

THE RUSSIAN CHEMICAL MARKET

MARKET STUDY REPORT



The Embassy of the Kingdom of the Netherlands

June, 2018



BILFINGER

Client: **Embassy of the Kingdom of the Netherlands**

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1 Introduction

1.1 General

Chemicals remains a growth industry at global, Europe and Russia level, being “industry of industries” at a medium risks rating as of beginning of 2017.

Chemical industry long-term benefiting from changing population and societies (new applications and new products), however, is being under transformation due to challenges on requirements by end-consumer markets, allied industries challenges, feedstock- and resource trends, regulatory requirements and incentives and political turbulence worldwide.

Sector development is characterized by long-term trend of moving of value chain (from manufacturing to R&D) eastward, following global shift of economic power.

World chemicals sales are expected almost double from today till 2030. The EU chemical industry is expected to rank only 3rd. Emerging markets driving chemical production growth above global GDP and emerging market players also are growing in global prominence, with companies rising to the top ranks of chemical producers; and the emerging market players acquiring firms (M&A's) in developed regions.

1.2 Disclaimers

This study was elaborated in close cooperation between the Embassy of the Netherlands in Russia and Bilfinger Tebodin CIS B.V.

General objective of the study was to investigate Russian chemical market, describe the current challenges facing the industry, and outline the environments and potentials as a destination for investment, whilst also identifying prospects, which may have the potential within the next in 1-3 years.

Information and conclusions provided in the study are applicable for the conditions, existing by the moment of the report and for the conditions, which may be reasonably forecasted. They cannot be applied for changed and/or closed data, purposely or involuntary hidden information, which is unknown for the authors and which, in this connection, cannot be considered.

1.3 Sanctions

Since March 2014, the EU has progressively imposed restrictive measures against Russia. The measures were adopted in response to the illegal annexation of Crimea and the deliberate destabilisation of Ukraine.

The measures concern a.o.:

- restrictions of economic relations with Crimea and Sevastopol
- economic sanctions
- restrictions on economic co-operation

Moreover, the EU adopted a list of physical and juridical persons whose capital in the EU is frozen and whose entry to the EU is restricted.

Questions related to these sanctions can be addressed to Ondernemersloket of the Netherlands Enterprise Agency (RVO) at: <https://www.rvo.nl/onderwerpen/internationaal-ondernemen/landenoverzicht/rusland/ondernemersloket-sancties-rusland>

Companies should pay attention to the fact that the due diligence regarding partners and activities in the Russian Federation remains the responsibility of the company.

1.4 About the Embassy of the Netherlands in Russia

The Embassy of the Kingdom of the Netherlands in Russia offers information services for Netherlands companies working in the Russian Federation, or who are planning first steps in the Russian market. Companies can send their trade requests or requests for a Business Partner Scan (a market overview combined with potential partner scan) to the Economic Section at mos-ea@minbuza.nl.

An overview of different services is found here: <https://www.nederlandwereldwijd.nl/landen/rusland/zakendoen>.

1.5 About Bilfinger Tebodin

Bilfinger Tebodin CIS B.V. is an affiliate of Bilfinger Tebodin B.V. (www.tebodin.bilfinger.com) established in The Hague, the Netherlands, in 1945.

It is a large multidisciplinary consultancy and engineering company operating in markets of industry, health & nutrition, pharma, chemicals, oil & gas, real estate, logistics and infrastructure, energy & environment.

Bilfinger Tebodin successfully operates in Russia since 1994. Locations in Moscow, Rostov-on-Don, Ekaterinburg, Saint Petersburg and on the sites guarantees being close to the client. We provide a portfolio of consultancy and engineering services covering the whole investment project cycle including but not limited to: Design & Engineering, Project Management, Construction Management, Procurement, and Consultancy. We offer our clients a winning combination of international approach to construction projects and knowledge of local norms and regulations.

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Ekaterinburg

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2 Current situation in the chemical market, trends and potentials

The Chemical industry is a key part of the national economy and industry in Russia. In 2017, the value of chemical and petrochemical output was approximately 3.600 billion rubles and equal to 3.7% of gross domestic product (GDP).

Russia's chemical industry has some 3.500 large enterprise and SMEs, and 100 scientific and design organizations and experimental plants. Together they employ approximately 650.000 production workers.

In 2015-2016 years indicators of the chemical industry were ahead of other industries (including oil refining and food processing), despite the reduction in investment and consumer demand in the country and the worsening of the world market:

In 2015, the production of the main products of the chemical industry in monetary terms increased by 24.1% compared to 2014 and amounted to about 42.1 billion dollars, exports in value terms decreased by 12.7% to 19.3 billion; import, by 26.9% to \$ 33.9 billion.

In 2015 the main reasons for the growth in chemical production were the devaluation of the ruble, which stimulates the growth of the physical volume of exports, and increased demand from Russian market (mainly, military sector).

In 2016, the chemical industry has become one of the leaders in the manufacturing sector in terms of production growth rates (+ 5.3%, the second result among the manufacturing industries) with leading positions by the production of rubber and plastic products.

In 2016 the high growth rate of the chemical industry was provided mainly by domestic demand, the export continues to fall.

The increase in output of chemical products was also supported by the active build-up of production capacities carried out in the industry in recent years (several new large plants for the production of polymers, mineral fertilizers and other chemicals).

In 2017, the output of the chemicals produced by Russian enterprises exceeded 3 billion rubles. Labor productivity in the chemical industry raised almost by 23%. Overall output of chemicals in Russia rose in 2017 by 4.3% year on year, with mineral fertilizers accounting for the greatest increase in production, according to data from Rosstat.

Structure of the chemical industry in money terms as per January-August 2017 according to Minpromtorg.

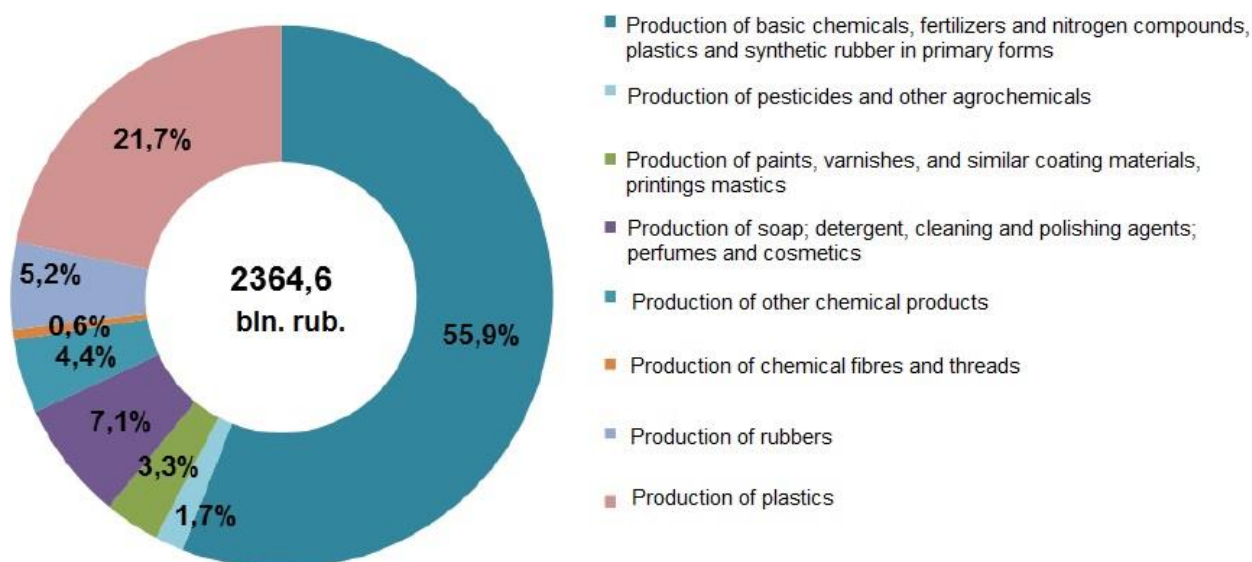


Fig. 2-A. Structure of the chemical industry in money terms as per January-August 2017

Source: Minpromtorg

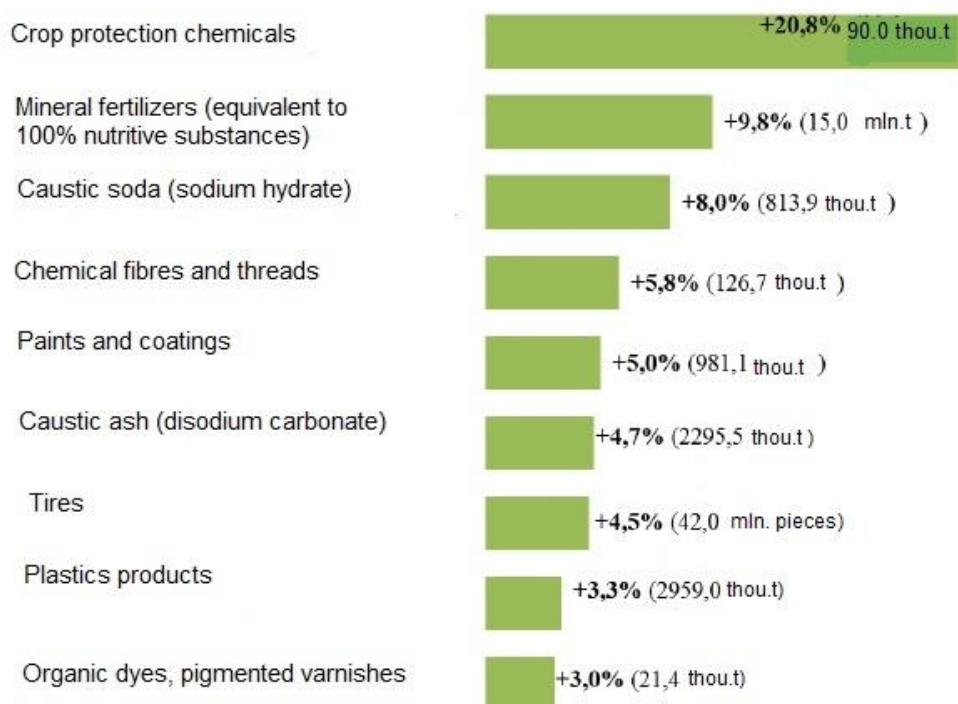


Fig. 2-B. Structure of chemical industry in volume in January-August 2017 (compared to January-August 2016)
Source: Minpromtorg

The share of chemical industry in the overall export made 5.7% in the 1st quarter of 2017 (compared to 6.7% in the 1st quarter of 2016). Compared to the first half of 2016, export of chemicals in money terms increased by 10.3%, in physical terms – by 1.1%. The volumes of supply of inorganic chemicals increased by 28.8%, of plastics and plastic goods - by 26.6%, of fertilizers– by 1.4%.

The share of chemical industry in the overall import made 19.0% in the first half of 2017 (compared to 20.2% in the 1st half of 2016). Compared to the first half of 2016, import of chemicals in money terms increased by 19.0%, in physical terms – by 3.6%. Import of natural rubber, synthetic rubber and rubber products in physical terms increased by 20.7%, organic compounds – by 13.6%, plastics and plastic goods – by 9.8%, paints and coatings – by 6.6%, perfumes – by 4.6%, pharmaceuticals – by 4.2%.

Production balance of speciality and fine chemicals in Russia in volumes (average values in 2014-2016).

Table 2-1

Indices	Average value in 2014-2016	
	In volumes, thousand tons	In money terms, mln. USD
Production	3351	4814
Export	620	847
Import	1531	3779
Consumption	4262	7746

Source: Minpromtorg

Russian Government has announced Strategy-2030, focused on import substitution, enhanced labor productivity due to development of chemical clusters, support of value-added production. In the medium term, the policy of import substitution will have a positive effect on the indices of the chemical industry.

Target indicators of Strategy 2030 include:

Table 2-2

Goal	Criterion	Indicators (Chemical industry, excl. pharma)	
		2014	2030
Increase of importance of chemical and petrochemical industry in the Russian economy and development of allied industries	Production growth in % to 2014 (in current prices)	100.00	260.2
	Share of chemical industry in GDP of Russia, %	1.18	2.07
	Volume of investment, bln. rubles	291.6	243.0
Increase in consumption of chemical and petrochemical products reaching the level of developed countries	Per capita consumption of chemical products, kg/per	223.6	460.0
	Consumption growth index compared to 2012	111.7	200.4
Growth of productivity	Labor productivity, mln. rub/person	5.1	21.1
Transition to innovative investment model due to increase in processing depth	Share of the highly processed products in the overall output of chemical industry, %	12.5	19.7
Development of R&D	Share of investment into R&D in the total revenue of chemical industry, %	0.09	1.00
Import substitution	Share of import in consumption of chemical products, %	15.7	10.3
	Share of import in consumption of tires, %	59.40	20.00
Provision of strategic industries with the quality domestically made specialty chemicals	Share of import in the specialty chemicals consumption, %	62.30	45.18

Source: Minpromtorg

The greatest potential of import substitution is demonstrated by the production of polymer products and rubber products. Meanwhile, an increase in production is observed in the production of chemical crop protection products, in the paint and varnish industry, in the production of chemical fibers and yarns, as well as in the production of household chemicals, again due to substitution of imported products.

In 2017 the Ministry of Industry and Trade of RF offered subsidies to enhance development of chemical companies in the total amount of 5.75 billion rubles. Upon strategy of chemical and petrochemical industry development until 2030 and import substitution roadmap for the Chemical industry, 10 investment project have been completed in 2017 with total amount of investment equal to 27.5 billion rubles (including state support – 0.43 billion rubles).

In total, the strategy of chemical and petrochemical industry development until 2030 includes 199 investment projects in the chemical industry with the overall investment of 1 trillion rubles. The import substitution policy includes 84 investment projects initiated by 55 companies from 33 regions of the Russian Federation. There are separate import substitution roadmaps for the following submarkets: mineral fertilizers, plastics, paints, tires, chemical fibers and yarns.

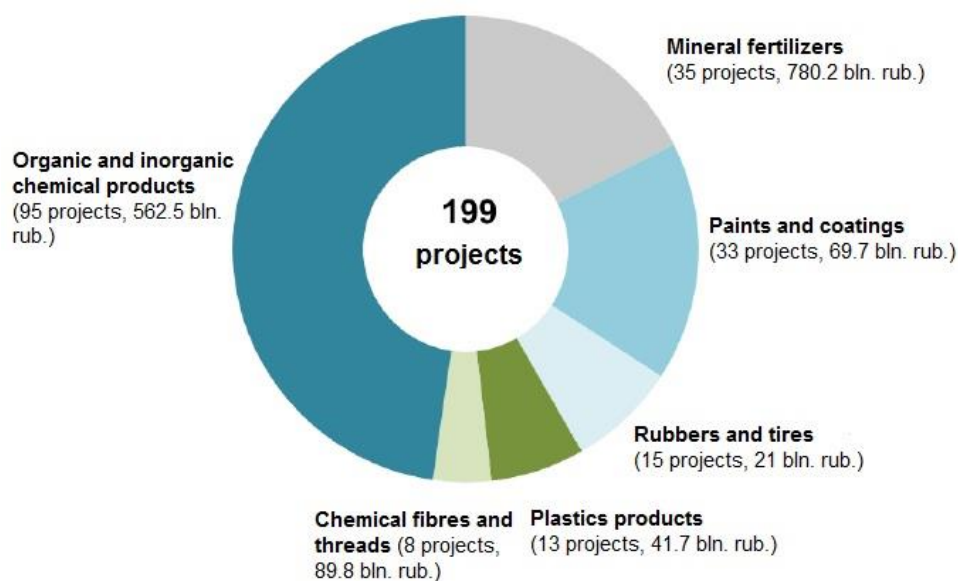


Fig. 2-C. Structure of investment projects according to Strategy 2030. Source: Minpromtorg

According to the Ministry of Industry and Trade of Russia investments in chemicals will be growing up to 2020 and from 2025 to 2030 and in long-term average amounts annually to RUR 237 billion.

Geographically, the chemical industry is significantly represented in 44 of Russia 83 regions. Chemical and petrochemical production clusters are led by five main big companies: SIBUR, Nizhnekamskneftekhim, PhosAgro, EuroChem, Gazprom Neftekhim Salavat.

Chemical clusters in Russia are based on the availability of natural resources (mainly petrochemicals) or proximity to the main transport corridors to export bulk chemicals. Thus, there are several clusters close to the deposits of oil & gas and nearby main ports of the Russian Federation.

There are six main clusters, such as:

- West-Siberian cluster (SIBUR-Tobolspolymer and Tomskneftekhim);
- Volga cluster (SIBUR, Togliattikauchuk, RusVynil, Kazanorgsynthes, Nizhnikasmkneftekhim, Polief);
- Caspian cluster (Stavrolen, Gazpromdobycha-Astrakhan);
- East-Siberian cluster (Angarsk polymer plant and Sayansk gas-derived chemicals integrated plant);
- Far-Eastern cluster (Eastern petrochemical company and Amur gas-derived chemicals integrated plant);
- North-Western cluster (Baltic gas-derived chemicals integrated plant).

In the future there can be expected the emergence of new clusters on the basis of the large factories of the chemical sector, located in the Urals, in Solikamsk, Nizhny Tagil. The plans also include development of existing and creation of new petrochemical clusters in Nizhny Novgorod region, Bashkortostan, Omsk.

3 Planned investments (top 10 investment projects until 2020)

Project owner	OGRN	Project scope	Investment	Timeline
Shchekinoazot, Tula Region	1027100507015	Joint production of 450 000 MTY of methanol, 135 000 MTY of ammonia	1.5 billion USD	Construction start - 2018
EcoPromService, Omsk		Production of Omsk gas processing complex	50 billion rubles	Project start - 2018
Kada NefteGas, Sayansk, Irkutsk region	1067758655854	Gas processing and methanol production with capacity of 1 MTY	40 billion rubles	2018-2020
EmPils, Rostov-on-Don region	1026104141260	Production of prefabricated varnishes and resins	300 million rubles	2016-ongoing
Irkutsk Oil Company, Irkutsk region	1023801010970	Ust-Kut polyolefin production plant with capacity of 600 thou. tons per year	56 billion rubles	2018-2020
Tatneft (Mitsubishi Heavy Industries & Sojits Corp.)	1021601623702	Gas chemical complex Ammonia-2 in Mendeleevsk, Tatarstan	1.4 billion USD	2016-ongoing
Nakhodkinsky mineral fertilizers plant, Primorsky krai	1122508003188	Construction of a methanol and nitrogen fertilizers plant in Primorsky region with capacity of 1.8 mln tones of commercial methanol and 1.8 mln tones of ammonia annually	6.3 billion USD	2018-2022
Mitsubishi Corp., Sakhalin	1137746421141	Construction of methanol production at Sakhalin with production capacity of 1 mln tons per year	n/a	2016-2025
Ekozon Ltd. (Poland)	n/a	Construction of methanol production in Leningrad region with production capacity of 1,6 mln tons per year	62.3 billion rubles	2016-2025
EuroChem Kingisepp	1027700002659	Ammonia production with capacity of 1 mln tons in Kingisepp	660 mln euro	2015-2018
Metafrax, Perm region	1025901777571	Ammonia, carbamide, melamine production plant in Gubakha, Perm region	950 mln euro	2018-2021
Technoleasing, Amur region	1077758297143	Methanol production in Skovorodino with production capacity of 1.2 million m3	44.3 billion rubles	2016-2019

Project owner	OGRN	Project scope	Investment	Timeline
Yakutsk Fuel and Energy Co. (YATEC)	1021401062187	Gas processing plant with capacity of up to 1.75 million tpy of methanol for sale in Asia-Pacific markets	1 billion rubles	2022
Gazprom processing Blagoveshchensk	1142722003467	The plant will consist of six units of 677 Million Cubic Feet per Day (MMCFD) each. The GPP will produce ready-for-sale methane, ethane, propane, butane, pentane-hexane fraction and include the world's largest helium plant.	22 billion USD	2015-2021
SIBUR	1057747421247	Amur Gas Chemical Complex with capacity of 1.5Mt of polyethylene per annum	7 billion USD	2019-2024
Rosneft	1027700043502	Construction of a refinery with a capacity of up to 12.5 million tons and a petrochemical complex processing 3.4 million tons of feedstock.	660 million USD	2014-2022

4 Petrochemicals

4.1 General overview of subsector

Russia possesses one of the world largest reserves of hydrocarbons and produces circa 10% of the world amount of oil and gas. In 2016 the production of oil and gas condensate reached 547.5 mln tons, more than half of them have been processed in Russian oil refinery, condensate stabilization and condensate processing plants. More than 40% of 83 bln m³ of APG have also been processed in Russia.

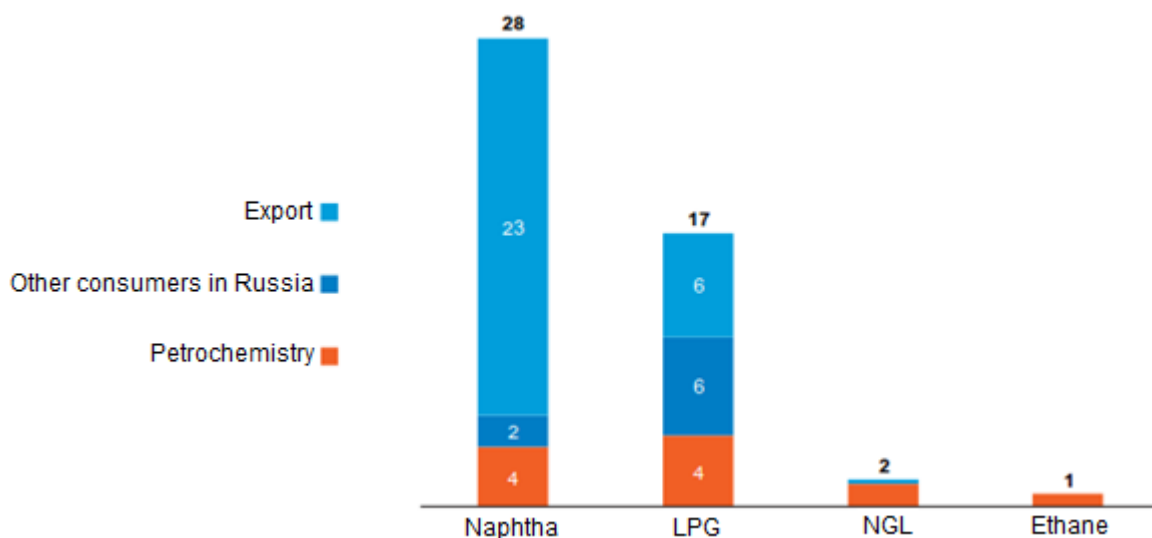


Fig. 4.1-A. Balance of petrochemical raw materials in 2016, mln tons. Source: Vygon Consulting

However, a wide range of Russian petrochemical sector is in the begging of its development comparing with the global leaders. Last few years share of the petrochemistry in GDP of Russia is between 1.2% and 1.6%. Russia ranks 20th in the world rating for overall production output.

Moreover, a wide range of deep conversion products is not manufactured in Russia (like special composites, additives). For example, at the moment China holds a market share of 25% for plastics primary form production, Europe holds 20% and Russia – only 2%.

However, in recent years there have been positive developments in the Russian petrochemical market: the state pays attention to the processes taking place in the industry. In particular, the final version of the "big tax maneuver" includes a number of wishes of the producers.

The most important global megatrend which will influence Russian petrochemical industry till 2030 is changes in regional balance of forces. What is meant here is the production focus transition from Europe to Middle East, China, India and the USA.

The second megatrend is high influence of the global innovations and breakthrough technologies. Russian companies are mainly committed to production of basic chemicals – propylenes and polypropylenes.

And the third megatrend is increasing of production environmental friendliness. Producers pay increasing attention to environment issue. That said the companies both reduce pollutant emissions and produce environmental friendly goods. However, managers of Russian petrochemical companies rate environment criterion not as high as the foreign ones. The industry leaders note the high cost of implementing initiatives in this area, as well as the lack of sufficient effective demand.

By 2030, the greatest demand for petrochemical products is expected in the automotive, food and construction industries.

In the automotive industry, thermoplastic composites and new types of plastics reducing the amount of car energy consumption are the products in demand. This in turn is connected with the development of the production of complex composite materials and plastic, which are increasingly used in the design of cars.

The most likely changes in the market of pipes – both oil and gas, and utilities, where an increasing share is occupied by polymer pipes. A high demand is forecasted for polymer pipes in the next 5-10 years in Russia in the housing market, as more than half of the infrastructure is already extremely worn, and when it reach 80%, the key driver of the market will be an increase in the number of accidents.

In the food industry, the main requirements of the industry will be associated with new brands for food packaging with the possibility of customization, as well as environmental friendliness of the materials used.

In the short term the majority of Russian petrochemical companies will continue to invest in the expansion of existing product lines or plan to start manufacturing other products in the segment of basic petrochemicals, such as polypropylene, LLDPE etc. Only a small number of market players is planning to move to manufacture deep conversion products. This is probably due to the lack of appropriate technologies, the need for significant investment and serious competition from foreign players.

4.2 Geography of production facilities and projects, clusters

4.2.1 Oil and gas chemical clusters

In 2012 Ministry of Energy of the Russian Federation elaborated a strategical document “Plan of gas and petrochemistry sectors development in Russia for up to 2030”. The document provides formation of six clusters which consider location of the existing productions and raw materials sources, as well as plans of the market players on development and new facilities construction.

Each of the clusters includes pyrolysis facilities as a core which consolidates plastics and rubber productions and production of end products of gas chemistry and petrochemistry.



Fig. 4.2-A. Map of oil and gas chemical clusters

Table 4.2-1

Cluster	Description
1. West-Siberian	<p>The cluster is located in Tyumen' region and includes two plants of SIBUR – Tobolsk-Polymer and TomskNefteChim, a project of ZapSibNefteChim, which is currently under development, and a gas chemical complex Novourenogorsky financing by Gazprom.</p> <p>The facilities mainly process local raw materials - NGL, naphtha, ethane, LPG – from associated petroleum gas and gas condensate of petroleum deposits in Khanty-Mansiysk and Yamal-Nenets regions.</p>
2. Povolzhskiy (Volga)	<p>The biggest oil and gas chemical cluster in Russia. It includes industrial facilities located in republics of Tatarstan and Bashkiriya, Nizhniy Novgorod and Samara regions: Sibur-Kstovo, Sibur-Himprom, Togliattikauchuk (Sibur), POLIEF (Sibur), RusVinil (JV of Sibur and Belgian SolVin), KazanOrgSintez (TAIF Group), NizhnekamskNefteHim (TAIF Group), Gazprom Neftehim Salavat, SANORS (Rosneft).</p>
3. Caspian	<p>The cluster is intended for processing of the raw materials produced in Caspian area and Stavropol region.</p> <p>Main enterprises of the cluster are LUKOIL's petrochemical plant STAVROLEN and gas chemical complex "Gazprom dobycha Astrakhan".</p>
4. East-Siberian	<p>The cluster located in the south of Krasnoyarsk and Irkutsk regions is planned to be developed on the basis of two enterprises: Angarsk polymers plant and Sayansk gas chemical plant.</p> <p>The deposits in this area are prolific with helium and its utilization is a challenging question for the cluster development.</p>
5. North-Western	<p>The cluster is based on the oil and gas chemical facilities on the Baltic sea and has an export orientation to the European market. It includes two SIBUR's plants – Tobolsk-Polymer and Tomskneftehim, a project of ZapSibNefteHim and Hovourenogoy gas chemical plant of Gazprom.</p> <p>Two options are considered for the production supply with raw materials: TransValGas project developed by Gazprom and Sibur and Horda project developed by TNK-BP and Sibur.</p>
6. Far-Eastern	<p>The cluster is located in the Primorye Territory. According to the Plan it includes Eastern petrochemical company of Rosneft and Amur gas chemical plant. Both projects are now under development.</p>

4.2.2 Existing refining and petrochemical plants

Table 4.2-2

No	Name	Location	Production capacity	Company	Web
1.	Petrochemical plant SIBUR-TOBOLSK	Tobolsk, Tyumen region	8 mln tpa of NGLs, 207 thou. tpa of butadiene, 155 thou. tpa of MTBE	SIBUR	https://www.sibur.ru/siburtobolsk/about/in_sibur/
2.	Petrochemical complex ZAPSIBNEFTEKHIM	Tobolsk, Tyumen region	1.5 mln tons of ethylene, 500 thou. tons of propylene, 1.5 mln tons of polyethylene, 500 thou. ton polypropylene annually	SIBUR	https://www.sibur.ru/ZapSibN/about/in_sibur/
3.	Krasnoyarsk synthetic rubber plant (KZSK)	Krasnoyarsk, Krasnoyarsk region	42.5 thou. tpa of rubbers	SIBUR	https://www.sibur.ru/kzsk/about/in_sibur/
4.	Synthetic rubber plant NIZHNEKAMSKNEFTEKHIM	Nizhnekamsk Republic of Tatarstan	Companie's portfolio includes more than 120 products: synthetic rubbers for basic and special needs, plastics (styrene resins, polypropene, polyethylene, ABS plastic), monomers and others.	PJSC Nizhnekamskneftekhim, TAIF group of companies	https://www.nknh.ru/en/about/structure/
5.	Gas chemical complex TOBOLSK-POLYMER	Tobolsk, Tyumen region	510 thou. tpa of polypropene, 500 thou. tpa of granulated polypropene	SIBUR	http://sibur-tobolsk.ru/factories/2/info/
6.	ANGARSK POLYMER PLANT	East Siberia	200 thou. tons of ethylene, 100 thou. tons of propylene	ROSNEFT	https://www.rosneft.com/business/Downstream/Neftehimija/

No	Name	Location	Production capacity	Company	Web
			and 60 thou. tons of benzene annually		
7.	BOPP film plant BIAXPLEN	Nizhny Novgorod region	180 thou. tons of BOPP films per year	SIBUR	https://www.sibur.ru/biaxplen/
8.	PET plant POLIEF	Blagoveshchensk, Khabarovsk region	272 thou. tpa of terephthalic acid, 219 thou. tpa of PETF	SIBUR	https://www.sibur.ru/polief/
9.	Butyl rubber plant NIZHNEKAMSKNEFTEKHIM	Nizhnekamsk, Republic of Tatarstan	No data	PJSC Nizhnekamskneftekhim, TAIF group of companies	https://www.nknh.ru/about/info/structure/zavod-po-proizvodstvu-butilovogo-kauchuka-bk/
10.	KAZANORGSINTEZ	Kazan', Republic of Tatarstan	652 thou. tons of ethylene, 270 thou. tons of HD polyethylene, 217 thou. tons of LD polyethylene, 70 thou. tons of bisphenol, 65 thou. tons of polycarbonate, 65 thou. tons of phenol and 60 thou. tons of propylene annually	PJSC Kazanorgsintez, TAIF Group	https://www.kazanorgsintez.ru/en/
11.	Ethylene plant NIZHNEKAMSKNEFTEKHIM	Nizhnekamsk, Republic of Tatarstan		PJSC Nizhnekamskneftekhim, TAIF group of companies	https://www.nknh.ru/about/info/structure/zavod-po-proizvodstvu-etilena/
12.	Plastic plant NIZHNEKAMSKNEFTEKHIM	Nizhnekamsk, Republic of Tatarstan	In 2016 the plant produced 725 thou. tons of styrene polymers, ethylene and propylene, 135 thou. tons of LDPE and more than 217 thou. tons of polypropylene	PJSC Nizhnekamskneftekhim, TAIF group of companies	https://www.nknh.ru/en/about/info/structure/zavod-po-proizvodstvu-poliiolefinov-po/
13.	Ethylene and propylene plant TOMSKNEFTEHIM	Tomsk region	300 thou. tons of ethylene, 139 thou. tons of propylene, 270 thou. tons of	SIBUR	https://www.sibur.ru/TomskNeftehim/

No	Name	Location	Production capacity	Company	Web
			polyethylene and 140 thou. tons of polypropylene annually		
14.	MONOMER plant	Republic of Bashkortostan		Gazprom neftekhim Salavat, GAZPROM	http://www.gazprom.ru/about/subsidiaries/list-items/gazprom-neftekhim-salavat/
15.	Omsk Polypropylene Plant Company POLIOM	Omsk region	210 thou. tpa of polypropylene. Assortment of manufactured goods includes 98 grades of polypropylene (homo-, stat-, blockcopolymer). The plant also has a propane propylene fraction processing unit of 250 000 t per year capacity.	JV of GC "Titan", SIBUR and "Gazprom-Neft"	http://www.titan-omsk.ru/en/gruppa_kompaniy/company/795/
16.	Synthetic rubber plant OMSKY KAUCHUK	Omsk region	Assortment of manufactured products includes synthetic rubbers, organic synthesis products, high-octane additives to motor fuels, liquefied hydrocarbon gases.	TITAN Group of company	http://www.titan-omsk.ru/en/gruppa_kompaniy/company/794/
17.	NOVOCHERKASSK LUBRICANT MATERIALS PLANT	Rostov region	The range of output include products based on petroleum and synthetic oils – engine, transmission, hydraulic oils; grease lubricants; lubricant materials; lubricating-cooling fluids; parting fluids; friction modifiers and components of drill fluids with a volume more than 12 000 tpa.	TITAN Group of company	http://www.titan-omsk.ru/en/gruppa_kompaniy/company/10023/

No	Name	Location	Production capacity	Company	Web
18.	NOVOKUIBYSHEVSK PETROCHEMICAL COMPANY	Samara region	In 2016 1.2 million ton of hydrocarbon raw materials were processed, and 1.1 million ton of commercial petrochemical products were manufactured	ROSNEFT	https://www.rosneft.com/business/Downstream/Neftemija/Novokuybyshev_Petrochemical_Company/
19.	STAVROLEN	Stavropol region	300 thou. tons of HD polyethylene and 120 thou. tons of polypropylene annually	LUKOIL	http://stavrolen.lukoil.ru/ru
20.	SIBUR-PETF	Tver'	75 thou. tons of PETF per year	SIBUR	https://www.sibur.ru/SiburPETF/
21.	Polycarbonate production plant KAZANORGSINTEZ	Kazan', Republic of Tatarstan	65 tpa of polycarbonate	PJSC Kazanorgsintez, TAIF Group	https://www.kazanorgsintez.ru/en/proizvodstvo/zavod-po-proizvodstvu-polikarbonatov.php
22.	Bisphenol A (BPA) production plant KAZANORGSINTEZ	Kazan', Republic of Tatarstan	Main products of the plant are Bisphenol A, phenol and acetone. Main feedstocks are propylene and benzene.	PJSC Kazanorgsintez, TAIF Group	https://www.kazanorgsintez.ru/en/proizvodstvo/zavod-po-proizvodstvu-bisfenola.php

4.2.3 On-going and planned projects

№	Project	Location	Company, investments	Description
1.	Construction of a new gas chemical plant in STAVROLEN complex	Stavropol region	LUKOIL 120 bln rub. (\$ 2.0 bln)	<p>In January 2018 LUKOIL announced a project of STAVROLEN complex extension.</p> <p>Construction of a new gas chemical plant is expected on the basis of the existing petrochemical complex in Budyonovsk. First phase of the plant will produce carbamide and the second-polypropylenes and polyethylenes.</p>
2.	Construction of a new olefin complex	Republic of Tatarstan	TAIF group of companies	<p>NIZHNEKAMSKNEFTEKHIM is considering construction of a new multi-billion olefin complex with a total capacity of 1.2 m of ethylene per year, which will be then used in polyethylene and polypropylene production and the production of alpha-olefins.</p> <p>Initially, the launch of the first phase of the ethylene complex with the capacity of 600 thousand tons per year was scheduled for 2020, the second of similar capacity – 2025. In April 2017, TAIF reported that the tender process for the licensor is at the final stage.</p> <p>The holding is additionally planning a massive modernisation of its benzene production facilities.</p>
3.	Construction of a heavy residues deep conversion complex	Republic of Tatarstan	TAIF group of companies \$ 1.7 bln	<p>TAIF-NK is implementing long-term project of constructing heavy residues deep conversion complex.</p> <p>The launch of the complex will enable TAIF-NK to refine oil residues and make Euro 5 diesel fuel and straight-run gasoline.</p>
4.	Construction of a new oil processing plant “Barabinsky”	Novosibirsk region	Non-disclosed German company 80 bln rub. (\$ 1.3 bln)	<p>Barabinsky OPP is planned to be a waste-free production, where oil sludge will be processed and APG will be collected and regenerated. Planned capacity of the facility is 3 MT of oil products per year.</p>

4.3 Key players per submarket

SIBUR HOLDING

SIBUR is Russia's largest integrated gas processing and petrochemicals company. SIBUR operates 22 production sites, has over 27,000 employees and serves more than 1,400 large customers in the energy, automotive, construction, fast moving consumer goods (FMCG), chemical, and other industries in 80 countries.

