Chemical and petrochemical industry in the Republic of Belarus

2023

NATIONAL AGENCY OF INVESTMENT AND PRIVATIZATION
REPUBLIC OF BELARUS

Contents

1. Current state of the industry

The chemical industry of Belarus is the most important industry of the country. It is represented by mining and chemical (production of potash fertilizers) and petrochemical (oil processing) sub-brunches, as well as a sub-branch of basic chemistry (production of mineral fertilizers, chemical fibers and threads, synthetic resins and plastics, rubber products). In addition, the paint and varnish, fiberglass, pharmaceutical, microbiological industry and the household chemicals industry are included.

The industry is coordinated by the Belarusian State Concern for Oil and Chemistry ("Belneftekhim" Concern). It is one of the largest industrial complexes of the Republic of Belarus. The Concern unites enterprises and organizations for the production, processing and transportation of oil, oil product supply, chemistry and petrochemistry, a number of scientific, design and engineering organizations, as well as a wide distribution network in foreign markets. "Belneftekhim" comprises 83 organizations that produce more than 90% of the total output of the entire chemical industry and are the main exporters of processed products. The organizations that are part of the concern form about 20% of Belarus' industrial output and produce more than 500 types of petrochemical and chemical products.

The main commodity groups determining the export potential of the concern's organizations are crude oil and petroleum products, mineral fertilizers, tires, caprolactam, polyethylene, chemical fibers and threads.

1.1. Key industry indicators

The chemical industry is the largest industry in the country. At the moment, statistics on the industry are not published. The latest available data is presented below.

Key indicators of industry development

Year	2016	2017	2018	2019	2020	2021	2022
The amount of organizations, units	466.0	481.0	482.0	492.0	517.0	525.0	531.0
The volume of industrial production, USD million.	3,362.3	4,329.3	5,056.7	4,979.4	3,885.6	-	-
in comparable prices, percent, (previous year = 100)	96.3	109.8	106.2	98.8	99.1	-	-
Share in total industrial production volume, %	8.2	8.9	9.3	9.0	8.0	-	-

Year	2016	2017	2018	2019	2020	2021	2022
Average number of employees, thousand people	48.0	47.7	47.9	48.1	46.8	46.6	45.8
to the average number of industrial employees, %	5.4	5.4	5.5	5.5	5.5	-	-
Nominal accrued average monthly wagesof employees, USD.	614.0	712.2	823.7	878.8	834.5	941.9	928.6
as a percentage of nominal accrued average monthly wages of industrial employees	162.5	158.4	165.9	163.3	163.0	165.6	-
Прибыль от реализации продукции, млн долл.	344.6	879.2	986.9	997.9	530.5	-	-
Profitability of sales, %	8.1	17.2	16.9	16.5	10.7	-	-

The volume of industrial production of the industry on average is at the level of 8-9% of the total volume of industrial production of the country, which on average amounts to 4-5 billion USD. It should be noted the annual growth in the number of organizations in the industry to 531 organizations, as well as a decrease in the average number of employees to 45.8 thousand people in 2022, which is the minimum for the last 7 years. On average, the industry employs 5.5% of the workforce in the industry as a whole. As of 2022, the wages of employees amounted to almost $ 930, a decrease of 1.4% compared to 2021.

1.2. Legal framework

The chemical industry belongs to the priority areas of scientific, scientific and technical and innovative activities of the country. In particular, this applies to chemical technologies and industries, petrochemistry, fine chemical synthesis, processing of raw materials and wood chemistry.

The main directions of development are stated in the state and regional scientific and technical programs. The list of programs for 2021-2025 was approved by Decree No. 173 of the Council of Ministers of the Republic of Belarus dated March 26, 2021. The main directions of the development of the chemical industry are stated in the State Science and Technology Program « Perspective Chemical and Biological Technologies» for 2021-2025 and the State Program « Science-intensive Technologies and Engineering « for 2021-2025 (in particular, subprogram 4 «Innovative products based on mineral and organic raw materials», subprogram 5 «Chemical products molecular technologies»).

The main regulations in the chemical industry are aimed at ensuring human safety. Certain activities that are hazardous are regulated by Law No. 213-Z "On Licensing" dated October 14, 2022, Law No. 356-Z "On Labor Protection" dated June 23, 2008 and other regulatory documents, including sanitary supervision requirements.

1.3. Scientific and research base

The chemical industry is becoming more science-intensive every year. This is due to the complexity of manufacturing chemical products, the sophistication of the equipment used and continuous innovative developments. Chemical activities require not only serious financial, but also technical support. That is why it is most common in technologically advanced countries.

«Production Association «Belorusneft» (BelNIPIneft), RUE, is the leading scientific center is the Belarusian Research and Design Institute of Oil in the field of petrochemistry. Being one of the leading oil industry institutes in the CIS countries, it can solve various tasks related to the prospecting, exploration and development of oil and gas fields, production and transportation of hydrocarbons. About 10-15 research and development works are carried out annually at the Institute, the results of which find practical application in the internal production process.

Currently, BelNIPIneft creates scientific developments at the level of inventions and utility models and successfully implements them in Belarus and abroad. Over the past five years, 18 applications for inventions and utility models have been filed with the patent offices of the Republic of Belarus, the Russian Federation, Ukraine and the Eurasian Patent Office, 28 patents for inventions have been obtained, including 5 patents for inventions of the Republic of Belarus, 1 patent for an invention of the Russian Federation, 3 patents of Ukraine and 19 Eurasian patents. In 2016-2022, the economic effect exceeded $10 million due to the implementation of the results of research and development performed by BelNIPIneft under 43 contracts. The volume of financing of such contracts amounted to 6 million.

The Concern has formed a network of industrial laboratories of scientific organizations of Belarus directly related to the Concern's enterprises. In 2020-2022, 22 projects have been implemented within the network, 12 are under implementation. By 2023, there is an economic benefit of at least 2.3 million USD with a financing cost of approximately 0.4 million USD.

Research is also conducted within the Academy of Sciences in the Department of Chemistry and Earth Sciences. This includes:

- State Scientific and Production Association «Chemical Products and Technologies»;
- State Scientific Institution «Institute of General and Inorganic Chemistry of the National Academy of Sciences of Belarus»;
- State Scientific Institution «Institute of Physical and Organic Chemistry of the National Academy of Sciences of Belarus»;
- State Scientific Institution «Institute of Bioorganic Chemistry of the National Academy of Sciences of Belarus»;
- State Scientific Institution «Institute of Nature Management of the National Academy of Sciences of Belarus»;
- State Scientific Institution «Polessky Agrarian and Ecological Institute of the National Academy of Sciences of Belarus»;
- State Institution «Republican Center for Polar Research»;
- State Scientific Institution «Institute of Chemistry of New Materials of the National Academy of Sciences of Belarus»

National Academy of Sciences of Belarus

The department consists of 16 academicians and 17 corresponding members, at least 1,000 people work in the organizations assigned to the department, including more than 500 researchers, 43 doctors and 177 candidates of sciences.

"Belgorkhimprom", OJSC is the leading scientific organization in the field of extraction and processing of potash ore and other mineral raw materials. The organization also acts as a general designer of leading mining and chemical industry enterprises, including works in the field of designing potash plants for the needs of "Belaruskali", OJSC.

The leading centers in the field of scientific research and training of scientific personnel are the Belarusian State University (BSU), the Belarusian State Technological University (BSTU), the Yanka Kupala Grodno State University (GSU).

Within the framework of the type of economic activity "Production of chemical products" in 2022, 11 organizations carried out scientific research, 89 people were involved in scientific research and development, 5 of them had a PhD degree. The share of chemical scientists is 3-4% of the total number of researchers, which does not allow solving the entire range of industrial tasks.

1.4. Human resources

Training of personnel for the chemical industry is carried out at the leading universities of the country. These are the Belarusian State University, the Belarusian State Technological University, the Yanka Kupala Grodno State University, Polotsk State University (PSU), Polessky State University and others.

Among all Belarusian universities, only BSU has a chemistry department, while the other universities offer either training in a narrower profile, or areas where chemistry is in conjunction with another science (biology). Research chemists, pharmaceutical chemists, radiochemists, biopharmaceuticals, future chemistry teachers and chemical engineers study here. The Faculty of Organic Substances Technology and the Faculty of Chemical Technology and Engineering of BSTU specialize in applied chemistry. The Faculty of Mechanics and Technology of PSU trains chemical engineers, technologists and mechanical engineers. Many universities in Belarus have chemical specialties in general faculties.

Chemical sciences belong to the profile of education "Natural sciences". In 2022/2021, 9.9 thousand people studied in this profile, which is 4% of the total number of students. In 2021, 2.3 thousand people were admitted, 2 thousand people graduated. The number of undergraduates was 676 people, 389 were admitted in 2021, and 447 people were graduated.

1.5. Technologies

Today, enterprises of "Belneftekhim" are successfully implementing the latest equipment, mastering innovative technologies that ensure high quality products and deep processing of raw materials.

Innovative developments are mainly focused on the creation of new materials (compounds, lubricants and coolants, composite materials, elastomeric compositions, ceramic materials, smart glasses, luminescent materials, film materials, protective coatings, environmental materials), the development of biotechnologies (new medicines, biological products), waste recycling technologies (solid municipal waste, organic fertilizers, waste water, woodworking waste, food waste, hazardous organic compounds), deep processing of raw materials (wood, mineral, organic).

In the petrochemical industry, technologies for refining oil and increasing the yield of light petroleum products are being improved. The Mozyr refinery's Nelson Complexity Index is 11.81 and the Novopolotsk refinery's is 9.2, which is one of the best indicators in the CIS and generally exceeds the global average.

