



**Tilo Else is Siemens Energy's Vice President for Distribution Transformers, responsible for the company's global dry-type and fluid-immersed distribution transformer and traction transformer businesses**

# TILO ELSE

## Siemens Energy's Vice President for Distribution Transformers

**The energy market is rapidly evolving with the energy transition as one of the most fundamental changes: What challenges does this rapidly changing energy landscape pose for customers?**

The energy transition poses big challenges to all of us – the authorities and governments, our customers, and also the manufacturers of energy equipment. Transmission and Distribution System Operators (TSOs and DSOs), as well as our industry and infrastructure customers, are faced with rising global demand for energy and three radical changes at the same time:

1. Decarbonization: worldwide increasing focus on the environment (strong increase in renewable energy generation, sustainable power distribution with lower losses, a stronger focus on electrical transportation);
2. Decentralization: embraced system complexity by decentralized energy sources and prosumers;
3. Digitalization: adopting digital solutions to improve asset performance and grid management.

**Our GEAFFOL® dry-type transformers show excellent electrical, mechanical, and thermal characteristics, and with epoxy resin insulation, they are especially eco-friendly and fire-resistant**

Consequently, our customers are facing the challenge of keeping the grid connection resilient and reliable during the energy transition while also focusing on increasing sustainability and exploiting opportunities of new technologies and digitalization. In addition, there is an increasing focus on localization, especially in the wind industry.

**How do you address these challenges and customer needs at Siemens Energy distribution transformers?**

At Siemens Energy, we support our customers from renewables business, industry business, power distribution and transportation not only with the latest innovations, we also provide expertise in how to implement the new technologies and which products and solutions would be most favorable for a specific challenge. With our global production network, we are able to serve our customers globally with the same highest standards and quality.

We offer a complete portfolio of standardized and customized low-loss

dry-type distribution transformers and fluid-immersed distribution transformers. Both technologies have their specific strengths and application fields. Our GEAFFOL® dry-type transformers show excellent electrical, mechanical, and thermal characteristics, and with epoxy resin insulation, they are especially eco-friendly and fire-resistant. They are mainly used in onshore wind turbines, industrial applications close to the load centers, data centers, modern buildings, and ships.

**Tilo Else** is Siemens Energy's Vice President for Distribution Transformers, responsible for the company's global dry-type and fluid-immersed distribution transformer and traction transformer businesses. He earned his diploma for Business Administration at the University of Leipzig, Germany, and spend some time in Silicon Valley. He started his career at Siemens as a Strategy Consultant in 2000. For more than 15 years, he has been working for the Energy business at Siemens, mainly Transformers and Medium Voltage Products & Systems. During this time, he has built up an impressive track record in running and improving operational business for more than a decade on the factory and business segment level. He also headed several central functions such as Group Strategy, Central Transformer Sales commercially, and Transformer License Department.

## With our new 66 kV low-loss fluid-immersed transformer, we set a new standard for efficiency and also for sustainability with a biodegradable ester insulation

Our fluid-immersed distribution transformers FITformer®, with their compact design and high efficiency, are used very broadly. We offer very environmentally friendly cooling and insulation systems using biodegradable fluids such as synthetic ester or natural ester. Our low-loss designs using amorphous cores and other high-tech core materials are supporting the decarbonization demand furthermore. With a voltage range of up to 66 kV, they are the perfect choice for new wind

offshore applications. Specifically, for our rail operators and train manufacturers worldwide, we also provide reliable and flexible traction transformers which increase train efficiency and performance and handle the highest ratings in a minimum of available space. Both GEAFOL® and FITformer® distribution transformers are nearly maintenance-free, have proven the highest reliability and of course, they come as Sensformer® with the latest digitalization features.

For every application area, we can offer our customers a perfect distribution transformer with a special focus on sustainability and the highest performance supported by digitalization. All our transformers do already comply with Tier II of the European EcoDesign Directive for increased energy efficiency that needs to be applied from 1 July 2021 onward.

