DESIGN AND RESEARCH
REPUBLICAN UNITARY ENTERPRISE

BELNIPIENERGOPROM

Founded in 1952

INTO THE FUTURE WITH NEW TECHNOLOGIES

We are pleased to introduce you the Republican Unitary Enterprise BELNIPIENERGOPROM as one of the Republic's leading enterprises engaged in designing of energy sources and heat networks, cooperating successfully with all energy handling organizations and companies operating on the territory of the Republic of Belarus and in many regions of the Russian Federation. We maintain business contacts and cooperate with manufacturers and suppliers of power equipment in the CIS countries and abroad. The Enterprise has experience in designing and building foreign facilities in such countries as Macedonia (Yugoslavia), Nigeria, Iran, China, Lithuania, the Union of Myanmar, Estonia, and carries out joint development of projects with many foreign companies.

RUE Belnipienergoprom has highly-qualified personnel, modern computer engineering, growing fund of technical standard documentation and advanced hardware which enable the Enterprise to fully solve the entire spectrum of tasks related to engineering of energy sources and provide timely and high-quality development of engineering designs of any level of complexity. When you take your problems to RUE Belnipienergoprom you receive the best of services.

Director

V. Yushkevich

The enterprise carries out pre-project work, integrated design and development of individual sections of design and other technical documentation, research and development work, energy surveys, commissioning, inspection of buildings and structures, construction design supervision on prices, providing a stable profit to the Enterprise and are acceptable for consumers (customers), for what we use such measures as:

- Formation of plan of subjects on the basis of consumers (customers) needs and ensuring of its execution;
- Development of design technology and other works based on manufacturing automation;
- Purposeful professional development of specialists at all levels;
- Involvement of every worker in the process of quality assurance of projects, services and technical documentation;
- Evaluation of customer satisfaction.

Enterprise management promises to improve the activity of enterprise and takes the responsibility for implementation of The Quality Policy.

Director

V. Yushkevich

THE ENTERPRISE HAS DEVELOPED AND IMPLEMENTED A QUALITY MANAGEMENT SYSTEM IN THE FIELD OF:

- Performing pre-design work, integrated design and development of individual sections of design and other technical documentation;
- Performing research and development work;
- Performance of commissioning works, works on survey of buildings and constructions, implementation of designer's supervision of construction.

THE LEGITIMACY OF THE QUALITY MANAGEMENT SYSTEM OF RUE «BELNIPIENERGOPROM» IS CONFIRMED:

- Performing pre-design work, integrated design and development of individual sections of design and other technical documentation; Performing research and development work; Performance of commissioning works, works on survey of buildings and constructions, implementation of designer's supervision of construction. THE LEGITIMACY OF THE QUALITY MANAGEMENT SYSTEM OF RUE «BELNIPIENERGOPROM» IS CONFIRMED: International conformity certificate of the management system with the requirements of the ISO 9001:2015 standard TUV THURINGEN, registration number TIC 15 100 2010986, valid from 02.12.2020 to 01.12.2023. The certification was carried out in accordance with the TIC auditing and certification procedure and provides for regular surveillance audits.
- Conformity certificate of the quality management system with the requirements of STB ISO 9001:2015 of the national conformity assessment system of the Republic of Belarus, reg. No. BY/112 05.01.105 11291, No. 0204904, valid from 08.12.2020 to 08.12.2023.
- Conformity certificate of the quality management system for the provision of services in the field of environmental protection for the inventory of pollutant emissions, the development of draft standards for permissible emissions of pollutants, the development of water supply and sanitation balances for compliance with the requirements of STB 1803-2007 of the national conformity assessment system of the Republic of Belarus, reg. No. BY /112 04.19.07400033, valid from 22.12.2018 to 22.12.2023.
- Conformity certificate of the health and safety management system in professional activities for the implementation of pre-project work, integrated design and development of individual sections of project documentation, other technical documentation, research and development work, energy audits, commissioning, building inspection and structures, implementation of architectural supervision of construction for compliance with the requirements of STB ISO45001-2020, registered in the register No. BY/112 05.04.113.01 00060 is valid from 08.09.2021 to 08.08.2024.
- Conformity certificate of the quality management system with the requirements of ST RK ISO 9001:2016 (ISO 9001:2015) of the State system of technical regulation of the Republic of Kazakhstan, registered in the state register No.KZ.7500952.07.03.00328 dated 05.27.2021, valid from 05.27.2021 to 05.27.2024.
- Certificate of admission to a certain type or types of work that affect the safety of capital construction facilities of the self-regulatory organization Association «Association of Urban Planning and Design» (Moscow) No. P-6-15-0007, issued on the basis of the Decision of the Board (Minutes No. 0007-06- dated 12.30.2015).

RUE “Belnipienergoprom” has 4 licences, obtained in the Republic of Belarus, 5 certificates – including conformance certificate of quality management system to requirements ISO 9001:2008 (“Tuv” Germany).

The Enterprise has a certificate (series №П-6-15-0007) of permission to work, which can influence on capital construction projects’ security, issued by SRO Nonprofit Partnership «Association of urban planning and design» (Russian Federation, Moscow).

The technical archive stores documentation on 1800 objects. The TDMS electronic archive implemented at the enterprise allows storing all issued design and estimate documentation in electronic form.

REPUBLICAN UNITARY ENTERPRISE

BELNIPIENERGOPROM

MAIN DIRECTIONS OF ACTIVITIES

- DEVELOPMENT OF FEASIBILITY STUDIES AND BUSINESS-PLANS;
- DEVELOPMENT OF ENERGY SUPPLY SYSTEMS OF DISTRICTS, TOWNS, CITIES, INDUSTRIAL HUBS AND THEIR ELECTRONIC MODELS;
- TECHNOLOGICAL AND CONSTRUCTION DESIGN OF A COMPLEX OF BUILDINGS AND FACILITIES OF NEW AND RENOVATED THERMAL POWER PLANTS, BOILER HOUSES, HEAT MAINS ON TERRITORIES WITH CATEGORY I, II AND III GEOLOGICAL ENGINEERING COMPLEXITY CONDITIONS AND SEISMICITY UP TO 7 POINTS OR MORE;
- DESIGN ENGINEERING OF INDUSTRIAL, CONSTRUCTION AND REPAIR BASES OF ENERGY AND INDUSTRY UNITS;
- ENVIRONMENTAL IMPACT ASSESSMENT OF ENERGY SOURCES AND INDUSTRIAL ENTERPRISES AND COMPILATION OF ENVIRONMENTAL PASSPORTS;
- DEVELOPMENT, INSTALLATION AND ADJUSTMENT OF ENERGY SOURCES AUTOMATED PROCESS CONTROL SYSTEM;
- ADOPTION OF HIGH PERFORMANCE STEAM-AND-GAS TECHNOLOGIES BOTH IN NEW BUILDING AND WHILE RENOVATING AND RETROFITTING THE EXISTING ENERGY SOURCES;
- DESIGN ENGINEERING OF HYDROELECTRIC POWER PLANTS AND WATER INTAKE SYSTEMS;
- DESIGN OF NEW AND RECONSTRUCTION OF EXISTING WATER AND WASTEWATER TREATMENT SYSTEMS;
- INVENTORY AND DEVELOPMENT OF STANDARDS OF MAXIMUM PERMISSIBLE DISCHARGE POLLUTANTS;
- THE USE OF EQUIPMENT OPERATING ON LOCAL FUELS ON THE DESIGNED ENERGY SOURCES;
- IMPROVEMENT OF TECHNOLOGICAL SCHEMES OF ENERGY SOURCES THROUGH THE USE OF ELECTRIC BOILERS AND SYSTEMS FOR ACCUMULATING HEAT AND HOT WATER;
- DESIGN ENGINEERING OF ELECTRIC SWITCHGEARS OF POWER PLANTS AND SUBSTATIONS;
- ADOPTION OF VOLTAGE REGULATION SYSTEMS ON BUSBARS 110 - 330 KV AND AUXILIARY ELECTRIC POWER PLANTS WITH THE HELP OF LTC TRANSFORMERS;
- DESIGN AND RECONSTRUCTION OF ASH AND SLUDGE DUMPS;
- RETROFITTING AND ADJUSTMENT OF ELECTRIC GENERATOR EXCITATION SYSTEM;
- DESIGN OF UTILITY NETWORKS FOR HEAT AND WATER SUPPLY;
- USAGE AT THE DESIGNED ENERGY SOURCES FIRED USING THE ENERGY OF STEAM AND GAS CHOKING FLOWS

HISTORICAL BACKGROUND


Volzhskaya CHPP-2


Penza CHPP


Saratov CHPP-5


Svetlogorsk CHPP


Grodno CHPP-2


Minsk CHPP-4

Minsk Branch of the All-Union Project Institute Promenergoproekt (Promenergoproekt Institute) was founded in 1952 on the basis of project office of trust «Belenergoproektstroy». The office was entrusted to develop heat and power plants projects for Belarusian, Lithuanian SSR and the number of regions of the Russian Federation (Smolensk, Kalinin, Bryansk, Kuibyshev, Saratov and etc.). In the initial period the office carried out design of low-power medium-pressure CHPPs with turbines of 1.5-12 MW capacity.