There is continuous innovation in well drilling technology in oil production. The majority of newly drilled wells are completed with intensification in the form of multistage fracturing.

It should be noted the digitalization and automation of the oil industry. In particular, digital technologies and intelligent systems, such as the Digital Deposit, are being introduced. Both big data and digital twins are used here.

"The Rechitsaneft" Integrated Operations Center became the launchpad from which the digitalization of domestic oil production began.

The pilot operation of the automated production management system began here – it is one of the six components of the intelligent system «Digital Deposit». Its implementation started in August 2021. One of its main tasks is to collect and transfer huge amounts of data from thousands of devices.

In order to fully digitalize wells producing with electric centrifugal pumps, obsolete Moscad controllers will be replaced with more modern ones. This will allow data to be fed directly from the telemetry system into a real-time database and will provide rapid polling and accurate monitoring of incoming data. The existing XsPoc teledynamometer system was replaced with NaftaScada for the wellstock where the wells are produced using deep well tubular pumps, as XsPoc was closed and could not be integrated into the Digital Field. By the end of 2023, it is planned to equip the entire fund of hose depth pumps with more modern WellSim controllers.

Key technologies in the oil industry as of 2023: – information modeling technologies have been successfully introduced into the design processes; – many projects are being developed in a digital environment; – digitization of existing sites of oil industry enterprises is being carried out; – geodetic works are carried out mainly using laser ground and air scanning; – the first works on the survey of complex structures has been successfully carried out with the help of scanning; - the first operational information model has been formed; – new technologies of construction supervision have been introduced – BIM supervision.

A new well drilling technology has also been tested at the South Ostashkovichi oil field. Drilling was performed using a casing running tool system (CRTi) and a bashmuck chisel. The technology allows minimizing the risks of absorption during drilling of rocks above the salt layer. In addition, the time and financial costs of well construction are reduced. This is achieved by eliminating technological down-lifting operations and working out the wellbore.

It should also be noted the beginning of the electrification of drilling rigs. The main actuators are set in motion by electric motors, not internal combustion engines. The first electrified rig was launched in 2020, and in 2023 an electromodernized drilling rig was connected to an external power supply network for the first time.

1.6. Production and territorial clusters

Innovative and industrial composite cluster in Polotsk

Production of composite materials.

Basic organization: «Polotsk- Steklovolokno» OJSC».

Participants: Educational institution «Belarusian State Technological University», branch «Niva-Service» of the Management company «Niva», «ApATeK-Polotsk» LLC, State Scientific Institution « Institute Of Mechanics Of Metal Polymer Systems of National Academy Of Sciences of Belarus», «Composite structures» LLC, « Stekloplastik PK» LLC, «Technoshans» CJSC, «SMIavtotrans» LLC, « Osipovichi Automobile Aggregates Plant» OJSC.

The capacities of the base enterprise – «Polotsk-Steklovolokno» OJSC – allow to produce up to 57 thousand tons of fiberglass of four types per year and to be among the world manufacturers. The products are supplied to more than 50 countries around the world. The leading enterprise has joint projects and cooperation plans with all cluster members, which indicates a strong and mutually beneficial cooperation in the cluster. Among the cluster projects are «Composite reinforcement», «Basalt plastic and fiberglass macrofibre for concrete», etc.

Novopolotsk Petrochemical cluster

Petrochemical industry.

Basic organization: "Naftan" OJSC, "Polimir" OJSC.

Participants: Educational Institution "Polotsk State University", municipal unitary enterprise "Novopolotsk Center for Entrepreneurship and Real Estate", "Construction and Installation Trust No. 16" OJSC, "Interservice" LLC, Educational Institution "Novopolotsk State Polytechnic College", Republican Innovative Unitary Enterprise "PSU Scientific and Technological Park, Commercial Unitary Enterprise «Novopolotsk cable TV «Vector».

In August 2018, FEZ "Vitebsk" organized a new sector in Novopolotsk, providing all its preferences for cluster members. The creation of the cluster allowed systematizing and putting on new rails the cooperation of "Naftan" and Polotsk State University, which carries out work on economic contracts of various directions by order of an oil refinery. Among them are the developments that the plant successfully uses in production activities. Recently, the Belarusian petrochemical cluster has got its own branch laboratory, which begins work on the basis of Polotsk State University with the support of "Naftan" OJSC.

Cluster for the development of chemical and petrochemical industry in Mogilev

Petrochemical industry.

Basic organization: "Mogilevkhimvolokno" OJSC.

Participants: the Mogilev City Executive Committee, the Belarusian State Technological University, the Belarusian State University of Food and Chemical Technologies, as well as the Mogilev State Industrial College.

"Mogilevkhimvolokno" OJSC actively develops import-substituting projects related mainly to the production of nonwovens, polymer threads, impregnating materials and strapping tape.

Potential clusters:

Chemical cluster

Chemical industry.

Basic organization: "Grodno Azot" OJSC.

Mining and chemical cluster

Mining and chemical industry.

Basic organization: «Belaruskali» OJSC; participants: Production Unitary Enterprise «Kaliyproekt», «Belgorkhimprom» OJSC.

2. Resource and raw material base

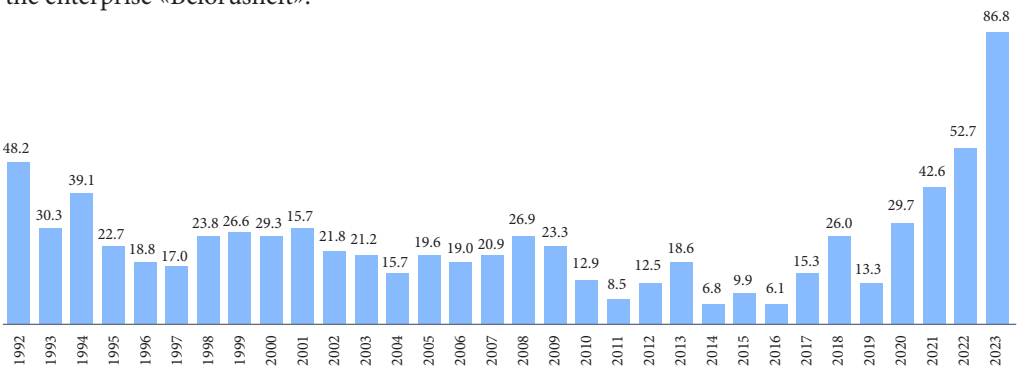
Today, the main raw materials for the chemical industry are products of the oil and gas industry.

Commercial hydrocarbon production in Belarus began in 1965 and is concentrated in the area of the "Pripyat Trough" (Gomel and Mogilev regions). More than 142 million tons of oil and more than 16 billion cubic meters of associated petroleum gas have been produced since the beginning of development. Most of the proven oil reserves in the Belarusian region are classified as hard-to-recover. The main volume of hydrocarbons is obtained from the largest deposits: Rechitsa, Ostashkovichi, Vishansky and South Ostashkovichi. Currently, Belarusian specialists consider the territories of Khoiniki, Yelsk, Bragin, Narovlya, Petrikov and Lelchitsy districts perspective. Thus, five new fields have been discovered in the last five years, all in Khoiniki district. At the moment, Rechitskoye remains the most efficient field. Most of its wells produce more than 100 tons of oil per day.

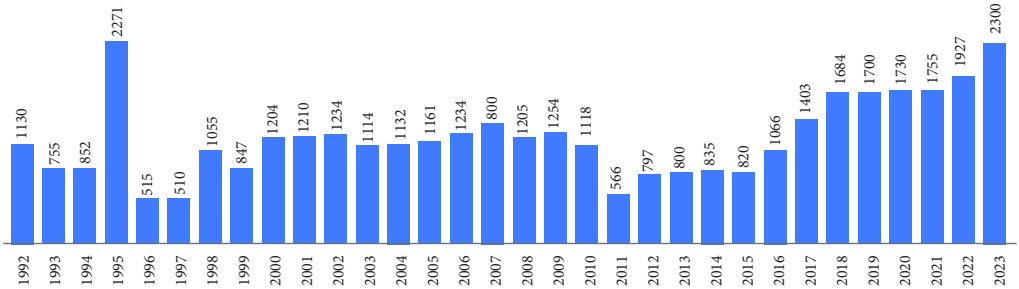
In 2023, "Belorusneft" is producing oil and gas at 52 fields. Oil production in the republic is carried out by the oil and gas production department «Rechitsaneft», the leading separate subdivision of the enterprise «Belorusneft».

In total, 93 oil and gas condensate fields have been discovered in Belarus, 60 oil fields are under development. All these deposits are located within the "Pripyat Trough". The main one is Rechitsky, which contains 24% of the residual reserves of the "Pripyat Trough".

The indicators of geological exploration over the past 30 years are characterized by a significant increase in exploration drilling since 2020. In 2022, they reached 52.6 thousand meters of penetration, which is the highest figure in 30 years – this ensured an increase in reserves in 2022 at the level of 1,930 thousand tons. The second volume of reserves growth in 30 years, after 2,271 thousand tons in 1995, which was obtained then taking into account the organizations of the Ministry of Natural Resources and Environmental Protection of the Republic of Belarus.



Exploration drilling, thousand meters



Increase in oil reserves, thousand tons

Four new oil deposits were discovered by drilling in 2022,: the inter-salt deposit of the Gartsevsky field, the Semiluki deposit of the southern block of the Kuzminsk field, the Sargaev deposit of the IV block of the Beskopylnovsky field, the Archean-Lower Proterozoic deposit of the Rechita field.

Once again, the increase in reserves – 1,927 thousand tons – in 2022 exceeded the volume of oil production – 1,812 thousand tons. A record increase in reserves – 2,300 thousand tons – and the volume of exploratory drilling - 86.8 thousand meters of penetration are also planned for 2023.

