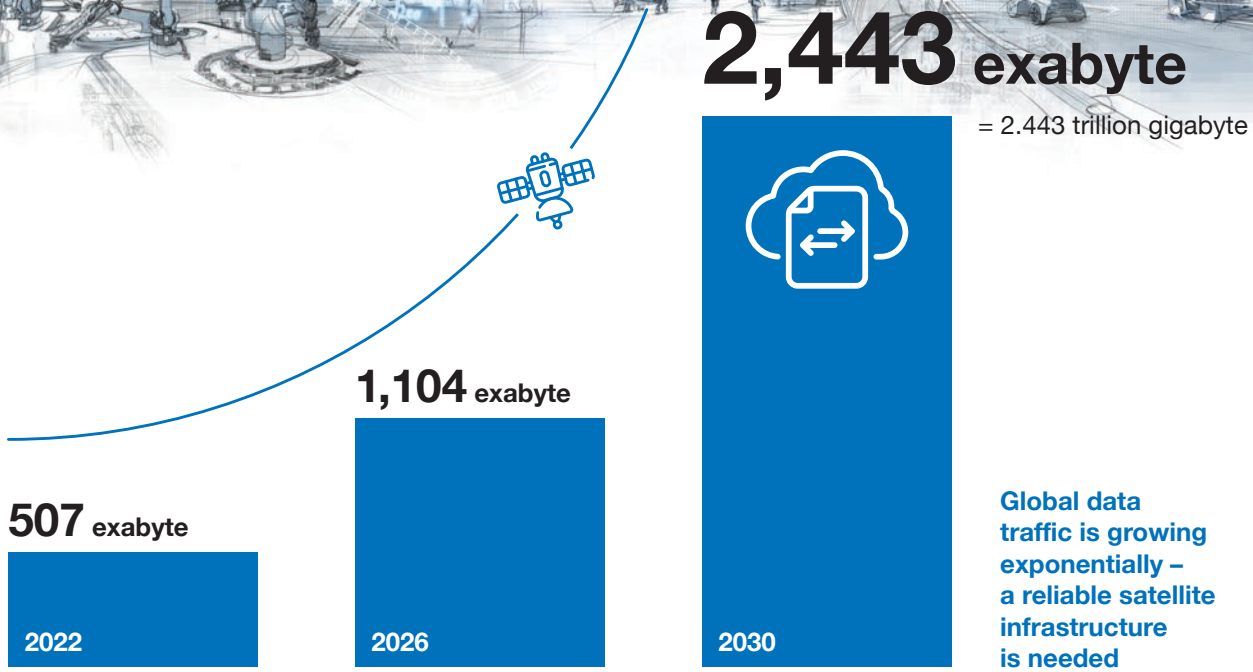


Global data traffic is growing exponentially – a reliable satellite infrastructure is needed

VDE Policy Brief

Edition 4/2023

VDE Policy Brief online

VDE

Satellite infrastructure

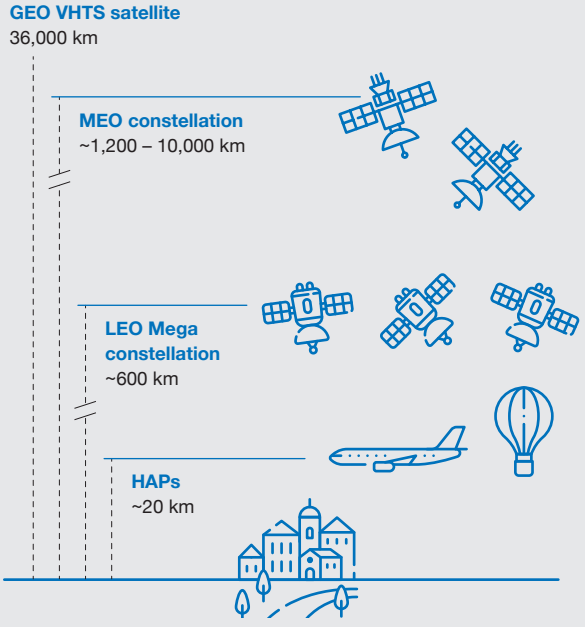
Essential for resilient communication

Satellite communication is promising. Areas without mobile phone masts and fiber optics can be connected via satellite. If terrestrial infrastructure is not available, satellite communication offers a reliable alternative that can sometimes save lives. Satellite communication also opens up completely new options for autonomous driving or for networking sensors in the Internet of Things.

