BLUE FUEL

Gazprom Export Global Newsletter

2018/ Issue 50



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To Our Readers

The year 2018 brought some good news to the global gas markets. A steady increase in demand for natural gas was shown in Asia-Pacific while European net gas imports have been continuously increasing on a year-on-year basis within 2018. New instruments of trade with the «blue fuel» continued to emerge all around the globe, bringing an increase in natural gas sales and market liquidity. Natural gas has been keeping its competitive edge against coal and confirmed its reputation as a fossil fuel of choice to complement renewables in bringing us closer to a low-emission new energy reality in the future.

The outgoing year was vigorous for the gas industry of the European continent as well. The record colds enveloped the European continent in February and March, also known as the famous «beast from the East». Against that challenge, natural gas safely heated houses of the European consumers and proved its uninterrupted supply advantages in the extreme weather conditions.

For us at Gazprom, the mid-year was marked by a significant event — the 50th anniversary of the first contract to supply natural gas from Russia to Austria. Over the decades of partnership, the basic principles of cooperation, which are stability and security of supply, remained unchanged; and the decision to increase contract volumes by 1 bcma, agreed this year, is not just a special milestone in the energy cooperation of the two countries, but also a sign that natural gas from Russia is demanded and needed. What is important is that this demand has been continuously growing throughout the whole of Europe, take Northern, Central or Southern regions.

Construction of the off-shore part of the brand-new TurkStream gas pipeline was finished in mid-November. This pipeline will bring new volumes of natural gas to the southern borders of Europe, and supply consumers in Turkey, Southern and Central Europe. Another new pipeline, Nord Stream 2, is being laid to supply the North-West Europe, a region with demand growth potential resulting from falling local production as well as ambitions to move from coal to cleaner solutions in power generation, where gas is perhaps the cheapest and safest one.

The year 2018 was marked with developments reaching from regulatory sphere to market, from infrastructure to policy. These will define the gas industry for the nearest as well as for longer prospective. In a world where issues like low-carbon, clean and efficient are important, gas is the solution. In a world that calls for safety and stability of energy supplies, gas is the solution again. And the leading industry analysts predict a call for additional gas volumes in several industries in the mid-term.

We step into 2019 with all these achievements in mind, and being ready and looking forward to meet the new challenges.

The European Strategy and Vision of the Leading Gas Supplier to the CEE Region

Elena Burmistrova, Gazprom Export Director General at Budapest Energy Summit, 3 December 2018



First of all, I would like to focus on the current trends and on their implications for Russian natural gas exports.

Let us look at what is happening on the European gas market now. Over the last four years, it has shown an impressive increase of nearly 70 bcm. The growth slowed down slightly within the first three quarters of current year, due to weather conditions, which were unfavorable for gas. However, demand for imported gas did not fall, and European net gas imports increased by 4 per cent on a year-on-year basis.

The main global trend within the three quarters was a worldwide increase of energy prices. Oil prices rose by an average 38 per cent. Coal prices grew significantly, but still less than for gas. However, with carbon emissions prices considered, gas kept its competitive edge against coal. With that, some new volumes of gas came into power generation.

Utilization of European LNG-terminals has shown a slight decrease within the three quarters of the current year. The more favorable conditions in the Asia-Pacific region lured LNG away from Europe and also served as a limiting factor for potential supplies from the US. These can already break-even for certain deals in Europe, but the bulk of supplies are driven to other, more attractive markets.

Against all these factors, Gazprom will reach a new record on supply to the European Far Abroad. Gazprom supplied here 171.6 bcm of natural gas from 1 January to 15 November this year, more than in last year.

We see a robust increase on year-on-year basis in our supplies to the Netherlands, to Austria, and to Germany. In addition, it is important that the demand for Russian natural gas grows throughout the whole of Europe – in Northern, Central, or Southern regions.



Within this year, Gazprom has also increased exports to Greece and to Hungary. This proves the importance of Gazprom's plans to construct the TurkStream gas pipeline. It will bring volumes of gas to the Southern borders of Europe. We recently celebrated a significant event, the completion of construction of the off-shore part of this pipeline. We hope that in the future, it will work at its best for the interests of Southern and Central European countries. We will continue to further implement the TurkStream and Nord Stream 2 projects, aimed at developing new gas pipeline systems, and at better security of gas supplies to Hungary and other European countries.

