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IMPACT OF THE RUSSIA-UKRAINE CRISIS ON ENERGY MARKETS

Executive Summary

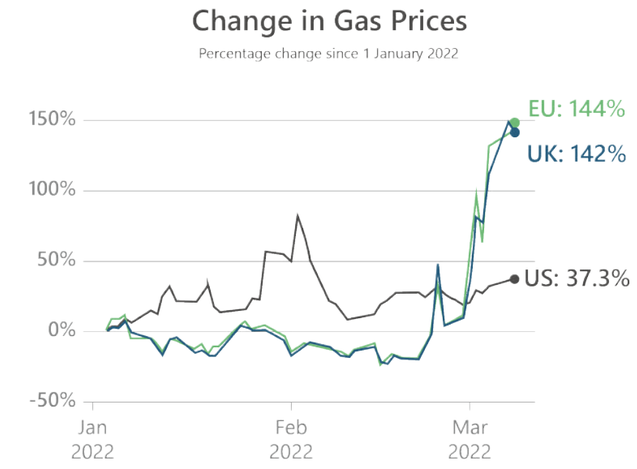
The global spotlight is on the Russia-Ukraine crisis, which has been responsible for wreaking havoc on international fossil fuel markets. Western powers responded to the crisis by proposing a number of sanctions on Russia, including ones on its fossil fuel exports. Given the fact that Russia is a key player in the global oil and gas markets, the crisis, and subsequent sanctions spell potential disaster for international energy security. Europe is an especially vulnerable region, given its considerable reliance on Russia to satisfy its fossil fuel needs.

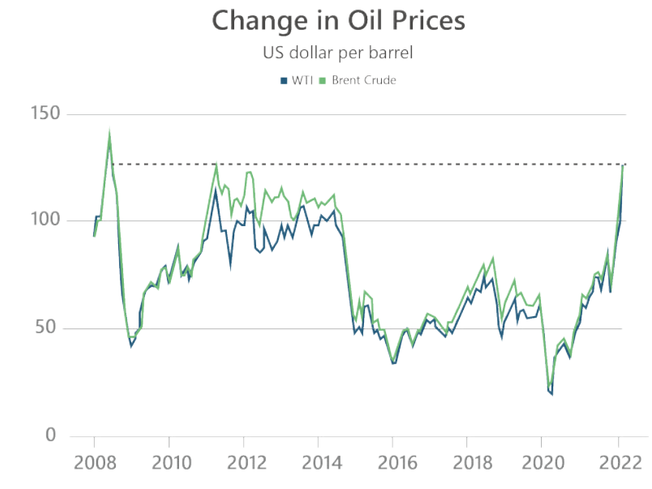
This paper explores the possible effects of the sanctions that have been placed on Russian energy by the West and discusses whether Europe will be able to liberate itself of its historic dependency on Russian oil and gas.

Background

Russia and Ukraine share a long history, with Ukraine forming a cornerstone of the former Soviet Union. It was home to much of the union's nuclear arsenal, agricultural production, and defence industries [1]. Ukraine and Russia had a strained relationship after the collapse of the Soviet Union in 1991. Beyond sentimental attachment to their shared history, Ukraine remains important to Russia because of its agricultural capabilities, and the fact that it acts as a buffer between Russia and the West.

The eight-year conflict between the two countries came to a head in February 2022, and the escalation in tensions led to volatile fossil fuel markets reacting immediately. Russia is a key player in global oil and gas markets, so it may come as no surprise that these two markets reacted the most violently, with WTI and Brent crude oil prices being the highest they have been since the financial crisis of 2008. Gas prices also skyrocketed, with EU gas prices increasing by 144% since the start of 2022; U.S. and UK gas prices rose by about 37% and 142%, respectively, since January 2022. Such turmoil in energy markets has contributed to inflation and rising prices around the world and has serious implications for international energy security [2].



