Make your life safer and simpler

PACiS solutions for utilities’ micro-grid and electrical substations

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Serious challenges to your changing business

Understand how current and future transition in the energy world affects your organisation.

Improve the safety and availability of your grid
Safety remains a major concern in a changing environment. And energy consumers’ needs are growing fast. Grids must be highly scalable and reliable to match new grid codes and overcome distributed generation management challenges.

Get ready to face new grid challenges and preserve investments
Electrical installations must be operational for 20 years or more. Grids have to support complex mutations and extensions of renewables. Further, stakeholders want you to protect and service their costly investments long into the future.

Optimize operational cost
With increased worldwide competition, utilities face permanent asset optimization challenges to reduce their operation and maintenance costs.

Maintain access to expertise
Managing the grid is becoming more and more complex. Staff competencies must remain up-to-date, and access to energy experts is crucial.

Protect installations against cyber threats
Energy installations are targets for cyber attacks. Processes and equipment need to be made continually more robust to counteract these threats.

Comply with regulations
Regulations are changing with the introduction of distributed generation. New recommendations and laws require critical infrastructure security.

66% of the world population in 2050 is expected to live in urban areas.
Concrete advantages for safety and simplicity

Meet ambitious business goals and turn your challenges into success stories.

Improved safety and security
PACiS helps improve personnel safety and electrical asset security with innovative cyber security designs combined with the latest Ethernet architectures. They also rely upon:

• Well proven protection relays, bay controllers, metering devices and Ethernet communication devices.
• Dedicated automation schemes and local SCADA/HMI.

PACiS Solutions offer secure access to your installation and critical data, using an innovative, certified, and global cyber security approach.

Extended energy availability
PACiS Solutions are designed for various kinds of architectures from the simplest substation to the most complex sites and microgrids.

With fast and secure automation using Ethernet according to IEC 61850, PACiS helps increase electrical network availability, even for the most demanding applications.

Simplified grid operation and maintenance
PACiS helps simplify and streamline substation installation and operation with features such as substation modelling, standardised bays and predefined automation schemes. It also enables powerful integration with asset management.

Local services and support
Projects with PACiS systems are engineered locally in specialised execution centres distributed across the world, bringing efficiency and global experience to your project. These local energy automation experts provide long-term support for you and your solution, helping you maximise the benefits of your investment and supporting you throughout and beyond the life of the solution.

With our cyber security leadership, Schneider Electric offers local expertise, support, and dedicated services for long-term peace of mind.

Secured investments
PACiS Solutions are scalable, customizable and dedicated to energy automation, leveraging international standards such as IEC 61850, IEC 62351 and IEC 60870-5. Thanks to its high level of standardisation and open standards, PACiS preserves your investments over the long term. Further, PACIS EcoFit™ services provide seamless migration for existing installations to take advantage of the latest technologies.

15% of project cost needs to be spent on cyber security.

20% time savings is thanks to IEC 61850 standardization.

Meet ambitious business goals and turn your challenges into success stories.
Preferred partner with versatile solutions

Get peace of mind by working with industry-leading experts who understand your business needs.

PACiS offers a global solution for retrofits and new installations, permanently meeting all your requirements

- HV and MV electrical substations
- Microgrids and smart grids
- Renewable generation: Step-up substations, wind farms

Choose from a robust set of PACiS Solution architectures or deploy customised solutions that meet highly specific requirements.

**PACiS SRTU 4S**

For HV/MV and MV/MV substations

- Smart RTU centralised system for HV & MV substations
- Smart, Simple and Scalable Solution (4S)
- Pre-engineered solution, with best in-class IEDs
- Fast deployment due to high level of standardization

The PACiS 4S-SRTU interconnects a Smart Remote Terminal Unit (SRTU) with a series of Intelligent Electronic Devices (IEDs) such as protection relays and power meters; optionally, local SCADA/HMI may interface with the Smart RTU.
Powerful architectures for broad applications

PACiS SAS
For HV and MV advanced substations
- Open and interoperable Substation Automation Systems (SAS) based on standards
- Robust architectures with distributed automation schemes and IEDs to minimise wiring

PACiS SAS is engineered from redundant IEC 61850 Ethernet networks (redundant ring or dual star) connecting substation components: Local SCADA/HMI, IEDs, gateways, automation devices, security administration modules, etc.

The PACiS SAS Solution leverages the IEC 61850 substation automation standard for system data modelling and communication over Ethernet, for a truly optimised solution.

PACiS Microgrids
For microgrids and large HV/MV substations
- Energy Control System with power management for large electrical distribution networks and microgrids
- Robust architectures with distributed Ethernet network over the entire site
- Distributed and fast automation to optimize energy availability and reduce outages

PACiS Microgrids can equip dispersed sites with large or multiple HV and MV substations. It provides robust, distributed architectures, and simplifies power management. It’s especially well adapted to microgrids, including renewable and distributed energy.
Innovative security with proven components

Fight cyber threats and simplify system administration with best-in-class IEDs that incorporate modern security standards.

Defence-in-depth
Following protocol standardisation and the widespread use of Ethernet, cyber security is now a key concern for substations and microgrids. Due to their innovative cyber security design, PACIS systems provide defence-in-depth for critical Infrastructure. Our solutions help you comply with the latest recommendations and regulations: NERC-CIP, ANSII, BDEW White Book, IEC 62351, IEEE1686, and WIB-IEC 62443.

