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**SINCE 1997**



**PROFENERGO GROUP**

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# PROFENERGO GROUP

## ● ● ● INTRODUCTION

PROFENERGO Group has been operating in the power industry market since 1997. Started as a supplier of equipment and machinery for Russian power industry companies, PROFENERGO Group has now been transformed into a modern engineering company using cutting-edge technologies. For 15 years PROFENERGO group has been implementing different complex projects for fuel-energy industry in Russia and CIS.

## ● ● ● Key activities

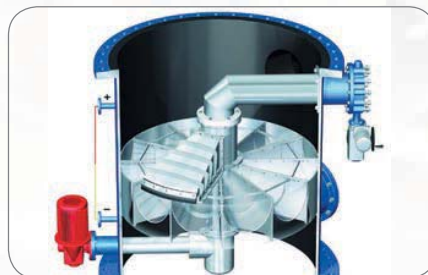
PROFENERGO provides the variety of engineering services for the fuel-energy industry enterprises:

- CONSTRUCTION AND MODERNIZATION OF INDUSTRIAL WATER CIRCULATION AND WATER TREATMENT SYSTEMS
- IMPLEMENTATION OF POWER AND RESOURCE-SAVING TECHNOLOGIES
- SUPPLY OF ELECTROTECHNICAL AND HEAT ENGINEERING EQUIPMENT
- EPC PROJECT MANAGEMENT
- ENGINEERING INNOVATIONS COMMERCIALIZATION



## ●●● Main Services and Solutions

- General contractor services for complex engineering projects in nuclear and thermal power industry.
- Engineering design, construction, equipment installation, starting-up and adjustment works for nuclear and thermal power plants.
- Construction and manufacturing of non-standard hydrotechnical, capacitive, heat-exchange and filtration equipment.
- Supply of electrotechnical and heat engineering equipment.
- Design of engineering networks, supply of glass-fiber plastic pipes, network pipes assembly, relining of operating water pipes of large diameters.
- Management of ecological projects and implementation of energy and resource-saving technologies for infrastructural objects



## ●●● PROFENERGO Development milestones

**1997–2001** // A group of Moscow Institute of Physics and Technology (MIPT) graduates established a company, which operated as a supplier of technological equipment and materials for the fuel-energy enterprises. RAO UES Russia, Gazprom JSC, Rosenergoatom Concern OJSC were among the major customers.

**2002–2004** // First engineering contracts were concluded within modernization programs of the enterprises of thermal power industry and power supply companies, including equipment assembling and producing of non-standard metal constructions.

**2005–2008** // The Group completely focused on providing turnkey engineering services, rising complexity and volume of work. In 2005 all companies of the Group started working under the PROFENERGO brand.

**2009–2012** // Permissions on project design and construction of engineering systems for the high risk objects had been obtained. The Ukrainian office had been opened.

## Our Mission:

To develop and to implement the most effective technological, organizational and financial solutions for construction and modernization of power and water systems of industrial objects and power plants.

## PROFENERGO Group is the reliable partner with:

- Its own engineering, technical, and construction departments
- Many years cooperation experience with the leading enterprises of power industry market and machinery building complex (including joint ventures). This guarantees high quality of equipment and in time delivery
- Set of permissions and licenses allowing to provide the whole complex of services, such as inspection of industrial objects, project design, construction, manufacturing of equipment, assembly, installation and adjustment works on high risks industrial objects (including nuclear and thermal power plants)
- Effective project management system



Power industry is a highly developed and financially stable sector of Russian economy. Apart from numerous programs of modernization and retrofitting of morally worn-out and depreciated equipment and machinery, a large number of new power construction and developments is going on in Russia. According to the federal campaigns and investment programs of power generating enterprises it is planned to start operation of 15 nuclear power plants units and 120 thermal power plants units by 2020.

Our Group has been operating in Russian power industry market for more than 15 years, actively participating in construction of new power industry objects.



