

Europe's Energy Reckoning

Gas Shortages in Europe & Future Implications

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Gas Summary

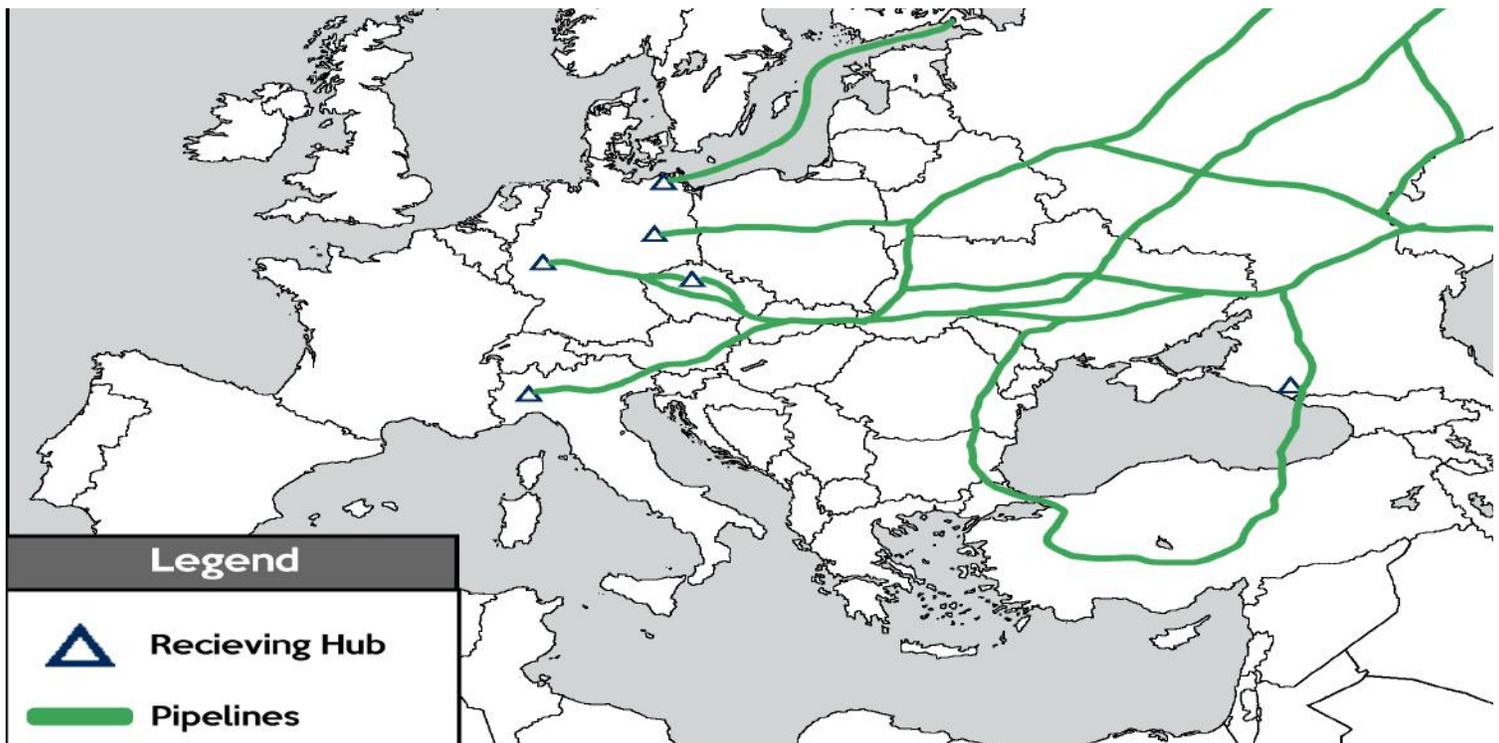


- EU gas levels are at their lowest points in decades due to internal and external supply bottlenecks brought on by pandemic shocks and reopening, and exacerbated by geopolitical strife in Europe.
- Gas futures are expected to remain elevated for at least another 12 month period - European utility companies bearing the brunt of hefty costs
- At the same time, more stringent climate regulation, as well as the exit of the U.K. from the European Emissions Trading Scheme (ETS), is making European carbon more expensive (ending 2021 at prices around 80 €/t CO₂e). All while extraneous effects are pushing the price of natural gas to new heights (peak of 181€/MWh December 2021).
- The higher price of pollution, coupled with higher prices for natural gas are disincentivizing investment into native production within the continent. Countries in Europe are turning back to coal-fired and oil-fired power to substitute gas.
- This switching back of coal and oil, means that there are continuously lower ETS permits available for the market, and an upward pressure on the price of both natural gas and carbon permits.



