

# COMPREHENSIVE SERVICES FOR RES INSTALLATIONS





## SPIE Energotest



We are an engineering company specializing in the delivery of advanced services and equipment for power system automation, actively supporting energy transition in Poland.

For over **30** years, we have been operating in the power engineering market, providing comprehensive, professional solutions for the conventional energy sector as well as renewable energy sources (RES).

We are a part of SPIE Central Europe, which belongs to the international SPIE Group, a leader in multitechnical services for energy, industry and telecommunications sectors.

EXPERTISE



PROFESSIONALISM



EXPERIENCE



SAFETY



## We carry out tasks comprehensively!

By entrusting us with all matters related to the secondary circuits engineering including design, supply of protection automation and control systems, prefabrication, and commissioning, the General Contractor or Investor can focus on optimising their core area of operation.

The scope of SPIE Energotest's competencies in the implementation of distributed energy facilities:

We design electrical automation systems and complete energy systems. We carry out formal project management to obtain administrative approvals.



### DESIGN AND ANALYSIS

### CONTROL SYSTEMS



We are an integrator of SCADA/EMS systems dedicated to the control and management of distributed renewable energy installations (RES).

We have many years of experience in electrical protection automation. Using our own resources, we carry out the selection, configuration, and commissioning of electrical automation systems.



### ELECTRICAL AUTOMATION SYSTEMS AND TELEMECHANICS

### CABINET PREFABRICATION



We specialise in comprehensive prefabrication of protection automation cabinets and control cabinets.

We are a recognised supplier of electrical automation devices such as automatic changeover switches, disturbance recorders, arc protection relays, field controllers, and more. We have our own R&D department.



### AUTOMATION AND PROTECTION DEVICES



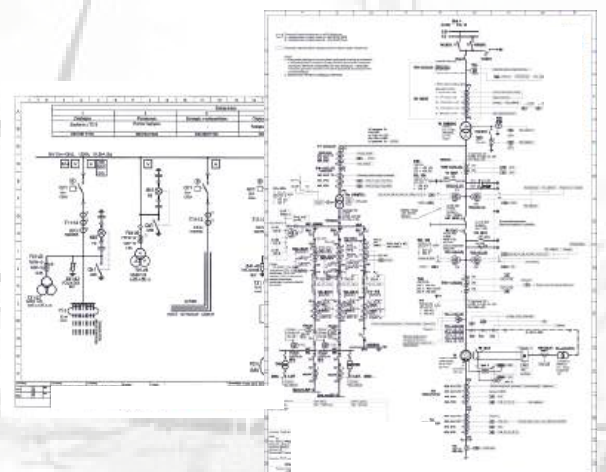
## DESIGNING POWER OUTPUT SYSTEMS



The Design and Analysis Division of SPIE Energotest has been providing clients with top-quality design services continuously since 2000. Utilizing advanced design expertise, we offer support in power automation and energy system design. Thanks to our extensive range of services, which includes both conventional energy and renewable energy sources, we are a key partner in the energy transformation process. Collaboration with us means access to innovative solutions and specialized knowledge, ensuring the efficiency and reliability of executed projects.

Our primary area of expertise in renewable energy sources (RES) is the comprehensive development of execution designs for power output systems and telemechanics systems for RES facilities. These systems must integrate distributed RES sources, where the generated electricity needs to be consolidated into a "single point," while also connecting to the existing distribution or transmission network to which the RES facility will be linked. Integrating RES into the National Power System (KSE) requires adapting the Operator's or Investor's existing power infrastructure to meet the needs of the source, based on the previously obtained Connection Conditions.

Thus, there are effectively two areas that need to be addressed to successfully integrate a RES source into the grid: the power output system from the RES and the existing power infrastructure to which the RES will be connected. Depending on the capacity of the RES source, the method of integration into the grid will vary. For small and medium capacities, direct connections will be used, while for high-capacity, large-scale RES facilities, integration will occur via Grid Connection Stations (GPO). SPIE Energotest's design services are targeted at both of these areas.



