



Federal Election 2025 **SPECIAL**

VDE Policy Brief

Edition 1/2025

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VDE Policy Brief online



Independent expertise. Always responsive.

The next German government faces massive challenges in ensuring technological progress in Germany. In-depth advice is more important than ever here. The problem is that many stakeholders pursue their own interests without considering the bigger picture of society as a whole. The non-profit technology organization VDE is different.

VDE has been practicing swarm intelligence for over 130 years. Founded in 1893, the organization unites around 100,000 experts in the fields of electrical engineering and information technology. VDE also stands for honorary office in the field of future technology. In addition, about 1,500 companies are among its members. With around 2,000 full-time employees at over 60 locations, VDE has a global presence. Our recommendations are neutral, independent and practical. Our mutual goal is to find intelligent solutions for political and technological core tasks and to strengthen Germany as a location for electrical engineering and information technology. In doing so, VDE always has the overall system in mind, including the market and regulatory framework.

Example 1: § 49 EnWG – VDE defines the technical rules for the operation and construction of energy systems (generation, transmission and distribution of electricity) for politicians. This unique expertise has been in demand from politicians for years.

Example 2: System Stability Roadmap – The roadmap, adopted at the end of 2023, defines who has to do what by when to ensure a secure power supply even with 100 percent renewable energies.

The Network Technology/Network Operation Forum at VDE (VDE FNN), the DKE standardization organization (German Commission for Electrical, Electronic & Information Technologies), and the Energy Technology Society at

VDE in figures

	Founded	1893
	Employees	2,000
	Honorary experts and members	>100,000
	Locations worldwide	>60
	Events per year:	>1,600
	Norms and standards:	>3,500

VDE (VDE ETG) play key roles: about half of the processes mentioned in the roadmap are carried out under the leadership or participation of VDE FNN.

One thing is clear: Germany and Europe must quickly regain their former strength. Otherwise, our continent is in danger of sinking into insignificance, and social tensions will continue to increase. VDE is ready to contribute its expertise towards all future technological issues. Anytime. Please contact us. You can also find thematic details in our [VDE Policy Briefs](#).

Volunteer work shapes VDE

Our democracy thrives on volunteering. This not only applies to the social sector: VDE unites tens of thousands of experts in its professional societies and (standardization) committees, who contribute their expertise on an honorary basis. This strengthens VDE as a truly independent voice in the political arena. It also strengthens Germany.

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 **VDE**
Topic overview

Key to technological sovereignty

Standardization is not a technical detail, but a geostrategic instrument.

Those who establish standards worldwide define essential future markets. This provides clear competitive advantages for Germany. The DKE, the national standardization organization supported by VDE, is an important and valuable partner for business and politics.

National politics – especially the federal government – is urgently called upon to put standardization on the agenda; otherwise, Germany's influence will dwindle. The number of German standardization experts is declining. The five key topics are:

- **Prioritizing standards:** standardization must be on the agenda of all relevant ministries. The departments must grasp the value and benefits and adequately address standardization in innovation strategies and legislative procedures. At the same time, the federal government is called upon to create a competence center for digital standardization.
- **Promoting expertise:** the curricula of universities and vocational schools must reflect standardization content. This is the only way to train experts who combine technical and strategic expertise. In addition, innovation projects that translate technologies into standardizable solutions must be specifically promoted.
- **Expanding our international presence:** German experts must be able to play an even greater role in international committees such as IEC, CENELEC and ETSI. This commitment must be flanked by standardization diplomacy in order to anchor values such as quality and safety globally.
- **Supporting SMEs:** standardization opens up market opportunities for small and medium-sized companies and start-ups in particular. Tax incentives and funding are needed to ensure that they can adequately participate in standardization processes.

