

# Performance in 2020

We describe our performance in 2020 in the following six chapters, each describing one of the six outputs/outcomes as mentioned in our value creation model.

## Deliver a high security of supply

TenneT has a crucial role to fulfil for society. We are entrusted with transporting electricity and ensuring a secure and reliable supply of electricity 24 hours a day, 7 days a week and 365 days a year. This is what energises and connects everyone who works at TenneT.

Securing a reliable supply of electricity every day, around the clock, is not an easy task. TenneT operates the grid in the Netherlands and a large part of Germany and as a European TSO, we are also connected with other grids in Europe via 15 cross-border interconnections. These play an important role in strengthening the security of supply in Germany and the Netherlands.

With knowledge and experience built over the last decades, we are dedicated to the secure supply of electricity at present and far into the future.

The challenges of doing so are growing. There is an increasing appetite for and dependence on electricity and we operate in a more dynamic and volatile energy landscape, with a higher proportion of renewable energy sources coming into the grid. TenneT is ready to find solutions to these challenges, through the strength of our employees and partnerships with others.

### Our performance in 2020

<b>Onshore grid availability</b> 2019: 99.9998% 2018: 99.9988%	Performance	Target	Status	Trend
	<b>99.9999%</b>	99.9996%		Our onshore grid availability was one of our best performances in the past decade.
<b>Offshore grid availability</b> 2019: 93,2% 2018: 94,5%	Performance	Target	Status	Trend
	<b>94.03%</b>	93.97%		Our offshore grid availability was above target.

### Securing supply today

We operate our grid from four control centres, two in Germany and two in the Netherlands. From these locations, we can operate the grid, monitor the stability and performance of the network and internationally coordinate beyond our borders. As a European TSO we have a shared responsibility to ensure a stable electricity supply throughout the continent.

Operating the grid to ensure a secure supply means constantly maintaining the balance between real-time supply and demand of electricity. In order to do this, we must plan days, weeks and months ahead to make sure that supply and demand are aligned. TenneT's teams plan and manage this balance on a daily basis, tackling challenges as they arise.

One of these is the rising amount of renewable energy sources (RES) being connected to the grid. In 2020, these increased by 3% compared to 2019. Overall, RES in-flow into our grid has increased by 40% compared to 2015.

The infeed of renewable energy can be volatile. If more or less electricity than expected is provided, this can create additional challenges for our system operations teams and the market participants, such as generators, Balance Responsible Parties (BRP) and customers. This occurred for example in June 2020, when we saw a steep increase of the RES in-feed into our grid and the grid of the DSOs. This required us to disconnect wind and solar farms to avoid overloading our 150 kV network in the Netherlands. To reduce the risk of this happening again, we are improving our weather forecasting tools to make our RES predictions more accurate.

Another example occurred on September 15<sup>th</sup> 2020, when we faced a new challenge in a large part of the Western European grid. In the early evening, there were very high electricity wholesale and imbalance prices, caused by high demand during high temperatures. This situation was combined with a shortage of electricity production. Low production was caused by very low wind infeed together with a fast decrease of solar infeed caused by the sunset. Conventional, gas and coal-fired electricity production could not meet the required steep ramping up rates.

Thanks to the ongoing efforts of our teams, we maintained our high security of supply in 2020, with an onshore grid availability of 99.9999%. This is among the highest reliability levels in the world.

Although we are proud of this achievement, it does unfortunately mean there were still occasions when we experienced interruptions in our supply of electricity. One such instance occurred in March 2020, in our Eindhoven-West substation. Although the outage lasted only a few minutes it impacted almost 50,000 households.

Maintaining security of supply also depends on our ability to expand and modernise our grid and to keep it in the best possible condition. To perform essential maintenance work on our infrastructure, planned outages are necessary for our people to work safely. As our project portfolio grows, we need to be able to execute these planned interventions and outages more frequently. We also coordinate planned outages internationally, to ensure cross-border connections remain open at all times.