At the same time, Europe is in danger of missing the boat. Under current conditions, domestic companies can hardly compete with US corporations or Asian state-owned companies. The VDE Information Technology Society (VDE ITG) has analyzed key technical developments and formulated recommendations in its current position paper "New Space Communications":

The different types of satellite communication carriers

While High-Altitude Platform Systems (HAPs) and Geostationary Earth Orbit Systems (GEOs) are virtually fixed above the users, satellites in Low Earth Orbit (LEO) move above them at high angular velocity. A powerful satellite infrastructure utilizes all levels and networks the systems.



- **Preserving sovereignty:** Europe needs its own satellite data connection for social, economic and security policy reasons. The goal is to build resilient communication networks. At the same time, Europe's research and development landscape for satellite communications – which is absolutely competitive – must be strengthened.
- **Driving IRIS2 forward:** this EU initiative was launched in 2022. A multi-orbit constellation with satellites at different orbital altitudes is planned. IRIS2 should fulfill governmental functions, but also be available for commercial services. Important: use experience from previous projects and secure funding.
- **Promote HAPs and GEO-based platform solutions:** in many cases, satellites at low orbit altitude are the focus of attention. High-Altitude Platform Systems (HAPs) and Geostationary Earth Orbits (GEOs) should also be promoted in order to achieve greater profitability of the overall system and higher performance. In addition, HAPs are not exposed to the risk of space debris and, thanks to their local positioning – in contrast to a satellite system distributed around the entire globe – do not have to take difficult political constraints into account.
- **Act internationally:** Europe must coordinate frequency allocation for communication satellite systems and influence global systems.

VDE ITG website
Press release

VDE position paper
New Space Communications

Article from the Policy Brief 1/2022
Strengthening resilience

Seal of approval

Promoting AI made in Germany

The future belongs to AI-based applications and services. All the more problematic: in Germany, skepticism about the safety and quality of AI often prevails, and growth opportunities remain untapped. A new AI seal of approval will provide a remedy.

At the end of October, the National Initiative for Artificial Intelligence and Data Economy (NITD) launched MISSION AI. The aim is to develop AI quality and testing standards on the basis of which an AI seal of approval can be awarded. VDE is a partner and contributes its many years of experience in the field of AI and its testing expertise. Key benefits of the AI seal of approval for:

- **Companies:** The seal of approval will provide practicable testing approaches for AI applications. This is essential for companies to bring new product ideas to market quickly and safely – so that AI applications can also be used in sensitive areas such as medicine and public authorities.
- **Consumers:** The AI label provides them with the necessary transparency and strengthens their trust in future technologies. VDE will systematically promote discourse with social partners, politicians and representatives of civil society during the development and establishment of the label and anchor it in the public eye.
- **Politics:** The EU has recently agreed on a globally unique AI law that regulates high-risk applications. There is only a transparency obligation for less risky applications.
  The AI seal of approval can also establish minimum requirements and market standards for this area – thereby relieving the burden on politicians.

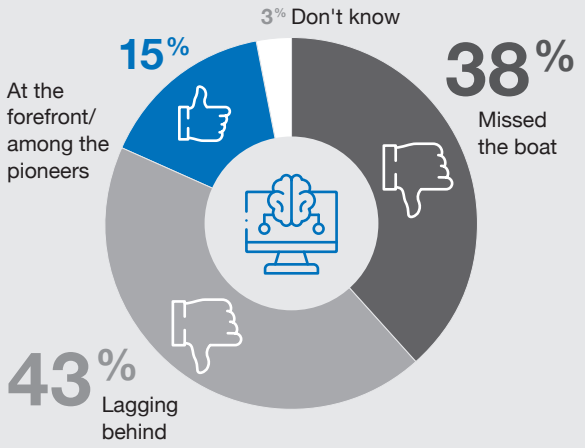
With the harmonized AI label, VDE is continuing its pioneering work in the field of AI. In mid-2022, the technology organization developed a Trust Label together with partners in order to be able to test AI with realistic effort. In February 2023, the AI Quality & Testing Hub (AIQ), which is supported by VDE and the state of Hesse, was launched, offering companies and organizations a comprehensive AI testing infrastructure and providing advice and training on all aspects of AI.

This concentrated knowledge is now being incorporated into the development of the AI seal of approval. At the same time, we are coordinating the technical guidelines with international standardization organizations such as ISO and CEN-CENELEC at an early stage to ensure that AI made in Germany sets standards worldwide.

AI: four out of ten companies feel left behind

68% of German companies with more than 20 employees describe AI as the "most important technology of the future". At the same time, the vast majority have a lot of catching up to do.

"Where does your company generally stand when it comes to artificial intelligence?"



