

**THE WORLD MARKET
FOR
SUB STATIONS AND SWITCHYARD
EQUIPMENT
2018 - 2028**

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1. INTRODUCTION

The objective of this report is to provide a concise overview of the Sub Station and Switchyard equipment market in 150 countries of the World. The report gives an estimate of the volume and value of Sub Station and Switchyard equipment consumption in each national market, broken down by product category. For the purposes of this report the categories of Sub Station and Switchyard equipment have been defined as follows:

Transformers

- **Transmission Transformers** - defined as transformers installed in transmission sub-stations. For the purposes of this report, Transmission Transformers are further defined as generally having a power handling capacity equal to, or greater than, 5MVA. Also known as system transformers, the purpose of these transformers is to step-down the voltage from transmission levels to sub-transmission and distribution levels.
- **Distribution Transformers** - defined as transformers installed in distribution and consumer sub-stations. Distribution Transformers are further defined as generally having a power handling capacity of less than 5MVA.

These categories include all transformers with a power handling capacity exceeding 16kVA. Measuring transformers, instrument transformers or transformers for use in civil aircraft are not included in this report.

High Voltage Switchgear

High Voltage Switchgear in this report is defined as comprising fuses/cut-outs; automatic circuit breakers (oil/air/SF6 - including reclosers); vacuum interrupters; isolating (make and break) switches; arresters/limiters/suppressors; discrete panels/bays for a voltage greater than 1000 volts.

Within this report High Voltage Switchgear includes:

- **Fuses** (for a voltage exceeding 1000 volts)
- **Circuit Breakers** (Automatic, for a voltage exceeding 1000 volts)
- **Switches** (Isolating and Make-and-Break, for a voltage exceeding 1000 volts)
- **Distribution and Control Panels** (for a voltage exceeding 1000 volts)
- **Other** (Other electrical apparatus for switching or protecting electrical circuits, or for making connections to or in electrical circuits, including boards, panels [including numerical control panels] consoles, desks, cabinets etc. for electric control or the distribution of electricity) for a voltage exceeding 1000 volts.

The market sizes for High Voltage Switchgear are also broken down by voltage, into the following voltage ranges:

- 1 – 49 kV
- 50 – 150 kV
- >150 kV

Transmission and Distribution Lines and Fittings

For the purposes of this report Transmission & Distribution Lines and Fittings are defined as comprising:

- **Insulators, Towers and Fittings** – High voltage insulators (of glass, ceramic and composite materials), – towers and lattice masts for power lines, made from iron or steel and other fixtures fittings.
- **Transmission & Distribution Cables & Lines** – Electric wire, cable or conductor, insulated or otherwise, for a voltage exceeding 1000V. Split into Overhead lines and Underground cable.

Converter/Inverter Equipment

Equipment associated with HVDC systems for converting AC to DC and back again including, thyristors, IGCT's, MCT's, IGBT's

FACTS Components

Components required for the implementation for flexible AC transmission systems, including inductors, capacitors, VAR and PSS equipment.

Control Systems and Relays

For the purposes of this report control systems and relays are defined as the control systems that are necessary for the control and monitoring of the network for operational purposes. It does not include the command and control systems within power stations; nor does it include metering, billing or customer care systems.

Meters

Consumer and custody meters associated with the implementation of smart grid systems, not included in this category are conventional single phase and three phase utility billing meters.

Engineering and Construction Costs

This product - or rather service area - is the most difficult to define. When transmission and distribution systems are installed and maintained there are two major elements comprising the overall cost of the project; the cost of the equipment and the cost of designing and installing the equipment. For some projects the owner buys equipment and completes the installation using their own labour and engineering staff; other projects are purchased as a fully installed and functioning system from a vendor. Sometimes users will employ an independent contracting company to design and oversee the installation. Often manufacturers will supply equipment and install it within the scope of an all-inclusive contract. The roles and activities are often blurred and are not easily defined. However, whenever work is undertaken somebody has to build the equipment, somebody has to design the installation, arrange for it to be installed, commissioned and taken into service. We have attempted to define these activities by action rather than by "who does what". For the purposes of this report the following guidelines have been applied.

- **Turnkey Engineering Costs** – The costs of designing and installing all equipment and systems for a transmission and distribution project
- **Civil Engineering Costs** - The cost of preparing ground, foundations and access for network expansion or maintenance.
- **Utility Management Costs** - The costs to the utility company (or their representative) of managing each project.

The report is designed to be used as a first line planning tool by companies interested in the global and regional market structure for transmission and distribution equipment and as a screen on which to identify national markets worthy of further investigation.

The principal data in this report is the Sub Station and Switchyard equipment market data 2018 to 2028, with figures for 2010 to 2028 being reported. More detailed product data may be found in other Goulden Reports publications.

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