

# IZOLYATOR



Century-old traditions — state-of-the-art technologies

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## INTEGRATIVE DEVELOPMENT OF POWER INDUSTRY



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# MAKING PROVISIONS FOR COOPERATION PROSPECTS



## ALEXANDER SLAVINSKY

*Chairman of the Board of Directors, Izolyator, Russia's Representative in CIGRE SC D1, Vice-President of TRAVEK International Association, Russia's expert in IEC (Permanent Committee 36A), Head of SC D1 RNC CIGRE*

International cooperation has always been a large part of our work and a natural challenge for Izolyator's development. We appreciate every opportunity to prove reliability and efficiency of our technologies by putting them to a most difficult check — the test of time. We are interested to set up exactly the same sort of partnerships — long-term and efficient, opening new regions of our presence.

A series of talks and meetings with representatives of electrical engineering corporations, power grid companies and R&D organizations of Europe and Asia, that took place in the third quarter of 2017, became a new stage of long-term partnership development.

Thus, the dialogue with partners from Vietnam that we developed became a basis for signing a Memorandum, stating key approaches and directions of long-term cooperation between the Federal Grid Company of the Unified Energy System of Russia and the State Power Grid Corporation of Vietnam EVN NPT.

The full-scale work, done by Izolyator in China, also opens new prospects for further mutually beneficial cooperation and integrative development between the national and regional power systems of Russia and China.

We carry on an active dialogue with power grid companies and power products manufac-

urers in Europe. The meetings organized by our sales and technical divisions in the third quarter once again showed interest of our partners in high-voltage bushings with RIP insulation that we have been promoting in the European market.

## GLOBAL POWER INDUSTRY EXPERIENCE

We are active contributors to the Russian National Committee of the International Council on Large Electric Systems — RNC CIGRE, including research work of SC D1 RNC CIGRE «Materials and emerging test techniques».

In September, during the International Colloquium of the Study Committee D2 CIGRE «Information systems and telecommunications» we had a meeting with the General Secretary of the International Council on Large Electric Systems (CIGRE) Philip Adam. In the course of the meeting, the sides marked the importance of information sharing on electrical engineering issues and directions.



*Meeting of EVN NPT and FGC UES management with Izolyator's participation*



*Meeting with representatives of the state company China Southern Power Grid Company Limited, in the forefront — Alexander Slavinsky (L) and Dang Zhenping*



International CIGRE SC D2 Colloquium, in the forefront, L-R: Alexander Slavinsky, Andrey Zhukov (System operator of UES) and Philip Adam

Representatives of Study Committee D1 took part in the International Conference on Condition Monitoring, Diagnosis and Maintenance — CMDM 2017 in Romania. Technical specialists from 12 countries worked at the conference, presenting 52 reports and 6 training aids. Russia’s delegation exchanged information materials with participants of the exhibition, held during the conference days, and took part in the final plenary sitting of the conference.

**IN THE CONTEXT OF EXPORT SUBSTITUTION**

Our company participated in a remarkable and meaningful event — the first national Import Substitution 2017 Forum, which placed the complex approach to realization of sectorial import substitution programs in the focus of attention of numerous experts.

At the strategic session «Technological development of fuel and energy industries», we made a report «Vector of development: from import substitution to export», which presented details of import substitution progress in the electrical engineering sector and summarized experience of domestic high-voltage bushings promotion on the world power markets.

Izolyator aims at maximum reliability and security in power systems operation in order to ensure uninterrupted power supply to consumers all over the world by promoting integrative processes in the global power industry, conducting a coherent policy of partnerships initiation between leading power corporations.



Alexander Slavinsky (in the forefront - center) with FGC UES representatives at the First National Import Substitution 2017 Forum



First Deputy Chairman of Energy Committee of the State Duma Igor Ananskikh (L) and Alexander Slavinsky at Import Substitution 2017 Forum



CIGRE Study Committee D2 (SC D2) “Information Systems and Telecommunications” covers various aspects of the Information and the Telecommunication systems development in power industry: specification, design, engineering, performance, operation, maintenance, economic efficiency and management.



The National Import Substitution Forum is called to outline the development vector for sectors of economy in order to create import substituting goods and services and to draw attention to the problems of legislative and state support. The forum gives an impetus to further realization of industrial import substitution programs.

# RUSSIA-VIETNAM: NEW STAGE OF COOPERATION



Participants of the meeting of EVN NPT and FGC UES management with Izolyator's participation



**IVAN PANFILOV**

Commercial Director,  
First Deputy CEO, Izolyator

Friendly relations between Russia and Vietnam are entering a new level and open great prospects for development of various sectors of economy of the two countries, including power industry. The Russian electrical engineering products have operated at power facilities of Vietnam for over half a century having proved reliable. So, today, cooperation ties between the companies of two countries are not merely confined in export — we rather speak about experience sharing, joint research and mutual strive to perfection of the energy complex. The dialogue development between the power engineers and electrical equipment OEMs of Russia and Vietnam became the next stage of interstate partner relations.

## INTEGRATIVE DEVELOPMENT OF POWER SYSTEMS

The huge experience, accumulated in the electrical engineering in the USSR and the Socialist Republic of Vietnam, laid the foundation for a trustworthy and mutually beneficial cooperation and knowledge sharing in power industry. The longstanding fault-free practice of Russian electrical equipment operation at power facilities of Vietnam became the best example and unquestionable reference of a high quality and reliability.

## HISTORY OF PARTNERSHIP

The beginning of relations in power industry, in power transmission, between the countries was put by the visit of EVN NPT delegation to Russia in

October 2016. EVN NPT management representatives, led by Dang Phan Tuong, Chairman of the Board of Directors had a meeting with Andrey Murov, Chairman of the Board of Directors at FGC UES PJSC. The sides discussed issues of 220 — 500 kV main power lines construction and operation, usage of nationally produced high-voltage equipment at power facilities.

The Vietnam delegation visited one of the world's largest new generation substations — the 750 kV Gribovo substation with 4552 MVA capacity in Moscow region. EVN NPT representatives witnessed the advanced technical level, reliability and high operational features of Izolyator high-voltage bushings on the example of the bushings, installed at Gribovo.

The colleagues from Vietnam also visited Izolyator plant where they were introduced to the company activities, production and testing of equipment.

Decision to continue cooperation between the companies and organization of a working visit of FGC UES PJSC's management to meet EVN NPT power grid corporation and EVN Holding in Vietnam was the result of the meeting. One of the key visit objectives is the share experience of power equipment operation in energy systems of the two countries.



Andrey Murov and Dang Phan Tuong at the meeting at FGC UES in 2016



Participants of FGC UES's 750 kV Gribovo substation tour



Visit of FGC UES and Izolyator representatives to EVN NPT in 2016

# NEW STAGE OF COOPERATION

In August 2017, management of the Federal Grid Company of Russia paid a working visit to Vietnam. The FGC UES delegation, led by Chairman Andrey Murov, had meetings with the management of the state power grid corporation of Vietnam EVN NPT, represented by Chairman of

the Board of Directors Dang Phan Tuong, and EVN holding. They also visited power infrastructure facilities near Hanoi.

## PLENARY SITTING

The plenary sitting was held in the headquarter

of EVN NPT. Mr. Dang Phan Tuong and Mr. Andrey Murov addressed the meeting attendees with welcome speeches. The colleagues wished one another to have productive talks and proceeded to discussion of power industry issues.



*Dang Phan Tuong addressing the audience*



**MR. DANG PHAN TUONG**

*Chairman of the Board of Directors EVN NPT*

Mr. Tuong made a thorough introduction of Vietnam's power system, prospects of its development, investment potential and turned the floor over to his Russian colleague.



*Andrey Murov addressing the attendees of Russia — Vietnam meeting*



**ANDREY MUROV**

*Chairman of the Board of Directors at Federal Grid Company of Unified Energy System PJSC, Member of the Board of Directors at Rosseti PJSC, RNC CIGRE Chairman, PhD in Economy*

Andrey Murov made a presentation of FGC UES's performance indicators, summarized previous discussion and informed about the power industry arrangements reached between RF President Vladimir Putin and Tran Dai Quang, President of the Republic of Vietnam, during the talks took place in the Kremlin on 29 June 2017.



**PAVEL KORSUNOV, PhD**  
*Deputy Chairman of the Board FGC UES PJSC,  
 Board Member RNC CIGRE*

Investment and power systems' innovative development programs became the next topic of discussion, introduced by the report of Pavel Korsunov, Deputy Chairman of the Board at FGC UES PJSC. He told about the progress of those programs at FGC UES and outlined key directions of cooperation with EVN NPT. Mr. Korsunov's report was received by the Vietnamese colleagues with interest.



**TIMOFEY RYABIN**  
*Deputy General Director at R&D Center of FGC UES*

Timofey Ryabin, Deputy General Director at R&D Center of FGC UES made a report on the scientific and engineering potential, initiation, development and implementation of innovative projects at his organization, which is a subsidiary of FGC UES PJSC. He named priority directions for innovative development in the quality of electric power, energy efficiency and decrease of loss in networks. In his report, Mr. Ryabin spoke about distant control and security of operation of power equipment and gave examples of innovations implementation at FGC UES's power facilities.

In addition, he mentioned that R&D Center of FGC UES made a bid on the open tender of EVN NPT, announced in 2016, to develop a program of power lines modernization in Vietnam. As a bidder, R&D Center of FGC UES ran a thorough analysis of the entire power transmission system in Vietnam and provided a complex and detailed modernization plan of Vietnam's ETLs.

This activity allowed the Center to assess the unique history of explosive development of Vietnam's power grids and offer rational suggestions on the methods allowing to identify evident problems of the grid development, avoiding expensive mistakes, in the shortest possible time. By all means, the report raised a great interest with EVN NPT. We can expect that the proposed assessment recommendations would be considered for the plans of

further transmission networks development in Vietnam.

After the first part of the meeting, the sides had an opportunity to discuss every speaker's report in a free discussion during a coffee break.

The informal socializing was of help for creating a more efficient coordination between the Vietnamese and Russian power men, facilitating all further dialogue between the two countries.



*Talks at the backstage of the official meeting*



**ANDREY ZHUKOV**  
*Deputy Chief Engineer at FGC UES PJSC*

Later on, the Deputy Chief Engineer of FGC UES Andrey Zhukov took the floor. He told the audience about advance development in construction and operation of unmanned substations and shared experience of dispatch control centers for distant control of power facilities.



**VYACHESLAV KHARINOV**  
*Trade Representative in Vietnam*

Russia's trade representative in Vietnam Vyacheslav Kharinov spoke about the role of the state bodies in non-resource exports promotion in Russia and the positive cooperation experience of Russian and Vietnamese companies. He gave references of successful cooperation between Russian industrial manufacturers, high-voltage equipment OEMs and various private and state energy companies of Vietnam.



#### ROBERT KURILO

*Head of Representative office of Russian Export Center JSC in Vietnam*

Russian Export Center was represented by Robert Kurilo, who shared positive references on Russian equipment deliveries to Vietnam and spoke about non-resource export of Russian companies. The sides emphasized the importance of cooperation issues between Russia and Vietnam and the need to develop a productive dialogue between the companies of the two countries.



#### ALEXANDER SLAVINSKY

*Chairman of the Board of Directors, Izolyator, Russia's Representative in CIGRE SC D1, Vice-President of TRAVEK International Association, Russia's expert in IEC (Permanent Committee 36A), Head of SC D1 RNC CIGRE.*

The Chairman of the Board of Directors of Izolyator Alexander Slavinsky represented Russia's industrial manufacturing sector, namely producers of electrical equipment most frequently used in power transmission networks. In his report, he mentioned the wide range of electrical equipment, made on the territory of Russian Federation, and presence of the manufacturers of the most demanded 330 kV and higher classes equipment in the market. He also spoke about highly professional and competitive pool of transformers and autotransformers makers (550 kV and higher).

Alexander Slavinsky stressed how important it is to attract manufacturers with possible organization of local production of 110 — 550 kV switchgear, 500 — 750 kV shunt reactors, 500 — 750 kV circuit breakers and 330 — 750 circuit breakers.



*Alexander Slavinsky making a report*

One of the growth factors behind Russia's power grid development is presence and a successful century-long operation of a manufacturer of the complete range of high-voltage bushings (up to 1150 kV and higher) in Russia. This fact allows the country to stay independent of import of such products and provides an opportunity to develop export of own products.

The longstanding positive track record of Izolyator equipment operation in Russia, confirmed by the world's leading power grid company FGC UES proves the best recommendation for other countries.

A separate part of Alexander Slavinsky's report was dedicated to the goals that Russian industrial companies set for themselves on the global arena and the ways to achieve them.

