

July 2023

European gas demand fundamentals

H1 2023 review and short-term outlook

Introduction

Gas prices have been on a rollercoaster since mid-2021. They climbed from very low levels in 2020 to record highs in 2021 and 2022 before falling again from December 2022 thanks to a mild winter in Europe and low LNG demand in Asia. At the time of writing this Energy Insight (July 2023), gas prices in Europe were down to below €40/MWh as shown in Figure 1. Despite the massive fall year-on-year, prices were still about twice their pre-crisis level. The gas market remains tight in Europe, as illustrated by the rapid price spike in June 2023 when gas prices grew by more than 50 per cent in a few days following a relatively small tightening in supply before dropping again shortly after.¹ These fluctuations have been analysed in a series of OIES papers and in our regular OIES Quarterly Gas Review series.²

This Energy Insight examines how the gas crisis continues to impact gas demand in Europe and provides an update on what happened in the first half of 2023, with a focus on fundamentals in the three main sectors: industrial, residential and commercial, and power.³ With much lower gas prices, should we anticipate a rapid recovery? What are the key factors to monitor over the next six to nine months that will influence gas demand in the region?

The main conclusions are that after a collapse in gas demand in 2022 (down by 13 per cent year-on-year), the trend continued in the first six months of 2023 (down by 11 per cent in the first half of 2023 year-on-year). In addition, the fundamentals seem to point towards a limited recovery in gas consumption in the industrial and power sectors in the coming months, provided expectations on French nuclear return are met. Uncertainties remain on the residential and commercial sector for the winter,

¹ <https://direct.argusmedia.com/newsandanalysis/article/2460379>

² OIES Gas Programme publications. <https://www.oxfordenergy.org/publication-category/gas-programme/>
OIES Quarterly Gas Review. <https://www.oxfordenergy.org/publicationtopic/quarterly-gas-review/>

³ For more information about gas demand fundamentals on the period from early 2022 to March 2023, see Honoré, A. (2023). <https://a9w7k6q9.stackpathcdn.com/wpcms/wp-content/uploads/2023/04/Insight-127-European-gas-demand-fundamentals.pdf>
More information about gas demand fundamentals in 2021 can be found in Honoré, A. (2022). 'Demand response to high gas prices in Europe in 2021 and early 2022'. <https://a9w7k6q9.stackpathcdn.com/wpcms/wp-content/uploads/2022/06/Insight-117-Demand-response-to-high-gas-prices-in-Europe-in-2021-and-early-2022.pdf>

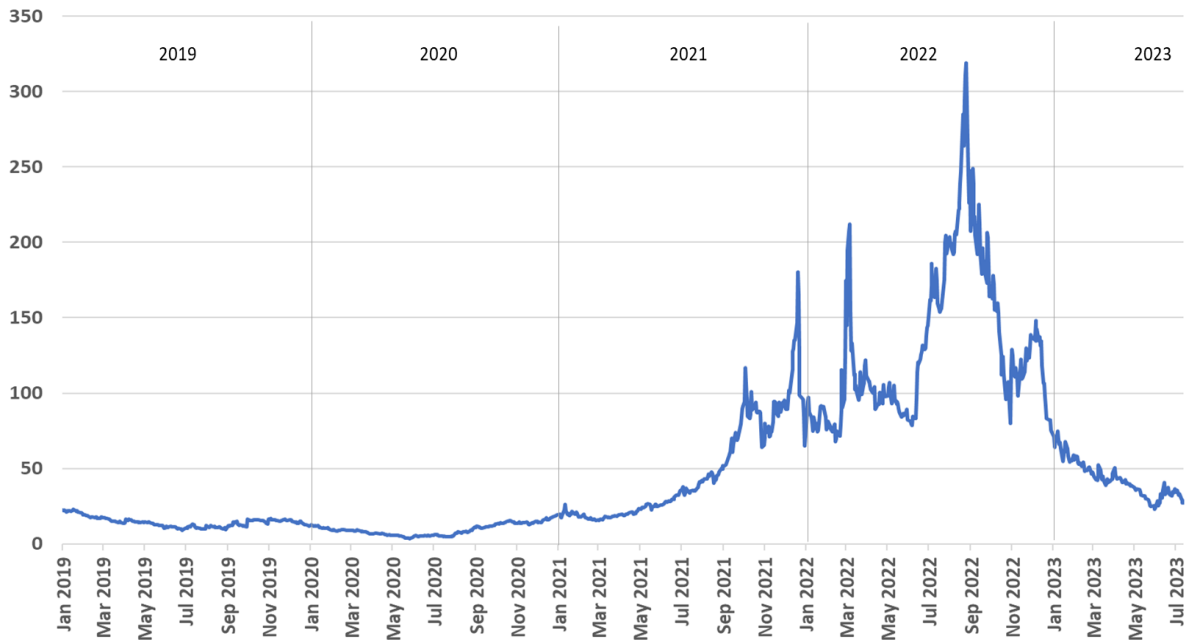
Details on European gas demand in 2020 can be found in Honoré, A. (2020). 'Natural gas demand in Europe: The impacts of COVID-19 and other influences in 2020'. <https://a9w7k6q9.stackpathcdn.com/wpcms/wp-content/uploads/2020/06/Natural-gas-demand-in-Europe-the-impacts-of-COVID-19-and-other-influences-in-2020.pdf>



which will depend on the level of temperatures and on consumers willingness to continue energy saving efforts in a context of lower gas prices.

Understanding gas supply and demand balances will continue to be a complex puzzle with many moving pieces, but minimizing gas demand will continue to be necessary to prepare for Winter 2023/2024 (and maybe even Winter 2024/2025) as suggested by the EU Commission's proposal to extend the voluntary gas demand cuts of 15 per cent until March 2024.⁴

Figure 1: TTF front month gas prices from 01 January 2019 to 13 July 2023 (midpoint, Euro/MWh)



Source: Data from Argus. Graph by the author

A word on methodology and definition: gas demand is driven by a combination of factors, and it is difficult to disentangle all the different drivers that influence it, including variations that may happen specifically as a result of price fluctuation, let alone access timely, detailed and consistent data to allow for accurate analysis. When some data is available, differences in methodologies and definition complicates a comparison between sectors and national markets. The charts in this paper are based on various sources of publicly available statistics, and the author's assumptions and calculations from this data (to complete the missing statistics and allow for comparison between various sets of data).⁵ Because of the lack of granularity in gas demand numbers, additional figures on temperatures, industrial production, and electricity generation are used to provide a clearer picture of the recent trends and key factors by sector (heating - represented largely by the residential and commercial sector, industry, and electricity generation). The conclusions and outlook presented here are based on the author's analysis

⁴ <https://www.consilium.europa.eu/en/press/press-releases/2023/03/28/member-states-agree-to-extend-voluntary-15-gas-demand-reduction-target/>

⁵ Harmonized data at a regional level showing gas demand by country and by sector is made available with a time lag of several months (up to 18 months). Some national data provided by transmission system operators (TSOs) show gas demand with only a few days, weeks or 1-2 months' time lag, and some provide a split for gas demand from various groups of consumers. These different (and often unclear) definitions and methodologies make it very difficult, if not impossible, to compare the evolution in 28 countries in a timely way based on existing data alone



of this data using a bottom-up methodology. Unless otherwise specified, 'Europe' includes 28 countries: EU27 plus the UK.⁶

Finally, in this fast-changing world, it is important to date the research: the text was finalized in mid-July 2023, with the data available in the public domain at the time covering 2019 (the last pre-COVID year) up to June 2023.⁷

Gas demand collapsed in 2022 and erosion continued in the first half of 2023

By contrast to 2021,⁸ gas demand in Europe collapsed in 2022 to 427 Bcm on the back of mild temperatures, high gas prices, and changes in consumer behaviour.⁹ This represented a sharp decline of 13 per cent year-on-year (yoy) or about -61 Bcm.¹⁰

As an aside, gas demand in the EU27 was down by 56 Bcm in 2022, well below the initial target of 38 Bcm gas demand reduction set in the first draft for the REPowerEU package, published in March 2022.¹¹ In addition, in July 2022, the EU published the Save Gas for Safe Winter proposal,¹² which included a European Gas Demand Reduction Plan to reduce gas use in Europe by 15 per cent between 1 August 2022 and 31 March 2023 compared to the five-year average (equivalent to 45 Bcm). The region reached and exceeded this target, with overall EU27 gas demand down by 18 per cent (equivalent to 54 Bcm) compared to the previous five years.

The general trend in the first six months of 2023 is one of continuous decline as shown in Figure 2. Estimated gas demand in Europe was down by 11 per cent (almost 27 Bcm) compared to the same period in 2022, continuing last year's trend and helped by unseasonably mild weather across most of Europe in January and March, limited industrial recovery despite lower gas prices, muted electricity demand and higher availability of renewables (hydro, wind and solar) in power generation. These key drivers are analyzed in more detail in the following chapters.

⁶ Gas demand data does not include storage filling. Because this is a bottom analysis, data corresponds to 'observed' demand. The terms 'demand' and 'consumption' are used interchangeably in this article

⁷ Various data for May 2023 and especially June 2023 are calculations by this author when the data was not available. Sources are indicated in footnotes and below each figure

⁸ For an analysis of gas demand response in Europe in 2021, see Honoré, A. (2022). 'Demand response to high gas prices in Europe in 2021 and early 2022'. <https://a9w7k6q9.stackpathcdn.com/wpcms/wp-content/uploads/2022/06/Insight-117-Demand-response-to-high-gas-prices-in-Europe-in-2021-and-early-2022.pdf>

⁹ For additional explanations about gas demand trends in Europe in 2022, see Honoré, A. (2023). 'European gas demand fundamentals 2022 & Q1 2023 review and short-term outlook'. <https://a9w7k6q9.stackpathcdn.com/wpcms/wp-content/uploads/2023/04/Insight-127-European-gas-demand-fundamentals.pdf>

¹⁰ Data from Eurostat and National Grid, author's calculations

¹¹ The target was achieved and exceeded, though mainly for different reasons to those envisaged in the initial REPowerEU document. The reduction was to be achieved through a combination of large-scale wind and solar power generation, rooftop solar power generation, heat pumps, and 'EU-wide energy saving', and although all these factors contributed, lower gas demand in 2022 was in fact largely due to warm temperatures in the winter, a price-led reduction in demand and fuel-switching (especially oil products)

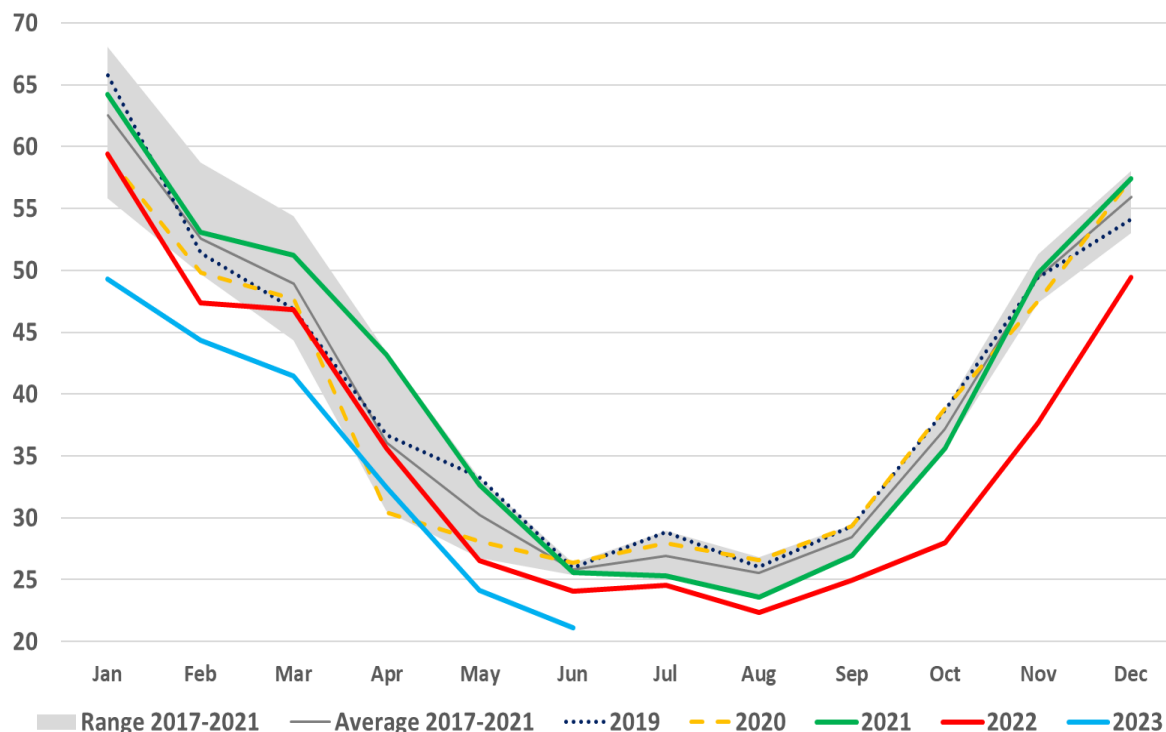
For more information on the initial proposal of REPowerEU published in March 2022, see Fulwood, M., Honoré, A., Sharples, J., and Hall, M. (2022). 'The EU plan to reduce Russian gas imports by two-thirds by the end of 2022: Practical realities and implications'. <https://a9w7k6q9.stackpathcdn.com/wpcms/wp-content/uploads/2022/03/Insight-110-The-EU-plan-to-reduce-Russian-gas-imports-by-two-thirds-by-the-end-of-2022.pdf>

