

SIEMENS



<http://siemens.com/energy/portable-power-solutions>

Portable Power Solutions

“Plug and play” High Voltage E-Houses, skids and mobile high voltage substations up to 420 kV

Plug & play solutions for flexible grid connection

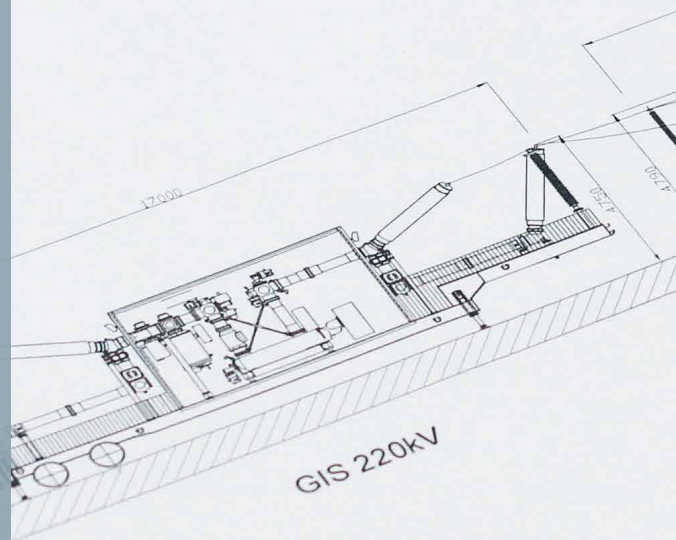
All over the world, grid operators, electrical power producers, and energy intensive industries work to ensure reliable power supplies for their customers or processes. Power demand has to be met at short notice without disruption - despite tight construction timeframes and potential eventualities such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

Siemens **Portable Power Solutions** ensure a safe and reliable grid connection to fit the most demanding environments anywhere, anytime. The Siemens **Portable 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 a "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 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 **Portable Power Solutions** ensure maximum flexibility of design and utilization combined with excellent reliability and a high return on investment.





A range of tailor made portable solutions

Siemens Portable Power Solutions come fully preconfigured as “plug and play” substations to be connected to the grid via overhead or XLPE cables. They are available in several configurations to provide the upmost flexibility.

■ Trailer & 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 inter-connected on site: Power transformer, HV/MV switchgears, HV/MV cables, control, telecom 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 a 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.

	72,5kV		145kV		170kV		245kV		420kV	
	AIS	GIS *	AIS	GIS *	AIS	GIS *	AIS	GIS *	AIS	GIS
Skid / E-House	■	■	■	■	■	■	■	■	■	■
Mobile	■	■	■	■	■	■	■	■	■	■

Nota :

■ Suitable for PPS design ■ Not recommended

* including Dead Tank Compact Switchgear

Restrictions may apply depending on expected substation architecture and equipment ratings.

Grid connection wherever and whenever required

The flexibility and robustness of *Portable 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 *Portable Power Solution* helps grid operators to restore power after a grid failure or to avoid disruption during extension or rehabilitation works. *Portable 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 "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 PPS can also be supplied with shelter protection 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 *Portable Power Solution* allows faster grid connection.

■ Environmental integration

Environment friendliness is a central concern when power infrastructures are required in the vicinity of natural, urban or business areas. The Siemens *Portable 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.



Tested and proven performances

■ Oil & Gas:

Canada : the 30 module GIS 245kV & 72kV E-House type substation enabled grid connection with minimum site works for a duration for a bituminous sand extraction site located in a very cold climate area.

■ Industry:

New Caledonia : an eighteen bay GIS 72,5kV 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 420kV mobile substation ensures fast track grid connection of a power plant in Biskra.

■ Grid operators:

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

Belgium : 5 bay 110kV GIS substations in 40' containers fitted for XLPE HV cable connection are used to bypass existing substations during extension & upgrading works in an urban environment.



High return on investment

By reducing the interface management and site works to a minimum, *Portable Power Solutions* provide significant cost and time savings along with a low risk profile.

Savings on grid maintenance and upgrading works

With a *Portable 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 a stand-by emergency grid restoration solution. It can be mobilized and set up within a few hours in the event of a grid failure, hence reducing the technical and financial impact of power outage.

Streamline project execution

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

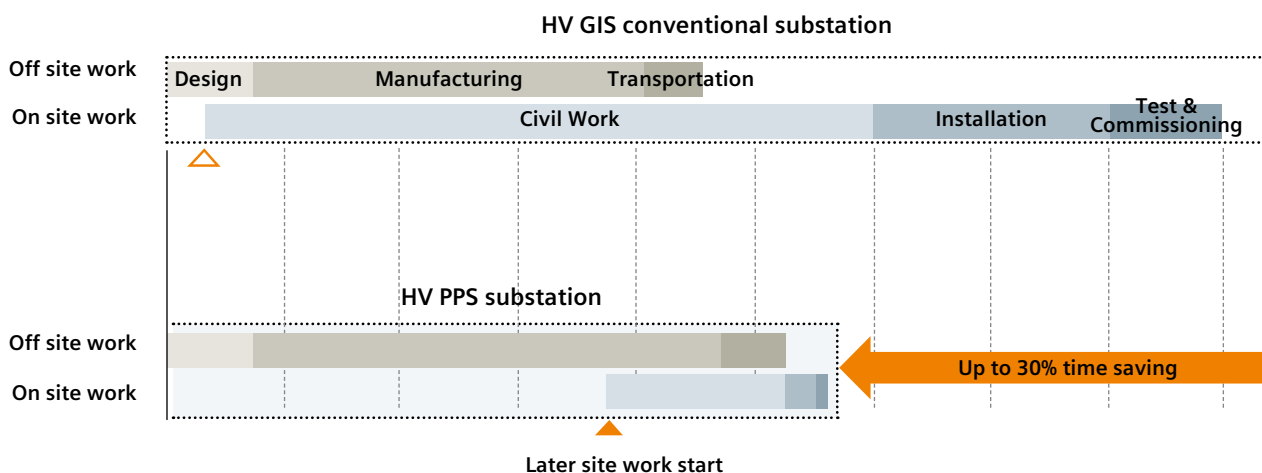
Land acquisition savings

The reduced footprint and modular concept of PPS substations allow optimized space usage.

