



TERAWATT GROUP
The Art of Engineering



TeraWatt Group

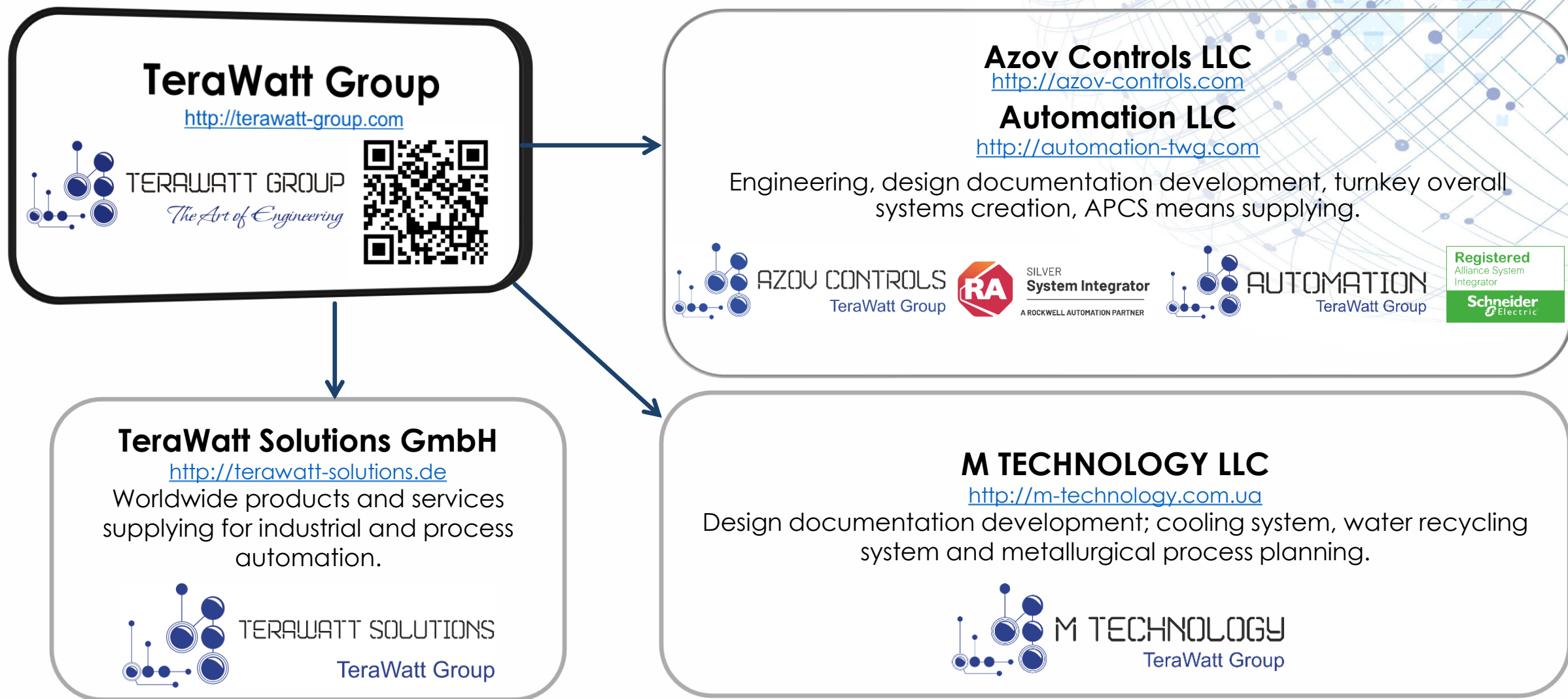
**Solutions in Control Systems
Design and Supplying**

Agenda

1. Group structure.
2. TeraWatt Group mission and vision.
3. Basic information about the group.
4. Cooperation with vendors.
5. Doing business worldwide.
6. Portfolio of the most interesting projects:
 - ☐ sinter shop;
 - ☐ HVAC system;
 - ☐ boiler;
 - ☐ mixing system for dry mixes;
 - ☐ blast furnace shop parameters archive.



TeraWatt Group structure



Our mission, vision and values



We are the company striving to be a step ahead of our customers needs.

We move our customers' business forward by putting qualitative, innovative and efficient process control system solutions into practice.