Final REPowerEU document published in May 2022. https://ec.europa.eu/commission/presscorner/detail/en/IP_22_3131

For a comment on the proposed measures for the short-term (2022) in REPowerEU, see Fulwood, M., Honoré, A., Sharples, J., and Hall, M. (2022). 'The EU plan to reduce Russian gas imports by two-thirds by the end of 2022: Practical realities and implications'. <https://www.oxfordenergy.org/publications/the-eu-plan-to-reduce-russian-gas-imports-by-two-thirds-by-the-end-of-2022-practical-realities-and-implications/>

¹² https://ec.europa.eu/commission/presscorner/detail/en/ip_22_4608

Figure 2: Monthly gas demand in Europe, 2019-2023 (Bcm)

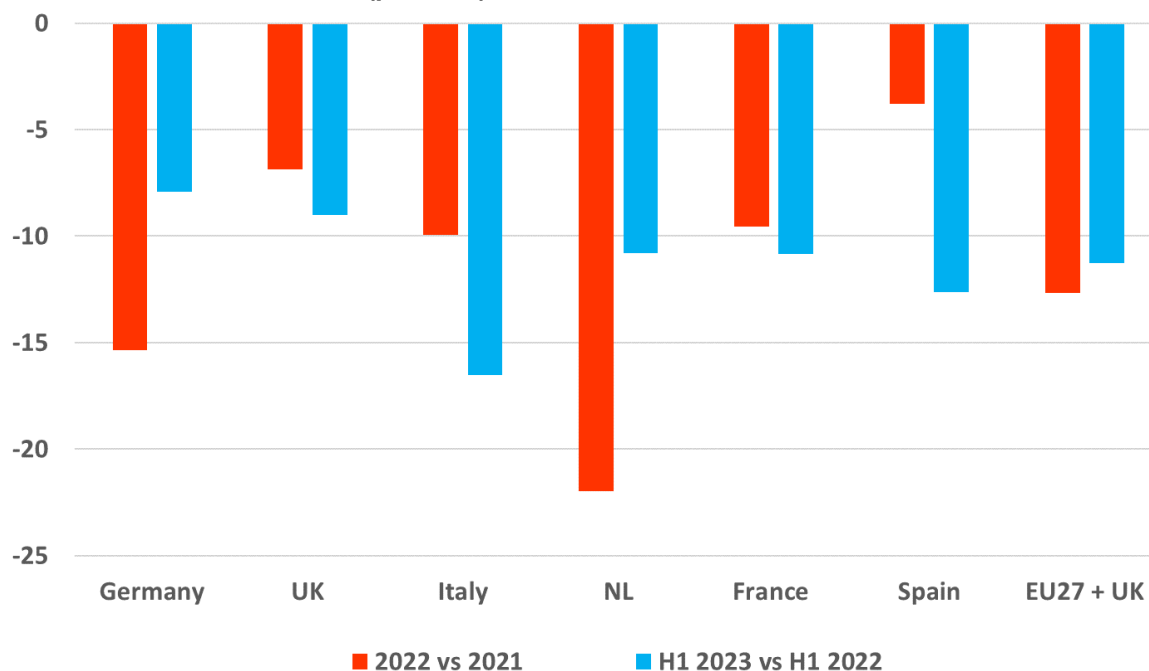


Source: Data from author's assumptions and calculations based on various sources, including IEA, Eurostat, EntsoG, GRTgaz, Terega, THE, SNAM, Enagas and NationalGrid. Graph by the author

The main objective of this Energy Insight is to provide an overview of gas demand at the regional level, but it is worth remembering that demand fluctuations at a regional level only show part of the story. While the main drivers were largely similar across Europe, the evolution of gas consumption has been diverse. These differences can be explained by several country-specific factors including the role of gas in the energy mix, access to alternative fuels, and the levels and extent of the support measures from governments to shield their national consumers from the worst impacts of high energy and gas prices. For instance, gas consumption in the six largest gas markets, which represent over 75 per cent of total demand, varied between a moderate 4 per cent year-on-year decline in Spain¹³ to a sharp 22 per cent year-on-year contraction in the Netherlands in 2022. Over the first half of 2023, initial estimates show a decline in all countries compared to the same period last year, but with large differences from one country to another, as illustrated in Figure 3. This highlights that the regional overview presented in this Energy Insight may show different trends from the ones experienced at the national level and the picture is not necessarily - or even traditionally - uniform across Europe.

¹³ A cap on the price of natural gas used for electricity generation was agreed in May 2022 in Spain and Portugal. The aim was to lower the wholesale electricity price in the Iberian market (MIBEL), but this measure also triggered additional gas use for electricity generation, which partly explains why Spanish demand was down by only 4 per cent year-on-year in 2022 despite sharp declines in gas demand in its industrial and residential sectors

Figure 3: Changes in gas demand in the largest gas markets plus Europe (EU27 + UK), in 2022 and over the first half of 2023 (per cent)



Source: Data from author's assumptions and calculations based on various sources, including IEA, Eurostat, EntsoG, GRTgaz, Terega, THE, SNAM, Enagas and NationalGrid. Graph by the author

Sector-focused analysis: delayed recovery in all sectors in the first half of 2023

Natural gas in Europe is used in three main sectors: the residential and commercial sector (especially for residential space heating),¹⁴ the industrial sector,¹⁵ and the power sector. All three sectors contributed to high levels of demand in 2021, with an especially sharp increase in the residential and commercial sector.

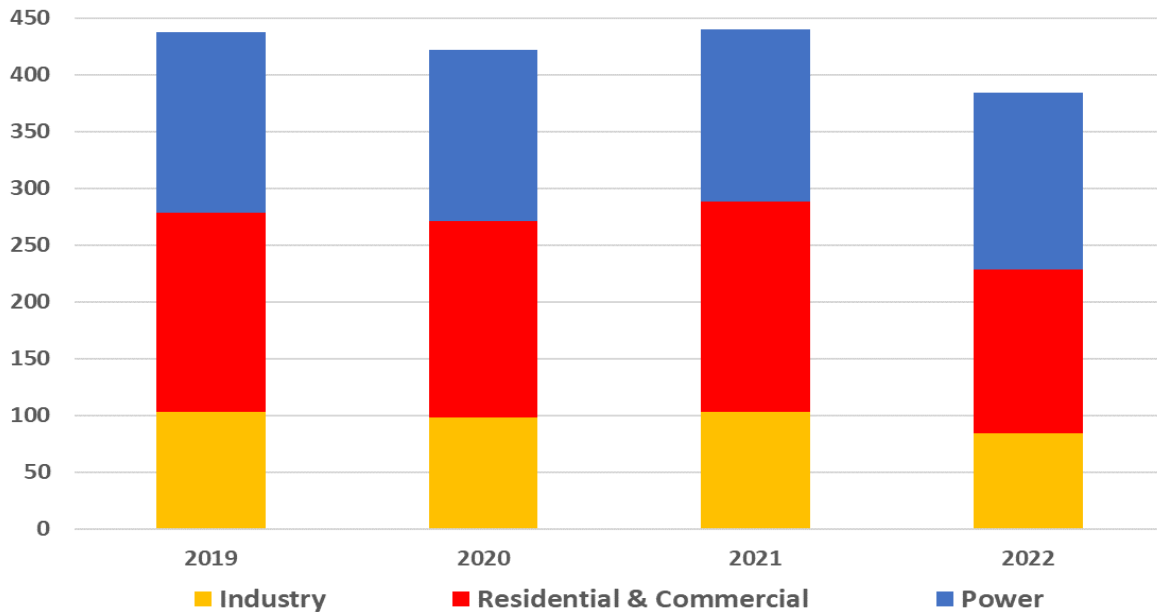
Conversely, most of the demand reduction in 2022 was concentrated in the residential and commercial sector and to a lesser extent, in the industrial sector, while gas use for electricity generation went marginally up (despite record high gas prices that should have pushed the fuel to the back of the merit order), as illustrated in Figure 4.

This author's monthly estimates of European gas consumption by sector show that all three sectors were down year-on-year so far in 2023, as illustrated in Figure 5.

¹⁴ For more details on gas in the heating sector, see Honoré, A. (2018). Decarbonisation of heat in Europe: implications for natural gas demand. <https://a9w7k6q9.stackpathcdn.com/wpcms/wp-content/uploads/2018/05/Decarbonisation-of-heat-in-Europe-implications-for-natural-gas-demand-NG130.pdf>

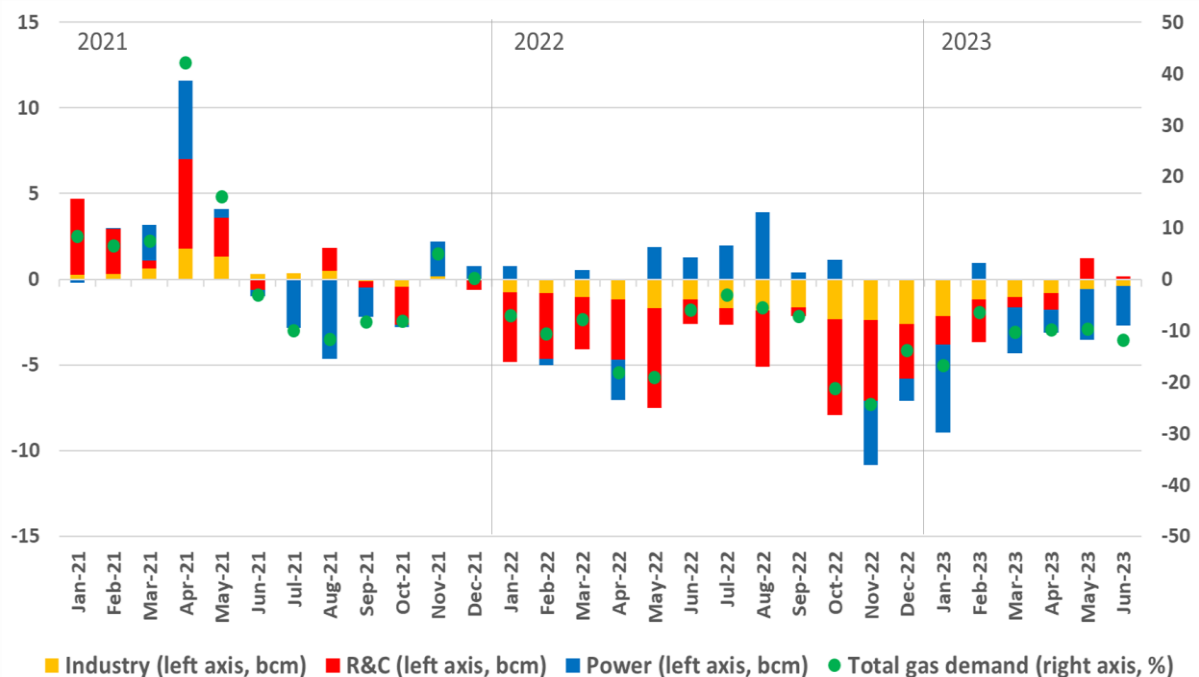
¹⁵ For more details on gas in industrial sector, see Honoré, A. (2019). <https://a9w7k6q9.stackpathcdn.com/wpcms/wp-content/uploads/2019/05/Decarbonization-and-industrial-demand-for-gas-in-Europe-NG-146.pdf>

Figure 4: Annual gas demand in the main sectors in Europe, 2019-2022 (Bcm)



Source: Data from author's calculations. Graph by the author

Figure 5: Monthly changes in gas demand in the three main sectors in Europe, year-on-year from January 2021 to June 2023 (Bcm and per cent)



Source: Data from author's calculations. Graph by the author

Gas supply and demand balances in the coming months will continue to be a complex puzzle with many moving pieces. The following paragraphs take a closer look at each of the three sectors, highlighting the main drivers and uncertainties for the next few months.

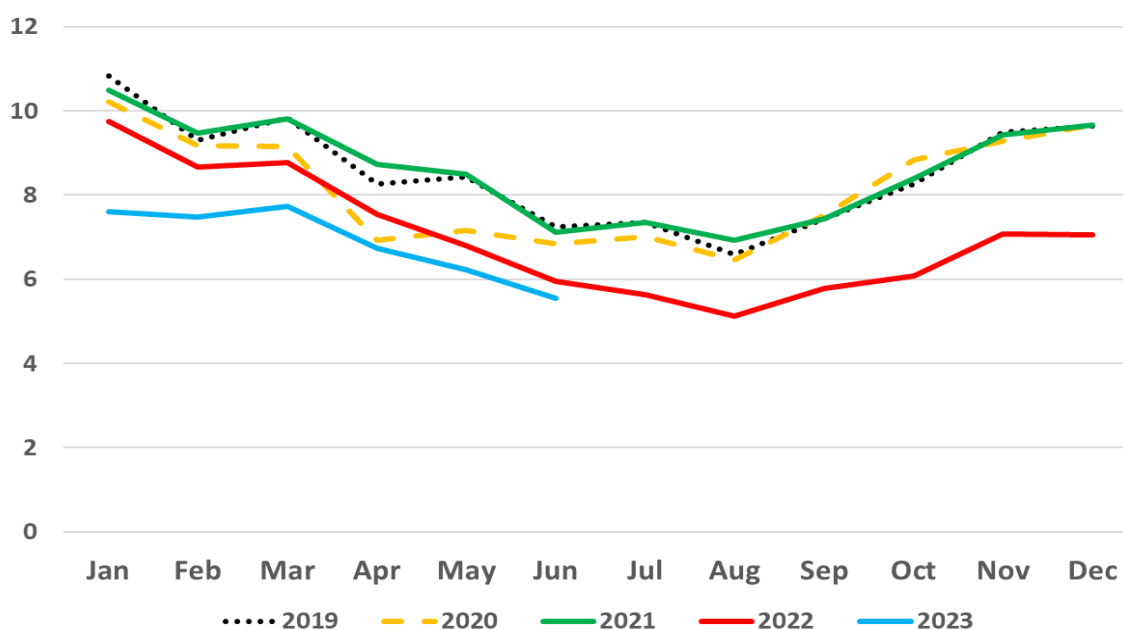
Focus on industrial gas demand: reduction or destruction?

