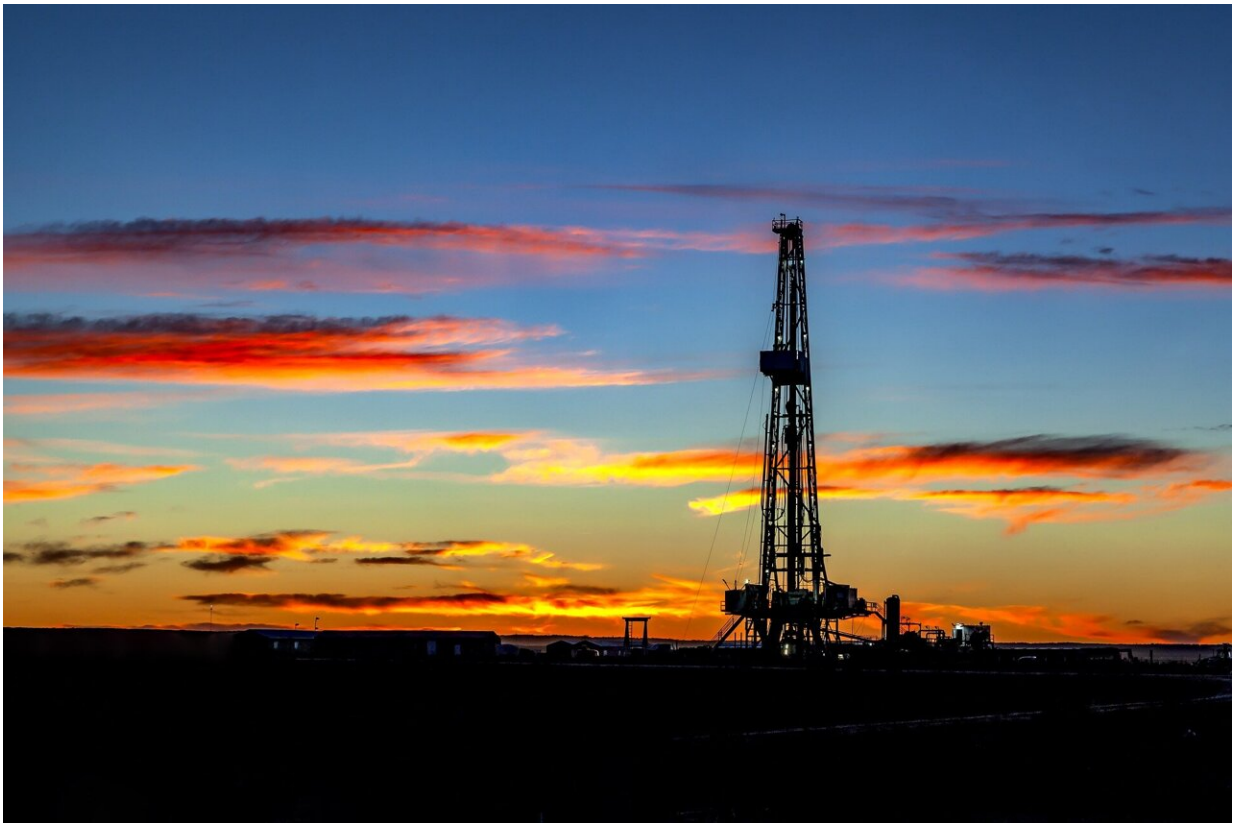
Europe can rapidly eliminate imports of Russian natural gas, say researchers

October 5 2022



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Using a new power sector model, a team of researchers, including faculty at Binghamton University, State University of New York, has proposed a method for Europe to eliminate natural gas imports from

Russia. The team's commentary article, "Europe's way out: Tools to rapidly eliminate imports of Russian natural gas," was published in *Joule*.

The Russian invasion of Ukraine has highlighted the depth of Europe's dependence on Russian natural gas imports. The REPowerEU plan, released by the European Commission, maps a European Union-wide pathway to reduce Russian natural imports by two-thirds by the end of 2022, with the complete elimination of Russian gas by 2027. Overall, there are only four main policy levers in the short term: Increase pipeline gas and liquified natural gas imports from non-Russian sources, reduce gas demand in heating and industry, reduce gas-fired electricity generation and adopt flexible gas storage targets.

A research team including Binghamton University engineer Neha Patankar has created a power sector model for Europe and a gas network model to analyze multiple feasible pathways to secure full independence from Russian natural gas. Patankar is an operations research analyst with a research focus on energy system and power system modeling. Her research aims to provide insights for constructing a robust decision under parametric and structural uncertainty. Her research also includes the evaluation of low-carbon technologies and the effects of policy scenarios on energy systems.

The team modeled European natural gas and electricity systems to assess the feasibility and potential impact of a near-complete embargo on imports of Russian natural gas to Europe beginning in October. It found that Europe can eliminate reliance on Russian natural gas by augmenting REPowerEU plans with a temporary boost in coal and recalibrated gas storage.

"All successful gas independence pathways increase reliance on coal-fired electricity generation but reduce overall greenhouse gas emissions due to offsets from lower gas demand," said Patankar, assistant

professor in Binghamton University's Department of Systems Science and Industrial Engineering.

To be successful, these actions will have to be sustained for the next two winters, Patankar said.

"Increasing renewables, electrification of heating and liquified natural gas imports will steadily replace the current policy levers and maintain Europe's long-term energy transition," she said.

Contributing to this research were Michael Lau, a second-year Ph.D. student in the Department of Mechanical and Aerospace Engineering, Princeton University; Wilson Ricks, a fourth-year Ph.D. student in the Department of Mechanical and Aerospace Engineering, Princeton University; Jesse Jenkins, an assistant professor of mechanical and aerospace engineering and the Andlinger Center for Energy and the Environment.

More information: Michael Lau et al, Europe's way out: Tools to rapidly eliminate imports of Russian natural gas, *Joule* (2022). DOI: 10.1016/j.joule.2022.09.003

Provided by Binghamton University