Siemens and the energy transition

Interview of Dr Sabine Erlinghagen

Chief Executive Officer Siemens Grid Software, Siemens AG

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Siemens, présent à la conférence internationale CIGRE des grands réseaux électriques qui s'est déroulée du 25 au 30 août 2024 à Paris, nous fait part de ses innovations pour répondre aux attentes mondiales dans le domaine de la transition énergétique.

REE : How do you perceive the varying expectations of your customers regarding the energy transition? How does Siemens manage these different requirements?

Dr Sabine Erlinghagen : The ultimate goal of the energy transition is universal: decarbonization, which entails moving away from fossil fuels. While large-scale projects like wind farms and major power plants will still play a role, much of this transition will be decentralized. Solar power, electric vehicles (EVs), heat pumps, and the electrification of various sectors—from heating to transportation to industrial processes—will be key components of this shift. The fundamental challenges across countries are similar: increased electrification, rising energy demand, and the need to expand grid capacity. Additionally, managing the complexity of this transition—such as grid stability and reliable energy distribution—remains a common hurdle worldwide.

However, the starting points vary significantly from one country to another. France, for example, relies heavily on nuclear energy, while Norway has abundant hydropower. Some countries are already advanced in electrifying heating, whereas others are just beginning their journey. These differences mean that the immediate next steps in the energy transition will vary between countries, even though the long-term destination is quite similar.

At Siemens, as a leading technology company, our focus is on this broader vision. We work closely with our customers to understand their specific starting points and determine the most effective next steps. In some cases, that could involve advancing electric heating, deploying heat pumps, or expanding EV charging infrastructure. In other cases, it may involve addressing challenges like transmission grid losses or managing inertia. Our role at Siemens is to rapidly build or upgrade capacity, enabling our customers to progress toward a cleaner energy future, regardless of where they start.

How is Siemens addressing new needs such as energy storage?

Energy storage is a critical component of the energy transition, and Siemens is actively involved in addressing this need. One example is through our joint venture, Fluence, which is a major player in the storage industry. This fast-growing company has seen significant success, and it represents one of the keyways we are investing in storage solutions.

Additionally, we support battery manufacturers in scaling up their production facilities through our industrial automation and software solutions, helping to accelerate battery capacity growth.

On the grid side, batteries play an essential role in enhancing grid stability and capacity. In my area of responsibility, we integrate batteries as grid assets, using our simulation tools and grid control software to optimize their deployment. We work closely with grid operators, TSOs (Transmission System Operators), and DSOs (Distribution System Operators) to ensure they can fully leverage energy storage in the most efficient way possible.

How do you manage the growing demand when all customers request the same services at once, often asking for immediate solutions?

At Siemens, we've made substantial investments in expanding our production capacity to meet the increasing demand, particularly for products with long lead times. Even during the Covid period, Siemens demonstrated resilience in continuing to supply our customers effectively.

From my perspective, as the one responsible for Siemens' grid software, one of the key advantages of software is its scalability. Unlike physical equipment, software doesn't require factories or additional resources to scale quickly. When we talk about the growing need for grid capacity—both in transmission and distribution—this is where software plays a crucial role.

For example, Eurelectric estimates that Europe will need to invest around 67 billion euros annually to expand grid capacity. However, this can be reduced to 55 billion per year if grids are managed and planned more efficiently. That's where our Gridscale X software comes in—it helps grid operators plan and operate their networks more effectively, allowing them to maximize the use of existing infrastructure. With this software, grids can carry more power over the same lines, operate closer to their physical limits, and reduce the need for buffers, all without the need for additional physical resources. By deploying software, we can quickly enhance efficiency and meet rising demand without bottlenecks.

Apart from Gridscale X, do you have any other significant innovations to showcase at the CIGRE exhibition or soon? What are your plans to address evolving customer needs?

Gridscale X is an ever-evolving platform, continuously expanding in functionality to better serve our customers. It covers both grid operation and grid planning. Since launching the platform six months ago, we've already added several key capabilities. One example is dynamic line rating, which enables operators to increase power flow by 15-30% over existing lines. A second one is advanced protection assessment, which optimizes protection settings for improved grid management. This constant evolution ensures the platform becomes increasingly comprehensive over time.

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At the CIGRE exhibition, beyond software, another major focus is on our blue GIS technology, which remains a crucial topic. Decarbonizing equipment itself is vital, and we're committed to moving away from SF6, a significant contributor to CO_2 emissions. Siemens is at the forefront of developing new solutions with Clean Air as an insulating medium to eliminate the use of SF6, further supporting our customers in their sustainability efforts.

Regarding Artificial Intelligence, is AI already integrated into your tools or software? Do you plan to expand its use?

AI is already an integral part of everything we do. For example, Gridscale X incorporates built-in algorithms to analyze and make sense of vast amounts of data generated by the decentralized energy transition. The sheer volume of data—some of it chaotic, some highly valuable—makes it challenging to process manually. AI plays a critical role in forecasting, analyzing, and extracting useful insights from this data.

AI itself is not new; technologies like deep learning have been around for 20-30 years. What's changed is how we leverage the latest advancements. For instance, with tools like ChatGPT and large language models, the usability of AI has become much more accessible. This helps us not only in improving internal processes like programming but also in enhancing customer service and knowledge building. AI is seamlessly integrated into our software solutions.

Our vision for Gridscale X is one of autonomous grid management—both in terms of planning and operations—much like the concept of autonomous driving in cars. We're working towards fully autonomous grid management, powered by AI, to make grid operations smarter and more efficient.

Are there notable expectations from certain countries regarding the energy transition? Do some countries stand out as being more advanced?

The level of advancement in the energy transition is closely tied to the share of renewable energy sources within a country. Grid management is heavily influenced by this factor. Europe, in particular, is a driving force for innovation, with a strong ambition to lead the transition.

Take Norway, for example, where electric vehicle (EV) penetration is exceptionally high. In countries like the UK and Denmark, there has been significant progress in wind energy development, while Germany is seeing rapid growth in photovoltaic (PV) installations. These advancements bring their own set of challenges, but they are challenges we are equipped to solve. The stability of the European grid also plays a crucial role in supporting the growth of renewable energy sources (RES) and accelerating the energy transition across the continent. ■