- Quality is the basis of our work.
- Responsibility, business reputation and results orientation.
- Innovation. You set a task for us - we find a solution.
- Efficiency.
- Professionalism.



Year of foundation: 2004



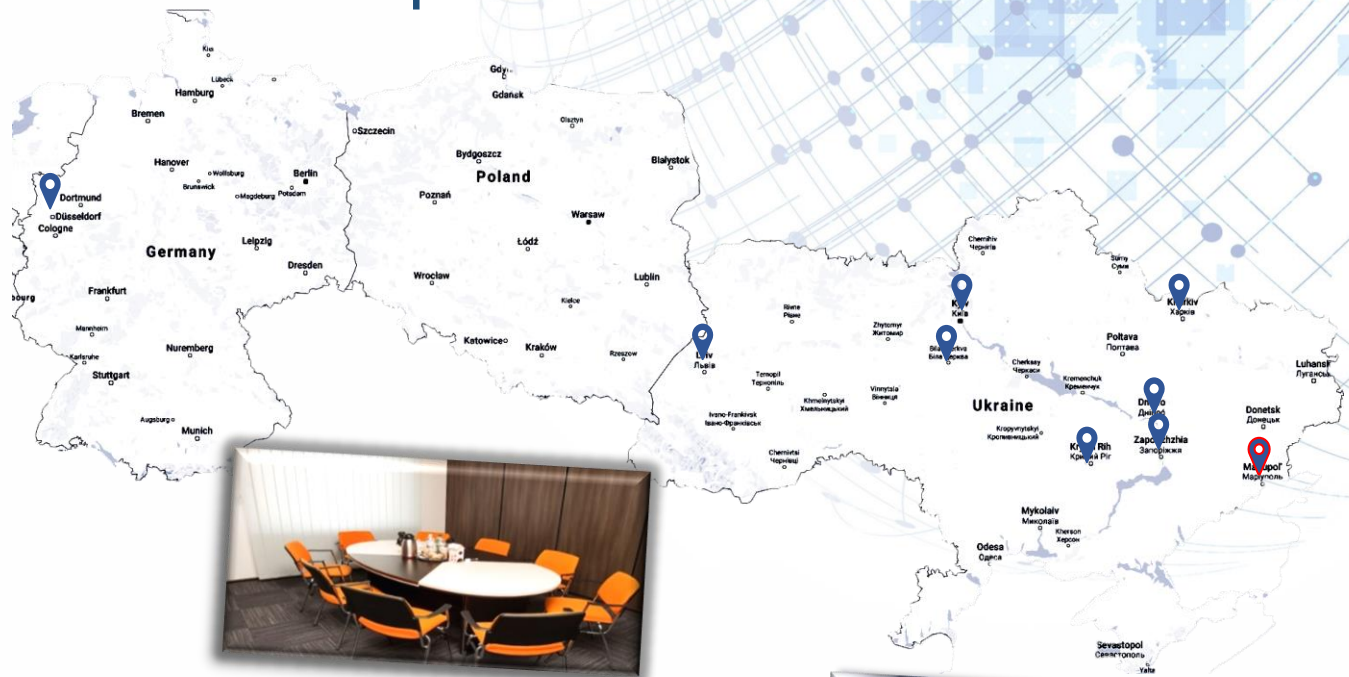
TeraWatt Group has representative offices in Ukraine (8 cities) and Germany:

- **headquarters:** Mariupol.
- office in Germany: Dusseldorf.
- offices in Ukraine: Kharkiv, Zaporizhzhya, Dnipro, Kryvyi Rih.
- representatives in Kyiv, Bila Tserkva, Lviv.

Own assembly shop: Mariupol.

Our core business activities:

- design of automation systems, electric drives, power supply;
- software development for the platforms of main vendors: Rockwell Automation, Schneider Electric, Siemens;
- electrical cabinets and control cabinets manufacturing;
- start-up works;
- comprehensive implementation and commissioning of automation systems ;
- development of IoT technologies, implementation of AR tools.