## ENGINEERING

### ● ● ● Audit. Feasibility study. Design

Having a great team of highly skilled engineers and strong connections with the major designing institutes, energy and machinery building enterprises, PROFENERGO Group provides the following services:

- Energy and water consumption audit
- Technological expertise of project design
- Development of complex modernization plans regarding customer efficiency specifications (including minimization of outages, operation costs reduction, lifecycle prolongation)
- Feasibility study and technical specifications development
- Project design and working project documentation



### ● ● ● Construction, manufacturing and supply of technological equipment

PROFENERGO Group uses a variety of cooperation forms with original equipment manufacturers: from the direct distribution up to the equity holding and joint ventures. This allows to guarantee the quality of production, to shorten the delivery time, to minimize supply costs as well as to:

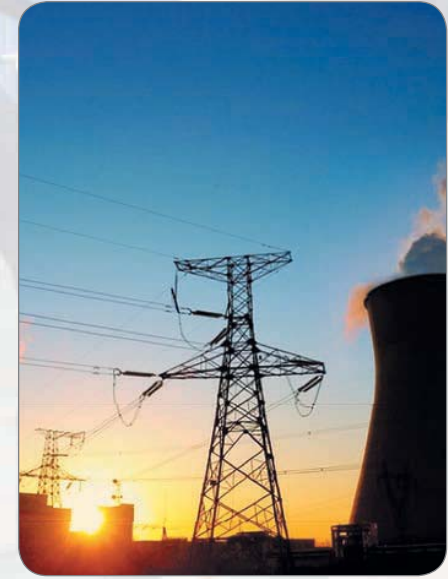
- Manufacture non-standard hydromechanical and heat engineering technical equipment
- Manufacture and supply of water treatment systems and waste water filtration systems

- Supply of high-voltage electrotechnical and heat equipment of the leading manufacturers
- Monitor and control placed orders status
- Carry out Russian state regulations tests (GOST and TU) as well as specific customer requirements tests
- Get best transportation conditions to the customer site
- Integrate imported equipment into existing technological systems

## Construction, Installation, Adjustment and Maintenance services

Having a great experience in construction, installation, and adjustment works (including those on high risk objects) PROFENERGO Group professionally executes the functions and tasks of a general contractor and provides:

- Thorough selection and control of the subcontractors for construction and assembly works
- Installation supervision, starting-up and adjustment works by PROFENERGO on-site mounting divisions
- Project risk management and control
- Construction schedule integration
- Strong adherence to the project deadlines
- Maintenance and training of the customers staff



## As a general contractor for complex engineering projects in power industry we offer to our partners:

- Introduction and promotion of the equipment in Russian power industry market
- Certification of the equipment in Russia
- Business plans assessment and expertise considering the conditions of Russia's and CIS's power industry market
- Promotion of partners technological solutions at the stages of project design and technical planning
- Organizational support for imported technological equipment (logistics, customs procedures, documentation)
- Promotion of energy-saving technological solutions for large power consumers
- Promotion of alternative power projects
- Promotion of ecological load reduction projects



# INVESTMENTS TO INNOVATIONS

## ● ● ● Infrastructural Projects

PROFENERGO Group is actively involved in participating in innovational projects in infrastructure keeping its focus on attracting investments and using energy and resource-saving technologies. In particular these projects are currently being developed:

- Autonomous water supply stations for the large industry objects, settlements and power plants (on reagentless water treatment and energy saving technologies basis)
- Industry heat pumps which significantly allow to save energy on power industry enterprises
- Installation of plasma thermal waste utilization systems with simultaneous power and heat cogeneration
- Dry ash removal system for the coal-fired heat power plants





### Hydrotechnical constructions

Having a great experienced in project design, construction and maintenance support of hydrotechnical constructions for nuclear and thermal power plants PROFENERGO Group implements the following projects:

- Dams and water catchment constructions Reservoir dredging for coolers and canals
- Coast protection constructions
- Holes with performance from 20m<sup>3</sup> per min.
- Frazil ice protection
- Inverted siphon and intake bucket
- Pipelines bridge crossing

### Water intake chambers and pump stations

PROFENERGO GROUP specializes on project design and turnkey construction of the Coast Pump Stations with different output, including supply and assembling of the following equipment:

- Fish protection systems
- Water cleaning machines and self-cleaning filtration systems
- Water gates and trashracks
- Grating cleaning machines
- Pumps
- Pumps performance control systems (The frequency-controlled drive, hydraulic clutches, automatic control system)
- Energetic equipment and peripherals
- Deep water intake





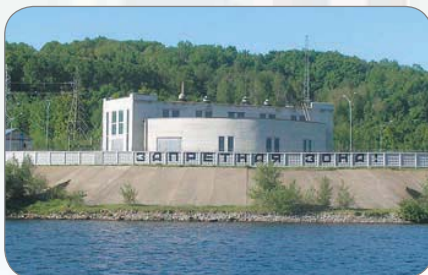
## Water treatment and water purification

One of the PROFENERGO Group priorities is the complex retrofitting of chemical water treatment workshop using water treatment membrane technologies adoption. This provides production of highly distilled water by reagentless (ecologically pure) methods including:

- Micro-, ultra- and nanofiltration
- Reverse osmosis and uninterrupted water electro deionization

Moreover, the PROFENERGO Group develops and uses standard technologies of water treatment industry: reagent treatment, clarification filtration, ion-exchange (including UPCORE), coagulation, adsorption, decarbonization, washing and flotation. We manufacture and supply:

- Poured and ion exchange filters
- Self-cleaning mechanical filters of film cleaning
- Clarifier, aeration systems and weigh stations
- Capacity equipment



## Drainage and wastewater purification

Increasing ecological requirements for wastewater quality force the industrial enterprises management either to reconcile with imposed fines and penalties or to modernize drainage systems and adopt closed cycle water consumption systems. PROFENERGO Group completely solves this problem applying modern project solutions and materials. We construct and retrofit:

- Canalization systems
- Sewage treatment constructions for production, storm and oil containing wastewater, as well as special water purification for nuclear power plant
- Collecting reservoirs ( including aggressive environment)
- Hydrotechnical constructions for cooling water pipe bend

## ● ● ● Pipelines networks

Application of fiber glass and polymer pipelines not only sufficiently increases durability of pipelines, but decreases breakdown rate risk and reduces water transportation and purification costs. Being a distributor of leading manufacturers of synthetic pipes, PROFENERGO Group implements such projects as:

- Water pipelines construction and retrofitting (up to DN 4000)
- Designing and installation of engineering pipelines networks, including siphon wells and controlling armature
- Water conduit relining using the pipe-in-pipe technology (from DN 1400)





# ENERGY AND RESOURCE SAVING TECHNOLOGIES IMPLEMENTATION

## Heat exchange intensification

**Scale and sediment on the pipes surfaces sufficiently diminish heat exchange. This causes fuel and energy overspending. To escape forced periodical downtime in that type of situation we implement effective solutions such as:**

- Automatic ball cleaning systems of shell and tube heat exchangers
- Innovative heat exchange equipment
- Fine mechanical filters

In addition PROFENERGO Group implements retrofitting projects of chimney-type water-cooling towers. The use of patented solutions significantly improves cooling effectiveness in these cases.