Izolator's long-term and successful experience in the Republic of Vietnam was named as an example of goal-setting and accomplishment, with clearly stated objectives that the company pursued, with consistent delivery in the practical side to-date.

In conclusion, Mr. Slavinsky gave a positive opinion on Russia-Vietnam relations' potential and prospects of Russian companies' involvement in high-voltage equipment modernization and power complex support in Vietnam.

The colleagues from EVN NPT spoke about investment plans of company development, innovative solutions, implemented by the corporation, and requirements to the manufacturers of equipment, which will later be used on the power transmission and distribution facilities.



*Direct Russia-Vietnam dialogue*

# SIGNING MEMORANDUM OF UNDERSTANDING



*Signing of the Memorandum of understanding between EVN NTP and FGC UES*

Signing of the Memorandum of Understanding became the main result of the meeting. Both sides reflected the main approaches and directions of long-term cooperation in the document, and decided to keep the achieved arrangements both in the short-term and 3-5 year perspective. Sides plan to share experience in construction, operation and management of bulk power transmission networks, train personnel, create and implement new technologies.

Andrey Murov, FGC UES Chairman and Vu Ngok Minh, EVN NTP President and General Director put their signatures on the memorandum in presence of the Chairman of the Board of Directors of EVN NTP Dang Phan Tuong and the delegates from both sides.



*Culmination of the day - Memorandum has been signed!*



*Exchange memorable gifts*

# VISIT TO THE HEADQUARTER OF EVN



Meeting at EVN

On the same day, the Russian delegation visited the headquarters of EVN and had a working meeting with Vice-President of EVN Mr. Ngo Sohn Hai. The sides agreed to take all efforts to make the Memorandum a working document and expand coordination as and when necessary.



**NGO SON HAI**  
Vice-President at EVN



Exchange memorable gifts

At the end of the official part of the business agenda, the Vietnamese partners invited the Russian delegation to a gala dinner, where the productive dialogue continued in an informal setting.

At the end of the official part of the business agenda, the Vietnamese partners invited the Russian delegation to a gala dinner, where the productive dialogue continued in an informal setting.



Talking about cooperation development



Gala dinner

# VISIT TO 500 KV THƯƠNG TIN SUBSTATION

A visit to the 500 kV Thương Tin substation, operated by EVN NPT, was made on the second day of the business agenda.

The Vietnamese specialists told about features of the substation operation, power equipment features and professional level of staff. It was interesting for FGC UES representatives to compare the work of their Vietnamese counterparts with the practices existing in Russia. The specialists received comprehensive advice on the electrical equipment operation and outlined possible directions of future collaborative action.

The Russian delegation also shared experience of successful application of HV RIP bushings in power transmission and distribution systems in Russia and confirmed a strong interest in further cooperation with Vietnam's power professionals.



Visit to 500 kV Thương Tin substation



Visitors of 500 kV Thương Tin substation

# RESULTS OF THE VISIT OF RUSSIAN DELEGATION

The visit opened new prospects of mutually beneficial and integrative cooperation development between the national and regional electric power systems of Russia and Vietnam.

Today, Russian companies are setting ambitious targets of entering new sales channels with electrical engineering products. The international markets have faced a high volatility, while non-resource export increase would help reduce its influence on Russia's economy. The key factor of exports growth is attraction and involvement of new exporters in foreign trade activities and increase of their competitiveness.

The signing of the memorandum has become an important step towards Russian power products promotion on the Asian market, laying the groundwork for further partnership development between Russian exporters and South East Asian countries' importers.

It should be emphasized that the prospect of continued cooperation between Russian and Vietnamese power industry professionals was included in the agenda to be discussed during President Putin's visit to Vietnam in the fourth quarter of 2017.

**On behalf of Izolyator side, we would like to express a deep gratitude to the Chair-**



*Russia - Vietnam meeting opened new prospects of cooperation*

**man of the Board of FGC UES PJSC Andrey Murov and the Chairman of the Board of Directors of EVN NPT Mr. Dang Phan Tuong for their input in development of a productive dialogue with the manufacturers of electrical products in Russia and Vietnam.**

**We hope that Izolyator's activities in supply of highly advanced innovative equipment to Vietnam will improve the volumes of non-resource export and make Made in Russia brand more visible and recognizable.**

## WE WOULD LIKE TO THANK ALL PARTICIPANTS OF THE MEETINGS FOR THEIR ACTIVE ENGAGEMENT IN THE INTERNATIONAL DIALOGUE!

### RUSSIAN DELEGATION

- Andrey Murov — Chairman of the Board, FGC UES PJSC
- Alexander Zaragatsky, 1st Deputy Chairman of the Board, FGC UES PJSC
- Alexey Molsky, Deputy Chairman of the Board, FGC UES PJSC
- Pavel Korsunov, Deputy Chairman of the Board, FGC UES PJSC
- Andrey Zhukov, Deputy Chief Engineer, FGC UES PJSC
- Georgy Reshetnikov, acting PR & GR Director, FGC UES PJSC
- Kirill Lunin, Deputy Head of Innovative Development Dpt, FGC UES PJSC
- Timofey Ryabin, Deputy General Director, R&D Center FGC UES JSC
- Robert Kurilo, REC Representative in Vietnam
- Vyacheslav Kharinov, Trade Representative in Vietnam

- Alexander Slavinsky, Chairman of the Board of Directors, Izolyator
- Ivan Panfilov, 1 Deputy CEO, Commercial Director, Izolyator

### DELEGATION OF EVN NPT:

- Mr. Dang Phan Tuong, Chairman of the Board of Director.
- Mr. Vu Ngoc Minh, Member of the Board, President/ General Director.
- Mr. Lu Minh Tuan, Member of the Board.
- Mr. Nguyen Minh Thang, Member of the Board
- Mr. Tran Quoc Lam, Vice-President
- Mr. Vu Tran Nguyen, Vice-President
- Mr. Nguyen Tuan Tung, Vice-President
- Mr. Pham Le Phu, Vice-President
- Mr. Do Duc Hung, Director Planning
- Ta Viet Hung, Technical Director
- Mr. Luu Viet Tien, Procurement Director

- Mrs. Luong Lan Dung, Director International Relations
- Mr. Nguyen Huu Long, Director, Power Transmission Company No.1
- Mr. Tran Thanh Phong, Director, Power Transmission Company No.2
- Mr. Hoang Xuan Phong, Director, Power Transmission Company No.3
- Mr. Vo Dinh Thuy, Director, Power Transmission Company No.4
- Mr. Phan Luong Thien, Director Northern Power Project Management Board
- Mr. Nguyen Dinh Tuyen, Director Central Power Project Management Board
- Mr. Doan Tan Phong, Director Southern Power Project Management Board
- Mr. Nguyen Tien Dung, Director National Power Transmission Offices

# OPEN WORKSHOP ON SHARING EXPERIENCE AND ADVANTAGES OF HV RIP BUSHINGS OPERATION IN THE POWER TRANSMISSION NETWORKS OF FGC UES PJSC IN RUSSIA



*Izolyator's seminar at EVN NPT*

Russian power grid is not only the longest in the world (over 140 000 km!) but also the most experienced operator of high-voltage bushings with solid RIP insulation. In 2005, FGC UES PJSC made a decision to use RIP bushings both on new power equipment and as replacement bushings on transformers, circuit breakers, wall-bushings, etc. Presently, FGC UES PJSC operates over 43 000 bushings of all voltages, with 7500 Izolyator RIP bushings among them. So, Russia represented by FGC UES is an absolute leader in RIP technology operation today.

The unique experience of mass use of HV RIP bushings in Russia attracts more and more attention in both Europe and Asia, where the obsolete bushings with oil-in-paper insulation are still widely used. The practice showed that the solid insulation is more reliable and safer, so one of the key targets of Izolyator is to tell about the advantages of application and maintenance of HV RIP bushings to the partners all over the world.

This priceless and unique 15-year experience of HV RIP bushings application at FGC UES PJSC and the worldwide trend with the leading power grid companies to make a transition to high-voltage RIP bushings, as was with PGCIL in India, raised interest with EVN NPT and allowed Izolyator to set up a dialogue and deliver a presentation on application examples and advantages of RIP bushings in FGC UES power network in Russia. Nguyen Minh Tang, Member of the Board of Directors at EVN NPT took part in the workshop.

Izolyator would like to express gratitude to EVN NPT and FGC UES for an opportunity to demonstrate its knowledge and give a detailed account of the successful longstanding practice of HV RIP bushings operation in the power transmission and distribution systems in Russia.

In the result of the meetings, all the involved sides reconfirmed readiness to continue cooperation on sharing years of experience in order to raise the quality and security of power transmission in Vietnam together with maximum cost saving of power equipment operation.

## IZOLYATOR BUSHINGS

### are operating in different conditions:

- ambient temperature from – 60° to + 55C°
- regions with very humid environment
- seaside regions
- regions with seismic activity (seismic withstand up to 9 on MSK-64 scale)
- regions with strong and very strong pollution of atmosphere
- high mountains

## FGC UES PJSC OPERATES

over 34,000 Izolyator bushings with OIP and RIP insulation in 35-750 kV range — 7,000 units out of those are RIP bushings.



*Discussion of high-voltage RIP bushings' advantages*

# ADVANTAGES OF RIP BUSHINGS

## OIP and RIP BUSHINGS COMPARATIVE ANALYSIS

FEATURE	OIP	RIP	
tgδ	≤ 0,7%	Standard requirement ≤ 0.007	Actual value ≤ 0.5%
Partial discharge level, (pC)	≤ 10	≤ 10	≤ 5
Dimensions (weight, size)	max	min	
Oil pressure control	regular	not required	
Excess pressure, MPa	regular	not required	
Bottom porcelain shield	yes	no	
Compact, light design	no	yes	
Ease of installation, monitoring	no	yes	
Possibility to use external insulation of diverse types	no	yes	
Loading and hauling risk	max	min	
Risk of fire/explosion of power equipment with damaged high-voltage bushing	max	min	
Risk of core moistening during improper storage	none	exists	

## DESIGN

1. BOTTOM PORCELAIN INSULATOR IS ABSENT
2. COMPACT, LIGHT DESIGN
3. PRODUCED WITH MANY DIFFERENT TYPES OF EXTERNAL INSULATION
4. POSSIBILITY TO MAKE BUSHINGS FOR REGIONS WITH HIGHLY POLLUTED ATMOSPHERE
5. MINIMUM OIL CONTAINED IN A BUSHING OR ITS COMPLETE ABSENCE
6. APPLICATION OF VARIOUS FILLERS (OIL, GEL, SF<sub>6</sub>) IN BUSHING CONSTRUCTION
7. POSSIBILITY OF BUSHINGS PRODUCTION FOR INSTALLATION AT ANY ANGLE TO VERTICAL





## OPERATION AND MAINTENANCE

1. HIGH SEISMIC WITHSTAND — 9 AND MORE ON MSK64 SCALE
2. MINIMAL MAINTENANCE REQUIRED
3. EASE OF INSTALLATION
4. APPLICABLE AT EXTREMELY LOW TEMPERATURES (–60 °C)

## BUSHINGS WITH FULLY DRY DESIGNS AND SILICONE INSULATION

1. HIGH VALUES OF HYDROPHOBY
2. HIGH IMPACT PROPERTIES
3. NO RISKS OF EXPLOSION
4. NO RISKS OF FIRE BECAUSE OF OIL LEAKAGE

## VOLUME OF DIAGNOSTIC WORKS

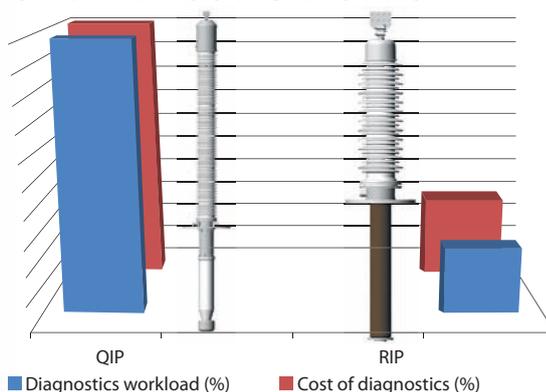
### OIP BUSHINGS

1. Exterior inspection
2. Oil pressure control
3. Electrical measurements:
  - Insulation resistance of measuring tap
  - Measurements of the main insulation and the last layer of insulation  $tg\delta_1$ ,  $tg\delta_3$ , C1 & C3
4. Oil test:
  - Physical and chemical features;
  - Chromatography analysis
5. Manometer check
6. Heat monitoring — once a year

### RIP BUSHINGS

1. Exterior inspection
2. Electrical measurements?
  - Insulation resistance of measuring tap
  - Measurements of the main insulation ( $tg\delta_1$  & C1)
3. Heat monitoring — once a year

### COMPARATIVE ANALYSIS OF THE VOLUME AND COSTS OF DIAGNOSTIC WORKS



## KEY FACTORS

- ✓ Starting from 2005, FGC UES PJSC uses only bushings with solid RIP insulation
- ✓ More than 80% of the bushings operating in the power complex of Russia are Izolyator made bushings
- ✓ Bushings of our production are successfully operating in all, including extreme climate conditions, in Russia and more than 30 countries of the world
- ✓ Fault rate of Izolyator bushings in the past 25 years is less than 0.1% of total quality of installed units
- ✓ OIP bushings have serious disadvantages compared to RIP bushings. The only alternative are RIP bushings presently.
- ✓ Cost of ownership including maintenance throughout the entire service life of RIP bushings is much less than that of OIP bushings
- ✓ Izolyator plant has a positive experience of manufacture and operation of RIP bushings from 2004, providing warranty and post-warranty service of bushings.

