

Integrate renewables quickly: VDE shows where large reserves lie in the power grid

- **German electricity grid could already transport significantly more electricity**
- **VDE ETG recommends making better use of existing grid capacity**
- **Expand renewable energy without overloading the grid - higher utilization of operating resources provides short-term relief**

(Frankfurt a. M., 17.10.2024) In a new study, experts from the Power Engineering Society within VDE (VDE ETG) show where there are still large reserves in the electricity grid to accelerate the expansion of renewable energies. They make recommendations on how reserves can be used for grid congestion management by temporarily increasing the utilization of resources in the existing electricity grid. This would allow the electricity grids to be quickly adapted to the expansion of renewable energies without jeopardizing security of supply. The study looked at equipment that is particularly important for the transmission of electricity: Transformers, overhead lines, cables, switching devices and switchgear. VDE ETG estimates the additional load capacity at up to 60 percent, depending on the equipment.

Old technology, new energy

Progress in grid expansion in recent years has not been able to keep pace with the changes on the generation side. Increasingly, there is more electricity supply than demand in some places. Wind turbines have to be shut down and large PV and wind farms cannot be connected to the grid due to a lack of grid capacity. In addition, there are bottlenecks in grid operation where the grid operators have to intervene at short notice.

“The costs of intervening in the grid are considerable. And switching off generation plants should always be a last resort. However, the expansion of renewable energies must not overburden the electricity grids. We therefore propose tackling the problem by technical means.

The VDE ETG Task Force provides practical approaches for modern operational management without exceeding the material limits. We would like to encourage operators and planners to actually implement the new approaches. After all, millions of tons of carbon dioxide could be saved with comparatively simple means,” summarizes task force leader Prof. Maik Koch from Magdeburg-Stendal University of Applied Sciences.

Increase the performance of a transmission chain

As the current situation with grid bottlenecks and sluggish implementation of the grid expansion is likely to continue for many years to come, the Task Force on *Increased Utilization of Operating Resources in the Energy Transition Grid* has examined in more detail how the existing grid operating resources can actually be physically loaded. The study makes a clear distinction between permissible increased utilization within the material limits and impermissible overloading with unacceptable risks for the technology.

The experts calculated a higher current carrying capacity of up to 60 percent for cables and up to 50 percent for transformers. Conductor cables can therefore withstand up to 58 percent more load when switching to weather-dependent overhead line operation. The current current carrying capacity is dynamically calculated from weather data and transferred to the control technology. For switchgear, on the other hand, the additional load capacity is 15 percent, which can be achieved through improved cooling or digital monitoring with sensors.

For a comprehensive use of measures to increase capacity utilization, the possibilities at the specific plants must be considered, but further questions still need to be answered. In particular, the interplay between technical regulations, the actual physical possibilities and legal restrictions resulting from liability risks would have to be addressed across all departments. The increased capacity utilization can also have an impact on the frequency of faults and ageing. The task force therefore recommends monitoring both parameters.

The VDE ETG study on *higher utilization of operating resources in the energy transition grid* is available for download [here](#) (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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