Source: Bitkom Research 2023; does not add up to 100% due to rounding

AI Quality Summit 2023

150 participants met on December 11/12, 2023, for the second AI Quality Summit of the AIQ in Frankfurt. The focus was on quality criteria such as robustness, performance, transparency and security as well as the regulatory context. Prof. Kristina Sinemus, Hessian Minister for Digital Strategy and Development, in her opening speech: "The quality of AI has gained in importance as a topic, politically, economically and in society. With the AI Quality & Testing Hub, we are addressing precisely the fundamental need to develop secure AI technologies with high quality standards."

VDE press release
Value-compliant AI

VDE topic page
Artificial intelligence

VDE press release
MISSION AI – Seal of approval for AI

VDE video
European Future Technology Summit – EFTS 2023

Energy system

Promoting flexibility now

As things stand today, coal-fired power generation, which still accounts for around a third of electricity generation, is set to be history by 2038. The weight of renewable energies is increasing accordingly, and in the long term, the entire generation system is to be decarbonized. However, the energy system must now be restructured under high pressure and more flexibility is absolutely essential.

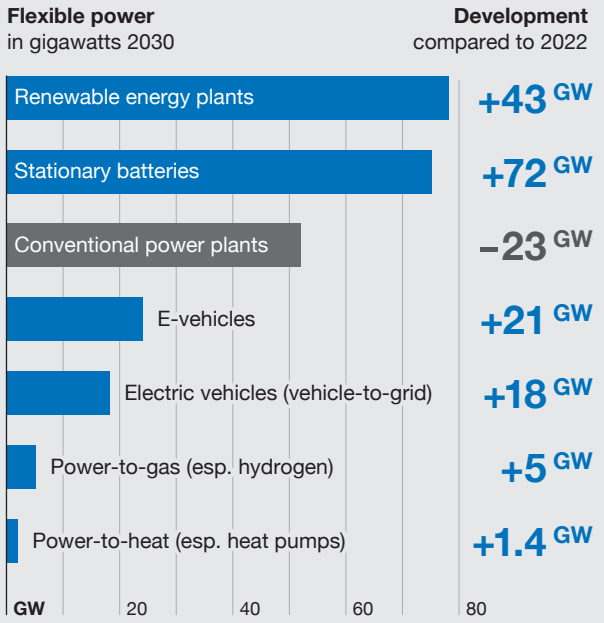
The higher the share of renewable energies in electricity generation, the greater the fluctuations. Conventional power plants have so far been able to balance these out well. In the study of the same name, the "Flexibilization of the Energy System" task force of the VDE Energy Technology Society (VDE ETG) shows what incentives need to be set to ensure a secure and stable power supply in the future. It is important to bear this in mind: flexibility is a valuable and scarce resource. This makes it all the more important to consider the options from an economic perspective.

This study is the first to provide a fundamental assessment. It looks at the three main areas for the use of flexibility – in own use, in grid operation and in system operation – individually. Where the legislator is called upon:

- **Create technical conditions:** it must be possible to better measure and control electricity production and consumption at the low and medium voltage level. Grid operators and plant owners must invest in the technology – which can be achieved through funding concepts or obligations.
- **Involve all stakeholders:** households that have a photovoltaic system with storage options, for example, offer considerable flexibility potential. Legislators must develop financial support instruments so that this potential benefits the energy system as a whole. System and supply security should always have priority.
- **Set price incentives:** The more households and companies purchase electricity at times of low grid load, the better. Clear and short-term price incentives for grid charges and levies can be an effective lever for this.
- **End double charging for mobile storage systems:** electric car batteries in particular will increase the flexibility of the energy system as mobile storage units. However, unlike stationary storage systems, they are subject to a double burden in terms of grid charges. This should be abolished.

More flexibility is possible: Key potential* at a glance

Three categories determine the flexibility of the energy system. **Firstly,** electricity generators that increase their output when required – which applies to conventional power plants – or reduce their electricity feed-in, which is also possible with renewables. **Secondly,** consumers who can charge their electric cars relatively flexibly, for example. **Thirdly,** stationary storage systems or so-called vehicle-to-grid cars, whose batteries can feed electricity into the grids when needed.



Source: VDE ETG; *Cold storage, process adaptation and pumped storage plants not shown, as the flexibility potential is largely stable.

VDE study
Making the energy system more flexible

Website
VDE ETG

Article from the Policy Brief 1/2023
Smart meters

Push ahead with automation and digitalization now

At the end of November, the Federal Network Agency presented new regulations for controlling consumption devices such as heat pumps or charging facilities for electric cars. The aim is to increase the utilization of the electricity grids while avoiding overloads. To this end, grid operators are allowed to curtail electricity supplies, provided that objective criteria are met. The problem is that the necessary measured values are currently only available in very few grids.

