

BELARUS

(UPDATED 2010)

1. GENERAL INFORMATION

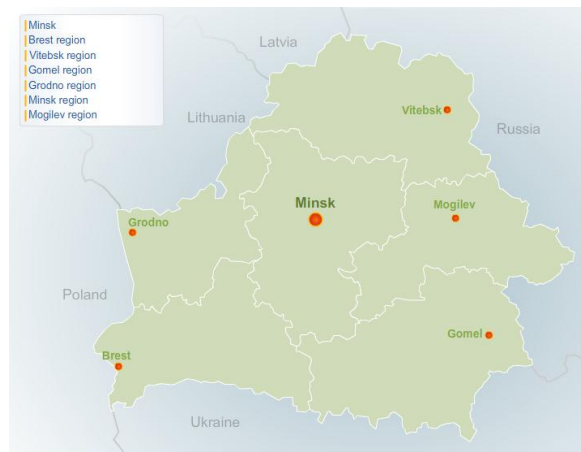
1.1. Country overview

The Republic of Belarus is situated in the central part of Europe. Belarus shares border with Lithuania in the north-west, Latvia in the north, Russia in the north-east and east, Ukraine in the south and Poland in the west.

The total area of the country is 207.600 square kilometers, making Belarus the thirteenth biggest country in Europe. In terms of population (9.663.500 as of June 1, 2009), Belarus is the fifteenth most populated country in Europe.

The country is divided into six administrative territories: Brest, Vitebsk, Gomel, Grodno, Minsk, and Mogilev oblasts. The capital of Belarus is Minsk.

The official languages are Belarusian and Russian.



Source: <http://www.belarus.by/en/about-belarus/map>

1.1.1. Governmental System

The Constitution of the Republic of Belarus of 1994 with amendments and additions adopted at the nationwide referendums in 1996 and 2004 is the core of the state legal system and the basis of all the legislation.

In conformity with the Constitution, the Republic of Belarus is a unitary democratic social law-governed state. The people exercise their power directly through the Parliament and Councils of Deputies (local parliaments).

The President of the Republic of Belarus is the Head of State, the guarantor of the Constitution of the Republic of Belarus and the rights and liberties man and citizen. The President's responsibility is to take measures aimed at protecting the sovereignty of the State, its national security and territorial integrity. The Head of State ensures continuity and interaction of the bodies of state administration,

maintains intermediation among them. The President has the right of legislative initiative.

The government - the Council of Ministers of the Republic of Belarus - is the central body of state administration. Under the Constitution the Council of Ministers exercises executive power in Belarus, governs the system of state and executive bodies subordinate to it. In its activity, the Government is answerable to the President and accountable to the Parliament. The Council of Ministers has the right to put forward legislative initiatives.

The National Assembly of the Republic of Belarus is a representative and legislative body. It consists of two chambers: the House of Representatives and the Council of the Republic. The House of Representatives consists of 110 deputies who are elected in their respective constituencies. The Council of the Republic is the chamber of territorial representation. The assemblies are elected for four years. Last elections were held in 2008.

Under the Constitution, the judicial power in Belarus belongs to courts. The system of courts is based on the principles of territorial delineation and specialization. The judicial branch of power includes the Constitutional Court and a system of economic courts and courts of general jurisdiction. The Constitutional Court supervises the conformity of enforceable enactments to the Constitution.

1.1.2. Geography and Climate

Belarus is situated in the East-European Plain. The average altitude is 160 meters above sea level. The landscape of the country is dominated by plains. The typical Belarusian landscape is uplands, plains or lowlands interlaced with swamps and lakes. Lowlands occupy 70% of the country's territory.

The climate in Belarus is moderately continental. It is influenced by the Atlantic Ocean. The average temperature in January ranges from -4°C to -8°C, in July – from +17°C to +19°C. The average annual precipitation is 550 to 650mm in lowlands and 650 to 750mm in plains and highlands.

There are over 10,800 lakes in Belarus, covering roughly 2,000 square kilometers. The country has around 20,800 rivers and streams which flow to the Black Sea and to the Baltic Sea. The biggest rivers which span more than 500km are the Dnieper, the Neman, and the Western Dvina.

1.1.3. Population

After the World War II till the beginning of 1990th, total population of Belarus has been continuously growing. However, the growth rate started to decelerate in the beginning of 1970th, and after 1993 the country entered into the depopulation phase despite of the migration surplus. One of the important demographic trends, which has been observed starting from 2004, is the increase in the birth rate. Also, life expectancy at birth increased both for men (from 62.7 years (2004) to 64.5 years (2009)) and for women (from 74.7 (2004) to 76.2 years (2009)). Birth rate increased from 9.3 in 2005 to 11.4 in 2009.

TABLE 1. POPULATION INFORMATION

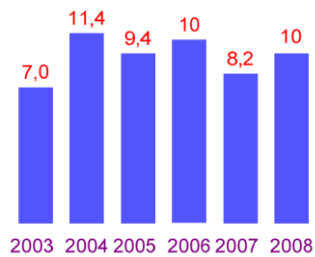
Average annual growth rate (%)

Year	1970	1979	1989	1999	2005	2009	1999 to 2009
Population (millions)	8.99	9.53	10.15	10.05	9.75	9.49	-0.51
Population density (inhabitants/km ²)	43.3	45.9	48.9	48.4	46.9	45.5	-0.54
Urban Population as % of total	43.3	54.9	65.4	69.3	72.4	74.0	0.62
Area (1000 km ²)	207.6	207.6	207.6	207.6	207.6	207.6	n/a

Source: Statistical Committee of the Republic of Belarus

1.1.4. Economic Data

Over a number of years, Belarus has recorded a robust economic growth. The past decade saw Belarus GDP doubled. In 2008, GDP grew 10 per cent on the year to reach Br 128.8 trillion. Annually, the average GDP growth in Belarus is 8 per cent.



