



Smart solutions.
Strong relationships.



SMART GRID Solutions by 

SUBSTATION AUTOMATION SYSTEMS (SAS):

PROTECTION & CONTROL

AUTOMATION SYSTEMS

COMMUNICATION SOLUTIONS

GLOBAL ENGINEERING SERVICES



**IEDs, systems and services
designed to meet utilities, industry and EPCs' requirements worldwide**



CG AUTOMATION, A GLOBAL SAS PROVIDER



CG is a global organization with a broad portfolio of products and services, ranging from high-end Power and Industrial Solutions to lifestyle Consumer products. CG is present in 85 countries with more than 16,000 employees across the world.

CG Automation BU is dedicated to the design, manufacture and marketing of digital protection, control, metering, communications equipment and systems for generation, transmission and distribution electric utilities, industries and EPC contractors worldwide; and automation systems for transit and water utilities.

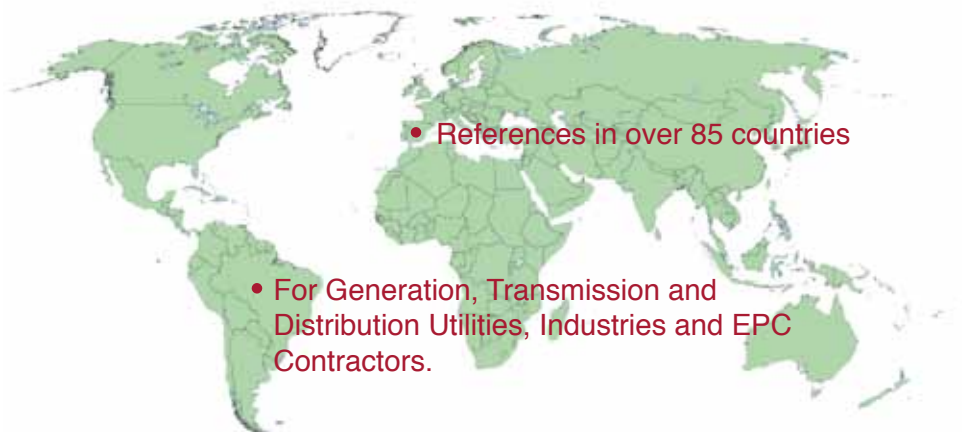


CG Automation headquarters located in Bilbao, Spain, host the center of excellence for the development of CG's smart grid solutions commercialized under ZIV® brand.

CG Automation business unit offers to the market a complete Substation Automation System portfolio (ZIV SAS).