In 1974, Minsk Branch of Promenergoproekt Institute was transformed into Belarusian branch of «VNIPIenergoprom».

In 1962, on the basis of the institute Belarusian Energosetproekt was founded (later – Belarusian branch of Belenergosetproekt).

Starting with 38 employees in 1952, in the 1980s, the Belarusian Branch on the number of staff and creative potential became the leading in the VNIPIenergoprom system. The number of the branch exceeded 1000 people, 160 of them worked in scientific divisions. Suffice it to say that the research and design development of the Institute was ensured by:

- the development of unique heating systems in a number of cities in Russia and Belarus, including Minsk, whose team of creators was awarded the USSR Council of Ministers Prize in 1983;
- the beginning of the application of heat supply systems with nuclear power sources, including the justification and start of the construction of the Minsk Nuclear CHPP;
- obtaining technical and circuit solutions for attracting CHPPs to regulate nighttime failures in the schedule of power systems electrical loads, which was first implemented at large steam-turbine units of Minsk CHPP-4 and Gomel CHPP-2;
- creation of high-efficiency self-compensating pipelines and their implementation in the main heat networks (Minsk, Vitebsk, St. Petersburg, Kiev) together with the EO Paton Electric Welding Institute (Ukraine);
- revival and development of small district heating;
- establishment of new standards for harmful gaseous emissions associated with energy, etc.

In the design and construction of the CHPP the most advanced basic equipment was used and progressive technical and technological solutions

were laid down. At the Belarusian CHPPs under the first serial numbers the following equipment is installed:

- heating turbine T-100-130 at Minsk CHPP-3 (1962);
- heating turbine PT-135-130 at Mozyr CHPP (1975);
- boiler with steam capacity of 420 t/h BKZ-420 NGM at Bobruisk CHP-2.

During the construction of the CHPP, a serial CHPP-ZIGM project developed with the participation of the Belarusian branch of VNIPIenergoprom and widely used in the USSR, the authors of which were awarded the USSR Council of Ministers Prize for 1981, was used.

THE MOST SIGNIFICANT ACHIEVEMENTS IN THE 80S AND EARLY 90S INCLUDE THE CONSTRUCTION AND COMMISSIONING OF THE FOLLOWING FACILITIES UNDER THE PROJECTS OF RUE «BELNIPIENERGOPROM»:

- three cogeneration power units with a capacity of 250 MW each at Minsk CHPP-4 (1985, 1987 and 1998).
- two power units with a capacity of 110 MW each at the Astrakhan CHPP-2 (1986 and 1987).
- three cogeneration power units with a capacity of 180 MW each at the Gomel CHPP-2 (1986, 1988 and 1995).
- construction of the first unit in the Republic of Belarus CCGT-65 MW at the Orsha CHPP (1988);
- 330 MW condensing heat and power unit at Minsk CHPP-5 (1999).

In 1992, the Belarusian Branch was transformed into the Belarusian Research Design Institute «Belnipienergoprom» (In 1996 it was renamed the State Enterprise «BELNIPIENERGOPROM», in 2000 it was renamed into the Design Research Republican Unitary Enterprise «Belnipienergoprom»). The Enterprise is state-owned self-supporting organization that is part of the State Production Association «Belenergo».

CURRENTLY

Currently RUE «Belnipienergoprom» as a large specialized organization for the design of energy sources, which has more than 500 engineering and technical and scientific workers, successfully works with all energy associations and enterprises on the territory of the Republic of Belarus and in a number of regions of the Russian Federation. Business contacts are maintained and cooperation is expanding with foreign design organizations (Energoproject Poland; Energoproekt Ukraine; NCPI and CSEPDI China; Ukrhydroproject Ukraine; Technopromexport Russian Federation), manufacturers and suppliers of power equipment, both in the CIS countries (power engineering plants of the Russian Federation and Ukraine), and far-abroad countries (ABV; SIEMENS; GEC ALSTHOM; AREVA).


Huadyan-Teninskaya CHPP in Yaroslavl


Boiler house «Central» Astrakhan (water purification plant)


Boiler house «Central» Astrakhan (Turbine Hall)


Chelyabinsk State District Power Plant (water purification plant)

ACCORDING TO THE PROJECTS OF RUE "BELNIPIENERGOPROM" WERE BUILT AND PUT IN OPERATION:

49 ELECTRIC POWER PLANTS OF DIFFERENT CAPACITY,
A LARGE NUMBER OF EXISTING THERMAL POWER PLANTS HAVE BEEN MODERNIZED,

234 TURBOGENERATORS WITH MORE THAN 8786 MW OVERALL CAPACITY,

261 BOILER UNITS,

151 WATER-HEATING BOILERS

840 KILOMETERS OF MAIN HEATING SYSTEM IN TWO-PIPE CALCULATION

IN RUSSIAN FEDERATION

ACCORDING TO OUR PROJECTS HAVE BEEN BUILT, RECONSTRUCTED AND MODERNIZED:

- Aleksin CHPP
- Astrakhan condensation station
- Astrakhan CHPP-2
- Balakovo CHPP-4
- CHPP at the Briansk machine-building works
- "Bezymianskaya" CHPP in Samara
- CHPP-1 and 2 in Volzhskiy
- CHPP in Guriev
- "Gusevskaya" CHPP
- "Dankovskaya" CHPP
- Dorogobuzh CHPP
- Yelets CHPP Open JSC
- Kazan CHPP-1
- Kaliningrad condensation station-1 and 2 (reconstruction)
- Kaliningrad CHPP-2
- Klintsy CHPP
- Kursk CHPP-1
- Michurinsk CHPP
- "Pervomaiskaya" CHPP
- Penza CHPP-1 and 2
- Samara state district power plant
- Samara CHPP
- Saratov state district power plant
- Saratov CHPPs 1 , 2 and 5
- Smolensk CHPP-2
- Syzran CHPP
- Tambov CHPP
- Tver CHPP-2 and 4
- Engels CHPP-3
- CCGT-115 unit at the boiler house of the Severozapadny district of Kursk
- CCCP "Central'naya" in Astrakhan
- CCCP at "Stavrolen" in Budennovsk
- Huadian-Teninskaya Combined Cycle Power Plant 450 MW in Yaroslavl
- Voronezh CHPP, CCGT unit with a capacity 225 MW
- Chelyabinsk state district power plant (water treatment plant)
- Ryazan state district power plant (unit 2)

FACILITIES IN OTHER COUNTRIES:

- A refinery CHPP in Skopje (Yugoslavia),
- A foundry CHPP-TBS in Ajaokut (Nigeria),
- Heat recovery plant of Myanmar Union Smelter
- According to projects of BELNIPIENERGOPROM a number of electric power plants have been built in China, Iran, Bangladesh, Libya.
- CCHP in Kohtla-Järve (Estonia)

LITHUANIA:

- Vilnius CHPP-1 (expansion),
- Vilnius CHPP-2 and CHPP-3
- CHPP for the Ioann CJSC
- Kaunas CHPP, Klaipeda CHPP
- Petrashunai condensation station (CHPP)
- Mini-CHPP in Panevezys
- Commissioned 12 km of main heating system

