Box B: War in Ukraine and the options for Europe's energy supply

By Christopher Aitken and Erkal Ersoy[1][2]

Introduction

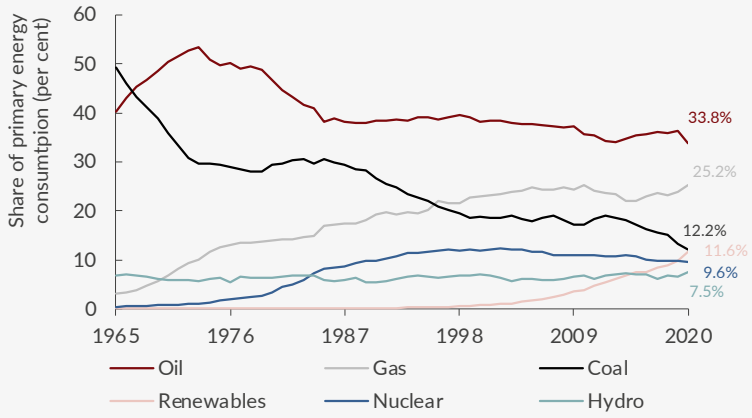
On 24 February 2022, Russia invaded Ukraine. Immediately, European countries made it clear that they stand with Ukraine in the conflict with Russia through swift action, sanctions, and the relaxation of immigration rules.

The imposed sanctions have had pronounced effects on the already struggling Russian economy. One of Russia's only remaining income streams is its fossil fuel exports, especially natural gas exports to Europe. The idea that European countries are effectively financing a war they condemn is anathema to the public and politicians alike. This analysis attempts to answer the question of whether Europe could realistically meet its energy requirements without Russia. To preview our conclusion, we argue that substituting away from gas imports from Russia is feasible in the medium to long term but very costly in the immediate future. That said, these costs would certainly be worth paying if doing so leads to an end to the war in Ukraine.[3]

The importance of Russian gas in the European energy system

Natural gas has become increasingly important in Europe's energy mix over the last few decades, accounting for approximately 25 per cent of European primary energy consumption in 2020 (Figure B1). This upward trend is partly due to Europeans' desire to substitute away from coal, which releases much more carbon dioxide per unit of energy than natural gas. Europe has managed slowly to reduce coal's share in its energy mix from around 19 per cent in 2000 to less than 12 per cent in 2020, while also reducing oil's share from 38 per cent to 34 per cent over the same period. With nuclear and hydropower's contributions remaining relatively constant, natural gas and renewables have gained importance (Figure B.1). This has made natural gas a key fuel in meeting Europe's energy demand.

Figure B1 European Energy Mix



Source: Authors' calculations based on BP Statistical Review of World Energy (BP, 2021).

This natural gas comes from many countries. Approximately 40 per cent is produced in Europe. The rest is imported from other countries, particularly Russia. Europe's dependence on Russian gas has diminished over

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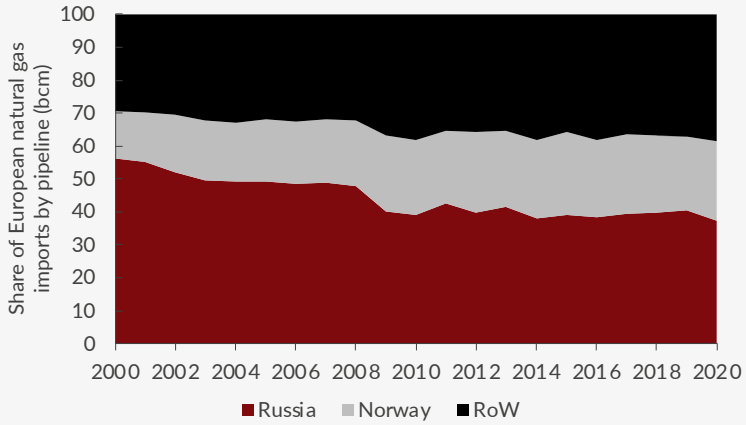
2 This work was presented as part of the Special Session organised by NIESR on 'The economic effects of the Russia-Ukraine conflict' that took place at the Royal Economic Society Annual Conference on 12 April, 2022.

