

Press release

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Siemens Energy strengthens German grid nodes with two STATCOM systems

- Systems will be among the most powerful STATCOM installations worldwide
- Innovative grid-supporting technology for stabilizing important nodes in the German transmission power grid and for a successful energy transition

German transmission system operator Amprion has commissioned Siemens Energy with the construction of two SVC PLUS series static synchronous compensator (STATCOM) systems to further stabilize the German transmission power grid. The plants will be in Polsum (North Rhine-Westphalia) and Rheinau (Baden-Württemberg). Both systems are designed for a reactive power range of +/- 600 Mvar making them among the most powerful systems in the world. In addition, the STATCOMs will feature innovative grid-supporting control mechanisms allowing the systems to efficiently compensate for increasing voltage fluctuations in the electrical transmission network.

The share of renewable energies is growing worldwide. However, their volatile feed-ins put significant strain on the power grids. Due to the geographical arrangement of renewable energy generation, the distance to the consumption centers is growing. In Germany, for example, the space is growing between large wind farms that feed into the energy grid in the north and load centers in other parts of the country. This makes the transmission network more susceptible to voltage fluctuations and interference. For a long time, large power plants have provided the reactive power necessary for grid stabilization. However, due to the energy transition many of these conventional power plants, which are operated with nuclear or fossil fuels, are being taken off the grid.

As a result, transmission system operators like Amprion set up STATCOM systems at important grid nodes. They compensate for the voltage fluctuations by regulating the reactive power as required, keeping the grid voltage in a stable range. In addition, the expansion of renewable energy generation allows greater use of power lines, reinforcing the need for increased reactive power compensation. This requires STATCOM systems with increasing capacities up to +/- 600 Mvar reactive power.

Siemens Energy AG
Communications
Head: Robin Zimmermann

Otto-Hahn-Ring 6
81739 Munich
Germany

"The restructuring of the energy system requires many individual innovative solutions," says Dr. Hendrik Neumann, Chief Technical Officer of Amprion GmbH. "We are very pleased to have Siemens Energy as an experienced technology partner at our side working with us on a stable power grid for the future.

"Powerful partnerships are the key to success to make the grids fit for the energy landscape of tomorrow," says Beatrix Natter, Executive Vice President Transmission at Siemens Energy. "We are thankful for this trust and look forward to continuing to support Amprion in expanding the network in Germany as required and thus paving the way for a climate-friendly energy system."

German transmission system operators have calculated a minimum expansion requirement for stationary and controllable compensation units for reactive power compensation in the network development plan. This controllable expansion requirement was defined to be between 23 and 28 Gvar and is expected to be covered to a large extent by STATCOM systems. Due to the increasing use of power electronic equipment in the network, network operators are also calling for new control concepts with grid-forming behavior for all STATCOM systems. These lead to a control behavior of the converter similar to rotating synchronous generators, such as those used in conventional power plants. Like generators, STATCOMs could keep the voltage in the network constantly stable by themselves.

The STATCOM systems available today do not yet have these comprehensive network-supporting properties. They use common current control schemes that are state-of-the-art power electronic equipment for transmission grid applications. Technology companies like Siemens Energy will further develop the control algorithms and possibly the hardware accordingly. The new turnkey STATCOM system that Siemens Energy will build in Polsum and Rheinau will have these new grid-supporting features.

Siemens Energy is market leader in terms of number and total installed capacity of the worldwide installed STATCOM systems with modular multilevel power converter technology.

Contact for journalists

Christina Hümmer

Telefon: +49 152 07158923

E-Mail: Christina.Huemmer@siemens-energy.com

Siemens Energy AG
Communications
Head: Robin Zimmermann

Otto-Hahn-Ring 6
81739 Munich
Germany

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<https://www.siemens-energy.com/global/en/offerings/power-transmission.html>

For further information on Flexible AC Transmission systems for grid stabilization, please see

<https://www.siemens-energy.com/global/en/offerings/power-transmission/portfolio/flexible-ac-transmission-systems.html>

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