The Russian invasion of Ukraine prompted Western countries to provide additional arms to Ukraine and impose serious sanctions on Russia, including a removal of Russian financial institutions from the SWIFT financial messaging network and bans on Russian seaborne oil exports.¹ In response to these sanctions and threats of an energy price cap or tariffs on Russian oil and gas exports, Russia slowed and sometimes stopped natural gas exports to countries of the European Union (EU) and threatened to end them entirely.² Most recently, the Nord Stream 1 and 2 pipelines appear to have been sabotaged, which has shut down the flow of Russian gas to northern Europe.

A continued shutdown would be a potentially serious problem, especially during the winter. Natural gas can’t be easily replaced with other forms of energy, at least for some years. The most economical way to ship natural gas is through pipelines, as exist from Russia to the EU. To replace natural gas with shipments of liquefied natural gas (LNG), from the United States or other sources, requires specialized container ships and substantial infrastructure to take delivery of the gas through ports and transport it to inland destinations. Such infrastructure ordinarily requires several years to build, although its construction is being rushed.³ Alternatively, one could replace natural gas with nuclear power; renewable sources such as solar, wind, or hydropower; or coal. But all of these potential replacements have drawbacks, such as greater cost or pollution, and/or would require years to construct.

Presidents Obama and Trump, as well as representatives of Poland and Ukraine, warned of the dangers of this dependence long before the current war. But the EU’s reluctance to continue nuclear power or exploit domestic resources has left it vulnerable to the cut-off of energy supplies. President Joe Biden has threatened to apply sanctions to those who finance the Nord Stream pipelines.⁴ However, it is not clear whether these sanctions will be effective or whether the EU is even committed to applying them.

Because some countries export energy in the form of oil, coal, or electricity, the total energy dependency on Russia can be less than the natural gas dependency ratio. To make the graph more readable, only countries with non-zero-dependency ratios are shown. For the left graph, Austria, Belgium, Bulgaria, Croatia, Denmark, Estonia, France, Greece, Ireland, Latvia, the Netherlands, Portugal, Romania, Slovenia, Spain, and Sweden have zero-dependency ratios. For the right graph, Austria, Belgium, Croatia, Cyprus, Denmark, France, Ireland, Malta, and the Netherlands have zero-dependency ratios.
The German government, however, has proposed to pay all private households’ gas bills in December and generously subsidize gas bills for both residential and industrial customers for a year or more, starting in early 2023. The generous subsidy is capped at 80 percent of previous consumption for households and small businesses and at 70 percent of previous consumption for industrial firms. The idea behind this subsidy was to have people and firms pay market prices for marginal consumption—thereby encouraging conservation—but to subsidize a lower level of consumption. Other EU members have criticized this move as undermining common EU policy on energy prices.

From an economic point of view, however, the one reason to criticize this proposed subsidy is that—even though it is limited to fractions of past use—it would still change people’s and firms’ incentives to reduce their consumption of gas. For example, if firms faced market costs for their entire demand for gas—rather than just the portion greater than the subsidized amount—then some firms with gas-intensive production might choose to shut down entirely rather than pay market costs. An alternative that would still assist low-income people but better retain conservation incentives would be to send households subsidy checks with no strings attached while allowing natural gas prices to rise to market levels for all purchases.

The effects of a shutoff or reduction on natural gas flows to Europe will be heterogeneous, as they will depend on local weather and a country’s reliance on such flows.

Notes
1 The EU sanctions can be found here, while the U.S. sanctions can be found here.
2 Russia supplies Europe with a large amount of natural gas through several pipelines, such as Nord Stream 1, Jamal/Yamal, Soyzul/Brotherhood/Transgas, and Blue Stream/South Stream.