### What role does co-creation play in this context?

A lot of our products, especially for DSOs, are highly standardized and are produced in large quantities. Other distribution transformers, for example, for data centers, are built according to customer specifications. For both transformer types, co-creation does not play an important role. But this is very different for industry customers, wind applications, and traction transformers, where co-creation plays a very important role. For industry, the distribution transformers need to be specifically designed to fit customer requirements – frequently in co-creation with the customer. The same is true for wind applications where the transformers need to perfectly match the turbine mechanical and technical requirements.

### We see wind energy technologies developing extremely fast with ever-larger turbines under development and 66 kV as a new standard for offshore wind farm array - How do you see Siemens Energy's wind distribution transformers in this evolving market? How do you make sure your transformers stay relevant to next-generation wind farms?

We are currently a leading transformer supplier for the offshore wind industry, and we intend to keep this position. We know this is only possible with state-of-the-art technologies and very close cooperation with the leading wind offshore turbine OEMs. With our new 66 kV low-loss fluid-immersed transformer, we set a new standard – for efficiency (already in line with the new EcoDesign Tier II directive that does not even have to be applied to wind offshore applications), and also for sustainability with the biodegradable ester insulation. But we are



far from resting and are already working with the next customer to develop the most efficient, reliable, and sustainable distribution transformer for his specific wind offshore turbine.

To pool all our ideas and efforts for product and process innovations, we set up specific innovation laboratories that drive innovations for distribution transformers – in terms of increasing customer value, experimenting with digitalization, and in terms of improving our production processes. However, our twelve factories play a very important role in staying close to our customers and implementing innovations and local requirements.

### How has digitalization shifted the focus of the distribution transformer market?

Digitalization is widely talked about in the Energy Sector nowadays. Until we launched Sensformer® in 2018, there was no transformer available with digital features – we were the frontrunner, and we are shaping the market also today with our digital innovations. But the focus of our customers still is on the physical product and its performance. However, the digital features of transformers start to play a role in the selling process. Our customers want to understand how digitalization can help to improve asset performance and manage the increasing complexity of the power grids. In this respect, our customers count on our experience and value our consultancy services. We offer our customers a complete digitalization package from sensors through secured cloud connection to apps or even integration of the operational data and analytics into the customer's IT environment.

### What is the value-add for customers of digitized distribution transformers?

First of all, the digitalization of transformers adds transparency to the current operation status. Per default, all Sensformers are equipped with direct measurement of oil level, top oil temperature, low voltage winding current, and GPS location. Near real-time data are available anytime and anywhere. Smart data analytics create great customer value, e.g.:



GEAFFOL® dry-type transformer from Siemens Energy

## Per default, all Sensformers are equipped with direct measurement of oil level, top oil temperature, low voltage winding current, and GPS location

- Increased reliability, safety, and productivity by early detection of potential problems,
- Decreased CAPEX and OPEX by preventive asset management, optimization of service scheduling and avoiding of unplanned outages,
- Improved climate impact by preventive detection of critical situations such as oil leakages.

For large distribution transformers, we already offer advanced features like a load management app and aging prediction. This allows customers to run the distribution transformers under controlled overload conditions without aging implications for a specific time period – increasing performance and profit according to business targets. Besides, we offer our customers specific digitalization solutions, including additional sensors and advanced analytics.

### To what extent has digitalization and the industry 4.0 changed the manufacturing of transformers at the Siemens Energy factories?

The digitalization level in our factories is not as high as in other industries as there is still a lot of specialized manual work required – e.g., for transformer assembly. Nevertheless, I strongly believe digitalization and automation are key levers to drive efficiency. There is a lot of activities we are driving: Our customers are able to visit our factories virtually and attend factory acceptance test virtually. By using plant simulation software, we are able to discuss with our customers our production capabilities and simulate and optimize the production flow. We are investing in production equipment with higher automation grade and connecting



Fluid-immersed FITformer® from Siemens Energy

## Together, we achieved a lot in this last very challenging year. Despite the pandemic, we were able to finalize almost every project in time by supporting each other

key production equipment to an industry cloud to online monitor, predict and further optimize process times. But not only production processes are subject to automation and digitalization. Also, in the office area, RPAs (Robot Process Automation) are taking over repetitive processes, and intelligent dashboards are replacing the old rather manual reporting systems.

