Gazprom Export Global Newsletter
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BLUE FUEL

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

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In this issue

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Publishers Contact Info:
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To Our Readers

For the third year in a row the European gas market demonstrates truly robust natural gas consumption dynamics. In 2017 European gas consumption will amount to 560-565 bcm reaching its maximum since 2011. The aggregated gas consumption growth over the last 3 years will total 75-80 bcm. This can be compared with the annual gas consumption of Germany. For such a developed and mature market as Europe is, it is a remarkable result.

The main driver of gas consumption recovery is power generation. During three quarters of 2017 gas consumption in this sector grew by 19% making up 80% of the total gas demand growth. What we see now is a structural growth which provides the whole gas industry confidence that "blue fuel" will remain in demand on its traditional market. Even more important is that gas demand is high despite considerable price growth since 2016.

For Gazprom this year is to become a year when a new historical export record will be set. The growth of more than 7% compared with 2016, is a good indicator that Gazprom stands on firm ground with a share of more than 33% of the European market. Gazprom also remains the most flexible supplier setting this winter a historical record of daily supplies – 640 mcm.

The year 2017 has also demonstrated that Gazprom has chosen a right way in company's pricing strategy. Gazprom has significantly adapted its contract portfolio to the evolving market adding to its core of oil-indexed contracts more hub indexation. Though, European gas hubs have become a respected pricing benchmark, but they still lack liquidity. Amid growing gas demand the volumes of gas trade on hubs have decreased by 21% on TTF and by 10% on NBP during three quarters of 2017. The December accident on Baumgarten gas station has demonstrated that European spot markets remain vulnerable to external shocks and can't smooth gas demand peaks. Thanks to the great efforts our Austrian colleagues have made in order to promptly resume gas transit, the "perfect storm" on the European gas market calmed down just in 24 hours.

The coming year will be interesting but also challenging for the gas industry in Europe. Interfuel competition is growing and some countries vote for going all-electric. But if there were no challenges, the game would be a boring one. We at Gazprom truly love the dynamic and changing atmosphere on the European energy market. And we are proud that with our resources, infrastructure and trading expertise we can contribute significantly to the process of European energy transition and creation of the energy system of the future.

The "Blue Fuel" editorial staff wishes all our much esteemed readers a Merry Christmas and a happy New Year! Let the coming year bring you every success in all your endeavors. And stay tuned!

Russia and Europe: A Relationship of Mutual Dependence

Introduction speech by Elena Burmistrova, Director General, Gazprom Export at European Autumn Gas Conference in Milan, November 7th, 2017

This year we celebrate 50 years of gas supplies from Russia to Europe. In 1967, the first gas was delivered through a trunk pipeline from the USSR to Czechoslovakia. Just one year later, Soviet gas reached Austria, and 6 years after that, in 1974, it arrived to Italy, our host country today.

The very fact that infrastructure could be built and gas could be supplied despite the 'cold war' and sanctions is still remarkable today. Over the decades, a lot has happened in the lives of our countries. Governments have changed and some countries have even broken down. Russia has made the transition to market principles. But gas trade has remained untouched, and blue fuel has been flowing uninterruptedly to customers. This year the aggregated historical volume of Russian gas exports to Europe will pass the 4.7 trillion cubic meter threshold. In 2017 Gazprom Export is ready to set another historical record with at least 188 bcm of gas being exported to Europe.

We speak of the relationship of mutual dependence between Russia and Europe in gas trade. There is no need for me to say that the interdependence we have is inherent in the very nature of this industry. On one side, the investment cycles for exploration, production and construction are long, and the funds requested are huge. On the other side, customers invest their trust and security when they choose the type of fuel to heat their homes and supply their industries. This results in stable fuel supplies and return on investment for the producers. The best thing about this mutual dependence is that it is based on mutual benefits and mutual trust. This is what works, and this is what counts. Our half-a-century-long relationship proves that.

I would like to highlight that the gas partnership between Gazprom and Europe is a natural one. From every point of view, gas from Russia is the best choice for European industry and customers. It is located nearby. It is abundant. The infrastructure is in place. And, most importantly, its pricing conditions are attractive.

There is probably no other region in the world today that has such a variety of supply options as North-Western Europe. However, the LNG terminals remain loaded to a mere one-third of their capacities, while export pipelines from Russia are practically full. This year the Nord Stream 1 pipeline is projected to reach the utilization rate of 90% – a historical high. And Yamal-Europe works at full swing, regularly exceeding its project capacity. Gas from Russia is simply the most efficient solution both in pricing and in delivery terms. You know how our contract formula works. The fact that gas sold under this formula is needed and in demand proves that our contract terms fit the needs of the market in the best way. And here, I would like to name another natural partnership specific for European trade. I am constantly being asked whether Gazprom would like to stick completely to spot indexation. I would answer that it doesn't serve the best interests of our consumers. Gazprom's hybrid trading model naturally fits this market in the best way. It combines the flexibility of spot markets with the predictability of long-term deals; it saves the market from price shocks and gives the guarantee of daily supply security. These advantages are extremely important in times when we are on the doorstep of winter.

Europe has started its way towards a more diversified energy future. Our important partner Germany is now looking for the best way to design its energy industry. And here is the third example of natural interdependence. Gas is a natural partner for green energy. It can smoothen off peaks and replace intermittent supplies in the quickest and most efficient manner. A natural gas power plant comes online in single minutes compared to hours for coal plants. Remarkably, we see the share of renewables growing in European energy in recent years, but at the same time, we as a gas supplier are not losing this market. Our share is growing as well. And by the way, recently the German regulator BNA marked gas-fired generation units in southern Germany as priority customers, exactly for their ability to step in and provide backup for renewable generation. It is logical, since gas plants are cheaper to build and operate compared to most other energy sources. The destined relationship of natural gas and renewables can remain for decades and provide clean and safe energy supplies for Europe. But we shouldn't overestimate the potential of renewables. Subsidies still play a key role in this sector. And in Germany – the leader of European renewable energy – the debates on the high costs of energy transition are now extremely active. Going 'all-in' for the all-electric world would not only cost Europeans tens of billions of euros to install new generators, but would also lead to a surge of pressure on transmission lines. This is not to mention that currently there are no batteries with enough storage capacity.

We at Gazprom are convinced that we can help Europe to create the best of both worlds – green with renewables, and safe and cheap with gas. Looking ahead, Europe is moving towards a more diversified energy future, but we are convinced that natural gas will play a key role in the new energy transition.

And the market itself chooses natural gas. In the first 3 quarters of 2017, according to our estimates, European gas consumption grew by 7.3%, or 27 bcm. Natural gas consumption by power generation has increased by 19%. This is a great achievement over the past several years. The long-term prospects for natural gas do vary. We see how the trend for internal consumption has been moving from high-speed growth to moderate predictions – no doubt influenced by the green 'hype'. However, another trend on falling domestic production remains. A stricter new production cap has been recently introduced on the Groningen gas field. North Sea natural gas production is on a downward trend. This will no doubt result in a growing need for import gas – even if demand predictions remain stable. According to our consensus forecast, Europe will need an additional 50 bcm of new imports in 2025 and no less than 75 bcm in 2035. And this is what gives us strong incentives to further invest in production and infrastructure. Gazprom is building new and efficient transport routes to cover additional demand and to provide security of supplies. No commercial company would do this without being 100% sure that the demand for gas is there. When we see European companies committed to new gas pipeline projects, it is the best sign that not only Gazprom but the whole industry sees prospects for Russian gas.

So what is the right definition for the relationship between Gazprom and Europe? It is, indeed, a mutual dependence – but I would rather call it a natural synergy. This is the kind of partnership that leaves huge potential for future cooperation.

What will happen to our relationship in the years to come? We have a record of half a century of beneficial interdependence. I am sure we can make further decades of cooperation no less beneficial. We, people from the gas industry, have enough credibility and bargaining power to explain to policy-makers that natural gas is a cornerstone of Europe's new energy strategy. Russia, as a reliable and long-standing partner, can provide Europe all the volumes it needs to fuel the energy transition. The transition to an economy where all the clean energy sources and suppliers from different countries will co-exist on a peaceful and non-discriminatory basis.

Forging Ties – Fostering Relationships and Creating Business Models for Success

Speech by Alexander I. Medvedev at Abu Dhabi Petroleum Conference on 13 November 2017 in Abi-Dhabi

Often we hear questions on how the global energy system will look like in the future, how the global oil and gas majors are prepared for this future, and what is needed for success.

It is symbolic that we raise these questions in Abu-Dhabi which has transformed from a fully oil-dependent emirate to the region of innovations. In our view, evolution of the global energy system is unstoppable. Some fuels, like coal, are to become a part of history. Some, like oil, continue playing an important role at least till the middle of this century. And the new champions are natural gas and renewables. They will go ahead to build a strong synergy, the fundament of the future economy.

The International Energy Agency forecasts that the global gas demand will grow by 50% by 2040. Global oil and gas majors do follow this tendency. The share of natural gas in production of international oil majors is already about 50% and continues to grow. We have heard declarations of big oil companies that it is gas to be their new Eldorado.

In our view, a successful energy company of the future should have a strategy that is based on three pillars. The first one is access to reserves that are vast and recoverable with existing technologies. The second pillar is optimized and cost-effective transportation routes. And the last but not least pillar is a wide base of loyal clients. And successful international partnerships bring additional value to each of these components. To make the most of our assets, Gazprom together with its partners from all over the globe, invests into every element of the gas supply chain.

So what are those three pillars for Gazprom based upon? In the upstream sphere, our business is developing in two directions. The first is intensive development of Russian resource base including joint ventures with our international partners. By the way, Austrian OMV has recently joined us in the development of the gas resources in the Far North of Russia. OMV will also increase its presence when the asset swap with Gazprom is completed. Further, although Gazprom has a huge expertise in developing Russian natural gas resources, we also want to get new experience in developing hydrocarbon resources in places with different geology and economic climate. Gazprom Group operates in more than a dozen of countries, from Central Asia to North Africa, and from South America to the North Sea. The Middle East is also in our close focus.

