



## Siemens ENEAS generic solutions

Always ahead of the field with substation automation out of the box

Answers for energy.

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# The state-of-the-art approach for efficient substation automation

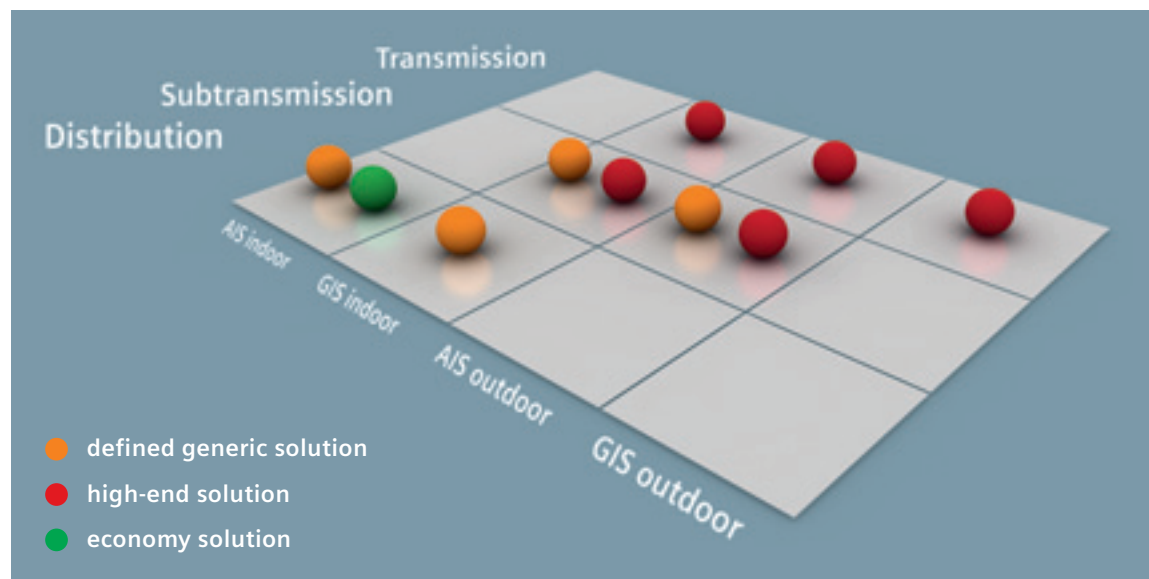
Distributed generation and increasing share of renewables in the energy mix, consumption optimization, and new consumer loads, e-cars, for example, are bringing about a variety of new challenges and requirements for network operators and utilities. This also affects substation automation: reliability, operational safety, and future expandability of all assets are of utmost importance, while increasing cost pressure calls for new approaches and strategies in the design and use of primary and secondary technology. Siemens ENEAS (Efficient Network and Energy Automation Systems) solutions put you ahead of the field, as they provide consistent answers to these issues.

Even though substation design varies greatly on an international scale, there is a high demand for a more streamlined and harmonized design based on an integrated, sustainable state-of-the-art solution.

Enter Siemens ENEAS generic solutions, the effective, comprehensive, and modern total solution for turnkey substation automation.

Siemens ENEAS generic solutions comprises pre-engineered and universally applicable solutions for substation layouts at various voltage levels – precisely tailored for a range of selected applications. Siemens ENEAS generic solutions, all based on tried and tested engineering concepts, make possible reduced project times, offer a high degree of economic efficiency, and afford the reliability of both the tried and proven Siemens solutions and products such as SICAM, SIPROTEC, and SIMEAS.

Siemens ENEAS generic solutions also include the entire documentation in a standardized and pre-prepared format. All configuration details are, therefore, available at a very early stage of the project. This allows for further changes and adaptations in the course of the project. And when, for whatever reason, you need to add an individual note to your substation, Siemens ENEAS generic solutions affords options for customization and expansion.



# Sustainable advantages with easily applicable ENEAS generic solutions

There is a huge variety in substation layout and design today. The tendency to assign increasingly distributed tasks to more and more powerful secondary equipment involves the need for meticulous individual parameterization and extensive engineering.

However, all substations can be categorized into certain general types and configurations. The engineering efforts can, therefore, be markedly reduced. Siemens developed a comprehensive range of universally applicable configurations, which are now available as Siemens ENEAS generic solutions. They give the customers a new choice: A convenient off-the-shelf solution with outstanding cost transparency or a more customized solution calling for higher effort.

Siemens ENEAS generic solutions is a modular system of predefined templates consisting of precise definitions and ready-made engineering and documentation solutions for configurations,

bay devices, station devices, operation, functions, and communication. All bay devices are specifically designed for the various voltage levels and bay types, e.g., single or multiple busbar, feeders, ties and couplings, cable feeder bays, or transformer bays. The result: all project phases from design to commissioning, as well as upgrades, expansions, and servicing become more efficient.

All configurations are geared towards modern distributed applications of digital substation automation and follow the use and importance of the substation. It goes without saying that all Siemens ENEAS generic solutions comply with the relevant IEC standards such as IEC 60870-5, IEC 61131, IEC 62351, IEC 60255, and IEC 61000 to mention just a few.