Belarus produces crude oil with a fairly large range of physical chemical properties. Most of it is of high commercial quality and is in demand on the market. It can be sent for processing and production of the entire range of petroleum products.

All Belarusian crude oil is exported. Associated gas produced together with oil is supplied to the Belarusian Gas Processing Plant. It is used to produce gas for petrol stations.

If we talk about minerals in general, they are the main deposits distributed throughout the territory of Belarus.

These are mainly oil, oil shales, lignite, peat, rock salt, sapropels, clays, phosphates, dolomite, etc.

3. Production infrastructure

3.1. Availability of industrial sites, buildings, structures and offices

Industrial parks

One of the most perspective sites for the implementation of chemical production is the Chinese-Belarusian Industrial Park «Great Stone». Promising areas of the park's activity are the development of production facilities in the field of fine chemistry, biotechnology and new materials.

Belarus is also implementing a project to create a network of industrial parks. The network will cover 11 cities in all regions of the republic. At the moment, new industrial parks are being created in Baranavichy and Pinsk. They will be ready to welcome their first residents in early 2025.

The starting area of the industrial park in Baranovichi is 13 hectares with the possibility of expansion up to 83 hectares. The area of the start-up zone of the industrial park in Pinsk is 12 hectares with the possibility of expansion up to 50 hectares. The selected sites are included or are planned to be included in the Brest Free Economic Zone, which guarantees a number of special tax preferences for developers and residents.

The industrial park in Baranovichi is generally aimed at the development of chemical industries, in Pinsk is aimed at the production of batteries, polymer and nonwoven materials. Also in Pinsk there is a centre of cluster development - the Polesie Technopark and Polesie State University.

Property

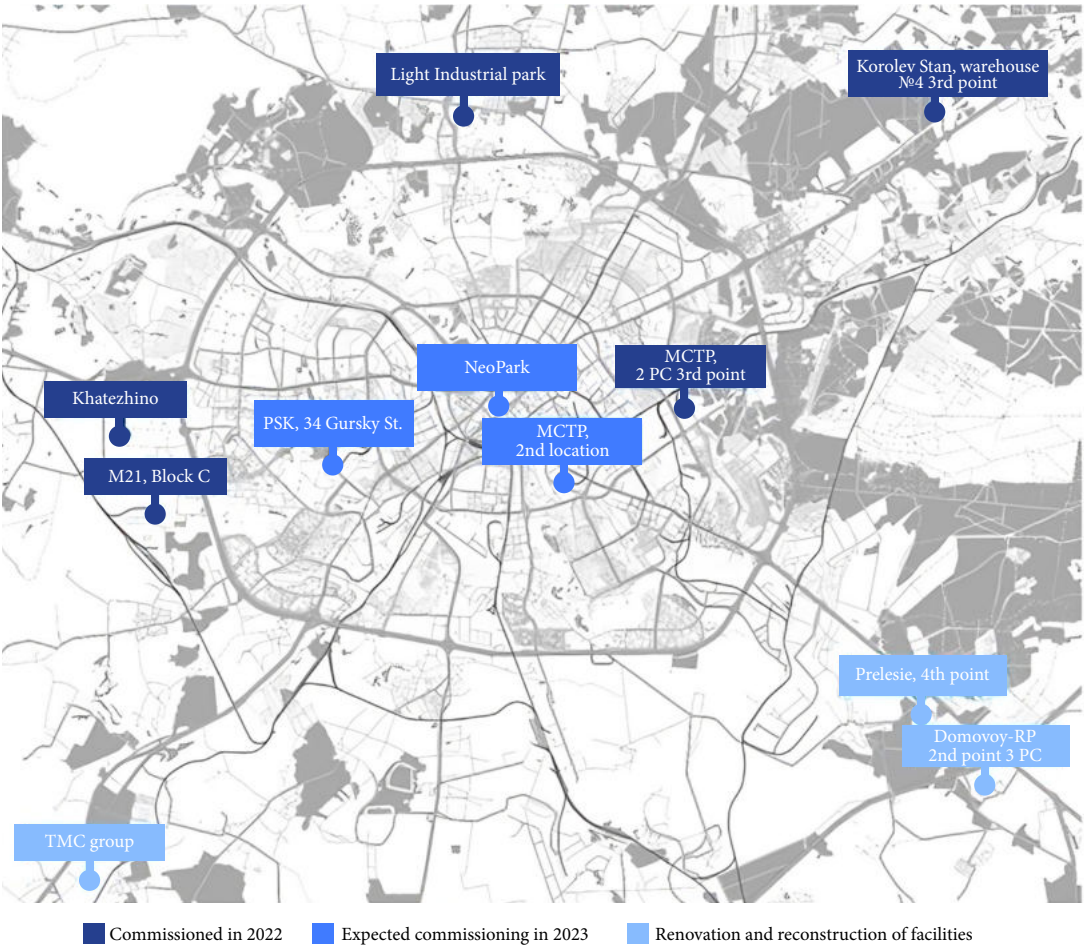
The supply of space has increased. Especially in Minsk region. At the beginning of 2022 there were more than 70 large-format (from 5 thousand square metres) modern commercial industrial and warehouse properties in the Minsk region, with a run-off of 1 404 thousand square metres. The commissioning of the 2nd launch complex of the 3rd stage of the complex of the Minsk City Technopark with an area of 16.1 thousand square meters took place, the reconstruction of which has been going on since 2013, which increased the area of the technopark up to 36.9 thousand square metres. The Minsk Technopark hosts 45 resident companies with a staff of more than 1 thousand people implementing projects from various fields (from the production of electric drives to microelectronics and pharmacology).

Key indicators of development of the industrial and warehouse real estate market

Indicator	2020	2021	2022
Total supply, thousand square metres	1 254	1 404	1 513
Input, thousand sq. m	87	150	109
Vacancy, %	4.0	3.8	4.0
The range of rental rates, 1 square metre/month*			
- Class A, €/BYN	4.2-7.0	4.2-7.0	4.2-7.2/11.6-19.3
- Class B, €/BYN	2.4-5.0	2.4-5.0	2.4-5.0/6.6-13.8

*Excluding operating costs and VAT

Location of new warehouse facilities in the Minsk region



A class A multifunctional complex «Hatezhino» with a total area of 38 thousand square metres, built in accordance with the requirements of the tenant - internet retailer «Triovist» (21vek.by), was commissioned in the village of Tabory.

A new stage of warehouse building No. 4 of class «A» with a total area of 16.1 thousand square meters has been put into operation in the transport and logistics complex «Korolev Stan», which makes this complex one of the largest in Belarus - the total area of TLC «Korolev Stan» is 62.4 thousand square meters.

The largest industrial and warehouse property in the Minsk region is the industrial park «Great Stone», which has a total of 140 thousand square meters of production and warehouse facilities.

In total, five production and storage facilities with a total area of 108.8 thousand square meters were commissioned in the Minsk region in 2022, and the total flow in the region amounted to 1,513 thousand square meters. In 2023, about 60.5 thousand square meters are expected to be commissioned.

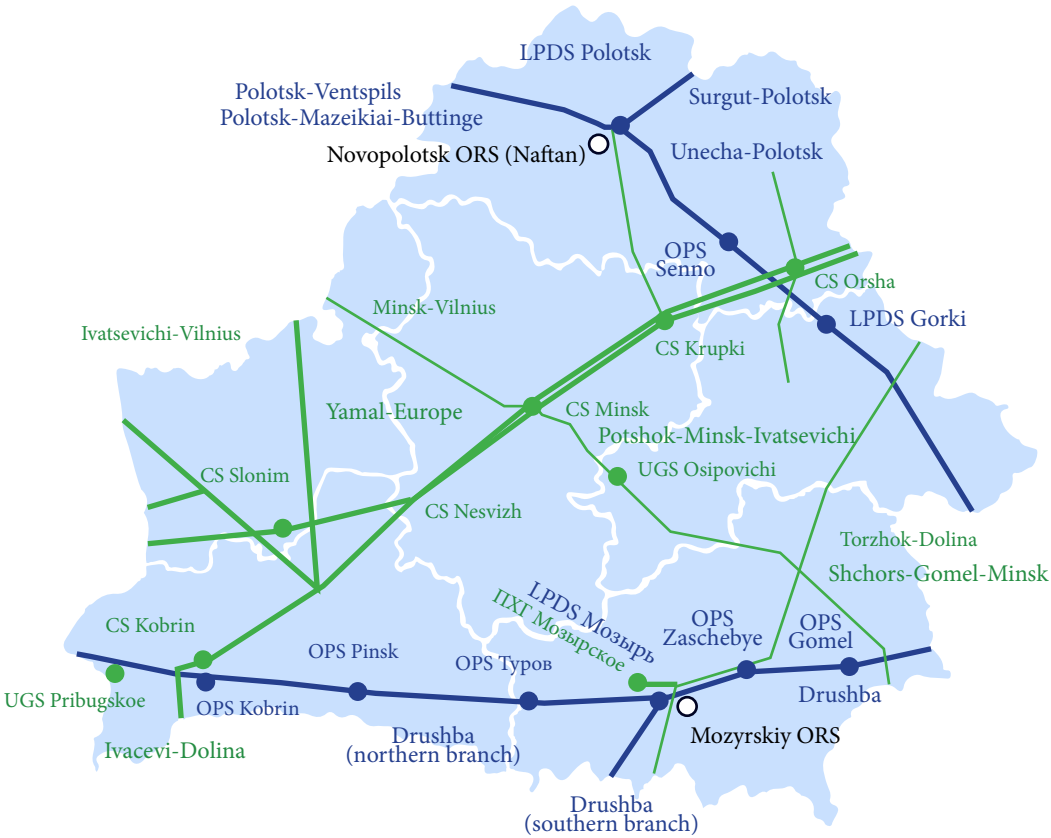
Industrial real estate is characterized by low vacancy, in the Minsk Technopark it is zero, in the «Great Stone» is about 15%.