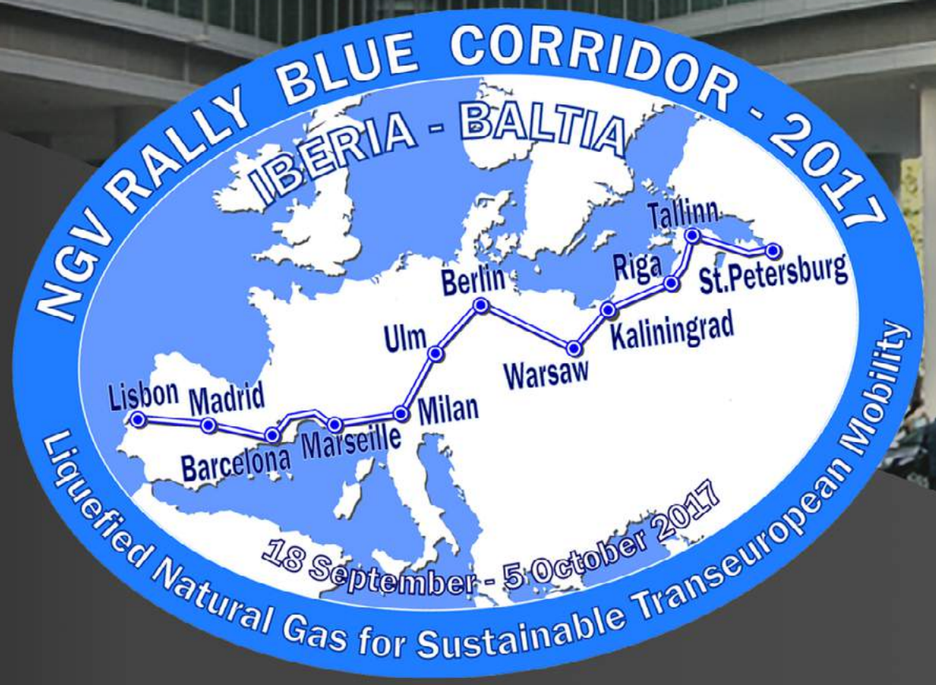
Gazprom invests as well into cross-border natural gas transportation projects and gas storages. Here, the investment and cooperation models might differ. The Nord Stream 1 and Nord Stream 2 pipeline projects are examples of internationally financed projects of Gazprom and its largest European clients. In the same way we carry out our gas storage projects in Europe. It might be another cooperation model as well, when Gazprom finances and builds all the capacities in Russia or international waters, and our partners create the necessary infrastructure on their territory. This is the case of the Power of Siberia and the TurkStream pipelines.

The third pillar of our growth is our relations with clients. All in all, Gazprom has signed contracts covering supplies of 4 trillion cubic meters of gas for the years to come. It gives us certain security when building large infrastructure projects. Moreover, we intensify our work with end consumers. After the asset swap with German Wintershall, Gazprom has significantly strengthened its presence on European retail markets.

As the globalization of the energy markets speeds up, oil and gas companies will definitely need more intensive cooperation. It concerns not only upstream and midstream investments, but also broader cooperation in the commodity trading. I believe that in the future we will see more swap operations between pipeline and LNG suppliers. I also expect more cooperation between natural gas and renewable energy, and new business options arising from it. And it is in our power to explain policy-makers that the world of tomorrow should not have any trade barriers or sanctions. After all, future belongs to the world where international investments and cooperation are encouraged for our common prosperity!

Special Focus

Gas as a Transportation Fuel



Blue Corridor Rally 2017 Travel Notes

The Blue Corridor NGV rally was born in 2008. Since then each year natural gas fueled vehicles of different types, classes and brands gather to drive thousands of kilometers all over Europe. This journey is usually accompanied by seminars, round-tables, conferences and motor shows which are held in the cities on the rally's route.
Over the 10 years of the project, 11 rallies have been held and the participants drove more than 50 thousand kilometers across Europe.

Blue Corridor Rally 2017 edition was a unique one by many reasons, but the main was a focus of this year – LNG as a fuel for the long-haul trucks. The goal was to demonstrate that cargo transportation through the whole European continent with the use of LNG as motor fuel is safe for the environment and beneficial for the budget.

The Blue Corridor Rally NGV crews for the first time travelled through the whole European continent from its far western point Portugal to the East – St. Petersburg, the northernmost city with a million plus population.

The LNG Way of Santiago

It was a natural choice to start the rally on Iberian Peninsula – the leading region in Europe in terms of using LNG as a motor fuel. Today around half of all European LNG fueling stations are situated here. The joint crew of the Blue Corridor Rally organizers – Gazprom and Uniper – got first impression of the growing popularity of LNG-fueled trucks in Spain even before the official opening ceremony, when it reached the busy LNG fueling station in Ollaberia, Basque country, just in a short driving distance from the border with France.

The festive opening ceremony of the Blue Corridor Rally 2017 took place on September 18 in Lisbon, the magnificent city where waves of the Atlantic Ocean touch the shores of Portugal. 16 gas fueled vehicles, including 6 LNG-fueled trucks, 5 commercial vehicles and 5 CNG-fueled cars, started their long way toward St. Petersburg. The host of the opening ceremony, Dourogas Natural organized a round table discussion bringing together gas producers and distributors, car manufactures and logistic companies. Participants shared their development plans and discussed

Gazprom/Uniper rally crew in Lisbon in front of Christ the King monument

Filling an LNG truck in Barcelona

existing problems, including the issue of excessive price of LNG trucks compared to diesel trucks.

During the next 2 days the Blue Corridor caravan crossed Spain, the beautiful country of flamenco, football, Gaudi and Dali. During the Spanish stage of rally the crews passed a symbolic landmark. On September 19 on the way from Zaragoza to Barcelona Gazprom/ Uniper rally crew passed Greenwich meridian getting back again to the Eastern hemisphere. GASNAM, Iberian association for gas-powered mobility, organized 4 media events at the LNG/CNG fueling stations in Madrid, Zaragoza, Barcelona and La Jonquera, near the border with France. These events attracted not only national and local media, but business participants representing transport and automobile industries as well. A surge of interest to the Blue Corridor Rally demonstrated how high in the Spanish agenda the use of gas as a motor fuel is. Environmental and economic benefits (CNG-fueled Seat Leon drove around 1300 km from Lisbon to La Jonquera for 40 euro, just compare this to traditional fuels!) together with well-established gas fueling infrastructure and developed technical regulatory system create good basis for further development of the industry in the region.

After Spain the rally participants headed for Italy – the renowned European-wide NGV champion. And our way there ran through picturesque landscapes of Maritime Alps.

"Life is a journey. Let's make it sustainable"

Milan stage of the Rally became a milestone for the Blue Corridor's crew. Here, in the middle of our route, the caravan was welcomed by the Regional Government of Lombardy on September, 22th. An impressive exhibition of CNG and LNG vehicles took place in the largest Europe's indoor square and attracted the interest of the visitors who were thoroughly observing the whole variety of NGVs represented here. A special curiosity was sparked by CNG fueled Audi A5 Sportback. Another new team member who joined the caravan here, in Milan –was a FIAT passenger car promoting natural gas as a clean sustainable fuel. FIAT's motto was memorable: "Life is a journey. Let's make it sustainable". With this, the participants of the event further moved to a cozy conference-hall kindly provided by Lombardy's Government.

A fruitful discussion on the future of natural gas a motor fuel followed up. Having gathered the best experts of the Italian NGV industry with the President of NGV Italy Mariarosa Baroni at the head, the event showed that those

Rally participants in front of Duomo Cathedral in Milan

Round table in Milan

issues raised by the Blue Corridor are on the front burner for the whole European continent. Opening remarks of Baroni followed up by the speech of Eugene Pronin, the organizer of the Rally from Gazprom Export. He immersed the participants in the bright history of the Blue Corridor: "We started it in 2008, and since then we have visited 22 countries in total. Gazprom is very active at the European NGV market and expands its activities on LNG and CNG sales and those associated with the sales". "The Rally has been promoting environmentally friendly and economically attractive fuel across Europe", added Pronin. Detlef Wessling, the head of cooperation and business development division of the Rally co-organizer Uniper shed light on his company's further plans: "As Uniper, we are focusing on LNG in the markets of Germany, France and Belgium". By 2020, Uniper is going to build up to 20 LNG stations across Europe and further promote work together with certain transportation companies whose goal is to be more ecological. As for Roberto Tozzoli of AssoGas Metano, who took the ground later, significant investments should yet be engaged in order to establish sustainable CNG/LNG fueling infrastructure here in Italy and all across Europe.

The importance of the Italian stage of the Rally was explained by Sergey Colin of Gazprom Group company Promgas S.p.A. "Being a leader of gas-engine fuel business, Italy has a strong potential in terms of both CNG and LNG. Without a doubt, this country is of great interest for gas companies and also for end consumers, especially if you look at the efficient policy of the Italian government aimed at supporting gas-engine fuel business".

With that, Milan stage turn a source of inspiration for the Rally crew and made them ready to continue their great mission which is to unite the whole Europe with the idea of environment-friendly and economy-reasonable fueling.

Elena Burmistrova CEO of Gazprom Export: "Italy is the European leader in using gas on transport. I think it is very important, and this country must become an example for the whole continent" (from the interview to the Italian daily "Sole 24 Ore" on 14 November 2017).

Warmest "Herzlich Willkommen" to LNG in Germany

Having completed an event in Milan and enjoyed attractions of Lombardy, the Blue Corridor-2017 crew set a northward course. Hundreds of kilometers of picturesque roads in Italy, Switzerland, Lichtenstein, Austria and Germany were awaiting for them. One of the most significant Rally stages was about to start.

In Germany the Blue Corridor caravan made the first stop in the city on the Danube River – Ulm, which is located on the boundary between two southern lands – Baden-Württemberg and Bavaria. Here the Rally was joined by a Russian LNG and CNG-fueled truck URAL Next.This impressively huge but eco-friendly machine traveled more than 4.4 thousand of kilometers from Asia to the very heart of Europe!

URAL Next truck in Berlin

Fuelling trucks at the first German LNG filling station, located on the domain of IVECO, was not the only goal of the Blue Corridor crews in Ulm. The main objective was to tell the local cargo market participants about the advantages of natural gas. The organizers, as well as the speakers did it with flying colors. In the new customer center of IVECO, which is one of the leading NGV-truck producers, a round table took place, where more than 50 experts and businessmen exchanged their views and discussed the challenges for the development of the gas motor fuel market.

From Ulm the Blue Corridor-2017 caravan moved to the next stage – towards the German capital. The trip, which was a bit spoiled by a long waiting due to road traffic accident, has finally, late at night, ended in a small town Grünheide located in several dozens of kilometers from Berlin. Here on the following morning the Rally crew continued to carry out their mission. On the territory of Meyer-Logistik, where the second German LNG fueling station had been recently commissioned, the next round table took place. The participants of the event agreed that natural gas as a fuel is already more than welcome in Germany, it has good prospects and should be used more intensively, but there is still much to be done to develop the fueling infrastructure in the country.

LIQVIS mobile LNG filling station in Berlin

Today, against the background of Dieselgate scandal, German politicians and businessmen are actively looking for alternative energy sources – the ones which are able to put in motion long-haul vehicles without environmental damage and at a reasonable price. It is evident already now, that in the future there will be a mix of different fuel types – from hydrogen to electricity. No doubt, there will be certainly a market niche for liquefied natural gas – a mature technology for cleaner and cheaper freight transport.

Festive finish in St. Petersburg

Having completed the German stage of the rally the caravan crossed Poland, Kaliningrad Oblast, Lithuania, Latvia and Estonia with a concluding round-table hosted by our traditional partner Eesti Gaas in Tallinn.

Participants of the festive finish of Blue Corridor 2017 Rally

On 5 October, the 11th annual natural gas rally Blue Corridor — 2017 crossed the finish line in St. Petersburg. The ceremonial finish of the Rally was attended by Deputy Chairman of Gazprom Management Committee Vitaly Markelov, Chairman of the Management Committee of the German company Uniper Klaus Schäfer, Director General of Gazprom Export Elena Burmistrova, Director General of Gazprom Gas Engine Fuel Mikhail Likhachev. The ceremonial finish took place within the 7th St. Petersburg International Gas Forum.