The industrial sector traditionally covers just over 20 per cent of gas demand in Europe.¹⁶ An important factor explaining strong gas demand in 2021¹⁷ was the economic recovery across Europe after the COVID pandemic and several lockdowns (from the second half of 2020).

In 2022, gas consumption in the energy-intensive industrial sector decreased by an impressive 18 per cent compared to 2021 (-19 Bcm),¹⁸ with an even stronger slowdown in the second half of the year as illustrated in Figure 6. This decline was largely price-driven as many firms struggled under the strain of high energy prices. However, the extent to which gas use for industrial production can be affected by higher gas prices is not necessarily straightforward. Some companies may be less exposed to fluctuations on the spot market, depending on their contractual agreements with suppliers and/or their forward hedging arrangements. Whether or not they have access to alternative sources of supply is another factor, while some complex industrial processes cannot be switched on and off easily or rapidly, for instance due to staff requirements. Production commitments and the supply chains' own time-lag or inertia could also play a role. Finally, whether companies are in direct competition with similar companies located in regions with lower (and/or subsidised) prices or whether they have the ability to pass on their rising costs to their consumers will also determine their demand response to high gas prices. Access to, and the extent of, government support was also important last year.

A rebound had been anticipated in the first six months of 2023 stimulated by the fall in energy prices. However, gas demand was again down year-on-year, by about 13 per cent as shown in Figure 6. The decline was more marked in Q1 than in Q2 (-16 per cent and -9 per cent respectively), indicating a possible, yet limited, price-driven demand response from March onward.

Figure 6: Gas demand in the industrial sector in Europe, 2019-2023 (Bcm)



Source: Data from author's calculations. Graph by the author

¹⁶ Average share during 2015-2021. Calculated from Eurostat data

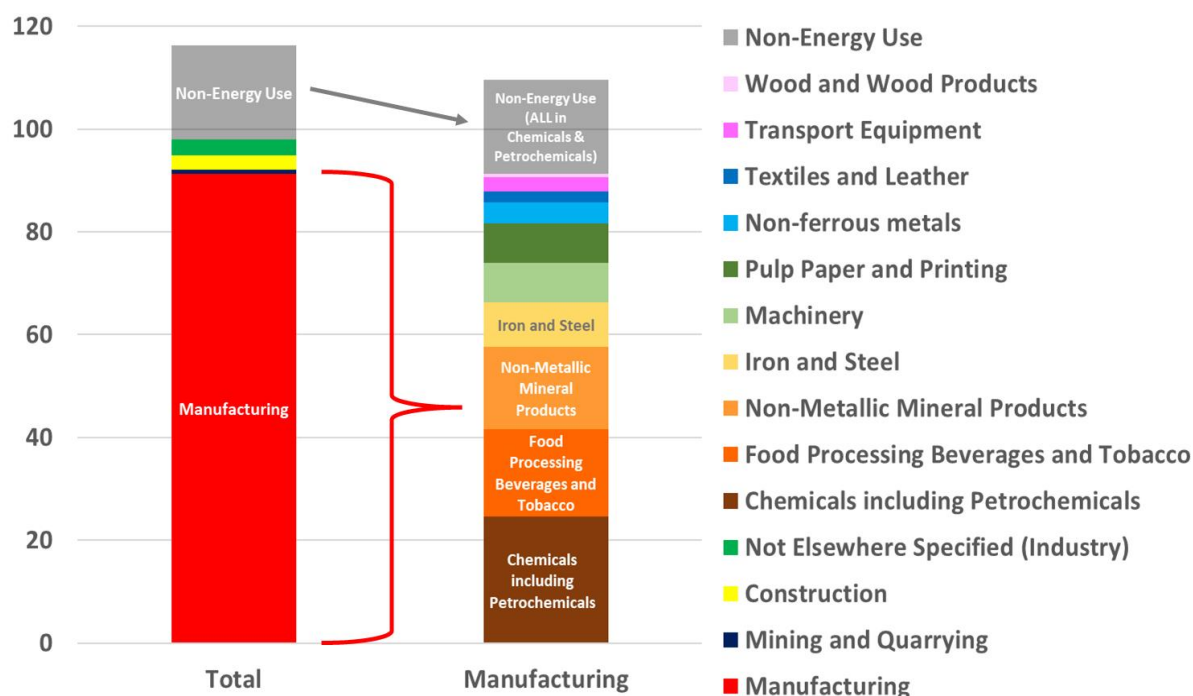
¹⁷ Despite rising prices from September 2021 onward, this author estimates that industrial gas demand increased by 5 per cent year-on-year in 2021

¹⁸ Author's calculations

Data granularity does not allow an analysis of the evolution of gas demand by industrial sub-sectors in 2022 and 2023 at the European level, but looking at industrial production gives *some* indication of the short-term impact of rising energy prices. We will focus on gas production in the manufacturing sector, which typically represents over 90 per cent of industrial gas demand in Europe,¹⁹ with the main consumers being the chemical sector, the food, beverages and tobacco sector, and the non-metallic minerals sector (that includes glass and cement for instance) as seen in Figure 7.

In the manufacturing sector, most of the gas is used for energy use (85 per cent), with the remainder as non-energy use (all in the chemical and petrochemical sector). Gas volumes used to generate process heat could, in theory, be replaced more easily/rapidly by other fuels although available options depend on access to alternative fuels, existing adequate equipment, and the level of temperatures (because not all technologies and fuels are capable of achieving very high temperatures, especially those associated with traditional renewables).²⁰

Figure 7: Gas demand in Europe in the main industrial sub-sectors, 2020 (Bcm)



Source: Data from the IEA, Annual report gas information. Graph by the author

Looking at manufacturing industrial production, it appears that the EU27²¹ has maintained high volumes of manufactured goods production since 2021, as illustrated in Figure 8. In other words, the remarkable reduction in industrial gas demand does not seem to correlate with the decline in the *total* manufacturing output. The logical explanation to this finding is that, facing increased prices and insecure supply, many sectors have been able to reduce gas demand without reducing (much of) their production by switching to alternative fuels - with some firms opting to use fuel oil or its derivatives to replace gas during record high prices and refiners opting to use LPG for instance - and/or by improving their operational efficiency.

¹⁹ Average share during 2015-2020. Calculated from IEA data

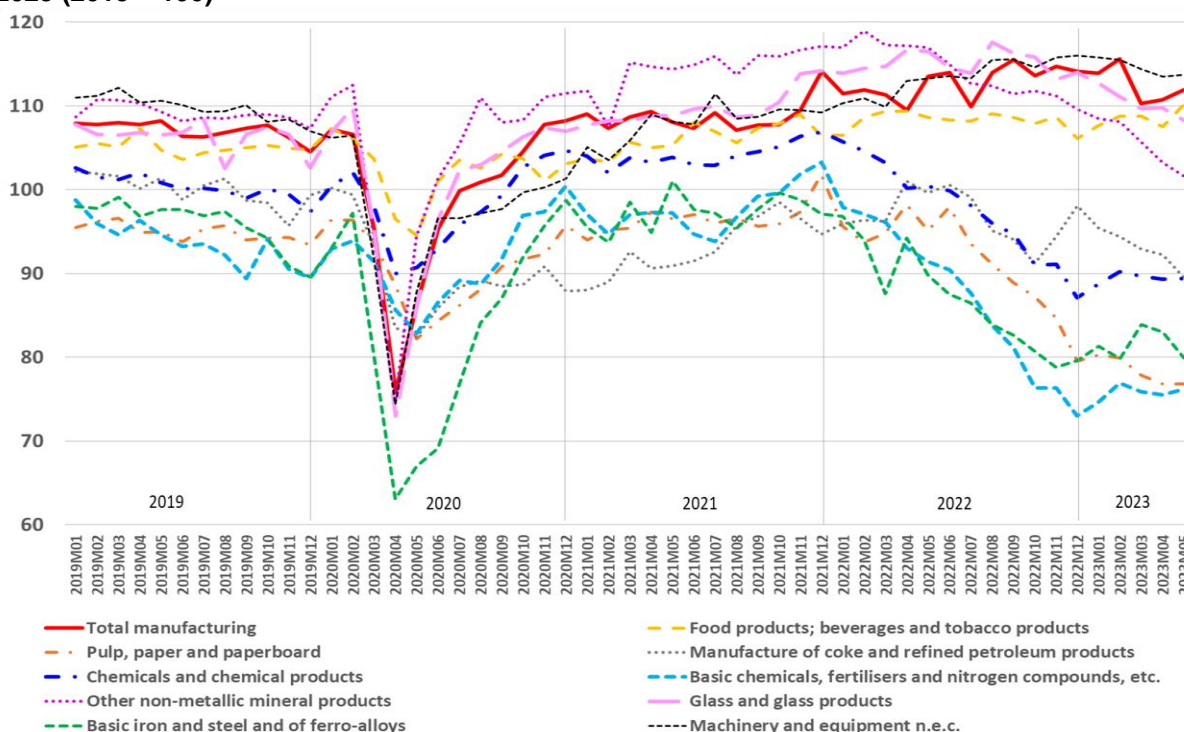
²⁰ See Honoré, A. (2019). 'Decarbonization and industrial demand for gas in Europe', *Chapter IV*. <https://a9w7k6g9.stackpathcdn.com/wpcms/wp-content/uploads/2019/05/Decarbonization-and-industrial-demand-for-gas-in-Europe-NG-146.pdf>

²¹ Eurostat stopped publishing data covering the UK in 2020, when the country left the EU. Therefore, data on manufacturing output in this section only cover the EU27

However, the devil is in the detail: the total manufacturing output hides important disparities between the industrial sub-sectors. The chemical sector (represented by both the dark and the light blue lines in Figure 8), the iron and steel sector, the pulp and paper sector and (to a lesser extent) the non-metallic mineral products (represented by both the dark and the light pink lines) have been clear exceptions. Objectively, the level of output in these four sectors, which represent over two thirds of industrial gas demand in Europe, has been more affected than the other sectors by rising energy costs and ensuing deteriorating business competitiveness.

In May 2023, the latest data available at the time of writing, the EU27 total manufacturing output was down year-on-year, but higher on the month (+1.1 per cent) for the second time in a row. However, evolution in gas-intensive sectors was mixed, with only the chemical sector and the food sector returning to a small growth.

Figure 8: Volume index of monthly production, Manufacturing in EU27 from January 2019 to May 2023 (2015 = 100)



Source: Data from Eurostat, Seasonally and calendar adjusted data. Graph by the author

Some switching back to gas since early 2023, but delayed recovery

Despite important year-on-year industrial gas consumption decline in Q1 2023 (-16 per cent), the rate of yearly contraction slowed from February and gradual gas demand recovery seemed to be on the way across several industrial sub-sectors, both in sectors that were likely to have switched to other fuels (especially oil products²²) and in sectors where curtailment of production and/or closures of plants happened in 2022, like in the chemical sector.

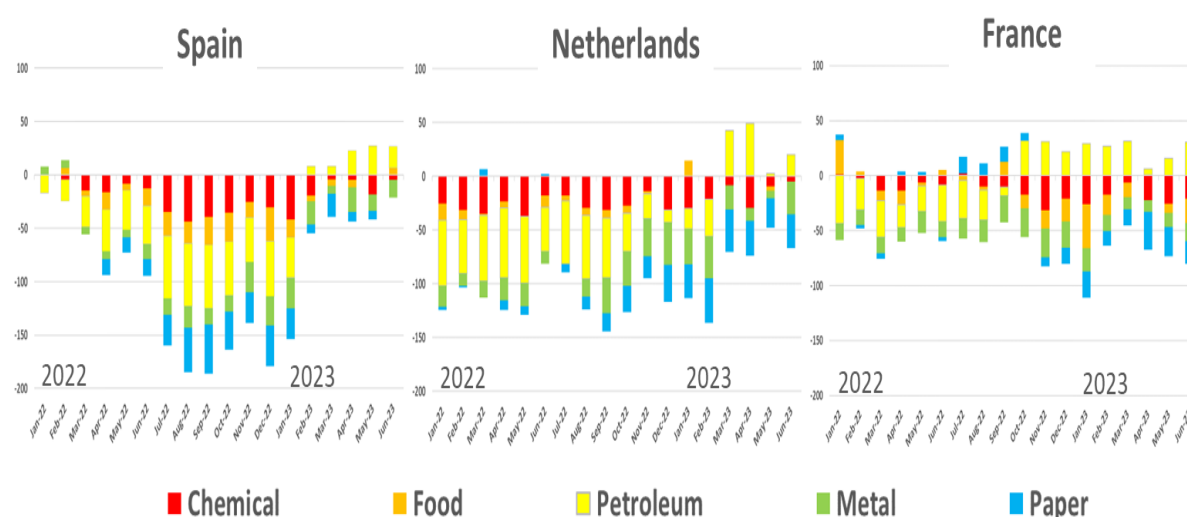
However, in Q2, the picture was more mixed. Gas consumption was closer to 2022 levels than in Q1 (-9 per cent yoy), but at the same time, the pace of recovery seemed to have slowed or even stopped, with the notable exception of the petroleum sector, where lower gas prices even allowed for year-on-

²² Firms that switched to renewables are unlikely to switch back to gas

year recovery (because of plants switching back to gas) as shown in Figure 9 with the examples of Spain, the Netherlands and France.

