BLUE FUEL

Gazprom Export Global Newsletter

2020/ Issue 56

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www.gazpromexport.com | newsletter@gazpromexport.com
+ 7 (812) 646-14-14 | comm@gazpromexport.com
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Publishers Contact Info:
www.gazpromexport.com I newsletter@gazpromexport.com
+7 (812) 646-14-14 I comm@gazpromexport.com

To Our Readers

Nowadays, the dominating topic in media as well as in the gas branch is coronavirus. It is often proclaimed that the world has never experienced and fought against such a crisis and its aftermath in all spheres of our life. However, if we turn to history, it seems to be rich in dramatic events when the world and gas branch in particular felt teetering on the brink. Nonetheless, tough times do not last forever and frequently it requires strong will and bold actions to pass the troughs and reach the picks again.

Russian-German cooperation in the gas sphere proves it very clear. In this issue, we invite you to take a break from coronavirus and have a look at the successful partnership, which provides us with a very positive experience and gives a charge of optimism.

This year, we celebrate the 50th anniversary of the so-called Deal of the century, also known as Gas-for-pipes Deal. It was the first contract for Russian gas deliveries to Germany, signed in 1970 (more details on page 6). For its time, this was an unprecedented success to reach such an agreement between ideologically opposing nations.

By just looking at the map, we see how much the world has changed since then. In fact, the deal was inked by the countries that do not exist now in their previous forms, the USSR and West Germany. Since 1970, our countries have seen the German reunification and the dissolution of the Soviet Union; emergence of new gas markets and companies; building of new gas transit routes and clashes over the old ones; as well as hard external pressure on our gas cooperation. Together, we overcame all these obstacles and continue to do so. For many years, Germany has been the largest consumer of Russian gas and the most important partner for Gazprom.

In this issue, you can find articles on the history of Russian-German gas partnership, as well as on its today's stance and prospects for the future. We are very proud to spotlight our new long-term contract with OMV for gas deliveries to Germany (page 20). Our colleagues from Gazprom NGV Europe kindly provide an insight into the role of gas for transport in Germany (page 21). On page 28, you find a brilliant contribution by Lawrence Templeton and Natasha Fielding from Argus Media on German gas market merger, which is to happen in 2021, being a kind of another German reunification in gas sphere.

Additionally, this issue includes an intriguing essay on the role of natural gas in the global energy and economic transition by gas expert Sergei Kapitonov from the Skolkovo Moscow School of Management.

Enjoy the reading and stay healthy!

BF Poll

Dear readers! We encourage you to participate in our poll with thematic questions, designed to detect and feel the pulse of the industry.

Share your opinion with us on the burning issues of the gas market world and help us enrich our newsletter.
We want to hear your voice!
Follow the link to cast your vote. It will take max. 2 minutes.

https://forms.gle/9DwKzCR33A4kVb8o6



Source: Nord Stream



This is a special year for the Russian-German relations in the gas sphere: it is half a century since the signing of the first gas contract, which entailed 50 years of mutually beneficial cooperation and partnership that is still strong and flourishing.

50 Years of Historic Gas-for-Pipes Deal

Almost half a century ago, Russian gas first arrived in the Federal Republic of Germany, thus laying a solid foundation for strong cooperation between the two countries.
For many years, Germany has been the largest export market for Gazprom. Over the years, the USSR and Russia supplied over over 1300 bcm of natural gas to Germany.
However, these successful trade relations as well as extensive cooperation between Gazprom and numerous German companies across the entire gas chain would not be possible without the historic "Gas-for-pipes" Deal – an example of mutually beneficial partnership between ideologically opposite nations.
Here is how it all began.

Germany seeks gas

1960s saw a surge in natural gas exploration in many locations in Europe and beyond. The estimated reserves in Europe as well as in neighboring countries were so large that many industrial enterprises in Europe were inclined to shift to natural gas. Eventually, this encouraged high-level discussions of transnational gas trade.

The economy of the Federal Republic of Germany in 1965 was largely dependent on coal, and gas accounted only for 2% of primary energy sources consumption. It was almost unbelievable that once Germany would supply gas from thousands of kilometers given that the Netherlands were developing their production just in 200 km away from the Ruhr industrial center.

First attempt

Still, the interest towards natural gas supplies from the USSR emerged in the south of the country – in Bavaria. This federal land was industrializing its economy and decided to follow suit of Italy and Austria, which were actively switching to gas technologies. However, for Bavaria, supplies from the Netherlands would be too expensive logistically, thus, deteriorating the competitiveness of the land's economy.

Potential gas sales from the USSR to Germany were discussed among companies and experts, but the Ministry of Economy of the Federal Republic of Germany warily insisted that they could be considered only in limited amount since the Western Germany feared that energy supplies could be used as tools of pressure. Officials tolerated maximal 1 bcm per annum, which was too little to cover even the construction of the pipeline.

In late 1967, the trade mission of the USSR to Germany studied conditions of potential gas exports. It organized talks with the Dutch NAM, Thyssengas, pipe-manufacturer Mannesmann and Bayerngas. Meetings with industrial associations and local gas distributors indicated high level of interest in Soviet supplies. But the both sides took a waiting game approach and did not make any progress on this issue for some time.

Breakthrough

Soon, the situation changed as gas consumption in Germany was surging outpacing domestic production. Furthermore, in 1968 the USSR started supplies to Baumgarten in Austria in accordance with the contract with the OMV.

In 1969, Germany invited Soviet Minister of Foreign Trade Nikolay Patolichev to a trade exhibition in Hannover to discuss the potential supplies. There, the parties officially confirmed the interest in supplies and the pipeline construction. The USSR was ready to import large-diameter pipelines and sell natural gas to Bavaria and other federal lands.

After several rounds of talks throughout the year, the Soviet and German delegations agreed upon chemical and technical conditions, measurement standards and the route – via Czechoslovakia to Bavarian Waidhaus. The price question was a serious obstacle since the German delegation insisted that it should depend on the price of Dutch gas, while the Soviet wanted the price to be close to the supplies to Austria. Eventually, the parties managed to agree upon 0.5198 pfennig/million calories and planned the conclusion of the deal for February, 1970.

Historic deal

On February 1, 1970, in the conference hall of Hotel Kaiserhof in Essen, representatives of Soviet and German ministries and companies concluded a historic contract for gas supplies to the Federal Republic of Germany. The supplies were planned to reach 52 bcm and last for 20 years with the first gas to arrive to the buyers in October, 1973. Total price of the gas was 2.5 billion DM. Germany also acquired an option for additional annual supplies of 2 bcm, which it soon successfully used.



Signing of first contract for natural gas supplies from Soviet Union to Germany | Source: Gazprom



Pipes deliveries | Source: Gazprom

Ruhrgas was to buy the gas and distribute it within the state. Pipe-manufacturers Mannesmann and Thyssen agreed to supply around 2 thousand km of pipes to the USSR for construction. Besides, the Soviet Union planned to import necessary equipment for pipeline construction. The total value of the products that the USSR was to buy amounted to 1.32 billion DM. A consortium of seventeen German banks led by the Deutsche Bank was backing the deal by providing a loan of 1.2 billion DM for the Soviet Union.

This contract was not the first gas deal between the Soviet Union and a Western nation because there had already been gas supplies to Italy and Austria. Nor was it the first contract in form of "gas-for-pipes". But why was it named "the deal of the century"?

The contract was of paramount economic and political importance to the both countries. Italy, Austria and Czechoslovakia were either neutral or leaning towards the Soviet ideology, but the relations with Germany were the first and clearest example that politically opposing states may reach a consensus, prove mutual trust and create firm cooperation in such a sensitive sphere as energy security. Moreover, this deal was the biggest between the two states and led to intensifying economic, scientific and political ties, as well as spurred the development of the European gas industry.

Business after the Reunion: What the Fall of Berlin Wall Brought to Energy Collaboration between Russia and Germany

The USSR and Germany signed the contract on February 1, 1970, and it became an economic icebreaker during the Cold War and laid the foundation for further fruitful Russian-German cooperation and relationship. Following the contract, the Orenburg – Western Border (1979), Urengoy – Pomary – Uzhgorod (1983) and Progress Yamburg – Western Border (1986) gas pipelines were constructed.



1974. The construction of a gas pipeline from Orenburg to the Western border of the USSR subsequently named Soyuz. | Source: Gazprom

Change in relations: the fall of the Berlin Wall

An important milestone in the world history that influenced all spheres of life, including the energy sector, was the reunification of Germany on October 3, 1990. A shift in ideology and the proliferation of capitalist economy had a huge impact on energy relations between Russia and Germany. Step by step, a new reference model for the cooperation in the gas sector has been built.