"Blue Corridor Rally has once again proved that natural gas is being used as a motor fuel across the whole European continent, allowing to efficiently reduce emissions and to improve the environment", said Vitaly Markelov in his welcoming speech.

Vitaly Markelov, Deputy Chairman of Gazprom's Management Committee pitting a Rally logo on the car

Vitaly Markelov, Deputy Chairman of Gazprom's Management Committee and Klaus Schäfer Uniper CEO

"The rally showed that you can cross the whole Europe in a safe and environmentally friendly manner", said Klaus Schäfer.

The participants of the rally unanimously agreed that the scope of the use of natural gas on transport is constantly expanding. Carmakers present new models of natural gas fueled transport, from CNG fueled small and commercial vehicles to heavy long-haul and freight trucks. A number of CNG and LNG stations increase significantly forming full-fledged transport corridors. With the use of the natural gas, the environmental footprint of the transportation sector decreases significantly.

The focus on the use of LNG on freight transport has provoked a vivid response of the European media and the experts' community. Dozens of articles and TV footages covered the Rally this year.

"Such a huge interest to gas as a motor fuel we are now observing worldwide means that the Blue Corridor Rally will move forward and new participants from European and Asian countries will join it. I am sure that in the future Blue Corridor will take the emerging Eurasian transport route from Lisbon to Beijing", — said the coordinator of the Rally of Gazprom Export Eugene Pronin.

Gazprom Export expresses the deepest gratitude to all the Rally attendees for their invaluable contribution. We wish you all the success and see you soon!

NGV KAMAZ crossing the finish line

Feel Free to Fill

From a gasnaut's diary. Eugene Pronin, Blue Corridor Rally 2017 coordinator from Gazprom Export

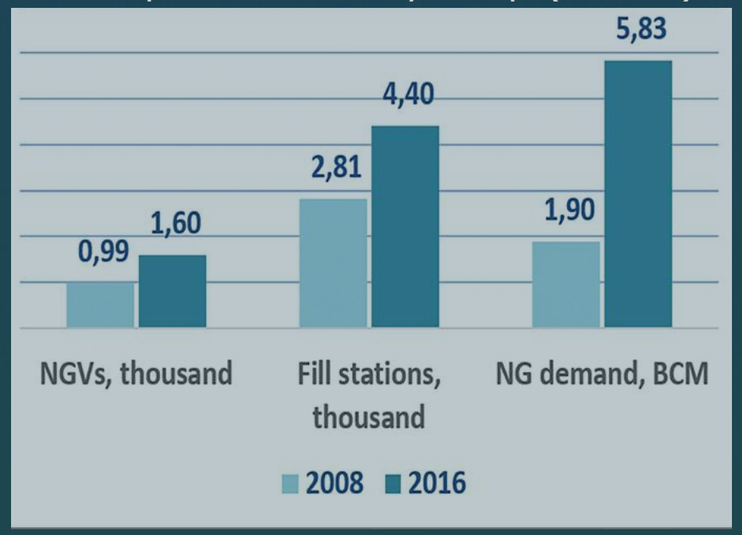
In our annual NGV Rally 'Blue Corridor' we pursue several goals. One of them is to look at the development of NGV filling infrastructure and project its future expansion. There were the days, when we were asking ourselves, whether our caravan of NGVs could drive a mere distances of 800 km. Since then, almost 200 factory built CNG and LNG vehicles drove over 50,000 kilometers across 25 European countries visiting 130 cities from Yekaterinburg to Lisbon and from Gothenburg to Sochi.

Over the years of the Blue Corridor project, the European NGV market has grown by every measure. From 2008 to 2016 the NGV fleet and the number of CNG/LNG filling stations grew 1.6 times and demand for methane – threefold.

Demand for natural gas progressively grows in the municipal segment (buses and garbage trucks – mainly CNG) and heavy trucking industry (mostly LNG).

Regrettably one has to admit that despite noticeable expansion of the CNG and LNG infrastructure, even now in 2017 it is quite challenging to drive a heavy duty truck from the Atlantics to the Urals or from the Norwegian to the Mediterranean coast using only one fuel – natural gas.

The development of NGV industry in Europe (2008-2016)



And the lack of CNG/LNG stations is not the only reason for that. During the Blue Corridor 2017, as well as through earlier editions of this NGV Rally, we had to face other smaller and bigger challenges when fueling our gas vehicles in Belgium, France, Germany, Italy, the Netherlands, Poland, Portugal, Russia, and Spain. This does not mean that we had no similar problems earlier in other countries.

Sometimes we solved those troubles, but sometimes not, being forced to leave the station without filling our tanks and cylinders. Nevertheless we survived.

Some most requent problems one can read of below:

- The geographical coordinates of the stations indicated in navigation systems may not match their real location;
- Navigation systems do not indicate on which side of the road exactly the NGV filling station is located. On a highway it may mean a good dozen of kilometers to drive into and get back;
- Many countries have no road signs showing where CNG or LNG filling station sits. However, vertical LNG reservoirs are good pointers to spot;
- A CNG or an LNG station may be located behind the fence with automatic gate (France, Lithuania). To drive in and fill the tank, a driver must have either a magnetic key or a special card, or enter a magic password. One may call a customer service but it doesn't guarantee the vehicle will be filled with gas. In travel books such filling stations might be indicated as public, but in reality those are private ones;
- CNG/LNG stations in different countries may lack NGV1 or NGV2 nozzles or adapters for CNG. Therefore one might fill either a passenger car or heavy duty vehicle;
- In Italy, it's prohibited to use NGV adapters except for those that belong to the station. There might be no such restriction in other countries, that's why a driver should better have one in the glove compartment;
- Fueling pressure might be not high enough to fill the cylinder up to 200 bar operating pressure. Thus the driver gets less gas and shorter range;
- In Russia, you have to present your vehicle certificate and certificate for gas cylinders;
- In Italy, CNG and LNG vehicles may be fueled only by a service station attendant;
- During a self-service LNG fuelling a driver must put on special gloves, apron and protection glasses;
- In France, a driver should prove that he has completed accident prevention training to fuel a vehicle with LNG;
- At some stations one can not pay with major credit cards or cash. Only gas supplier's card are welcome;
- Payment software may block quite an amount on one's card and release it only three or four weeks later;
- It's no better when only cash in local currency is accepted (Poland);
- Price indication differs from country to country: cubic meters, kilograms, liters and kilowatts are used;
- Sometimes paying machines do not give the receipt.

Of course, all these inconveniences are not the reason to give up methane. Instead, this is information to take into account before hitting unknown route. Further expansion of the CNG/LNG network will make the driver feel more comfortable while filling his NGV.

More and more often transportation companies turn to the 'blue fuel' in pursuit of making their image 'greener'. Still, today we can't speak about a massive transition to LNG fueled vehicles. More frequently we see a dozen or a couple of dozens vehicles belonging to a company. In such a case there is a point for a gas company to go to a client and to build there a fixed LNG refueling station or to arrange for a mobile LNG refueling unit.

Prices of different fuel types in Europe

Country	RON 95, l	Diesel, l	LPG (equivalent), l	CNG, kg	LNG, kg
Austria	€1,25	€1,17		€1,00	
Estonia	€1,20	€1,16	€0,73	€0,81	
France	€1,49	€1,37	€1,11	€1,13	€1,13
Germany	€1,36	€1,31	€0,70	€1,10	
Italy	€1,56	€1,36	€0,77	€0,95	€0,95
Latvia	€1,13	€0,99			
Liechtenstein				€0,89	
Lithuania	€1,08	€0,94	€0,64	€0,94	
Netherlands	€1,30	€1,19		€0,99	
Poland	€1,18	€1,16	€0,77	€0,76	
Portugal	€1,54	€1,31	€0,80	€0,94	€1,12
Russia	€0,57	€0,58	€0,36	€0,23	€0,36
Spain	€1,20	€1,11	€0,81	€0,85	€0,85

Such solutions are found in Russia, Spain, Germany, France and Italy. A mobile LNG station usually belongs to the LNG supplier. A transportation company just leases a spot of its land for the mobile LNG station, provides power and pays a lower price for LNG. In one of Spanish transportation companies we were told that a transportation company in Spain pays 30% less for LNG than for diesel bought on wholesale terms as well.

In order to improve economics, transportation companies may allow their private CNG/LNG stations to general public. Such stations may operate on business hours of week days only and be closed for weekends or public holidays. But if pre-arranged by phone they may fill an NGV and/or LNG truck even off-time.

The main drivers to use methane as a transportation fuel are saving environment and money. No need to say that natural gas is the cleanest commercially available transportation fuel. As for the economics, CNG and LNG are usually cheaper than petrol or diesel.

Sometimes CNG may cost more than LNG, for example in Matosinhos (near Porto), Portugal. But in general CNG and LNG are priced equally if measured in kilograms. In any case, methane is cheaper than petroleum products (excl. propane).

Liquis LNG filling station in Marceille

In the table above one may find prices in Euros
in the countries the Blue Corridor 2017 drove through. The difference in prices at the filling stations of different companies and in different regions of the same country may reach 10-15 eurocents.

CNG Mobility Days in Essen

Audi A5 g-tron

On November 7-8, 2017, in Essen, Germany, Volkswagen Group celebrated a respectable industry event branded "CNG Mobility Days". The gathering is intended to raise awareness of policy-makers, entrepreneurs, industry specialists and general public about the strategy Volkswagen Group pursues in the sphere of natural gas for transport, benefits of natural gas and the model range of vehicles manufactured by the VW Group.

In his introduction speech the Lord Mayor of Essen Thomas Markus Kufen underlined the fact that the city Essen is located in the center of the Ruhr area, the heart of the German coal industry. This region has an uneasy ecological legacy and desperately wants environmentally clean fuel and eco-friendly cars, buses and trucks. In this relation ecological strategy of the city and the targets of Volkswagen Group in protection of the atmosphere are in close harmony.

Mathias Müller, Volkswagen Group CEO says that by 2025 no less than 25% of all cars manufactured by the company will drive on electricity. Nevertheless, internal combustion engines will remain in the ranks for a long time in the future. According to the management of Volkswagen, CNG must take a significant share in the segment of cars which use conventional fuels.

Audi A4 Avant g-tron

Volkswagen continues expanding the product range of natural gas vehicles. In 2017 such new models as Audi A4 Avant g-tron, sportback Audi A5 g-tron, VW Polo TGI, SEAT Ibiza TGI have hit the road.

Dr. Jens Andersen, the VW Group coordinator for natural gas powered mobility, told the participants of the event about the strategy of Volkswagen in this field. According to him, CNG is a part of a new energy policy and an effective supplement to e-mobility.

Environmental benefits from the use of CNG will appear in full entirety when the fleet of NGVs in Germany will reach several million cars and the network of CNG filling stations will expand to 2000. Currently the NGV fleet in Germany covers around 80 thousand cars and about 850 CNG stations.

Volkswagen Group has invested significant funds into development of natural gas for transport and is very interested in growth of demand for NGVs. In order to drive car sales in June 2017 Volkswagen held the 1st round of CNG Mobility Days in Hamburg.