3.2. Engineering Infrastructure

The total fund of wells for oil production is more than 1000 units, the operational fund is 826 wells (95.8% are operated in a mechanized way using electric centrifugal and rod deep well pumps). The main oil production facilities are equipped with modern telemetry systems. The entire process of oil production, transportation and preparation is automated.

The Chinese rotary-controlled well drilling system has also been tested, which is used for drilling directional, horizontal and multi-barrel wells with a departure from the vertical, precise wiring of the wellbore and opening layers with unconventional reserves, as well as for drilling in difficult geological conditions. This system allows you to get significant cost savings during the construction of wells (up to 30%).

Map of main gas and oil pipelines



The largest gas pipelines are marked in red, oil pipelines in green. Compressor stations (CS), underground gas storage facilities (UGS), oil pumping stations (OPS), linear production and dispatch stations (LPDS), as well as oil refineries (ORS) have been signed. The pipelines are operated by subsidiaries of "Belneftekhim".

In April 2023, another oil pipeline for hydrocarbon raw materials was commissioned. The length of the pipeline is 8.5 km. At the Gartsevsky field, he connected Guryanov and Kartashov squares, which significantly reduce transportation costs for oil production, since previously only ground-based special vehicles were used to transport the extracted hydrocarbon raw materials in this territory.

3.3. Logistics capabilities

There are 58 logistics centers operating in Belarus. At the same time, 11 logistics centers provide priority transport and logistics services, 17 perform wholesale and logistics (distribution) functions, the rest have concentrated their efforts on providing warehouse services and cargo handling services.

21 logistics centers have temporary storage warehouses and customs warehouses on their territory: Brestvneshtrans, Transit, Brest-Beltamozhservice, Brest-Beltamozhservice-2, Beltamozhservice (Minsk), Beltamozhservice-2, Beltamozhservice-Mogilev, Beltamozhservice-Gomel, Beltamozhservice-Kamenny Log, Beltamozhservice-Bobruisk, Belmagistralavtotrans, TLC «Kolyadichi», Bremino-Bruzgi, Dominik, Khatezhinsky Refrigeration Plant, Ozertso-logistik, Belsotra, Veliky Kamen, Bremino-Orsha, Bremino-Berestovitsa, Bremino-Bruzgi. Business entities also have 13 container terminals for handling containers of various types.

Of the 58 logistics centers, 17 have a state form of ownership or possess more than 50% of the state's share (shares) in the authorized fund of the business company. The remaining logistics centers were created with the participation of national (Eurotorg, A-100, Tabak-invest, Belinterproduct, Darida, Alidi West, ALMI, Vitalur, Electrosila, Millennium Group, Bellvillesden, Romax, Astomstroy, Libretic, BIGZZ, OM) and foreign investors (Azerbaijan, Belgium, Germany, Iran, China, Lithuania, Poland, Russia, Ukraine, Serbia, Turkey and the Czech Republic).

18 logistics centers are multimodal: Brest-Beltamozhservice, Brest-Beltamozhservice-2, Beltamozhservice (Minsk), Beltamozhservice-2, Beltamozhservice-Mogilev, Beltamozhservice-Gomel, Beltamozhservice-Bobruisk, TLC «Kolyadichi», Khladokombinat Khatezhinsky, Ozertso-logistik, Veliky Kamen, Bremino-Orsha, Bremino-Berestovitsa, Mikhanovichi Logistics Center, Eurosklad, Eurasia, Dobrada, Minsk National Airport.

4. Market review

4.1. Key trends

The chemical sector is one of the largest and most important industrial sectors in the world. Global trends largely determine the prospects of the chemical industry. However, it is constantly facing new challenges, especially in the context of the development of technologies of the V and VI technological structures. The pace of current changes in demand and priorities is driven by new technologies in other industries, digitalization, the growing need for environmental protection and resource efficiency.

Global trends

1. **Advanced production technologies.** As a rule, these are additive technologies, digitalization and automation. For example, training of employees using augmented reality, modeling of technological processes and development of new materials in virtual reality, the use of robots in hazardous conditions, automated transportation of dangerous goods.

2. **Innovative materials.** Current directions are the development of accumulators and batteries, nanomaterials and biotechnologies. Examples are technologies for the production of biologically based batteries, cathode materials, carbon fibers, polymers.

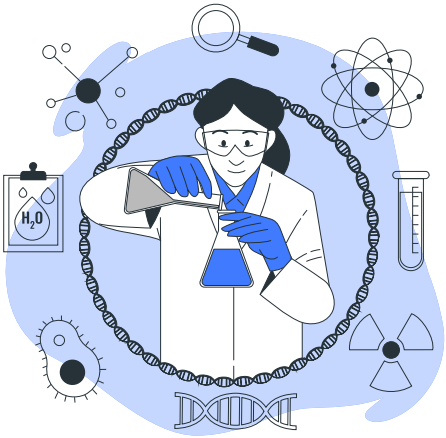
3. **Green chemistry.** Development of technologies with minimal waste or the possibility of their further processing. For example, the use of vegetable raw materials as fuel, the production of green hydrogen.

4. **Internet of Things (IoT).** Technologies for combining physical objects into a single data transmission network, which allows objects to exchange data without human intervention. In general, this makes it possible to configure the automatic operation of complex technological complexes.

5. **Data analytics.** Data analytics increases the productivity and profitability of chemical production. Big data analysis optimizes energy consumption, enterprise operation and supply chain.

6. **Artificial intelligence (AI).** AI is used in complex laboratory experiments, reducing time costs, for example, for the development of new substances or modeling of technological conditions, chemical reactions.

7. **Cloud computing.** Cloud computing enables to perform complex calculations and research using other people's computing power and models. For example, calculations on the compatibility of chemical materials and chemicals. Also, cloud technologies allow storing huge amounts of data and exchanging information without significant costs.



Famous start-ups in the chemical industry

NCTech is a startup from Egypt that produces nanocellulose materials from agricultural waste. NCTech develops nanocellulose with properties such as low density, high strength and large surface area. These properties provide better performance for water gels. The startup also replaces the use of synthetic raw materials. Thus, NCTech products are eco-friendly and suitable for the production of cosmetics, biomedical products, adhesives for wood and paper products.

Lignolix is a startup from the USA that processes lignin from plant waste into highly efficient specialty chemicals. Since lignin is difficult to process due to its smell, the startup's technology breaks lignin into small pieces while preserving its functional properties. This approach reduces odor and color issues, and is also compatible with other products. The end products are applicable in cosmetics, adhesives, fragrances and perfumes, and Lignofix's technology is easily scaled.

SusPhos is a startup from Denmark that uses «smart» chemistry to recycle waste rich in phosphates. The startup creates waste-free alternatives to products derived from minerals. SusPhos' patented technologies enable the production of sustainable phosphate products, such as high-quality flame retardants and special fertilizers.

The British startup **Volatile** identifies flavours, analyzes volatile flavors using an electronic nose, using artificial intelligence and intelligent sensors. Its electronic nose, Scout2, is a metal oxide-based gas sensor that detects odors and volatile organic gases. This device monitors air quality and monitors the composition of solid and liquid substances and works independently of changing environmental conditions.

MantiSpectra develops a chip-spectral sensor Mantispecta develops near-infrared (NIR) spectral sensors based on the indium phosphide platform. These sensors identify and quantify the chemical information of materials encoded at wavelengths. The calculation is also fast, contactless and non-invasive. Usually traditional spectrometers are expensive and difficult to use. However, Mantispectra's portable mini sensors completely solve these problems by fitting neatly into various devices.

Chemistry and chemical technologies are the basis for the development of technologies and materials of the 5th and 6th technological structures, including information, nano- and biotechnologies. Belarus is developing innovative materials aimed primarily at the needs of industry, including within the framework of import substitution. These are compounds, lubricants and coolants, composite materials, elastomeric compositions, ceramic materials, smart glasses, luminescent materials, film materials, protective coatings, environmental materials, new medicines, biological products.

As for market trends, the following are currently observed in the chemical industry:

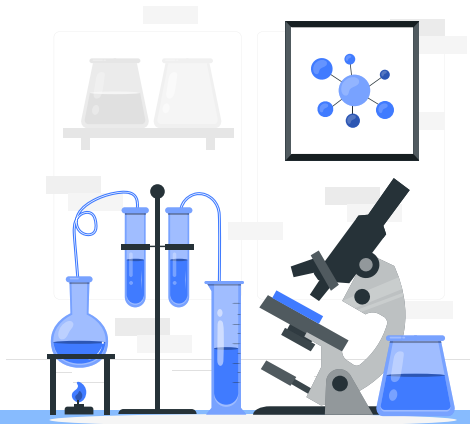
1. Reorientation to the markets of the Asia-Pacific region, including changing the export directions of products, import substitution of low-tonnage products and components, as well as substitution of technologies through own developments, alternative suppliers or parallel imports.

2. The formation of a new logistics, involving the modernization of the existing logistics infrastructure with an orientation to the East.

3. Import substitution aimed at the development of chemical products necessary for the development of production in the chemical industry itself and in related industries. The Belarusian Fund for Financial Support of Entrepreneurs, with the assistance of the Ministry of Economy, has created a platform for direct negotiations of potential suppliers – small and medium-sized businesses with large enterprises of the republic – on the supply of products presented in the lists of products recommended for development by small and medium-sized businesses in the territory of the Republic of Belarus. Suppliers can apply for any of the customers on the exchange according to the lists of import-substituting products to clarify the process of conducting online negotiations.