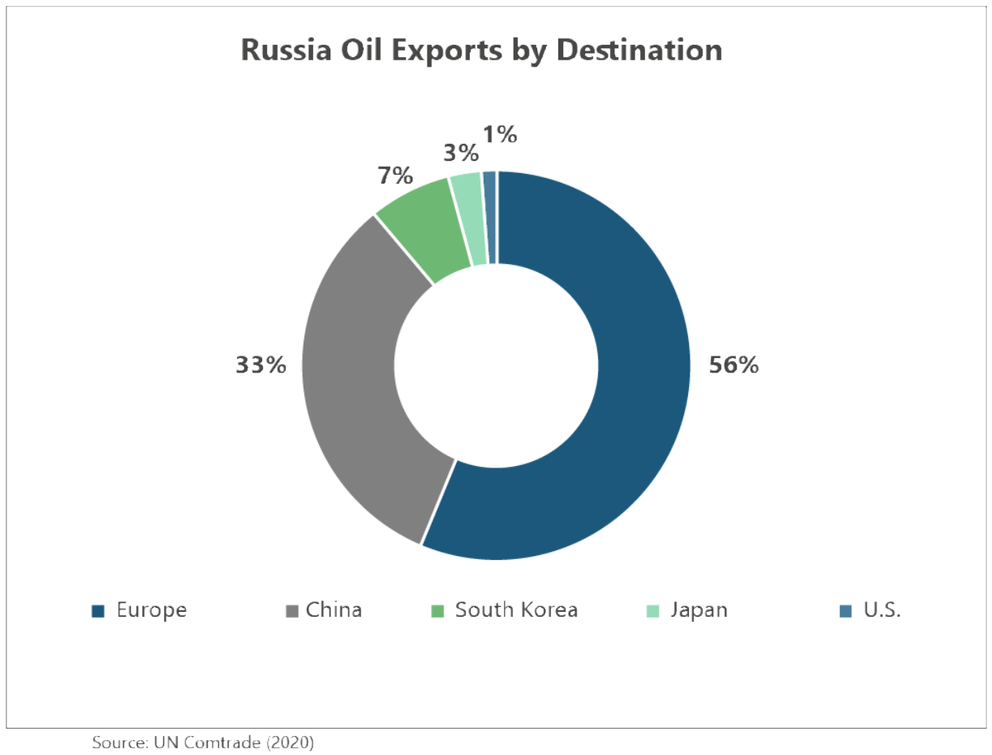


Russia's dominance in world energy markets:

Russia is a certifiable giant when it comes to fossil fuel production and exports. The Russian economy is deeply entrenched in the sale of its oil and gas, despite the commitment to reach net zero by 2060. In fact, oil and gas revenues contributed to 45% of Russia's federal budget in 2021, according to the International Energy Agency [3].

1. Oil

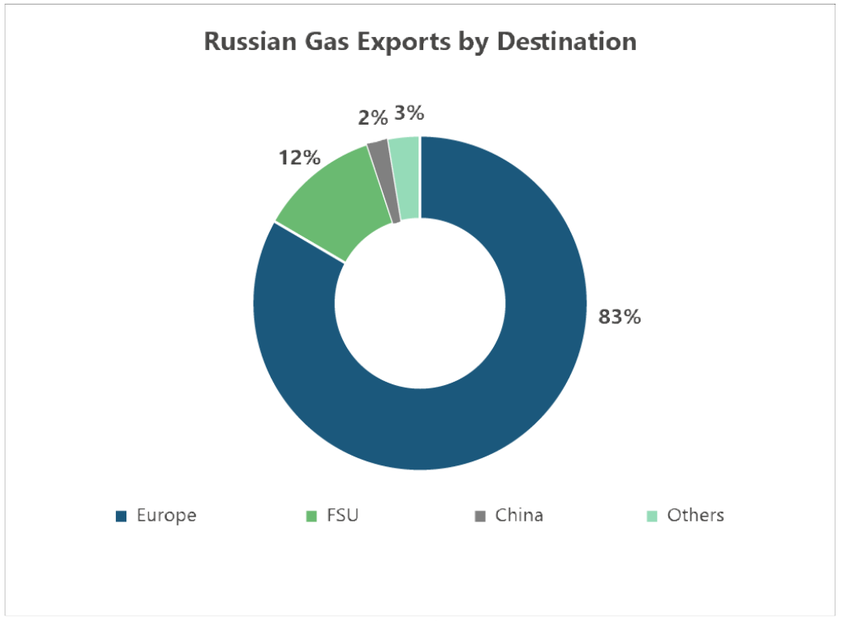
Oil is arguably Russia's most important export, accounting for about half of its export earnings, in addition to dominating the royalty earnings that Russia receives. According to the International Energy Agency, Russia is the third largest global producer of oil, only behind the U.S. and Saudi Arabia. It is also the world's largest exporter of oil to global markets and the second largest crude oil exporter behind Saudi Arabia. It exported an estimated 4.7 Million bpd of crude oil to countries all around the world in 2021, with China importing 1.6 Million bpd, followed by buyers in Europe importing 2.4 Million bpd [4]. Russia has extensive crude export pipeline capacity, allowing it to ship large volumes of crude directly to Europe as well as Asia.



