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TRANSPARENT

A newsletter from TransnetBW for policymakers
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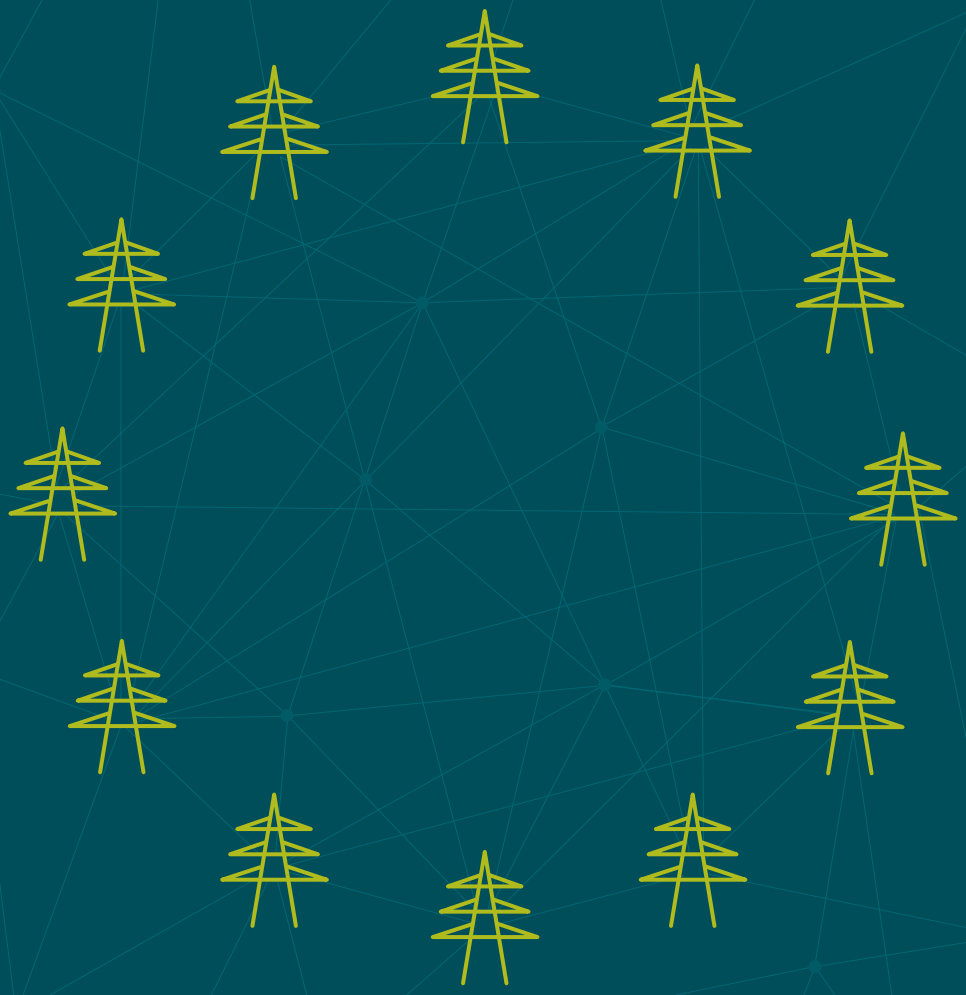
POWERING EUROPE'S FUTURE:



RELIABLE, AFFORDABLE, SUSTAINABLE

Affordability as a challenge

Driving the energy transition forward in a cost-efficient manner

Adjusting the sequence of the energy transition

Prioritising infrastructure to implement the energy transition

Energy policy triangle in focus

Maintaining the right balance between sustainability, affordability and security of supply

TRANSNET BW

For a successful energy transition

RECOMMENDATIONS FOR ACTION

01 DRIVING THE ENERGY TRANSITION FORWARD IN A COST-EFFICIENT MANNER

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1.2 The regulatory system should enable grid operators to fund necessary grid investments and cover the required innovation and operating expenditure.
1.3 To prevent that financing becomes a showstopper for the energy transition, sustainable financing options must be developed at national and European level to meet the growing need for investment.

02 PRIORITISING INFRASTRUCTURE IN THE IMPLEMENTATION OF THE ENERGY TRANSITION

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2.3 Take greater account of the consequences of approval procedures for grid infrastructure when reforming environmental law.
2.4 Reduce bureaucracy by examining the relevance and necessity of reporting obligations for Projects of Common Interest (PCI) with regard to national duplication.
2.5 Ensure political commitment and support to promote acceptance among the affected population for the infrastructure required to implement the energy transition.

03 MAINTAINING THE RIGHT BALANCE BETWEEN SUSTAINABILITY, AFFORDABILITY, AND SECURITY OF SUPPLY

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3.3 Within the framework of the existing internal market, incentivise without further delay geographically relevant investments in dispatchable and climate-friendly power plants.
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05 FOCUS ON IMPLEMENTING LAWS THAT HAVE ALREADY BEEN PASSED

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5.4 Within the regulatory framework, consider additional costs, efforts, and human resources that will be required to successfully manage future tasks.

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Dear Readers,

The European integrated energy system is an excellent example of a successful pan-European collaboration on highly complex issues. Compared to other regions in the world, Europe shows how cross-border collaboration and the harmonisation of regulations can make the energy supply more efficient and secure – especially through the cooperation of European transmission system operators in close coordination with market participants and policymakers. Not only does this contribute to economic growth, it also promotes social cohesion in Europe. An integrated energy system based on collaboration is a key factor for the sustainable development and prosperity of Europe.

TransnetBW is located in the geographical heart of Europe. Due to this central location we play a key role in the European energy system. We are a hub for cross-border energy flows and thus make an essential contribution towards the integration of European energy systems. Our geographical location requires us to work effectively with our neighbours to strengthen system security and the stability of energy supply across Europe.

The European Union plays a crucial role for TransnetBW and the entire European energy infrastructure. The EU sets the framework that ensures a secure, sustainable and competitive energy supply. An integrated European energy system is imperative for maintaining security of supply at the highest level, keeping the energy prices competitive and driving the energy transition forward.

The next five years of the new legislative term are extremely important for the European energy transition. Europe must focus on key topics in order to turn the ambitious targets that have been set for the climate and the energy system into reality – while ensuring that the high standards set for security of supply are being met, as these provide the foundation for a strong, industrial and peaceful Europe. In this edition of TRANSPARENT we will share some of our ideas and impetus with regard to energy policy for the upcoming legislative term from the heart of Europe.

Dr Werner Götz

Michael Jesberger

Dr Rainer Pflaum

Affordability as a challenge

DRIVING THE ENERGY TRANSITION FORWARD IN A COST-EFFICIENT MANNER

There is no alternative to the energy transition and it must be driven forward decisively

The energy transition is in full swing and has made tangible progress over the past 15 years. It is not only climate research that confirms that there is no alternative to the energy transition and that it must be driven forward decisively. The number of days on which renewables push (more expensive) fossil fuels out of the market and thus drive prices down has increased significantly. The improved integration of renewables into the European energy market has also contributed towards a considerable reduction in generation costs. By 2030, this savings potential will have risen to around five billion euros per year and by 2040 to approximately nine billion euros per year[1]. These economic gains far outweigh the required investments in the European grid and the electricity system.

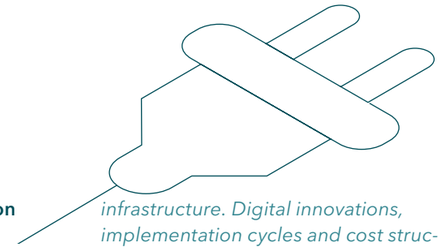
In addition to economic aspects, it should not be forgotten that the energy transition is making an essential contribution towards reducing Europe's dependence on energy imports, a contribution that is only set to grow over the coming years.