Just a few days before the merger of the FRG and the GDR, on September 26, 1990, two industry experts – German chemicals corporation BASF SE with its oil and gas subsidiary Wintershall and the Russian natural gas Russian foreign trade organization Zarubezhgaz (future Gazprom Export) – signed an agreement on long-term cooperation. The deal gave a historic impulse to Russian-German economic cooperation and laid the foundation for a unique partnership in the energy sector. This agreement provided gas trading mechanisms for East and West Germany and included the construction of a gas pipeline system in the country, which was necessary to increase the sales of Soviet and later Russian gas. In this regard, Wintershall Erdgas Handelshaus GmbH (WIEH), a joint venture between Wintershall and Gazprom, was established in Berlin.

The unification of Germany accelerated the processes of European integration, liberalization of the European energy and gas market, increased competition, spurred changes in rules of trade and pricing. The nature of business relations has changed as well in the result of the liberalization. Contracts have become less long-term and more volatile. Moreover, this is connected not only with changes in the gas industry, but also in the banking sector, with financing, with money emission, with the advent of trading.

Working side by side

The intensive activity that started in the 1990s led to large-scale joint projects in gas transmission, storage and trading. The cooperation with BASF (through the subsidiary company Wintershall Holding AG) became a landmark event that made it possible for Gazprom to increase gas supplies to Europe significantly.



November 9, 1990. A joint venture between Gazprom and Wintershall – WIEH – was set up in Germany to trade, convey, store and sell natural gas in various European countries. | Source: Wintershall Dea



Partners for 30 years: In 1990, the BASF subsidiary Wintershall and Gazprom signed a long-term agreement for the marketing of Russian natural gas. | Source: Wintershall Dea

1993 gave the Russian-German gas business a new impetus for development, leaving many memorable dates in history. Gazprom and Wintershall have established the WINGAS joint venture to sell gas to consumers in Germany, as well as deliver gas to Belgium, France, Great Britain, Holland, Austria, the Czech Republic and Denmark. WINGAS started building its own infrastructure in Germany, which resulted in increased competition in the German gas market.

In the same year, Gazprom, together with Wintershall, commissioned Europe's largest gas storage facility Rehden in the federal state of Lower Saxony, which marked the beginning of a new era of ensuring uninterrupted natural gas supplies to foreign consumers and making additional gas sales to the Gazprom Group. To date, Gazprom Group, together with German partners, jointly operates four UGS facilities: Rehden, Katharina, Jemgum, Etzel.



The Urengoyskoye field | Source: Wintershall Dea

In 2003, Gazprom, together with Wintershall, pioneered the Arctic Circle by setting up the Achimgaz joint venture for the development of the Achimov formation in the supergiant Urengoy field under extreme climatic conditions. In 2019, the joint venture launched the last of 108 production wells, which enabled the companies to reach the maximum annual production of 10 billion cubic meters of natural gas.

Another striking example of mutual interest and solid business was the development of scientific and technical cooperation, which entailed the launching of the Yuzhno-Russkoye field in Western Siberia. It was the first project implemented jointly with a foreign partner for building the value chain from production to the ultimate consumer. In 2006, Gazprom and BASF/Wintershall signed an agreement to swap assets in gas production and trading.



September 8, 2005. Gazprom, BASF (Wintershall) and E.ON signed an agreement to construct the Nord Stream gas pipeline. | Source: Gazprom

"When Achimgaz was founded in 2003, it was a historic moment for the German-Russian gas partnership. Wintershall became the first German company to produce natural gas directly in Western Siberia. Together with our Russian partners we defied the odds and went ahead with the successful development of the complex Achimov formation," says Thilo Wieland, Member of the Board of Wintershall Dea responsible for relations with Russia.

The Nord Stream gas pipeline became one of the most important aspects in the reformation of relations between Russia and Germany. As the largest energy infrastructure project, it contributes greatly to the security of energy supply in Europe. German companies E.ON and Wintershall became partners of Gazprom in this project, commercial gas deliveries of which started in 2011.

Successful experience in the construction and operation of the pipeline, as well as the economic profitability for all Nord Stream participants led to a decision to build the third and fourth strings of the pipeline – Nord Stream 2.

Gas for climate

Over the past decade, ecological concerns have become dominant in economy and energy. Germany and other European states committed to achieving certain goals to reduce harmful emissions into the atmosphere. That is why the use of natural gas on transport has also become an urgent issue, since natural gas is an efficient and viable solution to decarbonize mobility.



Blue Coridor – 2019 | Source: Gazprom Export

Along with German partners, Gazprom Group is interested in the development of the natural gas engine fuel market in Europe and beyond. Gazprom Group companies are engaged in marketing of gas engine fuel, its production and retail sales in Germany and other European countries. Since 2008, Gazprom Group, together with the German company Uniper, has regularly organized the Blue Corridor rally, demonstrating the benefits of natural gas.

Successful collaboration and trust through the years

Russia and Germany have established cooperation along the entire production chain: from gas production in Russia to its supply to end consumers in Germany. The mutual benefit in all areas of cooperation showed that the countries have chosen the right direction of their business relations.

The Russian-German cooperation is a role model for other European consumer countries. It is a perfect example of how, even under adverse circumstances, cross-border collaboration can develop into a genuine partnership, benefiting both parties.

As German Eastern Business Association notes, "German-Russian energy relations and the business of the century that began in 1970 are an inexhaustible source of discussion in Russia, the EU, neighboring countries, as well as across the Atlantic in Washington and the White House. It will be interesting to see how the situation develops over the next 50 years. " [1]

[1] *https://www.ost-ausschuss.de/de/50-jahre-roehren-gegen-erdgas*

Uniper - the Largest Buyer of Russian Gas

702 bcm

Total Sales

29.8%

Germany's Share in Gazprom's Exports in 2019

Nord Stream

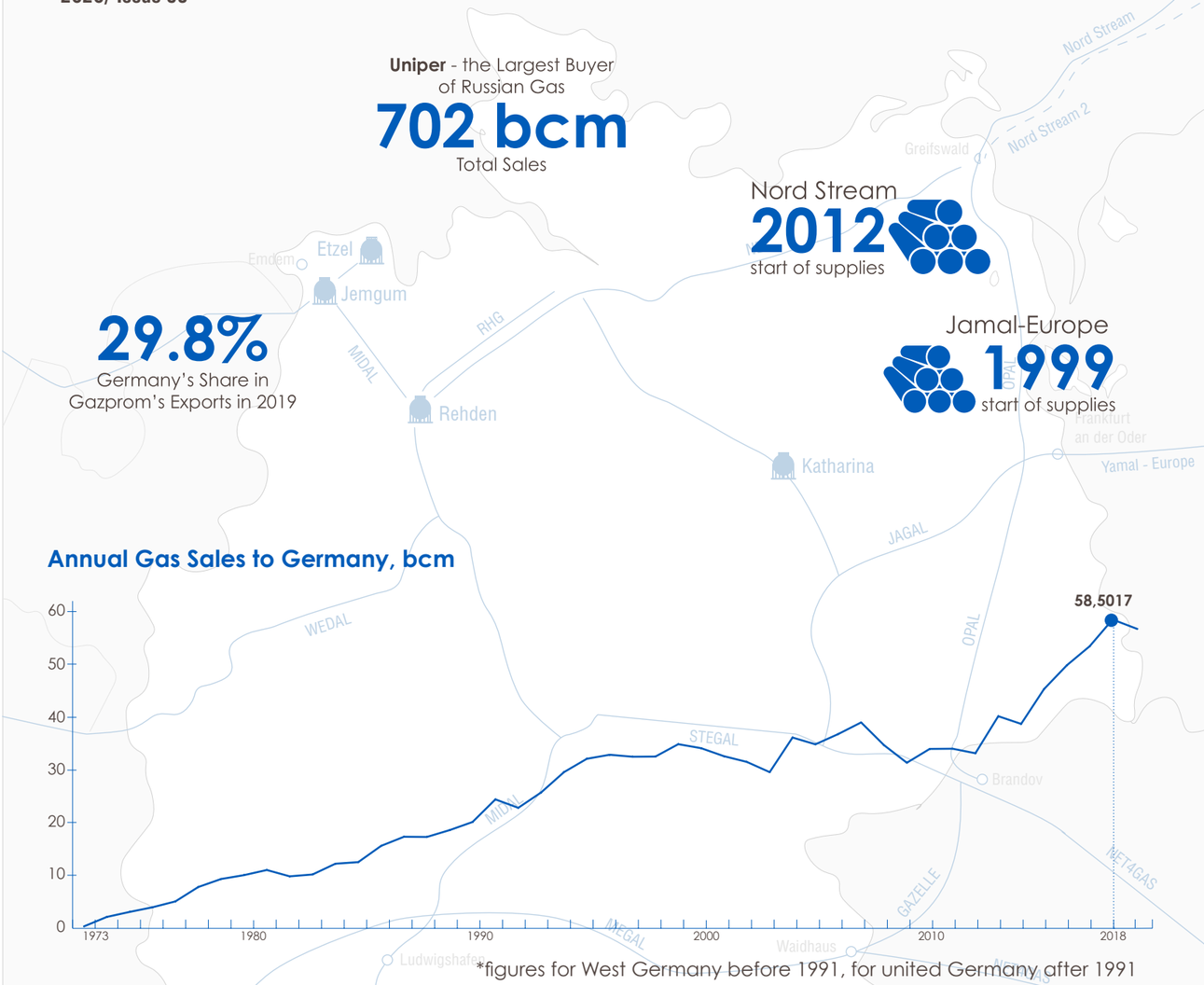
2012

start of supplies

Jamal-Europe

1999

start of supplies



Annual Gas Sales to Germany, bcm

*figures for West Germany before 1991, for united Germany after 1991

58.5 bcm

Record Exports of Russian Gas in Germany in 2018

Total gas sales to Germany more than

1 300 bcm =

Volume of water in Lake Boden x 28



German Partners of Gazprom Group

During the half a century of cooperation with Germany, Gazprom Group has worked on numerous joint projects with German energy, exploration and distribution companies. Russian gas, on the one hand, and Germany's gas distribution network, on the other, provide a sustainable foundation for meeting the demand of European energy consumers.

