

Energy Economics

Wholesale gas prices in the EU

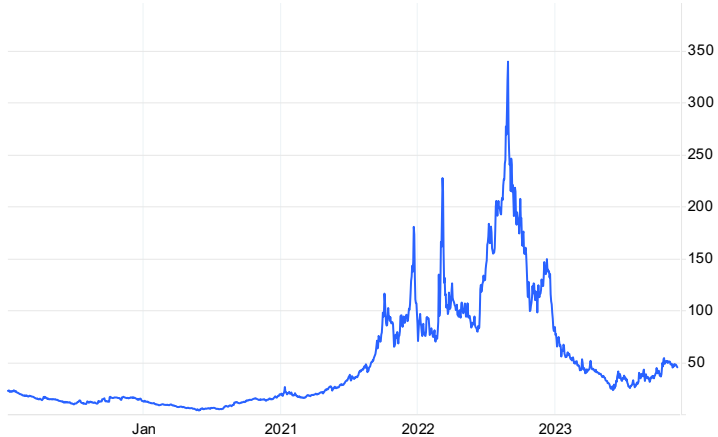


Figure: Price evolution for TTF gas from January 1, 2019 until November 17, 2023; source: tradingeconomics.com (2023).

Wholesale gas prices in the EU



Figure: Price evolution for TTF gas from January 1, 2022 until December 31, 2022; source: tradingeconomics.com (2023).



Gas flows to Europe 2022

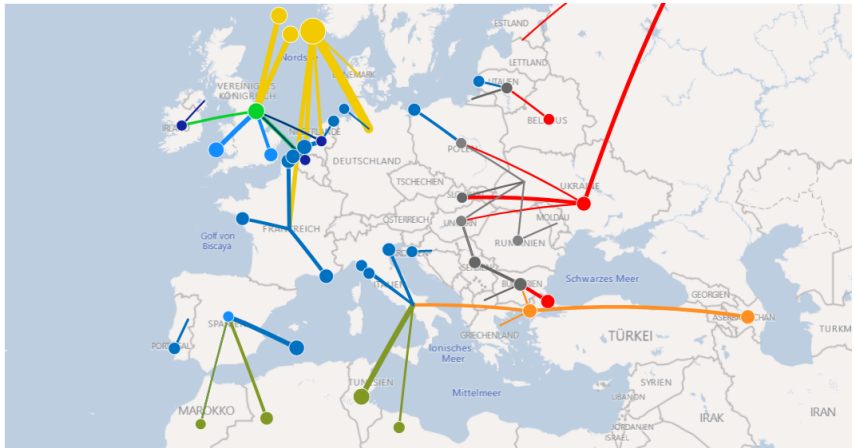


Figure: Overview of physical gas flows to Europe in IV/2022; source: ENTSO-G (2022).

Gas flows to Europe 2023

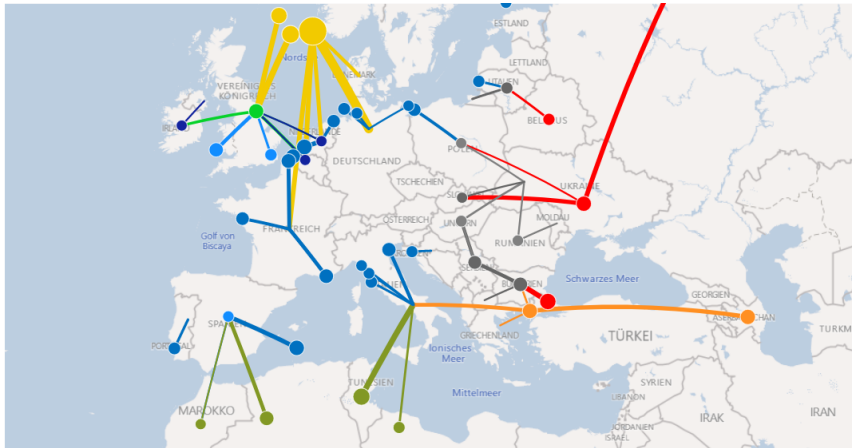


Figure: Overview of physical gas flows to Europe from October 1, 2023 until November 15, 2023; source: ENTSO-G (2022).