Total staff of TeraWatt Group is more than 200 employees, including:

- design engineers specializing in the development of design documentation for instrumentation, APCS, power electrical equipment, power supply, electric lighting; more than 30 people
- software engineers specializing in the development of PLC software, visualization software, IoT technology; more than 20 people
- process engineers specializing in power generation, air basin protection, blast furnaces, furnace cooling systems, aspiration, ventilation and air conditioning systems; more than 90 people
- construction engineers specializing in the design of metal structures, development of reinforced concrete structures, architects. more than 25 people

Experience in project implementation :

Since 2004, TeraWatt Group specialists have implemented more than 120 projects in various industries, including :

Project category	Completed (in progress *)
Blast furnace cooling systems	10(1)
Control of the casting yard electrohydraulic mechanisms	8
Control systems for heat removal from the blast furnace cooling system	5
Automation and power supply for sintering machines	8(2)
Boiler control	5
Gas cleaning and aspiration plants	8(2)
Central control rooms of production shops	6
Automatic control and protection systems for turbo blowers	2
Control systems for coke machines	3

Industries we work in:



Metallurgy



Chemistry and petrochemistry



Food industry



Power generation



CPG manufacturing

TeraWatt Group projects worldwide

❑ TeraWatt Group has experience in implementation of comprehensive solutions in the following countries:

- Ukraine;
- European countries;
- Belarus;
- Kazakhstan;
- Pakistan;
- Russia;
- India;
- Mexico.

❑ Own logistics department ensures timely delivery to any of the CIS countries, Europe and the world.

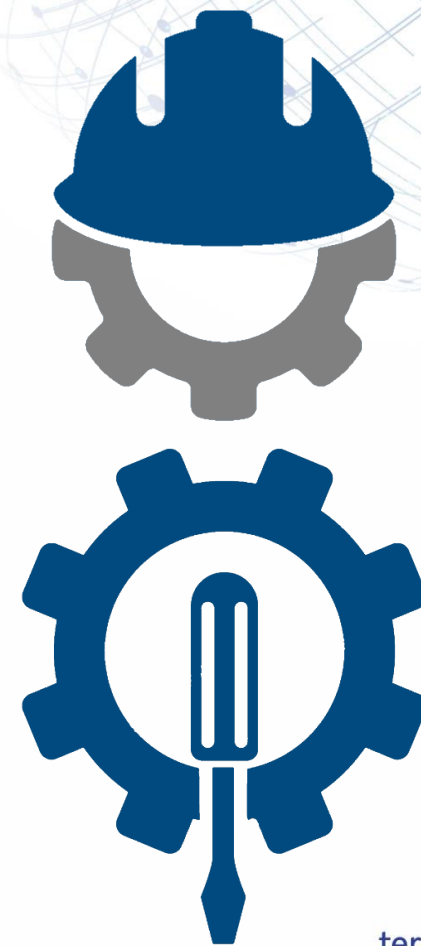
❑ Presence of a German company in the group of companies guarantees an appropriate level of interaction with European clients, including insurance, finance, etc.



TeraWatt Group capabilities in automation

As regards TeraWatt Group expertise in automation/electrical design, our capabilities include development of the following documentation (both basic and detailed engineering):

- control cabinets;
 - MCC;
 - cable routing;
 - instrumentation;
 - power distribution;
 - lightning;
 - grounding;
 - SCADA, PLC software;
 - safety.
- ☐ Controls cabinets, MCC assembling and supplying.
 - ☐ Commissioning.



TeraWatt Group capabilities in automation

TeraWatt Group offers some additional services such as:

- ☐ customer's personnel training;
- ☐ MES and accounting systems;
- ☐ creation of central control room, dispatch centers;
- ☐ support in development of APCS internal standards of the enterprise;
- ☐ modernization / maintenance of outdated equipment.



Engineering capabilities of TeraWatt Group

TeraWatt Group is able to dedicate a team to cope with large and intricate projects.

Companies belonging to TeraWatt Group have all licenses and permits necessary for executions of works. Our specialists are professionals in their area of expertise and fully meet qualification requirements. We systematically take care of updating knowledge and skills of our engineers, both in Ukrainian and European training centers.



Control cabinets assembling

- ❑ Our assembling shop manufactures control cabinets that meet any customer's needs.
- ❑ The process of control cabinets assembling takes place under constant quality assurance by the specialists of design department.
- ❑ Only high quality materials are used for the assembling. This provides high level of manufactured products.
- ❑ Each control cabinet is fully tested before being delivered to customer.
- ❑ We provide FAT and software demonstration to be passed together with customer's representatives before shipment.