Uniper SE

Düsseldorf-based energy company Uniper SE has been named the successor to the German energy giant E.ON. E.ON's predecessor in relations with Gazprom was the Ruhrgas AG concern – the first West German company that signed a contract for the imports of Russian natural gas in 1970. In 2003, E.ON Global Commodities SE became a sole shareholder of Ruhrgaz, and in 2010, the concern was divided into a trading and a transport companies.



Employees at Uniper's Etzel gas storage | Source: Uniper

Today, Uniper is an energy company specializing in natural gas, power generation and global energy trade. The main activities are the purchase, storage, transportation and supply of natural gas, LNG and coal, as well as energy-related products, energy efficiency and innovation.

Uniper operates in the EU countries – Germany, Sweden, the Netherlands, Belgium and Hungary, as well as in the UK, the USA, Azerbaijan, Singapore and the United Arab Emirates. The company not only generates electricity from fossil fuels, but also owns low-carbon hydropower facilities and interests in nuclear power plants in Sweden.

The company's long-term contracts include production and sales of electricity, as well as import of fossil gas to European countries. As one of the largest producers of electricity, the company actively applies advanced technologies in the field of production, storage and distribution of energy and energy products.

Russia is one of Uniper's most important markets. The company's core activities in the world's fourth largest energy market are power generation and sales, and the import of natural gas to Europe via long-term supply contracts.

Launched in 2007, Uniper's new-build program has played an important role in modernizing Russia's power sector. Its portfolio consists of five efficient gas- and coal-fired power stations located in several key industrial regions: Central Russia, Ural, and Western Siberia. Its significant investments of recent years have been aimed at making Russia's electricity supply more reliable, efficient and climate friendly. Today power plants of Uniper provide about 5 percent of the country's total energy needs.

Uniper is one of the stakeholders and partner of Gazprom Group in the Nord Stream 2 gas pipeline project, which will send Russian gas to Europe through the Baltic Sea. Together with Gazprom Germania GmbH, a subsidiary of Gazprom Export LLC, Uniper is working on the Etzel UGS project in Lower Saxony.

By now, in total, more than 702 bcm of Russian gas has been delivered to Uniper and its predecessors since the beginning of deliveries.

VNG AG

The oldest gas partner in Europe, VNG (earlier Verbundnetzgas AG) is a leading gas company in East Germany headquartered in Leipzig. With over 60 years of experience, the third largest gas importer, and the seventh largest energy company in Germany, VNG is Russia's oldest gas partner. In 1973, the company became the first recipient of Russian gas in Germany. In 1990, the company was made public. Today, VNG is a pan-European group that unites more than 20 companies and offers a large portfolio of services in the fields of trade, sale, transportation and storage of gas, as well as production of biogas.

The company is active in the climate-protecting technologies and the use of renewable fuels and believes that natural gas can play a more significant role in this process. Its main areas of activity are trade and distribution, transportation, storage, and biogas. The company focuses on investing and developing of biogas and renewable natural gas system concepts. In addition, VNG is increasingly focusing on project related with hydrogen.



Source: VNG

The pipeline network of the Ontras company that belongs to VNG Group spans over 7,000 kilometers (4,300 miles) in Saxony, Saxony-Anhalt, Thuringia, Brandenburg, Berlin and the Mecklenburg-Vorpommern region. The company's underground storage facilities and trade enterprises are large high-tech facilities that meet the most stringent environmental requirements.

The partnership with the Gazprom Group guarantees reliable supply of Russian energy resources to Europe. Together with Gazprom Export LLC, VNG is implementing a joint project on a parity basis – the Katharina UGS facility in Peissen (Saxony-Anhalt).

Wintershall Dea

The largest German oil and gas company Wintershall Dea has its headquarters in Kassel. The eleventh in Europe, one of the first hundred of the world's oil and gas companies, it was founded in 1894 and is a 100% subsidiary of the BASF concern. The transportation, storage and sale of natural gas is a key area of its activities. The company is represented in 40 countries of the world: in Europe, North Africa, North and South America, as well as in the Caspian region and Russia. Wintershall DEA participates in a holding that owns a pipeline network of more than 2,000 km.



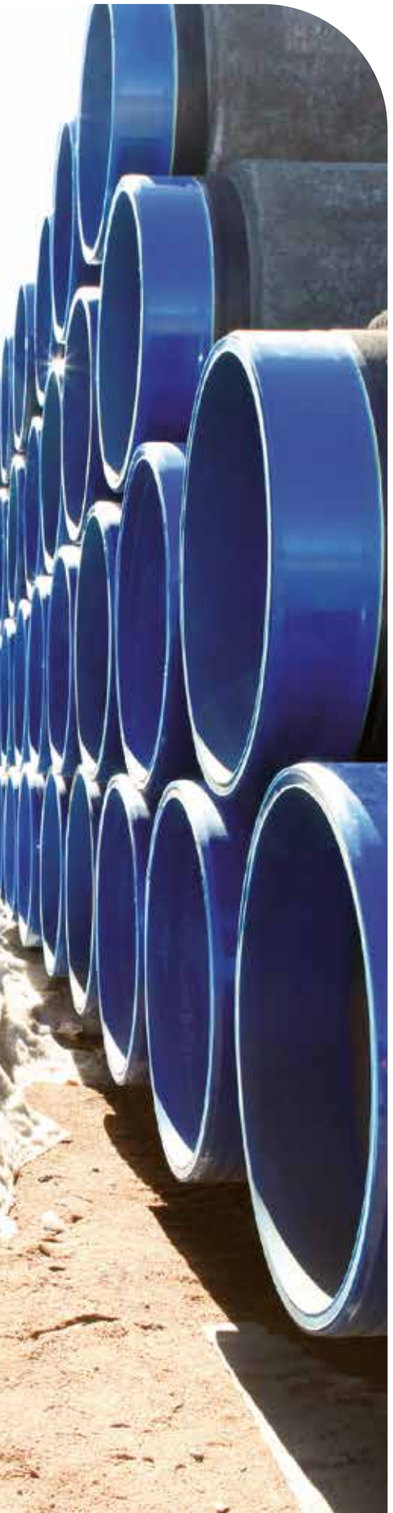
The Urengoyskoye field | Source: Wintershall Dea

Cooperation with Russia began in 1990, when Wintershall signed a long-term cooperation agreement with Gazprom. Since then, several joint ventures have been created that are engaged in the development of the Yuzhno-Russkoye field in Western Siberia, the Achimov formations of the Urengoyskoye field and other facilities. Along with Gazprom and the German company E.ON, Wintershall is a member of the international consortium for the construction and operation of the Nord Stream offshore gas pipeline, and also participates in the international consortium for the construction and operation of the Nord Stream 2 gas pipeline. At the moment, Wintershall's long-term contracts with Russia have been extended until 2030.

> **"The recognition of new business opportunities and the enthusiasm to contribute to the development of German-Russian cooperation brought our companies together 30 years ago. Our joint dedication to excellence and the passion for opening up new horizons was the main driving force behind the successful growth of this partnership. With Gazprom and Wintershall Dea, an alliance of two first-class energy industry specialists is setting best-practice standards in the sector," says Mario Mehren, Chairman of the Board and CEO of Wintershall Dea.**

Another partner of Gazprom Group in the German market is **METHA (Methahandel GmbH)**, headquartered in Düsseldorf, which is engaged in the transportation and distribution of natural gas.

Half a century of Russian-German partnership cooperation is an example of a stable, long-term relationship in which commercial logic is backed by mutual trust. Germany remains the largest buyer of Russian natural gas. In total, more than 1,3 trillion cubic meters of gas has been supplied to German partners since 1973.