In a few months, we will open our new distribution transformer factory in Guangzhou, China, that will apply the highest industry 4.0 standards. Already before the construction of the new factory started, an expert team evaluated new production methods and digitalization potentials.

Digital plant simulation was applied to confirm new methods and to optimize the production lines and the overall factory layout for distribution transformers.

### What challenges have come up in the market and in your operations due to the pandemic? How are you handling these?

The biggest challenge during the ongoing pandemic is, of course, keeping our staff safe and healthy while the factories are up and running. A lot of our people are working in front of the computer and can work

from the home office. For them, the pandemic really accelerated the work digitalization, and the rapid transition was managed very well by our IT staff. But factory workers cannot stay at home. To make work safe for them, we needed to keep in mind the local regulations in every location, and we worked out specific hygiene concepts for every factory to make sure to keep the distance between the people.

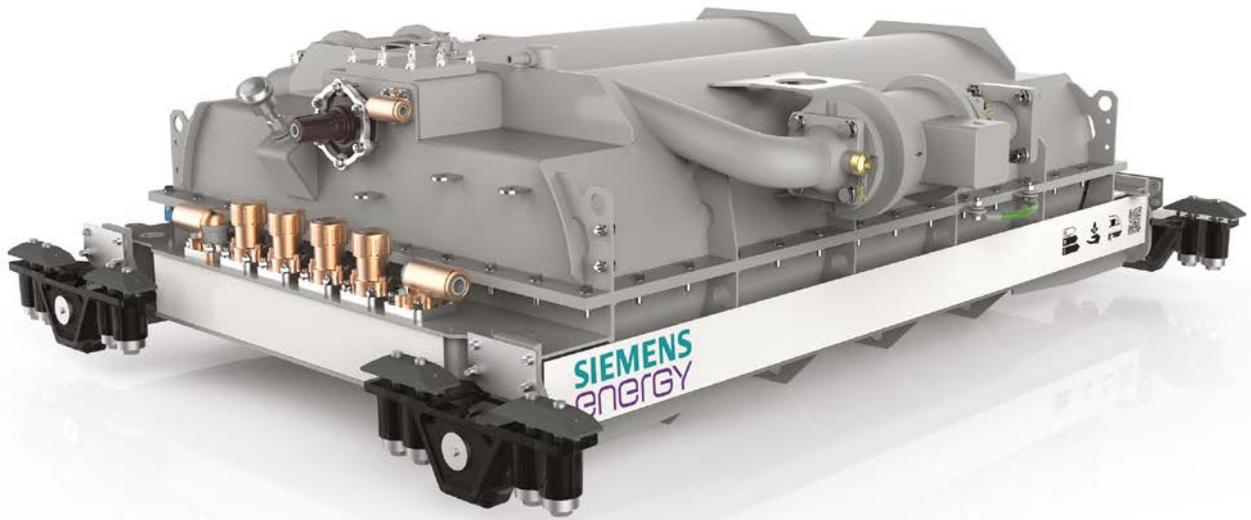
Another challenge was, of course, the supply chain management. Our suppliers had the same problems we had, and some supplier factories were even shut down for a period of time. We needed to be very flexible and source from different locations or even different vendors. Within the last year, we really benefited from our global factory network and our global supply base. We were able to shift projects or partial projects between our factories in different parts of the world.

A third challenge was minimizing the contact also with customers. Digitalization helped a lot. For example, we were able to implement virtual factory tours and offer our customers to virtually attend factory acceptance tests.

I am very proud of our people. Together, we achieved a lot in this last very challenging year. Despite the pandemic, we were able to finalize almost every project in time by supporting each other.

### What is your vision of the distribution transformer industry in the next 10 years? What will be market and technology drivers, and what are the opportunities for the response to these drivers?

We expect an ongoing strong increase in renewable energy generation (wind and solar). More and more countries will join the transition to a more sustainable energy supply. In some countries, wind farm operators already start to upgrade existing turbines with higher power ratings and higher efficiency. This will lead to a steady demand for distribution transformers in the next years – especially in the field of renewable integration. Besides, the current trend towards sustainable products will continue, and customers will be especially interested in dry-type and ester-filled transformers with lower losses. At the



Traction transformer from Siemens Energy

same time, digitalization will accelerate with an even greater value for customers.