We report our onshore and offshore grid availability separately, since they are technically different. Our offshore connections have less built-in redundancy than our onshore grid. We reported an offshore grid availability of 94.03%, which was on target (93.97%) and higher than last year. Although we are pleased to have achieved this, we also regret instances where defects appear. An example of this is the COBRACable interconnection between Denmark and the Netherlands. In September 2020, a defect related to the sea cable was discovered. As a result, it was cut at a depth of 40 metres on the seabed and lifted up to find the exact fault locations and to replace them. Following this work, the COBRACable was operational again at the beginning of 2021.

### Securing supply tomorrow

As well as securing supply for consumers in our service areas in 2020, we are also focused on fulfilling our responsibility in the future.

An important requirement to achieve this in a fast-changing energy landscape is finding new sources of flexibility to balance demand and supply and manage grid congestion. Until now, flexibility has been mainly sourced from fossil fuelled power plants, which increases and decreases production depending on the power system's needs. However, as the share of renewables in our electricity mix is expected to continuously grow in the next decades fossil power plants will be less and less available for system and grid balancing. Hence, maintaining today's high level of security of supply requires the early development of alternative flexibility sources.

We are working on new solutions to create more flexibility and in 2020. We are becoming more dynamic and innovative in the way we access flexibility in the markets, using daily automated trading to tap into available power in the fastest and most efficient way.

As well as making more efficient use of the markets to meet our flexibility requirements, we also pursue technological innovations. An example is the launch of our Equigy project in April 2020. TenneT, Swissgrid (the Swiss TSO) and Terna (the Italian TSO) formed a consortium to develop a standardised European electricity crowd balancing platform. Supported by blockchain technology, the platform allows TSOs to build flexible balancing reserve by tapping into the power stored in decentralised devices, such as electric vehicle batteries and heat pumps. By allowing TSOs to access the electricity stored in devices like these, consumers can take part in the energy system and be compensated accordingly. In December, the four founding TSOs established Equigy as a company.

Another important development to futureproof our systems is our Control Room of the Future programme. This initiative includes the update of our current operational system, which is used by our controllers to execute all our transport and system services. More information on this and other projects can be found in [‘Solve societal challenges with stakeholders and through partnerships’](#).

### Facilitating the market

TenneT believes that an integrated European electricity market best serves the people and businesses in our area. It also allows neighbouring countries to work together for a more secure and stable supply of electricity. Therefore we work hard to connect our grid to the countries around us and continue to expand and improve our interconnection network. An example of this is our NordLink project.

This direct current interconnector links German wind power to Norwegian hydro power. This project has transported its first megawatts of renewable energy in final trials. Completion is scheduled for early 2021.

## Societal impact due the availability of our grid

Transporting electricity to large industries and via DSOs to millions of households literally powers and empowers society. This is our main task and also our main societal impact as a company. Designing, building, maintaining and operating a grid that is available all the time is the most important impact TenneT can have for society. To ensure that the people living in the areas we serve are able to live their lives and organisations can do their work. Achieving this impact requires each part of the energy supply chain to work together, therefore this achievement is not just the result of merely our role, but this is an estimated societal impact we make together with others in the supply chain, such as electricity generation companies and distribution system operators. Nevertheless, having an electricity grid that was available to supply electricity to its customers for 99.9999% of the time onshore creates value. To investigate how much value this creates, we used academic research as a basis.

The supply of electricity has a certain value, which we used in our assessment. This year, we decided to start with the estimated societal value as a result of the availability of the Dutch part of our grid, as the research is related to the Dutch situation. This assessment shows that the estimated societal value created by the availability of our grid surpasses the gross domestic product (GDP) of the Netherlands, which was over EUR 800 billion in 2019. This is because the supply of electricity does not only create economic value, but also broader and more intangible estimated societal impacts, such as being able to enjoy leisure time. For more information on this assessment and our methodology, please refer to the Additional CSR document on our website. We will continue to further develop this and other societal impact indicators in the next years and invite other to help us with this.

## Cyber security

Delivering a high security of supply is only possible when we have taken all steps to ensure the integrity and stability of our grid. This requires us to consider all risk scenarios, including potential security threats ranging from copper theft to terror or cyber-attacks. We treat the possibility of a severe outage resulting from security incidents and attacks with the utmost severity. A successful attack cannot be ruled out entirely, despite us having physical and digital prevention measures in place that are continuously assessed, optimised and tested. To this end, we develop, align and carry out contingency plans together with national authorities.