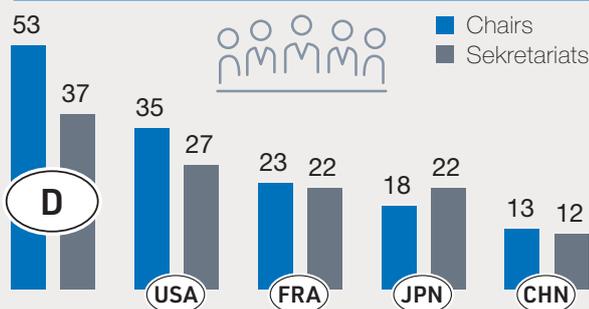
About the DKE

For essential future fields – secure telephone connections, high-performance batteries or DC technology – the DKE is shaping the corresponding standards. Around 10,000 volunteer experts develop approximately 500 new standards each year. The DKE is intensively involved in international committees and, for example, occupies around one-third of the secretariats and chairs in the European standardization organization CEN-CENELEC. Germany is also (still) well represented in the International Electrotechnical Commission (IEC) – the global counterpart.

- **Thinking on a European level:** standardization must be embedded as an integral part of European innovation strategies. Joint European initiatives and coordinated measures can help to establish robust standards that strengthen competitiveness and anchor our shared values worldwide.

One thing is clear: in a world marked by tensions, internationally recognized norms and standards enable open, fair trade and strengthen Germany's strategic independence. Take resilience and sustainability, for example: standards strengthen critical infrastructures in energy, mobility and communication against cyberattacks. They set benchmarks for more climate protection and circular value creation. And they create a reliable frame of reference in which new technologies – from AI to hydrogen to quantum computing and 6G – can be developed faster and transferred safely to the market.

Top 5 among the IEC Technical Committees



Source: IEC

- **DKE position paper on the German federal election**
Standardization as a strategic tool
- **Article from VDE Policy Brief 2/2024**
Smart standards as a booster

Power supply

Keeping the system stable at all times

How should the power grid of the future be designed to ensure a secure and stable supply even when 100 percent of energy comes from renewable sources? Experts at VDE's Network Technology/Network Operation Forum (VDE FNN) are developing concrete solutions.

A global comparison of power supplies

Average annual power interruption duration in selected countries, latest available data in each case



Source: VDE FNN analysis based on country-specific information

VDE FNN is unique. Its members include over 500 manufacturers, grid operators, utilities, plant operators, authorities and scientific institutions. Their goals: to make the energy system fit for the future – digital, flexible and still reliable. To bring the energy transition to the customer so that even more people can participate. And to make grid operation sustainable and contribute towards climate neutrality. To this end, the companies and organizations in VDE FNN are jointly developing uniform, practical standards, rules and implementation aids throughout Germany. These contribute towards safe and efficient grid operation and a forward-looking further development of the energy system. The technical self-administration of VDE FNN is thus an important key to the implementation of the energy transition. And it has been a success: although the grid and operations have been massively restructured in the course of the energy transition, 99.997 percent of Germany's households are supplied with electricity. This should remain the case.

Three aspects are essential to this. Firstly, the grids must be expanded. The objectives: transmission grids must better balance regional power fluctuations across Europe, and distribution grids must better integrate new producers and consumers. Secondly, renewable plants must be developed in such a way that together they can replace large-scale power plants in a stable manner. Thirdly, electricity consumption must be shifted to hours when a lot of renewable energy is available. It is essential to massively expand intelligent metering systems (iMSys) and develop market instruments so that private households become an active part of the energy transition. Speaking of private households: VDE FNN is specifically promoting solutions to simplify grid connection – for example, with implementation aids for the solar package I. This once again underscores its role as a partner to the legislator.

About VDE FNN

The goal of VDE FNN is secure system operation with 100 percent renewable energies at all times. It makes innovative technologies practical and provides answers to tomorrow's grid challenges. This makes VDE FNN a partner to politics for the technical side of the energy transition.



