



Natural gas as a transitional source of energy

How can Germany ensure a sufficient supply?

November 21, 2019

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Original in German: November 6, 2019

Natural gas will become more important as a source of energy in the medium term. As German policymakers plan to do without nuclear power, coal and lignite in the future, natural gas remains the last traditional source for power generation. And since Germany targets complete climate neutrality by 2050, natural gas will also be a transitional source of energy – nothing more and nothing less.

In 2018, Russia was Germany's most important supplier of natural gas, crude oil and coal. Recently, the US entered the picture as a potential additional gas supplier, now that they have established a major gas export infrastructure. The US and several European countries oppose the construction of the Nord Stream II pipeline. German policymakers, however, continue to support the project. The outcome of the US interventions is still unclear.

The completion and operation of Nord Stream II is clearly in line with the declared goals of German energy policy. In fact, Nord Stream II will not endanger, but improve supply security. Russia has reliably supplied western Europe with natural gas for more than 40 years now. As an additional infrastructure project, Nord Stream II will help to increase and diversify existing transport capacities. And the high investments in and new opportunities of Nord Stream II will further increase Russia's interest in uninterrupted deliveries to western Europe.

Gas-fired power plants can flexibly compensate for the loss of supply stability in the German grid stemming from the exit from nuclear and coal energy. Natural gas has a major advantage over electricity (including green power): it is possible to store large volumes of it. Since Nord Stream II will cross fewer transit countries, future gas deliveries will become even more secure.

Nord Stream II will not endanger the affordability of natural gas in Germany and Europe. Two mega trends are likely to limit Russia's pricing power. First, the gas market liberalisation will increase competition in Europe. Second, high global investment in LNG will strengthen the regional markets in Europe, Asia, Australia and America. In case of sufficiently high price differences, LNG will be delivered from one region to another. In turn, these deliveries will lead to price convergence. No single gas exporter, not even Russia, will be able to demand excessive prices in the longer run.

While renewable energies are more climate-friendly than natural gas, their adoption is slow; for example, it is difficult to build onshore wind parks. And as the grid capacities are insufficient, offshore wind power does not always reach potential customers. For that reason, natural gas will remain indispensable during the transition period. Pipeline gas, such as that delivered by Nord Stream II, is more environmentally friendly than LNG, which may be supplied by the US, for example.

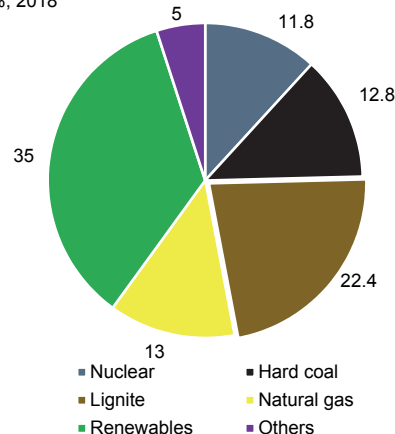


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Natural gas accounts for 13% of German electricity

1

Share in total German gross electricity generation, %, 2018



Source: Deutscher Energiemarkt 2018

Exit from coal and nuclear power will increase the importance of natural gas

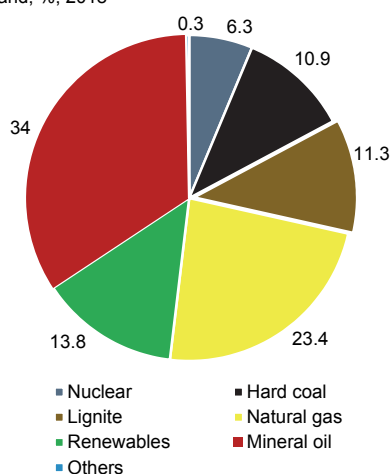
Germany has set itself numerous ambitious energy and climate goals. The exit from nuclear energy, which is planned to take place by the end of 2022, is already a challenge for a heavily industrialised country. And the situation is rendered even more difficult by the fact that the last coal power plant is to be shut down by 2038 at the latest, at least according to the decision by the coal exit commission.¹ In 2018, 47% of gross (and 46% of net) domestic electricity output was based on nuclear power, lignite and coal. As Germany aims to simultaneously exit from nuclear energy and coal, natural gas will remain the sole source of traditional electricity generation for the foreseeable future.² In 2018, natural gas contributed 13% to gross and 13.2% to net power production.³

The climate protection act adopted by the cabinet at the beginning of October 2019 aims at complete greenhouse-gas neutrality by 2050. One measure to achieve this goal is to make fossil fuels more expensive. Initially, a systematic charge on carbon emissions from buildings (heating) and transport is to be introduced. While we believe it highly unlikely that the goal can be reached with the technologies that are currently available and accepted by policymakers, the direction is clear. Even natural gas, which burns with lower carbon emissions than coal or lignite, is thought of only as a transitional energy source, which will be used for a few years or decades to come (unless technologies for carbon capture and storage (CCS) are implemented on a broad scale). The ambitious climate policy goals make natural gas transitional source of energy for Germany.