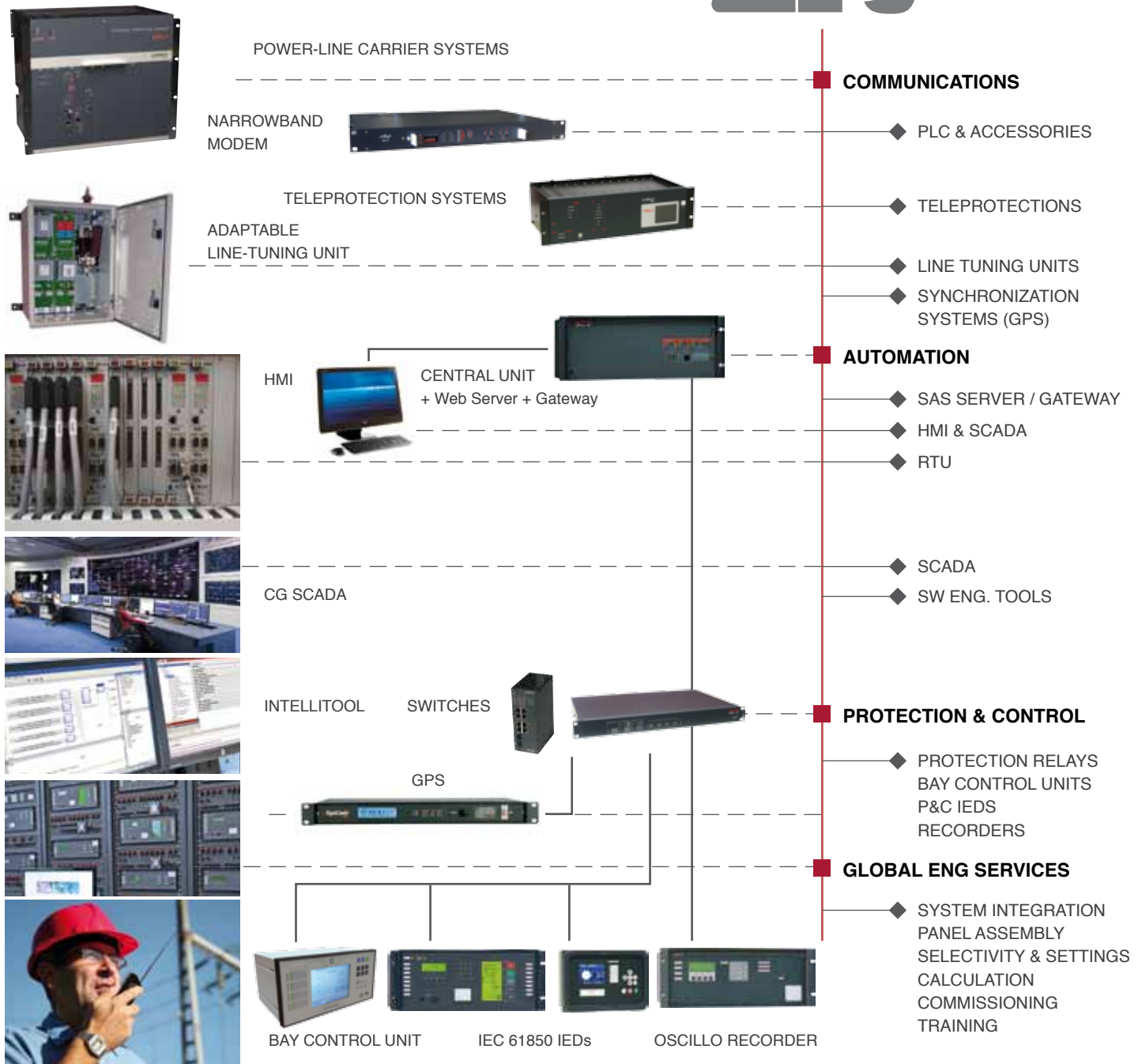
A portfolio based on in-house developed technologies and a unique mix of knowledge and experience in protection & control, communications and metering technologies.



SUBSTATION AUTOMATION SYSTEMS (ZIV SAS) PRODUCT LINE PORTFOLIO FOR HV AND MV POWER SYSTEMS:

Making the
Smart grid real

- ① **Integrated PROTECTION AND CONTROL SYSTEMS** including a variety of supervision and automation functions
- ② **COMMUNICATION SOLUTIONS:** Power-Line Carrier Systems, Teleprotection Systems, Modems, Networking and Line-Tuning Units & Accessories.
- ③ **AUTOMATION SYSTEMS:** an intelligent information platform: Modular RTUs, SAS gateway & SCADA.
- ④ **GLOBAL ENGINEERING SERVICES:** system integration, commissioning and training





① **PROTECTION & CONTROL
FOR TRANSMISSION & DISTRIBUTION POWER SYSTEMS**



ZLV
Line Protection
Distance

IDV
Transformer Protection
Differential



IRV
Feeder Protection
O/C Multifunction

BCV
Capacitor Bank Protection
O/C + unbalance + switching logic



RTV
Transformer Protection
Voltage regulator



IEC 61850

ZIV counts with a vast experience as provider of substation solutions using integrated protection and control systems including a variety of supervision and automation functions, Integrating legacy and modern standards such as IEC 61850.

