

Velikiye Luki | Moscow

CJSC Plant of Electrotechnical Equipment | CJSC ZETO

MANUFACTURING. SERVICES AND FACILITIES



Making the world brighter

www.zeto.ru | info@zeto.ru

CONTENT

1. Company introduction	2
2. Our history	4
3. Manufacturing	6
4. Production	10
5. Services and facilities	14
6. Equipment of CJSC "ZETO" onsite	18

Company introduction

VELIKIE LUKI PLANT OF ELECTROTECHNICAL EQUIPMENT CJSC “ZETO”

Plant of Electrotechnical Equipment (CJSC “ZETO”) is one of the leading Russian enterprises successfully operating within the power transmission market for over 55 years. Our wide range of products satisfies the demand of the entire spectrum of industries including power generation and power grid, oil and gas industries, extractive and materials processing, railways and underground, agricultural and municipal engineering.

The basic activity of our Company is the development and production of the high-voltage equipment that spans the wide field of high-voltage power transmission: with voltage from 10 up to 1150 kV, complete set of rigid busbar for 110-750 kV, block-modular compact constructions for ORU (outdoor switchgear) and ZRU (indoor switchgear) for 35, 110 and 220 kV, arrestors, surge arresters for 0,4 -500 kV, polymer insulators for 10-500 kV, SF6 column circuit-breakers for 110, 220 kV and live-tank circuit-breaker VTB -110kV, measuring current transformers for 110-500kV and voltage transformers for 110 – 220 kV.

The high quality of our products, solutions and services meets the most sophisticated requirements within the market. All equipment is being developed considering high technologies and power engineers’ demands and





requirements. Many constructive and technological solutions have been patented and do not have analogues all over the world. Our Quality management system and environmental management system have been certified in accordance with international standards ISO 9001:2008 and ISO 14001:2004. The equipment manufactured by CJSC "ZETO" is engineered to operate in moderate temperature as well as in cold and tropical climate.

Having a long history of supply within the major power transmission projects our Company has gained a reputation of a reliable and trusted partner for the main public and private enterprises all over the world. Our supply portfolio includes cooperation with markets of Ukraine, Byelorussia, Kazakhstan, Uzbekistan, and other CIS and Baltic States. Our foreign partners are represented by China, Egypt, India, Vietnam, Bulgaria, Poland, Iran, Iraq, Bangladesh, and Cuba.

CJSC "ZETO" – is a modern, highly efficient and socially oriented company having high scientific potential and technical capacity.

HALF-A-CENTURY HISTORY OF SUCCESS

1959

Plant of High-Voltage Equipment (VZVA) was established in autumn 1959 by the Decree of the RSFSR Council of Ministers and by the direction of the Economic Council of Leningrad economic area. The Company Regulation was affirmed on the 19th of November.

60s

Within the frame of the first state plan the first products were manufactured in January – they were disconnectors – RLND 35/600 - 3880 poles and RLND 110/600 – 706 poles. The first export supplies of disconnectors were made to China, Albania and Afghanistan.

Serial production of new devices and production range exceeded 100 items. The expansion of the products' export to different countries continued. The production of the equipment for 220-750 kV voltage classes was mastered. Labour force increased up to 1100 people.

Disconnectors for extra-high voltage experimental-industrial line Konakovo-Moscow were developed and put into production.

The unique high-voltage equipment was produced for Aswan hydro-complex in Egypt.

70s

A special design-construction engineering department was organized in the enterprise structure. It started to work on the modernization of the existing equipment units.

Extensive introduction and mastering of new technologies were carried out. New facilities were introduced into production: electronic computing machines, handling devices, robot-machines, CNC machines. The plant became a member of all-union Chamber of Commerce and an award winner of the Exhibition of Economic Achievements, started cooperation with industry research institutes and registered its trademark.

Output expansion of commercial products had experienced a seven times increase.

80s

Devices produced at the plant had no analogues in the world. Manufactured products were exported to more than thirty countries worldwide (power plants of Iran, Iraq, Turkey, Algeria, Yugoslavia, Finland, etc).

The equipment for Sayano–Shushenskaya HPS, which was the station with the highest output in the world at that time, was supplied prior to the scheduled date.

Equipment of ultra-high voltage for 1150kV was mastered for energy transmission at high-power stations of Ural and Kazakhstan.



90s

At the time of trial for all domestic enterprises the plant withstood the test of the market. Thanks to the competent management the active search of new market segments was conducted and new niches were acquired.

A serial production of new types of equipment had been successfully implemented at that time including those for underground railways and railways, transformer substations of urban and rural types, low-voltage equipment, accessories (steel insulated wires) for 0,4 kV and high-voltage protected line for 6-20 kV were developed.

2000s

In 2000 Velikie Luki Plant of High-Voltage Equipment (VZVA) was reorganized into Plant of Electrotechnical Equipment (CJSC "ZETO").

The program of technical re-equipment of the primary production had been carried out.

As a result new types of products were developed and upgraded, including: disconnectors of the fourth generation of RG series for 35-500 kV. The following products appeared in Russia for the first time – sets of rigid busbars for outdoor switchgears for 110-500 kV, disconnectors of knee-type RPG – 330 750 kV and pantograph type of RPV-series – 110-500 kV, disconnectors of swinging type RLK-10, surge arresters from 0,38 up to 500 kV, polymer insulators for 10-500 kV, compact module KM-ORU-110 kV.

A project on the production of SF6 circuit breakers, current transformers for 110 kV, a relay protection, automation systems and automatic process control system was carried out.

2010
2015

Serial production of SF6-gas equipment was mastered and included: live-tank circuit breakers of VGT-110 series and instrument current transformers of TOGF – 110-330 kV and TOGP – 500 kV. The complete production cycle was acquired using new domestic and foreign process equipment. It allowed carrying out a high quality manufacture of the critical components with the most complex configuration.