Natural gas: 23% of total primary energy demand

2

Share in total German primary energy demand, %, 2018



Source: AG Energiebilanzen

Natural gas the second most important source of energy in Germany

In 2018, 23.4% of total German primary energy demand were met by natural gas. This makes gas the second most important source of energy, behind oil (34%) and considerably ahead of lignite, coal, nuclear power and even renewables.

In 2018, the mild weather, higher energy prices and better energy efficiency helped to reduce energy demand by 3%.⁴ In fact, energy consumption decoupled again from economic growth, seeing that GDP grew by 1.5% in real terms in 2018.

¹ A review is to take place in 2032. Depending on the situation at that time, policymakers will, in consultation with the operating companies, decide whether the exit is to be brought forward to 2035 at the earliest. For the coming 20 years, the coal-producing states will receive a total of EUR 40 bn from the federal government to finance the necessary structural changes.

² In 2018, renewables contributed 35% to gross electricity production. Pursuant to the coalition agreement between the CDU, the CSU and the SPD, the share of renewables is to rise to 65% by 2030 already. However, with renewables projects (for example onshore wind farms) running increasingly into acceptance problems, this goal appears ambitious in the current environment. See, for example, Stratmann, Klaus (2019). Altmaiers Klimabilanz. Ein Lob auf die Energiewende. Handelsblatt. 6 June. P. 4/5.

³ The figures in this and the following chapter are taken from Schiffer, Hans-Wilhelm (2019). Deutscher Energiemarkt 2018. In: Energiewirtschaftliche Tagesfragen. Vol. 3, pp. 59-73. AG Energiebilanzen (2019). Auswertungstabellen zur Energiebilanz Deutschland. Figures for the years between 1990 and 2018. August.

⁴ German energy demand fell for the first time since 2014 and reached its lowest level since 1972. See BMWi (2019). The Energy of the Future Sixth "Energy Transition" Monitoring Report. Annual report for 2017. P. 79.



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Consumption of all fossil fuels declined in 2018

Consumption of all fossil fuels declined in 2018. Natural gas consumption decreased by 2.8%, to only 927 bn kWh in Germany. This was mainly due to the mild weather, which reduced energy demand for heating purposes.

Since Germany is an important transit country for natural gas, total natural gas supply (including domestic production of 61.6 bn kWh) clearly exceeded domestic demand in 2018, at 1,834.8 bn kWh. Once again, Russia, Norway and the Netherlands were the most important natural gas suppliers. Deducting exports (861.7 bn kWh, incl. transits), storage (27.8 bn kWh) and own consumption (18 bn kWh) from total natural gas supply gives us the actual gas consumption figure for Germany, namely 927 bn kWh.

Households consumed most of the total

Three sectors were the main consumers of natural gas in 2018. The first and most important is the household sector (including small commercial firms and services providers). While household consumption declined by 2.4% compared to 2017, it made up 41% of total demand. The second most important sector is the industry, which (including industrial power plants) used 40% of the total, even though it reduced its consumption by 0.1% in absolute terms. And the third sector consists of general household and heating power plants, which reduced their consumption by 3.3% in 2018. They used the remaining 19% of total German gas demand.

Gas prices are set by the markets now

Today, gas prices are no longer set by long-term contracts with the supplier countries. Instead, gas markets have developed over the last few years, and this is where gas prices are determined by supply and demand at so-called hubs or virtual trading points. As a result, there is no “single” gas price anymore; instead, there is a broad range of prices.

Natural gas considerably more expensive in 2018 than in 2017

The EEX spot price for natural gas averaged EUR 22.92/MWh in 2018 and was thus 32% above the median EEX spot price in 2017 (average of Gaspool, NCG and TTF: EUR 17.35/MWh). The cold spell at the beginning of 2018 reduced inventories in north-western Europe and drove prices up. A downward correction did not take place until the beginning of the new financial year on 1 October 2018. Afterwards, LNG saturation in Asia and higher ship charter rates on routes to Asia also started to dampen prices. Overall, this made LNG deliveries to Europe, for example from the Middle East, more attractive.

The import prices for natural gas to the German border, as determined by the Federal Office for Economic Affairs and Export Control (BAFA), rose as well in 2018 and averaged EUR 19.2/MWh (higher heating value, or “HHV”). Compared to the average for 2017 (EUR 17.0 MWh; HHV), these gas prices were up by 13%.

High import ratio and significant import bill for natural gas

94% of natural gas demand are imported

In 2018, Germany covered 70% of its total energy demand by imports. The import ratio for natural gas was 94%, the same as for coal, but below that for mineral oil (98%). If we count nuclear energy as a quasi-domestic source of energy on the grounds that the current fuel inventories cover the necessary supply for the few remaining years, the import ratio for energy drops to 63%. In 2018, Russia was Germany’s most important supplier of natural gas, crude oil and coal.⁵

⁵ During the decade between 2007 and 2017, the share of domestic natural gas production in total German gas supply declined from 15% to 5%, whereas the share of imports rose from 85% to 95%. See German Association of Energy and Water Industries (BDEW). Sources of natural gas.