## AN EXAMPLE OF SUCCESSFUL PARTNERSHIP

Over a long period of time, Izolyator has led activities in cooperation development and export of own made high-voltage bushings to the Republic of Vietnam. Today, the company is proud and appreciative of the opportunity to have a productive and open dialogue with power men and electrical equipment OEMs, including Vietnam's energy company EVN and EVN NPT in particular, power equipment plant Dong Anh Electrical Equipment Corporation.

Deliveries of 72 to 220 kV HV RIP bushings to Hoa Binh HPC by Izolyator is the best example of an efficient cooperation. Those bushings were used to replace obsolete bushings with oil-in-paper insulation made by Izolyator plant and having served for over 25 years! In May 2017, the hydropower plant had the first batch of 220 kV Izolyator wall bushings with RIP insulation installed.



220 kV OIP transformer bushings made by Izolyator with over 25 years operation period



220 kV transformer RIP bushings made by Izolyator, installed in 2016



220 kV wall bushings made by Izolyator in operation for over 25 years



220 kV wall RIP bushings made by Izolyator delivered in 2017



The state power company of Vietnam — Vietnam Electricity (EVN) is fully responsible for transmission and distribution of electric power in the country. To ensure power supply, EVN controls three power generating companies (GenCo 1, 2, 3).



Public limited company Federal Grid Company of Unified Energy System (FGC UES PJSC) was founded in the result of power industry reform with the purpose of the national power grid management for its preservation and development.



Industrial Equipment and Material Joint-Stock Company (Vatco) is a leading supplier of materials, equipment, parts for hydraulic and thermal power plants built in Vietnam with participation of the Soviet Union and a reliable supplier of equipment for power stations from developing countries.

# FULL-SCALE WORK TO ORGANIZE THE VISIT TO VIETNAM

The beginning of the dialogue between the power grid companies of Russian Federation and Vietnam, mutual interest to develop cooperation and experience sharing as well as the signing of memorandum, which could easily be considered a historic fact and starting point of successful cooperation between the two friendly countries were made possible thanks to the hard preparatory work and opinions sharing among all participants of the two-day meeting in 2017 in Vietnam and the meetings in Russia in 2016.

The visit of the Russian delegation started long before the actual meeting with an active and gradual preparation, so the success of it is based on the professional work of all sides and their intention to develop cooperation together supported by openness in all discussions. Izolyator, as participant and organizer of the meetings,



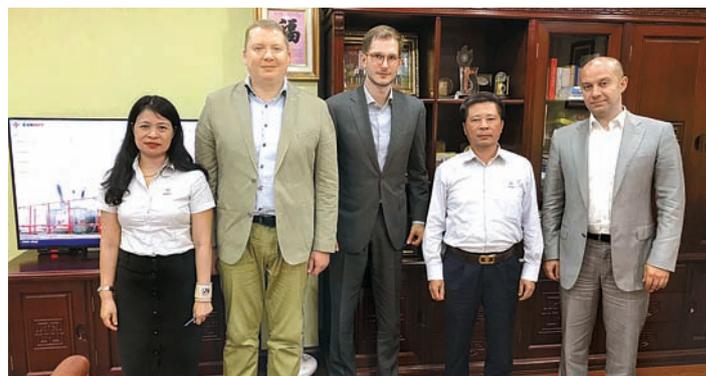
Preparatory meeting at EVN NPT

would like to thank all co-organizers who contributed at distant arrangements and final ap-

proval of the working visit to Vietnam and Hanoi agenda.



Discussing future events



Active participants at preparatory meeting

## OUR SPECIAL THANKS FOR ORGANIZATION OF THE WORKING VISIT OF FGC UES PJSC TO VIETNAM:



**Kirill Lunin**  
Deputy Chief Innovative Development FGC UES PJSC



**Georgy Reshetnikov**  
Head of External Communications FGC UES PJSC



**Pham Phuc Nguyen**  
Director Vatco



**Victoria Loshchinina**  
Manager of International Business Development dept.



Hydropower plant Hoa Binh Hydropower Company (Hoa Binh HPC) is the largest in Vietnam and the entire Southeastern Asia on a par with Son la HPP. The plant is located on the river Da in Hoa Binh province. The dam is 128 m high and 970 m long. The power plant was erected with attraction of Russian funding and specialists.



Dong Anh Electrical Equipment Corporation (EEMC) was founded in 1971 on the basis of the plant that repaired Dong Anh electrical equipment and Dong Anh power equipment company. The corporation has many year traditions and large experience in design, production, supply and maintenance of power equipment.



EVN National Power Transmission Corporation (EVN NPT) was founded on 1 July 2008 as reorganization of four power transmission companies #1, 2, 3, 4 and three project management offices — Northern, Central and Southern.

# MOVING ON — EXPANSION OF PRESENCE



*Participants of the meeting at the State Nuclear Electric Power Planning Design & Research Institute*

The Russia — China cooperation in energy sector has a long history and is supported on the highest political level by the Governments of both countries as a priority direction, so Izolyator appreciates an opportunity to prove itself a reliable and efficient partner to Chinese power men and power equipment OEMs.

In September 2017, Izolyator representatives visited several power engineering companies, research organizations and gave a technical workshop for Chinese electrical engineering corporations.

Izolyator was represented by Commercial Director Ivan Panfilov, Head of International Business Development dept. Andrey Shornikov and their colleagues from Bushing (Hongkong) HV Electric Co., Limited – Izolyator's partner in China.

## WITH A SCIENTIFIC APPROACH

The scientific and technological progress in China has reached an impressive level and it is only one of the reasons to make the visit to the State Nuclear Electric Power Planning Design & Research Institute in Beijing a bright experience during the business trip to China. Izolyator's presentation went in the atmosphere of interest and became another step towards setting up an efficient and mutually beneficial cooperation.



*Equipment of the test laboratory at CEA*

Izolyator products meet the world's highest quality standards and the testing process is part and parcel of the job. During the trip to China, Izolyator representatives visited the testing laboratory of earthquake forecasting administration (China Earthquake Administration), located in the advanced technologies development zone YanJiao, Hebei. Having familiarized themselves with the testing equipment of CEA, Izolyator representatives held talks with the center's administration about joint seismic tests of electrical equipment.

Shenyang Transformer Research Institute was no less impressive. During the visit, the guests saw the testing laboratory and discussed issues of high-voltage bushings, including DC bushings, testing with the institute's administration. This is a promising direction of cooperation and



State Nuclear Electric Power Planning Design & Research Institute (SNPDRI) develops and implements modern technologies in the following sectors of power industry of China: nuclear power, thermal energy, power grids and renewable sources of energy.



China Earthquake Administration, CEA) is a state body responsible for earthquake forecasting and damage decrease.



Participants of the meeting at Shenyang Transformer Research Institute

Izolyator appreciates an opportunity to develop it with partners in China.

It is not exaggeration to say that Izolyator's innovative products are used worldwide today. During the visit to the plant of China XD Group in Xian, Izolyator representatives not only learned about the corporation's work, but also outlined direction of a long-term cooperation development.



At the test laboratory of Shenyang Transformer Research Institute



Participants of the discussion at China XD Group



Introduction to China XD Group projects

# EXPERIENCE AS FORMULA FOR SUCCESS



Participants of Izolyator's seminar for Chinese electrical corporations

The technical seminars practice has become regular for Izolyator experts, who always offer initiative in organization of such events. The technical seminar for representatives of research and power products manufacturing corporation of China was a special point of the agenda. The companies that participated in the seminar: China Energy Engineering Group Shaanxi Electric Power Design Institute, State Grid Shaanxi Electric Power Company, China XD Electric Co. LTD,

Xi'an XD High Voltage Apparatus Co., Ltd, Xi'an XD Transformer Co., Ltd.

During the presentations, representatives of Chinese companies had an introduction to Izolyator and its products. The speakers made a special mention about design features and successful operational experience of Izolyator high-voltage bushings with solid RIP insulation in Russia and leading Power companies of the world as well as the company's foreign trade activities.



Ivan Panfilov is performing the seminar



Co-speaker — Andrey Shornikov

The participants of the seminar shared experience of production and operation of electrical equipment at power facilities of China and Russia.

**XD** 中国西电集团公司  
CHINA XD GROUP

China XD Group develops, tests and manufactures equipment for electric power transmission, distribution and control. The group offers AC and DC equipment for high, ultra-high and extra-high voltage.

# NEW STRATEGIC PARTNER



*Meeting of Izolyator and Bushing (Hongkong) HV Electric Co., Limited representatives*

The signing of Agreement that granting Bushing (Hongkong) HV Electric Co., Limited status of Izolyator's partner on the electrical equipment market of China became an outstanding event. According to the partnership agreement, Bushing (Hongkong) HV Electric Co., Limited will provide marketing information about the condition, trends and China's power equipment market's demand in electrical products and high-voltage bushings particularly. Also, upon approval of Izolyator, Bushing (Hongkong) HV Electric Co., Limited is prepared to set up business contacts and development of relations with consumers of high-voltage bushings — power and industrial enterprises of China.

On Izolyator side, the company will use every effort to efficiently develop the partnership, providing all required information about design features of RIP bushings, their technical properties and 15-year experience of their operation in different geographic and climate conditions.



*Signing of Cooperation Agreement*

**It is a honor for our company to promote business contacts and directly share experience between the leading power companies of Russia and China.**



*Participants of the signing ceremony of Cooperation Agreement between Izolyator and Bushing (Hongkong) HV Electric Co., Limited*

# DELEGATION OF CHINESE POWER ENGINEERS VISITED RUSSIA



Visit of CSG representative to Izolyator plant's test center, L-R: Vladimir Ustinov, Alexander Znamensky, Xie Zhengbin, Dmitry Orekhov, Alexander Slavinsky, Dang Zhenping, Ivan Panfilov, Lev Fishler, Konstantin Sipilkin, Jieyuan Tian and Andrey Shornikov

Russian experience of high-voltage RIP bushings' mass use raises big interest with foreign partners. Izolyator is always open to share the unique experience with all partners and kindly meet every delegation of colleagues.

During their visit to Russia, representatives of the Chinese state power grid company China Southern Grid Company Limited and Izolyator's partner in China Bushing (Hongkong) HV Electric Co., Limited continue to get competent with the products. During a plant tour, the visitors got an introduction to the modern production technologies of HV RIP bushings and had an opportunity to personally observe operation of the plant's advanced equipment.

The outstanding equipment and production capabilities of Izolyator plant are a result of the daily labor of the professional staff of the company. In the result of the meeting with Chinese power specialists, the sides discussed and agreed on matter of high-voltage bushings supplies to the power facilities in China.



The solid RIP insulation — in the spotlight



China Southern Power Grid Company Limited (CSG) is one of the two state-owned enterprises established in 2002 according to the precept to reform the power system promulgated by the State Council of the People's Republic of China.

# SPEAKING COMMON LANGUAGE

Izolyator aims to create an open and productive dialogue with all partners. Highlighting the importance of long-term relations development with Chinese power and industrial companies, Izolyator issued advertising materials — Company profile and Product catalogue — in Chinese. The company history, information about the experience and capabilities as well as the best practices are now available to the partners from China.

Moreover the Chinese language versions of the corporate video and training video on high-voltage bushings installation were released. Now, they can be viewed on Izolyator corporate channel on YouTube.

Launch of the Chinese version of Izolyator corporate web-site became one more step towards sharing experience and achievements, development of international dialogue and strengthening of long-term partner relations.

All those developments will help potential partners to easily find all required information about the company, HV bushings production technologies and can be used for getting an impression of company products.

**We appreciate Bushing (Hongkong) HV Electric Co., Limited and all Chinese colleagues for a deep interest in active development of Russia — China cooperation in power industry.**

«International presence – the strategic vector of the company's development.»

Alexander Znamenskiy  
Manager of International Business  
Development dept.