On the basis of CJSC "ZETO" test center a new high-voltage testing hall with an area of 1100 square meters was built. The state-of-the-art equipment was installed and put into operation in 2015 – a resonant alternating current (AC) testing system of 1200 kV voltage of HIGHVOLT manufacture. This made possible to perform tests on the equipment for voltage classes up to 750 kV.

Nowadays

Plant of Electrotechnical Equipment (CJSC "ZETO") is included into the list of "100 best Russian enterprises". It has been recognized as a socially responsible enterprise and acknowledged by the Pension Fund of the Russian Federation as "The best insuring party of 2012".

Every year CJSC "ZETO" takes part in the largest Russian and foreign specialized exhibitions, forums and tenders. It has been awarded various certificates and diplomas. The plant has been honored a medal "A prize winner of All-Russian exhibition center", awarded a diploma of "The best ecologically responsible enterprise of Pskov region in 2014".



PROGRAM OF REPOWERING

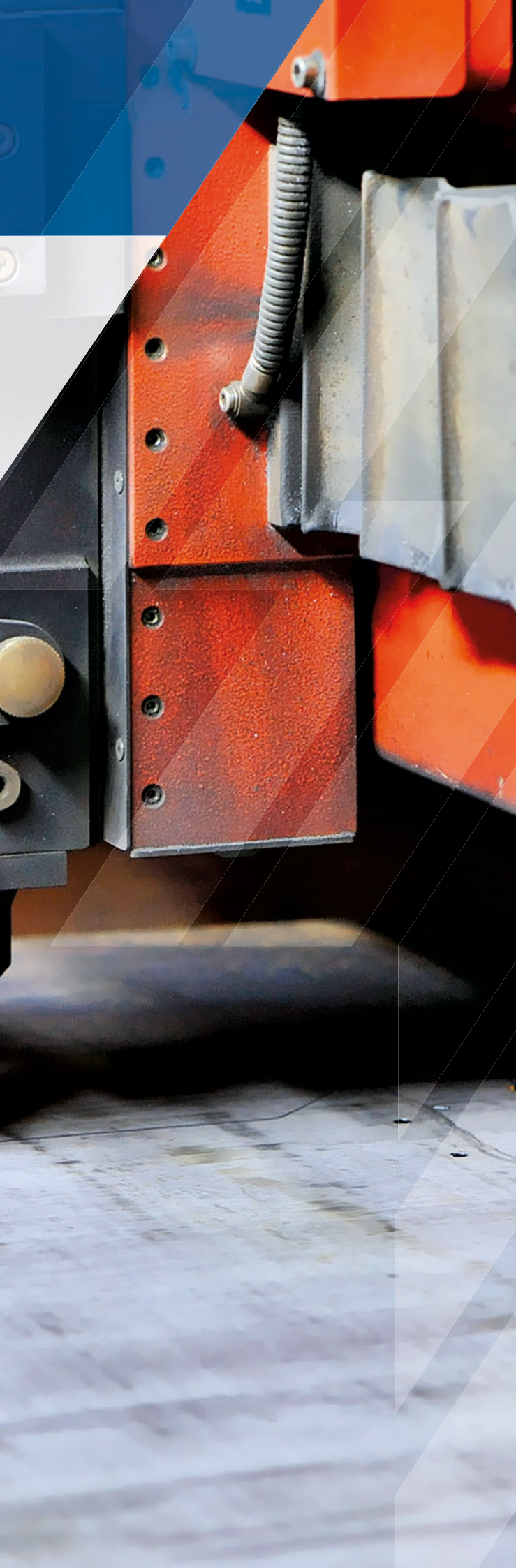
Manufacture of CJSC "ZETO" is spacious workshops and modern technologies. Plant has magnificent fleet of close control equipment which consists of 1100 units of manufacturing machines and different mechanisms, high technological machining and automated complexes located on production sites of more than 100 000m².

Updating programme and repowering of primary production have being realized at the enterprise. Modern high technological equipments were purchased and put into operation for the last 10 years, such as:

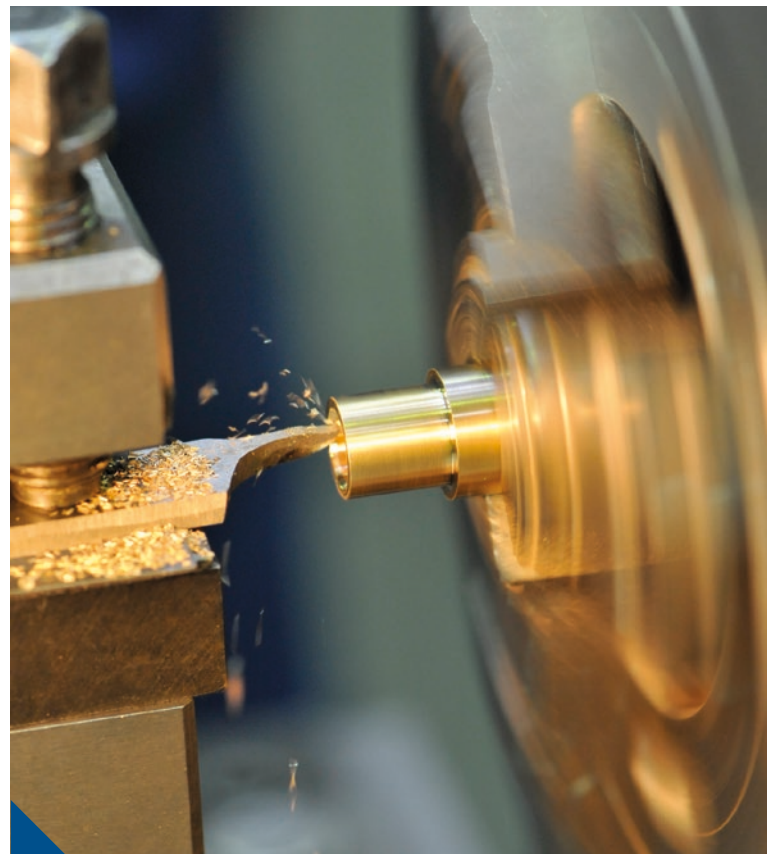
- ◇ Laser jets for metal cutting (Switzerland);
- ◇ Complex of plazma cutting (Germany);
- ◇ Pipe-bending machines, sheet bending press CNC (Switzerland);
- ◇ Metal working machines with program-controlled on a base of data processors of "SIEMENS" company;
- ◇ Complexes of engineering molding equipments (Germany) for pressing silicone organic layers OPN (surge arresters) and insulators;
- ◇ Line of thermodiffusion zinc coating under a licence from Belgium company "VICTOCOR";
- ◇ Automatic insertion of shot blasting;
- ◇ Machine of chill casting;
- ◇ New line of hot-dip galvanization of metal structures, parts and units under a licence of company "Hasko" (Great Britain) and technology of FSUE "CRDI of ferrous industry named I.P. Bardin" Russia
- ◇ Molding complex for production of polymeric insulators under a licence of SVT and insulating bracing for SF6 equipments of company "Hubers" (Germany)



