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RESOLVING THE ENERGY PRICE CRISIS: WHY THE UK'S FUTURE RESILIENCE LIES IN THE ACCELERATION OF CLEAN ENERGY

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This briefing clarifies how international dynamics in the global gas market have resulted in record high energy prices for consumers this year, and why increasing domestic supply of fossil gas is far from the simple fix to this problem that is pushed by some.

As a result, the long-term solutions to the energy price crisis lie in reducing the UK's demand for gas through the scale-up of energy efficiency programmes and clean energy investment.

This builds on a previous briefing outlining short and long-term solutions to the UK's energy bills crisis that protect consumers and rebuild a more resilient energy system.[1]

Global gas markets: key drivers of the current crisis

The high energy prices seen in the UK are the result of our dependence on expensive gas – the price of which reached a record 450p/therm in December 2021, compared to 50p/therm the year before.[2] But there is no single reason that explains this record-breaking spike in gas prices. Rather, it is due to a perfect

[1] Please see **https://www.e3g.org/publications/the-energy-bill-crisis/**

[2] **https://www.reuters.com/quote/NGLNMc1**

storm of multiple overlapping dynamics affecting global gas markets. These factors combine to affect the prices that consumers in the UK pay for gas not necessarily because of a direct dependence, but rather due to the UK's connection to international gas markets.

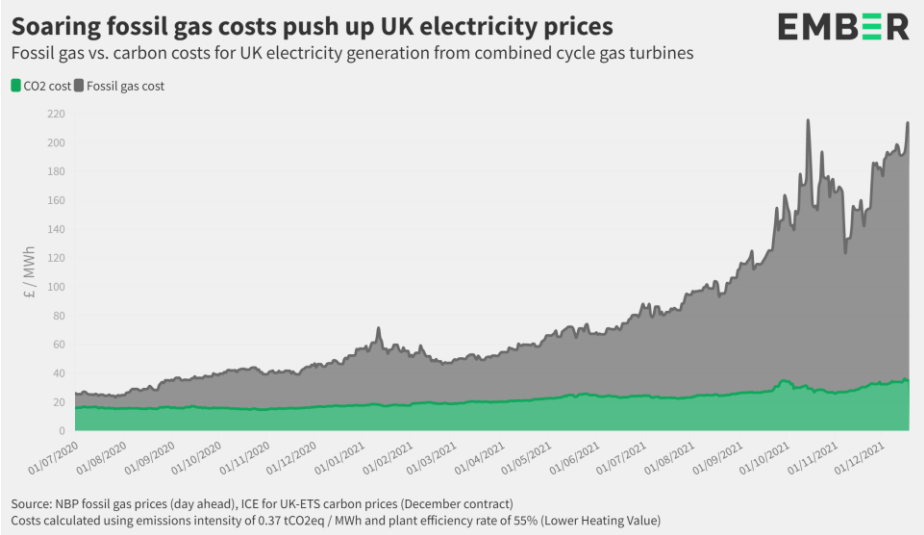

Figure 1: Cost of fossil gas is the dominant factor affecting UK electricity prices (Source: Ember)

Delayed maintenance because of Covid-19

Many of the causes of the high gas prices seen across Europe were set in motion almost two years ago. In 2020, as the Covid-19 pandemic uprooted economies across the world, many jurisdictions including the UK reduced gas production, and the industry saw delays in supply chain maintenance and investment decisions.[3]

Competition for LNG cargoes throughout 2021

An unprecedentedly cold winter in Asia in January 2021 led to sudden demand for LNG.[4] Weather-driven factors continued throughout the year, as a hot summer followed and further drove up gas demand for cooling, leading to sustained high spot prices in Asia.[5]

[3] **https://www.iea.org/reports/world-energy-outlook-2021**

[4] **https://www.oxfordenergy.org/wpcms/wp-content/uploads/2021/02/Asia-LNG-Price-Spike.pdf**

[5] **https://www.spglobal.com/platts/en/market-insights/latest-news/natural-gas/080621-surge-in-asian-spot-lng-price-raises-concerns-over-tightening-market-conditions**

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Low pipeline flows to Europe from Russia

For reasons both technical and geopolitical, pipeline flows from Russia are notably lower than in previous years. Europe's largest supplier of natural gas had experienced the same bottlenecks in gas supply chain investment and maintenance as other countries, and the cold winter of 2021 had depleted domestic gas storage levels. These technical factors would likely contribute to reduced pipeline flows to other countries.