A well-designed power output system for RES installations ensures maximum energy transmission efficiency, minimizing energy losses and thereby increasing the overall performance of the system. It also helps reduce operational costs by decreasing the need for maintenance and repairs related to overloads and failures.

As part of our RES-oriented services, we provide:

- conceptual and basic designs,
- construction designs, including formal and legal documentation as well as necessary administrative decisions and industry agreements,
- execution designs,
- as-built documentation.

## REFERENCES

- PV Farm Unibax
- PV Farm Ucosa
- Poultry Farm Marian Wątor
- MCP Kotła 130MW
- APC „Przełom”
- SS 110/20kV Żarków  
(PV Connection 80/130MWp Kotła)
- SS 110/20kV Przylesie  
(PV Connection 65MWp Żabice)
- IP Łuków
- IP Rileta
- IP Weindich

## RESIZING / CABLE POOLING ANALYSES

The benefits of PV (photovoltaic) installation resizing projects include optimizing energy efficiency, better utilization of available space, and reducing both investment and operational costs. Cable pooling, which involves the shared use of cabling infrastructure by different renewable energy sources, enables more efficient energy transmission management and reduces the cost of constructing new transmission lines. In this area, SPIE Energotest's offering includes developing documentation for RES resizing purposes (primarily for PV sources) and participating in consultations with the Operator regarding the proposed solution.

## REFERENCES

- MCP Kotła 130MW

## CONTRACT ENGINEER (INVESTMENT IMPLEMENTATION SUPERVISION)

The role of the contract engineer includes overseeing various elements of an investment on behalf of the Investor – construction works and the quality of their execution, the prepared documentation, and ensuring that the work and formal matters comply with the applicable procedures (the contract engineer focuses on Construction Law and EU regulations).



## REFERENCES

- MCP Gaworzyce 246 MW
- MCP Radwanice 44 MW
- Włączenie MCP Gaworzyce i MCP Radwanice do MPSP Polkowice (connection at 220kV - owned by PSE)

Numerous references in conventional energy, e.g. Contract Engineer for the 910 MW Unit at Nowe Jaworzno.



## ECONTROL<sup>o</sup>ZE



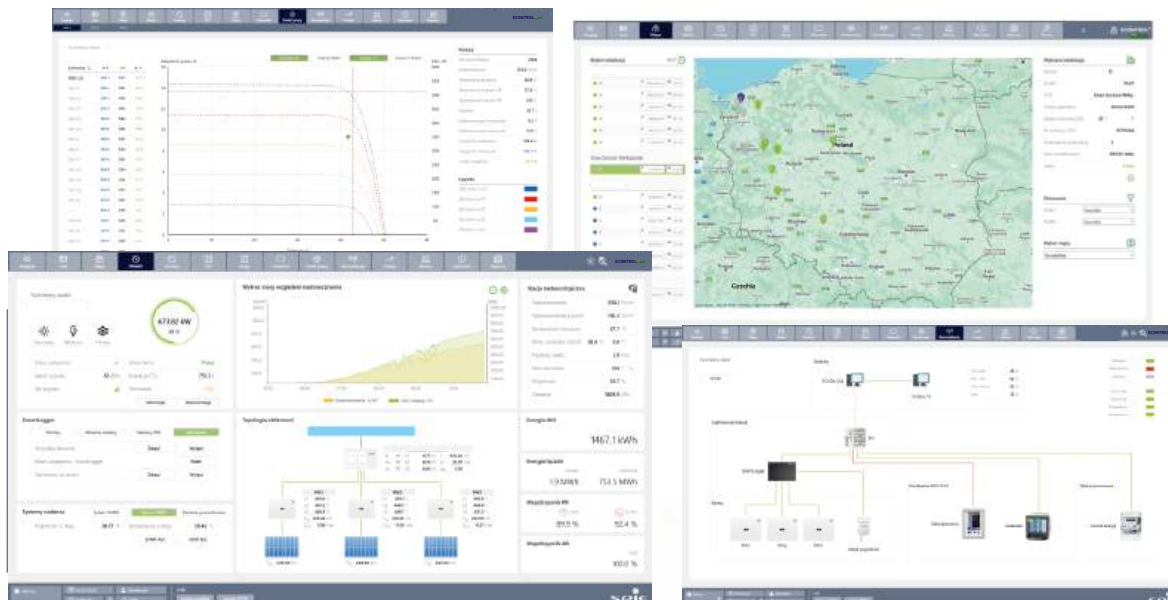
The **ECONTROLoze** system has been designed to meet all the unique needs arising from the operation of renewable energy installations. Its main task is to monitor, control and manage the operation of renewable energy installations including photovoltaic farms, wind farms energy storage systems, biogas plants, microgrids and cogeneration units. The system meets cybersecurity requirements and is implemented in accordance with the IEC62443 standard. SPIE Energotest has also implemented the ISO27001 standard, which specifies standards for information security management systems.

