



Medium-voltage switchgear

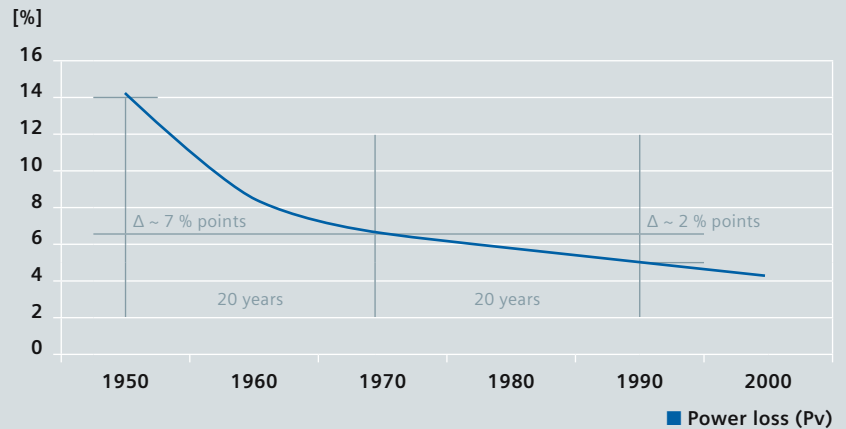
Environmental mission statement and environmentally-friendly product design

Answers for energy.

SIEMENS



Network losses Germany



Source: <http://www.udo-leuschner.de/energie-chronik/020818.htm>

Continuous improvements

Ecologically and economically sound

With its products, systems, complete power supply installations and comprehensive solutions, the Medium Voltage Business Unit of the Power Distribution Division in the Energy Sector offers a complete portfolio for power distribution at the medium-voltage level.

Customers around the world especially benefit from the fact that we have optimized the complete value-added chain comprising development, production, delivery and commissioning. Thanks to the integration of targeted innovations, medium-voltage switchgear from Siemens not only lowers costs but contributes to a lasting reduction in the environmental impact of equipment and systems and the entire distribution network (see graphic "Network losses Germany").