Line of laser metal cutting



Machine workshop of parts and SF6 equipments units

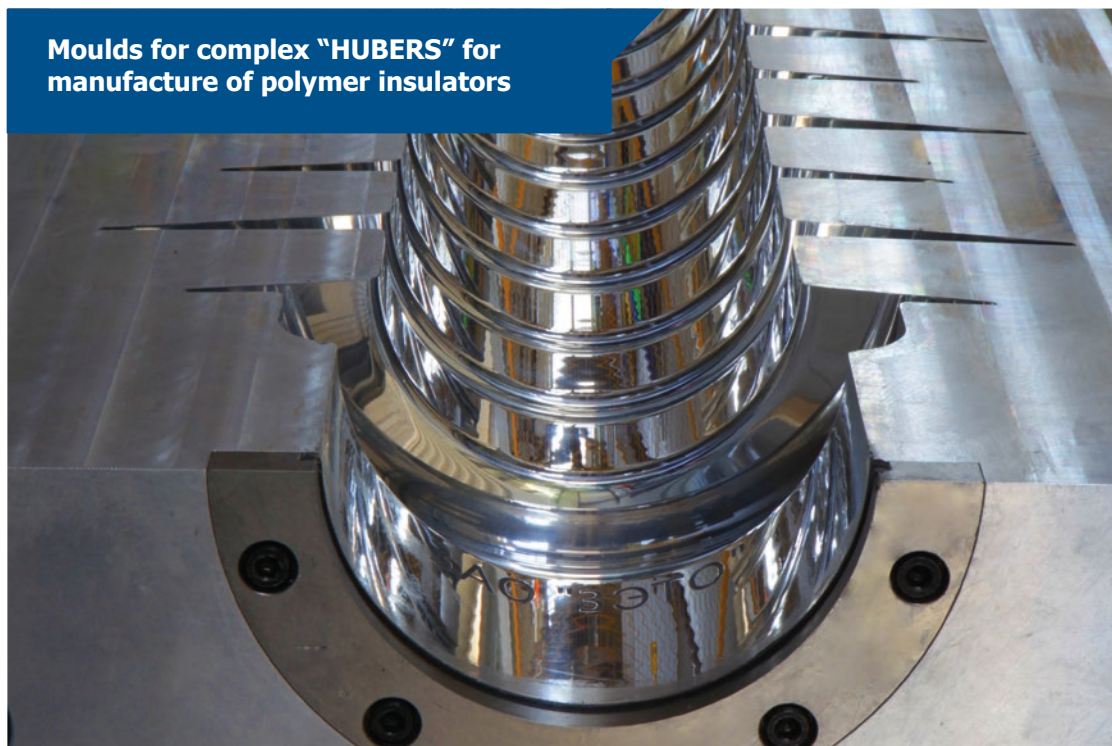


Metal turning lathe with CNC maintains high accuracy of part process

Details exposed adverse of external factors pass process of hot-dip galvanization on the equipment of "HASCO" company (Great Britain)



Moulds for complex "HUBERS" for manufacture of polymer insulators





Manufacture of polymer insulators under unique technology



The list of output products of CJSC “ZETO” includes more than 400 items ranging from 0,38 to 1150kV

High-voltage equipments

Innovations

- > *GIS-110 (U2) GIS – gas insulated switchgear*
- > *VGT-220 (U1, UKHL1*) SF6 Column circuit-breaker*
- > *ZNOG-220 (U1, UKHL1) SF6 voltage transformer*
- > *RPK3-3, 6/5000-60000 (U3) Disconnectors of V-shaped type*
- > *RPK3-12/5000-60000 (U3) Disconnectors of V-shaped type*
- > *EC-12 (U3) Earthing switches of cutting type*
- > *Switchgear -10kV, KSO-215, KSO-215M.*

SF6 equipment

- > *SF6 column circuit-breakers of VGT type -110kV:*
 - ◇ VGT-110(III, IV) / (2000, 3150) U(KHL)1(*)
- > *VTB-110(III, IV) / (2000, 3150) U(KHL)1(*):*
 - ◇ measuring current transformers of TOGF series for 110,220,330kV with porcelain isolation;
- > *TOGF-110; 220; 330UKHL1(UKHL1*):*
 - ◇ measuring current transformers TOGP -500kV with polymer isolation
- > *TOGP-500U1(UKHL1*):*
 - ◇ measuring voltage transformers ZNOG -110kV;
- > *ZNOG-110U1(UKHL1)*

