Solutions for Telecontrol and Operations Management

Overview

More than ever comprehensive and integrated real-time systems are today a fundamental tool for infrastructure management. SCADA and telecontrol systems are at the heart of everyday operation of companies ranging from generation, transmission or distribution utilities; water and wastewater utilities; railway infrastructure operators; or plant owners.

Managing operations requires systems that perform monitoring, control and optimization and solutions that adapt to specific customer needs and processes quickly and in a cost-effective way. Solutions that drive efficient, secure, economical and reliable operations are fundamental to increase competitiveness and profitably for infrastructure operators and owners.

Efacec is a world-wide provider of integrated solutions for plant and network management with more than two decades of industry experience and references in utility, rail and industry applications. Our long term commitment in the automation business and philosophy of customer partnership constitute the success factors of your projects.

Key Offer

- Integrated operation, management, technical supervision, communication and RTU solutions
- Differentiated solutions for large networks and smaller-scale systems
- Full set of services from design and engineering to maintenance and support
- Turnkey solutions
- Combined Efacec SCADA software, hardware and third-party offer
- Straightforward system engineering, maintenance and expansion tools

Value Proposition

- Open and versatile systems
- Strict conformance to industry standards
- Systems tailored to meet the specific needs of each project
- Evolving and adaptable solutions with economical life-cycle costs
- Seamless integration into the IT infrastructure
- Wide industry experience in telecontrol systems and solutions
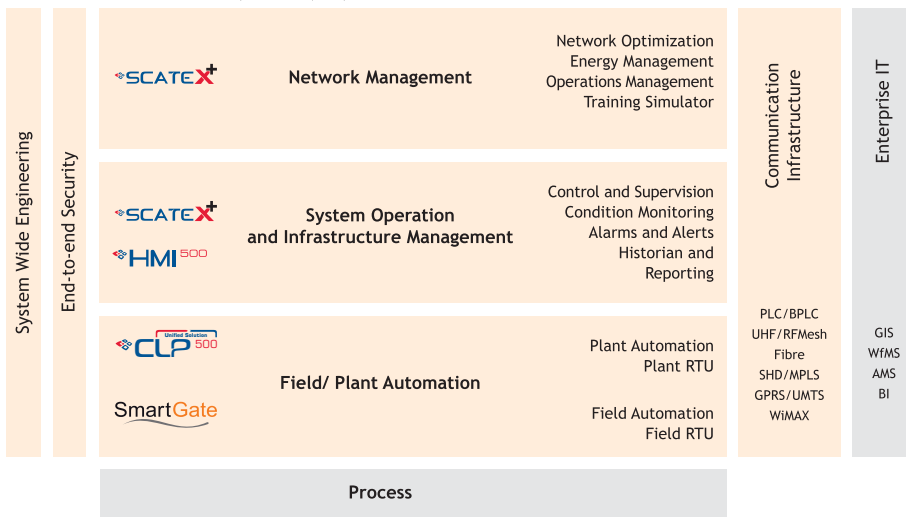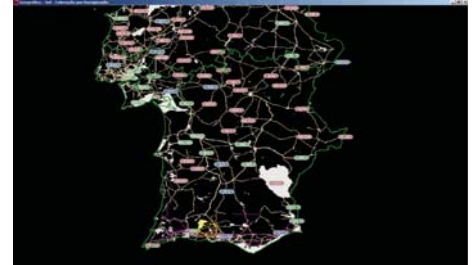
Solutions Overview

Modern telecontrol and operations management solutions include not only advanced control, visualization and alarms processing, providing real-time situational awareness and enhanced decision support, to operate the system, but also combined management and optimization applications as well as condition monitoring and technical supervision of all assets, including process assets and associated facilities, communication and automation equipment.