On top of this, many have highlighted the fact that Russia may be exploiting Europe's dependence on its gas exports in order to force through certification of the contested Nord Stream 2 pipeline, and as leverage during a time of heightened geopolitical tensions with Ukraine. Fatih Birol, the president of the International Energy Agency, asserted that "Russia could increase deliveries to Europe by at least one-third — this is the key message."[10]

[6] **https://www.oxfordenergy.org/wpcms/wp-content/uploads/2021/02/Asia-LNG-Price-Spike.pdf**

[7] **https://www.spglobal.com/platts/en/market-insights/latest-news/natural-gas/080621-surge-in-asian-spot-lng-price-raises-concerns-over-tightening-market-conditions**

[8] **https://www.oxfordenergy.org/wpcms/wp-content/uploads/2021/02/Asia-LNG-Price-Spike.pdf**

[9] **https://www.spglobal.com/platts/en/market-insights/latest-news/natural-gas/080621-surge-in-asian-spot-lng-price-raises-concerns-over-tightening-market-conditions**

[10] **https://www.ft.com/content/668a846e-d589-4810-a390-6d7ff281054a**

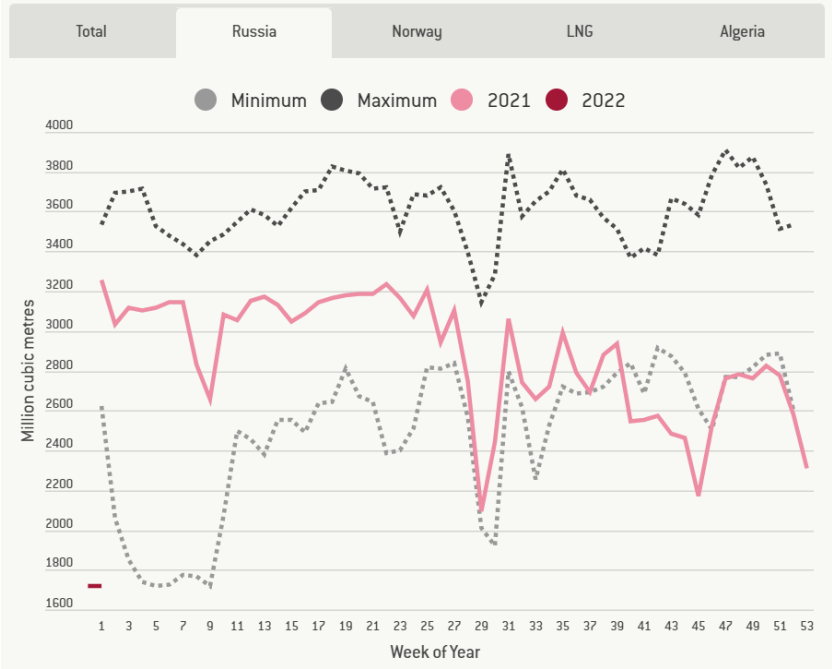

Figure 2: Pipeline flows from Russia to Europe in million cubic metres for 2021 and 2022, compared to historic maximum and minimum pipeline flows between 2015-2020. (Source: Bruegel)[11]

Low levels of storage going into winter months

Competition for LNG cargoes from Asia and low pipeline flows from Russia acted as a perfect storm to drive up gas prices over the summer months just as many countries in Europe were exiting lockdowns.[12] The summer months usually act as an opportunity for countries to refill domestic gas storage, but the high prices meant that instead Europe headed into winter with severely low levels of gas storage.[13] In the UK, the closure of the Rough gas storage facility in 2017 means there is no domestic seasonal gas storage.[14]

Domestic factors resulting in high gas demand

The UK felt all these effects acutely as it relies heavily on gas to meet heating demand and power generation needs. Part of this has stemmed from a failure to make progress on insulating homes over the last decade, especially for the most vulnerable households.[15] Other factors including a sustained lull in wind speeds, a fire at an interconnector station and unplanned nuclear maintenance drove up

[11] **https://www.bruegel.org/publications/datasets/european-natural-gas-imports/**

[12] **https://ec.europa.eu/info/news/quarterly-market-reports-confirm-globalised-nature-gas-market-imbalance-2021-oct-13_en**

[13] **https://www.reuters.com/business/energy/cusp-europes-winter-season-gas-storage-hits-10-yr-low-2021-09-22/**

[14] **https://www.ft.com/content/564a1ec0-8288-11e7-a4ce-15b2513cb3ff**

[15] **https://www.carbonbrief.org/analysis-cutting-the-green-crap-has-added-2-5bn-to-uk-energy-bills**

this reliance on gas at precisely the wrong time, further compounding rising prices. More details on domestic factors driving the UK's cost of living crisis are highlighted in a separate briefing.[16]

How the UK meets its gas demand

As the UK continental shelf (UKCS) has matured, the government has sought to shore up domestic production through its strategy of "Maximising Economic Recovery", resulting in a decade long production plateau, whilst developing a diverse range of sources for imports.