Source: UN Comtrade (2020)

2. Gas

In 2021, Russia was the largest exporter of natural gas in the world. Russian natural gas accounted for nearly 40% of the EU's demand for gas and 45% of imports in 2021. In fact, Europe's dependence on Russian gas has been historic, with Germany, Italy, and Turkey being the largest importers. Russia has an extensive gas export pipeline network, both via transit routes through Belarus and Ukraine, and via pipelines sending gas directly into Europe including Nord Stream 1 and Blue Stream.



Source: Gazprom, Eurostat, ING Research (2020 data)

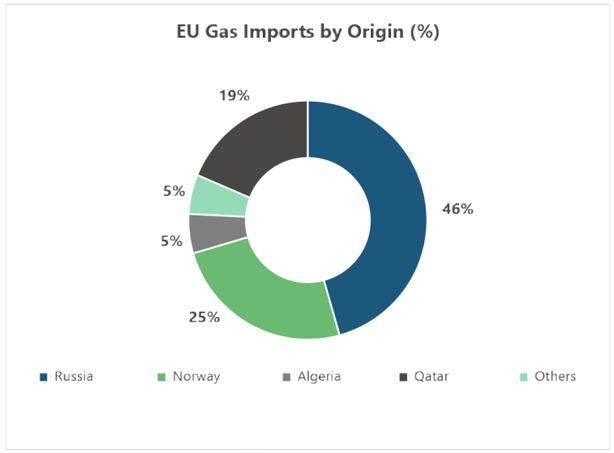
Europe's dependence on Russian energy

The energy relationship between the EU and Russia resembles an uneasy marriage, with both sides greatly dependent on each other even amidst remaining geopolitical rivals [5]. EU member countries and the UK account for more than 63% of Russia's fossil fuel exports. Europe is dependent on Russian fossil fuels, particularly natural gas. There are several reasons responsible for this dependence: firstly, Europe's own natural gas production started to decline rapidly after 2010. Before this, the Netherlands, Norway, and the UK were the largest producers of natural gas in Europe. But over the past decade, the UK's supplies started to decline, and earthquakes related to gas production forced a decrease in the Netherland's gas output, altogether paving the way for Russian gas to be the mainstay.

Additionally, Europe's demand for natural gas has stabilized in the past five years, leading to a widening demand-supply gap that had to be addressed by importing Russian natural gas.

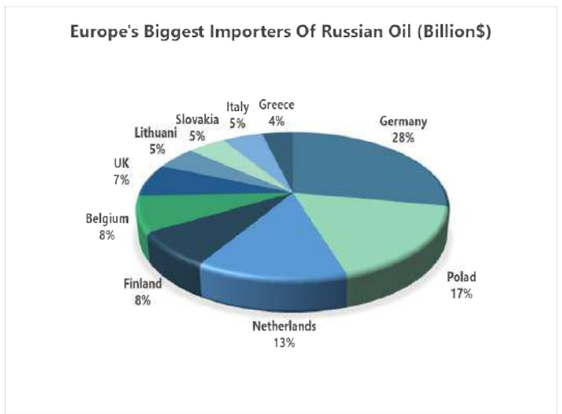
Lastly, despite successful attempts to expand Europe's LNG regasification capacity, alternative supplies still fall short of closing the growing import gap.

Therefore, it is no surprise that the share of Russian gas supplies increased from 25% of the region's total gas demand in 2009 to 32% in 2021.



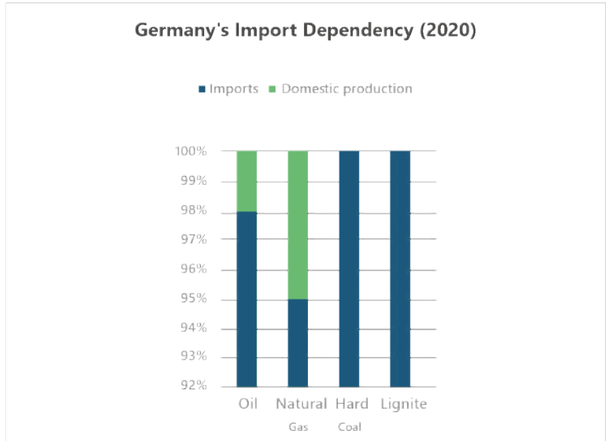
Source: Gazprom, Eurostat, ING Research (2020 data)

Europe is also heavily reliant on Russian oil and coal, although not as much as it is on Russian gas. Russia is Europe's largest oil supplier, providing over a quarter of EU oil imports in 2020. The EU also accounted for about 22% of Russia's coal exports, in 2021 [6].