Outdoor disconnectors 10-750kV

- > *Outdoor disconnectors of swinging type RLK-10kV, horizontal-side break type RLND-10kV:*
 - ◇ RLK(V)-(C)-10.IV/400UKHL1
 - ◇ RLND(C)-10(B,II,IV)/(200,400,630)(N)UKHL1
- > *Disconnectors of horizontal-side-break type of 4th generation of RG series -35-500kV:*
 - ◇ RG(P)-(V)-35(II)/(1000,2000,3150)UKHL1
 - ◇ RG(N,P)-(V,K,SK)-110(II)/(1000,2000)UKHL1
 - ◇ RGN-150.II/(1000,2000)UKHL1
 - ◇ RG(N)(P)-220(II)/(1000,2000,3150)UKHL1
 - ◇ RG-330(II)/(2000,3150)UKHL1
 - ◇ RG-500(II)/(2000,3150)UKHL1
- > *Disconnectors of pantograph type with vertical breaks of RPV series for 110-500kV and with horizontal breaks of RPG series for 330-750kV:*
 - ◇ RPG-330(500,750)(II) / 3150UKHL1
 - ◇ RPV-110(220,330,500)(II)/(2000,3150)UKHL1
- > *Disconnectors of suspended type for 330-750kV*
 - ◇ RP-330(B)-1(2)/3150UKHL1
 - ◇ RPD-500;750(b)-1(2)/3150UKHL1

Indoor disconnectors

- > *Indoor disconnectors for 10-35kV:*

- ◇ Disconnectors of cutting type:
 - > RV(3)-10/(400,630,1000)MUKHL2
 - > RVO-10/(400,630,1000)MUKHL2 single-pole
 - > RVR(3)-III-10/2000MU3
 - > RVR(3)-10/(4000,8000)MU3
 - > RRI-10/400 UKHL3 with insulated frame
 - > RKV3-10/2000(U3) of V-shaped type
 - > RRCH(3)-20/6300MU3 for frequent switching
 - > RVR(3)-20/(8000,10000)(M)U3
 - > RRT(3)-20/8000UKHL3 transposed type
 - > RVP(3)-20/12500NU3
 - > RR(3)35/(1000,2000,3150)U3
- ◇ Disconnectors for 1,5 and 2,5kV DC:
 - > RRP-1,5/(20000, 40000,50000)UKHL4

Outdoor and indoor earthing switches for 10-750kV

- > **ZP-10(24;35)NU3**
- > **ZON-110(M,B)-UKHL1**
- > **ZR(P)-110;220(II)UKHL1**
- > **ZRO-330(500;750)UKHL1**
- > **ZPPA-330;500(II)UKHL1**

Surge arresters with heightened power capacity of varistors for voltage up to 500kV

- > **OPN-P(1)0,38; 0,66UKHL1**
- > **OPN(F)-(P1)-(3;6;10;15;20;35)/(10/2(3)UKHL1)**
- > **OPN(N)-P(1,2)-(110,150,220,330,500)/(10(20)/2(3,4,5)UKHL1**
- > **OPN(K*)-(P)(1)-(3,3;27,5)(01)(UKHL1) for overhead lines**
- > **OPN-P1-25EPUKHL1 for rolling equipment**

Arresters

- > **Pipe-type:**
 - ◇ RTV-10-110(U1)
- > **Valve type:**
 - ◇ RNK-0,5 (U1,KHL1,T1) for insulation monitoring device
 - ◇ RVKU-1,65 and 3,3 (O1) switching unified
 - ◇ RVN-0,5 (MNU1) and RVN-1(T1) low-voltage
 - ◇ RVNE-0,5 (U1) for electro-rolling equipment
 - ◇ RVO-3,6,10 (U1, T1) reduced-weight
 - ◇ RVRD-3,6,10 (N,U1,T1) with stretchable arc
 - ◇ RVS-15,20,35 (U1,T1) station

Trip recorder

- > **RR (U1, T1) of valve arresters**
- > **RS-1,2,3 (UKHL1) of surge arresters**

Cast polymer post insulators up to 220kV and suspended up to 500kV

- > **OSK (KH)-10(35,110,220)-(KH)-(2,4)UKHL1**
- > **LK-35(110;220;330;500)/(70,120,160)UKHL**

> **Insulators for contact system:**

- ◇ K(F,N,P)SPK-70(120)-3(25)(UKHL1)

Switchgear for ORU (outdoor switchgear) ZRU (indoor switchgear) 35,110 and 220kV

- ◇ KM-ORU-110 (variants as per customers schematic diagram, including unit-type construction)
- ◇ KTPB-ORU-35 (variants as per customer schematic diagram)
- ◇ BM ORU 220 (variants as per customer schematic diagram)

> **Sets of rigid busbar for outdoor switchgear of station and substations with complicated schemes of connecting for 110-750kV**

Busbar support for 35-750kV

- > **SHO-(35,110,150,220,330,500,750,1150)(II)-U(KHL)1**
- > **SHOP-(35,110,220)UKHL1 (with polymer isolation)**

Step-down transformer substation for 10/0,4kV

> **Column and pole type:**

- ◇ PTM(P,A)-KH-(25,40,63,100,160,250)/10/0,4-93U1
- ◇ PTS(1,2)(U,P)-(25,40,63)/12)(II)/0,4-XXX-96U1
- ◇ KPTSO-(4,10)/10(II)/0,23-XX-99U1
- ◇ PTZS-(160,250,400)/10/0,4-(1,2)TKHKH-01U1
- ◇ KTPPR(1,2,3)-(25,40,63,100,160)/10/0,4-XXX-01U1