Different Eco-bonus rates by VW Group

AUDI	VW	SEAT	ŠKODA
A3 - 8000€	ecoUp! - 300€	Mii Ecofuel - 3750€	Citigo G-Tec - 3750€
A4 - 9500€	Golf TGI - 6000€	Leon ST TGI - 7000€	Octavia G-Tec - 7000€
A5 - 9500€	Caddy TGI - 5000€	Leon TGI - 7000€	Octavia Combi - 7000€
	Caddy Maxy TGI - 5000€		

Volkswagen Group is the leader among German vehicle manufacturers that offer passenger natural gas cars, trucks and buses. The model range of Volkswagen currently consists of 16 passenger models, 3 buses and 3 trucks. Many of them were demonstrated during the venue.

Volkswagen Group offers the following CNG passenger cars: Audi A3 g-tron, Audi A4 Avant g-tron, Audi A5 Sportback g-tron, VW eco up!, VW Caddy TGI BlueMotion, VW Caddy Maxi TGI BlueMotion, VW Golf TGI BlueMotion, VW Golf Variant TGI BlueMotion, SEAT Leon TGI, SEAT Mii 1.0 Ecofuel, SEAT Leon ST TGI, ŠKODA Citigo G-TEC, ŠKODA Octavia G-TEC, ŠKODA Octavia Combi G-TEC.

In order to stimulate sales of NGVs Volkswagen Group pays a so-called ecological bonus to its customers. Precise bonus rates are shown in the table below.

Volkswagen NGV platform

EU-Russia: Energy, Policy & Competition

Dr Thierry Bros. Senior Research Fellow. Oxford Institute for Energy Studies

From record Gazprom exports into the EU in 2016 thanks to lower prices, demand growth and lower domestic supply…

By having implemented three energy packages and a 2020 strategy with a focus on markets, efficiency and renewable, the EU Commission has set a new world where fossil fuels need to be competitive if they want to stay in the EU mix. By having commoditised gas and allowed trading on hubs, the Commission managed to set a new competitive level-playing field. Hence the arrival in 2016 of a new competitor (US LNG) pushed TTF price to their lowest levels since 2010, even with a second year of EU gas demand growth (after a decade of demand destruction) and lower domestic supply as the Dutch Groningen production was further cap from 30 to 27 bcm/y.

Gazprom, that has gained flexibility in the last few years, can benefit much faster from market changes. Hence, 2016 saw record imports from Russia into the EU as the price attractiveness of Russian gas outcompetes US LNG. In 2016, the EU was 33% dependent on Russian gas. More importantly, the EU-27 (excluding the UK to account for Brexit) was 35% dependant on Gazprom in 2016.

… to renewed record in 2017 with higher prices and more gas flowing via Nord Stream 1 thanks to a change in EU policy…

2017 turned out to be an interesting year for both EU markets and regulations. In October 2016 the European Commission allowed Gazprom to bid for the remaining OPAL capacity alongside third parties while guaranteeing that the latter would still have access to 20% of the capacity. Increased capacity access in OPAL from January 2017 – enabling increased utilisation of Nord Stream[1] – was an important achievement for Gazprom, as it reduces its dependence on transit countries and reduces costs while boosting export flexibility. But the EU decision to lift the cap on Gazprom's use of the pipeline angered Poland that referred the decision to the Court of Justice of the European Union. In January 2017 the Court of Justice suspended the Commission's decision. So, after a record use of Nord Stream 1 in January, Gazprom had to wait for the rejection of this suspension, in July, to again use fully OPAL and Nord Stream 1.

For 2017, Gazprom's flows to the EU have already reached a new record high[2] . So high indeed, that Gazprom Export that tested a new mechanism of sales with gas auctions in 2015 and 2016 (for a total of 3.6 bcm) decided, on 7 November, not to hold any auctions in 2017[3] as it had already sold enough gas. The change of EU policy regarding Nord Stream 1 and the further cut in Groningen cap (24 bcm/y) allowed those record Russian imports, leading to a further increase in Gazprom's market share in 2017, while TTF prices are on the rise as US LNG as a competitor didn't materialised yet. This highlights Gazprom's mastering of markets by efficiently using its competitive advantage as the lowest cost producer.

… to too high future Gazprom's market share allowing the EU to push its new policy agenda?

In November 2017, the Commission proposed to amend the Gas Directive to ensure that all major pipelines in the EU and entering the EU territory are operated under the same degree of transparency and are accessible to other operators. This is in part because "the Commission sees no need for new infrastructure of the magnitude of Nord Stream 2"[4] .

The further reduced cap in Groningen production (21.6 bcm/y) was rejected by the highest Dutch administrative court in November, saying it might be possible to cut output further without endangering supplies and ordered the government to review its decision within the next 12 months. The LNG glut that so many where expecting might not materialise at all with booming demand in China and lower than expected supply from Australia, leaving again additional room for Russian gas…

On a policy side, Russia is not an EU friend, but on the energy side Gazprom is the cheapest gas supplier that can, on top, provide, if it so wishes, additional gas the EU may need[5] . With Gazprom's increasing further its market share, how is Europe's schizophrenia going to evolve? Perhaps with a too high Gazprom's market share, hence a market power risk, the Commission could turn away from politics and focus on further enhancing gas market competitiveness for the benefit of its customers….

[1] Nord Stream 1 load factor was already 80% in 2016 at https://www.nord-stream.com/press-info/press-releases/nord-stream-utilisation-averages-80-in-2016-438-bcm-transported-to-the-european-union-490/

[2] "Russian Gas Export in January-October 2017 Tops the Figures of Previous Years" at http://www.gazpromexport.ru/en/presscenter/news/2065/

[3] "Gazprom's European Exports Growth in 2017 is Well Above the Market Once Again" at http://www.gazpromexport.ru/files/EVB_interfax_08_11_2017253.pdf

[4] http://europa.eu/rapid/press-release_MEMO-17-4422_en.htm

[5] Gazprom spare production capacity is estimated at 140 bcm for 2016.

US LNG: Game Changer or a Good Marketing Ploy?

Maria Belova, Head of research, VYGON Consulting

The United States as the home country of Philip Kotler, founder of the marketing theory, has always succeeded in sales. As of the end of 2016, 6 US LNG facilities signed 41 contracts to sell US LNG for a total of 47,8 mt per year including 28 long-term (20 years), 2 short-term contracts (up to 5 years) and 11 heads of agreement (HOA) for 7.7 mt.

Since the Sabine Pass 1st train start-up in February 2016, the revolution in the global LNG market did not occur. Almost 90% of the US natural gas is sold under long-term contracts and, same as Russian gas, have a «take-or-pay» obligation – importer should purchase LNG under FOB terms, regardless of gas withdrawal volumes, and is liable for liquefaction payments based on previously agreed capacity.

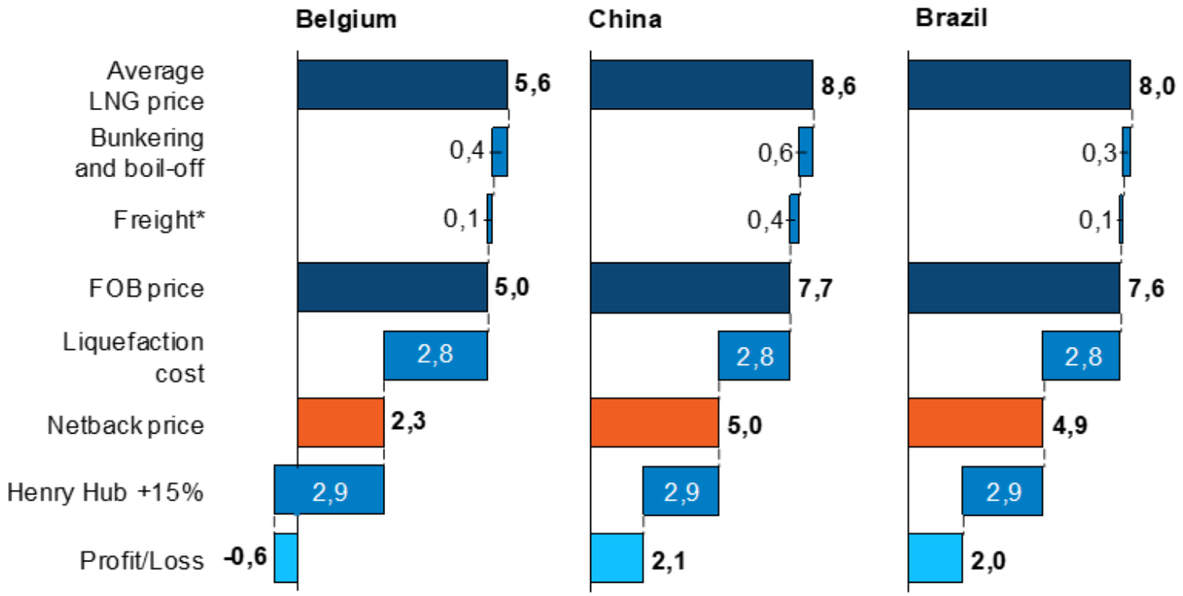
200 cargoes with US LNG left the Gulf of Mexico through September 2017 totaling 13.3 mt, which composed around 5% of global LNG trade in 2016.

Latin America was in the top of American LNG purchasers as it consumed nearly 40% of the total US exports. Asia-Pacific was the second largest region purchasing US LNG in 2016 and 2017. 62 tankers shipped 4.3 mt of LNG (32% of total exports) to South Korea, China, Japan, India, Taiwan, Thailand and others.

US LNG is also supplied to such exotic nations as Kuwait, UAE, Jordan and Egypt (14% of total US exports in 2016-17). Only 14% of US LNG total production headed to Europe (1.9 million tons) – mainly to those nations that have no contracts with Gazprom. Financial performance is the reason why the European market is so unattractive: despite a number of favorable shipping conditions and historically low Henry Hub prices, US LNG exports to Europe resulted in average losses of $0.6/MMBtu in 2016.

Latin America (Brazil) and Asia (China located within the almost same range from the Gulf of Mexico, have secured the exporter a profit of $2/MMBtu due to higher selling prices in their markets.

Figure 1. Changes in netback factors of US LNG delivery by country in 2016, $/MMBtu



* Freight cost includes Panama Canal fee for Asia

Note: export netback is calculated as an average selling price of LNG to the final market less transportation and liquefaction costs.
Source: EIA, FERC, VYGON Consulting

The key determinants of LNG deliveries cost from the USA to European and Asian markets are Henry Hub spot prices, liquefaction and shipping. In 2016, the Henry Hub price, an indicator of American LNG contracts, was at its lowest level since the beginning of the 1990s. The EIA long-term projection demonstrates signs that the natural gas glut in the domestic US market will be diminishing as LNG export capacities emerge and availability of new oil and gas resources and their development technologies shrinks[1] . The EIA projects that Henry Hub prices can grow $1 to $3 per MMBtu by 2020 versus 2016. Its Minimum Case Scenario assumes a rise in prices to $3.6/MMBtu and the Maximum Scenario to $5.4/MMBtu.