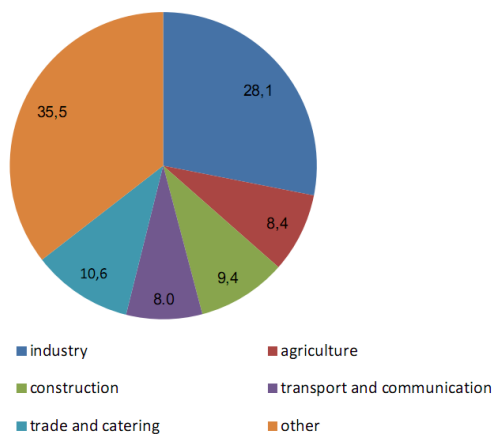
GDP growth in percentage

Half of the Belarusian production is exported. In 2009, Belarus traded with 181 countries, exporting commodities to 141 countries and importing goods from 168 countries. The main trade partners were Russia (47% of the total trade), the Netherlands (7.8%), Germany (6.4%), and Ukraine (6%).

The major industries in the country are engineering, chemical and petrochemical sectors, energy, agro-industrial sector, forestry and woodworking.

A key component of the Belarusian economy is industry. In 2008, the industrial production grew 10.8 per cent on the year. The fuel industry (11.1 %), engineering and metalworking (10.2 %), building (10.2 %) reported the highest growth rate in the industrial production.

GDP structure in percentage



In January-March 2010 GDP grew 4% over the first quarter of 2009, with the annual forecast of 11-13%. During the first three months of 2010 Belarus' industrial output increases by 5.9% from the same period last year (the forecast for 2010 – 10-12%). The largest contributors to the rise were the chemical and petrochemical industry, which rose by 29.5%, electric power industry, which increased by 12.7%, forest, woodworking and pulp industries, which rose by 7.2%.

In January-February 2010 the foreign trade in goods and services increased by 17.4% over the same period 2009 (the 2010 growth projections is 24-25%), export - by 31.2%, import - by 6.6%.

TABLE 2. GROSS DOMESTIC PRODUCT (GDP)

	1970	1980	1990	2000	2005	2008	Average annual growth rate (%)
							2000 to 2008
GDP (millions of current US\$)	n/a	n/a	17369	12736	30210	60313	37.4
GDP (millions of constant 2000 US\$)	n/a	n/a	14364	12736	18293	24054	8.9
GDP per capita (PPP* US\$/capita)	n/a	n/a	4644	5139	8541	12278	13.9
GDP per capita (current US\$/capita)	n/a	n/a	1705	1273	3090	6230	38.9

Source: <http://databank.worldbank.org/>

1.2. Energy Information

1.2.1. Estimated available energy

TABLE 3. ESTIMATED AVAILABLE ENERGY SOURCES

	Estimated available energy sources					
	Fossil Fuels			Nuclear	Renewables	
	Solid	Liquid	Gas	Uranium	Hydro	Other Renewable
Total amount in specific units*	15150**	58	3.43	-	0.0023	***
Total amount in Exajoule (EJ)						

* Solid, Liquid: Million tons; Gas: Billion m³; Uranium: Metric tons; Hydro, Renewable: TW

** Lignite

*** Biomass reserves in forests are estimated at 1.43 billion m³. Belarus has considerable potential for increase in biomass use for energy purposes, rising to 11 million m³ wood use (3.1 million tce) per year by 2020.

Source: Ministry of Energy

1.2.2. Energy Statistics

TABLE 4. ENERGY STATISTICS

	1970	1980	1990	2000	2005	2009	Average annual growth rate (%)
							2000 to 2009 (%)
Energy consumption**							
- Total	0.07	0.17	0.23	0.29	0.31	0.32	1.12
- Solids***	n/a	n/a	n/a	n/a	n/a	n/a	n/a
- Liquids	n/a	n/a	n/a	n/a	n/a	n/a	n/a
- Gases	n/a	n/a	n/a	n/a	n/a	n/a	n/a
- Nuclear	n/a	n/a	n/a	n/a	n/a	n/a	n/a
- Hydro	n/a	n/a	n/a	n/a	n/a	n/a	n/a
- Other Renewables	n/a	n/a	n/a	n/a	n/a	n/a	n/a
Energy production							
- Total	0,22	0,48	0,56	0,35	0,4	0,38	0,95

- Solids***	0,10	0,03	-	-	-	-	-
- Liquids	0,09	0,42	0,23	0,03	0,02	0,08	18,52
- Gases	0,03	0,03	0,33	0,32	0,38	0,30	-0,7
- Nuclear	n/a	n/a	n/a	n/a	n/a	n/a	n/a
- Hydro	n/a	n/a	n/a	n/a	n/a	n/a	n/a
- Other Renewables	n/a	n/a	n/a	n/a	n/a	n/a	n/a
Net import (Import - Export)	n/a	n/a	n/a	0,026	0,018	0,016	-4,27
- Total				0,376	0,418	0,396	0,59

* Latest available data

** Energy consumption = Primary energy consumption + Net import (Import - Export) of secondary energy.

*** Solid fuels include coal, lignite

Source: Ministry of Energy

1.2.3. Energy policy

The Republic of Belarus experiences deficit of its own fuel and energy resources. The share of own resources in the national fuel and energy balance is about 18 per cent. More than 80 per cent of the fuel and energy resources are imported, mainly from the Russian Federation. Natural gas is the dominating component in the national fuel and energy balance. Relative weight of natural gas in domestic electricity power industry reached 95-96 percent. This factor significantly affects the energy security of the Republic of Belarus.

The main directions of the development of the national fuel and energy sector are determined by the Concept of Energy Security of the Republic of Belarus approved by the Ordinance of the President of the Republic of Belarus in September 2007.

Implementation of the provisions of the Concept in 2007-2009 resulted in reduction of wear rate of the energy production facilities by 9.6 per cent, reconstruction and modernization of three largest hydropower and heat electrical power stations, construction of a number of small hydropower stations and 7 module power plants working on local fuels.

These activities, as well as implementation of energy saving programs, made it possible to save more than a million tons of coal equivalents per year during 2007-2009. In 2009, the use of renewable energy sources amounted to 1.5 percent of annual consumption of fuel in the electric energy sector. Emissions of the greenhouse gases were reduced by 1.7 million tons in 2006-2009.

Within the framework of implementation of the Kyoto Protocol, 8 project proposals aimed at reducing emissions by the electric energy facilities were developed.