As the enterprise real-time information backbone, SCADA systems include integrated historic data storage and reporting functions as well as interfaces to corporate systems, such as Workforce Management, Geographical Information, Asset Management or Business Intelligence systems. Plant automation systems, remote terminal units and intelligent field equipment, together with the communication system, constitute the foundation layer of the telecontrol solution.

To maximize system life-cycle options and reduce integration costs Efacec solutions are based on open and easy to integrate platforms regarding hardware, operating systems, core software and database engines, communication protocols and enterprise integration. International and industry standards such as IEC, DNP, W3C or OPC, just to name a few, are at the core of our solutions.

Recognizing that solutions follow requirements, Efacec builds on its long industry experience to partner with our customers and combine state of the art technology of its own product portfolio and third party offer with value-adding services to deliver the solution best fitting the needs of each system.

Operations management and telecontrol solutions are part of the Efacec solutions portfolio that extends from plant and substation automation, protection and control, through energy management and smart grid solutions including distribution automation, smart metering or electromobility.


System Wide Engineering	End-to-end Security			Communication Infrastructure	Enterprise IT
		SCATEX⁺ **Network Management**	Network Optimization Energy Management Operations Management Training Simulator		
		SCATEX⁺ **HMI 500** **System Operation and Infrastructure Management**	Control and Supervision Condition Monitoring Alarms and Alerts Historian and Reporting	PLC/BPLC UHF/RFMesh Fibre SHD/MPLS GPRS/UMTS WiMAX	GIS WfMS AMS BI
		CLP 500 **SmartGate** **Field/ Plant Automation**	Plant Automation Plant RTU Field Automation Field RTU		
		Process			

Overview of Telecontrol and Operations Management Solutions.

SCADA Software

Efacec SCADA software enables customers to select from two major platforms and several application functions to deploy solutions that balance performance, functionality and scalability within the scope of the specific project requirements and enterprise investment plans.

Being fully upgradable to the ScateX+ platform, the HMI 500 SCADA/HMI Platform is a perfect match for small to medium scale SCADA and plant systems. Typical applications include local or remote control for power plants, substations, waste/wastewater treatment plants or distributed energy resources.

For medium or large scale network systems requiring high-end solutions, such as power grid management, railway operation centers, power generation management, and water/wastewater networks, Efacec portfolio includes the ScateX+ Network Management Platform.
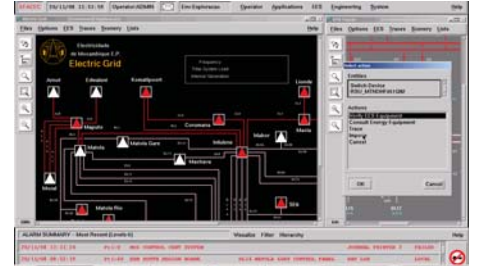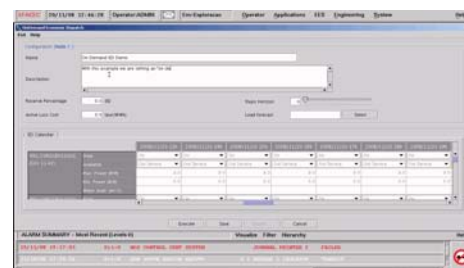

Application Functions Comparison Chart	HMI 500 SCADA/HMI Platform	SCATEX+ Network Management Platform
Applications for Real-time System Operation		
Full vector graphics 2D layered screens and schematics, Real-time trends, Data lists, Tags, pins and notes, Model browser, SMS/email reports and alerts, Alarms handling, Printers	Yes	Yes
Network-aware traces and coloring, Model-based on-the-fly generated schematics, Advanced alarm management, Advanced tagging and pinning, Cuts and jumpers, Synchronized views		Yes
Switching order/Operation list interface		Yes
Geographic screens and Cartography		Yes
IP Video integration	Yes	Yes
Information Storage Applications		
Time-stamped database storage (process events and data, user actions, system actions, etc.)	Yes	Yes
Historical trends and data listing	Yes	Yes
IED/RTU data file extraction and storage	Yes	Yes
Snapshot and Historical playback		Yes
Management Applications		
Power applications and network studies (EMS/DMS/GMS/OMS)		Yes
Operator training simulator		Yes
Supervisory reporting (reports and dashboards)	Yes	Yes
RTU/IED configuration management	Yes	Yes
Engineering Applications		
Engineering environment	Standalone Integrated Engineering Environment (Automation Studio)	Standalone Integrated Engineering Environment
Configuration management	Revision control system integration	Fully-integrated repository, version and configuration history support