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German energy import bill rose in 2018

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Imports-exports, EUR bn

	2017	2018
Mineral oil	37.5	45.2
Natural gas	13.7	15.2
Coal	5.2	4.6
Nuclear	0.2	0.0
Electricity	-1.8	-1.8
Total	54.8	63.2

Source: Deutscher Energiemarkt 2018

Many European countries are planning to give up coal as an energy source for climate protection reasons

Germany's double exit a unique feat in Europe

Gas power plants to become more attractive until 2030, ...

... but rising climate costs will result in more headwind from then on

The net import bill for natural gas (imports minus exports) amounted to EUR 15.2bn in 2018, i.e. EUR 1.5 bn more than in 2017 (EUR 13.7 bn). With total net energy expenses summing up to EUR 63.2 bn in 2018, natural gas took up 24% of the total. The import bill for natural gas was lower than that for oil and oil products, but higher than that for coal (see table). In 2018, the federal government reaped revenues of EUR 3.1 bn from consumption taxes on natural gas, i.e. slightly less than in 2017 (EUR 3.2 bn). The share of natural gas in total energy tax revenues (EUR 48.9 bn) was 6.3%.

Natural gas boosted by double exit from coal and nuclear energy

Many European countries stopped new investments in coal power plants and/or coal mining years ago. Most recently, the Paris Agreement of 2015 caused many European countries and companies to draft plans for an exit from coal as an energy source. Germany plans to give up coal by 2038, but many other European countries hope to do so earlier. Lignite is of particular importance in the German context. Only Poland, the Czech Republic and south-eastern Europe have other major lignite mines. As lignite is therefore an important source of energy, Germany will take longer to exit from coal than other European countries.

France and Sweden plan to shut down coal power plants by 2021/22. By 2025, the UK, Ireland, Italy and Austria intend to follow suit. Finland and the Netherlands plan to give up coal by 2029, and Denmark and Portugal by 2030. Including Germany's plans, by 2038 half of all European coal power plants will be taken off the grid. This trend centres on northern, western and central Europe.

Germany plays a special role in the EU, as it plans to abandon nuclear power quickly, too. This "double exit" is an extreme challenge for all those involved, from power producers to consumers. With many EU countries planning to give up coal as an energy source, demand for electricity from other sources is rising. During the coming decade, European gas power plants will play a more important role than before. Rising demand has already made electricity producers think about the construction of new gas power plants.⁶ However, it is doubtful whether new constructions would make economic sense.

Since the planning and operating phase for new gas power plants amounts to at least 20 years, suppliers will need to consider their future profitability. All across Europe, many countries' exit from coal by the end of the coming decade will initially render gas power plants more attractive, particularly since electricity demand is likely to rise. While carbon prices are expected to increase until 2030, the additional burden will probably not make gas power plants completely unprofitable. In fact, their competitive position should even improve compared to the remaining coal power plants. Existing plants will therefore tend to become even more profitable across Europe/Germany until 2030.

The decade until 2040 is likely to be more difficult. In particular, expenses will rise as emission rights are steadily reduced in line with the climate policy goals. Passing on the higher costs to consumers will become more difficult if production costs for alternative energies decline thanks to economies of scale and technological progress (e.g. in the area of wind and solar power). This

As of 2/2018. In 2017, 51.1% of total natural gas demand was sourced from Russia, 27.1 from Norway, 21.3% from the Netherlands and 0.4% from other countries. See Statista (2019). Natural gas sources for Germany in 2017.

⁶ See, for example, Trüby, Johannes (2019). Opportunities and constraints for gas in the European coal phase out. P. 4/5.



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Gas has two advantages over many renewables: it can be stored, and power production can be controlled

Gas power plants will remain indispensable in the coming years

development appears probable. In terms of pure marginal costs, weather-dependent renewables have an unbeatable advantage over conventional power plants: their marginal costs are near zero (no expenses for wind or solar irradiation).

However, renewables such as wind or solar power will be unable to compensate for one key advantage of gas power plants in the foreseeable future: output can be controlled depending on electricity demand. Since there are as yet no high-capacity, cheap ways to store electricity at an industrial scale, it is impossible to store excess power production from renewable sources. That is why natural gas (which can be stored) and gas power plants (which can be controlled) will remain attractive despite the expected progress in the area of renewable energies.

All in all, natural gas will be used more intensively for electricity production due to the exit from coal and coal's higher carbon emissions. At the same time, it will come under pressure from the upswing of renewable sources, which offer low marginal costs and even lower carbon intensity. During the last few years, gas power plants' capacity utilization dropped (sometimes considerably) in Germany. However, as long as storage technology is not available or economically viable at an industrial scale and as long as policymakers decide against other conventional sources of energy, gas power plants will remain the best option to secure the energy supply. Thus, they will remain indispensable for now.