The Federal Network Agency rightly states that the grids need to be optimized and digitalized at a rapid pace. In its current study "High automation of low and medium voltage grids", the VDE Energy Technology Society (VDE ETG) has developed numerous solution options. It shows how active grid operation can function with the help of automation and digitalization and which fields of action need to be addressed.

Legislation is particularly required in the following areas:

- **Ensure financing:** the regulatory framework must enable active grid operation. To this end, digitalization and automation must not be financially inferior to conventional grid expansion.
- **Reduce bureaucratic obstacles:** A large number of regulations complicate digitalization. For example, remote software updates should be permitted without having to check the functions of the systems on site again.
- **Offer financing and investment security:** digitalization and automation are imperative for the success of the energy transition. Grid operators need start-up funding to build up the infrastructure quickly and comprehensively.
- **Drive forward research and development:** future requirements must be researched further for the grid of the future. This applies, among other things, to the provision of system services from the distribution grid. The German government should support this financially.

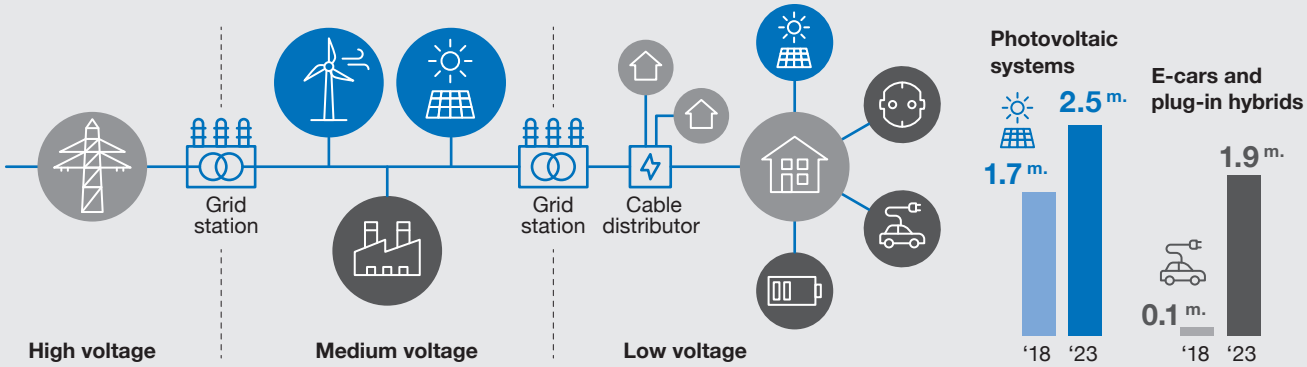
VDE study
High automation of low and medium-voltage grids

Website
VDE ETG

Article from the Policy Brief 1/2023
Strengthening resilience

Article from the Policy Brief 4/2022
System sustainability roadmap

Grids at a glance



Sources: Federal Motor Transport Authority, Federal Statistical Office; as at January in each case

VDE MikroSystemTechnik Congress – Microelectronics

Promoting future technology

In order to master issues such as the energy transition, e-mobility and cyber security, microchips need to be installed on a massive scale. Germany and Europe urgently need adequate production capacities for this key technology. Political support is essential, time is pressing and the EU Commission has responded with the EU Chips Act.

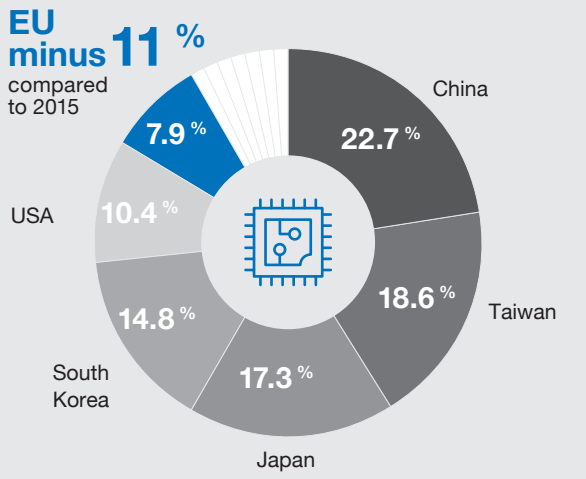
Germany and the EU have fallen behind in microchip production. A trend reversal is urgently needed, otherwise there is a risk of dramatic dependence on China and the USA in particular.