1.3. The electricity system

1.3.1. Electricity policy and decision making process

The development of the national energy sector is implemented in accordance with the Concept of Energy Security of the Republic of Belarus, which covers the time period up to 2021.

In order to ensure the national energy security, the Concept considers the introduction of nuclear energy into the national energy mix by constructing 1 nuclear power plant of two reactors with total output electric capacity of 2000 MW before 2020.

Also, the Concept outlines priorities of the development of the national energy sector, which are the following:

- development and modernization of energy sources by introducing efficient combined-cycle technologies for steam power plants in use, and constructing new steam power plants,
- increase in performance by modernizing turbines and adding generating equipment to boiler plants, thus transforming them into mini-heat and electrical power stations;
- diversification of fuel and energy balance by the use of nuclear power and coal, and by introduction of local fuels and renewable energy to the maximal feasible extent;
- increase of the capacity of underground storages of natural gas;
- development of the network infrastructure and enhancement of export and transit capacities;
- organization of energy equipment production within the country;
- introduction of modern energy-saving technologies in all the branches of the national economy.

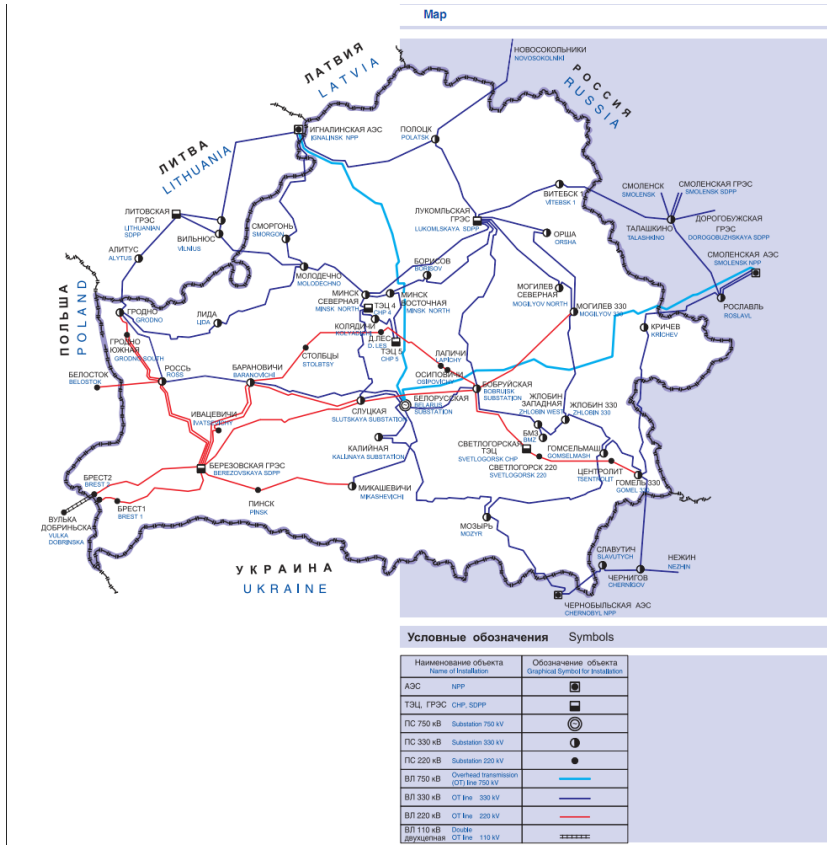
The fuel diversification approach presumes that in 2020 Belarus will introduce generating capacities based on alternative energy sources, including coal (about 1000 MW), hydropower plants (290 MW), heat and electrical power stations using local fuels (up to 265 MW).

At present, the State Program on Development of the Electric Power Industry for 2011-2015 is under preparation. It is expected that its implementation will bring the following results:

Results	Indicators
Introduction of new capacities in 2011-2015	3336 MW
Decommissioning of inefficient capacities in 2011-2015	2426 MW
Reduction of wear rate of capital assets of the energy system at the end of 2015, including:	up to 43,0 %
generating sources	up to 42,0 %
electric networks	up to 40,9 %
heating grids	up to 55,8 %

Fuel saving resulting from the use of introduced capacities(thousand tons of coal equivalent per year)	1015
Replacement of natural gas in the fuel and energy balance of the energy system by other types of fuel in 2016 (thousand tons of coal equivalent)	1546
including:	
coal	1140
local fuel and energy resources	406

1.3.2. Structure of electric power sector



Management of the grid

Electric power sector of Belarus is an intensively automated complex consisting of regional energy systems combined into the national system with integrated operation and control management.

Presently, the national electric power sector is integrated under the State Industrial Association "Belenergo", which includes the operation and control management facility. It integrates six regional electric power enterprises, and various companies performing maintenance, production and reconstruction of electrical facilities, as well as research, design and technological activities and construction of new electric energy facilities.

Production

As of January 1, 2010, the total established capacity of the "Belenergo" thermal power plants amounted to 7 974.398 MW, the total installed capacity of all power plants in Belarus – 8 386.158 MW.

Transmission, transmission and distribution structure

The electrical network of the national electric power sector includes 0.4-750 kV transmission facilities with total length of 269 245 kilometers, transformer stations with 35-750 kV voltage and total installed capacity of 33 389.7 MVA and transformer stations with 6-10/0,4 kV voltage and total installed capacity of 14 558.3 MVA.

The 220-750 kV power transmission lines are the backbone of the electric energy system and provide connections with the electric energy systems of the Russian Federation, Lithuania, Ukraine and Poland. The total length of these lines amounts to 6 971 kilometers.

The 110 kV power transmission lines with the total length of 16 642 kilometers provide both transmission and distribution of electric energy.

The 0,4-35 kV electric network serves for distribution purposes. Its length is 245 617 kilometers.