SIBUR's petrochemicals business comprises two business segments: Olefins & Polyolefins and Plastics, Elastomers & Intermediates.

The **petrochemicals business** operates an extensive production base, including:

- 3 steam cracker facilities,
- 1 propane dehydrogenation (PDH) plant,
- 2 production plants manufacturing polyethylene and polypropylene and five BOPP-films production plants,
- 3 elastomers plants manufacturing commodity and specialty rubbers, as well as thermoplastic elastomers, and
- 4 plants manufacturing plastics and organic synthesis products, including polyethylene terephthalate, glycols, alcohols, expandable polystyrene, acrylates, and others,
- 3 plants manufacturing methyl tertiary butyl ether (MTBE).

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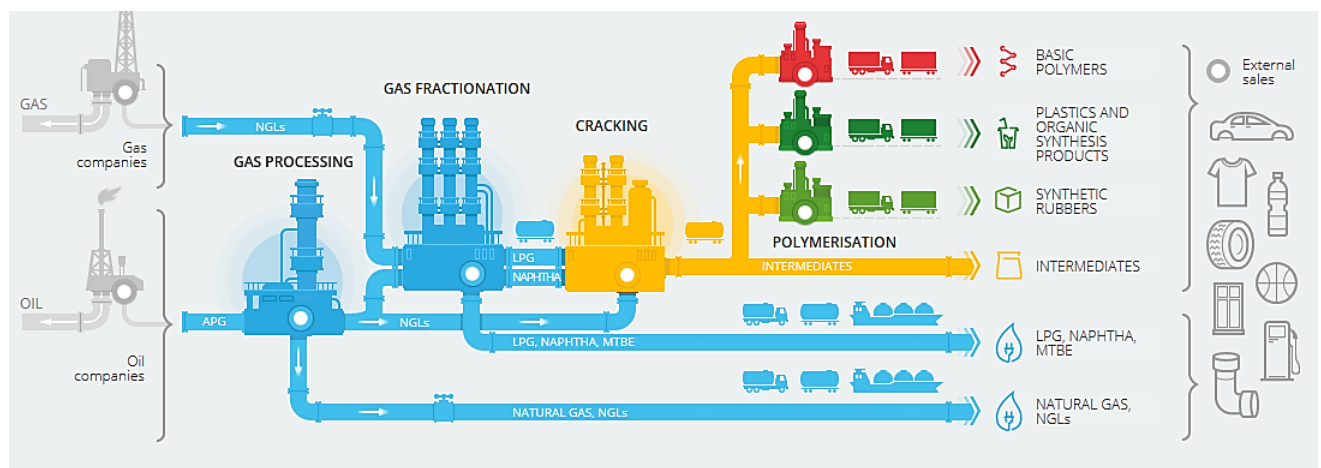


Fig. 4.3-A. SIBUR production chain

LUKOIL

LUKOIL is one of the largest publicly traded, vertically integrated oil and gas companies in the world accounting for more than 2% of the world's oil production and around 1% of the proved hydrocarbon reserves. While having the full production cycle, the Company exercises full control over the whole production chain — from oil and gas production to petroleum product sales. The Russian Federation accounts for 86% of hydrocarbon reserves and 83% of hydrocarbon production, with the main activities concentrated in four federal districts: the Northwestern, Volga, Urals and Southern Federal Districts.

For many years LUKOIL has been acting as one of the major suppliers of polymers, pyrolysis products and organic synthesis to the Russian market, while exporting petrochemical products to more than 30 countries worldwide.

LUKOIL's petrochemical products are compliant with the Russian and international quality standards.

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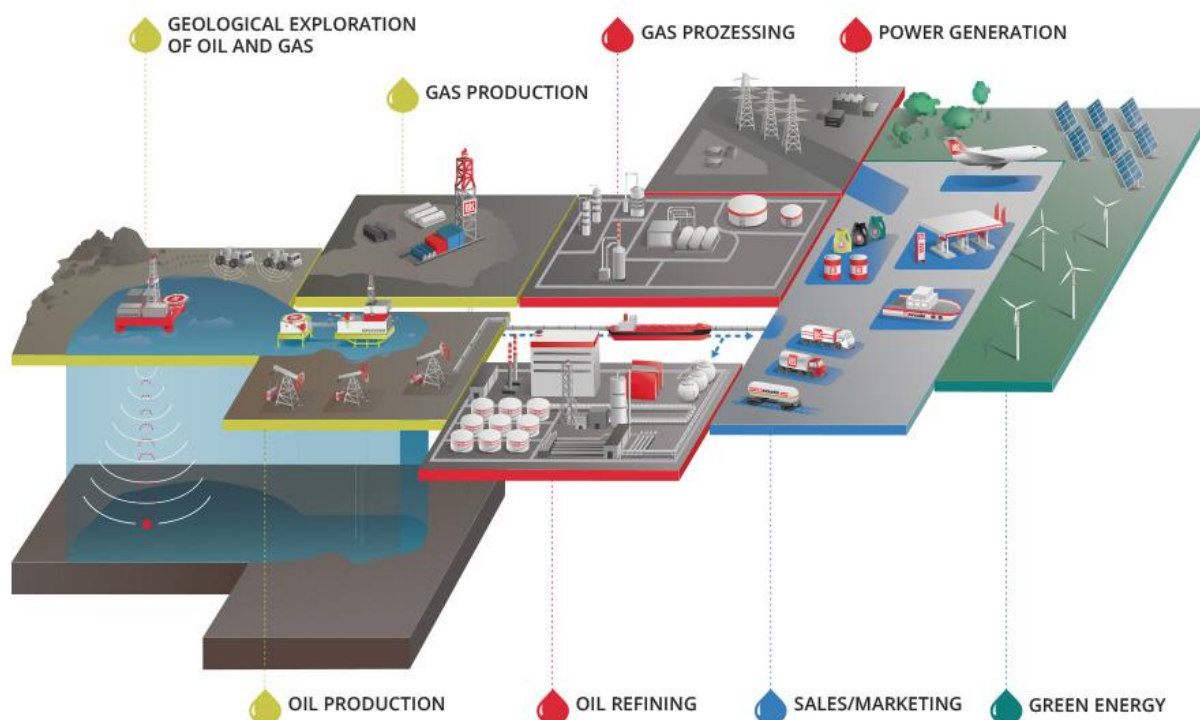


Fig. 4.3-B. LUKOIL Group's business model

ROSNEFT

Main part of the Company petrochemicals is produced by Angarsk Polymer Plant. Angarsk Polymer Plant is the only petrochemical plant in the East Siberia, which produces 200 K tons of ethylene, 100 k tons of propylene and 60 K tons of benzene annually. Part of the produced ethylene is sent to Sayankhimplast as feedstock, part is used for the production of high pressure polyethylene and other types of petrochemicals. Straight-run gasoline and hydrocarbon gases, mainly produced by Angarsk Petrochemical Company are used as feedstock for the plant.

Plant refurbishment program was developed with the following targets:

- Reconstruction of pyrolysis unit to increase its capacity by 1.5 times (up to 450 K tons of ethylene per year);
- Construction of low pressure polyethylene production with 345 ktpa capacity;
- Construction of polyethylene production for the production of 250 ktpa polymers of broad product range;
- Construction of LPG rail car loading rack with the capacity up to 300 ktpa is completed and the rack is commissioned, which will make it possible to reduce feedstock costs.

In 2015 Angarsk Polymer Plant processes 660.3 k tons of feedstock and produces 441.0 k tons of marketable products.

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TAIF GROUP OF COMPANIES

TAIF is a huge production and investment company possessing significant assets and enormous production capacities. TAIF Group comprising 54 subsidiaries and affiliated companies operates in various areas with the following major fields of activity: oil and gas processing and petrochemistry, telecommunication, building and construction, banking and investments, and services. All the enterprises are closely interconnected in terms of finances, engineering, technologies, and management.

At present, the TAIF Group is one of the largest producers of ethylene in Russia – 42% of all Russian production, almost half – 47% of all domestic polymers, more than 69% of all rubbers produced in Russia.

PSC TAIF-NK's Nizhnekamsk refinery, which is Tatarstan's largest, includes a gasoline plant and gas condensate processing plant. TAIF-NK is implementing long-term project of constructing heavy residues deep conversion complex. The launch of the complex will enable TAIF-NK to refine oil residues and make Euro 5 diesel fuel and straight-run gasoline.

PJSC Kazanorgsintez, part of TAIF Group, is one of the largest chemical companies of the Russian Federation. The Company produces more than 38% of the total Russian output of polyethylene with a production capacity of over 1 million tons of chemical products per year. Kazanorgsintez produces polyethylene and pipes thereof, phenol, acetone, bisphenol A, as well as polycarbonates. The overall products list includes 170 items. The Company's annual output amounts to 1.6 million tons.

Nizhnekamskneftekhim (NKNC) is one of the largest petrochemical companies in Europe, the leader in the production of synthetic rubbers and plastics in the Russian Federation. The Company is part of TAIF Group.

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GAZPROM

The Gazprom Group is the world's largest energy major in terms of natural gas reserves and production.

Gazprom is intent on expanding its petrochemical production, enhancing the extraction of valuable components from natural gas, and boosting the output of advanced processing products. In 2016, the Group processed 31 billion cubic meters of associated gas and 65.9 million tons of oil and gas condensate.

<http://www.gazprom.com/>

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SURGUTNEFTEGAS

Surgutneftegas is one of the largest private vertically integrated oil companies in Russia bringing together research and design, exploration, drilling and production units, oil refining, gas processing and marketing subsidiaries.

The company carries out prospecting, exploration and production of hydrocarbons in three Russian oil and gas provinces — Western Siberia, Eastern Siberia and Timan-Pechora.

Surgutneftegas oil is refined by the refinery – Limited Liability Company Kirishinefteorgsintez (LLC KINEF). LLC KINEF is one of the largest refineries and the only one in the North-West part of Russia.

The refinery produces petroleum products with high-quality performance and environmental characteristics, including motor fuels, aromatics, liquid paraffin, roofing and insulation materials, etc. Diesel fuel, jet fuel, roofing materials and bitumens produced by the refinery meet international quality standards. From year to year, LLC KINEF regularly upgrades its production facilities.

<https://www.surgutneftegas.ru/en/>

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TATNEFT

PJSC TATNEFT is Russia's sixth largest internationally recognised vertically integrated oil company. The industrial complex of the Company includes steadily developing enterprises of oil and gas production, petroleum refining, petrochemicals production, the tire manufacturing complex, network of filling stations and services.

One of the Company's major projects is the construction of the "TANECO" Refining and Petrochemical Plants Complex in Nizhnekamsk. It is the first industrial facility of its scale built from scratch in post-Soviet Russia.

The project implementation was started in 2005 with the aim of developing a new stage of the refining industry in Tatarstan. The first phase of the complex was put into commercial operation in 2011, the combined hydrocracking installation was put into commercial operation in 2014. July 2016 witnessed the comprehensive testing stage beginning of the delayed coking installation.

The petrochemical complex of TATNEFT is successfully developing providing for production and sale of tire products and carbon black. The tire manufacturing complex of TATNEFT comprises the high-tech enterprises of PJSC "Nizhnekamskshina", OOO "Nizhnekamsk Factory of Truck Tires" and OOO "Nizhnekamsk SSC Tire Factory", which produce about 300 tire commodity items such as car, agricultural machine, truck, light truck and solid-steel cord tires. The high quality of KAMA, KAMA EURO and Viatti tires, as well as innovative SSC tires has been confirmed by consumer reviews and victories at various prestigious contests.

<http://www.tatneft.ru/?lang=en>

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5 Gas processing and gas chemistry

5.1 General overview of subsector

About 40% of world gas resources are concentrated in Russia, 20 trillion cubic meters of them are ethane-containing gas.

An important advantage of gas processing sector in Russia is a constantly increasing demand for end products in the domestic market. The sectors consuming the end products (polymeric materials) are intensively growing in Russia, for example, construction and automotive industries, package and consumer goods production, etc.

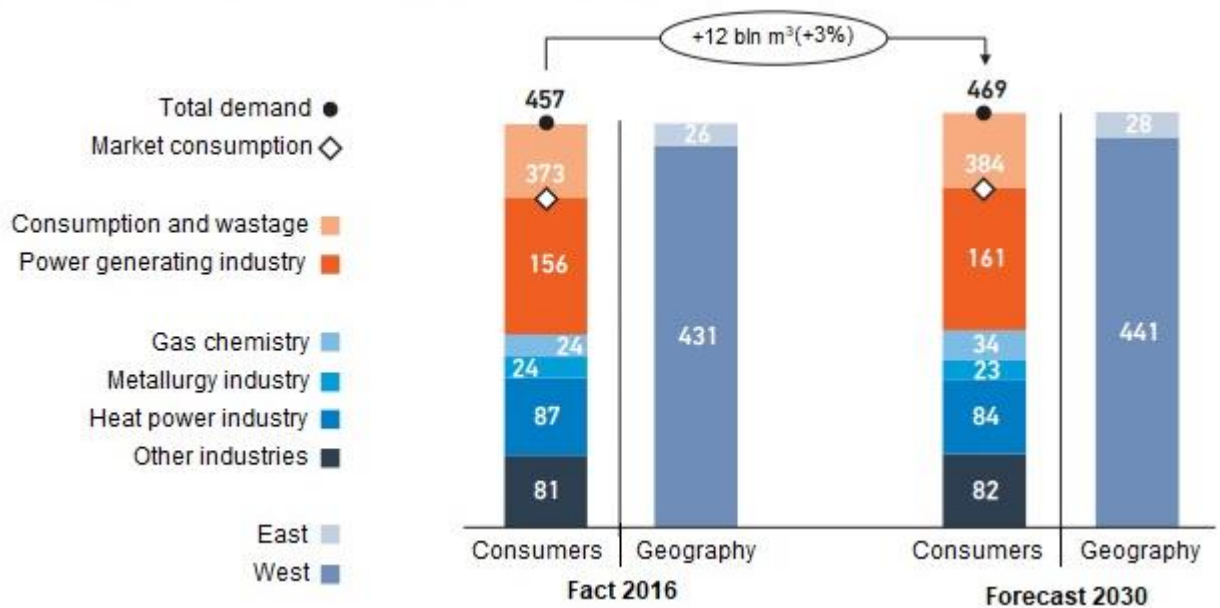


Fig. 5.1-A. Demand forecast for gas in Russia. Base scenario. Source: Vygon Consulting

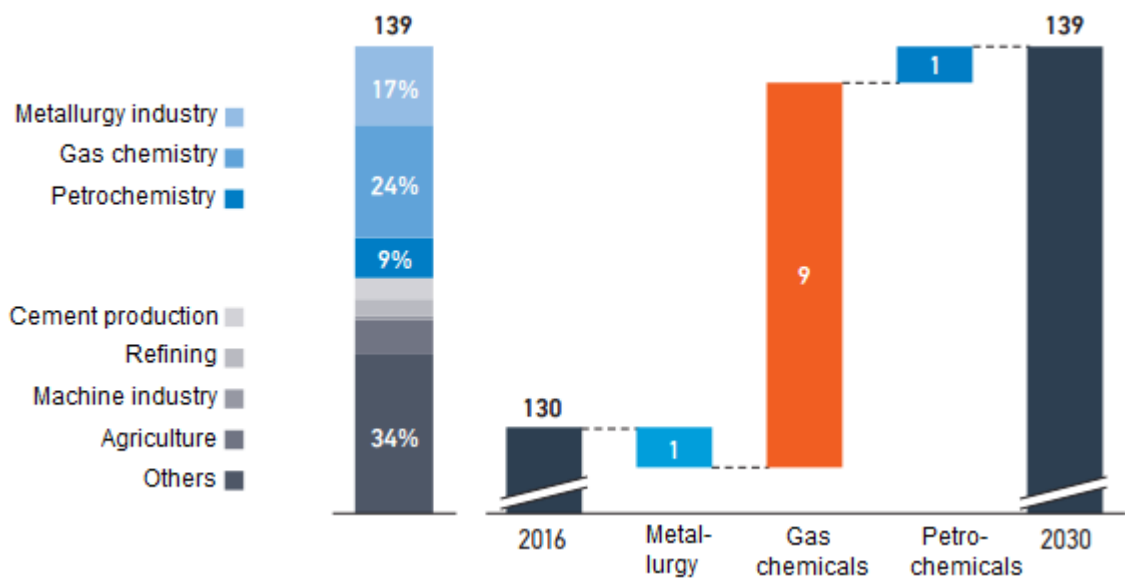


Fig. 5.1-B. Demand forecast for gas by industries, bln m³. Source: Vygon Consulting

Despite the fact that Russia possesses all required fundamental factors to rival in the world market of gas processing products and gas chemicals, only 2% of natural gas output are processed.

This goes to prove that potential of the sector underdeveloped due to systemic issues. According to the insiders of the market, major challenges facing the industry tend to the follows:

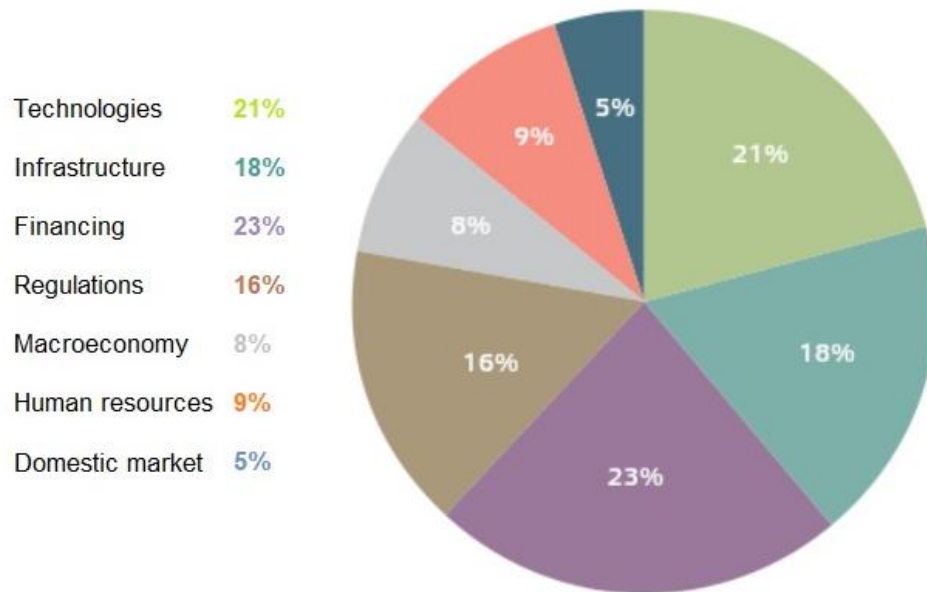
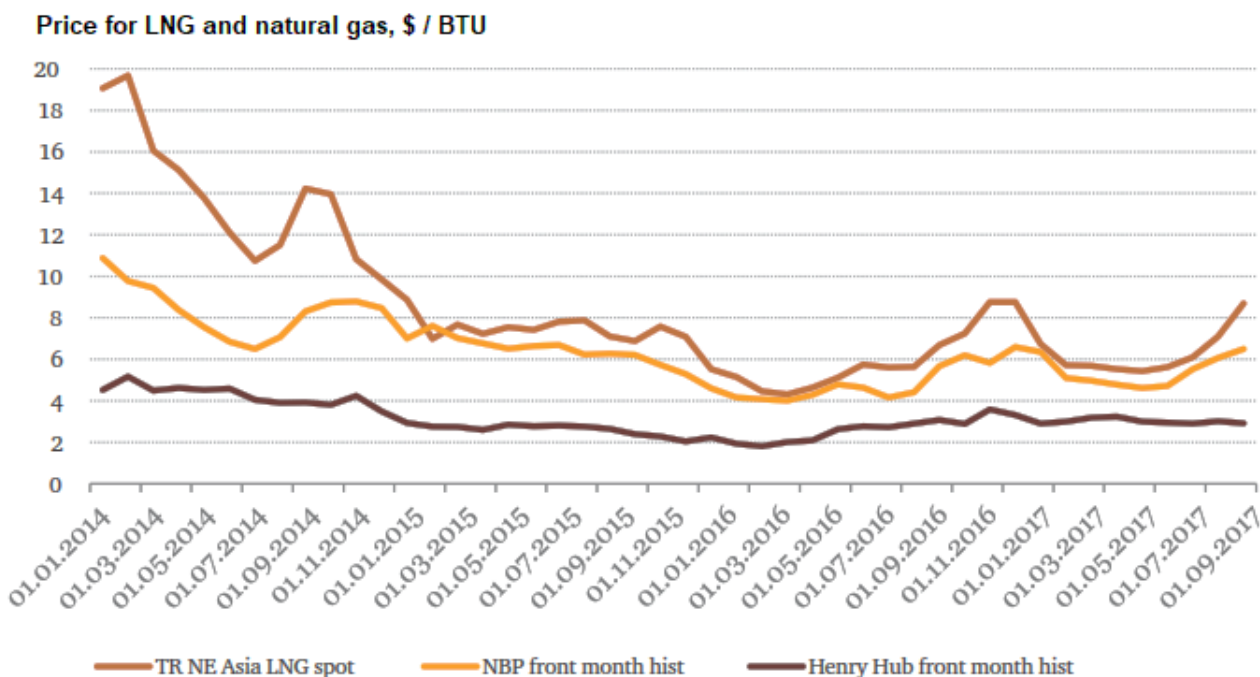


Fig. 5.1-C. Problems of gas processing and gas chemistry in Russia

- **Financial issues**

Cost of capital construction in Russia is 20-60% more expensive than construction of the same facilities in Europe.

Increase of all production costs (raw materials, consumables, energy resources, labor, freight rates): high prices and lack of required raw materials; high capital expenditures of new construction; high price of power and transportation; profitability lowering of advanced refining; low efficiency of investment process (high capital intensity, limited access to cheap loans, rate on long-term loan in Russia is more 10%); difficulties with attracting foreign investment; pricing policy.



Source: Thomson Reuters

Fig. 5.1-D. Price for LNG and natural gas

• **Technological backwardness and worn-out equipment**

Rate of capital consumption in Russian gas processing is 43%.

Results of extremely utilized capacity and insufficient level of scientific and technological capability due to poor financing of R&D:

- technological process in Russian factories is characterized by high power consumption and resource intensity;
- there is a high chance of industrial disasters and environmental safety threat;
- new generation of catalyst agents for gas processing and gas chemistry is an urgent need.

Market players are highly interested in technological solutions in the following areas (in descending order of priority):

- 1) Construction of gas processing and gas chemical facilities;
- 2) Environmental safety;
- 3) Industrial safety;
- 4) Emissions reduction;
- 5) Fuel elements and electrochemistry;
- 6) Platinum metals purification.

• **Lack of developed transport and logistic infrastructure** includes such issues as:

- Difficulty to access and extent the existing infrastructure;
- Infrastructural limitations for gas chemicals and LNG transportation;
- Underdeveloped network of pipelines for NGLs and LPG;
- Monopoly on access to gas pipelines;
- Need to implement innovative solutions for special vehicles.

• **Administrative burdens**

- Obsolete technical rules and regulations, superfluous requirements of industrial standards and quality systems;
- Lack of uniform technical requirements to permitting documentation and range of equipment;
- Non-transparency of procurement process;
- Lack of state support;
- Unadapted customs duties.

- **Human resources**

- Drain of qualified human resources out of Russia due to lower level of wages and working environment in the industry in comparison with Europe and the USA;
- Need to develop science and technology infrastructure.

- **Macroeconomic factors**

- Complications of foreign markets penetration
- Dependence on import raw materials;
- Imposition of duties for goods from Russia;
- Dumping in the Russian market.

- **Underdeveloped domestic market**

- Insufficient domestic demand;
- Pricing;
- Lack of resources (technical gases);
- Quality of raw materials.

5.2 Geography of production facilities and projects, clusters

5.2.1 Location of gas chemical facilities in Russia

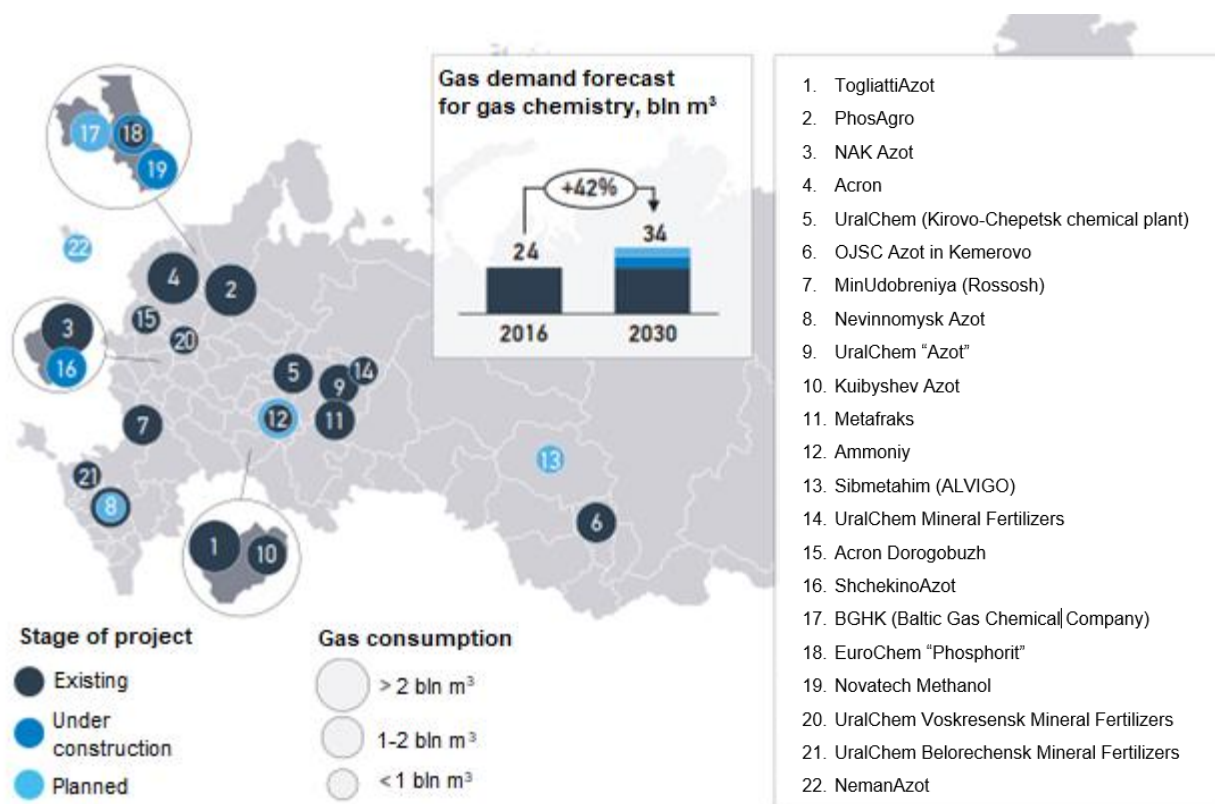


Fig. 5.2-A. Map of gas chemical facilities of Russia

5.2.2 Oil and gas chemical clusters

In 2012 Ministry of Energy of the Russian Federation elaborated “Plan of gas and petrochemistry sectors development in Russia for up to 2030”. The document provides formation of six clusters which consider location of the existing productions and raw materials sources, as well as plans of the market players on development and new facilities construction.

Each of the clusters includes pyrolysis facilities as a core which consolidates plastics and rubber productions and production of end products of gas chemistry and petrochemistry.

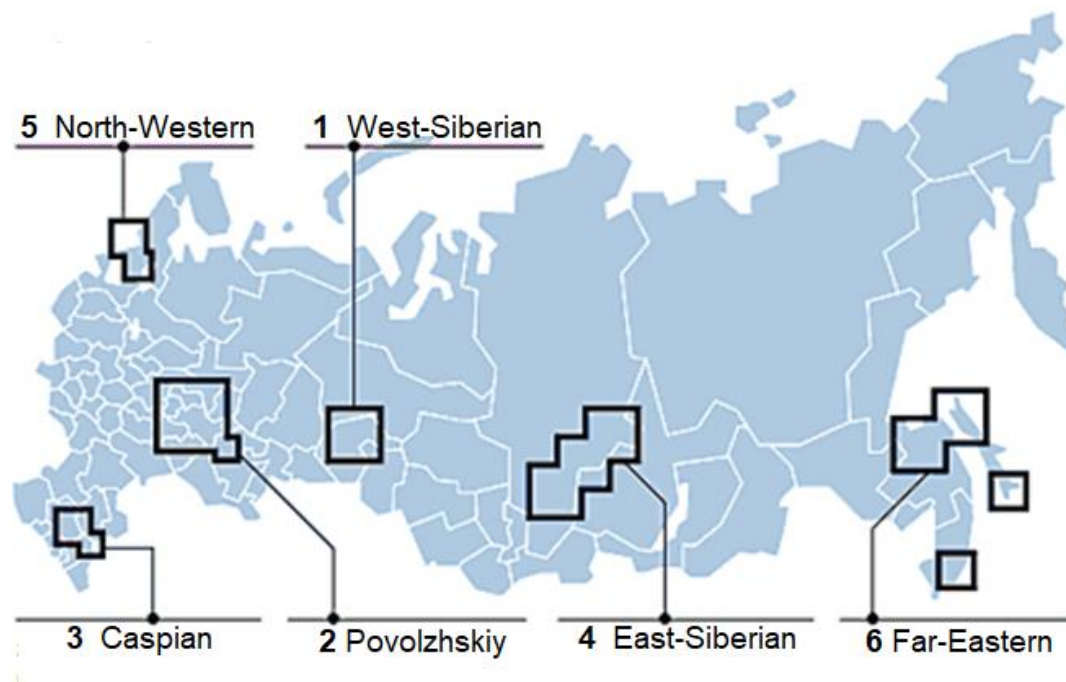


Fig. 5.2-B. Oil and gas chemical clusters of Russia

Table 5.2-1

Cluster	Description
1. West-Siberian	<p>The cluster is located in Tyumen' region and includes two plants of SIBUR – Tobolsk-Polymer and TomskNefteChim, a project of ZapSibNefteChim, which is currently under development, and a gas chemical complex Novourengoyskiy financing by Gazprom.</p> <p>The facilities mainly process local raw materials - NGL, naphtha, ethane, LPG – from associated petroleum gas and gas condensate of petroleum deposits in Khanty-Mansiysk and Yamal-Nenets regions.</p>
2. Povolzhskiy (Volga)	<p>The biggest oil and gas chemical cluster in Russia. It includes industrial facilities located in republics of Tatarstan and Bashkiriya, Nizhniy Novgorod and Samara regions: Sibur-Kstovo, Sibur-Himprom, Togliattikauchuk (Sibur), POLIEF (Sibur), RusVinil (JV of Sibur and Belgian SolVin), KazanOrgSintez (TAIF Group), NizhnkamskNefteHim (TAIF Group), Gazprom Neftehim Salavat, SANORS (Rosneft).</p>
3. Caspian	<p>The cluster is intended for processing of the raw materials produced in Caspian area and Stavropol region.</p> <p>Main enterprises of the cluster are LUKOIL's petrochemical plant STAVROLEN and gas chemical complex "Gazprom dobycha Astrakhan".</p>
4. East-Siberian	<p>The cluster located in the south of Krasnoyarsk and Irkutsk regions is planned to be developed on the basis of two enterprises: Angarsk polymers plant and Sayansk gas chemical plant.</p>

Cluster	Description
	The deposits in this area are prolific with helium and its utilization is a challenging question for the cluster development.
5. North-Western	<p>The cluster is based on the oil and gas chemical facilities on the Baltic sea and has an export orientation to the European market. It includes two SIBUR's plants – Tobolsk-Polymer and Tomskneftehim, a project of ZapSibNefteHim and Hovourenгой gas chemical plant of Gazprom.</p> <p>Two options are considered for the production supply with raw materials: TransValGas project developed by Gazprom and Sibur and Horda project developed by TNK-BP and Sibur.</p>
6. Far-Eastern	The cluster is located in the Primorye Territory. According to the Plan it includes Eastern petrochemical company of Rosneft and Amur gas chemical plant. Both projects are now under development.