> **Unit Transformer Substation (KTP)**

- ◇ KTP-6(10) 25-630

Fuse-disconnectors of exhausted type PRVT-10

- ◇ PRVT-(10)II-6,3(U1,T1)

Self-generated circuit-breakers for 10kV

- ◇ VNM-10/400-20(UKHL2)
- ◇ VNM-10/630-31,5(UKHL2)

High-voltage cross-arms

> **For concrete support for 10kV**

- ◇ KTV(U1) High-voltage cross-arms for railway supports of single-circuit overhead line for 10kV
- ◇ KTV2(U1) High-voltage cross-arms for railway supports of double-circuit overhead line for 10kV

> **For wooden supports for 10kV**

- ◇ KT-d(U1) High-voltage cross-arms for wooden supports of single-circuit overhead lines for 10kV

> **For concrete support of single-circuit lines for 35kV**

- ◇ TI-35 (U1) Isolating cross-arms for single-circuit lines for 35kV

Equipment for underground railways

> **Boards of switchgears**

- ◇ PRU-95(U3)

> **Cable connection points**

- ◇ PKV, PKN, PKKHN (U3,U1)

> **Switching points**

- ◇ PP-125 (U3,U1)
- ◇ PP-150 (U3)

> **Depot distribution points**

- ◇ PRD (U1)

> **Depot sectioning centers**

- ◇ PS, PSD (U1)

- > **Compensators**
 - ◇ KP (KI)(U3)
- > **Connectors**
 - ◇ SPYA (SSP; SKR; SKHR, SDT; SSHD)

Drives for operation of switching devices

- > **Motor drives**
 - ◇ PD-14K (UKHL1) Motor drive with digital controller
 - ◇ PD-14 (UKHL1) Motor drive
 - ◇ PD-11 (UKHL1) Motor drive
 - ◇ PDG-12 (U3) Motor drive
- > **Control units of drives PD-14 and PD-11**
 - ◇ BU (UKHL1) Control units of motor drives
- > **Manual drives**
 - ◇ PRG-6 (UKHL1) Manual drive
 - ◇ PRG-5 (UKHL1) Manual drive
 - ◇ PRG-5B (UKHL1) Manual drive of unit type
 - ◇ PR-3, PCH-50M (U3) Manual drives
 - ◇ PR-4 (UKHL3) Manual drives
 - ◇ PR11 (U1, U3) Distribution cabinets
- > **Spring drives**
 - ◇ PPrM (UKHL1) Spring-mechanical drive
 - ◇ PP-16M (UKHL2) Spring drive

Low-voltage complete devices (NKU)

- > **SOPT – operating DC voltage system**
- > **SHZNU – Outdoor cubicle of clamps**
- > **Auxiliaries board**

Low-voltage equipment, circuit-breakers – disconnectors for 380W

- > **Distribution cabinets:**
 - ◇ PR11M1-XXXX-21U3
 - ◇ PR11M1-XXXX-54U1
- > **Circuit-breakers – indoor disconnectors:**
 - ◇ VRR-(35, 37, 39)-XXXX-00UKHL3
 - ◇ VRP-37-3120X-00UKHL3
- > **Fuse-circuit-breakers-disconnectors:**
 - ◇ PVR-(1,3)-0,38/XXXU1
- > **Electromagnet blocking:**
 - ◇ 3B-1M(U,T)KHL(1,2)
 - ◇ KE3-1M(U,T)KHL2
 - ◇ KM-1(U,T)KHL2

Steel works (supporting, portal, railing, towers and etc.)

Disconnectors of previous generation

- > **Disconnectors of RDZ for 35-110kV**

Equipment for repair

- > **Separators of type OD-110**
- > **Short-circuiting switch of type KZ-110**

TEST CENTER

CJSC "ZETO" test center is one of the biggest test centers in Russia and represents a strong test base allowing performing tests on high-voltage equipment not only of in-house manufacture but also from other Russian enterprises.

The test center includes five laboratories specializing in performing the following tests:

- ◇ high-voltage;
- ◇ heat;
- ◇ mechanical;
- ◇ climatic;
- ◇ tests on protective devices.

All tests can be classified in the following way:

- ◇ prototypes investigation tests;
- ◇ qualification tests – tests on specimens of new technology before placing to serial production;
- ◇ periodic tests – tests on series-produced high-voltage equipment with the purpose to confirm technology stability and quality of manufactured products.





CJSC "ZETO" test center has been certified by the Federal Agency on Technical Regulation and Metrology for its technical expertise. It has been confirmed by an accreditation certificate and grants given for the right to perform certification tests of high-voltage equipment and gives evidence of technological infrastructure and high quality of the staff.

The company cooperate with the leading Russian and foreign test centers and laboratories such as: Federal State Unitary Enterprise "All-Russian Electrotechnical Institute", OJSC "Research and development center of FGC UES" (Moscow), "Research and Development Institute for Producing High-voltage Devices" (Saint Petersburg), "KEMA" (the Netherlands), "CESI" (Italy). CJSC "ZETO" is taking part in the project execution "Federal test center", the construction of which is being conducted outside of Saint Petersburg.

Successful test performance, including abroad tests, confirms a high reliability and competitiveness of high-voltage equipment developed and manufactured at CJSC "ZETO".

Overqualified and highly experienced personnel are of considerable importance in the successful operation of the test center. More than fifty test operators, electricians and engineers work in the laboratories. Thanks to the cooperation with the leading sectoral research institutes the specialists of CJSC "ZETO" test center are constantly increasing their competence level in different educational institutions throughout Russia.