I would like to highlight that we consider Hungary to be one of our key energy markets in Central Europe. Our partnership with this country is based on long cooperation, mutual benefit and good business relations. Looking ahead, we intend to continue gas supplies to Hungary on a long-term basis. Last year, Gazprom Export and Hungarian Gas Trade Ltd signed a Memorandum of Understanding to continue long-term cooperation in gas supplies, and a roadmap aimed at developing Hungary's gas transmission system.

We are quite positive about the mature performance of the European natural gas market. The most liquid European gas hubs do not require excessive financial securities and licenses for gas trading activities and for capacity booking. We are sure that Hungary has all the possibilities to get its well-deserved place within those promising European natural gas market realities, with further development of gas transportation system and bookings.

For the years to come, industry analysts have increased their expectations for natural gas demand in Europe. In the near future, the demand will remain stable. Forecasts for the mid-term perspective are even more positive. They predict a call for additional gas volumes, driven by power generation and transport sectors. Under the most favorable circumstances, additional gas could be demanded by households and industrial players as well.

What matters for us as a supplier, is the future of indigenous natural gas production in Europe. In this area, market analysts speak in one voice: it will further fall, even under the most optimistic forecasts. With this trend, the need for imported volumes of gas will predictably grow, both in the mid-term and long-term.

The current consensus forecast of the leading think-tanks says that the need for additional imported gas in Europe could reach 81 bcm in 2030, and 84 bcm in 2040. With that in mind, we are able and ready to provide Europe with as much gas as it needs.

If we evaluate the competitiveness of pipeline gas and LNG, in the mid-term perspective we can predict that some volumes of LNG, that were earlier directed to the premium markets, can return to Europe. However, demand for gas in Asia, including the new importers, will be the main factor that will determine the availability of the new volumes of LNG.

If asked about how we see our role in Europe in the coming years, I would suggest that Gazprom's position will remain stable. The achieved level of Russian gas exports has already been recognized as a 'new market reality', backed by objective factors and structural developments. That means that we and our European partners have decades of intensive cooperation ahead.

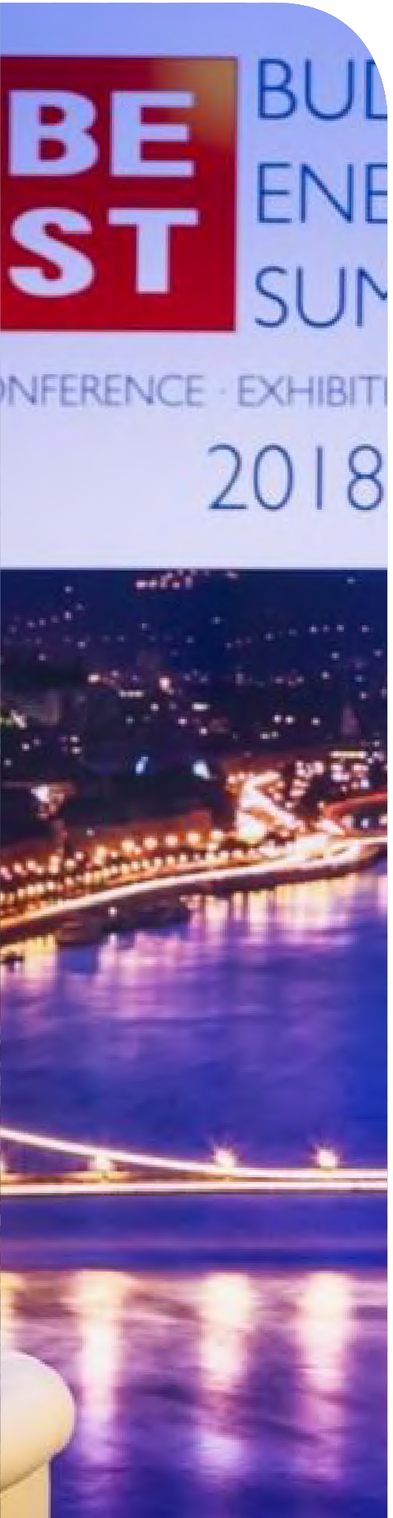
Gazprom closely follows the trends that drive the European energy market. We do not shy away from the changes that are now taking place. Our company has demonstrated that it can work in accordance with new European market realities. We continue to incorporate hub pricing in our contracts, meeting the requirements of the current market. And I am sure that Gazprom will continue to apply the best models available to its business.