Earlier energization

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

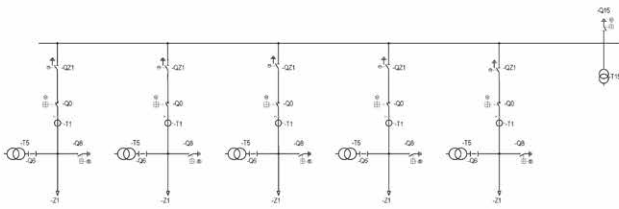
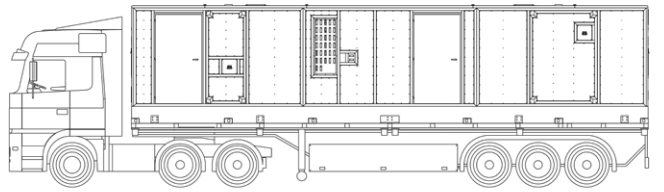
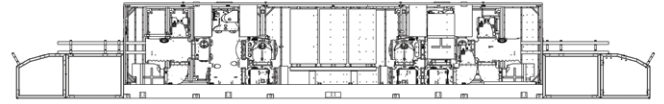
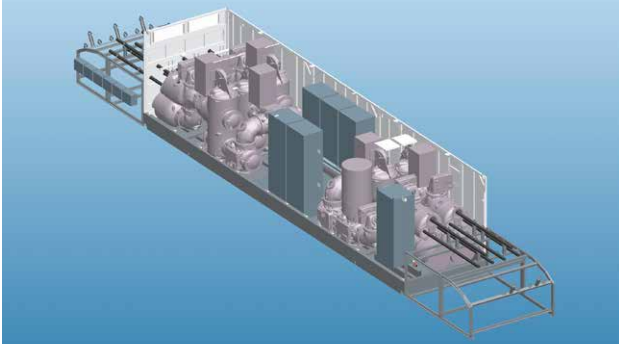
Time schedule optimization for a fast track substation construction project



Typical configurations for Portable Power Solutions

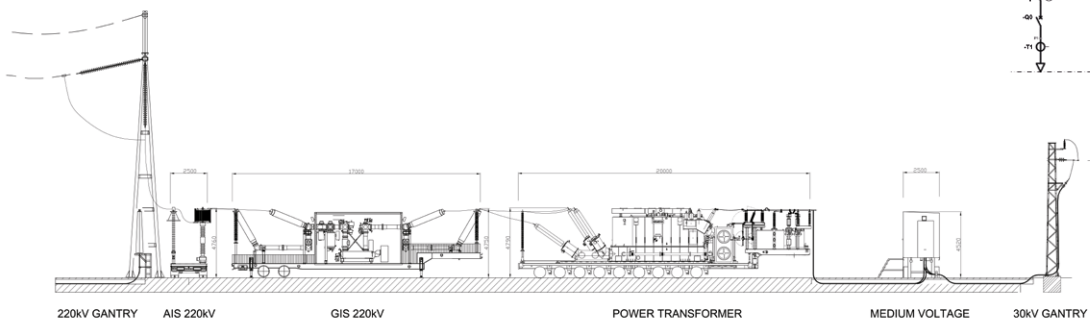
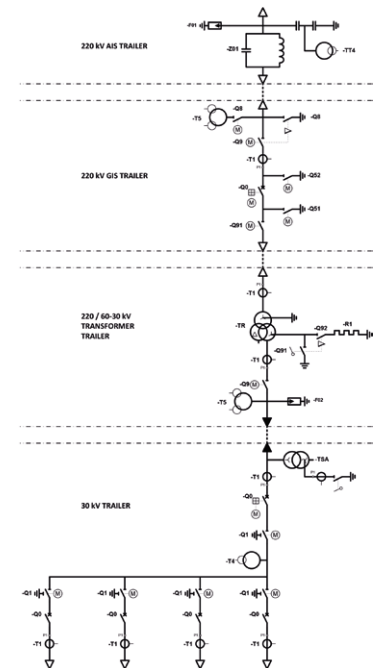
HV E-house: 123kV emergency restoration system

This E-House substation is used in urban areas in the event of outages or maintenance works (ie. 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.



Mobile substation: 220/60-30kV 40MVA

This mobile substation is used as a backup infrastructure to reinforce the grid. Its configuration enables single line, single breaker grid connection with minimum space requirements and little civil work.



220kV GANTRY AIS 220kV GIS 220kV POWER TRANSFORMER MEDIUM VOLTAGE 30kV GANTRY



The benefits are :

- Limited space requirement
- Minimum interface management
- Reduced on-site work (no major civil work, short installation and commissioning duration)
- Easy expansion and relocation
- Resistance to weather and harsh environments
- Environmental friendliness thanks to customizable visual appearance and easy removal, if required

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The Portable
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