## Your benefits at a glance

### Quality

- Multiple tested applications and templates provide improved quality to projects
- Increased quality of proposals
- More transparency of proposed services
- Improved quality of project documentation
- Improved quality of hotline and after sales services

### Security

- Easier to adapt and enhance the system even after commissioning
- Safe operation from the user interface to the command output
- Secure maintenance: standardized documentation
- Secure lifetime support: longterm maintenance because of large installed base
- Security of investment: migration strategies thanks to a wide installed base

### Speed

- Faster project delivery
- Reduced effort in the definition of requirement and detail clarifications
- Faster project documentation
- Faster service and support based on known project design

# Configuration diversity for spot-on solutions

**Sophisticated substation automation means much more than simply combining several devices. Siemens ENEAS generic solutions take into account the various system and application functions of transformer substations, switchgear, and the embedding of a substation into the communication network.**

## The station level

Communication is the basis for all automation tasks, and the station level is the central hub for all communication within a substation and beyond. The station level also coordinates all main substation functions and some bay and inter-bay functions. According to the importance of the substation, the station level may be singular or redundant, and it can also include station operation. Siemens ENEAS generic solutions comprises all suitable devices, which are available in various versions according to the related application – readily engineered, tested, and documented: from small to large devices with various capacities for communication and automation, and either modular hardware-based or software-based on standard platforms.

## The bay level

The sturdy bay controllers and protection relays are directly situated in the control cubicles of the bays. They are the interface to the primary equipment, contain all bay related functions, and are connected by the station communication LAN. Using IEC 61850 and its GOOSE transmission, they coordinate inter-bay functions such as interlocking, in a fast and direct manner. The same goes for protection schemes like e.g. reverse interlocking.

The integrated display of the controllers and relays enable local backup operation for service or maintenance. Combined control and protection devices are used for improved economy of space and cost on the distribution level. The world-renowned SIPROTEC series provides a versatile range of protection functions. The Siemens ENEAS generic solutions comprise the adequate combinations for defined bay types, for incoming and outgoing feeders, for cable or overhead lines, and for local or remote transformers. All parameters and settings, plus the data list of all information and I/Os, are prepared in templates, thus simplifying engineering significantly.

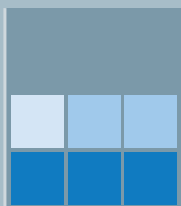
## Switchgear operation

Switchgear can be operated either remotely from the control center, or on the station level, or even locally through bay devices. Siemens ENEAS generic solutions takes all options into account and provides a user interface whose design results from the vast experience gained from reference units that are in operation all over the world. The interface meets the highest ergonomic demands and guides the user in a clear, hassle-free, and safe manner. The screen images and symbols are all predesigned and cater to a consistent look and feel in all substations.

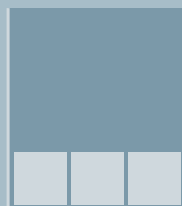
## Communication

As a vanguard in the development of the modern IEC 61850 communication standard, Siemens is not only aware of the outstanding importance of seamless communication in modern substation automation, but is a driving force in the further development and implementation of relevant standards and applications.

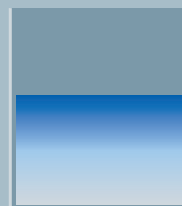
Siemens ENEAS generic solutions – well-devised and suitable for a multitude of applications.



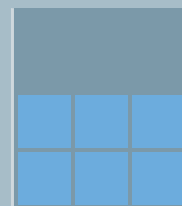
Products



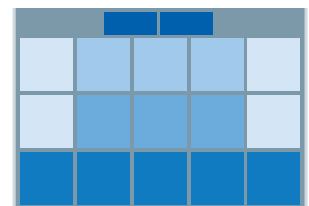
Engineering



Tools



System functions and applications



ENEAS generic solutions for substation automation systems

That's why the structure, as well as the hardware, for substation-internal communication is meticulously defined in all Siemens ENEAS generic solutions templates. Only proven, reliable, and safe data structures and hardware – cables, routers, and switches, for instance – are chosen for Siemens networks. Communication solutions for remote connections are available with Siemens communication products for various infrastructures. These solutions can utilize cables, fiber optics, power line carriers, or radio for remote data transmission. They offer complete services for all types of communication including voice and video transmission.

### Protocols

All Siemens ENEAS generic solutions fully comply with the IEC 61850 standard, thus ensuring highest compatibility within power generation, transmission, and distribution environments around the world.

For communication with superordinate entities such as control centers, communication according to IEC 60870-5-101 and -104 is implemented as a standard within all Siemens ENEAS generic solutions. Other protocols can be implemented as an option on special demand. Siemens is the world leader when it comes to connecting with third-party protocols. Experience from numerous implementations of both legacy and third vendor protocols ensure the efficient and reliable integration of external devices. All available protocols are implemented in most products, thus making possible the optimal utilization of the given functionalities.

### A flawless workflow

Pre-engineered templates for a wide variety of configurations and bay types are available for

- high, medium, and low voltage levels
- transmission and distribution applications
- various functions like RMU (Ring Main Unit), switching station, or transformer substation
- air-insulated and gas-insulated switchgear
- indoor or outdoor installation.

These templates provide the basis for easy project management and engineering. Entire plant components, which all come fully engineered, tested, and documented, can simply be copied and combined within the engineering environment. The result is a considerable acceleration of design and engineering, and also guarantees a hassle-free implementation of expansions whenever they become necessary.

### Customization and expansion

Every solution can be customized according to project specific requirements. Typical examples are, for instance, customer-specific design changes of the Human Machine Interface layouts or colors, additional working places for operation or supervision, additional automation functions, communication with specific legacy or third-vendor protocols, or proprietary protection schemes. Furthermore, the implementation of later asset extensions such as additional bays or new functionalities is made easier.

The straightforward combination of a well-defined default solution plus additional individual options yields the greatest possible transparency of functions and their respective costs even during the tendering phase.



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