



Support Energy Efficiency Deployment with the
Multiple Impacts CA l culation Tool

POLICY BRIEF

The EU's cost of gaslighting

■ **Authors:**

Diah Putri, Proforest, Indonesia

Frederic Berger, Fraunhofer ISI, Germany

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EXECUTIVE SUMMARY

After 2022' Russian invasion in Ukraine, gas price surged, widely attributed to the EU's high import dependence and low supplier diversity, mainly relying on Russian gas. Our research strives to link the gas price hikes during the energy crisis of 2022 to EU countries' import dependence and supplier diversity. Using panel OLS and a variety of dependent and independent variable combinations, this relationship is investigated.

However, the results are quite inconclusive with no patterns being consistent across multiple models and uniformly significant. As a result, no clear impact of import dependence and supplier diversity on gas prices could be deduced. This points to the need for a more refined approach including countries' policies attempting to mitigate the crisis' effects and potentially distorting effects of arbitrage between European gas markets.

INTRODUCTION

European energy markets have recently faced severe disruptions due to global crises and geopolitical tensions. The COVID-19 pandemic initially reduced energy demand due to economic slowdown [1]. As recovery began, the 2022 Russian invasion of Ukraine triggered major supply challenges. Russia's retaliatory reduction of gas exports to Europe caused gas prices to surge by 180% within weeks [2]. These disruptions had significant socioeconomic consequences, with energy costs for low-income households rising from 7.8% to 12% of income in 2022 [3] and industries like Germany's cutting production to conserve gas [4].

In response, the EU launched the REPowerEU plan to enhance energy security by promoting energy savings, reducing import dependence, and transitioning to renewables. This is crucial given the EU's heavy reliance on imports for 62.5% of its energy needs, with natural gas dependence at 97.6% in 2022. While supplier diversification has been proposed to mitigate risks⁶, its impact on gas prices remains underexplored. This study aims to address this gap by examining how import dependence and supplier diversity influence EU gas prices during crises, contributing to energy policy discussions.

[1] IEA (2024). [Analysing the impacts of Russia's invasion of Ukraine on energy markets and energy security](#).

[2] J. F. Adolfsen, F. Kuik, T. Schuler et al. (2022). [The impact of the war in Ukraine on euro area energy markets](#). ECB.

[3] European Commission (2024). [Study on energy prices and costs: evaluating impacts on households and industry](#).

[4] Ifo Institute (2022). [Many Industrial Companies in Germany Cut Gas Consumption without Curbing Production](#)

METHODOLOGY

The relationship between gas prices and their change through the crisis and gas import dependence and supplier diversity as well as a series of further independent variables was examined. In order to do this, a regression analysis using panel ordinary least squares (Panel OLS) was carried out, due to the temporal component. Data on gas prices originate from Eurostat and Enerdata, covering a range from 2000 to 2022 (there was no consistent data for later years). The gas import dependence rate is defined as the share of consumed gas stemming from abroad, while supplier diversity is calculated using the Herfindahl-Hirschman Index (HHI).

Model 1

The first approach (model 1) was to look at absolute gas prices over time and across EU countries, comparing values to the respective import dependence, supplier diversity, interaction term, as well as other independent variables.

Model 2

The second approach (model 2) involved a counterfactual gas price using third-degree polynomial extrapolation was conducted using 2000 to 2019 data to simulate hypothetical scenarios from 2020 to 2022.

Then, estimated prices under the assumption that the energy crisis (and the pandemic, thus starting the forecast in 2020) had not occurred were subtracted from actual gas prices. These were then analysed against independent variables for the period from 2020 to 2022.

Model 3

Finally, the difference between 2022 and 2019 gas prices (the latter subtracted from the former) was compared to independent variable values from both 2019 and 2022 (model 3).



RESULTS

Most results for model 1 point to a link between import dependence and absolute gas prices. The same is the case with HHI and absolute gas prices. Yet, for both the variance of coefficients is extremely high and most results are insignificant. The interaction term only produces very low coefficients, also with varying significance. Further independent variables do not show consistent patterns, merely the dummy variable for the energy crisis in the years 2020 to 2022 shows rather consistent gas price increases, although not significant.

Model 2 does not show any relevant patterns. Inter alia, this is due to the difficulty to forecast gas prices, as they do not really follow a steady trend.

Instead, a smorgasbord of events and political decisions have influenced gas prices, resulting in an inconsistent trend, resulting in unreliable forecasting from past values.

Model 3 has the highest proportion of significant results. When using the independent variables from 2019, results show that countries' Russian share of imports significantly increases the price hike between 2019 and 2022. Moreover, when using 2022's independent variables, the influence of import dependence and HHI on the change in gas prices seems very significant. However, it points to an inverse effect compared to what was expected, with higher import dependences and lower supplier diversity (higher HHI) in 2022 resulting in lower gas price increases between 2019 and 2022. This result is quite surprising and counter-intuitive, with no hypothesis supporting it.

CONCLUSION & DISCUSSIONS

Despite the variety of combinations of dependent and independent variables that were assessed, no consistent pattern could be deduced, reliably linking national gas price hikes to import dependence or supplier diversity (see Annex I). Even though some seemingly significant results came out, the variations in coefficients and their significance between merely minimally different models do not allow for sound deductions. Moreover, no consistent hypothesis could explain a sufficient number of significant results.

In order to establish a robust relationship between gas prices and the main independent variables import dependence and supplier diversity, the model would possibly need to include more data, in particular regarding national policies striving to mitigate the energy crisis. Yet, a central issue is the close link between European gas markets, since every price difference between grids allowing a profit will be effaced by arbitrage. Thus, the most noticeable extremes that would help identify a connection are extremely unlikely to actually materialise. As such, even a refined approach involving more factors is not certain to find a relationship between import dependence, supplier diversity, and gas prices.

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