



FAQ Natural Gas (Version 1.1, July 2021)

In this document, you will find answers to possible questions about natural gas (for reference or review). At the bottom, there are many links to videos, texts, and publications for more in-depth research. It is primarily technical in nature to provide a foundation on which to build the policy discussion.

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What is natural gas?

Natural gas is the name for gas mixtures that are extracted from the earth. Therefore, the chemical composition of natural gas varies depending on where it is sourced. However, most of the natural gas produced in large quantities consists of methane (CH₄). Most of the German natural gas network has been converted to H-gas (high calorific gas) with a methane content of 87-99%. In northwestern Germany, however, L-gas (low calorific gas) with a methane content of 80-87% is still used¹. Other chemical substances in natural gas include ethane, butane or pentane.

Normally, natural gas is gaseous, but at -162°C it becomes liquid (see LNG). In the liquid state, the volume shrinks by a factor of about 600, which means that 1 m³ of LNG is 600 m³ of natural gas.²

How is the Global Warming Potential (GWP) calculated?

The Global Warming Potential (GWP) indicates how much stronger the greenhouse gas effect ("warming effect") in the atmosphere is due to one unit of a gas as opposed to one unit of CO₂. That is, greenhouse gases are converted into CO₂ equivalents (CO₂e). Since greenhouse gases have different effects over different periods of time, the IPCC (Intergovernmental Panel on Climate Change) calculates the GWP over a span of 20 and 100 years.³ CO₂ is degraded very slowly, so that 1000 years after the original emission about 15-40% is still present in the atmosphere. Methane, on the other hand, survives in the atmosphere for just 12.4 years on average.⁴

Considering the time span of 100 years when accounting for national GHG inventories is explicitly not mandated by the IPCC but may be politically reasonable. For methane, however, it is argued to look only at a 20-year span because it contributes strongly to the climate crisis in the early years and becomes critical when meeting climate targets in the short term. People ultimately have to decide for themselves what is more important to them when considering greenhouse gases, the long view of the planet or the short-term emissions to meet climate goals or prevent tipping points from being reached.

What is the global warming potential (GWP) of natural gas?

Since methane is the main component of natural gas, this question considers the GWP of methane. According to the IPCC, this amounts to 28-36 CO₂e over 100 years (GWP100). This means that one methane molecule is as harmful to the climate as 28-36 CO₂ molecules. However, if only 20 years are considered (GWP20), methane is 84-87 more harmful to the climate than CO₂, according to the IPCC.⁵ Latest research even assumes 105 CO₂e at GWP20.⁶

However, most of the methane is not simply released into the atmosphere but is burned to generate energy or otherwise processed in chemical processes. So how high the respective GWP is cannot be easily determined. The problem is leakage. When natural gas is extracted, transported, and stored, some of it diffuses unburned directly into the atmosphere. How much is still too little researched, and it depends heavily on the source as to what value is given. The Scientists for Future Germany assume 2.3-6% of the total production (recommended reading).⁷ For comparison, Urgewald assumes that leakage must be no higher than 2.4-3.2% so that natural gas is less harmful to the climate than coal.⁸ All the figures are global averages, and the actual leakages strongly depend on the type of transport (LNG or gaseous), type of extraction (fracking or not), the transport route and the state of the infrastructure.

Which actors are working against natural gas in Germany?

So far, there are not many actors who have focused on natural gas, but in recent years new initiatives appeared. **Gegen Gasbohren** (Against Gas Drilling) is an alliance of many citizens' initiatives that have been working for

¹ <https://www.verivox.de/gas/ratgeber/h-gas-und-l-gas-umstellung-und-kosten-1000840/>

² <https://www.fluessiggas1.de/lng-gas-entstehung-und-einsatz-von-fluessigerdgas/>

³ Table 8.7, Page 714: https://www.ipcc.ch/site/assets/uploads/2018/02/WG1AR5_Chapter08_FINAL.pdf

⁴ <https://www.umweltbundesamt.de/themen/klima-energie/klimaschutz-energiepolitik-in-deutschland/treibhausgas-emissionen/die-treibhausgase>

⁵ <https://www.epa.gov/ghgemissions/understanding-global-warming-potentials#Learn%20why>