Huadian-Teninskaya CHPP in Yaroslavl

Voronezh CHPP-1

CCHP in Kohtla-Järve (Estonia)

CCGT-115 unit at the boiler house of the Severozapadny district of Kursk

Heat recovery plant of Myanmar Union Smelter

CCCP at "Stavrolen" in Budennovsk

CCCP "Central'naya" in Astrakhan


Lukoml state district power plant


Molodechno Electric Networks


Minsk CHPP-4

Minsk CHPP-5


Berioza state district power plant


Mini-CHPP in Baran

IN THE REPUBLIC OF BELARUS ACCORDING TO OUR PROJECTS HAVE BEEN BUILT, RECONSTRUCTED AND MODERNIZED:

- Belarusian state district power plant
- Lukoml state district power plant
- Berioza state district power plant
- Minsk CHPP-2
- Minsk CHPP-3
- Minsk CHPP-4
- Minsk CHPP-5
- Orsha CHPP
- Mozyr CHPP
- Novopolotsk CHPP
- Polotsk CHPP-1
- Bobruisk CHPP-1
- Bobruisk CHPP-2
- Lida CHPP
- Brest CHPP
- Baranovichi CHPP
- Vitebsk CHPP
- Svetlogorsk CHPP
- Gomel CHPP-1
- Gomel CHPP-2
- Zhlobin CHPP
- Zhodino CHPP
- Grodno CHPP-2
- Mogilev CHPP-1
- Mogilev CHPP-2
- Mozyr CHPP
- Gomel CHPP -1
- Mini-CHPP “Severnaya” in Grodno

GAS TURBINE POWER PLANTS WERE IMPLEMENTED ON:

- Mozyr Oil refinery
- Auxiliary energy source at Minsk CHPP-5
- Auxiliary energy source at Berioza state district power plant
- Auxiliary energy source at Lukoml state district power plant
- Auxiliary energy source at Novopolotsk CHPP

HYDROELECTRIC POWER PLANTS:

- Grodno HPP
- Vitebsk HPP
- Polotsk HPP
- Osipovichi HPP
- Mini-HPP Chigirinskaya
- Mini-HPP “Volpa”
- HPP Zelvenskaya

FACILITIES USING LOCAL FUELS:

- Mini-CHPP in Osipovichi
- Bobruisk CHPP-1
- Mini-CHPP in Vileyka
- Pinsk CHPP
- Zhodino CHPP
- Mini-CHPP in Baran
- Luninets CHPP
- Boiler house in Pravdinskiy

Grodno HPP
Grodno CHPP-2


Grodno CHPP-2

Berioza state district power plant
Brest CHPP
Pinsk CHPP
Luninets CHPP
Mozyr CHPP
Mozyr Oil refinery


Luninets CHPP


Osipovichi CHPP

Novopolotsk CHPP
Polotsk CHPP-1
Polotsk HPP
Vitebsk CHPP
Vitebsk HPP


Vitebsk HPP

Belarusian state district power plant
Lukoml state district power plant


Orsha CHPP

Orsha CHPP
Mini-CHPP in Baran
Mini-CHPP in Vileyka
Zhodino CHPP
Lida CHPP


Lida CHPP

Baranovichi CHPP
Minsk CHPP-2
Minsk CHPP-3
Minsk CHPP-4
Minsk CHPP-5
Mogilev CHPP-1
Mogilev CHPP-2
Osipovichi HPP
Mini-CHPP in Osipovichi
Bobruisk CHPP-1
Bobruisk CHPP-2
Svetlogorsk CHPP
Gomel CHPP-1
Gomel CHPP-2

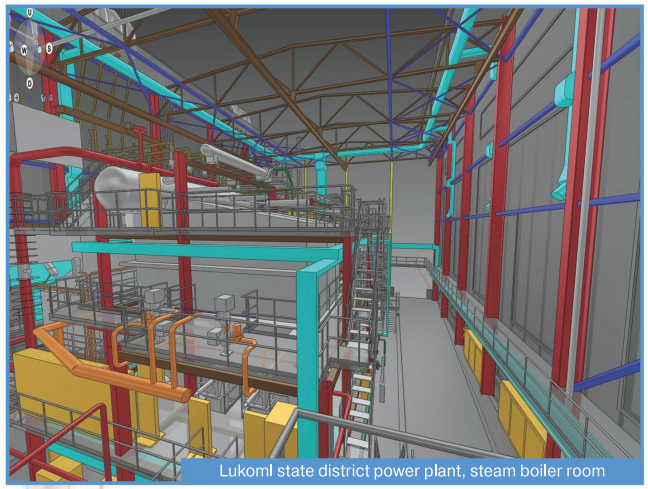

Gomel CHPP-1

BIM DESIGN

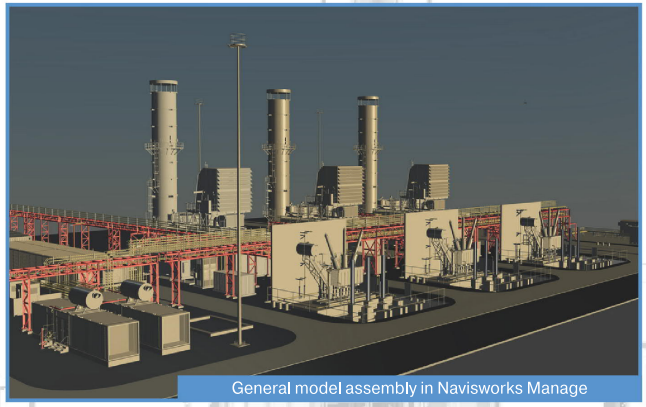
When designing objects of energy sources and heating networks, RUE «BELNIPIENERGOPROM» uses innovative technologies to create full-fledged BIM models of objects.

BIM process is a modern approach to design that provides transparency of project implementation, improves communication with customers, contractors and other project participants, organizes teamwork at a higher level with change tracking, which reduces the number of requests for changes to project documentation from builders, remove financial costs and save time.

To achieve the result, the Enterprise uses extensive software, more than 55 design and calculation programs, the main of which are Aveva E3D, Autodesk Revit, Tekla Structures. For effective internal interaction and coordination of work between all project participants, a common data environment (CDE) has been created. Departments and specialties have access to this repository and this is a single source of reliable and consistent information for all project participants. This allows to work with models of various disciplines in real time, quickly and efficiently make changes to design decisions, tracing the result in all interconnected models and provides a much more flexible form of project execution.



Lukoml state district power plant, steam boiler room



General model assembly in Navisworks Manage

Thus the model is a kind of database that contains all the graphic, geometric and alphanumeric parameters and codes related to the project or building. All innovations, changes and further developments are integrated into this model.

Graphical changes also automatically change the BIM database by linking, adding, and configuring information in the form of properties and attributes to the component parts of the model.

The overall quality of the project is improved. The most common mistakes are collisions between building structures and its engineering networks, lack of technological openings for engineering systems, incorrect calculation of the volume of materials, caused primarily by unproductive interaction between specialists involved in the design of various sections, when working with BIM, they are immediately visible thanks to 3D models, and special tools that check for intersections and logistical inconsistencies, reducing the amount of rework in the last stages of design.

Navisworks software provides the ability to jointly manage data from models of different disciplines, work in a single Navisworks model assembled on their basis, coordinate their actions and carry out the approval process, automatically find design errors and collisions, virtually study the object, simulate the construction process to search for collisions in time .

The BIM model allows to track the state of the facility at the stage of operation, including the control of the state of structures, engineering systems and equipment, if necessary, technical re-equipment, redevelopment, overhaul and reconstruction.

DESIGN OF BELARUSIAN NPP

In connection with the decision of building a nuclear power plant in the Republic of Belarus RUE «Belnipienergoprom» performed:

- choosing of nuclear power plant building site ;
- the justification of investment for the project «BELARUSIAN NUCLEAR POWER PLANT»;
- evaluation of the impact on the environment;
- design and estimate documentation for construction of buildings and structures (production base) , linked to technology of nuclear power plant construction.