Chart 4.1 Supply and demand for natural gas, 1996-2020 (DUKES Table 4.1)

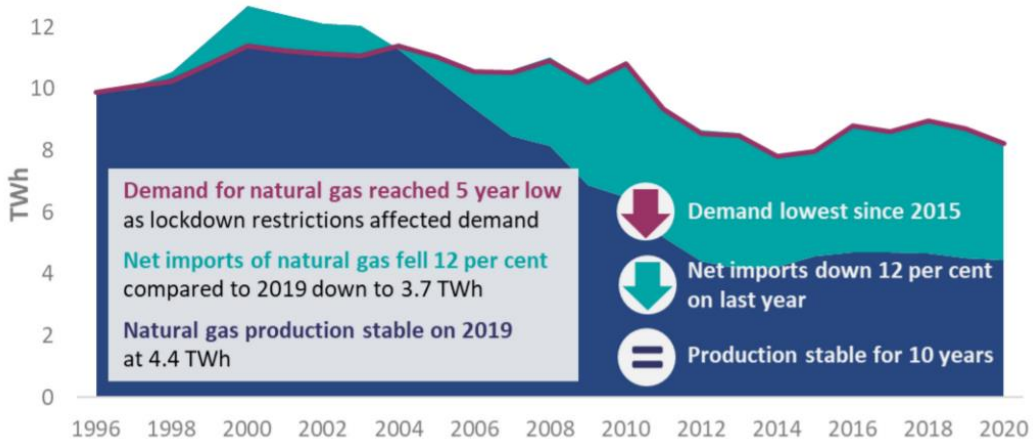

Figure 3: Supply and demand for natural gas (Source: BEIS Digest of UK Energy Statistics)[17]

In 2020, 54% of demand for natural gas demand was met by domestic production, 32% from pipeline flows from Norway, with the remainder largely met by LNG cargoes from Qatar (12%), the United States (7%) and Russia (3%).[18]

Notably, only 3% of domestic demand is met by Russian LNG. The UK is not exposed to Russia's geopolitical decisions on gas exports directly, but rather through being a part of the interconnected global gas market.

[16] **https://www.e3g.org/publications/the-energy-bill-crisis/**

[17] **https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/1006628/DUKES_2021_Chapter_4_Natural_gas.pdf**

[18] **https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/1006628/DUKES_2021_Chapter_4_Natural_gas.pdf**

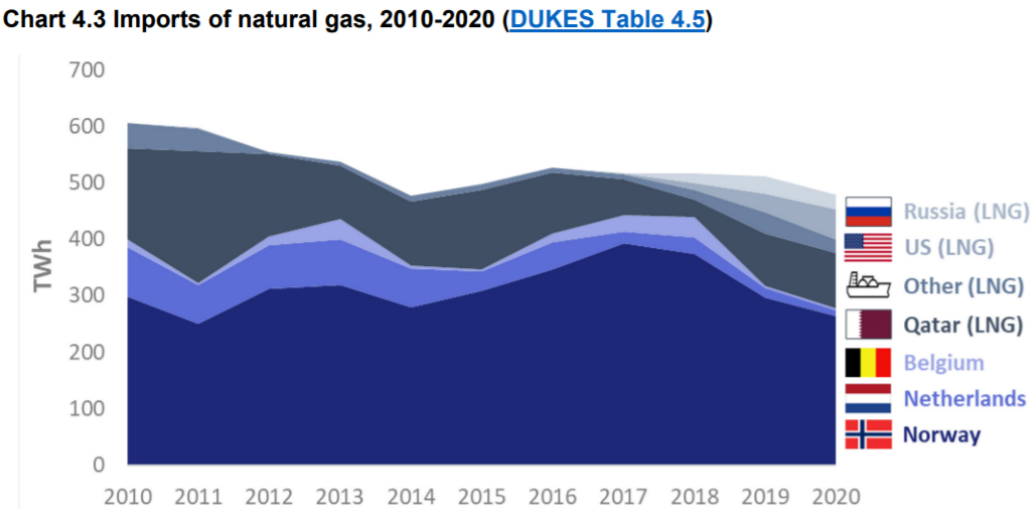

Figure 4: Natural gas imports by type and country of origin (Source: BEIS Digest of UK Energy Statistics)