5.2.3 Existing gas processing plants (GPP) and gas chemical complexes (GCC)

Table 5.2-2

No	Name	Location (region, city, settlement)	Year of commissioning	Production capacity	Company
23.	Orenburg GPP	Orenburg region, city of Orenburg, Kholodnye Klyuchi	1974	37.5 billion m3 of gas per year.	Gazprom
24.	Orenburg Helium Plant	Orenburg region, city of Orenburg, Kholodnye Klyuchi	1978	15 billion m3 of gas per year. Up to 8.8 million m3 of helium per year.	Gazprom
25.	Astrakhan GPP	Astrakhan region, settlement of Arsarayskiy	1987	Up to 12 billion m3 of gas per year.	Gazprom
26.	Surgut condensate stabilization plant	Tyumen region, city of Surgut	1980	12 million tons of motor oils	Gazprom
27.	Nizhnevartovsk GPP	Tyumen region, city of Nizhnevartovsk	1975	7.5 billion m3 of gas per year.	SIBUR
28.	Surgut GPP	Tyumen region, city of Surgut	1980	5 billion m3 of gas per year.	SurgutNefteGaz
29.	Belozerny GPP	Tyumen region, Nizhnevartovsk district	1980	4.6 billion m3 of gas per year.	SIBUR

No	Name	Location (region, city, settlement)	Year of commissioning	Production capacity	Company
30.	Sosnogorsk GPP	Republic of Komi, city of Sosnogorsk	1944	3 billion m3 of gas and 1.25 million tons of liquid carbohydrates per year.	Gazprom
31.	Vyngapurovsky GPP	Yamalo-Nenets Autonomous Okrug, Purovsk district	2012	4.2 billion m3 of gas per year.	SIBUR
32.	Yuzhno-Balyksky GPP	Yamalo-Nenets Autonomous Okrug, city of Pyt'-Yakh	1978	3 billion m3 of gas per year.	SIBUR
33.	Gubkinsky GPP	Yamalo-Nenets Autonomous Okrug, city of Gubkinskiy	1988	2.6 billion m3 of gas per year.	SIBUR
34.	Lokosovsky GPP	Khanty-Mansiysk Autonomous Okrug City of Langepas	1983	2.14 billion m3 of gas per year	LUKOIL
35.	Krasnoleninsky GPP	Khanty-Mansiysk Autonomous Okrug City of Nyagun'	1988	2.14 billion m3 of gas per year	SIBUR
36.	Zaykinskoe GPP	Orenburg region, City of Buzuluk	2001	2.2 billion m3 of gas per year.	Rosneft
37.	Muravlenkovsky GPP	Yamalo-Nenets Autonomous Okrug, city of Muravlenko	1987	1.3 billion m3 of gas per year.	SIBUR
38.	Otradny GPP	Samara region, City of Otradny	1962	1.1 billion m3 of gas per year.	Rosneft
39.	Neftekumsk GPP	Stavropol region, city of Neftekumsk	1964	1.1 billion m3 of gas per year	Rosneft
40.	Yuzhno-Priobsky GPP	Tyumen region,	2015	0.9 billion m3 of associated petroleum gas (APG) per year	JV of SIBUR and Gazprom Neft

No	Name	Location (region, city, settlement)	Year of commissioning	Production capacity	Company
		Khanty-Mansiysk Autonomous Okrug			
41.	Yakutsk GPP	City of Yakutsk	1993	0.87 billion m3 of gas per year	SakhaTransNefteG az
42.	Tuymazinsky GPP	Republic of Bashkortostan, Tuymazinsky district	1957	0.73 billion m3 of gas per year	Bashneft
43.	Neftegorsk GPP	Samara region, city of Neftegorsk	1967	0.68 billion m3 of gas per year	Rosneft
44.	Perm' GPP	Perm' region, city of Perm'	1969	0.56 billion m3 of gas per year	LUKOIL
45.	Usinsk GPP	Republic of Komi City of Usinsk	1980	0.5 billion m3 of gas per year	LUKOIL
46.	Korobkovsky GPP	Volgograd region city of Kotovo	1966	0.45 billion m3 of gas per year	LUKOIL

5.2.4 On-going and planned projects

According to the market experts, capital investments in gas processing sector of Russian economy will reach US \$65 billion until 2018.

Table 5.2-3

No	Project	Location	Company, investments	Description
1.	Construction of a gas processing plant and a methanol plant in Sayansk	Irkutsk region	Kada-NefteGaz 40 billion rubles	The project includes 2 stages. In 2018 a natural gas liquification plant will be commissioned. Planned capacity of the facility is 250,000 tons per year. A methanol plant with a capacity of 1 million tons per year will be built in 2018-2020.
2.	Construction of gas chemical complex "Ust'-Kutskiy"	Irkutsk region	Irkutsk Oil Company (INK) 56 billion rubles	The polyolefin plant will be built in Ust'-Kut with a capacity of 600,000 tons of polyethylene (LLDPE and HDPE) per year and a possible extension to up to 1 million tons of production per year. A gas-fired power plant with a generating capacity of 100 MWt is to be constructed in Ust'-Kut to supply electricity and heat to the plant. In total, Irkutsk Oil plans to process up to 7 billion cubic meters of gas per year by 2020.
3.	Construction of Amur GPP	Amur region	Gazprom 790.6 billion rubles	The Amur GPP will be the largest such plant in Russia and one of the biggest in the world. It will serve as an essential link in the process chain of natural gas supplies to China via the Power of Siberia gas pipeline.

No	Project	Location	Company, investments	Description
				<p>The construction started in October 2015. Commissioning is planned in 2025.</p> <ul style="list-style-type: none"> • Design processing capacity: 42 billion cubic meters of natural gas per year. • Helium production: up to 60 million cubic meters per year. • Ethane production: around 2.5 million tons per year. • Propane production: around 1 million tons per year. • Butane production: around 500,000 tons per year. • Pentane-hexane fraction production: around 200,000 tons per year. • Production trains: 6. • Plant's area: 800 hectares.
4.	Baltic LNG	Leningrad Region	Gazprom \$ 11.5 bln	<p>The plant will be built near the seaport of Ust-Luga in the Leningrad Region. Its annual capacity will amount to 10 million tons. The potential target markets for the project include countries in the Atlantic region, Middle East, and South Asia, as well as small-scale LNG markets in the areas of the Baltic and North Seas. Commissioning is planned in 2022-2023.</p>
5.	Vladivostok-LNG	Primorye Territory	Gazprom \$13.5 bln	<p>Under the Vladivostok-LNG project, a liquefied natural gas plant will be built in the Khasansky District of the Primorye Territory. The plant will have three process trains with an annual capacity of 5 million tons of LNG each. The first train will become operational in 2018. The LNG plant (first two trains) will be fed with gas from the Sakhalin gas production center as well as (third train) from the Yakutia and Irkutsk centers. The Asia-Pacific region will be the target market of the project.</p>

5.3 Key players per submarket

GAZPROM

The Gazprom Group is the world's largest energy major in terms of natural gas reserves and production.

Producing 11 per cent of the global gas output, the Gazprom Group is among the leading oil and gas companies worldwide. In 2016, the Group extracted 419.1 billion cubic meters of natural and associated gas, 15.9 million tons of gas condensate, and 39.3 million tons of oil.

Gazprom owns the world's biggest gas transmission system capable of continuously conveying gas over long distances across Russia and abroad. The overall length of Gazprom's gas trunklines is 171,400 kilometers.

A new important business for the Gazprom Group is the shaping of the natural gas vehicles market in Russia. Gazprom Gazomotornoye Toplivo was appointed as the single operator responsible for promoting the use of gas as a vehicle fuel.

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ROSNEFT

Rosneft is the second largest gas producer in the Russian Federation and the first among independent producers. The Company produces gas in several dozen subsidiaries and joint ventures in Western and Eastern Siberia, Central Russia, in the Southern European part of Russia, the Far East, and in Vietnam and Venezuela. Every year, the gas segment is becoming increasingly significant for the Company. In 2016, Rosneft's gas production totaled 67.1 billion cubic meters (21% in total hydrocarbon production).

As of January 01, 2017, Rosneft's recoverable gas reserves, according to the Russian classification (ABC1 + C2), amount to 7.6 trillion cubic meters. The Company resource base allows to sustain the increasing gas production. The principal centers of production growth in the coming years are the Rospan, Kharampur and Beregovoe fields, and the Kynsko-Chaselskaya group of fields.

The Company possesses enormous resources of hydrocarbons on the Russian shelf, a significant part of which is natural gas. Rosneft's gas resources on the Russian shelf amount to about 22.7 trillion cubic meters. The shelf deposits are difficult to access, and their connection to the Unified Gas Supply System is economically impractical. Therefore, the most efficient method of monetizing such natural gas resources is their liquefaction and sale in export markets.

In particular, in order to monetize the gas in Sakhalin-1 Project and the gas of Rosneft's own offshore fields in the vicinity of island Sakhalin, the Far Eastern LNG Project is to be implemented under the Production Sharing Agreement (PSA) of Sakhalin-1 Project. The project provides for the construction of a LNG plant in the Russian Far East with the annual capacity of 5 million ton, as well as a sea terminal for LNG shipments and associated gas transportation infrastructure. The resource base for the plant will comprise Rosneft's reserves in the region and those of the Sakhalin-1 consortium.

Further plans include an extensive exploration program at the Company licensed areas on the shelf of the Sea of Okhotsk and the Arctic aimed at converting gas resources to reserves and subsequent development of new LNG production centers.

Rosneft plans to take a 20% share in the Russian gas market. In order to achieve this objective, the Company has recently significantly expanded and continues to expand the supply geography, already covering the regions from Krasnodar to Sakhalin.

The Company continues developing new gas production centers based on its continental assets in the East of Russia: in the Republic of Sakha (Yakutia), in Irkutsk Region and Krasnoyarsk Territory.

The development of the Company's gas business will be based on the application of advanced gas production and processing technologies. In order to achieve these objectives, the Company focuses on the development, economic evaluation and implementation of development technologies for the hard-to-recover gas reserves, large-, medium- and low-scale gas liquefaction, gas-to-liquid conversion.

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SIBUR

SIBUR derives unique competitive advantages from its extensive infrastructure. This includes eight out of a total of nine existing gas processing plants (GPPs) located in Western Siberia (including a JV with Gazprom Neft), as well as five compressor stations and two gas fractionation units (GFUs).

SIBUR has APG processing capacity of 25.4 billion cubic meters per annum (including Yuzhno-Priobskiy GPP - a JV with Gazprom Neft) and raw NGL fractionation capacity of 8.55 million tonnes per annum.

SIBUR sells energy products on the Russian and international markets. In addition it supplies a portion of its feedstock to the Group's petrochemicals business for further processing into a wide range of products.

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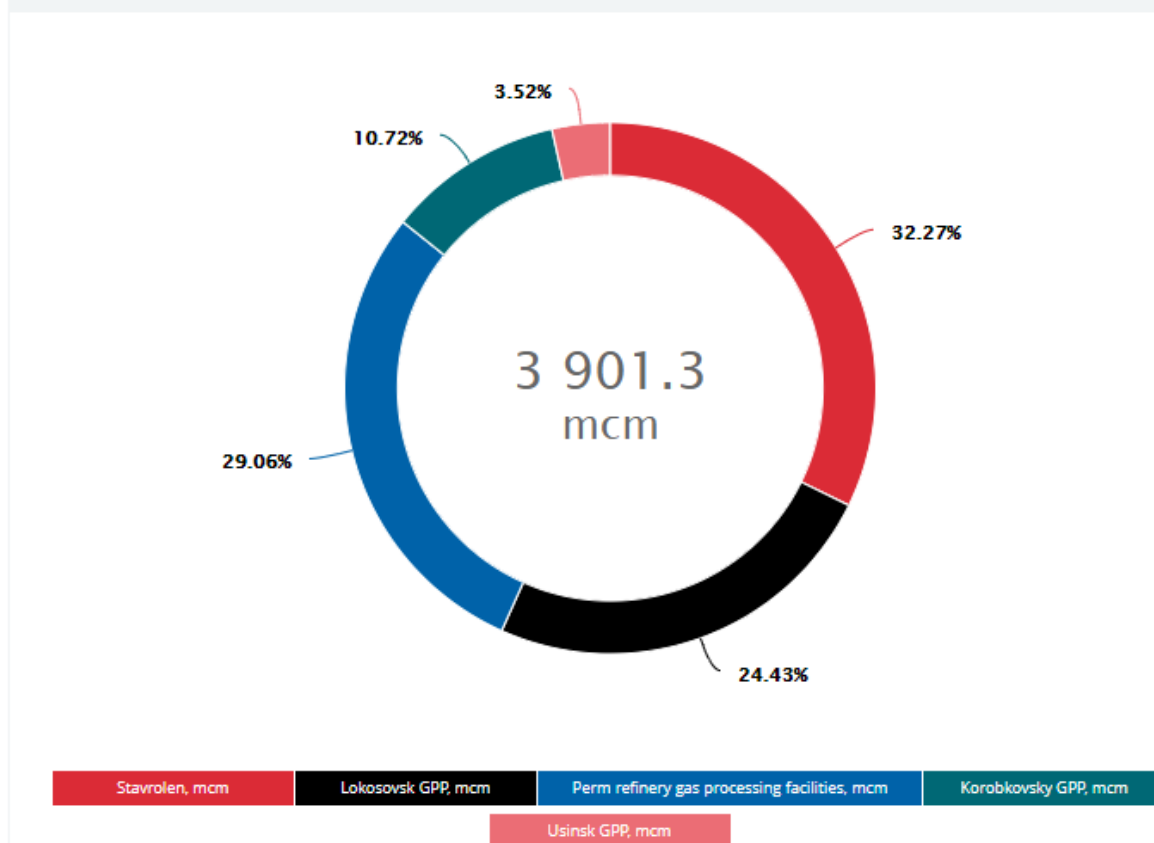
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LUKOIL

LUKOIL Group processes gas and natural gas liquids at three gas processing plants in West Siberia, Timan-Pechora and Volga regions, as well as at the Perm Refinery and on the site of Stavrolen oil and gas chemical complex in the Stavropol Territory. The Group's GPPs process APG extracted by LUKOIL in Russia into liquid hydrocarbons and marketable gas.

In 2016, the natural and petroleum gas throughput increased by 6.6% to 3.9 billion cubic meters, mainly due to the gas processing unit launched at Stavrolen complex in Budennovsk with an annual capacity of 2.2 billion cubic meters.

GAS PROCESSING IN 2016



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SURGUTNEFTEGAS

Surgutneftegas pays special attention to the operating activity in the field of gas production and transportation, its processing volume growth and electricity generation increase at the Company's own power plants.

Gas processing is the important part of an integrated system for collecting and utilizing associated petroleum gas. Gas processing plant of the Company is an up-to-date complex enabling to produce dry stripped gas and liquid hydrocarbons which are widely used in the industrial and business activity in Russia. Products of the plant have high qualitative characteristics and meet the requirements of the state standards of the Russian Federation and technical regulations of the Customs Union.

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6 Fertilizers

6.1 General overview of subsector

Mineral and Chemical Fertilizers are main Russian submarkets in terms of volumes. Due to ruble devaluation fertilizers produced by Russian market leaders become competitive on external markets. As a result, market of mineral fertilizers has been growing annually by 4-5% in average since 2013.

In addition, the growth of chemical production was to a large extent stimulated by the state support of the agricultural sector of the country, due to which the demand for agro-chemicals and mineral fertilizers increased. Due to measures of state support to Russian farmers, domestic demand for agrochemical products (herbicides, fungicides, etc.) and mineral fertilizers increased sharply.

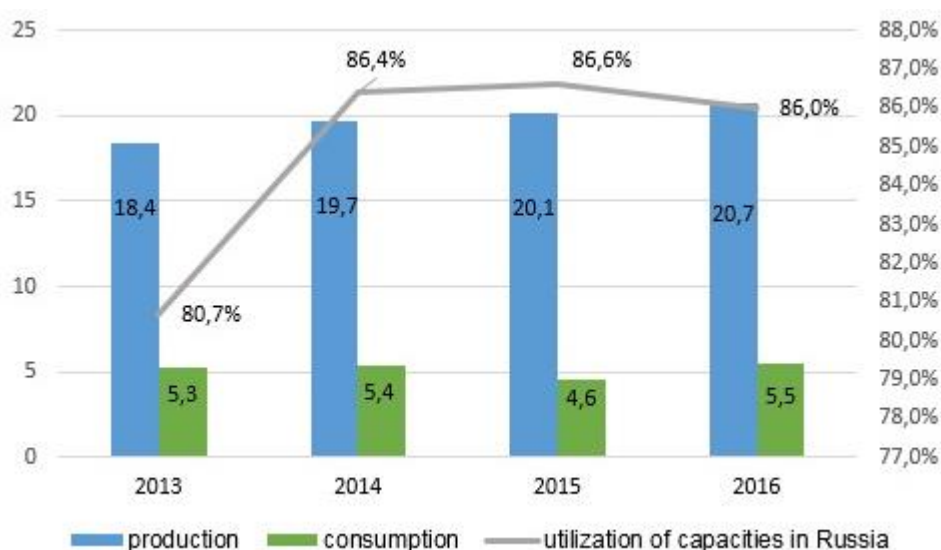


Fig. 6.1-A. Balance of production and consumption of mineral fertilizers in Russia (based on 100% nutrient materials).

Source: Rosstat, CREON

The only segment where the production is dropping is the segment of potassium fertilizers. This can be explained by the fact that Uralkali reduced the capacities because of the accident at the Soilikamsk-2 mine at the end of 2014. The volume of production did not restore.

Table 6.1-1

Growth rates of mineral fertilizers production by type

	2015	2016
Phosphoric fertilizers	7%	9.8%
Nitrogen fertilizers	5.3%	8.5%
Potassium fertilizers	-4.1%	-3.8%

Source: CREON

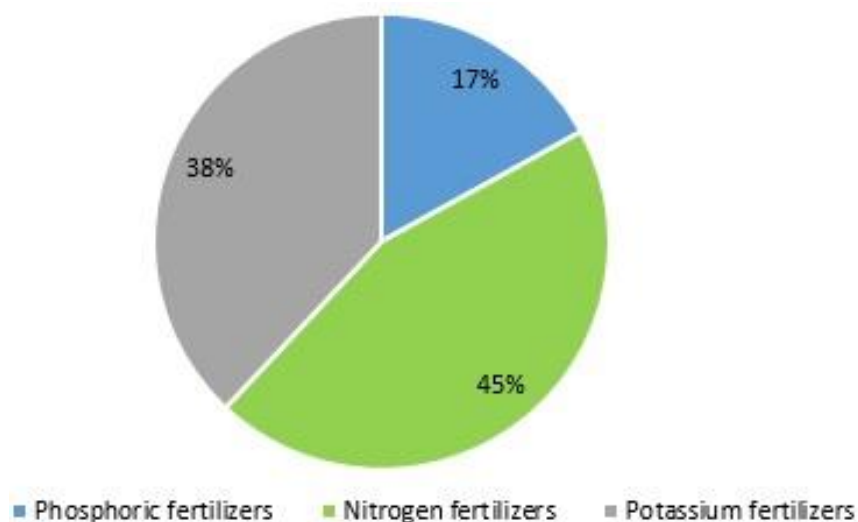


Fig. 6.1-B. Type structure of mineral fertilizers production in Russia, 2016

Source: CREON

Around 70% of Russian mineral fertilizers is exported, the remaining 30% almost fully cover the demand of the internal market: the share of imported fertilizers makes only 0.5%. The share of mineral fertilizers in the structure of non-resource non-energy related exports makes 20%, including compound fertilizers – 2.4%; nitrogen fertilizers – 2%; potash fertilizers – 1.7%.

Brazil (21%), China (11%) and USA (8%) are the key markets for Russian fertilizers.

6.2 Geography of production facilities and projects, clusters

A weak point of Russian producers of fertilizers is the remoteness of their production facilities from the consumers. The majority of production facilities are located in the heart of the continent far away from the ports of shipment, while similar facilities in the Middle East and USA are located directly in the ports. In Russia, mineral fertilizers are being transported mainly by the railroad to the sea ports. The share of fertilizers in the total rail loadings makes 3% and tends to grow. In January-September 2017, the volume of fertilizers transported by the railway made 42.5 million tons which is 7.9% more than in the similar months of 2016.

In 2013-2015, a number of logistics projects have been launched to develop the logistics infrastructure of the Russian chemical market. As a result, all the key market player - UralChem, Acron, EuroChem, PhosAgro, Uralkali - obtained their transshipment facilities in Russia and Baltic States.

In 2015, PhosAgro launched the Smart Bulk Transshipment Terminal at Ust Luga port (Leningrad region), and invested 150 mln rubles into logistics complexes in Krasnodar and Bryansk regions.

Acron commissioned a new ammonia loading facility with capacity of 1500 tons per day in Veliky Novgorod.

Another large investment project is being realized by Togliattiazot in the Krasnodar region. The unique infrastructural facility, a deep-water seaport for the transshipment of ammonia and bulk fertilizers on the Taman Peninsula, goes 2.5 km down into the Black Sea below its above-water loading rack. The total volume of investment may exceed USD 300 million. The marine terminal in the Black Sea is expected to be started up by 2020.



Fig. 6.2-A. Mineral fertilisers' production clusters

6.3 Key players per submarket

Russian market of mineral fertilizers is consolidated. Main players in the segment of nitrogen and phosphoric fertilizers are EuroChem, Uralchem, PhosAgro and Acron. Main player on the ammonia market is Togliattiazot - capacities of the plant make 22% of the Russian ammonia production volume. Key player on the carbamide market in Russia is Nak Azot -17% of the Russian carbamide production volume.



Fig. 6.3-A. Largest producers of fertilizers in Russia by output in 2016, bln. rub. Source: RBC Research

EUROCHEM

EuroChem headquartered in Zug, Switzerland, is a leading global fertilizer company producing nitrogen and phosphate fertilizers, as well as organic synthesis products and iron ore. It is a vertically integrated company with own mineral extraction, manufacturing, logistics, research, distribution and advisory operations.

Nitrogen fertilizer plants produce a wide range of mineral fertilizers, such as urea, AN, UAN, and CAN, as well as specialized fertilizers that do not contain chlorides and treated with inhibitors. EuroChem is Russia's only producer of melamine; in addition, the company manufactures industrial products such as nitric acid and methanol, as well as industrial gases, including argon, nitrogen and oxygen.

High-quality phosphate raw materials extracted and processed at Kovdorsky GOK (Murmansk region) represent the main component of phosphoric fertilizers production chain. At the moment, the Company produces nitrogen and phosphate fertilizers, and in the near future the production of potash fertilizers will also be launched, which will further expand the range of products.

EuroChem is one of the fastest growing large fertilizer producers, which is planning to enter the top-5 world leaders in terms of production over the next three years.

The geography of production assets is gradually expanding and covers Russia, Lithuania, Kazakhstan and Belgium, as well as China, where the joint venture was launched. These assets have direct access to major markets through a logistics and distribution network that currently operates in more than 25 countries. At the end of 2017, EuroChem employed more than 25,700 people across the world.

In addition to nitrogen and phosphate operations, EuroChem have invested about US\$4.13 billion in two new potash extraction and processing operations in Russia (VolgaKaliy and Usolskiy). Once they are commissioned, EuroChem will be one of only three companies globally that operate in all three main nutrient segments.

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PHOSAGRO

PhosAgro is one of the world's leading vertically integrated producers of phosphate-based fertilizers. Its core line of business is the production of phosphate-based fertilizers, high-grade phosphate rock (with a content of P₂O₅>35.7%), as well as feed phosphates, nitrogen fertilizers and ammonia. Structurally PhosAgro is a holding company whose major assets include Apatit and Balakovo Mineral Fertilizers (BMF), PhosAgro-Cherepovets (established via the merger of Ammophos and

Cherepovetsky Azot in 2013), Agro-Cherepovets, and Metachem. The company's overall fertilizer capacity accounts to 6.4 mln tonnes, ranking it the third largest globally after Mosaic and OCP (excluding Chinese producers).

Structurally, PhosAgro is a holding company whose major assets include Apatit and Balakovo Mineral Fertilizers (BMF), PhosAgro-Cherepovets (established via the merger of Ammophos and Cherepovets Azot in 2013), Agro-Cherepovets, and Metachem. The company is self-sufficient in key feedstock (100% in phosphate rock, up to 90% in ammonia and 40% in electricity), which makes it a low-cost producer.

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Fig. 6.3-B. PhosAgro production assets. Source: Gazprombank

URALKALI

Uralkali is the world's leading vertically integrated producer of potassium chloride (KCl), which is the key nutrient for crops development together with phosphate and nitrogen-based fertilizers. The company accounts for 20% of the world's potash production and 23% of the potash export market.

The company develops the Verkhnekamskoye potassium and magnesium salt fields in Perm region of Russia, which is the world's second-largest deposit in terms of ore reserves. The company's production facilities include five mines, six potash plants and one carnalite plant, all located in the towns of Berezniki and Solikamsk (1,600 km from Moscow), where the company produces standard white, pink, and premium granular potash. The company has a transport division that includes 8,000 railcars and a fertilizers terminal at St. Petersburg Sea Port with total capacity of 8 mln tons. The company's headcount totals more than 21,000 employees, of which nearly half are involved in the main production units.

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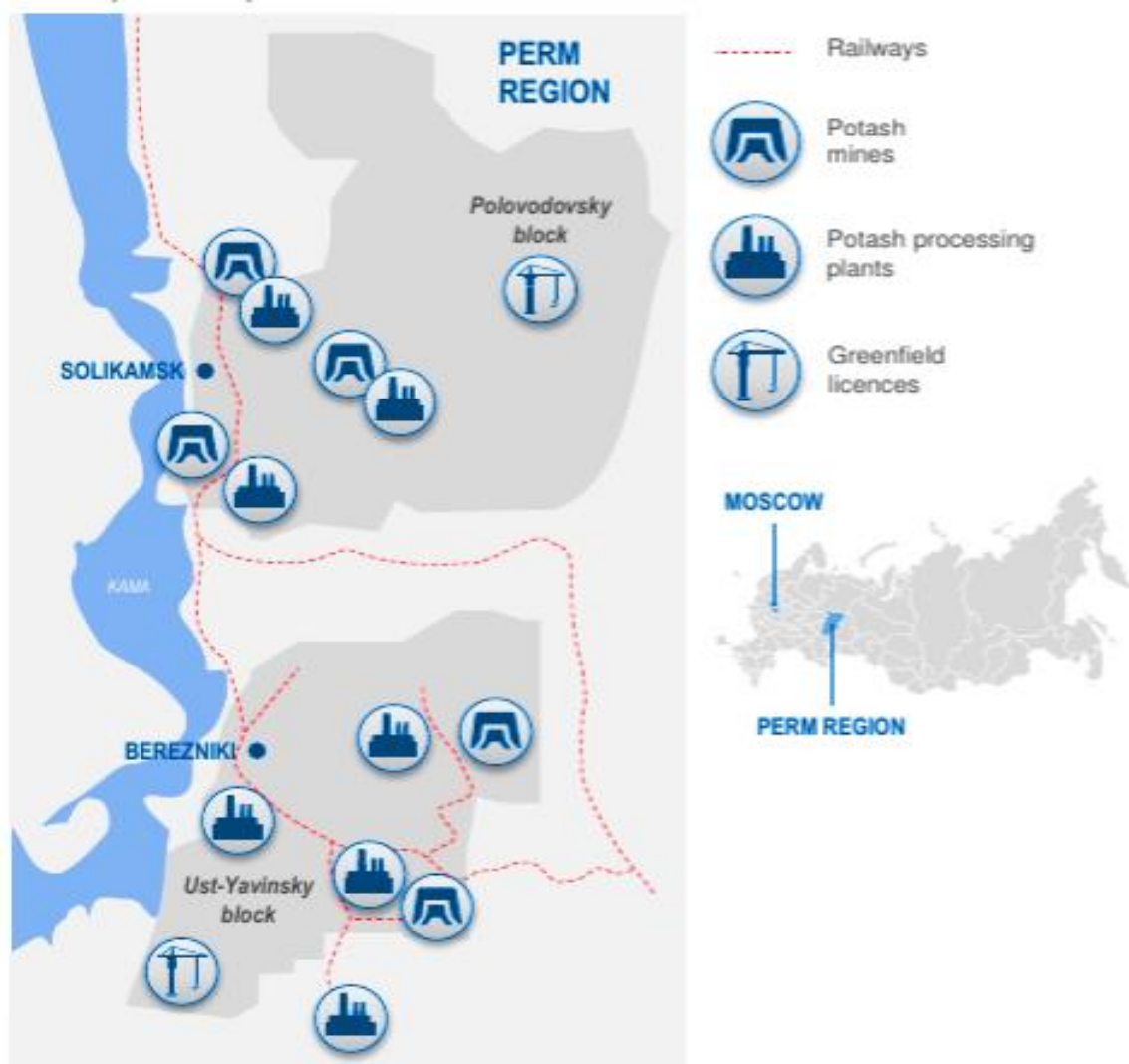


Fig. 6.3-C. Uralkali production assets. Source: Gazprombank

URALCHEM GROUP

UralChem Group is the largest ammonium nitrate producer in Russia and the second largest ammonia and nitrogen fertilizer producer in Russia.

The key competitive advantage of the Company is the production flexibility which allows maintaining an effective production balance focused on current demand. The Company's production also includes innovative products going along with the latest trends in the mineral fertilizers world market.

The main commodity for the production of nitrogen fertilizers is natural gas supplied under long-term contracts with PJSC Gazprom.

UralChem's key assets include:

- KCKK Branch of UralChem, JSC in Kirovo-Chepetsk, Kirov region;
- Azot Branch of UralChem, JSC in Berezniki, Perm region;
- PMU Branch of UralChem, JSC in Perm, Perm region;
- Voskresensk Mineral Fertilizers, JSC (Minudobrenya, JSC), Voskresensk, Moscow region;
- Perm Mineral Fertilizers, Joint Stock Company;
- UralChem Trading House LLC (Trading House URALCHEM), Perm, Perm region;
- SIA Uralchem Trading (Latvia);
- Uralchem Trading do Brasil LTDA (Brasil);
- Uralchem-Trans, LLC, Moscow;
- Riga Fertilizer Terminal Limited (Latvia);
- SIA Ventamonjaks (Latvia).

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Fig. 6.3-D. UralChem production assets. Source: UralChem website

ACRON

Acron is a leading Russian fertilizer company that produces nitrogen (ammonia, urea, UAN, AN) and complex fertilizers (NPK), organic and non-organic compounds (methanol, formaldehyde), and phosphate rock.

The holding comprises two fertilizer plants in Russia (Acron and Dorogobuzh); one production facility in China (Hongri Acron); and a mining and processing plant in Murmansk region that produces phosphate rock (Oleniy Ruchey). It also develops potash deposits in Perm region and has potash licenses in the Canadian province of Saskatchewan.

The Company has three Baltic Sea transshipment port terminals with aggregate throughput capacity of over 5 million tons annually, extensive distribution networks in Russia and China, wholly-owned trading companies. It exports their products to 5 countries.

Acron also owns a 1.13% stake in Uralkali worth \$130 mln and a 20% stake in Polish Grupa Azoty worth \$400 mln. Total headcount numbers more than 16,000 employees.

Acron is a member of the International Fertilizer Industry Association, the European Fertilizer Import Association and the Russian Fertiliser Producers Association

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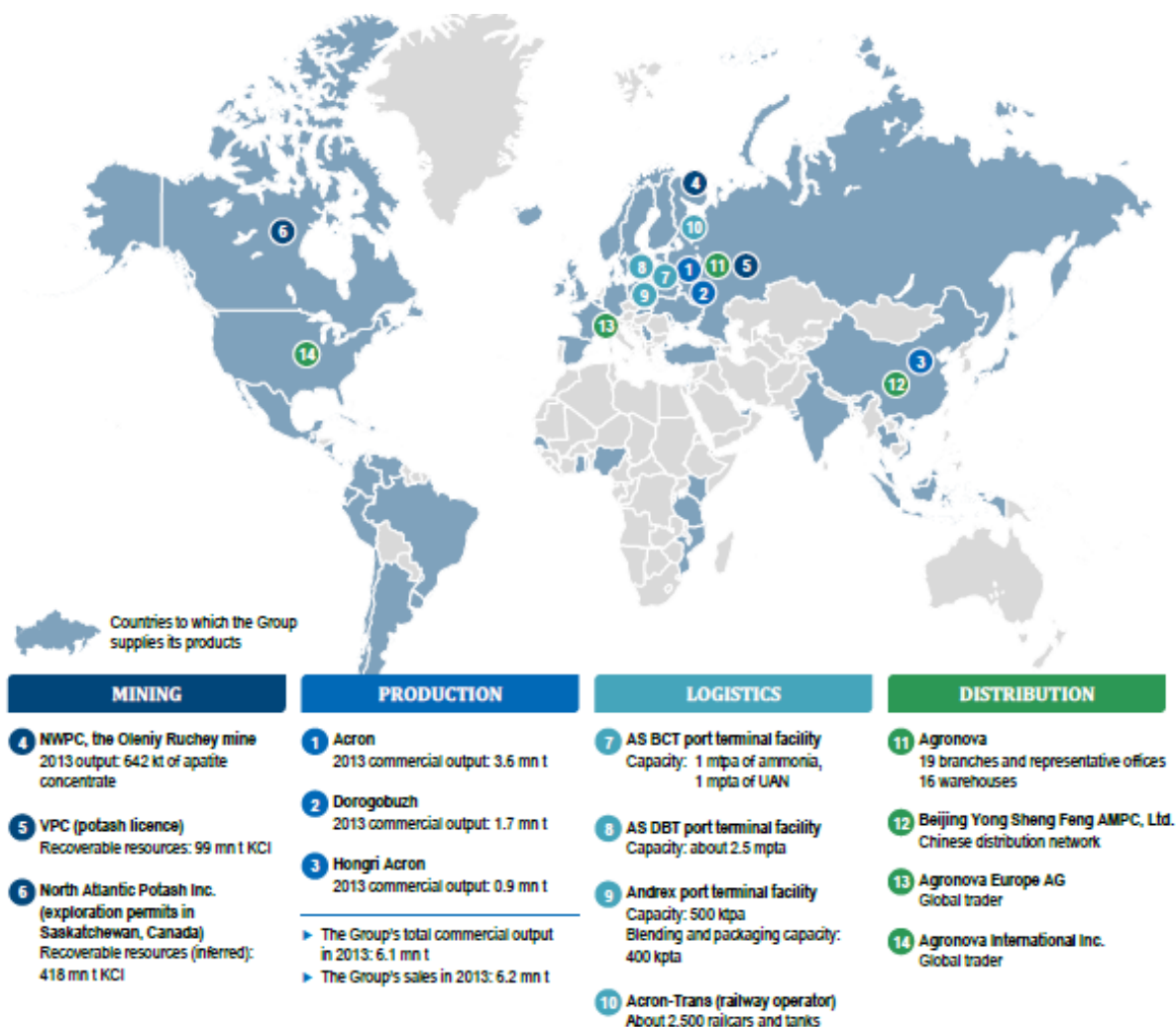


Fig. 6.3-E. Acron production assets. Source: Gazprombank

TOGLIATTIAZOT

Togliattiazot (TOAZ) is one of Russia's largest producers of chemicals. The company is among the top three producers of ammonia in Russia and the top ten worldwide. Togliattiazot is the only chemical company in the world with production capacity of about 3 million tons of ammonia annually. PJSC Togliattiazot (Togliatti, Samara region), being the world's largest producer of ammonia, is the core enterprise of the company. Its main activity is the production of mineral fertilizers: ammonia, urea and urea formaldehyde condensate (UFC). More than 4 thousand people work at the main production site of the company.

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7 Polymers and Plastics

7.1 General overview of subsector

Four challenging and crisis years in the Russian plastic industry have passed. Experts play with the forecasts, though all come to the same conclusion: quick recovery of the field should not be expected. At the same time, commissioning of new polymer production facilities that may also boost the growth of refinery makes the players keen.

In recent years, commissioning of new facilities has led to the growth of base polymer production. Compared to 2010, production of five types of polymers (i.e. PE, PP, PS, PVC, and PET) has increased almost by 55% and, according to experts, exceeded 5 mln tons in 2017. The demand has shown a slower growth – plus 17.5% over seven years, and consumption figures at the end of the year are expected about 5.13 mln tons. Summary capacity of polymer production comprises 5.44 mln tons. At that, an apparent surplus of capacities is observed in polypropylene segment, and deficiency – in production of emulsion PVC, film and fibre PET, and linear polyethylene.