Personnel training

- ❑ Training courses on operation with hardware and software manufactured by Rockwell Automation Inc have been held since 2007.
- ❑ The classroom located in the office of TeraWatt Group in Mariupol is equipped with the necessary equipment : PLC, frequency converters, network equipment, etc.
- ❑ Courses are being held by our best specialists of the software-engineering and commissioning department.
- ❑ A full list of standard courses is available on the site, it is possible to have courses on an individual program.
- ❑ On-site courses at the customer's premises are offered as well.





TERAWATT GROUP

The Art of Engineering



METINVEST

METINVEST HOLDING, LLC

- "Azovstal Iron&Steel Works" PJSC
- "Ilyich Iron And Steel Works" PJSC
- "Yenakiieve Iron & Steel Works" PJSC
- "Zaporizhstal" PJSC



ISD Corporation

- "Alchevsk Iron & Steel Works" PJSC
- "Dneprovskiy Metallurgical plant" PJSC



ArcelorMittal

ArcelorMittal Group

- "ArcelorMittal Kryvyi Rih" PJSC
- "ArcelorMittal Temirtau" PJSC



DCH Group

- "DMZ" PJSC



**INDUSTRIAL
METALLURGICAL HOLDING**

Industrial Metallurgical Holding

- "Tulachermet" OJSC



"Kosaya Gora Iron Works" OJSC



Sumy NPO
ESTABLISHED IN 1996

Sumy NPO PJSC

The Art of Engineering

Our key clients



Procter & Gamble Corporation

- Procter & Gamble Plant, Boryspil
- Procter & Gamble Plant, Ordzhonikidze
- Procter & Gamble Plant, Karachi, Pakistan



"Mondelez Ukraina" PJSC

- Trostyanetskaya chocolate plant "Ukraina" LLC
- "Chipsy lyuks" LLC



"AVK" Confectionery Company



ROSHEN Confectionery Corporation



"BELSHINA" JSC



"ROSAVA" PJSC



PSA Peugeot Citroën

- PSMA RUS, Kaluga

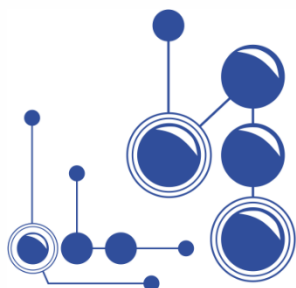


Gas Turbine Research & Production

Complex "Zorya-Mashproekt" SOE

Cooperation with vendors

- ❑ Azov Controls has been Rockwell Automation system integrator since 2015.
- ❑ Cooperation with Rockwell Automation since 2005.
- ❑ Own training center in operation with Rockwell Automation equipment.
- ❑ Full set of tools, converters, software licenses.



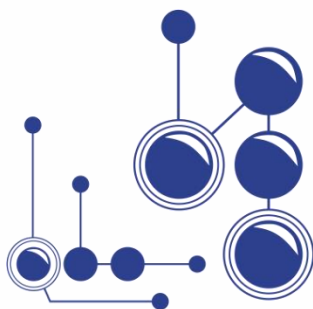
AZOV CONTROLS
TeraWatt Group



SILVER
System Integrator
A ROCKWELL AUTOMATION PARTNER

Cooperation with vendors

- ❑ Automation TeraWatt Group has been Schneider Electric registered partner of System Integrator Alliance since 2019.
- ❑ Cooperation with Schneider Electric since 2004.
- ❑ Full set of tools, converters, software licenses.



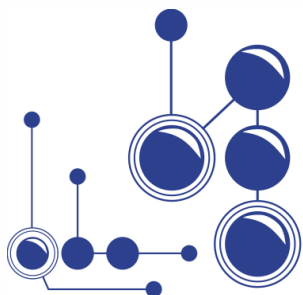
AUTOMATION
TeraWatt Group

Registered
Alliance System
Integrator

Schneider
Electric

Cooperation with vendors

- ❑ Azov Controls has achieved Siemens Ukraine certification as a System Integrator in the field of Components for automation system SIMATIC since 2020.