Credibility of climate policy and technical progress as factors of uncertainty

Climate policy harbours risks for existing gas power plants

The further development of the climate policy debate remains a risk/a challenge. Every additional burden will reduce the profitability of gas power plants compared to renewables. Ultimately, the ambitious climate goals for 2050 and the resultant, higher carbon costs will make even low-emission gas power plants redundant. However, it is a fact that Germany and other countries have regularly missed their climate-policy goals in the past. The credibility of climate policy is therefore highly relevant for the economic outlook for gas power plants (and not only for them). Uncertainty also stems from technical progress concerning energy sources which have not been sufficiently or completely researched yet and concerning storage technologies.

If, however, the EU really wants to achieve zero greenhouse gas emissions by 2050, it will have to compensate for emissions. Investments in underground storage (which have been rejected by policymakers in Germany so far) or reforestations (which run into spatial limits in Germany) are potential countermeasures. There is as of yet no answer to the question which technologies should be used to achieve climate neutrality.

Price-setting mechanism is key for the profitability of gas power plants

Gas-fired power plants would benefit from capacity markets

The price setting mechanism in the electricity sector will be a key factor for the profitability of gas power plants in the coming years. Remunerating the provision of reliable capacities (capacity markets) would increase investment security. However, it is uncertain whether the probable, but unpredictable price spikes for electricity in the short term will be sufficient to trigger investments in gas-fired power plants or run existing plants profitably if capacity utilisation is low.



Arguments for and against Nord Stream II

Russia would like to deliver more gas

Germany's domestic production of natural gas (in 2018: 6% of total demand) looks set to decline over time, simply due to a lack of competitive resources. Moreover, the Netherlands lose importance as a supplier of gas because their sources are starting to run dry.⁷ While Norway would be able to deliver more gas, the supplier competes with other export countries, which may offer better prices. Over the last few years, Russia has been trying to expand its supply, as its activities around the construction of the Nord Stream pipeline confirm.

The US, too, hopes to deliver more gas to Europe

The US have recently emerged as another gas exporting country. It was only during the 1990s that the country created an extensive gas import infrastructure which would enable it to satisfy the expected increase in domestic demand by imports from abroad. However, as US companies developed unconventional gas and oil production methods ("shale revolution"), perception shifted. Shale gas production has risen considerably thanks to the new technologies, which is why the US are no longer a net gas importer, but aim instead at large-scale gas exports. For this purpose, they have recently made considerable investments in a gas export infrastructure, which has been established by now and is being expanded further.⁸

Higher exports have a positive side-effect for the US: they bring relief to the domestic market, where supply is considerable. Investment conditions for shale producers remain very favourable under the current government, which is why supply is ample and natural gas prices are very low.⁹ While consumers obviously enjoy the situation, it is a challenge for investors.¹⁰ This is one reason why the current US government argues against Nord Stream. In fact, if Russia was to deliver less gas to Europe, other suppliers, including the US, would stand a better chance on the European market.

Germany, as a net importer of gas, and investors have different interests

With Germany being a net importer of gas, the country's interests obviously are different from those of the suppliers, both in terms of prices and in terms of volumes. From Germany's vantage point, Nord Stream II is helpful if the pipeline can make a positive contribution to the country's energy-policy goals. Whether the project is economically viable for investors is another question.

Many competitors for US LNG

Nord Stream II is only one option to satisfy Germany's gas demand, which is expected to remain high in the coming years. German policymakers are keeping this in mind. On 7 June 2019, a majority of Bundestag members (including the Greens) voted for the construction of new LNG terminals on the North Sea

⁷ According to former announcements, natural gas production in the Netherlands was to stop in 2030. Recently, however, economics minister Eric Wiebe said that gas production would already be stopped by mid-2022 because earthquakes had led to damages to both the environment and people lately. See Kirchner, Thomas (2019). Runter vom Gas. Die Niederlande fördern überraschend schnell kein Erdgas mehr. Süddeutsche Zeitung. 12 September.

⁸ The construction of new LNG terminals, for example in Texas and Louisiana, will double US export capacities between 2018 and 2020. PGNiG from Poland and Shell, Edison, BP, Galp and Repsol have signed long-term purchase contracts, which means that the US will probably make considerable deliveries to Europe. However, this depends on US LNG gas remaining competitive (even after liquification, transport and regasification) against European pipeline gas. Alternatively, or in a supplementary capacity, US LNG might help to reduce the trade tensions between the US and China. First, higher Chinese US LNG imports would reduce the Chinese energy bill (probably by up to USD 2 bn per year). Second, the US trade deficit versus China might be reduced by USD 17 bn per year. However, an increase in China's US LNG imports from currently 5% to 25% by 2025 would certainly drive gas prices up. This might dampen European LNG imports. For more details see the comments on the development and impact of US LNG terminals in GVS-Gasmarkt-Telegramm. 6/2019. P. 6–8.