⁶ Page 10: https://www.diw.de/documents/publikationen/73/diw_01.c.798191.de/dp1892.pdf

⁷ Page 3: <https://doi.org/10.5281/zenodo.4474498>

⁸ Page 2: https://urgewald.org/sites/default/files/media-files/urgewald_LNG_report.pdf

many years against fracking in Germany.⁹ One of the more active citizens' initiatives in the alliance is **Kein CO2-Endlager**, which is also fighting against the LNG terminal in Brunsbüttel. They are also part of the **Klimabündnis gegen LNG** (Climate Alliance Against LNG), which is also working on the planned LNG terminal in Brunsbüttel. Also represented in this alliance is for example the **Deutsche Umwelthilfe** (DUH), which gave some impulse to the movement since its entry a few years ago. They focus on working legally against the planned LNG terminals, and at the same time they are also forming alliances in specific cases. Other larger environmental associations also have the topic of natural gas on their radar, but unfortunately only peripherally or locally. As a smaller NGO, **Bürgerbegehren Klimaschutz**¹⁰ works with local citizens' initiatives primarily against planned natural gas power plants. They also launched the more activist group **Gasexit** in 2021. Furthermore, a group under the name **Wintershall must fall** is currently constituting itself against the German company Wintershall Dea.¹¹ **Fridays for Future** and **Extinction Rebellion** have also worked on natural gas in Germany. There are also some individuals contributing to the topic in various places within the German movement, predominantly perceived as male. On the scientific side, names such as **Claudia Kemfert** and the **German Institute for Economic Research** (DIW)¹² among others are well known.

Which actors are working internationally against natural gas?

Internationally, much more is happening than in Germany. For example, our Swedish friends from **Fossilgas fällan** prevented a LNG terminal in Gothenburg with their mass action 2 years ago.¹³ In the Netherlands there were two actions of **Shell must Fall (before Code Rood)** against natural gas production.¹⁴ There have also been civil disobedience actions against natural gas infrastructure in Italy, Portugal and England.

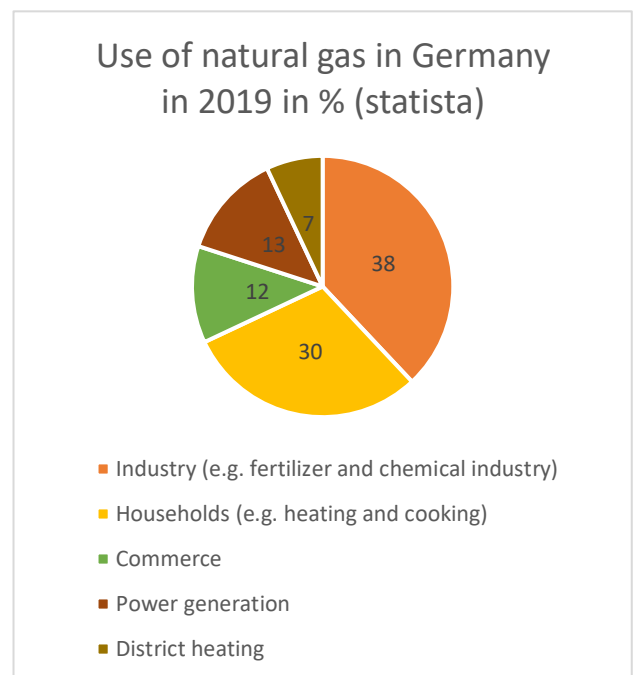
In the global south, the fight is mainly against fracking. The global alliance **Shale Must Fall** tries to bring some of the actors together and plan days of action (e.g. on World Water Day or on 11.12.2020).¹⁵ Also the **Gastivists Network** is international acknowledged as the main grassroots organization and there are many regional groups that gather a lot of information (it is worth a look at the website).¹⁶ There are many more groups and alliances that cannot all be listed.

How to block natural gas?

The natural gas infrastructure can be roughly divided into four areas. First, the extraction of natural gas, this also happens in Germany, but only a little, especially in Lower Saxony. Second, the arrival of natural gas in Germany. This happens via large pipelines or soon perhaps LNG terminals. Third, the transportation of natural gas. More on this in "How is natural gas transported?". Fourth, the use of natural gas. Of course, this happens in power plants, some of which are still being built, but mainly in industry, where the forms of action would be very diverse, depending on the production site. A large part also arrives at households. Another possibility is to go directly to the companies that are represented in the natural gas industry, either those that primarily earn money with natural gas, or the companies that consume a lot of natural gas. There are many of these in Brunsbüttel, for example.