1.3.3. Main indicators

TABLE 5. ELECTRICITY PRODUCTION, CONSUMPTION AND CAPACITY

	1970	1980	1990	2000	2005	2009	Average annual growth rate (%)
	1970	1980	1990	2000	2005	2009	2000 to 2009
Capacity of electrical plants (GWe)							
- Thermal	2,5	5,9	6,7	7,6	7,8	7,7	0,13
- Hydro	0,01	0,07	0,05	0,01	0,01	0,01	0
- Nuclear	na	na	na	na	na	na	na
- Wind	na	na	na	na	na	na	na
- Geothermal	na	na	na	na	na	na	na
- other renewable	na	na	na	na	na	na	na
- Total	2,51	5,97	6,75	7,61	7,81	7,71	0,13
Electricity production (TW.h)							
- Thermal	14,8	33,8	39,2	25,6	30,1	28,6	1,17

- Hydro	0,03	0,02	0,02	0,02	0,02	0,03	5
- Nuclear	na	na	na	na	na	na	na
- Wind	na	na	na	na	na	na	na
- Geothermal	na	na	na	na	na	na	na
- other renewable	na	na	na	na	na	na	na
- Total (1)	14,83	33,82	39,22	25,62	30,12	28,63	1,17
Total Electricity consumption (TW.h)	14,8	33,8	39,2	33,2	34,7	34,5	0,39

(1) Electricity transmission losses are not deducted.

Source: Belenergo

TABLE 6. ENERGY RELATED RATIOS

	1970	1980	1990	2000	2005	year*
Energy consumption per capita (GJ/capita)						
Electricity consumption per capita (kW.h/capita)						
Electricity production/Energy production (%)						
Nuclear/Total electricity (%)						
Ratio of external dependency (%) (1)						

(1) Net import / Total energy consumption.

* Latest available data

***Estimates for "per capita" statistics taken from 1979, 1989, and 1999 census data.

2. NUCLEAR POWER SITUATION

2.1. Historical development and current organizational structure

The need to develop a nuclear power program is resulting from the following reasons:

- scarcity of available fuel and energy resources;
- a significant share of natural gas in the fuel and energy balance;
- high expenditures for import of energy resources;
- domination of one country-supplier of fuel and energy resources;
- difficulties in creating considerable reserves of natural gas.

On September 17, 2007, the President of the Republic of Belarus approved the *Concept of Energy Security of the Republic of Belarus*, which considers the

introduction of nuclear option into the national energy mix. The *Concept* assumes the construction of a nuclear power plant consisting of two reactors with total output electric capacity of 2000 MW before 2020.

On January 31, 2008, the Security Council of the Republic of Belarus made a decision to construct the nuclear power plant by commissioning the first unit of 1000 MWe in 2016 and the second one in 2018.

On July 30, 2008, the Law of the Republic of Belarus "*On the use of atomic energy*" was adopted. The Law sets up conditions, normative and legal base for safe development of nuclear energy sector, and for the use of nuclear technologies in various sectors of the national economy, as well as for conducting research activities.

2.1.1. Overview

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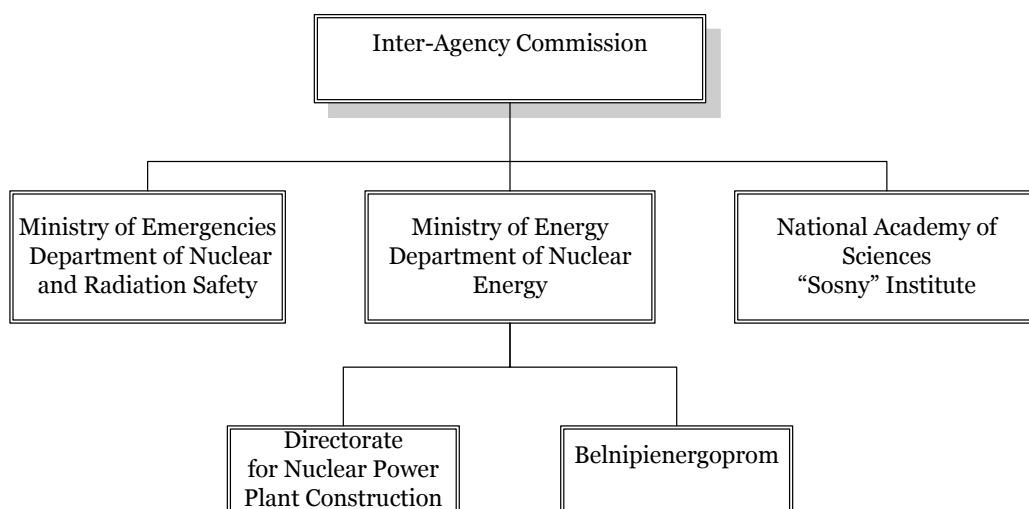
2.1.2. Current organizational chart(s)

In order to develop the national nuclear power program and to implement NPP construction activities, the following infrastructure of three bodies was established in Belarus:

- Department of Nuclear Energy of the Ministry of Energy, which is responsible for the implementation of the national policy in the area of nuclear energy sector development;
- Department of Nuclear and Radiation Safety of the Ministry for Emergencies, which is responsible for the state supervision over the issues of nuclear and radiation safety;
- State Enterprise "Directorate for Nuclear Power Plant Construction", which acts as a customer for the package of preparatory and design and planning works required to construct the NPP.

The National Unitary Enterprise "Belniptenergoprom" is appointed as the general designer to coordinate the development of design and budget documentation for the NPP construction.

Scientific support of the NPP construction activities is performed by the State Scientific Institution "Joint Institute for Power and Nuclear Research - Sosny".



2.2. Nuclear power plants: Overview

Non applicable

2.2.1. Status and performance of nuclear power plants

Non applicable

2.2.2. Plant upgrading, plant life management and license renewals

Non applicable

2.3. Future development of Nuclear Power

Non applicable

2.3.1. Nuclear power development strategy

The State Corporation on Atomic Energy “Rosatom” is defined as a strategic partner in the development of the national nuclear power program. “Rosatom” confirmed its readiness to construct the NPP in Belarus on the “turn-key” basis with commissioning of the first 1000 MWe reactor in 2016 and the second one in 2018. This partnership is reflected through three main documents and one general contract with Atomstroyexport (ASE). The three documents are the following:

- In order to set up a legal basis needed for concluding contracts for the construction of the NPP, the *Agreement between the Government of the Republic of Belarus and the Government of the Russian Federation on cooperation in the area of peaceful use of atomic energy* was concluded.
- At present, the preparatory work for signing the Agreement between the Government of the Republic of Belarus and the Government of the Russian Federation on cooperation in the construction of the nuclear power plant on

the territory of the Republic of Belarus is under completion. The contract documents for NPP construction are being developed.