I am delighted to update you on Gazprom Export's electronic sales platform activity. The platform is only a few months old, but is already producing mature results. Starting from 20 September 2018, Gazprom Export has carried out daily trading sessions, offering contracts for gas supply to European delivery points. I am proud to say that in the middle of November, sales through the platform reached the 1 bcm mark. We expect that it will further be a robust trading tool, providing more flexibility to our clients and additional revenues for our company.

Looking forward, the principles of the future energy system have to meet the most elaborate requirements – in economic, environmental, technological and many other terms. Natural gas provides the best compromise for both secure and clean energy.

In our view, gas has an abundance of opportunities ahead, even in a world of strong environmental commitments. First, switching to gas from coal generation allows for immediate CO2 reduction at a reasonable cost.

Further progress can be achieved by switching transport to natural gas, which can allow the immediate reduction of



greenhouse gas emissions in Europe by up to 18 per cent compared to existing levels. Gas offers readily available solutions for heavy-load transport, where electric technologies cannot fit the specifics in the best way.

In a more distant perspective, the gas industry can offer a smart and elegant solution for a low-carbon future. It is hydrogen. According to Gazprom's assessments, the use of methane-hydrogen fuel can reduce emissions by up to 35 per cent and allow a smooth transition to a low-carbon economy. If widely used, hydrogen could result in up to an 80 per cent emissions reduction in the EU by 2050.

We must be realistic about natural gas. It has repeatedly proven its self-sufficiency as an essential element of the new global energy system. It can provide affordable, reliable and clean solutions. And it is a perfect partner fuel which, hand in hand with renewables, can lead Europe into a new, low-emission, sustainable and competitive energy reality.

Ahead of a new winter, our aim is to fuel our consumers all across Europe and to supply their homes with a stable source of energy. The market itself will choose the best options for the most beneficial solutions about prices and volumes. For our part, we are ready to further provide it with robust guarantees of energy security. I am sure that we already have the most reliable basis to further strengthen our cooperation.



Bovanenkovskoye Field's Final Gas Production Facility and Ukhta – Torzhok 2 Gas Pipeline Brought into Operation



Alexey Miller Takes Part in the Ceremonial Start of Operation at Final Gas Facility at Bovanenkovskoye Field

On December 5, 2018, an official ceremony was held at the Bovanenkovskoye field to celebrate the commissioning of the field's third and final gas production facility and the Ukhta – Torzhok 2 gas trunkline.

The ceremony was attended by Alexey Miller, Chairman of the Gazprom Management Committee, Dmitry Artyukhov, Governor of the Yamal-Nenets Autonomous Area, and heads of the Company's relevant subdivisions, subsidiaries and contracting organizations.

Vladimir Putin, President of the Russian Federation, greeted the participants via a conference call.

The Yamal gas production center has strategic importance, as it will assume the primary role in the national gas industry throughout the 21st century. In a mere ten years, Gazprom created a powerful industrial complex at the Bovanenkovskoye field, building transport (including a railroad and an airport) and utility infrastructure in the severe Arctic conditions of the Yamal Peninsula from the ground up.

In 2012, Bovanenkovskoye's gas production facility No. 2 came onstream, followed by gas production facility No. 1 in 2014.

Today, gas production facility No. 3 was brought into operation. The facility includes, inter alia, a gas treatment unit with the annual capacity of 30 billion cubic meters of gas. As a result, the field has reached its design production capacity of 115 billion cubic meters of gas per year.

Gas from Yamal is delivered to consumers via the gas pipelines of the northern gas transmission corridor, which is becoming the key route of Russia's Unified Gas Supply System (UGSS). Since 2012, the Company has brought onstream the state-of-the-art and highly efficient Bovanenkovo – Ukhta, Ukhta – Torzhok and Bovanenkovo – Ukhta 2 gas pipelines within this corridor. Today, the Ukhta – Torzhok 2 gas pipeline



was connected to the UGSS. The new gas pipeline is 970 kilometers long and has a design throughput of 45 billion cubic meters of gas per year.

For its development operations in Yamal, Gazprom employs advanced technological solutions and highly reliable equipment. For instance, every facility at Bovanenkovskoye operates with the help of modern automation systems and lightly manned technologies. Particular attention is paid to maintaining a high level of industrial safety and preserving the natural environment of the Arctic. To that end, the use of vapor-liquid heat stabilizers and heat-insulated pipes in wells helps minimize impacts on the permafrost.