What is natural gas used for?

25% of Germany's primary energy needs are met by natural gas. This is more than lignite and hard coal combined and is



⁹ <https://www.gegen-gasbohren.de/>

¹⁰ <https://buenger-begehren-klimaschutz.de>

¹¹ <https://wintershallmustfall.org>

¹² <https://www.diw.de/de>

¹³ <https://fossilgasfallan.se>

¹⁴ <https://code-rood.org/en/shell-must-fall/>

¹⁵ <https://shalemustfall.org>

¹⁶ <https://www.gastivists.org>

only exceeded by crude oil.¹⁷ It is important to note that primary energy is the total energy demand, which is used in a wide variety of forms (e.g. also as diesel or heavy oil). It is therefore not only energy that is consumed in the form of electricity, but also in heat generation (e.g. housing and industry), in combustion engines (e.g. transportation), in chemical processes (e.g. fertilizers) and many others.

Where does natural gas come from in Germany?

Most of the natural gas in Germany comes from abroad. In 2019, 3169 PJ of natural gas were imported¹⁸, with Russia (50.7%, H-gas), Norway (25.4%, H-gas) and the Netherlands (21.4%, L-gas) as the sources of supply¹⁹. Compared to 3169 PJ of natural gas from imports, Germany produced just 194 PJ itself (L-gas).²⁰

These figures will change in the future, as natural gas reserves in the Netherlands will run dry by 2030 and production in Germany will also decline. Therefore, since 2015, millions of devices in Germany are being converted from L-gas to H-gas and the infrastructure is being changed. This is happening mainly in NRW. For this reason, the ZEELINK was also built (whose construction site was blocked by Ende Gelände in 2020).²¹ Instead of using a lot of money to change the infrastructure, decarbonization could have been targeted there.

Globally, the USA produces the most natural gas with a share of 20% (2017). Right after comes Russia (17%). The next largest producers are Iran, Canada, Qatar, China, Norway, Australia and Saudi Arabia (3-5% each).²²

How is natural gas produced?

So far, there is a moratorium in Germany and the EU against fracking (hydraulic fracturing), i.e. the extraction of natural gas and oil from "unconventional" deposits such as shale, clay or sand rock, as well as coal seams. Fracking involves injecting a mixture of water, sand and chemicals into the subsurface under high pressure.²³ Although this process is expensive, it is still executed since the more easily accessible gas deposits are slowly running out. This is also the case in Germany, so fracking may soon be permitted again. To be precise, it is a bit complicated in Germany.²⁴ Even though the countries that supply Germany with natural gas do not frack, after the construction of LNG terminals this could change. Especially the USA have been fracking massively in recent years, but Canada, China, South Africa, Argentina, and other countries are fracking as well.

"Conventional" natural gas is simply extracted by drilling a well a few kilometers deep. By extracting the gas from the rock, the pressure can drop so much that earthquakes occur at the surface. This is one of the main reasons why the Netherlands wants to phase out natural gas production.

What does natural gas have to do with neocolonialism?

Germany imports a large part of its primary energy needs. The extraction of natural gas in Germany is highly controversial and there are many voices in particular against fracking. There are good reasons for this. Fracking is highly damaging the environment, pollutes a lot of water and causes illness in the regions concerned. Many people in Germany do not want that. Therefore, for Germany to get energy, it must be imported. Some of the largest global corporations specialize in energy sources such as coal, gas, and oil. They are mostly based in the global north but produce in the global south or in indigenous regions in Australia, the USA and Russia. They have a lot of power because their money makes them influential. For example, in 2017, over 200 environmental activists were killed worldwide, most of them in Latin America.²⁵ This is because local people are resisting extractivism as they suffer from its consequences.²⁶ Environmental standards are often not met or are generally too low. The people affected usually gain nothing from the extraction of raw materials, and the money usually benefits only a few population groups. At the same time, the affected countries are dependent on the sale of raw materials due to colonial continuities. Many areas rich in raw materials are at the same time crisis regions,