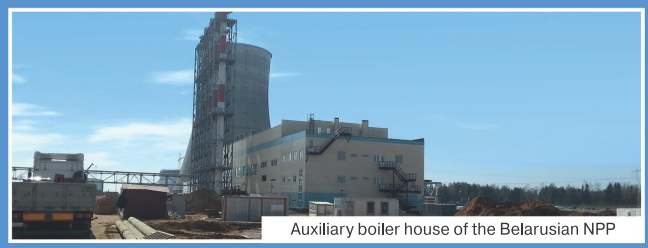
Industrial site of production base includes following objects :

- administrative building;
- a complex of industrial buildings and premises, including household premises for employees of the complex;
- concrete-mixing facilities with a capacity of 180 m3/h,
- point for unloading aggregates from railway wagons, utility premises);
- a complex of warehousing by types of stored products;
- storage facilities of general contractor (heated and unheated warehouses, areas for storage of materials and structures);
- workshops of general contractor, and complexes of buildings and structures by types of work;
- general construction objects (transformer substation, boiler station, security checkpoints).

The fire station of the Belarusian NPP is designed for 12 vehicles, consisting of: a fire station, a block of warehouses, a protective structure. In order to create an effective fire rescue division of a nuclear power plant, the fire station includes fire rescue equipment, process equipment, fire fighting and rescue equipment, equipment for communication and warning systems, information and computer technology, furniture and inventory . The designed fire station ensures full readiness for solving practical problems at the Belarusian NPP, standing in front of the fire rescue unit of the Republic of Belarus.

The auxiliary boiler station of the Belarusian NPP includes 4 steam boilers of 40 t/h each manufactured by Danstoker (Finland), operating on natural gas (reserve fuel is diesel). Steam parameters - 9 bar, 175 °C, three network water heaters with a heat output of 50, 25, 10 MW are installed in the boiler house. The boiler house is fully automated.

Fire station of the Belarusian NPP



Auxiliary boiler house of the Belarusian NPP

THE USAGE OF ADVANCED STEAM GAS AND GAS PISTON TECHNOLOGIES IN DESIGNING OF POWER-GENERATING FACILITIES.

RUE "Belnipienergoprom" has successfully developed the process of designing of power-suppliers with the use of advanced steam gas and gas piston technologies both during the building of new objects and the modernization and reconstruction of operating power plants.

During the building of new objects utilization patterns of combined-cycle power unit are used.

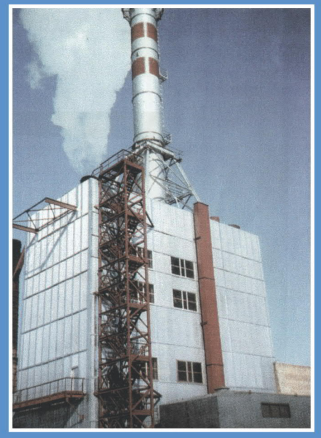
The reconstruction of operating power plants is carried out by construction of superstructures for operating gas-turbine units and steam boilers of heating plant. Besides combustion products after gas turbine are bumped into reconstructed steam generator. This scheme was implemented on 3 units of K-160 Berioza state district power plant, "Kazanskaya" CHPP and "Bezymianskaya" CHPP.

The prospective direction of reconstruction operating CHPPs of high and medium pressure is installation of steam turbines with heat recovery steam generators which work on general steam drum. This solution helps to increase the production of electric energy on thermal input with rather low capital outlays, for example Grodno CHPP.

ORSHA CHPP

(Republic of Belarus)

combined-cycle cogeneration unit, capacity 66 MW, consisting of 2 gas turbines of 27 MW each ("Alstrom", Switzerland), heat recovery steam generator an steam turbine of 12 MW. Commissioning in 1998.



BEZYMIANSKAYA CHPP

(Russian Federation)

dual-purpose gas turbine plant, capacity 25 MW based on aviation engine NK-37 (The Kuznetsov Design Bureau, Russian Federation)
Commissioning in 1999.

JSC MOZYR OIL REFINERY

(Republic of Belarus)

dual-purpose gas turbine plant GTU-16, capacity 16 MW (R&D production facility "Mashproekt", Ukraine)
Commissioning in 1998.

DOROGOBUZH CHPP

(Russian Federation)

2 dual-purpose gas turbine plants GTU with capacity 6MW each (NPO Saturn, Russian Federation).
Commissioning in 2005.

KAZAN CHPP

(Russian Federation)

2 dual-purpose gas turbine plants with capacity 25 MW each based on aviation engine NK-37 (The Kuznetsov Design Bureau, Russian Federation)
Commissioning in 1999.

MINI-CHPP "GRODNO-SEVERNAYA"

(Republic of Belarus)

Installation of gas turbine with capacity 6MW (MSICH, Ukraine) with heat recovery steam generator
Commissioning in 2006.

LIDA CHPP

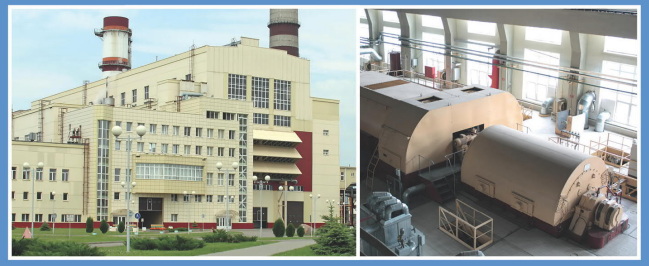
(Republic of Belarus)

Installation of gas turbine with capacity 25MW, type NK-37 (The Kuznetsov Design Bureau, Russian Federation) and heat recovery steam generator for steam supply to the header 3,9. ..MPaCommissioning in 2008.

MINSK CHPP-3

(Republic of Belarus)

Combined-cycle power unit, capacity 230MW including gas turbine GT13E2 with capacity 170MW ("Alstrom", Switzerland), heat recovery steam generator and cogeneration steam turbine T-53/67 – 8,0.
Commissioning in 2009.



MINSK CHPP-2

(Republic of Belarus)

Together with China National Corporation For Overseas Economic Cooperation (CNCOEC) design works of building 2 steam gas units including gas turbine SGT-600 with capacity 25 MW each ("Siemens"), heat recovery steam generator and cogeneration turbine with capacity 7,5 MW were done).
Commissioning in 2011.


KURSK CHPP
(Russian Federation)

2 gas turbines LM 6000 PD «Sprint» with capacity 45,65 MW each («GE Energy») as a part of combined-cycle power unit with capacity 115 MW.
Commissioning in 2011.


MINSK CHPP-5
(Republic of Belarus)

Together with China National Corporation For Overseas Economic Cooperation (CNCOEC) design works of building steam gas unit with capacity 399MW as a part of gas turbine of capacity 280MW of type M701F("Mitsubishi") heat recovery steam generator and steam turbine with capacity 130MW was implemented.
Commissioning in 2012.


GRODNO CHPP-2
(Republic of Belarus)

Installation of a gas turbine with capacity 121.6 MW («General Electric», India) with heat recovery steam generator for steam supply into plant header 14 MPa on existing steam turbines.
Commissioning in 2013.



"CENTRALNAYA" CHPP
in Astrakhan (Russian Federation)

Installation of two steam gas two-boiler single-turbine units with electric capacity 115 MW and 120 MW and total heat capacity 130 Gcal / h consisting of four gas turbines LM 6000 PF DF Sprint (45,65 MW, «General Electric»), 4 heat recovery steam generators and 2 steam turbines KGT-44/4 ,6-435-13 / 0,5-210 and two steam turbines T-17/23-4, 5/0, 18.
Commissioning in 2013.

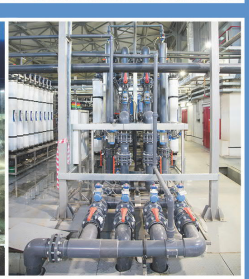

BERIOZA STATE DISTRICT POWER PLANT
(Republic of Belarus)

Unit No. 4 and No. 3 (K-150) were reconstructed with a superstructure of two gas turbines of the TD-80E type with a capacity of 25 MW each (NPO Mashproekt, Ukraine). Commissioning: unit No. 4 in 2003, unit No. 3 in 2005.
Reconstruction of unit No. 5 (K-160) by the building-up of two gas turbines SGT-700 of 30 MW each («Siemens»).
Together with China National Corporation For Overseas Economic Cooperation (CNCOEC) steam gas unit with capacity 427MW was built.
Commissioning in 2014.