Ukhta – Torzhok and Ukhta – Torzhok 2 Gas Pipelines and Bovanenkovskoye Field



Gas Production Facility No. 3 at Bovanenkovskoye Field

The domestically-produced pipes used in the Ukhta – Torzhok 2 gas pipeline are made of cold-resistant steel and protected from corrosion by special long-life external insulation. The pipes also have internal coating that makes gas transmission more efficient.

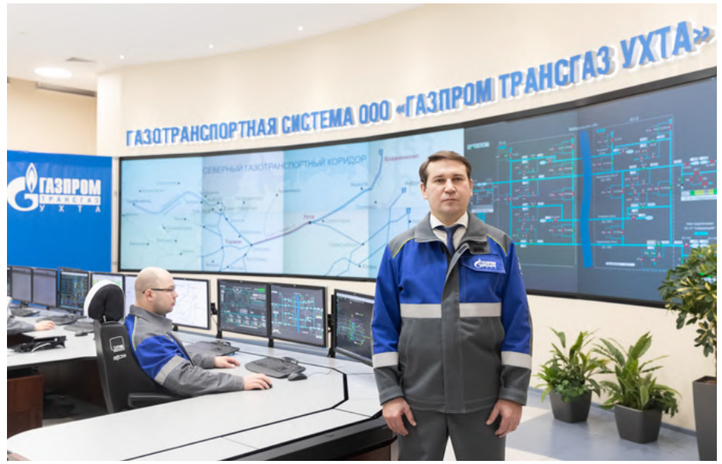
"The commissioning of the third production facility at Bovanenkovskoye is a landmark event for the Russian gas industry. Now, the main field in Yamal has all of its key facilities up and running. Gas production operations will continue here until 2128. We have made yet another step toward achieving the government-mandated goal of creating the main Russian gas production center in the Arctic," said Alexey Miller.

In December 2008, Gazprom began implementing the Yamal megaproject by welding the first joint of the Bovanenkovo – Ukhta gas pipeline and drilling the first producing gas well at the Bovanenkovskoye field.

Bovanenkovskoye – the backbone of the Yamal gas production center – is the largest field in the Yamal Peninsula in terms of explored gas reserves. At the start of development in 2012, its initial gas reserves were estimated at 4.9 trillion cubic meters.

The field's actual gas production rates are gradually increasing, thus reflecting the market demand. In 2017, gas production from Bovanenkovskoye amounted to 82.8 billion cubic meters.

Construction of the Ukhta – Torzhok 2 gas pipeline started in 2015.



Alexander Gaivoronsky, Director General of Gazprom Transgaz Ukhta

Gazprom Export LLC Has Been Assigned AAA (RU) Credit Rating by ACRA, Outlook Stable

Analytical Credit Rating Agency (ACRA) assigned to Gazprom Export LLC the highest creditworthiness rating AAA (RU) under the national scale for the Russian Federation with the Stable outlook. The company has been assigned a credit rating for the first time.

The expert assessment by ACRA reflects the strategic importance of Gazprom Export LLC to PJSC Gazprom as the centralized single export channel beyond the borders of the Russian Federation for commodities produced by Gazprom Group. The assessment is a proof of the confidence of one of the leading Russian export agencies in the stability of Gazprom Group's work in the future.

The rating proves the high financial capability and ability to meet payments of Gazprom Export LLC and confirms the image of Gazprom Export as a reliable partner and supplier that timely meets all the taken commitments.

The ACRA was established in 2015. The list of its shareholders includes 27 major Russian companies and financial institutions. Its share capital totals over RUB 3 billion. The Agency's main objective is to provide the Russian market with a high-quality rating product. ACRA's methodologies and internal regulation are being developed pursuant to Russian legislation and in line with international best practice in rating activities.

Gazprom Export Successfully Concludes a Day-Ahead Gas Sales Deal on the Electronic Sales Platform

On December 18, 2018, within the closed session, Gazprom Export LLC successfully concluded the first gas sales deal on day-ahead basis.

Currently, a standard framework contract is being prepared that will allow performing such deals on a regular basis with all interested clients. Gazprom Export reckons that the introduction of new flexible sales instruments, like day-ahead contracts, will attract additional interest to the company's products. The Electronic Sales Platform is designed to physically sell natural gas to the European consumers, in addition to supplies under existing contracts. Gas sales through the ESP started at the end of September, 2018. Over the first 3 months of operations on the ESP the company has sold more than 1.6 bcm of gas having signed contracts with more than 20 clients.