Gazprom Export Starts Gas Supplies to Germany under a Long-Term Contract with OMV

On December 1, Gazprom Export LLC began gas deliveries to the German market for OMV Gas Marketing & Trading GmbH. The companies have concluded a new long-term agreement in the end of October 2020. On behalf of Gazprom Group, the document was signed by Elena Burmistrova, Deputy Chairman of the Gazprom Management Committee and Director General of Gazprom Export.

“

“This new long-term contract proves that Russian pipeline gas will remain in demand in Europe for many years to come. We are glad that our oldest partner OMV will work on Europe’s largest gas market in Germany with gas from Gazprom,” said Elena Burmistrova.



Elena Burmistrova,
Deputy Chairman of the Gazprom Management Committee, Director General of Gazprom Export

Insight into the Role of Gas for Transport Market in Germany



Tobias Jacobs
Gazprom NGV Europe

The usage of natural gas in the transport sector has a long history in Europe. Within science and among experienced customers of alternative fuel natural gas in the form of CNG (compressed natural gas) and LNG (liquefied natural gas) is a widely accepted alternative fuel. Nevertheless, the perception of CNG and LNG as an environmental friendly alternative is still insufficiently reflected in the current regulations and in the awareness of the general population. Compared to a booming electrification of the transport sector the potential of gas mobility is more and more forgotten. This article provides a detailed look on German, one of the important gas for transport markets in Europe. It describes the current dilemma with growing market potential for CNG and LNG and at the same time the lack of political support for gas as a fuel and a clear political and regulatory focus on e-mobility.

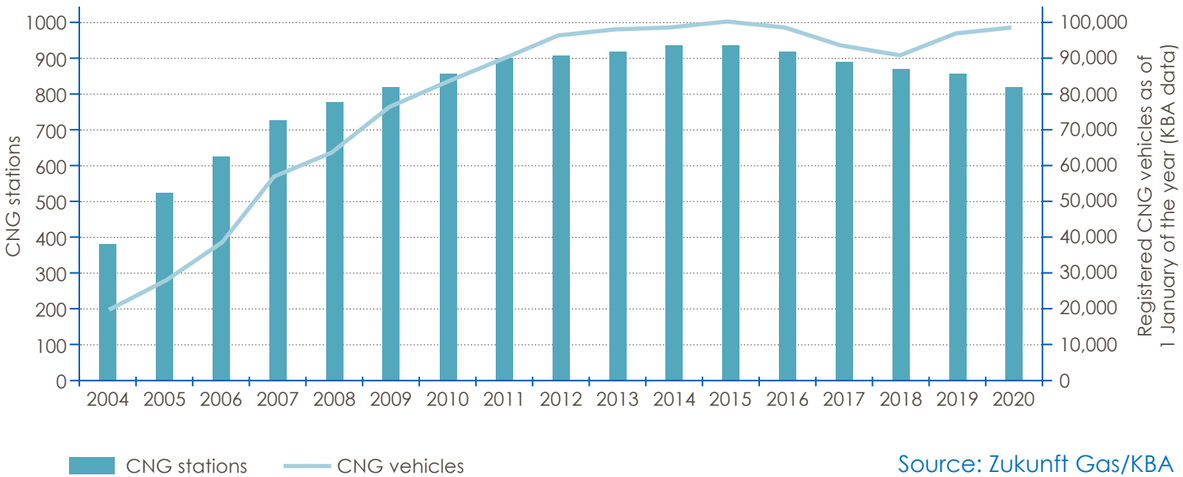
Another good year for gas for transport in Germany

Gazprom NGV Europe (NGVE) is the Gazprom entity responsible for gas for transport in Europe, which currently operates 62 CNG stations in Germany and the Czech Republic. NGVE was able to increase their sales volumes continuously in the last years in line with the general market trend. The growing demand for gas as a fuel in 2018 has continued in 2019 and even in the current year of the COVID-19 crisis.

The increasing importance of gas mobility in Germany in recent years is mainly based on two factors:

- an continuous increase of registered CNG vehicles, by about 3% up to 98.400 vehicles in 2019;
- an increase of the average utilization of the CNG filling stations from 100 in 2018 to roughly 120 natural gas vehicles (NGV) per CNG filling station today.

Figure 1. German CNG vehicles and filling station development

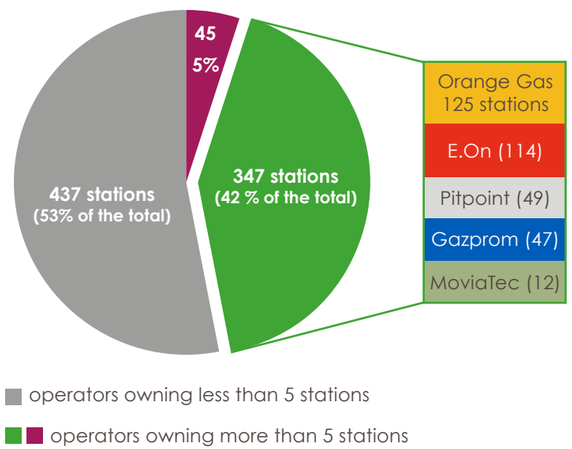


Source: Zukunft Gas/KBA

Nevertheless, the consolidation of the German CNG filling station network, which has already started in 2017, continued in the last years. As a result, one can find less CNG filling stations on German roads today, but the quality of the remaining filling stations, including the newly opened stations closer to demand centers (e.g. logistic hubs, motorways, etc.), improved.

Figure 2. German CNG stations operators and market consolidation

There are 829 CNG stations in Germany (of that, more than are 50% Bio CNG stations)



Source: Gazprom NGVE

The competitive environment has changed significantly during the last years. Municipalities which operate only one or two CNG stations have to focus on e-mobility and sold or closed down their stations. In addition, long lasting CNG pioneers left the market and new international, specialized on gas mobility market players entered the German market by intensive M&A activities. Gazprom NGV Europe managed to keep their market share stable at 5% in the last years.

With 53 % market share, the majority of the CNG filling stations are still operated by companies with less than 5 filling stations. However, there is a clear development for larger CNG filling station operators to increase their filling station portfolio. This enables them to operate their filling station network more efficiently and generate cost advantages. In addition, it supports investments in new and modern CNG filling stations. The 5 biggest filling station operator have currently a market share of 42 %. While in 2014 only 35% of the CNG filling station operators operated more than 5 stations, the current figure is already approx. 50%. The optimization of the CNG filling station network is expected to continue further on, since the demand shifts from rural to high traffic areas and from dedicated passenger car stations to truck suitable stations will change the station network in Germany further. Furthermore, there is an increased focus on bio-methane with more than 50 % of total German CNG stations offering Bio CNG nowadays.

Gas powered truck as a new market driver

While the CNG passenger car segment suffers from lacking political support and the current regulatory framework, new laws and government support mechanisms (e.g. the 'Clean Air' vehicle support program for trucks and buses) were introduced. The creditability of the CO_2 reduction potential from the use of CNG/ LNG in transport were implemented in 2018 to promote the positive effects on the environment of gas-powered vehicles with lower CO_2 and NOx emissions and particulate matter.

According to the Reform of the Federal Highway Toll Act CNG or LNG powered vehicles with a weight of more than 7.5 tons will enjoy the same benefits as electric trucks from 1 January 2019 to 31 December 2023. The goal of the toll exempt is to provide a maximum incentive to purchase such environmental friendlier vehicles to support the market ramp-up of alternative fuels in the truck segment. Depending on the weight class, the savings per kilometer would be between 9.3 and 18.7 cents per km, which can lead easily to annual savings of up to 15,000 EUR and more.

In addition to the toll exemption, there are further simplifications for haulage companies that rely on gas powered trucks: Compared to diesel fuel, the mineral oil tax is more than half cheaper (23 instead of 47 EURO cents) and for the purchase of a truck there is a subsidy of 12,000 EUR per LNG vehicle and 8,000 EUR per CNG

vehicle. The 'Clean Air' subsidy program is currently limited to two years but it is expected to continue due to the successful start and high interest form haulage companies.

Currently almost all German CNG filling stations are under review for truck suitability and first upgrade investments have been taken by the station operators in order to cover the additional demand from the trucks.

New construction projects for a growing market segment in Germany

Gazprom NGV Europe, for example, managed to gain new logistical customers with a high gas volume offtake. This required the construction of new CNG filling stations in Stuttgart and Berlin this year in order to offer our partners from the logistics industry an improved filling station network. Freight transport is currently the growth driver in the CNG market. One can calculate per truck with approx. 1000 kg CNG, which is equal to the consumption of 1360 m³ of natural gas per month.



New customer group garbage trucks. AWS trucks in Stuttgart, Germany | Source: Gazprom NGVE

Our new construction project in Stuttgart's Neckarwiesenstraße was planned, for example, with our cooperation partner AWS, the Stuttgart waste management company. As a municipal enterprise, AWS has the requirement to operate as CO_2-neutral as possible. In order to meet these requirements, the nearly 20 garbage collection vehicles at the new NGVE filling stations fill up with 100% biogas, which makes them practically climate-neutral and therefore politically acceptable for the green State Government of Baden-Württemberg.