FNN press release

Turbo for the energy transition



FNN roadmap

Energy system 2030



Article from VDE Policy Brief 4/2024

Secure a high level of security of supply in the long term

Quality ensures the energy transition

VDE Renewables ensures that electricity from renewable sources can be integrated into the grid safely and efficiently. In this way, VDE supports politics and industry in making renewable energies reliably usable in the long term.

High-quality and safe products are central to the energy transition! This applies to PV systems as well as to electricity storage. VDE Renewables stands for independent testing of reliable standards. In this way, VDE also contributes towards three important policy goals:

- **Strengthen companies:** the EU Batteries Regulation sets new standards for sustainability and safety. Companies have to deal with their supply chains, meet recycling quotas and comply with high safety standards. This presents an opportunity for German manufacturers: those who focus on tested quality at an early stage can position themselves as reliable suppliers. VDE Renewables supports companies with technical due diligence, training and certification to efficiently implement the new requirements and successfully compete in the market.
- **Secure investments:** the market for renewable energies is growing rapidly. However, the quality of many products remains an uncertainty, especially for imported goods. Insufficient durability, missing safety

Turning legal requirements into reality

How VDE Renewables supports companies, taking the example of the EU Batteries Regulation

Training and Q&A sessions



Tailored training courses



Battery tests



Information on the status of standardization

About VDE Renewables

VDE Renewables ensures the safe and efficient integration of renewable energies into the power grid:

- Independent testing body for renewable energy technologies
- Focus on testing, certification, technical consulting and quality assurance
- International locations in Germany, China and Singapore

In this way, VDE Renewables creates a reliable basis for society, politics and the economy to use renewable energies sustainably.

certificates or untested grid compatibility are potential hazards and can result in high follow-up costs. VDE Renewables offers companies certainty: VDE carries out tests on PV systems, battery storage systems and their components to verify their performance and ensure that they meet international standards. Thanks to international offices in places like China and Singapore, VDE Renewables can keep a close eye on local supply chains – with factory audits and laboratory tests. This protects investments and strengthens confidence in renewable technologies.

- **Build trust:** not only companies, but also private households are increasingly turning to renewable energies. Plug-in PV systems enable citizens to participate in the energy transition at a low threshold. However, these systems also increase safety risks. A new standard for the safety of such systems is in the works. VDE Renewables is strengthening consumer trust by already offering comprehensive system testing and certification that ensures the highest safety standards. This not only accelerates the energy transition, but also ensures trust in the technology.



Website

VDE Renewables



Article from VDE Policy Brief 1/2024

EU Batteries Regulation: VDE is the first point of contact

Enabling better healthcare

Medical technology can make an important contribution towards improving healthcare in Germany. This is dependent upon politicians creating better framework conditions for the life science sector as quickly as possible.

An aging population and a shortage of skilled workers, high cost pressure and a lack of digitalization: the list of challenges in the healthcare system is well known. What has been missing so far is a coherent strategy to initiate a real turnaround and, in particular, to leverage the potential of healthcare technology. This is precisely what the German Society for Biomedical Engineering at VDE (the VDE DGBMT) is calling for from the new federal government. It identifies four central fields of action:

- **Strengthen research transfer:** Germany's research in biomedical engineering is strong. But innovations are taking too long to reach the market. Increasing regulatory requirements, such as those imposed by the European Medical Device Regulation (MDR), are complicating the transfer. Small companies in particular face hurdles. The new federal government must design funding programs in such a way that regulatory preparatory work is also supported. Industry-independent clinical studies require more resources to bring new approaches into practice more quickly.
- **Accelerate digitalization:** Germany is lagging far behind when it comes to the digitalization of the healthcare system. This must be changed as quickly as possible. The consistent use of electronic patient files is an important building block here. In the future, data from networked medical devices should also be integrated. Politicians must also ensure secure access to healthcare data for research and development. At the same time, international standards must be applied in a binding manner so that digital solutions are interoperable and can be used efficiently.