The energy transition is an investment that pays off

We can thus clearly say that the energy transition is an investment in the future that is paying off. However, before they pay off, investments first cost money. Therefore, expenditure needs to be examined in terms of its efficiency. After two years of turmoil due to the pandemic, followed directly by increased energy prices and high inflation as a consequence of the Russian invasion of Ukraine, cost efficiency is paramount. In addition, the acceptance of the energy transition by the public can only be maintained in the long term if its implementation is cost-effective.

1.1

The energy transition requires the continued support of all political forces to prevent time-consuming and costly zigzags.



Grids make the energy transition possible

The goal of cost efficiency is important, but must not lead to false economy. The EU Commission has put a figure of approximately 584 billion euros on investments in the transmission and distribution grids that are needed by 2030 for the energy transition to succeed[2]. Germany alone accounts for **200 billion euros**[3]. These are "no-regret investments", there is no alternative to them since without the right grid infrastructure there can be no energy transition. However, there is significant scope for improvement in the regulatory framework for these investments, which currently leads to inefficiencies and disincentives.

In addition to copper and steel, the grid for the energy transition needs *bits and bytes*

Without grid expansion and upgrades, the energy transition would not be possible. However, digitalisation and innovation, controlling the electricity flows and making the grids more efficient also play an important part in this context. In order for measures of this type to be implemented on a larger scale, adjustments to the regulatory framework and additional incentives are needed. Innovation projects are frequently run as collaborations between several grid operators, often at the pan-European level. At the same time, the TSOs are subject to a regulatory system that is aimed at increasing the individual efficiency of the grid operators and varies from country to country.

Dr Rainer Pflaum, CFO at TransnetBW, has thus been calling for improvements to be made for years: *"The regulatory framework should enable system operators to not just invest in copper and steel, but increasingly also in bits and bytes to build a smart and future-proof grid infrastructure. Digital innovations, implementation cycles and cost structures are different from traditional grid construction – we must take this into account."*

On the one hand, digitalisation requires highly insecure innovation activities. On the other hand, such innovations require cost-intensive research and development and must be tested before they can be put into practice.

PICASSO: possibly abstract, but certainly valuable

In order to ensure the stability of the electricity grid's frequency, the TSOs activate secondary control power once the grid frequency exceeds or falls below a defined tolerance range. The TransnetBW-operated Platform for the International Coordination of the Automatic frequency restoration process and Stable System Operation (PICASSO) serves to connect the national markets for secondary control power and to enable cross-border exchange while taking into account grid restrictions. PICASSO thus provides the framework and processes for coordinating the secondary control power market at the pan-European level. The platform is aimed at increasing cross-border competition and thus reducing costs for activating secondary control power. PICASSO thereby provides an approach for implementing the networking of international balancing power markets as stipulated by the European Commission's Guideline on *Electricity Balancing*[4].

Another example is the International Grid Control Cooperation (IGCC) project involving 27 transmission system operators from 24 European countries. The IGCC optimises the consumption and generation of electricity from different control zones in its interconnected electricity grids. The IGCC project enables the participating TSOs to reduce the need for balancing power and, at the same time, increase system security.

TransnetBW is the common service provider for the PICASSO and IGCC balancing energy platforms. Through the IGCC alone, a total of more than 2.5 billion euros have been saved so far. In 2023, around 14 TWh less balancing energy needed to be activated, the equivalent of the annual consumption of smaller EU member states such as Slovenia[5].

TransnetBW's costs for setting up and operating platforms such as PICASSO and IGCC are covered, at least partially, by the participating TSOs and/or national regulatory instruments. However, the risk of full cost recovery remains. At the same time, a Europe-wide societal benefit is created by reducing system costs. Unfortunately, this benefit is currently not being utilised to incentivise the TSOs' investments. →

1.2

The regulatory system should enable grid operators to fund necessary grid investments and cover the required innovation and operating expenditure.

[1] TYNDP 2022 System Needs Study: t1p.de/ngm4t

[2] Communication from the EU Commission Grids, the missing link – an EU Action Plan for Grids from 28/11/2023: t1p.de/hy94z

[3] VDI Nachrichten from 13/10/ 2023: t1p.de/fljo6

[4] Commission Regulation (EU) 2017/2195 from 23 November 2017 establishing a guideline on electricity balancing: t1p.de/x3v1v

[5] ENTSO-E Statistical Factsheet 2023, april 2024: t1p.de/xls6i

EU funding will not be sufficient to plug the gap

The most important EU funding programme available for grid investments is the Connecting Europe Facility (CEF). SuedLink, the joint project by grid operators TransnetBW and TenneT, was also subsidised with just over 39 million euros from this programme. These are initially very high funding amounts that can be put to good use by the TSOs. However, the leverage effect of the CEF is very limited in relation to the investment requirement in the grid infrastructure of 584 billion euros across Europe by 2030. Michael Jesberger, COO of TransnetBW, adds:

"The current German grid development plan with the target year 2037 depicts an investment requirement of around 320 billion euros for Germany alone. And if we take additional cross-border interconnector capacities, the expansion of distribution grids and offshore grid expansion into account, I believe that around 600 billion euros across Europe will not be sufficient."

Nobody can expect the required investment to be fully covered by EU funding. The lion's share of the investments will still need to be financed through equity and external capital. Part of the planned investment is for innovation and involves a correspondingly higher level of risk and OPEX. We will need to find alternative funding mechanisms at the European level during the upcoming legislative term. This could involve the European Investment Bank taking on a more prominent role, for example, by offering investors new financial de-risking products, among other options.

NOVA: utilising the existing grid more efficiently

An obvious idea for keeping costs and the environmental impact in check is a more efficient use of the existing grid before investing in new assets. The TSOs use the NOVA principle for grid planning. NOVA is the German acronym for grid optimisation before grid reinforcement before grid expansion. An expansion may only be planned after all other options in the existing grid have been exhausted. A good example of this approach is the "dynamic line rating", which enables the TSOs to utilise the existing grid considerably more heavily in many instances.

However, the current regulatory framework has a negative impact on the TSOs' operating costs, even if corresponding measures ultimately have a positive impact on system costs. The regulatory framework needs to be adjusted accordingly.

The grid booster: storage as a virtual power line

The grid booster is another innovative technology developed by TransnetBW to utilise the existing grid more efficiently. In normal operation the battery system is charged with energy, allowing the transmission grid to be utilised to a higher degree. The grid booster provides the safety buffer with a short lead-in time, which is needed to keep the grid stable in case of a line outage.

If an outage leads to congestion on the grid, the grid booster is only activated reactively and supplies the consumers downstream from the bottleneck with electricity within milliseconds. The grid booster can therefore bridge the time between the outage occurring and a power plant taking over. This means existing power lines can be utilised more heavily with the grid booster in place. In turn, fewer new lines need to be built, which reduces the overall system costs and security of supply remains unaffected.

The grid booster concept is currently being piloted. Since the grid booster is a storage system, its operation and ownership are governed by Article 54 of the Electricity Market Directive, which permits TSOs to own and operate storage systems only in exceptional cases.

With the decision to build the system, TransnetBW took an entrepreneurial risk, as the distinctions between different use cases for storage technologies in Article 54 are unclear. However, the use case of the grid booster, which is used like a virtual power line in order to increase the utilisation of the grid, should be considered in a differentiated manner from a regulatory perspective.

Overhead lines could halve the costs compared to underground cables

The plans for expanding the ultra-high-voltage grid in Germany comprised around 14,000 kilometres of electricity lines in various implementation stages at the end of 2023 – almost 3,000 kilometres of which have already been constructed. Now, another 4,800 kilometres and around 2,500 kilometres for the reinforcement of existing lines have been added and the need for those lines was confirmed in the current German grid development plan. Thus a considerable portion of the planned grid expansion has yet to be implemented. Across Europe the figures are significantly higher: a total of 34,100 kilometres need to be newly built and 30,000 kilometres of existing routes must be reinforced.[6]

There is scope for cost savings within the planned grid expansion, too. The current German Grid Development Plan Electricity 2023 (looking ahead for 2037/2045) provides for several additional high-voltage direct current (HVDC) transmission lines. If just the three projects NordOstLink, NordWestLink[7] and SuedWestLink[8] were to be built as overhead lines instead of underground cables, 20 to 23 billion euros could be saved[9]. This corresponds to a reduction of grid fees of between 1 and 1.5 billion euros per year as of 2030.