## What could prevent us from realising our goals?

In 2020 the COVID-19 pandemic was the main challenge to ensure a secure supply of power. It is likely to continue presenting challenges in 2021. In the first half of 2020, TenneT was able to prove its level of preparedness. However, the continuing public health measures and ongoing uncertainty about duration may lead to a critical increase of the sickness rate (physical and mental) within companies in the power supply chain.

Aside from COVID-19, the further increase in the infeed of renewables continues to present challenges for how we operate our grid in its current form. Essential investments are required to ensure our grid is future-proof and can facilitate the energy transition. We continue to develop new and innovative ways to improve our way of working to secure supply of electricity today and tomorrow. TenneT has defined and started multiple strategic initiatives to ensure the preparedness of the grid. Uncertainty remains on potential political decisions, on a national and/or European level concerning the phase out of conventional energy production and the future expansion of renewables. These changes may influence (re-)investment decisions of power producers, resulting in a shortage of electricity production and thereby reducing the options for TSOs in the connected European grid in the short term. However, in the long term, this should help the evolution of a green grid.

New technology plays a crucial role in mitigating risks related to security of supply. In particular, TenneT sees opportunities in the field of digitalisation and resulting possibilities in automation, robotics, prognosis and block-chain technologies to improve the utilisation of the grid, without increasing operational risk. In this regard, we are exploring the potential of big data to improve our capacity to predict the weather and assess levels of consumer demand. Sophisticated data analytics can also help us

determine the condition of our assets and reduce demand on the grid at peak times by connecting decentralised batteries.

Technological innovation plays an important role in achieving the ambitions of the energy transition. Although there are many innovations in the energy sector, there are currently no decisive breakthroughs that will simultaneously guarantee security of supply, affordability for society and competitiveness of industry prices. It is not yet clear which technology developments hold the most promise.

We assume it will most likely be a mix of digitalisation, big data, market and price models, sector coupling, new types of cables, lines and other assets to transmit energy. As new technologies are introduced, either physical assets or software solutions, there could be an increased risk of outages caused by malfunctioning. TenneT demands high quality standards from its suppliers and service providers. As an additional measure, TenneT builds test procedures, test periods and guarantee periods into its project planning and supplier contracts. As such, TenneT is actively involved in defining standards and developing partnerships with market partners and suppliers.

An example of this is related to an increased demand for underground cabling. As this is rather new technology for extra high-voltage, both AC and DC, we partnered up with others in pilot projects. The level of maturity of these projects is still to be proven, but with this, we are working together with others to find new solutions.

In the longer term, these uncertainties can be added to those surrounding the level of European collaboration to foster cross-border solutions, progress with sector coupling, integrated decarbonisation and the ongoing politics of the green industry.

In addition, cyber and terror risks remain an ongoing risk across our sector. To ensure we can handle cyber-related risks and any repercussions, we continuously work on understanding our cyber risks (and how best to handle them) in collaboration with internal and external allies. We have ISO 27001 certification for information security in place in Germany and underway in the Netherlands. We also carry out penetration tests and crisis management exercises every year.

**Herman Harreman**  
Site Manager DoWin5

Deliver a high security of supply

### Locked down in Dubai

#### TenneT colleague Herman Harreman stays committed to critical project during lockdown

When the COVID-19 pandemic forced parts of society to shut down in 2020, many of TenneT's specialists working in the field went into lockdown on location, so they could continue to work on our critical projects. With no possibility for travel, this meant some of our people spending long periods away from their families in far-away countries.

Herman Harreman, who has travelled extensively for TenneT throughout his 27-year career, is an example. When he said goodbye to his wife in January to work on the construction of our HKZ Alpha and Beta platform in Dubai, he expected to be home again before long. Little did he know he wouldn't see her or his family again until October, as his team went into lockdown in Dubai, with no possibility for overseas travel. "Due to supply more than one million households with clean wind energy per year, HKZ Alpha and Beta is a crucial project for TenneT and society as a whole. The company needed the team to stay to continue working on the project, so it didn't fall behind schedule. I was happy to do this, but it was a challenging time. Our team of about 15 people was effectively confined to solitary lockdown, including three weeks when we could not go out at all in Dubai." Thanks to the team's dedication and commitment, the project was not delayed by COVID-19.