120 years  
**IZOLYATOR**  
CENTURES-OLD TRADITIONS – STATE-OF-THE-ART TECHNOLOGIES

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Izolyator web-site in Chinese

实验中心

试验中心：所有产品的电气试验。得到俄罗斯及国际公司认可。

A frame of Izolyator video in Chinese

# PRODUCT QUALITY RECOGNIZED BY PROFESSIONALS



## ANDREY SHORNIKOV

*Head of International Business Development dept.*

Izolyator's strategic goal is to develop long-term and mutually beneficial relations with foreign partners in power industry and access to foreign markets.

## RIP INSULATION — GLOBAL TREND

Presently, Izolyator exports its products to more than 30 countries of the world. Our staff are always open to start and develop a friendly dialogue with partners.

All high-voltage bushings, made at the plant, are certified according to the Russian and inter-

national standards, which allows to supply products not only to Russian internal market, but far beyond its borders.

In recent years, high-voltage bushings with RIP insulation draw more attention in the global power industry, so we strive to make this trend cover as many power systems as possible across the globe.



*Introduction to the assembly technology of 220 - 1150 kV bushings*



*Participants of PowerGrid corporation inspection at the test center of Izolyator plant, L-R: Ivan Panfilov, Ashok Singh, Vikram Singh Bhal, Andrey Shornikov, Alexander Znamensky and Dmitry Orekhov*



Power Grid Corporation of India Limited (PowerGrid) is a state Indian operator involved in construction, operation and maintenance of the system of bulk power transmission networks. The core business of the company is power transmission between the states of India.

We keep sharing experience in production and operation of electrical equipment and this practice gives results.

**KEEPING IN TOUCH**

The third quarter of 2017 passed with regular contacts with our foreign partners. In mid July we visited the Indian state company Power Grid Corporation of India Limited, where we discussed the program of the upcoming high-voltage tests and the corporation's inspectors' visit to Izolyator plant. During our business trip we actively worked on preparation of our tender bids documentation and set new targets.

Moreover we had meetings with the top management of CTR Manufacturing Industries Ltd in Nashik and with Mehru, where we introduced Izolyator plant and its products, answered questions of most interest and coordinated a road map of cooperation development.

**SUCCESSFUL TESTS**

Use of own patented technologies, only the best equipment and materials, highly qualified staff and production control at all stages ensure a high technical level and product quality of Izolyator equipment.

In July, PowerGrid representatives took part in the electrical type testing of 145 kV 1250 A HV RIP bushings at Izolyator plant and the All-Russian Electrical Engineering Institute n.a. V.I. Lenin. The tests were made under rain at industrial frequency. Vikram Singh Bhal, Deputy Department Director at PowerGrid arrived for tests inspection in Moscow.

Dmitry Ivanov, Head of Test Center performed the tests. Already in August, Power Grid



**We would like to thank Mr. Vikram Singh Bhal and PowerGrid for the large contribution in the inspection of high-voltage bushings and a high opinion on Izolyator products' quality. Thank you for cooperation!**



*Inspection of high-voltage bushings tests by TSTRANSCO representatives, L-R: B. Ravindra, J. Suria Prakash, Ivan Panfilov, Alexander Slavinsky and Andrey Shornikov*

confirmed the tests results as positive. It should be said that all tests and inspection went in strict conformity to IEC 60137-2008 proving the high quality of Izolyator products.

Confirmation of the successful test results by Transmission Corporation of Telangana Limited was another important event for our company. The acceptance tests went in presence of the inspecting group of TSTRANSCO.

Alltogether, 30 bushings were inspected, which makes 30% of the quantity that will be delivered by Izolyator for installation on Transformers & Rectifiers (India) Ltd's transformers and further delivery to the facilities of PowerGrid and Gujarat Energy Transmission Corporation Limited.

The inspectors highlighted the high organizational and technological level of RIP bushings production and recommended Izolyator as a highly qualified manufacturer of high-voltage bushings.



**We would like to thank Mr. J. Suria Prakash and TSTRANSCO for executing the on tests inspection and a high opinion on the quality of Izolyator products. Thank you for cooperation!**

**We appreciate our foreign colleagues for their high opinion on the activities of Izolyator. We will keep perfecting our products, aiming at maximum reliability and efficiency for the benefit of our partners.**



The Transmission Corporation of Telangana Limited (TSTRANSCO) was founded in the result of India's power industry reform. Initially, the power company of Andhra Pradesh State APSEB, which came into existence in 1959, was responsible for generation, transmission and distribution of electricity.



Mehru Electrical & Mechanical Engineers (P) Ltd. makes measuring transformer for rated voltages up to 420 kV. The company is a leading supplier of measuring transformers for numerous customers in both India and overseas.

# OPTIMAL SOLUTIONS FOR EUROPE



**YAROSLAV SEDOV**

*Head of EU sales*

Izolyator is a dynamically developing company, which sets a strategic goal of expansion of relations with our partners worldwide. Over the past several years, we have actively promoted Izolyator products on the European power market and today this work begins to bring results. It means that the sales division managed to improve the recognition of our brand, which is not only visible, but trusted. Today, Izolyator is perceived as a reliable and perspective partner in Europe.

## STRENGTHENING PARTNER RELATIONS

Traditionally and geographically, Europe is a trade partner to electrical engineering companies of Russia, so our company keeps strengthening partner relations with such European companies as CG, ETD, ZREW, maintaining regular communication at all levels.

We had several meetings in the third quarter of 2017 with our European partners to promote HV

RIP bushings as pertains our strategy realization over all recent years. Thus, in September 2017, we visited electrical engineering companies and held talks on cooperation development in respect to delivery of our products to European countries.

At the transformer plant of CG Power Systems Belgium NV — Power Transformers Division in Belgium we had a meeting with the Head of Procurement Dirk Cousy. We discussed the general situation on the market of power equipment of Belgium and other world's power systems, de-



*Participants of the meeting at the plant of CG Power Systems Belgium NV — Power Transformer Division, L-R: Dirk Cousy, Victoria Loshchinina and Yaroslav Sedov*



CG Power Systems Belgium NV (formerly Pauwels Trafo Belgium NV) is a developer of innovative, high-quality, reliable products and turnkey solutions with manufacturing units in Belgium, Ireland, USA, Canada and Indonesia and several Business Units: transformers, switchgear, systems, automation, services.



ETD TRANSFORMATORY a. s. Plzen, Czech Republic. It is one of the oldest electrical engineering plants in Czech Republic counting its history since 1921. In Russia it is known by one of its former names Skoda — Energo, because it entered the largest machine building and electrical equipment holding of the country — Skoda.



ZREW Transformatory S.A. is company from Lodz, Poland that has operated in the market of transformers for 60 years. The Company's core business is the manufacture, repair, upgrade and full diagnostics of oil-immersed power transformers.

deliveries of Izolyator HV bushings, technical specifics of Izolyator HV RIP bushings operation and current and future projects.

Izolyator became the first supplier of HV RIP bushings to Belgium, which realizes a large scale transition program from OIP bushings to RIP technology in its power system.

We enter talks to discuss our company's involvement in similar programs with other power grid and electrical engineering companies of Europe.

For instance, we made a visit to ETD Transformatory's oil power transformer plant in Czech republic and met with Petr Mandik from Purchasing to discuss issues of long-term cooperation development and possibility of Izolyator high-voltage RIP bushings application in power facilities of Czech republic and other countries.

We also held talks at JST Transformateurs plant in Lion, France. During the meeting with the Head of Purchasing and Logistics Frederic Palmer we presented Izolyator plant and its products and made a presentation of Izolyator's foreign trade activities, including reference of HV bushings deliveries to the European power market.

In the course of our visit to GE Grid Solution plants in France, we discussed the global purchasing strategy of the company in respect to HV bushings and issues of further cooperation development on the basis of existing deliveries to GE Switzerland and GE Turkey.



Participants of meeting at ETD Transformatory, L-R: Petr Mandik, Victoria Loshchinina and Yaroslav Sedov



Participants of the talks at JST Transformateurs, L-R: Victoria Loshchinina, Frederic Palmer and Yaroslav Sedov

## CONSTRUCTIVE DIALOGUE CONTINUED

Our company has a rich history of relations with Siemens AG concern and we continue cooperation. In September 2017, representatives of Siemens AG, global technological leader, paid a working visit to Izolyator plant. The delegation included Head of Purchasing Maik Rothe, Global Sourcing Manager Frank Selbiger, Purchasing and Logistics Director at Siemens Transformers Ltd (Voronezh) Iskren Tsekov. We told our guests about our advanced technologies and demonstrated them in a plant tour.

The purpose of the talks was discussion of possibility to use Izolyator's potential for delivery of completing parts to Siemens Transformers plant in Voronezh. Thanks to a productive meeting with the Head of OEM Sales Maxim Zagrebina, we were able to discuss possibility of arrangement of a technical seminar for the specialists of Siemens Transformers Ltd.

We once again demonstrated that our experience in operation of high-voltage RIP bushings of various applications allows us to find optimal



GE (NYSE: GE) is a global industrial and digital technologies leader. 300 000 people work in 175 offices of this company across the globe. GE contributes to the world's industry move to a whole new level combining digital and industrial equipment.



Dedicated to the transformation of electrical energy for more than 60 years, JST transformateurs is proud to count among its worldwide customers the biggest names of electricity generation, transmission and distribution, railway transportation and heavy industry.



Siemens AG is a German concern, focusing on the areas of electrification, electronics, power equipment, transport, medical equipment and lighting, as well as specialized services in various sectors of industry, transport and communications. The company's headquarters are in Berlin and Munich.

solutions for our partners. With its work, Izolyator proves that its products meet the highest quality standards and the company is a perspective and reliable partner.

## EXPANDING BORDERS OF COOPERATION

Expanding presence on the global markets, Izolyator representatives visited key power equipment manufacturers in Turkey in the third quarter of 2017.

The Turkish market is one of the most interesting, possessing huge growth potential and counting large manufacturers of equipment that meet the demands of domestic market and sell their products in many other countries, such as Botswana, Ghana, Kongo, Middle Eastern and European countries.

During our visit to Turkey, Sezai Ozkaya, Izolyator's partner and Tempek Foreign Trade Co. representative accompanied the delegation.

The visit to Balikesir Elektromekanik Sanayi Tesisleri A. S. (The BEST) in Balikesir was one of the first. Izolyator representatives made a presentation and introduced innovative designs of high-voltage bushings. The BEST specialists learned about the advantages, specifics of the production technology and successful operational experience of high-voltage bushings with solid RIP insulation. It is important that Izolyator is already a qualified supplier and bids in several tenders for delivery of high-voltage bushings for the needs of BEST.

It is as important to work with large multinational corporations like GE. GE is an old partner, and we aim at developing relations with divi-

sions in different countries. In July 2017, Izolyator representatives visited the transformer plant of GE in Izmir, Turkey. This meeting once again demonstrated the importance of our cooperation.

We had productive visits to the transformer plants Astor and ELTAS. These companies dynamically developing transformer makers in Turkey. Our target is to support the dialogue offering the shortest production terms of high quality HV bushings. Astor Transformer AS possesses the largest production capacity in Turkey with monthly output of distribution transformers 2000 units. It enters top 5 transformer makers in the world in that segment. Izolyator representatives saw the production facility with the equipment used at Astor Transformer AS.

Izolyator made a presentation of its product range during the visit to Eltas Transformer in Iz-



Meeting with Siemens AG representatives at Izolyator plant, L-R: Yaroslav Sedov, Maxim Zagrebin, Maik Rothe, Frank Zeligiger, Iskren Tsekov and Alexander Znamensky



Balikesir Elektromekanik Sanayi Tesisleri A. S. (BEST) is a manufacturer of high-quality and reliable distribution and power transformers. BEST is the largest national transformer producer in Turkey. Power transformers from BEST have a reputation for quality and reliability in more than 50 countries.



GE (NYSE: GE) is a global industrial and digital technologies leader. 300 000 people work in 175 offices of this company across the globe. GE contributes to the world's industry move to a whole new level combining digital and industrial equipment.

mir. Our representatives visited the manufacturing facility and familiarized themselves with the stages of transformer production.

Russia and Turkey are strategic partners, so as an equipment maker we develop the dialogue in the power industry: we talk about setting ties with the largest power grid company in Turkey.

The meetings that we had turned out very informative and all sides showed interest in development of the dialogue. Besides, we were able to discuss not only common projects, but the market of power equipment in Turkey and Middle Eastern countries and its current trends.