About the VDE DGBMT

The VDE DGBMT brings together research, industry and politics to develop practical solutions. It develops scientifically sound proposals for innovation-friendly regulation, the acceleration of digitization and sustainable medical technology. At the same time, it advocates the targeted promotion of research and skilled workers in order to improve the transfer of knowledge into practice.

Medical technology in Germany at a glance

 Value creation	€18.2 billion
 Workstations	> 210,000
 R&D quota	9%

Source: BVMed

- **Promote technology:** innovative medical technology is being held back by excessive regulation and bureaucracy. Small companies and start-ups in particular struggle with complex approval procedures and extensive documentation requirements. Bureaucratic hurdles must be reduced, redundant requirements avoided and funding programs designed to be more practically focused. A binding location strategy for healthcare technologies will help ensure that German companies remain internationally competitive.
- **Ensure security and resilience:** the pandemic has shown how fragile the healthcare system is. Global supply chains, cyberattacks and a shortage of skilled workers threaten the stability of the system. Policy-makers should make targeted investments in the training of biomedical engineering specialists, implement reforms to make the healthcare system more resilient when faced with crisis, and diversify supply chains. Intelligent storage systems for critical medical products are necessary to avoid bottlenecks.



VDE DGBMT

Position paper on the federal election



Article from VDE Policy Brief 4/2024

Securely connecting medical technology

A shift in energy policy

Profitability is achievable!

Renewable energies are an option for the future. In 2024, their share of German electricity consumption was 55 percent. However, the power grids must be massively expanded for this, and the costs are considerable. The within VDE (VDE ETG) provides support to policymakers in order to technologically master the energy transition in the future.

VDE's expertise in the successful energy transition is unique. VDE ETG combines the knowledge of 8,500 members and around 300 volunteers from industry and research, universities and government agencies. It makes practical recommendations – three examples are outlined below.

Increasing the utilization of power grids

Grid capacities must be increased massively, but expansion is faltering. One piece of good news is that VDE ETG has demonstrated that the loads on essential operating resources could be temporarily increased by up to 60 percent above the nominal value using modern monitoring systems and precise control technologies. This will enable significant cost reductions.

Digitization and flexibilization

Digital solutions such as smart meters, automated grid control systems and digital twins are essential for the planning and operation of the future energy system. Making new electrical consumers in mobility, buildings and storage more flexible is essential to cushioning peak loads. VDE recommends integrating digital technologies more strongly into funding programs and legal frameworks in order to promote flexibility at all levels.

About the VDE ETG

As a neutral platform, VDE ETG promotes the exchange of knowledge between politics, business, research and society. The objective is to make the future energy system sustainable, efficient and economical. Expertise is required. For example, current VDE ETG chair Dr.-Ing. Britta Buchholz is a chairwoman of the expert advisory board of the 8th Energy Research Program of the BMWK.

Increasing resilience

Power and communication networks are becoming increasingly interdependent. To protect them from cyber-attacks and the effects of natural disasters, the system must be built resiliently. VDE has developed recommendations for action to ensure the digital and physical security of the grids. Pilot projects for island grids – also known as microgrids – are already showing how supply stability can be achieved even in times of crisis.

Dr Ralf Petri new managing director of VDE ETG

In January 2025, Dr. Ralf Petri has taken over the management of the Power Engineering Society within VDE (VDE ETG). The previous managing director, Dr. Thomas Benz, is retiring after more than nine years at VDE. As Head of VDE Mobility, Dr. Ralf Petri already has many points of contact with the ETG's main areas of work: the topics of electromobility, charging infrastructure and battery technology are closely linked to the technological challenges posed by the development of energy systems in Germany, for example. In his new role, Dr Petri will also support the work of the ETG Board, chaired by Dr Britta Buchholz, and the ETG Working Groups.