All in all, there appears to be a mixed picture around Europe and also from one month to another, with both growth and contraction recorded, but the first general conclusions regarding industrial gas demand in the region in the first half of 2023 are that the anticipated recovery, both in manufacturing output and in gas consumption, has not really happened despite the important fall in gas prices year-on-year.

Figure 9: Changes in industrial gas demand in selected sub-sectors in Spain, the Netherlands, and France, year-on-year (per cent)



Note: Sectoral definitions vary between countries. Groups have been simplified to allow a comparison.
Source: Data from author's calculations, CBS, GTS, Enagas, GRTGaz. Graph by the author

Demand reduction or demand destruction?

It is not yet possible to find hard data to differentiate between what has been demand reduction (for example, fuel switching to oil products or curtailment of production, in other words, demand that could bounce back rapidly) and demand destruction (gas demand which will not return, i.e. improved operational efficiency, switching to renewables and heat pumps or relocation outside Europe).

The International Energy Agency (IEA) estimated that about half of the decline in industrial gas demand in the EU27 in 2022 came from production curtailment and about 30 per cent from fuel switching, and the rest was from efficiency gains, import substitutions, and the effect of the weather.²³ In other words, based on this estimate, about 80 per cent of the demand fall last year was a simple price-demand response. Therefore, these volumes were expected to come back with lower gas prices. And we saw this happening in October 2022 when gas prices reached their lowest levels in months and fertilizer producers restarted production in Europe (fertilizers may tend to be more responsive to changes in gas prices than manufacturers of finished products), and this is also what we started to see in Q1 2023. These expectations even raised questions over how the region would cope if consumption were to bounce back rapidly, especially in what was (is) still a tight gas market. However, recovery in gas demand from the industries has been limited in the first half of the year and expectations for the rest of the year are now of a slow and gradual recovery capped by limited end-product demand and a bleak economic situation.

²³ <https://iea.blob.core.windows.net/assets/227fc286-a3a7-41ef-9843-1352a1b0c979/Naturalgasupply-demandbalanceoftheEuropeanUnionin2023.pdf>, page 6

Slow and gradual gas demand recovery...

The impact of low prices has been counter balanced by several factors that have often prevented firms switching back to gas and/or re-starting idle production capacity, including uncertainties on gas supply and demand fundamentals (and therefore a lack of visibility), continuous tightness of the market (and consequently high gas price volatility) and security of supply especially over the winter period,²⁴ which would come in addition to the typical technical constraints and related costs.

Focusing on the chemical sector, which accounts for about 40 per cent of total gas demand in the industrial sector, the European Chemistry Industry Council (CEFIC) anticipates a decline of approximately 8 per cent in EU27 chemical production year-on-year in 2023 as demand for chemicals continues to fall resulting in the need to further reduce chemical inventories. Indicators in July 2023 showed that incoming orders for the European chemical industry were still declining.²⁵ In Germany, the chemical output dropped by almost 15 per cent in Q1 due to continued high gas and power costs and decreasing demand for end products, according to the chemical industry association VCI. Despite an anticipated decline in commodity prices and easing of supply bottlenecks, VCI expects German chemical production to decline by 8 per cent year-on-year in 2023.²⁶

The period from June to September is traditionally characterised by low gas demand in the industrial sector, as seen previously in Figure 6. For instance, Q3 is traditionally marked by low fertilizer demand in Europe with ammonia producers waiting for increased downstream demand for fertilizers, which is not expected to rise again until after the summer, in September when stocks are being rebuilt for autumn application and then in February for spring application. In other words, there would be limited scope for further increase this summer even if prices were to decrease enough to make indigenous production of ammonia competitive against imports (production of ammonia has been largely uncompetitive since mid-2022, despite a short-lived period in December 2022 and in Q1 2023, which triggered a brief return of plants back online²⁷).

More generally, the most important driver over the next six to nine months may be the level of demand for end-products in sectors such as chemicals, steel, glass and nonferrous metals. Any anticipation that gas use in industry would recover in the second half of 2023 may not materialise or be limited amid an ongoing manufacturing collapse and generally subdued economic growth in Europe.

... capped by limited end-user demand and bleak economic perspectives in H2 2023

The eurozone was in a technical recession in the first three months of 2023, with the gross domestic product (GDP) having already contracted in the fourth quarter of 2022. In its latest economic forecast in Spring 2023,²⁸ the Commission (EC) anticipated a much lower GDP growth in the EU in 2023 and 2024 compared to 2022 levels as seen Figure 10. Even if the EC marginally lifted its economic forecast for the region compared to its previous scenario due to declining energy prices, GDP growth is expected

²⁴ Security of supply may also still be an issue in case of shortage during the winter. The industrial sector will be the main source of flexibility to balance supply and demand in case of a tight European market with potential gas rationing in order to divert supply to protected users if need be. Last year, mild temperatures, voluntary demand reduction and demand response were sufficient, but had there been a need for it, the industrial sector would have been first in line. This in turn, would have caused widespread disruption to manufacturing production, though exactly which industries would have been targeted first remained largely unclear.

²⁵ <https://cefic.org/media-corner/newsroom/#:~:text=18%20July%202023%20%E2%80%93%20EU27%20chemical,consumer%20chemicals%20are%20more%20resilient>

²⁶ <https://direct.argusmedia.com/newsandanalysis/article/2469469> ; <https://www.vci.de/vci-online/die-branche/zahlen-berichte/chemical-industry-in-figures-online.jsp>

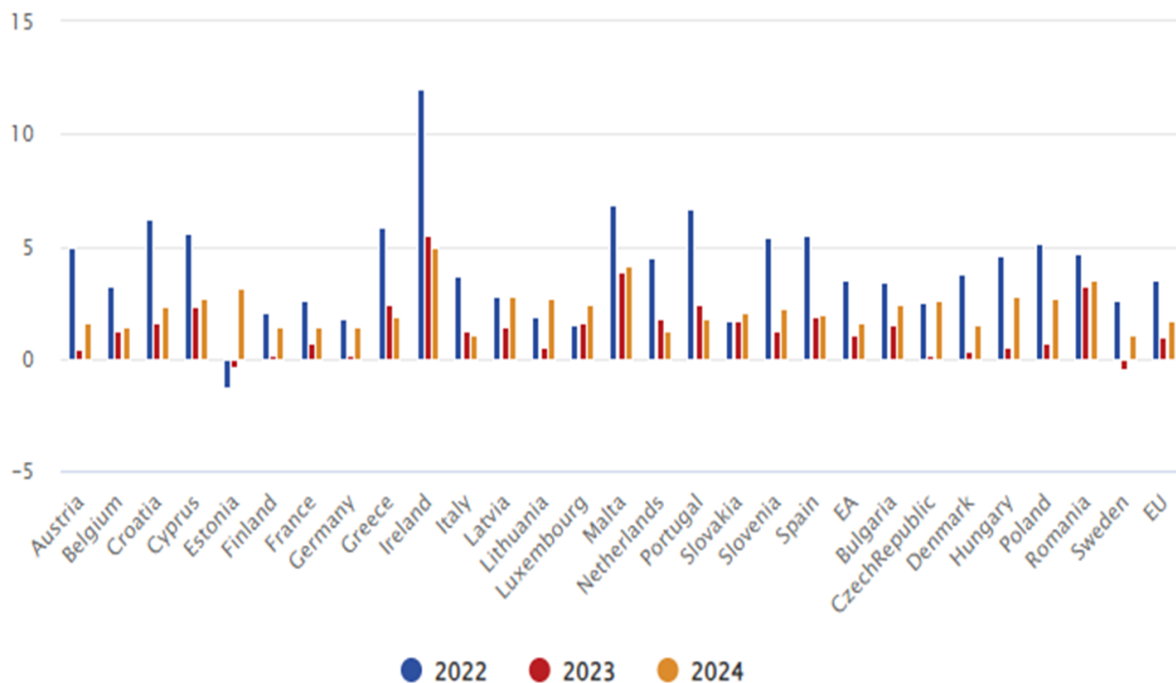
²⁷ Europe's largest ammonia producer, Yara, decided to curtail its production and took its Ferrara plant offline in April, just three weeks after bringing it back online (after nine months of being idled). <https://direct.argusmedia.com/newsandanalysis/article/2468836>

²⁸ https://economy-finance.ec.europa.eu/economic-forecast-and-surveys/economic-forecasts/spring-2023-economic-forecast-improved-outlook-amid-persistent-challenges_en

to reach only 1 per cent in 2023 (from 0.8 per cent in its Winter forecast²⁹) and 1.7 per cent in 2024 (from 1.6 per cent), compared to almost 4 per cent in 2022.

The GDP forecast for Germany, the largest economy in Europe, was only 0.2 per cent for 2023, a rather bleak expectation for a country responsible for a quarter of the total gas volumes consumed in the industrial sector in Europe. The latest scenarios published by the OECD and by the International Monetary Fund showed even slightly worse expectations at -0.002 per cent³⁰ and -0.1 per cent³¹ respectively.

Figure 10: Economic forecast, Spring 2023, GDP growth (per cent)



Source: European Commission, Spring 2023 Economic Forecast

Another pessimistic signal concerning short term expectations for the region's manufacturing sector is shown in the Eurozone Manufacturing PMI,³² which fell for the fifth consecutive time in June to 43.4,³³ reflecting the deepest contraction in factory activity in three years as the sector continues to feel the impact of higher borrowing costs. The region has been below the 50 level (that separates growth from contraction) since July 2022 as shown in Figure 11.

²⁹ https://economy-finance.ec.europa.eu/economic-forecast-and-surveys/economic-forecasts/winter-2023-economic-forecast-eu-economy-set-avoid-recession-headwinds-persist_en

³⁰ Economic Outlook No 113 - June 2023. <https://stats.oecd.org/index.aspx?DataSetCode=EO>

³¹ World Economic Outlook - April 2023.

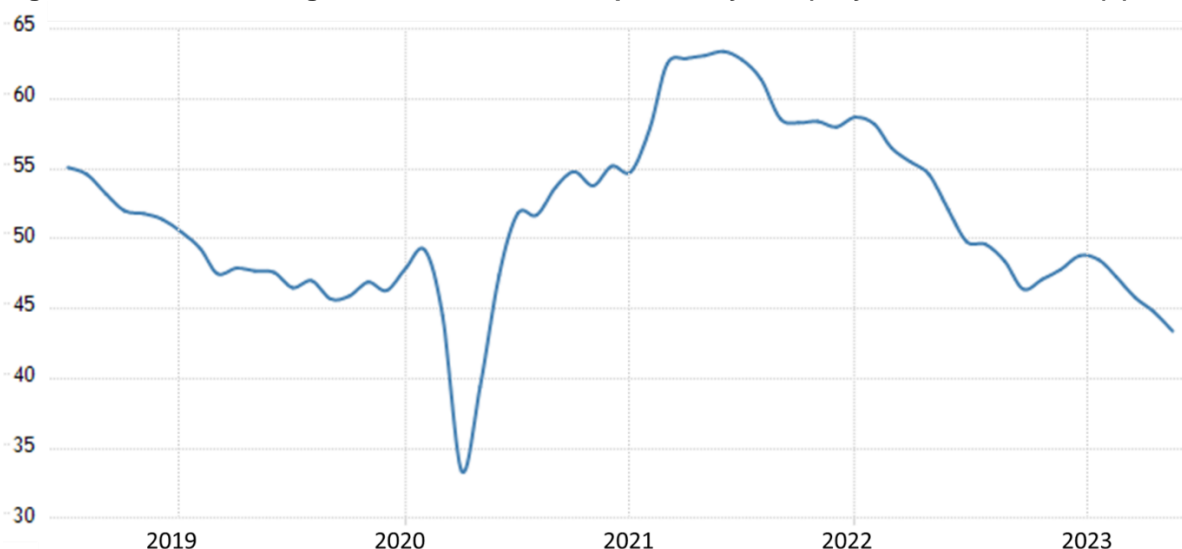
https://www.imf.org/external/datamapper/NGDP_RPCH@WEO/OEMDC/ADVEC/WEOWORLD

³² PMI = Purchasing Managers Index is a measure of the prevailing direction of economic trends in manufacturing. The HCOB Eurozone Manufacturing PMI is compiled by S&P Global from responses to monthly questionnaires sent to survey panels of manufacturers in Germany, France, Italy, Spain, the Netherlands, Austria, Ireland and Greece, totalling around 3,000 private sector companies. The headline figure is the Purchasing Managers' Index (PMI), which is a weighted average of the following five indices: New Orders (30%), Output (25%), Employment (20%), Suppliers' Delivery Times (15%) and Stocks of Purchases (10%). For the PMI calculation the Suppliers' Delivery Times Index is inverted so that it moves in a comparable direction to the other indices. The index varies between 0 and 100, with a reading above 50 indicating an overall increase compared to the previous month, and below 50 an overall decrease. <https://tradingeconomics.com/euro-area/manufacturing-pmi>

³³ <https://tradingeconomics.com/euro-area/manufacturing-pmi>

Germany's PMI was even more depressed at 40.6, one of the lowest in the region as its manufacturing sector contracted at the fastest rate in over three years with firms reporting lower production levels at the end of Q2 and a fall in new orders.³⁴

Figure 11: Manufacturing PMI in the EU over the past five years (July 2019 to June 2023) (Index)



Source: Data from Trading Economics, retrieved on 5 July 2023

Therefore, at the time of writing this Energy Insight, and despite lower gas prices in 2023, a rapid recovery in industrial activity and therefore gas demand in this sector seemed unlikely, with uncertainties possibly up to early 2024 if the gas market tightens again this winter.

