SIEMENS energy

Micro substation

Electricity accessibility through tailor made solution to overcome different applications such as electrifying remote areas by a direct connection from the existing transmission grid. One step from high voltage to low voltage.

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Providing electricity accessibility for remote areas


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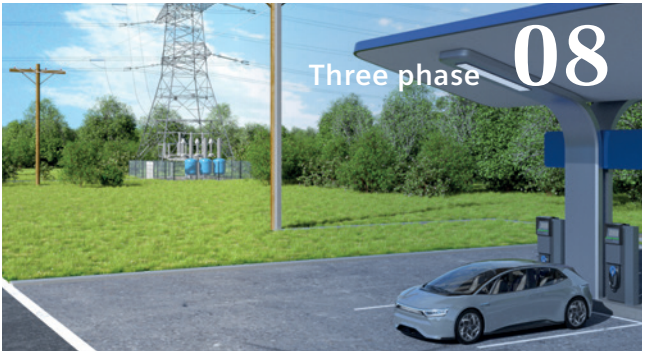
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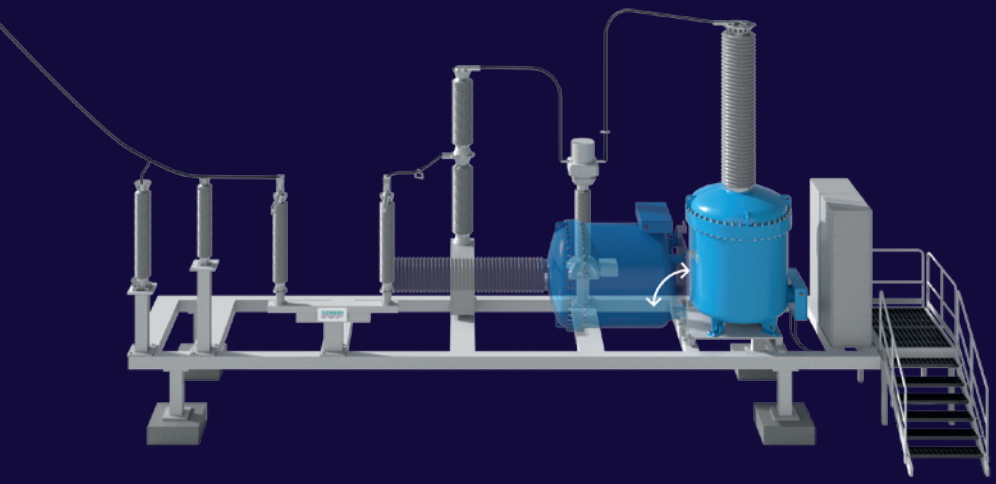
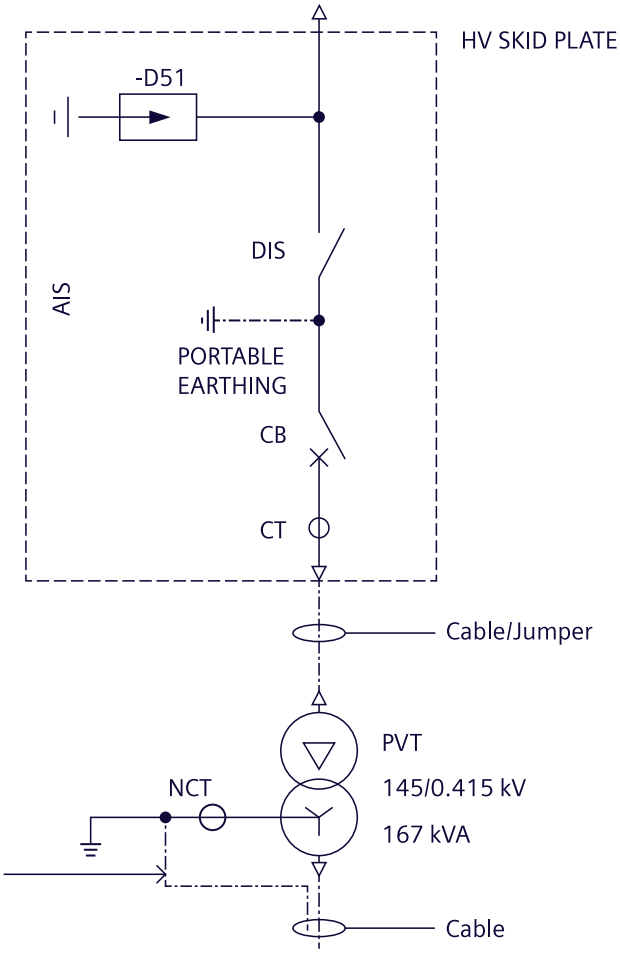


Benefits

- Electricity accessibility
- Economical solution for remote areas
- Minimum civil works required
- Transportable solution
- One-step from high voltage to low voltage
- Applicable solution with blue portfolio
- Pre-assembled concept
- Quick installation on site

