

New VDE study: Integrating renewable energies faster and more reliably with automation of power distribution grids

- **Due to the energy transition, distribution grid operations are becoming increasingly complex and are reaching capacity limits**
- **In the study "High automation of low and medium voltage grids", VDE ETG shows how existing grid capacities can be better utilized with automation and efficiency can be increased.**
- **Observability and controllability of the networks are mandatory, technology and regulatory framework must be right**

(Frankfurt a. M., 28.09.2023) The discussion about the expansion of the power grid has so far focused primarily on the lengthy and costly construction of new routes and lines. The massive and accelerated expansion of renewable energies on the generation side and electromobility and heat pumps on the consumer side are increasingly causing distribution grids to operate at capacity limits. This threatens bottlenecks in the distribution grids and grid operation management is becoming increasingly complex. In a new study, the Power Engineering Society within VDE (VDE ETG) now concludes that the increasing complexity and growing challenges can only be overcome with active grid operation and via automation.

Active network operation instead of passive-reactive

The operation of low- and medium-voltage networks currently mostly follows a passive-reactive approach. In the study "High automation of low and medium-voltage networks", the experts from VDE ETG also use many examples to show how automation can make better use of existing network capacities and increase the efficiency of network operation. For example, by automatically restoring the supply if there is a power outage in an area, e.g. due to extreme weather conditions. Or how active grid operation can integrate more photovoltaic systems or electric cars into the grid more quickly, because the power flow can be influenced as needed when bottlenecks threaten. Another example is system services such as frequency or voltage

maintenance, which can be provided more easily with new software solutions or better data exchange.

"Complexity has now reached a level that requires extensive assistance systems and automation functions in distribution networks," explains Dr.-Ing. Sönke Loitz of Netze BW and head of the VDE ETG Task Force, which prepared the study on the high automation of low- and medium-voltage networks. "Only in this way can network management master the complexity and implement the necessary tasks and decisions," Loitz continues.

Observability and controllability - two core elements of automation

Nevertheless, there are currently only a few automation solutions in the low- and medium-voltage grid in Germany that go beyond a pilot character. "The aim of the task force was therefore to clearly highlight the added value of automation in low and medium voltage grids and to make recommendations for action for the various players in the environment of (highly) automated grid operation," says Dr.-Ing. Karsten Viereck from Maschinenfabrik Reinhausen, who accompanied the task force as a mentor from the VDE ETG board.

Currently, our medium and low-voltage networks are usually only observable or controllable to a limited extent. Condition monitoring, i.e., making the networks observable while maintaining all necessary measures to ensure cyber security, is an essential component of automation. In addition, against the backdrop of the electrification of the heating and mobility sectors and the integration of electrical storage systems, the controllability of operating equipment, such as remote switching, is essential for the realization of automation solutions.

The right technology is needed and the regulatory framework must be right

In particular, if active network management is increasingly sought in the low- and medium-voltage networks, demand-oriented automation is required due to the large number of low- and medium-voltage networks. The VDE study shows a practical path of action towards a highly automated distribution network and at the same time identifies further requirements and research needs. In addition to enabling active grid operation by changing the regulatory framework accordingly, it is also necessary to ensure that this type of grid expansion is not financially inferior to conventional grid expansion. At the same time, framework conditions must be created in which, for example, remote software updates are permissible without having to recheck the functions of the plants on site. Operating processes must also be automated, for example, to improve the data situation and data quality. And last but not least, the transformation of the low and medium-voltage networks must also involve the employees, e.g., through appropriate qualification measures.

The VDE ETG study "High automation of low and medium voltage networks" is available for download [here](#) (German version).

About 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/de/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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