Cross-sector thinking to achieve a carbon-neutral system

For the transformation of the energy system to succeed, it is necessary to plan and implement projects across multiple sectors. If the energy requirements of the respective sectors can be electrified, the transition to renewables can be completed more efficiently and cost-saving synergy effects can be utilised.

A cross-sectoral approach can contribute towards creating cheaper alternatives to fossil fuels in as many areas as possible and making the transformation socially fair. At the same time, Europe's electricity systems will be increasingly dependent on flexibilities from the other sectors. This, however, requires sector coupling.

TransnetBW already conducted a study on this topic in 2022. The *Energy Systems 2050*[10] study looked into the key question of which energy system a cost-optimised and climate-neutral EU will need in 2050. Considering that electricity and gas supply form the backbone of the energy transition, the study concludes that the energy transition can only succeed if the individual sectors (gas, electricity, heat, industry and transport) converge. Due to the expansion of wind power and photovoltaics, the EU is also becoming less dependent on energy imports.

In addition, TransnetBW is working to achieve sector integration in various research projects. The *BANULA*[11] project investigates how the barrier-free charging of electric vehicles can be achieved while maintaining system security and security of supply. The *DigiPlat* project is aimed at achieving interoperability between different flexibility platforms.

The European Union has also started to embrace sector integration. The electricity and gas ENTSOs have been working on joint European scenarios for their ten-year network development plans (TYNDPs) for many years. In addition, the European hydrogen and gas market package describes requirements for coherent national grid planning between natural gas, electricity and hydrogen as well as the increasing use of sector coupling. In the near future there will also need to be an increased coupling of the mobility, heat and industry sectors in order to create synergy effects and the required flexibility.

Conclusion

The financial requirements for implementing the energy transition are considerable. However, it is an investment that is already paying off. Financing the energy transition must not become its showstopper, so efficiency is paramount in the further transformation of the energy system. We have identified several levers that show there is still room for optimisation, sometimes with relatively little effort.

1.3

To prevent that financing becomes a showstopper for the energy transition, sustainable financing options must be developed at both national and European level to meet the growing need for investment.

[6] Source EMBER: t1p.de/79xc9

[7] DC41: 607 km from Alfstedt in Lower Saxony's Rotenburg (Wümme) district to Obrigheim (Baden), in which TransnetBW is involved alongside TenneT.

[8] DC42: 737 km from the Herzogtum Lauenburg district (southeast Schleswig-Holstein to Böblingen district (south of Stuttgart), also with the involvement of TransnetBW, but here together with 50Hertz.

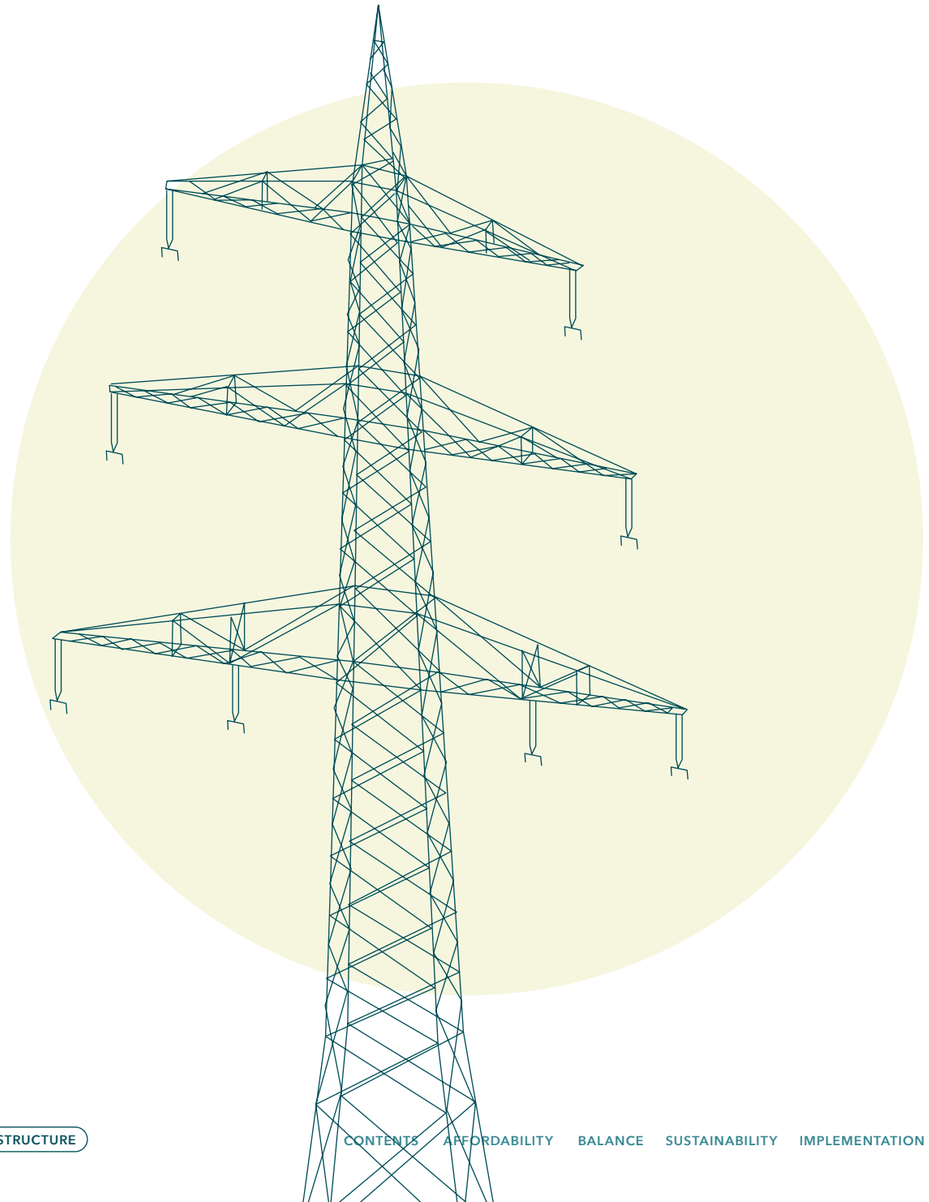
[9] Further to the calculations by the transmission system operators, in June 2024 the Federal Network Agency confirmed that up to 35 billion euros could be saved if overhead lines were built instead of all the planned underground line projects.

[10] www.energysystem2050.net

[11] banula.de

Adjusting the sequence of the energy transition

PRIORITISING INFRASTRUCTURE TO IMPLEMENT THE ENERGY TRANSITION



The EU has the best power grid in the world, BUT …

The EU has the best and most reliable power grid in the world, but 40 per cent of the existing electricity infrastructure is more than 40 years old. Not only must the older lines be upgraded by the mid-2030s, the grid as a whole must be prepared to deal with completely new challenges arising from the implementation of the energy transition. In addition to constructing new sections of the grid, which are already urgently required to connect many new wind farms, for example, this also includes investments to make the grids smarter.

The energy transition must be implemented in an appropriate order

Up to now, policymakers have strongly focused on transforming generation when implementing the energy transition. Renewable generation capacities are being built and conventional power plants decommissioned. In 2000, the German Renewable Energy Act set the ambitious target of a 20 per cent share of renewable energy in the system by 2020. Since then, the bar has been continuously raised, so that in 2020 around half of the German electricity mix came from renewable energy.[1] However, the transformation of the grid infrastructure, which usually takes a lot longer, has often been neglected. This has resulted in frequent problems transmitting the renewable energy to the consumption centres.