¹⁷ Page 10: <https://ag-energiebilanzen.de/10-0-Auswertungstabellen.html>

¹⁸ Page 8: <https://ag-energiebilanzen.de/10-0-Auswertungstabellen.html>

¹⁹ <https://de.statista.com/statistik/daten/studie/151871/umfrage/erdgasbezug-deutschlands-aus-verschiedenen-laendern/>

²⁰ Page 5: <https://ag-energiebilanzen.de/10-0-Auswertungstabellen.html>

²¹ <https://www.zeelink.de>

²² https://de.wikipedia.org/wiki/Erdgas/Tabellen_und_Grafiken

²³ <https://www.umweltbundesamt.de/themen/wasser/gewaesser/grundwasser/nutzung-belastungen/fracking>

²⁴ More info: <http://klima-der-gerechtigkeit.de/2020/06/15/fracking-in-deutschland-wirklich-verbieten-ein-bisschen-erlaubt-oder-sogar-bald-wieder-en-vogue/>

²⁵ <https://www.nationalgeographic.de/umwelt/2018/07/zahl-ermordeter-umweltaktivisten-stieg-2017-auf-rekordhoch>

²⁶ Example: <https://www.desmogblog.com/2021/03/15/argentina-vaca-muerta-oil-waste-illegal-dumps-investigation>

such as the natural gas-rich Cabo Delgado region in Mozambique, where 2500 people have been murdered since 2017, in some cases in a cruel manner, and 700,000 have had to flee.²⁷ Natural gas arriving in Germany from Russia is produced partly at the expense of the 30,000 Nenets (indigenous people).²⁸

The desire for cheap energy of the global north leads to tensions and conflicts in the global south. At the same time, the people in the global south cannot protect themselves so well from the climate crisis, because they are comparatively poor despite abundance of fossil fuels, so that the climate crisis also increases the tensions and conflicts that come along with the burning of those very fossil fuels in the global north.

What is Wintershall Dea?

Wintershall Dea was merged in 2019 from the companies Wintershall Holding GmbH and DEA (Deutsche Erdöl AG) and is the largest German natural gas and crude oil company. It is 67% owned by the German group BASF and is based in Kassel. Both former companies benefited significantly from the Nazis and helped them rise.²⁹ The company wants to have its IPO after 2021.³⁰ Wintershall Dea is active in Germany, but mainly in the global South. It uses neocolonial structures and exploits the people of Neuquén (Argentina), for example, by ruthlessly fracking there.³¹ In Germany, Wintershall Dea is involved in 2900 km of pipelines through a company called WIGA³², and has a 1 billion stake in Nordstream 2, operates 15 oil and 40 gas fields in the world and the only German oil platform "Mittelplatte" near Brunsbüttel.³³

How is natural gas transported?

Europe has a shared gas network³⁴. This network consists of different sized pipes, the largest have a thickness of 120 cm (e.g. Nordstream 2), others are more narrow (e.g. Zeelink with 80 cm). Due to its central location, a lot of natural gas used in Europe passes through Germany, which is why Germany has a large natural gas network, as well as natural gas storage facilities that can store 28% of Germany's annual consumption³⁵. In the pipelines, the natural gas is compressed for increased transport rates. This is done in so-called compressor stations every few dozen kilometers, as the natural gas keeps expanding. In Germany, the pipelines are below the surface; only the large compressor stations or small gas pressure regulating stations (change the pressure when the gas is transferred to regional networks), metering stations (for monitoring) or other facilities are above the earth's surface.

Companies that own natural gas pipelines include Gascade (subsidiary of Wintershall Dea and Gazprom), Open Grid Europe, Gasuni, Thyssengas (formerly RWE) and others.³⁶

In addition, there are 28 large and 6 small LNG terminals in Europe that feed liquid natural gas from ships into the European gas grid. Although these are only operating at about 25% capacity to date, 21 more are planned, including some in Germany.³⁷

What is LNG?

LNG is liquefied natural gas. It is cooled down to -162°C and thus shrinks to one six-hundredth of its volume. This allows it to be transported over long distances in ships, or used as a fuel in the mobility sector (e.g. cruise ships). The problem with this is that cooling down requires a lot of energy and in addition there is the so-called boil-off gas (BOG). BOG means that a percentage of the tank evaporates every day, the percentage is approximately between 0.028% (large tanks, low methane content) and 0.048% (small tanks, high methane content) per day.³⁸ Therefore, the transport of LNG is more harmful to the climate than that in pipelines.