VDE discussion paper

Greater resilience for power and communication networks



VDE study

Making the energy system more flexible



VDE study

Higher capacity utilisation of operating resources



Article from VDE Policy Brief 4/2024

Better utilization of power grids



Article from VDE Policy Brief 4/2023

Promote flexibility now

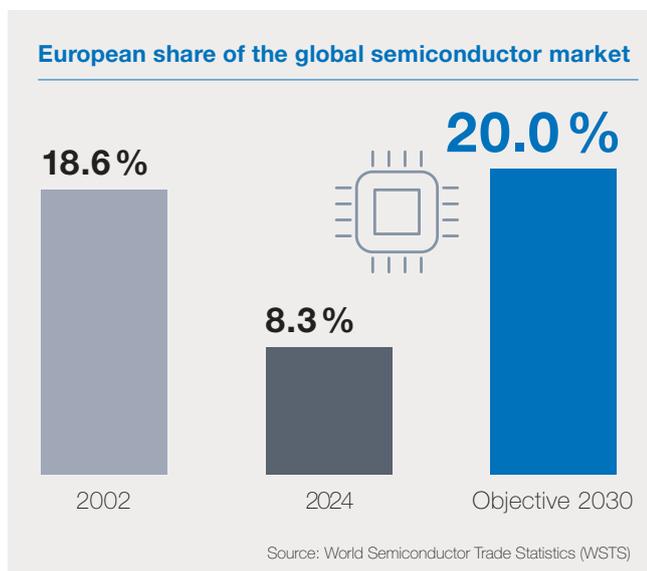
Facilitating technological sovereignty

Germany's key industries have a future only with high-performance and, above all, innovative semiconductors – from automakers to plant manufacturers. The aim is to ensure competitiveness and technological sovereignty through a strong domestic microchip industry. Politicians must act.

Germany is broadly positioned in microelectronics and is even a global leader when it comes to sensor technology and power electronics. However, Germany is hardly playing a role in the production of highly integrated semiconductors such as processor, logic and memory chips, which are needed to realize the dramatic developments in the field of artificial intelligence, and is losing market share. Why are Germany and Europe increasingly at a disadvantage compared to global competitors from China, Taiwan or the USA? This is because Asian and American governments consider the field to be strategic and are supporting industry accordingly. A dangerous development: the chip crisis of 2021/22 – when assembly lines at automotive and medical technology manufacturers, for example, came to a standstill – showed how dependent European companies are on global supply chains.

The economic importance of microelectronics is therefore immense. In addition, only with their own production facilities can Germany and Europe maintain a minimum of technological sovereignty, which should also be the order of the day for security policy reasons. To ensure that microelectronics made in Germany/Europe has a future, VDE demands:

- **Targeted expansion of technology funding:** measures to promote production, as we have them so far, are extremely important, but in the future they urgently need to be supplemented by the inclusion of design and assembly production. What is needed is a holistic strategy. The European Chips Act and IPCEI are a step in this direction and should be promoted.
- **Improve location conditions:** Germany is largely unattractive as an investment location for chip factories, see energy costs. Intel's planned investment in Magdeburg is also at risk of falling through. Competitive energy costs and a stable legal framework are urgently required. In particular, impending regulations such as the PFAS ban must be evaluated in an international context so as not to further weaken the industrial base.
- **Tackle the shortage of skilled workers:** more than 13,000 electrical engineers are needed in Germany every year, but only 7,500 complete their studies. At the same time, the proportion of women in STEM professions is far too low at 17 percent. To ensure technological expertise in the long term, more university places and apprenticeships must be created, along with targeted development programs for young talent. The data clearly shows when chip architects will retire and how large the personnel gap will be.



About the VDE GMM

With its 6,000 members, VDE GMM is the platform for engineers in microtechnical fields of application. It is helping to shape the future of microelectronics and microsystems technology and their applications for society.

- VDE position paper**
Hidden Electronics II
- VDE position paper**
Hidden Electronics III
- Article from VDE Policy Brief 3/2023**
Developing trustworthy microchips

The engine of the digital society

Information technologies drive economic progress, social participation and ecological sustainability. The Information Technology Society at VDE (VDE ITG) supports excellent research and facilitates practical applications.

