

GE
Grid Solutions

Mobile Substations



A Complete Range of Flexible Solutions



Imagination at work

Grid Solutions, a division of GE Renewable Energy, is a global leader in providing solutions that modernize the grid - managing and moving power from the power plant to the consumer.

For over 100+ years, Grid Solutions has led in the development, design, manufacturing and installation of a broad range of integrated hardware and software solutions for utilities and energy intensive power users including oil and gas, petrochemical, mining, metals, water, critical infrastructure and telecommunication companies.

Built on interpolatable designs, industry standards and deep domain knowledge, Grid Solutions products help to maximize the efficiency, reliability and security of our customer's electrical infrastructures. From protecting and optimizing assets such as generators, transmission lines and motors, to delivering analytic tools to help manage the power grid, Grid Solutions delivers industry leading technologies to solve the unique challenges of each customer.

WHO WE ARE





Advanced engineering ready for rapid deployment

Mobile substations – providing a crucial flexible link in the electrical grid

Substations play a crucial role in the transmission and distribution of electrical power throughout the grid. So what happens if a substation goes ‘off-line’? Disruption can be caused by a range of events outside of the control of utilities, grid operators and industries, including equipment breakdown, natural events such as lightning strikes, floods, and earthquakes, as well as operational requirements such as maintenance and refurbishment.

GE’s mobile substations can bridge the gap left by these events, helping to keep the grid operational and safe. A mobile substation is a self-contained trailer or container equipped with the necessary high and medium voltage components of a full substation, including power transformer, switchgear and disconnect switches (GIS, AIS or Hybrid), metering transformers, surge arresters, protection and control equipment, AC and DC auxiliary power and control systems. Other equipment can be supplied to meet customer specific requirements.

Madrid, a center of excellence worldwide

The GE center of excellence for the design and manufacturing of mobile substations is based in Madrid. Mobile substation units have been delivered and energized for national electric companies, utilities and end-users around the world.

As a center of excellence, our team works with customers and GE’s companies worldwide to offer advice and consultancy on developing the best possible solution for each situation. We have a proven track record and depth of expertise backed by international quality certification, including ISO 9001-2000, ISO 14001 and OHSAS 18000.

With our expertise and experience, we are able to offer our customers complete ‘turnkey’ solutions, including commissioning services, transportation, energizing and training to ensure the most flexible and effective solution.

Optimized mobile substations

What is a mobile substation?

Mobile substations are autonomous systems that offer maximum mobility and flexibility. They can be prepared, transported and operational in a very short space of time, making mobile substations the ideal solutions for addressing a range of contingencies that utilities may face.

CLASSIFICATION

There are several possible configurations for mobile substations, depending on client requirements and local traffic regulations:

These contingencies could include events such as:

- Temporary supply during periods of main substation refurbishment, upgrade or planned maintenance
- Ensuring continuity of service during contingencies such as fires, sabotage, blackouts or weather events
- Temporary supply for seasonal loads, events, or additional consumption in neighborhoods, industrial plants or remote locations
- Option to provide a permanent or semi-permanent installation, in specific situations