Michael Jesberger, COO of TransnetBW, is therefore calling for a rethink of the "sequence of the energy transition": *"The infrastructure for both electricity and gas plays a key role here and we must carefully think about the point in time in which the infrastructure is expanded and converted, which infrastructure is already in place, what our plans are for modernising the grid, and, in particular, how consumption patterns are evolving."*

In addition, grid development plans, both national and European, have in the past been planned for a maximum of 10–15 years into the future, which is far too short-term to achieve the target of becoming climate-neutral by 2050, or in the case of Germany by 2045. For this reason, TransnetBW published a Europe-wide study in June 2022: "Energy System 2050 – towards a decarbonised Europe"[2]. The study is based on the target year 2050, by which the EU is to become climate-neutral. From this long-term perspective, it discusses what type of cost-optimised energy system the EU needs – and not just in relation to the electricity sector, but across all sectors (see article on p 4).

2.1

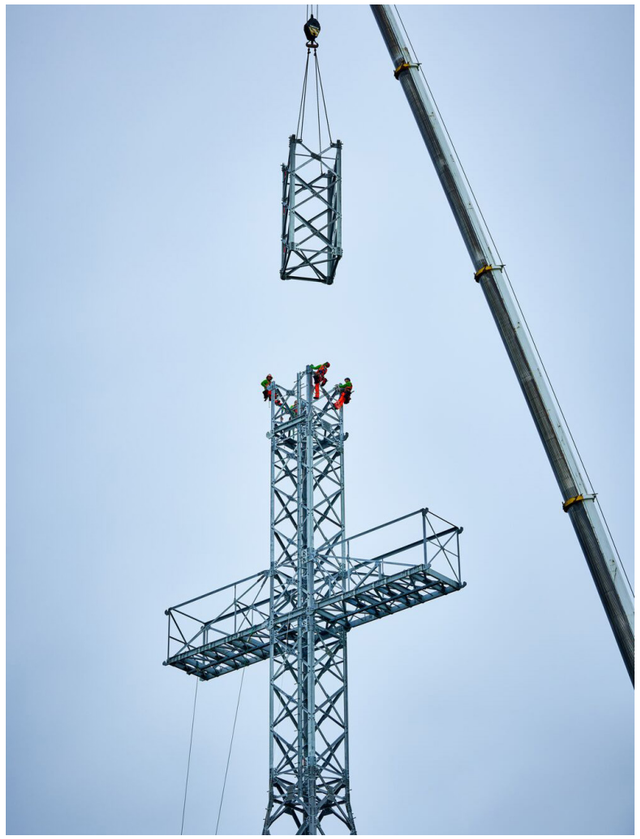
Prioritise grid expansion over the transformation of the power plant structure in the further implementation of the energy transition.

2.2

Plan grids across multiple sectors and for the target year 2050 to prevent inefficiencies.

[1] Energy Charts: t1p.de/jyfqc

[2] www.energysystem2050.net



Removing restrictions to grid construction

Approval procedures in the transmission grid sector can easily take ten years. The reasons for this are complex and solutions rarely simple. Decision-makers at both European and subordinate levels can make a contribution towards cutting the authorisation knot.

Two good examples are the Council Regulation setting out a framework to speed up the deployment of renewable energy[3] and the Renewable Energy Directive III[4]. Both legislative texts are aimed at accelerating approval procedures for the infrastructure required for renewables.

Applying the European Project of Common Interest (PCI) label[5] to large projects can create important political tailwinds. However, the requirements that need to be met in order to obtain the label can be very restrictive and may be detrimental under certain circumstances. Obligations under national law often result in duplications of reporting requirements, which lead to unnecessary additional bureaucracy and resource requirements. These conditions are not helpful in terms of accelerating approval procedures – and are thus undermining the idea behind the PCI label.

2.3

Take greater account of the consequences of approval procedures for grid infrastructure when reforming environmental law.

2.4

Reduce bureaucracy by examining the relevance and necessity of reporting obligations for Projects of Common Interest (PCI) with regard to national duplication.

Political support for affected residents

The large majority of the population supports the energy transition. However, this support may fall away once the energy transition manifests itself as a pylon or wind turbine close to home. After all, anyone can be prone to Nimbyism (*not in my back yard*). However, we cannot call for an energy transition without accepting the infrastructure that is required to implement it.

Many infrastructure projects have been delayed because of a lack of acceptance or even resistance among the affected population. However, the delays could have been reduced with local political backing. Project developers should thus be given political support from elected representatives, both in Brussels and their respective capitals.

2.5

Ensure political commitment and support to promote acceptance among the affected population for the infrastructure required to implement the energy transition.

Decisively implementing the EU Grids Action Plan

With the EU Action Plan for Grids,[6] the EU Commission has sent the right and important signals for the energy policy measures that need to be prioritised during the 2024–2029 legislative term. The package of measures comprises many key challenges that must be addressed to accelerate the implementation of electricity infrastructure projects, from financing the energy transition and taking a long-term view of grid planning to strengthening supply chains for grid technologies.

Planning the energy transition beyond a ten-year horizon seems an obvious and long overdue step in this context. However, even the best plans cannot come to fruition if the required transformers, switchgear, or underground cables are not available in time. This is a genuine risk for grid-related components in the current strained situation on the markets and should not be worsened by increasing bureaucracy in procurement law.

Enabling anticipatory investments

The aforementioned EU Action Plan for Grids calls for guiding principles on anticipatory investments. These investments in the grid that are not aimed at the immediate need for expansion, but necessary in the context of long-term climate and energy policy (e.g. the goal of climate neutrality). TransnetBW welcomes this approach, as it would make the implementation of grid planning more efficient.

SuedLink is a good example to illustrate the problem: during the planning stages for the SuedLink underground cable, TransnetBW called for empty pipes to be laid alongside the cable to cater for potential future growth in transmission demand. This demand could not be concretely demonstrated within the timeframe of a ten-year grid planning process and was therefore not eligible for approval.

However, over the years, European and German energy and climate policy targets were readjusted, leading to an increased transmission demand for electricity routes including for SuedLink. Changes to the implementation of the SuedLink project are no longer possible though, because the route corridor would then become wider, and the planning and approval process would have to start again from scratch.

[3] Council Regulation (EU) 2022/2577 of 22 December 2022 setting out a framework to accelerate the deployment of renewable energy: t1p.de/8vzay

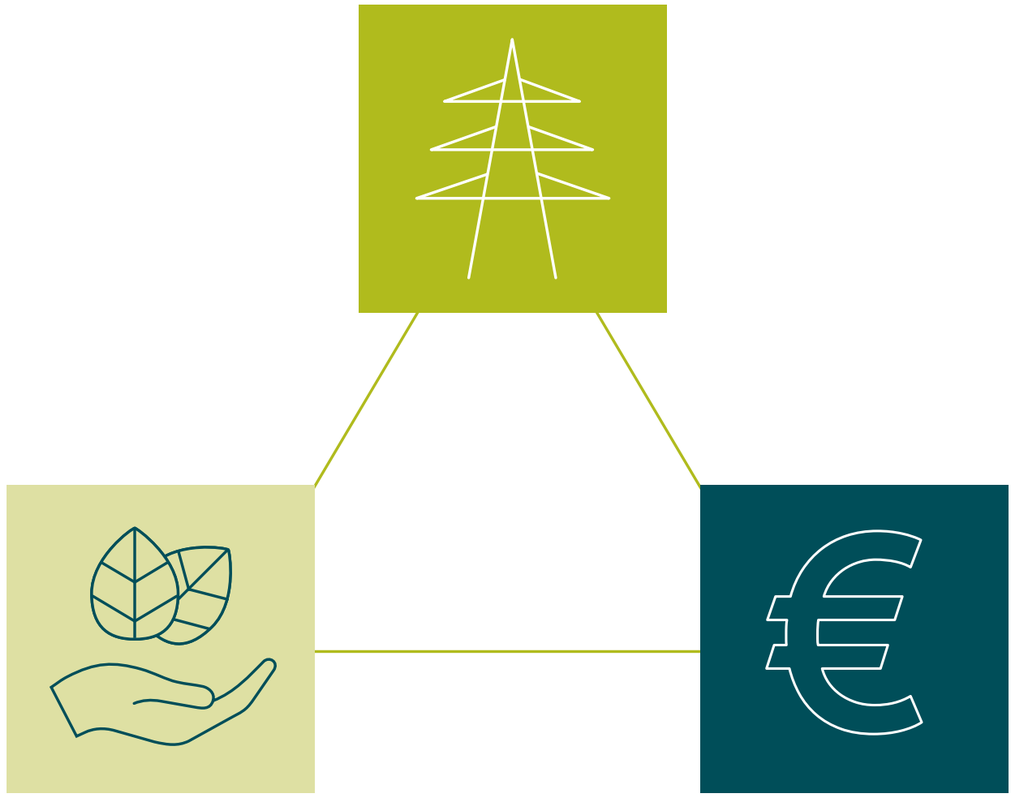
[4] Directive (EU) 2023/2413 of 18 October 2023 on the promotion of energy from renewable sources: t1p.de/lowj4