Back home, the TenneT team did everything they could to help Herman and his colleagues in the field. "I stayed in very close daily touch with the COVID-19 crisis team at our head office, which made us feel supported and connected. We also made sure we had regular online gatherings among our team to make sure everyone was doing ok," says Herman, who was officially in charge of safety. "The meaning of safety in a broader sense took on a new meaning for me during this strange time," he adds.

“Safety got a new connotation during this strange time”

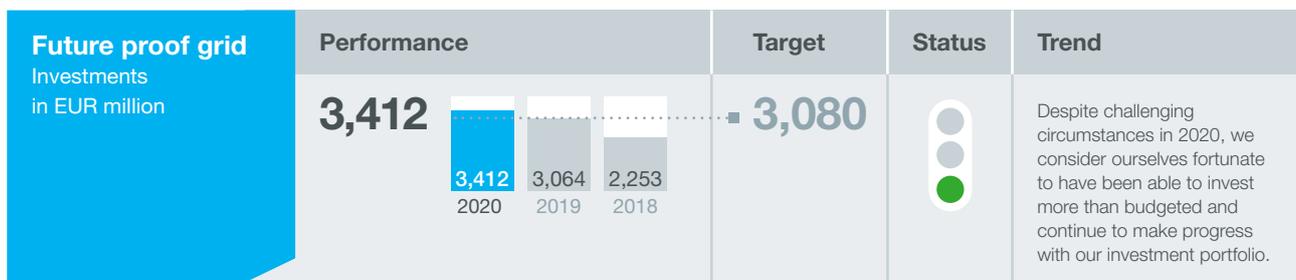
## Ensure critical infrastructure for society

At TenneT, our unwavering task is to provide society with a secure and sustainable supply of electricity, while driving the energy transition and facilitating the European cross-border energy market.

Our extra high-voltage electricity grid forms the backbone of this mission. It transports electricity over long distances, providing power to homes and businesses across our region. With the materials and products we use to build and maintain our grid, such as our cables, stations and interconnectors, we create the critical infrastructure that people and businesses depend on every day.

In the years and decades ahead, the decisions we take to develop the onshore and offshore electricity grid will play a vital role in setting the pace of the energy transition. Connecting more and more renewable energy sources to the grid and safely transporting green electricity over long distances is a technological and engineering challenge, and a mission that we are proud to fulfil.

### Our performance in 2020



Despite the challenges in 2020 caused by the COVID-19 pandemic, we were determined to do our utmost best to keep our investment portfolio on track. We sustained the momentum of our ambitious grid expansion and investment programme, continuing to meet the demands of the energy transition, while maintaining a secure and affordable supply of electricity. With annual planned investments growing to EUR 5-6 billion within the next 5 years, TenneT is heavily investing in the energy transition in Europe, making an important contribution to meet national climate targets and to connect society to a brighter energy future.

We invested EUR 3,412 million in the Dutch and German high-voltage grids in 2020, an 8.9% increase compared to EUR 3,064 million in 2019. We are proud that 2020 was a record year of investment for TenneT, achieved under challenging circumstances.

Despite the global pandemic, we worked hard to meet the milestones of our grid expansion plan, with some projects even completed ahead of schedule.

The way that our people lived up to our principles to achieve this, particularly our teams in the field, was inspiring. Our ability to stay on schedule, as much as possible, was also helped by bringing in flexible labour from abroad and by sharing and moving essential supplies – such as steel for overhead lines – between projects. With this level of logistical agility, our principles of ownership, courage and connection were truly demonstrated by everyone involved.

Of course, COVID-19 caused challenges and setbacks. Closures and lockdowns in some of the overseas shipyards where we construct our offshore platforms put the timescale of several offshore projects under pressure, but fortunately these did not cause any critical delays in 2020. In many cases, our teams locked down on-site – staying away from their families for weeks in order to keep our work on track. Strengthened by this determination in the face of adversity, we were able to complete and commission several key projects on budget and on time and we also began work on milestone projects for the future.

