



Closed Joint-Stock Company

URALTECHENERGO

Engineering Company



Process Control System Engineering

Start-up and set-up operations
Equipment tests
Energy survey
Engineering

About us

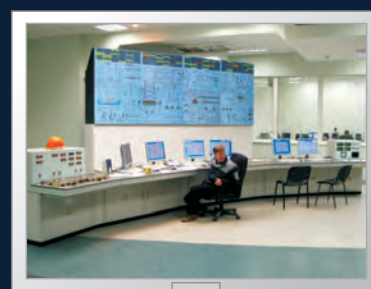
The Uraltechenego Engineering Company, CJSC (Uraltechenego EC) was founded in 2002 as a provider of engineering services on the energy market of Russia and neighboring countries. The company has gained vast hands-on experience in upgrading equipment of electric power plants and in commissioning innovative combined cycle gas turbine (CCGT) plants.

Core activities of the Company:

- ▲ designing and launching of leading-edge process control systems (PCS) for thermal plants;
- ▲ start-up and set-up operations, performance and commissioning work on thermal and mechanical equipment, electrical equipment;
- ▲ functional performance (thermal) tests of boilers and turbine generator units;
- ▲ energy surveys (energy audit) of energy providers (combined heat and power plants, state district power plants, boiler houses) and industrial enterprises in different sectors;
- ▲ description of energy characteristics of equipment and preparation of regulatory technical documentation on fuel use for electric power plants and boiler houses;
- ▲ development and deployment of software for information and computational tasks;
- ▲ other engineering services.

Our professionals possess unique skills in the latest energy-related technologies, highest extent of responsibility, ability to find optimum solutions to the most challenging problems.

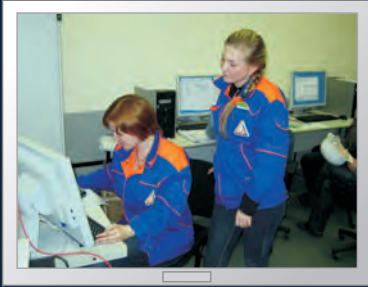
Our reputation is the best guarantee of the quality of our services.





Our team members

Human resources are the key factor for growth and success of any company. The backbone of the team of the Uraltechenergo Engineering Company is made up by high-caliber professionals – graduates of the Ural State Technical University (at present, the Ural Federal University) named after the first President of Russia N.N. Yeltsin, Ural State University, Moscow Power Engineering Institute and other famous universities; they amassed professional experience while working for the largest design and setting-up companies such as Soyuztekhnenergo, ORGRES, Teploelektroproekt (UralTEP), VNIPInergoprom (UralVNIPInergoprom), and at large electric power plants that are presently members of different wholesale generating companies and territorial generating companies operating in Russia.



Today, the working team of the Uraltechenergo Engineering Company is represented by a unique fusion of highly skilled engineers of different schools of Soviet and Russian power engineering. Many employees who are presently working at the Uraltechenergo Engineering Company took part in construction of the largest projects of the power industry, among them: Troitskaya GRES (SDPP), Reftinskaya GRES (SDPP), Surgutskaya GRES-1 (SDPP-1) and GRES-2 (SDPP-2), Permskaya GRES (SDPP), Nizhneartovskaya GRES (SDPP) and other electric power plants not only in the Soviet Union and Russia, but also in China, Iran, Cuba, Syria, Bulgaria, Yugoslavia, Greece, and Finland.



The Company employees are experts in different fields of power engineering: PCS engineers, instrumentation and controls engineers, turbine, boiler and electrical equipment engineers, design engineers, chemical engineers, etc. Due to the experience and knowledge of our employees, we can offer the entire range of engineering services for the power industry.



The Uraltechenergo Engineering Company has a long-term cooperation with the leading Russian universities and institutes. Our top managers and experts read lectures, advise on diploma projects, take part in the work of state certification commissions; some of them have graduate degrees. The team of the Uraltechenergo Engineering Company is steadily growing, welcoming graduates of different universities and institutes.



Full-scope process control systems for five 800 MW power units at Surgutskaya GRES-2 (SDPP-2), the world's largest thermal power plant, have a prominent place in the track record of the Uraltechenergo Engineering Company. The Company employees participated in start-up and set-up operations of Russia's first combined cycle gas turbine plants, in energy surveys of major enterprises operating in different sectors of industry, and in other significant projects.



