4. TWO-YEAR EU GAS BILL1 (BN EUR/YEAR) (ASSUMING 75 EUR/MWH JP PRICE FOR 2023, AVW, LH, LN, +SUP)



Comparing two year's gas bill it is apparent that low storage levels in 2023 March are driving up costs for the second year. This means that it is not rationale to use up the stocks in the 2022/2023 winter to mitigate high prices, but rather **keep high stocks (minimum 30%) in for the 2023/2024 winter. (Figure 4.)** This is not unrealistic, as the EU27 started the 2022 injection season with 27% fill-up rate.

SENSITIVITY

Results are highly dependent on demand and infrastructure availability. In the scenarios above we assumed high demand adjustment and non-constrained third-party access on all European gas infrastructure.

We tested the case when demand savings do not follow the envisaged reduction path and as a result European consumers need the same amount of gas as in 2021. **We found that without demand savings the EU gas bill cannot return to pre-war levels in 2022/23.** The second year's gas bill is 150-300% of the 2021 level even with high storage stock levels. The level of the gas bill depends much more on the storage stock level at the end of the first year than on the price of LNG.

There is a risk that existing capacities might be artificially constrained We therefore restricted UK exports to the EU as well as flows of gas on the Balkan Stream and Trans-Balkan. Although the export ban would not impact the first year's gas bill significantly, the two-year combined gas bill could even double if an export ban coincides with very high LNG prices. Even a moderate (75€/MWh) LNG price would result in extreme high prices (around 600-900 €/MWh) in a small group of countries in Central Eastern Europe: Ukraine, Moldova, Hungary, Serbia and Bosnia.

REKK FOUNDATION

The goal of the REKK Foundation is to contribute to the formation of sustainable energy systems in Central Europe, both from a business and environmental perspective. Its mission statement is to provide a platform for open-ended, European-wide dialogue between government and business actors, infrastructure operators, energy producers and traders, regulators and consumers, professional journalists and other interested private entities. The Foundation will develop policy briefs and issue papers with forward-looking proposals concerning challenges posed by energy and infrastructure systems and organize regional forums allowing stakeholders to become familiar with the latest technological and regulatory developments within the industry.

Borbála Takácsné Tóth has worked with REKK since its creation in 2004. In 2001 she received an M.A. in International Relations and European Studies at the CEU in Budapest. Borbala is an economist and received her degree from the Budapest University of Economic Sciences in 1998. Between 2001 and 2003 she was Head of the President's Secretariat responsible for international relations of the Hungarian Energy Office. With REKK she has been leading several international and national consultancy projects, with many using the EGMM as the primary analytic tool. Her main fields of expertise include: regional co-operations; security of supply issues; energy geopolitics; major infrastructure initiatives in the gas sector and incentives for investments; competition cases in the gas market; and the effect of gas release programs on competition in the gas market in Europe.

Péter Kotek graduated in 2009 at the Corvinus University of Budapest as an economist, majoring in market analysis. He joined REKK in the same year as a research associate. From 2015, he is working as a senior research associate. His areas of interest are ancillary services market in electricity, LNG and gas storage markets. He has participated actively in REKK's gas market modelling work since 2015.

Adrienn Selei has been working for REKK since 2011. Her work especially includes gas market modelling, but she has been also involved in different works in the field of electricity markets (mainly analysing system reserves market and topics of market integration). She has already finished her Phd studies in Economics. Due to her studies and teaching experience she has a profound knowledge in industrial economics and market modelling.

Gábor Horváth joined REKK as a research associate in September 2019. He completed his bachelor degree at Corvinus University of Budapest in Business Administration and Management. After that he started his MA degree in economics at ELTE and absolved in 2019. During his university studies he was also a member of Rajk László College for Advanced Studies, a college of BCE. Before joining REKK he was working as a data analyst and research assistant at various projects.