In addition, average liquefaction costs are expected to grow because of higher costs at Corpus Christi ($3.5/MMBtu) reflected in the contracts terms. Based on that, the average unit cost of gas liquefaction at LNG plants scheduled to come online will soar by $0.5/MMBtu to represent about 30-40% of the final LNG price in European and Asian markets.

[1] see Annual Energy Outlook 2017 with projections to 2050 - https://www.eia.gov/ outlooks/aeo/pdf/0383%282017%29.pdf

Signs of changing shipping costs also have a negative impact on the future competitiveness of US LNG. LNG freight rates has touched the bottom in 2015-16, and then has been on the rebound. According to Affinity, wider tanker uses by LNG producers would dampen the existing LNG shipping demand/ supply imbalances already in the second quarter of 2018 with resulting impacts on the freight rates. Fearnley, an international marine broker firm, estimates, that a comfort freight rate for an LNG tanker is $80,000 per day.

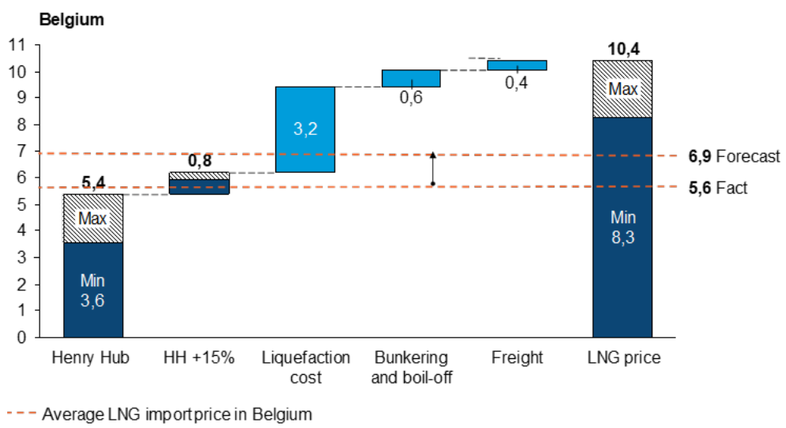
At such shipping rates, we estimate average freight costs to rise 2.5 times up to $0.4/MMBtu.

In addition, Brent crude prices that are expected to grow from 43 to 63 USD/bbl in 2016-2020 (according to World Bank projections) will lead to a rise in the average bunkering costs by $0.15/MMBtu. The cost of boiled-off gas will also vary proportionally with the ex-plant LNG price.

Assuming the crude oil prices to elevate to 63 USD/bbl by 2020, LNG price in Europe (Belgium), according to our estimates, will be $6.9/MMBtu.

Therefore, even under the minimum Henry Hub price scenario projected by the EIA for 2020 US LNG exporters are likely to carry losses in Europe.

Figure 2. Cost plus forecast of US LNG delivery to Europe by 2020



Source: EIA, FERC, VYGON Consulting

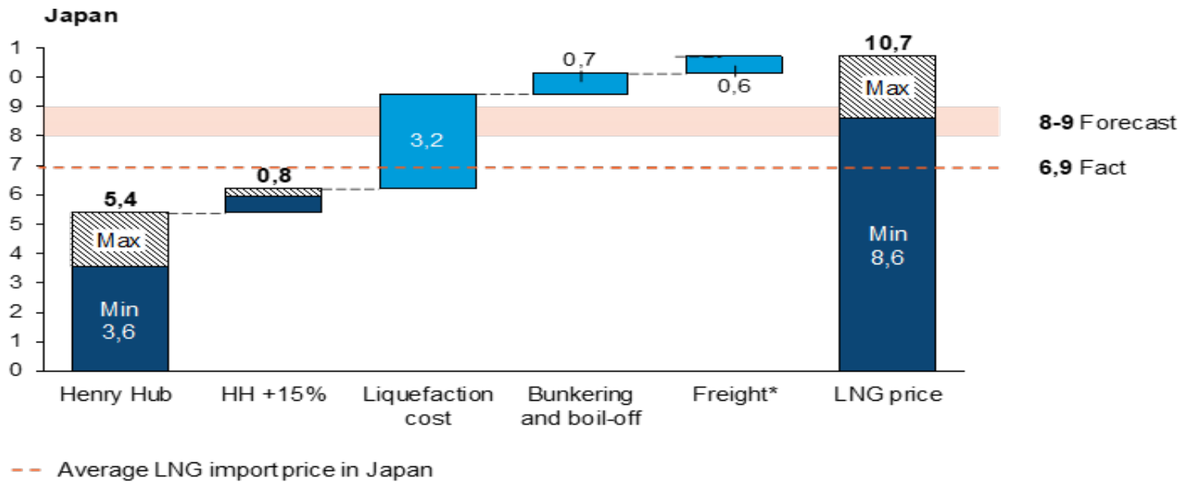
American LNG exports to Europe could be viable, if the average import price was in the range from $5 to $7 per MMBtu. However, if the European price is below this range, the American LNG exporters will prefer halting their deliveries and simply paying for liquefaction capacity they contracted.

The exporters have two strategies to minimize their losses: use predatory pricing in European markets (i.e. offer its LNG for $5-7 per MMBtu instead of the desired $8.2 and current prices of $7 per MMBtu) or ship its LNG to more attractive markets in Asia or Latin America, where they can offer a price premium during seasonal price hikes.

Based on an assumption about regional gas market globalization due to expanding LNG trade, we project the further LNG prices alignment in the importing regions. The price differential between Europe and Asia/Pacific was $3.1/MMBtu in 2015, $2.3/MMBtu in 2016 while by 2020, according to our estimates, it will shrink to $1-2 per MMBtu. With the expected LNG price in Belgium of $6.9/MMBtu, the price in Japan will be in the range from $7.9 to $8.9 per MMBtu. This corresponds to the World Bank's forecast of $7.8/MMBtu. Since demand in Japan unlikely to grow further primarily due to the national nuclear energy policy regaining its focus, and taking into account overall LNG supply growth in the Asia/Pacific region as a result of domestic gas market liberalization launched in 2016, we expect that the price of LNG will be closer to the bottom value of the forecast range.

Cost of supply of the American LNG in Japan may vary from $8.6 to $10.7 per MMBtu. Thus, the economics of LNG supplies from the United States to Europe and Asia remains extremely questionable in the medium term.

Figure 3. Cost plus forecast of US LNG delivery to Asia by 2020



Source: EIA, World Bank, VYGON Consulting

Shale gas. Deadly race 2.0

Valery Nemov, Deputy Head of Contract Structuring and Price Formation Directorate, Gazprom Export LLC.

Since natural gas production in North America has boomed, Gazprom has always been giving a lot of its attention to the situation in shale gas industry and scrutinized this topic. No doubt that shale has been extremely overhyped in recent years; therefore looking beyond catchwords and bright prospects is something that is necessary today.

We had on hand gas producers in the US from the Natural Gas Supply Association list as of 2016 and excluded international companies like ExxonMobil, BP, ConocoPhillips, in which foreign activities may influence the general picture in large extent (see Table 1). Here is how the top ten chart looks like. Companies differ by their production mix; some are more exposed to liquids, that's why we added the share of gas in terms of energy equivalent.

Investigating pure economics of US shale gas producers helps to shed light on the nature of shale boom as well as to envisage its further horizons. It's not today a secret that so called "shale revolution" in the US was basically possible due to enormous flows of capital to the industry in the low interest rates environment. Besides direct paid-in capital injections, companies attracted bank loans to finance their growth.

But today it seems obvious that companies failed to demonstrate growth in anything rather than production volumes and debt burden, and what is the most important – they failed in creating value for their investors. The article, published in The Wall Street Journal[1] on 7 December 2017, revealed that since 2007 US energy companies have spent $280bn more than they generated from operations on shale investments, according to advisory firm Evercore ISI.

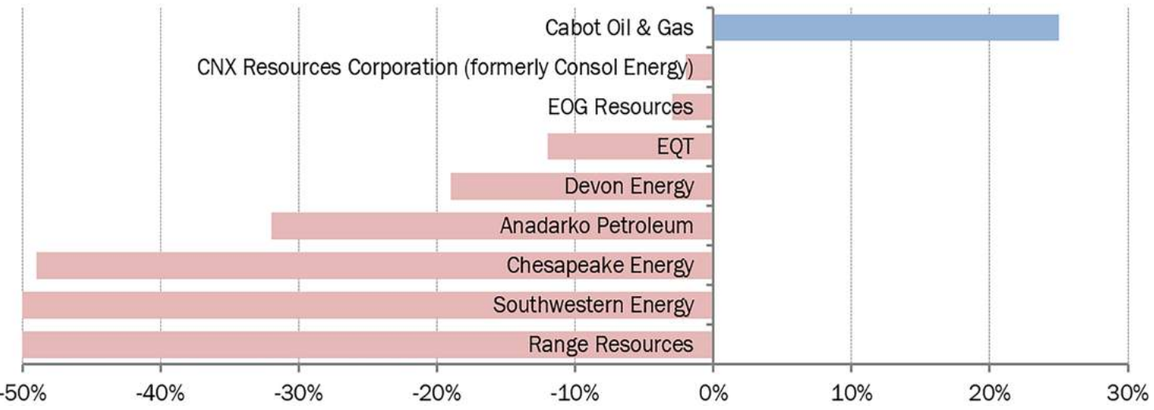
[1] https://www.wsj.com/articles/wall-streets-fracking-frenzy-runs-dry-as-profits-fail-to-materialize-1512577420

Table 1.

		Gas production, bcf/day			
	Share of gas	2017 (1-3Q)	2016	2015	2014
Chesapeake Energy	75%	2.55	2.87	2.93	3.00
Southwestern Energy	89%	2.41	2.15	2.46	2.10
Anadarko Petroleum	36%	1.39	2.09	2.33	2.59
EQT	91%	1.86	1.87	1.50	1.19
Cabot Oil & Gas	96%	1.80	1.64	1.55	1.39
Devon Energy	51%	1.21	1.39	1.59	1.66
Range Resources	69%	1.31	1.03	0.99	0.79
CNX Resources Corporation (formerly Consol Energy)	90%	0.98	0.95	0.79	0.59
Rice Energy (acquired by EQT in 2017)	95%		0.83	0.55	0.27
EOG Resources	24%	0.74	0.81	0.89	0.92

No surprise that stocks were under pressure, and many companies demonstrated remarkable multifold decrease of their market cap. What is even more interesting is that oil prices started to recover since May 2017 and increased sharply during the 4Q2017, with natural gas prices being quite stable, while shares of top gas producers underperformed: only Cabot Oil & Gas has demonstrated positive dynamics, and the others have lost up to half of their market cap (see Figure 1).

Figure 1. Change in market cap from 2 January to 18 December 2017.



The downward trend is going on as lack of any returns has disappointed investors decisively. Moreover, probabilities of financial distress, which are the values between 0 and 100 indicating the actual probability the firm will be distressed in the next 2 fiscal years, are increasing[2] (see Table 2).

Table 2.

