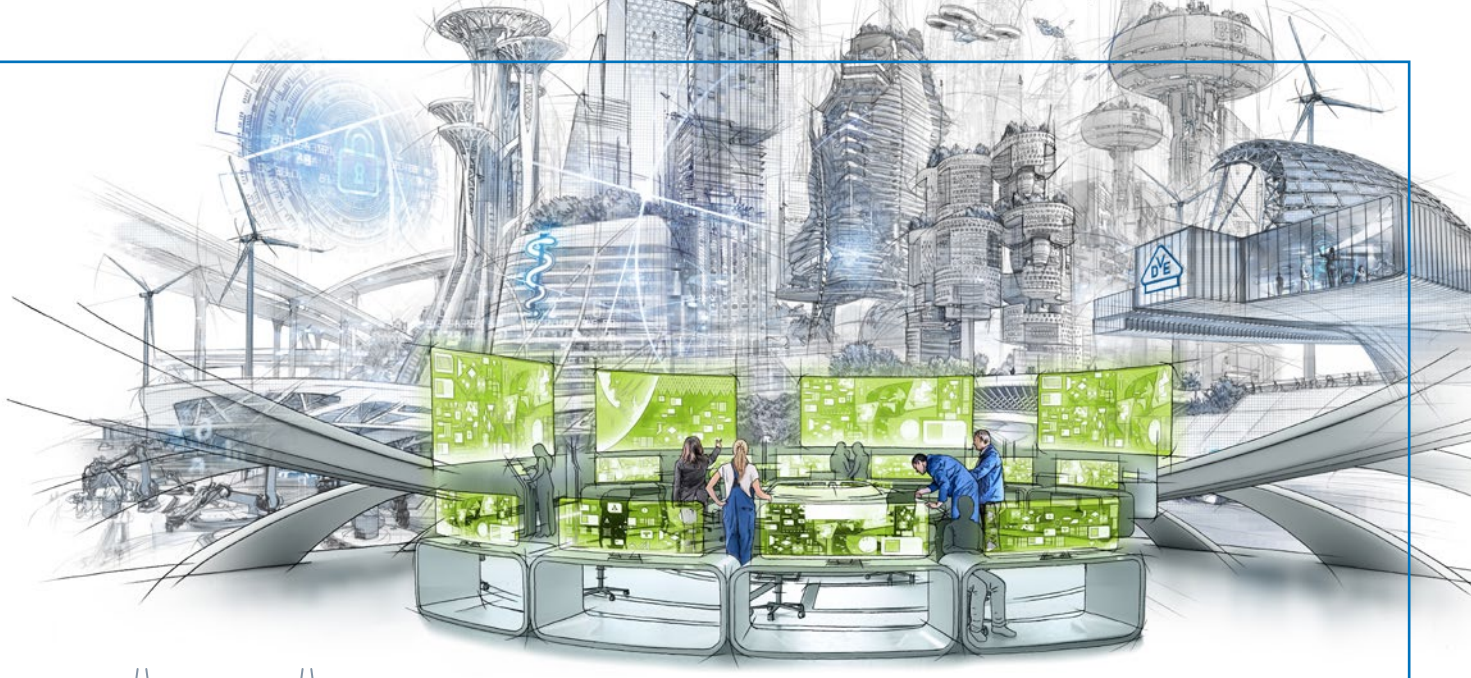
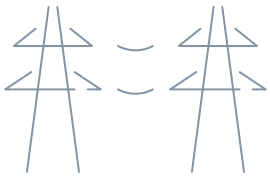
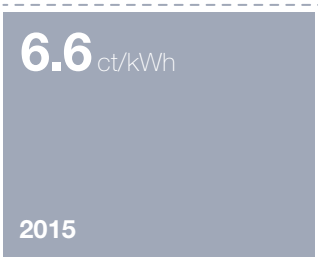
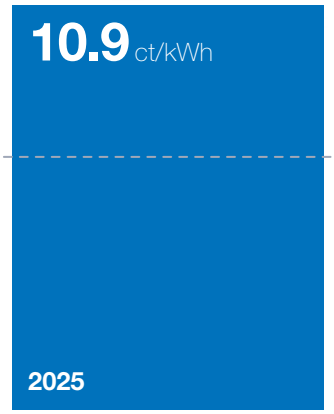








+65%

Curbing the rise in grid fees

For households, grid fees currently account for about a quarter of electricity costs. VDE outlines approaches to contain costs (see page 3).

VDE Policy Brief

Edition 1/2026

VDE Policy Brief online

VDE

Federal modernization agenda

No compromises when it comes to electrical safety!