LUKOML STATE DISTRICT POWER PLANT (Republic of Belarus)

Together with China Machinery Engineering Corporation (CMEC) design works of building steam gas unit with capacity 426MW as a part of gas turbine of capacity 280MW of type SGT54000F(«Siemens»),heat recovery steam generator and steam turbine with capacity 130MW.
Commissioning in 2013.


"STAVROLEN" LTD.
(Russian Federation, Budennovsk)
Installation of steam gas units with electric capacity 135 MW, heat capacity 58 Gcal / h consisting of 2 gas turbines with capacity 58,9 MW of type Tren60 («Rolls-Royse»), 2 heat recovery steam generators and steam turbine T-18-4, 2/0, 25 with capacity 18 MW.
Commissioning in 2015.

GOMEL CHPP-1
(Republic of Belarus)
The reconstruction project with the unit of a 35 MW CCP using the existing steam turbo generator set P-6-3 , 4/ 0 ,5 -1 with electric capacity 6 MW and installation of new steam turbo generator set (analogue - «Siemens» SST-060/060 Tandem) to work on exhaust steam 0.6 MPa of existing turbo generator set and gas turbine power unit 25 MW (analogue - SGT- 600 «Siemens») and heat recovery steam generator (complete supply with gas turbine) with nominal steam capacity of 40 t / h and the parameters of working steam 3.9 MPa/440°C. The project was designed and implemented jointly with the China Machinery Engineering Corporation (CMEC).
Commissioning in 2017.


UADIAN-TENINSKAYA COMBINED CYCLE POWER PLANT
(Russian Federation, Yaroslavl)
Installation of steam gas two-boiler single-turbine unit of CCP- 450 MW as a part of gas turbine units(GTU-160), (JSC «Siloviye mashini «, Russian Federation)and 2 heat recovery steam generators PR-225/44-7,60/0,89-510/217 (JSC «Engineering Company ZIOMAR», Russian Federtion) and steam turbines of type T-25/34-3, 4/0, 12 and steam turbine plant of type LN-150-7.6/0.84 (Harbin Turbine Plant, China)
Commissioning in 2017.


VORONEZH CHPP-1
(Russian Federation)

Installation of steam gas two-boiler single-turbine unit with electric capacity 223 MW and heat capacity 130 Gcal / h consisting of four gas turbines LM 6000 with capacity 45 MW each, 4 heat recovery steam generators and steam turbines of type T-25/34-3, 4/0, 12.
Commissioning in 2020.

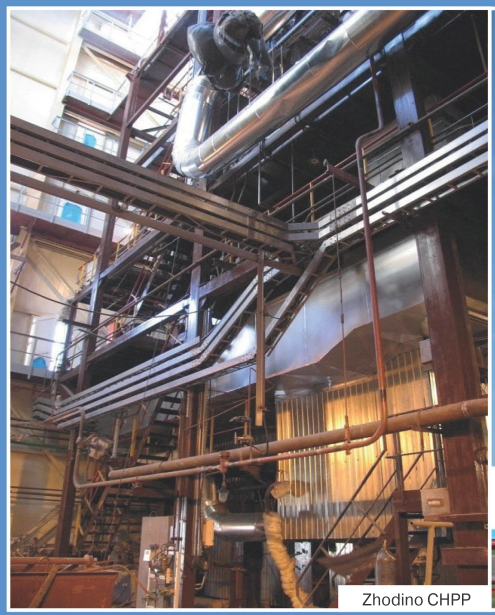

EXPERIENCE IN PROJECTS USING BIOFUEL COMBUSTION EQUIPMENT

SINCE 2003, WITHIN THE FRAMEWORK OF STATE PROGRAM OF BUILDING POWER-SUPPLIERS ON LOCAL FUELS, RUE «BELNIPIENERGOPROM» CARRIES OUT THE DESIGN OF ENERGY FACILITIES USING LOCAL FUELS (LF) -WOOD, LIGNIN, PEAT AND PEAT BRICKS.

EQUIPMENT OF BELARUSIAN, RUSSIAN AND EUROPEAN MANUFACTURERS IS USED IN THESE PROJECTS.

Pinsk CHPP

Mini-CHPP in Vileyka



Zhodino CHPP

Mini-CHPP in Osipovichi

NAME OF OBJECT	YEAR OF STARTING	TURBINE SET		STEAM BOILERS				
		QUANTITY AND TYPE OF UNIT	CAPACITY, MW	QUANTITY AND TYPE OF UNIT	BURNING FUEL	COMBUSTION METHOD	PRODUCTIVITY (CAPACITY), TONS PER	STEAM CONDITIONS, MPA/S
Mini-CHPP in Osipovichi	2005	1*т/а ПТГ-1,2-0,4-2,4/0,12	1,2	2*КЕ-10-2,4-300 ОГМВ Biisk boiler plant	wood peat	Shershne v's heating	10	2,4/300
BOBRUISK CHPP-1	2005	Existing		1*к/а КЕ-30 INEKO	lignin, peat	fluidized bed	30	3,9/440
BelGRES power plant	2006	1*т/а ПТГ-1,2-0,4-2,4/0,12	1,2	1*КЕ-20-24	wood	fluidized bed	20	2,4/350
Mini-CHPP in Vileika	2006	1*т/а Р-2,4-2,3/0,12	2,4	1*КЕ-25-2,4-350	wood	fluidized bed	25	2,4/350
CHPP in Pinsk	2007	1*т/а ПТГ-4,0/10,5Р-0,6/0,1	4,0	2*Е-10-3,9-440Т Biisk boiler plant	Wood	Shershne v's heating	10	3,9/440
Zhodino CHPP	2009	Existing		1*Е-60-9,5-510 INEKO	wood	fluidized bed	60	9,5/510
BelGRES power plant	2012	Existing		1*Е-30-3,9-440ДФ « Belozersk Power Engineering Plant «	wood	fluidized bed	30	3,9/440
Mini-CHPP in Baran'	2014		3,25	thermal oil boiler «Polytechnik Luft-und Fereuerunqstechnik Gmbh »(Austria) thermal capacity 14.79 Gcal / h	milled peat, fuel wood chips	ORC-module		
Boiler station in Luninets	2016	1*т/а Р-4-3,9/0,49-0,12	4,0	Е-20-3,9-440ДФ Е-20-3,9-440ДФ «Belozersk Power Engineering Plant « and "NPO CKTI"	Fuel wood, milled peat	fluidized bed	20 10	3,9/440
Boiler station in Pravdinskiy				4*ДКВР-1010/14 double-drum water-tube reconstructed boiler	Milled peat		40	1,4/320

HYDROELECTRIC POWER PLANT DESIGN

IIN ORDER TO INCREASE THE ENERGY SECURITY OF THE REPUBLIC OF BELARUS, THE WORK OF CHOOSING POWER SITES ON THE LARGEST RIVERS (THE WESTERN DVINA, DNIEPER AND NEMAN) WAS CARRIED OUT.

WITHIN THE FRAMEWORK OF REALIZING THE POSSIBILITIES OF USING THE HYDROPOWER POTENTIAL OF THE REPUBLIC RUE «BELNIPIENERGOPROM» CARRIED OUT CONSTRUCTION PROJECTS:

GRODNO HPP

Electric power - 5 generators with total capacity 17 MW
Annual electricity - 85 million kW · h
Width of the river - 120-150 m
Head - 7.3 m
Long-time average annual water consumption in the site - 199 cubic meters/sec
Commissioning in 2012.

POLOTSK HPP

general contractor is JSC «Tekhnopromexport» (Russian Federation)

Electric power - 22 MW
5 mine hydraulic units - 4.75 MW
The annual output of 111 million kilowatt-hour
Width of the river 100-150 m
Medium head - 7.7 m
Average consumption - 292 m3/s
Maximum discharge over the dam - 3750 m3/s
Commissioning in 2017.