Gas Overview

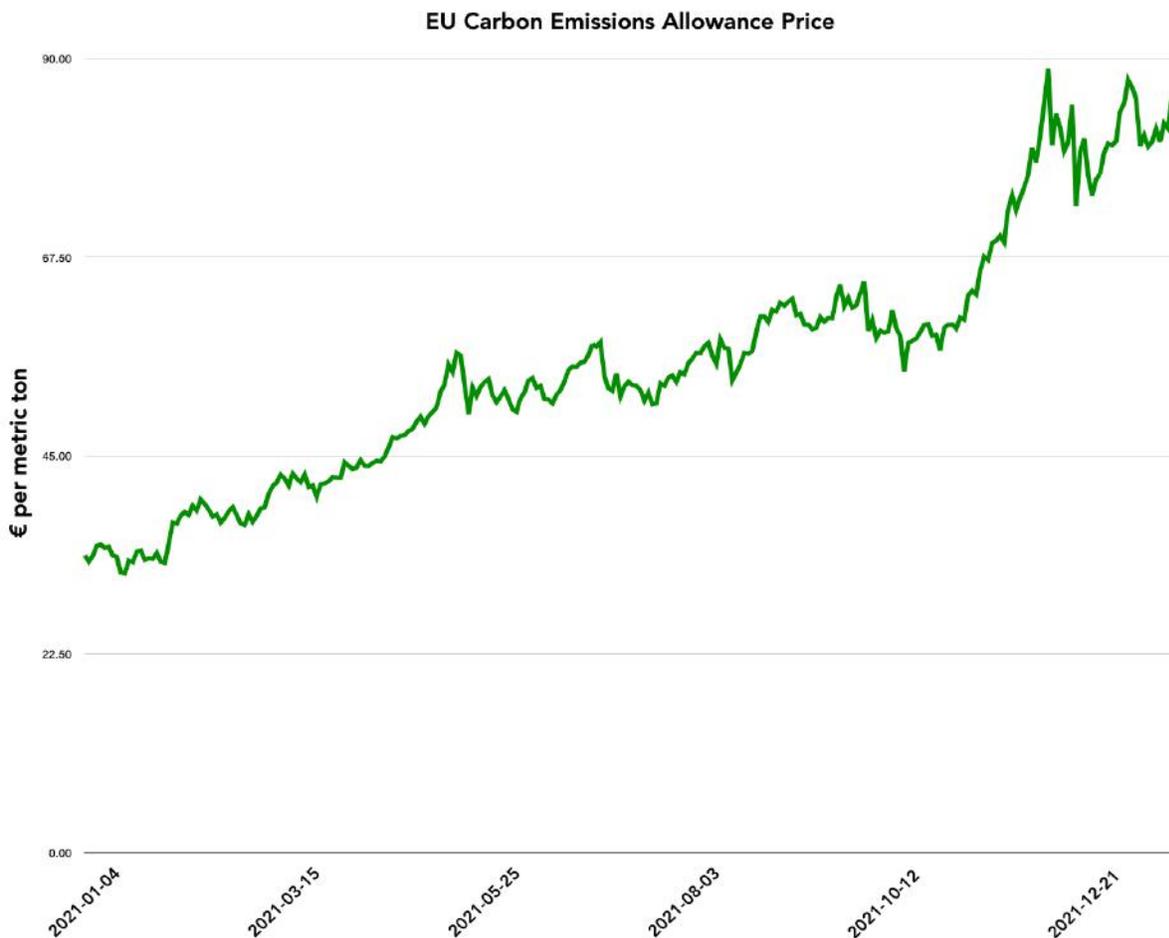
European natural gas prices on the spot market have fluctuated widely over the past months as a result of a variety of global and regional economic factors, which are closely interlinked with a greater geopolitical conflict on the continent. European Union (EU) gas prices saw an [incredible rally in 2021](#) - starting the year at 15.75€/MWh, and peaking at 181€/MWh in late December - constituting over a 1000% increase. Prices have since dropped and seem to be more stable at ~90€/MWh. In the past 10 years, the European continent had [not seen the cost of gas rise above 30€/MWh](#). The economic recovery from the COVID-19 pandemic is one culprit for prices spiking in 2021. European demand rebounded in the summer following vaccination efforts and [supply was not able to respond in tandem](#). This undersupply was then reflected in record-high natural gas prices. In addition, the trading of the commodity has shifted from long-term contracts to [spot and derivative markets in the past decade](#), making it susceptible to price swings and bidding wars. Rising carbon prices under European Union regulations have gradually disincentivized increasing native natural gas supplies among member states. The [Nord-stream 2](#) project offers a solution to the problem, yet this itself is entangled in geopolitical and regulatory complications. The European continent in response is shifting to ['dirty coal and oil'](#) and debating the revival of nuclear power to bridge the gaps in its energy demand - to the detriment of the transition towards a low carbon future in Europe in the short term. This brief will cover the two issues of a rising carbon price, and the pandemic recovery, in relation to the increasing prices of natural gas.