Could be transported without special traffic authorization

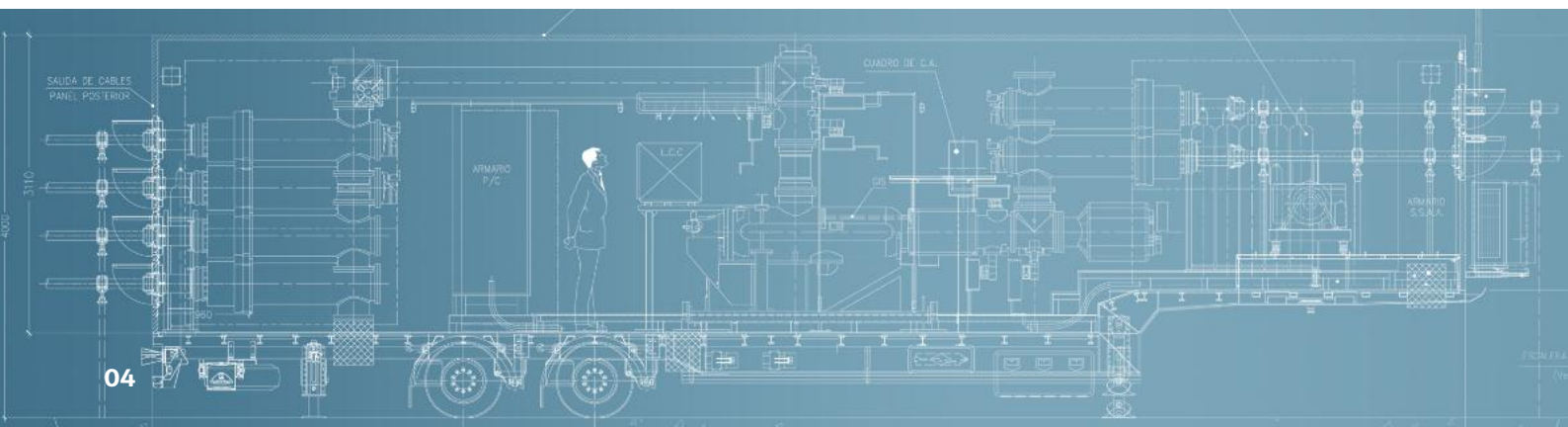


Have to be transported with special traffic authorization

Type of substation	Maximum voltage level	Other characteristics
GIS	220 kV	Complete bay
Hybrid - AIS	145 kV	Complete bay, incl. power transformer up to 10 MVA
MV cubicles	52 kV	Several bays, up to 15 cubicles
Power transformer	145 kV	Up to 10 MVA

Other ratings available under request and study.

Type of substation	Maximum voltage level	Other characteristics
GIS	420 kV	Complete bay
Hybrid - AIS	170 kV	Complete bay, incl. power transformer up to 60 MVA
MV cubicles	36 kV	Several bays, up to 19 cubicles
Power transformer	400 kV	Up to 105 MVA single phase transformer



The right configuration – anywhere you need it

Turnkey solutions for our customers

Mobile substations are designed by GE as a turnkey solution, adapted to the specific requirements of each customer.

Each project is unique and our project management team works closely with our customers to make sure that the huge range of possibilities are focused to the ideal customized solution.

Some of the key variables we advise on as part of our project management process are:

- Containers - substation in a single trailer/container or several units (modular designs can allow the possibility of independent working of each unit)
- Exact equipment specification of each vehicle/container/substation including one or more of the following key components: HV/MV switchgear, power transformer, protection and control panels, auxiliary AC&DC services, HV/MV cable and reels and system control equipment
- Assembly and testing at our factory, so that the mobile substation is ready to be energized as soon as it arrives at its operational location



Key benefits of GE's mobile substations

- No civil works cost
- Reduced maintenance costs
- Maximum utilization and return on investment
- Maximum mobility and flexibility
- Can be rapidly on site and available for service
- Maximum reliability through customized design
- Optimization of space equipment
- Reduced or minimal dismantling cost

The mobile substations are delivered 'ready to go', so they can be connected into the grid and provide a rapid solution to short or longer-term requirements.

Offering diverse solutions



Mobile substations in industrial applications

Mobile substation technology is a perfect solution for 'special applications', such as industry power requirements for specific projects or locations.

These custom units can be deployed as **mobile units (on trailers)**, **containerized** or **on Skid**. They can include heating and cooling equipment to allow for operation in more hostile environments, while the ability to link together containers makes it possible to set up multi-bay configurations in very confined spaces.

Industrial customers can deploy mobile substations in a range of situations and conditions, such as:

- Changing or undefined access points for energy consumption
- Temporary and short-term power requirements
- Multiple service requirements, such as changing power needs, different voltages etc.
- Emergency requirements to maintain production in energy intensive manufacturing industries – avoiding lost-production costs



Working closely with our customers

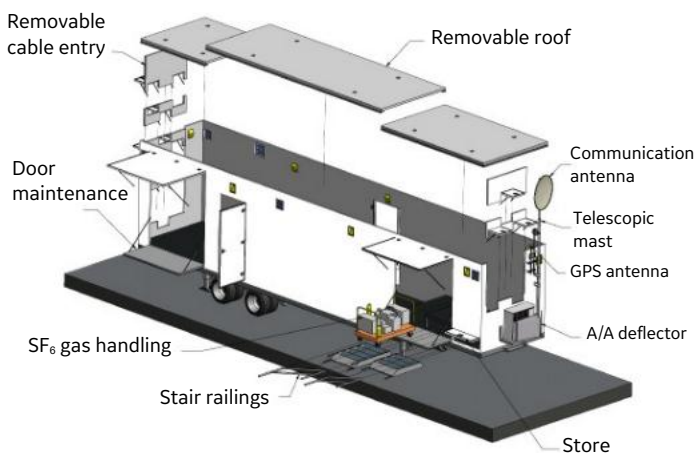
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Our team of experts work closely with our customers through clearly defined stages, ensuring perfect project delivery through collaboration.