[5] PCI stands for Projects of Common Interest, important infrastructure projects that have been formally acknowledged by the EU as being essential for implementing its energy and climate policy targets.

[6] Communication from the Commission of 28 November 2023 (Grids, the missing link - An EU Action Plan for Grids): t1p.de/0guyp

Energy policy triangle in focus

MAINTAINING THE RIGHT BALANCE BETWEEN SUSTAINABILITY, AFFORDABILITY AND SECURITY OF SUPPLY



Balancing the energy policy triangle

Balancing the energy policy triangle of sustainability, affordability and security of supply is crucial with regard to the future of the European energy system. Implementing the energy transition places high demands on all three aspects, which must be balanced carefully in order to achieve the ambitious goals without endangering security of supply. A strong society and industry depend on a reliable and affordable energy supply – underlining the need for this balance and making it a central concern of European energy policy.

Market integration is the force maintaining the balance in terms of affordability. The European energy market is definitely a success story. According to an ACER/ENTSO-E evaluation, European day-ahead trading alone resulted in a welfare gain of 34 billion euros in 2021. European electricity trading is currently being switched from hourly to quarter-hourly products, which will make it much easier to integrate the increasingly volatile generation of electricity from wind power and PV systems. European electricity trading has enormous benefits, but it must always be looked at in conjunction with grid capacities.

Leaving the foundations of the market design in place

A solid market design is a key pillar for the successful implementation of the energy transition by 2050. It is therefore crucial to maintain the basis of the current market design and only make adjustments where needed. Basic concepts such as the pricing mechanism (merit order) and the configuration of bidding zones are examples for prerequisites that need to be maintained to ensure this stability.

Any potential changes to the existing design need to be evaluated carefully; their implementation must be efficient and maintain the balance of the triangle. For example, the initiative to make 70 per cent of the thermal capacity of transmission lines available for cross-border intraday trading could disturb this balance. An intraday minimum capacity cannot be reliably and efficiently provided for with the current grid operating equipment, power plants and available redispatch potential.

3.1

Maintain the foundations of the existing market design in order to guarantee a successful implementation of the energy transition until 2050.

Integrating flexibility into electricity markets

The current market design offers few incentives for system-serving behaviour of existing and future flexibilities, including storage, dispatchable generation and shiftable loads. This presents a challenge, as the energy transition and the internal European energy market will require such flexible behaviour in the future.

In addition to the use of flexibility itself, the coordinating the various flexibility requirements is also important. The response of electricity producers, storage providers and consumers to price signals on the spot market is an important contribution to meeting the demand for electricity in Europe in an efficient and cost-effective manner and to improving the integration of renewables. Specifically, this means that price peaks can be flattened or at least not increased, or generation can be more efficiently utilised by shifting demand to times of high feed-in from renewable generation. At the same time, this flexibility must be coordinated with the requirements of the electricity systems and the grids. It must be possible for grid operators to sufficiently incentivise the provision of system-serving flexibility, e.g. as a control reserve or congestion management, and prevent behaviour that is harmful to the system. To this end, the integration of the demand side into system service markets needs to be further developed.

3.2

Integrate the demand side into the markets for ancillary services, strengthen incentives that promote system-serving flexibility and sanction behaviour that is harmful to system security.

Strategic positioning of controllable generation as the key to system security in the energy transition

"Planning to phase out coal must always be viewed in the context of the quality of security of supply. It can succeed if we simultaneously build replacement dispatchable generation capacities for prolonged lulls in generation from renewables ("Dunkelflaute"), which produce fewer or, ideally, no carbon emissions. It is the right course of action to phase out coal quickly, but we currently do not have enough dispatchable generation capacities in reserve and must thus consider coal-fired power plant units as system-relevant. The situation will only ease when the gas-fired and hydrogen-ready power plants planned by the German government in its power plant strategy become available." (Michael Jesberger, COO of TransnetBW)

The decision to phase out coal is a done deal. However, it is also a fact that no other European country still has as many coal-fired power plants in operation as Germany. The coal phase-out will only succeed if the tendering for dispatchable generation capacities starts without delay. →

Building controllable generation capacities in targeted locations is crucial for both the energy transition and system security. Dispatchable power plants can react quickly to fluctuations in the grid and balance out the volatility of renewables. The power plant strategy as proposed by the German Federal Ministry of Economic Affairs and Climate Action (BMWK) aims to promote the construction of controllable power plants. It is important to introduce a local component. Controllable generation capacities should be built where the plants can contribute to covering electricity demand as well as ensuring grid voltage stability, dissolving grid congestions, or rebuilding the grid in the event of an emergency. To this end, TransnetBW has proposed a practical solution: the ***Redispatch Payment Guarantee***.

Today, there is a high level of uncertainty among investors as to how often a power plant will be called on by the transmission system operators for congestion management. However, these redispatch deployments make up a significant portion of operating hours at many power plant locations. The use for grid stabilisation is mostly remunerated retrospectively via the "proportional value consumption" method. It contributes significantly to covering fixed costs at power plants in the west and south of Germany, but is difficult for investors to plan.

The ***Redispatch Payment Guarantee*** reduces this uncertainty for investors: the extent of deployment for grid stabilisation is forecasted for each grid region and part of the remuneration ("proportional value consumption") is guaranteed in advance. With this guarantee, investors can achieve better tendering conditions in the capital market.

If the benefit of guaranteed remuneration for grid stabilisation calls is priced into the tendering of the power plant strategy, investments at system-serving locations will be incentivised.

The ***Redispatch Payment Guarantee*** can be implemented in conjunction with the German government's power plant strategy and thus ensure that new power plants are built in line with the needs of the energy system. In addition, the ***Redispatch Payment Guarantee*** reduces the need for state funding in the power plant strategy and thus relieves the federal budget by over one billion euros.[1]

These measures contribute significantly towards maintaining the balance in the energy market and ensuring a reliable supply of electricity.

3.3

Within the framework of the existing internal market, incentivise without further delay geographically relevant investments in dispatchable and climate-friendly power plants.

Network codes for security and efficiency in the electricity market

Network codes[2] have played an important part in maintaining the balance of the energy policy triangle for transmission system operators. These codes are crucial for supporting the integration of renewables, cross-border collaboration, and general market integration within Europe. The Connection Codes, for example, define how wind turbines can also assume responsibility for maintaining voltage stability, where conventional power plants were once primarily used. Operational Codes stipulate how the grid is to be operated jointly and securely across borders. The Market Codes focus on cross-border electricity trading, with particular emphasis on better integration of renewables and flexibilities.