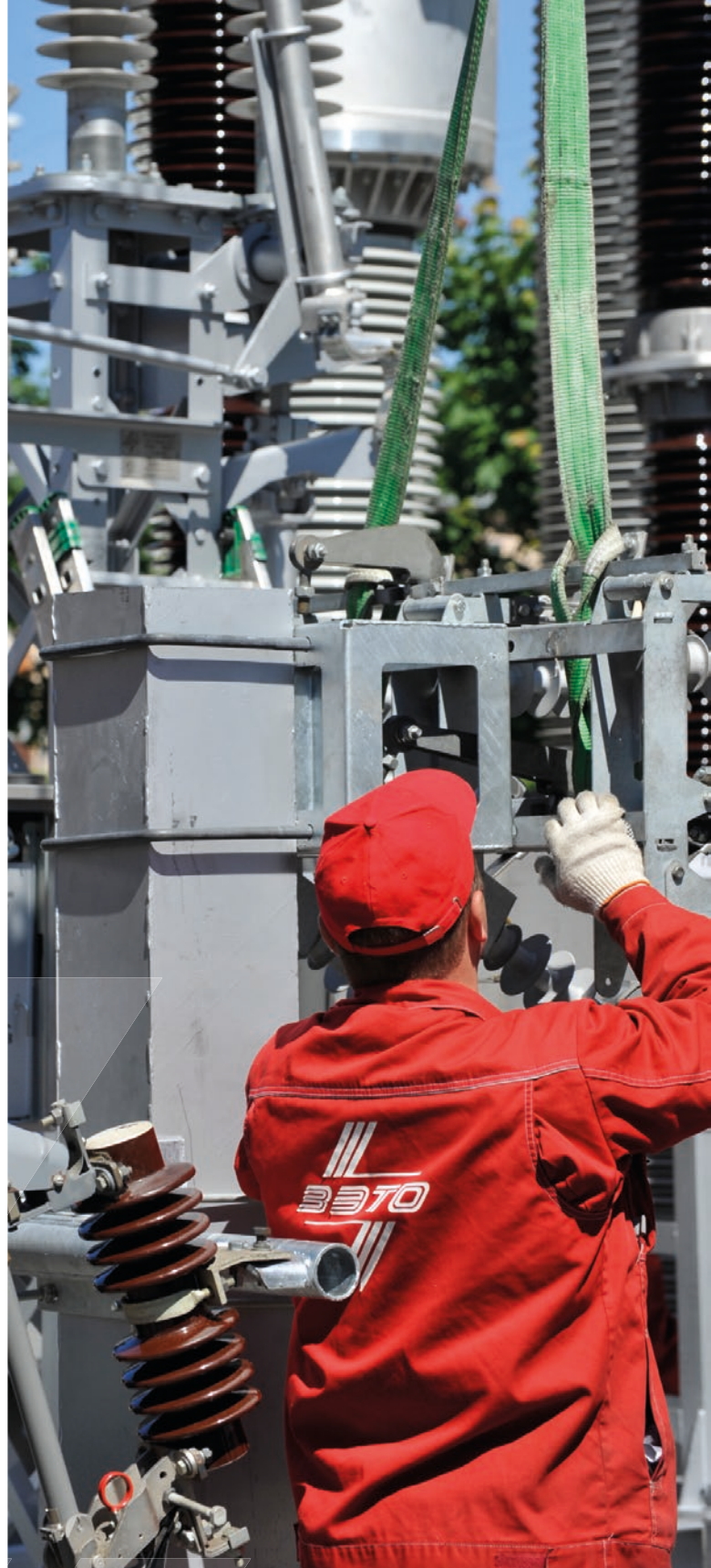
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SUPERVISION

In order to increase customer satisfaction CJSC "ZETO" performs a supervision services to its clients. Construction and mounting organizations – LLC "ZETO-SMP of the North-West" (Saint-Petersburg) and LLC "ZETO-SMP" (the Volga region, Kazan) – were established to perform the full range of works. These organizations have wide experience of constructing different power objects.

Our Supervision service is ready to provide a complementary service package in order to carry out after-warranty maintenance of CJSC "ZETO" equipment. There are special programs to train specialists of installation companies to install and adjust the equipment of our manufacture. A special attention is paid to the enhancement of engineers and supervision engineers' skill level since correctly made installation determines 80% of reliability and life cycle of implemented equipment.



AFTER-WARRANTY SERVICE

Post-warranty maintenance of the equipment provided by CJSC "ZETO" implies the replacement of failed components and assemblies at the initiative of a customer as well as a routine maintenance and equipment adjustment.



HOT-DIP GALVANIZING

In 2010 a new high-efficiency environmentally safe hot dip galvanizing line for metal structures was put into operation. It is based on the "Hasco" equipment (the United Kingdom) and technology of the federal state unitary enterprise "Central research institute of iron industry named after I.P. Bardin". A horizontal bathtub with 6,5x1,2x3 m sizes allows galvanizing a full range of metal structures. The practice of hot dip galvanizing at CJSC "ZETO" covers more than 40 years and presently coating quality conforms to the most severe anticorrosion protection requirements. Hot-dip galvanizing is the best method of steelwork protection against corrosion among all known methods.

Protective coatings considerably extend service life of the equipment. Relatively small expenses for applying coating allow making savings for purchasing a new construction, which would be inevitable, if there is no anticorrosion protection. According to the experience hot dip galvanized steel can be used for up to 50 years without visible corrosive damages and the renewal of zinc coating.

The combination of high economic efficiency and enhancing reliability of the constructions puts this protection method of hot-dip galvanizing on a leading position in many countries worldwide.