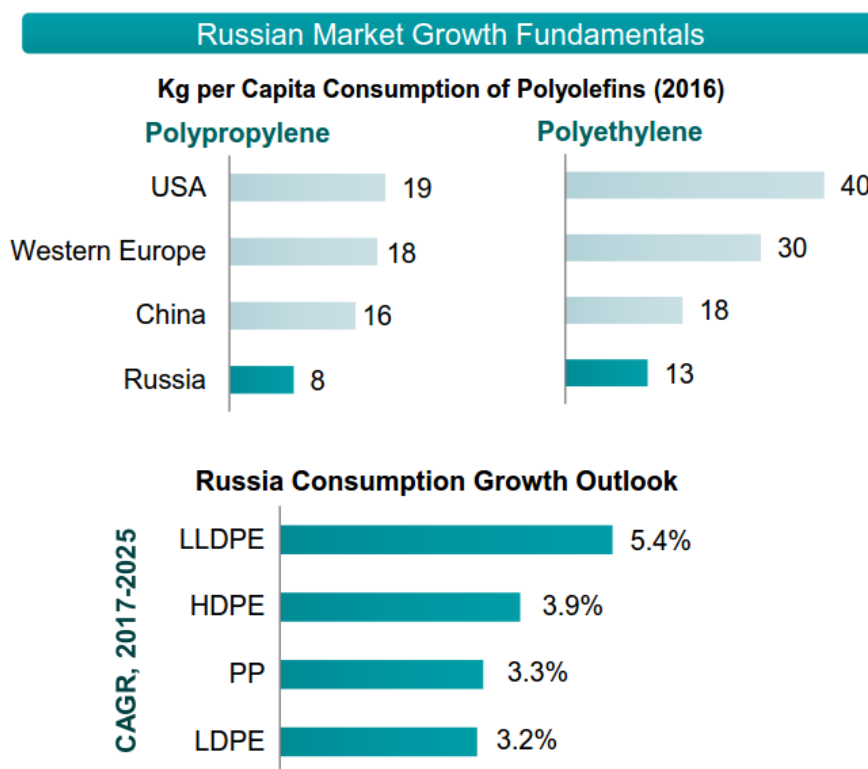


Fig. 7.1-A. Russian market Growth Prospect 2017-2025. Source: SIBUR

According to Minpromtorg, the volume of investment into the chemical complex has been constantly growing and reached over one and a half trillion rubles but this is still not enough for a dynamic development. One of the main goals set by the chemical and petrochemical complex development strategy for the period till 2030 is to move away from the raw materials export model of development, thus, increasing the share of export of high refinery products from 21% to 45% and decreasing import in consumption of high refinery products from 46% to 28%. In 2016, the enterprises of the chemical complex were granted 2.4 billion rubles from the government budget, from the beginning of 2017 – 3.43 bln rubles.

Structure of the Russian market by product type

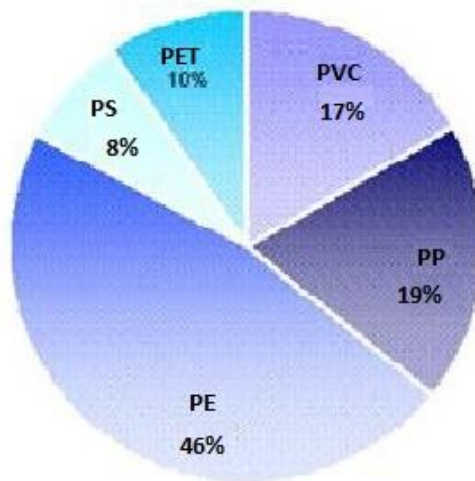


Fig. 7.1-B. Structure of polymer market. Source: Eurasian Economic Commission

As visible from the figure above, polyethylene (PE) and polypropylene (PP) take the largest shares in the Russian market structure – 46% and 19%, respectively. Share of other polymers: polyvinylchloride (PVC), polystyrene (PS), and polyethylene terephthalate (PET), is significantly lower.

Polyethylene

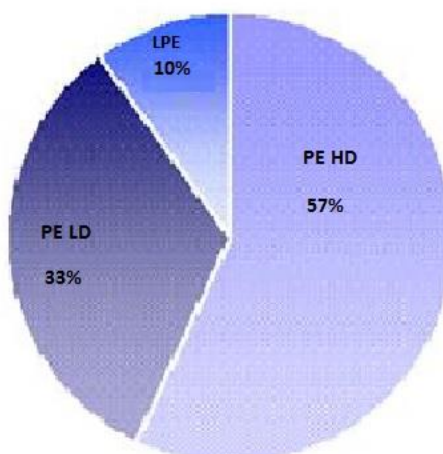
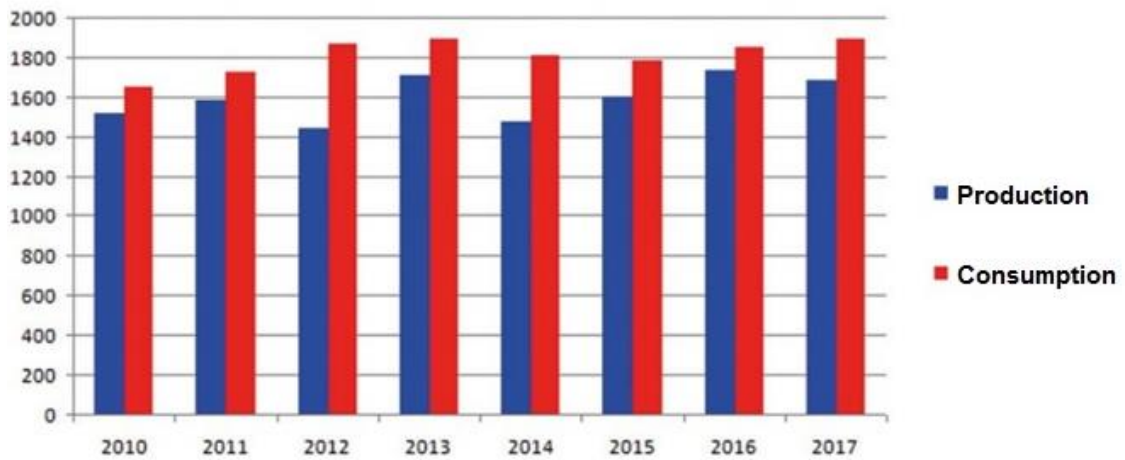


Fig. 7.1-C. Structure of Polyethylene market by product. Source: Eurasian Economic Commission

The biggest volume of consumption is notable for high density polyethylene (HDPE) which comprises 55% of the total polyethylene consumption. Second goes low density polyethylene (LDPE) with 33% of the total volume, and the share of linear polyethylene (LPE) comprises only 10% of the total consumption volume of polyethylene in Russia.



Polyethylene (PE): key indicators over 2010-2017 (thousand tons per year)

Fig.7.1-D.Polyethylene indicators for 2010-2017. Source: CREON

As of the year-end 2017, polyethylene production added up compared to the previous year results and reached 1.680 mln tons. The volume of PE consumption in Russia has insignificantly decreased and totalled 1.890 mln tons.

Last year “Nizhnekamskneftekhim” launched an upgraded production of alpha-olefins. As a result, an amount of linear PE grew 1.6 times and reached 73.5 thousand tons. However, despite the upward trend, the linear polyethylene segment remains the most import-dependant. LDPE production kept almost the previous year level, having decreased by only 6 thousand tons. In spite of the production growth in 2016, polyethylene market is in stagnation as regards to commissioning of new capacities. Over the decade, no new enterprise has been commissioned, all gain came from the modernization and upgrade of the existing facilities. That is why, force-major at any of the operating plants may destabilize the market and lead to a dramatic price leap.

Polypropylene

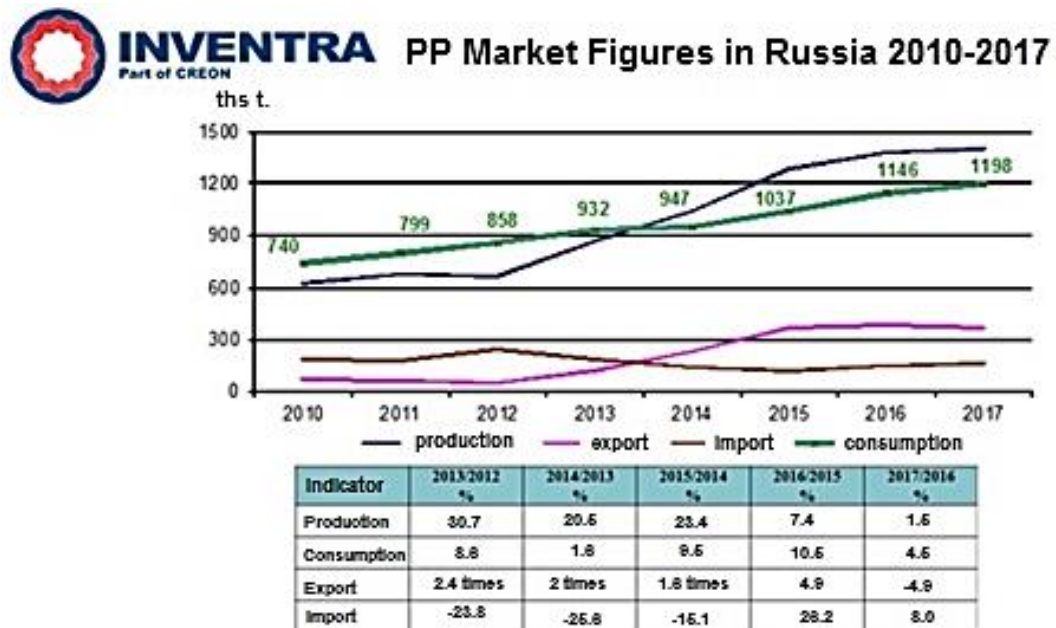


Fig.7.1-E.Polypropylene indicators for 2010-2017. Source: CREON

Polypropylene market can be generally described in two phrases: capacity surplus and favourable foreign trade balance. Thanks to investments and capacities development, PP production in Russia has grown by 120% during 10 years, and

consumption – by more than 60%. Polypropylene capacities comprise 1.42 mln tons at the moment, and the enterprises operate at a high level of utilization. In 2017, polypropylene production made up 1.390 mln tons, and consumption - 1.200 mln tons. The propylene market has been actively developing over the last four years due to implementation of two new projects, “Sibur-Tobolsk” (500 000 tons) and “Poliom” (210 000 tons). Today the growth has reached its ceiling, capacity utilization is up to 98% and pretty close to the threshold. In these conditions local companies has paid their attention to high margin products.

As of the year-end 2016, copolymers production in Russia reached its maximum of 280 thousand tons, having increased by 12% from the previous year. In 2010 the share of copolymers in overall polypropylene production was 9%, while in 2016 this share increased up to 20.3%.

The demand for polypropylene has been growing and over the last seven years has increased by 50%. Domination in the structure of PP consumption is distributed as follows: consumer goods (30%), fibre (20.5%), films (19.2%), nonwoven fabric and pipes (11.3% and 6.1%, respectively).

Polystyrene

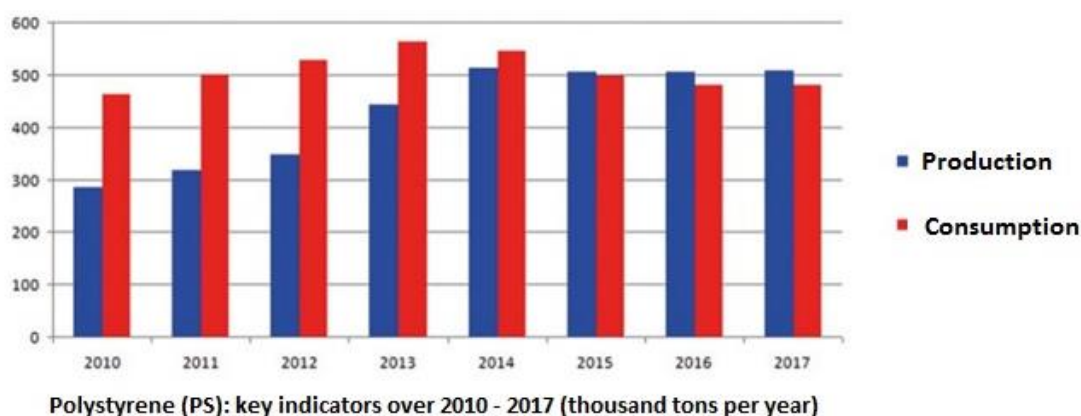


Fig.7.1-F.Polystyrene indicators for 2010-2017. Source: CREON

Despite almost double increase of polystyrene production since 2010, the polymer consumption has been going down four years in a row after its maximum in 2013. Production capacities are close to their peak utilization, while supply from the PS producers exceeds the demand. The structure of PS production is determined by two dominants: general purpose polystyrene/high impact polystyrene (73.8%), and expandable polystyrene (23%). As for acrylonitrile butadiene styrene, its deficit in the market is severe as its production comprises only 3.2% of the total volume of styrene plastics production.

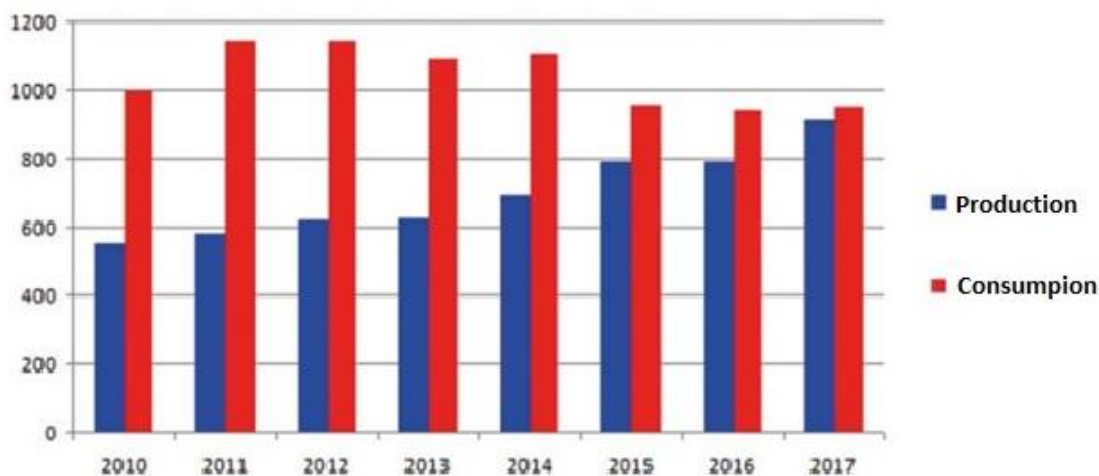
New projects on PS and ABS production are rather unlikely to be implemented in the nearest future given some decline in consumption volume. The construction industry is still underperforming. Automotive industry is also not fully recovered after the crisis. And, on the other hand, given the decline of the buying capacity, explosive sales growth of household appliances should not be expected, as well.

On October 18, 2018, the conference “Polystyrene, ABS and Expandable Polymers 2018” will be held in Moscow to gather representatives of the Russia leading manufacturers and processors of polystyrene and ABS in order to define the mechanisms that may foster the market growth.

Polyvinylchloride

As of the year-end 2017, the total PVC production made up about 900 thousand tons, which is 14% increase compared to the previous year results. As for consumption, the increase was insignificant, i.e. only 1.4% and made up 954 thousand tons.

The main consumption volume is due to S-PVC that has been processed in Russia over the last three years, including 2017, at the level of 830 thousand tons, while the real consumption is a bit lower: annually some forty or sixty thousand tons of S-PVC are found at the warehouses as the surplus. Its import is the main price controller at the local market, that’s why even in case of surplus, it will be maintained, at least at a minimum level. In case of balanced operation of the Russian manufacturers, demand for suspension PVC can be fully covered by the domestic production. That is why, 2017 was the first year when after a long while S-PVC production exceeded the demand, and the export volume exceeded the import supplies that, based on the 2017 results, reached the minimal 57 thousand tons.

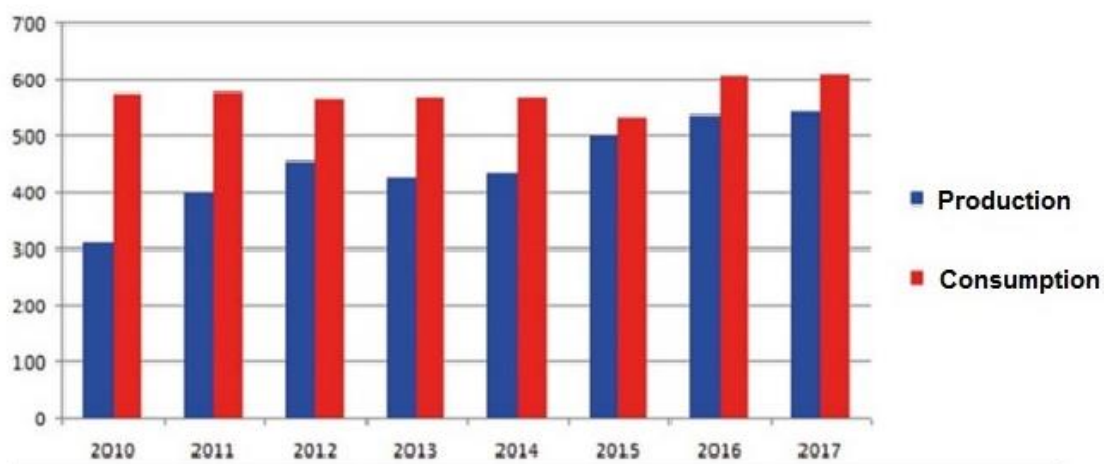


Polyvinylchloride (PVC): key indicators over 2010 - 2017 (thousand tons per year)

Fig.7.1-G. Polyvinylchloride indicators for 2010-2017. Source: CREON

At that, emulsion polyvinylchloride directly depends on the import supplies, and the situation seems not to change. In Russia E-PVC is known to be produced only by one enterprise, "RusVinyl", which capacity makes up 30 thousand tons. As of the year-end 2017, consumption totalled about 124 thousand tons, that is 15 thousand more compared to 2016. Increment in E-PVC segment is, first of all, expected due to production of floor coatings and wall paper. Import dependence will grow with demand increase, unless a new manufacturer appears in Russia. Results of 2018 will be traditionally discussed at an industrial conference on December 4 this year.

Polyethylene terephthalate



Polyethylene terephthalate (PET): key indicators over 2010-2017 (thousand tons per year)

Fig.7.1-H. Polyethylene terephthalate indicators for 2010-2017. Source: CREON

In 2017, 540 thousand tons of PET were produced in Russia, and 610 thousand tons were consumed. The leading producers of PET in Russia are: "Polief" (40%), "Alco-Naphtha" (29%), "Senega" (17%), and "Sibur-PET" (14%).

The PET market is featured by a biased consumption: it is packaging that is basically being developed. One of the main PET consumption segments in Russia is water and beverages bottling. If decision regarding low alcohol drinks resulted in restriction on container size, bottled water is not restricted with anything. However, in the recent years its consumption has slightly grown, thus, demand for PET containers has also increased insignificantly.

Almost all PET-fibre and nonwoven materials produced in Russia are made from bottled PET wastes. Demand for polyester fibre is rapidly growing (+12.5% over the last year), though the import share is still suppressing (over 60%). In this regard, launch of a domestic fibre production in 1Q 2020 is of special importance.

"Polief" is also the only manufacturer of terephthalic acid that is used for PET production. It is assumed that in 2019 Sibur will close down TPA production for modernization for a four month period. The lack of required volumes is planned to be fulfilled by importing raw materials, first of all, from the South-East Asia. However, overproduction of TPA in China creates the risk that cheap import products will be more preferable than local ones, even after upgraded facilities are commissioned.

On the contrary, PET recycling is getting more and more promising. The number of projects on separate waste collection is increasing, and products manufactured from the recycled polymers are more and more applied in various fields and industries.

7.2 Geography of production facilities and projects, clusters

In general, location of the largest polymer production in Russia follows the same cluster strategy as established by the Ministry of Energy of the Russian Federation in 2012 in its "Plan of gas and petrochemistry sectors development in Russia for up to 2030". The document provides formation of six clusters which consider location of the existing productions and raw materials sources, as well as plans of the market players on development and new facilities construction.

Each of the clusters includes pyrolysis facilities as a core which consolidates plastics and rubber productions and production of end products of gas chemistry and petrochemistry.

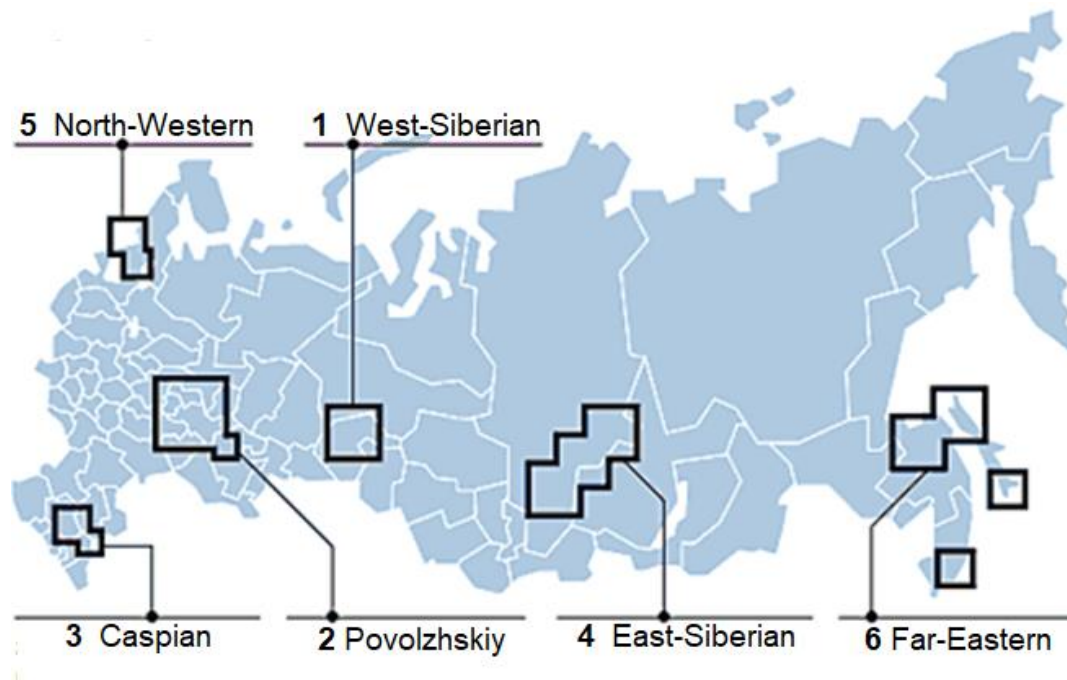


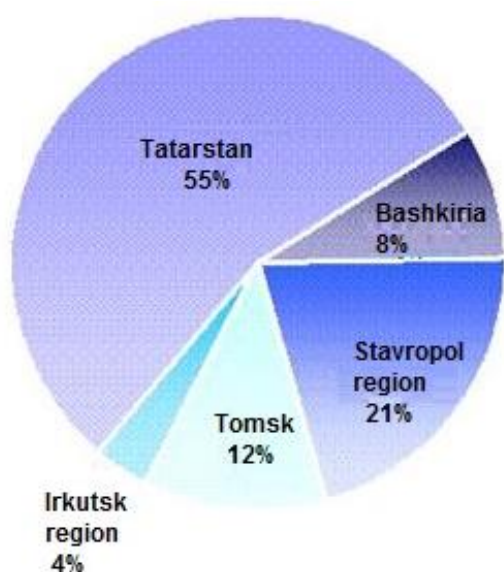
Fig. 7.2-A. Oil and gas chemical clusters of Russia

Polymer production by cluster:

Cluster	Description
1. West-Siberian	The cluster is located in Tyumen' region: SIBUR: "Tobolsk-Polymer" (part of LLC Sibur Tobolsk), TomskNefteKhim, ZapSibNefteKhim, which is currently under development; GAZPROM: Gas Chemical Complex Novourengoyskiy

Cluster	Description
2. Povolzhskiy (Volga)	<p>The biggest oil and gas chemical cluster in Russia. It includes industrial facilities located in Republics of Tatarstan and Bashkiriya, Nizhniy Novgorod and Samara regions:</p> <p>SIBUR: Sibur-Kstovo, Sibur-Khimprom, Sibur Togliatti (Togliattikauchuk), POLIEF, RusVinyl (JV of Sibur and Belgian SolVin);</p> <p>TAIF: Kazanorgsintez, Nizhnekamskneftekhim;</p> <p>GAZPROM: Gazprom Neftekhim Salavat.</p>
3. Caspian	<p>The cluster is intended for processing of the raw materials produced in Caspian area and Stavropol region.</p> <p>Main polymer enterprise of the cluster is LUKOIL's petrochemical plant STAVROLEN.</p>
4. East-Siberian	<p>The cluster located in the south of Krasnoyarsk and Irkutsk regions:</p> <p>Rosneft: Angarsk polymers plant</p> <p>SIBUR: Krasnoyarsk Synthetic Rubber Plant</p> <p>The deposits in this area are prolific with helium and its utilization is a challenging question for the cluster development.</p>
5. North-Western	<p>The cluster is based on the oil and gas chemical facilities on the Baltic sea and has an export orientation to the European market.</p>
6. Far-Eastern	<p>The cluster is located in the Primorye Territory. According to the Plan it includes Eastern petrochemical company of Rosneft and Amur gas chemical plant. Both projects are now under development.</p>

Geography of Polyethylene market



Geography of Polypropylene market

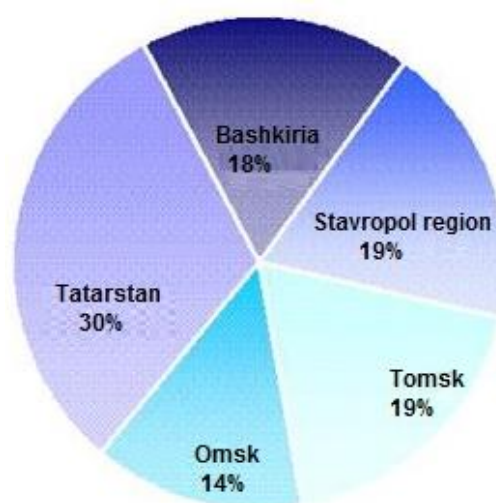


Fig.7.2-B. Geography of PE and PP market. Source: Eurasian Economic Commission

7.3 Projects

As of beginning 2018, there are 3 projects planned for PET, two – for polystyrene, seven – for polyethylene, and three – for polypropylene. Total capacities for the declared projects may comprise 1.75 mln tons (+175 thousand of polyester fiber) of PET, 550 thousand tons of polystyrene, 8 mln tons and 3 mln tons of polyethylene and polypropylene, respectively. The planned productions are supposed to be constructed with application of import technologies and licences that is why the planned release of base polymers will not be a solution to the import substitution of the deficit types. The first to commissioning is “ZapSibNefteKhim” in Tobolsk.

ZapSibNefteKhim

Beating the schedule, one of the greatest construction sites in Russia today - “ZapSibNefteKhim” in Tobolsk - will also become the largest petrochemical complex in the country upon commissioning in 2019. This is a unique enterprise by SIBUR for raw hydrocarbons deep conversion to polyolefins.

The project implementation is aimed at development of deep conversion of oil and gas extraction by-products in West Siberia, including associated petroleum gas (APG). The new complex will allow to utilize up to 20 bln m3 of APG in process, thus avoiding its burning at deposits and emission of pollutants in amount of about 7 mln tons a year. For the “ZapSibNefteKhim” project SIBUR Holding declared the budget of 4.2 bln UDS for 2018-2020.

The scale is impressive indeed: within the area of 460 ha the grand highly technological construction was launched. The following equipment will be used for the project: pyrolysis plant with capacity 1.5 mln tons of ethylene (technology by Linde AG, Germany), about 500 000 tons of propylene (technology by LyondellBasell, the Netherlands), and 100 000 tons of butane-butylene fraction (BBF) a year; production plants of various polyethylene and polypropylene types with total capacity 2 mln tons a year, as well as about 240 000 tons of high-margin by-products (vinyl ethylene, buten-1, methyl tertiary butyl ether, pyrolysis naphtha). Today the operating industrial facilities of SIBUR-Tobolsk (“Tobolsk-NefteKhim” and “Tobolsk-Polymer”) produce about 0.5 mln tons of polymers per annum.

The supply of construction materials come on site from 35 region of Russia and total 226 bln rubles.

Nizhnekamskneftekhim

In 2017 at St-Petersburg International Economic Forum a memorandum on strategic cooperation between TAIF Group and LINDE was signed. In particular, it concerned implementation of a huge ethylene complex for “Nizhnekamskneftekhim” with the total capacity 1.2 mln tons p.a. The construction is planned in four stages. The investment for the first stage is announced 868 million euro. The new complex will allow to triple the production of ethylene by “Nizhnekamskneftekhim” - up to 1.8 mln tons per year, to triple production of polymers and to increase release of rubbers up to 1 mln tons.

The project implementation is planned for ten years and is in the focus of Tatarstan government attention.

Besides ethylene, the project provides for construction of plant for production of value-added products: polyethylene, polypropylene, polystyrene, and some other by-products.

However, the project of olefin giant is not only about construction of manufacturing facilities, it also provides for arrangement of storm water treatment system, process waste storages, as well as a new chemical collector that is part of a bio WWTP. Moreover, new type of pyrolysis ovens will minimize the emissions to the air. As a result, the complex is expected to be both complicated and one of the most technological in CIS region.

Details for the first stage:

- **Alpha-Olefins Plant – 37.5 kta**

New technology for alpha-olefins production will allow to maximize the output of such desired products as butane and hexane monomers to be use in polyethylene production.

The License Agreement has been signed, the Extended Basic Engineering is in the completion phase, equipment manufacture is ongoing.

- **Olefins Complex EP-1000 and Polyolefins**

The Complex includes 1000 kta Ethylene Plant, 600 kta Polyethylene Plant, 400 kta Polypropylene Plant. The License Agreements have been signed, the Extended Basic Engineering is in the completion phase

GC Titan

On May 21, 2018 Special Economic and Industrial Zone “Mogolino” and LLC “Pskovsky Plant “Titan-Polymer”” made an agreement of intention with regard to the future project realization at the territory of the Technopark.

Group of Companies "Titan" intends to invest in establishment of a new complex on production of PET-granules and BOPET films almost 13 bln rubles. The project execution is planned in two stages. The first stage (2018-2020) – construction of PET-granule plant with capacity of 168 thousand tons per year and the first film production line with capacity up to 35 thousand tons per year. The second stage (2019-2020) – construction of the second BOPET production line of similar capacity. The main distribution market is thought to be Russia, as well as CIS and European countries. The manufacturing facility will meet all the environmental requirements. The new complex will become the unique in Russia and will fully comply with the import-substitution requirements.

Novourengoyskiy gas chemical complex

Novourengoyskiy gas chemical complex is constructed 30 km away from Noviy Urengoy, Yamalo-Nenetskiy region. The planned production capacity is 420 kta of LD polyethylene of various types. The produced polyethylene is promised to be of extreme purity and can be used for medical purposes. 200 kta of the production volume is already known to be exported, mainly to China.

Besides, the new enterprise is supposed to release an extended hydrocarbons fraction and methane fraction. Gas from Urengoy GCF will be used as a feedstock for ethylene and polyethylene production. Commissioning is planned for 2019, though the main construction works should already be completed in 2018.

Amur gas chemical plant

Amur gas chemical complex is one the priority SIBUR projects implemented in Svobodniy, Far-Eastern cluster. The total plan for polyethylene, according to the original concept, is 2 mtpa, i.e.:

1 stage: till 2021 – 1200 kta

2 stage: till 2024 – 800 kta

The construction meets the governmental strategy for petrochemical development and Plan-2030. The investment in the project is estimated as 7 bln USD.

Orient Petrochemical Company

Orient Petrochemical Company is a Russian company, part of Rosneft group, established specifically to implement construction of a petrochemical complex with capacity 30 mln tons of raw material per annum in Far East. The project was aimed to solve the problem of local deficiency and high process for motor fuel in Far East Federal District and become the ground for the petrochemical cluster in the region. Besides, crude oil refining and pyrolysis installation with 3.4 mtpa capacity commissioned at the first stage, the following production is planned for release:

- Polyethylene — 850 kta – for production of a wide range of polymer films and pipes;
- Polypropylene — 800 kta – for production of various cable and medical products;
- Vinyl ethylene — 200 kta – for production of synthetic rubbers (PBR, SSBR, EPDM etc.);
- Benzene — 230 kta – feedstock for pharma, plastics, synthetic rubber, dyes;
- MEG — 700 kta – for production of a wide range of home care goods (synthetic fibers, solvents, low-freezing and pressure liquids).

The project is implemented in two stages. Stage 1 is expected to be commissioned 2020, Stage 2 – 2022.

According to different sources, investment is estimated from 660 bln to 1300 bln rubles.

7.4 Key players per submarket

KAZANORGSINTEZ

Kazan Public Joint Stock Company "Organicheskiy sintez" is one of the largest chemical companies of the Russian Federation. PJSC Kazanorgsintez produces more than 38% of the total Russian output of polyethylene and it is one of its major exporters. PJSC Kazanorgsintez possesses the leading position in production of gas polyethylene pipelines.

The enterprise is located in Kazan, Tatarstan, and is part of TAIF Group.

The polymer manufacturing comprises:

- Low density polyethylene plant
- High density polyethylene plant
- Polycarbonate production plant

The LDPE plant produces polyethylene composition for production of cord items shells, cable compositions of polyethylene (natural and black colors), polyethylene composition for high-speed extrusion, polyethylene composition for large-size items production by rotary molding. LDPE Plant is a unique producer of electric conductive compositions of polyethylene for special cables and pipes productions for explosives transportation in mineral resource industry in CIS.

HDPE production and processing plant produces different ethylene grades of high and medium density as well as linear low density polyethylene and bimodal high density polyethylene. Output products are intended for processing by extrusion, blow and injection molding methods, for production of film articles, pressure pipes for gas and water supply. HDPE is used as feed stock. It produces polyethylene pipes and fittings for gas and water supply.

Construction, pre-commissioning and start-up works at Polycarbonates production plant with capacity of 65 thousand tones per year were completed at JSC "Kazanorgsintez" in 2008. "Kazanorgsintez" is the only producer of polycarbonate in Russia.

According to the Company's annual reports, as of YE2016 the total production volume of ethylene polymers and copolymers was equal to 1, 647 thousand tons.

www.kazanorgsintez.ru/en/

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Address: 101, Belomorskaya str., 420051, Kazan,

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E-mail: kos@kos.ru

NIZHNEKAMSKNEFTEKHIM

PJSC Nizhnekamskneftekhim – one of the largest petrochemical companies in Europe, the leader in the production of synthetic rubbers and plastics in the Russian Federation. The Company is part of TAIF Group. The main production facilities are located in the city of Nizhnekamsk, Republic of Tatarstan. The Company was founded in 1967.