AZOV CONTROLS
TeraWatt Group

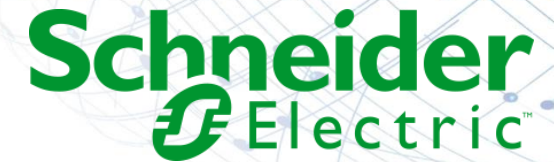
SIEMENS

TeraWatt Group main partners and vendors

TeraWatt Group companies are authorized partners of the following vendors:



SIEMENS



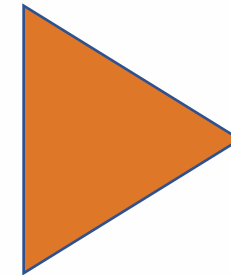
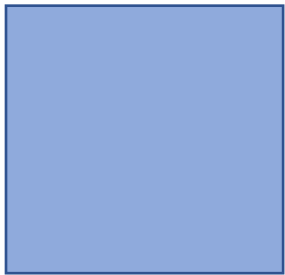
Doing business worldwide

- ❑ A significant part of our business is the implementation of projects as a subcontractor of European companies, including the development of design documentation, equipment supply, commissioning.
- ❑ We provide the commissioning of own projects, projects of third-party developers both on an hourly basis and on the principle of fixed volume.
- ❑ The presence of German company within the group of companies provides an appropriate level of interaction with European customers, including insurance, finance, etc.



PORTFOLIO

of projects accomplished by TeraWatt Group



Sinter Shop revamping

Customer: JSC “Zaporizhstal”.

Years of revamping: 2015-2018.

Revamping scope:

- ❑ sinter machine #4,5,6 revamping & modernization;
- ❑ implementation of the automatic mode for sinter machines;
- ❑ new gas cleaning system for the sinter machine #1;
- ❑ power distribution for sinter machines #4,5,6 revamping;
- ❑ new control room for the whole sinter shop;
- ❑ sinter shop transport system revamping.

Project budget ~ 2,3 Mil euro.

Automation platform: Rockwell Automation.



Sinter Shop revamping

TeraWatt Group scope:

- ☐ system design:
 - power distribution;
 - instrumentation;
 - MCC;
 - electrical & control cabinets;
 - cable routing;
 - software.
- ☐ control cabinets supplying (~100 pieces);
- ☐ cabling, installation;
- ☐ commissioning.



Sinter Shop revamping

New control room for the whole sinter shop

TeraWatt Group scope:

- ☐ development of the control concept for the sinter shop control room;
- ☐ interior design;
- ☐ furniture design;
- ☐ videowall design and programming;
- ☐ software development;
- ☐ commissioning.



Sinter Shop revamping

The success story based on this project is available at Rockwell Automation [web-site](#)

Connected control solution delivers greater process precision, enhanced energy management and data-capture capabilities at Ukrainian Sinter Plant

Major modernisation programme by Azov Controls gives metalworking plants access to multiple data-driven process improvements



Challenge

Ageing control infrastructure at Ukrainian sinter plant unable to leverage modern data-driven process advances

Solution

A Rockwell Automation solution was installed, which included:

- Integrated Process control system
- Industrial Ethernet switches
- Multiple EtherNet/IP-based device level rings (DLR)
- Integrated Safety
- Connected variable speed AC & DC drives
- OWS stations
- EWS Stations with integrated design tools

Results

- Modern connected automation solution for sinter plant
- Brand new central control room
- Greatly enhanced process data capture
- More efficient energy control
- Remote access
- Automated management of automation assets



The new central control room was built "from scratch" in a completely new building, with the layout being determined by the tasks to be undertaken by the operators

Background

Modernisation can deliver multiple technological, operational and legislative benefits, even in industries where automation has not traditionally played a key role.

One example would be in metalworking foundries, which are often highly mechanised and do not deploy automation on a scale similar to other major industries. Through modernisation however, these types of sites can realise significant performance gains, while also more effectively addressing ever-stronger legislation concerning energy use and harmful emissions.

Integrated Iron and Steel Works can actively use modern technologies to increase the efficiency of controlling industrial and business processes. A classic example of production automation is the "Enterprise in plain sight" system of visualisation and monitoring of technological processes, which was implemented at the Zaporizhstal PJSC in 2016.