Source: National Geographic

Rising Carbon Prices & Natural Gas

The European carbon price, as determined by the trading of EU Emission Trading Scheme (ETS) permits, has been increasing at [unprecedented rates](#) since Q1 of 2020. Last year the price rose from 32.57 €/t CO₂e to 78.76 €/t CO₂e, representing over a 140% increase in just 12 months. The average annual growth rate from 2018 through 2020 was around 59.56% for comparison, and even more striking is the fact that the price did not climb above 10 €/t CO₂e for the years between 2012 and 2018. In this section we explore how the ETS carbon price plays into and interacts with the rising natural gas prices in the continent.



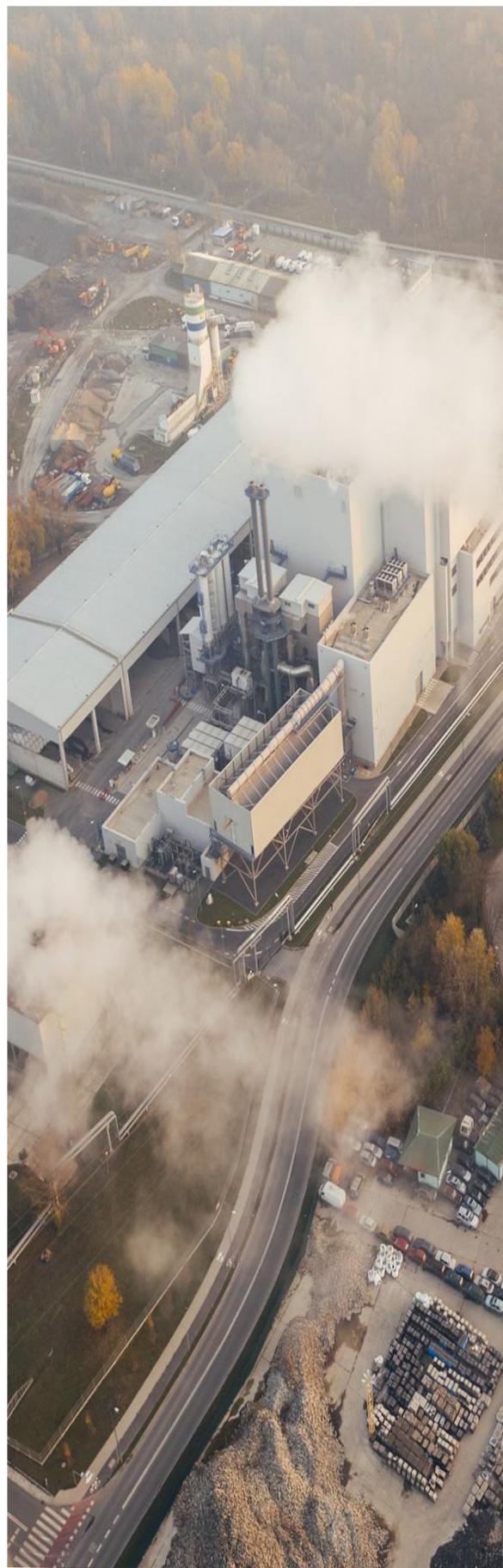
Source: Ember Climte.org

The EU ETS is the world's largest regulated market for carbon allowances and covers approximately 40% of the [EU's emissions](#). It operates as a [cap and trade system](#) with a decreasing issuance of total permits since 2013 when permits began decreasing at a steady rate of 1.74% per year. This was the case until tightening regulations in 2018 that increased the diminishing rate to -2.2%. This rate was again made tighter in 2021 (-4.2% per year) as politicians pursued more ambitious climate action goals and a total emissions reduction [target of -55% from 1990 levels by 2030](#). The mid-2021 reform also included a one-time reduction in permits, the inclusion of the maritime sector into the regulation, a faster phase-out of free permit allowances for Emissions-Intensive and Trade-Exposed (EITE) sectors of the economy, and the proposal of a Carbon Border Adjustment Mechanism - tariffs on products from nations without carbon regulation. Naturally, the ETS is designed to create upward pressure on the price of carbon as time goes by and in doing so incentivize decarbonization by companies, but one other thing affected this price further through 2020 and 2021: [Brexit](#).

The way the total cap for participating industries was set at the beginning of the program in 2005 was through the aggregation of national allocation plans of all member states. Subsequent reductions were spread out throughout the EU in a proportional manner. When the United Kingdom (UK) withdrew from the EU, and the ETS alongside it, the total permits available within the system fell by the amount that had been allocated to the UK. This would have been insignificant if the economies of all member states had progressed towards decarbonization evenly and were still comparatively in a similar position to their EU partners as at the onset of the program. But there is evidence that the UK has been extraordinarily efficient at decarbonization compared with the rest of the EU, [reducing 1.8 times as much emissions](#) (compared to 1990) as the EU average as of 2019. This would have meant that a large share of the permits that were allocated to the UK was being traded in the market instead of being utilized to legally pollute by actors in the UK. This one-time reduction in available permits within the ETS market, assuming these were largely being traded instead of being utilized, would have created upward pressure on the price of carbon.