Another new construction project is the filling station at Berlin's Westhafen, the logistics hub in Berlin. As a climate-neutral alternative for the logistics partners, it will also be selling 100% biogas there from December onwards, which will give the customers not only a cost advantage but also an image advantage over forwarding companies with conventional diesel trucks. One of our major customer - Zippel, a logistic company devoted to gas mobility, which already refuels regularly at NGVE CNG stations in Saxony, will refuel up to 15 trucks daily at the new station in Berlin.

LNG now also on the upswing in Germany

Compared to its Western European neighbor, the network of LNG stations was relatively thin, especially for LNG trucks. In contrast to Italy or the Benelux countries, which recognized the range advantage relatively early on, no LNG filling station existed in Germany until 2018 at all. This is one of the reasons why LNG was hardly an interesting alternative for logistics companies with international activities. Much has changed in this respect in recent years. Due to the latest policy changes the development of the LNG infrastructure is also picking up speed. Currently it is planned to have more than 30 LNG stations in operation nationwide by the end of 2020. Due to the range of LNG trucks with a range of 1,500 kilometers, routes across Western Europe can easily be realized. By the end of 2022, further 60 LNG filling stations are planned to be built to cover the main freight traffic routes in particular. The only downside is that this development has so far remained restricted to Western Europe, as the technology is capital-intensive.



Proliferation of CNG trucks increases the demand for gas. CNG truck of logistic company Zippel | Source: Gazprom NGVE

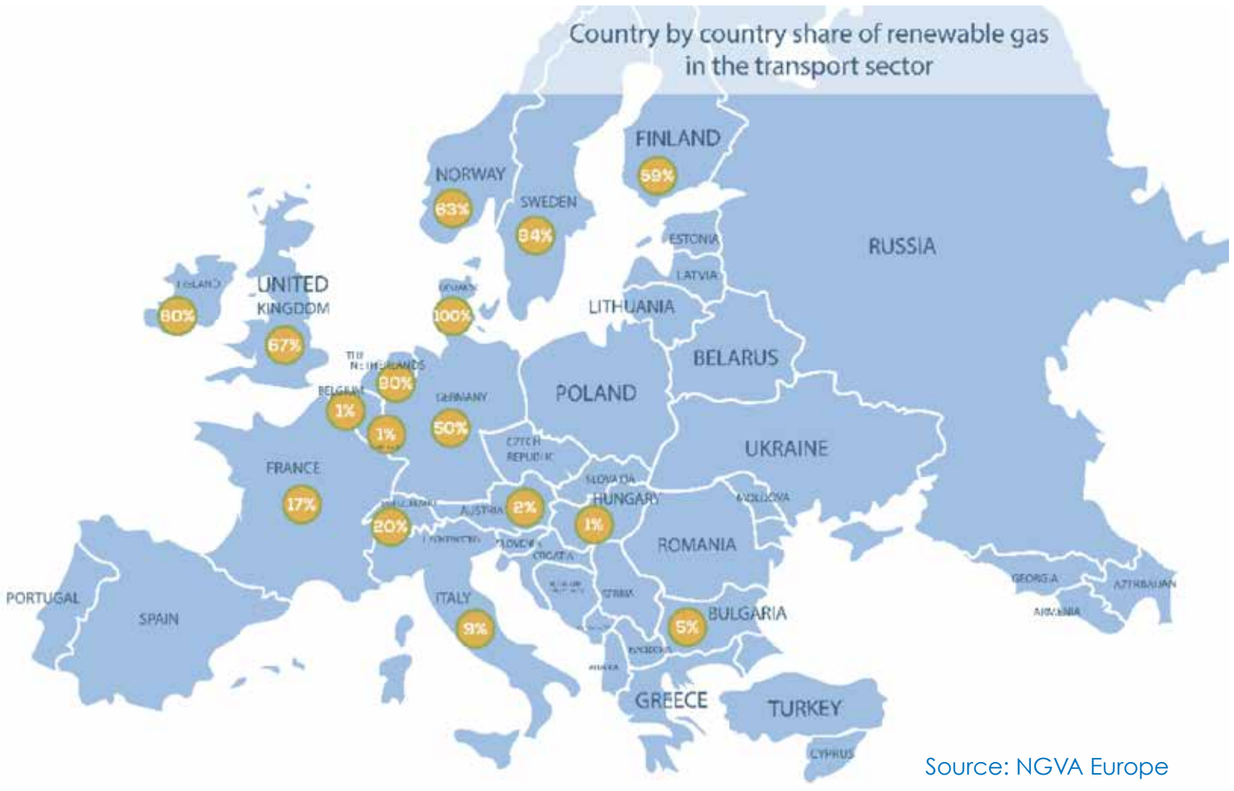
Like CNG vehicles LNG-operated trucks are characterized by a significantly higher environmental compatibility. Not only do they emit significantly less carbon dioxide, nitrogen oxides and particulate matter, they are also significantly more quiet than comparable diesel-powered vehicles. For instance, the truck company Meyer Logistik - partner at the LNG filling station in Grünheide (close to Berlin) - was one of the first companies to test LNG in their truck fleet and has integrated 20 Iveco trucks in recent months. According to Meyer Logistik officials, they will save around 50,000 kg of CO_2 per truck compared to a diesel-powered vehicle in the next five years. LNG trucks are as powerful as their diesel counterparts with lower fuel costs and lower pollutant emissions.

Bio-methane as a new market trend

With the increasing requirements on national and EU levels regarding CO_2 emissions, a clear trend towards sustainable biofuels can be observed within the last few years. In order to use biogas as CNG, it must first be purified and concentrated, but after the process the biogas contains nearly 100% methane and thus is equivalent to conventional gas. Due to the biological origin of the gas, no fossil CO_2 is emitted, which is why it can be called emission-free in the balance sheet. This advantage and the associated ecological image make bio-methane interesting for both vehicle owners and car manufacturers.

Many municipal utilities in Germany, for example, have the requirement not to exceed certain CO_2 fleet limits. Besides electrically powered buses, only CNG vehicles powered by bio-methane are really suitable for fleets. In the Nordic countries the share of bio-methane in the G4T sector is already over 90%, in Germany the share has risen from 20% since 2018 to over 50% in 2020.

Figure 3. Overview of bio-methane usage in the European transport sector



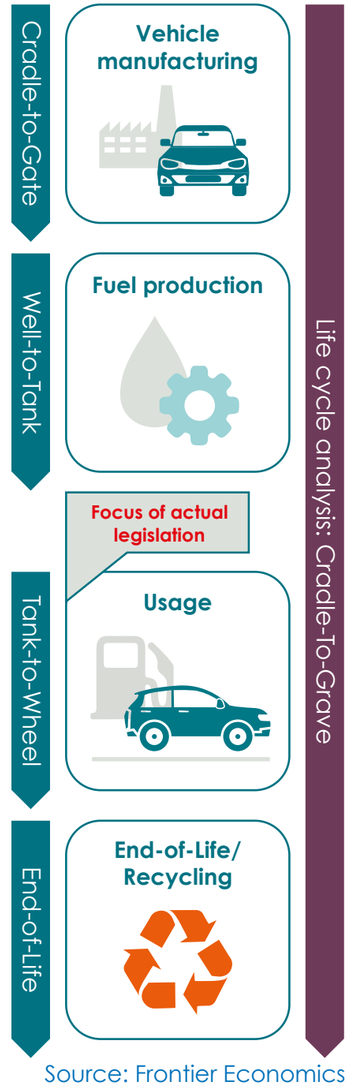
Source: NGVA Europe

European climate policy is decisive for the gas as transport fuel today and in the near future

Nevertheless, in Germany one can clearly see skid marks in the growth development of passenger cars which is driven by the lack of availability of CNG cars due to WLTP[2] homologation change in 2018/2019 and the increasing focus of the car manufactures on E-mobility. The later development is mainly driven by European policy which favors an "all-electric" strategy. The CO_2 fleet regulation as well as the 2nd review of the Renewable Energy Directive (RED2) currently do not consider the environmental benefits of gas mobility – especially with bio-methane utilization for the existing stock of vehicles compared to the planned electric cars of the next years.

In 2021, the European regulation for the CO_2 fleet targets for passenger cars and light duty vehicles will be reviewed. In order to overcome the current discrimination of gas mobility the currently used Tank-to- Wheel approach needs to be changed to a more realistic based Well-to-Wheel or even Cradle-to-Grave approach with consideration of CO_2 emissions along the full value chain. Such an open technology mindset would enable the best solution with the highest efficiency in order to reduce CO_2 in the transport sector and biofuels or synthetic fuels including bio-methane could unfold their full potential in the transition to a low or zero carbon future.