The range of products output comprises more than 120 items. Major commodities are:

- general purpose and specialty synthetic rubber;
- plastics: polystyrene, polypropylene, polyethylene and ABS-plastic;
- monomers being a feedstock to produce rubbers and plastics;
- other petrochemical produce (ethylene oxide, propylene oxide, alpha-olefins, surfactants, etc.)

The Company occupies the leading position among domestic producers of synthetic rubber, plastics and ethylene. It produces more than 120 types of products in four major categories: synthetic rubbers, plastics, monomers, other products - and can perform complex packet delivery of rubbers and plastics.

The Company ranks among the top 10 world producers of synthetic rubber, is the world's largest manufacturer of polyisoprene (43% of the world market) and is among the three leading companies in the production of butyl and halobutyl rubbers.

Sales in the Russian Home Market and export in the International Market are approximately on a par. The major export destinations are for Europe, Asia and the Middle East.

Nizhnekamskneftekhim is the largest Russian producer of styrene plastics, one of the major producers of polyolefins including LLDPE. The Company is a leader in propylene copolymers production and supply to the home market. All plastics plants are designed and constructed under foreign licenses for the recognized process technologies.

According to Annual reports, as of YE2016 the Company produced more than 665 thousand tons of rubbers and 725 thousand tons of styrene polymers, 135 thousand tons of LDPE, and more than 217 thousand tons of polypropylene

According to the Company's business strategy of development, the capacities growth is expected as follows:

- Rubbers: up to 1 mln per year in 2021
- Plastics: up to 1.5 mln per year in 2021, up to 2.5 mln per year in 2025
- Ethylene: up to 1.2 mln per year in 2021, up to 1.8 mln per year in 2025

<https://www.nknh.ru/en>

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E-mail: skd@nknh.ru

STAVROLEN

LLC "Stavrolen" is the second largest producer of high density polyethylene in Russia (after Kazanorgsintez) and the third largest producer of polypropylene. Its share of the HDPE market is about 37%.

LLC "Stavrolen" is part of Lukoil Group since 1998.

Annually the enterprise produces more than 300 thousand tons of polyethylene, 120 thousand of polypropylene, 80 thousand tons of benzol, 50 thousand tons of vinyl acetate.

<http://stavrolen.lukoil.ru/ru/>

OGRN 1022603220518

Address: 1, Rozi Luxeburg st., 356808, Budyonovsk, Stavropol region

Tel.: +78655951501

Fax: +78655922020

E-mail: mail.stavrolen@lukoil.com

TITAN Group

"Group of Companies "Titan" takes its origin since November 20, 1989, when Mikhail Sutyaginsky created Youth Center "Titan" (MC "Titan") by the Komsomol committee of PO "Omsknefteorgsintez" (ONPZ). Today the Group includes — complex of petrochemical production facilities with total volume of investments of more than 300 million dollars, large transportation company, and agro-industrial complex.

Petrochemical complex includes the following enterprises:

- PJSC "Omskiy Kauchuk" - one the leading domestic producers of synthetic rubbers; it produces 25% of all rubber produced in Russia. The production of latex makes up 50 thousand tons per months at the moment (possible 70 thousand tons per month without modernization) with intention for increase up to 300 thousand tons per month.
- LLC "Poliom" (JV with Gazprom Neft Group and Titan group through Sibgazpolimer JSC) – production capacity 210 thousand tons of polypropylene per year, about 98 types of PP. The plant is based on Basell technology, process equipment by Tecnimont.
- LLC "Novocherkassk Lubricant Materials Plant" – produces range of products based on petroleum and synthetic oils – engine, transmission, hydraulic oils; grease lubricants; lubricant materials; lubricating-cooling fluids; parting fluids; friction modifiers and components of drill fluids with a volume more than 12 000 tpa.

<http://titan-omsk.ru/en/>

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Phone: +7 (3812) 29-95-55, 35-69-31

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SIBUR

SIBUR is probably one of the most significant players in the Russian polymer market today.

Petrochemicals production capacity exceeds one million tons of basic polymers (including NPP Neftekhimia - a JV with Gazprom Neft), 572 thousand tons. In general, SIBUR operates 22 production sites, and almost all of them are in this or that extent relate to polymers and plastics production.

The main polymer products produced within the group:

- o LDPE
- o Polypropylene
- o Rubbers
- o Polyethylene Terephthalate (PET)
- o Alphapor EPS
- o BOPP films
- o Thermoplastic Elastomers

SIBUR Group structure in polymer production

Plastics		
JSC Sibur-Khimprom https://www.sibur.ru/SiburKhimprom/ Production capacity: 100 kta polystyrene, 135 kta styrene, 220 kta ethylbenzene	JSC Polief https://www.sibur.ru/polief/ Production capacity: 216 kta PET, 272 kta TPA	JSC Sibur-PET https://www.sibur.ru/SiburPETF/ Production capacity: 75 kta PET
Elastomers		
LLC SIBUR Togliatti https://www.sibur.ru/togliatti/ Production capacity: 217 kta rubbers, 120 kta MTBE	JSC Krasnoyarsk Synthetic Rubber Plant <i>(JV with SINOPEC through Sibur-Sinopec Rubber Holding Company Limited)</i> https://www.sibur.ru/kzsk/ Production capacity: 42.5 kta rubbers, 85 kta TEP	JSC Voronezhskiy Syntheticheskii Kauchuk https://www.sibur.ru/voronejkauchuk/ Production capacity: 290 kta rubbers,
Olefins and polyolefins		
LLC Tomskneftekhim https://www.sibur.ru/TomskNeftehim/ Production capacity: Polyethylene: 270 kta Polypropylene: 140 kta Ethylene: 300 kta Propylene: 139 kta	LLC RusVinyl http://rusvinyl.ru/ru/ Production capacity: Suspension PVC: 300 kta Emulsion PVC: 30 kta Caustic soda: 225 kta	BIAXPLEN LTD. https://www.sibur.ru/biaxplen/ Production capacity: BOPP film: 180 kta 40 types of film 5 production sites
LLC NPP Neftekhimia <i>(JV with Gazprom Neft)</i> http://www.neftekhimia.ru/ Production capacity: Polypropylene granulated: 130kta	Poliom Ltd <i>(JV with Gazprom Neft Group and Titan group through Sibgazpolymer JSC)</i> http://www.titan-omsk.ru/en/gruppa_kompaniy/company/795/ Production capacity: Polypropylene: 210 kta Propane propylene: 250 kta	LLC SIBUR Tobolsk https://www.sibur.ru/siburtobolsk/ Production capacity: Polypropylene: 500 kta MTBE: 155 kta NGLs processing: 8 mln t a Vinyl ethylene: 207 kta
Western Siberian Petrochemical Complex Limited Liability Company ("ZapSibNefteKhim") https://www.sibur.ru/zsn/ Production capacity: Polyethylene: 1.5 mln tons per annum Polypropylene: 500 kta Ethylene: 1.5 mln tons per annum Propylene: 500 kta		

<https://www.sibur.ru/en/>

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GAZPROM NEFTEKHIM SALAVAT

Gazprom neftekhim Salavat is one of Russia's major petrochemical complexes. Nowadays the Company carries out a full cycle of hydrocarbon processing and produces more than 100 different products. 50% of them are bulk products such as gasolines, diesel fuels, fuel oil, styrene, polystyrene, LDPE, HDPE, DOP plasticizer, butyl alcohols, sulphur, ammonia, urea etc. The export reach covers more than 50 CIS and non-CIS countries including Finland, China, Brazil, UK, Western European Countries and the Baltic states.

Gazprom neftekhim Salavat comprises the Oil Refinery, Gas & Chemical Plant and Monomer Plant.

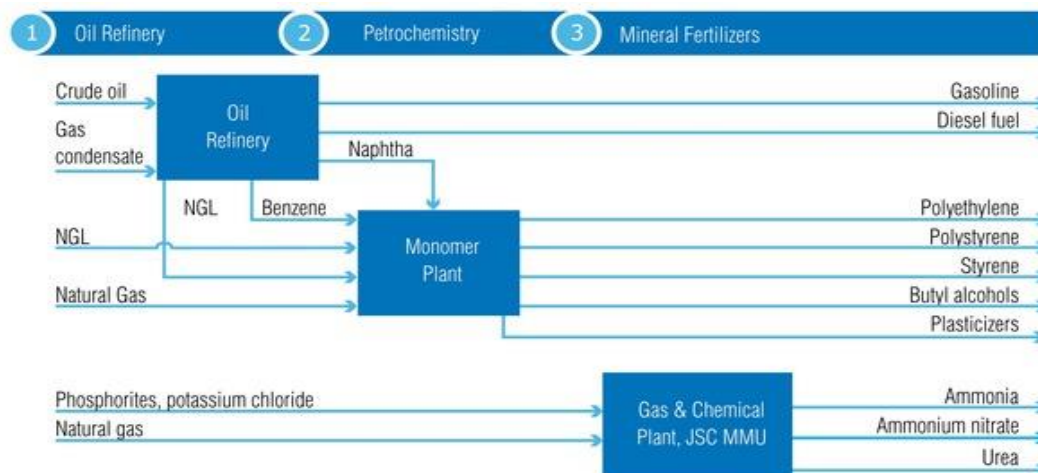


Fig. 7.4-B. Gazprom neftekhim Salavat production chain

The Company's petrochemical sector comprises Monomer Plant with its ethylene/propylene facilities, plastics production units and alcohols and plasticizers production units.

According to its corporate strategy, Gazprom neftekhim Salavat adds value to its petrochemical sector by expanding its production range, increasing production and diminishing operating costs. For further development of the Company, it is planned to increase the HDPE unit capacity and the EP-340 pyrolysis unit capacity up to 380 tsd. t/y, and to construct a new Acrylic Acid and Acrylates Production Complex.

<http://salavat-neftekhim.gazprom.com/about/>

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Telephone: + 7 (3476) 39-41-58 (English); + 7 (3476) 39-36-81 (English); + 7 (3476) 39-31-14 (German);

+ 7 (3476) 39-45-79 (French)

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E-mail address: snos@snos.ru

SENEGE

PET under brand 'ROSPET' is manufactured at New Polymers Plant 'Senegé'.

PET production was first launched in 1960-s by Dupont company. Production in Russia started in the year 2003. The plant is located in Solnechnogorsk, Moscow region. The production capacity is 100 kta. Senegé plant is one of the four leading producers of PET products in Russia today.

http://www.senege.com/index_en.html

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UFAORGSINTEZ

OJSC Ufaorgsintez is a Russian producer of organic synthesis products. The Company is focused on petrochemical products, associated petroleum gases, polypropylene production of various types, phenol, acetone, alpha-methylstyrene,

bisphenol, and other petrochemical products. In 2013 the plant released about 25% of all phenol produced in the Russian Federation, 15% of the LDPE and 14% of polyethylene. The Company produces about 70 types of polypropylene. Today new types of copolymers of PP are under research and development at Ufaorgsintez.

<http://ufaorgcintez.ru>

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ANGARSK POLYMER PLANT

Angarsk Polymer Plant, part of Rosneft Group, is the only petrochemical plant in the East Siberia (Irkutsk region), which produces 200 thousand tons of ethylene, 100 thousand tons of propylene and 60 thousand tons of benzene annually. Part of the produced ethylene is sent to Sayankhimplast as feedstock, part is used for the production of high pressure polyethylene and other types of petrochemicals. Straight-run gasoline and hydrocarbon gases, mainly produced by Angarsk Petrochemical Company are used as feedstock for the plant.

Plant refurbishment program was developed with the following targets:

- Reconstruction of pyrolysis unit to increase its capacity by 1.5 times (up to 450 K tons of ethylene per year);
- Construction of high density polyethylene production with 345 ktpa capacity;
- Construction of polyethylene production for the production of 250 ktpa polymers of broad product range;
- Construction of LPG rail car loading rack with the capacity up to 300 ktpa is completed and the rack is commissioned, which will make it possible to reduce feedstock costs.

In 2015 Angarsk Polymer Plant processes 660.3 k tons of feedstock and produces 441.0 k tons of marketable products.

https://www.rosneft.com/business/Downstream/Neftehimija/Angarsk_Polymer_Plant/

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Address: 1st Industrial building zone, block 8, bld. 5, city of Angarsk, Irkutsk region

Tel./Fax: +7 (3955) 57-30-00, 57-30-02, 57-76-12

E-mail: secr@azp.ru, secr@azp.rosneft.ru

ALCO-NAPHTHA

Alco-Naphtha is the second largest manufacturer of PET for food products in Russia and Eastern Europe with state of the art technology 2R-MTR of the company Uhde Inventa Fisher, GmbH (Germany). AO Alco-Naphtha is a resident of a Special Economic Zone in Kaliningrad region. Alco-Naphtha products are supplied on the Russian market as well as on the markets of the European Union and the Commonwealth of Independent States. Rated production volume is 220 thousand tons, constant expansion of sales geography, which includes neighboring Poland, Lithuania, Belorussia, Ukraine, Kazakhstan, Uzbekistan and other countries of the Commonwealth of Independent States. The company's plant is the first in Europe and the fourth in the world working with MTR (Melt-to-Resin) technology. In 2016 PET production increased by 39% from 112 thousand tons up to 156 thousand tons per year.

<http://en.ekopet.ru>

<http://eko.pet/>

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8 Biofuels

8.1 General overview of subsector

As one of the world's leading producers and exporters of oil and gas, biofuels have an insignificant share in the overall energy production matrix of Russia, estimated at only 1.2 percent, with biomass accounting for only 0.5 percent.

8.1.1 Bioethanol & Biodiesel

Development of the bioethanol and biodiesel sectors will continue to stay low priority for the government. No major breakthrough is expected at least in the short-term. The production of biofuels still remains small and has almost no impact on Russia's overall domestic grain and oilseed prices. High excise taxes for ethanol in Russia coupled with high production costs and increasing demand for grain for other uses, are all major obstacles for the development of the bioethanol industry.

In March 2015, the Ministry of Economic Development of the Russian Federation (MED) approved amendments to Federal Law "On State Regulation of Production and Turnover of Ethyl Spirt, Alcohol Products Containing Spirt and Limitations of Consumption of Alcohol Products," developed by the Federal Service for Regulation of Alcohol Market. MED supported the idea of defining bioethanol and motor bioethanol as an individual product. The documents include a more specific definition of bioethanol identifying that motor oils that contain no more than 10 percent of bioethanol are not subject to regulation as products containing spirt. Also, it exempts the production of bioethanol as an additive to motor oil from excise taxes.

The Russian bioethanol community has been lobbying for many years for this exemption. However, so far the amendments have not been approved and there is no indication of when they may get final approval from the government. According to the Russian Biofuels Association, if enacted, the potential for expansion of bioethanol production in the near term will increase up to 2 million MT. This expansion would be primarily for use as an additive. And, the potential for expansion for the use of bioethanol production for blending with 95 percent fossil gasoline (B5) could increase up to 5 percent. However, without strong support from the federal level, these targets are unlikely to be achieved.

Experts estimate potential production capacity of the bioethanol market in Russia at 850 million liters. According to experts, the demand for ethanol to be used as a gasoline additive is estimated at 320,000 MT (including 200,000 MT of hydrolysis ethanol and 120,000 MT of synthetic ethanol), or about 1 percent of the total volume of gasoline production in Russia. Current production for fuel is estimated at 210,000 MT.

Table 8.1-1

Bioethanol Used as Fuel and Other Industrial Chemicals (million liters)

<i>Calendar Year</i>	2009	2010	2011	2012	2013	2014	2015
<i>Beginning Stocks</i>	0	0	0	0	0	0	0
<i>Fuel Begin Stocks</i>	0	0	0	0	0	0	0
<i>Production</i>	71.0	68.34	80.0	85.08	106.2	107.95	107.575
<i>Fuel Production</i>					0.12	0.17	0.175
<i>Import</i>	0	0	0	0	0	0	0
<i>Fuel Imports</i>	0	0	0	0	0	0	0
<i>Exports</i>	25.86	22.34	32.89	39.68	61.0	59.3	58.1
<i>Fuel Exports</i>	0	0	0	0	0	0	0

Calendar Year	2009	2010	2011	2012	2013	2014	2015
Consumption	45.14	46.0	47.11	45.4	45.2	49.85	49.475
Fuel Consumption	0	0	0	0	0.120	0.150	0.175
Ending stocks	0	0	0	0	0	0	0
Fuel Ending Stocks	0	0	0	0	0	0	0

Source: Rosstat (Russian Federal Statistical Service), Russian Customs Committee, trade sources, Russian National Biofuels Association.

Industry analysts also attribute the limited presence of bioethanol in Russia to high wheat and grain prices worldwide, which makes biofuel production less profitable.

In such circumstances, the most promising agricultural plant in terms of bioenergy is rape used for production of biodiesel. Russia being ranked 2nd in the world in terms of the surface of farming land per capita could produce up to 50% of the demand of agricultural industry in energy supply due to production of rapeseed oil for further processing into biodiesel. Rape is mostly widespread in the Volga, Central and Siberian Federal Districts. Best results in terms of productivity are recorded in Lipetsk, Kaliningrad, Nizhny Novgorod and Krasnodar regions.

Almost all the amount of rapeseed oil produced in Russia is being exported to foreign countries where it is used as biofuel. The main consumer of Russian rapeseed oil is Norway (up to 32,6% of total exports). Among other consumers are France, Latvia, Netherlands, Lithuania, Czech Republic, Italy, Romania, Denmark, Israel, and Germany.

During the last 5-7 years, a few biofuel production projects had been announced in Russia, but none of them had been realized. The only bioethanol production facility in Russia is the one owned by Miranda Group in the Northern Ossetia (www.mirandagroup.ru). The facility produces bioethanol out of corn. Main consumers are Baltic States. There are plans to organize also production of ethanol out of wheat.

Currently, Federal biofuels policy is not under the National Agricultural Priority Project. With the lack of government support, the sector is unlikely to develop. The major reasons for the government lack of interest include high cost of biodiesel; inadequate regulations pertaining to the sector; limited domestic demand; higher availability of alternative energy sources and poor infrastructure (in particular machinery) that cannot be adapted easily to biodiesel use.

8.1.2 Biogas

Biogas is a type of biofuel that is naturally produced from the decomposition of organic wastes such as agricultural waste, wastewater, solid domestic waste, waste of timber-processing complex.

There is vast potential for exploiting agricultural waste in Russia. However, there are only a small number modern agricultural plants that can utilize agricultural waste efficiently. Experts estimate total annual agricultural waste in Russia at 250 million MT, in addition municipal solid waste is estimated at 60 million MT. The programs for agricultural waste are

supported by the regional budgets. Most of the resources could be used for biofuel production or be exported. However, to date, government is in the initial stage of developing programs that would entice producers to utilize these wastes.

Experts from the Institute of Energy Strategy estimate that due to vast supplies of agricultural wastes, food processing wastes and municipal wastes 66 billion m³ of biogas and 112 million MT of high value granulated fertilizer could theoretically be produced in Russia. In addition, experts estimate potential production of electricity from biogas is 121, 200 GWh, and heat – 169, 344 GWh (Source: USDA Foreign Agricultural Services Biofuels Update 2017).

The leading agricultural regions of Russia such as Belgorod, Krasnodar, Altai show the largest potential in biogas production.

There are no companies producing full-cycle manufacturing equipment for biogas production in Russia. Leading companies that supply turnkey biogas units based on the equipment of European manufacturers are:

Table 8.1-2

No	Company name	Location	OGRN	Contact details
1.	BioGasEnergostroy Ltd	Moscow	1107746643223	http://www.bioges.ru/ Verhnyaya Radishchevskaya, building 7/4, office 207, 109240, Moscow, Russia Tel: +7 (495) 972-24-00, 915-52-11, 915-33-25, 915-22-24, 943-72-45, 943-72-44 Fax: +7 (495) 915-56-89 E-mail: info@bioges.ru
2.	AltEnergO	Belgorod	1093123017008	http://www.altenergo.su/biogas/ 28, Prospect Slavy, Belgorod, 308000, Russia T. +7 (4722) 78-81-77 F. +7 (4722) 78 81 68 E-mail: posta@altenergo.su
3.	<u>Agrobiogaz</u>	Saint Petersburg	1107847093155	http://www.agrobiogaz.ru/ Oktyabrskaya embankment, 29A, Saint Petersburg Tel: +7 (921) 595-42-52 E-mail: info@agrobiogaz.ru, infobio@list.ru
4.	<u>Agrobiotech</u>	Kirovsk, Leningrad region	1074706002360	Novaya street 22 #9, Kirovsk, Leningrad region, Russia 187342 Tel: +7 (812) 715-42-34; +7 (812) 937-60-01 E-mail: info@biogaz.ru
5.	<u>Greentech Ltd.</u>	Moscow	5067746318734	Volzhsky boulevard, block 95, bld. 2, Moscow 109125 Tel/ Fax: +7 499 177-30-79 E-mail: info@greentecltd.ru
6.	<u>R-EnergO</u>	Moscow	1117746948912	Smolenskaya square, 3, Moscow E-mail: info@r-energo.ru
7.	<u>BioEnergO</u>	Moscow	1147603002304	Nauchny proezd, 17, Moscow Tel: +7 (499) 220-14-20 E-mail: info.mos@bio-energo.ru
8.	<u>Energoregime</u>	Perm	1105904014567	Chernyshevskogo 5, Perm Tel: +7 (342) 216 00 61; +7 912 88-088-32 Skype: energorezhim E-mail: energorezhim@yandex.ru

One of the first large-scale projects realized in Russia in biogas sector was Biogas plant Luchiki in Belgorod region built by AltEnergO company for processing of waste from AgroBelgorie meat processing plant.

Other completed investment projects are:

- Mosvodokanal biogas station based on Kuryanovo treatment plant (WTE Group);
- Biogas Plant in Doshino, Kaluga region (realized by "BioGazEnergO Stroy").

Among disadvantages of Biogas energy one can name high capital expenditures into construction (2-8 thousand euro per 1 KW of installed capacity), small range of viable projects, and necessity of continuous waste supply. Moreover, there is a problem of guaranteed sales of produced energy, which makes number of viable projects limited to projects with continuous cycle and constant level of consumption certainly overrunning the capacity of biogas station.

8.1.3 Wood pellets

Wood pellet production and exports will likely continue to increase by 10 percent or to 1.45 MMT in CY2017, driven primarily by strong demand from Europe and more interest from the Asian markets, soft ruble and increasing local consumption.

Russia ranks 8th in the world for total wood pellet production, with three percent of total world wood pellet production. According to Rosstat, production of wood pellets in Russia is forecast to increase significantly by 4 MMT by 2020, and by 8 MMT by 2025. However, the Russian Ministry of Energy and Industry analysts forecast that production will increase at a lower pace, between 10 and 12 percent annually. Stabilization of world prices for wood pellets in CY 2017, after a downward trend in 2015 due to a drop in oil prices, will also be a driver for stimulating export from the Russian producers.

According to Rosstat, Russia produced 1.013 MMT of wood pellets in 2016, a 3.5 percent increase from CY 2015. Sources report that production statistics for wood pellets are not accurate. The statistics primarily capture large-capacity factories, and mid-sized and smaller facilities, which operate as part of larger wood processing plants, do not report their production. Inaccuracy of statistics for production of wood pellets also contributes to the high difference in production in CY2013 and CY 2014. As a result, Post believes the actual wood pellet production is underreported by Rosstat.

Post estimates production of wood pellets in Russia in CY 2016 at 1.33 MMT, or five percent increase over production in CY 2015. Production is forecast to increase by 10 percent in CY2017, primarily driven by continued strong demand from European Union as well as Asian countries, specifically South Korea. Construction of new smaller and middle-sized wood pellets facilities oriented for export coupled with strong dollar will support and motivate local producers. In addition competitive export prices, increasing local production, new processing capacity, as well as the Russian government's call for increased efficiency in the forestry sector will contribute to an increase. However, the lack of a domestic standard for

pellets, poor transport infrastructure, a lack of warehouses, and the product's seasonality will all negatively impact the development of the wood pellet sector in Russia. Industry sources believe that Russia will require large investments in order to upgrade its facilities and expand its production capacity. Domestic demand can also absorb some of the increased, near-term production, however, at a very moderate pace.

Table 8.1-2

Leading Wood Pellet Production Facilities in 2016

Name of the Facility	Region	Annual Production, mln tons
Vyborgskay Forestry Industrial Corporation	Leningrad region	50
"SP Arkaim"	Khabarovsk region	130
JSC LDK-3	Arkhangelsk region	95
NovoYeniseyskiy	Krasnoyarsk region	80
Mir Granul	Leningrad region	45
JSC "Lesozavod-25"	Arkhangelsk region	90
DOK Yenisey	Krasnoyarsk region	45
Svedwood Tekhvin	Leningrad region	55
RusForest Magistralniy	Irkutsk region	30
Biogran	Republic of Karelia	25
Setnovov	Novgorod region	25
STOD	Tver region	20
Total		695

Source: www.biointernational.ru based on the Russian State Customs Service data

Reportedly, about 65 percent of total Russian production of wood pellets is manufactured by 12 processing facilities. According to experts from Lesonline.ru portal, there are about 20 wood pellet facilities in Russia with production capacity from 30,000 to 70,000 MT that have had stable operations since 2010. They produce 50 percent of all wood pellets in Russia. However, analysts project a trend away from large facilities with an increasing number of facilities with smaller capacity, up to 20,000 MT.

However, the share in overall pellet production from the smaller facilities accounts for only 14 percent. Given the current economic situation, the number of smaller-capacity facilities is forecast to increase because they have more mobility in sourcing raw materials and can easily market their production locally. In addition, recent government initiatives to support exporters and call for improving ecology and environments are likely to stimulate producers of forestry processing industries to construction wood pellet production facilities.

In the mid-term, domestic demand for wood pellets is forecast to increase at 10-12 percent annually. In the local market wood pellets are in demand by private heating stations and municipal housing, primarily in heavily forested areas where traditional sources of energy are not accessible. Production of wood pellets is, in most cases, cheaper than gas.

According to the National Bioenergy Union, a number of regions, including Moscow oblast, Karelia and Nizhniy Novgorod, Republic of Mari El, and Arkhangelsk oblast, have started implementing initiatives to transfer local heating stations from coal or residual oil to wood pellets. However, experts believe that in the mid-term there will not be significant breakthrough in switching to wood pellets due to lack of additional investments needed for transfer from boilers adapted for gas and other residual oils to wood pellet boilers.

The Russian Customs Service reports exports of wood pellets from Russia in 2016, at 1.075 MMT, or more than 14 percent higher than in 2015. The leading export destination for these products was Denmark at 399,400 MT, followed by Sweden at

129,700 MT, and South Korea at 129,300 MT, and the Netherlands at 79,100 MT. These four destinations account for almost 70 percent of total Russian export share of wood pellets worldwide. Europe will continue to be the largest importer of Russian wood pellets.

The "International BioEnergy" magazine estimates that 17 Russian wood pellet facilities account for 70 percent of total export share of wood pellets to the foreign markets. The same source also estimates that 16 large foreign companies import nearly 80 percent share of total Russian wood pellet production. These large foreign buyers include CM Biomass Partners A/S from Denmark, "Kaymar Ltd." from South Korea, and Engie Energy Management from Belgium.

Currently there are six major export oriented regions in Russia that account for almost 88 percent of Russia's total wood pellet exports. More than 50 percent of total Russian wood pellet exports originate from Leningrad region, followed by Krasnoyarsk (12 percent) and Arkhangelsk (10 percent) regions. Irkutsk region has recently expanded production and export of wood pellets as a result of stronger demand from South Korea and potentially from Japan.

9 Technical rubber

9.1 General overview of subsector

TECHNICAL RUBBER

- Over the past three years, Russia has seen a recovery in the production of regenerated (devulcanized) rubber in primary forms or in the form of plates, sheets or strips (tapes). In 2017, Russia produced 22.933 tons of rubber, recovered (devulcanized) in primary forms or in the form of plates, sheets or strips (ribbons), which is 34,3% higher than the previous year.
- The production of regenerated (devulcanized) rubber in primary forms or in the form of plates, sheets or strips (tapes) in December 2017 increased by 31,4% to the level of December last year and amounted to 2.007 tons.
- The leader of the production of regenerated (devulcanized) rubber in primary forms or in the form of plates, sheets or strips (tapes) in (tons) of the total production volume for 2017 was the Central Federal District with a share of about 49,8%.
- In the period 2015-2018. average producer prices for conveyor belts reinforced with only textile materials increased by 45,0%, from 2.227 rub/m² up to 3.230 rub/m². The largest increase in average producer prices occurred in 2018, when the growth rate was 19,8%
- The average price of producers for conveyor belts reinforced with only textile materials in 2018 increased by 19,8% against the level of the previous year and amounted to 3.230 rub/m².

TIRES

Production of tires in Russia is growing: 47,1 mln. pcs in 2016 versus 45,7 mln. pcs in 2015.

These figures are due to several factors:

- rising demand of automotive industry (despite the decline in car production in 2016) due to localization of automotive components (such companies as Nokian, Pirelli and Bridgestone are investing in production facilities in Russia);
- anti-dumping measures against Chinese producers;
- consumer behavior, due to decline of real income with private consumers, substituting the imported tires with the locally produced ones.

This allowed to intensify the export of tires: +22,8% from 17,96 to 22,05 mln. pcs (2016 versus 2015).

Main problems of the subsector remain to be: insufficient productivity, lack of automation, lack of product offerings, lack of funding to modernize production and lack of innovations.

9.2 Geography of production facilities and projects, clusters

The companies of the sector are mostly spread through the European part of Russia: Moscow, St. Petersburg, Yaroslavl, Kazan and others. The majority of them are located in Volga region due to the proximity to petrochemical clusters.

TRADE FAIRS

TIRES & RUBBER expo

<http://www.rubber-expo.ru/en/>

The trade fair has 20 y.o. history and is being held on a yearly basis in the last decade of April in Moscow.

Product sectors at the fair:

- Raw and auxiliary products, intermediate goods
- Equipment and devices
- Finished products
- Packaging and storage
- Innovations, R&D
- Environment protection, ecology
- Contract manufacturing
- Services

KHIMIA (*chemical industry and science*)

<http://www.chemistry-expo.ru/en/>

History starts from 1965. Takes place on a yearly (previously 2y) in the last decade of October in Moscow.

Major event in the field.

Main branches:

- Raw and auxiliary materials
- Machinery, equipment, instruments
- Finished products
- Services

9.3 Key players per submarket

TECHNICAL RUBBER

Table 9.3-1

№	Company name	Location (city, region)	Contact details
1.	PJSC "BALAKOVOREZINOTECHNIKA" (ПАО "БАЛАКОВОРЕЗИНОТЕХНИКА")	Balakovo, Saratov region	http://www.balrt.ru/index.php?option=com_content&view=article&id=113&Itemid=112
2.	LLC "K-FLEX" (ООО "К-ФЛЕКС")	Ilnskoye-Usovo, Moscow region	http://www.k-flex.ru/kontakty
3.	OJSC "SARANSKIY ZAVOD "REZINOTECHNIKA" (ОАО "САРАНСКИЙ ЗАВОД"РЕЗИНОТЕХНИКА")	Saransk, Republic of Mordovia	http://rubexgroup.ru/en/
4.	PJSC "KVART" (ПАО "КВАРТ")	Kazan, Republic of Tatarstan	http://kvart-rti.ru/kontakts/adres-foto/
5.	JSC "YAROSLAVL-REZINOTECHNIKA" (АО "ЯРОСЛАВЛЬ-РЕЗИНОТЕХНИКА")	Yaroslavl, Yaroslavl region	http://www.yart-main.ru/kontakty
6.	JSC "FACTORY "SPETSPLASTINA" (АО "ЗАВОД "СПЕЦПЛАСТИНА")	St. Petersburg	http://specplastina.ru/contacts
7.	JSC "INSTITUTE FOR SIENTIFIC RESEARCH REZINOVOY PROMYSHLENNOSTI" (НАУЧНО- ИССЛЕДОВАТЕЛЬСКИЙ ИНСТИТУТ РЕЗИНОВОЙ ПРОМЫШЛЕННОСТИ)	Sergiey Posad, Moscow region	http://niirp.com/en/contact_us/
8.	PJSC "URALSKY ZAVOD REZINOVYH TECHNICHESKIH IZDELIY" (УРАЛЬСКИЙ ЗАВОД РЕЗИНОВЫХ ТЕХНИЧЕСКИХ ИЗДЕЛИЙ)	Ekaterinburg, Sverdlovsk region	http://uralrti.ru/contacts
9.	JSC "TULSKY ZAVOD REZINOVYCH TECHNICHESKIH IZDELIY" (ТУЛЬСКИЙ ЗАВОД РЕЗИНОВЫХ ТЕХНИЧЕСКИХ ИЗДЕЛИЙ)	Tula, Tula region	http://www.tularti.ru/contacts/
10.	JSC "CHAYKOVSKY FACTORY RTD" (ЧАЙКОВСКИЙ ЗАВОД РТД)	Tchaikovski, Perm region	http://www.zavodrt.ru/contact.html

№	Company name	Location (city, region)	Contact details
11.	JSC "ARMAVIRSKIY ZAVOD REZINOVYH IZDELII" (АРМАВИРСКИЙ ЗАВОД РЕЗИНОВЫХ ИЗДЕЛИЙ)	Armavir, Krasnodar region	http://en.azri.ru/contact
12.	JSC "OMSKIY SAOUTCHOUC" (ПАО «ОМСКИЙ КАУЧУК»)	Omsk, Omsk region	http://www.titan-omsk.ru/en/

TIRES

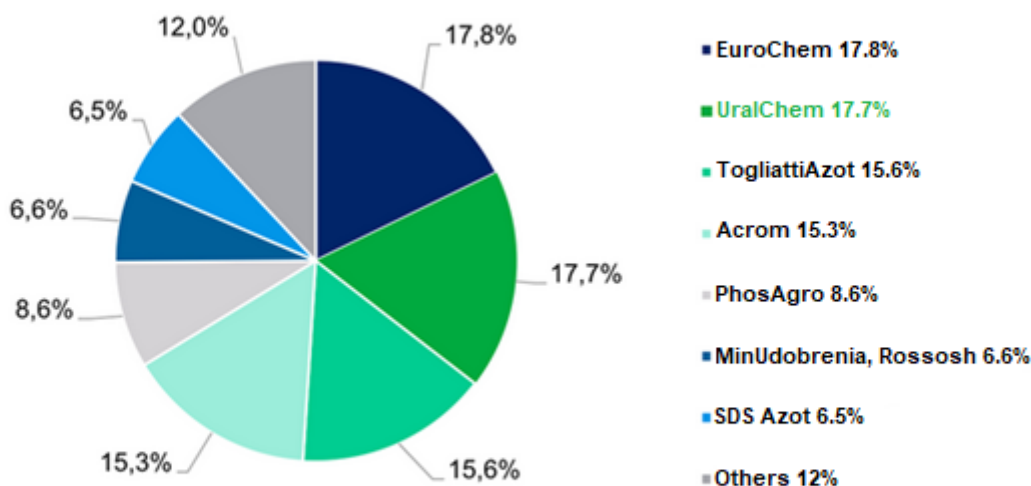
Table 9.3-2

№	Company name	Location (city, region)	Contact details
1.	LLC "NOKIAN TIRES" (ООО «НОКИАН ТАЙЕРС»)	Vsevolzhsk, Leningrad region	https://www.nokiantyres.ru/o-nokiantyres/kontakty/
2.	JSC "NIZHNEKAMSKSHINA" (ПАО "НИЖНЕКАМСКШИНА")	Nizhnekamsk, Republic of Tatarstan	http://shinakama.tatneft.ru/?lang=en
3.	LLC "MICHELIN" (ООО «МИШЛЕН»)	Moscow	https://www.michelin.ru/RU/ru/homepage.html
4.	LLC "NIZHNEKAMSKIY ZAVOD GRUZOVYKH SHIN" (ООО «НИЖНЕКАМСКИЙ ЗАВОД ГРУЗОВЫХ ШИН»)	Nizhnekamsk, Republic of Tatarstan	http://nz-shina.tatneft.ru/kontakti/?lang=ru
5.	JSC "CORDIANT" (АО «КОРДИАНТ»)	Moscow	https://www.cordiant-tyre.ru/kontakty
6.	LLC "BRIDGESTONE CIS" (ООО "БРИДЖСТОУН СИ")	Moscow	https://www.bridgestone.ru/contacts/#

10 Ammoniac and iodine

10.1 Ammonia

Production of ammonia in Russia in 2017



Source: reseach group AzotEcon

Fig. 10.1-1. Production of ammonia in Russia, 2017

1. JSC "EuroChem"

EuroChem is the largest producer of mineral fertilizers in Russia, headquartered in Zug, Switzerland ("EuroChem Group AG").