²⁷ <https://www.bbc.com/news/amp/world-africa-56411157>

²⁸ Page 12: https://urgewald.org/sites/default/files/media-files/urgewald_LNG_report.pdf

²⁹ <https://www.mopo.de/hamburg/in-der-hafencity-hamburgs-sinti-sind-geschockt-ueber-diesen-mieter-38042968>

³⁰ <https://wintershalldea.com/de/newsroom/boersengang-von-wintershall-dea-wird-nach-2021-angestrebt>

³¹ <https://www.theguardian.com/environment/2019/oct/14/indigenous-mapuche-argentina-fracking-communities>

³² <http://www.wiga-transport.de/home.html>

³³ https://de.wikipedia.org/wiki/Wintershall_Dea

³⁴ An interactive map (attention: from Chevron): <https://energywebatlas.com/interactiveworldgasmap.html>

³⁵ <https://de.wikipedia.org/wiki/Erdgasspeicher>

³⁶ <https://www.fnb-gas.de/fnb-gas/mitglieder/>

³⁷ Page 2: https://urgewald.org/sites/default/files/media-files/urgewald_LNG_report.pdf

³⁸ Page 295: <http://www.enggiournals.com/ijet/docs/IJET10-02-04-30.pdf>

Where does LNG come from?

Worldwide, LNG infrastructure is being expanded because it can reduce dependencies on individual states and natural gas-producing states can increase their market. Thus, natural gas from the USA, South America and Qatar can also arrive in Europe. LNG terminals are being intensively expanded around the world in recent years.³⁹

What changes with LNG terminals?

The LNG terminals can be viewed from two perspectives, a lot of it is speculation(!). On the one hand it is about geopolitics and a diversification of suppliers, on the other hand it is about economic aspects and price pressure. The three planned LNG terminals in Germany are expected to have a total capacity of up to 26 billion cubic meters (bcm) per year (Stade 8 bcm, Wilhelmshaven 10 bcm, Brunsbüttel 8 bcm)⁴⁰. For comparison: Germany had a natural gas consumption of 88.7 bcm in 2019.⁴¹ That means an enormous additional capacity. However, it is now very unlikely that an LNG terminal will be built in Wilhelmshaven, and the other terminals are not on schedule either.

Geopolitical arguments are that the US is pressuring Germany to build the LNG terminals to market its own gas, and Europe's dependence on Russian natural gas would be just a pretext. At the same time, there was a deal from the German Ministry of Economics to support the LNG terminals with one billion euros, if Nord Stream 2 can be built in return, but the US didn't accept it.

So far, LNG has been more expensive than natural gas from Russia, but one argument in favor of building the terminals is that this will put pressure on Russia to lower its prices, since purely theoretically natural gas could also be purchased elsewhere. This argument would not be about utilizing the terminals to capacity, but merely an element of pressure. In this case, little LNG would be imported.

The fact is that other companies are supposed to report their expected required capacities to the respective investors (German LNG at Brunsbüttel, Dow Chemical and others at Stade), the terminal in Wilhelmshaven (Uniper) failed in this step.⁴² LNG also makes the market for natural gas more dynamic, as it is not tied to static pipelines.

The LNG terminal in Brunsbüttel?

An LNG terminal is planned to be built in Brunsbüttel. The location is the ChemCoastPark, next to the fertilizer producer Yara, Wintershall Dea, an oil port (partly of Sasol), and a nuclear power plant in its decommissioning mode with lots of radioactive material. In fact, it should be built right next to the nuclear power plant. In the spring of 2021, it is estimated that the planning approval process will be initiated by German LNG. So far, the regasification capacities are to be reserved to RWE (decision possibly in mid-2021). In order to connect the LNG terminal with the existing natural gas network, a pipeline connection to Hetlingen is also planned. The closest pipeline to Brunsbüttel so far is the DEUDAN pipeline of Gasuni and Open Grid Europe.

What is the conflict around Nord Stream 2?