Figure 4. CO2 fleet target approaches



Source: Frontier Economics

[2] *The WLTP procedure (world harmonized light-duty vehicles test procedure) is a global, harmonized standard for determining the levels of pollutants, CO2 emissions and fuel consumption of traditional and alternative fuel vehicles.*

German Gas Market Merger — Three Quarters and Counting

In early 2017, the German government committed to integrating the country's two remaining gas trading hubs, Net Connect Germany (NCG) and Gaspool. This move sought to complete years of market reform, aiming to increase trade and reduce regional cost disparity.



Natasha Fielding
Editor of Argus' European Natural Gas Daily Report

Germany's system operators plan to launch the new market from October 2021 under a new market area manager, dubbed Trading Hub Europe. But Germany's networks were developed piecemeal, at different times and for different purposes. The country's infrastructural constituents were not built to be used as a contiguous whole.

Market-based instruments will be used to overcome physical constraints, while rules will be aligned so that the entire physical market operates in a broadly consistent way.

But some long-running capacity contracts will be retained, meaning Germany will operate a dual model. And it remains to be seen how the new tools will work in practice and whether liquidity — a measure of trade frequency and volume — will really increase.

Managing scarce capacity

Physically-backed firm entry capacity into the German network will fall by 78pc once NCG and Gaspool are combined because of bottlenecks within the country. Shippers will have to rely on market measures to guarantee firm capacity and less secure interruptible capacity because of this.



Lawrence Templeton
Argus' Vice-President, European Natural Gas and Electricity

German system operators have opted to mitigate congestion issues through market-based tools, rather than committing to costly and time-consuming physical network upgrades. Gas will be transported across a third network through wheeling and third-party network use, while an exchange-based spread product will allow for trade across different parts of the network that are not connected.



A final tool — available as a last resort — enables system operators to buy capacity back from shippers when the system is congested on a short-term basis.

Standing capacity contracts and virtual interconnectors

New virtual interconnector points (VIPs) — which combine two or more physical interconnection points — will operate under new rules with new fees following the merger. But a dual model will be used, with existing capacity contracts to be retained until expiry.

Four VIPs will be in operation from October 2021, linking Germany to the Netherlands, Belgium and Denmark. They will cover 14 underlying physical points. A fifth VIP connecting Germany to the Czech Republic may also be created.

New transport fees

Germany in September published new reference fees to access the combined market.

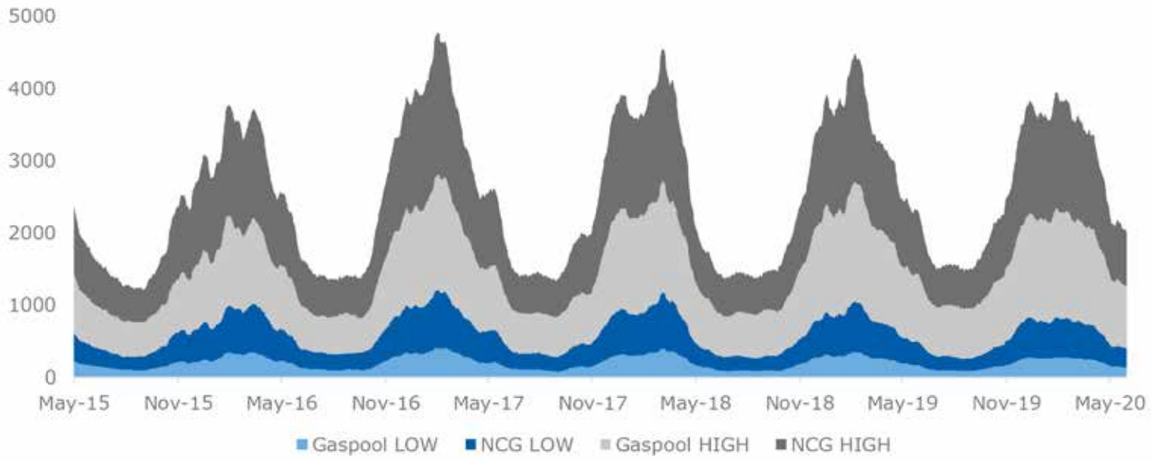
Table 1. German gas transport capacity reference prices

Period	NCG	Gaspool	Germany VTP
2020	0.465	0.384	-
Jan-Sep 2021	0.430	0.379	-
Oct-Dec 2021	-	-	0.433

Source: German gas system operators, BNetzA

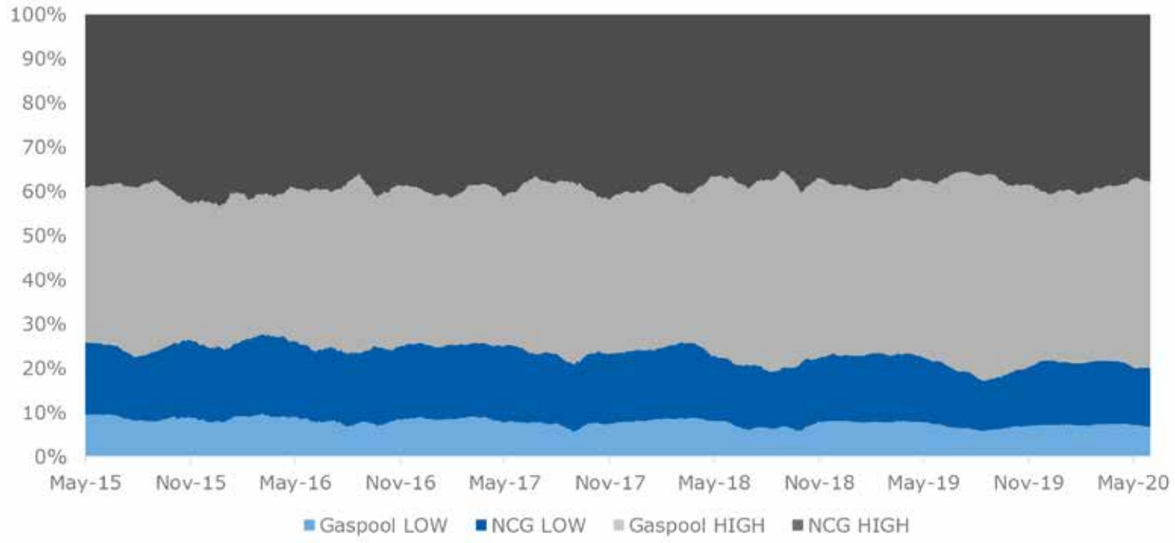
Multipliers apply for shorter-term bookings in line with common EU rules, and discounts are offered at storage connection points. And a higher discount will be given for interruptible capacity products post-merger, given the increased chance of interruptions.

Graph 1. German gas burn by L-H calorie, GWh/d



Germany operates a dual-quality grid based on more common high-calorie gas and dwindling low-calorie supply from domestic sources and the Netherlands (see Graph 1,2). The country will retain a series of socialised and targeted fees to cover its balancing gas costs in the medium term and the upgrade to a single high-calorie network in the longer term.