How to Make natural Gas a Fossil Fuel of the Future

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



This article is an introduction to a book which discusses in detail ways how to fix current difficulties on the way of further development of the global natural gas industry.

There is nearly a consensus view that global transformations will eventually boost the importance of natural gas (NG) within the group of fossil fuels as crucial ingredient of the world's effort to shift toward less-polluting forms of energy. International Energy Agency (IEA) in its New Policies Scenario regards NG as the fastest growing carbon fuel, overtaking coal by 2040 to become the world's second-largest source of energy after oil. With demand growing by 1.6% per year, gas consumption is almost 45% higher in 2040 than today. Coal consumption is expected to decrease to 29% of the world's carbon fuels mix by 2040 from 23% in 2017, while oil – to 37% from 39%[1].

Oil majors both International and National Oil Companies (IOCs, NOCs) share similar views on the future of NG as the IEA: gas offers the best long-term demand growth potential among fossil fuels. Royal Dutch Shell Plc and BP Plc have boosted their proportion of gas output in recent years. In 2016, Shell's acquisition of BG Group for more than $50 bn was primarily a purchase of gas assets. By 2025, Shell and BP will be producing more NG than oil. Meanwhile Chevron Corp. added two giant Australian



[1] World Energy Outlook 2018. IEA.PP.38,171





liquefied natural gas projects and Exxon stepped up with two major projects of its own, in Papua New Guinea and Mozambique. Total's today's production is already a near 50-50 split between oil and gas. Russian oil major Rosneft revealed its plan to prioritize development of gas over the oil business. Qatar has decided to withdraw its membership from OPEC effective January 2019. The decision is reportedly connected to Qatar's plans to concentrate on developing its natural gas sector. It is expected to boost its annual LNG output from 77 million to 110 million tons. Meanwhile Saudi Aramco's gas program is targeting almost $160 billion of investment in the next 10 years and an output increase of 64% [2]. Dash for gas is to a large extend a forced maneuver as over the last decades oil companies have discovered fewer new oil deposits than gas ones.

Is an appeal of NG for an enhanced role of a fossil fuel for the future substantiated? My answer to this question is positive under precondition that NG sorts out two of its major problems. The first is its below-optimal pricing. The second one is its current odd relationship with the renewable sources of energy. So far, no batteries or other storage technology give the "grid-stabilizing capability" that NG has, since gas-fired power generators can start and stop quickly, helping smooth fluctuations in supply coming from wind and solar farms. Transformed into a collaborative one, NG/RES relationship should make it a truly "bridge fuel" to the carbon-free world. Both problems to a large extend are not a fault of NG industry but result from the outcomes of distorted market mechanisms.

Below-optimal prices make NG more competitive in relation to its substitutes, oil and coal, but make investments in gas unattractive due with to their low returns. According to the Wood Mackenzie consultancy, the weighted average international rate of return for LNG projects currently is about 13%, compared with 20% for deep-water projects and 51% for unconventional oil developments like shale[3]. Under these

[2] Saudi Aramco eyes 64% increase in gas production over next 10 years. By M. Malek. S&P Global Platts. Nov.27, 2018.

[3] "Oil Industry Bets on Natural Gas". By S. Kent and S. McFarlane. The Wall Street Journal. October 10, 2018 p.B3.



circumstances, it is hard to prioritize gas developments over oil.

A clear signal that NG prices do not fully represent its value, are the tremendous losses incurred in the process of its production. Industry research group, CEDIGAZ, estimates that only 81% of gross NG production became a commercially viable product in 2017[4]. Nearly 900 bcm of gas produced worldwide, which equals to a combined demand of the USA, Canada and Mexico, was wasted. It was reinjects back into the well, flared, vented, or lost in the process of its preparation for putting NG in the network. According to IEA, flared volumes of associated gas were 140 bcm in 2017, which resulted in emissions of around 270 Mt CO2.

These loses originate primarily for economic and not technological reasons. Natural gas is often produced as an unwanted by-product when extracting oil. Due to its relatively low price compared with oil and other liquids it is often uneconomic to build transportation infrastructure to bring gas to market.

There are at least two reasons explaining why value of NG is not sufficient to justify profitable utilization of produced gas. According to the IGU price survey, in 2017 regulated pricing on a wholesale level still enclosed 35% of the commercialized volumes of NG worldwide. Nearly all regulated prices were below costs of NG production. The industry needs price liberalization badly in order to make its output economically viable.