4. Clustering of the chemical industry, including cooperation of producers of raw materials, processors and manufacturers of final products, especially in terms of the development of new products and their financing. Since 2021, Belarus has been hosting contact and cooperation exchanges, which are designed to establish direct business communication between state-owned enterprises and entrepreneurs of the country. A vivid example of intra-industry industrial cooperation is the following commodity and raw material chain: benzene ("Naftan" OJSC, "Mozyr Refinery" OJSC) – caprolactam ("Grodno Azot" OJSC) – polyamide-6 ("Grodno Azot" OJSC) – cord fabric ("Grodno Azot" OJSC) – tires ("Belshina" OJSC). In addition, many petrochemical products, in particular orthoxylene, paraxylene, nefras, toluene, ethylene, acrylonitrile, act as primary raw materials for the production of a number of domestic enterprises that produce a wide range of goods such as polyethylene, polyester yarns, PAN fibers, PET preforms, paint and varnish materials.

5. Introduction of technologies responsible for the production of synthetic products. Industry is also making constant efforts to reduce emissions of pollutants that have a huge impact on climate change.



Trends in petrochemistry

The dynamics of the petrochemical complex largely depends on oil prices. The dynamics of prices for the Urals grade of oil over the past 10 years has ranged from 126 USD per barrel to an abnormally low price drop in 2020 – 10.6 USD per barrel. This ensures the trend of stable operation of "Belorusneft".

The focus of investments in the near future will be on the construction of wells and the reasonable conduct of geological exploration, including seismic exploration and exploratory drilling.

Trends in the field of electric charging infrastructure

Global trends indicate a multiple increase in the number of electric vehicles and electric buses, electric trucks in countries with relevant state support programs. Therefore, the development of the network of electric charging stations for the period up to 2030 is seen on the basis of the introduction of new super-fast and fast electric refueling stations.

As a national operator of electric charging infrastructure, "Belorusneft" is building up a network of electric charging stations in the country. Today it is 627 electric charging stations, including one super-fast charging complex in Minsk. Currently, the network already meets the needs of consumers and provides charging of the existing fleet of electric vehicles in the country.

4.2. Production

Belneftekhim Concern produces more than 500 types of petrochemical and chemical products. Belarusian oil refineries are characterised by a high technological level of oil refining depth and the quality of oil products meeting international standards. All organisations of the concern operate under the system of international quality standards of ISO 9000 series. The Republic of Belarus is a leader among the CIS countries in terms of quality and ecological purity of motor fuel. Work is actively carried out to implement ISO 14000 series environmental safety management standards and OHSAS 18001 occupational health and safety management standards.



In general, the organisations of the petrochemical complex of the republic produce:

1) nitrogen fertilisers (urea, ammonium sulphate, urea-ammonia mixtures);
2) phosphate fertilisers (ammoniated superphosphate and ammophos of various grades);
3) complex NPK fertilisers (one granule) and tucos mixtures of various brands;
4) motor gasoline (including those meeting Euro-4,5 requirements), diesel fuel (including for the operation of diesel engines in the Arctic and cold winter climate), fuel for subsonic jet engines of the RT and Jet A-1 brands, aromatic hydrocarbons;
5) tyres for cars, trucks and heavy-duty vehicles, light-duty vehicles and buses of particularly small capacity, buses and trolleybuses, road construction and lifting and transport machines, for tractors and agricultural machines, for vehicles of particularly large capacity, electric vehicles and trailers for vehicles;
6) polyester fibres and filaments;
7) high-pressure polyethylene of both basic grades and compositions based on it, as well as a wide range of polyacrylonitrile fibres;
8) glass fibre and materials based on it (yarns, rovings, chopped fibres, nets, fabrics of various structures and needle-punched heat-insulating materials), products made of fibreglass plastics;
9) polyamide fibres and yarns, cord fabrics, as well as primary polyamide-6 and composite materials based on it;
10) nonwoven materials based on polypropylene and polyethylene terephthalate;
11) carbon fibre materials, arselon products (fibres, yarns, fabrics, etc.);
12) paint and varnish materials, phthalic anhydride and other products.



A significant increase in both physical and value volumes of exports was provided for almost the entire range of petrochemical products: tires – by 21.5per cent and 77.6per cent, respectively, petroleum products – by 1.6 and 1.8 times, chemical fibers and threads – by 15per cent and 43.8per cent, fiberglass products – by 16.5per cent and 62.4per cent, non-woven materials – by 23.6per cent and 33.1per cent, polyamides – by 10.5per cent and 30.4per cent.

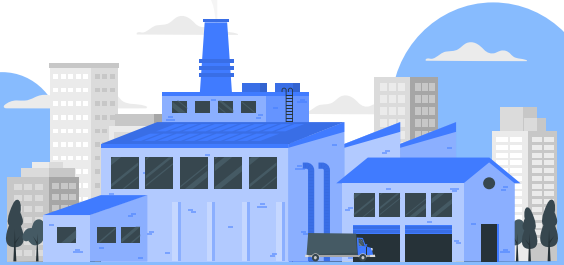
Thanks to timely measures taken to register complex mineral fertilisers produced by the Gomel Chemical Plant in the Russian Federation, it was possible to promptly redirect the supply of products from the closed Ukrainian market. In cooperation with the largest distributor, over 219.1 thousand tonnes of fertilisers were delivered to Russia in 2022 and over 100 million USD of foreign currency earnings were received.

In 2023, all facilities of the delayed coking complex of Naftan OJSC were put into operation, which allowed the company to increase the depth of oil refining to 92per cent, and the yield of light petroleum products to 70per cent. The main purpose of the delayed coking process at the enterprise is the maximum production of light petroleum products. Coke is considered as a by-product, but it is used as a fuel in the cement and energy industries.

The issue of import substitution of tyre products, paint and varnish materials, oils and lubricants is of particular importance.

Thus «Belshina» JSC has mastered the production of four tyre models, including truck all-metal cord tyres 395/85R20 BEL-405 for JSC «MAZ», super large-size 46/90R57 BEL-232 for dump trucks of JSC «BELAZ», two agricultural - 900/60R32 BEL-47 and 28.1R26 FD-12 173A8 for equipment of «Gomselmash» JSC. It is planned to put into serial production two models - 445/65R22,5 BEL-145 TL and 16.00R20 BEL-95 TL with improved load characteristics for «MZKT» JSC.

Lakokraska OJSC is at the final stage of developing such paintwork materials as Lidkar and Lidkar TR primer enamels for painting platforms, chassis parts, bridges and buses of MAZ OJSC, tractors of «MTZ» OJSC, conductive primers «ZinkoLid EU» for corrosion protection of buses of «MAZ» OJSC, enamels Polylux carmine-red RAL 3002 and black amber RAL 9005 for painting of tractor parts of «MTZ» OJSC. In addition, Lakokraska JSC is mastering one- and two-component paintwork materials for painting wagons at “Mogilev Wagon Works” agricultural closed joint stock company. Naftan OJSC and Mountain Wax Plant OJSC are setting up production of hydraulic, gearbox, turbine, transformer, motor oils for the enterprises of the Ministry of Industry, Ministry of Energy, Ministry of Transport and Communications, Ministry of Defence.

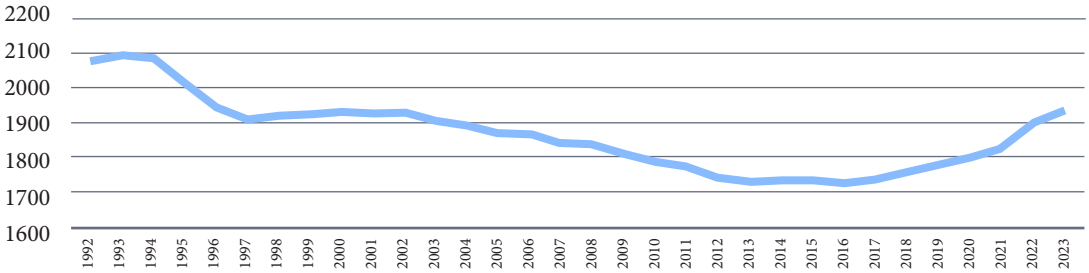


Oil extraction

The maximum annual level of oil production by the enterprise was recorded in 1975, it was 7.96 million tonnes. Due to high rates of extraction, deterioration of the reserves structure (the main fields entered the final stage of development) since 1976 oil production in the republic has been falling and in 1997 reached 1.82 million tonnes, after which a gradual decline in production volumes began.

(YNAD). Yangpur also holds the right to use the Yuzhno-Tydeottinskiy subsoil area in the Yamalo-Nenets Autonomous District (YNAO) since 2020. Yangpur Oil Company JSC's core activities include oil, gas and gas condensate production, primary oil refining, supply of hydrocarbons and refined products to enterprises of the Russian Federation and foreign countries.

Oil production by years, thousand tons



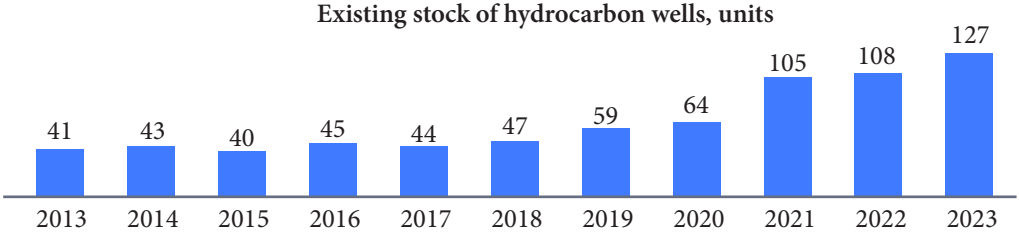
The organisation of rational and efficient development of deposits allowed us to stabilise hydrocarbon production in the region and keep its annual volume at 1 million 645 thousand tonnes since 2013. A slight annual production growth has started since 2017. In 2023, production is planned to increase to 1 million 850 thousand tonnes.

