

Tracking down the reserves in our power grids: Grid operation with the help of the digital twin

- **Pace of the energy transition is pushing power grids to their limits**
- **Digital twin concept from Industry 4.0 can help**
- **Break down data silos, validate and merge data**

(Frankfurt a. M., 03.07.2023) The grid and electricity industry is facing major challenges. The pace and volume of RE expansion is pushing traditional grid expansion to its limits. Long planning and construction periods, bureaucratic and regulatory hurdles, and not least the lack of specialists require new approaches and technologies. A task force of the Power Engineering Society within VDE (VDE ETG) has therefore looked into the extent to which the concept of the digital twin, which originated in the field of Industry 4.0 (I4.0), could provide a remedy here. With the study "Der Digitale Zwilling in der Netz- und Elektrizitätswirtschaft (DZiNE)" ("The Digital Twin in the Grid and Electricity Industry") now presented, the experts from VDE ETG show: The digital twin will be a very important building block in the grid and electricity industry for greater efficiency and productivity as well as higher data quality and better control options for the grids and processes.

Increased demands on power grids due to energy transition

This is because the increased and new demands placed on power grids require intelligent and interconnected solutions in order to uncover existing reserves and use them safely. Today, this is often confronted with non-existent or outdated plant documentation, manual processes, data silos and redundant databases, insufficient data in poor quality, and a multitude of systems and interfaces that are not coordinated with each other. Working according to Industry 4.0 methods with solution approaches such as the "Der Digitale Zwilling in der Netz- und Elektrizitätswirtschaft (DZiNE)" ("Digital Twin in the Network and Electricity Industry") presented here comes into play precisely at this point. This digital model of a real object, networked

according to I4.0 methodology, forms the data basis for end-to-end, data-driven processes from planning through operation to dismantling.

Data silos must be broken down

In the study, the often very abstract concept of the digital twin is first concretized. For this purpose, a reference architecture for the grid and electricity industry as well as various practical use cases and examples are presented. The latter are analyzed in terms of the added value created over the life cycle of electrical equipment and plants and qualitatively evaluated in terms of costs, quality, duration, risk and challenges.

Great importance is attached in the study to the recommendations for action on how network operators, energy suppliers and manufacturers can implement the innovations in this area in a target-oriented manner. The core task will be to break down data silos, validate and merge data, and implement initial digital twins for specific use cases.

The ETG study "Der Digitale Zwilling in der Netz- und Elektrizitätswirtschaft (DZiNE)" ("The Digital Twin in the Grid and Electricity Industry") can be downloaded [here](#) free of charge (German version).

About the Power Engineering Society within VDE (VDE ETG)

With more than 9,000 members, the Power Engineering Society within VDE (VDE ETG) bundles the expertise of power engineering from generation, transmission and distribution to the various fields of applications. The comprehensive expert knowledge of the approximately 300 volunteers from industry, research, utilities, universities and authorities, who participate in specialized areas, technical committees and working groups, forms the technical-scientific basis for events and publications of the Energy Technology Association in the VDE.

For more information, visit www.vde.com/etg

About VDE:

VDE, one of the largest technology organizations in Europe, has been regarded as a synonym for innovation and technological progress for more than 130 years. VDE is the only organization in the world that combines science, standardization, testing, certification, and application consulting under one umbrella. The VDE mark has been synonymous with the highest safety standards and consumer protection for more than 100 years.

Our passion is the advancement of technology, the next generation of engineers and technologists, and lifelong learning and career development "on the job". Within the VDE network more than 2,000 employees at over 60 locations worldwide, more than 100,000

honorary experts, and around 1,500 companies are dedicated to ensuring a future worth living: networked, digital, electrical. Shaping the e-dialistic future.

The VDE (VDE Association for Electrical, Electronic & Information Technologies) is headquartered in Frankfurt am Main. For more information, visit www.vde.com

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