ZIV IEC 61850 Interoperability Simulation Laboratory



**One tool to configure & communicate
with all ZIV IEDs**

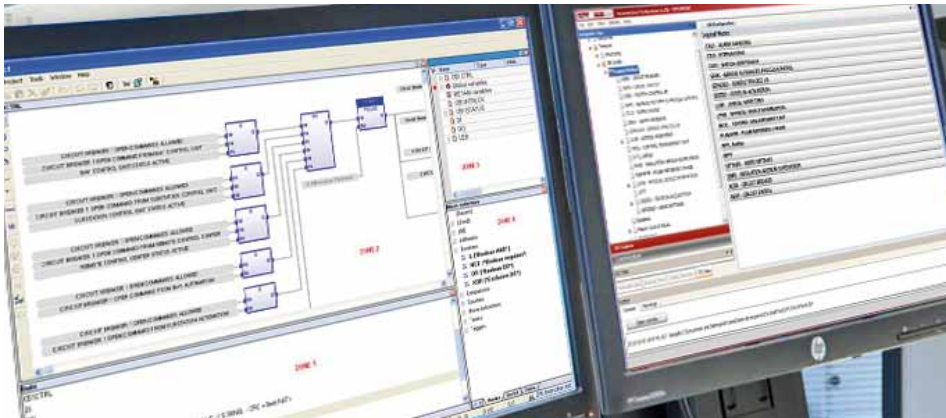
Intellitool is ZIV's new software application, user friendly and capable to configure all ZIV IEDs:

- Intelligent Electronic Devices (IEDs)
- Substation Central Units (RTUs)
- GPS clocks
- Switches
- Terminal Servers
- Merging Units
- RIO modules

Key features:

- Multiprotocol (IEC 61850, DNP3, IEC 101/104, Modbus)
- Graphic Interface (drag & drop mode).
- Graphic Editor for Logics (IEC 31131, function block diagram)
- Project mode /stand alone mode
- Partial insertion of elements
- Automatic mapping of user signals
- Third-party IEDs integration.

PROTECTION & CONTROL IEDS



DLX
Line Protection
Differential

IRX
Feeder Protection
O/C Multifunction



DBC + DBP / DRV
Busbar Protection
Differential



CGI 14S
Self-powered
Overcurrent Protection

	MAIN FUNCTION	I61850	PROTECTION	CONTROL	GRAPHIC HMI
LINE PROTECTION					
ZLV	Distance	X	X	X	X
DLX	Differential	X	X	X	
BUSBAR PROTECTION					
DBC + DBP	Differential	X	X		
DBC + DRV	Differential	X	X	X	X
TRANSFORMER PROTECTION					
IDV	Differential	X	X	X	X
IDX	Differential	X	X	X	
AEGIS T	Differential	X	X		
RTV	Voltage regulator	X		X	
FEEDER PROTECTION					
IRV O/C	Multifunction	X	X	X	X
IRX O/C	Multifunction	X	X	X	
AEGIS F O/C	Multifunction	X	X		
CAP. BANK PROTECTION					
BCV	O/C+unbalance + switching logic	X	X	X	X
BAY CONTROL UNIT					
MCV	Bay control unit	X		X	X
SmartBay	Bay control unit	X		X	X
BREAKER					
IRV	Breaker protection	X	X	X	X
SCT	Trip coil supervision		X		
SINGLE FUNCTION RELAY					
CPI	O/C		X		
CGI	O/C		X		
TPI	U/V + O/V		X		
CGV	U/V + O/V		X		
FGI	Frequency		X		
WDI	Reverse Power		X		
MXI	Motor		X		
CGI 14S	Self-powered O/C		X		
SCI	Synchro-check		X		

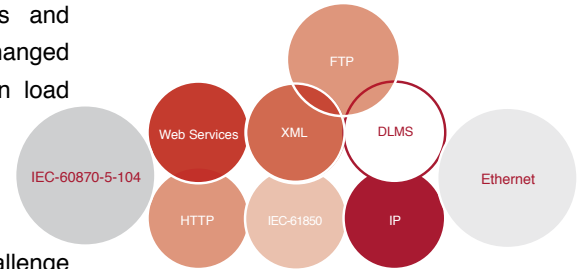
2 COMMUNICATION SOLUTIONS

Multiple communication technologies



ZIV telecom solutions make possible the integration of all the available automation functions, enable communications between substations, control centers and even allow data to be exchanged between different distribution load centers.