During 2020 we submitted our onshore and offshore investment plans to our regulator in the Netherlands, the Authority for Consumers and Markets (ACM), which is a

bi-annual requirement. These plans contain the measures and investments needed over the next years to keep the quality and transmission capacity of the electricity network in the Netherlands at the desired level.

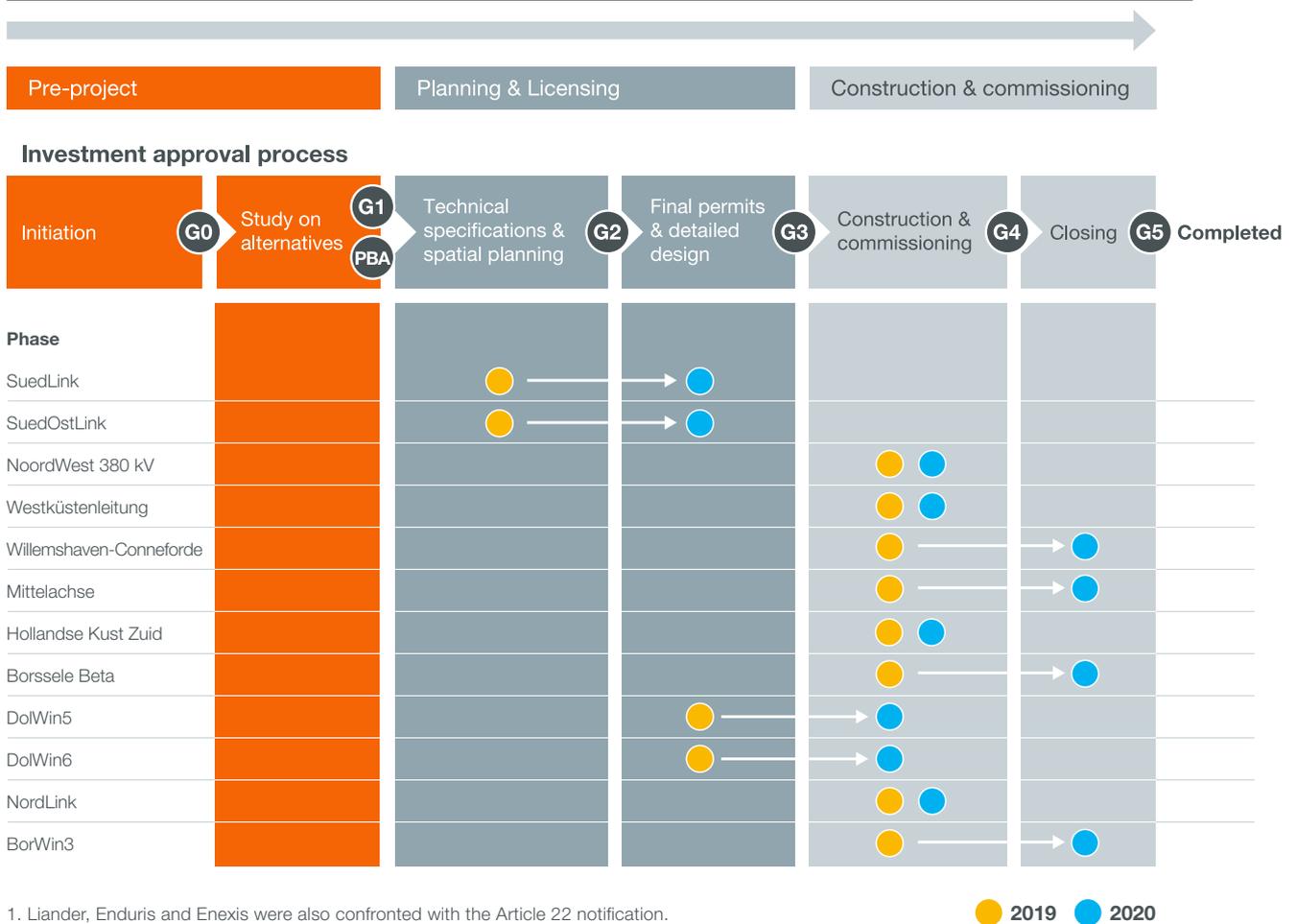
The ACM approved the investment plan therewith confirming the need and necessity of these investments. ACM however also concluded that TenneT cannot solve its capacity bottle necks in due time. Consequently ACM reported in accordance with Article 22 of the Electricity Act to the Minister of Economic Affairs and Climate (EAC) that TenneT is not capable of timely realising its capacity investments. In its communication ACM explained the underlying causes and stressed the importance of all parties working together to facilitate TenneT (and the other grid