Flexibility

- Single phase and three phase solutions are available as per power demand
- Solutions with latest technology (SF_6 free)
- Substation arrangements are tailored to each location and customer's needs, utilizing options, examples include: skids platform, steel structures or foundations



E.g.: 145 kV micro substation using AIS technology, with circuit breaker integrated and station service voltage transformer (SSVT) with 167 kVA

Single phase

Electricity accessibility is crucial for many reasons. It enhances the quality of life by providing access to lighting, communication, and refrigeration. It also supports education, healthcare and economic development. Electrification infrastructure has been a fundamental factor for society among the years. We should also seek a development to reduce the reliance on traditional fuels, which will lead to improved environmental conditions.

According to the International Energy Agency (IEA) around 770 million people worldwide do not have access to electricity. Many of these people are in remote areas. Our solution can assist in bringing reliable and clean energy ready to use.

There are already many high voltage transmission lines crossing areas where the energy is needed. However, for known electrical reasons, we need to convert the high voltage to low voltage before we can connect to the final application (e.g.: homes, 5G antenna and auxiliary services).

There is a solution that can be used to convert the high voltage directly to low voltage, ready to be used for customers.

Through our micro substation with a station service voltage transformer (SSVT) in a range of 72.5 kV to 550 kV this voltage can be transformed directly to voltage ranges between 100 V up to 900 V.

To ensure the safety on the operation of the micro substation, switching equipment is used, such as circuit breakers and disconnector switches.

A current transformer is used to measure the current flowing on the micro substation and surge arresters may also be installed to protect from high voltage impulses.

Single phase solution can deliver power up 333 kVA on the secondary side.

Three phase

When a larger power phase is needed, we can use the three phase solution and supply a higher value of power.

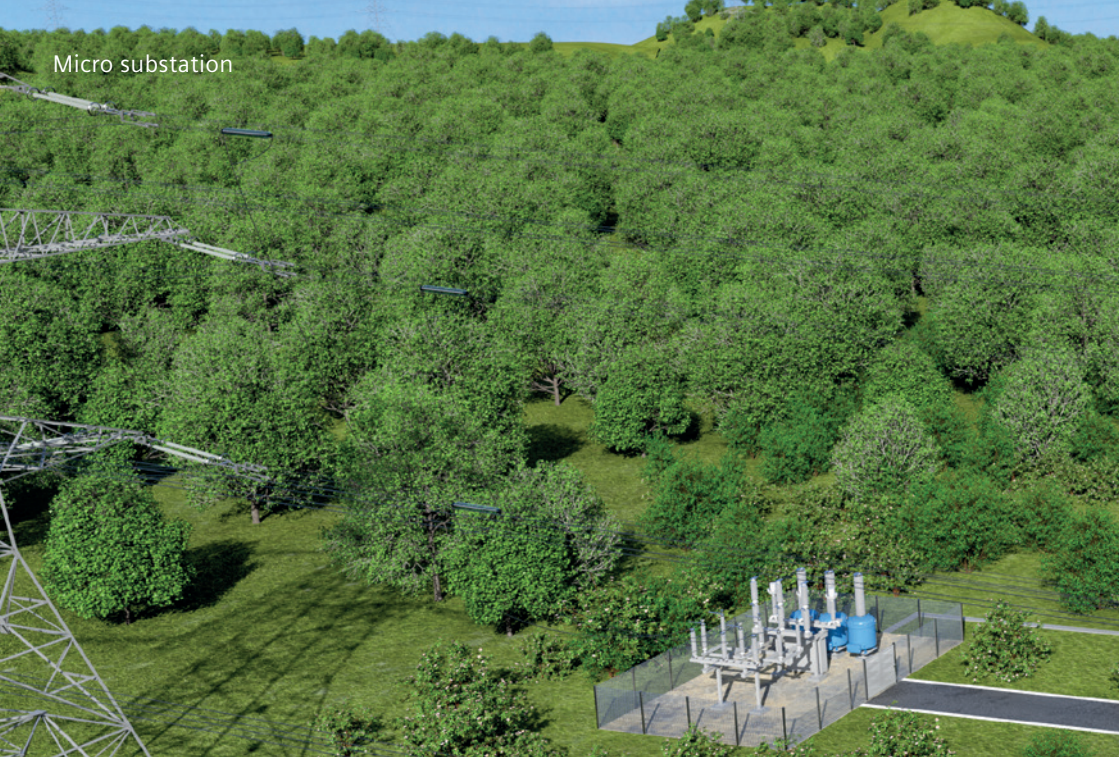
For example, in remote areas near to highways, where we have a high voltage transmission line we can install a micro substation with three phase and supply energy to different applications such as EV charging station.

With three station service voltage transformers (SSVT) we can supply up to 1 MVA to our customers. The solution is designed to easily scalable to aggregate additional station service voltage transformers (SSVT) whenever the demand requires it.