3 The effectiveness of sanctions was discussed by the Treasury Select Committee and their findings published in House of Commons (2022).

the last 20 years: in 2000, over 56 per cent of natural gas imported to Europe by pipeline came from Russia. By 2020, this figure had fallen to 38 per cent (Figure B2). Note, however, that this is because Europe has been importing more pipeline gas from elsewhere, making imports from Russia a smaller share of the larger whole. The other key supplier of European natural gas is Norway. Norwegian pipeline exports to Europe more than doubled between 2000 and 2020, now accounting for around 24 per cent of total pipeline imports (Figure B2). Overall, however, there is no denying that pipeline imports from Russia are critical for Europe. Could Europe realistically move away from Russian gas? If so, how quickly?

Figure B2 European natural **gas imports by pipeline (in billion cubic metres)**



Source: Authors' calculations based on BP Statistical Review of World Energy (BP, 2021). RoW=Rest of the World.

Is Russian natural gas unavoidable for Europe?

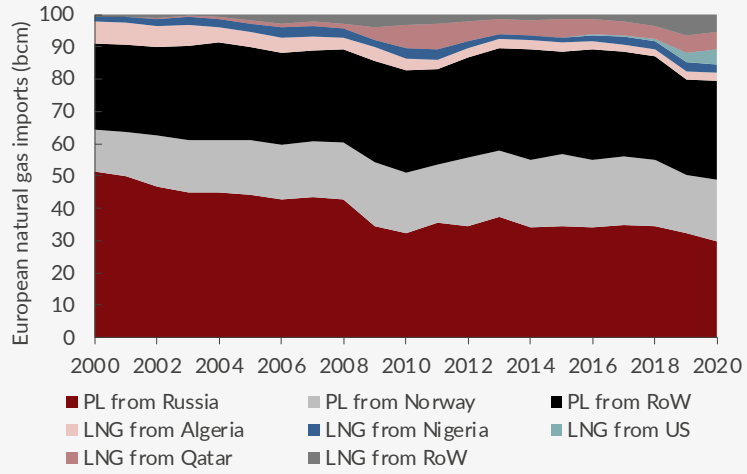
There are two overarching solutions. The first option is to reduce gas consumption, either by substituting towards a different source of energy or by reducing overall energy consumption. The second is to move away from Russian imports but retain gas in the energy mix at its current level. We could think of the former as diversification of the energy mix and the latter as diversification of natural gas supply. Because of the region's existing dependence on gas, there are no easy solutions in the short term. But over the longer term, diversification of supply and the energy mix are possible, and the latter is likely to have the largest effect in shoring up Europe's energy security.

The alternative to pipeline trade is transporting natural gas in liquefied form. We have the technology to do this using liquefied natural gas (LNG). European gas supply relies on both technologies, although pipeline imports significantly exceed LNG imports. Figure B3 plots the percentage shares of imports from Europe's top natural gas trading partners. Pipeline imports (shown in shades of blue) are much larger than LNG imports (shown in shades of orange).

Reducing gas imports from Russia in the short term would be difficult. In 2020, Europe imported 185 billion cubic metres (Bcm) of gas from Russia (BP, 2021). According to the International Energy Agency (IEA), Europe could realistically import an additional 10 Bcm of natural gas via pipeline from Norway[4] and Azerbaijan, plus 20 Bcm as LNG from other exporters around the world, such as Qatar (IEA, 2022). Constraining factors include tight limits on the export capacity of major producers (Reuters, 2022c), international competition for the existing supply of the fuel – particularly from Asia – and limits on the continent's regasification capacity which are both geographical and technical in nature (IEA, 2022; Rystad Energy, 2022).

4 Equinor and its partners are planning to increase gas exports from the Norwegian continental shelf (Equinor, 2022).

Figure B3 European natural **gas imports by type and origin**



Source: Authors' calculations based on BP Statistical Review of World Energy (BP, 2021). RoW=Rest of the World.

Options in the longer term

Over the medium to long term, there is more scope for reshaping Europe's energy policy. With respect to the development of new capacity, floating terminals could be a more cost- and time-effective solution than onshore facilities. Refitting an existing vessel as a floating storage and regasification unit (FSRU) can be achieved within 18 months, while onshore terminals take much longer.

Europe also needs new LNG contracts. As Figure B3 shows, pipeline imports from Russia dominate LNG imports. These contracted volumes will therefore need to be substantial if they are to make a serious dent in Europe's gas dependency problem. Consequently, they need to be sought from exporters with the requisite production capacity and industry maturity.