## High capacity electric drive losses optimization

**Controlled electric drive is used as a way to control supercharger output (pumps, smoke exhauster, blow fans, compressors) by changing the shaft rotation speed. It is an alternative to the throttle way of control. PROFENERGO Group supplies:**

- Adjustable hydraulic clutches
- Adjustable hydraulic clutches with reduction gear
- Planetary gear VORECON
- Electrical control systems by Variable Speed Drive



## REFERENCES:

### INDUSTRY WATER CIRCULATION SYSTEMS

#### WATER INTAKES AND PUMP STATIONS

NIAEP JSC	Engineering documentation design, supply and assembly of hydro mechanical equipment to Unit 3, Unit 4, Kalininskaya NPP, Rostovskaya NPP, Russia
JSC Atomenergomash	Engineering documentation design and supply of hydromechanical equipment to Unit 2, Rostovskaya NPP, Units 1 and 2, Novovoronezhskaya NPP-2, Russia
JSC SPbAEP	Engineering documentation design and supply of hydromechanical equipment to Units 1 and 2, Leningradskaya NPP-2, Russia
Rosenergoatom Concern OJSC	Supply of hydromechanical equipment, Smolenskaya and Kurskaya NPP, Russia
Rosenergoatom Concern OJSC	Emergency circulation pumps upgrade, Leningradskaya NPP, Russia
WGC-1 JSC	Pumps supply, Kashirskaya GRES, Russia
WGC -2 JSC	Supply of hydromechanical equipment, Stavropolskaya GRES, Russia
WGC -3 JSC	Engineering documentation design and supply of hydromechanical equipment to Gusinoozerskaya GRES, Russia
WGC -4 JSC	Supply of hydromechanical equipment, Berezovskaya GRES, Russia
Enel OGK-5 JSC	Supply of hydromechanical equipment Konakovskaya GRES, Reftinskaya GRES, Russia
Enel OGK-5 JSC	Water intake constructions upgrade with supply, assembly and building works of hydromechanical constructions, Nevinnomisskaya GRES, Russia

#### PIPELINE SYSTEMS

SUGRES Enel JSC	Pipeline relining DN 1200
Rosenergoatom Concern OJSC	Pipeline relining using pipe-in-pipe technology, Leningradskaya NPP, Russia
NIAEP JSC	Project design and calculation of water feed pipes, Units 3 and 4, Rostovskaya NPP, Russia
Uzhnouralskaya NPP, Russia	Supply and assembly of circulation pipeline

#### WASTE WATER TREATMENT AND PURIFICATION

Enel OGK-5 JSC	Tank reconstruction of chemical water purification sector
Mosenergo JSC	Pumps and vessels supply for chemical water purification sector, HES-22
Rosenergoatom Concern OJSC	Project design, manufacture and supply of industry storm cleaning constructions
Rosenergoatom Concern OJSC	Project design, manufacture, supply and assembly of condenser tube cleaning system (modular desalination system) on a precoat ion-exchange filters basis

### ELECTROTECHNICAL SYSTEMS

Mosenergo JSC	Relay protection and automatization system modernization TG-1, HES-22
Moscow local electricity JSC	Construction and assembly works on cable routing transposition
Moscow local electricity JSC	Transformer substations reconstruction
Mosenergo JSC	Gas-insulated circuit breakers assembly 110 kV, 220 kV, HES-2, HES-21



## HEAT ENGINEERING SYSTEMS

### BALL CLEANING SYSTEM AND FILTRATION

TGK-9 JSC	Heat exchanger upgrade
"EuroChim" Moscow chemical factory	Turnkey implementation of ball cleaning system based on aircoolers, low nitric acid sector, NAK "Azot" JSC, Russia
WGC-6 JSC	Heat exchanger upgrade
Residential energy sector in Yaroslavskaia region	Turnkey implementation of ball cleaning system, region heating plant heat-exchangers, Tutaev town
WGC -1 JSC	Turnkey implementation of ball cleaning system TAPROGGE, Units 1,6,7, Iriklinskaya GRES, Russia
Enel OGC-5 JSC	Project design, supply, assembly and installation of ball cleaning system TAPROGGE, Reftinskaya GRES, Russia
E-4 Group JSC	supply, assembly and installation of ball cleaning system TAPROGGE, constructing Units 1,2,3, Nyaganskaya GRES
E-4 Group JSC	Ball cleaning system TAPROGGE supply, constructing combined-cycle power plant, Cherepovetskaya GRES
WGC -1 JSC	Project design, implied ball cleaning system replacement of GRES-24 (Russia) into TAPROGGE (Germany), Nizhnevartovskaya GRES
NIAEP JSC	Supply of filtration system TAPROGGE, building Novovoronezhskaya NPP
NIAEP JSC	Supply of filtration system TAPROGGE Units 3,4, Rostovskaya NPP, Russia
NIAEP JSC	Supply of ball cleaning system TAPROGGE, Units 3,4, Rostovskaya NPP, Russia