**We are always grateful to our partners for their trust and we work hard to prove it right. Izolyator is dynamically developing, meeting new challenges and offering modern and reliable electrical equipment to many countries**



Meeting attendees at GE Turkey plant, L-R: Yaroslav Sedov, Armagan Ceylan and Ivan Panfilov



At the Head office of Astor Transformer A. S.: Frank Zeligber, Iskren Tsekov and Yaroslav Sedov



Visit to the manufacturing facility of Eltas Transformer, L-R: Yaroslav Sedov, Ivan Panfilov, Aibke Gure Izmit and Sezai Ozkaya



Astor Transformer AS produces the transformers used in the electric energy transmission and distribution. It makes 300 kV oil and cast resin dry type transformers and 200 MVA power transformers at its 26000 square meter square plant located at 36000 square meter Ankara Sincan Industrial Zone.

Eltas transformers makes transformer that are exported to more than 50 countries in 4 continents. Russia, Turkmenistan, Azerbaijan, Netherlands, Germany, Jordan, Nigeria, Iraq, Iran, Egypt, Kongo and Ethiopia make up the main export market. Eltas Transformer offers 3 product groups.

# DEVELOPING DIALOGUE WITH CIS COUNTRIES



**MAXIM OSIPOV**

*Head of CIS Sales*

Power industry is the most important, critical sector of economy in all countries. The successful operation of power companies, in turn, is a factor of reliable and uninterrupted power supply to consumers. We are confident that constructive, strong and friendly relations with customers and consumers of our products allow us to work efficiently in pursuit of our main goal - to ensure uninterrupted and secure operation of power equipment.

## FOUNDATION OF COOPERATION

CIS is a special territory, since all the countries are tied with long-term cooperation including power industry. So, it is very important to support and develop those relations. Thus, our company has strengthened ties with power grid companies and power equipment OEMs in Armenia, Moldavia, Tajikistan, Kazakhstan, Belarus, Ukraine, Uzbekistan and Georgia.



*Izolyator's partner in Kazakhstan at the test center at Izolyator plant, L-R: Dmitry Ivanov, Nurlan Sarbalin and Maxim Osipov*



*Izolyator's partner in Uzbekistan at the test center of Izolyator plant, L-R: Victor Kiryukhin, Armen Bunyatyan and Maxim Osipov*



The state enterprise Moldelectrica is a specialized company, exercising a centralized real-time operations control over the Moldavian power grid. The operator of the transmission system works on two groups of tasks: electric power transmission and real-time operations control of the Moldavian power grid.



State Unitary Enterprise GC Dniestrenergo (SUE GC Dniestrenergo) services high-voltage substations and 35 — 330 kV electric networks. The goal of the company is to maintain technical condition of equipment and modernize networks.



The Kazakhstan Head Research and Design Institute of fuel and energy systems Energiya (KazNIPITEES Energiya) has the following main divisions: power systems design, high-voltage power lines sector, substations sector, survey, construction and relay protection, communication and secondary wiring.

Izolyator specialists regularly meet with partners from different CIS countries. For example, in the third quarter of 2017, we had productive negotiations with representatives of Kentau transformer plant JSC (Kazakhstan), State company Moldelectrica (Moldavia) and the State Unitary Enterprise GC Dniestrenergo (Transdnester) and visited the Leading R&D and Design Institute of fuel and energy systems Energia in Almaty.

Be it discussion of current project or plans for future, there is one unchanged attitude: our partners and we always strive to listen to each other and seek ways to a comfortable and efficient cooperation.

### MEETINGS AT THE PLANT

Receiving the guests on the territory of Izolyator plant, we want to introduce them to the modern production technologies of Izolyator high-voltage bushings, show the equipment and the testing process of finished goods. In August, Nurlan Sarbalin, Executive Director at TOO DOC Co. LTD and Izolyator's partner in Kazakhstan and Armen Bunatyan, Izolyator's partner in Uzbekistan were our guests.

We value our partners' interest to the production during their visits. We discussed prospects of further cooperation at the meetings. We look forward to developing mutually beneficial business relations with leading power industry and electrical engineering companies of CIS.

### SEMINAR FOR SPECIALISTS

We always welcome every opportunity to give a seminar for technical specialists of our partners as it is a part of ongoing process of professional development in the power industry. In July this year, we held a seminar for the employees of the electric department of Ekibastuz SDPP-2 in Kazakhstan. The meeting was dedicated to issues of Izolyator HV RIP bushings' storage, diagnostics and operation.

During a productive dialogue the specialists received detailed information on all aspects of installation and operation of high-voltage bushings. We see lively response at such meetings and it is important for us because many of our partners are really interested in development of a productive cooperation.

**Izolyator continues to actively develop strategic partnership with consumers of our products in the CIS countries. We would like to thank all our partners for the trust and cooperation.**



Meeting at Ekibastuz SDPP-2, L-R: Pavel Kiryukhin, Sergey Timakov and Dmitry Karasev



Public company Ekibastuz SDPP-2 Power plant is a JV between Kazakhstan and Russia, located at Kazakhstan. Ekibastuz SDPP-2 is a thermal power plant with the total installed capacity of 1000 MW (two power generating units 500 MW each) in the city of Ekibastuz.

Power industry of Kazakhstan. There are 118 power plants of various forms of ownership producing electricity in Kazakhstan. The power plants are divided into nationally significant plants, industrial-purpose plants and regional power plants.

The Power Industry of Uzbekistan. The unified power grid of Uzbekistan fully meets demands in electric power from economy and population. Uzbekistan has become the biggest power state in Central Asia.

# FAULT-FREE OPERATION OF EQUIPMENT IS THE MOST IMPORTANT TASK



**OLEG BAKULIN**

*Director of Partner Relations*

One of the key tasks that Izolyator sets for itself is to establish mutually beneficial partnerships with the final goal of efficient and failure free operation of power facilities.

Meeting the provisions of the memorandum, signed with Rosseti PJSC, plays a large part in realization of the above mentioned task. Thus, in the third quarter of 2017, we carried on with our meetings with management and specialists of subsidiaries and affiliates of Rosseti PJSC with a view to organize joint tests of bushings. We participate in the workgroup, created on the initiative of Rosseti, to analyze failure rate of high-voltage bushings.

Personal meetings with partners always accentuate mutual interest in an efficient cooperative work. In July this year, the Chairman of the Board of Directors of Izolyator Alexander Slavinsky visited the power grid company Kubanenergo in Krasnodar. The meeting agenda was concentrated around the Power electrical equipment roadmap till 2030 development in the part of high-voltage bushings. Besides, Kubanenergo

representatives shared a successful experience of Izolyator high-voltage bushings operation in the power complex. The meeting once again emphasized that the sides are prepared to actively develop further cooperation.

Issues, connected with Izolyator products operation at power facilities, and important issues of technical cooperation are always discussed at the talks with our partners. So, the talks with technical specialists of IDGC Volga PJSC's branch

Orenburgenergo and Penzaenergo were no exception. Importantly, at such meetings we truly see our partners' interest in achievement of the best efficiency in our cooperation.

During Alexander Slavinsky's visit to the Interregional Distribution Grid Company of South (IDGC South) in the city of Rostov-na-Donu in July, they discussed key points of Izolyator's technical policy among other topics. The dialogue turned out truly productive and intense.



*Alexander Slavinsky (L) and Grigory Masin by the head office of Kubanenergo*



Kubanenergo is the largest grid company of the Krasnodar region and the Republic of Adygea that transfers and distributes electricity through 0.4-110kV networks. The service territory of the company makes 83 thnd sq km with a total population of 5.5. mln people.



Orenburgenergo is a branch of the Interregional Distribution Grid Company of Volga. It operates on the territory of Orenburg region of 124 thnd square kilometers area size and a population over 2.11 mln residents.



Interregional Distribution Grid Company of South (IDGC South) is 0.4-110 kV lines operator that has utility connections to the unified national power grid with dominating share on the transportation and distribution market in the Southern Federal District.

Preparation for the winter period is always on control, so an enterprise's qualification for the certificate of readiness (to the winter heating period) is the most important activity for power engineers, with lots on work behind it. All deliveries of high-voltage bushings to the subsidiaries and affiliates of Rosseti PJSC were made in time. We do not sit on our achievement and are now planning to take part in the tender procedures for bushings supply in 2018.

### STATE-OF-THE-ART EQUIPMENT

It is no secret that modernization of electrical equipment play a big part in a secure and uninterrupted operation. RusHydro PJSC carries on with its complex modernization program of the entire transformer park. For instance, the company held a tender for supply of transformers to Votkinsk HPP. VNIIR HydroElectroAutomation JSC was named a winner. It offered transformers made by Power Machines - Toshiba. These units would be completed with Izolyator high-voltage bushings.

Sakhalinenergo PJSC, a subsidiary of RusHydro, also runs a replacement program with planned installation of new 110 and 220 kV bushings. At the meeting with Sakhalinenergo PJSC in August, we discussed schedule and details of the works and further cooperation development.

### MODERN PRODUCTION FOR THE BEST RESULT

In 2017, Rosenergoatom Concern began the replacement program of time-expired oil-in-paper bushings and the program of the reserve stock replenishment. For instance, the company announced tenders for high-voltage bushings purchasing for the needs of Balakovo NPP and Beloyarsk NPP, where Izolyator offers its equipment.

We are pleased that our partners visit Izolyator plant to personally see the process of high-voltage bushings making. In July, we received the Leading Engineer of Electric Shop at Novovoronezh NPP, branch of Rosenergoatom Concern JSC Evgeny Materkin. At the meeting, we mostly spoke about operation of high-voltage bushings with RIP insulation. The guest was also introduced to the production technology and testing procedure of high-voltage bushings.

We believe that thanks to this meeting format our partners receive an opportunity to personally witness our product quality and enjoy a special atmosphere of confidence which we are always glad to maintain and foster.



«Interaction efficiency and excellent management are the key to success!»

Irina Daurova  
Senior Manager of Partner Relations



Lead Electric shop engineer of Novovoronezh NPP Evgeny Materkin at Izolyator plant (second on R).  
L - Victor Kiryukhin, R - Oleg Bakulin

### TRAINING AIDS ON PRODUCTS AND INSTALLATION OF BUSHINGS

In the third quarter of 2017, our company prepared a training video «Installation of high-voltage bushings with solid RIP insulation at power facilities» for partners and consumers. This video gives details on the installation process of circuit breaker bushings of Izolyator brand in a substation.

The shooting of one of the episodes was performed at the 110/6 kV SS No 533 Vikhrevo electric substation in Moscow region (MOESK PJSC). The shooting crew together with Izolyator's SVN-Service specialists filmed the installation of circuit breaker bushings on the power equipment of the substation.

We would like to thank our old partners MOESK PJSC for the all-round support in the training video shooting organization.

The video is available in Russian and English languages on [www.mosizolyator.ru](http://www.mosizolyator.ru) and our official page on YouTube.

In order to familiarize our consumers with Izolyator products and support professional training programs for operators, we began to regularly make high-voltage bushings' replicas and information boards for the training centers of the subsidiaries and affiliates of Rosseti PJSC. Together with our seminars, the technical specialists learn from Izolyator representatives about designs, specifics of installation and operation of high-voltage bushings, test and diagnostics of bushings with solid RIP insulation.

**We appreciate our partners for cooperation and look forward to further interaction in regard to supplies of modern electrical products on the Russian power equipment market.**



Sakhalinenergo is an energy company in the Far East, the largest default provider of electricity in the Sakhalin region. The company is in charge of centralized electric power supply in 17 out of 22 municipalities as well as heat supply in Yuzhno-Sakhalinsk and Vostok.



Novovoronezh NPP, branch of Rosenergoatom Concern is one of the first nuclear power plants in USSR. The plant is producer of electric energy, covering 85% of power consumption in Voronezh region. Besides, since 1986 it provides 50% of thermal energy for Novovoronezh.

# ON GUARD OF SECURE POWER SUPPLY



**ALEXANDER SAVINOV**  
 Director of Strategic Sales

Izolyator is a recognized expert in high-voltage equipment operation and the status imposes several responsibilities on us, flawless delivery on all our promises being one of those.

It is a great honor and responsibility to be a part of common work on achieving maximum efficiency and reliability of power systems, so we work to meet these high requirements.

## DIALOGUE AS A PREREQUISITE OF DEVELOPMENT

Our team works to reach the most efficient communication with partners at all times. Whether it is a meeting at a forum or a personal meeting with customers and consumers, we are open to dialogue. When we took part at the Suppliers Forum of Fortum, Russian Division in July 2017, we witnessed again that the purchasing process in our country is gradually improving, and we are pleased to make a contribution.

Our partners always have an opportunity to personally witness the high quality of Izolyator products and its conformity to international standards. Thus, in the third quarter of 2017, the power grid company Gazprom energo performed

an audit of the entire production process of high-voltage bushings with solid RIP insulation. The inspectors got an introduction to the manufacture of RIP bushings of a new design with rated voltage 220 kV, which are intended for installation on the transformers of Gazprom energo's electric substations in replacement of obsolete bushings with oil-in-paper insulation. The audit went successfully having confirmed that the technical level of production meets the highest requirements and standards. Already in September, we shipped a batch of bushings of new design to the power facilities of Gazprom energo.