Based on many years of experience, we have developed a distributed energy facility management system with the following functionalities:

- compliance with NCRfG network code requirements,
- energy production prediction,
- facility operation management,
- power guard,
- active power regulation with reactive power compensation,
- operation within the balancing market,
- advanced reporting,
- performance analysis (point of operation),
- maintenance module - notifications/ticket handling,
- facility balancing in off-grid mode,
- energy storage systems management,
- advanced tracker operation algorithms,
- oversizing,
- cable pooling,
- group control of renewable energy facilities,
- facility operation scheduling (setting operating parameters for renewable energy facilities in specific time intervals),
- cooperation with the Polish Power Exchange (price arbitrage),
- justified periods,
- calculation of KPI,
- cooperation with LFC/SOWE systems in the provision of balancing services: FCR, aFRR, mFRR, and RR.

The system can integrate existing local vendors SCADA/EMS systems into one Centralised Management System ECONTROLoze - all the data can be stored and used from one SCADA/EMS.





ECONTROLoZe enables precise, real-time control and optimisation of renewable generation units and energy storage facilities, supporting energy efficiency, operational reliability, compliance with capacity market requirements, and dynamically evolving regulatory frameworks. It is a modern tool that significantly supports our clients in achieving their operational and strategic objectives.

The system is designed to accelerate energy transition in Poland by digitizing the management of distributed renewable energy installations. It provides real-time monitoring, remote control, backup power management, and optimization of generated profits. Integrated with weather forecast services and data from the Polish Power Exchange (TGE), it supports 24-72 hour production forecasting and responds dynamically to price signals. The system enables communication with power grid operators. It allows for the control and regulation of individual generation sources, as well as power generation reduction, e.g., in the event of a transmission network failure. The solution complies with European NC RfG standards (PPC).

## ADDITIONAL FUNCTIONS

- generation of predefined reports,
- possible implementation of a tool that allows editing existing reports as well as adding new ones. Reports can be presented in various graphical formats (charts, tables, mixed summaries),
- support for auxiliary installations, such as automatic systems for cleaning photovoltaic panels, animal deterrent systems, etc.,
- sending selected information to mobile devices.

## SYSTEM SECURITY

All critical system components can be redundant (servers, network devices, power supplies, hard drives, communication channels, etc.). Diagnostics for all network devices can be performed using the SNMP protocol (device status, individual port status, network traffic statistics, syslog file reporting). Computers can be equipped with antivirus software and automated tools for creating backup copies or full disk images, enabling quick system recovery in the event of a failure.