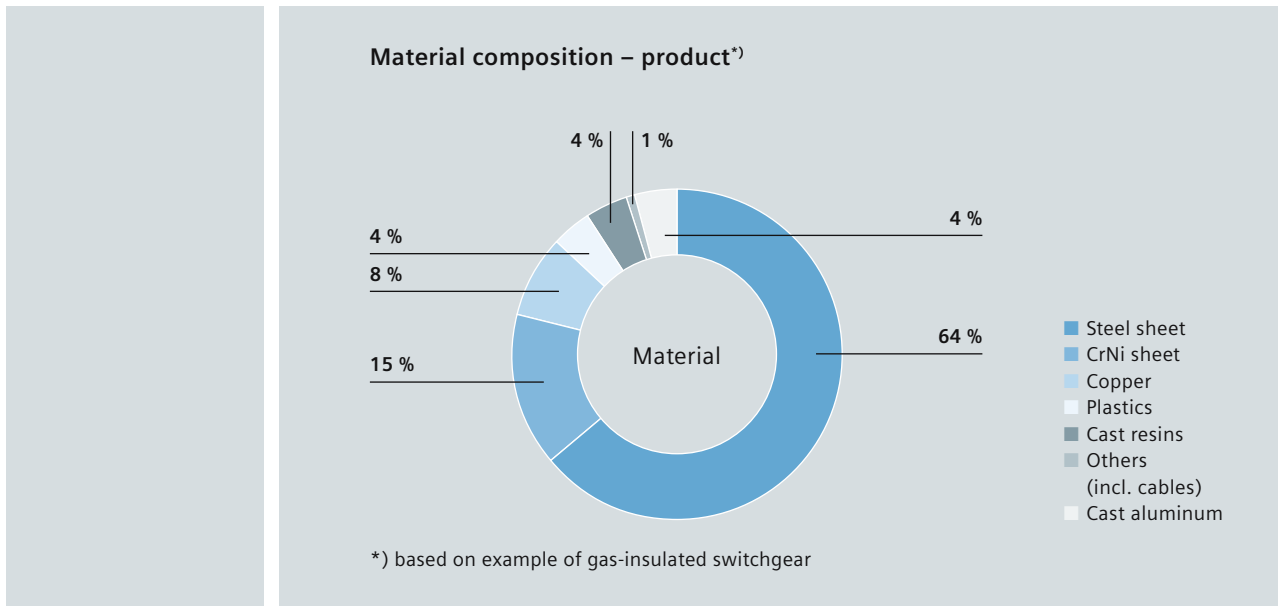
Safe and efficient

Our medium-voltage products and switchgear ensure the reliable, secure current flow in distribution networks. In line with the division of distribution networks into a primary and secondary distribution network level, a distinction is made between circuit-breaker switchgear (for the primary level) and load-break switchgear (for the secondary level).

Load-break switchgear of the secondary distribution level is generally required to switch rated currents (low loads). Circuit-breaker switchgear at the primary distribution level, on the other hand, also has to be able to reliably and safely disconnect short-circuit currents (high power), which can be as much as 30 times higher than the rated currents.

For this reason, the panels are divided into different metal-clad compartments for the cable connection, circuit-breakers and the busbar. The protection device and the low-voltage wiring are additionally isolated in a separate room.

The design must also be able to withstand the unlikely occurrence of an accidental arc in the panel. Medium-voltage switchgear from Siemens is metal-encapsulated to provide optimum protection against arcing faults.



Environmentally relevant analysis of the entire lifecycle

Use of materials

Switchgear consists essentially of metallic materials. Steel (for the housing) accounts for the bulk of the metal weight followed by copper (current paths), aluminum and other metals. The main non-metallic material used is cast resin (bushings, current and voltage transformers). Other plastics are used in considerably smaller amounts as insulating components (pole shells, spacers, cable insulation). Further materials making up very small proportions of the overall weight are silicone, ceramics (vacuum interrupter), and lubricants.

Some built-in devices for switchgear also contain electronic parts and components. These, for the most part, are protection devices. You will find further information about the protection devices in the product environmental declaration issued by the Siemens Energy Automation Business Unit.

Some current path contact surfaces have high-quality silver-plated contacts to optimize the electrical contact resistance of positive and non-positive connections.

Production of switchgear

We continuously improve our production processes with respect to their energy, water and material requirements. They comprise the following main steps:

Preprocessing

- Processing of steel sheet (cutting, blanking, bending, welding)
- Copper processing (blanking, bending)
- Cast resin processing
- Preconnectorizing of cables, cable harnesses
- Surface treatment (painting, electroplating)

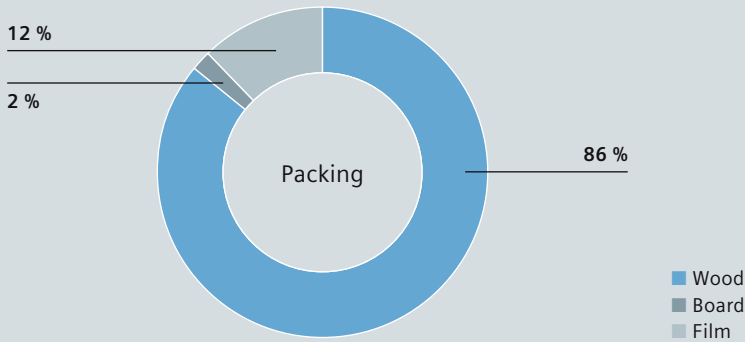
Switchgear assembly

- Preliminary and final assembly of components and complete panels
- Installation of equipment in panels (circuit-breakers and load interrupters, disconnectors, earthing switches, transformers, fuses and protection equipment)
- Wiring of built-in equipment via the cable harness and other cables

Configuration and final inspection, packing, dispatch and transport

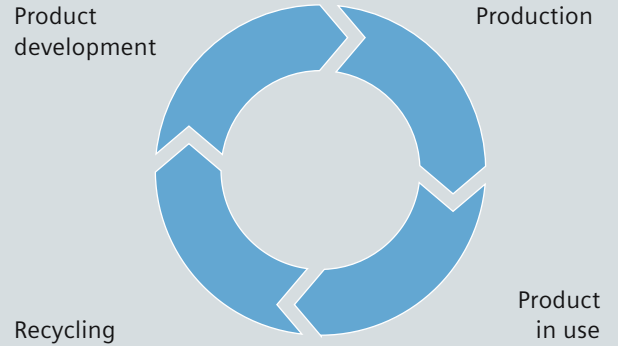
- Configuration of the individual panel or the switchgear composed of panels
- Preliminary and final assembly of components and switchgear (mechanical and electric)
- If necessary, commissioning and acceptance by customers