ZIV Communications Engineering services will make sure you have the right communication solution at the right cost.



Standards

We believe that the main challenge for electrical utilities is the seamless implementation of communications networks using multiple technologies, and combining a variety of systems with different capacities and security levels.

More than 11,000 **Power-Line Carrier** Systems installed worldwide.

Around 13,000 **Teleprotection systems** for Renewable Industry and transmission/distribution substations.

Security

The combination of communications + security + standards will be essential for successfully implementing the electrical distribution grids of the future.

Several thousands of **Switches** deployed. Industrial Ethernet switch for electrical substations, IEC 61850 compliant.



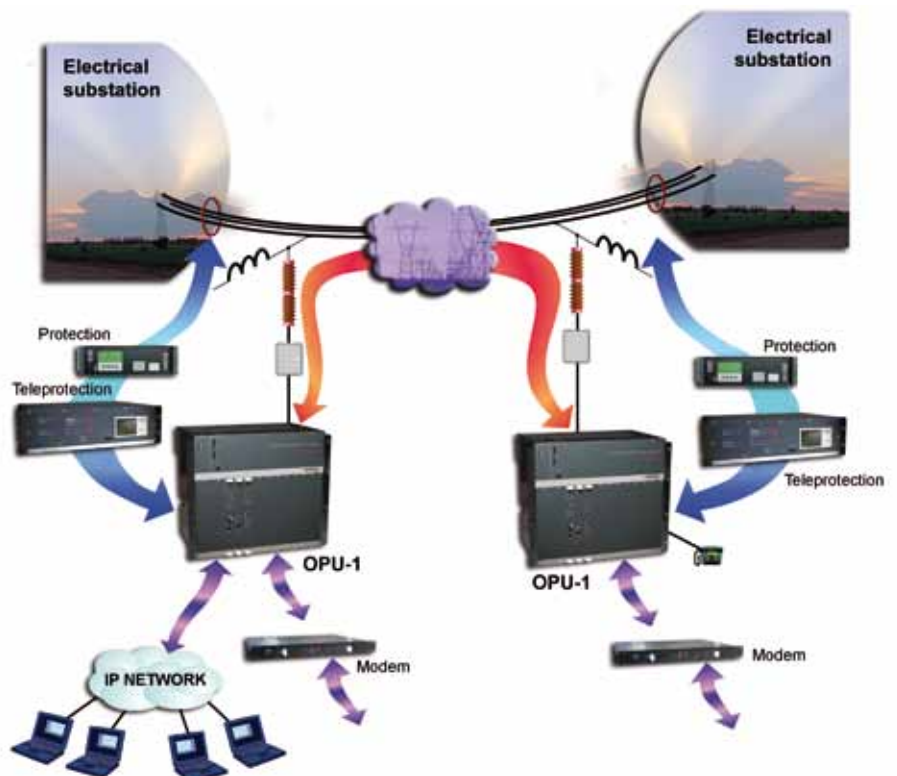
TPU-1
Universal Teleprotection



OPU-1
PLCC Terminal



AR-40
Communications Cabinet



Communication solutions, teleprotection and couplings units for power utility companies. Since 1967 (as former DIMAT) we are able to develop the best solutions for our customers.



POWER LINE CARRIER SYSTEMS	ANALOG	DIGITAL
OPU-1 · Universal Terminal	X	X
OPC-2 · Multi-function platform	X	
OPL-1 · Compact Terminal	X	
TELEPROTECTION SYSTEMS	ANALOG	DIGITAL
TPU-1 · Universal Terminal	X	X
CTP-1 · Compact Terminal	X	X
ABIT & CDIT modules for Power-Line Carrier Systems	X	
F2MUX · Universal Fiber to MUX converter		X
LINE-MATCHING UNITS & ACCESSORIES	OUTDOOR	INDOOR
UAPA-1 · High-Pass / Band-Pass Unit with integrated Hybrid Circuit	X	
UAMC · Compact Band-Pass Unit with integrated Hybrid Circuit	X	
UAM-4 · Band-Pass Unit with low impedance tuning	X	
CHD-4 · Differential Hybrid Circuit	X	
HPFA · Differential Hybrid Circuit		X
CIAV-1 · Attenuator	X	