The existing two pipes of the Nord Stream pipeline transport about 59 bcm of natural gas per year. As a reminder, Germany had a natural gas consumption of 88.7 bcm in 2019. The two additional strings of Nord Stream 2 are expected to be able to transport another 55 bcm of natural gas. Onshore connecting pipelines have also been built in Germany, such as the OPAL (to the Czech Republic, still under construction) and NEL (to Lower Saxony). Therefore, the four strings should not only supply Germany with natural gas, but also create a more direct route to the center of Europe. Since the pipelines run through the Baltic Sea, no money has to be paid to transit countries like Poland. Nevertheless, there are geopolitical considerations here as well. For example, less natural gas can be transported via Ukraine as a result of the additional capacity, so that the Ukraine conflict does not mean a loss of gas business for Russia and it is not co-financed. The previous pipelines through Ukraine have been able to build up pressure so far. Therefore, the few winners of the pipeline are Germany and Russia, which is why the EU, Poland, the US and others are against the project. Exactly what the US sanctions are, how likely it

³⁹ <https://globalenergymonitor.org/projects/global-fossil-infrastructure-tracker/tracker-map/>

⁴⁰ <http://klima-der-gerechtigkeit.de/2020/07/30/us-fracking-lng-und-russisches-gas-per-nordstream-2-deutschlands-doppelspiel-erhitzt-geopolitische-gemueter-und-das-klima/>

⁴¹ <https://de.statista.com/statistik/daten/studie/41033/umfrage/deutschland---erdgasverbrauch-in-milliarden-kubikmeter/>

⁴² <http://klima-der-gerechtigkeit.de/2020/07/30/us-fracking-lng-und-russisches-gas-per-nordstream-2-deutschlands-doppelspiel-erhitzt-geopolitische-gemueter-und-das-klima/>

is that they take place and other aspects have been discussed in numerous articles and is out of the scope of this text.

Where is the natural gas infrastructure being expanded in Germany?

At the German level, the major projects have already been listed: LNG terminals in Stade, Wilhelmshaven, Brunsbüttel, Rostock, new pipelines are the ZEELINK in NRW and the new strand of OPAL in East Germany, also Nord Stream 2 and a few kilometers near Leverkusen and Brunsbüttel. There are projects to build LNG refueling stations for ships. For example, one went into operation in Cologne last year, and new LNG ships have also been launched. Many natural gas power plants are planned in Germany, more on that below.

At the European level, there are the so-called Projects of Common Interest (PCI), which include energy infrastructure projects that can be approved more easily and are additionally eligible to get resources from the CEF Fund. The latest 2020 list includes 32 natural gas projects, which would have a total volume of 29 billion euros.⁴³ In total, natural gas projects with a total volume of 99 billion euros were planned or built in Europe in 2019, according to the Global Energy Monitor. This includes power plants.⁴⁴

What is this gas lock-in?

The fear of a gas lock-in is repeatedly voiced. The concern is that investments in gas infrastructure will lead to a slowdown in the energy transition, thereby exacerbating the climate crisis. It is often the answer to the lie of natural gas as a "bridge technology." This is because investments in natural gas infrastructure are said to be profitable only after several decades, at a time when Europe should have been climate neutral long ago. The fear is that where money is invested, the investment should also pay off. Therefore, the infrastructure would then also be used, although it would not make sense from a climate point of view, since investments in renewable energies would then be omitted.

If investments are made, but the invested infrastructure is not used and the investments do not pay off, this is also referred to as "stranded assets".

How will the coal phase-out change the use of natural gas as an energy source?

Instead of switching from coal energy to renewables, the plan is to build many new power plants or to convert coal-fired power plants. This conversion only works for smaller power plants, which is why new large gas-fired power plants are to be built at some locations. For example, in Berlin, the coal phase-out is to be completed by 2030 and a new gas-fired power plant is to be built for this purpose (Reuter West). According to a study by the state of Berlin and Vattenfall, this would break the 2°C target, but this scenario is still recommended.⁴⁵ According to the 2035 grid development plan (2021), between 10.6-19.3 GW of new power plant capacity is to be built by 2035. In 2019, 19.5 GW of capacity was installed throughout Germany. This is 50-100% more power plant capacity from natural gas than currently.⁴⁶

This is mainly because electricity is currently produced simultaneously with district heating in so-called CHP (combined heat and power) power plants. Since the infrastructure for district heating already exists, it is therefore easier to put another power plant in the same place instead of converting the infrastructure to decentralized, renewable heating concepts. Thus, according to current planning, the phase-out of coal leads to an entry into the use of natural gas in many places.