⁹ The price for Henry Hub natural gas in the US only amounted to USD 2.07/m BTU on 5 August 2019. This was a three-year low.

¹⁰ We expect US gas prices to hover between USD 2.51 and 2.60/m BTO between 2019 and 2021, down from USD 3.07 in 2018. And even in 2025, a price of more than USD 3.44 on average appears unlikely. See Deutsche Bank (2019). Iron ore to remain the outlier. Commodities Quarterly. 9 July. P. 7



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coast. This enables the federal government to promote and subsidise the construction of such terminals.¹¹ Potential suppliers are the US, Qatar, Oman and Norway. This means that US LNG will compete not only with pipeline gas, but also with LNG from other countries. Generally speaking, the expected, intense competition among suppliers is likely to dampen prices and prevent a single supplier from dominating the market.

Will Nord Stream II threaten supply security?

Former transit countries are critical of Nord Stream II

A number of different countries are against Nord Stream II. Ukraine, so far the main transit country for Russian gas deliveries to Europe, understandably rejects the project, as alternative transport routes will mean more competition and a loss of income. The situation is similar for other important eastern European transit countries, such as Poland and Slovakia or the Baltic countries. All of these may have to cope with smaller deliveries to their own countries, revenue losses due to lower transport volumes and lower supply security as a whole.

US are against Nord Stream II as well

Apart from the transit countries, the US are particularly vocal in their opposition against Nord Stream II. According to the US, Nord Stream II makes Europe too dependent on Russian gas deliveries and endangers supply security. In addition, the US government (and in particular the current US president) claim that US LNG is an alternative option. The US comments are one reason behind plans to build an LNG terminal at Brunsbüttel (Schleswig-Holstein), which would have the capacities to handle US LNG imports. However, neither the European nor the US opponents have succeeded in stopping the construction of Nord Stream II.

Denmark approves important part of the pipeline

By mid-2019, the completion of Nord Stream II was thought to be delayed until mid-2020, mainly because Denmark had not granted the necessary construction approvals even two years after the application.¹² However, this changed when Denmark approved the plans on 30 October 2019. Now, 147 kms of the double pipeline may be built along an alternative route on the Danish continental shelf through the Baltic Sea south-east of Bornholm.¹³ Alexey Miller, the CEO of Gazprom (the majority shareholder of Nord Stream AG), believes that the new route might make it possible to start using Nord Stream II by end-2019 and not by mid-2020.¹⁴ In contrast, market experts such as Gasversorgung Süddeutschland still think that Nord Stream II will not be ready for operation by end-2019.¹⁵

Disagreement between the EU and Gazprom may delay the project, but will not stop it altogether

Some EU members want to include gas pipelines in and from third countries in the amended EU Gas Directive. The plan is to separate gas production and distribution. In addition, at least 10% of the pipeline capacities are to be made

¹¹ Up to EUR 850 m are to be invested in each LNG terminal. See the comments on the development and impact of US LNG terminals in GVS-Gasmarkt-Telegramm. 6/2019. P. 8.

¹² See, for example, Ballin, André (2019). Nord Stream 2 wird sich noch bis Mitte 2020 verzögern. Handelsblatt. 17 May.

¹³ See, for example, Dänen geben Nord Stream 2 grünes Licht. (2019) Handelsblatt. 31 October. P. 19

¹⁴ See Mühlbauer, Peter (2019). Nord Stream 2 macht Umweg, um rechtzeitig anzukommen. Telepolis. 1 July.

¹⁵ See the comments on the energy markets in GVS-Gasmarkt-Telegramm. 9/2019. P. 7. See also Mihm, Andreas (2019). Das Tauziehen um Nord Stream 2 ist zu Ende. Frankfurter Allgemeine Zeitung. 31 October. P. 15



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Some EU countries argue in favour of separating gas production from distribution

available to third parties.¹⁶ In the case of Nord Stream II, Gazprom runs both the production and the distribution business. The operators of Nord Stream II filed a complaint against the EU with the General Court (European Union) (EGC) in July 2019. They asked the Court to declare the amendments to the new EU Gas Directive null and void because they violated the EU principles of equal treatment and proportionality.¹⁷ While the decision, which is still outstanding, may delay the completion of Nord Stream II, it is unlikely to stop the project altogether.

US sanctions against involved companies?

While Gazprom is the only owner of the pipeline, the companies Uniper, Wintershall (both Germany), Shell (UK), Engie (France) and OMV (Austria) have contributed roughly EUR 1 bn each to its funding. A foreign policy committee of the US senate already discussed sanctions against individuals and companies which sell or lease ships for the construction of Nord Stream II or provide financial or technical support or insurance solutions for such ships.¹⁸ So far, however, the federal government sees no reason to prepare an action plan against potential US sanctions, saying that there is no danger to the project right now.¹⁹

Nord Stream II will actually improve supply security

The energy policy goal of fossil fuel supply security is particularly important for Germany and the EU as a whole due to their high dependence on supply from abroad. This applies to natural gas in particular, and to some extent also to oil. The supply of coal is relatively secure, despite the high import ratio, because many different countries world-wide have large coal resources at their disposal.