	4Q 2017	2Q 2017
Chesapeake Energy	74%	73%
Southwestern Energy	48%	38%
Anadarko Petroleum	45%	45%
EQT	10%	10%
Cabot Oil & Gas	9%	8%
Devon Energy	50%	49%
Range Resources	44%	41%
CNX Resources Corporation	45%	45%
EOG Resources	36%	36%

Source: www.macroaxis.com

The financial results of the companies are not looking that bad at first sight. Increase of realized price allowed going to green zone by net income. After being totally loss making beginning from 2015, in the 9 months of 2017 they demonstrated positive net incomes with only a single exception (see Table 3).

Table 3.

USD million	2017 1-3Q			2016		
	Revenues from operating activities	Net income	Profit margin	Revenues from operating activities	Net income	Profit margin
Chesapeake Energy	6 977	619	8.9%	7 872	-4 926	-62.6%
Southwestern Energy	2 394	564	23.6%	2 436	-2 751	-112.9%
Anadarko Petroleum	8 979	-1 250	-13.9%	7 869	-3 071	-39.0%
EQT	2 249	479	21.3%	1 608	-497	-30.9%
Cabot Oil & Gas	1 363	145	10.6%	1 156	-417	-36.1%
Devon Energy	9 976	1 218	12.2%	12 197	-3 704	-30.4%
Range Resources	1 932	112	5.8%	1 100	-521	-47.4%
CNX Resources Corporation	2 236	115	5.1%	2 026	-848	-41.9%
Rice Energy				779	-298	-38.3%
EOG Resources	7 868	152	1.9%	7 651	-1 082	-14.2%

[2] Financial distress is an operational condition where a company is having difficulty to meet its current financial obligations towards its creditors or to deliver on the expectations of its investors

The companies, which share of gas in total production is less significant, have relatively higher revenues, which seem obvious assuming higher prices for liquids. For years it has been considered that liquids provide profitability for shale producers and support their entire economics. In the low commodity price environment of 2015-16 even liquids could not sustain incomes, including of companies with the larger share of them in production mix. Therefore anyone pointing that $40/bbl. would become a new long-term price niveau was a little too far from the actual state business.

What is either remarkable is that companies, relatively less exposed to liquids, have quite positive profit margin in 2017, while some of primarily oil producers have an insignificant (EOG Resources) or even negative (Anadarko Petroleum) profit margin. The reason is that not only production mix influences economics, but also the quality of production base. In conditions of realized prices sharp decline, producers endeavored to optimize their production assets, aimed to develop sweet spots at first, and with different success.

What prevents shale producers of being sustainable and creating value? In the current situation we assume that the two prime enemies of their economics are enormous debt burden and capital spending.

The Table 4 reveals that long-term liabilities are the most considerable part of debt. The companies managed to slightly reduce their long-term liabilities in 2017, while some of them boosted debts on a short-term basis. Anyway the total debt remains tremendous, and several producers have it bigger than their equity (7 units in 2016 and 4 units in 2017).

Table 4.

USD million	2017 1-3Q			2016		
	Short-term liabilities	Long-term liabilities	Debt-to-Equity ratio	Short-term liabilities	Long-term liabilities	Debt-to-Equity ratio
Chesapeake Energy	2 218	10 467	-10.34	3 648	10 583	-11.83
Southwestern Energy	784	4 766	2.69	1 064	5 095	6.72
Anadarko Petroleum	3 683	25 523	1.44	3 328	26 739	1.94
EQT	1 435	5 125	0.56	805	5 549	0.70
Cabot Oil & Gas	237	1 285	0.58	258	1 521	0.69
Devon Energy	2 832	12 793	1.46	2 616	12 922	1.50
Range Resources	632	3 982	0.72	703	5 171	1.09
CNX Resources	860	2 532	0.43	940	4 303	1.33
Rice Energy				533	1 998	0.77
EOG Resources	2 180	12 700	0.46	2 027	13 451	1.11

Debt-to-Equity ratio is the ratio of total liabilities of a business to its shareholders' equity. It is a leverage ratio and it measures the degree to which the assets of the business are financed by the debts and the shareholders' equity of a business. Noteworthy is the pattern of the largest US "independent gas producer" Chesapeake Energy, whose equity has a negative value. Practically it means that its assets – primarily property and equipment – cost less than its debt, and the company itself has a negative value.

Another crucial topic stemming from the debt burden problem is the EBITDA-to-interest coverage ratio that is used to assess a company's financial durability by examining whether it is at least profitably enough to pay off its interest expenses. A ratio greater than 1 indicates that the company has enough interest coverage to pay off its interest expenses. The EBITDA has been increasing through 2017 in the most of companies in the framework of our research, while the interest expenses have been quite stable. EBITDA-to-interest coverage ratio went to green zone for all the producers after being insufficient for three of those in 2016. The realized prices in 2016 were too low, and the debt burden was so considerable that they were spending more money on interest than they actually earned from operations (See Table 5).

Table 5.

USD million	2017 1-3Q			2016		
	EBITDA	Interest expenses	EBITDA-to-interest coverage ratio	EBITDA	Interest expenses	EBITDA-to-interest coverage ratio
Chesapeake Energy	1 847	302	6.12	172	296	0.58
Southwestern Energy	928	175	5.30	655	226	2.90
Anadarko Petroleum	2 619	680	3.85	2 465	890	2.77
EQT	1 211	137	8.83	708	148	4.79
Cabot Oil & Gas	719	62	11.65	NDA	NDA	NDA
Devon Energy	2 420	250	9.68	4 147	488	8.50
Range Resources	601	144	4.17	-41	168	-0.25
CNX Resources	472	129	3.66	73	191	0.38
Rice Energy				349	100	3.50
EOG Resources	3 435	211	16.28	3 298	313	10.53

For the purposes of this article EBITDA was calculated in house unless it was provided in a quarterly report. The visible peculiarity of shale producers is that EBITDA is quite considerable as we are making adjustment on depreciation, depletion and amortization plus repairment of assets. These components are tremendous among shale producers given high rates of productivity loss. In practice it means that each year producers need to write off up to 30% of their assets. To sustain productivity on the same level, enormous money should be spent for drilling.

Unlike EBITDA net cash provided by operating activities reality does not allow to make necessary investments. For example, Chesapeake's net cash in nine months ended September 30 was only $273 million while drilling and completion costs were close to $1.6 billion, and the hard core of them was financed at the expense of properties selling in the sum of $1.2 billion.

In recent years companies have been reporting cost reduce and F&D improvement, but the decrease was only reflecting negative dynamics of commodity prices operational free flows. In reality companies stayed free cash flow-negative after all the necessary investments (see Table 6). We can see some positive figures through 1-3Q of 2017, but the picture for entire year may differ substantially as a lot of spendings may be attributed to the 4th quarter. In these conditions shale producers are not only unable to provide any returns to their investors, but hardly making ends meet.

Table 6.

USD million	2017 1-3Q	
	Investing spendings (CAPEX + acquisitions)	Free Cash Flow
Chesapeake Energy	1 823	-877
Southwestern Energy	943	-154
Anadarko Petroleum	3 796	-1 177
EQT	1 716	-505
Cabot Oil & Gas	578	12
Devon Energy	1 734	178
Range Resources	850	-250
CNX Resources Corporation	451	225
EOG Resources	2 755	-130

Moreover, in accordance with some estimates, paid-in capital of shale producers (the money raised from financial markets) exceeds total stockholders' equity. Notwithstanding, on 14 December 2017 Reuters noticed that financiers keep pouring cash into shale sector despite questions on returns and rising pressure from some investors for drillers to prioritize better profit margins over expanded production. Through the third quarter of this year, private equity firms have put $20.26 billion into energy-related deals, 36% more than all of last year, according to financial data provider Prequin.

Another way to finance drilling – price hedging, or contacts producers use to fix prices on future production – is on the rise this year too. Forty midsize producers tracked by researcher PetroNerds LLC hedged 45% of their production in the third quarter, up from 36% a year earlier. Those same companies multiplied capital spending by nearly two-thirds this year.

The third way producers use to fund drilling is issuing bonds. According to Dealogic, this year companies raised $60 billion in form of bonds, which is 28% more than in 2016 and the highest since oil prices have collapsed in 2014.

The today reality is that the number of wells is increasing, the production is increasing, but at the expense of the companies enormous spendings. They use any available possibility to increase drilling as in case one is not doing that, the other will do. It reminds deadly race, the second round of it. In this race the prime rule is "drill or die". We can say that in low price environment of 2015-16 companies hardly survived so that they even were made to neglect the rule – to cut their spendings on drilling just due to physical absence of money. A number of producers went bankrupt, and their names are easy to find. Yet as prices have recovered, it seems, the flow of money has deepened, and it is not about to dry in the nearest future.

Natural gas in US cannot be considered separately from oil as a considerable part of gas production is associated gas, which is driven by fundamentals of the oil market. Higher oil production driven by relatively higher oil prices means more associated gas, a pressure on gas prices, and poor economics of gas business respectively. Assuming the current financial situation, the output increase seems to be a procrastination of the end of the shale boom. We are about to see who is the winner in the race when there will come the moment to pay the bills.

The author expresses his acknowledgment to Ilya Rassalov for his significant contribution to the data for 2016

IEA Forecasts Rise of Natural Gas Use by 45% to 2040

On November 14, 2017, The International Energy Agency (IEA) presented its newest forecast of the world energy industry development up to 2040 — the World Energy Outlook 2017 (WEO).

The baseline New Policies Scenario, which takes into account the implementation of all existing and announced measures of economic and political transformation of the energy sector, assumes that gas consumption will increase by 45% to 2040. The main area of consumption growth will be industry rather than power generation. In general, natural gas will account for a quarter of the world's energy consumption.

The most significant growth will be demonstrated by the developing economies of China, India and other Asian countries. The forecast authors believe that China will provide a quarter of the growth in the world gas demand. Its annual imports by 2040 will reach 280 bcm of gas. At the same time, coal consumption in China will decrease by 15% to 2040.

In Europe, gas demand will be primarily generated by the need of greenhouse gas emissions reduction and coal generation withdrawal, as well as to weaken the positions of the nuclear energy.

According to the WEO, natural gas becomes a global commodity, and the role of LNG in world trade will grow. The number of countries that import LNG increased from 15 in 2005 to 40 in 2017, and their number will continue to grow. In 2016, the world gas trade amounted to 706 bcm, of which 39% was delivered in the form of LNG — and in 2040 the global gas trade, according to the forecast, will amount to 1.23 trillion cubic meters, and 59% of it will account to LNG.

The number of LNG plants will double by 2040. Major part of the new volumes will come from the USA, Australia, Russia, Qatar, Mozambique and Canada.

In turn, the growing share of LNG in the world gas trade will change the pricing system — most of the contracts will be

linked to hubs, and the importance of inter-fuel competition in the gas prices formation will decrease. The gas trading system will become more flexible and reliable. "The natural gas market is becoming increasingly global and interconnected than ever before," — says Tim Gould, one of the forecast authors.

The IEA forecast also considers the alternative Sustainable Development Scenario, which envisages the UN Sustainable Development Goals (SDGs). Under this scenario, a more moderate increase in gas consumption is projected: by 20% to 2030, and maintaining this level of consumption until 2040. In absolute terms, this growth will amount to 580 bcm of additional gas demand by 2040.