The longer the recovery, the higher the risk of gas demand destruction

The longer the recovery takes, the higher the chance it will be a smaller one, with more gas demand destruction than purely gas demand reduction.

First, although the length and the extent of the crisis will be a crucial factor, so is the general context in Europe as firms need to reduce their GHG emissions in line with the EU 2030 and 2050 environmental targets. Measures include efficiency measures (such as waste heat recovery, self-generation, and electrification), switching away from fossil fuels to low carbon sources such as renewables (when possible) and hydrogen (when low carbon hydrogen becomes available and at scale), or by relocating outside Europe. All these options will impact the level of gas demand in the industrial sector and may be taken sooner rather than later in view of continued gas uncertainties.

Second, and in addition to having to meet emissions reduction targets, another incentive for companies to invest in energy-efficiency measures or to switch to renewables will be to make them more resilient to future shocks, and therefore, lowering their gas consumption faster than previously envisaged. Industries that use gas as feedstock (non-energy use) may not be able to implement efficiencies to the same degree as other sectors, but the risks remain to see a decline in investments traditionally done to maintain production over the years. If this happens, production will decline faster than previously anticipated.

The third risk is to see this production stop in Europe and be relocated outside its borders where gas and energy prices are lower, security of supply perceived as better and/or where environmental regulation is lighter. The erosion of competitiveness was one of the main factors (along with industry

³⁴ <https://www.reuters.com/markets/europe/german-manufacturing-shrinks-june-demand-weakens-pmi-2023-07-03/>

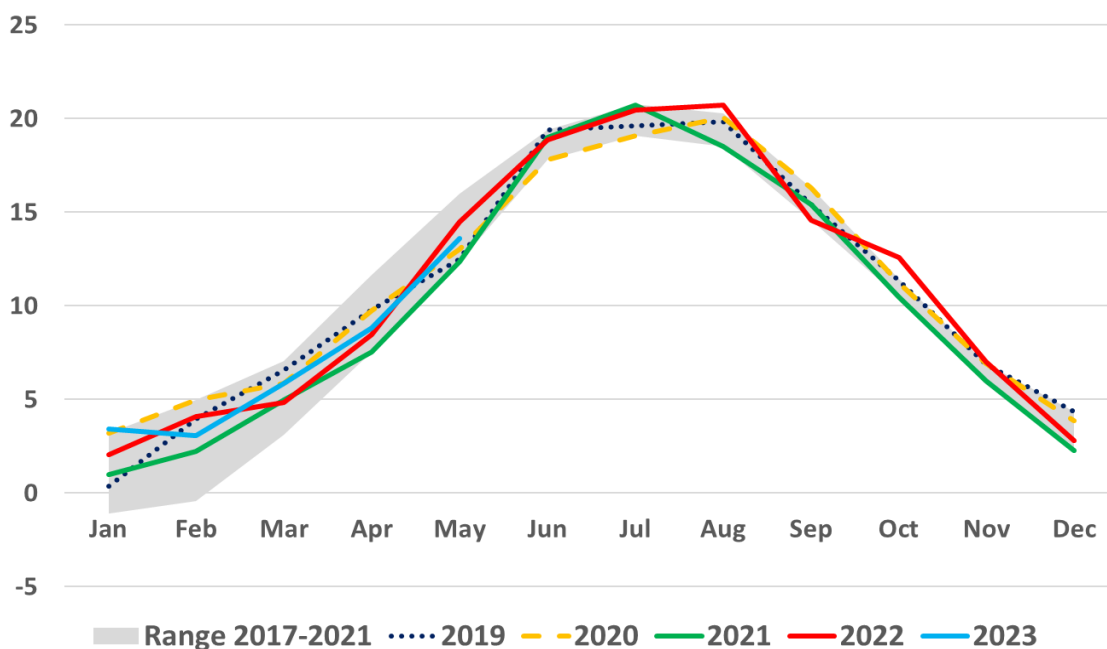
regulation in the EU) given by BASF, one of world’s largest chemical companies, when it announced in October 2022 that it would ‘permanently’ downsize in Europe, closing one of two ammonia plants and associated fertilizer facilities in Ludwigshafen in 2026.³⁵ Another example came in Yara’s July 2023 result statement, when Europe’s largest ammonia producer warned that competitive supply from the US to Europe could lead to reduced lifespan or impairments of European ammonia and fertilizer production assets.³⁶ Despite all these uncertainties, permanent closures of industries (and relocations) have, so far, not materialised significantly, although some smaller firms have been forced into bankruptcy, which will also contribute to demand destruction in Europe.

Focus on gas demand in residential and commercial (heating)

Gas used in residential and commercial (primarily for space heating) represents 35-40 per cent of annual gas demand in Europe and is typically the most important driver of annual fluctuations. The weather is a key influence on demand in this sector: there can be a difference of +/- 20 to 25 Bcm in demand year-on-year if the winter is milder or colder.³⁷

In 2021, the first four months (January to April) and December were much colder than the same periods in 2020, which contributed to a boost in demand for heating as illustrated in Figure 12. In 2022, the average temperatures in January, February, and April were warmer than the previous year, and March was relatively similar at a regional level, implying a lower need for heating in the residential and commercial sector. Warm temperatures in October and November then pushed the beginning of the heating season towards late November / early December. In other words, 2022 was an especially warm year, which came after a particularly cold one in 2021, and as a result, the mild weather alone is likely to have contributed to about 30 per cent of the entire reduction in gas demand in Europe last year.

Figure 12: Average monthly temperatures in Europe in 2019-2023 (degrees Celsius)



Note: Malta not included

Source: Data from author’s calculations, EU Copernicus programme. Graph by the author

³⁵ <https://www.ft.com/content/f6d2fe70-16fb-4d81-a26a-3afb93e0bf57>

³⁶ Platts S&P Global, European Gas Daily, 20 July 2023

³⁷ Author’s estimates

In addition to the mild temperatures, which were an undeniable factor in keeping demand low, this combination of warmer weather and continued high gas prices seems to have facilitated an important demand response from small consumers as illustrated in Figure 13. This was an interesting evolution in what is usually a rather inelastic sector in the short term.^{38,39}

Despite high gas prices in the second half of 2021, there was no strong evidence that gas demand was not in line with levels to be expected at various temperature levels, although there seem to have been signs of some initial demand response in December.⁴⁰ On the contrary, in 2022, data seem to indicate a much stronger price response. This happens through various measures including lower production and fuel switching in small businesses, gas-saving measures in public buildings and lower energy use in the residential sector. The latter is likely to have predominantly come from behavioural changes with customers turning their thermostat down or switching their heating off earlier in the season. However, we should not discard some demand destruction with fuel-switching to renewables including heat pumps⁴¹ and efficiency gains with building renovation and improved insulation. Non-weather-related factors drove gas demand down by a further 10 per cent or so in 2022 (the colder the temperature, the smaller the difference) compared to the three previous years.

³⁸ For some examples, see Honoré, A. (2022). 'Demand response to high gas prices in Europe in 2021 and early 2022'. <https://www.oxfordenergy.org/publications/demand-response-to-high-gas-prices-in-europe-in-2021-and-early-2022/>

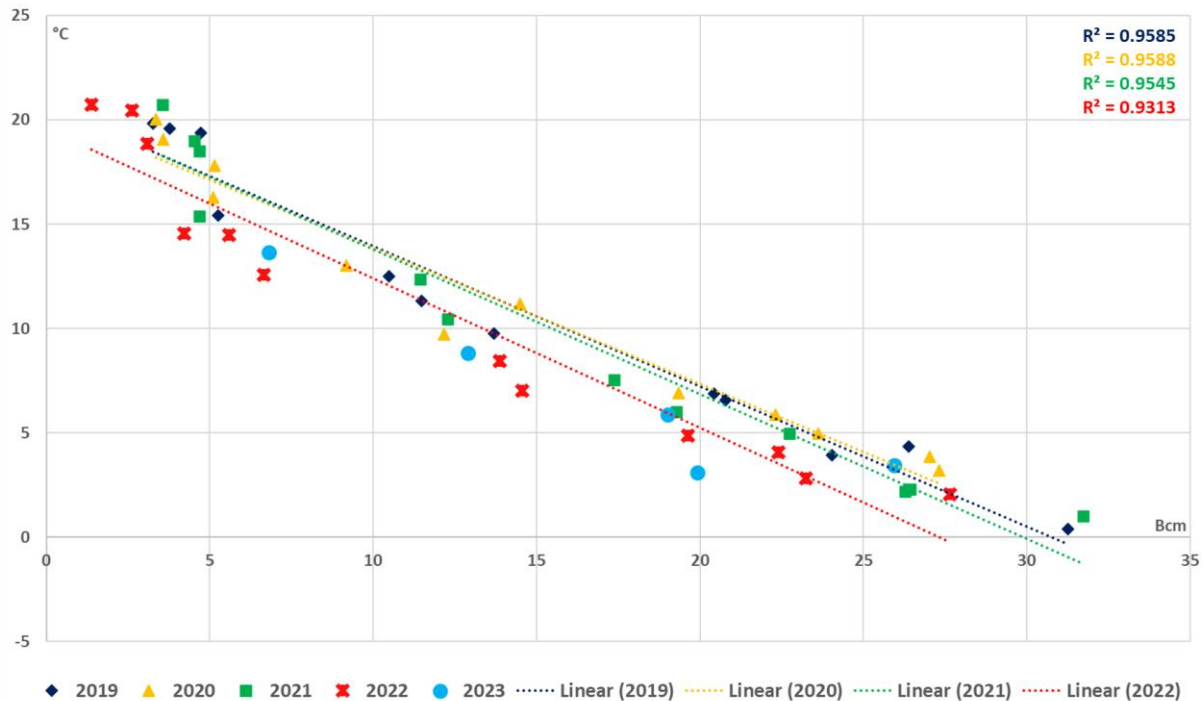
³⁹ Space heating in buildings covers energy use in the residential sector (the largest segment), the commercial sector and the industrial sector. This demand is very responsive to fluctuations in temperatures, but short-term price elasticity is relatively nonexistent, or at best, fairly limited due to a combination of factors. First, consumers do not have easy access to alternative options for heating. Second, in addition to these physical limitations, the degree to which end-use consumers would be affected by higher gas prices also depends on the type of contracts they have with their suppliers: contracts based on fixed tariffs would not reflect fluctuations of wholesale prices quickly. It is also possible that even for contracts with variable rates, gas suppliers had not adapted their rates to reflect higher procurement costs by December 2021 (therefore not impacting the level of gas demand in the last months of 2021), though they probably had done so by the first months of 2022. Finally, the share of the energy bill relative to the customers' income would also play a role in this, nonetheless, rather inelastic price demand and this varies considerably across Europe

⁴⁰ In 2020, with widespread remote working, cooler weather is thought to have had a stronger impact on gas use than usual. This is likely to have benefited gas demand in Western countries with high volumes of gas used in residential heating, such as the UK, Italy, Germany, France, and the Netherlands

One example was reported by thermostat maker Tado based on its own consumers' behaviours. The company's analysis of more than 100,000 customers in Europe showed an increase of 9 per cent in heating energy demand in Germany in March and more than 40 per cent in Italy and Spain, where COVID restrictions started on 9 March and 14 March respectively, while outside temperatures differed by only 1°C on average from the previous year. <https://www.current-news.co.uk/news/lockdown-causes-british-households-heating-use-to-soar>

⁴¹ According to the European Heat Pump Association, the European heat pump market broke a new record in 2022 with around 3 million units sold in 21 markets, which represents a growth of 39 per cent, even more than the previous year's unprecedented rise of 34 per cent in annual sales. <https://www.ehpa.org/market-data/>

Figure 13: Monthly gas demand in residential and commercial vs temperature variations in Europe in 2019 – 2023 (Bcm and degrees Celsius)