The United States is the world's largest gas producer and a natural partner to seek out. In 2020, it produced 915 Bcm of natural gas but also consumed 90 per cent of it domestically. By comparison, Russia produced around 640 Bcm, and exported nearly 240 Bcm. As such, the United States cannot currently meet Europe's demand, but has the capacity to do so in the future. It has reportedly granted construction and export permits for LNG terminals that would have a combined annual liquefaction capacity of around 220 Bcm (Wood Mackenzie, 2022). By 2025, half of these could be online and furnishing Europe with significant flows of gas. Qatar and Australia are also countries Europe could look towards. In 2020, they exported around 106 Bcm of LNG each (BP, 2021). In Qatar, work is already underway to increase the country's production and LNG export capacity within the next five years (Reuters, 2022a, 2022b).

Importing LNG is not the only option. At the end of 2020, the long-awaited Southern Gas Corridor became operational, linking Greece, Bulgaria and Italy with gas production facilities in Azerbaijan via Turkey (TAP, 2022). The pipeline is now expected to deliver 10 Bcm to the continent each year, helping to diversify supply away from Russia. Crucially, this was designed with expansion in mind: with further investment, it could support a further 10 Bcm of imports per year. An additional proposal to link Eastern Mediterranean producers with Italy and Greece could bring in a further 10 Bcm each year from 2025 (European Commission, 2021).

In the longer run, ensuring energy security will require investing heavily in new renewables capacity. This expansion of capacity will need to accelerate rapidly. In the meantime, exploiting existing nuclear and hydroelectricity generation capacity should be a priority.

Options in the short term

Short term emergency solutions available to Europe are costly. Due to logistical and technical difficulties, we believe it would be challenging to achieve the proposals put forward thus far. Given the current tightness of the market, procuring 50 Bcm of additional LNG imports next year as suggested by the European Commission's (2022a) REPowerEU report is optimistic. This volume is 2.5 times more than the IEA (2022) estimated would be available. Furthermore, many of the planned measures have a long time horizon and would not address immediate concerns.

One possibility would be to substitute away from gas towards coal or fuel oil. There are fewer issues with coal supply, and Europe still has a substantial fleet of coal-fired power plants. The IEA estimates that, if used, this alternative generation capacity could offset the requirement for around 22 Bcm of Russian gas imports (IEA, 2022). But the environmental impact would be substantial. Given the already enormous projected costs from climate change, as set out by the Intergovernmental Panel on Climate Change (IPCC, 2022), policymakers may be reticent to pursue this option. That said, increasing emissions temporarily to help save innocent lives in the ongoing conflict seems like a price worth paying – especially if we are determined to make up for these emissions in the near future.

Beyond that, governments could consider demand-oriented policies. These could include campaigns to turn down boilers in the winter and air conditioning units in the summer – perhaps with financial incentives provided for doing so – and usage monitored via smart meters (European Commission, 2022b). Even with these measures, we are likely to see severe shortages next winter.

Conclusion

The options available to Europe in the short run are limited, imperfect, and costly. They also require immediate upfront investment and commitment despite considerable uncertainty surrounding natural gas demand in the next decade. In the immediate future, alternative fossil fuels, such as coal, might have to be considered despite the costly implications for the climate. Even then, shortages and associated price rises appear inevitable. These costs would certainly be worth paying if doing so leads to an end to the war in Ukraine.

On the demand side, although the sharp rise in prices is likely to dampen natural gas consumption, further progress is required. To this end, it is important to be uncompromising in the pursuit of energy efficiency improvements. Public campaigns with information on energy efficiency can help, especially if they are coupled with policies and financial incentives.

In the longer term, European energy policy can aim to diversify energy and natural gas supply. A two-pronged approach that involves developing renewable energy capacity while ensuring natural gas supply would be wise and would ensure we emerge from this conflict greener, less reliant on Russian gas and therefore more able to continue isolating Russia in retaliation for its actions. In addition to building renewables capacity within the continent, European investment in renewables capacity in Eastern Mediterranean and Northern African countries could provide an attractive solution. This type of investment would enable countries in these regions to export more gas to Europe by reducing their domestic consumption of the fuel, while also contributing to Europe's climate commitments.

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