Sources: World Bank, Eurostat, T&E Analysis. 2021 Data Note: Oil includes imports of crude oil, petrol and diesel

A European country with a heightened dependence on Russian fossil fuels is Germany. About half of German imports of gas and hard coal, as well as around one third of oil imports originate from Russia. On the whole, Germany depends on Russia for about one third of its total energy consumption [7].



It has now been established that Russia's budget greatly depends on its fossil fuel export revenues, which means any sanctions on Russian oil, natural gas, and coal will have considerable impacts on the Russian economy. However, the impact of sanctions will not just be limited to Russia. Countries that depend on Russia for their energy needs, particularly ones from Europe, will have to pay the price of imposing such sanctions and tariffs.

Existing sanctions and their effects
(on both Russia and country itself)

Overall, if all sanctions are considered, according to the Bloomberg forecast, Russian GDP will fall by 9.6% in 2022 with a peak quarterly GDP decline reaching negative 15.7% of annual growth rates. Since oil and gas are the backbone of Russia's budget- and around half of its oil exports and three-quarters of its gas exports are accounted for by the European Market- EU sanctions on oil and gas will send a very strong signal to Russia.

1.The U.S.

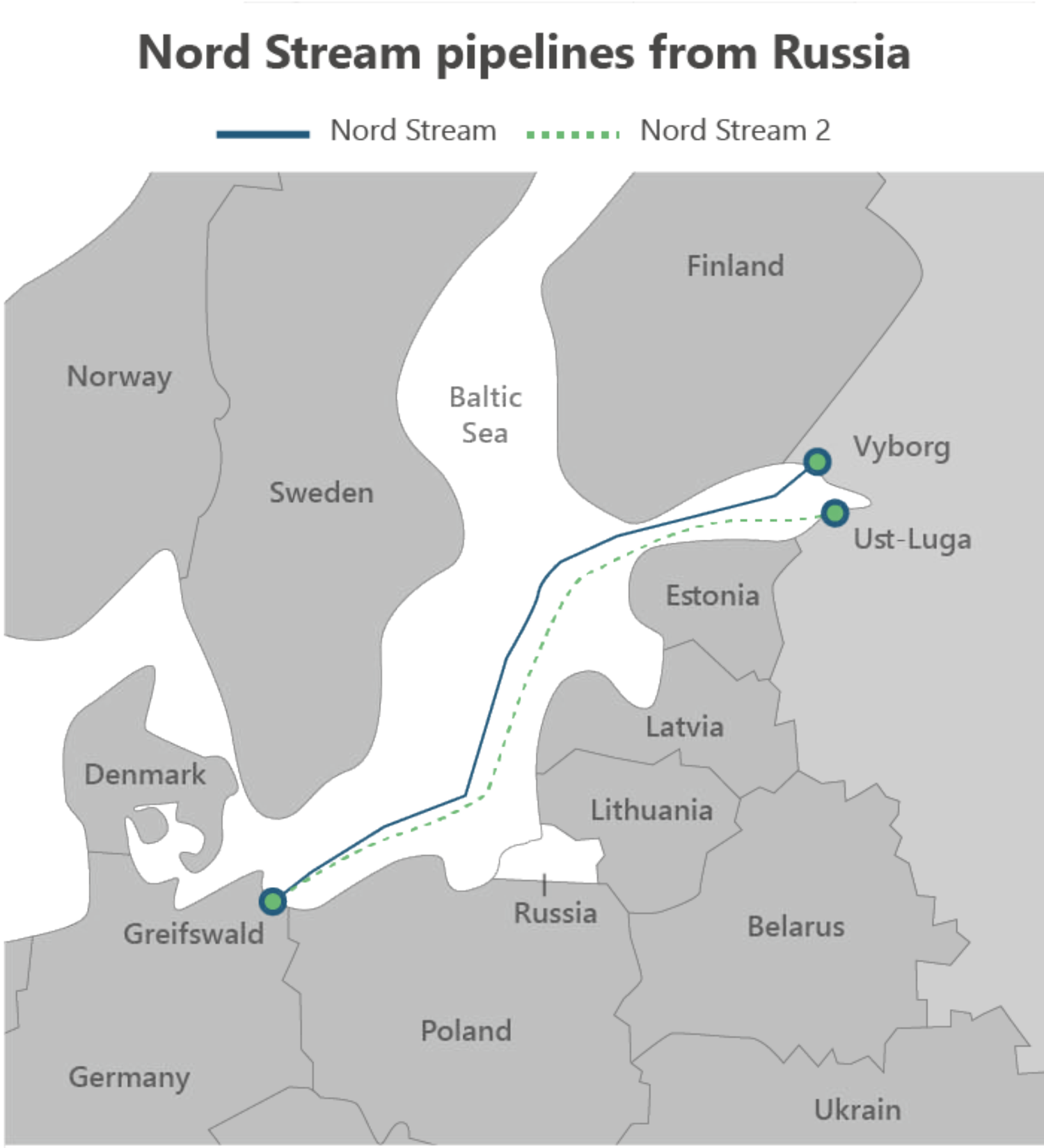
The U.S. is banning all Russian oil, gas, and energy imports. Approximately 8% of U.S. oil and refined product imports come from Russia. In 2021, the US imported an average of 209,000 bpd of crude oil and 500,000 bpd of other petroleum products from Russia, according to the American Fuel and Petrochemical Manufacturers trade association. This represented three percent of US crude oil imports and one percent of the total crude oil processed by US refineries. For Russia, this represented three percent of its total exports [8]. As discussed before, the conflict had already sent petrol prices to record highs in the U.S, and U.S. sanctions on Russian energy will obviously affect Americans too. However, Venezuela is set to increase its oil production [9] to replace Russian oil. Even though the country has faced heavy U.S sanctions in the past, talks to raise production to as much as 1.2 million barrels a day, are taking place, which will supply some of the shortfall. Analysts have determined that the U.S. will be able to afford these sanctions.