companies<sup>1</sup>) to realise the investments on time. Further details about our investment projects can be found on our [corporate](#) website.

**Our progress with respect to our offshore investment portfolio**

In 2020, governments at several levels set increasingly ambitious climate targets. The European Commission raised the bar by introducing a new target to reduce its carbon footprint by 55% in 2030, replacing its original 40% target. Furthermore, the European Commission also published its offshore wind strategy as part of the European Green Deal, with an ambition to create offshore wind capacity of 60 GW by 2030 and 300 GW by 2050.

**Our progress with respect to key projects related to our investment portfolio**



Our investment process can be divided into three phases. The Initiation phase starts with identifying capacity constraints. At this stage, it is decided to either accept the capacity constraint or to solve it with infrastructure. If the decision is the latter, the next phase is initiated. In the Planning & Licensing phase other elements are considered, such as the spatial planning of the project. When a final investment decision has been made, permits are requested and final design details are formalised. A project is tendered to award a contract for the Construction and Commissioning phase of the project. When the project is administratively closed, it is formally completed.

National governments are also setting increasingly ambitious targets for harnessing North Sea wind power and we continue to push ahead with our investment programme to help meet these goals. The German government has set a target to connect 6.5 gigawatts (GW) of wind energy to the grid by 2020 and 20 GW by 2030. This corresponds to the energy output of about 20 large power plants. TenneT has already exceeded the 2020 target, as our offshore connection systems provide more than 7 GW of offshore wind energy to the onshore grid. By 2030, TenneT expects to have seven more of these grid connections completed in the North Sea, which will lead to a total of more than 17 GW generation capacity.

The Dutch government is also targeting further expansion of offshore wind energy in the North Sea. In its Offshore Wind Energy Roadmap, the government states that 10.6 GW of offshore wind farms are expected to be built and connected to the onshore grid by 2030. This would provide an amount of electricity equivalent to 40% of the current electricity consumption of the Netherlands.

In order to be able to connect more powerful offshore wind farms and thus bring more energy onshore, TenneT pooled and further developed in 2020 the best practices from the

German 900 MW HVDC and Dutch 700 MW AC grid connection systems. The result is a new approach of connecting future grid connections with a transmission capacity of 2 Gigawatt (GW) by using 525 Kilovolt (kV) HVDC systems. This new 2GW standard aims to further reduce the costs of offshore wind to minimise the spatial and environmental impact and supports the vision towards larger offshore wind farms and a North Sea wide Hub-and-Spoke system, combining wind power connection, coupling of energy markets through interconnection and smart integration into the main onshore grids.

TenneT has committed to deliver at least five 525 kV high-voltage direct current offshore connections, between 2028 and 2030. We are creating a standardised way of working for these projects which allows us to realise these projects faster and at lower cost.

#### Offshore achievements in 2020

- At the beginning of 2020, the 12<sup>th</sup> offshore grid connection in Germany was completed with BorWin3. This brings the total connection capacity in the German North Sea to over 7 GW. We are rapidly moving to the next stages of our offshore developments.