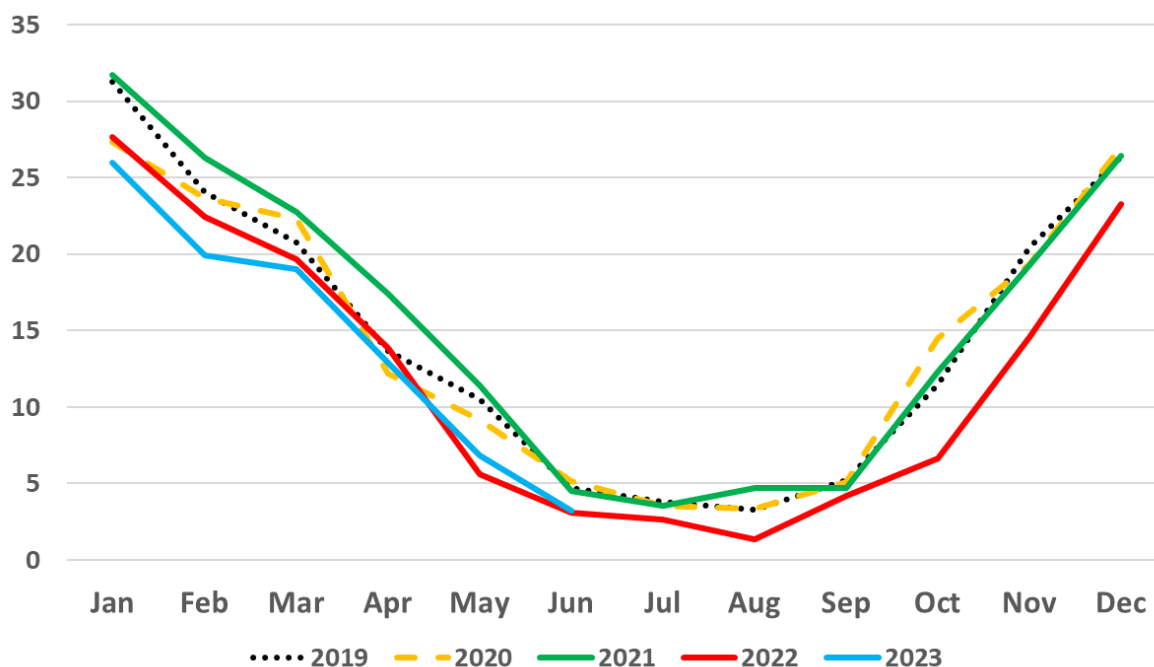
Source: Author's calculations. Gas demand data from author's estimates and temperature data from EU Copernicus programme. Graph by the author

Incentivising customers to turn down their heating, especially during the coldest days, while at the same time providing financial support to shield them, at least partially, from soaring prices was a tricky balancing act in 2022, but many policies did count on customers turning down their thermostats to save energy (and therefore gas) last winter.⁴² Rising affordability issues and the communications campaigns to incentivise energy savings seem to have paid off with clear signs that non-weather related factors helped reduce gas use in the residential and commercial sector probably by 10-15 Bcm in 2022 (equivalent to more or less 30 per cent of the total reduction in this sector).

All in all, this author estimates that gas demand in the residential and commercial sector (essentially for heating) fell by 22 per cent in 2022 (-40 Bcm) and again by 5 per cent in the first half of 2023 (-4 Bcm), despite a colder February and, to a lesser extent, spring (April and May) as seen in Figure 14.

⁴² For instance, the REPowerEU document published on 8 March 2022 by the European Commission mentioned that turning 'down the thermostat for buildings' heating by 1°C [would save] 10bcm' (p.6). https://eur-lex.europa.eu/resource.html?uri=cellar:71767319-9f0a-11ec-83e1-01aa75ed71a1.0001.02/DOC_1&format=PDF
 The IEA also mentioned the measure in its 10-point plan to reduce the European Union's reliance on Russia natural (9th point): <https://iea.blob.core.windows.net/assets/2db624be-ccda-4bc7-80a8-9bd3787efcd9/10PointPlanToReduceTheEuropeanUnionsRelianceOnRussiaNaturalGasinfographic.pdf>
 Individual countries are also counting on customers' participation, for instance in the Netherlands. <https://www.rferl.org/a/dutch-reduce-russian-gas-campaign/31782700.html>

Figure 14: Gas demand in the residential and commercial sector in Europe, 2019-2023 (Bcm)



Source: Data from author's calculations. Graph by the author

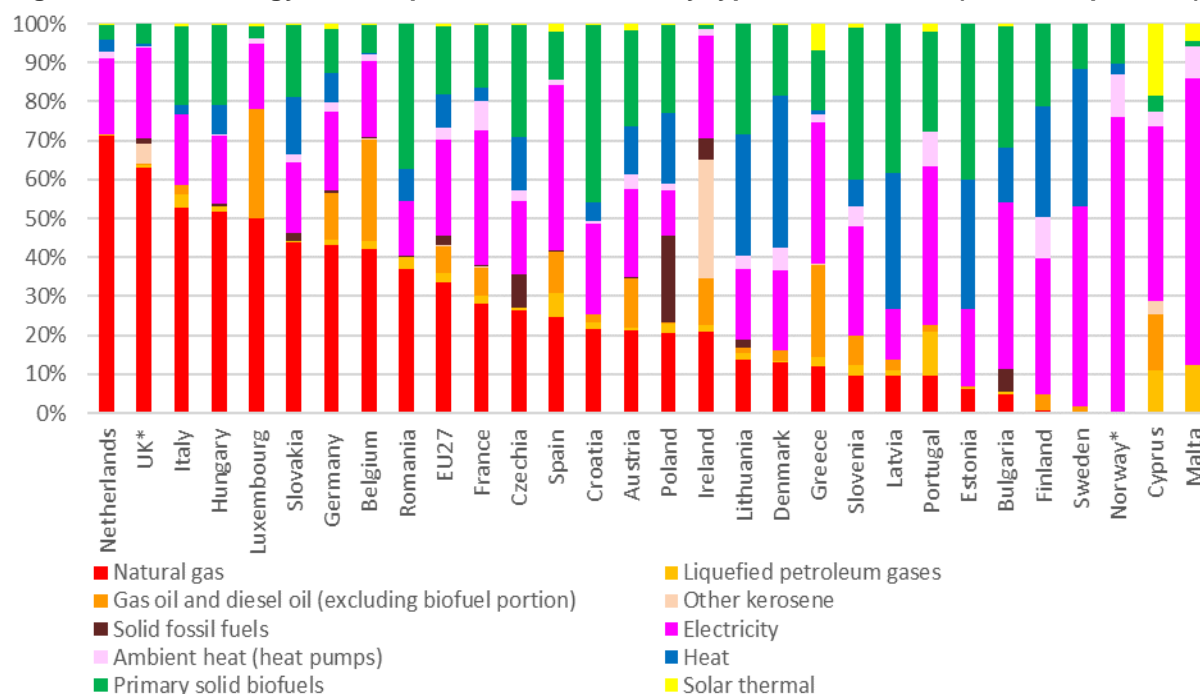
As gas is the largest single source of energy used for heating in the residential sector in Europe (37 per cent in 2021),⁴³ continued participation of small consumers in demand saving measures is going to be essential for the rest of 2023 to keep gas consumption under control, and especially to limit a sudden surge in gas demand during the coldest days. However, consumers' willingness to reduce their energy for heating may erode when cold temperatures finally hit Europe. The early days of December 2022, when temperatures across Europe plunged below their 5-year average, seemed to confirm this with a sharp rise in gas demand for heating in the residential and commercial sector. This was again seen during the cold spell in the first half of February 2023, though the impact was not, and will never be, uniform across Europe due to differences in weather and in the role of gas for space heating as illustrated in Figure 15. However, requirements rose less than has been seen in previous winters with similar temperatures.⁴⁴

Because 2022 was especially warm, both at the beginning and the end of the year, the probability that 2023 will be colder is important (although Q1 2023 was warmer than Q1 2022), with gas use for heating likely to be higher this year although some uncertainty remains about consumers' ability and willingness to continue to save energy in a lower-price environment. With price signals possibly much weaker than in winter 2022/2023, the effectiveness of campaigns and government policies could be put to the test. Consumers are still being urged to consider installing insulation and/or more efficient heating systems to keep their consumption down and help save on their energy bill in the future, but it will be interesting to see whether this advice is heeded on a continuing basis. Cooler temperatures this winter would also increase the demand for electricity in the heating sector, and in turn, potentially boost the use of gas in the power sector.

⁴³ Around a quarter of energy used for heating in the residential sector in Europe comes from electricity, and in turn, gas covers about 20 per cent of Europe's electricity needs.

⁴⁴ <https://direct.argusmedia.com/newsandanalysis/article/2402159>

Figure 15: Final energy consumption in households by type of fuel in 2021 (shares in per cent)



Note: Data for Norway and the UK is for 2019

Source: Data from Eurostat. Graph by the author

Focus on the power sector

Gas used in the power sector typically represents around 30 per cent of gas demand in Europe, with gas covering about 20 per cent of electricity generation in 2022. In contrast to the trends observed in the industrial and heating sectors, gas used for electricity generation increased by almost 3 per cent (+4 Bcm) year-on-year in 2022 despite aims to reduce gas consumption and high gas prices, which should have pushed the fuel down the merit order and favoured other sources.

Three main elements influenced the need to use more gas in the generation mix. First, there was continued high electricity demand in the first eight months of the year, before energy saving measures and the economic slowdown finally started to have an impact from September onwards as illustrated in Figure 16. Exceptionally mild temperatures in Q4 2022 also helped to limit the need for electricity demand.

The second reason was low availability of nuclear power. Nuclear generation was down by 116 TWh (16 per cent yoy), with most of the decrease concentrated in May-November as seen in Figure 17. About 69 per cent of the decline (80 TWh) originated from France alone. The French utility EDF faced a wave of repairs caused by stress corrosion plus delays to its scheduled ten-year maintenance plan due to the COVID pandemic (as well as strikes in France in October 2022), which forced a record number of reactors offline for most of the year. As a result, French nuclear generation was down by 23 per cent in 2022, lifting thermal power generation in the country and in neighbouring markets.

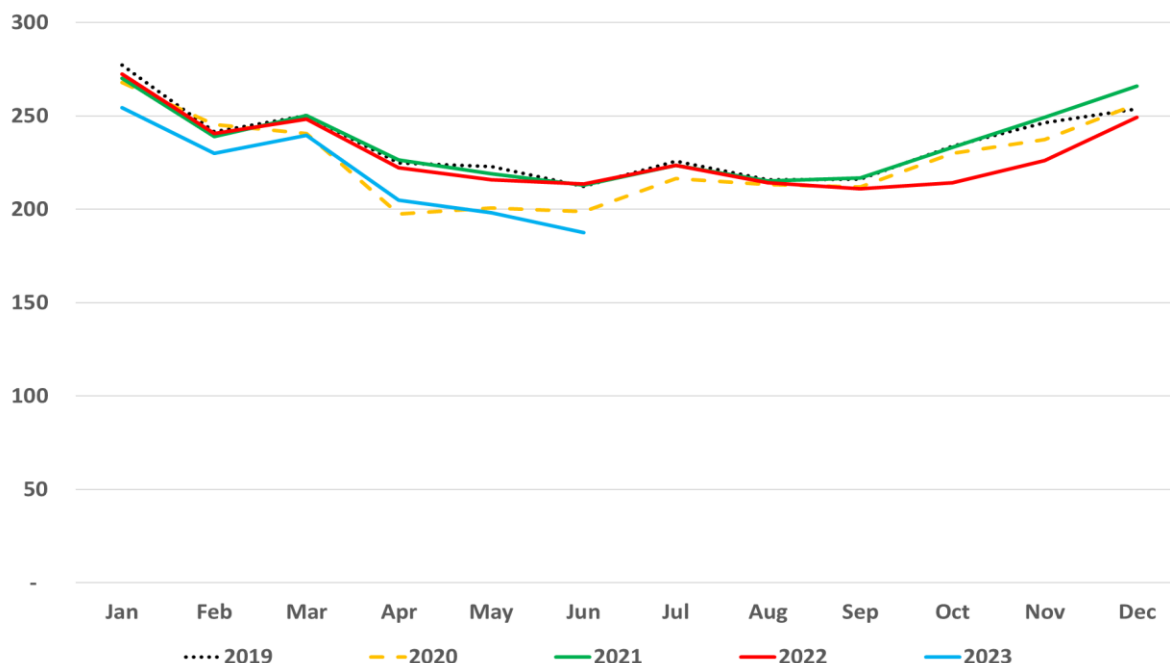
Another important factor was the closure of three reactors in Germany at the end of 2021 as part of the country's phase-out process, which limited nuclear generation to 33 TWh in 2022 compared to 65 TWh in 2021 (this accounted for about 28 per cent of the total decline in nuclear generation in Europe last year).

Thirdly, the severe drought across Europe, especially in the south, depleted hydro stocks last year. Hydropower generation fell by 53 TWh (15 per cent), with the bulk of the year-on-year decline

concentrated in the first nine months, although this result is also explained by existing low levels of hydro generation in Q4 2021.

The sharp fall in both nuclear and hydro generation was partly covered by lower electricity demand (70 TWh). Higher generation from renewables covered about two thirds of the gap, helped by additional installed capacity (wind 39 TWh and solar with an impressive growth of 32 TWh). Electricity from coal and gas made up for the rest (23 TWh and 14 TWh respectively).