The Micro Substation is supplied with the protection system customized according to customers standards.

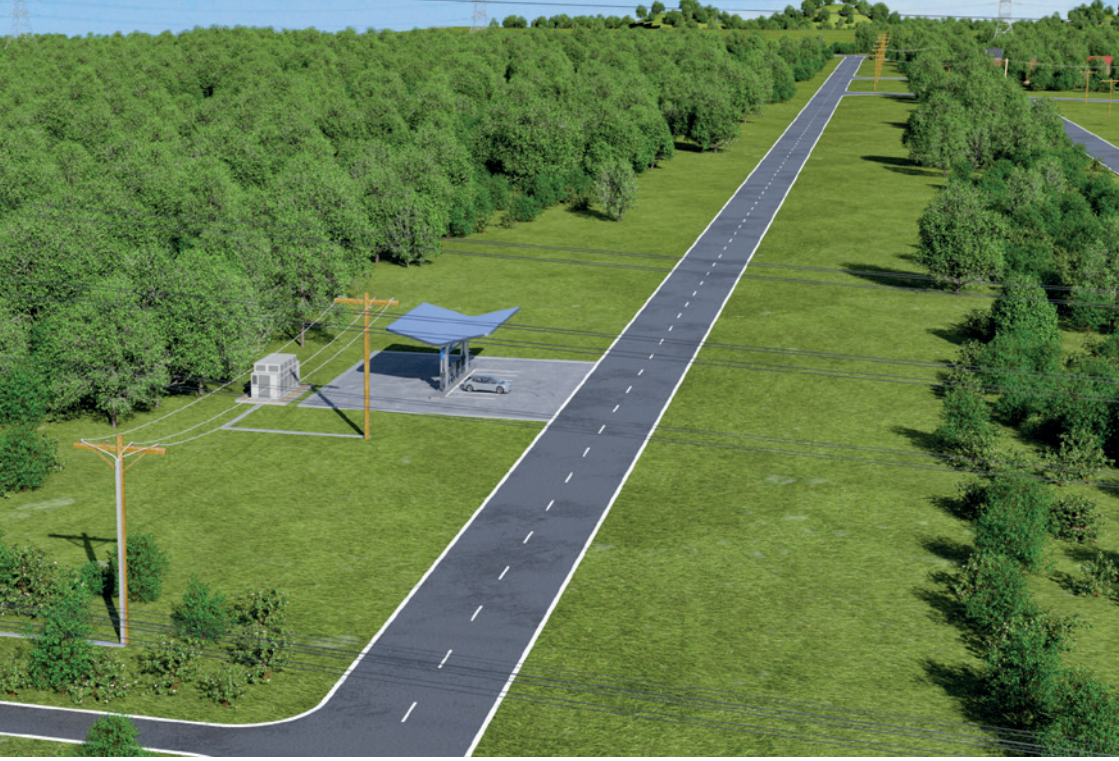
The connection of the micro substation to an overhead line does not disturb the current performance of the energy transmission. If the fault occurs inside the micro substation, the protection system is able to discriminate the source of the fault since there are current transformers installed on the high voltage side.

E.g.: 145 kV micro substation using AIS technology, with circuit breaker integrated and station service voltage transformers (SSVT) supplying power of 500 kVA.
A solution by Siemens Energy for e-charger licensed by REN (European TSO).


Micro substation

Micro substation

The micro substation can be completely assembled with SF_6 free solutions. Siemens Energy offers the blue portfolio including vacuum switching technology and clean air insulation to produce zero harmful emissions without having to compromise on performance or economic feasibility.
With over 10 years of experience in high-voltage vacuum switching, we have been able to maintain outstanding levels of technical performance and low lifecycle costs while reducing our ecological footprint and increase long term sustainability. Making the blue portfolio the perfect choice for substation applications. With the help of our strong partnerships, we will develop and implement it even further and faster. It provides the same electrical and insulation features as traditional insulation technologies while at the same time giving all the benefits of a SF_6 free solution. The application is suitable for low temperature applications at -50 °C and below.
The final main features regarding the quality of service include, "virtually unlimited" power availability and sustainability. Concerning the quality of service (continuity of supply), this solution provides the quality of supply



of a transmission grid to the final customer. Usually, the average interruption time of a transmission grid is significantly lower than the interruption time of a distribution grid, since distribution grids are more affected by external factors such as extreme events like storms, high winds, heavy snow or forest fires.
Finally, this micro substation presents a sustainable solution since it results as a new use for the existing transmission grids that are already available across the countries, without the need for grid reinforcements due to new power requirements. This is useful as a complementary approach mainly outside the urban centers, where the rural distribution grids can have difficulties to supply the power demand for different applications.

The solution is focused on:

- Consumers do not have access to MV/LV energy
- Quick installations with minimum civil works are available on site
- Overhead lines (OHL) are available for usage

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