Apart from Belarus, Belorusneft also operates in Russia - Yangpur Oil Company JSC has been representing Belorusneft on the Russian oil and gas production market since 2013. The company searches for, explores and develops hydrocarbon deposits within the Izvestinskiy subsoil area located in the Yamalo-Nenets Autonomous District

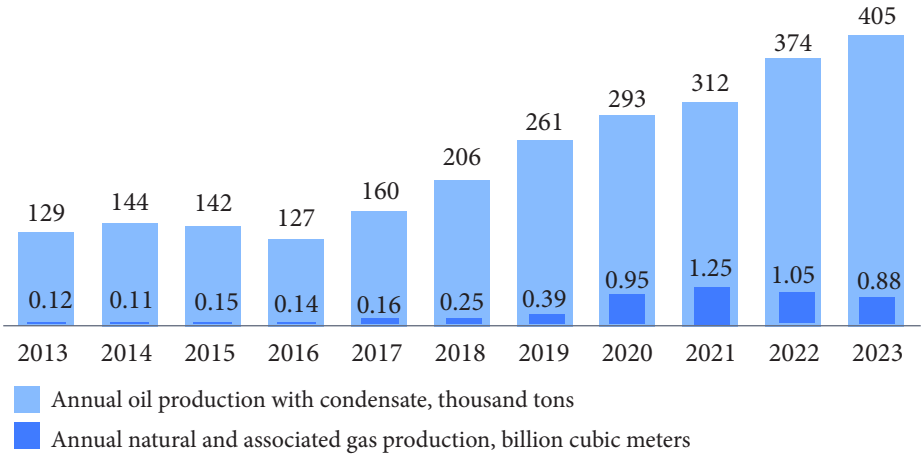
Yangpur's development strategy is based on the search and exploration of new resources, efficient development of open fields using modern production technologies.

As of 2023, the active well stock is 127 wells, annual oil production is 405 billion m^3, and annual production of natural and associated gas is 0.88 billion m^3.

Existing stock of hydrocarbon wells, units



Extraction of hydrocarbon raw materials



Biotechnology

The production of biotechnological products is growing in Belarus. The volume of its production increased by 153.8per cent from 154.8 million USD in 2021 to 238.1 million USD in 2022. The Belarusian National Biotechnology Corporation made the biggest contribution to production. Biotech production volumes: 33,000 tonnes - L-Lysine monohydrochloride 98.5per cent; 32,000 tonnes - L-Lysine sulphate 70per cent; 6,000 tonnes - threonine 98.5per cent; 2,000 tonnes - tryptophan 98.5per cent; 20,000 tonnes - wheat gluten. This growth in production is due to the fact that biotechnology is a priority area of scientific research.

Belarusian National Biotechnology Corporation (BNBC CJSC) is implementing a large-scale export-oriented and import-substituting investment project «Organisation of high-tech agro-industrial production of a full cycle for 2016-2032». The aim of the project is to organise deep grain processing using modern biotechnology methods to produce essential amino acids for the production and entry into local and export markets of high-yielding, balanced mixed fodders and premixes. The project is the largest and unique agro-industrial complex not only in the Republic of Belarus, but also in the entire former USSR.

4.3. Consumption

Consumption of oil products

The consumption of motor petrol, diesel fuel and gas has been growing over the last few years. The share of Belorusneft has been steadily growing. Belarus sold 75 thousand tonnes of motor gas from Belarusian associated petroleum gas and 45 million m3 of stripped gas.

Belorusneft's target for 2024 is to increase domestic sales of these products to 91,000 tonnes of autogas and 50 million m³ of stripped gas produced from associated petroleum gas from its own production.

Consumption of chemical products

Raw materials required for the production of medical and pharmaceutical preparations, as well as disinfectants, have become one of the most demanded commodity groups. The use of raw materials of natural origin is also increasing.

The consumption of domestic car tyres produced by Belshina also increased. The company held 26per cent of the market in 2020 and 36per cent in 2022. This is due to the fact that more Belarusian tyres were purchased by enterprises such as «MAZ» OJSC, «MTZ» OJSC, «Gomselmash» OJSC, as well as by consumers in the retail market.

Organisations of light industry increased the use of domestic chemical fibres and yarns. In 2022, the enterprises of Belneftekhim Concern shipped 1.76 thousand tonnes more products to Bellegprom organisations than in 2021. It is expected that in 2023 the volume of shipments will increase by another 26per cent (by 4.8 thousand tonnes).

Main indicators of petroleum product consumption

Oil product	2019	2020	2021	2022	2023
Consumption of petroleum products in the Republic of Belarus, thousand tonnes	4 347	4008	4089	3 915	3 904
Sales of petroleum products Production Association Belorusneft	2 945	2 826	2 903	2 795	2 795
Market share of Belorusneft Production Association	67.8%	70.5%	71.0%	71.4%	71.6%
Including					
petrol	68.0%	70.2%	71.2%	71.5%	71.9%
diesel fuel	67.5%	70.6%	70.9%	71.2%	71.4%
Gas					
Gas consumption in the Republic of Belarus, thousand tonnes	84	87	104	107	110
Gas sales by Belorusneft Production Association, thousand tonnes	68	71	87	90	93

4.4. Foreign trade

Export of domestic chemical products in the context of aggregated groups of goods
(according to International Trade Center, in thousands of US dollars)

Name of group of goods	HS code	2018	2019	2020	2021	2022
Rubber and its products	40	372 875	381 185	349 483	112 537	48 664
Plastics and plastics products	39	1 084 526	1 099 023	1 013 680	1 000 688	227 862
Miscellaneous chemicals	38	321 560	268 130	286 995	348 741	73 308
Fertilisers	31	3 224 706	3 260 738	2 909 574	0	21 450 80
Organic chemicals	29	319 537	263 242	164 577	0	51 269
Non-organic chemicals	28	61 741	56 302	63 426	122 927	70 316
Mineral fuels, petroleum products and their distillation products	27	8 477 298	6 821 222	3 680 387	0	1 189 350
Salt; sulphur; earth and stone; plastering materials, lime and cement	25	264 126	253 459	204 009	180 171	39 812

Import of domestic chemical products in the context of aggregated groups of goods
(according to International Trade Center, in thousands of US dollars)

Name of group of goods	HS code	2018	2019	2020	2021	2022
Rubber and its products	40	509 127	525 234	479 504	358 737	198 251
Plastics and plastics products	39	1691 283	1 717 626	1 569 119	1 594 922	694 799
Miscellaneous chemicals	38	358 276	378 670	396 685	455 727	233 341
Fertilisers	31	84 298	73 549	73 068	0	9 216
Organic chemicals	29	662 340	610 835	528 844	0	208 794
Non-organic chemicals	28	239 795	254 539	218 925	218 782	49 826
Mineral fuels, petroleum products and their distillation products	27	11 085 604	9 785 626	6 684 641	0	146 456
Salt; sulphur; earth and stone; plastering materials, lime and cement	25	245 576	248 795	204 931	232 511	33 162

It should be separately noted that based on the results of 2022, exports of the Concern's organizations to the Russian Federation increased by 55% and amounted to $1.1 billion, including $903 million excluding oil products and nitrogen fertilizers.

Taking into account the work done to reorient the export volumes that had fallen out of the European and Ukrainian markets, the share of the Russian Federation in the Concern's total exports increased by 12.1 percentage points, reaching 22.6%.

Based on the results of the Concern's work, the export volume of products in the groups and sections of the commodity nomenclature of foreign economic activity of the EAEU assigned to the Concern is estimated at 3.5 billion dollars against the established indicator of 2.25 billion dollars.

4.5. Key players

Belaruskali OJSC

Belaruskali is one of the largest producers and exporters of potash mineral fertilisers. According to the International Fertiliser Association, it accounts for one fifth of the world's potash fertiliser production. The mineral fertilisers produced by Belaruskali OJSC are sold by Belarusian Potash Company OJSC. Belaruskali OJSC comprises five ore mining plants, auxiliary and service divisions (transport, energy, repair, construction, etc.), as well as social and welfare divisions.

In addition to potash fertilisers in the form of potassium chloride with additives, Belaruskali OJSC produces granulated potassium chloride, fine potassium chloride, technical potassium chloride, NPK-fertilisers, tucosmixtures, technical sodium chloride, halite, rock salt, table salt, feed salt, sodium hypochlorite, hydrochloric acid, potassium oxide hydrate.

In 2021, Belaruskali OJSC will launch a full-fledged mining and processing plant at the Petrikovskoye deposit (Gomel region), which has 1.8 billion tonnes of potash reserves.

Naftan OJSC

A large oil refining and petrochemical complex. It has a fuel-oil-aromatic profile of oil feedstock processing, which allows the Company to carry out complex processing of hydrocarbon feedstock to produce the following main products:

1) fuels, including petrol, diesel fuel, heating oil, RT and Jet A-1 jet fuels, marine and heating oil, furnace fuel oil;

2) individual aromatic hydrocarbons (benzene, toluene, orthoxylene, paraxylene);

3) lubricating oils (motor, transmission, compressor, industrial, base oils);

4) road, construction, roofing bitumen;

5) other refinery products, including various petroleum solvents, hydrocracking residue, vacuum gas oil, petroleum gas and sulphuric acid.