2.The UK

The UK has vowed to phase out Russian oil imports by the end of 2022 [10]. Russia makes up about 6% of the UK's oil imports, which makes Russian oil important enough for the UK to not impose immediate sanctions on it. The UK Prime Minister, Boris Johnson, accepted that the move would not hit Russia immediately but added, "what it will do is add to the pressure we're already seeing on Russia and don't forget that the economic impact of the sanctions that the UK has led has been extreme".

3.The EU

The EU stopped imports of Russian coal, and now faces pressure from its allies to place sanctions on Russian oil and gas. To reiterate, Europe's dependence on Russian oil and gas makes EU countries reluctant to place restrictions on them. So far, there has been a long-term commitment by the EU to switch to alternative supplies and make Europe independent from Russian energy "well before 2030".



Additionally, the operating license for Nord Stream II (NS2) has been put on hold by Germany. The Nord Stream II is a 1200 km pipeline under the Baltic Sea, which runs from northwest Russia to Germany. The pipeline allows Russian gas to be transported to Germany without entering Ukraine and other transit countries in Eastern Europe, depriving them of billions of dollars in yearly transit fees and make Europe more directly dependent on Russia [3]. If the pipeline becomes operable, Nord stream I and II will be able to deliver 110 bcm of gas to Europe every year, rendering Europe even more dependent on Russian gas. Therefore, putting NS2's license on hold is a major step for Germany.

The EU is much more reliant on Russian energy and is, ergo, far more reluctant to impose energy sanctions on Russia. So far, the EU has only ended imports of Russian coal- with a four-month transition period to wind down under way. European Commission President Ursula von der Leyen said the action on coal would amount to US$4.4 Billion a year [11]. The EU is now under immense pressure by its allies to stop Russian oil imports. A sanction to phase out imports of Russian crude oil in six months and refined products by the end of 2022 has also been proposed [12]. Poland is one European country that has announced it will ban all imports of Russian oil, gas, and coal by the end of this year. However, a number of the EU-27 are ill-equipped to deal with the economic consequences of cutting off Russian oil imports, what with Russia being the EU's largest oil supplier. Germany has played a major role in resisting an EU-wide oil embargo on Russia, despite pressure from the other EU-states to do so. Germany acquires 34% of its oil from Russia and leading German economic institutes have said that an immediate embargo would result in a 2.2% decline in Germany's GDP in 2023 [13], amounting to 220 billion euros in 2022 and 2023. Deutsche Bundesbank, the central bank of Germany, has estimated that an oil and gas embargo on Russia would trigger a deep recession in Germany, but that the slump would probably be less severe than the impact of COVID-19 [14].

