



The transformer business is back to being an innovative future-oriented industry

STEFAN KLAASSEN

Siemens Energy's Vice President for Power Transformers

Mr Klaassen, as General Manager of Siemens Energy Power Transformers, how do you think the industry has developed in the past few years?

When I first came to work in the power transformer industry in 2013, the industry and its products were close to being categorized as commodities and offered limited attractivity. Today, conditions have changed, and the transformer industry is back to being an innovative future-oriented industry. Transformers are the important link within the energy value chain towards achieving a successful energy transition. Today, the energy landscape is changing rapidly, and our customers need to respond flexibly to power fluctuations due to renewable energy generation. Therefore, the requirements for power dissipation and continuous and reliable power transmission are higher than ever. Besides that, many grids need to be renewed and grid operators require digitalized, cybersecure solutions. This trend can be seen worldwide and is expected to continue during the next decade.

You said that conditions in the industry have changed. What challenges does this rapidly changing energy landscape pose for customers?

We see three challenges: first, the increased infeed of renewable energy resources and the corresponding fluctuations that impact grid stability, second, further electrification results in a rising demand for electric energy, and

third, the requirement for our customers to improve their own carbon footprint. Consequently, our customers are confronted with the questions: Which products and solutions will meet their CO₂ reduction requirements? How do they bridge the gap between increasing energy demand, potentially longer delivery times for key equipment and the growing challenge to secure materials in a heating-up transmission equipment market? Our customers are looking for answers to their challenges and we are prepared to address them.

You previously mentioned the impact of renewable energy generation. What does this mean? How do you target this topic and what role do power transformers play in it?

There are two different perspectives. Onshore power distribution is affected, as well as offshore power generation. Onshore, the increasing use of renewable energy resources has a tremendous impact on grid stability. Fluctuations cause losses through reactive power and the need for power flow control. Therefore, grid stabilizing equipment like variable shunt reactors and phase-shifting transformers are needed. Such equipment supports the control of reactive power and voltage in the grid, regardless of the measures of other grid operators. Offshore, power generation takes place in a dynamic and sometimes unpredictable environment. In addition, power has to be transmitted with the least possible losses over longer distances. That is why we apply our technological know-how

to designing highly efficient AC and DC transformers to withstand the harsh conditions out at sea.

What other measures can be taken to ensure grid stability and what role does digitalization play?

We truly believe that digitalization will play an integral part in improving the

Stefan Klaassen is Siemens Energy's Vice President for Power Transformers, responsible for supplying AC / HVDC transformers, reactors and phase shifters up to 1300 MVA / 1100 kV to customers globally. He qualified as an Engineer in Mechanical, Thermodynamical & Process Engineering at the University of Duisburg in Germany in 1995. He joined Siemens AG as a technical engineer and worked as a project manager and later as an integration manager in the power generation department. Stefan Klaassen spent several years at the factory in Jundiaí, Brazil, where he was Head of Operations & Head of Restructuring Office, then he returned to Germany. Before he became Vice President for Power Transformers, he held several managerial positions at Siemens AG in Görlitz, Germany.



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efficiency, productivity and reliability of all assets in a substation. This will be made possible through digital interconnections.

What do you mean by 'interconnection'?

In a digital environment, physical sensors and comprehensive applications continuously generate data that is converted into recommendations for operators. In an interconnected environment, the hardware and the digital part

are linked to each other in order to help operators to manage the growing grid complexity. Thanks to Senproducts® - digitally enabled products that provide real-time status information - and especially Sensformer® Advanced, our customers can simulate their transformer through a digital twin. The digital twin simulates and even predicts the transformer's 'health' and performance. Supported by this technology, operators can react to a fluctuating grid by managing temporary overloads while reducing the impact on asset lifetime as

much as possible. Digitalized products help to achieve effective and modern power flow as well as effective peak management. It goes without saying that digital solutions provided by Siemens Energy fulfil the highest cybersecurity standards.

You have explained how energy transition impacts your customers. What does it mean for your business? What specific measures have already been taken to contribute to meeting global climate goals?

We are actively driving our efforts to be the greener choice for our customers – by supplying an attractive product portfolio in a sustainable way. Half of our factories use 100% green electricity. By 2023 our global factory network will



Grid stabilizing equipment like variable shunt reactors and phase-shifting transformers support the control of reactive power and voltage in the grid



run exclusively on green electricity. In addition, we adhere to our corporate Siemens Energy emissions reduction targets to become climate-neutral in our own operations by 2030.

We supply products with green features, such as eco-friendly natural ester as a fire-safe and biodegradable insulation fluid, explosion-proof tank designs in order to avoid oil spills at all AC and DC voltage levels, and minimal footprint requirements. Furthermore, we're currently upgrading our HVDC transformers to be ready to be used on offshore floating platforms.

T&D Europe stated that there are shortages with raw materials. What challenges do you face as transformer manufacturer?

As transformer manufacturer, we are highly dependent on the four main materials copper, oil, GOES (Grain

Oriented Electrical Steel) and steel. Material determines around 50% of the total product costs. Therefore, fluctuating raw material prices have a significant impact on our industry's price levels. In the current situation we are not only challenged to manage product and material price increases, but also to ensure material availability.

How do you ensure material availability and supply for your customers?

We optimize our transformer designs to reduce material quantities and we use standardized materials to increase material availability. In addition, our global factory network and joint competence allow us to meet our customers' delivery time expectations. However, we expect further increases in demand. A proper and timely planning of customer demands will become essential.



Stringent development is key when providing the highest quality, safe and reliable products

What drives your team at Power Transformers to successfully execute and implement customer projects?

Our team is driven by passion for our customers and our products, as well as our long-lasting experience. It is spread across eight countries and we profit from the corresponding diversity each team member brings along, as well as our efficient cooperation network across our different transformer sites. Based on these ingredients, we identify global and local challenges and trends – we collect and bundle knowledge from all over the world. Thanks to the competence of our workforce, we can

provide our customers with the latest technology and highest-quality products and solve our customers' challenges. At this point I would like to thank our employees who have accomplished extraordinary results under the ongoing COVID-19 pandemic situation! We really have an outstanding team behind Siemens Energy Power Transformers.

What is your vision of the power transformer industry in the next 10 years? What will be market and technology drivers, and how will you respond?

Transformers will continue to link generation and distribution. However,

the direction and intensity of power flow is going to fluctuate continuously. Compared to the past, transformers not only serve as load reserves, today they enable efficient transmission by ensuring grid stability and dynamically control peak management. They have shifted from being a nearly passive component to playing an active role on the journey towards a successful energy transition. That's what makes power transformers a very exciting, innovative and important part of the energy transition. We've noticed that this makes our industry particularly interesting also for young people, who care about climate change and want to engage in progressing towards a climate-friendly future in the energy sector. Within the next decade, we want to make a big contribution to climate protection with our innovations and the establishment of environmentally-friendly products within the power transformer industry.