Efacec solutions present multiple choices of user interface, such as control room operation, distributed operator stations or web and mobile access; multiple architecture options, from highly scalable distributed server and data center deployments to cost-effective single machine systems; integrated management/optimization applications and functions; as well as straightforward engineering and life-cycle management.
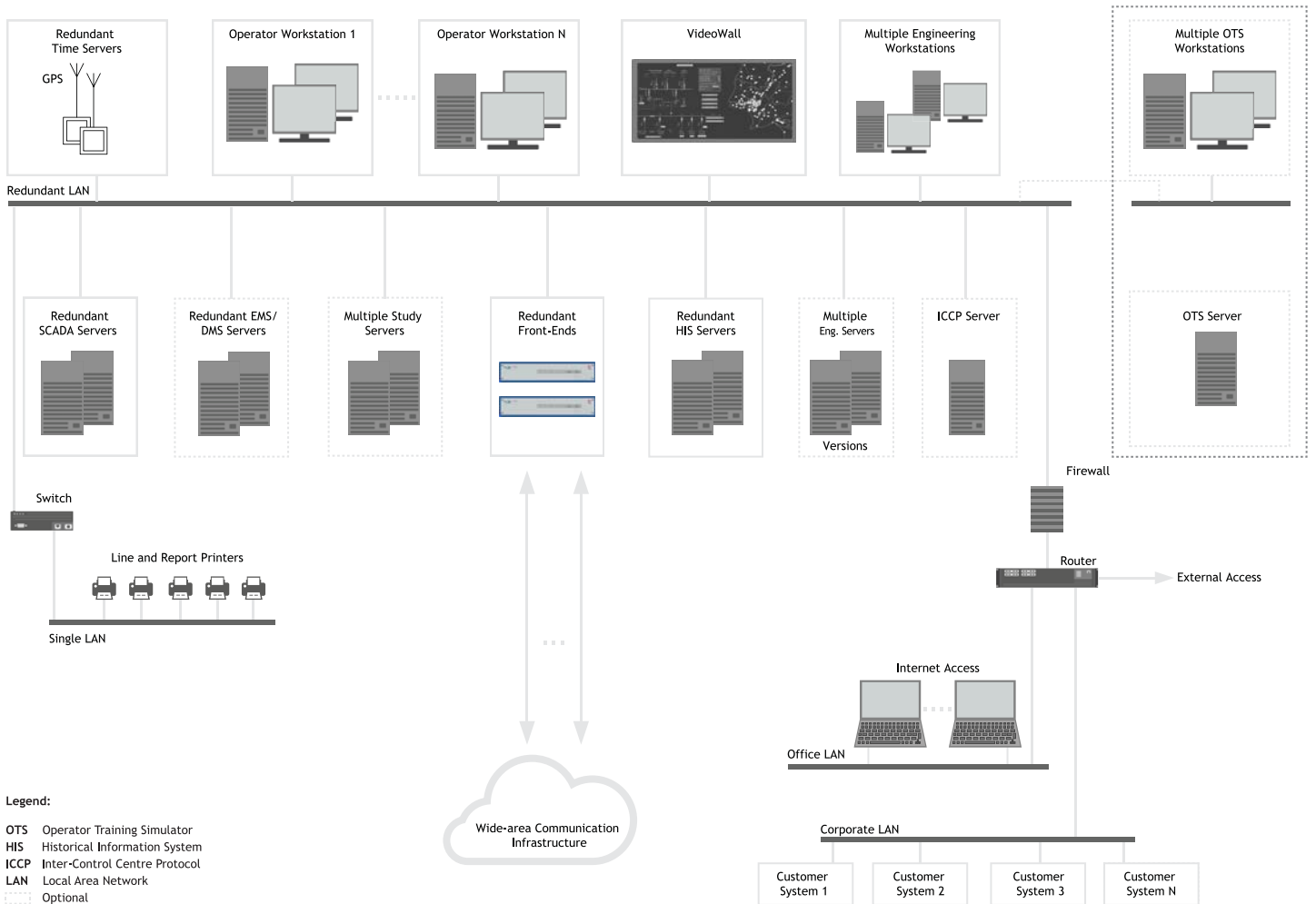
For wide-area network operations Efacec software supports network-aware applications such as topology processing, to provide real-time connectivity and flow analysis, or estimation, to improve telemetry data. Furthermore, integrated cartography, geographic screens and video-surveillance enable integration of field and facility operations with remote operations.