## REFERENCJE

### Selected projects:

- Central management system for PV farms with a total capacity of approximately 170 MWp - PVE GROUP
- Central management system for PV farms and wind farms with a total capacity of 530 MW - in progress
- MPO Skarszów
- MPO Płowki
- Tauron Ekoenergia - Reclaw station
- connected to the Zagórze WF
- Synthos Dwory - PV farm
- WF Krzęcin

### Hydroelectric power plants

- HPP Włocławek
- HPP Ptuśza
- HPP Niedzica

### Energy storage systems

- microgrid in Bytom
- Bełchatów Power Plant – 1MW Energy Storage



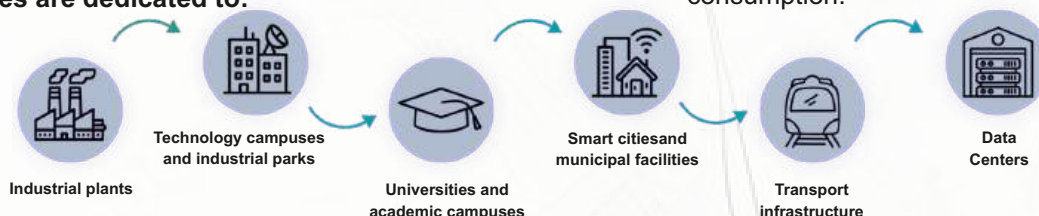
# MICROGRID MANAGEMENT SYSTEM



The microgrid management system was created in response to the needs of Investors and in line with market trends that encourage electricity producers to consume their own generated energy. This solution allows for:

- efficient energy management by balancing energy production with the current demand of the microgrid,
- savings resulting from avoiding shutdowns of RES sources,
- improved efficiency through regulation of individual inverter operation,
- improved energy quality,
- prediction of energy production and consumption.

The services are dedicated to:



## BALANCING AND SELF-CONSUMPTION OF GENERATED ENERGY

Depending on the configuration of the microgrid installation, the ECONTROLplus management system allows for independence from external electricity suppliers, maximization of energy production, or management of self-consumption and balancing of electrical energy.

The system enables real-time tracking of energy production from renewable generation sources, such as photovoltaic panels and/or wind turbines, and manages backup power sources (e.g., gas generators, diesel generators) and energy storage systems, as well as consumers who are the main beneficiaries of the microgrid setup. The use of different operational scenarios in the microgrid management system, such as maximum electricity production, maximum supply time to consumers in island mode, or prioritization of consumers, contributes to increasing the efficiency of the implemented system. By using a weather station and connecting to a weather forecast server, it is possible to predict (up to 72 hours) the production of individual generation sources as well as the degree of utilization of the energy storage.

### ENERGY STORAGE

- Management of surplus power storage as well as management of available power in the system.
- Maintaining the charge level of energy storage systems at the desired level.
- Real-time calculation of performance indicators (KPIs).
- Connectivity with battery management systems (BMS) and energy conversion systems (PCS) regardless of the suppliers.

## ENERGY TRADING

By using the RES installation management system, the user has the ability to decide on charging/discharging the energy storage in correlation with the current energy price, thus optimizing costs and generating profits (by purchasing electricity at a lower price and selling it at a higher price). The charging/discharging process can be optimized by using predefined thresholds, making the system virtually maintenance-free while still allowing for real-time monitoring.