Gas supply to the EU

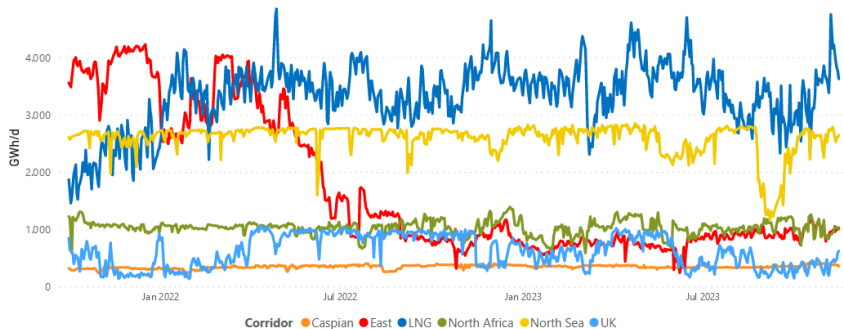


Figure: Gas supply corridors and flow to the European Union from October 1, 2021 until November 15, 2023; source: ENTSO-G (2022).

Market interventions and the EU

The European Commission suggested on May 18, 2022:

- “... a **reduction of gas demand** even in Member States less directly impacted...”
- “Such intervention may trigger the need for an administrative price for gas to be established in parallel, such as a maximum regulated price for natural gas delivered to European consumers and companies (**EU price cap**)...” (European Commission, 2022c)



Brussels, 18.5.2022
COM(2022) 236 final

COMMUNICATION FROM THE COMMISSION TO THE EUROPEAN PARLIAMENT, THE COUNCIL, THE EUROPEAN ECONOMIC AND SOCIAL COMMITTEE AND THE COMMITTEE OF THE REGIONS

Short-Term Energy Market Interventions and Long-Term Improvements to the Electricity Market Design – a course for action

EN

EN

Proposal for EU legislation

The European Commission suggested on October 18, 2022:

- “*An ad hoc Steering Board shall be established to facilitate the coordination of **demand aggregation** and **joint purchasing**.*”
- “***Market correction mechanism:*** *The Council, upon a proposal by the Commission, may adopt a decision providing for a **temporary mechanism to limit episodes of excessive gas prices.***” (European Commission, 2022a)

Market correction mechanism

proposal for legislation from November 22, 2022:

- *The **market correction mechanism** shall be activated where the following conditions are met ('market correction event')*
 - a) *the front-month TTF derivative settlement **price exceeds EUR 275** for two week(s) and*
 - b) *the TTF European Gas Spot Index as published by the European Energy Exchange (EEX) is EUR 58 higher than the reference price during the last 10 trading days before the end of the period referred to in subparagraph (a).*
(European Commission, 2022b)

Back in November 2022



Figure: Price evolution for TTF gas from October 1, 2019 until November 21, 2022; source: tradingeconomics.com (2023).

The proposal in the news

- Euronews from November 22, 2022

source: <https://www.euronews.com/my-europe/2022/11/24/its-a-bad-joke-energy-ministers-blast-proposed-eu-cap-on-gas-prices>

- Bloomberg from November 22, 2022

source: <https://www.bloomberg.com/news/articles/2022-11-22/eu-eyes-gas-price-cap-to-avoid-abnormal-spike-seen-in-august?leadSource=uverify%20wall>

Comments on the proposal

- The proposal goes in “*the right direction*” and only “*some minor changes*” will be required. “*The rationing of gas would be the wrong response for citizens and businesses in such a crisis.*” (Sven Giegold, Germany’s state secretary for the economy)
- “*Putting a ceiling at 275 Euros is not actually a ceiling*” (Kostas Skrekas, Greek minister for Energy)
- “*The conditions seem to be designed so that the price cap is never enforced. This proposal might stimulate a hike in prices rather than contain them.*” (Teresa Ribera, Spanish minister for energy)