The federal and state governments are pushing ahead with reducing bureaucracy. VDE supports this in principle. However, safety-related standards must not come under general suspicion. Especially in the field of electrical engineering, references to standards safeguard lives, legal certainty, and the stability of critical infrastructure – VDE has published a groundbreaking position paper on this topic.

In December 2025, the federal and state governments adopted the federal modernization agenda. One mandate is to review all references to technical standards in federal and state laws by June 30, 2026. However, in VDE's view, this assessment requires differentiation – what can be eliminated, and what is indispensable? One thing is clear: electrical safety standards are not intended to prioritize convenience or design. They define the state of the art for protecting against specific hazards posed by electricity.

Safety rules are developed and updated under the VDE umbrella by, for example, industry, grid operators, academia, and government agencies/policymakers. Their purpose is clear: to protect life and health and to ensure product, grid, and supply security. With the increasing electrification of mobility, heating, and industry, as well as the digitalization of critical infrastructure, their importance continues to grow. A blanket removal of references to standards would interfere with the structure of hazard prevention.

Legal references to recognized technical rules provide clear guidance. Without them, authorities and companies would have to determine on a case-by-case basis what constitutes the state of the art. This increases liability risks, prolongs procedures, and makes investments more expensive. Electrical engineering standards are also closely intertwined with European and international standards. They form the basis for product safety, the single market, and international competitiveness.

Conduct a nuanced review – enhance safety

Reviewing all references to standards offers an opportunity to identify unnecessarily detailed requirements. The following principles apply:

- clearly distinguish safety standards from convenience and equipment standards
- explicitly safeguard references to standards in the area of electrical safety
- ensure European interoperability
- strengthen technical self-governance as an efficient alternative to detailed government regulation

VDE Website
Federal modernization agenda

VDE Position Paper
The indispensability of legally recognized standardization work

Article from VDE Policy Brief 1/2025
Standardization: key to technological sovereignty

Not every standard serves the same purpose

Electrical safety standards

- Protection against electric shock and electrical fires
- Safety requirements for electrical installations and equipment
- Specifications for grid stability and supply security
- Safety requirements for critical infrastructure and IT systems

Equipment and convenience standards

- Material and surface requirements
- Design and architectural detail specifications
- Convenience requirements beyond the minimum safety standards
- Construction details with no immediate relevance to hazards

Distribution grids

Curbing the dramatic rise in costs

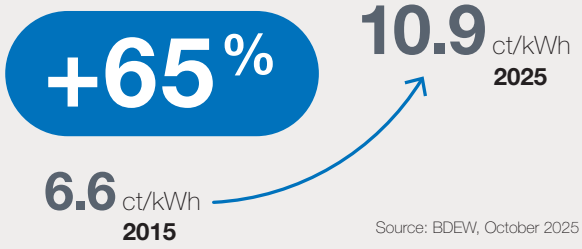
The energy transition is achievable. However, it comes at an enormous cost: according to the Federal Network Agency (BNetzA), distribution grid operators alone must invest around 110 billion euros into infrastructure by 2033, and by 2045, the requirement will rise to as much as 207 billion euros. The Power Engineering Society within VDE (VDE ETG) is exploring cost-containment approaches that could save billions of euros. Policymakers are called upon to adjust the framework conditions accordingly.

With this position paper, VDE ETG clearly distances itself from calls for subsidies. The goal is to optimize processes, make optimal use of existing infrastructure, and thus enable a cost-effective transformation of the energy system. The focus is on methods that provide quick and effective help without creating new problems elsewhere. Key points are:

- **Actively managing grids:**
  If serious voltage deviations are imminent, grid operators may – in clearly defined exceptional cases – temporarily curtail decentralized power generators via so-called curative grid management or disconnect consumers from the grid. This flexibility allows for better utilization of the grids, which has a significant impact on grid costs. Policymakers are called upon to incentivize these measures.
- **Utilize flexible grid connection agreements:**
  As a general rule, anyone connected to the grid is guaranteed full power at all times. Notwithstanding this, since 2023, utilities have been able to enter into flexible grid connection agreements with their customers in the spirit of curative grid management. This tool should be utilized much more extensively. At the same time, there is still a significant need for research: legislators must give grid operators the option to establish experimental zones and support research projects.

Cost increases must be limited

For over a decade, grid fees have been rising sharply, accounting for about a quarter of total electricity costs for households. Background: in particular, measures related to the energy transition such as grid expansion, grid modernization, and digitalization.