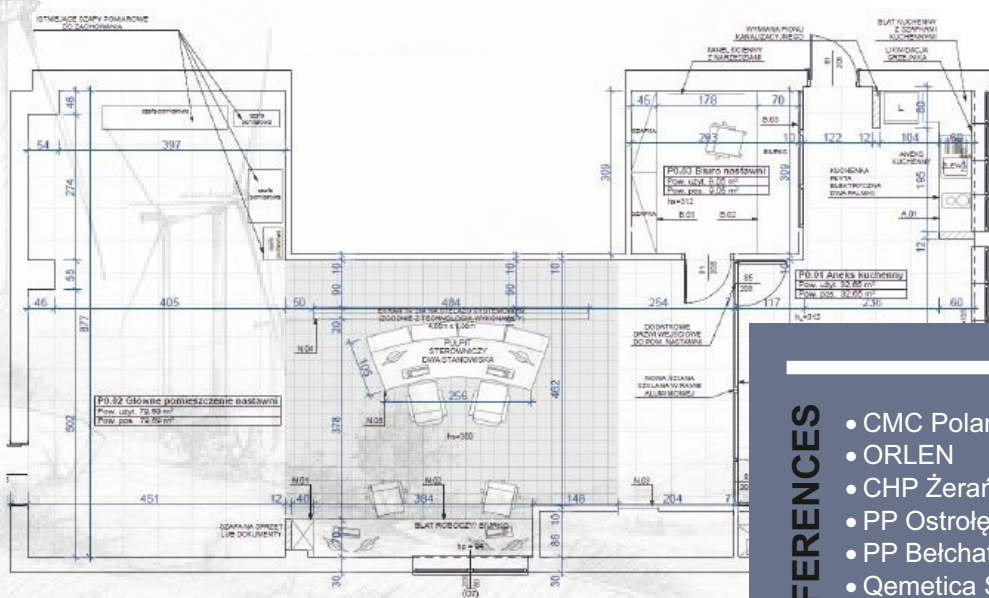
# COMPREHENSIVE IMPLEMENTATIONS OF CONTROL ROOMS



Our offer includes the comprehensive implementation of control rooms for centralised control systems in distributed RES installations, providing clients with full support from design to implementation. We specialise in the design and construction of modern control rooms that meet the highest standards of quality and safety.



We offer the development of designs and execution of all auxiliary installations, such as fire protection, air conditioning, and others. Our solutions also include ergonomic workstations tailored to the needs of operators, which translates into increased efficiency and user comfort.



## REFERENCES

- CMC Poland
- ORLEN
- CHP Żerań
- PP Ostrołęka
- PP Bełchatów
- Qemetica Soda Polska (formerly CIECH Soda Polska)



## EAZ SYSTEMS AND TELEMECHANICS



We provide the supply and commissioning of power system protection automation and telemechanics systems, both based on controllers from any manufacturer as well as our own solutions. Our experience comes from conventional energy, where we have been offering services for over 30 years. To date, we have completed:

- power output protection systems: over 130 applications,
- high-power generator synchronization systems: over 200 applications,
- auxiliary power supply switching systems for power plants: over 200 applications.

Thanks to our expertise, we are a trusted partner in the implementation of the power output system on the alternating current side for RES facilities. Our services include:

- comprehensive implementation of medium and low voltage power output systems,
- selection/configuration/setting/commissioning of telemechanics and protection systems in accordance with the Connection Conditions and NC RfG Network Codes,
- participation in measurements, post-installation tests, and functional trials of automation systems,
- commissioning of individual electrical systems and coordination of the startup of the entire facility,
- acceptance testing for RES installations in accordance with IRIESP requirements and NC RfG Network Codes.

We have the expertise to conduct acceptance testing of energy generation modules before they are connected to the National Power System (KSE).

As part of this service, we carry out:

- preparation and agreement of test programs in accordance with the requirements of IRIESP, the NC RfG network code, and the provided technical documentation,
- registration of selected electrical parameter values,
- participation in tests and trials at the site in the presence of the OS representative - acting as a witness to confirm the compliance of the tests and trials with the agreed programs,
- documentation of the course of tests and trials,
- preparation of reports on the performed tests and trials, including the final assessment of compliance with the requirements.



In the case of comprehensive implementations of power system protection automation for RES installations, our offer includes:

- **Needs and requirements analysis:** The first step is a thorough analysis of the client's needs and the specific requirements of the RES installation. At this stage, we gather all necessary data regarding the operating parameters of the installation and risks related to operation in order to design the optimal protection system.
- **Protection and telemechanics system design:** Based on the gathered information, we develop a detailed design of the protection automation system. We include the selection and configuration of appropriate devices to ensure rapid and effective response to failures.
- **Equipment selection and supply:** After project approval, we proceed with selecting the equipment. We collaborate with reputable suppliers, ensuring the high quality and reliability of the devices used. We order and deliver all the necessary components to the project site.
- **Installation:** We then move on to the installation stage of the protection automation system. Our team of engineers and technicians installs devices, wiring, and software, ensuring precision and compliance with the project.
- **Testing and commissioning:** After installation, we conduct detailed system tests. We verify the correct operation of protections, their response to various emergency scenarios, and integration with other automation systems. Once the tests are successfully completed, we proceed with the system commissioning.
- **Personnel training:** As part of the offer, we also provide training for the personnel operating the installation. We teach how to monitor and control the protection system to ensure maximum efficiency and safety.
- **Technical support and service:** After commissioning the system, we offer continuous technical support and maintenance services. Regular system reviews and updates are crucial for the long-term, reliable operation of the RES installation.

Each of these stages is carried out with the utmost care, which allows us to guarantee the complete safety and reliability of the protection automation systems.



Preparation of the application documentation for voltage connection (attachments required for the EON application).



Development of the guidelines for the cooperation between the dispatching services of the energy production facility owner and the relevant system operator (OS).

## REFERENCES

Several dozen projects completed, with capacities ranging from 200 to 1000 kW.

Projects commissioned by end customers or general contractors of renewable energy sources (RES).

Selected projects:

- WF Jasna
- Mistal
- Precision Castings
- RKS Golezów
- APC "Przełom"
- Wiendich
- IP Łuków
- IP Rileta





## CABINET PREFABRICATION



We carry out the prefabrication of cabinets for:

- protection (including compliance with PSE requirements),
- power switching,
- disturbance recording,
- synchronisation,
- control,
- excitation systems for generators and motor starting.

We carry out designs or work based on documentation provided by the client.

We prefabricate using our own components or those entrusted to us.

We conduct functional tests.

We participate in FAT, SAT, and HAT testing.



### REFERENCES

In our history, we have completed the prefabrication of several thousand control and automation cabinets.

#### Industry

- Arcelor Mittal Dąbrowa Górnicza
- Arcelor Mittal Kraków
- Arcelor Mittal Zdziechowice
- Anwil Włocławek
- Azoty Puławy
- Azoty Police
- Azoty Tarnów
- CMC Zawiercie
- Cement Plant Ożarów
- Cement Plant GóraŹdze
- Ekocem Przemysłownia
- Steel Mill Królewska
- Steel Mill Pokój
- MM Kwidzyn
- KWK ROW Ruch Jankowice
- KWK Zofiówka
- ORLEN Południe
- ORLEN Płock
- ORLEN Możejki
- Piklington Sandomierz
- Radpec
- Soda Ciech
- Synthos Dwory
- Tameh Dąbrowa Górnicza
- Tameh Kraków
- Umicore
- ZA Kędzierzyn Koźle
- ZG Janina
- ZTUO Szczecin

#### Power Plants

- PP Bełchatów
- PP Jaworzono III
- PP Dolna Odra
- PP Kozienice
- PP Łaziska
- PP Turów
- PP Opole
- PP Ostrołęka
- PP Połaniec
- PP Pomorzany
- PP Skawina
- PP Stalowa Wola

#### CHP Plants

- CHP Białystok
- CHP Czechnica
- CHP Łódź 3
- CHP Gdańsk
- CHP Gdynia
- CHP Gorzów
- CHP Elbląg
- CHP Kraków
- CHP Siekierki
- CHP Skierniewice
- CHP Zofiówka
- CHP Żerań

#### PSE Stations

- S/S Byczyna
- S/S Choczewo
- S/S Czarna
- S/S Czerwonak
- S/S Dunowo
- S/S Gdańsk Przyjaźń
- S/S Groszowice
- S/S Kozienice
- S/S Nysa
- S/S Pasikowice
- S/S Pelplin
- S/S Piaseczno
- S/S Plewiska
- S/S Polkowice
- S/S Praga
- S/S Siersza
- S/S Praga
- S/S Rogowiec
- S/S Wielopole
- S/S Żydowo Kierzkowo