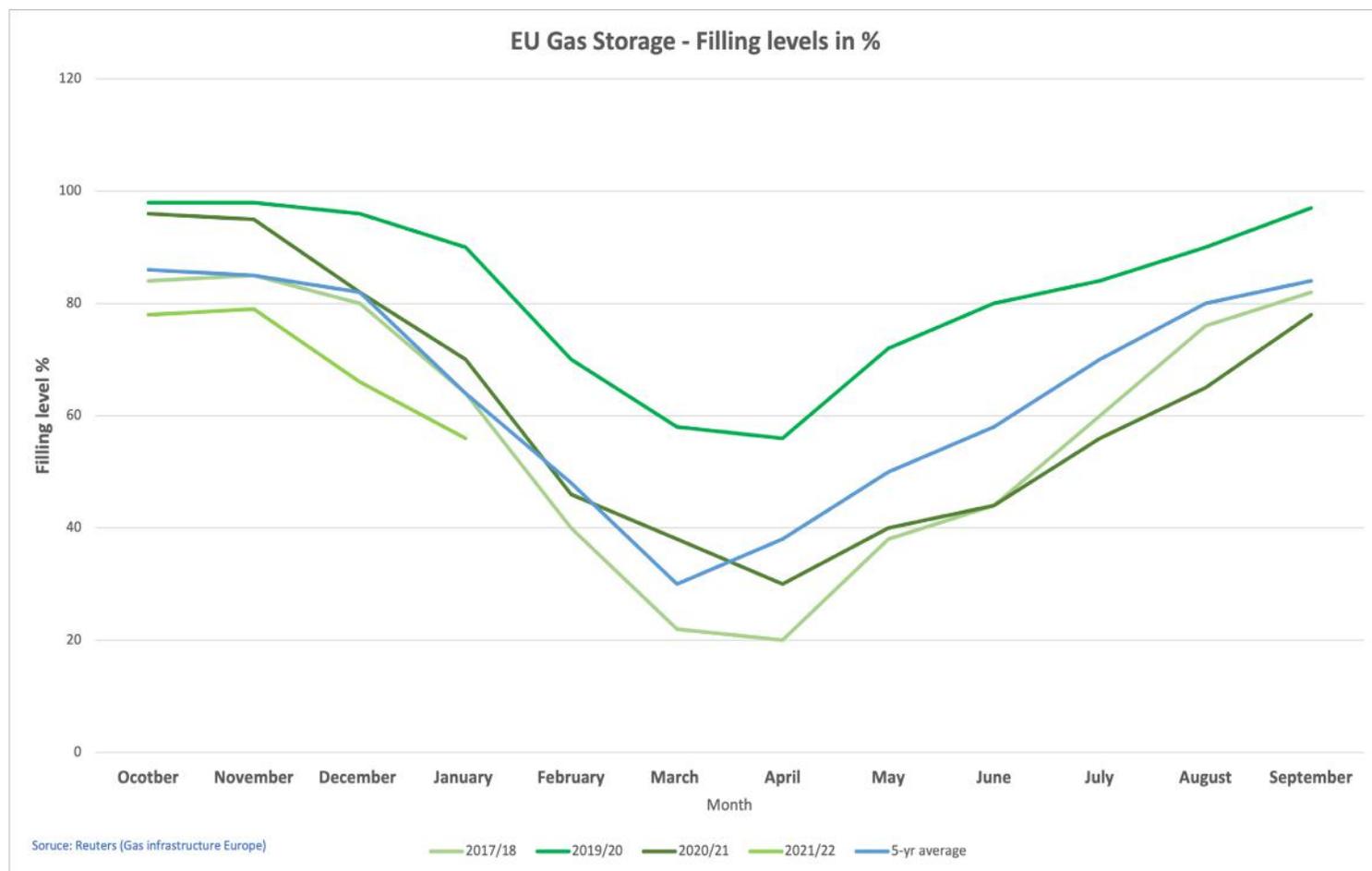


With carbon prices already increasing sharply since around Q1 2018 in response to tightening regulations, and then further increasing due to Brexit and even more stringent regulations through 2020 and 2021; natural gas-fueled power production and manufacturing would have started to look more costly. This is a demand-side issue turned into a supply issue for natural gas. As prices of utilizing natural gas went up due to pollution costs, companies would have started to shut [infrastructure off](#) and begin to look for cheaper alternatives than utilizing the fuel. When the supply issues of 2021 and the pandemic hit (elaborated further in the next sections), shooting natural gas prices up, the reaction was to [turn coal- and oil-fired power back on](#) (which emit approximately double the emissions of natural gas) in a scramble to meet the winter demand for heating and energy. The result is higher emissions, lower available ETS permits pushing up the price of emissions even further, and [high electricity prices](#) (over 200% increase in 2021 for baseload power in Germany, France, and the UK). The higher carbon prices further discourage the use of natural gas when the price of the fuel is already so high, creating a feedback loop of reverting back to coal and oil, and increasingly higher emissions prices.



Storage Short Comings & Last Summer Demand

Current energy and storage policies in the EU coupled with several other factors have led to storage levels of natural gas in the EU reaching their lowest point in a decade. These factors, both internal