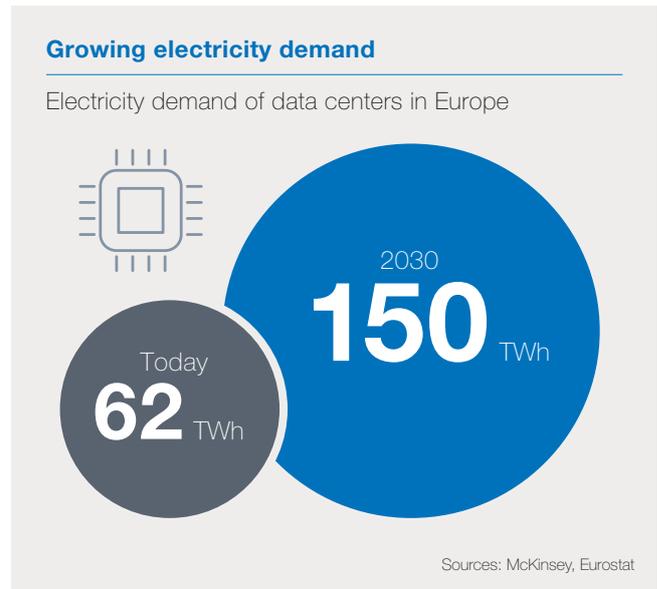
Germany is strong in key digital technologies, but the transfer from research to industrial implementation is a challenge, unlike in China or the USA, for example. To ensure that Europe remains digitally sovereign, innovative approaches must be adopted more quickly by companies. VDE ITG sees three exemplary fields of action:

1. Advance hardware for generative AI

Large language models (LLM) are revolutionizing the economy. However, the costs of using them in business applications are considerable due to the enormous computing power required. New hardware in the form of neuromorphic computing – which is based on biological nervous systems and can process information energy-efficiently in parallel structures – offers companies a solution. Germany is one of the leading nations in research, but application in the economy is faltering. To make it easier for companies to access, VDE ITG has accompanied the standardization with a [VDE SPEC](#), and VDE's testing institutes already offer reliable testing options.

2. Improve the efficiency of data centers

Data centers consume around two percent of the world's electricity – and this figure is set to rise sharply, partly due to AI applications. Photonics could break this trend and become a key technology for data centers of the future: optical data transmission is faster and at the same time more energy efficient than conventional microelectronics. Despite advanced research, there is still a lack of broad application of photon technology in companies. VDE ITG



networks experts in the field of research and creates transparency about technological options with independent analyses.

3. Strengthen technological sovereignty

Digital sovereignty is crucial for our economic stability and security. Communication infrastructures in particular must be protected against cyberattacks. The problem: traditional encryption systems are increasingly reaching their limits. So-called quantum key distribution (QKD) offers a physically secure solution here. VDE ITG highlights this in a new publication. Global competitors are investing heavily in the technology, while Europe is yet to pursue a comprehensive strategy. Germany should lead the way and establish binding QKD security standards to ensure a resilient infrastructure in the long term.

About the VDE ITG

With its 11,000 members, VDE ITG drives innovation in mobile communications, space and the stratosphere. With its expertise, it makes valuable contributions towards resilient networks and cybersecurity and supports society and industry in digitization.

- VDE info**
Data centers: the challenge of AI – photonics solutions
- VDE info**
Secure communication through quantum key distribution
- Article from VDE Policy Brief 4/2024**
Innovative computer technology: faster time to market

VDE – the technology organization



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Agency partner

Köster Kommunikation

Facts and figures

 Founded	1893
 Employees	worldwide 2,000
 Honorary experts and members	100,000
 Sites	worldwide over 60
 Research and funding projects	over 175
 Events per year	over 1,600
 Product inspections per year	25,000
 Electrical products bearing VDE's certification mark	billion
 Norms and standards	3,500