#### Distribution Stations

- MFP Towarowa

#### Hydropower Plants

- HP Nidzica
- HP Włocławek
- HP Żarnowiec
- HP Porąbka-Żar

#### RES

- GPO Skarszów
- PVE Group
- Tauron Polska Energia

# DISTURBANCE RECORDERS



When operating electrical equipment, a crucial issue is the quick and precise assessment of emergency and disturbance states. For this reason, in locations where swift and accurate operational decisions are essential, it is necessary to use specialised recorders with very high measurement parameters (frequency, resolution, and sampling accuracy), typically integrated into a cohesive registration system.

SPIE Energotest is a recognised supplier of disturbance recorders in Poland, with over 2,000 installed devices, predominantly featuring the RZ-40 recorders. The latest device in the company's offering is the RZ-50 recorder, which meets the current PSE requirements.

The RZ-40 and RZ-50 recorders are designed to perform synchrophasor measurement functions. Compliance with the requirements for synchrophasors has been confirmed by a certificate from the Fraunhofer Institute.



RZ-50



RZ-40

## REFERENCES

- |                     |                     |
|---------------------|---------------------|
| • FW/GPO Barwice    | • FW/GPO Markowice  |
| • FW/GPO Banie II   | • FW/GPO Nozdrzec   |
| • FW/GPO Biały-Bór  | • FW/GPO Pruszcz    |
| • FW/GPO Bąków 1    | • FW/GPO Podlasek   |
| • FW/GPO Bąków 2    | • FW/GPO Pomerania  |
| • FW/GPO Darłowo    | • FW/GPO Radziejów  |
| • FW/GPO Dąbsk      | • FW/GPO Radzyń     |
| • FW/GPO Drzeżewo   | • FW/GPO Rajgród    |
| • FW/GPO Dzierzgoń  | • FW/GPO Rutki      |
| • FW/GPO Gawłowice  | • FW/GPO Sępólno    |
| • FW/GPO Grabowo    | • FW/GPO Skurpie    |
| • FW/GPO Grajewo    | • FW/GPO Suchań     |
| • FW/GPO Januszkowo | • FW/GPO Szymankowo |
| • FW/GPO Kokawa     | • FW/GPO Wisznice   |
| • FW/GPO Kostomłoty | • FW/GPO Wielowieś  |
| • FW/GPO Kraśnik    | • FW/GPO Wrocław    |
| • FW/GPO Lotnisko   | • FW/GPO Zalesie    |

Nearly two thousand recorders installed on wind farms, PV farms, PSE stations, power plants, and in industry.

- Over 30 recorders at the largest newly constructed transmission station in Poland (SE Choczewo – power intake from offshore wind farms).
- Two offshore stations!

Cybersecurity



Compliant with the Latest PSE Requirements



Colour display



Number of analog inputs (in standard configuration)



Number of digital inputs (in standard configuration)



Separate processors: communication and measurement



Sampling frequency



Capability to support Synchrophasor Measurement



Time synchronisation precision



Communication protocols: IEC 61850, Modbus TCP/RTU



Communication ports: 2×ETH, 1×RS485, 2×OPTO (optional)





## ARC FAULT PROTECTION DEVICE ArcPRO-6

Protection of people and equipment  
against the effects of arc faults

No. 1 in Poland (protecting over 20,000 MV and LV)



Autonomous protection.  
20-50 ms faster than solutions integrated  
in field controllers



Modular structure allowing optimal  
configuration of the device for  
various applications



Selectivity of disconnections  
(including for open-type switchgear  
connections)



Self-protection time  
below 8 ms



Arc light detection based  
on front sensors or fibre  
optic loops



Device configuration capability  
via web browser



Loop continuity and front  
sensor cable monitoring



Over the past 25 years, SPIE Energotest's arc protection devices have been installed at over twenty thousand MV fields, primarily in the national energy sector, but also at several dozen facilities abroad, including in Africa. We are not aware of a single case of unnecessary activation of our protection systems. However, we are aware of numerous instances where our arc protection devices have saved lives.