Material composition – packing^{*)}



*) based on example of gas-insulated switchgear

Product lifecycle



Switchgear in use

Our medium-voltage switchgear and products guarantee the current flow and perform measurement and monitoring functions. Switchgear only changes out of this “network-neutral” (passive) function into the active function of interrupting and/or switching over of the current flow in the event of a fault or in the case of controlled circuits.

This generally happens in order to avoid damage to and in the distribution network and to ensure the ongoing electrical supply or its rapid restoration.

In practice, the active function of a switchgear is seldom needed, regardless whether this is due to system faults or controlled switching operations. Instead, for most of the time the switchgear functions in the distribution network as a neutral, reliable protection element that uses only a minimal amount of energy.

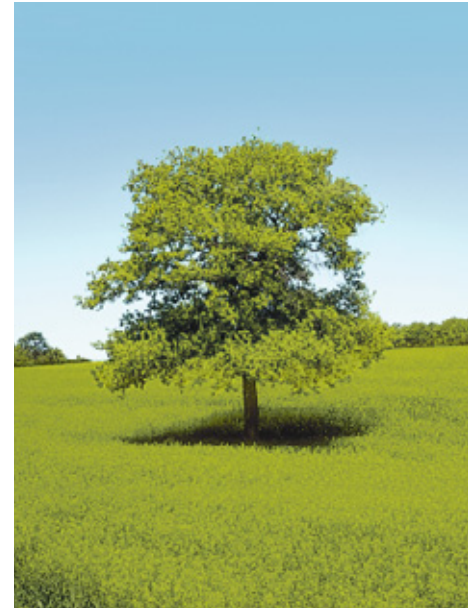
Disposal and recycling

After dismantling at the end of their period of use, the components are recyclable as sorted and mixed scrap. Any electronic auxiliary devices present must be removed previously during dismantling or when using mixed scrap and recycled separately.

In the case of gas-insulated switchgear the insulating gas must be properly extracted according to the legal regulations and sent for reprocessing and reuse.

Because of existing legal regulations switchgear can be recycled in an environmentally friendly way overall. There are no hazardous substances present as defined by the Hazardous Substances Act applicable for the Federal Republic of Germany. The relevant local laws and regulations must be observed for operation outside the Federal Republic of Germany.

Further information can be obtained from the regional Siemens representatives.



Commitment to environmentally compatible quality

Certified environmental management system

In addition to the EN ISO 9001-compliant quality management system, Siemens has also put in place an environmental management system in accordance with EN ISO 14001 at the relevant main locations Berlin, Erlangen and Frankfurt am Main. Furthermore, all our locations have a certified work protection management system in compliance with BS OHSAS 18001.

The effectiveness of these management systems is verified annually by independent organizations.

Other environmentally relevant information

Switchgear are classified as air-insulated (AIS) or gas-insulated (GIS) according to the type of insulant used.

For the same performance data, GIS is significantly smaller since the insulating gas (SF₆) has outstanding insulating properties. Because SF₆ also intensifies the greenhouse effect, we only deliver hermetically sealed gas-insulated switchgear which has been individually tested for leaks. If one considers the environmental impact over the period of use of the switchgear, gas-insulated switchgear from Siemens offers slight advantages due to the lower consumption of material during manufacture and a lower system resistance (smaller power loss).

The SF₆ insulating gas is kept in a closed (hermetically sealed) system, so that apart from the technical losses amounting to a maximum of 0.1 % of the filling volume occurring during filling and disposing of the switchgear, no insulating gas can escape into the atmosphere. A few years ago, the electrical industry made a voluntary commitment with regard to the use of SF₆ in order to restrict the emission of insulating gas into the atmosphere to a minimum.

This voluntary commitment was one of the foundations on which the European Union enacted the SF₆ Ordinance in 2008, which is fully implemented by Siemens and the electrical industry.

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