When will Germany phase out the use of natural gas?

So far, there is no phase-out date for the use of natural gas in Germany. The fact that Germany will one day phase out natural gas is far from being as clear as it is for coal. This is because there are still attempts by the industry to present natural gas as CO₂e neutral using certain technologies. One example of this is the concept of producing hydrogen from natural gas (this is how most hydrogen is currently produced in Germany). The by-product CO₂ is to be cut off in the process and stored, for example, pressed underground. So-called Carbon Capture and Storage (CCS) methods have been researched for many years, have never been implemented on a large scale, but are

⁴³ <https://www.euractiv.com/section/energy/news/billions-to-be-wasted-on-unnecessary-gas-projects-study-says/>

⁴⁴ Page 3: https://globalenergymonitor.org/wp-content/uploads/2020/02/Gas_at_a_Crossroads_EU.pdf

⁴⁵ Look at the abstract: <https://www.berlin.de/sen/uvk/klimaschutz/klimaschutz-in-der-umsetzung/waermewende-im-land-berlin/kohleausstieg-berlin/>

⁴⁶ Page 36: https://www.netzentwicklungsplan.de/sites/default/files/paragraphs-files/Szenariorahmen_2035_Genehmigung_0.pdf

assumed in many scenarios (also by the IPCC). The newly built natural gas pipelines should also be able to transport hydrogen.

If political arguments are to be followed, the actual roadmap of the natural gas phase-out is much more important than the date itself. This is because it makes more sense to use natural gas in some sectors than others. While relatively easy to replace in the electricity sector, it takes more time to make a comfortable switch in heat applications. Substances produced from natural gas, such as fertilizer or plastics, also cannot be replaced easily. From a climate perspective, of course, these are not valid arguments, so it can also be called for an immediate phase-out of natural gas.

What does hydrogen have to do with natural gas?

Hydrogen has so far been the ultimate argument for investing further in natural gas infrastructure. New pipelines should also be able to transport hydrogen, new gas turbines should also work with hydrogen, and everything that does not work with hydrogen itself should simply be powered by synthetic gas, i.e. "climate-neutral", CO₂-enriched hydrogen.

Hydrogen is currently subject to a hype whose expectations cannot be fulfilled. This is also due to the fact that the natural gas lobby is generating this hype. For example, the lobby association "Zukunft Erdgas" (engl. future natural gas) recently renamed itself to "Zukunft Gas" (engl. future gas).

There is nothing wrong with the increased use of hydrogen for now, but the question is where will the hydrogen come from and how much will be available and when. Hydrogen will not be able to simply replace natural gas in the next 15 years, even if that is assumed in many scenarios. For example, the planned natural gas power plant in Berlin will run on synthetic gas after 2030, or the planned extension of the Heidekrautbahn in Berlin will rely on hydrogen trains instead of overhead lines.

So far, the German government's national hydrogen strategy assumes that much of the hydrogen will be imported from the global South (neo-colonialism), since it is not expected that sufficient electricity will be available from renewable energy sources.^{47, 48} In the end, hydrogen will also always be more expensive than electricity from renewables, since the only CO₂-free hydrogen ("green hydrogen") is produced from renewable electricity. However, during the conversion to hydrogen and the reconversion or other further use, energy is wasted due to efficiency losses.⁴⁹

What are the specific sticking points in the natural gas phase-out? (An analysis)

Currently, a lot of groundwork is being laid for a gas lock-in. Money is being pumped into fossil gas infrastructure and switching from other fossil fuels to fossil gas. Therefore, an important point is that this must end. After all, fossil gas has no less of an impact on the climate than, say, burning coal, and it has not been a source of energy to prevent climate injustice for a long time. Many problematic industries, such as agriculture and chemicals, depend on fossil gas. A fossil gas phase-out would likely make current agriculture impossible. Fossil gas is also needed for the steel industry and for plastic production. A fossil gas phase-out would affect Germany much more than a coal phase-out. Therefore, the big question is how this can work quickly and, above all, fairly. In addition, a sticking point is the use of fossil gas for district heating and that currently over 30 million people in Germany have a gas connection.⁵⁰ That means about 40% of Germans are directly dependent on natural gas in their daily lives.