- The document dedicated to fundings (intergovernmental Agreement on credit arrangement for the purpose of design and construction of the NPP in the Republic of Belarus; see 2.3.3)

A draft Strategy of Radioactive Waste Management in the Republic of Belarus is also prepared. The optimal conditions for joint operation of the systems of radioactive waste management at the NPP and at the special enterprise for radioactive waste management is determined. The radioactive waste management flowsheet in principle is created. The draft project specification for justification of investments required to construct the national radioactive waste burial ground is developed.

Table 8. Planned nuclear power plants

Station Name	Type	Capacity	Expected Construction Year	Start	Expected Commercial Year
	WWPR	1200	2011		2016
	WWPR	1200	2013		2018

2.3.2. Project management

In order to implement preparatory activities for nuclear power plant construction in the Republic of Belarus, the Inter-Agency Commission chaired by the First Deputy Prime-Minister was established. The Commission is comprised of representatives of the National Academy of Sciences, Ministry of Finances, Ministry of Energy, Ministry for Emergencies, Ministry of Natural Resources and Protection of the Environment, Ministry of Health, Ministry of Education and several other governmental bodies and organizations. The Commission holds regular meetings to discuss various issues related to the development of the national nuclear power program.

To perform functions of a customer for the package of preparatory and design and planning works required to construct the NPP, the State Enterprise "Directorate for Nuclear Power Plant Construction" was established. The Directorate is also responsible for coordination of the development of design and budget documentation for NPP construction, coordination of activities related to NPP construction and creation of the required infrastructure, information support, training of personnel, etc.

Department of Nuclear and Radiation Safety was established within the Ministry for Emergencies and was given responsibilities to exercise the state supervision over nuclear and radiation safety issues, and to control observation of the relevant legislation.

Department of Nuclear Energy of the Ministry of Energy is established with the aim to implement the national policy in the area of nuclear energy sector development. The main functions of the Department include coordination of activities related to construction and operation of the NPP, development and monitoring of implementation of nuclear energy programs, organization of activities aimed at ensuring nuclear safety, information and communication activities.

2.3.3. Project funding

The construction of the NPP in the Republic of Belarus is planned with the use of credit resources. At present, the Belarusian and Russian sides discuss the draft intergovernmental Agreement on credit arrangement for the purpose of design and construction of the NPP in the Republic of Belarus.

2.3.4. Electric grid development

The State Program on Development of the Electric Power Industry for 2011-2015 includes the modernization of 400 kilometers of 220-330-750 kV transmission line backbone to ensure power output of the first unit of the NPP, as well as conversion of 220 kV power transmission lines to 330 kV ones.

Also, the project "Electricity Generation System Analysis for Integration of Nuclear Power" was implemented within the framework of IAEA Technical Cooperation Program. As a result of the project, potential influence of integration of the NPP with 2000 MW capacity on the national energy system was evaluated and feasibility study of the use of nuclear energy as compared to alternative ways of electric power generation was performed.

The outcomes of this study demonstrated that based on the demand, technology cost and fuel import price assumptions for the period 2005 to 2035, the policy of the Government of Belarus of introducing 2000 MW of nuclear power by 2020 is economically viable and attractive from both an economic and energy security perspective. Sensitivity tests proved that nuclear power can be a competitive electricity generating option for Belarus over a wide range of nuclear investment costs, alternative fuel price, competing technology and discount rate assumptions.

2.3.5. Site Selection

Initially, 74 prospective sites for NPP construction were identified. At the first stage, 20 sites were excluded from the list, as having forbidding factors determined by the main criteria and requirements for site selection. The remaining 54 sites were subject to analysis based on available library and archive information.

To reduce the amount of survey works, a special expert commission analyzed hydrological, seismotectonic, environmental, aerometeorological, radiological, and engineering-geological factors and land use conditions, as well as the results of additional reconnaissance field studies. This analysis made it possible to single out 3 most perspective areas for detailed examination.

In 2006-2008, in these areas three sites were identified:

- Krasnopolyanskaya (Bykhov area);
- Koukshinovskaya (Shklovsko-Goretskiy area);
- Ostrovetskaya (Ostrovets area).

On these sites, research and survey works were conducted to select the priority site for NPP construction. In December 2008, based on the results of these works, the specially established State Commission defined the Ostrovetskaya site as the priority one, two other sites were approved as reserve ones.

The research and survey activities on the priority site were completed in 2009 and the environmental impact assessment report was prepared. The report is now being finalized taking into account the results of consultation and public hearings conducted within the framework of Espoo Convention mechanisms.

2.4. Organizations involved in construction of NPPs

The State Enterprise "Directorate for Nuclear Power Plant Construction is appointed as a customer for the package of preparatory and design and planning works required to construct the NPP.

"Atomstroyexport" (Russian Federation), the state engineering company, which is subordinated to "Rosatom" and implements intergovernmental agreements on NPP construction outside the Russian Federation, is defined as general contractor.

State Scientific Institution "Joint Institute for Power and Nuclear Research - Sosny" conducted review of possibilities of using industrial, construction, raw materials and scientific base, as well as availability of human resources of the Republic of Belarus in the NPP construction. The review demonstrated that Belarus has sufficient reserves of building materials for construction of the NPP and required infrastructure.

The Ministry of Economy developed the *Perspective Plan of the Development of the Region of the NPP Construction*. The Plan determines participation of national and local industries in creating the industrial base for NPP construction and developing the required infrastructure (transport, communication, power transmission lines, housing, new enterprises, social objects).

2.5. Organizations involved in operation of NPPs

Non applicable

2.6. Organizations involved in decommissioning of NPPs

Non applicable

2.7. Fuel cycle including waste management

The strategy of nuclear fuel cycle will be finally defined after signing the contract documents on construction and operation of the NPP, concluded on the basis of the Agreement between the Government of the Republic of Belarus and the Government of the Russian Federation on cooperation in the construction of the nuclear power plant on the territory of the Republic of Belarus (see 2.3.1).

This strategy will assume that fresh fuel as ready-to-use fuel assemblies, produced in the Russian Federation in amounts required for initial load and all successive loads of power units, will firstly enter to the fresh fuel storage.