Zaporizhstal PJSC turned to Ukraine-based Rockwell Automation Recognised System Integrator, Azov Controls LLC, to not only replace and build the control systems for its fifth and sixth sinter strands, but also design and populate a brand new central control room.

Allen-Bradley • Rockwell Software

Rockwell Automation

system operates 24 hours a day and the speed of the received data is a matter of seconds. It provides round-the-clock access to the most important information on production processes, online if production, making of informed decisions, initiation of control actions.

As a huge technological achievement, the shop comprises 15 sinter strands. In order to ensure instant emissions control for these sinter strands, they are equipped with process-gas cleaning and control systems to cater for the intense sources of dust generated by the sintering process.

For this turnkey project, Azov Controls had to gain a deep understanding of the customer's precise requirements. They then developed a system that met these needs; implementation, installation, commissioning major project activities, including on-site surveys.

Given the scale of the project, time was another key factor. In view of maintaining a continuous production schedule, the works had to be performed in a phased approach – a highly robust management strategy.

The power and control circuit supply systems were completely reconstructed and new hardware introduced.

Solution

The brains of the new process control system is the programmable automation controller (PAC) from Rockwell Automation, which communicates with a number of networked devices and cells through multiple EtherNet/IP-based device level rings (DLR).

As an integrated control system, CIP and CIP Safety™ is achieved through the connectivity with an Allen-Bradley SmartGuard™ 600 safety controller. Connected PowerFlex® 753 variable-speed drives are used for the mixing drum motor and a DC drive controls the sinter belt.

The integrated process control system uses the proven Rockwell Automation process solution with a hardware- and software-redundant server. Integrated engineering tools are being used to configure, develop and test the high-end plant controls and visuals based upon existing graphics.

The new central control room was built "from scratch" in a completely new building, with the layout being determined by the tasks to be undertaken by the operators. Console-type monitors were used for the local management of workstations and a mixture of 27 and 55 inch industrial monitors are used in a video wall to display the information served by the FactoryTalk software.

Using this new infrastructure, the operational staff at Zaporizhstal PJSC are able to accurately and clearly monitor key parameters such as temperature, pressure, humidity, machine speed and equipment status, while also being able to obtain real-time information about possible malfunctions and issues.



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Creation of central control room



HVAC system control

Customer: Procter & Gamble Plant, Boryspil.

Years of revamping: 2011.

Revamping scope:

- ❑ development and implementation of a control system, air handling unit electrical equipping (fan , gate valves control, atomizer and chiller on / off switching and setting , etc.);
- ❑ development of a control and parameters acquisition system, coordination work of 3 air handling units for one room in order to maintain the set parameters of operation - humidity, pressure, temperature (within the accuracy of 0.5°C).

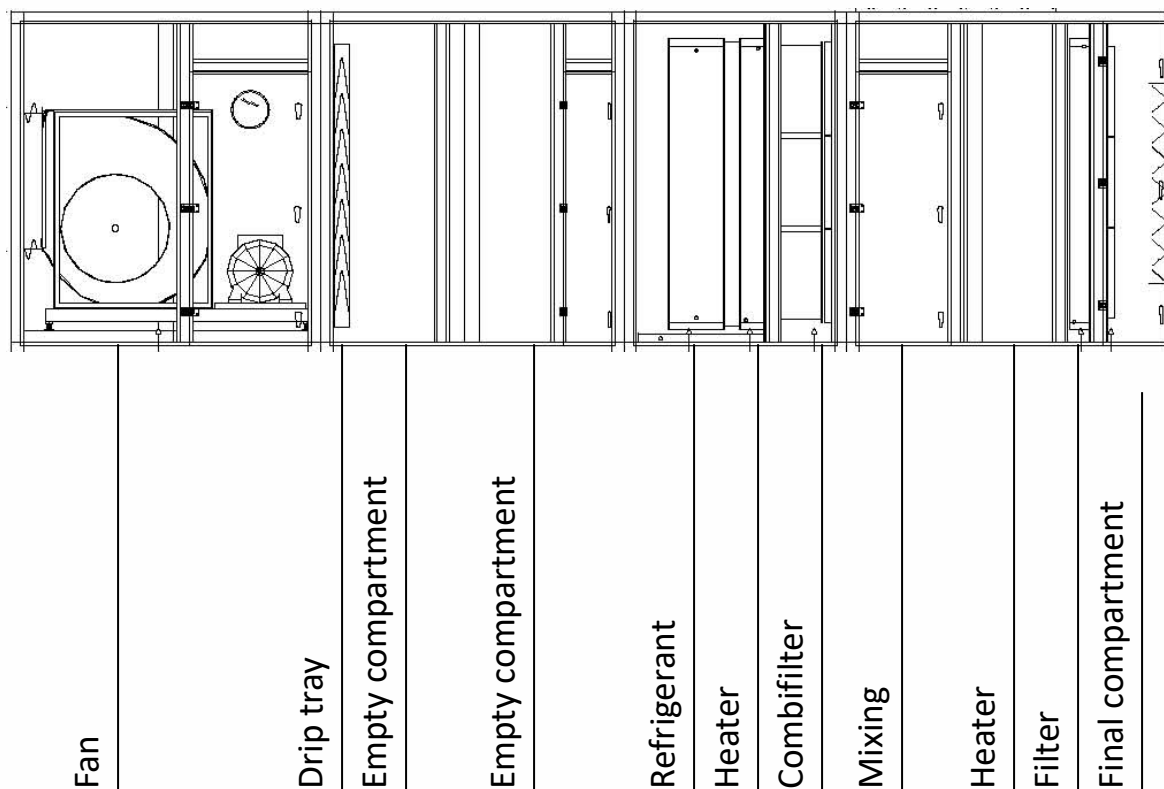
Project budget ~ 60 thous. euro.