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GE has extensive expertise in developing specific mobile substations for industry customers. The units are adapted to include the components that may be required for our customers' specific needs and could include:

- Diesel generator (with fuel tanks and smoke exit system)
- Motors soft starters and frequency variable drives
- Motor control centers (MCC)
- Power transformers for special applications
- Capacitor banks
- Facilities to accommodate maintenance and operational people



Our project teams use the latest 3D CAD tools to help plan and design sophisticated, space-efficient mobile substations.



A global With a



A record of worldwide success

As a company, GE has a strong presence in all regions. This enables our team in Madrid to work closely with GE colleagues virtually anywhere in the world. These global resources help ensure rapid development and commissioning of mobile substations with the help of local knowledge and resources to deliver our solutions in an efficient and responsive manner. We can be close to our customers, wherever they are.



GAS NATURAL FENOSA (SPAIN)
132/66 kV 4 GIS bays

4 GIS Bays F35-132/66 kV, on a single trailer: The protection and control and auxiliary services equipment to operate the bays is integrated as part of the trailer. No special permits needed for transportation.



EON (SPAIN)
132-55/30-20-12 kV 20 MVA

Complete mobile substation composed of 3 trailers: Hybrid switchgear with 20 MVA power transformer, MV cubicles with protection - control system and motorized cable reels trailer.



EON (SWEDEN)
170/52.5 kV 35 MVA

Three module substation, including one special trailer for 35 MVA power transformer and two transportable containers for 170 kV and 52.5 kV GIS switchgear. The protection and control equipment needed to operate the bays is integrated in the containers.

partner customer-focused approach



REE (SPAIN)

220 kV, GIS bays

Complete 220 kV indoor GIS bay on a trailer. Protection, control and communication equipment needed to operate the bay is fully integrated. General dimensions: 13.6 m x 2.5 m. No special permits needed for transportation.



SEC (SAUDI ARABIA)

110/13.8 kV 27 MVA

A two module mobile substation, including one trailer with 110 kV GIS switchgear and a 27 MVA power transformer and a second trailer with 13.8 kV switchgear, control and protection equipment and HV and MV cable reels included.



IBERDROLA (SPAIN)

36/13.8 kV 15 MVA

Single trailer medium voltage mobile substation, including 36 kV and 13.8 kV switchgear, 15 MVA power transformer and motorized MV cable reels included. General dimensions: 11 m x 2.5 m.



PDVSA (VENEZUELA)

115-69/13.8 kV 42 MVA

Complete substation on a single platform including 115-69 kV HYpact module, power transformer up to 42 MVA and 13.8 kV switchgear cubicles. Protection, control and communication equipment needed to operate the bay is integrated. General dimensions: 22 m x 3.8 m.



ENDESA (SPAIN)

132-66/25-10-15 kV

Mobile substation integrating a single platform 132-66 kV GIS switchgear (double ratio for choice) and 25-10-15 kV MV switchgear (three ratios for choice). Control and protection equipment is included. General dimensions: 13.6 m x 2.5 m. No special permits needed for transportation.



UTE CUETO SOLUCIONES (ANGOLA)

66 kV GIS single bay

Mounted in a transportable sea container, this bay includes: automatic breaker, measuring transformers, disconnect switches, and the necessary equipment to properly operate and control the bay. The container is fully prepared to ensure the optimal working conditions including thermal and fireproofing of the equipment.

Service and support

Your asset management partner

GE is committed to bringing you the support you need throughout the lifespan of your mobile substation. Whatever the requirements of your mobile substation; alternative asset during planned maintenance, temporary substation capacity increase, forced outage repair and other natural or dramatic event, the key factors to ensure the substation is always on duty are availability and reliability.

To ensure we provide a solution that is always ready to go, GE provides a full range of services, from the wheel of the trailer to the top of the bushings.

During standby periods or while in use on site, our teams can assess the condition of the equipment, such as the mechanical health of the solicited joints and mechanisms, dielectric health via PD monitoring, quality of the fluids and their sealing for oil or SF₆, low-voltage panels integrity, then advise and apply preventive and corrective actions.

To maximize your asset performance and to reduce possible intervention delays due to administrative constraints, GE offers long-term operations and maintenance agreements, including 24/7 emergency service center assistance.



GE Technical Institute

All around the world, the GE Technical Institute offers a full range of comprehensive training related to use of mobile substations, including: electrical safety, gas handling, operations & maintenance, protection & control and network management solutions.

Grid Solutions

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Helping to meet growing energy demands

Improving grid resiliency and energy efficiency

Upgrading and digitizing aging infrastructure

Enabling renewables and a diversified energy mix



Comprehensive Portfolio

Application Expertise

Engineering Services

Project Management

Field Service & Technical Training



Imagination at work

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