High import ratios in the EU

Just as in Germany (see the comments on the high import ratio above), the ratio of net imports to total domestic demand is quite high at the EU level, and it is even higher for oil (89%) than for natural gas (75%). Russia is the most important supplier not only at the German, but also at the EU level, with a net share of almost one-third of total oil and almost half of total natural gas imports.²⁰ While the global oil market and its infrastructure are well developed, the relatively new international gas market is still in its infancy. The oil supply is sufficiently sure, despite some OPEC interventions, because oil can be delivered via a number of transport options. This is less true for the relatively new gas market, which relies on more recent innovations, such as shale gas, LNG and new transport technologies.

Russia an important supplier of oil and gas at the EU level as well

Additional transport options via Nord Stream II a benefit

Nord Stream II will improve the security of gas supply, as it will increase and further diversify available transport capacities. In addition, it will shorten current transport routes. Transport losses also look set to decline in comparison to today's routes. From a technical vantage point, illegal diversions from the underwater pipeline are much more difficult than from traditional onshore pipelines. Ceteris paribus, the additional transport option is therefore a benefit.

Natural gas remains particularly important for Germany

Germany in particular, which plans to do without nuclear and coal-based power and rely on renewables in the future, will need natural gas for the transition period. Natural gas will play an important role in terms of supply security. As we have explained above, gas-fired power plants are flexible and can thus compensate the loss of stability in the German electricity grid stemming from the exit from nuclear and coal energy. Moreover, as we have mentioned before,

¹⁶ See Nord Stream 2 challenges EU's new gas rules in General Court (2019). NS Energy Business. July 29.

¹⁷ See Nord Stream klagt gegen EU (2019). Börsen-Zeitung. 27 July. P. 7

¹⁸ See Neue Konflikte um Gaspipeline Nord Stream 2 (2019). Börsen-Zeitung. 30 July. P. 8

¹⁹ See Neue Konflikte um Gaspipeline Nord Stream 2 (2019). Börsen-Zeitung. 30 July. P. 8

²⁰ See BMWi (2019). The Energy of the Future. Second Progress Report on the Energy Transition. Monitoring Report. Report for 2017. 6 June. P. 29



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natural gas has one key advantage over electricity: large volumes of it can be stored. Germany's gas storage volumes are, in fact, the largest in the EU, at more than 24 bn cubic metres. The Network Development Plan (NDP) for gas drafted by the transmission system operators (TSOs) forms the basis for a further expansion of the domestic gas infrastructure in line with what is needed. The NDP covers the decade from 2016 until 2026 and foresees the construction of 823 km of new pipelines until 2026 and investments of EUR 4 bn. According to the Federal Ministry of Economics and Technology, the large distribution network, the liquid markets, the large storage volumes and the diversified supplier portfolio and import infrastructure offer German gas consumers a very high level of supply security. In addition, the gas infrastructure is in good condition.²¹ We agree with this analysis.

Is there a risk of supply interruptions under Nord Stream II?

Russia has been delivering gas for decades without interruptions

Opponents of the project sometimes argue that the completion of Nord Stream II will give Russia even more opportunity to interrupt the supply of gas for political reasons. However, we do not think that this argument is convincing. In fact, Russia has been reliably providing gas to western Europe for more than 40 years. And what is more important: there has not been a single instance of politically motivated interruptions. This is remarkable because the Iron Curtain was in place for much of this period and the economic relationship was sometimes just as cool as it is now due to the Crimea conflict between the EU and the US on the one hand and Russia on the other. Since gas transports via Nord Stream II will involve fewer transit countries than so far, future gas deliveries appear more secure than past, if anything.

Will Nord Stream II be a risk to affordability?

Nord Stream II will basically enable Russia to export more gas. However, gas prices will be influenced by several contradictory trends. What is positive for Russia, as a gas supplier, is that Nord Stream II will tend to reduce transport costs and thus increase margins.

Russia's market power is quite limited

However, several other developments will considerably limit Russia's market power. Two mega trends in the global gas sector come to mind. First, the liberalisation of the European gas market will increase competition. Second, high global LNG investment will strengthen the regional markets in Europe, Asia, Australia and America. If price differences are sufficiently high, LNG deliveries between these markets will smooth them out. It is therefore impossible for any single gas exporter (including Russia) to demand excessive prices.

Gas investors take on higher risks than before

As the market gains relevance, gas investors, including Nord Stream II investors, have to shoulder higher risks. An oversupply of gas on the new, global markets will reduce marginal prices and, in turn, market prices for gas considerably, and the Nord Stream II investors will be among those which suffer most from such a development. This means that gas investors take on considerably higher risks today than in the golden age of long-term supply contracts.