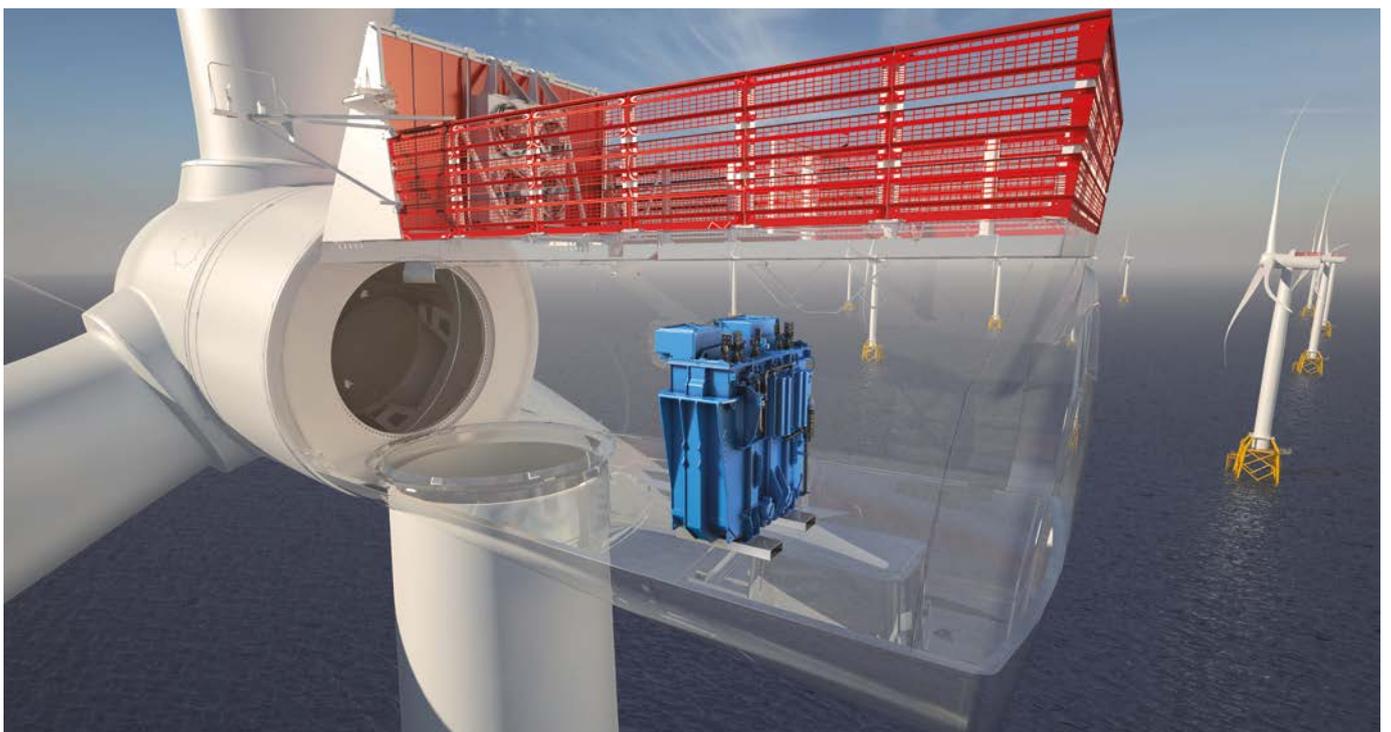
The trends toward decarbonization, decentralization, and digitalization will differ in intensity between different parts of the world. While Europe and North America are challenged by the energy transition and aging equipment, parts of Asia, Africa, the Middle East, and Latin America are still faced growing energy demand and modernizing grid infrastructure.

Within the worldwide distribution grid structures, we will see a trend to more resilience to increase availability and reli-

ability of the grids (e.g., fire protection in rural areas). Also, in this regard, digitalization will play an important role in supporting the protection, maintenance, and optimization of operation.

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FITformer® WIND in the nacelle of an offshore wind turbine