Due to the fact that Izolyator has a significant experience of RIP bushings operation in power lines all over the world, we do have what to say and we hope our experience will be useful. This quarter, our plant was visited by representatives of Enel Russia generating company. Besides a traditional plant tour, we discussed experience of cooperation and future prospects on the example of successful deliveries of Izolyator 550 kV bushings to Reftinskaya SDPP, a branch of Enel Russia. We outlined steps of further long-term relations development.

We visit our partners' facilities with pleasure as we expand our network of contacts. In the third quarter, we had talks with Quadra generating company, visited the Territorial Generating

Company No14 in Chita. In all those meeting, we discuss both cooperation opportunities and the power industry development in general. We appreciate every chance to make our contribution in its development.

## IMPROVING PROFESSIONAL COMPETENCE

Unstopping improvement of equipment and technologies require timely training of personnel. We do this as part of our activities. We stay in regular contact with our partners both on technical and informational levels, meet and personally discuss aspects of cooperation. We have regular seminars for specialists of technical services of generating and distribution companies.

In August, Izolyator gave a master class during the Interregional Contest of FGC UES maintenance and repair personnel (220 - 1150 kV substations) that took place in the Training Center of Main Power Transmission Lines of South in Zheleznovodsk. Representatives of all FGC UES's branches and executive office took part in the event under the management of the Chief Referee, Deputy Chief Engineer of FGC UES PJSC Andrey Koltsov.

The master class of our company was dedicated to designs and results of modernization, as well as specifics of diagnostics of high-voltage



Enel Russia's representatives at the test center of Izolyator plant



Limited liability company Gazprom energo is a unified power grid company engaged in electric power transmission. The company operates power equipment of the facilities of the Unified gas supply system and subsidiaries of Gazprom PJSC.



Fortum Corporation is a Finnish state energy company and leader in ecologically clean energy, which delivers electric power, heat and cold to its consumers, and offers intellectual solutions for a more efficient utilization resources.

bushings with RIP insulation. For visual aid we used a full size replica of a 220 kV transformer bushing made by our plant specially for training purposes, as well as information board on Izolyator products.

This is the first delivery of visual aids to our partners that we made under the initiative of furnishing of power industry companies with informative visual aids. The master class raised a great interest with the specialists and went in the atmosphere of an efficient and productive dialogue. Together with achieving the priority goal of raising professional level of the staff of the Main power transmission networks we set up numerous business contacts and outlined directions of cooperation in future.

### TO PLAN AND TO CONTROL

Izolyator specialists are proud to make their contribution in the fault free operation of electrical equipment at power facilities.

We prepared several proposals for our partners, among those - complete analysis of oil-in-paper bushings' condition for units exceeding 25 years in operation.



Alexander Savinov (L) and Denis Savchenko by the head office of Chita CHPP-1 of TGC-14



Master class on the educational layout of the HV RIP bushing is conducted by the Izolyator company chief engineer Alexey Pilugin (R)

The main and the most effective method of cost optimization in realization of those project is long-range planning and long-term agreement of equipment supply from the leading domestic OEMs. This pattern of interaction can accurately plan both costs on purchasing procedures or

equipment and work volumes and schedules, avoiding upsets caused by force-majeurs. The experience of that kind that we have proves that long-term equipment supply agreements are convenient, practical and beneficial for the power grid.

**Inspite of a large work already done by us, there are many new projects with power grid companies and power equipment OEMs ahead. We will continue timely deliveries of quality Izolyator product to our partners.**



Enel Russia PJSC is a generating company and the key asset of Enel Group in Russia. The company supplies electric and thermal power to industrial clients and households in the service area, which includes: Tver region, Stavropol kray and Sverdlovsk region.



The public listed company Quadra is a generating company (Quadra PJSC), one of the largest Russian territorial generating companies. The core activities are production and sale of electric power on the wholesale electricity and capacity market.

# OUR PARTNERS' TRUST IS A PRIORITY



**MAXIM ZAGREBIN**

*Head of OEM Sales*

Izolyator as manufacturer and supplier of high-voltage bushings for the global power industry and the transformer plants of Russia shows a special interest to innovative projects. Firstly, we highly interested in the nuclear industry and the trust from the manufacturers who make transformer-reactor equipment for large nuclear power corporations is very pleasant. Izolyator began development of 750 kV RIP bushings for supply to the nuclear sector in the first half of 2017. Besides, we designed and supplied high-voltage bushings to Russia-based OEMs for the Rosenergoatom Corporation being the end buyer and operator.

At the same time, we carry on working to deliver our products as completing parts for the equipment made by our OEM partners to such corporations as Rosseti, RusHydro and FGC UES.

## DEVELOPING DIALOGUE

Considering that the power industry ever develops, we always move with the times and sometimes try to get a little ahead to always retain leading positions in development of new types and designs of high-voltage bushings. We appreciate opportunities to stay in dialogue with our partners and be able to personally express our interest in collaborative work.

Our company carries on an active dialogue

with Power Machines — Toshiba. High-voltage transformers. In the third quarter of 2017, we visited the transformer plant in Saint Petersburg. There we discussed progress of ongoing orders and future projects as well as perspective directions of cooperation.

We are always happy to see guests at Izolyator plant and visit advanced electrical engineering companies with great interest in our turn. In July, we made a visit to Togliatti Transformer



*Participants of the business meeting at Power Machines - Toshiba. High-voltage transformers plant, L-R: Alexander Yuzhakov, Maxim Zagrebina and Konstantin Stafeev*



*500 kV oil-SF6 gas bushing tests at Izolyator plant*



Power Machines — Toshiba. High-voltage transformers Ltd is a joint venture of Power Machines JSC and Toshiba Corporation. The project started in September 2011 with signing of a JV set up agreement and construction of power transformers manufacturing facility in Russia.



Togliatti Transformer Limited is one of the largest designers and makers of electric engineering equipment in Russia and the CIS countries. Equipment under TT trademark is operating in more than 50 countries of the world, including Eastern and Western Europe.

Ltd where we discussed issues of mutually beneficial cooperation and purchasing program of high-voltage bushings till the end of 2017.

We should mention delivery of unique 220 and 500 kV oil-SF6 bushings, specially design under the order of Togliatti Transformer Ltd.

Among the events of the third quarter, we should point out the successful talks at Power Standard. In July, we agreed on the key directions of mutually beneficial cooperation, and in September, we met again for discussion of potential projects with Power Standard's participation. Much attention was given to the technical aspects of scheduled high-voltage bushings replacement on ZTR transformers during those meetings.

At the meeting with Uralelectrotyazhmash JSC representatives in Ekaterinburg, we also discussed opportunities of common projects on the territory of Russia and abroad.

The trip to Ufa transformer plant was no less informative. The plant enters Electrozavod Holding. Besides productive talks with the management of the company, we received an opportunity to see the production and testing technologies of transformer equipment.

We believe that direct relations with partners are a key to the future fruitful cooperation, and we are always prepared to provide support to our clients. This important principle is well familiar to our old partners.



Maxim Zagrebina (L) and Alexey Borisenko at the meeting at UETM

**IN THE GLOBAL TREND**

Having a large experience behind and a century-long reference of deliveries, we actively work not only on the Russian market. Izolyator has proved

itself a reliable supplier to the markets of India, Vietnam and Europe.

Control of high-voltage bushings production for delivery to power facilities in Russian

Federation and CIS, logistics coordination with customers and, in some cases, end user, control of terms of shipment occupy a large share of our team's activities. Meeting the required production schedules and high-voltage bushings' arrival to customers are key factors for the clients of our company.

Being a supplier of high-voltage bushings, we see how the power equipment market growth rates are changing, how our OEM partners in Russia are developing, meaning the companies themselves and the young specialists and their mentors, too.

These are examples of efficient cooperation with key and strategic partners of our company: Togliatti Transformer Ltd, SVEL Group JSC, Zaporozhtransformer PJSC, Electrozavod PJSC, UETM JSC, Power Machines — Toshiba. High-voltage transformers Ltd, Siemens Concern.

**We hope that the fourth quarter of 2017 will be even more productive and we, on our side, will render our partners all-round support in all stages of our cooperation.**



Meeting with Siemens Transformers Ltd representative: Maxim Zagrebina (L) and Isken Tsekov



Power Standard Ltd is a dynamically developing company that promotes products of the largest CIS plants on the Russian market. At present, the company offers a wide range of equipment for oil, gas, chemical, ferrous and nonferrous metallurgy, rail transport and mining industries.



Uralelectrotyazhmash JSC is the biggest Russian developer and producer of electric power equipment for generation, transmission, distribution and consumption of energy. High-voltage equipment, transformers and reactors, converter equipment and electric machines of UETM brand are world known and enjoy a good reputation.



Ufa Transformer Plant is a modern enterprise with specialization in development and production of power and distribution transformers. The plant was built by Electrozavod JSC in 2009 and today is the largest power equipment building facility in Russia.

# THE TIME OF EFFICIENT PARTNERSHIP



**DMITRY ABBAKUMOV**  
Deputy Commercial Director

Today, the power industry is rapidly developing and we can see how it changed and how requirements to the market players were changing. For example, 10 years ago we were requesting only all-time goods availability for production. Later, the lowest prices became the guideline. Today, we live at the time of quality and additional services. Many companies working with electrical products entered a certain phase of development, which requires that suppliers take an active part in creation of competitive advantages of your company, and that is a true partnership. It helps to dramatically raise competitiveness of all companies entering the production chain.

## ACTION PLAN

When working out our strategy in respect to suppliers for the plant, we passed through several stages. First, we ran analysis of the range of purchased materials and divided them into categories. We also defined, which key requirements

should be observed by this or that supplier type, distributing them into several provisional categories.

**Normal supplier.** This category may have numerous items and regularity of supplies, therefore such requirements as convenience of supplier, including transport leg, obligatory delivery by supplier on agreed schedule, conven-

ient assembly set and packaging with repeated deliveries during the month and the standard quality and low prices.

**Qualified supplier.** The main materials are the biggest expense portion and any delay in supply of materials or poor packaging can lead to a production stop. Here, such requirements as reliable supply, stable quality with quality checks



Visit of Huntsman Corporation representatives, L-R: Konstantin Sipilkin, Konstantin Ilyichevsky, Dr. Hubert Wilbers, Dmitry Abbakumov and Yury Kukhtin



Discussion of technical features of Splav-DMZ products, on the R - Alexander Timofeev

**HUNTSMAN**  
Enriching lives through innovation

**СПЛАВ DMZ**

The companies that enter Huntsman Corporation produce chemical components for consumers from a large variety of industries: chemical, plastics, footwear, paints, fabrics, detergents, hygiene products, furniture, packing materials, automotive, aviation, medical equipment.

Splav DMZ Ltd is a modern foundry engaged in production of complex aluminium castings and has a complete cycle of mechanical treatment of cast parts.

of products and deferred payment are to be observed by all means.

**Reliable supplier.** There are not many problem materials, however risks and costs are high. These also include goods which we had to buy in large volumes in Europe because of periodic deficit on the Russian market, wait for delivery and store for a long time. Suppliers of problem materials must correspond to such requirements as readiness to have programs on supplies optimization: changing shipping quantity, packing quality, deliveries frequency, transportation safety, storage, handling and supplier proximity.

**Strategic supplier.** Strategic materials are the sort of materials whose share in value chain is fairly high for now and for future key and highly profitable products. They have a certain share of costs in general costs and a participate in creation of profit. Among requirements to a strategic supplier are readiness to system integration and coordinated business policy.

The quantity of suppliers by one type of products may vary depending on the market proposition and their capabilities. We put the emphasis on development of partner relations with selected suppliers.

### WITH PERSONAL INVOLVEMENT

When we develop a strategic partnership, we always aim at strengthening relations and personal meetings with our suppliers. In August, we had an important visit of our plant by representatives of Huntsman Corporation. We had talks on supplies of epoxy compound components by Huntsman. It is used by Izolyator in production of high-voltage bushings with solid RIP insulation. Besides, the Huntsman representatives made an overview of new materials made by the company. We discussed technical and commercial issues and outlined nearest and long-term cooperation plans.

Plant tours have become a good tradition during visits of our partners. It is a great opportunity to get an introduction to the key stages of production technology of high-voltage bushings with RIP insulation, meet technical specialists. In August, General Director of Splav DMZ Ltd Alexander Timofeyev paid a social visit to Izolyator plant. He made acquaintance with the manufacturing facility and had a meeting with representatives of the special design bureau and quality department, where they covered issues of casting quality and parts characteristics improvement.