It is a good sign that the German government and the EU want to bring semiconductor production back to Europe. The aim of the EU Chips Act is to double the European market share for microchips to 20 percent by 2030. The German Federal Ministry of Education and Research (BMBF) is already contributing towards achieving this goal with a 400-million-euro funding scheme. Further important impulses from VDE's point of view:

- **Strengthen education:** The success of the microelectronics location stands and falls with the experts and top talent to develop innovations and bring them to market. The key is education. Necessary measures range from more STEM lessons in schools to better teaching at universities. Enthusiasm must be conveyed in everything: Microelectronics makes the world a better and more sustainable place.
- **Promote long-term research:** research policy must be designed for the long term. Evolutionary improvements can be achieved within three years, for sustainable, groundbreaking innovations a time horizon of at least ten years is required.
- **Support start-ups:** innovative young companies need a protected creative space. This needs to be created in the field of microelectronics.
  Together with established companies, start-ups can turn their ideas into innovative products.

Semiconductor production: Europe is falling behind

Share of global production in 2020



Sources: ZVEI, SEMI

Next generation – improving the world with microchips

VDE wants to get young people excited about electrical engineering, microelectronics and information technology, and show that they can make valuable contributions towards the future. Examples for different age groups in cooperation with the BMBF:

- Tens of thousands of pupils have taken part in the INVENT a CHIP competition since 2005. In 2023, the task was to control a solar tracker.
- The COSIMA student competition has been recognizing students with ideas for microelectronics suitable for everyday use since 2009.

VDE and BMBF bring the industry together

The who's who of the microelectronics industry met with politicians and researchers in Dresden in October 2023. With the MikroSystemTechnik Congress (MST), BMBF and VDE have been promoting networking since 2005 so that political goals can become a reality.

Website
VDE MikroSystemTechnik Congress (MST)

VDE position paper
Hidden Electronics II

VDE position paper
Hidden Electronics III

Article from the Policy Brief 3/2023
Developing trustworthy microchips

E-mobility conference

VDE enables unique exchange on the mobility transition

The number of electric cars is set to increase steadily. Electromobility will dominate the roads of the future – according to the political will and business intentions of automotive companies worldwide. Nevertheless, key issues remain unresolved. Numerous players need to network even more and work together to exchange knowledge. Developing solutions together – VDE offers a unique platform for this with the E-mobility conference.

Under the patronage of the Federal Minister for Digital Affairs and Transport, Dr Volker Wissing, VDE hosted the conference for the second time at the end of November. 200 experts – from vehicle and charging station manufacturers, suppliers and battery producers to scientists, electricity grid operators and politicians – came together at the conference to discuss current technological issues and political aspects relating to the mobility of the future. More than 30 speakers offered insights into the latest developments and took part in panel discussions. The focus was on seven subject areas:

- **Political framework conditions for the promotion of electromobility, three keynotes, including:** Parliamentary State Secretary Daniela Kluckert, MdB, on electromobility and climate protection. The speech, which was eagerly awaited in light of the short-term budget shutdown, was understandably unable to provide an answer to the question of whether and where the red pencil will be applied to e-mobility funding.
- **Mobility of the future, trends and solutions, four presentations, including:** Alexander Krick, Head of E-Drive Development at Volkswagen, on the Group's electrification strategy.
- **Charging infrastructure and power supply systems, four presentations, including:** Malte Hock, Head of Market and Customer Development at TotalEnergies, on the company's transformation from filling station operator to full-service charging infrastructure provider.
- **Effects of electromobility on the labor market, three presentations, including:** Claudia Kefferpütz, speaker at the Zentralverband Deutsches Kfz-Gewerbe, on the competition for talent.
- **Transition from traditional drives to electromobility, five presentations, including:** Dr Marcus Ewig, Managing Director of Rhenus Automotive, on Battery Lifecycle Management as the basis for sustainable e-mobility.
- **Sustainability and environmental impact of electromobility, four presentations, including:** Dr Gideon Schwich, CDO of battery recycler CYLIB, on the path to a closed-loop economy.
- **Case studies and alternative drives, five presentations, including:** Dr Cornel Klein, Program Manager at Siemens, on safe AI for the driverless regional train.

VDE website
E-mobility conference

VDE dialog
E-fuels: theoretically great

Article from the Policy Brief 3/2022
Fuel cells for HGVs

Article from the Policy Brief 2/2021
Drive technologies 2030

VDE – the technology organization

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Founded:	**1893**
Employees:	worldwide **2,000**
Members:	almost **30,000**
Volunteer experts:	over **100,000**
Locations:	worldwide over **60**
Research and funding projects:	**175**
Events per year:	over **1,600**
Product inspections per year:	**25,000**
Electrical products bearing the VDE certification mark:	**billions**
Norms and standards:	over **3,500**

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