Thus, despite the pressure to make a decision, an EU-wide oil embargo on Russia is yet to be decided [15]. So far, putting an end to Russian gas imports has not been entertained at all, because they remain too critical to important European economies, particularly Germany.

A huge concern surrounding the sanctions is that they will be ineffective harming the EU more than Russia, because while the EU will have to do without its main sources of gas and oil, Russia may easily direct its supplies to China. However, the size of the European market, and the constraints of the transportation infrastructure given the fact that the bulk of Russia's pipelines are concentrated in Europe make it impossible for Russia to simply substitute its oil and gas supplies to China and other countries. Besides presenting a united western front to Russia, EU sanctions on oil and gas may also induce China into joining the West in admonishing Russia. A study employing ENVISAGE, a computable general equilibrium model, estimated that by 2030 the cumulative loss in real income for Russia would exceed US$1.1 Trillion, while cumulative export revenue losses from reductions in fossil fuel exports would total almost US$1.4 Trillion [16].

Oil and gas exports are the backbone of Russia's budget, so an EU-wide ban on these fossil fuels would cause massive disruption to the Russian economy, which it may be unable to recover from. However, are such embargoes viable for Europe, given its heavy reliance on Russian energy?

The viability of ending Europe's dependence on Russian energy

In the event of a gas embargo on Russia, Europe faces an immediate problem: The EU Strategic Reserves for gas are not ready: as many as 14 of the 27 EU countries have reserves for less than a month of average imports. Additionally, as discussed, Germany gets 34 percent of its oil from Russia. A key challenge will be not only to find alternative suppliers to make up for that, but also to line up sufficient land transport for oil heading to two of its refineries that are transported by Russian pipelines. Considerable challenges involve dealing with pipeline bottlenecks, identifying alternative routes, reducing demand for oil and gas in Europe, as well as transitioning to renewables. In the event of a gas embargo, estimates suggest that Europe would need to build an additional 370 GW of wind to replace this gas (on top of 215 GW installed as of 2020). Alternatively, another 105 GW of nuclear capacity, close to the existing capacity installed in 2021 (115 GW), would need to be added.

However, despite difficulties, such energy sanctions provide the EU with the unique opportunity to kill two birds with one stone: end its dependence on Russian fossil fuels and make an enormous leap forward in its climate goals. There are a number of viable measures that have been proposed to help Europe substitute away from Russian fossil fuels. In past crises, countries have also sought to reduce industrial production at certain times, pay back-up generators to switch on supply, order households to curtail energy use or enforce temporary power cuts.

The International Energy Agency has released a ten-point plan [17] that outlines ways in which reliance on Russian gas may be reduced. In 2021 alone, the European Union imported approximately 140 billion cubic meters of gas from Russia through pipelines. According to the IEA, the measures implemented in 2022 could bring down the EU's imports of Russian gas

down by over one-third. This ten-point plan stresses a number of short-term measures that can be enacted immediately to reduce dependence, and also bolster the resilience of the EU gas network whilst making sure vulnerable consumers are cushioned from the resulting hardships.

The plan starts by stating that no new gas contracts will be signed with Russia, and that alternative sources will be targeted to replace Russian supplies. These alternatives would include pipeline gas supplies from Norway and Azerbaijan, as well as increasing LNG inflows. The European Commission said gas and LNG from countries like the United States and Qatar could this year replace 60 billion cubic metres (bcm) of the gas Europe gets annually from Russia [18]. By 2030, increased biomethane and hydrogen use could also help. Southern Europe can receive Azeri gas via the Trans Adriatic Pipeline to Italy and the Trans-Anatolian Natural Gas Pipeline (TANAP) through Turkey. The United States will work to supply 15 billion cubic metres of liquefied natural gas (LNG) to the European Union this year. Germany, Europe's biggest consumer of Russian gas, could import gas from Britain, Denmark, Norway, and the Netherlands via pipelines.