Automation platform: Rockwell Automation.



HVAC system control

Air handling units (2 pcs.)



Expenditure - influx 80000,00 m³/h

Configuration Horizontal

Height without border 2250 mm

Width 3820 mm

Supplied without:

- ☐ sensors
- ☐ electric drives
- ☐ control systems

Boiler revamping

Customer: PJSC “Azovstal Iron&Steel Works”.

Name of project: Development and implementation of PJSC “Azovstal Iron&Steel Works” CPP APCS Boiler #5:

- ☐ performance: 220 tons of steam per hour;
- ☐ three types of fuel: natural, blast furnace, coke gases.

The years of revamping: 2011-2012.

Revamping scope:

- ☐ APCS designing;
- ☐ software development;
- ☐ control cabinets supplying;
- ☐ commissioning and putting into operation.

Project budget ~ 250 thous. euro.

Automation platform: Rockwell Automation.



Mixing system for dry mixes

Customer: Procter & Gamble Plant, Pokrovsk.

Name of project: Technical re-equipment of the cleaning powder packing site.

The years of the revamping: 2009.

Revamping scope:

- ☐ design documentation development and equipment supplying:
 - weighing and metering system;
 - electrical equipment (motor control cabinets);
 - MCC;
 - APCS (PLC cabinets, visualization tools).
- ☐ development of software:
 - process control in automatic mode;
 - recepies management;
 - accounting system.
- ☐ commissioning.

Project budget ~ 61 thous. euro.

Automation platform: Rockwell Automation.



Blast furnace shop parameters archive

Customer: “EVRAZ-DMZ” PJSC.

Year of implementation: 2014.

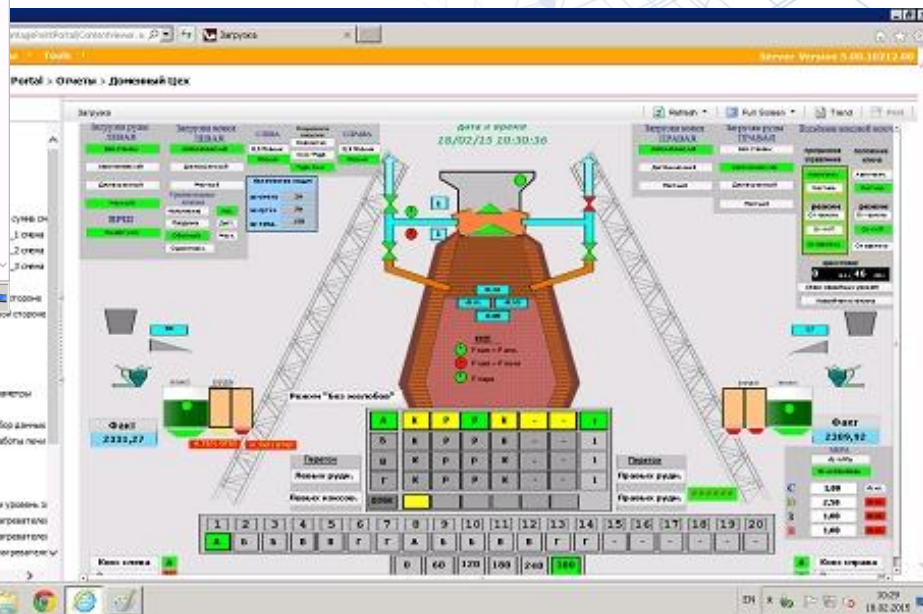
Name of project: Blast furnace shop parameters archive.