Graph 2. German gas burn by L-H calorie, pc

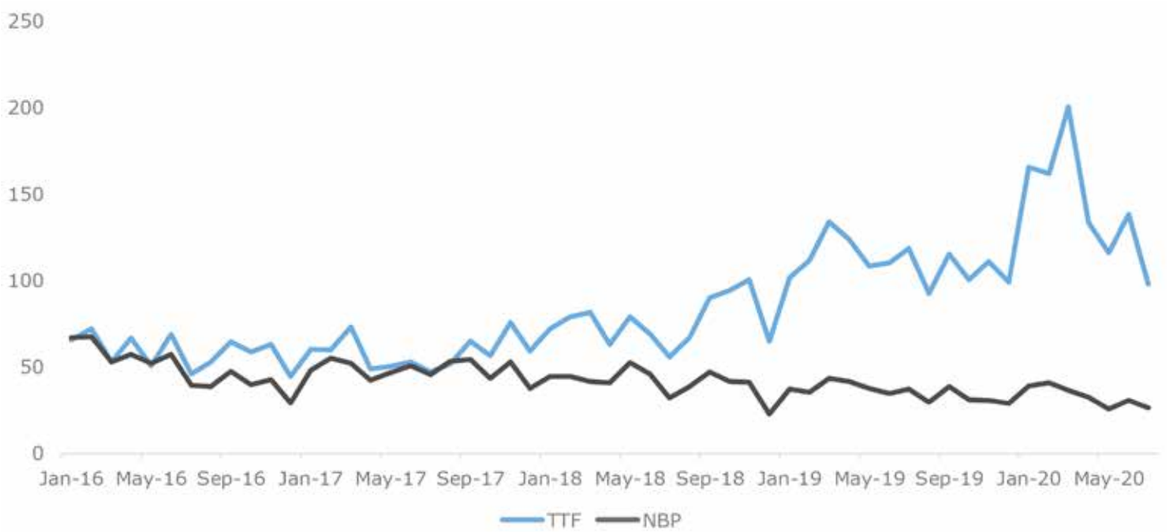


A word on liquidity and pricing

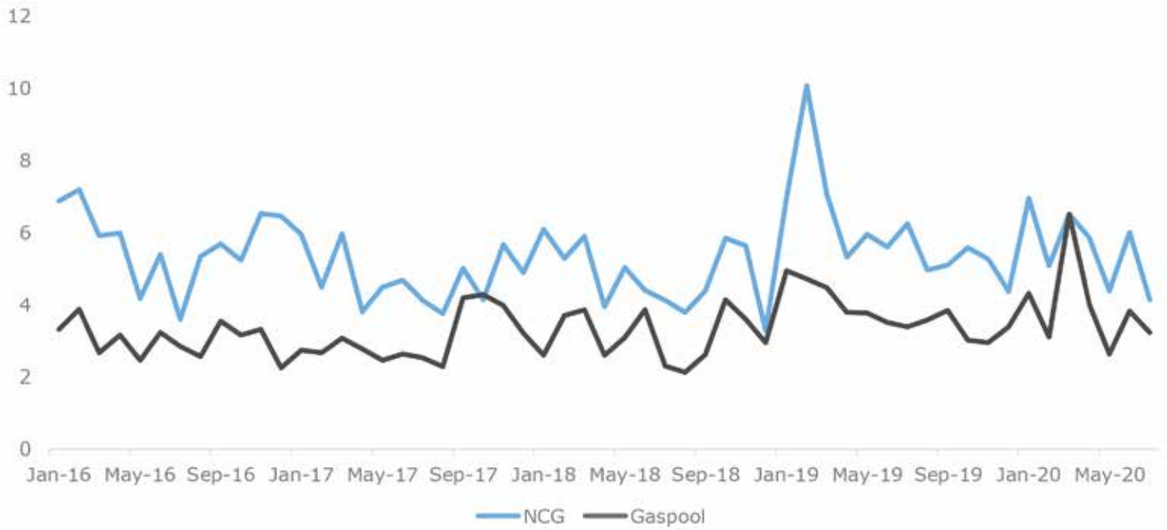
NCG and Gaspool have struggled to attract more liquidity in recent years, while trade at the neighbouring Dutch TTF has soared and overtaken the UK's NBP.

German hub trade was less than 7pc of TTF volumes in January-July 2020. Dutch liquidity has more than doubled since 2016, while German liquidity has barely changed.

Graph 3. NBP and TTF traded volumes, TWh/d/m

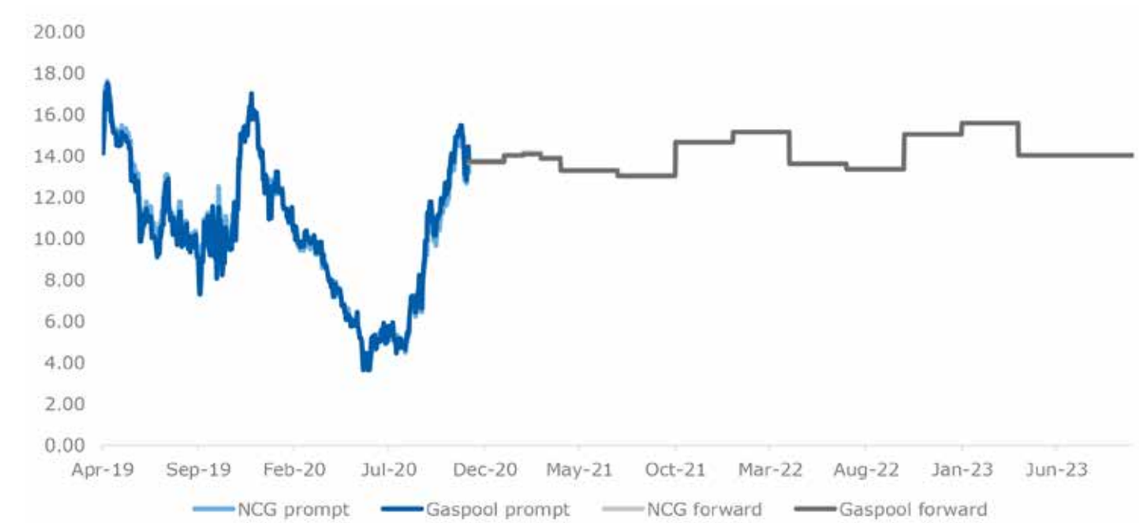


Graph 4. Gaspool and NCG traded volumes, TWh/d/m

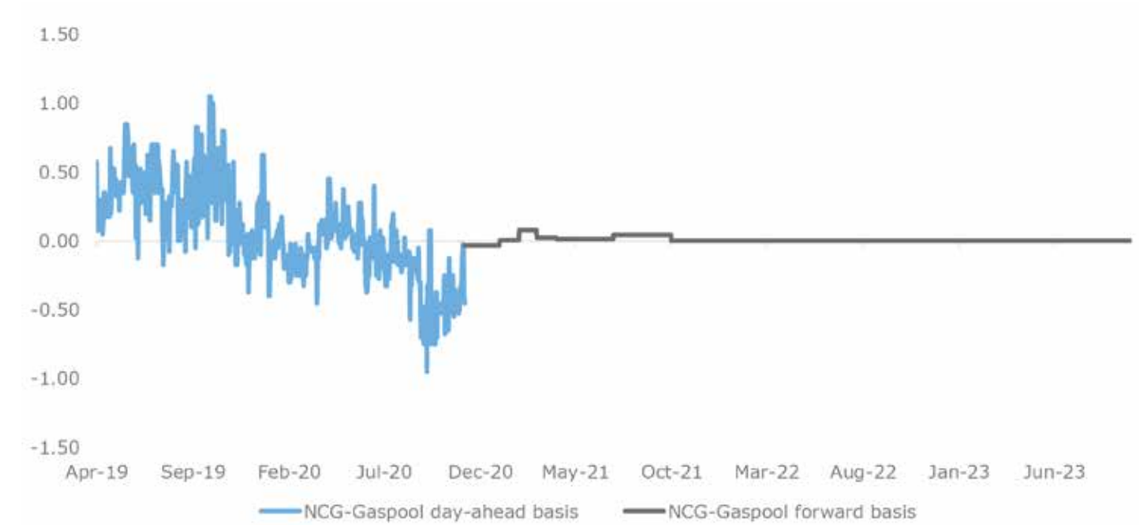


Meanwhile, while market participants continue to trade NCG and Gaspool contracts for delivery beyond the October 2021 merger date, there is some consensus around pricing. Argus' price assessments indicate no price difference between Gaspool and NCG beyond the merger, while short-term NCG-Gaspool basis markets have been volatile in recent years.

Graph 5. NCG-Gaspool prompt and forward prices, €/MWh

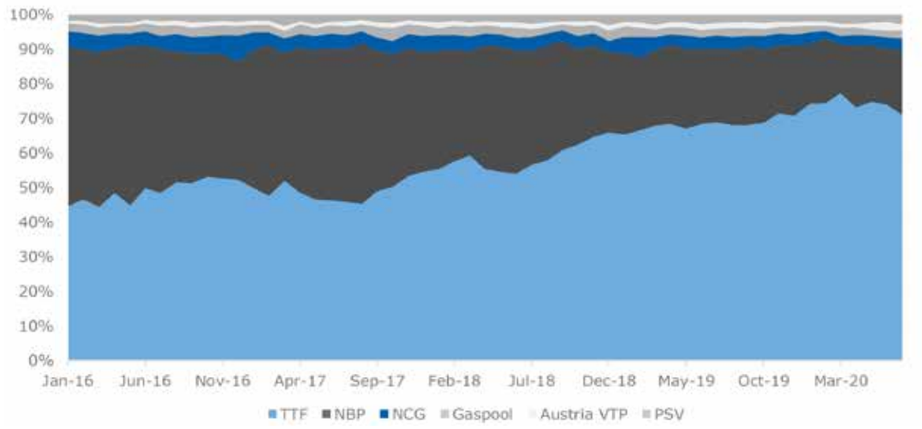


Graph 6. NCG-Gaspool basis markets, €/MWh



It remains to be seen if Germany VTP (Trading Hub Europe) can gain European market share in liquidity terms, or if the old traders' maxim, that "liquidity attracts liquidity", will prevail.

Graph 7. Selected hubs market share, traded volumes, pc



German consumption and flexibility

Any change to how Germany operates following the merger has implications for the rest of Europe, given its interconnectedness, considerable demand base and continent-balancing storage capacity.

The German grid has links to eight different networks, with the ability for flows to switch directions at many points.

The country hosts the EU's largest gas-intensive manufacturing base and considerable gas-fired electricity generation capacity, with demand-side flexibility provided by the ability to switch between gas and coal, at least before the country's coal-fired fleet is phased out. And domestic and commercial space heating provide for a large seasonal swing in German demand.