At present, the Company is taking part both in upgrading of electric power plant equipment and in commissioning of new combined cycle power units.

We look to the future of our company and Russian power industry with optimism and confidence.

Services

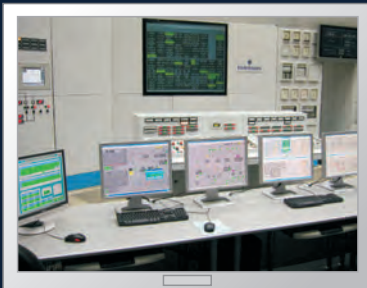
The Uraltechenergo Engineering Company focuses its competencies on the following types of work required during upgrading and new construction of power generating facilities, first of all, thermal power plants:

- ▲ designing and launching of leading-edge process control systems (PCS) for thermal power plants;
- ▲ start-up and set-up operations, performance and commissioning work on thermal and mechanical equipment, electrical equipment;
- ▲ functional performance (thermal) tests of boilers and turbine generator units;
- ▲ energy surveys (energy audit) of energy providers (combined heat and power plants, state district power plants, boiler houses) and industrial enterprises in different sectors;
- ▲ design of energy characteristics of equipment and preparation of regulatory technical documentation on fuel use for electric power plants and boiler houses;
- ▲ software design for information and computational tasks;
- ▲ engineering services.

Most of the services provided by the Uraltechenergo Engineering Company involve challenging tasks and are characterized by a high impact on performance reliability and efficiency of power generating equipment. The Company's activities are intertwined, complementing each other seamlessly. The efficient operation of the automated process control system is almost impossible without proper performance and commissioning work on the process equipment. Equally, process flow diagrams cannot be prepared without a smooth-running automatic control subsystem and without stable operation parameters set for the main equipment. Testing of boilers and turbine generator units, conducting of energy surveys (energy audit) of an industrial enterprise, deployment of specialized software for accomplishing information and computational tasks – all these types of services are aimed at high reliability, longevity and efficient performance of process equipment of enterprises operating in the power industry.

The reference list of the Uraltechenergo Engineering Company does not include general contracting services or services offered by EPC contractors. Most of the work in the core business areas of the Company is completed through our own resources; we engage subcontractors only in highly specialized operations. If the Customer is interested in general contracting services when planning large-scale revamping or construction of a new power generating unit, we will be happy to refer the Customer to our partners who meet the strictest performance requirements and quality criteria.





PCS-related services

One of the core competencies of the Uraltechenergo Engineering Company is designing cutting-edge process control systems (PCS) for electric power plants.

Over the last few years, we have deployed full-featured PCS in power generating units with the total electric output equal to more than 5,500 MW. At the moment, our design and setting engineers are working on a few PCS projects for power generating units at combined cycle gas turbine (CCGT) plants with the electric output totaling more than 1,100 MW.

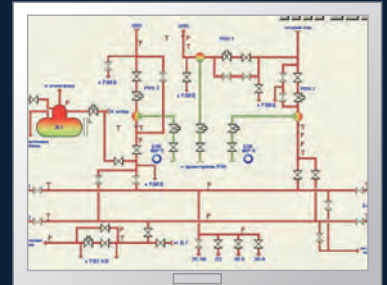
The engineers of the Uraltechenergo Engineering Company boast successful experience in designing full-featured PCS based on software and hardware from different manufacturers: Emerson, LLC (Ovation, DeltaV), Siemens (TelepermME, Simatic), ABB (800 xA), PIK Progress CJSC (Kosmotronika-Venets). PIK Progress CJSC and Emerson LLC are our strategic partners we can always rely on, having worked with them in many projects. Yet, if the Customer has its own preferences, we are open for cooperation with the manufacturer of any state-of-the-art software and hardware. The Uraltechenergo Engineering Company can offer its prospective Customer different options of organizational and contracting patterns of cooperation with software and hardware suppliers.