Figure 16: Monthly (total) electricity demand in the EU27 + UK (TWh)



Source: Data from author's calculations, Entsoe and Gridwatch. Graph by the author

It was a remarkably different picture in Europe in the first half of 2023 with strong renewables availability that limited the need for gas (-18 per cent yoy) and coal (-22 per cent yoy) in the generation mix, despite low nuclear generation (-8 per cent yoy) as seen in Figure 18.⁴⁵ This situation was also helped by continued depressed electricity demand (-7 per cent yoy), the result of muted activity in energy-intensive industries, together with continued improvements in energy efficiency and behavioural changes.

As a result, two thirds of the electricity generated came from low or zero emissions sources: renewables covered 44 per cent of European needs (up from 39 per cent in H1 2022), while the share of nuclear remained at 23 per cent. Fossil fuels were down to 33 per cent (from 37 per cent) with natural gas alone at 17 per cent (down from over 19 per cent).⁴⁶

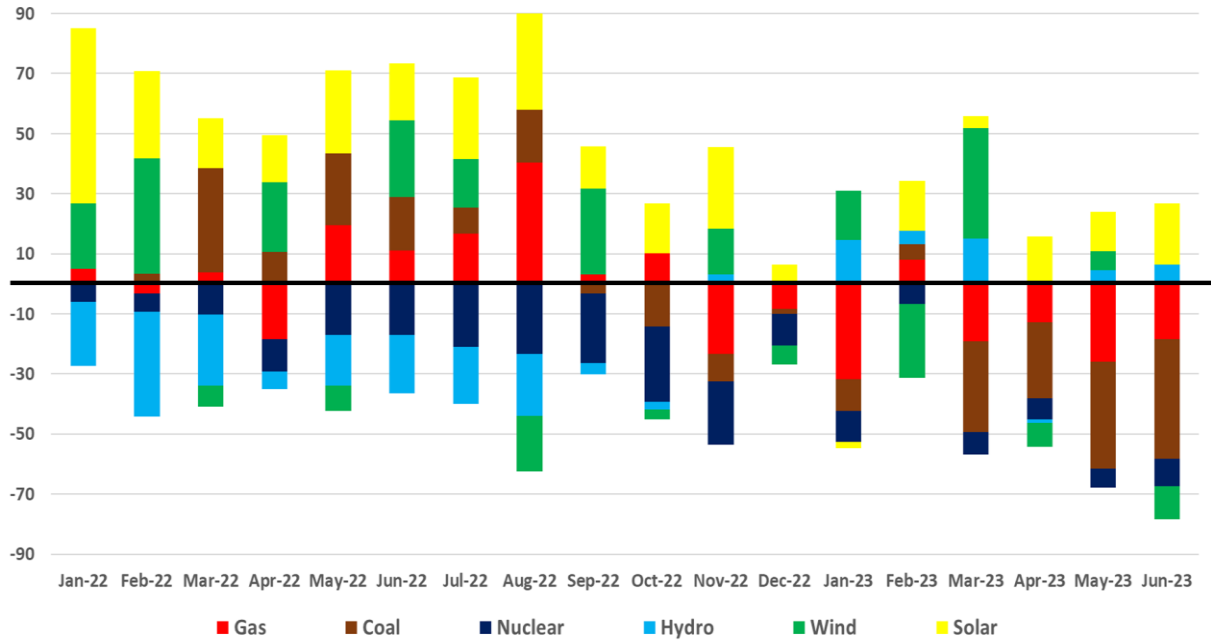
The main drivers for gas consumption in the power sector over the next few months will be the pace and scale of the French nuclear recovery, the level of electricity demand, the availability of renewables and especially hydropower generation this summer, and finally the extent of coal to gas switching.

⁴⁵ Smaller sources are not mentioned in this paragraph and in Figure 18

⁴⁶ Calculations from the author from data from Entsoe and Gridwatch

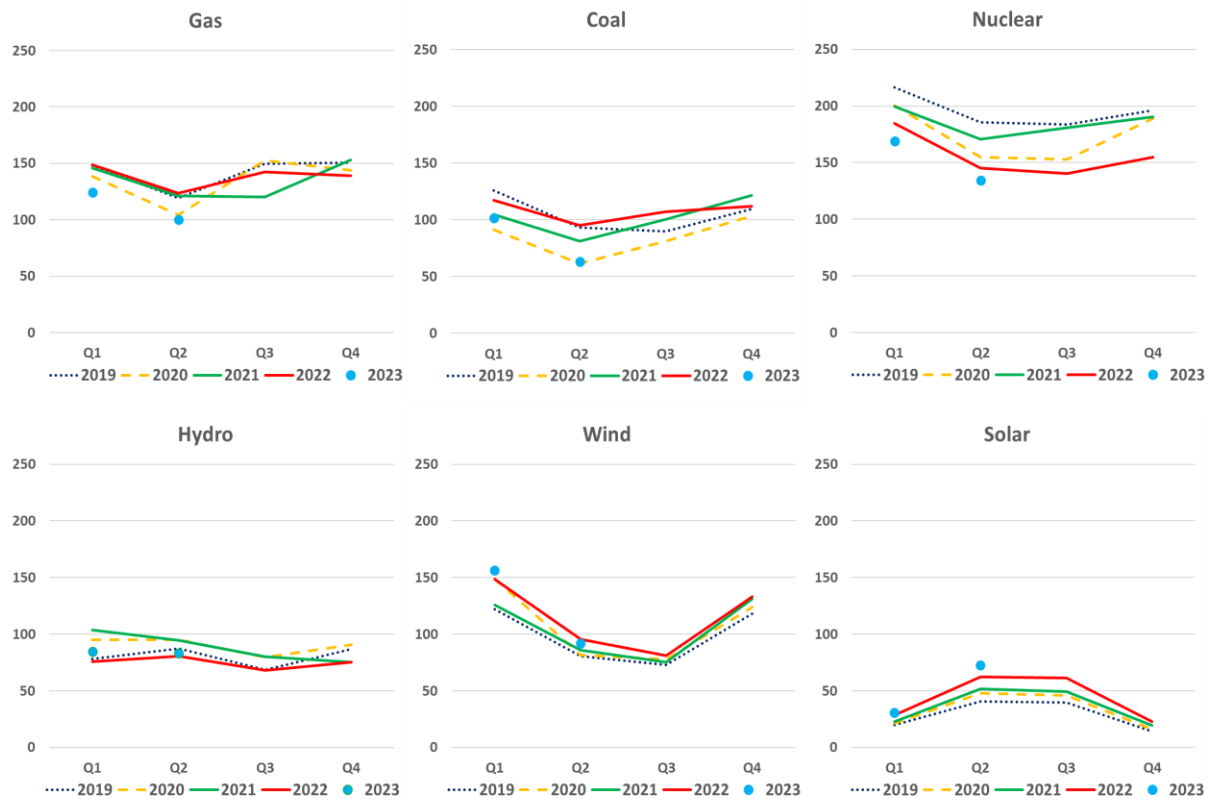


Figure 17: Monthly changes in electricity generation in Europe by source, year-on-year from January 2022 to June 2023 (per cent)



Source: Data from author's calculations, Entsoe and Gridwatch. Graph by the author

Figure 18: Quarterly electricity generation in the EU27 + UK (TWh)



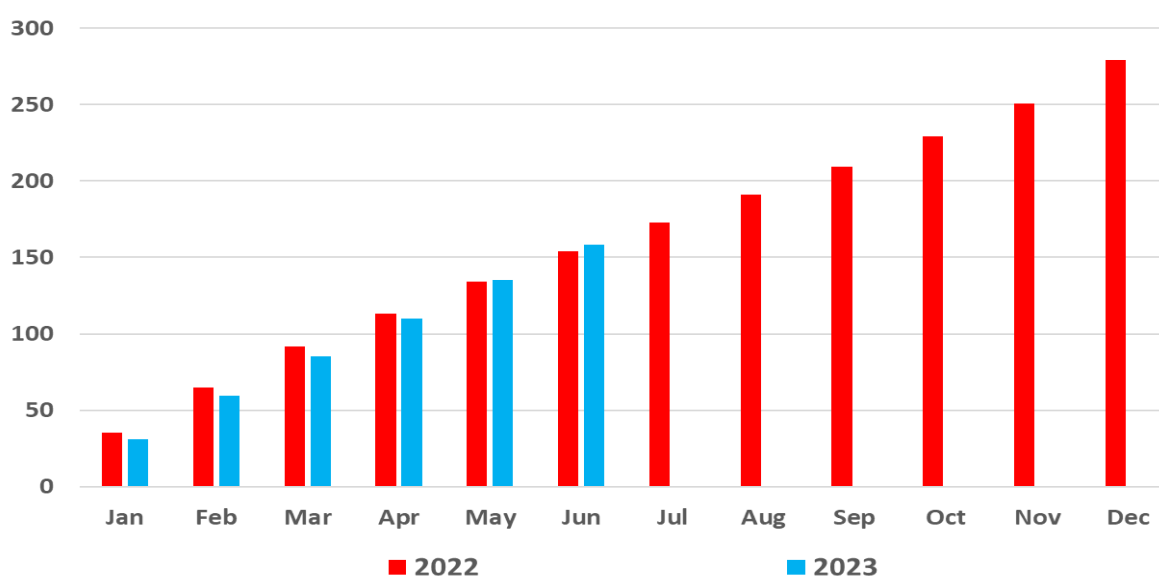
Source: Data from author's calculations, Entsoe and Gridwatch. Graph by the author

French nuclear: slow recovery, cautious optimism

In 2023, one of the key factors will be the availability of the French nuclear fleet, as French nuclear generation typically covers about 15 per cent of European electricity needs.⁴⁷ The French utility EDF raced against the clock last year to put as many reactors as possible back in service as soon as possible.

The availability of the French nuclear fleet has significantly improved in 2023 as several reactors have reconnected to the grid after safety checks were concluded. In the first six months of 2023, nuclear generation in France was 2.3 per cent higher year-on-year, with cumulated generation above 2022 levels from May (Figure 19). By the end of June 2023, available capacity was around 30-35 GW (about 5 GW more yoy).

Figure 19: Electricity generation from nuclear in France in 2022 and 2023 (TWh)



Source: Data from EDF. Graph by the author

In its short-term outlook published in June 2023, the French transmission system operator RTE expected the availability of the nuclear fleet to be 5 to 10 GW higher over the summer and autumn, and again up by 5 GW year-on-year in the winter (with a central trajectory of 40-45 GW available in December and 45-50 GW in January) as shown in Figure 20.^{48,49}

Last year, EDF brought down its nuclear output estimate for 2022 four times, with the actual production reaching 279TWh, its lowest level in over thirty years.⁵⁰ EDF has so far confirmed its expectations for 300-330 TWh of nuclear generation for 2023 after submitting a revised inspections plan for the 16 reactors most at risk from stress corrosion.⁵¹ This would still be relatively low by historical standards (the average generation over the last 20 years is about 402 TWh⁵²) but nonetheless 8 to 18 per cent above 2022.

⁴⁷ Author's calculations from Entsoe data

⁴⁸ The starting date of the Flamanville EPR has been delayed to mid-2024

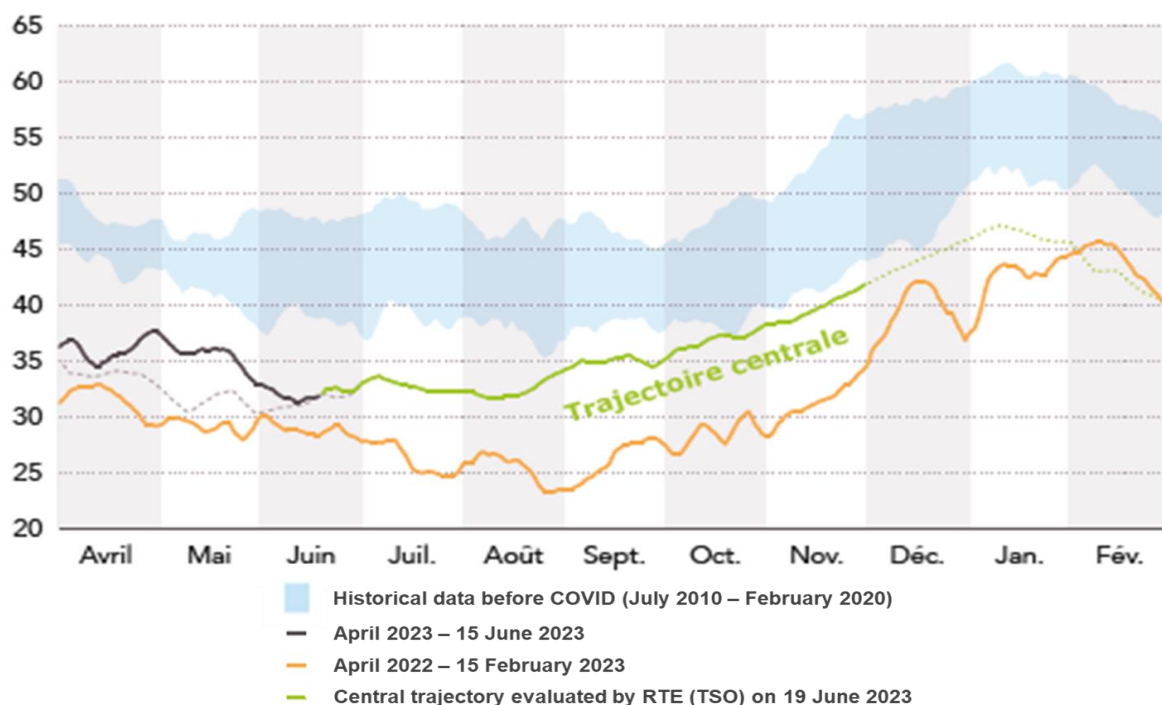
⁴⁹ <https://assets.rte-france.com/prod/public/2023-06/2023-06-28-perspectives-securite-approvisionnement-%C3%A9t%C3%A9-hiver-2023-complet.pdf>