Comments on the proposal

Anonymous diplomats commenting the proposal:

- *“Right now, nobody’s happy [...] We’re not progressing [...] and] back to where we were at the beginning.”*
- *“It’s clear that the Commission took sides with the Netherlands and Germany.”*
- *“How fucked up can you be and how bad can you handle all this?”*

Introduction of a EU-wide gas price cap

revised proposal from December 16, 2022; the cap should entry into force if

- the price for TTF gas exceeds **188 €/MWh** for **3 days**
- the spread between TTF gas and global prices exceeds **35 €/MWh**

final decision from December 19, 2022; the cap should entry into force starting from February 15, 2023 if

- the price for TTF gas exceeds **180 €/MWh** for **3 days**
- the spread between TTF gas and global prices exceeds **35 €/MWh**

Back to the scientific basis



CAMBRIDGE WORKING PAPERS IN ECONOMICS

Defining gas price limits and gas saving targets for a large-scale gas supply interruption

Karsten
Neuhoff

Abstract

Should deliveries of Russian gas by pipeline be interrupted for an extended period of time, then gas prices could explode to up to several hundred Euros per MWh due to scarcity of supply. This risk is already reflected in future and spot gas prices and has caused much of the current extremely high gas price levels and volatility. Any additional price increase after a potential large-scale gas supply interruption would likely trigger even more government interventions in EU's energy markets, with the objective to limit costs for households and other consumers. To avoid such ad-hoc measures, the EU Commission has proposed in the REPowerEU communication to agree already now, ahead of any potential large-scale interruption, on a coordinated European response to a large-scale gas supply interruption. We explore how the proposed measures, which include binding national gas saving targets and limits to the gas price in the case of large-scale gas supply interruptions, would impact supply and demand after an interruption. We also assess how the level of the price limit would impact the supply and demand balance after an interruption and the price formation prior to it.

Reference Details

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Published 13 September 2022

Key Words Price cap, Security of Supply, Gas saving, Consumer welfare
JEL Codes D30, D47, D61, L95

Website www.econ.cam.ac.uk/cwpe

- What is a working paper?
- What is an abstract?

Your task

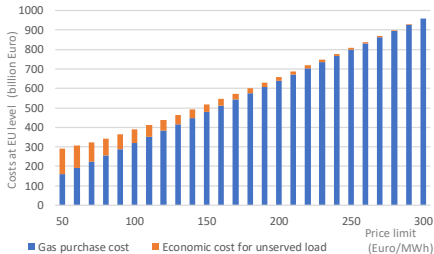


Figure: Cost to EU consumers after a supply interruption of Russian gas; source: Neuhoﬀ (2022).

- understand the main findings of the paper
- reproduce the main result
- analyze the underlying assumptions
- modify assumptions and results

Introduction – guiding questions

- Explain the mechanism causing a shift of the supply curve at the gas market?
- Illustrate why inelastic demand and supply curves could make the new equilibrium price “extremely costly”?
- Why is there a limited price pass-through to consumers?
- Why gas supply is inelastic in the short-run when prices exceed 30-40 €?

Introduction

- If a supplier does not deliver gas anymore, the gas supply curve becomes steeper (“de-aggregation” of supply curve).
- ⇒ effect is similar to shifting the supply curve to lower quantities (special shape of the gas supply curve)
- gas supply and demand is inelastic in the short-run above 30-40 € because all available switching capacity is already used and a big part of remaining consumers is shielded from market prices by tariff structure or administered prices
- ⇒ supply and demand at the gas market are inelastic in the short run for prices above 40 €.
- ⇒ inelastic demand/supply graphically corresponds to a very steep curve
- ⇒ new equilibrium at very high prices

Introduction

- consumers usually have contracts for gas delivery lasting for 1 or 2 years
 - consumers usually make a monthly advance payment receiving the invoice with adjusted delivery and prices after one year or more
 - many consumers are shielded by subsidies (e.g. administered price)
- ⇒ delayed price pass through to consumers

Elasticity – guiding questions

- Summarize Neuhoﬀ's findings about the price elasticity of demand and supply with respect to elasticity for prices exceeding 50 €.
- Why is it diﬃcult to outcompete demand in other markets?
- Why supply will not increase in the short run?