For power applications, the **ScateX+** platform provides several operational, optimization and automation applications targeting transmission, distribution, generation and railway electrification systems. Applications include contingency analysis, forecasting, short circuit analysis, optimal power flow, automatic generation control or automatic fault isolation and restoration.

As telecontrol systems upscale and become increasingly sophisticated and dynamic, straightforward engineering becomes an invaluable tool for the user to ensure short and high quality setup and update cycles. Efacec software bundles state of the art fully-integrated engineering environments that enable highly productive application of modern engineering paradigms such as template and object-based design, integrated programming, early validation, configuration management and integrated engineering from control center to RTU.

SCADA Platforms Technical Comparison Chart	HMI 500 SCADA/HMI Platform	SCATEX+ Network Management Platform
Architecture		
Physical architecture options	Single node system with optional independent storage node and multiple HMI nodes	Single to multiple computing, storage, communication and HMI nodes
Real-time database	Hierarchical/Object datapoint model	Hierarchical/object datapoint model Dynamic Network/Topology Model
Scalability	Up (limited)	Up and out (unlimited)
Self-monitoring, software and hardware watchdogs	Yes	Yes
Availability and redundancy	Hot-standby servers, industrial grade embedded hardware, redundant communication links	Hot-standby servers, redundant communication links
HMI Terminals	Multi-screen single/multiple desktop, web-based access, video screen, industrial-grade touch consoles	Multi-screen single/multiple desktop, web-based access, video wall
Access control	Role-based access control, responsibility areas/domains	Role-based access control, responsibility areas/domains
Secure protocols, port mapping and OS security	Yes	Yes
Communication Interfaces		
Open integration through telecontrol and automation protocols	Multiple (IEC 61870-101/103/104, DNP, IEC 61850, OPC, Modbus, Profibus, etc.)	Multiple (IEC 61870-101/104, DNP, OPC, etc.)
Communication network management protocols	Yes (SNMP, ICMP, etc.)	Yes (SNMP, ICMP, etc.)
Multi-control center integration	With standard telecontrol and automation protocols	ICCP, ELCOM
Gateway function for hierarchical telecontrol systems	Multi-hierarchic control systems with standard telecontrol and automation protocols	
System clock	Yes, multiple time sources (NTP, GPS, radio, IRIG-B, etc.)	Yes, multiple time sources (NTP, GPS, radio, etc.)
Systems Integration		
SQL interface	Yes	Yes
CIM-compatible interface		Yes
Middleware/.Net/SOA/JMS/REST interfaces	Options available	Options available
Engineering and Programmability		
Import/export	Standard vector graphics formats, MS Excel, CSV, ScateX+	Standard vector graphics formats, MS Excel, CSV, SQL, GIS, Automation Studio
Customized user and reports logic, HMI screens and symbols	Yes (IEC 61131-3 available)	Yes