EuroChem's production capacity reaches 3.2 million tons of ammonia per year. The company includes the following ammonia production enterprises:

Table 10.1-1

No	Name	Location	OGRN	Contact details
1	JSC "Azot Novomoskovsk"	Tula Region	1027100507378	301660, Tula Region, Novomoskovsk, Svyazi str., 10 Tel.: +74876222222; (48762)30747 E-mail: novomoskovsk@eurochem.ru
2	JSC "Azot Nevinnomyssk"	Stavropol Territory	1027100507378	357107, Stavropolsky Region, Nevinnomyssk, Nizyaeva St, 1 Tel: +7 (495) 795-25-27 Fax: +7 (865-54) 7-80-05 E-mail: lyudmila.bykovskaya@eurochem.ru
3	LLC "EuroChem - Belorechenskie Minudobreniya"	Krasnodar Region	1062303006930	Belorechensk Tel.: +7 (495) 795-25-27; (86155) 7-42-12 E-mail: logistics.dir_brk@eurochem.ru

In 2015 the Company signed a contract for the construction of ammonia production plant with a capacity of almost one million tonn in Kingisepp (Saint-Petersburg region) on the basis of LLC "Industrial group "Fosforit".

<http://www.eurochemgroup.com>

Moscow, OGRN: 1027700002659
 115054 Moscow, Dubininskaya str., 53/6
 Tel.: +7 (495) 545-39-69; +7 (495) 795-25-27; +7 (495) 663-10-20
 Fax: +7 (495) 795-25-32
 E-mail: info@eurochem.ru

2. JSC "UCC "Uralchem" (United chemical company "Uralchem")

Uralchem is one of the largest companies in the Russian fertilizer market. The Company is a Russian leader in the annual production of ammonium nitrate (around 3 million tons of ammonium nitrate and its derivatives), ammonia (around 0.8 million tons), urea (around 1.2 million tons) and nitrogen fertilizers in Russia.

The Company's production capacities are more than 2.9 million tons of ammonia, 2.9 million tons of ammonium nitrate, 1.2 million tons of urea and 0.8 million tons of phosphate and compound fertilizers per year. In 2017 the UralChem produced 24.8% of Russian ammonium nitrate, 17.7% of ammonia, 15.6% of urea and other fertilizers.

The company includes the following ammonia production enterprises:

Table 10.1-2

No	Name	Location	Contact details
1.	Filial PMU	Perm	http://www.uralchem.ru/about/assets/68/ 614065, Perm, Promushlennaya str., 96. Tel.: + 7 (342) 220-73-11; + 7 (342) 220-73-98 Fax: + 7 (342) 220-73-99 E-mail: office@uralchem.com
2.	JSC "KCHKKH"	Kirovo-Chepetsk	http://www.uralchem.ru/about/assets/65/ 613040, Kirov region, Kirovo-Chepetsk, Pozharnyi str., 7 Tel.: +7 (83361) 9-42-24; +7 (83361) 9-42-08 Fax: +7 (83361) 9-44-51; +7 (83361) 9-43-31 E-mail: kckk@uralchem.com
3.	JSC "Azot"	Berezniki, Perm Region	http://www.uralchem.ru/about/assets/67/ 618401, Perm Region, Berezniki, Churtanskoe highway, 75 Tel.: + 7 (3424) 29-84-22 Fax: + 7 (3424) 26-48-72 E-mail: azot@uralchem.com

In 2014 Uralchem planned to construct a new ammonia production plant in Taman port (Krasnodar region) with a capacity of 680 000 tons per year.

www.uralchem.ru

Moscow, OGRN: 1077761874024
 6/2, Presnenskaya naberezhnaya, Moscow, Russian Federation, 123112
 Tel: +7 (495) 721 89 89
 Fax: +7 (495) 721 85 85
 E-mail: info@uralchem.com

3. **PJSC “TogliattiAzot”**

PJSC “Tolyattiazot” (ToAZ) is one of the largest enterprises of the Russian chemical industry, one of top-3 main ammonia producers in the country and one of top-10 world leaders. According to ToAZ reports, it is the only chemical plant in the world capable of producing 3 million tons of ammonia annually.

Today the plant includes 7 units for ammonia production and 2 units of urea aggregators. The export share varies around 85% of the total output. In addition, the company mastered the production of bricks, basalt super thin fiber, refractory materials and consumer goods.

ToAZ exports their products to more than 120 countries. ToAZ capacities provide about 20% of demand in the Russian market and 11% of world ammonia exports. Uninterrupted supply is guaranteed by the developed infrastructure: in addition to its own railway fleet of more than 1,400 cars, ToAZ has an access to ammonia pipeline “Togliatti-Odessa” with a length of more than 2,000 km.

The transshipment complex completion in Taman port (Krasnodar region) by 2020 will not only ensure the stability of cargo flows, but will expand the geography of supplies.

In 2018 ToAZ will start the construction of new ammonia production plant with a capacity of 1,860 tons per day. The project is based on a unique technology for Russian chemical industry which is usage of purging gases from ToAZ operating units as raw material for ammonia synthesis. Such approach will significantly increase the plant’s efficiency and reduce negative environmental impact.

<http://www.toaz.ru/>

Samara Region, OGRN: 1026302004409
32 Povolzhskoye Shosse, Togliatti, Samara Region 445045
Tel: (8482) 69-14-80, (8482) 60-11-52
Fax:(8482) 69-14-77, (8482) 71-81-97
E-mail: zavod@corpo.toaz.ru

4. **PJSC “Acron”** and its subsidiary company JSC “Dorogobuzh”

Acron is a leading global mineral fertilizer producer, leading Russian vertically integrated NPK producer, one of top-10 global producers by NPK capacity. The Company possesses two chemical production facilities and a mine in Russia with aggregate capacity of over 7 million tons of commercial product.

In 2016 Acron opened the largest ammonia plant in the country, increasing the Company’s capacity by 28% to 2.2 million tons a year.

<http://www.acron.ru/>

Moscow and Velikiy Novgorod

OGRN Acron: 1025300786610
World Trade Centre, 12 Krasnopresnenskaya Naberezhnaya, Moscow 123610, Russia
Tel.: +7 (495) 745-77-45; +7 (495) 411-55-94
Fax: +7 499 246 23 59
E-mail: info@acron.ru

Velikiy Novgorod 173012, Russia
Tel: +7 (8162) 99-61-09
Fax: +7 8162 99 66 63, +7 8162 73 19 40
E-mail: root@vnov.acron.ru

Dorogobuzh

www.dorogobuzh.ru

Smolensk region, OGRN Dorogobuzh: 1026700535773
6, Mira St, Dorogobuzhsky, Dorogobuzh, 215713,
Tel. : +7 (481-44) 6-82-07; +7 (499) 246-23-59
Fax: +7 (481-44) 6-88-36; +7 (481-44) 6-83-28,
E-mail : root@drg.dol.ru; shitikov@drg.dol.ru

5. **JSC “PhosAgro”**

PhosAgro is a Russian vertically integrated company and one of the world's leading producers of phosphate-based fertilizers. Its core business line is the production of phosphate-based fertilizers, high-grade raw phosphate (P₂O₅>39%, apatite concentrate), and also feed phosphates, nitrogen fertilizers and ammonia.

The Company is Europe's largest producer of phosphate-based fertilizers, the world's largest producer of high-grade raw phosphate and the world's second largest producer (excluding China) of MAP and DAP (according to Fertecon), Russia's only producer of feed monocalcium phosphate (MCP), and also the sole producer of nepheline concentrate in Russia.

The company includes the following ammonia production enterprise:

Table 10.1-3

No	Name	Location	OGRN	Contact details
1.	JSC "Apatit" (until 01.11.2017 - JSC "PhosAgro- Cherepovets")	Cherepovets, Vologda region	1025100561012	http://www.phosagro.com/about/holding/item639.php 75, Severnoe Shosse, Cherepovets, Vologda Region, 162622 Tel. (8202) 59-33-09 Fax: (8202) 55-50-34 E-mail: cherepovets@phosagro.ru Press Secretary Mikhail Kuzmitskiy Tel.: (8202) 59-43-96

It specializes in the production of phosphate fertilizers, phosphoric and sulfuric acids, aluminum fluoride, ammonia, urea, ammonium nitrate and fertilizers on its basis.

The Company uses an industrial river port for transportation of raw materials and end product.

In 2015 a construction of new liquid ammonia storage facility has been completed. A new warehouse of liquid ammonia was erected in less than two years. It represents six ball tanks for ammonia storage of 3000 cubic meters each, which are the biggest ones in terms of individual volume in Russia. The total storage capacity is 8000 tons of ammonia. It allows increasing raw material security of Apatit and creates a basis for production capacities development.

<https://www.phosagro.ru>

Moscow, OGRN: 1027700190572
 119333, Moscow, Leninsky prospekt, d. 55/1, str. 1
 Tel: +7 (495) 232-96-89
 Fax: +7 (495) 956-19-02
 E-mail: info@phosagro.ru

6. JSC "Minudobreniya"

Minudobreniya ("Mineral fertilisers") is one the largest enterprises of Russian chemical industry, the only manufacturer of mineral fertilizers in Central Chernozemny Region.

It operates more than thirty years producing high-quality products, appreciated by both domestic and foreign farmers. In July 2014 Minudobreniya passed recertification audit of the current integrated quality and environmental management system and was certified by TÜV Thüringen e.V. with conformity of the management system to the requirements of ISO 9001:2008 and ISO 14001:2004 standards.

The production capacity of ammonia is around a million tons per year.

<http://www.minudo.ru/>

Voronezh region, OGRN: 1023601231840
 2 Himzavodskaya str. Rossoch, 396657
 Tel.: +7 (47396) 5-15-08, +7 (47396) 9-63-90

Other ammonia producers with significant production capacity:

Table 10.1-4

No	Name	Location	OGRN	Contact details
1.	JSC "Gazprom Neftekhim Salavat"	Bashkortostan Republic	1027100507015	http://salavat-neftekhim.gazprom.ru/ 30, Molodogvardeitsev st., Salavat, 453256, Republic of Bashkortostan, Russian Federation Tel.+ 7 (3476) 39-41-58 (English); + 7 (3476) 39-36-81 (English); + 7 (3476) 39-31-14 (German); + 7 (3476) 39-45-79 (French) Fax: +7 (3476) 39-21-03 E-mail: snos@snos.ru
2.	LLC Joint Chemical Company "Schekinazot"	Tula Region	1027100507015	http://n-azot.ru/ (exports to NL) 7, Simferopolskaya Street, Pervomayskiy, Shchekino District, Tula Region, Russia, 301212 Tel.: +7 (48751) 9-23-88 Fax: +7 (48751) 9-67-78, 9-66-95 E-mail: azot@azot.net
3.	LLC "Mendelevskazot"	Tatarstan Republic	1041603000999	http://mendelevskazot.ru/ Tel.: +7 (855-49) 2-43-29 Fax: +7 (855-49) 2-10-35
4.	JSC "Ammoniy"	Tatarstan Republic	1061674035257	http://www.ammoni.ru/ 109, Industrial Zone, Mendelevsk, Tatarstan, 423650 Tel.: +7(85549)_2-60-01 E-mail: info@ammoni.ru Sales Dept: +7(85549)9-20-01, +7(85549)9-20-17, +7(85549)9-20-38
5.	PJSC "Kuybyshevazot"	Samara Region	1036300992793	http://www.kuazot.ru/ 6, Novozavodskaya street, 445007 Togliatti, Samara Region, Russian Federation Tel.: tel. +7(8482)56-11-01, 56-12-01 Fax: +7(8482)56-11-02, 56-13-02 E-Mail: office@kuazot.ru

10.2 Iodine

As for now iodine is not produced in Russia and imported mostly from Chili and Azerbaijan.

JSC "Tyumen Commodity Company"

The Company plans to establish a serial production of small-sized iodine production plants operating in the wells of geothermal pressure waters with iodine amount of 10 mg/l.

The technology is based on the reagentless sorption method of iodine extraction. The advantages of this method are the preservation of original water properties, possibility of iodine release at low-power wells with a low iodine amount and the absence of chemical reagents negative influence on the environment. This approach is 30% more profitable and more environmentally friendly compared to the currently used technologies. The company manufactured an experimental-industrial prototype of the installation, obtained the trial batch of raw iodine.

At the moment company is looking for scientific and research assistance in the field of electrochemistry (e.g., electrolysis, metals passivation, current density) applied to the elaborated technology.

Tyumen Region, OGRN: 1117232039858

11 Motor oil distributors

11.1 General overview of subsector

The motor oil market in Russia is very competitive. In the struggle for the Russian consumer, both domestic and foreign companies from around the world are participating. As a result, customers have a wide choice of price segments and types of oil and their properties.

The Russian motor oil market can be divided into two segments. The first is represented by domestic production. It includes the main oil producers and refineries. Because of the existing capacities such companies have good opportunities for the production of the motor oil and additives and also of the other lubricants.

The main Russian producers of motor oil are LUKOIL, Gazpromneft, Rosneft, Delfin Group and various other companies. Most distributors who work with the mentioned producers have exclusivity in a certain region and are monobrand.

The second segment of the Russian engine oil market is represented by foreign manufacturers. In Russia, their products are known for brands such as Castrol, Mobil, Esso, Shell, and other brands.

Important trends in the engine oil market, according to some experts, are the following:

- import substitution due to the increase of the exchange rate.
- increasing confidence in the Russian oil brands;
- increasing demand for oil replacement services and reducing consumer involvement in the selection of oil brands;
- increasing demands for the periods between the oil changes;
- wide choice in oil brands;
- drivers are increasingly using the technical stations for oil replacement, and do not replace the oil themselves, as was the case in the past;
- Consumers are less and less visiting the specialized stores, and prefer to buy a lot of goods for motorists in the hypermarkets. According to some estimates, sales of motor oil sold through the retail chains are growing by 10-20% annually;
- gradual renewal of the fleet in Russia, increase in the percentage of foreign cars, which will lead to an increase in demand for the high-tech types of oil.

The oil distributors had difficult period in 2014-2015. Turnover and net profit of the majority of the oil distributors stabilized.

11.2 Geography of production facilities and projects, clusters

Due to the logistics schemes where Moscow, as a capital, has central role, major part of the distributors are located in Moscow and Moscow oblast.

11.3 Key players per submarket

Hereunder you will find the contact details of the distributors that work with different brands (multibrand).

№	Company name	Location (city, region)	Contact details
1.	BERG Holding (ООО «БЕРГ Холдинг»)	Moscow	http://odk.org.ru/
2.	Trade house "Prostor" (ООО Торговый дом «Простор»)	Reutov, Moscow region	http://www.tdprostor.ru
3.	Petrolube (ООО «Петро-Люб»)	Moscow	http://www.petrolube.ru/company/About_eng.php

№	Company name	Location (city, region)	Contact details
4.	Auto-Partner (ООО «Авто-Партнер»)	Moscow	http://www.avto-partner.ru/
5.	AVTOTECHMAS (ООО «АВТОТЕХМАС»)	Tambov, Tambov region	http://avtotehmas.ru/
6.	PETROLTRADE (ООО «ХОЗПРОМТОРГ-ЭКСПОРТ»)	Ufa, Republic of Bashkortostan	http://www.petrotrade.ru
7.	MASLON (ООО «МАСЛОН»)	Ekaterinburg, Sverdlovsk region	http://www.maslon.ru/
8.	ODOLEN'-AVIA (ООО «ОДОЛЕНЬ-АВИА»)	Balashikha, Moscow region	http://www.aeromaslo.ru
9.	REDITAL (ООО «РЕДИТАЛ»)	Moscow	http://redital.ru/
10.	UNITED DISTRIBUTION COMPANY (ООО «ОБЪЕДИНЁННАЯ ДИСТРИБЬЮТОРСКАЯ КОМПАНИЯ»)	Moscow	http://odk.org.ru/
11.	EURO-RS (ООО «ЕВРО-РС»)	Moscow	http://ar64.ru/

12 Industrial gases

In 2016, the global market of industrial gases amounted to \$83 billion in money terms. Global leaders in this market are Air Liquide (23%) and Linde (22%). The average annual growth rate from 2009 until 2015 made 7.3%. The positive dynamics is expected to remain in future, with the market volume being over \$90 billion in 2020.

The Russian market indices differ from those in Europe significantly. In 2016, the share of on-site pipe supply increased up to 13% of the overall market volume (compared to 24% in Europe), while the share of production by the enterprises for own needs decreased down to 60% (compared to 10% in Europe).

In 2016, the sales of industrial gases made 21.2 billion rubles, excluding the volume of production for own needs. This figure includes oxygen, nitrogen and argon. The overall market volume, including other types of industrial gases makes 30-32 billion rubles.

In 2016, the market volume increased almost twice compared to 2011 due to the newly commissioned on-site facilities by the leading global companies Linde Gas (in Kaluga, Nizhny Novgorod), Air Liquide (Saratov, Vologda, Nizhny Novgorod regions, Tatarstan), Praxair (Volgograd, Sverdlovsk region), Cryogenmash (Sverdlovsk, Rostov regions). The total amount of investment into on-site projects in Russia exceeded 1 billion euro.

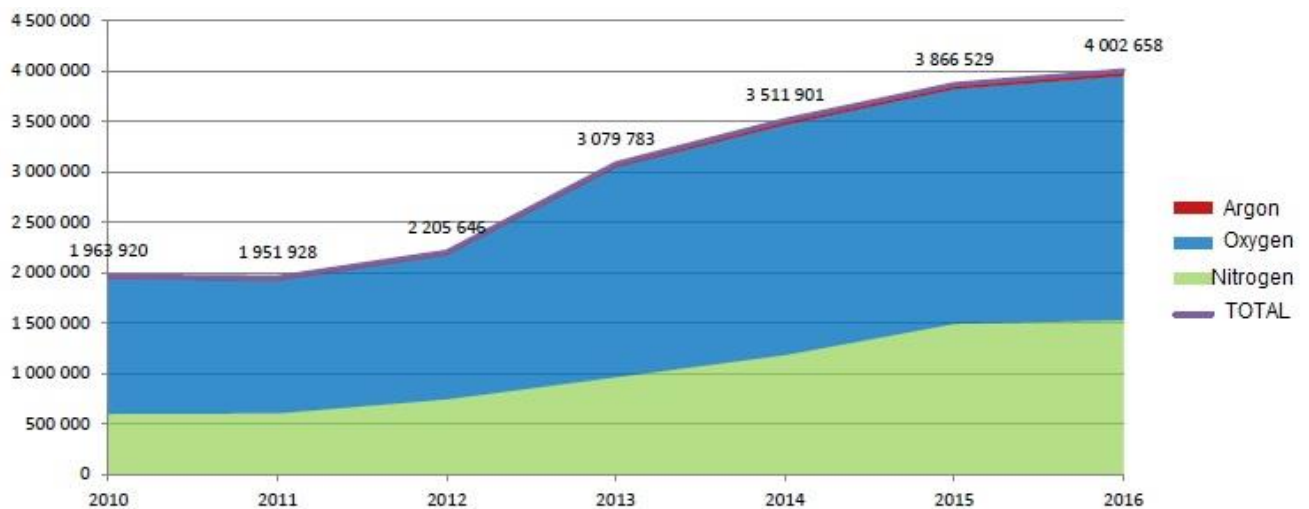


Fig. 12-A. Volume of shipped industrial gases in physical terms, thou.m³. Source: Cryogenmash

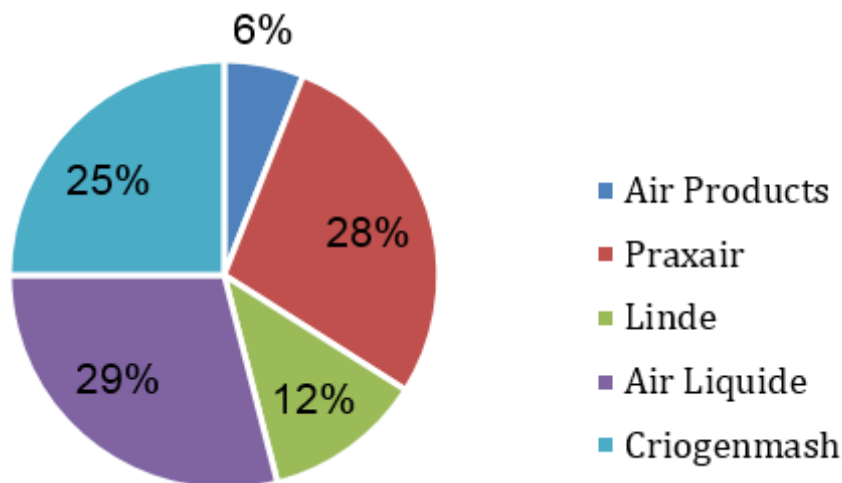


Fig. 12-B. Market share of leading industrial gases suppliers in Russia in 2016. Source: Cryogenmash

In 2016, the Russian market of air-separation units decreased more than twice from 8.6 bln. rub. down to 3.5 bln. rub. due to the completion of foreign supply upon earlier concluded contracts and lack of newly concluded contracts for supply of air-separation units from abroad.

Oxygen is the most frequently used type of gas, used in such industries as chemicals, oil and gas, metallurgy, machine-building, pharma. In 2016, the share of oxygen in the Russian volume of industrial gases production made 59%, including commercial oxygen and oxygen produced for own needs.

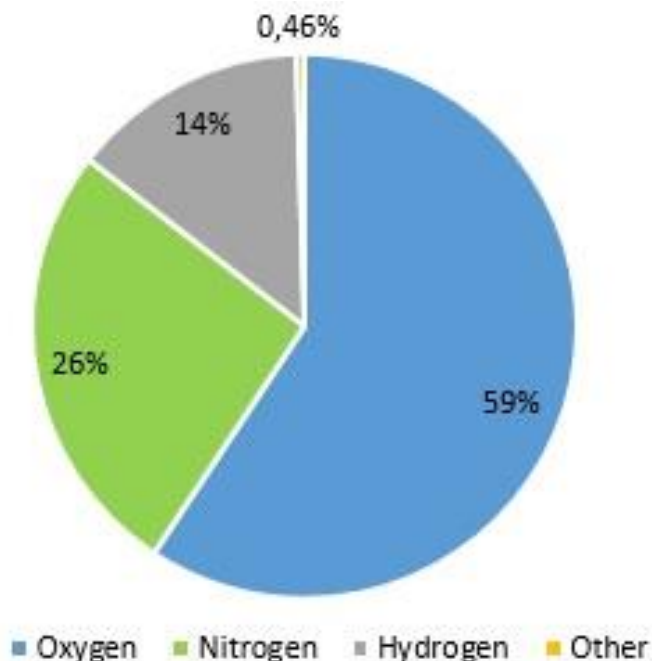


Fig. 12-C. Structure of industrial gases market in Russia in 2016. Source: CREON

Production volumes of oxygen remain basically stable year-to-year from 18.44 million tons in 2013 to 18.2 million tons in 2016. At the same time, the output of oxygen for own needs is continuously declining due to the decline of metallurgical production caused by Chinese market expansion.

On the contrary, the output of commercial oxygen is continuously growing due to the increase of output at newly built facilities by Linde Gas in Vorsino, Air Liquide Balakovo, Air Liquide Kstovo.

In 2016, the overall consumption of oxygen in Russia, including consumption of oxygen produced for own needs, exceeded 18 million tons, the largest share — 85.3% — applied to metallurgical plants. The structure of consumption of commercial oxygen is as follows: metallurgy — 51%, chemical industry (14%) and healthcare (10%).

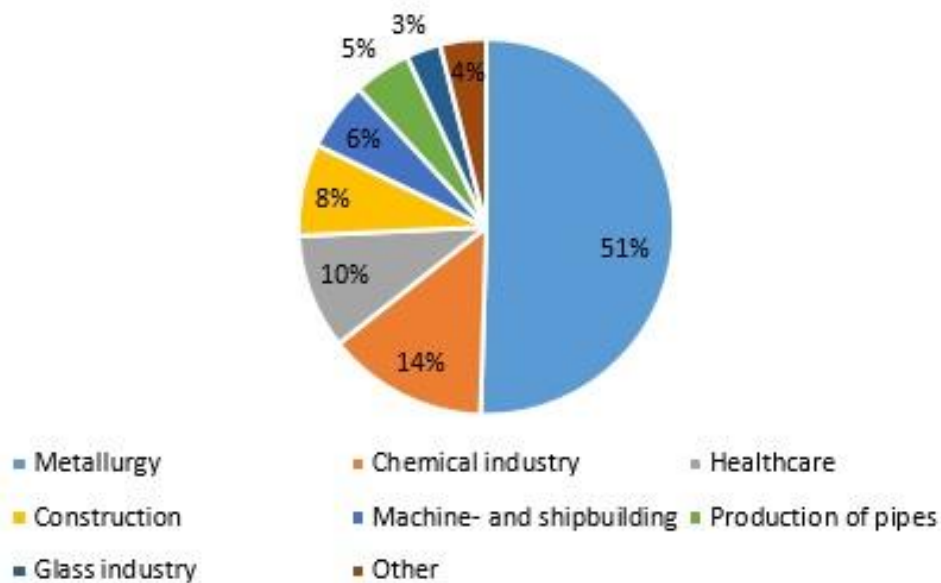


Fig. 12-D. Consumption of commercial oxygen in Russia in 2016 per industry. Source: CREON

In the near future some experts expect consumption growth in metallurgy due to start up of new production facilities. In 2018-2019 there are six investment projects under realization that require totally 585 thousand tons of oxygen (Tulachemet, Evraz NTMK, Ishimbai steel, Stav steel, Kirov metallurgical plant, Don metal). Another growth point is related to the announced methanol projects with the output of 1 million tones. Such output will require additionally up to 6.2 million tones of oxygen.

The market of rare gases (krypton, xenon neon, krypton-xenon concentrate and helium-neon compound) is export oriented. The volume of export of rare gases made 600 million rubles in 2016. In 2016, the leading export supplier of rare gases in Russia became Inergas - a subsidiary of Cryogenmash (17%). Other market leaders are Moscow coke gasworks (16%), Akey (14%) and Business management (14%).

13 Development in health, safety and environment in companies

13.1 General trends and conclusions

Summarizing the experience of the biggest chemical companies in Russia and their activities in the field of occupational health, safety and environmental protection, some common features may be marked.

The companies are law-abiding in observation of such standards as:

- H&S laws and regulations in the country of operation;
- Environmental laws in the country of operation;
- ISO 9001 – Quality Management System,
- OHSAS 18001 – Occupational Health and Safety Management System,
- ISO 14001 – Environmental Management System,
- ISO 50001 – Energy Management System.

The following actions in the companies may be considered as the common tendencies in the field of occupational health and safety:

- Application of unified safety standards and practices (HSE Policy) across all of company's subsidiaries;
- Promoting a unified corporate culture concerning safety, workplace health and healthy lifestyle / culture of health and safety is an integral part of the company's overall corporate culture;
- Cascading occupational health and safety KPIs into functional contracts for facility units and in KPIs of employees at all levels;
- Signing of individualized health and safety contracts for facility managers;
- System for managing risks of industrial-accidents and health and safety risks;
- Set up of medical rooms at all production sites;
- Establishment and maintenance of the required level of workplace health and safety;
- Use of modern and innovative personal protective equipment;
- Training and instructions – employees' training in the area of Russian and regional legislative and other normative;
- Certification of 100% of employees in the field of industrial safety;
- Special assessment of working conditions (SAWC);
- Application of the industry best practice.

The major number of the companies undertake the following common measurement in the field of environmental protection:

- Belong to Responsible Care® program, an international voluntary initiative to facilitate continuing improvements in the area of health, safety and environment;
- Meet the requirements of the European Union's REACH (Registration, Evaluation, Authorization and Restriction of Chemicals) regulation which addresses the use of chemical products produced in and imported into the EU countries;
- Certification as compliant with the European GMP+ quality control standard for raw materials;
- Apply best available technologies guidance documents;
- Develop energy-efficiency and energy-saving programs and the measurement of Greenhouse Gas (GHG) emissions at all its enterprises;
- Reduce waste production, emissions and discharges of pollutants and resource usage by investing in new, more efficient technologies;
- Improve the technological procedures;
- Equipment renovation and increasing of equipment service life;
- Improving the quality of fuel and energy;
- Environmental monitoring, including services of own sanitary-industrial laboratory.

13.2 Legislative and administrative framework in the area of environmental protection

Russian environmental law meets international standards, utilizing the following main pieces of legislation: the Environmental Protection Law, the Russian Federation Water Code, the Law on Industrial Waste and Consumption, the Law on Protection of Atmospheric Air and the Environmental Expert Review Law. These pieces of legislation require environmental impact assessments prior to the implementation of a project that may have an impact on natural resources.

No construction or operation is permitted until the Company is in receipt of a positive report from the State Environmental Expert Review (an essential precondition for financing and implementation).

Regional legislation supports and expands on these federal laws and regulations. Russia is also a signatory to most of the major international environmental conventions and treaties, which, in the event of a conflict with Russian law, take precedence, as dictated by the Constitution of the Russian Federation and the Federal Law on Environmental Protection.

In general, any activity in Russia that may have an adverse impact on the environment is subject to:

- Issuance of permits or licences (including for water use; subsoil use, for example, in mining; forest use; air emissions; disposal and recycling of waste; operation of hazardous industrial facilities);
- Establishment of limits with respect to the amount of environmental impact;
- Payment for negative environmental impact (emissions and waste disposal);
- Payment of a fine and potential liability in the event of a violation up to and including criminal prosecution;
- Penalties are calculated in material terms for damage caused to the environment.

13.3 SIBUR

In 2016, the Company adopted its Memorandum of Corporate Social Responsibility and Charitable Activities which identifies the following priorities in implementing the Sustainability Strategy:

- 1) Sibur is a good-faith taxpayer and employer who invests in social, economic, scientific and cultural growth in the regions of its presence. The Company strives to establish long-term partnership arrangements with government agencies using Social and Economic Cooperation Agreements as a vehicle.
- 2) Sibur considers the human capital to be its most valuable resource and commits to adhere to the international standards of health and safety at all of its facilities, provide an adequate level of pay, enable its personnel to grow and develop professionally. The Company's Human Resources Management Policy is its framework document covering this area.
- 3) Sibur strives to ensure that natural resources are used in a rational manner and puts measures in place to minimize its impact on the environment. The principles, priorities and implementation mechanisms for exercising the Company's environmental responsibility are defined in the Company's Environmental Policy document.

Sibur's green strategy includes the following features:

1. Eco-friendly feedstocks. By processing associated petroleum gas and other by-products of hydrocarbon extraction into products that bring value to the society, the Company contributes in a major way to conserving natural resources and to maintaining environmental equilibrium.
2. Eco-friendly production. The Company follows stringent environmental standards throughout the entire value chain.
3. Eco-friendly products and processing. The Company's products have environmental advantages and leave a smaller carbon footprint when compared with alternative materials. Polymers have the potential of being 100 per cent recyclable. The Company has been actively advancing the principles of circular economy by fostering polymer recycling.

The Company has implemented an Integrated Management System (hereinafter, the IMS) for occupational health, safety and environment, quality and energy efficiency. The strategic goals in these areas include:

- cost of procuring and generating energy resources.

Sibur's IMS is underpinned by such international standards as:

- ISO 9001 – Quality Management System,
- OHSAS 18001 – Occupational Health and Safety Management System,
- ISO 14001 – Environmental Management System,
- ISO 50001 – Energy Management System,
- ISO/TS 16949 technical specification – special requirements for applying ISO 9001:2008 in the automotive industry and at facilities manufacturing automobile spare parts.

1. Occupational health and safety

Since 2012, the Company has been pursuing a program of facility upgrades with a view to enhancing industrial safety at its hazardous sites. By year-end of 2016, the number of machinery-related incidents dropped by 19 per cent compared with 2015.

In 2016, SIBUR continued to implement its programs that are aimed at reducing injuries incurred by the employees of the Company and its contractors, and at preventing accidents and incidents:

- cascading occupational health and safety KPIs into functional contracts for facility units (line, shop, and plant level);
- approving individualized health and safety contracts for facility managers;
- fostering a safety culture;
- implementing a system for managing risks of industrial-accidents, and health and safety risks.

In 2015, SIBUR launched a 24/7 hotline to address matters of occupational health and safety. By calling its number or sending a text message, every staff member can offer any information they find useful that may pertain, for example, to improving working conditions, or to implementing successful practices and initiatives that can be instrumental in addressing such issues.

Striving to enhance safety and reduce negative environmental impact, all of the Company's facilities set their annual and long-term goals through 2021, with HSE goals being adjusted and approved annually. The following targets were set for 2016 as regards occupational health and safety:

- Bringing the incidence of occupational injuries within PJSC SIBUR Holding down to the level equivalent to LTIF = 0.93;
- Ensuring safety of processes. Bringing the rate of accidents at production facilities (PFAR) down to the level of 0.029;
- Ensuring that the HSE management system is compliant with international standard and meets pertinent legal requirements. Improving the rate of compliance with the HSE management system requirements to the level of 2.47.

All SIBUR's subsidiaries and facilities take steps to ensure workplace safety relying on the risk-based approach. This approach involves systematic identification of threats at the workplace and during work, analysis of production hazards with subsequent risk assessment and implementation of measures to eliminate or reduce the most significant risks where feasible. The culture of health and safety is an integral part of the company's overall corporate culture. Its key elements are embedded in SIBUR's Production System (SPS) and have been incorporated into the KPIs of employees at all levels.