Bottle necks for an increase of gas supply

- gas exploration (except in North America) is large scale, complex and requires highly skilled companies
 - LNG liquefaction in North America almost used with full capacity
 - export capacity (via pipeline and ship) exhausted at 50,- €
- ⇒ capacity expansion takes several years

LNG imports to Japan

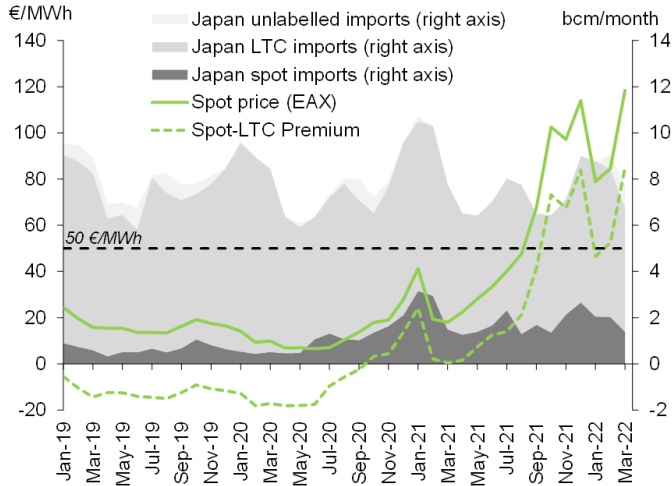


Figure: LNG imports to Japan with respective spot prices; source: Neuhoﬀ (2022).

Shifting gas flows

- competing LNG buyers are mainly Japan, China, Korea and India (“Asia”)
 - the Fukushima power plant accident lead to a shift of LNG to Japan originally intended for delivery to the EU
- ⇒ LNG price of 45 €
- consumers in “Asia” are largely shielded against high gas prices
- ⇒ only 20 % of “Asian” demand (= 950 TWh) is responsive to market prices

Elasticity of gas demand

	Region	Time	Consumer	Elasticity
Labandeira et al. 2017	Meta analysis	Since 1970s	Aggregated	-0,18
Aufhammer & Rubin 2018	USA, California	2003-2014	Households	-0,21
Steinbuks 2021	UK	1990-2007	Manufacturing	-0,2
Asche et al. 2012	Europe (12 countries)	1978-2002	Households	-0,242
Alberini et al. 2020	Ukraine	2013-2017	Households	-0,16
Andersen et al. 2011	Finland, France, Italy, UK	1978-2003	Industry	-0,06 to -0,18
Alberini et al. 2011	USA	1997-2007	Households	-0,572
Dagher 2011	USA, Colorado	1994-2006	Households	-0,091
Madlener et al. (2011)	OECD (12 countries)	1980-2008	Households	-0,24

Figure: Short-run price elasticity of demand for gas according to Neuhoﬀ (2022).