Redundant Time Servers · GPS · Operator Workstation 1 · Operator Workstation N · VideoWall · Multiple Engineering Workstations · Multiple OTS Workstations

Redundant LAN

Redundant SCADA Servers · Redundant EMS/DMS Servers · Multiple Study Servers · Redundant Front-Ends · Redundant HIS Servers · Multiple Eng. Servers · Versions · ICCP Server · OTS Server

Switch

Line and Report Printers

Single LAN

Firewall

Router · External Access

Internet Access

Office LAN

Corporate LAN

Customer System 1 · Customer System 2 · Customer System 3 · Customer System N

Wide-area Communication Infrastructure

Legend:

|	
OTS	Operator Training Simulator
HIS	Historical Information System
ICCP	Inter-Control Centre Protocol
LAN	Local Area Network
	Optional

ScateX+ Architecture Example

Communication Infrastructure

From hierarchically distributed to fully networked, telecontrol systems are supported by distinct communication technologies. Conventional UHF radio, PLC, fiber, microwave or satellite links; SONET/SDH utility backbones; RF-Mesh, GPRS/UMTS, WiMAX or Broadband PLC for smart distribution automation as well as Ethernet and MPLS wide-area infrastructures are deployed depending on multiple factors such as geography, availability, cost and service requirements.

Efacec solutions can adapt to any telecommunication infrastructure and incorporate technical supervision of associated telecommunications equipment. To develop combined telecontrol and telecommunication solutions that enable best return on investment for our customers, Efacec partners with leading communication technology providers.

Efacec frontends, gateways and RTUs incorporate multiple standard telecontrol, automation or communication network management protocols, enabling seamless integration in multi-vendor systems. Legacy protocols are also available to enable smooth integration in renewals or upgrades. To ensure continuity of service, solutions include redundant channels at both the data link and application layers.

With the introduction of IP-based wide area communications, cybersecurity, resilience, QoS and multi-traffic integration must also be equated to ensure adequate data transmission service for real-time control, engineering, video-surveillance, voice and corporate applications. Solutions include use of network-level virtual leased lines and virtual private networks, automatic re-routing, traffic prioritization and latency limitation, combined with firewalling, role-based access control as well as modern secure IP-based protocols or architectures such as IEC 61850.
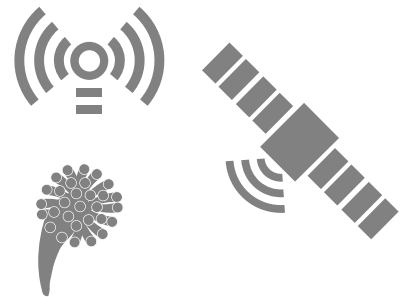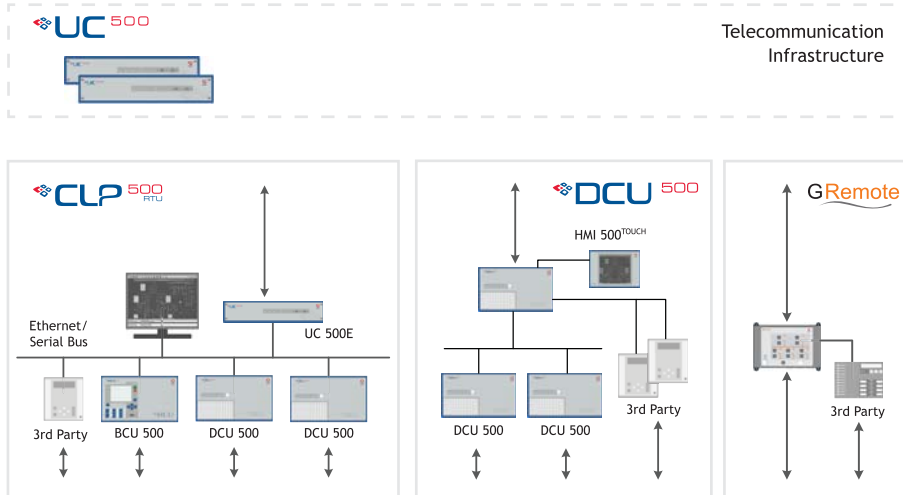
Telecontrol Units

Efacec provides a range of products for gateways and RTUs that enable applications such as network data concentration and protocol translation, application gateways and frontends, plant remote terminal units, out-station controllers or distribution automation.