The company's assets include a wide range of highly efficient modern processes: primary oil distillation, secondary processes (hydrotreating, reforming, isomerisation, aromatic hydrocarbons production and separation), soft hydrocracking and high-pressure hydrocracking, visbreaking and thermal cracking processes, a set of processes for producing oils and bitumen. Oil refining is carried out at more than 40 process units, which allows the Company to produce a wide range of refined products.

Polymir Plant of Naftan OJSC

Polymir Plant is a leading manufacturer of chemical products. The basis of Polymir Plant technology is pyrolysis of hydrocarbon raw materials - petrol and light hydrocarbon fractions of oil and gas refineries. Polymir's products are used in a wide variety of industries: cable manufacturing, plastics processing, production of packaging materials, carpets, textile fabrics and knitwear, artificial fur, household chemicals and other products. A number of organic compounds offered by Polymir plant are also raw materials for further synthesis of various speciality chemical products.

The Nelson Index, which indicates the level of technological complexity of oil production, is 9.2. Regular investments in the modernisation of the refinery are made in rather large amounts, which contributes to its development and growth of productivity indicators. «Naftan» OJSC produces more than 70 types of products.

Mozyr Oil Refinery OJSC

It produces environmentally friendly motor gasolines, diesel fuel for land and marine vehicles, fuel oil, liquefied gases for municipal and other purposes, oil bitumen (road, roofing, construction), paraffins required for the production of detergents and protein-vitamin feeds, sulphuric acid, technical sulphur, petroleum benzene and gasoils. Its capacity is capable of refining more than 14 million tonnes of crude oil annually.

Svetlogorsk Khimvolokno OJSC

The company includes an artificial fibre plant and a polyester textile yarns plant. The company's structure also includes capacities for production of carbon and heat-resistant materials, polypropylene products, «SpanBel» and «AquaSpan» nonwovens, textured, multifilament and complex matted yarns, polyester yarns with antibacterial and antiperene additives.

Grodno Azot OJSC

One of the leading chemical enterprises producing nitrogen mineral fertilisers for agriculture (ammonia, urea, urea-ammonia mixtures, ammonium sulphate), and for the country's chemical industry - caprolactam, which is necessary for the production of chemical fibres and threads, liquid nitrogen, cyclohexane, carbon dioxide, liquid oxygen, as well as methanol, nitric and sulphuric acids and other products.

Borisov Plant of Plastic Products OJSC

It produces plastics products for industrial purposes (polyethylene and polypropylene pipes and fittings), consumer goods (plastic products for home, kitchen, garden, containers, products for transport and storage), household chemical products (liquid cleaners and detergents, powdered cleaners, laundry detergents, technical detergents, plant protection products, adhesives), polyethylene film.

Mogilevkhimvolokno OJSC

It is a complex of production facilities linked by a single technological cycle - from obtaining raw materials (dimethyl terephthalate, polyethylene terephthalate) to production of finished products (polyester fibres, yarns, nonwoven fabrics, fatty acid methyl esters, glycerine 80per cent, polymer films) and production of consumer goods on their basis (PET strapping tape, pressure fire hoses, household polyester cord, polyvinyl chloride plasticate).

Belshina OJSC

One of the largest enterprises in the CIS producing tyres for passenger cars, trucks, heavy-duty vehicles, construction and road building and lifting machines, electric vehicles, buses, tractors and agricultural machinery. "Belshina" OJSC includes several factories and produces annually more than 4 million tyres of 170 standard sizes. The main consumers of the company are "BelAZ", "MAZ", "Gomselmash" and others.

Gomel Chemical Plant OJSC

It is the country's largest enterprise producing phosphate mineral fertilisers (ammophos, nitrogen-phosphate-potassium fertilisers, ammoniated superphosphate), fungicides and herbicides, as well as inorganic synthesis products (sodium sulphite, aluminium fluoride, cryolite, aerosil, phosphogypsum).

Lakokraska OJSC

The leading enterprise in the Republic of Belarus for the production of paint and varnish materials for various purposes, such as enamels, varnishes (semi-finished varnishes), primers, paints for road markings, water dispersion paints, front paints, phthalic anhydride, solvents, adhesives, polyvinyl acetate dispersions, automotive technical liquids (tosol, glass washer).

5. Investment potential and development prospects of the industry

5.1. Investment and investment attractiveness of the industry

The priority of the Concern's investment policy is implementation of investment projects with high science-intensive and resource-saving technologies for export and import substitution. Other promising areas are development of the distribution network, search for new business partners, and active promotion of petrochemical and chemical products in foreign markets.

The main investment project of the last decade at Belorusneft has been the construction of new wells, which has enabled it to ensure growth in oil production over the last six years. One of the most pressing issues for Belorusneft is the digitalisation of well construction processes, primarily drilling. Implementation of Smart Drilling is planned for 2025. In parallel, the company will develop the «Digital Plant» - introduction of artificial intelligence into the gas processing plant. It is planned that the Digital Plant will be operational in 2025.

Biotechnologies are actively developing. Various monomers, fibre- and film-forming polymers, fibres based on reproducible plant raw materials (lyocell, polylactide) can be produced on the basis of biochemical technologies. Biochemical processes for obtaining fibre-forming monomers and polymers are the least energy-intensive, environmentally less harmful compared to traditional chemical technologies and allow obtaining specified products with high yields.

An urgent task is to deepen processing and expand the use of traditional minerals developed in the country (potash salts, peat, sapropel, kaolin clays, oil shale and others). The Republic of Belarus ranks third in the world in terms of potash ore reserves and is one of the world's top three producers of potash fertilisers. The commissioning of two large mining and processing complexes - at the Petrikovskoye deposit in 2021 (Belaruskali OJSC) and at the Nizhyn section of the Starobinskoye deposit in 2023 (Slavkali FLLC) - will make it possible to increase potash fertiliser production capacity to 17 million tonnes per year by 2025.

In turn, this requires the expansion of work on the creation of new chemical technologies for the complex processing of domestic raw materials, taking into account their composition, structure, presence and properties of associated components. As part of the modernisation of mineral fertiliser production facilities and improving their competitiveness, it is necessary to expand the range of fertilisers, including the production of chlorine-free potash fertilisers K2SO4, KNO3, KH2PO4, soluble fertilisers for greenhouses, organo-mineral and micro-fertilisers. In addition, the use of large-tonnage fertiliser production waste (phosphogypsum, clay-salt sludge), as well as waste from BMZ OJSC - the managing company of BMK Holding and other enterprises should be intensified.

One of the promising areas is the development of peat deposits. This type of raw material has a significant economic potential, as it can be used for energy purposes, as well as for the production of various non-fuel products (fertilisers, soils, feed additives, ameliorants, biologically active preparations, sorption materials, etc.). The total volume of world exports of peat and peat mixtures is currently about 8-8.5 million tonnes per year, the largest exporters are Canada, Latvia, Estonia, Ireland, Belarus, Lithuania. In recent years, work has been carried out to obtain new products from peat. In 2020, the leading producer of peat products, the Finnish company Vapo, launched a project to produce activated coals from peat with a capacity of 5,000 tonnes per year.

On the photo: peat extraction

The Republic of Belarus is one of the countries with large peat reserves and holds a leading position in the study and utilisation of peat resources. The total area of peat deposits is 2.4 million hectares with geological reserves of peat of about 4 billion tonnes. The scheme of peatland distribution by areas of use for the period until 2030, approved by Resolution of the Council of Ministers of the Republic of Belarus № 1111 of 30th December 2015, includes 8533 peat deposits. The peat fund under development includes 190 peat deposits and sites allocated and prospective for peat extraction with a total area of 99.1 thousand hectares (commercial reserves of raw materials - 302.1 million tonnes). Seventy-five sapropel deposits with balance reserves of 80 million tonnes have been prepared for commercial development.

Activity in the field of extraction and processing of peat is carried out by 25 enterprises of the republic, the main products are fuel briquettes, nutrient soils (more than 50 names), top peat, liquid fertilisers, lump fuel peat, peat pots. Peat processing for non-fuel products seems to be the most promising, as such productions are not demanding in terms of raw material volumes and development can be economically efficient for small deposit volumes (0.5-1 million tonnes).

5.2. Export potential of the industry

The products of the Concern's organisations are exported to more than 100 countries. Over 70 per cent of products manufactured by the petrochemical complex are sold on the foreign market.

Nevertheless, the country's petrochemical complex is actively engaged in research and development of new technologies and products that enhance the industry's export potential.

Within the framework of the State Science and Technology Programme «Nature Management and Ecological Risks» the development of technology for pilot production of activated coals from lump peat, complex technology for production of carbon adsorbents from peat raw materials by steam-gas activation method has been started (the republic's demand for activated coals is about 800 tonnes per year).

The second promising area is the extraction of sapropel on retired peat sites, which is widely used to create fertilisers, fodder additives and biomedical preparations. There are more than 400 promising peat deposits with sapropel deposits (about 100 million tonnes) in the republic. The development of these resources is a more promising technical task than the development of lake sapropel deposits. It also develops new and improves existing environmentally safe technologies for processing mineral (mainly potash) and organic (peat and sapropel) raw materials and creates innovative products based on them, including new chemical technologies for the complex processing of polymineral potash and phosphate ores, new forms of simple and complex fertilisers and microfertilisers based on them, sorption materials, corrosion inhibitors, new polymeric materials for various purposes, new polymer materials for the production of potassium and phosphate ores, new forms of fertilisers and microfertilisers, and new polymer materials for the production of sorbent materials and microfertilisers.