Key areas and activities of the Company in designing and deploying of process control systems:

1. Designing full-featured PCS for newly constructed or renovated electric power plants (power generating sources) and other industrial facilities:
 - ▲ survey of the facility intended for automation;
 - ▲ preparing an automation concept and Technical Specifications for PCS;
 - ▲ selection of the integrated software and hardware for PCS;
 - ▲ preparing of the front-end and detailed PCS design, including equipment arrangement and layouts, architectural and building drawings, installation drawings for instrumentation, controls and secondary control wiring, cable logs, specifications for equipment and materials for the entire project, cost estimates, consolidated cost estimates;
 - ▲ designing of algorithms, including videograms, algorithms for process protection and interlocks, automatic transfer switches, automatic regulators, alarm system, sequences, information and computational tasks;
 - ▲ preparing a project of the integrated software and hardware complex;
 - ▲ factory testing and supply of software and hardware;
 - ▲ training of the personnel;
 - ▲ construction and electric installation works (through subcontractors);
 - ▲ start-up and set-up operations, including “cold” adjustment

operations, unit-wise test run, comprehensive testing and reliability run, commissioning for pilot operation, performance and commissioning work;

- ▲ acceptance-and-delivery tests and commissioning of the automated process control system for commercial operation;
 - ▲ warranty and post-warranty service support.
2. Designing (revamping) of process control systems for local branching points or for accomplishing of specific tasks for operating electric power plants and industrial facilities (boilers, water treatment facilities, process protection functions, burner automation, automatic control functions, etc.).
 3. Completion of the entire scope of works to bring boiler control systems in compliance with the Safety Regulations applicable to gas facilities, including:
 - ▲ design development;
 - ▲ selection of equipment;
 - ▲ selection of automation devices;
 - ▲ installation, set-up operations and deployment.
 4. Completion of the scope of works aimed at deployment of frequency and power automatic control systems in the Unified Energy System of Russia in compliance with the requirements set by the Standard of the UES System Operator – Central Dispatch Department, OJSC – STO 59012820.27.100.002-2005 (UES SO-SDD 001-2005, IDN) – Standard Requirements for Participation of TPP Power Generating Units in the Standardized Primary and Automatic Secondary Frequency Control.
 5. Designing of control system electrics for steam turbines.
 6. Completion of design, installation and set-up work relating to:
 - ▲ control systems for boiler burner firing;
 - ▲ monitoring of the boiler burner flame;
 - ▲ variable frequency electric drive.
 7. Deployment of systems of information and computational tasks both for operation within control systems and for autonomous operation (workstation software and hardware).
 8. Developing of automated end-to-end design systems using the integrated database.
 9. Training of the personnel in control systems.
 10. Designing of computer simulators for training of the personnel of electric power plants.





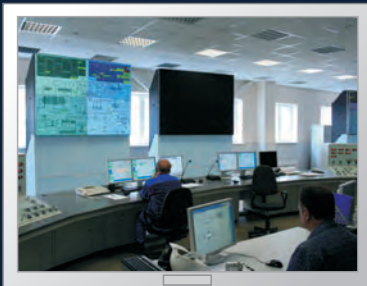
Ground rules in PCS design development

1. Designing of PCS means moving to a fundamentally new level of industrial process automation.

Undoubtedly, application of digital automation systems as compared to traditional relay systems boast a vast number of advantages, among them: high reliability, detailed equipment and process-related information received by the operator in a user-friendly format, unification of technical devices, etc.

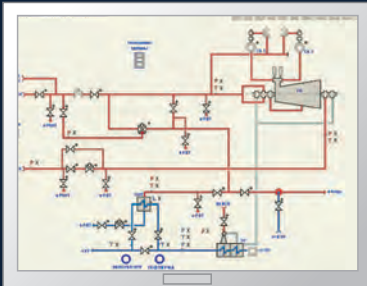


However, without a high level of automation (variable-speed governors, controllable interlocks, sequences, programming devices, etc.), while enjoying the above advantages, the operating personnel may encounter annoying downsides. The remote control of actuators with the help of the mouse can be too novel and difficult to get used to even for experienced operators in comparison with the traditional switches on control panels. Therefore, both the remote control and the participation of the operator, especially in challenging situations requiring prompt decisions, should be kept to a minimum and replaced by automatic controls.