Future amendments to the network codes may not jeopardise the ongoing implementation of existing successful projects and must ensure that TSOs have enough scope for action to maintain secure system operation. It is crucial that changes to the regulatory framework do not compromise the continuous stability and reliability of the electricity grid and maintain the balance of the energy policy triangle.

Now that the elections are over, the EU should focus on implementation the current legislation, which was recently amended with the electricity market design reform. Rather, small amendments need to be made to the network codes. Comprehensive new legislation on the internal electricity market would be counterproductive with regard to achieving the targets of the energy policy triangle.

3.4

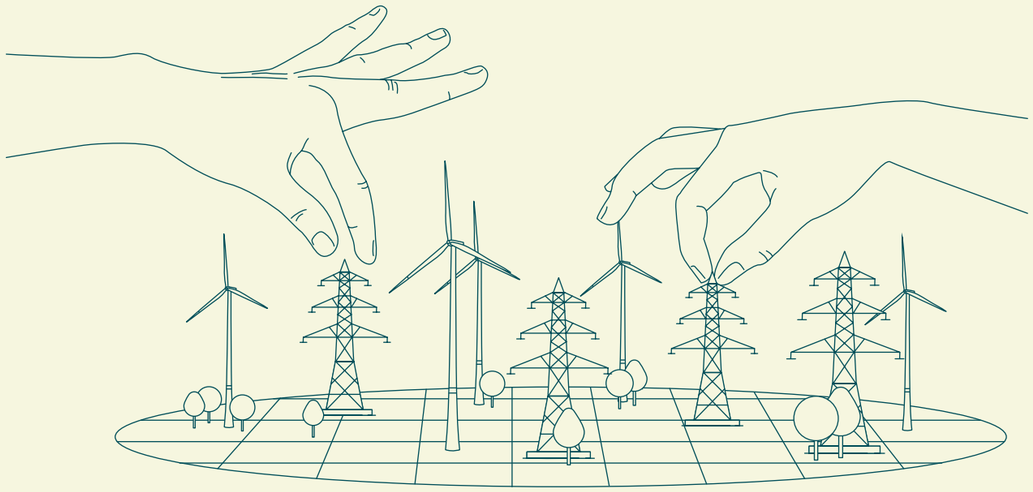
Amendments to the network codes must not put their ongoing implementation at risk and should leave sufficient scope for the TSOs to ensure secure system operation.

[1] t1p.de/6gw9s

[2] The EU electricity network codes and guidelines deal with issues concerning the further development of the European internal electricity market. They contain a legally binding set of rules for the market, grid connection and system operation areas. Specific methods are developed based on the provisions set out in these EU network codes and guidelines.

Sustainability in practice

MAKING SUSTAINABILITY POSSIBLE, RATHER THAN JUST CALLING FOR IT



Sustainability made in Baden-Württemberg

Transmission system operators pave the way for the energy transition and thus for a carbon-neutral future for Europe. However, at the same time, the expansion of the electricity grid generates emissions. As a driver of the energy transition, TransnetBW strives to reduce emissions or cut them out altogether wherever possible. Unfortunately, regulatory obstacles stand in the way of this goal, which need to be removed during the upcoming legislative term. Strengthening the supply chains and simplifying public procurement law must also be on the agenda in order to drive a low-emission and resource-saving grid expansion forward. The transformation towards a sustainable future requires the development of competitive, ecologically compatible and socially responsible technologies. Policymakers must clear the path for these technologies.

Setting the course for sustainability – greening grid losses

The legal framework must be adapted in such a way that sustainability is not just being called for, but the right conditions for implementing it are created as well. One example is the procurement of green loss energy or the installation of ground-mounted photovoltaic plants in substations. Most of the emissions generated by grid operators (approximately 90 per cent) are due to grid losses. These occur for technical reasons and the options for reducing them are limited. Currently, TSOs in Germany cannot procure electricity explicitly from renewables to compensate for grid losses. →

4.1

National legislators should not be more restrictive than European ones and enable system operators to procure grid losses from sustainable energy.

Strengthening European supply chains

The energy industry is facing massive supply chain issues, partly because the entire sector is growing at an above-average rate due to the energy transition. Raw materials and resources are limited, the shortage of skilled workers is omnipresent, and the demand for important technologies is high. For TSOs, the integration of social and environmental sustainability criteria into tenders presents a challenge due to the limited availability of suppliers, which needs to be overcome. The potentially more limited choice of suppliers is a risk for the energy transition. Long waiting times and supply shortages slow down the expansion of the grids and the integration of renewables. In conjunction with complex tendering rules and the vast array of procurement regulations, these conditions are slowing down the grid expansion. Strengthening European supply chains by promoting sustainable technologies and products and thus creating a wider choice of suppliers would give the transmission system operators a broader scope for action.

Net Zero Industry Act: an opportunity to strengthen key industries for the energy transition

With the Net Zero Industry Act (NZIA), the EU has passed legislation that supports key European industries. However, European procurement law is already extremely complex and therefore must be simplified and standardised. It must be ensured that the environmental sustainability criteria for tendering processes, which are set out in a separate implementing act to supplement the NZIA, are non-discriminatory and standardised. The future environmental sustainability criteria must be weighted in such a way that TSOs remain capable of acting and can implement the grid expansion swiftly. There is only a very limited number of potential suppliers for many high-voltage technologies.

4.2

Simplify and streamline procurement regulations at the European level to prevent delays in the energy transition.

SF_6 gas: eliminate the climate killer!

Sulphur hexafluoride (SF_6) is used by TSOs in gas-insulated operating equipment such as transformers and circuit breakers as well as in gas-insulated switchgear. However, with a GWP[1] value of 23,500 SF_6 has one of the highest global warming potentials and is extremely damaging to the climate if it escapes into the atmosphere.[2] Therefore, a reduction of SF_6 emissions is necessary and can be achieved by promoting the research and development of new alternative technologies and, wherever possible, by procuring SF_6-free new equipment. The four German TSOs have called for using only natural insulation gases as an alternative to SF_6 in the long term. TransnetBW already recycles SF_6, to minimise the total amount being used.

Bans on using SF_6 in gas-insulated operating equipment were introduced in the new F-gas Regulation. For high-voltage equipment a ban will come into effect from 2032. The use of SF_6 in medium-voltage switchgear panels used in auxiliary applications will already be banned from 2026. Until alternative gas technologies become available on the market in sufficient volumes, the ban will make procuring equipment for new construction projects considerably more difficult. At the same time, the ban is expected to have an incentivising effect on research into natural insulating gases. A timely implementation of the NZIA will hopefully contribute towards developing and producing natural SF_6 alternatives and be another step on the way to developing sustainable grid technologies.