MODEMS	ASYNCHRONOUS	SYNCHRONOUS	STAND ALONE	MODULE
MAFP · Asynchronous Narrowband Modem	X			X
MAS-2 · Asynchronous Narrowband Modem	X		X	
MQBT · Modem with Programmable Modulation Scheme	X	X		X
AVDM · Serial into E1		X		X
VDM – 1 · Serial into E1		X	X	
MDD-3 rack for MAFP/AVDM modules			X	

NETWORKING	KEY FEATURES
GPS	Both IRIG-B and NTP available models
Real Time Router	Modular IP router with several available communication interfaces and specific telecontrol applications (embedded GateWay IEC 60870-5-104/60870-5-101)
Switches	Modular IEC 61850 Ethernet Switch with high flexibility in the type and number of ports.
Concentrator / diffuser	Serial device server that allows secure connection of up to 9 serial devices to an IP network. Optional WAN interface (GPRS/EDGE/UMTS,...) with single/dual SIM



UAPA-1
High-Pass Band / Band-Pass Line Matching Unit



3SWT
Ethernet Switch

3 AUTOMATION SYSTEMS

An intelligent information platform for centralized & decentralized control systems:

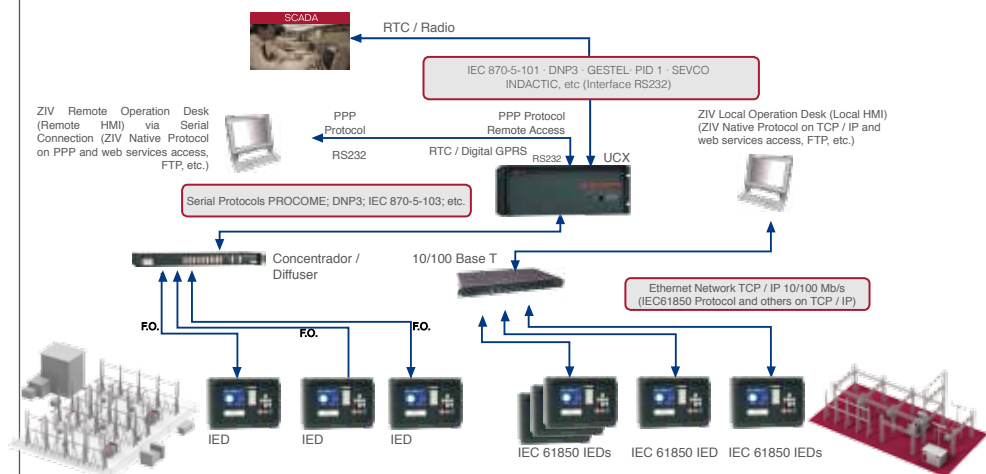
- Transmission RTUs
- SAS server
- Substation Control Systems
- SCADA
- Gateway & Protocol Conversion IEDs
- Data Concentrators



Transmission RTU

Xcell is a modular platform with features including protocol conversion, substation communication, I/O data monitoring and physical automation. XCell can be fitted to new substations or retro-fitted to existing substations and can be fully integrated with other substation equipment. It provides flexibility and scalability to accommodate power utilities of varying scale.

IEC 61850 SAS Server / Gateway. Modular.





CG Scada

General features:

- Multiprotocol (61850, DNP3.0, MODBUS, IEC101/104, OPC, ICCP, (master & slave)
- Multilanguage (Spanish, English, French, Portuguese, ...)
- Redundancy
- Cibersecurity
- Fault recording and visualization (oscillograph)
- Multiple Substations
- 61131 logic
- Web support (client / server)
- Reports & Trends
- Real Time Data Base
- Synchronization IEEE1588, SNTP, IRIG-B
- Alarms & Events Module
- Multilevel
- Zooming, declustering, overlaying, ...
- Dynamic Symbol Library
- Automatic Line Colouring



Substation Control Systems

By coupling the Bay Control Unit (BCU) and RTU system to Local HMI facilities, data links to system IEDs, and communication links to remote EMS or DMS Control Centers we can provide elegant **Substation Control Systems providing full system information, both current and historic, simultaneously to all of the interested parties**

The systems can be simple stand alone through to redundant, multiple site, multiple master systems merely by the provision of additional equipment and functionality.