Source: BDEW, October 2025

- **End uncontrolled proliferation:** Electricity suppliers are obligated to connect approved large-scale battery storage systems and ground-mounted photovoltaic plants across Germany. This uncontrolled expansion is devouring millions of euros. Therefore, location-flexible technologies should be deployed where grid capacity is already available. The federal government can and must issue corresponding guidelines.
- **Rethink grid planning:**
  Germany's distribution grids operate at low capacity on an annual average. Planning must be based on real load profiles rather than theoretical extreme cases. The Federal Network Agency (BNetzA) should require this approach. In doing so, the effects of curative grid management and the increasing number of flexible grid connection agreements must also be taken into account.

Adequately compensate for operational services

To make the power grid fit for the future, there are essentially two approaches. First, expand the grids to the maximum extent possible. The associated investment costs are financed through grid fees. Second, to improve grid utilization through digital solutions. This entails operational costs for grid operators – which are currently not compensated. Legislators must create incentives from a total-cost perspective so that grid operators provide meaningful operational services.

VDE ETG Position Paper
Cost containment in distribution grids

Article from VDE Policy Brief 1/2025
Economic viability is achievable

Article from VDE Policy Brief 4/2024
Increasing utilization of power grids

VDE Defense

Curbing dramatic cost increases

The security situation in Germany has noticeably worsened. The world is changing – a critical turning point. Our society faces daily threats, yet its current ability to defend itself is limited.

In this age of advanced technology, civil security and defense capabilities do not depend solely on security forces and the military. Engineers are also contributing to this by designing more robust systems, reducing technological dependencies, and making digital and physical infrastructures more resilient. For this reason, VDE has decided to establish a new division called VDE Defense.

Five key areas of focus

Since its founding in 1893, VDE has stood for the orderly, safety-enhancing design of technical innovations. Security is in VDE's DNA. Defense and civil security fundamentally begin with the early detection of vulnerabilities.
This is where VDE Defense comes in, with five key focal areas:

1. Resilience is the key

In a networked, complex, and disruption-prone world, traditional security alone is no longer sufficient. What is needed is resilience: withstanding disruptions, adapting, and quickly becoming operational again in the event of damage. For VDE, resilience is the logical evolution of its historic mission. Resilience has both a technical and a societal dimension: democracies are under pressure from hybrid warfare, disinformation, and targeted destabilization – for example, in the context of the Russian attack on Ukraine. These attacks – especially in the digital realm – aim to destroy trust and social cohesion. They are intended to undermine the ability of democratic institutions to act. A society that fails to recognize or take such threats seriously loses its resilience.

2. Safeguard technological sovereignty

Technological sovereignty is not the same as self-sufficiency. Those who wish to remain technologically sovereign must strategically expand key technologies. Take microelectronics, for example: it forms the basis of virtually all security-relevant applications – sensor technology, navigation, electronic warfare, drone and missile defense, and cryptographic technologies. Yet it is precisely here that Europe's vulnerability due to dependencies on third countries becomes apparent.

In its position paper Technological sovereignty: proposal for a methodology and recommendations for action, as well as in the position papers Hidden Electronics I, II, III, IV VDE has made it clear: microelectronics is the invisible nervous system of society – often underestimated, but critical to the system.

Operational communication in a constitutional state: achieving success through legality and consistent credibility!

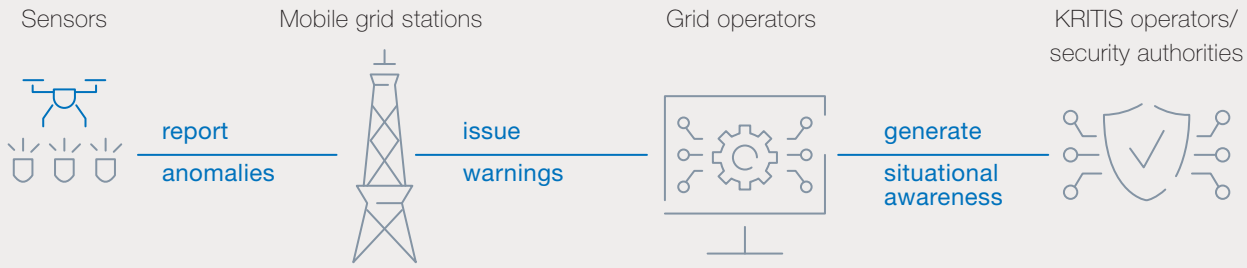
From ancient battlefields to the digital echo chambers of the present: operational communication has always been part of military action – yet its nature has fundamentally changed. At the latest since Russia's annexation of Crimea in 2014, which violated international law, the information space itself has become a military domain. Social media, disinformation, AI-generated content, and targeted influence campaigns shape modern conflicts – often below the threshold of open warfare. Markus B. Jaeger recently discussed this and much more with Colonel Dr Ferdi Akaltin. At the time of the conversation, Colonel Dr Akaltin was commander of the Bundeswehr's Center for Operational Communication (ZOpKomBw).