4.3

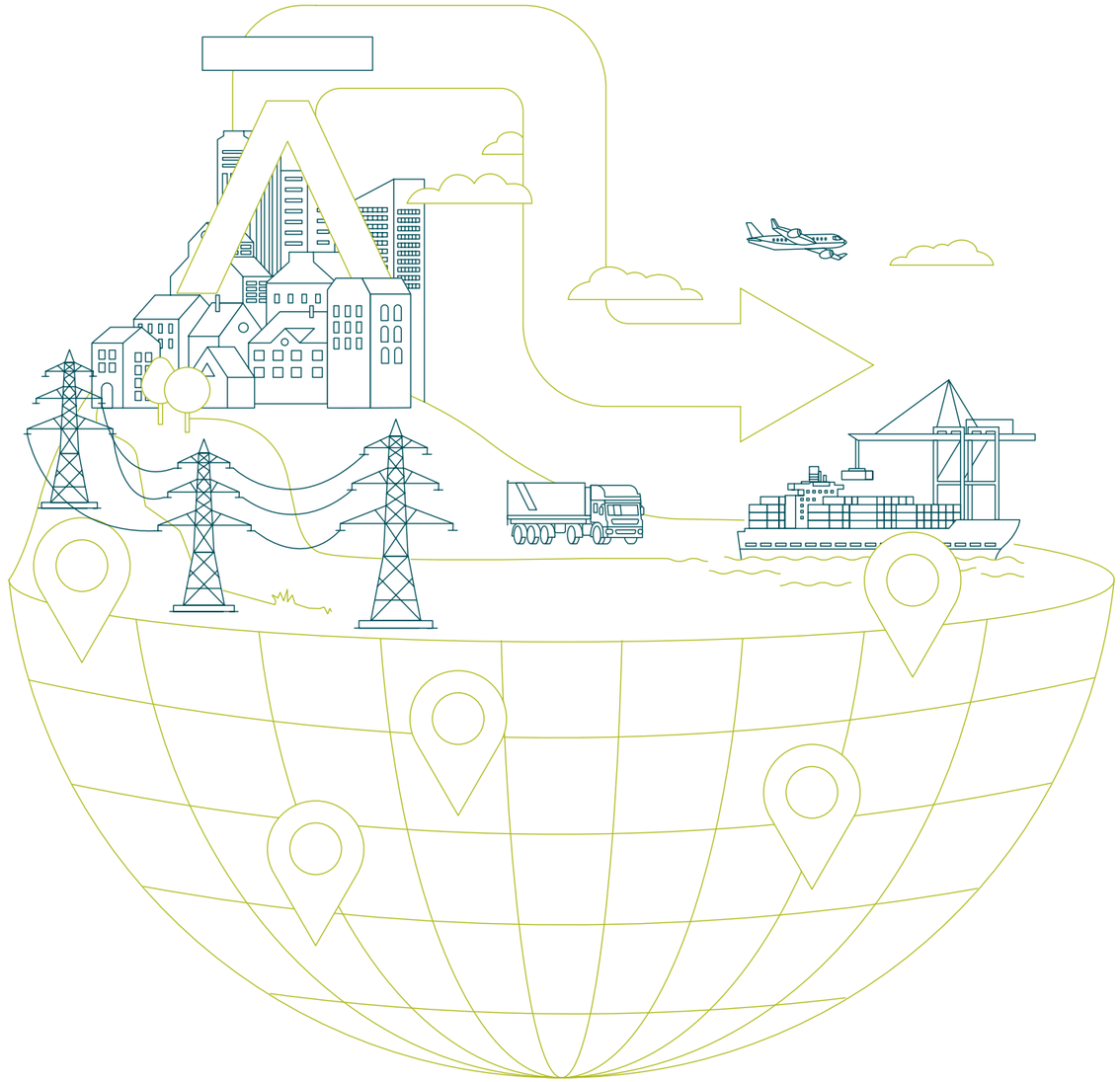
Support European suppliers in order to strengthen resilient and sustainable supply chains in the EU.

4.4

Support the development of natural insulating gases as alternatives to SF_6 and prioritise it over PFAS-based alternatives.

[1] GWP = global warming potential

[2] Netztransparenz.de: t1p.de/mkour



Work in progess

FOCUS ON IMPLEMENTING LAWS THAT HAVE ALREADY BEEN PASSED

Room for the implementation of legislative packages that have already been passed
In the past legislative terms, energy and climate policy targets for the years 2030 and 2050 were set and partially even subsequently readjusted. Against the backdrop of the worsening climate crisis and the energy policy challenges resulting from the Russian war on Ukraine among other factors, rapid action and course corrections were essential.

It is important to note that the implementation of legislation that has been passed, be it the Clean Energy Package or the Green Deal, takes time. However, there are examples of legislative texts that were still being implemented at full swing as the next amendment was already being introduced. Agreeing on and adopting ambitious climate policy targets is not an easy matter, but implementing and complying with them often presents an even greater challenge.

The big lines have been drawn and the general direction of travel has been set. Since an investment cycle in the energy sector can easily last a decade, it is now important to stay on course, provide political and regulatory stability and only make adjustments where they are genuinely necessary.

5.1

Leave room within the upcoming legislative term for a thorough implementation of legislative packages that have already been passed.

Back to regular legislative procedure
TransnetBW is not advocating a "regulatory break" as the socio-political framework conditions are very dynamic and we have already identified several recommendations for action for the coming years in this edition of TRANSPARENT.

Nonetheless, it is important to return to the regular legislative procedures at the European level. During the past legislative term, the EU demonstrated in impressive fashion that it is capable of taking swift, decisive action when the situation requires it. However, emergency actions can come at the expense of transparency, diligence, and democratic control mechanisms.

Therefore, it is important to return to regular legislative procedures. Existing emergency regulations, in particular those that have a market-distorting effect, should be phased out in the foreseeable future. Stipulations that have proven to work well in practice should be transferred into legislation in accordance with the rules within the ordinary legislative procedure. This has already happened for some legislation, for example provisions from the Emergency Regulation (EU) 2022/2577 setting out a framework to accelerate the deployment of renewable energy, which has been transposed into the Renewable Energy Directive III (EU) 2023/2413 and is now being implemented.

With the transition to regular legislative procedure, legislation can be based on robust impact assessments and the stakeholders who will be involved in implementing it can be consulted. To this end, TransnetBW makes its expertise available via associations such as ENTSO-E as well as directly.

The energy transition remains challenging, but the surrounding conditions are evolving
The energy transition is and will continue to be a challenge, as the framework conditions are continuously evolving. Worsening climate change requires the aspect of climate resilience to be taken into account when implementing future grid infrastructure. The first provisions to this end have already been enshrined in law. In the upcoming legislative period, it will also be necessary to examine the extent to which the security aspects of critical infrastructure need to be strengthened beyond the current level without causing further delays in project implementation.

At the same time, there is no alternative to implementing the energy transition in line with the path mapped out by the EU. The energy industry and policymakers need to jointly identify which challenges are on the horizon for the next few years, so that the regulatory framework can be adapted as early as possible in terms of the additional effort, costs, resources, and skills required to address them.

5.2

Phase out emergency regulations with a market-distorting effect, but transpose provisions from such regulations that have proven to work into regular law.

5.3

Base legislative amendments on robust impact assessments and underpin them with expertise from the stakeholders who are to implement them.