Seeking to prevent and minimize the incidence of work-related injuries, in 2016 SIBUR updated its Key Safety Rules (KSR), and developed and implemented its motivation programs targeting HSE. New approaches to motivation have been adopted, including competitions between production shops and crews, as well as the use of motivational signs and safety cards. A mandatory corporate training Program targeting workers, technicians, engineers and managers, has been implemented.

Medical rooms have been set up at all production sites. They are fully equipped to carry out health checkups and provide medical assistance to the individuals who are falling ill or have suffered an injury as a result of an incident. The staff of the medical rooms provide training to personnel on how to administer first aid in the event of an accident or an emergency.

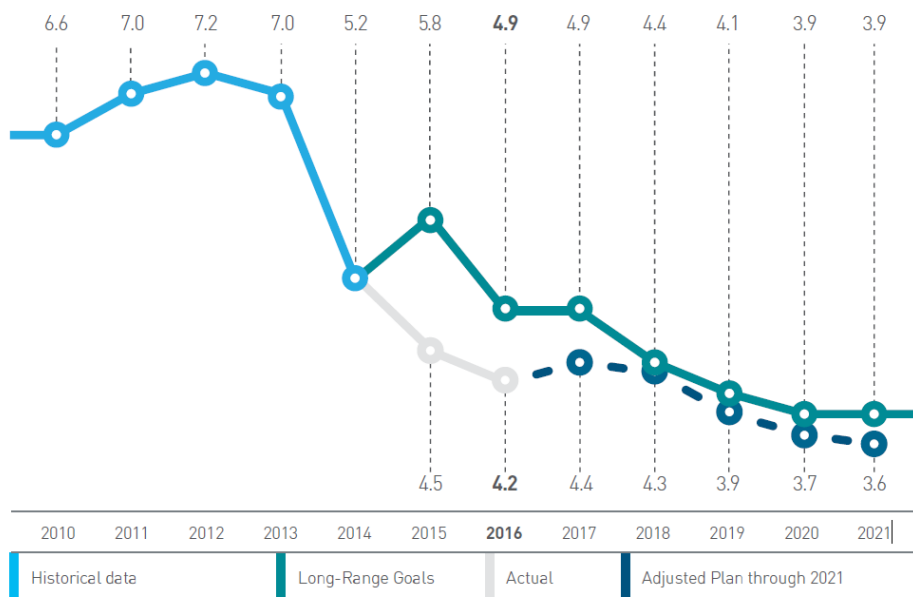
2. Environmental protection

Environmental safety and reduction of environmental impact are among the key priorities the Company is mindful of when formulating and implementing its development strategy. Sibur makes sure that carefully studies the best Russian and foreign practices and share the experiences with the experts from the world's leading petrochemical companies. The Company's most significant contribution to protecting the environment is the primary processing of the associated petroleum gas (APG). In addition to greatly reducing air pollution, this allows us to produce feedstocks needed for the fabrication of state-of-the-art eco-friendly materials. The volume of APG processed in 2016 totaled 22.4 bcm thereby helping the Company prevent the emission of 7 mln tons of pollutants and 71 mln tons of greenhouse gases (CO2 equivalent). This is comparable to one half of all emissions produced by the entire fleet of Russia's motor vehicles.

All SIBUR companies pursue policies that are aimed at reducing their environmental impact. Their conservation activities are in line with the international ISO 14001 standard, and with Russian regulatory requirements.

The effectiveness of the work done to ensure environmental safety is realized through adherence by all staff to the requirements of the law, rules and regulation, and by means of involving personnel in impact mitigation and prevention efforts. All members of the staff, including the contractors', have a legal responsibility to follow the prescribed environmental rules and regulations.

Changes in the Environmental Impact Index over 7 years, and the target through the end of 2021



In terms of air pollution control, the Company's primary focus is on reducing atmospheric emissions and protecting the health of residents of nearby communities. Air pollution control constitutes an integral part of the company's targeted environmental programs.

The list of the most important measures implemented in 2016 to reduce air pollution includes:

- retrofitting a firing furnace at JSC Voronezhskintezkauchuk with an air pollution treatment system;
- performing a complete overhaul of the polymerization battery pressure measuring unit to prevent air pollution at JSC Krasnoyarsky zavod SK;
- developing a design for upgrading the industrial emissions treatment system at Shop 1 of JSC POLIEF;
- performing regular maintenance and complete overhaul of the flare system; completing an FEED for upgrading the nitrogen blanketing system of the rectification unit at JSC Sibur-Khimprom.

The list of the most important measures aimed at streamlining handling of production and consumption waste, and preventing soil and ground contamination, includes:

- procurement of ecobins for selective waste collection (JSC POLIEF);
- retrofitting the solid waste incinerator furnace: reconditioning and replacing major parts of the furnace; Relining the furnace at Togliattisintez LLC).

In January 2014, SIBUR joined the Responsible Care® program, an international voluntary initiative to facilitate continuing improvements in the area of health, safety and environment. By signing, in 2015, the Responsible Care Global Charter, the Company reaffirmed its commitment to the key principles of industrial and occupational safety, protection of health and environment.

As part of its commitment to the Responsible Care Program, SIBUR developed and submitted its regular report to the Russian Chemists' Union, the initiative's authorized national body.

SIBUR meets the requirements of the European Union's REACH (Registration, Evaluation, Authorization and Restriction of Chemicals) regulation which addresses the use of chemical products produced in and imported into the EU countries. As is required by REACH, the Company works in a systemic manner to manage its product risks and continuously re-examines safe use of the product throughout the product's life cycle. To achieve this goal, the Company interacts very closely with its suppliers and customers.

To fulfil energy saving and energy efficiency commitment, the Company is carrying out the following set of measures:

- developing and implementing an Energy Saving Program;

- conducting energy surveys of its facilities;
- identifying potential for narrowing the gap with the best global practices in the medium term;
- searching for and replicating best practices;
- implementing an ISO 50001-compliant energy management system to serve as a component within SIBUR's Integrated Management System.

The energy goals are achieved through the implementation of energy saving programs developed annually by each facility. An energy program would consist of activities that are both implementable and economically feasible. Program implementation is monitored with the use of the SOVA information system.

As part of the process of procuring reliable and energy efficient equipment, the Production Support Function will work with the Center for Energy Supervision and the Energy Efficiency Stream to audit suppliers of lighting equipment. Following the audit, a short list of reliable suppliers would be compiled thereby enabling the Company's facilities to buy lighting equipment from these suppliers directly.

13.4 PHOSAGRO

1. Occupational health and safety

PhosAgro's workplace health and safety strategy aims to achieve three key goals:

- 1) Zero fatal incidents involving employees of PhosAgro or its subcontractors
- 2) Zero accidents involving production equipment
- 3) Sustainable performance achieved by creating a culture of safety at production sites

The strategic and operational goals and tasks in the area of workplace health and safety are based on the analysis of large volumes of data from internal and external audits and inspections, incident investigations, and recommendations from representatives of the workforce.

Unified standards:

- As part of the integration and streamlining of PhosAgro's production assets, Phosagro has introduced new, unified safety standards and practices across all of its subsidiaries. These new standards are based on internationally recognised best practices, and are being implemented together with some of the best external experts available
- Currently, PhosAgro-Cherepovets production site has OHSAS 18001:2007 certification for its occupational health and safety management systems

Policy highlights:

- The company has established and maintain the required level of workplace health and safety, whereby the risk of injuries or death, or accidents at production sites is minimised and reflects the latest scientific, industrial and community standards;
- The company seeks to constantly develop and update its workplace health and safety practices based on international standards and the experience of other companies that are leaders in the field of production site safety;
- The company is promoting a unified corporate culture concerning workplace health and 2016 PERFORMANCE HIGHLIGHTS safety among the employees at each of its production sites;
- The company provides for adherence to all legal and regulatory requirements in the area of workplace health and safety by all employees, regardless of their position in the Company;
- The company aims to improve the monitoring of compliance with workplace health and safety requirements at its production sites with the help of modern information technologies.

The company has achieved good results in 2016: zero incidents resulting in loss of the ability to work at PhosAgro's chemical processing sites, and a 28% year-on-year decline in LTIFR.

2. Environmental protection

PhosAgro introduced new KPIs for the Company's Environmental Service in 2016, aimed at helping to ensure regulatory compliance and to minimise payments for overlimit environmental impact.

Phosagro has in place environmental management practices that ensure its compliance with applicable regulations, and that help to reduce the impact of its operations on the environment. The company also invests in advanced technologies and highquality production processes to make the most efficient use possible of finite natural resources.

Phosagro's environmental strategy focuses on the following key areas:

- Reducing its waste production, emissions and discharges of pollutants and resource usage on a per-unit basis by investing in new, more efficient technologies;
- Ensuring acting as a conscientious neighbor and maintain a constructive dialogue with local stakeholders about its environmental impact;
- Implementing energy-efficiency and energy-saving programs at all its enterprises.

PhosAgro maintains a policy framework and related management systems procedures to address business conduct matters.

Here are some of the highlights of the organization's policy framework:

- The company continually monitors and analyze the impact that its production sites have on the environment and implement corrective measures with the goal of limiting that impact;
- The company aims to comply with all applicable Russian and international legislation and standards;
- The company continually invests in new technologies and processes that reduce its use of energy and finite resources;
- The company looks to reduce, process or recycle the waste we produce wherever possible;
- The company embed a culture of respect for the environment and the indigenous natural communities where we operate.

The main KPIs of the Company's environmental function are:

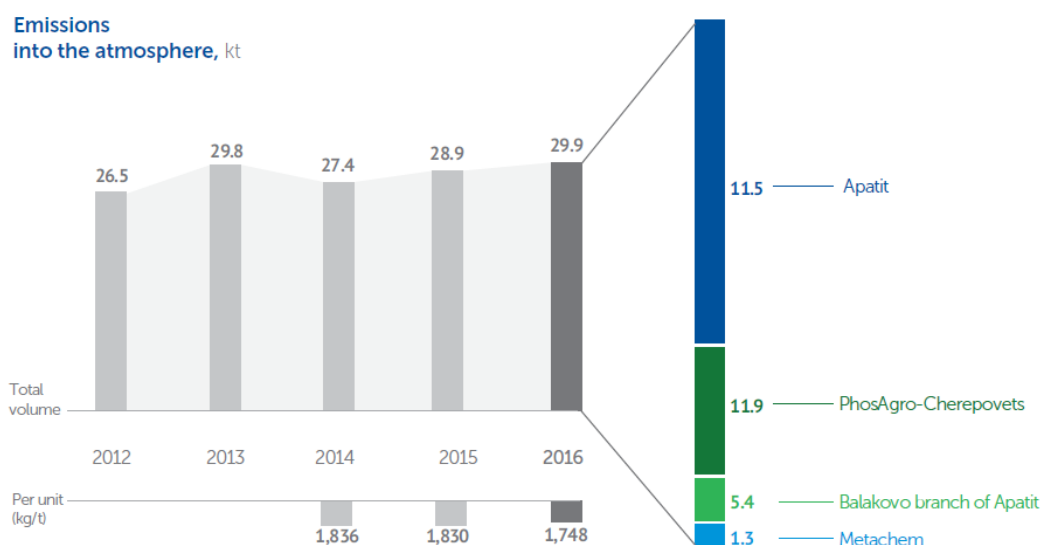
- Possession of all necessary environmental permits for the key production assets and subsidiaries;
- The size of payments for environmental impact, including over-limit payments, which is a key indicator of the Company's overall environmental impact.

The Company's production sites hold all necessary licences and permits related to environmental protection.

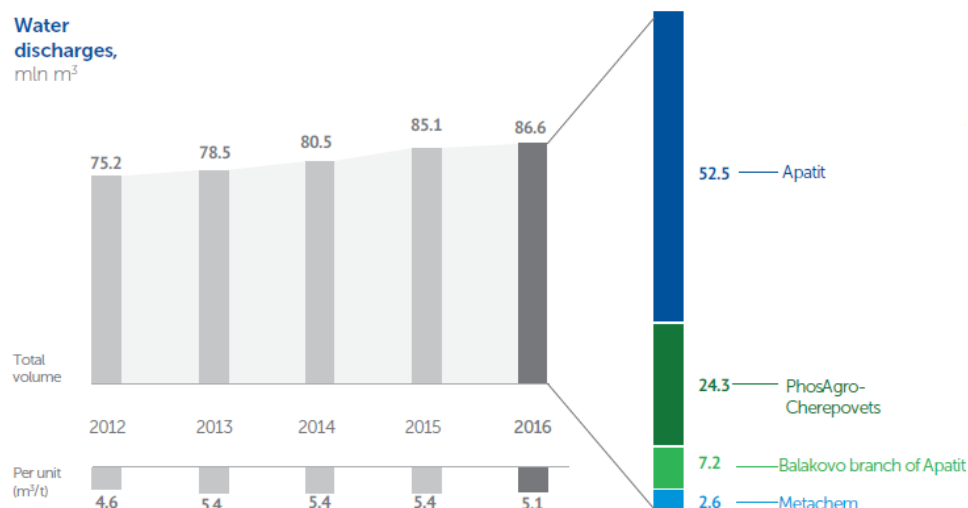
In addition to observing Russian environmental law, Phosagro adhere to international standards relevant to its business to guide its approach, for example, the Balakovo branch of Apatit is the first Russian enterprise to be certified as compliant with the European GMP+ quality control standard for feed materials.

Phosagro also undertakes regular internal and external audits to assess its compliance and obtain certification, together with exposure assessments, international format safety data sheets and recommendations for safe handling that are developed in compliance with the requirements of European Regulation on classification, labelling and packaging, and another one concerning the Registration, Evaluation, Authorisation and Restriction of Chemicals (REACH) in the development of exposure scenarios.

In 2016, consolidated atmospheric emissions by PhosAgro's production subsidiaries increased by 1 kt to 29.9 kt, up 3% year-on-year. The increase in emissions was primarily due to higher production volumes, with total fertilizer output growing at a faster pace of 9.4% year-on-year. This brought atmospheric emissions per unit of production down by 4.4% in 2016.



In 2016, PhosAgro's total consumption from surface water sources increased by 1.7% year-on-year to 86.6 million cubic metres. Water consumption per unit of production declined by 5.5% year-on-year in 2016 to 5.1 cubic metres per tonne. Water discharges by PhosAgro's production sites increased slightly, amounting to 200.0 million m3.



13.5 EUROCHEM

EuroChem, headquartered in Zug, Switzerland, is a leading global agrochemical company producing primarily nitrogen and phosphate fertilizers, as well as certain organic synthesis products and iron ore, more than 100 products in total. The Group is vertically integrated, with activities spanning mining, hydrocarbon extraction, fertilizer production, logistics and distribution. EuroChem is currently developing two sizeable, greenfield potash deposits at VolgaKaliy and Usolskiy in Russia. Production at Usolskiy is set to commence from late 2017, while VolgaKaliy is expected to start in 2018. The Group operates production facilities in Belgium, China, Kazakhstan, Lithuania, and Russia and employs more than 25,000 people globally. As one of the fastest growing fertilizer majors, EuroChem aim to become a top five producer by nutrient capacity.

The Company strategy includes, besides other, the following goals with the corresponding results:

Strategic goals	2016 outcomes
Reduce environmental footprint	<ul style="list-style-type: none"> Continued to invest in water, emissions and effluent reduction; Focus on water reduction and efficiency measures through the Clean Water Program (EuroChem Northwest ammonia plant, Phosphorit); Continued to be recognized as a leading exponent of BAT in Russia/CIS
Create a safe and healthy working environment	<ul style="list-style-type: none"> Continued to strengthen safety culture across the Group; Expanded the reach of new working at height procedures; Group lost time injury frequency rate (LTIFR), decreased from 1.08 per million man hours in 2015 to 0.97.

1. Occupational health and safety

EuroChem works to a Health, Safety and Environment (HSE) Policy and Framework, published in 2013 and upgraded in 2016, which links to detailed procedures and management systems.

The HSE Policy and Framework applies to all of its operational sites, employees and on-site contractors. Implementation is monitored by the Board of Directors. Operational managers have primary responsibility for health and safety at each site.

Policies and guidelines:

- Business strategy;

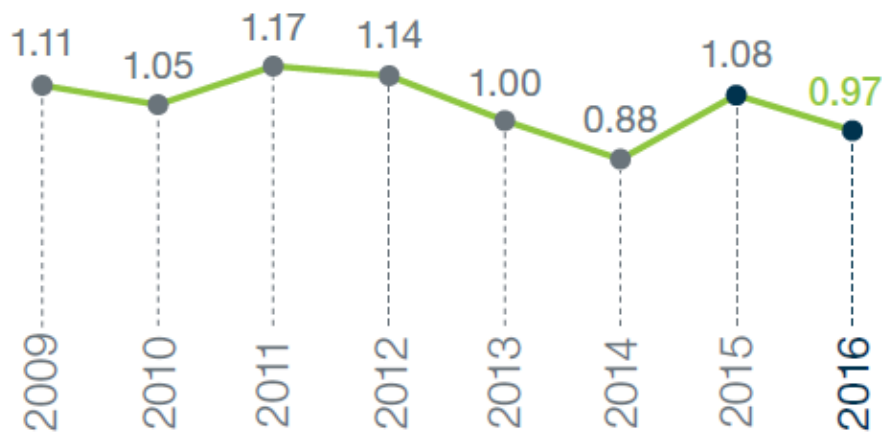
- HSE Policy and Framework;
- H&S Management System (compliant with OHSAS 18001);
- H&S laws and regulations in countries of operation;
- Equator Principles;
- Industry best practice.

Throughout 2015–16, Eurochem have piloted an improved approach at Nevinnomyssk, which has identified the quality of scaffolding and temporary working structures as a key weakness. The new approach specifies that work can only proceed once the scaffolding has been passed as 100% safe by its internal repair and maintenance team.

The Group recorded 49 lost time injuries (LTIs) in 2016, 40 LTIs in 2015 and 32 in 2014.

In 2016, the Lost Time Injury Frequency Rate (LTIFR) reduced from 1.08 (2015) to 0.97 per million man hours.

LTIFR per 1m man-hours (employees)



Health and safety priorities for 2017:

- Lead indicators;
- Key risks management;
- Contractor management.

2. Environmental protection

Policies and guidelines:

- Business strategy;
- HSE Policy and Framework;
- ISO 14001 Environmental Management System (EMS) (upgrading to ISO14001: 2015);
- Environmental laws in its countries of operation;
- Equator Principles;
- Registration, Evaluation, Authorization & Restriction of Chemicals (REACH) Regulation;
- Responsible Care;
- Best Available Technologies Guidance Documents.

EuroChem key objectives are to:

- Reduce air emissions and waste water year-on-year
- Reduce solid waste and increase recycling year-on-year
- Continuously improve environmental management systems and levels of compliance.

The company has identified water use, air emissions, waste and effluent as its key material issues.

EuroChem also focuses on energy efficiency and the measurement of Greenhouse Gas (GHG) emissions.

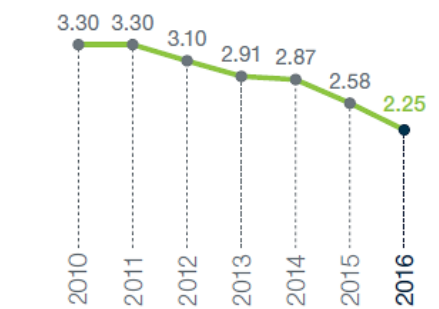
Water use

Water is sourced from a mixture of surface and groundwater sources and is used for production and energy generation. EuroChem continues to investment in water reduction and efficiency measures as exemplified

by its Clean Water Program at its new ammonia plant at Phosphorit plant in Kingisepp (see case study on page 36).

In 2016, across the Group EuroChem used 2.25 m³ of non-recycled water per tonne of production, a reduction of 10% compared to 2015. This reflects the ongoing effectiveness of its investments in closed-loop water use and treatment systems at Kovdorskiy GOK and Phosphorit

Non-recycled water consumption
(m³ per tonne of production)

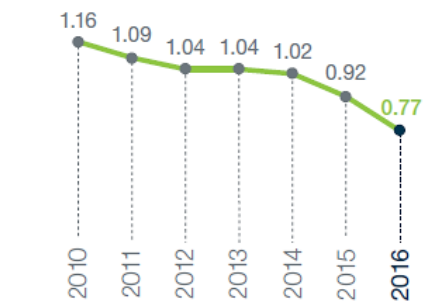


Air emissions

The main air emissions from its plants are sulphur oxides, carbon monoxide, nitrogen oxides, sulphuric acid, ammonia, particulates and hydrocarbons.

EuroChem applies BAT to emitting processes in order to meet its continual emission reduction, linked to a traditionally strong monitoring capability. This is exemplified by its networks of air quality monitoring stations at Belorechensk, Nevinnomyssk, Tuapse, Kotelnikovo, Novomoskovsk, Kingisepp and Usolye. The data generated by these network of sensors is made available to government agencies, communities and the media. The data from these networks and its other emissions monitoring units is constantly monitored by the HSE teams at each plant, with performance reported to Plant Managers and the Corporate HSE Department. In 2016, its Group operations generated an average of 0.8 kg of air emissions per tonne of production, a reduction of 13% compared to 2015.

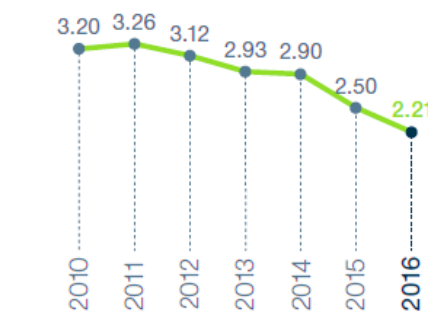
Air emissions
(kg per tonne of production)



Waste and effluent

The most significant solid wastes from its plants are phosphogypsum from the production of phosphate fertilizer and overburden/concentration tailings from mining operations. EuroChem is constantly exploring ways of finding alternative uses, where practicable. Effluent (waste water) generated at its plants may contain petroleum products, suspended matter, ammonium, nitrates, sulphates, chlorides, fluorine and phosphorous. In 2016 its Group operations generated an average of 2.21 m³ of effluent per tonne of production, a reduction of 12%. This performance further reflects the impact of its investments in state-of-the-art water use and treatment systems. All of its waste and effluent generation and handling processes are governed by national regulations. The systems are maintained and monitored by plant HSE teams, reporting into Plant Managers and the Corporate HSE Department.

Effluent discharge
(m³ per tonne of production)



13.6 NizhneKamskNefteHim (NKNH)

Environmental protection

Being a corporate citizen, the Company covers the environmental protection issues for the mass media and is actively involved in competitions and meetings.

Nizhnekamskneftekhim aims to respond efficiently to the complaints from Nizhnekamsk residents and the Company's employees. Compliance with the environmental legislation is controlled through the inspections and audits conducted by both the supervising authorities and the Company's environmental protection department.

Running the production process, Nizhnekamskneftekhim observes the environmental safety requirements and operates all relevant protection facilities:

- water effluents and storm runoffs are neutralized and treated in the in-house treatment units;
- production premises are equipped with the special local units to pre-treat and neutralize heavily polluted effluents;
- after treatment or neutralization most off-gases are vented to the atmosphere.

In 2016, Nizhnekamskneftekhim was nominated in all - Russia competition and awarded a certificate of "Top 100 Russia's Best Organizations. Ecology and Environmental Management".

Environmental performance 2014-2016:

- Raw materials saving – 2.3%;
- Heating power saving – 3.2%;
- Fuel saving – 0.6%;
- Process water saving – 4.3%;
- Air emissions decrease – 7.3%.

From August 2014 to December 2016 the Company re-utilized 6.6 million m3 of flushing water (including 2.6 million m3 in 2016).

Since 2014, air pollutants discharge was reduced by 1,180 metric tons (5.03%).

A great deal of importance is given to the efficient use of land. In particular, production capacities grow with no additional land resources occupied. The Company is in a constant strive for conservation and restoration of the natural landscape. Land plots disturbed by the underground communication systems repairs are restored with fertile soil layer. Transfer of IM-2201 waste catalyst to outsourcing companies prevented 4.87 thousand metric tons of wastes to be landfilled during 2015-2016 (including 1.97 thousand metric tons in 2016).

13.7 URALKALI

1. Safety

Absence of fatalities, incidents, accidents and occupational diseases is one of the most important tasks of the Company. Uralkali recognises its responsibility not only to employees but also to their families and society as a whole.

Therefore, Uralkali strives to create the most comfortable and favourable working conditions. However, achieving a zero accident rate is only possible if each worker adheres to safety rules.

Safety is one of the key elements of its Code of Corporate Culture:

"Safety is an unconditional value that must be an integral part of any action or decision. We understand that careless, thoughtless and irresponsible actions may have tragic implications not only for ourselves and its colleagues, but also for its families and friends. No achievement or economic benefit can justify loss of life or damage to a person's health."

Company's purposes in the field of safety:

- Absence of fatalities;
- Absence of industrial accidents;
- Prevention and reduction of occupational diseases amongst employees.

Main achievements of the company in the field of safety in 2015:

- The Group's lost time injury frequency rate (LTIFR) has not changed compared to 2014;
- The lost day rate (LDR) across the group declined by 20%;
- 4,268 employees trained and certified in occupational health and safety;

- All of the Group's employees were tested on their knowledge of the Cardinal Rules;
- Workplaces at the main production unit were certified at Uralkali according to requirements on working conditions;
- Hazardous production facilities were identified and re-registered by hazard class;
- Gas transport system safety certificates were issued;
- 52 facilities were declared fire safe. The number of fire outbreaks decreased by 37%.

2. Labor protection

The company's management understands that they can only ensure the safety of its employees by using a comprehensive approach that covers all areas of their activities and appeals to their understanding of the importance of measures taken by us and to their active cooperation.

In 2012, Uralkali adopted a Health, Safety and Environment Policy, which demonstrated the Company's belief that health, safety and the environment are key priorities that should be taken into account in all its actions and decisions, regardless of the line of work to which they relate.

2015 Key achievements:

Occupational Safety

As part of detection of unauthorised equipment, all mines were examined for use of unauthorised self-made hand tools, electrical equipment.

According to the current law "On special assessment of working conditions" No. 426-FZ of 28.12.2013, a survey of 680 workplaces was conducted in 2015. As a result, compensation and benefits were introduced.

The Company completed the acquisition of innovative headphones, equipped with an active noise- reduction system for drivers of mining excavation machinery.

To ensure safe movement of Group's employees between the head office buildings of Uralkali and its units in Berezniki and Solikamsk all vehicles involved in the transportation of the Company's employees were provided with additional seatbelts.

Industrial safety

Three industrial safety declarations for hazardous production facilities (hazard class II) were developed and approved.

In 2015, Uralkali received the Certificate of qualification of mine rescue crews issued by the Ministry of Industry and Trade of the Russian Federation. Those crews were formed from employees of Uralkali's mines who were qualified as rescuers.

At the Company's mines, a system of personnel positioning was installed and commissioned.

The Company completed the scheduled examination of industrial safety of technical devices, buildings and structures used at Uralkali's hazardous production facilities.

Fire safety, civil defence and emergencies

All facilities were declared to have met fire safety standards.

In 2014, no fire or emergency situations were registered at the Company's facilities. The number of fire outbreaks decreased by 37%

All 1,600 existing fire alarm and fire extinguishing systems and installations for the underground and surface complexes, as well as warning systems for civil defence and emergencies, were serviced

The outdated detectors in firefighting systems were replaced with more advanced ones, which significantly reduced the number of false responses and mine conveyor downtime in 2014

The certification of existing systems for monitoring and control of engineering systems of buildings and structures (ESM) continues

The Company carried out work to prepare units for preventing and mitigating the consequences of oil spills at the Company's facilities that handle oil products

Comprehensive exercises were conducted to prepare employees for natural and man-made emergency situations and civil defence warning signals

An inventory of civil defence structures, which included technical condition reports, was carried out and measures to improve their protective properties were adopted. In 2014, a civil defence structure at Solikamsk-3 was named the best in the Perm region by a review competition

Health

They believe in the company that nothing is more important than people's health, and the Company takes care of its employees by preventing and reducing their exposure to health hazards in the workplace.

An effective system of regular health checks helps the Company to detect occupational diseases at an early stage, to identify the initial effects of exposure to health hazards, and to take measures to protect the health of employees and assist in their recovery.

To reduce the incidence of these types of conditions, the following measures were implemented:

- Mandatory hearing tests for all individuals working at sites with a high background noise level;
- Additional health checks for all employees working at sites with a high background noise or vibration level;
- Mandatory transfer to jobs that do not involve exposure to health hazards for employees found to be susceptible to occupational diseases;
- Use of modern and innovative personal protective equipment to mitigate the impact of negative workplace factors. For this purpose, Uralkali purchased sets of active noise-cancelling headphones.

As part of its health improvement programmes, employees undergo regular mandatory health checks and examinations, and are also given vaccinations.

Training and instructions

Making employees aware of the latest health and safety requirements and developing a culture of compliance play a key role in ensuring workplace safety. Before starting work at Uralkali's production facilities, the Company's employees receive workplace training. Ensuring workplace safety and monitoring employee compliance with safety requirements are part of the responsibilities of all foremen and supervisors.

Training and certification in 2015:

In the field of industrial safety — 7,663 employees

In the field of occupational safety — 1,181 employees

In the field of emergency situations and civil defence — over 3,500 employees

In the field of fire safety — 8,613 employees

Health and safety requirements for contractors

When it comes to health and safety, Uralkali makes no distinction between its own employees and contractor personnel.

The Company checks all potential contractors to ensure that they have all necessary health and safety permits and that their employees receive health and safety training and certification. Agreements with contractors expressly specify that their employees must comply with their safety requirements and Uralkali's safety standards. Contractor personnel must receive health and safety induction training and Uralkali's officers carry out regular health and safety inspections and checks during contract periods.

Uralkali's contractors also have to comply with the Cardinal Rules: if they break any of them, they are taken off their assignment and banned from Uralkali's facilities for a year.

3. Environmental protection

Respect for the environment and the sustainable use of natural resources are an integral part of the corporate social responsibility policy which underpins Uralkali's strategy. The Company's policy covers all areas of environmental protection:

- **optimisation of production:** Uralkali aims to optimise its production in order to maximise the efficiency of use of natural resources;
- **minimising the impact on the environment:** while its production uses advanced treatment systems, Uralkali is looking not only for new ways of waste disposal, but also for the possibility of their **recycling**;
- **private initiatives:** the company is engaged in volunteer environmental campaigns to clear its cities and forests of household waste.

Uralkali focuses on measures to minimise the negative impact of its activities on the environment. Responsibility for preservation of the environment is an integral part of doing business.

The Company fully adheres to the requirements of environmental legislation, uses natural resources responsibly, and constantly introduces new environmental protection measures.

The highest level of production organisation and the use of advanced technologies enable Uralkali to successfully achieve its sustainable development goals. These include the efficient use of non-renewable resources and adherence to the highest environmental protection standards, aimed at minimising the impact of the Company's business on the environment.

Sustainability of ecosystems, biodiversity and a healthy environment are vital conditions for the wellbeing of future generations.

Company's purposes in the area of environmental protection:

- Reduction of waste discharges into water, balanced water consumption
- Efficient waste management
- Reduction of air emissions
- Minimisation of energy consumption

Company's key achievements in the area of environmental protection in 2015:

- In 2015, total water intake for industrial needs and utility services at Uralkali decreased by 11.4% compared to 2014.
- In 2015, the volume of associated gas used across the Group totalled 70.9 million m³.
- The water intake from surface sources totalled 14.2 million m³ (not including water intake for third parties).
- In 2015, crushing of concrete slabs at a mobile crushing-and-sorting plant continued (16,608 tonnes crushed in 2014, 12,600 tonnes crushed in 2015).
- In 2015, the Company's enterprises produced 31.3 million tonnes of waste (in 2014 — 34.77 million tonnes). More than 99% of this is industrial waste of hazard class V (halite waste and clay-salt slurries).
- Also, over the past three years there has been an increase in the tonnage of waste intended for own production use: in 2015 — 11.25 million tonnes, in 2014 — 10.43 million tonnes, in 2013 — 10.23 million tonnes.

13.8 URALCHEM

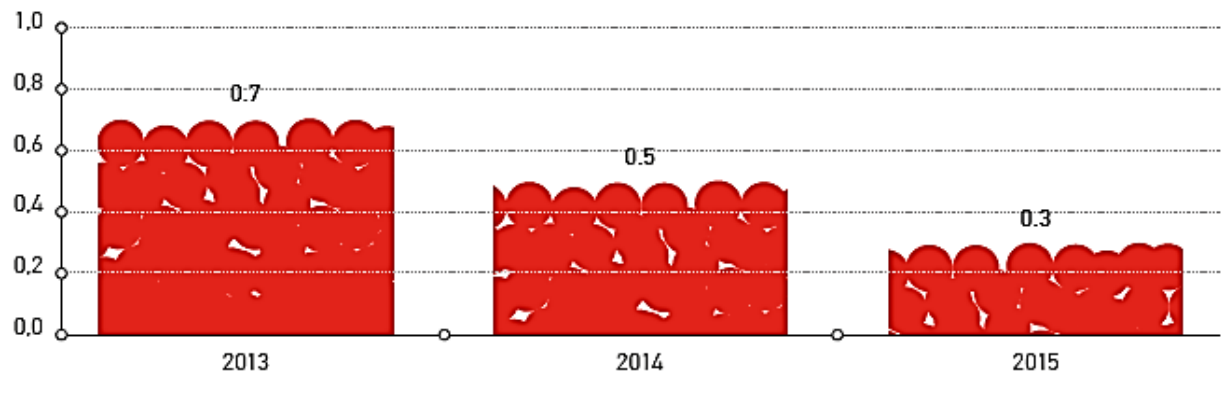
1. Occupational Health and Safety

Occupational health and safety is a major priority for URALCHEM Group. URALCHEM has implemented The Occupational Health and Safety Management System based on the ongoing prevention of incidents. Thanks to the efficient work in the field of occupational health and safety, in 2015 a significant reduction in workplace injuries was achieved and the safety of working conditions at all its facilities were improved.

To ensure the health and safety of all employees, URALCHEM implements a range of activities to prevent occupational injuries and diseases. All Group companies comply with legal requirements and industry standards concerning occupational safety, harmonize the requirements for personal protective equipment and procedures for warning and investigation of accidents and incidents.

The company runs mandatory medical check-ups for employees engaged in hazardous or transport-related activities those who are exposed to potentially harmful elements. Employees are not allowed to do their work unless they have passed such an examination and proven that they have no health restrictions.

Lost Time Injury Frequency Rate (LTIFR)* in 2013-2015 across URALCHEM Group



* The Lost Time Injury Frequency Rate is a key measure of a company's OHS performance. LTIFR is calculated as follows: 1 million man-hours/total time worked.

The Lost Time Injury Frequency Rate (LTIFR) over the reporting period amounted to 0.3 compared to 0.7 in 2013.

This injury rate reduction could be attributed to the Company's activities based on the results of the accident follow-up investigations, stronger control by the management of URALCHEM, JSC, and harmonized safety standards developed and implemented by the Group.