### ECOLOGY, ENERGY AND RESOURCE SAVING TECHNOLOGIES AND INNOVATIONS

Mosenergo JSC	Project design, supply, assembly, installation and adjustment of APC (automatic process control) GRP-1, HES-21, TG 1 HES 22, TG-26, 27, 30 Hydro ES-1
Mosenergo JSC	Hydraulic clutch and VFD for booster pumps SE-2500-180, feedwater pump PE-580-185, PE-270-150
Mosenergo JSC	Project design, supply, assembly, installation and adjustment of APC, Chemical water purification, HES-22
Mosenergo JSC	Supply of testing equipment, chemical control and gas analysis devices, HES-27 (Units 3 and 4), HES-9, HES-21, HES-23, GRES-3
WGC -6 JSC	Project design, supply, assembly, installation and adjustment of automatic frequency and load control on a KVINTSystem basis, Unit 4, Kashirskaya GRES
Enel OGC-5 JSC	VFD installation on a pump's drive (6 kV)
Enel OGC-5 JSC	Hydraulic clutch for feed pump PE-600-300
Enel OGC-5 JSC	Splice plate drives of feed pumps and induced fans, feed pumps upgrade
FSUE RSC "Applied chemistry"	Construction of electricity generation 5mVt and boiler plant 30Hkal, internal consumption of the factory in Leningradskaya region
The Salavatnefteorgsintez JSC	Assembly, installation and adjustment of Assembly, installation, adjustment works and maintenance of induction motor excited system,

## OUR PARTNERS



TAPROGGE GmbH is a leading European water ball cleaning and filtering systems manufacturer.



NII Teplopribor. This RF National Scientific Center is involved in creating new technical solutions for the production processes control instruments.



Sarenergomash OJSC. The Saratov power engineering works manufactures the heat mechanical, water treatment, and auxiliary boiler equipment.



Trust Gidromontazh OJSC is a complex engineering company, specializing in project design, manufacturing, assembly, installation and maintenance of hydromechanical equipment and metal constructions.



RGI GmbH is a leading supplier of control equipment, including radiometer on-line non-contact scales for detection of coal content.



The Ruselprom concern is a research and production complex that consolidates leading electromechanical engineering companies of Russia.

## PROFENERGO GROUP

Voith Turbo is a leading German concern in the fluid flywheels and superchargers control systems manufacture.



Cooling Quality Management. The CQM company (Israel) is a leader in the condensers and heat exchangers tubes automated cleaning systems development and manufacture.



The Uralgidrostal OJSC is a state-of-the-art production company specializing in manufacturing of the metalwork and mechanical equipment for hydraulic works.



SIEMENS AG Russia offers different solutions in the power production, transmission, and distribution, and in the environment protection/



The Pilot Plant under the Moscow Power Engineering Institute (Technical University) (OPZ MEI) is a diversified industrial enterprise, the renown supplier in the Russian electrotechnical market.