Should European Gas Industry Campaign for its Own Stance on Climate Change Policies?

Sergei Komlev, Head of Contract Structuring and Pricing, "Gazprom Export"LLC

Should the European gas industry take its own position on post Paris Agreement carbon mitigation policies? If the answer is positive, what should the industry then say? Answers to these questions should be based, in my mind, on the analysis of the different strategies in defense of natural gas. My major concern is the destiny of natural gas in Europe. Radical plans by some EU countries for gas-exit by 2050 are reflected in the today's reality which the natural gas industry faces in Europe.

Risks are Already There: Demise of Gas Industry in Europe May Occur Earlier than in 2050

Several European countries have declared a goal of fossil-exit in favor of renewable energy. Although gas-exit is expected there only by 2050, it is incorrect to perceive that the implications of climate change policy for the industry to be only long term. They are already relevant to business decisions made today.

Taken the long-term nature of the gas industry investments with a maturity over 30 years, the prospect of gas-exit makes funding of these projects impossible. Politicians in several EU countries are already discussing a ban of gas exploration and production, decommissioning of "excessive" pipelines, and mothballing gas-fired power generation.

Premature disengagement from proven and reliable sources of energy like gas under mistaken assumptions that alternatives could be rapidly deployed, will not only be detrimental to gas industry but create problems for the energy security of Europe. It will push the continent towards energy supply chaos and its associated harmful consequences.

The risks associated with an early demise of European gas industry should be brought into public area discussion. The chaos created by reckless climate policies may be no less harmful than the perceived consequences of global warming. Challenge posted to gas by a blindfold shift to renewable energy is unavoidable but needs to be mitigated in a rational way.

One of the risks is related to the market distortions caused by subsidies and priority dispatch for renewables which end-up in favor of coal in the European energy mix. For years now, natural gas has wanted the back-up role in electricity, being the best fuel to ramp up and down generation to support more variable renewable generation. Decision making based on the distorted market signals give preference to perform this goal this with coal, and in some cases with diesel generators but not with cleaner gas. This absurd outcome is somehow lost in the public discussions.

Present Strategies in Defense of Natural Proved to Be Inefficient
As I see, energy industry stakeholders currently use several approaches to defend natural gas in Europe

1. Deny a threat of climate change as "the greatest falsification of 21st century" and thus defend fossil fuels (this is what European supporters of the Trump's Administration climate policies do).

2. In public agree that global warming is inevitable and that damage is wholly caused by fossil fuels, but implicitly undercut mainstream climate science by supporting sceptics (this is what some energy companies do).

3. Agree with the statement that global warming is the only possible scenario for the future, defend natural gas on the ground that it is cleanest (or "the least dirty") among the fossil fuels and could be partly transformed into an entirely green fuel (European gas associations).

4. Agree with the statement that global warming is the only possible scenario for the future, defend natural gas on the ground that it is the best back-up for the intermittent renewables and could stay in the energy mix in a reduced form, in the areas where there are no alternative to it (this is what majority of the energy companies does).

First strategy runs against the perception of European public and is one-sided. It will never be successful in Europe because it ignores climate change risks and blocks any engagement in tackling them.

Any denial of climate change (explicit or implicit as under a second approach) is a destructive approach which creates risks for a sustainable global development.

But the third and the fourth defense strategy leaves gas with only a temporary mandate for existence in Europe. Gas is hailed as the bridge between fossil fuels and renewables on the path to zero emissions. After 2035 reaching emissions mitigation goals would necessarily require a progressive gas-exit. As part of the "bridge" natural gas could remain in a drastically reduced form of syn-gas, biogas and gas with CCS.

What Kind of Successful Strategy Should Be Adopted?

Successful narrative should recognize a threat of global warming caused by an anthropogenic impact, but a rise of temperatures on a planet should not be viewed as inevitable and the only possible outcome. Climate change and global warming are not the synonyms. One should keep in mind that predictions of global warming are based on a computer modelling which extrapolated historic trends into the future whilst accelerating these trends assumptions. There is a high probability that climate change will take direction of the growing temperatures, but it is not something 100% predetermined. Other scenarios of climate change are possible too, although they are less probable, according to the mainstream environmental science.

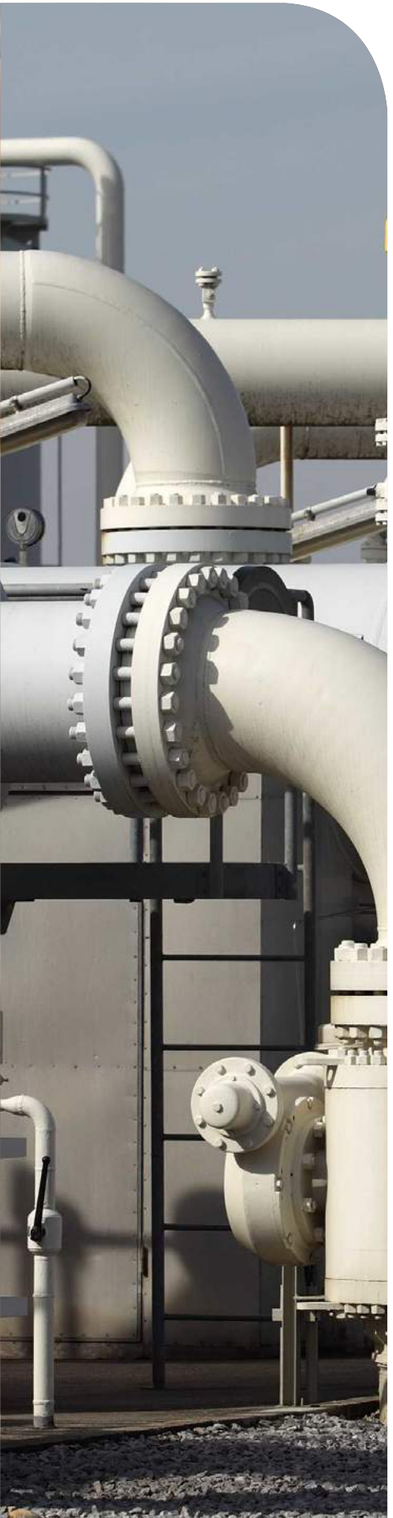
In my opinion the climate change debate should not be reduced to global warming concept only. Once the alternative scenarios are taken into consideration, they will give a boost to the role on gas in the energy mix as a unique and indispensable solution for security of supply in the era of intermittent energy.

Moreover, the energy industry should more actively communicate the message that beyond the climate change debate there is a variety of factors that might influence the process of energy transition. The world of today is a complex system of constantly evolving components: economic, social, political, ecological. A planned change in one of the components or an unexpected "black swan" may trigger a domino-effect, thus bringing a challenge to the whole system. The energy industry is no exception. It is vulnerable to economic fluctuations, political instability, changes of human behavior. To be ready to provide an effective response to any future challenge, the energy system must be reliable and have a sufficient safety margin. Natural gas provides this reliability, and natural synergy in gas cooperation between Russia and Europe is a perfect example of how the energy system could be improved and strengthened even in turbulent times.

Natural Gas is the Best Guarantor for Energy Security under any Scenario of Climate Change

Gas in the energy mix offers a unique and indispensable solution for security of supply in the era of intermittent energy. Indeed the cleanest among fossil fuel natural gas offers unique opportunity to proceed along the de-carbonization path and simultaneously serve as a powerful guarantor for energy security just in case developments take another direction. Until a substitute for natural gas in that guarantor's capacity is found, any discussions of gas-exit should be considered as a threat to the European civilization no less damaging than the perceived consequences of global warming. "Do not take irreversible steps", that is in my mind, the message European gas industry should give over and over again.

Views expressed in this abstract are the author's sole responsibility and do not necessarily represent that of Gazprom Export



200 billion cubic meters of gas delivered via Nord Stream

On November 30, 2017, at 12:59 p.m. Moscow time, the Nord Stream gas pipeline transmitted its 200 billionth cubic meter of gas from Russia to Germany via the Greifswald delivery point.

"The Nord Stream gas pipeline is a high-profile pan-European infrastructure project, a stellar example of mutually beneficial and productive cooperation between Gazprom and its European partners. Today's development is a clear rebuttal to the skeptics. For six years, Nord Stream has consistently exported Russian gas to the European market via the most cost-efficient transit-free route, i.e. across the Baltic Sea. The gas pipeline is operating at full capacity, providing reliable energy supplies to thousands of companies and households in Europe.

Drawing on the success of Nord Stream, Gazprom is implementing a similar project, Nord Stream 2, with the active support of Europe's leading energy companies. In accordance with the plan, the new gas pipeline will be built by the end of 2019. Gazprom is convinced, as are our partners, that the project will further strengthen the reliability of gas supplies for European consumers and foster the development of the region's energy market," said Alexey Miller.

Nord Stream is the export gas pipeline with the annual design capacity of 55 billion cubic meters of gas running from Russia to Germany across the Baltic Sea. The pipeline is operated by the Nord Stream AG joint venture (Gazprom – 51 per cent, Wintershall Holding and E.ON – 15.5 per cent each, and Gasunie and Engie – 9 per cent each). The first string of Nord Stream was put into service in November 2011 and the second in October 2012.

Nord Stream 2 is the construction project for a gas pipeline with the annual capacity of 55 billion cubic meters from Russia to Germany across the Baltic Sea.

Natural gas receiving terminal in Greifswald

Gazprom Group Companies Presented the Project of Helium Gas Hub to World Largest Consumers

Computer model of the future helium gas hub

Gazprom Export LLC and Gazprom Gazenergoset Geliy LLC presented in Vladivostok the project of the Logistics service center for helium containers (hub) to potential clients.

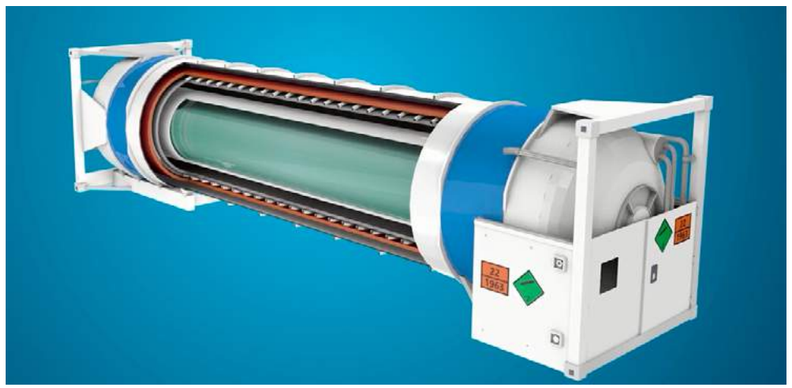
The largest global helium traders, representatives of a Territory of Advanced Socio-Economic Development (TASED) Nadezhdinskaya, Far East Development Corporation JSC, ports of Vladivostok and Nakhodka and stevedoring companies (operators of port terminals of loading and uploading sea vessels) took part in the presentation.