The impact of future domestic production on UK gas prices

The surge in gas prices has been met by calls from some to boost domestic gas production to shore up energy security and drive down prices. But this approach fails to differentiate between physical security of supply, and price security of supply.[19] The UK is currently able to physically obtain natural gas, due to its diversity of import sources. The problem is that the price of this globally traded commodity is skyrocketing and rendering energy bills unaffordable to consumers.

Increasing domestic production of fossil gas would not be the solution that some claim it to be for three main reasons: our interconnection with global markets, the time it takes to bring new production online, and the amount of reserves left in the UK Continental Shelf.

Interconnection with global markets

The price consumers pay for gas is dictated by large global dynamics such as those outlined at the start of this briefing. Prices in the UK market are driven up by significant changes in gas demand in China and Europe. This linkage was exemplified in September 2021, when as gas prices were rocketing the UK exported record amounts of gas to Belgium, as producers sought to capitalise on

[19] **https://ukerc.ac.uk/news/cost-of-gas-by-default/**

a premium in the European market.[20] This in term drove up the price of gas in the UK.

Due to this interconnection, multiple bodies including the National Audit Office conclude that expanding domestic production, even through onshore fracking, would have little impact on gas prices for consumers.[21] Recently, Centrica CEO Chris O'Shea restated these findings, saying "*I'm not sure an increase in UK supply would have brought the price down from £3 a therm, as it was in December, from 50p as it was a year ago. We bring gas in from the United States, from Norway, from Europe, from Qatar, from other places. So we're not in a position to simply have the UK as an isolated energy market. We are part of a global market*.".[22]

The time taken to bring new production online

Another factor to consider is the time it takes to bring new production online. High gas prices mean there are already huge incentives to maximise production from existing assets. But bringing new production online takes time. The average time from the first discovery of gas to first production from a field is 28 years, meaning that licences awarded this year would on average only lead to fields being brought online by 2050[23]. Even projects already approved for development take an average of three years to be brought online. There is no magic gas tap in the North Sea that can be turned up in a short space of time. This stands in contrast to the ability to roll out clean heat and energy efficiency retrofit programmes at speed, and in a targeted manner such that vulnerable households are protected first.[24]

Remaining gas reserves in the UK Continental Shelf

There remains an additional fact standing in the way of the idea that the UK might be able to isolate itself from international gas markets: the amount of gas that remains in the North Sea. The UKCS is a mature, high-cost basin with declining reserves. The basin is also oil-weighted, with gas making up only 30% of

[20] **https://www.spglobal.com/platts/en/market-insights/latest-news/natural-gas/092921-highest-ever-zeebrugge-basis-leads-to-record-uk-gas-export**

[21] **https://www.nao.org.uk/wp-content/uploads/2019/07/Fracking-for-shale-gas-in-England.pdf**

[22] **https://www.theguardian.com/business/2022/jan/12/centrica-boss-says-high-energy-bills-could-last-two-years**

[23] Figure can be found on page 3 of the following OGA report: **https://www.ogauthority.co.uk/media/6117/ukcs-projects-insights-report-2019.pdf**

[24] **https://www.theeeig.co.uk/media/1091/eeig_report_rebuilding_for_resilience_pages_01.pdf**

remaining reserves.[25] Even if these reserves could be brought online at speed, the UK would still be exposed to international gas markets and their inherent price volatility.[26]

Shale gas remains a non-starter

Some have gone further to assert that the UK should boost domestic production through overturning its moratorium on shale gas production. For the same reasons as above, multiple assessments have highlighted that increased domestic production through fracked shale gas would do little to shift the price of gas.[27] Not to mention, even with a broad base of public and political support (neither of which it commands), it would not bring about any notable increase in physical supply for years due to the time it would take to develop an entirely new industry.