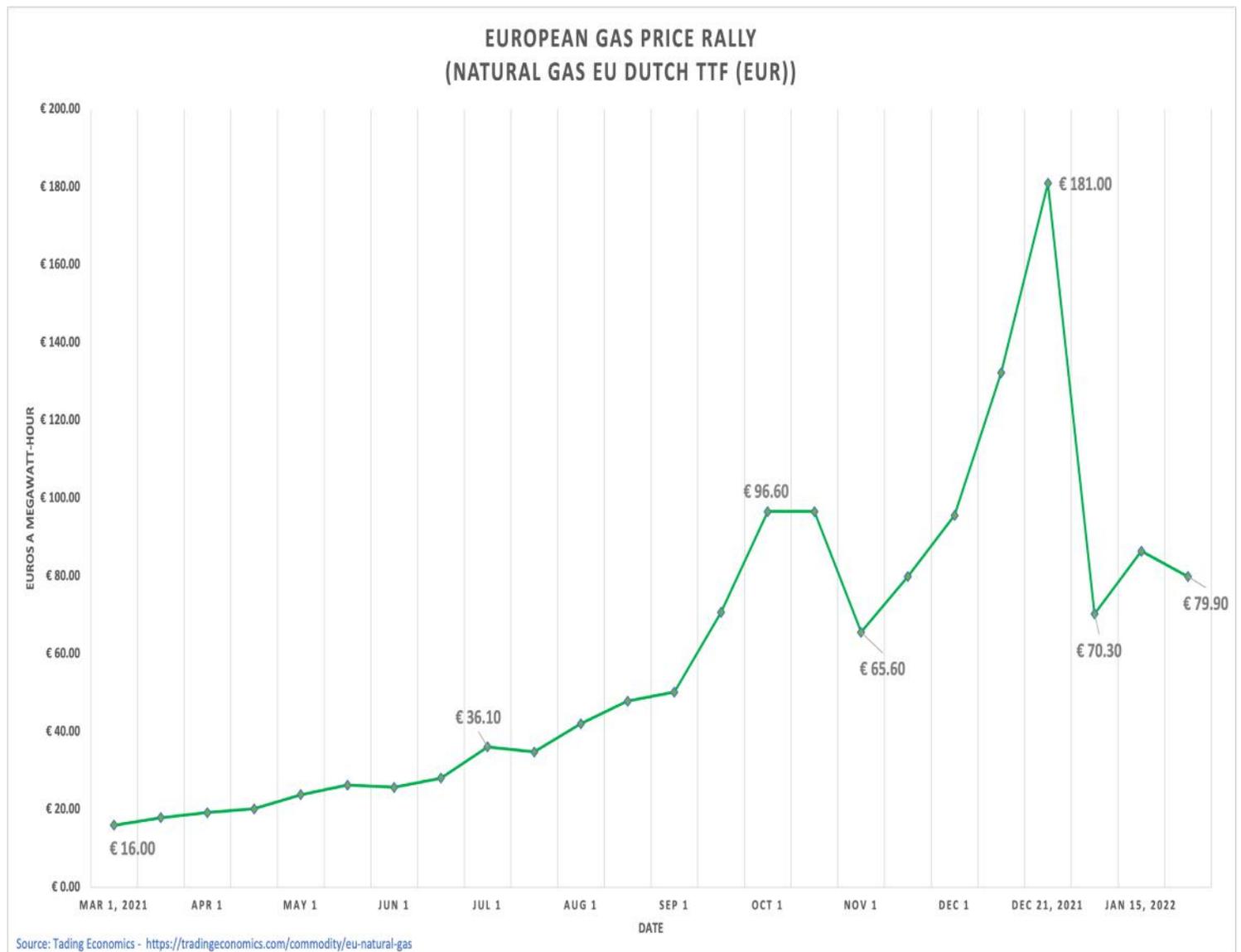


and external, have left private consumers in the EU with unprecedented household energy bills as the use of renewable energy sources has yet to yield a reliable level of power on the continent. The North Sea gas fields north of the UK have seen [depletion](#) as demand for gas rises and production falls. Elsewhere in Europe, gas flows from Norway [dropped significantly](#) in Q3 2021 as the Troll gas field required extensive infrastructure maintenance, and production at Groningen, Europe's largest onshore natural field, continued to decrease due to its [ongoing shutdown](#). The EU's reliance on imports has also taken a hit due to [Russia's recent decision](#) to reduce supplies of gas to the EU in order to satisfy its domestic demand, amidst continued strife with Ukraine. Despite a six-year low in imports in November 2021, Gazprom remains one of the EU's largest gas suppliers, [providing](#) EU member states with one-third of their entire consumption in 2020, due in part to its availability, low price point, and the tightening climate policies in the EU. Despite

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The fate of the Nord Stream 2 project, which would offer a solution to the EU's gas supply shortages, is being held up despite its completion after German regulators [delayed its certification](#) as pressure mounts from other states to prevent its operation as this pipeline bypasses Ukraine - a strategic move by Russia that weakens Ukraine economically. As the threat of war grows and the delay of Nord Stream 2 goes well into 2022, the EU's gas shortages may not be solved in the near future.