VITEBSK HPP

general contractor is Chinese Corporation CNEC

Electric power - 40 MW;
Installed 4 capsular hydraulic unit10.3 MW
Annual output - 138 million kW · h;
Width of the river 80-120 m;
Medium head 9.1m;
Average consumption of 213 m3/s
Maximum discharge over the dam in 2710 m3/s.
Commissioning in 2017.

ACCORDING TO THE INSTITUTE'S PROJECTS, THE FOLLOWING WERE RECONSTRUCTED:

- Osipovichskaya HPP
- Chigirinskaya mini HPP
- Volpinskaya mini-HPP

ACCORDING TO THE PROGRAM OF INTEGRATION OF THE BELARUSIAN NPP INTO THE ENERGY SYSTEM OF THE REPUBLIC OF BELARUS, ACCORDING TO THE PROJECTS OF RUE «BELNIPIENERGOPROM», THE FOLLOWING WERE BUILT:

ELECTRIC HOT WATER BOILERS:

- Gomel CHPP-2 – 2*40 MW
- Minsk CHPP-2 – 2*20 MW
- Minsk CHPP-3 – 2*50 MW
- Minsk CHPP-4 – 2*40 MW
- Grodno CHPP-2 – 2*30 MW
- Mogilev CHPP-2 – 2*20 MW
- Bobruisk CHPP-2 – 2*15 MW

ELECTRIC HOT WATER BOILERS WITH HEAT STORAGE SYSTEMS (STORAGE TANK):

- Lukoml state district power plant – 2*40 MW
- Berioza state district power plant – 1*30 MW
- Mini-CHPP "Severnaya" in Grodno – 1*30 MW
- Mini-CHPP in Soligorsk – 2*20 MW
- Mini-CHPP in Molodechno – 1*20 MW
- Lida CHPP – 1*10 MW
- Boiler station in Kostyukovichi – 1*10 MW

PEAK-BACKUP POWER PLANTS WITH GAS TURBINES SGT-800 (SIEMENS)

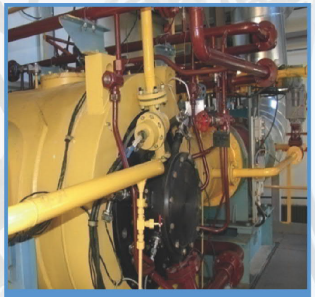
- Minsk CHPP-5 – 6*50 MW
- Berioza state district power plant – 5*50 MW
- Lukoml state district power plant – 3*50 MW
- Novopolotsk CHPP – 2*50 MW

THE USE OF TURBO-EXPANDER UNITS

A new direction in work of the institute was designing of power objects with the use of potential energy of compressed gas. The use of natural gas pressure differential, which earlier was lost in reduction stations, for energy production in turbo-expander units stimulates the increase the efficiency of power-supplier.

Installations of this type designed on the base of institute's projects were implemented:

Turbo-expander unit 4 MW in 2008



GOMEL CHPP-2

Turbo-expander unit generator 5 MW and 25 MW in 2004 and 2006

Lukoml state district power plant

Turbo-expander two units of 2.5 MW each in 2005 and 2006

MINSK CHPP-4

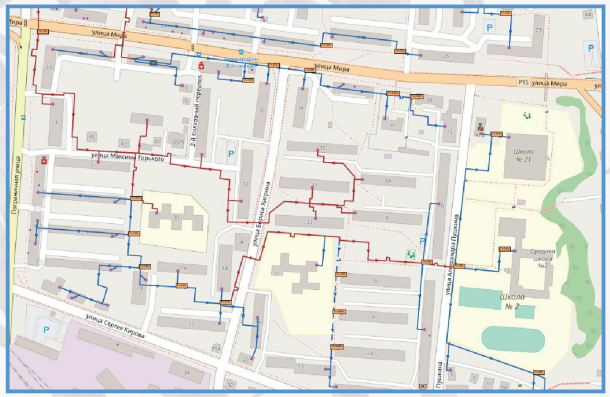
OPTIMIZATION OF HEAT SUPPLY SCHEMES OF CITIES AND INDUSTRIAL UNITS

RUE «Belnipienergoprom» is the author of heating complexes as part of thermal power plants operating in the base mode and intracity boiler houses that regulate the peak part of the heat supply system. For the work «Design and construction of a heating complex in Minsk» RUE «Belnipienergoprom» in 1983 was awarded the Prize of the Council of Ministers of the USSR.

In the course of further work on this subject heating complexes were justified and created in the cities of Gomel, Mogilev, and partly in Samara, Kaliningrad and Vilnius.

During its existence, the Enterprise has developed heat supply schemes for all cities of the Republic of Belarus with more than 20 thousand people, as well as a number of cities in the Russian Federation:

SARATOV
ASTRAKHAN
TOGLIATTI
ARMAVIR
SAMARA
NOVOSIBIRSK
BRYANSK
LIPETSK
NOVOKUIBYSHEVSK
KALUGA
YELETS
NOVOMOSKOVSK
SOCHI
DANKOV
VOLZHSKY
NOGINSK
KALININGRAD
BALAKOVO
ENGELS
TVER
PENZA
KURSK



An example of an electronic model
of a heat supply system based on the GIS «ZULU-THERMO»

Currently, RUE «Belnipienergoprom» carries out electronic modeling of heat supply systems only using the GIS information and graphic system «ZULU-THERMO» for the cities of the Republic of Belarus and a number of cities in the Russian Federation, including:

SMOLENSK
SURGUT
KOGALYM
NYAGAN
SARATOV
MINSK
GRODNO
POLOTSK
PINSK
GOMEL

As part of the implementation of the decisions laid down in the approved heat supply schemes for cities and industrial centers of the Republic of Belarus, now RUE «Belnipienergoprom» is actively designing new and upgrading existing heating networks in many cities of the country.

IN MINSK:

According to the institute's designs, the city's heat supply system was built, this system includes powerful CHPP-4 (1035 MW, 1519 Gcal/h), CHPP-2 and five peak boiler houses, including more than 65 km of pipes with a diameter of 1400-800 mm (in double calculus). At present, the Enterprise provides projects for the repair and reconstruction of the heating complex in Minsk.

IN GRODNO:

For reliable heat of beyond river Neman part of the city when the heat demand growth due to housing development and decommissioning of small boiler stations main pipeline M-14 2Ду700мм mm was designed and constructed with pipelines laying across the river Neman in the structures of existing of «Rumlevskiy» bridge. At the final stage of construction is heating main 2Du500 mm (with upload pumping station), which loops around M-4 and M-14. In the future it is planned to construct the third heating main of beyond river Neman part of the city due to the increase of heat load of the Yuzhniy District (up to 100-120Gkal/h).

DESIGN OF HEATING NETWORKS

IN GOMEL:

In 2012-2014 projects completed and implemented: «Construction of the heating main Gomel CHPP-1 - Sevastopolskaya Str. in Gomel» and «Crossing of the heating main across the Sozh River on the structures of the steel-reinforced concrete structure of the existing automobile bridge across the Sozh River in Gomel».

The projects solved an important national economic task of supplying heat to the Novobelitsa microdistrict under construction from the Gomel CHPP-1, for which the construction of a 2Du500 overground and underground heating main with a total length of 2.7 km is envisaged. The crossing of the heating main and across the Sozh river was made according to the structures of the steel-reinforced concrete structure of the existing automobile bridge along the Frunze st. The construction of the heating main was carried out in 2012-2013.

In the course of further development of heat supply to newly constructed areas in 2017-2019, projects were completed for the Shvedskaya Gorka facilities and a number of central heating centers.

IN BREST:

In 2014-2015 RUE «Belnipienergoprom» completed the construction project of the main network 2Du500 mm, 4 km long, connecting the zones of the South District Boiler House and the Brest CHPP and providing heat supply to the South-Western residential area of Brest from the Brest CHPP. A feature of this project is the solution of the problem of building an underground heating main from pre-insulated pipes in the floodplain areas of the Mukhovets river and the construction of overground crossings through two existing, one promising channel of the Mukhovets river and the inlet. The project was implemented on December 30, 2016.