2. Application of state-of-the-art and reliable software and hardware in automation.

The backbone of PCS is a software and hardware complex. Performance characteristics of the software and hardware complex as well as the level of its service functions have a direct impact on the reliability of the entire system. The Uraltecheno Engineering Company has a vast experience in designing of process control systems based on software and hardware from the world's leading manufacturers. We are knowledgeable and well-informed about characteristics of the present-day software and hardware. In cooperation with the Customer, we can choose the software and hardware complex that will be optimum for the particular facility.



Furthermore, our Company is a co-designer of one of the best software and hardware complexes in Russia – Kosmotronika-Venets software and hardware complex (manufactured by PIK Progress, CJSC). Our knowledge and experience give us an edge when we work with other complexes: We are able to help our partners-manufacturers of software and hardware in setting tasks for upgrading characteristics of their products.



3. High quality of services.

Quality of our work is our priority. Algorithms and videograms, which we design for automated process control systems, go through multistage testing. In most cases, prior to on-site set-up and adjustment operations, algorithms are tested on debugging stands, with the help of mathematical models of power generating units or individual assembly components.



The algorithms are further checked during software and hardware acceptance tests conducted by the manufacturer; during cold/no load adjustment operations at the facility, during the unit-wise test run of the process equipment when PCS is checked through pre-

commissioning tests for pilot operation and during performance and commissioning work when PCS is put into commercial operation.

4. Well-organized cooperation with the allied participants of the project.

However, even application of a reliable and advanced software and hardware complex does not guarantee that PCS will be reliable and efficient, and will meet the latest requirements.

If there are problems interfering with cooperation and coordinated efforts of the general contractor, designer, software and hardware supplier, suppliers of local automations systems, Customer and PCS designer, they will, most likely, generate further problems in the new PCS.

For each project, prior to the commencement of the work, we prepare Guidelines for Cooperation of the Project Participant; the guidelines are reviewed and approved by the Customer, and describe in detail all the stages of work, documents mandatory for exchange between the parties at each of the stages, status of each document (for the further approval or for information), boundaries of responsibility, etc.

Due to our own design department, extensive experience in successful designing of full-featured process control systems, we are able to organize PCS designing and deployment operations of any level of difficulty.

5. Maximum information availability to the Customer.

We see it as important that Customers should understand the process of the planned work and should know who they can communicate with to be informed about the progress of work. The Uraltechenargo Engineering Company has an assigned technical supervisor for each project, and these supervisors are responsible for liaison with Customers who can obtain any relevant information and solve problems connected with the work. Besides, the Customers' engineers can always have advice from any member of the project team.

We do not burden Customers with the work our Company must do under the contract. We do not push off our responsibility onto Customers: We are totally responsible for the decisions we take, acting as contractors and service providers. On the other hand, we do not obey unquestionably the instruction of the Customer. If any proposal looks doubtful, it will be discussed in detail, and alternative solutions, which we see as more efficient, will be offered.

Customers' expectations before the work and their satisfaction with the results are of paramount importance for us.

6. Highly responsible attitude towards training of the Customer's personnel.

When control systems are revamped at operating electric power plants or when process control systems are launched at new facilities, the operating personnel of the Customer may encounter problems during the start-up of the equipment and during first month of operation, without proper training. The deployment of new PCS means new technology and new methods that have replaced the





traditional process control systems, methods and even process equipment, while the personnel have not developed the required skills.

Preliminary training in the form of classroom and hands-on courses can be very helpful in solving the problem. The classes on mastering practical skills can be offered on debugging stands; however, the best option is using simulators imitating the process equipment and its characteristics. The control system of the simulator is absolutely identical to the actual PCS.



The Uraltechenergo Engineering Company has a successful experience in designing simulators for training of the Customer's personnel.

7. Shortest timeframe for set-up operations at the facility due to the full-featured stand-based debugging and adjustment of algorithms with the help of mathematical models of the process equipment.



The APCS set-up stage crowns the design process. Frequently, due to The PCS set-up stage crowns the design process. Frequently, due to different factors and circumstances (rescheduling of the design work, delays in delivery of equipment and materials, etc.) the schedule for the start-up and set-up operations is very tight.

The professional organization of PCS design work at the Uraltechenergo Engineering Company helps to alleviate the problem. Prior to the set-up operations, all the algorithms are checked through multistage tests on the debugging stand (with the help of mathematical models of the process equipment).



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