Then, in accordance with the existing international practice, the spent nuclear fuel, after conditioning in the course of three years in the fuel pool, can be transferred from the reactor building to the Russian Federation for regeneration or long-term technological storage.

In August 2005, the sanitary rules for radioactive waste management "СПОРО-2005" issued by the Ministry of Health entered into force. These rules include classification of radioactive waste, basic principles of radioactive waste management, criteria of radiation safety in radioactive waste management, and requirements for safety of personnel and population at all the stages of radioactive waste management (collection, storage, transportation, processing and disposal). Transportation of radioactive materials is regulated by the sanitary rules "Requirements for ensuring radiation safety and safety of population in transportation of radioactive materials (substances)". This document covers dispatch, transportation, transit storage, unloading and receipt of radioactive materials, including radioactive waste in all transport means.

The NPP design will indicate the following systems of radioactive waste management:

- system of gaseous radioactive waste management;
- system of collection and decontamination of liquid radioactive waste, system of processing and storage of liquid radioactive waste;
- system of solid radioactive waste management.

At present, a draft strategy of spent nuclear fuel management is developed.

2.8. Research and development

The nuclear research capacities were laid down in Belarus when the Institute of Nuclear Energy was founded in 1965. Research activities conducted by the Institute were concentrated in the areas of development of gas-cooled nuclear reactors and the use of ionizing radiation sources. Another important program ran by the Institute was the development of mobile nuclear power plant, which could be used as an autonomous energy source in difficult-to-reach regions.

After the Chernobyl accident some of the Institute's activities were stopped and it provided scientific support to the measures taken by the Government aimed at minimizing consequences of the accident.

2.8.1. R&D organizations

According to the State Program *"Scientific support to the development of nuclear energy in the Republic of Belarus for 2009-2010 and for the period up to 2020"* the main organization responsible for the implementation of the Program is the State Scientific Institution "Joint Institute for Power and Nuclear Research - Sosny" of the National Academy of Sciences of Belarus.

The main goal of the Program is the development and introduction of scientific and technical proposals aimed at optimizing technological processes, enhancing nuclear, radiation and environmental safety, improving physical protection, and increasing efficiency of nuclear power sector.

The implementation of the Program will make it possible to use effectively the existing industrial and human capacities of Belarus, to minimize negative impact of nuclear facilities on the environment and population, to develop measures aimed at increasing NPP efficiency. An emphasis is also put on human resources development.

The Program is funded from the national budget.

2.8.2. Development of advanced nuclear technologies

The "Sosny" Institute conducts researches in the following areas:

- analytical and numerical methods for description of chaos-associated tunneling and applications in micro- and nanoelectronics based on these methods;
- conditions of stable work of quantum computers;
- physics and kinetics of Accelerator Driven Systems and Accelerator Driven Transmutation Technologies;
- methods of nondestructive control of radioactive materials, etc.

2.8.3. International co-operation and initiatives

The “Sosny” Institute has been actively cooperating with International Scientific and Technical Center, IAEA, leading research centers of Western Europe, USA. The Institute continues to implement joint activities with leading nuclear research centers of the Russian Federation and Ukraine.

Special interest is given to research of new technologies of energy generation, transmutation of radiotoxic elements of nuclear fuel cycle, physics of reactors and subcritical systems with external sources, creation of nuclear data libraries in the broad range of mass numbers and energies. These works are carried out in cooperation with nuclear research institutes in Republic of Korea and Japan, Federal Nuclear Center (Germany), Royal Technological Institute (Sweden), Research Center on Energy and Technologies (Spain), Institute of Nuclear Research (Ukraine), Kurchatov’s Institute (Russian Federation), and European Center of Nuclear Research.

Studies in application of ionizing radiation are performed in cooperation with Scientific and Research Institute of Nuclear Reactors (Russian Federation), Institute of Applied Radiochemistry and Institute of Nuclear Chemistry and Technology (Poland).

2.9. Human resources development

In 2008, the Council of Ministers of the Republic of Belarus approved the *State Program of Human Resources Development for the Nuclear Energy Sector for 2008-2020*. The Program is aimed at establishing a comprehensive system of human resources development, which will ensure knowledge and skills required for construction and safe operation of the NPP, nuclear and radiation safety, safety of NPP personnel, population and the environment.

In accordance with the Program, new specializations were opened in the following higher educational institutions:

- Belarusian State University;
- Belarusian State Technical University;
- Belarusian State University of Information Technologies and Radio Electronics;
- Sakharov’s International Ecological University.

Belarus receives significant assistance from the IAEA in the area of human resources development. Presently, Belarus implements the national IAEA Technical Cooperation project BYE/006 “Development of Human Resources and Training System for the Nuclear Power Program”.

2.10. Stakeholder Communication

In Belarus, the information support activities are performed within the framework of stakeholder communication plans, which deal with continuous provision of information related to the development of nuclear power program to the public.

Under the leadership of the Ministry of Information, a working group, which consists of representatives of governmental bodies and organizations involved into nuclear power program, as well as representatives of mass media, was established.

In the press center of the “House of Mass Media”, the Information Center for nuclear energy was set up. The Center conducts round tables to discuss issues related to the development of nuclear power program in Belarus on the regular basis.

The Directorate of Nuclear Power Plant Construction runs the NPP Information Center, which main task is to provide information to the local public in the perspective area of NPP construction. Information about the progress in the construction of the NPP is disseminated in the Internet through the web sites of the Ministry of Energy (<http://www.minenergo.gov.by>) and Directorate of Nuclear Power Plant Construction (<http://www.dsae.by>).

The Institute of Sociology of the National Academy of Sciences conduct opinion polls among the general public related to introduction of nuclear power.

The Department of Nuclear Energy cooperates with “Atomexpo” (Russian Federation), which acts as the exhibition operation of “Rosatom” and as the provider of information support in the nuclear power industry in Russian Federation. The International Exhibition “Atomexpo-Belarus” is held in Minsk annually in collaboration with this organization.

In accordance with the Espoo Convention, consultations and public hearings to discuss the environmental impact assessment report of the planned Belarusian NPP were conducted in Lithuania, Latvia, Poland, Austria, and Ukraine.