IN MOGILEV:

In 2012-2016 a series of projects was implemented to provide heat supply to the newly built microdistricts «Sputnik» and «Kazimirovka» from the Mogilev CHPP-1 and CHPP-2 through the construction of mains with a diameter of 700 and 600 mm with a total length of more than 6 km, three pump booster stations and the decommissioning of two boiler houses.

«Reconstruction of a heating main using PItrub TM-01 in the section from TK-0118 to a point in the area of TK-0127 on the Ulyanovskaya Str. in Bobruisk,» 2Du800 mm, U-shaped compensator.

«Construction of a heating network in the city in Borisov from UT6 in the area of the boiler house on Brothers Vainrubov Str. to the district of heat supply of boiler room No. 5 on Serebrennikov Str. with the construction of the central heating substation,» central heating substation, installation of equipment.

«Boiler on Sosnovaya Str. in Kostyukovichi». 1 stage of construction. Off-site heat supply networks 2Du500 mm, above-ground laying.

TO SOLVE THE PROBLEM OF INTEGRATED CONTROL OF VOLTAGE IN THE POWER SYSTEM IN THE REPUBLIC OF BELARUS SPECIALISTS OF RUE «BELNIPIENERGOPROM» DEVELOPED AND SUCCESSFULLY IMPLEMENTED A NUMBER OF VOLTAGE CONTROL SYSTEMS, WHICH INCLUDE:

1. Implementation of voltage regulation systems on high-voltage busbars of 110...330 kV power plants by group control of generator excitation, as well as voltage regulation on auxiliary busbars of 6...10 kV power plants by controlling on-load tap-changers of auxiliary transformers (manufactured in the Republic of Belarus).

2. Implementation of digital multifunctional voltage regulation systems on substation buses using on-load tap-changers (manufactured by the Republic of Belarus). The characteristics are similar to the characteristics of systems for regulating the voltage on the auxiliary buses of the power plant and can additionally (if necessary) maintain the voltage on the buses of remote consumers, taking into account the operating modes and characteristics of the connections.

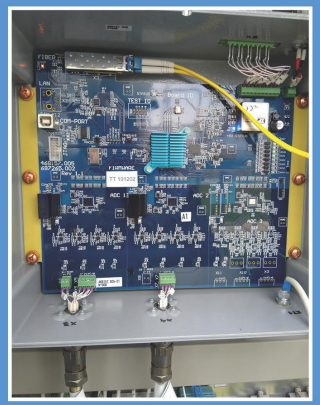
3. Implementation of an automated control system for measuring current transformers (ASKMITT) 330 kV under operating voltage (manufactured in the Republic of Belarus). The system provides continuous monitoring of the CT insulation with the issuance of emergency and warning signals, as well as the display and archiving of monitored parameters.

4. Implementation of an automated search system for the control of single-phase ground faults (ASPOZZ) for cable and overhead line connections 6 ... 10 kV (manufactured in the Republic of Belarus). The system allows you to determine the damaged feeder at a current of 1 A and a duration of single-phase-to-ground fault protection of 20 ms.

5. Implementation of automated control systems for the state of pumping equipment of heating pumping stations, integrated into existing automated process control systems, and made on the basis of multifunctional controllers (manufactured in the Republic of Belarus). This system provides information on the presence of breaks in heat networks, performance (without the installation of flow meters), efficiency and the value of the optimal load of each of the pump units connected in parallel, on the position of the control valves.

6. Implementation of systems for recording emergency transients based on vector measurement devices or multifunctional controllers in the electrical network 6 ... 330 kV (manufactured in the Republic of Belarus).

7. Modernization of excitation systems for brushless and electric machine excitation systems for generators with a capacity of up to 63 MW using a microprocessor-based excitation cabinet with a high-speed AEC (manufactured in the Republic of Belarus).



8. Modernization of thyristor self-excitation systems for generators up to 70 MW with the use of a microprocessor excitation cabinet with a high-speed AEC, replacement of thyristor converters and power input cabinets (manufactured in the Republic of Belarus).

9. Modernization of thyristor frequency converters made on the basis of autonomous current inverters with a power of up to 1600 kW with the replacement of the control system and, if necessary, power semiconductor modules.

10. Conducting a survey and performing a feasibility study for the installation of an adjustable drive (electric drive or hydraulic drive) on pumping equipment and mechanisms of the draft-blowing group. The feasibility study is carried out on the basis of the actual characteristics of the mechanisms using a mathematical model, including when regulating the rotational speed.

11. Carrying out mathematical calculations of steady and transient electromechanical and electromagnetic processes in the power system as part of the design or analysis of work:

- relay protection devices at power plants, boiler houses and substations;
- emergency control devices (EC) at power plants and substations;
- performance automation devices (PA) at power plants;
- mechanisms for own needs of a power plant or boiler house during power outages;
- excitation systems of synchronous generators; steady-state and transient thermal-mechanical processes in heat networks as part of the design or analysis of work:
- pumping equipment for heating pumping stations;
- EC and PA devices at pumping stations.

Calculations are carried out on the basis of modern high-performance and licensed simulation packages. The initial data for calculations may be data obtained during the operation of the equipment by the Customer or on the basis of field tests previously carried out at the Customer's facility.

12. Development of design estimates for items 1 ... 10.

AUTOMATION OF TECHNOLOGICAL PROCESSES

RUE «BELNIPIENERGOPROM» PERFORMS COMPREHENSIVE WORKS ON DESIGN, INSTALLATION AND ADJUSTMENT OF AUTOMATED AND AUTOMATIC CONTROL SYSTEMS FOR TECHNOLOGICAL PROCESSES AT ENERGY FACILITIES.

In connection with the rapid development of industrial automation based on computer and microprocessor technology, in the mid-90s, the leadership of the Enterprise decided to expand work in this direction and create an independent specialized department for automation of technological processes (DATP).

The employees of the department quite quickly mastered the new direction. The result of this work was the creation of our own automated process control system (APCS) based on microprocessor and computer technology and modern software.

In December 1999, the first facility was successfully launched and put into operation, equipped with an automated process control system developed by the institute - boiler KVGM-100 st. No. 9 at the Molodechno mini-CHPP.

The developed system turned out to be so successful that in the next two years at the same Molodechno mini-CHPP, almost all the main and auxiliary equipment were equipped with similar systems: 8 steam and hot water boilers, auxiliary equipment, a steam turbine. The system has been functioning flawlessly so far.

In subsequent years, the specialists of the department developed more than 250 projects of software and hardware systems and implemented more than 100 systems of varying complexity on their own performed on modern software and hardware from various manufacturers.

Automation objects are practically all the main and auxiliary equipment of power facilities: boilers, turbines, electrical equipment, water treatment, fuel oil facilities, gas distribution equipment, including large technological installations (330 MW unit of Berezovskaya GRES station No. 5 - a full-scale automated process control system for the unit, auxiliary and electrical equipment), as well as entire energy facilities: thermal power plants, heating networks, boiler houses, pumping stations . Works on the creation of automated process control systems and their adjustment by the Enterprise were carried out at Molodechno, Vileika, Soligorsk mini-CHPP, in Minsk, Mogilev and Grodno thermal networks, at Bobruisk CHPP-2, Grodno CHPP-2, Minsk CHPP-4, Mogilev CHPP-2 and etc.

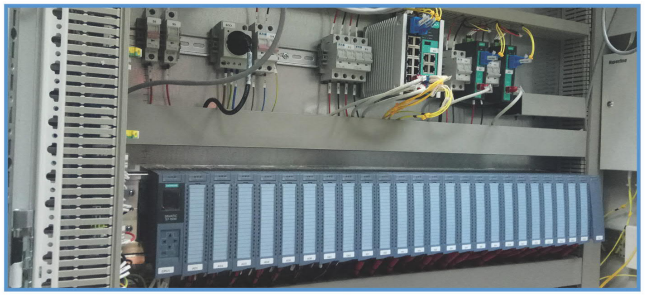
One of the last such facilities was the thermal power plant of the Dobrush Cardboard Plant, where a full-scale automated process control system was introduced and put into operation with all the main and auxiliary equipment of the power facility.