In September, management representatives of MPC plant Sergey Panko, Quality Director and



Meeting with the representatives of MPK plant, L-F: Sergey Sirenko, Dmitry Abbakumov and Sergey Panko



Meeting of Reinhausen Power Composites GmbH and Izolyator representatives, L-R: Yury Kukhtin, Dmitry Abbakumov and Kinga Kastenberger

Sergey Sirenko, Head of Logistics visited Izolyator. The guests not only saw the plant but also discussed technical requirements to contact terminals of high-voltage bushings and plans of further cooperation development.

In the third quarter, Izolyator plant also received visitors from MR Reinhausen Power Composites from Germany. Kinga Czar, Area Sales Manager Eastern Europe represented the company. The agenda of the talks was discussion of the technology of composite hollow insulators

making and the resurfacing method of coating, which Reinhausen Power Composites GmbH supplies to Izolyator plant for application as one of types of external insulation of high-voltage bushings. The sides clarified technical features and supply volumes of these items till the end of 2017 and future plans.

**We wish to thank all our suppliers for active work in the third quarter of 2017 and look forward to our continued partnership!**



Maschinenfabrik Reinhausen GmbH (MR) is a leading company within the Reinhausen Group. For 30 years, MR has designed and manufactured insulation tubes from glassfiber reinforced epoxy resin. Based on this know-how and experience, MR expanded activities in the insulation materials business.

# IZOLYATOR TEST CENTER



**DMITRY IVANOV**

*Head of test center at Izolyator*

In Innovation column we keep talking about the technological process of high-voltage bushings manufacture at Izolyator. After the production cycle is complete, all bushings without exception go to necessary testing at the plant's test center, equipped to the latest technology with all required equipment from the leading global OEMs. It helps to perform testing of AC or DC high-voltage bushings with rated voltage up to 1200 kV. Each bushing rated 220 kV and higher has to undergo testing by lightning impulse, which is unique for our country.

## UNIQUE EQUIPMENT FOR INNOVATIVE TECHNOLOGIES

The test center for Izolyator high-voltage equipment was created at the new manufacturing facility in 2007. Parallel to the plant construction, we purchased and put in operation the most modern testing equipment of foreign and domestic manufacturers. The Swiss-American concern HAEFELY-HIPOTRONICS was the main supplier. All the testing equipment and measuring instruments meet the requirements of the standards.

Presently, Izolyator's test center is one the most advanced testing facilities in Russia. The core activity of the center is high-voltage tests performance on 10 - 1150 kV bushings for transformers, reactors, switch gear, wall bushings and DC bushings. The center is also capable to perform some tests on voltage transformers, current transformers, circuit breakers, porcelain.

The test center can carry out AC current tests: 50 Hz, up to 1200 kV (there are test stations of 20 kV, 300 kV, 700 kV and 1200 kV), surge voltage

tests by full and chopped wave 1.2/50 ms up to  $\pm 3600$  kV, tests by switching impulse 250/2500 ms +1800/-3000 kV. It should be said that Izolyator is the only electrical engineering company in Russia, which is able to perform tests by DC current up to  $\pm 1600$  kV!

## IN TANDEM WITH SCIENCE

We run heating tests by nominal current up to 10 kA and moist resistance of polymer insulation, cantilever load tests, oil and SF<sub>6</sub> leaktightness, measurements of key characteristics of the in-



*220-1150 kV testing station at Izolyator plant*



*10-150 kV testing station of Izolyator's test center*

sulation dielectric loss tangent, partial discharge level for alternating and direct current with noise level 0-1 pC, tests of transformer oil.

The test center closely cooperates with both customers and equipment suppliers. We are in regular contact with Research University MPEI, FSUE VEI, FSUE VNIIMS, FSUE VNIIMASH. We give excursions for the plant visitors — power industry professionals and students — on a regular basis.

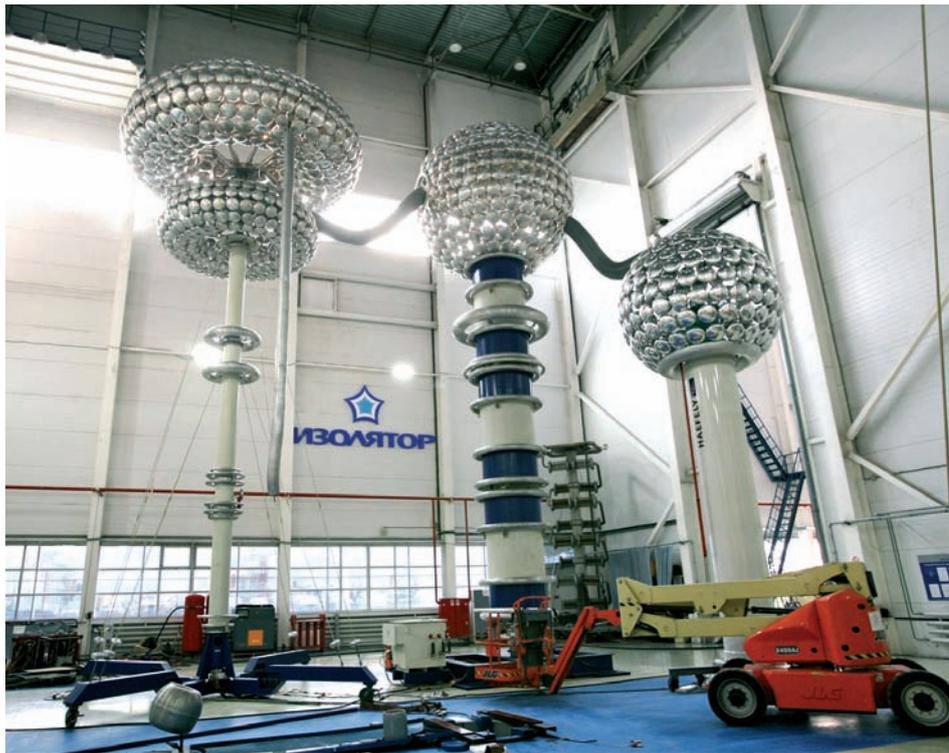
The unique tests are without exaggeration a trademark of the center. Thus, in 2010, the plant held unique tests of  $\pm 820$  kV wall bushing for China. The company conducts unique tests: some of those could not be repeated by many world's manufacturers of bushings. For instance, he did climate tests of a 500 kV bushings with porcelain housing and seismic tests of a 420 kV bushing with polymer insulation.

Over the past several years, the test center performed a huge number of acceptance tests in presence of representatives of foreign customers, who shared a high opinion on the performed test and became regular clients of Izolyator.

Izolyator became the first company in the world to develop, make and successfully test



220 kV air-liquid nitrogen bushing tests at  $-200^{\circ}\text{C}$



Series resonance test system of modular type for 1200 kV of alternating current

air-liquid nitrogen bushing type with solid insulation with capacitive field regulation with rated voltage 220 kV. The bottom part of the bushing is intended for operation in liquid nitrogen

at  $-196^{\circ}$ , and the upper part — in the open air from  $-60$  to  $+55^{\circ}\text{C}$ .

Air — liquid nitrogen bushings are designed for operation in innovative current limiting de-

vices, developed by Russian company SuperOx. The operating principle of current limiting devices is based on superconductivity effect.

### IN CONFORMITY WITH MODERN CRITERIA

We continue to develop our test capabilities. In August this year, we had talks with Peter Schikarski, Marketing and Sales Director at HAEFELY TEST AG regarding purchase of new test equipment and in September we already signed contract for delivery of a new 1200 kV impulse generator for execution of impulse tests on 110 — 150 kV transformer bushings during acceptance tests in compliance with the new IEC60137-2017 standard.

In 2017, we made a decision to make accreditation of Izolyator's test center with Rusaccreditation under new criteria. In September, we passed an onsite evaluation of our test center for compliance to the accreditation criteria and GOST ISO/IEC17025 under the authority of RusAccreditation. Based on the assessment's positive results, we filed an accredited test center status application with Rusaccreditation to be included in the register as accredited test center.

We are glad to meet our partners: the test center is always ready for cooperation with customers and suppliers of equipment.

**HAEFELY  
HIPOTRONICS**



Haefely Hipotronics AG is a trusted supplier of innovative solutions ensuring safe and reliable high-voltage power grids operation. It offers dependable high voltage test and measurement equipment to its customers around the world. Haefely Hipotronics, as a subsidiary of Hubbell Incorporated (HUBB).

Federal Service for Accreditation (RusAccreditation) is a federal government agency that serves as Russian Federation's national body for accreditation. RusAccreditation is under the supervision of the Ministry of Economic Development of Russian Federation.

# FIRST NATIONAL IMPORT SUBSTITUTION 2017 FORUM

In September 2017, Izolyator took part in the First National Import Substitution Forum 2017 in Moscow.

The Import Substitution Exhibition is traditionally represented by a large business events program, but this year, for the first time, those events went under common concept of complex approach to realization of industrial programs (plans) of import substitution.

Agriculture and agribusiness, construction, power industry, high-tech, medicine and pharmaceutical industry, transportation, — all those sectors were in the focus of attention of numerous experts who gathered at the venue in Crocus Expo.

Izolyator took part in the Power industry section meeting.

During the strategic session “Technological development of fuel and energy industries”



Alexander Slavinsky is making a report at the First National Import Substitution 2017 Forum

the Chairman of the Board of Directors of Izolyator Alexander Slavinsky made a report “Vector of development: from import substitution to export” covering import substitution issues in electrical engineering and summarizing

experience of export promotion of domestic high-voltage bushings on global markets.

We would like to thank the Forum’s organizers for the invitation and a high level of the event’s execution!

## CMDM 2017



In September 2017, representatives of SC D1 RNC CIGRE Materials and Emerging Test Techniques worked at the International Conference on Condition Monitoring, Diagnosis and Maintenance 2017 CMDM 2017 in Buharest, Romania.

CMDM Conference (Condition Monitoring, Diagnosis and Maintenance) is held every two years and took place for the fourth time. The organizer is Romanian National Committee of CIGRE, coorganizer is Romanian National Energy company CNTEE Transelectrica S.A.

The event went with support from CIGRE HQ in Paris.



Participants of the International Conference on Condition Monitoring, Diagnosis and Maintenance 2017 CMDM 2017

Technical specialists from 12 countries worked at the conference.

Dr. Ciprian Diaconu, President of Romanian National Committee of CIGRE opened the conference. Dr. Constantin Moldoveanu, Vice President of Romanian National Committee of CIGRE and Dr. Ioan Dorin Hategan, Secretary addressed the audience with a welcome speech.

52 reports and 6 training aids were presented at the conference.

Alexander Krayachich, Head of Primary Ele-

ments Dept at ASU-VEI Ltd represented SC D1 RNC CIGRE at the conference.

He made a report and actively engaged in discussions.

Russia’s delegation exchanged information materials with participants of the exhibition, held during the conference days, and took part in the plenary sitting of the conference.

A report on the conference’s results will be prepared and published on the webpage of SC D1 RNC CIGRE at RNC CIGRE portal.



The National Import Substitution Forum is called to outline the development vector for sectors of economy in order to create import substituting goods and services and to draw attention to the problems of legislative and state support. The forum gives an impetus to further realization of industrial import substitution programs.

# CIGRE SC D2 INTERNATIONAL COLLOQUIUM



*Participants of the CIGRE SC D2 International Colloquium*

In September 2017, Izolyator took part in the ceremony of opening of the International CIGRE SC D2 Colloquium in Moscow.

The colloquium went under the auspices of the Russian National Committee of CIGRE. The partners of the event were the leading power industry companies: the Federal Grid Company of the Unified Energy System (FGC UES), the Science and Technology Center of

FGC UES, the System operator of UES. Andrey Murov, Chairman of the Board of Directors at FGC UES and Philip Adam, General Secretary of the International Council on Large Electric Systems (CIGRE) took part in the Colloquium's work.

In his opening address, Andrey Murov noted that Russia gives a lot of attention to digital economy development. In FGC UES, there is a growing number of scientific research and prototyping projects, connected with digitization of production and operation processes.

Alexander Slavinsky, Chairman of the Board of Directors at Izolyator, Head of SC D1 RNC CIGRE, Russia's representative in CIGRE SC D1 was present at the opening ceremony.

During the event, Alexander Slavinsky and Philip Adam had a brief meeting where they spoke about the importance of knowledge and information sharing on industry development issues, which the Colloquium is called to aid.

More than 150 experts from 26 countries took part in the Colloquium.



CIGRE Study Committee D2 (SC D2) «Information Systems and Telecommunication» covers a vast variety of aspects of development of information and communication systems in power industry: specification, design, engineering, performance, operation, maintenance, economic efficiency and and management.

## ENERGY OF A PROFESSIONAL



On 26 August 2017, Alexander Slavinsky, EngD, Chairman of the Board of Directors at Izolyator celebrated his 55th Anniversary.