European gas prices had been gradually increasing over the past one and a half years in response to EU climate action policies and the gradual shift to the spot market from long term contracts. Towards the end of Q2 in 2021, gas prices exponentially rose in reaction to the gradual economic recovery from the COVID-19 pandemic, as European demand rebounded in the summer following vaccination efforts in the second quarter of 2021. The third and fourth quarters of 2021 showcased a rapid increase, with [prices](#)



[peaking](#) at 181€/MWh on December 21, 2021. Futures market prices are expected to stay elevated for up to another year, [according to French Secretary of State](#) for International Affairs Clément Beaune. As factories began to reopen, [commercial and private demand for gas shot up](#), leading to demand outstripping supply among EU member states. German base-load wholesale prices, [the benchmark for Europe](#) and tracked through futures contracts, currently lie over 100€/MWh - a 200% increase since 2020. EU countries, such as Germany and France, typically [stock up their reserves](#) over the summer months. Yet as the global world economy witnessed a rebound in Q2 and Q3 of 2021, the Europeans found themselves [battling for limited supplies](#) on the spot market by Q3 2021. Crucially, domestic storage levels were at a historic low this past summer due to an extremely harsh European winter in 2020-2021 that saw gas consumption accelerate. In an effort to steer current increasing costs away from private consumers, some EU governments have imposed temporary price caps in response to the recent price spike. Consequently, leading national utility companies, among them the German provider Uniper, find themselves forced to [seek additional credits](#) of up to €10 billion to provide sufficient liquidity to fund operating costs and meet future contracts of gas supplies. The trading of the commodity shifting from long-term contracts to spot and derivative markets in the past decade has made gas more susceptible to [price swings and bidding wars](#). In the context of the COVID-19 pandemic rebound, this indirectly translates to exacerbated competition for limited supplies, as states around the world are experiencing the same swings of economic openings and closures simultaneously. Consequently, as EU storage levels find themselves at an all-time low due to the inherent infrastructure shortcomings and complications with Nord Stream 2, the European continent will likely find itself grappling with inflated gas prices on the future and spot markets for another year.