Helium will be produced at Amur Gas Processing Plant (GPP) of Gazprom and will be shipped to the Logistics center on the territory of TASED Nadezhdinskaya in Primorsky Krai. Helium will be transported in liquid state at ultra-low temperature (-269°C) in special cryogenic tanks equipped with multilayer vacuum and nitrogen insulation. The experts of the center will perform all necessary technological and service procedures and send the tanks further to the ports of the Russian Far East for loading to sea vessels and further transportation.

The project of the Logistics center is synchronized with construction of Amur GPP. The center is planned to be put into operation in 2021. When the GPP reaches its full capacity helium production of 60 mln cubic meters per annum, the Logistics center will become one of the largest helium hubs in the world.

Currently Gazprom Export completes the process of signing long-term helium export contracts.

Amur GPP will become the largest in Russia and one of the world biggest gas processing plants. Its project capacity will amount to 42 bcm of natural gas per year. It will include the world largest helium production facility with a capacity of up to 60 mln cubic meters of helium per year (around 30% of the current global helium consumption).



Helium is stored in special cryogenic containers

Russian-German partnership: Beyond technical cooperation

In today's information and knowledge society collaboration between companies has become fundamental for success and growth. Approaching this aspect solely in technical terms ignores the most important resource: trust. Mutual trust among partners and colleagues is the most essential ingredient for successfully working across borders. The basis of trust lies in direct "analogue" exchanges between people. Knowing one another is crucial for successful performance and collaboration – a path that has already been jointly pursued by Gazprom and Wintershall for more than 25 years.

Participants of Wintershall-Gazprom "Young Vision Awards" program

A partnership based on sharing knowledge and experience

"The partnership between Gazprom and Wintershall Holding is based on sharing knowledge and experience" said Sergey Khomyakov, Deputy Chairman of the Gazprom Management Committee, during the 25th anniversary celebration of the bilateral "Scientific and Technical Cooperation" (STC). Exchanging ideas between the staff from both partners has played a key role right from the beginning in order to facilitate and deepen the technical dialogue between Gazprom and Wintershall and to promote and realise projects in close collaboration. Over the years, the trusting exchange at many levels has raised the cooperation between Gazprom and Wintershall to a higher level and the STC has followed suit. Today it is an integral part of both companies and has provided impetus for the entire joint operational business.

The program covers practically all phases of the production cycle, ranging from the production and transport to the processing of hydrocarbons and their marketing. Always future-oriented right from the start, STC meetings nowadays also feature business segments geared to future needs such as on the production of liquefied natural gas or gas fuel. The results are used by Gazprom and Wintershall for developing the Yuzhno-Russkoye field and Achimov reservoirs in the Urengoyskoye field. The partners' Russian and European underground gas storage facilities likewise benefit, as does the Nord Stream pipeline. "The results from the successful STC discussions and meetings find their way into the operative business. At the end of the day this is what matters,» explains Mario Mehren, the Chairman of Wintershall's Executive Board.

The STC achieves considerable synergy effects, explains Wintershall Executive Board member Thilo Wieland, who is responsible for exploration and production in Russia and gas transport projects: «The program combines and thereby expands the know-how of all participants, strengthens the personal relationships and, in particular, ensures that knowledge is applied in the areas where it is

http://www.gazprom.com/press/news/2016/december/article297215/

needed. The STC is a symbol for our trustful partnership with Gazprom and is still unique in terms of its scale and scope.»

The next annual meeting in November 2017 will focus on «Industry 4.0». About thirty specialists and board members from Wintershall, Gascade and Gazprom will come together to discuss the prospects for scientific exchange and the further development of technical projects. As in previous years, the employees will establish numerous personal and trusting contacts.

Lifelong learning

For its executives at all management levels, Gazprom and Wintershall also run a further training and development program. During up to ten seminars a year, employees from both companies meet to discuss and consult one another on topics such as «Organizational Management», «Corporate Management» and «International Rules of Procurement» in Russia and Germany. More than 400 professional development sessions involving more than 6,000 people have been held as part of this program since 1992.

Besides fostering personal bonds, the basic idea behind this program is to provide an appropriate and regular framework for sharing thoughts and increasing technical as well as operational knowledge and experience amongst the participating specialists and managers. At the same time, the program provides a unique opportunity to expand the employees' intercultural skills. Participants expand their personal horizons by experiencing and getting to know one other's cultural traits, and by visiting cities and places beyond the partner country's capital. This leads to a deeper understanding and thus beneficially contributes to increased collaboration.

A fresh perspective on the industry

The "Young Vision Award" is another example of both companies' aim to foster mutual understanding. The high-profile initiative organised by Gazprom International and Wintershall Russia focuses on up-and-coming scientists and potential future staff within the international E&P business. Since 2013, the Young Vision Award has promoted and honoured technical and environmentally friendly solutions proposed by students within the oil and gas sector, and connects young people from Russia with German-speaking countries.

The fresh perspectives offered by these young scientists have repeatedly provided innovative ideas and solutions for the challenges

that industry faces. Combining these with the companies' long-term expertise has become a proven recipe for joint innovations. This year, Anzhelika Posvyashchennaya and Eldar Urazov from Tomsk Polytechnic University won the Young Vision Award for their work entitled Pretreatment-free Monitoring of Tracers in Oil Fields: Mobile Technology. «We managed to identify many weak points in the old technology for the indicator-assisted analysis of water pumped out of probes», explains Eldar. He adds: «In our project we propose using much smaller amounts of material, which avoids costly and lengthy transport and eliminates the use of bulky special equipment.»

The award winners are now looking forward to a two-week internship at Wintershall. «I always wanted to be part of a team in a production facility», says proud winner Anzhelika. The Russian winner will now join forces with an international expert team at Wintershall's laboratory – a perfect setting for further developing a fruitful basis for increased trust among our companies and nations.

Tennis Heroes on the Banks of Neva River

Roberto Bautista Agut

Fabio Fognini

The 22nd St. Petersburg Open International Tennis Tournament of the Association of Tennis Professionals (ATP) took place in September 2017, in St. Petersburg. The competition was suppoted by Gazprom Export LLC. Singles and doubles events of the tournament commenced in Sibur Arena Indoor Sports Complex on September 18, 2017.

The first racket of the tournament this year was No. 12 of world ranking, Jo Wilfried Tsonga from France. Other participants in the competition included Roberto Bautista Agut (No. 13), Gaël Monfils (No. 22), Fabio Fognini (No. 12) and also finalist of St. Petersburg Open 2015 João Sousa (currently No. 50 in world ranking).

The singles and doubles finals were played on September 24, 2017. In the doubles, Roman Jebavy (Czech Republic) and Matwe Middelkoop (The Netherlands) defeated tournament leaders Julio Peralta (Chile) and Horacio Zeballos (Argentina) by a score of 6:4, 6:4.

Finalists of the Tournament

Damir Džumhur from Bosnia triumphed at the tournament, after defeating Fabio Fognini (Italy) in the finals. The match lasted almost 2 hours. Džumhur completed the match by a score of 3:6, 6:4, 6:2, and moved to the 40th position in the world ranking. This was the first ATP tournament title for the 25-year-old player.

A traditional Legends Match was held at the tournament before the finals. The Russian team was represented by former No. 2 in world ranking Anastasia Myskina, and Davis Cup winner Igor Andreev. They faced Iva Majoli (Croatia), winner of Roland Garros, and Carlos Moyá (Spain) former No.1 in world ranking. The Russians won by a score of 8:7, 8:6.

The competition completed with a remarkable music show and presentation of awards to winners of the tournament. Alexander Medvedev, Deputy Chairman of the Management Committee of Gazprom PJSC and General Director of the Tournament, Elena Burmistrova, Director General of Gazprom Export LLC, Natalia Kamelzon, Tournament Director, Vladimir Kirillov, Vice Governor of St. Petersburg and Iva Majoli, Member of Players' Relations Team of the Tournament Directorate took part in the ceremony.

Alexander Medvedev, Deputy Chairman of Gazprom's Management Committee and Elena Burmistrova, Gazprom Export Director General

Imperial Capitals: St. Petersburg - Vienna. Symphony in Letters and Poems

Allegra Tinnefeld (violin)

The musical theatrical performance "Imperial Capitals: St. Petersburg - Vienna. Symphony in Letters and Poems" was held on October 5, 2017 in the Grand Hall of the D.D. Shostakovich St. Petersburg Academic Philharmonia. It was another event under the joint cultural project of Gazprom PJSC and the Austrian company OMV AG with Gazprom Export LLC being the main organizer of the event.

The performance was the main cultural event of the 7th St. Petersburg International Gas Forum. Among the guests there were Gazprom PJSC Deputy Chairman of the Management Committee Alexander Medvedev and OMV AG Chairman of the Executive Board Rainer Seele, and directors of major foreign energy companies. Children from social institutions of St. Petersburg and the Leningrad Region were also invited to the performance.

The project "Imperial Capitals: St. Petersburg - Vienna" was held for the second time. This year the emphasis was placed on the work of the Russian and Austrian poets which acquired a new sounding in conjunction with music. The compositions of the famous Russian and Austrian musicians and the performances of the drama actors were accompanied by visual and light shows on the background of decorations, specially made for this show. The synthesis of different types of art, the fusion of timeless subjects and up-to-date methods of creative self-expression provided the audience with the most multifaceted and unique cultural heritage of the two imperial capitals.

The legendary People's Artist of Russia Yuri Bashmet greeted the audience at the director's podium. The world-famous musician Sergei Krylov performed a violin piece, while the Boris Berezovsky, an outstanding modern pianist, enchanted the audience with a solo piano performance. The actors Katerina Shpitsa and Mikhail Trukhin, prima ballerina of the Mariinsky Theatre Ekaterina Kondaurova, leading soloists of the Mariinsky Theatre and the Vienna Opera, Vienna Philharmonic Quartet and other musicians also participated in the performance.

Alexander Medvedev, Deputy Chairman of Gazprom's Management Committee, Rainer Seele, OMV CEO, and Elena Burmistrova, Gazprom Export Director General

Alexander Medvedev, Deputy Chairman of Gazprom's Management Committee and Rainer Seele, OMV CEO greeting participants of the Gala Evening

The program featured works by Tchaikovsky, Mozart, Haydn, Schubert, verses by Pushkin, Akhmatova, Rilke, Fogl and many other authors who became part of the history of classical music and poetry of Russia and Austria.

The proceeds from the sale of tickets will be transferred to a charity fund whose projects are aimed at helping children suffering from serious diseases.

A reciprocal cultural event under the project will be held on December 14, 2017 in the Hofburg Imperial Palace in Vienna.

Yuri Bashmet and Sergey Krylov

One of the directions of the joint activities of the Gazprom Group and OMV AG, in addition to the energy partnership, is cooperation in the field of culture and art.

With the participation of the Gazprom Group and OMV, for several years a number of significant cultural and social projects have been successfully implemented.

The Gazprom Group and OMV for over 10 years have been supporting the large-scale International Children's Project "Open World" implemented by the Austrian Energy for Life social foundation under the patronage of the international organizations UNESCO and UNICEF.

The basis for the St. Petersburg performance was laid on 1 April 2016, when Gazprom and OMV signed a number of documents for further development for strategic cooperation between the companies, including the Memorandum on Mutual Understanding for a Joint Cultural Project.

Participants of the theatrical performance

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

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