Project goal: providing access to information about the BF shop technological process to customer's officials throughout the enterprise

Implementation method: development of a Web portal based on the Rockwell Automation FT Vantage Point EMI product. Main advantages:

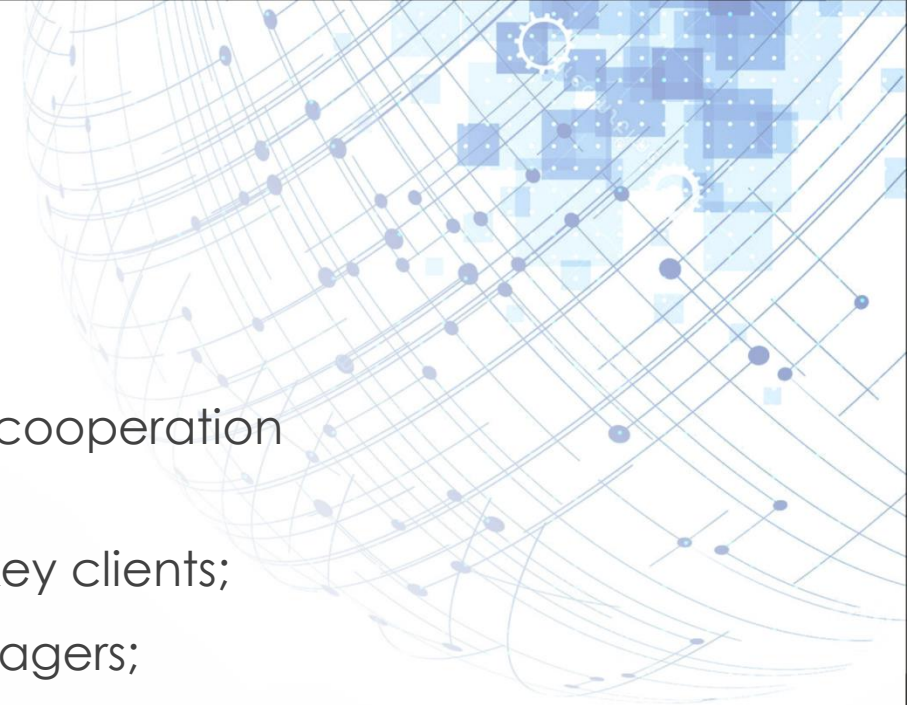
- ☐ the installation time, including development of basic graphics, reporting forms took 3 weeks;
- ☐ development tools - SCADA system-type specialized software without the need for scripts, HTML-code, FLASH programming, etc.;
- ☐ creation of reporting forms and calculations in MS Excel;
- ☐ simple connection to existing databases ;
- ☐ specialized database based on the FT Historian SE software for storing and “quick” handling of technological process data - for example, the trend for seconds values for 6 months is made in 3 seconds;
- ☐ maintenance of the system by the customer's APCS specialists.

Blast furnace shop parameters archive



We can offer our partners the following benefits:

- ❑ high skilled English speaking design, commissioning and start-up engineers.
- ❑ implementation of turn-key projects;
- ❑ own production and technical department;
- ❑ development of design documentation in EPLAN and AutoCAD systems;
- ❑ successful long-term cooperation with foreign partners;
- ❑ good contacts with key clients;
- ❑ network of sales managers;
- ❑ use of engineering licenses for access to the Rockwell Automation software package.



Thank you for your attention!

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