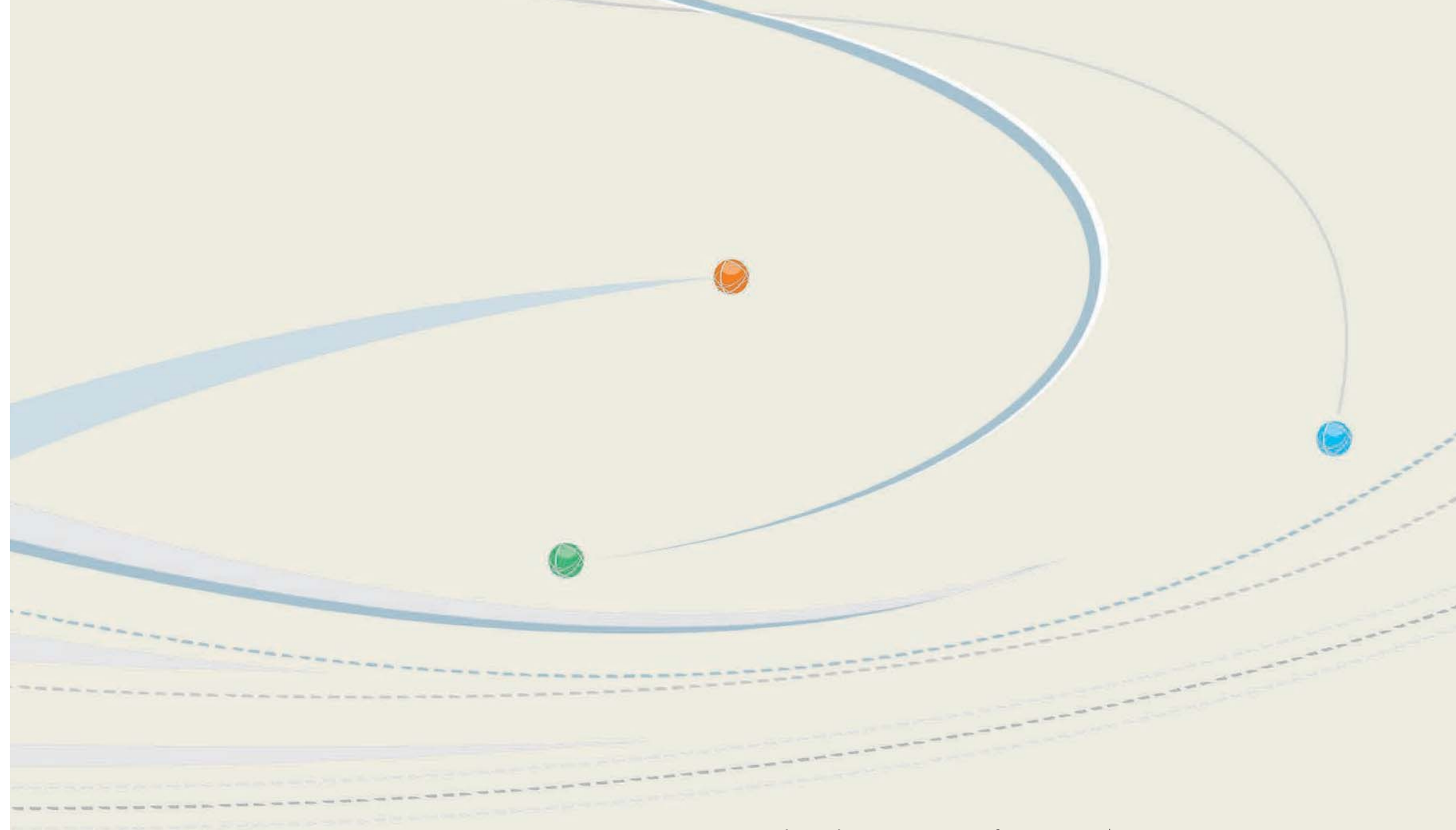
AREVA Transmission and Distribution (now Alstom GRID) is a world leader in the electric power transmission and distribution equipment and solutions.





# LICENSES





- industrial engineering of energy supply and water circulation systems
- resources saving and recycling technologies

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