Pipeline investors particularly vulnerable

In contrast to the past, when pipelines led to a mutual dependence of suppliers and buyers, the risks are more differentiated in the new gas world. While the

²¹ See BMWi (2018). The Energy of the Future. Sixth "Energy Transition" Monitoring Report. Report for 2016. 6 June. P. 109. Within the EU, the amended Gas Security Regulation 2017/1938 aims to secure an uninterrupted supply of gas to customers. In particular, it relies on regional cooperation for crisis prevention and solidarity in overcoming supply crises; see BMWi (2018), p. 109.



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new LNG options enable customers to choose relatively quickly new, more attractive offers, pipeline investors are tied to their investments.

Broader range of suppliers improves
affordability

Nord Stream II is unlikely to endanger the affordability of natural gas in Germany and Europe. The new pipeline provides an alternative delivery route and thus improves the supply options. However, the project involves risks, of course. The market risk is first and foremost borne by investors, who will therefore be interested in high utilisation ratios. Customers bear a smaller risk than investors because alternative sources of supply are available. Nord Stream II will also be a challenge for the planned LNG terminal(s) in Germany, since both technologies are meant to facilitate gas imports. Depending on the market situation, we may see oversupply, which may result in (too) low capacity utilisation.

Additional costs for gas consumers

In 2019, the Federal Ministry of Economics and Technology led by Peter Altmaier decided that future gas pipelines which link German LNG terminals with the public grid will become a part of the regulated domestic grid. This means that costs for the construction and use of the gas pipelines will not be borne only by the terminal investors, but by all gas consumers. The goal is to make investments in the construction of liquid natural gas infrastructure more attractive. Since Germany plans to allow Russian LNG deliveries on the same footing as deliveries from other countries, the origins of LNG (Russia, the US or other countries) will depend on the market situation at any given time.²² Competition among suppliers is quite desirable in order to generate price pressures. Relatively cheap gas will make the exit from coal and nuclear energy easier and less expensive. As LNG starts to play a larger role, competition in Germany and Europe will increase. Increased LNG capacities in Europe and world-wide is a challenge for large-scale projects such as Nord Stream II, as the two infrastructure systems will compete. More competition will weigh on prices in the countries of destination. However, if prices decline due to competition, the profitability of investments in the relevant gas infrastructures will decrease as well. Depending on the market situation, this will apply to both Nord Stream II and the LNG facilities. Apart from these economic risks, regulatory risks (for example due to climate policy) will need to be taken into account as well.

Competition among alternative
suppliers intensifies

New Russian suppliers ...

Russia diversifies gas distribution

Russia has been taking into account new technologies for the production and transport of natural gas for some years now. Not only has it allowed Russian companies to develop their LNG business, but also has the Russian group Novatek been allowed to export LNG recently. Russia obviously tries to diversify its gas distribution. Novatek has signed a supply agreement with German energy provider EnBW and will be able to export LNG from its production sites on the Yamal Peninsula in the Arctic Sea (in which European companies are involved as well) to Europe in the future thanks to the establishment of a high-performance LNG infrastructure and the construction of tankers which are suited under Arctic conditions. LNG may certainly be supplied to the planned terminals in Germany. Such deliveries will increase competition, not least for Nord Stream II, for the UK and other suppliers.

²² In winter 2018/19, LNG deliveries from Russia to Europe already exceeded those from the US. See Moritz Koch and Klaus Stratmann (2019). Mehr Erdgas aus Russland. Handelsblatt. 19 July. P. 13



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... and the potential construction of a pipeline towards the Black Sea will dampen prices as well

Russia plans to use several delivery routes

The Russian-dominated Gazprom group plans (as it did once before) a southern route to deliver more gas to central Europe and Germany. This is no longer the South Stream project, in which Bulgaria, as a country of destination, played an important role. Rather, this is an expansion of Turkstream, which currently includes two pipelines with a total capacity of 31.5 cubic metres of gas.²³ Two additional pipelines are planned, with the construction believed to involve no major technical problems. For a few months now, the Russians have been involved in negotiations about the construction, with the route going through Bulgaria, Serbia and Hungary to Austria.²⁴ This means that Russian gas might be exported to Germany and its neighbours via this route, too. The infrastructure expansion and the expected Russian LNG deliveries will ultimately dampen prices, as this project competes with other options, ranging from US deliveries to Nord Stream II.

Nord Stream II will serve environmental goals during the transition phase

Natural gas is better for the environment than coal

Germany might choose another path

From an environmental vantage point, natural gas is preferable to coal. However, Germany's path for abandoning coal-based electricity production by 2038 is quite expensive. Overall, roughly EUR 100 bn will be spent on compensation payments to plant owners, structural change, early retirement schemes for workers and electricity subsidies for energy-intensive industries.²⁵ While the political decisions will help to reduce carbon emissions, more could be done (at least in terms of carbon reduction) if the money were used to buy and withdraw carbon emission certificates under the EU Emissions Trading Scheme. Doing so would drive carbon prices up and help to reduce emissions in the most effective way possible, for example by shutting down domestic lignite plants. Natural gas would have an advantage over coal in this scenario.