3. NATIONAL LAWS AND REGULATIONS

3.1. Regulatory framework

3.1.1. Regulatory authority(s)

Presently, the Ministry for Emergencies is the state administration body in the area of nuclear and radiation safety. Within the Ministry, the Department of Industrial Safety is responsible for industrial safety at the nuclear energy facilities and the Department of Nuclear and Radiation Safety (Gosatomnadzor) is the competent authority for safety of ionizing radiation sources and nuclear energy facilities.

In 1993, the Council of Ministers of the Republic of Belarus conferred the responsibilities of competent national authority in the area of nuclear and radiation safety to the State Committee on Supervision of Industrial and Nuclear Safety. In 1995, this body was transformed into the Committee under the Ministry for Emergencies and Protection of Population from the Consequences of the Chernobyl NPP Catastrophe with transfer of responsibilities to this Ministry.

The list of governmental bodies responsible for various aspects of nuclear safety and security includes the Ministry of Emergencies, Ministry of Environment, Ministry of Health, Ministry of Interior, and Committee of State Security (Article 7 of the Law “On the Use of Atomic Energy”).

State administration in the area of radiation safety is exercised by the Ministry of Emergencies, Ministry of Environment and Ministry of Health in accordance with the Law “On Radiation Safety of the Public”. Their responsibilities are set up by the two above mentioned Laws and the Law “On Sanitary-Epidemic Welfare of the Public”.

The Ministry of Natural Resources and Environment Protection is responsible for observation of the pollution level of the atmospheric air, surface water, soil, atmospheric precipitation and snow cover with the aim of identifying radioactive contamination of these environmental components resulting from the emission (discharges) of pollutants and their transboundary migration. The information about the environmental pollution is provided to the state authorities, local executive and administrative bodies and the public in order to prevent and mitigate the impact of radiological emergency situation.

3.1.2. Licensing Process

At the moment, the licensing process is regulated by the following legislation:

- Decree of the President of the Republic of Belarus of 14.07.2003 № 17 “On licensing of some types of activities”;
- Regulation on Licensing of Activities in the Area of Industrial Safety, approved by the Ordinance of the Council of Minister of the Republic of Belarus of 20.10.2003 № 1357;
- Regulation on the procedure of examination or expertise of compliance of license contender to license requirements and conditions, approved by the Ordinance of the Council of Minister of the Republic of Belarus of 20.10.2003 № 1382.

The specific procedures for licensing activities in the area of the use of nuclear energy are to be developed in 2010.

3.2. Main national laws and regulations in nuclear power

- Nuclear Law
The Law of the Republic of Belarus “On the use of atomic energy” of July 30, 2008.
- Radiation protection:
The Law of the Republic of Belarus “On Sanitary-Epidemic Welfare of the Public” (adopted in 1993 and amended in 2000);
The Law of the Republic of Belarus “On radiation safety of public” (adopted in 1998);
Ordinance of the Council of Ministers of the Republic of Belarus of 30.04.2009 № 561 “On the National Commission on Radiation Protection”;
- Site Selection:
Technical Code of Established Practice (TCEP) 097 - 2007 Placement of nuclear power plants. Main criteria and safety requirements;
TCEP 098 - 2007 Placement of nuclear power plants. Main requirements for researches and surveys in the process of area and site selection;
TCEP 099 - 2007 Placement of nuclear power plants. Guidelines on development and content of justification of environmental safety of nuclear power plants;
TCEP 102 - 2007 Placement of nuclear power plants. Procedure for development of quality assurance program for nuclear power station.
- Transportation, storage and processing of nuclear and radioactive materials:
Safety rules for transportation of hazardous commodities by railroad transport on the territory of the Republic of Belarus;
Rules of transportation of hazardous commodities by automobile transport in the Republic of Belarus;

Rules of safe transportation of hazardous commodities by civil aircrafts of the Republic of Belarus;

Safety rules for storage and transportation of nuclear fuel;

Nuclear safety rules for storage and transportation of nuclear fuel at the nuclear energy installations; indicate the references (dates, where from etc.); documents available in Russian language at www.

Comment [JT2]: Finish website

- Physical protection:
Ordinance of the Council of Ministers of the Republic of Belarus of 24.05.1993 № 338 “On measures for physical protection of nuclear materials”
- Radioactive waste management:
TCEP 170 -2009 General provisions for nuclear power plant safety;
“Sanitary rules for radioactive waste management”
- Emergency preparedness:
The Law of the Republic of Belarus “On Protection of the Public and Territories in Emergency Situations of Natural and Technogenic Character” (adopted in 1998);
Ordinance of the Council of Ministers of the Republic of Belarus of 10.04.2001 № 495 “On State system of prevention and liquidation of emergencies”

REFERENCES

APPENDIX 1: INTERNATIONAL, MULTILATERAL AND BILATERAL AGREEMENTS

· *Cooperation agreements with IAEA in area of NP*

Title	In Force	Status
Agreement on the Privileges and Immunities of the IAEA	1966-12-02	acceptance: 1966-12-02
Vienna Convention on Civil Liability for Nuclear Damage	1998-05-09	Signature: 1997-05-27 ratification: 1998-02-09
Convention on the Physical Protection of Nuclear Material	1993-06-14	succession: 1993-09-09
Convention on Early Notification of a Nuclear Accident	1987-02-26	Signature: 1986-09-26 ratification: 1987-01-26
Convention on Assistance in the Case of a Nuclear Accident or Radiological Emergency	1987-02-26	Signature: 1986-09-26 ratification: 1987-01-26
Convention on Nuclear Safety	1999-01-27	accession: 1998-10-29
Joint Convention on the Safety of Spent Fuel Management and on the Safety of Radioactive Waste Management	2003-02-24	Signature: 1999-10-13 ratification: 2002-11-26
Protocol to Amend the Vienna Convention on Civil Liability for Nuclear Damage	2003-10-04	Signature: 1998-09-14 ratification: 2003-07-04
Revised Supplementary Agreement Concerning the Provision of Technical Assistance by the IAEA (RSA)	1990-06-29	Signature: 1990-06-29
Agreement between the Republic of Belarus and the IAEA for the Application of Safeguards in connection with the NPT	1995-08-02	Signature: 1995-04-14
Protocol Additional to the Agreement between the Republic of Belarus and the International Atomic Energy Agency for the Application of Safeguards in Connection with the Treaty on the Non-Proliferation of Nuclear Weapons		Signature: 2005-11-15