3. Promote new technologies, accelerate research

Modern defense and civil security today rely almost entirely on high technology such as cybersecurity, AI, sensor technology, energy technologies, and autonomous systems. Many technological innovations are classified as dual-use goods that can be used for both civilian and military purposes. As an independent body, VDE can help define security standards at an early stage, assess risks, and develop ethical guidelines. VDE shines a spotlight on new technologies designed to improve security. VDE supports researchers in the fields of security and defense.

Detecting drones in low-altitude airspace

Unauthorized drone flights over critical infrastructure are on the rise, while traditional radar systems have limited coverage of low-altitude airspace. VDE Defense promotes new technologies and strengthens the role of researchers – just look at the drone detection technology ISAC: the technology uses cellular networks to identify drones safely and cost-effectively.



4. Attracting skilled workers

Without skilled workers, there is no technical security, no reliability, and no future viability – neither economically nor in terms of security policy.

In 2025, there were approximately 12,700 retirements compared to only 7,500 graduates in electrical and information technology. The situation is particularly critical in the field of security and defense technologies, as 83 percent of master's graduates in electrical and information engineering from R&D-intensive universities do not hold German passports. Half of these come from countries such as China and India, which are not permitted to participate in national and alliance defense projects for security reasons. As a consequence, the security and defense industry cannot fill open positions. Projects are delayed, and innovation potential remains untapped.

5. Building trust

The VDE Testing and Certification Institute makes security measurable and builds trust. The institute's services go far beyond traditional product testing. They include security assessments for hardware and software, the analysis of supply chains and components for vulnerabilities, and the certification of critical technologies according to international standards. For VDE Defense, this means that systems used in both civilian and military environments must be trustworthy and tamper-proof – a fundamental prerequisite for operational sovereignty and strategic resilience.

VDE Defense interview: drone flights – are we blind in lower airspace? ISAC: regaining control with mobile communications!

VDE Defense firmly believes that Germany's civil security and defensive capabilities do not depend solely on its armed and security forces. Engineers also contribute to this. In the spotlight of the VDE Defense interview: unmanned aerial vehicles – drones as serious threats to critical infrastructure. In a conversation with Markus B. Jaeger, Prof. Dr.-Ing. habil. Reiner S. Thomä (Ilmenau University of Technology) explains the role mobile networks can play in enhancing security and why Integrated Sensing and Communication (ISAC) is key in this context.

Website
VDE Defense

Website
VDE Defense – Focusing on resilience

Website
VDE Defense – Interviews

Article from Policy Brief 4/2025
NATO Hub: Resilience as a security factor

The defense sector as a workplace

Electrical engineers in demand

In light of the threatening global political situation, Europe is ramping up its defense capabilities. But the expansion is stalling: there is a particularly dramatic shortage of young engineers in the fields of electrical and information technology!

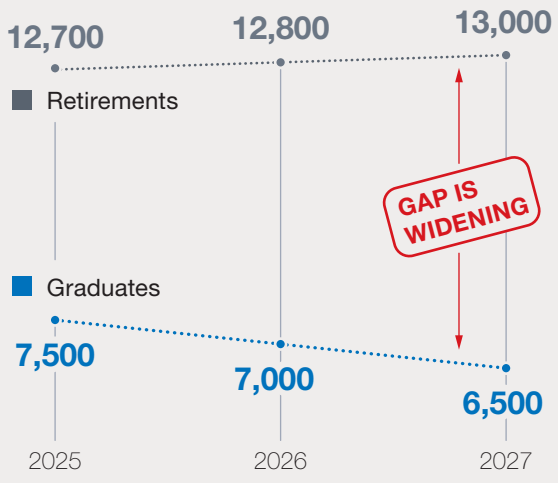
Since the start of Russia's war of aggression against Ukraine in early 2022, the defense industry has been growing faster than any other high-tech sector. German companies specializing in defense and security are reporting record orders and massive hiring drives. Specialists in electronics, sensor technology, embedded systems, power electronics, and secure communications are in particularly high demand. Small and medium-sized enterprises (SMEs) and startups are also expanding rapidly.

Skilled labor shortage

However, the drastically growing demand is met by a pool of young talent that has been steadily shrinking for years. In 2025, there were approximately 12,700 retirements compared to only 7,500 graduates in electrical and information technology, with a dramatic downward trend. Another critical issue: **83 percent of master's graduates in electrical and information technology at R&D-focused universities do not hold German passports.** Half of these come from countries such as China and India, which are not permitted to participate in national and alliance defense projects for security reasons.