At present, the range of services provided by the department includes the whole range of works from development APCS concepts before its implementation:

- pre-project work: survey, development of the system concept, technical specifications, investment justification, etc.;
- design work: development of design and working documentation;
- author's supervision;
- ccommissioning works;
- delivery of the object;
- training;
- warranty service;

- post-warranty service;
- other works (technical support, consulting services, extension of the service life of systems, etc.).

At the request of the Customer, the work can be performed on a ready-to-operate basis.

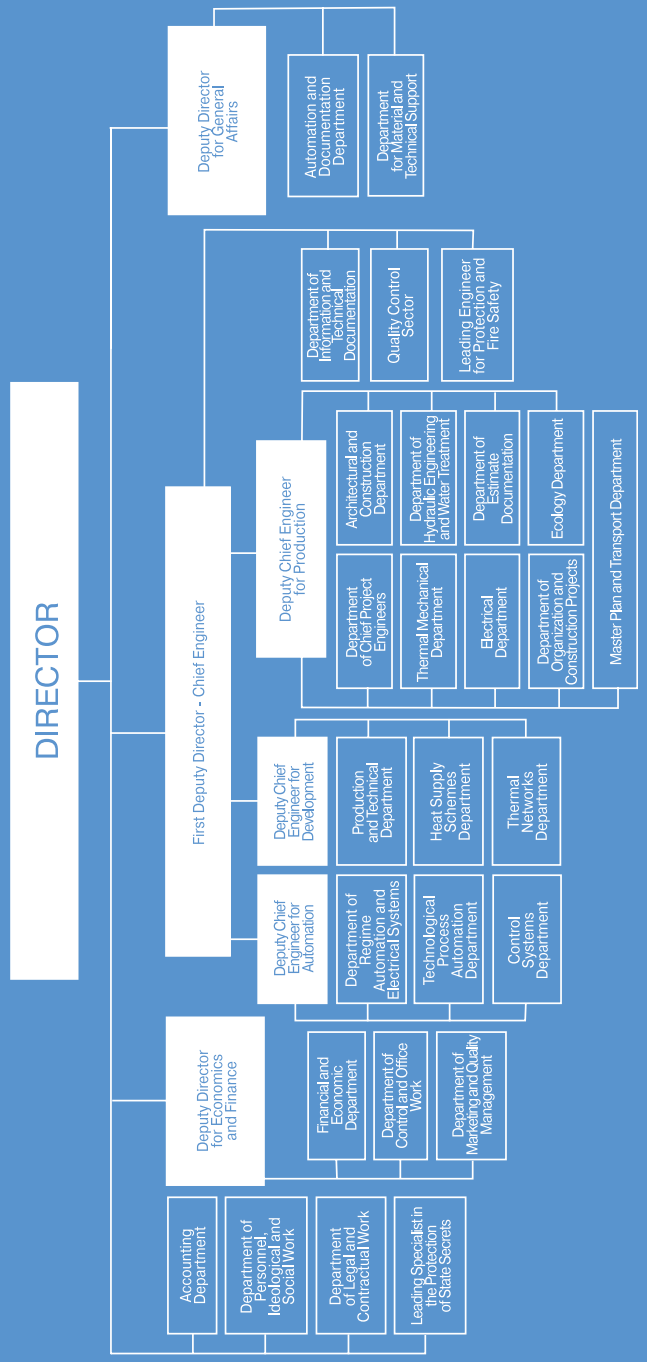


TECHNICAL EQUIPMENT

FOR THE IMPLEMENTATION OF THE DESIGN PROCESS THE ENTERPRISE HAS A STAFF OF OVER 500 HIGHLY QUALIFIED SPECIALISTS, INCLUDING 6 CANDIDATES OF SCIENCE, «MORE THAN» OR NEAR 450 EMPLOYEES HAVE HIGHER EDUCATION; MORE THAN 480 COMPUTERS, CONNECTED TO A LOCAL COMPUTER NETWORK, THE LATEST SOFTWARE:

- BIM modeling software package «Autodesk Revit»
- Collection of programs «Architecture, Engineering & Construction Collection»
- 3D design software package «AVEVA E3D»
- BIM-solution for the design of building structures «Tekla Structures»
- program of automated designing «AutoCAD»
- The program for development of project documentation in accordance with the standards of System of construction designing documentation among AutoCAD «SPDS GraphiCS
- Computer-aided design program «nanoCAD SPDS»
- 3D modeling and visualization program «Autodesk 3ds Max» + «Corona Renderer»
- Graphic editor «Adobe Photoshop»
- The program for modeling thermal power plants and CAD systems «United Cycle»
- A unified program for calculating air pollution «Ecolog»
- Program «Ecolog-Waste of boiler houses»
- Program «Ecolog-Construction Waste»
- Program «Ecologist-Welding»
- Program «Ecolog-Motortransport»
- Program «Ecolog-Risks»
- Program «Ecolog-Boiler»
- Program «Ecologt-Boiler Houses Belarus»
- Program for Evaluation of noise spread from external influences based on software «Ecolog-Shum» («Standard»)
- The program for calculation and design of pipelines thermal insulation of «Insulation»
- Program for selection of diameters and hydraulic calculation of pipeline systems « Hydrosistema»
- Program for thermal calculation of pipeline systems «Hydrosystema-Thermo»
- Program of strength calculation of pipelines «START» + «START- Grunt» and Module of Compatibility «START- otkritiy format»
- Program of thermal and hydraulic calculation of branched pipeline «POTOK 1Ф»
- A program of calculating flow meters to measure the flow of gases and liquids «Rashodomer ISO»
- Module of flow calculation by using the SSA by RD 50-411-83 «Rashodomer ISO - SSA»
- Software complex for calculating sanitaryware systems «ARS -PS»
- Program of design of foundations under columns of skeleton buildings «FOK PC -2014»
- Engineering and construction guide «Spin 2.2»
- Software complex for calculation of the strength and design of structural constructions «Scad Office 21»
- The software complex for calculation in the design of electrical power systems «EnergyCS»
- Program of lighting engineering calculations in the design of lighting installations «ElectriCS Light»
- Software complex «CREDO III» for processing engineering research :
  - «CREDO- GenPlan»
  - «CREDO- Dorogi»
  - «CREDO- Rodon»
- Program for the design of metal structures «Real STEEL»
- Program for professional CCTV system design «VideoCAD»
- Information system for managing technical documentation «TDMS» 4
- Information and reference system for normative documents of the Russian Federation «NormaCS». Sections: «Energy and Heat Engineering», «Electric Power Industry», «Construction. Max version»
- Information retrieval system for technical regulatory legal acts in construction in force on the territory of the Republic of Belarus «StroyDocument OnLine»
- Software for calculation of estimates «Grand smeta 2021»
- Software complex of the integrated system of cost and resource calculations «RSTC.Smeta»
- Estimated program «ARM - Technological preparation of production. Resource estimates»
- System for cost estimates and resource calculations in construction «ABC-4PC»
- Software package for calculation of estimates «GosStroySmeta» 2.0
- Software package for calculation of estimates «AtomSmeta» 8.0
- FactorySuite software package for designing real-time information systems, Wonderware Development Studio development environment
- The program complex finite-element analysis of geotechnical facilities «Plaxis 2D v9»
- nformation and calculating system GCI «CityCom- teplograf» consisting of subsystems: «Teplopoteri» (heat loss), «Stoimost' teplosnabzheniya» (heat supply costs)
- Software and settlement complex for heat supply systems «Zulu»: «ZuluThermo», «ZuluHydro», «ZuluDrain»
- CAD software for secondary switching circuits of electrical installations «CAD TsVK»
- Program for simulation and analysis of transients in multiphase power transmission systems «EMTP-RW»
- A set of programs for calculating heating and heat supply systems, heat and power calculations, water supply and sewerage, «Sankom Auditor»
- The program «Exam» on labor protection and safety

ORGANIZATIONAL STRUCTURE OF THE PROJECT SCIENTIFIC RESEARCH REPUBLICAN UNITARY ENTERPRISE «BELNIPIENERGOPROM»



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