Hot dip galvanizing is a reliable, high-efficiency protection method against atmospheric, water and soil corrosion. It has given a good account of itself in building and power engineering, transport infrastructure and chemical industry, rural and urban economy.

CJSC "ZETO" offers services to hot-dip galvanizing of different metal structures, pipes, meshes and other items with the length of up to 6 meters. The manufacturing of metal structures according to a customer's drawings of any complexity with the further hot zinc coating can also be made at the plant.

PROJECTS OF XXI CENTURY



**SS 750/500/220/110kV
"Gribovo" MPN of Center**

Disconnectors horizontal-side-break type for 220kV, disconnectors of pantograph type for 500kV, rigid busbar for 220 and 500kV.



Kirovskaya TPP-3

SF6 column circuit-breakers, SF6 current transformers, outdoor disconnectors, surge arresters with polymer indoor isolation.



**SS "Igora" 110kV OJSC
"Lenenergo"**

Block-modular outdoor switchgear for 110 kV, SF6 circuit-breakers, SF6 current transformers, rigid busbar, disconnectors of horizontal-side-break type.



**SS "Shchelkovo" 500/220/110kV
OJSC "Grid company"**

Rigid bus bar for 500 and 220kV, disconnectors of pantograph type for 500kV, disconnectors of horizontal-side-break type for 220kV, compact module for 110kV, SF6 circuit-breakers and current transformers, support and constructional steelwork, portals, floodlight towers and others.



TSS "Novolisino"

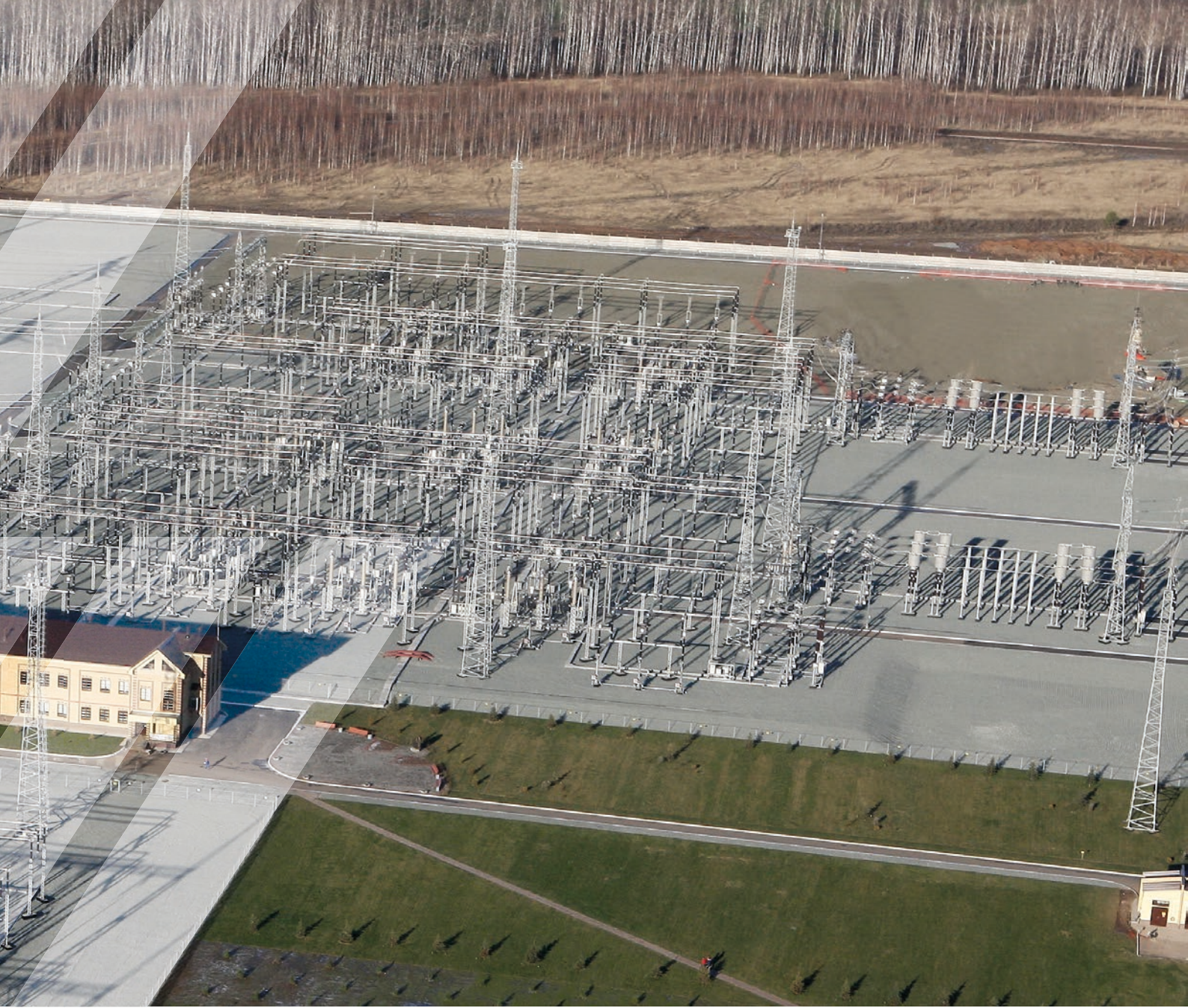
Compact module outdoor switchgear (KM ORU)



SS "Tsentralnaya" 200/100/10 kV

Compact module outdoor switchgear (KM ORU), rigid bus bar, SF6 column circuit-breakers, SF6 current transformers.