Different expansibility and platform options (distributed, modular or compact), flexible I/O options, high reliability, multiple communication protocols, IEC 61131-3 user programmability, local archiving and optional HMI provide application flexibility while maintaining manageability through unified engineering.
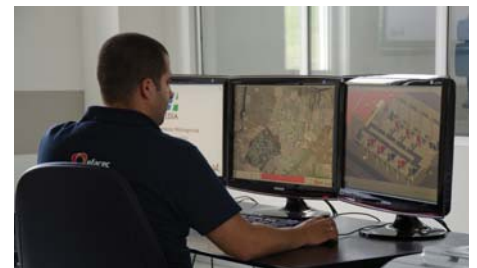

Overview of Telecontrol Products

Efacec also provides fully integrated and certified standard enclosures and cabinets, including telecontrol devices, communication equipment, electrification and power supply such as the **Micro TCMT** for distribution automation or the **CSC 5000** line for plant and substation applications.

From conventional telecontrol to real-time information management, Efacec solutions build the backbone for operations management.

Telecontrol Product Comparison Chart	CLP 500 Platform			SmartGate Platform	
	UC 500 Gateway	CLP 500 RTU Distributed RTU	DCU 500 Programmable Automation Controller	GRemote Smart RTU	GFault Micro-RTU
Application					
Target Applications	Telecontrol Gateways and Frontends	Large to Very large RTUs	Medium to large RTUs	Small RTUs	Micro-sized RTUs
Target Systems	Telecontrol Systems	Plants, HV/VHV Substations	Out-stations, Plants, HV/VHV Substations	Out-stations, MV Automation	MV Automation
Architecture					
Platform	Embedded Platform or Industrial Hardware	Decentralized (IEC 61850 or IEC 60870-104 station bus)	Modular	Compact	Compact
Scalability	Software and Hardware	Multiple I/O units	Up to 12 field-replaceable boards Cascading option	Three chassis variants Cascading option	
Availability	Watchdog, Self-monitoring, Industrial-grade hardware High-availability hardware option	Watchdog, Self-monitoring, Industrial-grade hardware High-availability hardware option	Watchdog, Self-monitoring, Industrial-grade hardware High-availability hardware option	Watchdog, Self-monitoring, Industrial-grade hardware	Watchdog, Self-monitoring, Industrial-grade hardware
I/O Point Count	64.000	32.000 or more	296 I/O points per unit	112 I/O points per unit	20 I/O points
Communications					
Available Protocols (non-exhaustive)	IEC 608705-101/104, IEC 61850, OPC, DNP	IEC 608705-101/104, IEC 61850, OPC, DNP	IEC 608705-101/104, IEC 61850, DNP	IEC 608705-101/104, IEC 61850, DNP	
Third-party IED/RTU integration	Yes	Yes, at multiple levels	Yes	Yes	
Gateway Function	Yes, application-level gateway, extensive multi-protocol/channel	Yes, application-level gateway, extensive multi-protocol/channel	Yes, application-level gateway, multi-protocol/channel	Yes, application-level gateway, multi-protocol/channel	
Media (serial, Ethernet, etc.)	>32 ports	>32 ports	Up to 6 ports	Up to 5 ports	1 port (serial only)
Clock Synchronization	Multiple time sources	Multiple time sources	Multiple time sources	Multiple time sources	Telecontrol protocol
Configuration and Management					
Configuration	Template or point-based, SCL-compatible	Unified centralized engineering Template or point-based, SCL-compatible	Template or point-based, SCL-compatible	Template or point-based, SCL-compatible	Pre-setup
Engineering Tool	Automation Studio	Automation Studio	Automation Studio	Automation Studio	
Additional Features					
User Programmability	IEC 61131-3, Object-oriented	IEC 61131-3, Object-oriented	IEC 61131-3, Object-oriented	IEC 61131-3, Object-oriented	
Local HMI	Optional HMI 500	Full-fledged SCADA/HMI interface option	LED-based or through HMI 500TOUCH	LED-based, Customer-specific	LED-based
Remote HMI	Web-based	Web-based	Web-based	Web-based	
Application Functions					
Non-exhaustive Examples	Application gateway, local data archiving	Measurement and metering, Control and Supervision, SOE and Data Recording, GOOSE-based distributed	Measurement and metering, SOE, Control and Supervision	Measurement and metering, SOE, Control and Supervision, Local power supply supervision	Measurement and metering, Fault detection