### REFERENCES

Over 100 transformer stations in Poland  
belonging to all key distribution system operators:

- Tauron-Dystrybucja
- PGE Dystrybucja
- ENERGA Operator
- ENEA Operator
- STOEN

Numerous industrial plants, PSE, selected distributed  
energy facilities.



## EPROTECT RSE CONTROLLER

Compliant with the latest frequency measurement  
standard PN-EN IEC 60255-181:2019-07.  
Ability to manage the entire SN/nn cable connection in  
a single device.

### REFERENCES

- PV CP Gliwice
- PV Warszawice
- PV Woodpack
- PERN
- Synthos
- KGHM

A total of several dozen  
controllers installed!



The device is equipped with a full set of protective  
functions dedicated to medium voltage (SN) switchgear,  
fully meeting the requirements of renewable energy.

- supports up to 32 outputs and 49 binary inputs,
- control outputs for circuit breakers equipped with relays  
with power contacts and continuity monitoring,
- enables control of 10 switches.

## AUXILIARY RELAYS



Compliant with the requirements of the Polish Power Grid.  
Over 10,000 intermediate relays installed in the Polish energy sector.

A complete range of relays, with over 20 different types.

Most commonly used in GPO stations:

- high-speed relay PWS-3,
- fast relay PPS-6,
- timer relay PT-4,
- intermediate relay PP-4,
- bistable relays PBI-4/PBI-8.

Design  
without reed switches



Flame-retardant enclosure  
(UL 94 V-0 standard)



Disconnection capacity up to  
6A 220 V DC L/R = 40 ms



Design resistant  
to contact pull-out.



Compact size



## POWER SUPPLY SWITCH AUTOMATION – APZmini



Proven (over a thousand installed devices).



The ability to measure medium  
voltage without the need

The device is designed for simple MV and LV switchgear. It can operate in seven commonly used switchgear configurations. It features a distributed structure consisting of:

- one APZmini unit, responsible for controlling the automatic load transfer (SZR),
- several (up to 5) PB relays (or PB-04), which collect information from the designated field (including voltage presence monitoring). They also serve as actuators for the power switching automation. They can cooperate with circuit breakers or contactors.

### REFERENCES

Wind farm:

- WF Banie
- WF Grajewo
- WF Radzyń Chełmiński
- WF Słupsk



Since 1992, we have participated in post-installation testing, commissioning, and startup of power engineering devices and systems in practically all newly built and modernised power plants and combined heat and power plants in Poland. We have also carried out this work at numerous substations and various industrial facilities.

Thanks to our experience, we can offer comprehensive support for investment processes in the area of renewable energy sources (RES). Our specialists are at your disposal during both the verification of the technical feasibility of investments and the supervision and execution of the tasks. We can supply integrated installation management systems as well as controllers and protections based on our own production. While carrying out our work, we take full responsibility not only for the equipment we provide but also for the correct operation of the entire power engineering system.

With the unique experience of our specialists gained over the last several decades, we guarantee our clients complete safety in the execution of entrusted tasks and offer a flexible and creative approach to each assignment. We provide a wide range of services, specialist knowledge, and a personalised approach to your needs. With our unique set of competencies, SPIE Energotest is the right partner for undertaking tasks in the field of distributed energy.

## INFORMATION SECURITY / MANAGEMENT STANDARDS

In today's world, information is one of the most valuable assets! We have implemented an information security management system:  
**ISO 27001**

Our other implemented management systems:

ISO 9001: Quality Management System

ISO 14001: Environmental Management System

ISO 45001: Occupational Health and Safety Management System



**SPIE Energotest sp. z o.o.**

ul. Chorzowska 44b

44-100 Gliwice

Tel. : + 48 32 270 45 18



[www.spie-energotest.pl](http://www.spie-energotest.pl)

08-01-2026