Natural gas will still be used during the transition phase, despite emissions

Gas remains indispensable because the shift towards renewables takes time

Renewables are certainly much better for the climate than natural gas. However, shifting to renewables costs money and takes time. In Germany, the construction of onshore wind parks and long-distance energy transmission networks is running into difficulties due to protests by citizens and political delays. The government's climate package presented in September²⁶ includes a rule which says that the minimum distance between wind parks and residential buildings is 1,000 metres. This looks set to slow down the construction of onshore wind parks. Offshore wind parks are in a better position. In addition, they offer a considerably higher number of full load hours (i.e. higher capacity utilisation) than onshore plants. However, the distribution networks will have to be expanded much more quickly to use this energy efficiently. All in all, calls for relying only on renewables and abandoning gas as a source of energy are

²³ See Polous, Kiril (2019). Gazprom's natural gas production and export strategy. Entsog workshop on supply potentials. Brussels. July 2019. P. 3.

²⁴ See Ballin, André (2019). Gazprom nimmt neuen Anlauf für South Stream. Handelsblatt. 23 July. P. 22

²⁵ See Ruhkamp, Christoph (2019). Viel Geld für wenig CO₂. Börsen-Zeitung. 8 June. P. 6

²⁶ For a discussion of the climate package see Heymann, Eric (2019). Germany's climate action package: Foul compromise or a reflection of society? Deutsche Bank Research. Talking Point. 23 September.



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therefore unrealistic. Germany's current concept of relying on gas during the transition phase appears well-considered and the most sensible solution if we take into account all key factors.

From an environmental vantage point, pipeline gas is more advantageous than LNG

LNG potential overestimated

Pipeline gas, as delivered via Nord Stream II, has a certain environmental advantage over LNG deliveries, for example from the US. That is what research by the Fraunhofer Institute for Systems and Innovation Research (ISI) and the DVGW Research Center at the Engler-Bunte-Institute of the Karlsruhe Institute of Technology (KIT) on behalf of the German Environment Agency has shown.²⁷ The study analysed greenhouse gas emissions during the production, transport and distribution of relevant energy sources, i.e. the so-called upstream emissions.

Pipeline gas has advantages over LNG

One important result of the study is that the upstream emissions of LNG imports into the EU always exceed those of pipeline-supplied gas.²⁸ To a large extent, this is due to specific characteristics of LNG deliveries, in particular liquification and regasification. The distance between the import and export regions and the technologies used for the individual delivery are important, too. According to the German Environment Agency, there is no clear reason on the grounds of energy efficiency or climate policy to prefer LNG to pipeline-delivered gas if all factors are taken into account. However, against the background of the energy transition, an expansion of LNG infrastructure might help to diversify the range of potential supplier countries, not least with a view to creating a future market for electricity-based renewable gases, improving supply security and fostering more competition.²⁹

Conclusion: Use natural gas as a source of energy during the transition period

Good arguments in favour of gas

During the coming years, gas will play an even more important role for electricity production in Germany than today due to the planned exit from nuclear energy and coal-based power generation. It will gain even more importance under the climate protection package, which aims to reduce carbon emissions from traffic and construction. Gas will remain an indispensable source of energy during the transition period.

Nord Stream II will increase supply security

As a rule, the extent to which natural gas is used should be determined by the traditional goals of energy policy. Gas will make an important contribution to supply security in the medium term. Russia has been delivering gas without interruptions to western Europe for more than 40 years, i.e. even during the Iron Curtain period. With Nord Stream II providing additional delivery infrastructure, the project will even improve supply security. There is no convincing argument which suggests that Russia may interrupt supply for political reasons.

More challenges in the longer term

Gas investors, including those in Nord Stream II, now bear significantly higher risks than in the past because long-term delivery contracts have been replaced by more liberalised markets. Significantly higher carbon prices in a few years' time will be a challenge for natural gas. Carbon prices may reduce the

²⁷ For details see German Environment Agency (2019). Wie klimafreundlich ist LNG? Kurzstudie. May. P. 6-24.

²⁸ "In extreme cases, they may be seven times as high". See German Environment Agency (2019). Wie klimafreundlich ist LNG? May. P. 19

²⁹ German Environment Agency (2019). Wie klimafreundlich ist LNG? May. S. 24.



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US sanctions cannot be excluded

competitiveness of Nord Stream II gas in the future. This risk is borne by investors and suppliers.

All in all, Nord Stream II will improve the supply situation in Germany and increase competition (thanks to higher supply) during the transition towards carbon-free energy production. However, the US threats with sanctions are not the only indication that the project may run into political difficulties.

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Printed by: HST Offsetdruck Schadt & Tetzlaff GbR, Dieburg

ISSN (Print): 2511-8552