## Partnerships for North Sea offshore wind connection

For many years, TenneT has worked with partners to find solutions, including how we can harness the full potential of offshore wind. An important example of this is the North Sea Wind Power Hub (NSWPH) consortium – consisting of TenneT, Energinet and Gasunie. This started in 2016 to explore how to connect and integrate, securely and affordably, several hundreds of GW of offshore wind in the North West European energy system. In the summer of 2019, the consortium presented its findings in a series of concept papers. It concluded that a modular hub-and-spoke concept was technologically and economically the most advantageous. This would consist of a sequence of 10-16 GW hubs connecting offshore wind to (and providing interconnection between) multiple countries, combined with onshore or offshore power-to-gas. In October 2020, the NSWPH was awarded funding by the Connecting Europe facility

(CEF) for a maximum of EUR 14 million to develop this project further. With this support, the NSWPH will further explore the options for a first international hub and spoke project in the early 2030s. This will be undertaken through detailed technical and energy system related studies and extensive interaction with stakeholders. In December, the Dutch and Danish government signed an agreement of intent enabling TenneT, Gasunie and Energinet to carry out further research into a joint energy hub in the North Sea.

In 2020, TenneT also joined forces with National Grid, the British TSO. Together we announced a cooperation agreement to explore the feasibility of connecting Dutch and British wind farms to the energy systems of both countries via subsea interconnectors. The development would be the first of its kind for the UK and the Netherlands in the North Sea.

- In February, TenneT announced that two 2 GW offshore grid connections will be built in the IJmuiden Ver wind energy area, alongside the eight 0.7 Gigawatts (GW) AC grid connections already planned. Grid connections like this will be important to help the Netherlands achieve its target for 40% of all its electricity to come from offshore wind farms by 2030.
- In July, TenneT received the 'Grid Readiness' certification for Borssele Beta – a new high-voltage connection for the offshore wind farms Borssele III, IV and V off the southern coast of the Netherlands. It has a total capacity of 700 MW, equivalent to the electricity consumption of around 1 million homes. This essential project for the energy transition was completed one month earlier than planned, within budget.
- In August 2020, TenneT awarded contracts for converter stations and cables for the longest offshore DC connection to date – the 230 km connection for BorWin5 in Germany, with a transmission capacity of 900 MW.
- NordLink, the first direct connection between the German and Norwegian high-voltage grids, reached a milestone in September as it transported the first amount of renewable energy in final trials.

#### Our progress with respect to our onshore investment portfolio

- Important progress was made with the strategically important 700 km, EUR 10 billion, SuedLink project. This is the largest infrastructure project for the energy transition in Germany, connecting wind-generated electricity from Germany's north coast to energy-intensive industry in the south of the country. The commissioning of the cables for the link will take place in 2026 at the earliest. TenneT and fellow German TSO TransnetBW have opted to use plastic-insulated underground DC cables with a voltage level of 525 kV. As these can transmit more electricity, only half as many cables are required compared to a conventional 320 kV solution. Lower transmission losses and less civil engineering work mean the SuedLink cables will have a lower impact on the environment.
- A milestone was also reached in the SuedOstLink, a 580 km connection from near Magdeburg to near Munich in Germany. This is another important connection in the energy transition and a joint project together with another fellow German TSO, 50Hertz. The project managed to finish the spatial planning (Bundesfachplanung) as the first DC onshore Project. The permitting phase (Planfeststellung) has now begun and corridors are being worked out for the routing. In addition, contracts for the cable production and laying were awarded in Q2 and negotiations for the converter are progressing well.

SuedOstLink will thus establish another backbone for grid stability and transition capacity along the north-south axis of Germany.

- TenneT and Danish Energinet completed the expansion of one of the two existing interconnectors to improve market integration between Denmark and Germany. The project increases the cross-zonal connection between Western Denmark and Northern Germany to a maximum net transfer capacity of minimum 2,500 MW.
- In October TenneT brought the Wilster-West substation, in Schleswig-Holstein, northern Germany, into service. This is a central hub for the transport of electricity from the north to the south of Germany. In the future three new extra high-voltage lines from TenneT will converge here: West Coast Line, NordLink and SuedLink.
- Also in October, another important network expansion project for the energy transition went into operation – a new 380 kV line between Wilhelmshaven and Conneforde. The short 30 km line connects wind power from the coast into the onshore grid. This is also the first AC line in the German grid with two underground cabling sections in the 380 kV three-phase network.
- In the Northern Netherlands, TenneT is constructing a new 380 kV line between Eemshaven and Vierverlaten – Noord-West 380 kV. Civil works started in 2020 and the first pylons were erected at the end of the year. Furthermore, civil works started for the Zuid-West 380 kV West project, – a new 380 kV line to be constructed in the South West of the Netherlands.