Within the programme «Science-intensive technologies and engineering» of the subprogramme «Chemical products and molecular technologies» scientific developments will be carried out in the following main directions:

- production of synthetic genes, including DNA synthons, oligonucleotides, trinucleotide phosphoamidites, synthetic gene libraries;
- creation of synthetic chimeric antigenic receptors (CARs) of T-lymphocytes for the treatment of cancer;
- production of recombinant enzyme preparations, including nucleases and endoproteases, for the chemical synthesis of pharmaceutical substances, screening and preclinical studies of drugs, analytical studies in doping analysis in sports medicine, in chemical analysis to increase the sensitivity and specificity of qualitative and quantitative methods;
- development of technologies for chemical synthesis of conjugates of proteins, nucleic acids and nucleoside triphosphates with a given composition and functional properties;
- development of production technology and setting up production of recombinant cytokines required for biomedical cell products based on induced dendritic cells;
- development of methods, immunochemical and molecular diagnostic kits for medical and veterinary diagnostics, including test systems for diagnosing genetic and infectious diseases, preclinical diagnostics of neoplasms, analysing the degree of risk of their occurrence and development, determining the quality of food and animal feed (antibiotic residue content);
- creation of technologies for the production of effective and environmentally safe chemical preparations, the use of which contributes to increasing crop yields and improving the quality of crop products.

5.3. Prospects for industry development

To accelerate the development of the petrochemical complex, incentives are being taken for the construction and development of small and medium-sized enterprises for advanced processing of chemical raw materials and basic chemical products. This is done in order to ensure deep processing of oil, gas and chloroalkali feedstock into high value-added products. Almost all enterprises of the Belneftekhim Concern are large-capacity enterprises, so they cannot always develop deep processing of mineral or petroleum raw materials. This gap can be filled by medium and small business organisations. However, they often do not have the appropriate base (infrastructure costs in the chemical industry account for 30-40per cent of all capital expenditures), but they are able to develop low-tonnage chemistry.

Since the Concern's enterprises have been participating in the work of contact and cooperation exchanges since 2021, they constantly update offers for goods of critical imports of the Concern's organisations for development by small and medium-sized businesses. This allows manufacturers to promptly discuss the volumes and terms of raw material supplies and adjust information about their needs. Participation in the work of the exchanges in the offline format allows the Concern's organisations to expand the base of potential suppliers of raw materials and equipment.

Projects for the production of high-tech plastics are planned for implementation, and independent chemical production facilities are being set up for certain raw materials (ethylbenzene, acetone, phenol, bisphenol, styrene, butadiene, etc.), which will enable their use in the production of a wide range of chemical products, including products of fine and low-tonnage chemistry.

Taking into account the emerging economic conditions, the Petrochemical Complex Development Strategy until 2030 was finalised. As a result, the number of investment projects alone with specific timeframes and investment volumes has doubled - there are more than 55 of them.

The company plans to produce at least 42 types of new products, including products of low-tonnage chemistry and end-use goods, develop and master more than 28 new formulations of paint and varnish materials, as well as put into production 14 new brands of fertilisers and more than 100 tyre models, which will make it possible to increase production 1.5 times by 2030.

The existing production facility of Grodno Azot OJSC is also being upgraded, which will increase the production of nitrogen fertilisers. A project at the Mozyr Refinery is planned to be launched to organise the production of a new product for Belarus - polypropylene. The project requires serious investments. According to the company's development programme, the construction of three new units is planned for the period until 2030: a propylene concentration unit, a polypropylene production complex and a benzene alkylation complex. This will enable another Belarusian enterprise, Novopolotsk Polymir Plant, to set up production of polymers in demand in the domestic market.

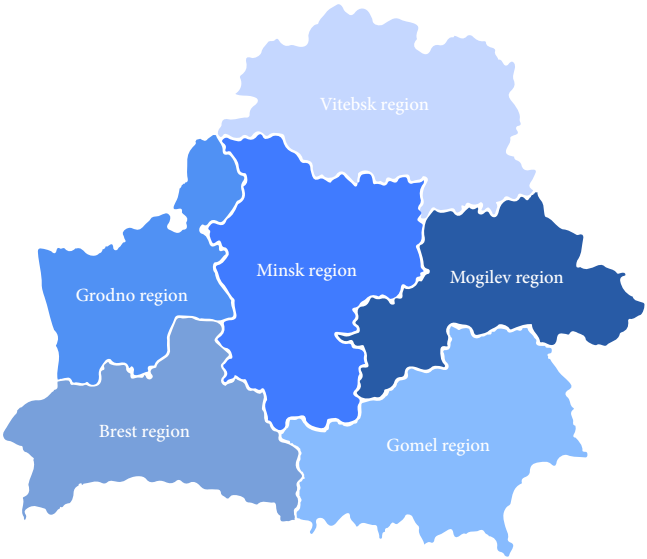
The organisations' expenditures on research and development increased from $3 million in 2016 to $5.4 million in 2022. At the same time, the Concern's organisations refused from budget financing of innovation activities, preferring to use their own funds.

6. Investment climate

6.1. Macro indicators for the country

Indicator	2019	2020	2021	2022	2022/2021
Population (end of year), thousand people	9,410.30	9,349.60	9,255.50	9,200.60	-0.59%
Average annual number of population employed in the economy, thousand people	4,334.20	4,319.60	4,284.50	4,215.90	-1.60%
Nominal accrued average monthly wage, USD	522.57	514.39	568.67	620.35	9.09%
Gross domestic product, billion USD	64.41	61.38	69.69	72.80	4.47%
Agricultural output in farms of all categories, billion USD	10.38	9.68	10.28	12.10	17.64%
Investments in fixed capital, billion USD	13.77	12.14	12.21	10.57	-13.41%
Retail trade turnover, billion USD	23.72	21.94	23.68	25.68	8.44%
Volume of foreign trade in goods and services, billion USD	84.40	72.40	94.90	89.20	-6.01%

6.2. Investor Roadmap



Investment projects and PPP
>1000

Investment ideas
>700

Concessions
9

Manufacturing sites and real estate
>900

Land plots
>1000

map.investinbelarus.by

More investment projects and ideas, as well as land plots and real estate objects for the implementation of investment projects can be found on the interactive portal «Investor's Roadmap»

6.3. Preferential regimes

General guarantees

Belarusian legislation provides the following basic guarantees to investors:

- the right of private property and its protection without discrimination
- protection against illegal actions of state bodies, which violate rights of investors and/or cause losses
- equality of rights for national and foreign investors
- free repatriation of profits
- protection of investments against nationalization and requisitioning

By law, nationalization can only be carried out on the basis of public necessity and subject to appropriate compensation. Compensation for nationalized property must be paid in a timely manner and include the value of the nationalized property and other losses caused by nationalization. The legislation also establishes a number of circumstances under which requisitioning is possible. These are mainly emergencies such as natural disasters, accidents, epidemics and epizootics, as well as when the public interest requires these measures.

Investment agreement

- VAT deduction in full amount
- exemption from import duties and taxes on import of technological equipment, raw materials and materials into the territory of the Republic of Belarus
- exemption from reimbursement of losses in forestry and agricultural production

Small and medium-size cities, rural territories

- exemption from income tax for 7 years
- exemption from real estate tax for 7 years
- exemption from import customs duties on imported (imported) goods contributed to the statutory fund, from the date of manufacture of which not more than 5 years have passed for some commodity items
- exemption from profit tax in the part of profit received from sale of goods of own production; exemption from income tax for 7 years

Bremino-Orsha

- 0% VAT and duty on customs
- 0% corporate tax for 9 years
- 0% property tax for 20 years
- 0% VAT for 15 years at realization, rent (leasing) to residents of real estate objects till 1 January 2033
- 0% income tax, tax on dividends and similar income for 5 years from the announcement of profits (for the founders of resident companies and joint ventures)
- 0% tax on dividends and similar income from the date of declaration of profits up to 1 January 2033 (for joint ventures if accrued from a management company)
- 5% on royalties until January 1, 2028

Industrial park «Great Stone»

- exemption from income tax on revenue from the sale of goods (works, services) of own production within ten years from the date of registration as residents
- exemption from property tax on properties
- exemption from tax on land plots
- until 1 January 2027, the income tax rate is 9%
- full deduction of VAT amounts charged for imported goods (works, services) as well as property rights used in designing, construction and equipping of buildings and structures in the Industrial Park
- exemption from customs duties and VAT on goods (production equipment, components and spare parts, materials and raw materials) imported to Belarus for the implementation of investment projects

Free economic zones (FEZ)

- exemption from profit tax when selling products for export and to other FEZ residents
- exemption from real estate tax on properties in FEZ within three years of registration
- exemption from land tax and land lease for the period of design and construction, but for no longer than 5 years from the date of registration. Exemption irrespective of the direction of their use (if sold for export or to other FEZ residents)
- exemption from payment for the right to conclude a land plot lease agreement

The choice of preferential treatment will depend on a number of factors and components of the investment project, such as the need to create infrastructure facilities, export orientation of the project, implementation of innovative technologies and many others.

More detailed information about the business environment, investment opportunities in the Republic of Belarus can be found on the website of the National Agency of Investment and Privatization of the Republic of Belarus at www.investinbelarus.by/en/business-environment, as well as to get necessary advice and assistance in implementation of the investment project in Belarus by contacting representatives of the Agency at the contacts specified on the website www.investinbelarus.by/en/contacts.

National Agency of Investment and Privatization

The Agency is a state institution that provides assistance at no cost or foreign investors interested in launching a business in Belarus:

- provision of information about investment opportunities, preferential regimes and benefits granted, economic sectors and legislation
- provision of up-to-date information about investment projects
- assistance in selection of sites and premises
- search for prospective partners for investment projects, arranging meetings and negotiations for establishing cooperation
- providing a platform for negotiations and support during negotiations
- organization of visits to the Republic of Belarus (schedule development, visa support)
- representation of investor's interests during negotiations with governmental representatives concerning implementation of investment projects, as well as improvement of investment climate in the Republic of Belarus
- aftercare

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