Other measures include accelerating energy efficiency improvements in buildings and industry to reduce gas consumption for heat by close to an additional 2 billion cubic meters within a year. Vulnerable consumers will be protected through policies such as tax rebates. Points 4 and 5 stress the hastened deployment of new wind and solar projects, as well maximizing generation from alternatives like nuclear and bio energy. These points could lead to an additional 35 TWh of generation from new renewable projects over the next year and bring down gas use by 6 bcm and would add 70 TWh of power generation from existing dispatchable low emissions sources, reducing gas use for electricity by 13 bcm.

So far, supply side measures have been discussed to increase the supply of oil and gas to Europe in the event of sanctions. However, it must be stressed that reducing demand for energy, at least in the short term, is as important. For example, turning down the thermostat for buildings' heating by just 1°C would reduce gas demand by some 10 billion cubic meters a year. Researchers at Purdue University were interested in seeing how European economies would react to the imposition of increasing tariff barriers on Russia's natural gas, crude oil, and petroleum products. They estimated that the impact of cutting Russia's fossil fuel exports would have non-trivial consequences in the short term but would be modest for Europe in the long term. This translates into a slowdown in the income growth rate of only 0.04% per year – instead of growing at 2.18% per year, the EU's real income would be growing at 2.14% per year over the period 2022-2030. They also found substantial environmental and health co-benefits of such a move: they estimated that carbon dioxide emissions would drop by 3.1% in 2022 [16]. So, restrictions on Russian fossil fuels would also promise advancements in the EU green deal.

There are also a number of ways in which the negative effects of restricting Russian fossil fuels in Europe may be cushioned: for example, Russian gas could be replaced by Europe's coal-fleet in the power sector. This would obviously be a set-back in terms of climate policy but is a viable option in case of an emergency. In fact, Europe has been trying to shift away from coal to meet climate targets, but some coal plants have been switched back on since mid-2021 because of surging gas prices. Russian oil can be replaced with emergency stocks. IEA member countries decided to make an additional 120 million barrels available from their emergency oil stocks, over a six-month period [19]. Several nations could seek to fill any gap in energy supplies by turning to electricity imports via inter-connectors from neighbouring states or by boosting power generation from nuclear, renewables, hydro-power, or coal.

Switching away from Russian coal, oil, and gas to more expensive substitutes such as renewable energy sources will undoubtedly increase energy prices in the European Union. In the past, this has been the reason why the transition to clean energy has been put on hold. However, analysts have stressed that heavy short-term losses will make way for eventual long-term gains. For a country like Germany, for example, which depends on Russia for roughly half of its natural gas and coal and for more than one-third of its oil, such a transition will prove very expensive. Germany's power generation sector will be particularly vulnerable, but a report by Leopoldina, the German National Academy of Sciences, found that if Germany could survive the next few years with higher prices in the industry, this could pave the way for enormous benefits as far as energy policy and greenhouse-gas emissions are concerned. In the longer term, the German government is proposing to increase the share of renewable energy sources in the power sector from around 40% currently to 100% by 2035, 5 years earlier than planned.

A sustained period of high energy prices could lead to noteworthy investments in energy efficiency, an area that has enormous potential but has attracted less attention than renewables [20]. In the short-run and taking the EU as an aggregate, the bloc will likely be able to survive a dramatic disruption to Russian gas imports. But involving individual entities across the EU, countries that are vastly different economically as well as politically, makes the end result far more uncertain and complex.

For example, the central and eastern European pipeline system is designed to bring imports from the east to final consumers. If too much gas were to come from the west, pipeline bottlenecks could prevent sufficient deliveries to the eastern most parts of the EU or Ukraine [21]. Ultimately, therefore, solidarity between EU countries is absolutely vital in order to move away from Russian fossil fuel.

Conclusion

Energy sanctions on Russian fossil fuels are imperative if the signal of a unified West is to be sent to Russia, and its military budget significantly impacted. An EU-wide embargo on oil or gas has not been imposed thus far, because the European Union's dependence on Russian oil and gas is especially significant. However, if the U.S and UK's energy sanctions are to make any impact on Russia, they must be bolstered with EU sanctions on the same fossil fuels. While the cost of such sanctions will be enormous for the EU in the near-term, there are sever-al energy substitutions and measures that could be taken to cushion the impact on industries and consumers. However, the long-term gains will be twofold: ending the EU's dependence on Russian fossil fuels as well as propelling Europe towards clean energy, once and for all.

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