JSC "FGC UES"

- ◇ MPN of Volga: SS "Krasnoarmeyskaya" 500/220 kV, SS "Penza-1" 220/110kV
- ◇ MPN of East: SS "Lozovaya" 500kV, SS "Elgaugol'" 220/110kV, SS MSDS of Amursk for 110kV
- ◇ MPN of Western Siberia: SS "Muravlenkovskaya" 500/220/110kV
- ◇ MPN of North-West: SS "Vostochnaya" 330kV, SS "Parnas" 330kV, SS "Shangaly" 220/110 kV
- ◇ MPN of Siberia: SS "Tataurovo" 220/110, SS "Chara" 220kV, SS "Chesnokovskaya" 220/110kV
- ◇ MPN of Ural: SS "Trachukovskaya" 500/220kV, SS "Shagol" 500/220
- ◇ MPN of Center: SS "Gribovo" 750/500/220/110kV, SS "Dorohovo" 500/220/110kV, SS "Belgorod" 330/110kV, SS "Oka" 220/110kV, SS 220/110
- ◇ MPN of South: SS "Kubanskaya" 500/220kV, SS "Tikhoretsk-Krimskaya" 500/220/110kV, SS "Nevinnomisk" 500/330/220kV, SS "Budenovsk" 330/110kV, SS "NPS-8" for 220kV, SS "Dagomis" 220/110kV.

Inter-Regional Grid Company

- ◇ SS "Vorsha"110kV JSC IRGC "Center" – "Vladimirenergo" branch
- ◇ SS "Usman'-2" 35kV (Raduga) JSC IRGC "Center" – "Voronezhenergo" branch
- ◇ SS "Kommunalnaya" 110kV, SS "Tomashev Kolok" 110kV JSC IRGC of Volga – "Orenburgenergo"
- ◇ SS "Velikoretskaya" 110kV, SS "Mogolino" 110kV, JSC IRGC of "North-West" – "Pskovenergo" branch
- ◇ SS "Mikun'" 110kV JSC IRGC "North-West"- "Komienenergo" branch
- ◇ SS "Sheregesh-1" JSC "IRGC of Siberia"
- ◇ SS "Ozhogino" 110kV JSC "IRGC of Ural" - Tyumenenergo
- ◇ SS "Pushkarskaya" 35kV, JSC "IRGC of Center" - Orelenergo branch
- ◇ SS "Tambovskaya 5" 110kV, JSC "IRGC of Center" – Tambovenergo branch

Russian Railways

- ◇ TS "Gatchina" 110kV, TS "Lyaypesou" 110kV, TS "Novolisino", TSS "Losevo-Kamenogorsk" (TS 12 km, 29km, 46km) – Oktyabrskaya railway.
- ◇ TSS "Kazan'-Airport" 110kV – Gorkovskaya railway.
- ◇ SS "Ayachi" 35kV – Zabaikalskaya railway.
- ◇ Far Eastern railway, North railway, North Caucasian railway, Sverdlovskaya railway, Privolzhskaya railway, South-Ural railway, South-Eastern railway.

Generations

- ◇ SS "Angara" 500/220kV, JSC "Rusgidro"



- ◇ Cascade Serebryanskih HEP, TGC-1
- ◇ Novgorodskaya TPP, TGC-2
- ◇ Dyagilevskaya TPP, TGC-4
- ◇ Cherepovetskaya SDPS, WGC-6
- ◇ Tsimlyanskaya HEP, TGC-8
- ◇ Nizhneturinskaya SDPS, TGC-9
- ◇ Chelyabinskaya SDPS, JSC "Fortum" – TGC-10
- ◇ TPP-11, TPP-12, TPP-21, TPP-26, JSC "Mosenergo"
- ◇ Iriklinskaya SDPS, THC-1
- ◇ Serovskaya SDPS, Stavropol'skaya SDPS, Troitskaya SDPS, TGC-2
- ◇ Goosinozerskaya SDPS, TGC-3
- ◇ Surgutskaya SDPS, TGC-4
- ◇ Nevnomisskaya SDPS, JSC "Enel Russia" TGC-5
- ◇ Kaliningradskaya TPP-2, JSC "Inter RW Power generation"

Concern "Rosenergoatom"

- ◇ Balakovskaya NPP, Bilibinskaya NPP, Volgodonskaya NPP, Kalininskaya NPP, Kurskaya NPP, Kurskaya NPP-2, Leningradskaya NPP, Novovoronezhskaya NPP.

Foreign NPP

- ◇ NPP "Busher" – Iran, Belarusian NPP (Belarus), Khmel'nitskaya NPP, Zaporozhskaya NPP (Ukraine)

Oil

- ◇ JSC "Tatneft", Komsomolskiy Oil refinery (ORF), Novokuybishevskiy ORF, Sizranskiy ORF, SS "Rostashinskaya", "Orenburgneft"
- ◇ "Slavneft-Megionneftegaz" JSC "OGC Slavneft"
- ◇ OPS "Novozibkov", OPS 11, OPS-15, OPS-19, OPS-20 ESPO JSC "Transneft"; SS "Rassvet" JSC "Surgutneftegaz".

SEZ (Special Economic Zone)

- ◇ SS "Alabuga" 110kV, SS "Innopolis" 110kV – Republic of Tatarstan, SS "SEZ Moglino" Pskov Region.

Industry

- ◇ GK "SamarSKIY Electroshield", MSDS-1 "Minery named Matrosov"; MSDS-6, MSDS-15 Stoilenskiy MPCW; MSDS-1, MSDS-2 Mihailovskiy MPCW; Lebedinskiy MPCW, JSC "Severstal", JSC "MMC Norilsk Nickel".



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CJSC Electrotechnical Equipment Plant

79, Oktyabrsky Avenue, Velikie Luki Town, Pskov
Region, 182113 Russia;

Phone: +7 (81153) 6 37 32, 6 37 73;

Fax: +7 (81153) 6 38 45;

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