Regarding flexibility, Germany operates the EU's largest market-based gas storage system with about 230TWh of capacity. The system can absorb gas imports in the summer and add to winter supply, helping balance Europe's markets.

Authors note: Argus recently published a detailed white paper covering Germany's gas market merger. It is freely available (here). Copyright © 2020 (Argus Media) group. All rights reserved.

Natural Gas as an Element of Energy and Economic Transition



Sergei Kapitonov,
Gas Analyst at the Energy Center of the Moscow School of Management Skolkovo

Amidst the COVID-19 pandemic, more and more governments across the globe take commitments of the energy transformation as a part of their economic recovery. Today, here are several dozen countries and territories from New Zealand to Iceland, and from China to California, which have legally binding goals or declarations to become carbon neutral, in most cases by mid-century. With the proposed Green Deal package in the European Union and individual goals of its member-states, the EU leads the global race for climate and sustainability improvement.

A greater shake up for the global economic and energy system, however, may come from the shores of the Pacific Ocean, where China has recently declared its intention to become carbon neutral by 2060. For the world's largest energy consumer this would mean a profound fundamental transformation of the energy system.

China's primary energy consumption is based on coal, which supplies 63.8 % of the demand. This dependence is as high as 67.9 % in case of power generation according to the IEA 2017 figures. The country runs the world's largest fleet of coal power plants with a combined capacity of 1 TW. Another 100 GW are under construction and more than 150 GW are at various project phases.

Japan and the Republic of Korea have also recently taken the headlines with their declarations of plans for carbon neutrality by 2050. Both countries use significant amounts of coal primarily for power generation with 31 % and 45 % shares respectively.

The road to climate neutrality will require massive deployment of renewables, exploitation of new energy forms such as hydrogen (all three nations are leaders

in developing hydrogen technologies), but the first and imminent precondition is coal phase out.

The only currently available option to significantly cut the coal use in Northeast Asia (and beyond) is to grow natural gas consumption.

According to CNPC's projections, natural gas demand in China may rise to 610 bcm by 2035, doubling from current figures. The Republic of Korea's 3rd Energy Master Plan envisages natural gas consumption growing to 85 bcm (+ 55 %) by 2040. Japan's gas demand will depend to a great extent on the relaunch of nuclear reactors and overall increase of energy efficiency, but Tokyo will remain a major LNG importer.



Source: Gazprom

Another point of growth for gas consumption is in ASEAN economies, primarily in Thailand and Vietnam. Vietnam is planning to more than double its installed power capacity by 2030, which will lead to demand for LNG rising to 8.5 million tonnes. Thailand's LNG import capacity is expected to almost triple as of the late 2020s, from the current 11.5 mtpa.

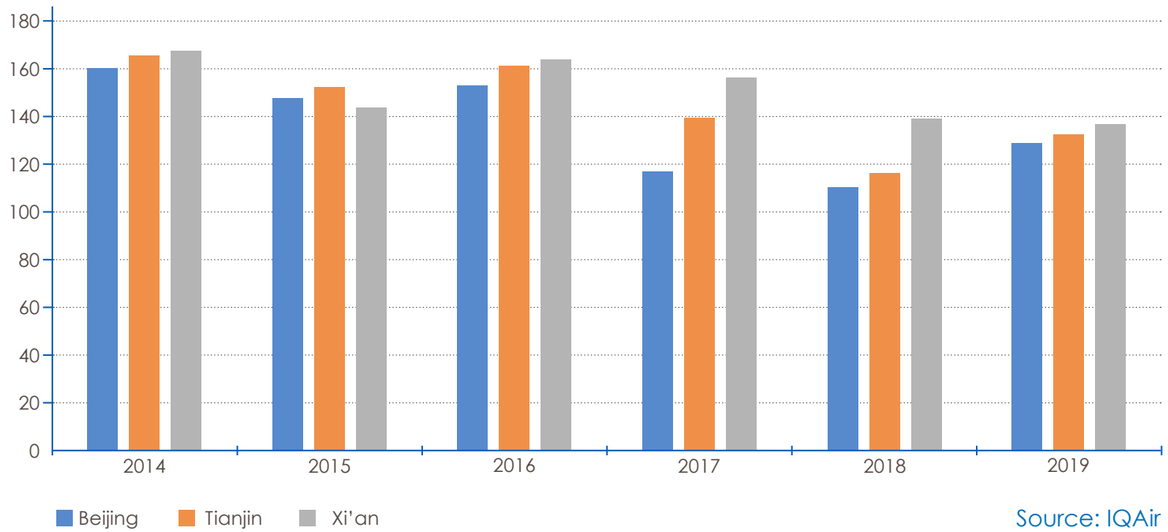
Indonesia and Malaysia, both of which are historically major gas exporters in the Asia-Pacific region, have now turned to LNG imports due to increasing energy needs and dwindling domestic production. For island nations, small-scale LNG is a viable alternative to diesel on remote islands. This is also fair for small island countries in the Pacific.

South Asia led mainly by India is also expected to demonstrate a fantastic growth in gas demand. India is aiming to raise the share of gas in energy mix to 15 % by 2030 from the current 6.2 %.

One should keep in mind that the things, which are often taken for granted in the developed countries, such as access to electricity, can be lacking in the developing world especially in rural areas. According to the World Bank data, in 2017, 178 million people had no electricity in Central and Southern Asia, 573 million people in Sub-Saharan Africa and 12 million people in Latin America and the Caribbean.

As far as access to clean cooking technologies goes, only 61 % of the global population enjoyed it in 2017, according to the World Health Organization. Most people lacking such access reside in Sub-Saharan Africa and Central and Southern Asia.

Graph 1. Yearly average PM2.5 Index in selected Chinese cities



Source: IQAir

For developing countries in Asia, the issue of air quality especially in big cities is of prime importance, and usually outweighs climate policy goals. According to the WHO, ambient (outdoor) and household air pollution causes 7 million premature deaths globally, mainly in developing counties in Asia and Africa.

According to IQAir 2019 World Air Quality Report, nine out of ten cities with the highest concentration of PM2.5 were located in developing Asia. Smog enveloping big cities especially in winter is a typical picture from Dhaka to Bishkek, from New Delhi to Ulaanbaatar and from Tehran to Bangkok.



Source: Gazprom

COVID-19 pandemic has changed the overall picture – for the first time in months people of big cities primarily in Asia saw blue skies. Due to social lockdowns and decline in economic activity, concentrations of particulate matters fell to safe levels even in most polluted megalopolises.

But the economic growth is not something that developing nations can sacrifice for the sake of emissions' reduction. Improving the energy mix might be the answer, though it will inevitably cost more than preserving the status quo in energy.

A 100 % switch to renewables can resolve these problems. Most of the developing countries, however, either don't have time (decades) or financial and technological resources for commercially-scalable renewable integrated energy systems. Although natural gas is more expensive than coal, and also requires building massive import and domestic transmission and distribution system, it has a tangible immediate environmental effect in GHG and PM reduction.

A vivid example of how natural gas can contribute to cleaner skies is a directive China's energy policy. In the choking from coal Beijing-Tianjin-Hebei region forced gasification allowed to significantly reduce PM concentrations in the air mostly in the course of the 13th Five-Year Plan (2016-2020).

Similar effect can be observed in brick production, steelmaking, other heavy industries in China, India, Bangladesh, etc where gas is replacing coal or primitive organic solid fuels.

An example of potential future policy is the brick industry in India, which is the 3rd largest coal consumer after power generation and steel industry in the country and is responsible for 15 % of the nation's CO_2 emissions. The recent conversion of brick kilns in the state of Karnataka allowed for more than 40 % of CO_2 emissions and almost total reduction of particulate matter emissions.[3]

Natural gas can also play a role in providing clean cooking solutions especially in countries with presence of domestic gas resources. Although, in this sector LPG is still far more popular, the combination of two sources can be efficient. For example, from 2000 to 2018, Indonesia has increased the proportion of population with access to clean cooking from 6 to 80 % through the expansion of LPG use, and now is planning a nationwide program to connect 5 million of households to natural gas grid (uptake from 500 thousand now).[4]

From the above examples, we see that in the regions where state policies don't constrain the future use of natural gas, it has vast opportunities to secure a key role in the ongoing energy transition. And we should bear in mind that the energy transition includes not only European fields covered with windfarms and solar panels, but also the phase out of huge coal plants in the suburbs of big Asian cities and provision of clean cooking solutions for Sub-Saharan Africa. And the last part is as important as the first one.

[3] *https://www.manufacturingtodayindia.com/products-suppliers/8138-wienerberger-india-successfully-commissions-natural-gas-for-brick-kiln-operations*
[4] *https://www.iea.org/reports/gas-2020/2021-2025-rebound-and-beyond*

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www.gazpromexport.com | newsletter@gazpromexport.com
+7 (812) 646-14-14 | comm@gazpromexport.com

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