Bilateral Agreements

1. Agreement between the Government of the Republic of Belarus and the Government of Russian Federation on cooperation and mutual assistance in prevention of large-scale man-made catastrophes and natural disasters and liquidation of their consequences of 18.12.1993;
2. Agreement between the Government of the Republic of Belarus and the Government of the Republic of Poland on prompt notification about nuclear accidents and cooperation in the area of radiation safety of 26.10.1994;
3. Agreement between the Government of the Republic of Belarus and the Government of Austrian Republic on exchange of information in the area of nuclear safety and protection against ionizing radiation of 09.06.2000;
4. Agreement between the Government of the Republic of Belarus and the Cabinet of Ministers of the Ukraine on cooperation in prevention of emergencies and liquidation of their consequences of 07.07.2000;
5. Agreement between the Government of the Republic of Belarus and the Government of Kyrgyz Republic on cooperation in the area of civil defence, prevention and liquidation of emergencies of 30.05.2001;
6. Agreement between the Government of the Republic of Belarus and the Cabinet of Ministers of the Ukraine on prompt notification about nuclear accident and cooperation in the area of radiation safety of 16.10.2001;
7. Agreement between the Government of the Republic of Belarus and the Government of the Republic of Latvia on cooperation in the area of prevention of catastrophes, natural disasters and other emergencies and liquidation of their consequences of 08.07.2003;
8. Agreement between the Government of the Republic of Belarus and the Government of the Republic of Latvia on cooperation in the area of prevention of catastrophes, natural disasters and large-scale accidents and liquidation of their consequences of 16.12.2003;
9. Agreement between the Government of the Republic of Belarus and the Federal Council of Swiss Confederation on cooperation in the case of natural disaster, crisis or large-scale accident of 12.09.2004;
10. Agreement between CIS Member States on the main principles of cooperation in the peaceful use of nuclear energy of 26.06.1992;
11. Agreement between CIS Member States on cooperation in the area of prevention and liquidation of consequences of man-made and natural disasters of 22.01.1993;
12. Agreement between CIS Member States on control over transboundary movement of dangerous and other waste of 12.04.1996;
13. Agreement between the Government of the Republic of Belarus and the Government of the Russian Federation on cooperation in the area of peaceful use of atomic energy (approved by the Ordinance of the Council of Ministers of the Republic of Belarus of 29 August 2009, № 1125).
14. Agreement between the Government of the Republic of Belarus and the Government of the People's Republic of China on cooperation in the area of peaceful use of atomic energy (approved by the Ordinance of the Council of Ministers of the Republic of Belarus of 23 April 2009, № 518).

APPENDIX 2: MAIN ORGANIZATIONS, INSTITUTIONS AND COMPANIES INVOLVED IN NUCLEAR POWER RELATED ACTIVITIES

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Address: 14, K.Marksa Str., 220030, Minsk, Belarus
Phone: + 375 (17) 218 21 02
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Department of Nuclear and Radiation Safety (Gosatomnadzor)
of the Ministry of Emergencies
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e-mail: gosatomnadzor@tut.by

Directorate for Nuclear Power Plant Construction
Legal address: 2, Naberezhnaya Str., 231201, Ostrovets, Grodno area
Post address: office 90, 64, Volodarskogo Str., 231201, Ostrovets, Grodno area
Phone/Fax: + 375 (1591) 26 0 03
e-mail: dsae@tut.by
<http://www.dsae.by/en>

State Scientific Institution "Joint Institute for Power and Nuclear Research - Sosny"
Address: 99, Akademika Krasina Str., 220109, Minsk, Belarus
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E-mail: jipnr@sosny.bas-net.by

ATTACHMENT 1: PREFIXES AND CONVERSION FACTORS

TABLE 1. PREFIXES

Symbol	Name	Factor
E	exa	10^{18}
P	peta	10^{15}
T	tera	10^{12}
G	giga	10^9
M	mega	10^6
K	kilo	10^3
H	hecto	10^2
da	deca	10^1
D	deci	10^{-1}
C	centi	10^{-2}
M	mili	10^{-3}
μ	micro	10^{-6}
η	nano	10^{-9}
P	pico	10^{-12}
F	femto	10^{-15}
A	atto	10^{-18}

TABLE 2. CONVERSION FACTORS FOR ENERGY

To:	TJ	Gcal	Mtoe	MBtu	GWh
From:	Multiply by:				
TJ	1	238.8	2.388×10^{-5}	947.8	0.2778
Gcal	4.1868×10^{-3}	1	10^{-7}	3.968	1.163×10^{-3}
Mtoe	4.1868×10^4	107	1	3.968×10^7	11630
Mbtu	1.0551×10^{-3}	0.252	2.52×10^{-8}	1	2.931×10^{-4}
GWh	3.6	860	8.6×10^{-5}	3412	1

TABLE 3. CONVERSION FACTORS FOR MASS

To:	kg	T	lt	st	lb
From:	Multiply by:				
kg (kilogram)	1	0.001	9.84×10^{-4}	1.102×10^{-3}	2.2046
T (tonne)	1000	1	0.984	1.1023	2204.6
Lt (long tonne)	1016	1.016	1	1.12	2240.0
st (short tonne)	907.2	0.9072	0.893	1	2000.0
lb (pound)	0.454	4.54×10^{-4}	4.46×10^{-4}	5.0×10^{-4}	1

TABLE 4. CONVERSION FACTORS FOR VOLUME

To:	US gal	UK gal	bbl	ft ³	L	m ³
From:	Multiply by:					
US gal (US gallon)	1	0.8327	0.02381	0.1337	3.785	0.0038
UK gal (UK gallon)	1.201	1	0.02859	0.1605	4.546	0.0045
bbl (barrel)	42.0	34.97	1	5.615	159.0	0.159
ft ³ (cubic foot)	7.48	6.229	0.1781	1	28.3	0.0283
l (litre)	0.2642	0.22	0.0063	0.0353	1	0.001
m ³ (cubic metre)	264.2	220.0	6.289	35.3147	1000	1