4CCT
Data Concentrator Comm Port Expander



ePAQ/9410/9430
Multifunction Gateway



BCU+RTU
Substation Control Systems



4 GLOBAL ENGINEERING SERVICES

Recent 61850 SAS projects

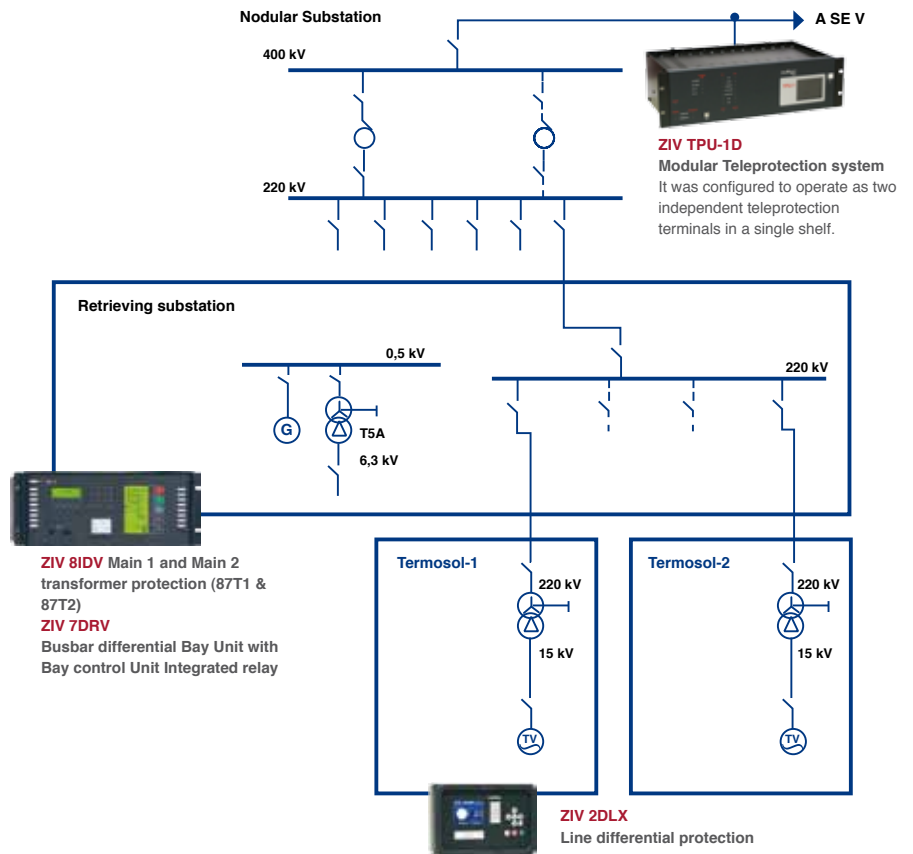
SUBSTATION AUTOMATION & COMMUNICATION SYSTEM FOR RENEWABLE PLANTS

400/220kv Thermosolar

Substation. Logrosan, Spain.

EPC: Inabensa. Spanish company SENER was the designer of the complete system and specifications.

This system is located in the Spanish region of Extremadura. It is a group of substations that collect all the power from several Thermosolar plants in the area and deliver it to the REE (Red Electrica de España, Spanish transmission company) system.



System engineering

61850 relays

61850 SAS Server

Communication System

System integration

Commissioning

Training services

The system included an integrated **protection and control system** for the substations Termosolar-1, Termosolar- 2, Colectora and Nodal. (10 P&C pannels and 2 metering pannel fully equipped).

It also included the **communication system** via fiber optic, including ZIV Teleprotection system, and the integrated communication system to connect to REE Valdecaballeros Substation and to the collateral Solaben TV Plant system (six substations).