Engineering Services

Ranging from systems specification and design, through integration, commissioning and training, up to maintenance and product support, Efacec provides a full set of services that ensure optimal performance throughout the entire system life-cycle.

Recognizing that successfully developing system upgrades, renewals or turnkey projects requires both engineering and project management skills, Efacec services are delivered by engineering and customer support teams with highly experienced and certified professionals.

Our worldwide network includes local engineering centers, branch offices and partners that work jointly with our customers, in close cooperation with R&D and manufacturing centers, to deploy systems on-spec, on-time and on-budget.

Case Studies		
Location / Company	Overview	Example
Distribution Management System		
Portugal / EDP	For the management of EDP's distribution network, Efacec has delivered a wide range of solutions for all hierarchical levels of its network including the SCADA/DMS control centre, substation automation systems featuring control and protection, as well as, monitoring and control solutions for the MV network. Solutions integrate standard protocols such as IEC 60870-5-101/104 or IEC 61850.	
Grouped Control Centers		
Algeria / GRTE	Efacec provided to Algerian GRTE four Grouped Control Centers spread throughout the Algerian territory and eight RTUs for VHV and HV substations. Supplied systems make network operation and maintenance more efficient and reliable.	
Distribution Management System		
India / BESCOM	BESCOM awarded Efacec with orders for the supply of equipments and systems for the project of distribution energy network modernization in Bangalore. These supplies, which include RTUs, communication systems and SCADA/DMS, will help BESCOM improve reliability, efficiency, safety and quality of service of its energy distribution network of 11 kV.	
Dublin Light Railway		
Ireland / RPA	Efacec Automation was involved in the supply and installation of integrated automation systems for traction substations, as well as of technical supervision systems for the light metro infrastructures. With implementation of this project, Dublin Light Railway provides its users with unmatched quality of service.	
Casablanca Power, Water and Effluent Dispatch		
Morocco / LYDEC	Efacec was awarded with an order from Casablanca based company LYDEC for the supply of the combined SCADA System, based on ScateX+, for its power, water and effluent networks.	
Generation Operation Center		
Brazil / ENERGEST (Energias do Brasil)	Efacec received contracts for the supply of SCADA system for the Generation Operation Center to be installed in Serra, in the Brazilian state Espírito Santo. The installed system targets remote supervision and control of Brazilian EDP Group's 15 hydro power plants to ensure maximum system availability. A Disaster Recovery System running from one of the supervised power plants is also included.	
Power Network Control Center		
Switzerland / CERN's	Efacec provided CERN, the European Laboratory for Particle Physics, with a SCADA DMS system and associated Remote Terminal Units for more than 50 substations, providing integrated operation of the electrical power network for the large scale laboratory including the LHC (Large Hadron Collider), the largest particle accelerator in the world.	