Over the reporting period a range of personal protective equipment, which enabled centralized procurement of this equipment for the first time in history, was unified. In connection with the entry into force of new regulations on occupational safety when working at height, all companies conducted employee trainings in safe methods and techniques of work, in addition to other activities for developing practical skills of safe work directly at the workplace.

100% of employees of URALCHEM, JSC are certified in the field of industrial safety in accordance with their official duties. A certification schedule for the Company's employees and certification committees' members is developed in the area of industrial safety for 2016.

In 2015, all Group companies hold the Special Assessment of Working Conditions (SAWC) that covered 4,769 workplaces and 9,300 employees, or 89% of the Company's headcount. The results of the Special Assessment of Working Condition showed a significant improvement in working conditions at all workplaces. In particular, the Group's enterprises have no workplaces with hazardous working conditions.

2. Environmental protection

Production operations of the Group companies have an impact on the environment. Aware of this fact, special attention in the company is paid to activities aimed at environmental protection, as well as strictly adhere to environmental regulations.

Its environmental efforts are mainly focused on planning and implementing environmental initiatives across all its entities to maximise nature conservation in the regions where they operate and promote energy and resource efficiency.

URALCHEM's environmental efforts are mainly focused on reducing emissions, increasing the efficiency and reliability of gas treatment equipment, reducing water disposal and improving its quality, as well as strengthening industrial environmental monitoring.

In 2015, URALCHEM spent on environmental activities over 301 million roubles.

All production facilities of URALCHEM Group have in place an integrated management system certified according to ISO 14001:2004 international standard.

Environmental policy

All URALCHEM's companies have in place internal environmental policies that set out the Group's main priorities: to comply with environmental laws, implement ongoing environmental monitoring of its operations and consistently reduce its environmental footprint.

Proceeding from key provisions of environmental regulations, Uralchem's companies introduce state-of-the-art production technologies, upgrade emission and discharge treatment solutions, ensure proper waste disposal, reclaim their waste disposal sites, and enhance in-process environmental controls.

Environmental management

The Group has an environmental service that mainly focuses on managing the environmental activities of URALCHEM companies. It operates under Russian laws, URALCHEM's internal procedures and advanced environmental management systems such as ISO 14001.

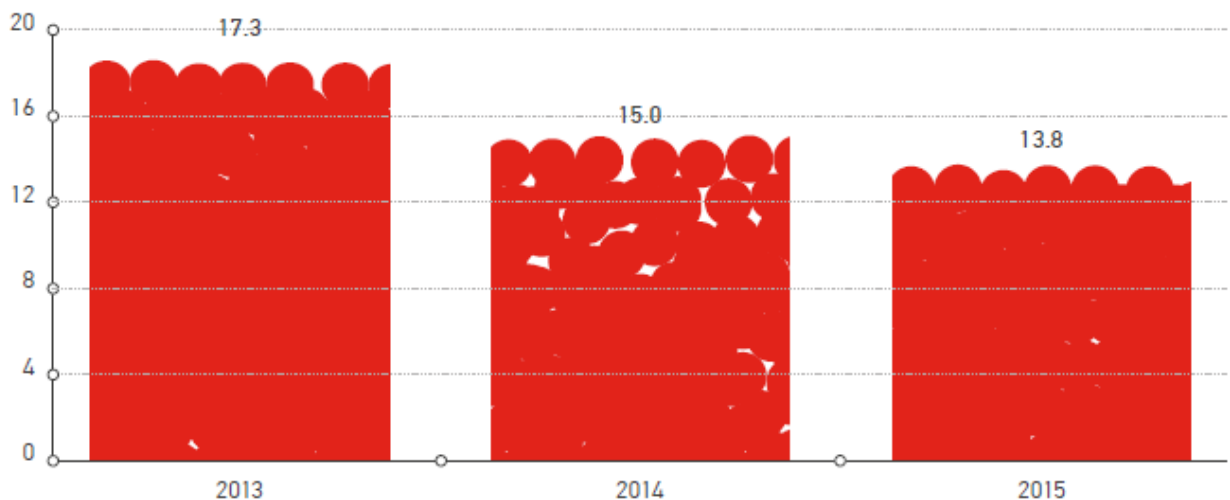
Additionally, special units operating directly within the Group companies are responsible for developing and updating environmental documents and procedures, the Group's mandatory environmental reporting, and internal environmental audits.

Reduction of emissions

URALCHEM's facilities comply with applicable emissions limits. Despite production growth, the company is still below statutory limits. They are continuously improving the production processes, upgrading and renovating emission treatment facilities and running in-process analysis of emissions.

Initiatives implemented in 2015 led to an 8% year-on-year cutback in emissions.

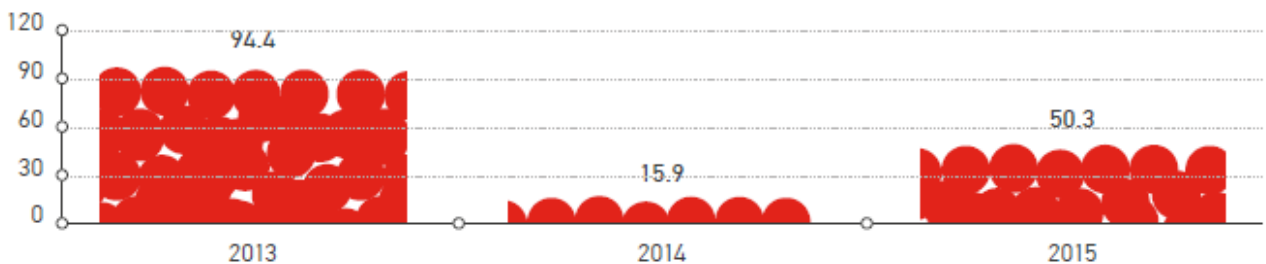
Air emissions by URALCHEM Group in 2013-2015, '000 tonnes



URALCHEM Group implements a consistent programme to reduce the negative impact on the environment of its production and consumer waste. In 2015, the Group's environmental policy was focused on two key waste reduction areas:

- Maximising waste recycling within its companies and waste transfer for use by third parties;
- Waste processing and neutralisation by waste treatment companies.

Waste disposal by URALCHEM companies*, '000 tonnes



Energy and resource conservation

Energy and resource conservation contributes to more efficient consumption of resources used as feedstock for production.

The Group's energy and resource conservation activities are aimed at:

- Cuts in expenses for energy resources — power energy, heat energy and industrial water;
- Cuts in consumption and purchase of resources;
- Cuts in costs of auxiliary energy resources.

The following main activities in the field of energy saving were identified:

- improving technological procedures;
- equipment renovation;
- reducing losses of fuel and energy resources;
- improving the quality of fuel and energy;
- improving the reliability of equipment;
- increasing equipment service life;
- reducing the negative impact on the environment.

13.9 Kazanorgsintez

Kazan Public Joint Stock company “ Organichesky sintez” is one of the largest chemical companies of the Russian Federation. PJSC Kazanorgsintez produces more than 38% of the total Russian output of polyethylene and it is one of its major exporters.

1. Occupational health and safety

The Management of OJSC Kazanorgsintez undertakes to take all necessary measures to prevent personnel injury and disease, constantly improve management and increase performance of occupational health and safety system. The Management of OJSC Kazanorgsintez undertakes to provide compliance of the Company's activity to the requirements set in respect of health protection and labor security.

Objectives:

- Provision of safe work conditions for personnel and trouble-free operation for equipment;
- Provision of Occupational Health and Safety Management System functioning and its efficiency increase;
- Resource allocation management taking into account the significance of risks in the area of labor protection and industrial security;
- Extension of Occupational Health and Safety Management System requirements to outside companies working at OJSC Kazanorgsintez's industrial units;
- Coverage of occupational health and safety issues at OJSC Kazanorgsintez official web-site and Sintez newspaper;
- Provision of occupational health and safety for all OJSC Kazanorgsintez's employees through prevention of incidents and professional diseases;
- Observance of legislative and other normative, legal acts, collective agreements, different documents and requirements that OJSC Kazanorgsintez have undertaken to fulfill.

The objectives are reached by:

- Organizing employees' training in the area of Russian and Republican legislative and other normative, legal acts requirements, as far as requirements of the Company's different standards, instructions and regulations in the sphere of occupational and industrial safety;
- Risks' assessment in the sphere of occupational and industrial safety aimed to determine the necessary management tools for their reduction;
- Regular monitoring of the work conditions and occupational safety;
- Involvement of employees and their representatives in the management and analysis of occupational safety at all levels of government.

According to the requirements of the current Russian and Tatarstan legislation, laws and regulations, as well as technical standards on occupational and industrial safety OJSC Kazanorgsintez has the Occupational Safety Division that has been functioning in the Company from the very first start-up and carries out purposeful work on:

- Improvement of uninterrupted operation system;
- Creation of healthy and safe work conditions;
- Prevention of industrial injuries and occupational diseases.

Occupational Safety Division submits to the Deputy Chief Engineer for industrial safety and includes production control engineers, and specialists for occupational safety and health in the production units of the Company.

Promotion of **healthy lifestyle** is widely spread at the Company. Annually sports and recreational activities are carried out in accordance with the order of the Company.

Major factor in the prevention of morbidity and health care is the own medical sanitary unit (MSU), which is a subdivision of the Company and is located directly on the premises of OJSC Kazanorgsintez. Within 2-5 minutes medical team is able to come to a place of a disaster, or accident and provide the necessary pre-hospital medical care.

Preliminary medical examinations (held at starting the work) and periodic medical examinations of workers engaged in work with harmful and dangerous working conditions, as well as employees, driving vehicles, play a big role in reducing the morbidity. In 2014, 6,154 employees of the Company passed planned medical examination. The Company's expenses amounted to 24.8 million rubles.

Production control of **industrial safety** at OJSC Kazanorgsintez's hazardous production facilities is carried out in accordance with Federal laws, regulations and technical documents, the local regulations of the Company.

The Company has the Technical Inspection Office, which is the part of the industrial safety division, and provides:

- Technical supervision over the safe operation of vessels, vehicles, membrane-relief devices, process piping, compressor and pump equipment;
- Technical supervision over the safe operation of ventilation systems, test the effectiveness of ventilation systems;
- Technical supervision over the safe operation of lifting equipment, crane tracks, lifting devices;
- Supervision over the heat and power systems;
- Supervision over the buildings, constructions and roads.

2. Environmental protection

Production process of main organic synthesis, inorganic substances, polymers as well as products manufactured from them sold by PJSC "Kazanorgsintez" by reason of the specific nature of the technological process are related to generation, emission and discharge into environment. Due to this Company management pays full attention to environment protection issues. The selected Company policy is focused on minimization of negative impact on environment.

The Joint Stock Company activity is performed in conformity with environmental legislation of the Russian Federation and Tatarstan Republic. Environmental protection measures plans are elaborated and implemented annually. These plans are intended to decrease the harmful environmental impact of operation units, rational use and protection of water resources.

Since 2005 the Company has implemented ecological management system certified for the compliance with International Standard Requirements ISO 14001. Management system allows increasing effectiveness of processes and actions aimed to achievement of continual improvement in the field of environment protection.

Following the market trends, consumer demands lead to inescapable expansion and sophistication of technological process and due to this it is necessary to constantly improve and build-up facilities intended for nature protection purposes including the following:

- dust and gas catchers;
- hydrocarbon blowdowns collection and utilization units with their partial return to the process;
- circulating water system;
- local purification units for chemically contaminated waste waters;
- biological treatment plants system;
- thermal deactivation stations of liquid production wastes;

Currently operating environmental monitoring system allows clearly and objectively trace ecological situation in plant operation area, analyze the ambient air condition tendency and water objects, to determine the effectiveness of environmental actions held, promptly determine and eliminate emerging ecological abnormal situations on production units.

PJSC "Kazanorgsintez" water supply is performed from its own water intake structure. In order to decrease water intake from the Volga river Company is constantly increasing the capacity of circulation water systems- the rate of water circulation makes up 97,5%.

PJSC "Kazanorgsintez" faces a task of rational and effective usage of nature resources which allows providing vital demands for people as well as protection and reproduction of environment. This problem can be resolved on a system approach basis realizing the complexity of actions taking in each field of material sphere. The way of demonstration on how PJSC "Kazanorgsintez" understands its responsibility to fulfill the assigned targets is the Company activity in environment protection for which PJSC "Kazanorgsintez" was awarded by diplomas and certificates. They include the following awards: diplomas of ecological forum participant "Hunan. Nature. Science. Engineering" for activity in the field of environment protection; annual diplomas of contest winner ECOleader nominated in "For effective ecological program".

Environmental Policy

Public Joint Stock Company "Kazanorgsintez" produces organic synthesis products, inorganic products, polymers and polymer products and realizes that production processes negatively affect the surrounding environment that is why the ecological management is considered as top priority in the Company's activity and as a basis for successful development.

Strategy

Company's sustainable development under dynamic economical growth and maximum rational use of natural resources as well as preservation of the environment for future generations by means of adverse technological effect minimization.

Ecological policy objectives:

- Provision of the environmental management system operability and improvement in accordance with its international standard requirements in order to achieve targeted goals with economic costs and high efficiency;
- Environmental pollution decrease by means of advanced technology implementation;
- Compliance to the RF and RT legislation requirements as well as observance of standards and regulations in the field of natural resources utilization, environment control and ecological safety;
- Specific amount of emissions, pollutants and wastes discharge decrease;
- Raw materials, materials and power resources rational use, implementation of resources saving technology;
- Reduction of accidents risk and its negative impact on the environment by means of process equipment enhanced reliability and its safe and trouble free operation;
- Raise employees awareness in the area of natural resource rational use, environmental protection and ecological safety;
- Monitoring the effect of main and supplementary production processes on the environment.

Compliance to these guidelines is considered by PJSC "Kazanorgsintez" management as a basis for insuring environmental safety of the Company's activity as well as condition for optimum balance between ecological interests and social and economic requirements of the society aimed to promote sustainable development of the Russian Federation.

Environmental monitoring

PJSC "Kazanorgsintez" successfully applies an environmental monitoring system which provides prompt and effective tracing of the ecological conditions in the Company's exposure area, as well as allows to analyze ambient air and water bodies condition tendency, to determine the efficiency of environmental protection measures being implemented and as well as to promptly identify and eliminate environmental emergencies at manufacturing plants. All these efforts are performed by the accredited sanitary and industrial laboratory (Accreditation Certificate No.ROSS.RU.0001512321 dd. 02/04/2013.)

The monitoring includes such key areas as:

- Observance of specified environmental impact regulations by the natural resources user;
- Recording the assortment and quantity of pollutants exhausted to the environment by facilities of the natural resources user;
- Performance of environment-oriented plans and activities determined by designated state authorities involved in monitoring and supervision of the environmental protection;
- Observance of limits for the use of natural resources;
- Control of hazardous production waste storage in specially designated areas;
- Stable and efficient operation of the environmental protection equipment and facilities;

- State of environmental medium;
- Prompt and timely provision of necessary and sufficient information specified by environment management system of the Company;
- Timely provision of complete and competent information specified by state statistical reporting system in the environmental protection area, state ecological monitoring system, used to ensure safety measures in emergency situations and to validate the amount of ecological payments.

Sanitary-industrial laboratory performs industrial and ecological supervision of the following:

- Content of harmful substances (dusts, gases, vapors) in working area air; dust and gas collectors operation efficiency and compliance with specified regulations requirements concerning maximum allowable emissions into the atmosphere;
- State of air medium in the territory of the Company's premises and in sanitary-protection zone (stationary center), including control under unfavorable meteorological conditions (UMC);
- Emissions spread around the territory of Joint Stock Company (under flare sampling);
- Operation of local industrial wastes treatment units for the compliance to technical regulations;
- Quality of Company's chemically contaminated and industrial rain-storm run-offs;
- Quality of waste waters downstream treatment in biological plants before they are discharged to water basins;
- Quality of water in the Volga river, higher, lower and at the point of Company's treated water discharge;
- Air quality upon requests of workshops, departments in order to execute firing works and gas hazardous works (welding, equipment repair etc.);
- Physical factors parameters in industrial premises (noise, illuminance, microclimate, vibration, electromagnetic field).

13.10 TogliattiAzot

1. Occupational health and safety

The systems of industrial safety, occupational safety and environmental protection, created in the company, by their structure comply with the requirements of the standards ISO 14001 and OHSAS 18001:2007, i.e. the elements of the indicated standards are implemented, which provides the efficiency of the management system operation.

Due to the fact that production facilities of I and II hazardous class are situated, their safety continued operation shall be guaranteed with controlling the risks of thermal, barometric and toxic damage effects.

A specialized department is responsible for the questions of occupational safety and industrial safety. The employees responsible for occupational health and safety are acting under the "Regulation on the responsible for occupational health and safety in "Togliattiazot" JSC. This Regulation was developed and agreed in 2008 in accordance with the art. 370 of Labor Code of the Russian Federation, art. 20 No 10-FZ "On professional unions, their rights and guarantees of actions" and the Charter of Russian professional union of the employees of chemical sectors of industry.

There is a complex of measurements by the following directions in the area of occupational health and safety, industrial safety and environmental protection, in the company:

- Provision of the Company's operation with the legislative requirements in the field of occupational health and safety, industrial safety and environmental protection;
- Modernization of production capacities with a purpose on minimization of a negative impact on the environment, decreasing of consumed resources and increasing of the equipment reliability;
- Personnel qualification sustainment and improvement in the field of occupational health and safety, industrial safety and environmental protection;
- Development of culture of industrial and ecological safety in the production;
- Readiness for localization and relief of consequences of possible emergency situations and incidents;
- Health maintenance and implementation of a healthy lifestyle.

The work on maintenance of safety labor conditions is being performed on a constant basis. Special evaluation study of all the working places is performed and all the necessary measurements on the places bringing in compliance with the regulatory requirements.

The employees of "Togliattiazot" OJSC, occupied with the works with damaging and/or hazardous conditions of works shall use the means of individual protection (SIZ) on obligatory basis.

The works on implementation of one of the instruments of the methodology of "Lean production", "5S" instruments, including the system of rational arrangement of a working place and allowing to increase both the labor productivity and safety, were continued in 2016. They started to estimate all the actions in the matrix "possibility-consequence". Other regional companies started to use the experience of TOAZ in this field.

The following directions may be indicated in the area of the employees' health protection: prevention of occupational deceases, decreasing of total morbidity rate, increasing of accessibility and quality of medical aid.

Thanks to effective organization of the system of health management within the last 15 years no one occupational decease was indicated in the company.

Qualified doctors control the personnel health and the material resources of the plant medicine center allows perform not only regular health assessment but also the prophylactic and treatment of the employees. Free program of medical assurance (DMS) operates as of June 2016 – 100% of the employees are insured. Regular medical assessment ear being performed for all the employees, working in damage hazardous labor conditions. By the results of such assessment, a sanatorium-resort treatment in a jurisdictional sanatorium "Nadezda". The Company insists on annual preventive treatment (including a possibility of partial day release) of the Heads of technological and repair workshops, whose work is connected with great tension and psychoemotional pressure.

The index of morbidity indicated in the number of days of disability per 100 employees, has achieved 307.6, decreasing for 0.7% in comparison with the level of 2015.

2. Environmental protection

Togliattiazot strictly respects the requirements of the Russian Federation legislation and accounts the requirements of international standards in the field of environmental protection and occupational health and safety. The Company also invests in implementation of innovative technologies and in methods of ecological and production safety provision in order to guarantee the most effective use of natural resources.

There are Departments of occupational health and safety, environmental protection and improvement and grassing workshop in the Company, managed by the Chef Specialist in HSE. Production Control Department performs the compliance with the requirements of industrial safety.

A strategic goal of the Company is decreasing of negative impact on the environment at all the stages of the product lifecycle. The most important tasks are indicated for every significant aspect:

- Decreasing of emissions in the air;
- Decreasing of storm water discharge in water bodies and improving of the storm water quality;
- Decreasing of the production wastes volumes and increasing of the recoverable wastes share;
- Compensation of the impact on environment due to realization of environmental protective initiatives on natural resources renewal and environment quality improvement.

Togliattiazot pays great attention to the problems of air pollution and implements different programs on the emissions amount decreasing.

In 2016 the amount of pollutant substances in the air from all the industrial sites of "Togliattiazot" OJSC amounted to 6 622.5 tones, what is for 27% less than officially allowed rate of emissions for an enterprise and almost for 2% less than in 2015.

Quality of the atmosphere air at the production site is being controlled by means of a unique movable ecological laboratory. High-sensitive infrared spectrometer-interferometer determines content of pollutants in the air and transfers their characteristics in the plant dispatching room by means of wireless network.

Within the frameworks of the production process Togliattiazot intends to implement modern technologies for multiuse of wasted water that allows to decrease the volume of water consumption step by step.

This data is confirmed with stable high index of the rate of multi-used water: it amounted to 99.47% in 2016.

The following measures are being performed for control of water bodies' condition:

- Monitoring of waste water condition when discharging in Saratov water basin;

- Bio testing of mixed wastes;
- Microbiological study in the area of diffusing output with attraction of specialized companies and with hygienic estimation of the results.

The company operation is connected with creation of significant volume of wastes.

Herewith "Togliattiazot" intends to decrease the wastes volume. By the present moment 118 types of wastes are being arised at the enterprise, 96% of which belong to low-risk and practically non-hazardous wastes (of IV and V hazardous classes). Constant production control is being performed in the places of temporary wastes accumulation. "Order of production ecological control in the field of wastes treatment" is developed at the enterprise.

The level of consumption of all the energetic resources decreased in the reporting period in comparison with 2015. Despite the increasing of ammonia production volumes, TOAZ has managed to decrease the coefficient of natural gas consumption for 5% (from 1.28 to 1.22). The indicated decreasing is conditioned with realization of the program of the enterprise modernization, within the frameworks of which in 2015-2016 a major repair works of the ammonia production aggregates was performed.

14 Scientific institutes, associations, R&D

RUSSIAN CHEMISTS UNION



The main association in Russia, coordinating the activity of the companies in chemical production sector is the Russian Chemists Union. It is a noncommercial organization which unites the enterprises of chemical sector, scientific research institute, the unions and associations of a chemical orientation, vertically - integrated structures of Russia. Nowadays about 600 enterprises and chemists organizations from 34 subjects of the Russian Federation, and also the company and their representation of Latvia, Georgia, Ukraine, France, Germany and the USA are members of the Russian Union.

The organizational structure of the Union will consist of 43 members of Council which include directors of the largest enterprises, institutes, the organizations, and deserved people of branch.

The Union is in constant interaction with bodies of federal and regional authority in operatively - current work: the Ministry of Industry and Trade of Russia, the Ministry of Economics and developments of the Russian Federation, executives and controlling bodies of Russian Federation, Agency on the industry, administrations of regions, etc. The Russian Union of chemists organizes and supports 21 Russian exhibition actions, from them 14 pass in Moscow, 6 - in the Russian regions and 3 - abroad. The union traditionally is the organizer of the International Chemical Summit in Moscow.

The basic purpose of the Union are:

- protection and representation the interests of domestic commodity producers;
- participation in expert work with the state, public, international authorities in various questions, including on "Strategy of development of chemical and petrochemical industries till 2015";
- work on improvement of economic conditions and increase of competitiveness in the international and national markets;
- creation of reliable conditions of workers' social security;
- others.

The union pays the great attention to cooperation with other sectoral unions and organizations. The RCU is a member of the Russian Union of Industrialists and Entrepreneurs (RSPP), the Rusprodunion, The Chamber of Commerce and Industry of the Russian Federation. On base of the RCU is created the Commission in chemistry and petrochemistry RSPP. The Russian Chemists Union active works with business, authorities concerning the problem of explanation of European rules REACH which insures since June, 1 2008. Working with the federal law «About technical regulation» is a priority direction for the RCU in Russia.

Within several years the RCU closely cooperates with the ICCA, with the CEFIC, with Confederation of the chemical industry of Finland and others international organizations.

The Russian Chemists Union conducts fruitful work with the global program «Responsible Care», recommended by the United Nations to all countries. Action of the program «Responsible Care» is distributed in spheres of the safety precautions, labour safety and ecology. In 2007 Russia, on behalf of the Russian Chemists Union has entered Committee on realization the program at a national level and has been accepted in the leader group of the countries working by techniques of the given program. Russia became 53-rd state working based on standards of the program "Responsible Care".

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CHAMBER OF COMMERCE AND INDUSTRY OF THE RUSSIAN FEDERATION



**Chamber of Commerce and Industry
of the Russian Federation**
For the benefit of business. For the benefit of Russia.

The Chamber of Commerce and Industry of the Russian Federation (CCI of Russia) is a non-governmental non-profit organization uniting its members to meet the tasks and objectives set by the Russian Law on Chambers of Commerce and Industry in the Russian Federation and the Chamber's Charter.

The Chamber of Commerce and Industry of the Russian Federation represents the interests of small, medium and big business and encompasses all business sectors – manufacturing, domestic and foreign trade, agriculture, finance system and services.

One of the priorities of the chambers of commerce is the development of a system for the resolution and settlement of disputes. The structure of the Russian Chamber of Commerce more than one hundred arbitration and more than 30 boards of intermediaries.

Center for Arbitration and Mediation includes the International Commercial Arbitration Court, Maritime Arbitration Commission, the Court of arbitration for the resolution of commercial disputes, Sports arbitrage, as well as the Panel of Mediators for the mediation procedures.

The Chamber is well- known in the world by its internationally acclaimed companies:

- **The World Trade Center- WTC**, is part of a worldwide network of international trade centers. It contributes to the expansion of world trade, the development of stability in the global economy and provides a wide range of high-tech business services at international standards. WTC Moscow is the biggest business center in Russia. It offers over 500 services to its customers. With a well-developed infrastructure creates all range of conditions for business and leisure and provides high level innovative technological services;
- **Expocentre-** is a world-known Russian exhibition company, which has always retained its status of a leading organizer of largest international exhibitions in Russia, the CIS and Eastern Europe, and of Russia's national expositions at EXPO exhibitions;
- **Sojuzexpertiza-** is the leading and oldest Russian independent inspection company that performs at the request of Russian and foreign legal entities and individuals examination and verification of the quantity and quality of export and import goods in Russia and abroad;
- **Sojuzpatent-** is the oldest company in the market of patent and legal services - it dates back to the creation of the Russian-East Chamber of Commerce in 1922. "Sojuzpatent" - one of the leading firms providing local and international customers with services for the legal protection of intellectual property: inventions, utility models, industrial designs, trademarks, appellations of origin, domain names, and others.

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SCIENTIFIC RESEARCH INSTITUTE OF TECHNICAL-ECONOMICAL INVESTIGATIONS IN CHEMICAL COMPLEX



Scientific research institute of technical-economical investigations was established in 1958 within a framework of massive state program of accelerated development of chemical industry in USSR. From the very first years the Institute has obtained a status of the main center of methodological developments, analytical and forecasting researches, dedicated to forming of strategical directions of development of soviet chemical industry.

Within more than 50 years passed the Institute has collected wealth of experience in the area of through analysis of the chemical complex activity. All these years it provides the federal and regional authorities, organizations and the sector companies with the results of feasibility studies, predictive estimates and scientific-technical information in a wide range of problems.

The main Institute's areas of activities is elaboration of strategies, programs, concepts of chemical and oil-chemical industry development in the whole, in separate federal districts, Russian regions, in the leading companies in the sector; elaboration of feasibility studies and business plans of chemical and oil-chemical production companies, market studies of chemical and oil chemical production markets.

As of 2010 the Institute is an operator of exposition of Russian chemical complex enterprises at the international exhibitions, included in the Plan of exhibition and nundrial measurements of the Ministry of industry and trade of the Russian Federation, including the international exhibition "Chemistry".

The Institute provides the following services:

- 1) Analytics and forecasting
 - a. Proposals on high refining of large-capacity chemical, gas-chemical and oil-chemical products into the products, imported and in-demand in the internal and external markets;
 - b. Market studies and prospective of development of Russian market in chemical production according to the nomenclature agreed with the Client;
 - c. Multi-optional forecasts of development of the productions and marketing area of chemical products in according to the nomenclature agreed with the Client;
 - d. Estimation of competitive environment (by the model of Porter's 5 forces and the methodology of Federal Anti-Monopoly Service) and competitive capacity of an enterprise in the whole and its separate productions in the internal and external markets;
 - e. Condition and forecast of provision of chemical and oil-chemical production with hydrocarbon and mineral raw materials in the whole in Russia and for separate enterprises accounting their territorial allocation;
 - f. Tendencies in development of the world markets of chemical and oil-chemical products with evaluation of the Russian producers' positions for them in a prospective;
 - g. Composite materials: development of composite products market in the world and in Russia (marking out carbon fibre and PAN-precursor);
 - h. Biotechnologies in Russian economics: bioplastics, biocatalysts. Condition and prospective of biotechnologies in Russia;
 - i. Ways of extension of logistic chains of selling of a determined type of products and raw materials purchasing and semi products for its production;
 - j. Analysis of technologies of obtaining of determined types of chemical products in the world and recommendations on selection of the most optimal one for use in Russia.
- 2) Informational-analytical servicing:
 - a. Export / import of chemical production in physical and monetary estimation in according to the nomenclature agreed with the Client in dynamics for the past 10 years and in the current year with a lag once per month by the countries of the world and in the context of supplier/buyer;
 - b. Internal and external trade prices for chemical products in according to the nomenclature agreed with the Client in dynamics per months of the current year;
 - c. Package of the documents on necessity of increasing/decreasing of import custom duties for the chemical products agreed with the Client (analytical note on the condition of internal market and feasibility study of necessity of increasing/decreasing of import custom duties in accordance with the methodology of the Ministry of economic development) for their provision in the Department of tariff and nontariff regulation of Eurasian Economic Commission (EEC) and information-consulting maintenance within the period of an application processing at all the steps of the application processing.
- 3) Strategic planning
 - a. Elaboration of the strategy of chemical complex development in separate regions of the Russian Federation;

- b. Development of the strategy of the sector companies accounting forecast development of the issued production markets and logistics and raw materials provision;
 - c. Elaboration of feasibility studies, business plans of investment projects in the area of chemistry and oil-chemistry.
- 4) Trading platform
 - a. Provision of the chemical and oil-chemical companies with required raw materials, semi products and additional materials;
 - b. Reference guide of the producers of chemical and oil-chemical products in Russia;
 - c. Information on the most important indexes of development of the Russian chemical complex in on-line environments;
- 5) Expert conclusions
 - a. Independent evaluation of feasibility studies of the projects related to chemical complex;
 - b. Determination of current condition and forecast on the level of concentration of a separate product's market in the Russian chemical market. Determination and characteristics of comparative markets by the Federal Anti-Monopoly Service methodology;
 - c. Estimation of the level of dominating and monopolization of separate enterprises in the Russian market by the methodologies of economic theory and anti-monopoly politics of the state;
 - d. Analytical and expert support of investigation into the case of violation of Russian anti-monopoly legislation on the chemical products markets.
- 6) Organizational services
 - a. Organization of participation in international industry exhibitions, included in the exhibition plan of the Ministry of trade of Russia;
 - b. Organization of conferences, round tables, seminars related to the problems of development of chemical and oil-chemical industry.

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RUSSIAN UNION OF THE PRODUCERS OF CHEMICAL CROP PROTECTION AGENTS

Russian union of the producers of chemical crop protection agents is established and acts in accordance with the Civil Code of the Russian Federation, the Federal Law of the Russian Federation "on non-commercial organizations", Articles of incorporation and a Charter.

The Union is an association of legal entities, created on a voluntary basis with a purpose of efforts integrating and coordination of the operation of the members of chemical crop protection market in Russia and representation and protection of their interests. The Union performs the following activities in accordance with the above-mentioned purposes:



- Provision of cooperation and formulation of common ground of the Union's members in the area of working on the Russian market crop protection agents;
- Protection and representing of common interests and collective opinion of the Union's members in the legislative and executive authorities of the Russian Federation and in relations with public organizations;
- Independent expertise and development of the projects of legislative and normative acts, regulating functioning of the crop protection agents market;
- Organization of communication with mass media in the interests of the Union's members;
- Development of the system of informational provision of the market of chemical crop protection agents;
- Analysis of the Russian market of chemical crop protection agents, forecasting of the requirements in different types of crop protection agents and development of recommendations for the members of the Union on their strategy regarding the work on the Russian market;
- Protection of the interests of the Union in tenders (competitive tenders) for delivery of the chemical crop protection agents;
- Coordination of common activity with other unions of companies in protection of the interests of Russian producers;
- Other areas of activities, complying with statutory tasks and not prohibited by the current legislation.

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List of information sources

1 – External Electronic Publications

Ministry for Industry and Trade of the Russian Federation (Minpromtorg) <http://minpromtorg.gov.ru/>
Russian Federal State Statistics Service (Rosstat) <http://www.gks.ru/>
Russian Customs Service of the Russian Federation <http://eng.customs.ru/>
Russian National Biofuels Association (RBA) www.biofuels.ru
Eurasian Economic Commission <http://www.eurasiancommission.org/en/Pages/default.aspx>
CREON Energy <http://www.creonenergy.ru/en/>
Vygon Consulting “*Petrochemical sector of Russia*”, Dec’2017 <http://vygon.consulting/>
Vygon Consulting “*Domestic gas demand*”, Mar’2018 <http://vygon.consulting/>
PWC “*Impact of global megatrends on the Russian petrochemical sector till 2030*” Apr’2017, <https://www.pwc.ru/>
RBC Research <https://www.rbc.ru/research/>
AzotSyntezgaz Russia & CIS “*Current and perspective investment projects*”, Apr’2018 <https://www.syngasrussia.com/>
AzotSyntezgaz Russia & CIS “*Report on results of the survey ‘Gas processing and gas chemistry in Russia’*”, Apr’2018
<https://www.syngasrussia.com/>
International Bioenergy magazine <http://www.biointernational.ru/>

2 – Official websites of institutions and companies

EUROCHEM <http://www.eurochemgroup.com/en/home/>
PHOSAGRO www.phosagro.ru
URALKALI <http://www.uralkali.com/>
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GC TITAN <http://www.titan-omsk.ru/en/>
GAZPROMBANK <https://www.gazprombank.ru/>
ALCO-NAPHTHA <http://en.ekopet.ru>
MINUDOBRENIYA <http://www.minudo.ru/>
CRYOGENMASH <http://www.cryogenmash.ru/>
RUSSIAN CHEMISTS UNION <http://www.ruschemunion.ru>

Bilfinger Tebodin CIS B.V.
The Russian chemical market
Market study report
Order number: ruT00080.01
Document number: 3513001
Revision: A
June 08, 2018
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CHAMBER OF COMMERCE AND INDUSTRY OF THE RUSSIAN FEDERATION <http://tpprf.ru/en/>

SCIENTIFIC RESEARCH INSTITUTE OF TECHNICAL-ECONOMICAL INVESTIGATIONS IN CHEMICAL COMPLEX
<http://niitekhim.ru/ru/>

RUSSIAN UNION OF THE PRODUCERS OF CHEMICAL CROP PROTECTION AGENTS <http://www.pesticidesunion.ru/>