Skills shortage in electrical and information technology

The annual shortage of skilled workers will grow to over 6,000 engineering positions by 2027.



Source: VDE

Another reason: misguided higher education policy. With drastic consequences, as the example of Frankfurt University of Applied Sciences (UAS) shows: within five years, 40 percent of electrical engineering professorships there will fall victim to budget cuts. Entire degree programs will no longer be offered to first-year students in the future. Further drastic cuts loom at the end of 2026 in North Rhine-Westphalia when the higher education agreement expires. When it comes to defense issues, targeted funding programs are lacking. And the traditional separation between civilian and military research at German universities further hinders greater innovation. At least Bavaria, following the U.S. model, was the first federal state to abolish the separation between civilian and military research – with a focus on practical and industrial applications.

Urgently needed skilled workers can only be attracted if education, security, and research policies are considered together:

- **Strategically anchor the securing of skilled workers:** Defense and security technology must be permanently incorporated into university and research planning as fields of the future.
- **Support domestic talent:** Schools and universities must attract more young people to electrical and information technology and prepare them for security-related roles.
- **Standardize security clearances:** Procedures for research institutions and companies must be streamlined and harmonized.
- **Stabilize university funding:** Chairs and degree programs in electrical and information technology must be maintained even during periods of temporary underutilization.

VDE Info
Labor market situation in the defense industry

VDE Info
Universities: Electrical and Information Technology 2026

VDE Recommendation
Funding for education

VDE Briefing
Electrical engineering at Frankfurt UAS particularly affected

Article from VDE Policy Brief 2/2025
Electrical engineering programs need reforms

System stability

Technology is ready – regulatory framework must follow

The rise of photovoltaics, heat pumps, and e-mobility is fundamentally changing the power system. The goal is a flexible energy system with 80 percent renewables by 2030 – without compromising supply security. With its roadmap, VDE FNN provides guidance on the status of the system transformation and identifies regulatory action needed.

1. System transformation while ensuring security of supply

With the decline of conventional power plants, renewable energy facilities and storage systems must take over their system functions in the future – that is, not only supply electricity but also stabilize frequency and voltage. The technical requirements for this are regulated at the European level – in the Connection Network Codes. However, these date from a time when the system was still dominated by large power plants. A revised version (CNC 2.0) has already been technically agreed upon, but the European Commission has postponed its publication indefinitely. This is grossly negligent; CNC 2.0 must be published. At the same time, market mechanisms must be created that provide binding remuneration for system services and ensure investment security.

2. Bring the energy transition to the customer

The energy transition is becoming hard to ignore in the distribution grid – that is, where electricity reaches households and businesses. Smart metering systems and control technology make it possible to flexibly integrate millions of systems. Today, more and more households are combining multiple systems: rooftop solar, a wallbox for the electric car, and a heat pump. Grid operators are permitted to intervene during bottlenecks and limit power output. For heat pumps and wallboxes, the responsibilities and procedures are clearly regulated in Section 14a of the Energy Economy Act (EnWG). For PV systems, however, Section 9 of the Renewable Energy Act (EEG) applies – without a similarly clear and consistent regulatory framework. The differing requirements create unnecessary complexity. A uniform regulation for electricity generation and consumption is required. Only in this way can flexibility be used in a targeted and efficient manner to ensure grid stability.

Where do we stand on grid expansion and digitalization?

The Network Technology/Network Operation Forum (VDE FNN) is the technical standards-setter for secure power grids in Germany. Over 500 members – grid operators, manufacturers, plant operators, and scientific institutions – identify technical challenges in the energy transition across 60 committees and jointly develop solutions. Every four years, VDE FNN publishes a roadmap outlining the current status of grid expansion and digitalization.

Electricity system in Germany

100,000 km
Transmission grids

1,700,000 km
Distribution grids

99.998 %
Electricity availability

3. Ensuring safe and efficient grid operation

With the growing number of decentralized systems, feed-in and load fluctuate more – the system becomes more dynamic. Grid operators must therefore know at all times what is happening in the grid and be able to actively control it. This requires clear responsibilities and robust intervention rights – that is, clearly defined authorities to enable a rapid response to bottlenecks or disruptions. At the same time, the distribution grid level, with millions of controllable installations, is becoming critical to the system. Binding cybersecurity requirements are therefore essential.

VDE FNN roadmap
From grid to system

Article from VDE Policy Brief 3/2025
How renewables must work together

Article from Policy Brief 2/2025
System stability: preventing future blackouts

VDE – the technology organization

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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**

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