Alexander Slavinsky was born on 26 August 1962 in Moscow in the family of public servants. Finishing high school in 1979, he went to work at the Era plant, where he made career from laboratory technician to head of department. In 1985, while working full-time at the plant, he graduated from the Moscow Institute of Electronics, part-time department of the physicotchnical faculty, with engineer-physicist qualification. In 1992, he was hired as Chief of External Cooperation Bureau, and, already in 1995, at the shareholder meeting he was appointed General Director of the Mos-

cow plant Izolyator CJSC — one of the leading companies of the industry specialized in development and manufacture of lead-through insulators — high-voltage bushings. In 1998, Alexander Slavinsky was conferred a PhD degree and in 1999 — he defended his doctorate degree in technical sciences.

With the appointment of the new director at Mosizolyator, the plant's production was reconstructed, a lot of changes were made to expand the product range significantly, and the R&D team received a much greater authority and initiative in creation of new items of insulating equipment.

Thus, in 2002 — 2005, under the leadership and with Alexander Slavinsky's direct involvement, the plant created a unique proprietary technology of industrial production of solid RIP insulation, with the use of which it developed

110 — 220 kV bushings and commenced their mass production.

By the mid-2000s, it was clear that in order to increase output of the plant including older and new products, larger facility and modern technological base were required. Under Alexander Slavinsky's lead, the company realized a large-scale greenfield project of construction of a highly technological last generation production, over 20 thnd sq m, for modern high-voltage equipment production. In 2007, Izolyator plant was launched in Pavlova Sloboda of Moscow region. Alexander Slavinsky is at the head now in the function of the Chairman of the Board of Directors of Izolyator company.

Following the principles of innovative development, among other tasks, Alexander Slavinsky initiates and manages activities of gradual transition of high-voltage bushings range to the solid RIP insulation (today, AC bushings of up to 800 kV inclusive are offered), works on creation of DC bushings (up to  $\pm 800$  kV) and development and implementation of brand new insulation types.

Alexander Slavinsky's involvement in activities of industry organization is an important part of his professional life. He is Vice President AES RF, Vice President of International TRAVEK Association, Russia's Representative in IEC (Regular committee 36A), Russia's Representative in CIGRE SC D1, Chair of Study Committee D1 at RNC CIGRE.

Alexander Slavinsky is a member of the Dissertation Council at the Moscow Power Institute.

Among awards that Alexander Slavinsky has, there are For Distinguished Service in Public Order Maintenance (1985), In memory of the 850th Anniversary of Moscow (1997), second-class medal of the Order of Merit for the Motherland (2001). In 2017, Alexander Slavinsky was awarded a Badge of Honor of Merit for Moscow regions, third class, for his input in development of the industrial complex of Moscow region.

Wherever Alexander Slavinsky works, everywhere his no mean abilities combined with respectful and tactful treatment of people find use.

This management style invariably evokes a response, mobilizing and engaging the team in solving the daunting and complex tasks. The ability to look ahead and move on, analyze the present and take right decisions for the near and remote future are his signature features.

Izolyator staff, partners, colleagues and friends congratulate Alexander Zinovievich on his Anniversary and wish him strong health, high energy, professional and human longevity. May all your wishes come true! We wish you understanding and love!

## BEST MANUFACTURERS OF MOSCOW REGION AWARDED

In July 2017, Alexander Slavinsky, Chairman of the Board of Directors at Izolyator was awarded a Badge of honor «For Service to the Moscow Region», III grade, for his input in the development of the science and industry of the Moscow region.

The awarding ceremony took place within the Manufacturers of the Moscow Region 2017 Forum, which brought together executives of the largest industrial companies of the region, representatives of the banking sector, expert and scientific community, investors, realizing project in the Moscow region.

The Moscow Region Governor Andrey Vorobyov congratulated the industry workers on their professional holiday and awarded the best industry men of the region.

«I would like to thank you and your staff members, everyone who is involved in this important, highly important work. I wish your companies to develop and grow. My congratulations on the Industry Men Day of the Moscow region», said Andrey Vorobyov.

The Governor also thanked all entrepreneurs and executives of the Moscow region companies, who create new work



*Andrey Vorobyov (L) is awarding Alexander Slavinsky at the awarding ceremony of the best manufacturers of Moscow region*

places, implement advanced technologies, build new plants and produce highly competitive and modern products.

We appreciate the Government of the

Moscow Region for the high recognition of Alexander Slavinsky's input in development of the science and industry of the Moscow region.

## NINA MIKITENKO'S ANNIEVERSARY

On 8 August 2017, Nina Mikitenko, Lead Accountant of the financial and accounting department at Izolyator celebrated her Anniversary.

Ms Mikitenko began her career with Izolyator in 1965.

She received many awards and grateful letters for her achievements at work and active involvement in the plant's social life.

Sergey Moisseev, General Director at Izolyator took part in the celebration and passed Ms Mikitenko congratulations on behalf of the entire staff.

We join all congratulations and wish Nina Vladimirovna good health, many years and love!



*Sergey Moisseev is giving a Letter of recognition to Nina Mikitenko in connection with her Anniversary*

## TALENT POOL IS A STRATEGIC FACTOR



*Meeting on staff succession planning at Izolyator*

A meeting to plan talent pool development took place at Izolyator.

Julia Tyurina, HR Manager at Izolyator presented a project of talent pool development at the plant.

The objective is to ensure that the company has the right people in place to accomplish its strategy.

It is achieved by scheduled and unsched-

uled replacement of key, including managerial, roles in the company and provisioning continuity of manufacturing control.

The key participants in the process are heads of divisions at Izolyator and employees entered in the talent pool development program (succession candidates).

Succession candidates are selected by the company management based on the evaluation of their business and personal qualities.

Each candidate is assigned a coach — a qualified specialist or manager — who forms an individual development plan of that person without discontinuing work.

Upon completion of the training and development program Izolyator management would run appraisal of the candidate's performance and take a personnel decision.



*Meeting and discussion on staff succession planning at Izolyator on the initiative of HRM Julia Tyurina*

# WIN IN BRONZE PLAY-OFF OF THE CORPORATE FUTSAL CHAMPIONSHIP OF PAVLOVSKAYA SLOBODA

On 31 August 2017, Izolyator futsal team became a winner in the Bronze play-off of the Corporate Futsal Championship of Pavlovskaya Sloboda.

The championship, which went from 1 June to 31 August 2017, brought together six futsal teams of industrial enterprises and the team of Pavlova Sloboda administration.

The special awards of the championship were given to these Izolyator team's best players:

- Alexander Germanov — best shooter
- Evgeny Kurachuk — best assistant

Complete team roster:

- Mikhail Sheremetyev
- Anton Kobelev
- Alexander Nakidalyuk
- Mikhail Kharchenko
- Evgeny Lavrov
- Ilya Laptev
- Gennady Rybakov
- Mikhail Puzyrev
- Nikolay Ulitin



*Izolyator team is winner of the bronze cup of the Corporate Futsal Championship of Pavlovskaya Sloboda*

- Pavel Zotov
- Denis Petrov
- Maxim Smurygin
- Andrey Belotserkovsky
- Alexander Vakhrushev

- Evgey Kurachuk
- Alexander Germanov

**We want to say thank you to all players for the beautiful game and supporters — for their great input!**



*Izolyator team seizing the invitative*



*A 'dance' before the win*

# WE APPRECIATE ALL OUR PARTNERS!

## IZOLYATOR IS OFFICIAL SUPPLIER OF





# SALES DEPARTMENT



**IVAN PANFILOV**  
*Commercial Director*  
*Deputy CEO*



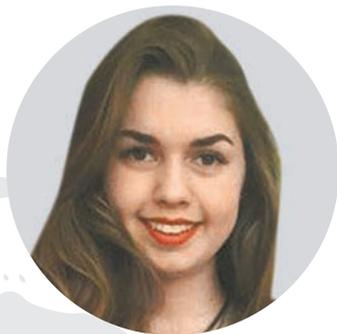
**DMITRY ABBAKUMOV**  
*Deputy Sales Director*



**OLEG BAKULIN**  
*Director of Partner Relations*  
Tel.: +7 (495) 727 3311, ext. 152  
Cel.: +7 925 879 2232  
Fax: +7 (495) 727 2209  
o.bakulin@mosizolyator.ru



**ALEXANDER SAVINOV**  
*Director of Strategic Sales*  
Tel.: +7 (495) 727 3311, ext. 150  
Cel.: +7 926 182 1942  
Fax: +7 (495) 727 2209  
a.savinov@mosizolyator.ru



**VICTORIA LOSHCININA**  
*Manager of International Business Development dept.*  
Tel.: +7 (495) 727 3311, ext. 128  
Cel.: +7 929 505 3405  
Fax: +7 (495) 727 2766  
v.loshchinina@mosizolyator.ru



**DMITRIY OREKHOV**  
*Manager of International Business Development dept.*  
Tel.: +7 (495) 727 3311, ext. 305  
Cel.: +7 929 961 2445  
Fax: +7 (495) 727 2766  
d.orekhov@mosizolyator.ru



**ALEXANDER ZNAMENSKIY**  
*Manager of International Business Development dept.*  
Tel.: +7 (495) 727 3311, ext. 173  
Cel.: +7 967 296 1510  
Fax: +7 (495) 727 2766  
a.znamenskiy@mosizolyator.ru



**IRINA DAUROVA**  
*Senior Manager of Partner Relations*  
Tel.: +7 (495) 727 3311, ext. 301  
Fax: +7 (495) 727 2766  
i.daurova@mosizolyator.ru



**BELLA KHASAIEVA**  
*Manager of Strategic Sales*  
Tel.: +7 (495) 727 3311, ext. 144  
Fax: +7 (495) 727 2766  
hasaeva.bv@mosizolyator.ru

# IZOLYATOR COMPANY



**MAXIM ZAGREBIN**

*Head of OEM Sales*

Tel.: +7 (495) 727 3311, ext. 300

Cel.: +7 926 273 9297

Fax: +7 (495) 727 2209

m.zagrebin@mosizolyator.ru



**MAXIM OSIPOV**

*Head of CIS Sales*

Tel.: +7 (495) 727 3311, ext. 151

Cel.: +7 926 182 2045

Fax: +7 (495) 727 2209

m.osipov@mosizolyator.ru



**ANDREY SHORNIKOV**

*Head of International Business Development dept.*

Tel.: +7 (495) 727 3311, ext. 129

Cel.: +7 926 342 3529

Fax: +7 (495) 727 2766

a.shornikov@mosizolyator.ru



**YAROSLAV SEDOV**

*Head of EU sales*

Tel.: +7 (495) 727 3311, ext. 171

Cel.: +7 925 889 5796

Fax: +7 495 727 2766

y.sedov@mosizolyator.ru



**DMITRY KARASEV**

*Senior Manager of CIS Sales*

Tel.: +7 (495) 727 3311, ext. 156

Cel.: +7 929 627 6816

Fax: +7 (495) 727 2766

d.karasev@mosizolyator.ru



**ANASTASIA KUZNETSOVA**

*Manager of CIS Sales*

Tel.: +7 (495) 727 3311, ext. 163

Fax: +7 (495) 727 2766

a.kuznetsova@mosizolyator.ru



**NIKOLAY BORICHEV**

*Marketing and PR Director*

Tel.: +7 (495) 727 3311, ext. 149

Cel.: +7 916 782 3505

Fax: +7 (495) 727 2766

n.borichev@mosizolyator.ru



**EKATERINA ZENINA**

*Manager of OEM Sales*

Tel.: +7 (495) 727 3311, ext. 214

Fax: +7 (495) 727 2766

e.zorina@mosizolyator.ru



**ANNA ZUBAKOVA**

*Manager of CIS Sales*

Tel.: +7 (495) 727 3311, ext. 162

Fax: +7 (495) 727 2766

zubakova.aa@mosizolyator.ru



**JULIA KOZLOVA**

*Assistant of Head of International Business Development dept.*

Tel.: +7 (495) 727 3311, ext. 251

Fax: +7 (495) 727 2766

j.kozlova@mosizolyator.ru

# FACTS AND ACHIEVEMENTS



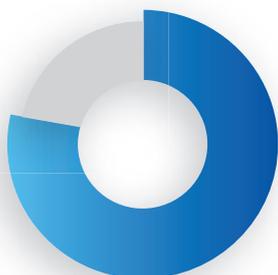
PRODUCTION CAPACITY



**12 000** BUSHINGS PER YEAR



MARKET SHARE  
IN RUSSIA



**70 – 80%**



STAFF



EXPORTS SHARE  
IN SALES VOLUME



**20%**



**EXPORTS  
30 TO OVER  
COUNTRIES**



**SUPPLIES RECORD  
IN EVERY REGION  
OF THE WORLD**