But the barriers to the development of shale gas extend far beyond the economic. Shale gas remains one of the country's least popular forms of energy, with only 19% of the population approving of its usage. This stands in stark contrast to the >80% support afforded to wind and solar energy.[28] Overturning a manifesto pledge to come out in support of such an unpopular technology would be politically unviable.[29]

The other major factor is that the industry has been declared unsafe. It was after all a report by the Oil and Gas Authority that highlighted how "*it is not yet possible to accurately predict the seismic response to hydraulic fracturing*", and that "*Where induced seismicity has occurred, mitigation measures have shown only limited success*".[30] It was this report which was the final straw that resulted in change to Government policy.

While some look to the shale boom in the United States and assume the same could take off in the UK, there are crucial geological differences that mean the

[25] **https://www.ogauthority.co.uk/data-centre/data-downloads-and-publications/reserves-and-resources/**

[26] **https://www.ogauthority.co.uk/data-centre/data-downloads-and-publications/production-projections/**

[27] **https://ukerc.ac.uk/publications/the-uk-s-global-gas-challenge/**

[28] **https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/1040725/BEIS_PAT_Autumn_2021_Energy_Infrastructure_and_Energy_Sources.pdf**

[29] **https://www.thetimes.co.uk/article/boris-johnson-to-ban-fracking-ck59rrz9s**

[30] **https://www.ogauthority.co.uk/media/6970/oga-summary-of-pnr2-studies-final.pdf**

cost of production of shale gas would be significantly more expensive. The US Energy Information Administration (EIA) reported that "*Compared with North America, the shale geology of the UK is considerably more complex, while drilling and completion costs for shale wells are substantially higher*.".[31] Instead of the continuous structures found in the United States, shale deposits in the UK are broken up by significant numbers of faults - these increase the risk of seismic activity, and the cost and time it would take to assess and de-risk a project. Geographically, the smaller size of the UK in comparison to the US also means that fracking would take place unacceptably close to people's homes, worsening the dangers arising from unpredictable seismicity.

Prolonged high gas prices highlight the need for clean investment step change

Industry bosses expect gas prices to remain high for the next 18 months.[32] While these predictions are hard to make with clarity, one thing for certain is that the volatility of gas markets is here to stay. Alongside the need for emergency support for the most vulnerable customers, there is a clear and urgent need for the UK to reduce its long-term exposure to volatile gas prices. This can be achieved through scaling up investment in renewable power, seasonal storage, flexibility, energy efficiency, and low-carbon heat.

As countries move away from gas towards high renewables energy systems, a strategic approach towards the future of the North Sea is needed. This requires a critical assessment of exactly how much gas the UK needs to rely on at different stages of the transition, measures to support the transition of the oil and gas workforce into other industries, and end dates for production, licensing and new developments to minimise the risk of assets becoming stranded and ensure we align with our net zero targets.

The Climate Change Committee's balanced net zero pathway gives a clear direction for the future of gas in the UK, with demand falling by 70% by 2050[33] But the role of blue hydrogen (sourced from fossil gas) is currently unclear, with the current crisis calling into question the economics of this as a "transition"

[31] **https://www.eia.gov/analysis/studies/worldshalegas/pdf/UK_2013.pdf**

[32] **https://www.theguardian.com/business/2022/jan/12/centrica-boss-says-high-energy-bills-could-last-two-years**

[33] **https://www.theccc.org.uk/publication/sixth-carbon-budget/**

fuel.[34] Experts and academics have also highlighted other social, economic and environmental limitations of blue hydrogen, and Germany has recently indicated to exclude blue hydrogen from central government support.

There are also important market design questions to be asked in the face of rising and prolonged price volatility. Government thinking over recent decades has been that exposing market participants to prices is the most effective way to drive efficient investment and usage – this is now having severe effects on consumers and raises questions as to whether this is the best way to deliver the investment needed to move to a high-renewables energy system.

As the International Energy Agency highlighted in their World Energy Outlook, without a rapid scale-up of clean investment, the world remains exposed to energy price shocks and the volatility of fossil fuel prices.[35] The UK is currently paying a heavy price for this delay.

About E3G

E3G is an independent European climate change think tank with a global outlook. We work on the frontier of the climate landscape, tackling the barriers and advancing the solutions to a safe climate. Our goal is to translate climate politics, economics and policies into action.

E3G builds broad-based coalitions to deliver a safe climate, working closely with like-minded partners in government, politics, civil society, science, the media, public interest foundations and elsewhere to leverage change.

More information is available at **www.e3g.org**

[34] **https://www.e3g.org/publications/between-hope-and-hype-a-hydrogen-vision-for-the-uk/**

[35] **https://www.iea.org/reports/world-energy-outlook-2021**