At the same time, we need to phase out the use of fossil gas as quickly as possible, perhaps even immediately. Because it is not sustainable to continue to amplify the climate crisis with the resources of the global South, primarily at their expense. The discussion is often conducted on a technical level, like this FAQ, but less on one of political necessity. So far, there is no strong voice in Germany calling for an immediate phase-out of fossil gas, and there has been far too little discussion of a phase-out at all.

⁴⁷ Page 6f: https://www.bmwi.de/Redaktion/DE/Publikationen/Energie/die-nationale-wasserstoffstrategie.pdf?__blob=publicationFile&v=20

⁴⁸ More info on the export initiative energy: <https://www.german-energy-solutions.de/GES/Navigation/DE/Home/home.html>

⁴⁹ More info: <https://doi.org/10.1007/s10273-020-2793-1>

⁵⁰ <https://de.statista.com/statistik/daten/studie/181631/umfrage/gasanschluss-im-haushalt-vorhanden/>

Video and literature tips in German and English(from short to long)

- Maps of natural gas infrastructure are available at the following two links (different information):
<https://energywebatlas.com/interactiveworldgasmap.html>,
<https://globalenergymonitor.org/projects/global-coal-plant-tracker/tracker/>
- Map about companies and their working areas of ShaleMustFall: https://shalemustfall.org/wp-content/uploads/2020/12/SMF_world-map_V1-980x551.jpg
- A series of short videos on why natural gas is dumb:
<https://www.youtube.com/channel/UCfshkXEVbKa9zFovb5BJ7zA/videos>
- Claudia Kemfert on hydrogen at the end of 2020 (commentary, 2 pages):
<https://doi.org/10.1007/s10273-020-2793-1>
- From LobbyControl an article on hydrogen and lobbying:
https://www.lobbycontrol.de/2021/01/wasserstoff-der-stoff-aus-dem-die-traeume-der-gaslobby-sind/?pk_campaign=20210202&pk_source=nl
- Science for Future early 2021 to expand natural gas infrastructure (7 pages):
<https://doi.org/10.5281/zenodo.4474498>
- Deutsche Umwelthilfe 2021 on the transparency of European natural gas companies (8 pages):
https://www.duh.de/fileadmin/user_upload/download/Projektinformation/Energiewende/Positionspapier_Markabfrage_Gas_20210316_FINAL.pdf
- The EG campaign #NotMyEnergiewende writes in three posts examples of neocolonial practices related to hydrogen and fossil gas:
Part 1: <https://www.ende-gelaende.org/news/notmyenergiewende-erdgas-und-wasserstoff-folge-1/>
Part 2: <https://www.ende-gelaende.org/news/notmyenergiewende-2-was-hat-kolumbianische-steinkohle-mit-der-energiewende-zu-tun/>
Part 3: <https://www.ende-gelaende.org/news/notmyenergiewende-folge-3-was-hat-suedamerikanisches-lithium-mit-der-energiewende-zu-tun/>
- An interview (video) with Esteban Servat on the fight against fracking, colonialism and extractivism:
<https://www.youtube.com/watch?v=rCdcVyhYPCc>
- Urgewald early 2021 on LNG projects and their insurance worldwide (Report in English, 20 pages):
https://urgewald.org/sites/default/files/media-files/urgewald_LNG_report.pdf
- An overview of the latest findings in Germany (35 pages):
https://www.diw.de/documents/publikationen/73/diw_01.c.815872.de/diwkompakt_2021-166.pdf
- A handbook with action proposals against natural gas infrastructure by the Gastivists (English, 40 pages): www.bit.ly/3aKP6JZ
- A 2018 study by the Rosa Luxemburg Foundation on the global gas lock-in "Bridge to Nowhere" (approx. 80 pages): <https://www.rosalux.eu/de/article/1246.globaler-gas-lock-in-bruecke-ins-nirgendwo.html?sstr=gas>
- A book about pipelines (about 1200 pages): <https://www.springer.com/de/book/9783662503546>