⇒ average: -0.24 (-0,20)

Gas price development

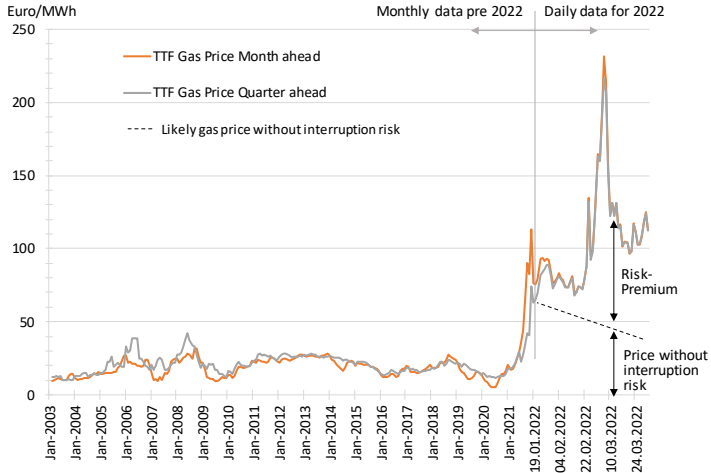


Figure: Gas price development with interpretation according to Neuhoff (2022).

Schematic demand and supply function

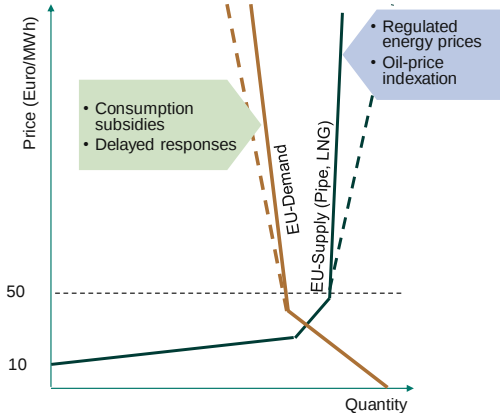


Figure: Schematic demand and supply functions for gas based on Neuhoﬀ (2022).

Assessment of a gas price cap

- What is the problem Neuhoﬀ (2022) wants to work on?
- What are his assumptions?

Gas supply gap

EU historic gas demand	4000 TWh
Historic Russian Gas supply (interrupted)	1600 TWh (40%)
Assumption on gas saving within EU	800 TWh (20%)
Assumption on additional gas supply at 50 Euro/MWh	560 TWh (14%)
Supply-demand gap to be filled	240 TWh (6%)

Figure: Assumptions about demand-supply balance according to Neuhoff (2022).

Gas price cap – assumptions

- demand shift of 240 TWh from Asia to the EU for a gas price of 300 €/MWh
 - gap of 240 TWh for a gas price of 50 €/MWh
 - constant elasticity of supply (demand)
- ⇒ constant elasticity: -0.16
- value of lost load (VOLL) equals 600 €/MWh

Gas price cap – calculations

- insert the known prices of 50 and 300 €/MWh into the demand function

$$950 = A50^{\epsilon}$$

$$710 = A300^{\epsilon}$$

- division of first equation by the second yields

$$\frac{950}{710} = \frac{50^{\epsilon}}{300^{\epsilon}}$$

$\Leftrightarrow$

$$\ln\left(\frac{950}{710}\right) = \epsilon \ln\left(\frac{50}{300}\right) \Leftrightarrow \epsilon \approx 0.1625$$

Main result of the paper

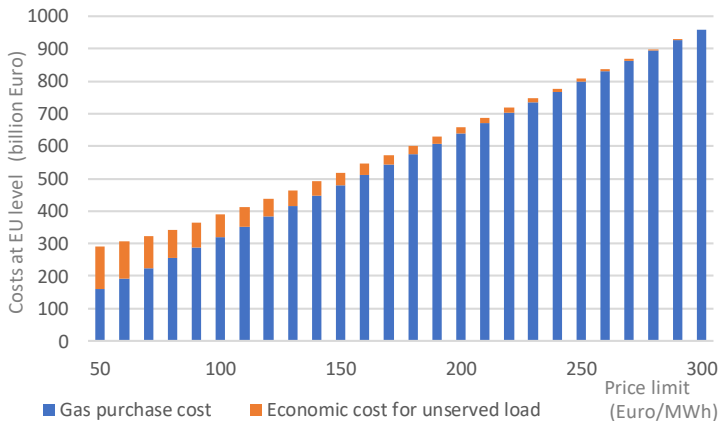


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