References in 85 countries

AMERICAS

61850 SAS FOR PHOTOVOLTAIC PLANTS & WIND FARMS

115 Kv. El Porvenir. México

EPC: IsoluxCorsan

100 MW – 138 KV Llano de Llampos Substation. Latin America´s largest solar photovoltaic plant

EPC: Isastur

110 kV. Chacabuco & San Cristobal Substations.

Client: Endesa - Chile

EUROPE

AUTOMATION SYSTEMS

A Generation Management System (GMS) for a Grid Supply Point (GSP) and associated embedded generation sites (275/132/66 kV Substations)

Client: Northern Power Grid (UK)

SAS FOR UNDERGROUND GAS STORAGE

132 kV Yela Substation. Spain

Client: Enagas

It has two lines of 132 kV and two 40 MVA transformers, the plant is key to ensuring the supply of gas in the center of Spain.

CG's Automation Business Unit is a global provider of Distribution Automation Solutions and Substation Automation Systems. References in over 85 countries in main Generation, Transmission and Distribution Utilities, Industries and EPC Contractors.

Some references are listed below:

- EUROPE: (SP) Iberdrola, Grupo Endesa, Grupo Gas Natural Fenosa, Red Eléctrica de España, HC Energía , EDP, E.ON España, Gamesa, Repsol, Aceralia, Ehn, Metro De Madrid; (Czech Republic) Jme-Eon; (Fr) Rte, Edf; (Italy) Enel; (Nw) Statnett, Lyse Energi As (Poland) Pse; (Portugal) Ren, Edp ; (Romania) Hidroelectrica; (Sweden) Vattenfall; Svenska KraftnÅ ; (UK) MANX Electricity Authority; National Power Grid, Northern Power Grid, etc..

- AFRICA: (Algeria) SONELGAS ; (Angola) GAMEK ; ENE ; (Burkina Faso) SONABEL ; (Cameroon) AES-SONEL ; (Egypt) EETC; (Ethiopia) EEPKO (Mali) EDM; (Tanzania) TANESCO; (Morocco) ONE; (Kenya) KPLC

- AMERICAS: (USA) Alabama Power Co, Hydro Mississauga, Pennsylvania Electric Co, Houston Electric, Entergy, Maine Electric Co ; (BRAZIL) Ampla, Coelba, Cosern, Celpe, Coelce, Furnas, Copel; (MEX) CFE , Luz y Fuerza; (ARG) Edenor, Edesur, Edelap, Ape, Dock Sud; (BOL) Electropaz, Cre; (CHILE) Grupo Enersis –Chilectra, Chilquinta; (PAN) Edemet; (PARAGUAY) Ande; (VEN) Cadafe, Enelven.

- AUSTRALIA (Australia) Western Power, TransGrid, SPI PowerNet , Powerlink, Hydro Tasmania, ETSA, Ergon Energy; (New Zealand) Transpower; etc...

- ASIA: (Indonesia) PLN; (Malaysia) SESCO; (Philippines) TRANSCO ; (Thailand) EGAT; (Vietnam) EVN; (India): Avanyha Power, PGCIL, MSETCL, UPPCTL, JSEB, Power Grid India, etc...



AFRICA

COMPLETE COMMUNICATION SYSTEM SUPPLY & INTEGRATION

Kinyerezi 150 MW Gas Power Plant and collateral substations.

EPC: Jacobsen Elektro AS

Final Client: Tanesco Tanzania

KENYA 5 SAS & TELECOMMUNICATION SYSTEM

Isiolo S/S, Meru S/S Extension and Nanyuki S/S Extension

EPC: CG

Final Client: KPLC, Kenya

INDIA

61850 SAS for 400 & 220/132/33 KV Substations

400 kV. RAIGARH Substation

India | EPC: KWPC

Client: Avantha Power

Six 220/132/33 kV ZIV 61850 SAS at Govindpur, Manoharpur, Jaduguda, Dalbhumgarh, Jamtara and Rourkela in the State of Jharkhand (JSEB)

Utility: Power Grid India



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Strong relationships.

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