Prefabricated power solutions

Plug and play E-house, skids and mobile substations up to 420 kV
Plug and play solutions for flexible grid connection

All over the world, grid operators, electrical power producers and energy intensive industries work to ensure reliable power supplies for their customers or processes. Power demand has to be met at short notice without disruption - despite tight construction timeframes and potential eventualities such as natural disasters or operational restrictions.

Siemens Energy prefabricated power solutions ensure a safe and reliable grid connection to fit the most demanding environments anywhere, anytime. The Siemens Energy prefabricated power solutions consists of a “plug and play” high- and medium-voltage substation built as fully mobile substation on trailer, on skid or inside a shelter as “HV E-house”.

The modules contain all the necessary components for a complete substation: power transformer, AIS or GIS switchgear, MV/HV cable drums, protection, monitoring and control systems as well as AC and DC auxiliary power supplies.

Modules are fully factory-tested before dispatch and simply need to be connected to each other on site. Siemens Energy prefabricated power solutions ensure maximum flexibility of design and utilization combined with excellent reliability and a high return on investment.
The benefits are:

- Earlier and more reliable energization date
- Full assembly and pre commissioning prior to shipment
- Reduced on-site work: minimum civil works, plug and play installation and energization
- Easy mobilization and relocation
- Resistance to weather and harsh environments
A range of tailor-made prefabricated solutions

Siemens Energy prefabricated power solutions come fully preconfigured as “plug and play” substations to be connected to the grid via overhead or isolated cables. They are available in several configurations to provide the utmost flexibility.

**Trailer and skid-mounted substations**

Trailer or skid-mounted power solutions are modular substations designed to provide maximum flexibility during mobilization and relocation. The substation comprises several compact modules to be interconnected on site: power transformer, HV/MV switchgears, HV/MV cables, control, telecom, protection, monitoring and auxiliary power systems.

The trailer external dimensions are sized to comply with local road transportation restrictions. Its base-frame is designed to protect switchgear from structural constraints despite transportation on rough road surfaces.

**HV E-house substations**

E-houses are prefabricated buildings designed to host switchgear, secondary and auxiliary systems in one single structure. These substations can comprise several switchgear bays forming various configurations such as single/double busbar rings or one and half breaker.

The E-house generally comes as a single lift unit pre-wired and factory-tested. Depending on voltage level and transportation restrictions, the E-house can be fitted with a built-in overhead crane or removable roof to simplify maintenance work.
420 kV mobile substation
Plug and play solution for a high return on investment

By reducing the interface management and site works to a minimum, prefabricated power solutions provide significant cost and time savings along with a low risk profile.

Savings on grid maintenance and upgrading works

With a prefabricated power solution as a temporary alternative grid connection, the upgrading or rehabilitation work on existing substations can be significantly faster and work process simplified.

Black-out impact limitations

A mobile substation can act as stand-by emergency grid restoration solution. It can be mobilized and set up within a couple of hours in the event of a grid failure, hence reducing the technical and financial impact of power outage.

Social acceptance

Customizable appearance and limited amount of on-site works maximize the social acceptability of prefabricated power solution substations. Furthermore, the relocatable nature of the substation also contributes to the simplification of the construction permit process.

Streamline project execution

With a fully comprehensive set of components, pre-designed interfaces and limited on-site works, prefabricated power solution substations simplify procurement tasks and substantially reduce interface management risks.

Land acquisition savings

Thanks to their reduced footprint and flexible modular arrangement concept, prefabricated power solution substations require less space both for construction and operation.

Earlier energization

Prefabricated power solution substations ensure efficient and faster grid connection, hence enabling earlier energization and commercial operation of the connected plant.

Time schedule optimization for a fast track substation construction project
Prefabricated power solutions

Grid connection wherever and whenever required

The flexibility and robustness of prefabricated power solutions are key benefits to several application fields covering power generation, grid development and energy intensive industries.

**Emergency alternative grid connection**

The mobile design of the prefabricated power solution helps grid operators to restore power after a grid failure or to avoid disruption during extension or rehabilitation works. Prefabricated power solutions can easily be extended through the addition of further modules and relocated whenever required.

**Remote / hostile environments**

Mining and Oil & Gas works are often executed in isolated areas, thus generating high labor costs. This factor incites the reduction of on-site works to the strict minimum.

The Siemens Energy "plug and play" solutions are 100% factory-tested in their final configuration. Their mobilization on site is optimized and minimum labor is required for final installation. Almost no civil works are required. The prefabricated power solution can also be supplied with shelter providing protection against extreme weather conditions and harsh environment.

**Fast track projects**

The grid connection of power critical infrastructures such as electrical generation or energy intensive industries is often located on the critical path of the project. With little exposure to site work contingencies, the Siemens Energy prefabricated power solution allows faster grid connection.

**Environmental friendliness**

Environmental friendliness is a central concern when power infrastructures are required in the vicinity of natural, urban or business areas. The Siemens Energy prefabricated power solution can be located in shelters or prefabricated buildings and the external appearance can be customized to maximize visual integration. Furthermore, they can easily be dismantled to restore the site to its original conditions if required. Finally, by providing a flexible temporary power supply solution from HV grid rather than from diesel gensets, prefabricated power solution can contribute to reduce CO₂ emissions.

**Tested and proven performance**

**Oil & Gas and mining industry**

Canada:
The 7 GIS E-houses 72.5 and 245 kV enable grid connection with minimum on-site works. The substations are in operation for bituminous sand extraction sites and potash mining industry. Both located in a very cold climate area.

New Caledonia:
An 18 bay GIS 72.5 kV substation was shipped as a single lift prefabricated unit to meet the requirements of a copper mine for minimum site work due to lack of local resources.

**Power generation**

Algeria:
The 420 kV mobile substation ensures fast track grid connection of a power plant in Biskra.

**Grid operators**

Algeria:
The 220 / 60 kV-30 kV and 60/10 kV semi trailer type mobile substation provides the customer with a backup infrastructure to reinforce the grid in this area.

Belgium:
5 bay 110 kV GIS substations in 40’ containers fitted for isolated HV cable connection are used to bypass existing substations during refurbishment works in an urban environment.
Typical configurations for prefabricated power solutions

Prefabricated power solutions cover a large range of customer needs and are designed accordingly. They can be single or multiple bays, from 11 kV to 420 kV, with or without transformer, trailer mounted or E-House.

HV E-house: 123 kV emergency restoration system

This E-house substation is used in urban areas in the event of outages or maintenance works (i.e. extension and modernization). The compact GIS enables the installation of bays and local control cabinets in a shelter protected from the environment. Thanks to its built-in jacking system, it can be unloaded without the need of a crane.

Example of a single line diagram
Mobile substation: 380/132-11 kV
500 MVA

This mobile substation is used for bypassing existing substations in case of emergency or for a fast-track grid connection of a new plant. This modular solution enables to interconnect the main 380 kV grid with three other grid voltage levels (132, 115 and 110 kV). Thanks to rotative bushings and prefabricated interface cables, their installation is performed within less than one week.

Example of a single line diagram
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