That price normalization is not enough. Despite a growing share of deregulated markets, volumes of flared and vented gas on the production sites have not decreased

[4] CEDIGAZ, the International Association for Natural Gas. September 2018. TRENDS & FIGURES 2017. Gross and marketed production in 2017.

dramatically compared to the 1970th when volumes of flared gas were 180 bcm. Flaring's reduction was achieved by increased pumping of NG back into the wells.

Second reason for the below optimal prices are various forms of market failure, which characterize gas prices when they are set on a free basis. Market failures make NG on energy equivalent basis much cheaper than oil though it comes from the same wells as oil and targets the same end-user markets. The idea that gas is inferior to oil deters many potential investors, further reducing the NG industry's potential liquidity and value.

Indeed history of the NG industry is a story of an endless combat with a syndrome of a "little brother" of oil. Mainstream solution to the "little brother" syndrome in a pricing model change. Deliveries of NG traditionally implicate long-term contracts indexed to the oil indexes, rather than to the natural gas indexes. So conventional view is that NG should disconnect itself from oil via trading like other commodities, or purely on gas-on-gas competition basis. This path in practical terms ends up in an even stronger dependence of NG on oil. This path does not necessarily regain value to NG. It does not take into account specific features of NG and is counterproductive to this idea of making it a fossil fuel of the future.





Vienna Welcomes the 9th 'Energy for Life' Christmas Charity Ball for Children



A grand event was hosted on December 12th in Vienna Hofburg Palace. For the 9th time already, the Charity Christmas Ball "Energy for Life" was organized for children. This event was carried within Gazprom Group and Austrian OMV's joint cultural project "Imperial capitals: St. Petersburg - Vienna".





Over thousand children of social and charity establishments of Austria were invited to join the fascinating show "Snowhite saves Christmas" by Gernot Kranner, a famous Austrian director. Renowned Austrian artists like Axel Herrig, Reinwald Kranner and Rita Sereinig took part in the show along with singer and composer Sandra Pires. Christmas carols were performed by the young winners of the song contest "Kiddy Contest" of 2018, and by students of the Vienna Girls' Choir, the girls' faculty of famous Wiener Sängerknaben Choir. Young dancers of Thomas Elmayer Dance School joined the performance. A special treat of this year's Ball show were the ballet compositions performed by students of two world's oldest ballet schools, the Vienna State Opera Ballet Academy and Vaganova Ballet Academy of St. Petersburg.

Main music theme of this year's Ball was the "Silent Night" ("Stille Nacht"), a popular Christmas carol that celebrates its 200 years in 2018.

The event also included the ceremony of transferring donations from the project supporters to Caritas Charitable Organization. The donation is intended to support the MOMO Kinderhospiz program, aimed at mobile children's hospice that provides comprehensive assistance to terminally ill children at their homes.

The event was held under the auspices of Vienna Mayor and Governor Michael Ludwig, and was organized traditionally by the Austrian "Energy for Life — Social Foundation".







New Year Children Charity Ball in the Nicholas Palace

The children charity ball took place on December 16, 2018, in the great halls of the Nicholas Palace in St. Petersburg.

More than 300 children from disadvantaged social groups from St. Petersburg and Leningrad Region were invited to take part in the festive event. Those included children from orphanages and foster houses for kids with special needs, students from specialized boarding schools, children from rehabilitation centers and other social institutions as well as children from large or low-income families.







The fascinating and diverse entertainment program was prepared for the ball's guests. At the Palace's entrance, beautiful ladies handed out carnival masks and other festive attributes to the guests while a string quartet was olaying classical music. On the grand staircase of the Palace, little guests could meet fairytale characters from the "Mr Pejo`s Wandering Dolls" theater, enjoy the New Year photo-zone or get a special face-painting. The event continued in festive halls of the Palace where children could join the scientific show and watch the performance of educated circus dogs. After that, the guests proceeded to the Ball Hall where dances and games began in the company of Father Frost and Snow Maiden.

Dance performances by students from the Vaganova Academy of Russian Ballet and the Ballet Academy at the Wiener Staatsoper became one of the brightest moments of the festival.

After the program was completed all children received holiday treats and New Year presents.

The ball in the Nicholas Palace was mirroring an event of Energy For Life Charitable Christmas Ball, held several days prior, on December 12, in Hofburg Palace in Vienna. Both events are included in the joint cultural project of Gazprom Group and OMV under the title "Imperial Capitals: St. Petersburg — Vienna."





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