User authentication and authorization (IEC62351-8 RBAC)
The key components of PACIS such as SCADA/HMI, protection relays and bay computers, all integrate user authentication and authorization according to Role-Based Access Control (RBAC) and IEEE1686 standards.

Device hardening
PACIS components also benefit from device hardening, and their robustness is tested in hostile environments for improved availability. Substations’ entry points can additionally be equipped with robust firewalls, VPNs and routers.

Security event logs
Under PACIS, substation components generate security event logs such as login attempts, access failure, firmware and configuration updates. These events are available over Ethernet station bus with the popular SYSLOG format. Events can be centralized and securely stored on a dedicated Security Administration Management (SAM) device. Using an Ethernet or remote connection, a security administrator can then recover security events and prepare security audits in an efficient way.

System-wide policies
A global security policy can be easily deployed across the entire system, thanks to the Security Administration Tool (SAT).

Security services
Schneider Electric’s service teams offer dedicated and customised services for cybersecurity applications such as risk assessment, patch management, backup and restoration facilities throughout the system life cycle.

Vulnerability monitoring
Security vulnerabilities are continuously monitored by the Schneider Electric CERT team and are treated with remedial action; these data and recommendations are regularly published on Schneider Electric’s Cybersecurity support site.

1. According to the US Department of Homeland Security’s Industrial Control Systems Computer Emergency Response Team (ICS-CERT), percentage of cyber security incidents reported and investigated by the agency in the first half of 2014.

Develop automated networks with open and flexible device integration.

Open IED integration
PACiS systems often integrate several IEDs, such as those used for protection, like MiCOM, Sepam, Vamp, Easergy, Sael, ION and multiple third-party devices. PACiS is also fully open to the integration of third party devices; devices already installed can be accommodated according to your preferences. Strict tests are performed to precisely validate functional and interoperability limits.

SCADA/HMI tools
In addition to the usual HMI facilities of monitoring, control and archiving, further modules can be added to the same workstation. Those include analysis tools, disturbance analysis, IED settings and engineering tools. Additional tools can also be provided for functions such as operator alert management or dedicated reporting.

Distributed automation
In PACIS solutions, automation schemes can be distributed across various IEDs and dedicated automation processors such as MiCOM A or MiCOM G devices, increasing performance.

Ethernet and communication devices
PACIS includes communication devices designed for rugged substation environments:

- Protocol converters and data concentrators to link legacy IEDs with remote control centres
- IEC 61850 Inter-Lan proxy with GOOSE fast transfer capabilities using MiCOM H range Ethernet switches.

They facilitate the design of star, ring or mixed topologies according to your requirements. Embedded Ethernet switches integrate redundant interfaces (IEC 62439-3 PRP and HSR or RSTP). They contribute to high availability and reliability of the system.

In addition, PACIS offers a large portfolio of readily validated communication devices (switches, routers, firewalls and VPNs)

Optimal lead time
With standard panels and cubicle schemes, components may be assembled according to the required electro-technical arrangement. Connectors, security switches, test facilities and internal arrangements for IEDs are defined according to your practices and requirements. The concept of a standard bay provides a mechanism for higher levels of standardization of any installation with limited purchasing effort, reduced lead times and improved maintenance.

Panels and cubicles can also be specified with secure user-access protection using Schneider Electric’s APC range.
Global experience by industry leader

Trust Schneider Electric’s experienced teams to supply first-class project execution and delivery.

**PACiS SRTU 4S case study**

- **Customer:** Large distribution utility and opinion leader in North Africa
  - Project for 24 (30kV) distribution substations
- **Solution:** Each substation equipped with PACiS SRTU – centralized architecture
- **Key features:**
  - Smart RTU, MiCOM C264
  - Up to 24 numerical protection relays (SEPAM S82 with Modbus communication)
  - Time synchronization via GPS and IRIG-B: >>1ms accuracy
  - Local HMI: Power Scada Expert (PSE) on Magelis PCs
- **Project delivery:** < 6 months

>1,600 PACiS systems installed worldwide

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PACiS SAS case study:

- Customer: Large transmission and distribution utility in South America
  Project for 5 substations: 400kV / 115 kV / 13.8 kV
- Solution: PACiS SAS protection, control and supervision with telecoms
- Key features:
  - IEC 61850, Ethernet redundant architecture, more than 450 communicating IEDs and ION power meters
  - 180 bay panels, local substation HMI, multiple gateways to interface multiple remote SCADA
- Project delivery: 18 months

PACiS Microgrid case study:

- Customer: Large generation and distribution utility in Europe
  Project for large urban area with 95 distribution substations (11kV) and generation (> 40MW)
- Solution: PACiS Microgrid for rejuvenation of aging installations and interface to legacy switchgear
- Key features:
  - Network studies followed by protection, control, supervision system with outage minimization and load management
  - Based on redundant Ethernet IEC 61850, more than 400 IEDs and multiple HMIs
  - Distributed automation for fault detection, isolation and automatic self-healing, fast load shedding to ensure network stability and avoid black-outs
- Project delivery: 24 months