

Digital solutions for future grid complexity – The change in the grid forces the adoption of digital solutions to manage future complexity



ABSTRACT

Siemens Energy's presentation at the 2023 Transformers Magazine conference emphasized the role of digital solutions in addressing changes in the energy industry, including integrating renewables and managing

complex grids. Their digital grid team focuses on implementing software-defined energy infrastructure using IoT and cutting-edge technologies, with solutions like Sensformer® offering real-time asset management and integration capabilities for improved operational decisions.

KEYWORDS:

digitalization, digital solutions, renewable energy, sustainability, grid management, IoT technology, asset management

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Introduction

During the 2023 Transformers Magazine conference in Dubrovnik, Tarik W. Radwan and Steffen Appel from Siemens Energy introduced the omnipresent topic “digitalization in the energy industry”.

The presentation shed light on ideas concerning the sustainability and digitalization of energy assets and explained the current strategy and vision on how to support Siemens Energy customers.

“The change in the grid forces the adoption of digital solutions to manage future

complexity”: everyone talks about digital solutions, but nobody really knows when exactly to apply them.

Various challenges in today’s markets can be tackled using digital solutions, such as enhancing transparency and optimizing asset management capabilities. At Siemens Energy, our mission is to guide our customers towards a more sustainable and digitally advanced future. As a reliable partner, our digital grid experts are committed to assisting in the implementation of a modern, software-defined energy infrastructure, empowering them to operate their grids autonomously and sustainably.

Breaking down the statement above, three main aspects should be discussed:

1. Change in grid

The industry is undergoing a profound transformation with the increasing integration of renewable energy sources like wind, solar, and hydroelectric power. This change introduces a fresh challenge: dealing with intermittent and unpredictable energy generation patterns. Organizations need to connect and manage various grids across regions and countries to balance supply and demand in the most efficient way. Gone are the days of unidirectional energy flow: the modern grid manages multi-directional flows, including energy storage and prosumers.

2. Future complexity

The increasing complexity in managing power grids underlines the importance



of making faster and more accurate decisions. Therefore, gaining and maintaining digital control becomes increasingly crucial, ultimately supporting the transition from a human-led model to a more automated and decentralized digital control system, thus enabling, for example, faster data flows and communication, real-time observability, and reduced human errors, decentralizing digital support leads to quicker decision-making. This progression eventually aims to enable faster and more efficient monitoring and control of power systems.

3. Digital solution

Through digital solutions, data is collected, analyzed, and utilized for data-driven decision-making and enhancing operational efficiency. Various analytics tools are utilized to detect failures, identify trends, predict future scenarios, and simulate key performance indicators.



Siemens Energy's digital grid team aims at implementing modern, software-defined energy infrastructure, empowering customers to manage their grids autonomously and sustainably

Additionally, digital applications assist operators in scheduling maintenance at optimal times and enhance asset performance.

Siemens Energy's digital grid team aims at implementing modern, software-defined energy infrastructure, empowering customers to manage their grids autonomously and sustainably. Since 2018, they have been developing their expertise in IoT and edge technology to facilitate the transition towards net-zero emissions. IoT and Edge technologies provide transparency and asset management through a diverse array of advanced applications. Our team of experts develops and delivers asset management solutions that transform assets into real information hubs, enhancing overall re-

liability, customizing maintenance plans based on real-time asset conditions, and optimizing asset performance.

Just to name one of our solutions, Sensformer® is the complete asset management answer for your power transformer, which can provide you with all necessary information in real-time to make informed operational and maintenance-related decisions. **Sensformer®** provides automated alarm notifications based on pre-set alarm thresholds, allowing you to take action if and when required. Connected to the **Sensproducts** platform, you can drive your assets' performance and reliability and integrate with any third-party software via our API (Application Programming Interface) functionality.

Authors



Steffen Appel is a versatile professional with a master's degree in economics, boasting expertise in project management, business development, software development, and IoT. As a Product Manager for Asset Performance Management Applications, he supports cross-functional teams, delivering innovative solutions that drive growth and success within the

Energy Industry. Outside work, he enjoys outdoor activities and sports.



Tarik Radwan commenced his journey with the Service Business for Power Assets at Siemens Energy, in 2015, based in Brazil, where he has specialized in Transformer Lifecycle Management. Passionate about Primary Equipment, he has been instrumental in shaping today's technologies to meet the ever-increasing demands on maintenance

strategy, performance optimization and grid resilience. Tarik successfully spearheaded the launch and market entry of Siemens Energy's Sensformer solution in the Americas. Currently, he leads Siemens Energy's IoT & Edge global sales initiatives and go-to-market strategies.