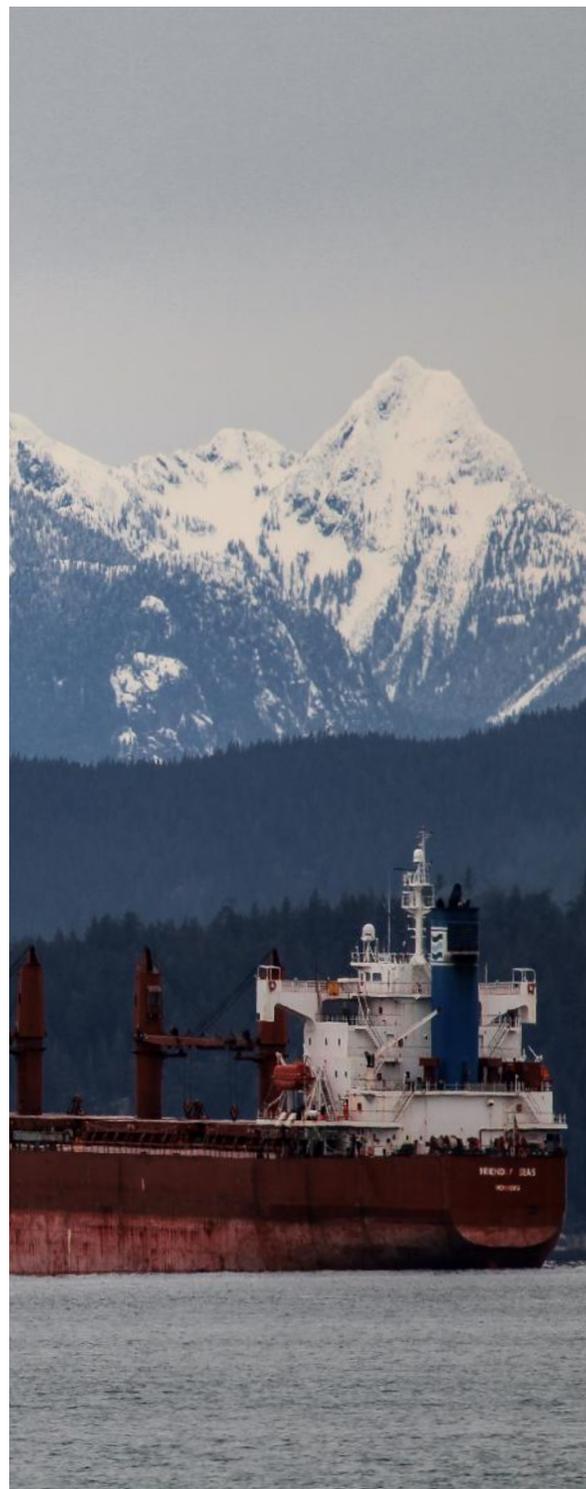


Future Outlook

Looking forward into 2022, gas prices are likely to remain higher than in previous years due to resilient demand and a lack of supply. It is [unlikely that Russia will proliferate supply towards Europe](#) as Russia has claimed they are giving priority to topping up their domestic gas supply. In addition, [geopolitical tensions](#) surrounding the construction of Nord Stream 2, along with tensions with Ukraine will play a critical role in the prolonged market tightness in Europe. [IHS Markit suggests](#) that spot gas prices are projected to stay higher and linger until summer 2022, averaging 44€/MWh and 34€/MWh over the second and third quarters.

Higher gas prices have resulted in many European countries resorting to coal and oil power generation. [The use of coal has been most prominent in Central and Eastern European countries](#) where alternative energy sources are not yet widely adopted. However, richer countries like [Germany continue to generate almost 40 gigawatts of electricity through coal](#). The use of coal is becoming more enticing as power plants utilizing coal have seen a [dramatic rise in projected profits](#) driven by the shortage of energy supply along with cheap supply of coal. This remains the case even as turning coal and oil-fired power plants back on pushes carbon prices up in the EU.

Another prominent reason for the proliferation of coal-powered energy generation is due to Europe's relatively limited alternative energy sources including renewables and biofuels. [For example, Germany's total energy usage in 2019 amounted to over 12 million terajoules \(TJ\)](#), with gas responsible for over 3 million TJ or roughly a quarter of the total energy supply. On the other hand, renewable sources such as hydro, wind, and solar made up only 735 thousand TJ while coal alone was responsible for over 2 million TJ. Figures for [other European countries display a similar trend](#) where coal



and oil repeatedly outpace renewable energy production; given that renewable energy sources have a longer time horizon to implement, it is expected the utilization of non-renewable sources will continue to increase until natural gas supply stabilizes.

The energy crisis has reignited the discussion surrounding the proliferation of nuclear energy sources. Recently, the [EU has moved to label nuclear energy alongside natural gas as renewable energy sources](#). While this declaration is still in the works, it demonstrates the continent's willingness to proliferate the use of nuclear energy. [France leads the EU in nuclear energy](#) production producing over half of the EU's total nuclear energy production. Thierry Breton, the EU Internal Market Commissioner has stated that [nuclear power is "critical" to meeting the 2050 net-zero goal](#) and the bloc will need to invest €500 million by 2050 to meet this goal. However, the topic of nuclear energy remains divided as countries like Germany refuse to re-incorporate nuclear energy stating that it is "dangerous". Despite fragmentation among bloc members, the EU's ["Fit for 55" package](#), which aims to reduce Europe's GHG emissions by 55% by 2030 means the abstinence from nuclear energy might no longer be viable nor in the best interest of European countries. While nuclear energy has its drawbacks, it would be in the best interest of major economies and emitters such as Germany to revisit the phasing out of nuclear energy to meet emission reduction goals.

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