

# Fracking likely to result in high emissions

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Derrick and platform of drilling gas wells in Marcellus Shale - Pennsylvania.  
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Natural gas releases fewer harmful air pollutants and greenhouse gases than other fossil fuels. That's why it is often seen as a bridge technology to a low-carbon future. A new study by the Institute for Advanced

Sustainability Studies (IASS) has estimated emissions from shale gas production through fracking in Germany and the UK. It shows that CO<sub>2</sub>-eq. emissions would exceed the estimated current emissions from conventional gas production in Germany. The potential risks make strict adherence to environmental standards vital.

In the last ten years natural gas production has soared in the United States. This is mainly due to shale gas, which currently accounts for about 60 percent of total US gas production. Shale, a fine-grained, laminated, sedimentary rock, has an extremely low permeability, which in the past made it difficult—and uneconomical—to extract.

However, recent advancements in horizontal drilling and hydraulic fracturing have opened up previously unrecoverable shale gas reserves to large-scale, commercial production.

In light of experiences in the US and dwindling conventional gas reserves, the debate on shale gas has also taken centre stage in Europe. The purported climate advantages of shale gas over coal and the implications for domestic energy security have made fracking in shale reservoirs an interesting prospect for many European countries.

## **What emissions is shale gas production in Europe likely to cause?**

IASS researcher Lorenzo Cremonese led a study that investigated the greenhouse gas and air pollutant emissions (including carbon dioxide, methane, carbon monoxide, nitrogen oxides, particulates and other [volatile organic compounds](#)) expected to result from future shale gas production in Germany and the UK.

A team of researchers from the University of Potsdam, the TNO

Utrecht, the Freie Universität Berlin, and the IASS determined the amount of these chemical compounds that would be released into the atmosphere through fracking activities, based on estimated reservoir productivities, local capacity, and the technologies used. Their findings have been published in the International Journal *Elementa—Science of the Anthropocene*.

To quantify total emissions, the authors assigned gas losses to each stage of upstream gas production. In the process, they also generated two plausible emission scenarios: a 'realistic' and an 'optimistic' scenario.

While methane leakage rates for the optimistic scenario approximate official figures in national inventories, the rates for the realistic scenario exceed them by a large margin. The emission intensity of shale gas in electricity generation is up to 35 percent higher than estimates of the current [emission](#) intensity of conventional gas in Germany. The study also questions the accuracy of methane leakage estimates for current conventional gas production.

## **Time to put the environmental risks of natural gas on the political agenda**

At the same time, the results show that in all plausible scenarios, emissions of air pollutants like carbon monoxide, [nitrogen oxides](#) and particulate matter will have a negligible effect on overall national emissions of these substances. But unlike [greenhouse gases](#), air pollutants have immediate health effects at local and regional level. They are the focus of another study currently being prepared.

The present study fills a gap in the scientific debate on European shale gas reserves and the consequences of exploiting them. "If [shale](#) gas becomes a reality in Europe, the risks arising from that will have to be

minimised through strict adherence to environmental standards," explains Cremonese.

The study also provides valuable insights for the discussion on the climate effects of a new gas industry, and, more generally, on the question of if and how natural gas should play a role in the global energy transition.

"The major differences between the realistic and optimistic scenarios in terms of their anticipated emissions underline once again the importance of improving existing emissions reduction technologies and practices," says Cremonese. "In light of the climate crisis, the environmental risks posed by gas emissions need to move quickly onto the agenda in policymaking and in negotiations with the gas industry in order to keep the adverse effects of a European [shale gas](#) industry to an absolute minimum."

**More information:** Lorenzo Cremonese et al, Emission scenarios of a potential shale gas industry in Germany and the United Kingdom, *Elem Sci Anth* (2019). [DOI: 10.1525/elementa.359](https://doi.org/10.1525/elementa.359)

Provided by Institute for Advanced Sustainability Studies e.V. (IASS)

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