5.4

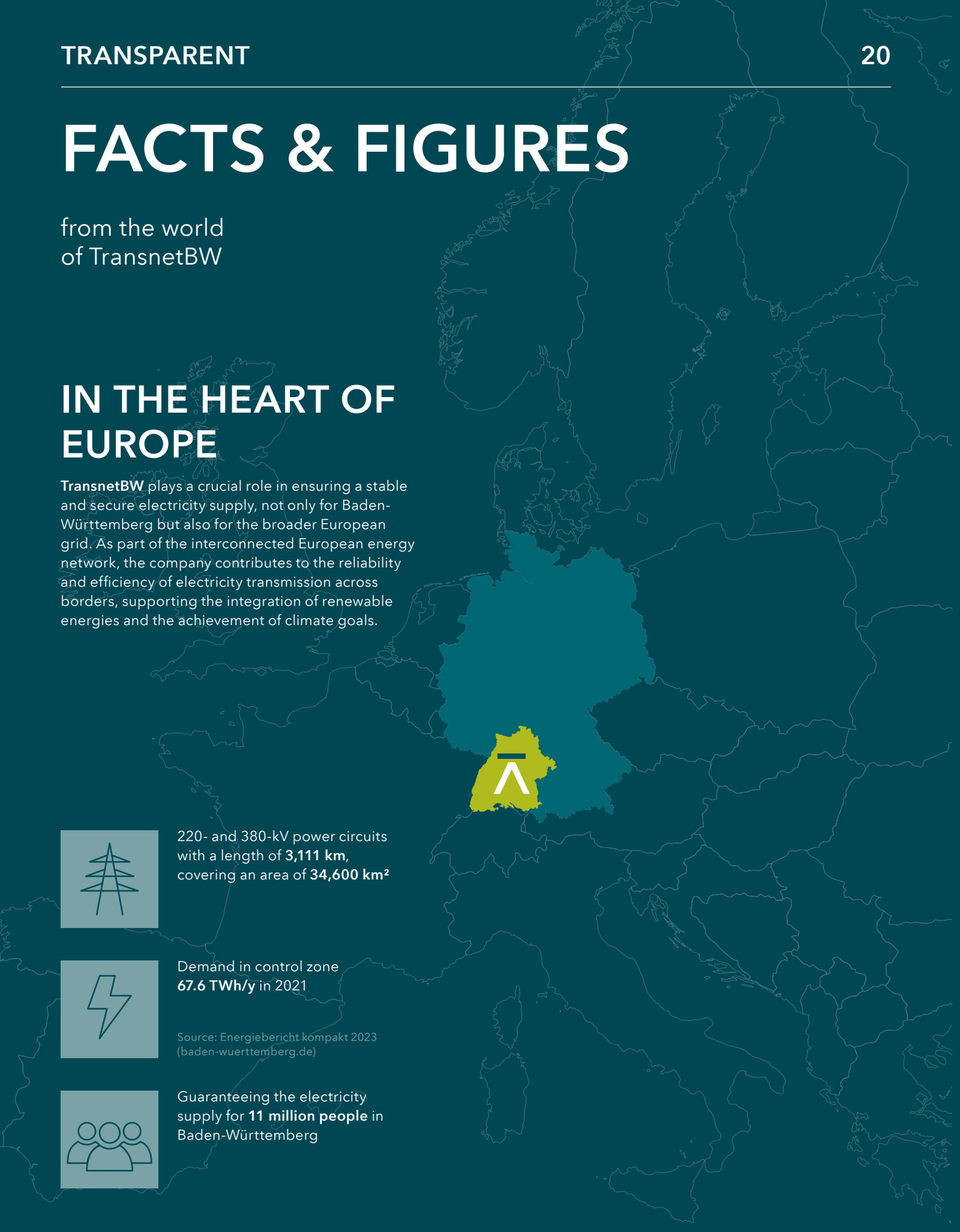
Within the regulatory framework, consider the additional costs, effort and human resources that will be required to successfully manage future tasks.

FACTS & FIGURES

from the world
of TransnetBW

IN THE HEART OF EUROPE

TransnetBW plays a crucial role in ensuring a stable and secure electricity supply, not only for Baden-Württemberg but also for the broader European grid. As part of the interconnected European energy network, the company contributes to the reliability and efficiency of electricity transmission across borders, supporting the integration of renewable energies and the achievement of climate goals.



220- and 380-kV power circuits with a length of **3,111 km**, covering an area of **34,600 km²**

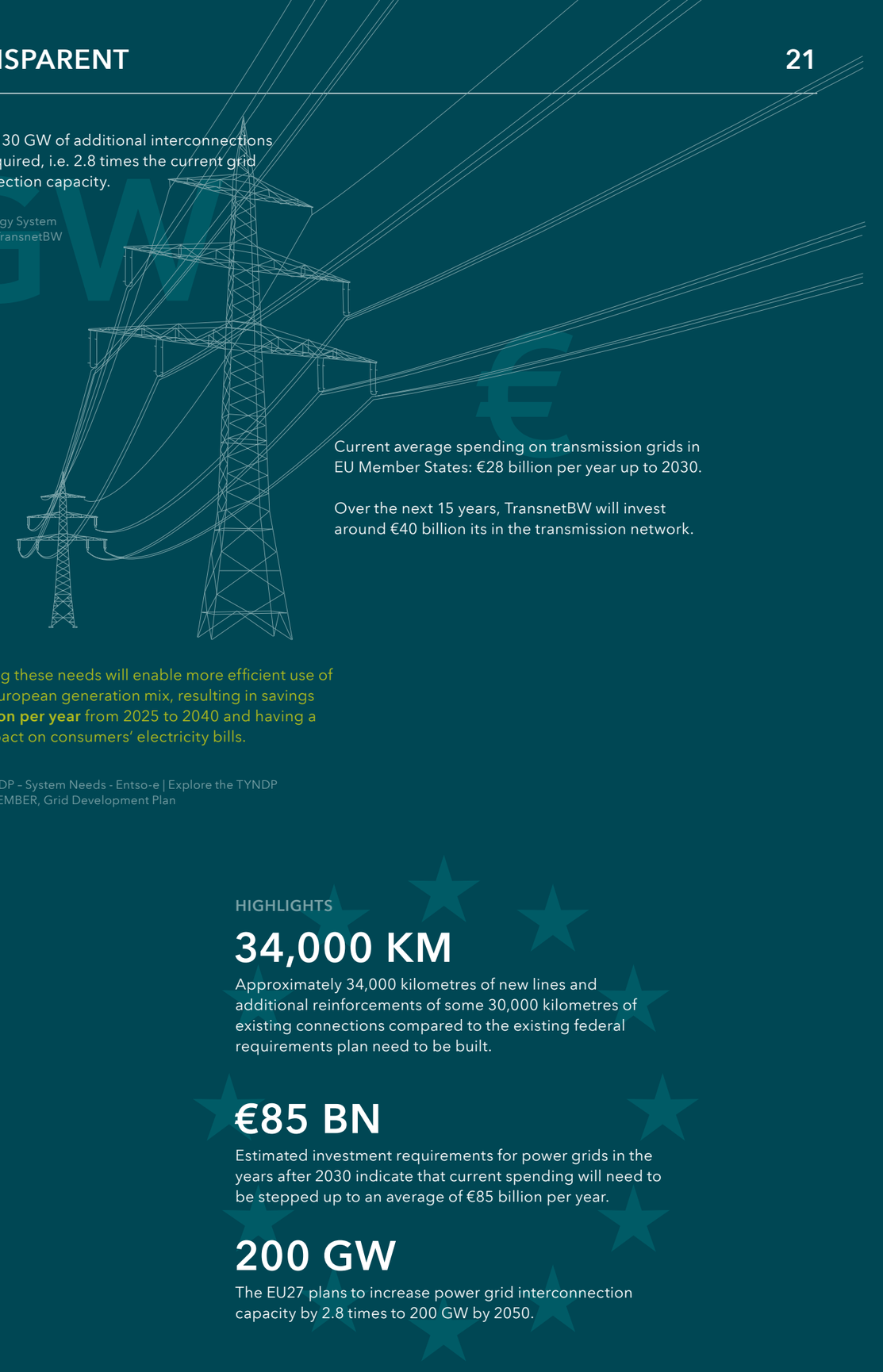
Demand in control zone **67.6 TWh/y** in 2021

Source: Energiebericht kompakt 2023 (baden-wuerttemberg.de)

Guaranteeing the electricity supply for **11 million people** in Baden-Württemberg

By 2050: 130 GW of additional interconnections will be required, i.e. 2.8 times the current grid interconnection capacity.

Source: Energy System 2050 Study TransnetBW



Current average spending on transmission grids in EU Member States: €28 billion per year up to 2030.

Over the next 15 years, TransnetBW will invest around €40 billion its in the transmission network.

Addressing these needs will enable more efficient use of the pan-European generation mix, resulting in savings of **€9 billion per year** from 2025 to 2040 and having a direct impact on consumers' electricity bills.

Source: TYNDP – System Needs - Entso-e | Explore the TYNDP (entsoe.eu), EMBER, Grid Development Plan

HIGHLIGHTS

34,000 KM

Approximately 34,000 kilometres of new lines and additional reinforcements of some 30,000 kilometres of existing connections compared to the existing federal requirements plan need to be built.

€85 BN

Estimated investment requirements for power grids in the years after 2030 indicate that current spending will need to be stepped up to an average of €85 billion per year.

200 GW

The EU27 plans to increase power grid interconnection capacity by 2.8 times to 200 GW by 2050.

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