⁵⁰ Data from the French utility EDF

⁵¹ Platts S&P Global, Power in Europe, Issue 891, 17 March 2023

⁵² Data from French transmission system operator RTE

Figure 20: Availability of the French nuclear fleet for summer 2023 and winter 2023/2024 (GW)



Source: RTE, Perspectives pour la sécurité d’approvisionnement en électricité pour l’été, l’automne et l’hiver 2023, p.12, June 2023

The French nuclear situation is in a much better situation than a year ago, but some uncertainties remain. First, EDF still needs to carry out planned decennial safety reviews on top of stress corrosion protection maintenance on a few reactors this year, and the discovery of new fissures at three reactors in early 2023⁵³ has cast another potential shadow on the availability of the fleet with further checks required (although there was no specific concern at the time of writing). Second, low hydro stocks could limit the availability of some nuclear reactors over the summer, as seen in previous years in France.⁵⁴

Nonetheless, French nuclear availability is expected to grow year-on-year in 2023, and combined with the higher capacity in Finland,⁵⁵ it is expected to mitigate the impact of the plant closures that happened in Germany, Belgium and the UK in 2022 and early 2023.⁵⁶ Works and maintenance are planned across Europe in Q3, but nuclear availability should only be marginally reduced without major impact on gas.

Strong renewables in H1, but warmer-than-average summer

Improved availability of French nuclear power combined with continued roll-out of renewables across Europe (centralized and decentralized), hydropower reserves above historical averages and low electricity demand should keep the call on gas-fired plants below 2022 levels, but gas-fired generation

⁵³ Platts S&P Global, Power in Europe, Issue 891, 17 March 2023

⁵⁴ <https://www.ecologie.gouv.fr/secheresse-economiser-leau>

⁵⁵ The 1.6GW Olkiluoto 3 nuclear reactor finally began full commercial operations on 1 May 2023

⁵⁶ Germany’s last three nuclear plants (1.4GW Isar 2, 1.34GW Emsland A and 1.3GW Neckarwestheim 2 units) closed in mid-April 2023

Belgium decommissioned the Doel 3 and Tihange 2 plants in September 2022 and February 2023 (2GW in total) as planned as part of the previous policy to phase out nuclear by 2025

In the UK, the 1GW Hunterston B was closed in January 2022 and the 1GW Hinkley Point B closed in August 2022

could pick up over the summer at times of low renewable availability and increased electricity demand for air conditioning.

By June 2023, the level of hydropower reservoirs across Europe was generally higher year-on-year, including in the Nordic countries, in France and Switzerland and in southern Europe (Spain and Italy) but with the notable exception of Austria. However, hydro generation will also depend on how much precipitation Europe gets until the end of the year, which is becoming increasingly unpredictable and an important source of uncertainty. As of mid-July 2023, the EU Joint Research Centre anticipated higher-than-average precipitation levels for the Mediterranean region but significantly lower than usual ones for central and northern Europe, especially around the Baltic Sea.⁵⁷

Seasonal weather forecasts were also expecting a warmer-than-average summer, which would increase electricity demand for air conditioning in Q3, although how much will depend on customers behaviour and whether the good practice of last winter is carried on. In addition, high temperatures would rise water temperatures in rivers, which could affect the cooling system of some of France's nuclear reactors, and therefore there could be episodes of limited availability of some their nuclear fleet over the summer.

The continued deployment of renewables will increase the availability of wind and solar and compensate for some of the hydro shortfalls,^{58,59} but these sectors are also facing uncertainties created by inflation, supply constraints in sourcing some materials, revenue caps, and looming market reforms, plus continued slow approval processes and supply chain disruptions.

Coal to gas switching: limited impact

In the first half of 2023, electricity generation from gas fell by -18 per cent while generation from coal was down by -22 per cent. The decline in coal-based generation was steeper than for gas, reflecting the deteriorating competitiveness of coal-fired plants in the mix amid the sharp drop in gas prices and high prices for EU ETS emission allowances.⁶⁰ The clean spark spreads have been generally well above the clean dark spreads in most continental European countries since mid-February 2023, and even from mid-January in the UK, as gas prices fell faster than coal while the price of carbon emission allowance remained firm. In other words, incentives for coal to gas switching have been there for most of the last six months, but thanks to the good availability of wind, solar and hydro in the first half of 2023, combined with the progressive return of some French nuclear reactors and low electricity demand, the need for electricity generation from both coal and gas has been kept relatively low (as shown in Figure 21 for gas), and any switching from coal to gas has not been enough to put an upward pressure on the gas price. Coal-fired plants are not expected to regain competitiveness against gas-fired plants before the winter, when gas prices are likely to rise again with seasonal demand.

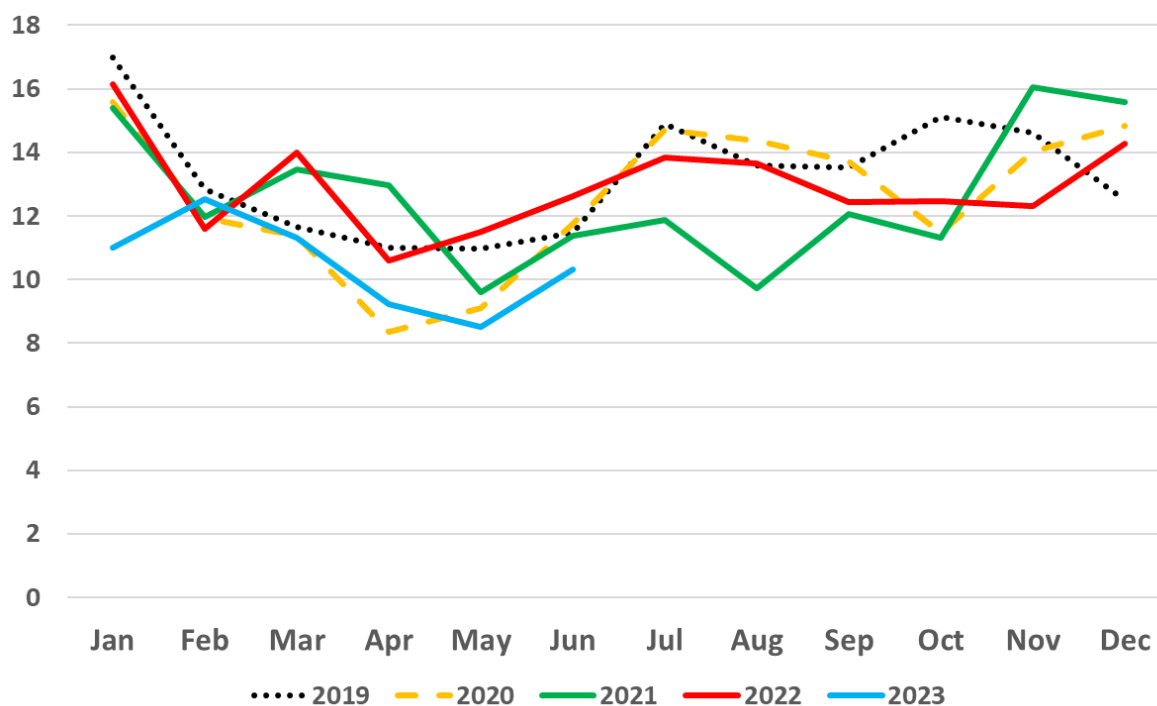
⁵⁷ https://joint-research-centre.ec.europa.eu/jrc-news-and-updates/variable-drought-conditions-keep-affecting-large-parts-europe-2023-07-14_en

⁵⁸ After an impressive growth in 2022, the solar sector is set to continue its positive trend in 2023 with 53 GW of new installations after 41 GW in 2022 according to SolarPower Europe. EU Market Outlook for Solar Power 2022-2026 - SolarPower Europe

⁵⁹ <https://windeurope.org/intelligence-platform/product/wind-energy-in-europe-2022-statistics-and-the-outlook-for-2023-2027/>

⁶⁰ €87 per ton on 12 July 2023. Data from Argus, retrieved on 15 July 2023

Figure 21: Gas demand in the power sector in Europe, 2019-2023 (Bcm)



Source: Data from author's calculations. Graph by the author

Conclusions: gas demand fundamentals in Europe in H1 2023 and short-term outlook

The European gas market is still tight, but new LNG import capacity has been added,⁶¹ storage filling was already over 80 Bcm at the end of June 2023,⁶² and overall gas (and electricity) demand has gone down with limited prospects of a rapid recovery this year. Nonetheless, Europe must remain vigilant.

Gas supply and demand balances will continue to be a complex puzzle with many moving pieces, but minimizing gas demand will remain necessary to prepare for Winter 2023/2024 (and even for the following winters until the next LNG wave in 2026/27) as suggested by the EU Commission's proposal to extend the voluntary gas demand cuts of 15 per cent from 1 April 2023 to 31 March 2024.⁶³

Contrary to earlier expectations that lower gas prices would trigger a recovery, gas demand was down by 11 per cent in the first six months of 2023 (-27 Bcm) in Europe (EU27 + UK). This evolution was largely driven by the decline in gas use for power generation (-18 per cent, -14 Bcm), but also in the industrial sector (-13 per cent, -6 Bcm) and finally in the residential and commercial sector (-5 per cent, -4 Bcm).

The pace of demand reduction slowed from -12 per cent in Q1 to -10 per cent in Q2 year-on-year. In Q1, the fall was shared among the three main sectors: the power sector was responsible for 39 per

⁶¹ More information on the short-term outlook on supply to Europe in the latest OIES Quarterly Gas Review published on 18 July 2023. <https://a9w7k6q9.stackpathcdn.com/wp-content/uploads/2023/07/OIES-Quarterly-Gas-Review-Issue-22.pdf>

⁶² 81.4 Bcm on 30 June 2023. <https://alsi.gie.eu/>

⁶³ 15 per cent reduction compared to their average consumption in the period between 1 April 2017 and 31 March 2022. <https://www.consilium.europa.eu/en/press/press-releases/2023/03/28/member-states-agree-to-extend-voluntary-15-gas-demand-reduction-target>

cent of the decline, the industrial sector for 25 per cent and the residential and commercial sector for 27 per cent. In Q2, 75 per cent of the decline came from power generation in a context of continued depressed electricity demand, ongoing return of French nuclear capacity and stronger renewable power output. About 20 per cent of the fall came from the industrial sector amid an ongoing manufacturing collapse and generally subdued economic growth in Europe.

Gas demand is driven by a combination of multiple factors. It is difficult to disentangle all the different drivers that influence it, but the power sector and the residential and commercial sector appear to concentrate most of the uncertainties for the next six to nine months in Europe.

The availability of French nuclear power has improved and both the utility EDF and the transmission operator RTE seem to be confident that the trend will continue in the second half of 2023. However, stress corrosion protection maintenance and planned decennial safety reviews still need to be carried out this year, and the evolution of the situation should still be closely monitored. In addition, hydro availability and record-high temperatures this summer could trigger additional gas use in the generation mix.

This winter, the level of temperatures and energy saving measures will be two equally important factors that will influence seasonal demand, as seen last winter. But uncertainties remain on the willingness and ability of the (small) consumers to continue adapting their behaviour in a context of lower year-on-year gas and energy prices, and any cold days would add quickly to the market tightness this winter.

In the industrial sector, only the petroleum sector has consumed more gas in H1 2023 than in 2022. The other sectors have contracted less year-on-year, but monthly recovery has been limited, especially in Q2. For the rest of 2023, an ongoing manufacturing collapse and, more particularly, the deterioration of the business climate in Germany will weigh on gas demand recovery. Firms seem to have been taking a wait-and-see approach by holding off switching back to gas or fully reopening plants that were suspended or operating at partial capacity. This situation could last until after the winter, or at least until the visibility over gas market fundamentals improves. Therefore, at the time of writing this Energy Insight (July 2023), and despite lower gas prices year-on-year, industrial gas demand recovery in Europe was likely to be gradual and capped by low end-user demand in the second half 2023.

All in all, the main conclusion of this Energy Insight is that gas demand fundamentals in the three main sectors now seem to point towards lower gas demand in Europe in 2023 even if gas prices fall further. Marginal growth in the second half of the year (+0.5 per cent yoy) is anticipated driven by a small decline in the power sector due to the gradual return of French nuclear power and continued depressed electricity demand; a muted demand recovery in the industrial sector; and an anticipated colder winter in October-December with higher gas use for heating compared to 2022. If this scenario materialises, it would bring the total gas decline for 2023 to -6 per cent year-on-year.