#### Maintain the grid to meet reliability targets

Adequate maintenance is essential to operate our grid to its maximum capacity. We regularly assess if our assets are in the appropriate condition and perform maintenance, repairs and other activities until operational end of life is reached. The advanced application of data analytics increases our ability to predict failures and thereby the effectiveness of our maintenance strategies. We are harmonising and integrating our maintenance strategies across different geographies and asset classes to make use of these developments. Risk-based maintenance approaches, based on FMECA studies, aim to optimise overall risk and maintenance workload. Our maintenance strategy also focuses on maximising the efficiency of replacing end-of-life equipment at our ageing estate of substations. That is, our approach aims to keep our assets in the best operational conditions without needing significant down-time.

In the operations, two main trends are influencing maintenance activities: our aging network and inflow of renewables. Aging existing infrastructure leads to a large volume of replacement projects and increased maintenance

## Sustainable supply chain practices

Our contractors and suppliers are important partners to realise our investment portfolio. We require them to adhere to our supplier code of conduct, particularly regarding sustainable practices. These are not only related to environmental impact, but also to moral, ethical and safe working standards. These standards are based on the principles of the UN Global Compact, which TenneT committed to in 2015. The labour principles are championed by the International Labour Organisation ILO. We are committed to the OECD (Organisation for Economic Cooperation and Development) guidelines, as are the Dutch and the German governments. For more information on this, please refer to the 'Additional CSR Data' document on our website.

As we rely on our suppliers to provide essential components and materials for our work, such as pylons and power lines, we want to ensure that none of them are involved, directly or indirectly, in conduct that does not meet our policies and quality standards. This can relate to product specification, environmental performance or human rights.

Our policy is to visit suppliers, ask them detailed questions on these issues and discuss with them how to make improvements where necessary. In 2020, we performed 24 supplier visits. It is our policy to not accept suppliers who fail to meet our standards. In 2020, 23 suppliers met our standards, or were given the opportunity to after taking corrective actions and 1 supplier was not approved.

In 2020, we joined six other international TSOs in a call for action to further integrate sustainability into procurement practices. TenneT sent a statement to over 2,000 companies we work with calling on them to work with us in making more sustainable choices. We are enhancing the way we manage human rights within our supply chain, by defining new metrics, monitoring and steering mechanisms. A scan performed in 2019 showed that our human rights risks are predominantly related to our supply chain as we buy our parts on the global market. The most salient issues identified were fair business practices, human rights, ethics and labour rights.

demands. At the same time, a substantial inflow of renewables is followed by a large increase in grid reinforcement and expansion projects, as well as new customer connections. The projects and maintenance activities that result from these demands require outage windows and technical resources. To meet the growing demand for resources, TenneT is not only actively working on increasing capacity of both internal and contractor staff, but also extracting efficiencies in the execution by integrating activities in the stages of planning and scheduling, as well as by introducing innovative methodologies and technology. To be concrete, the following developments can be mentioned: clustering maintenance activities and combining those with project activities, providing execution personnel with a real-time overview of allocated work packages, and introducing programs that not only allow TenneT to hire skilled personnel, build additional competences, but also to retain them in the long run. Furthermore, a roll-out of a new corporate ERP system, introduction of new mobile solutions in the field, use of

sensors and real-time data replacing physical inspections, as well as optimisation of digitalization (such as by use of Building Information Modelling) are to boost efficiency and yields from the existing data.

### What could prevent us from realising our goals?

Society and governments expect a swift transition towards renewable energy. To ensure secure supply today and tomorrow the execution of a large investment portfolio is essential. This portfolio consists of investments in new assets as well as replacing, repairing and maintaining existing assets. This presents a high workload for TenneT and our entire supply chain. We face scarcities in markets for materials, resources, services and other supplies. This situation is exacerbated by demands from other TSOs, DSOs and other infrastructural companies worldwide as well as by the lack of skilled staff available to us and our suppliers in the labour market. This may lead to increases in prices as well as delays in the realisation of our investment portfolio.

To cope with this, TenneT has updated its supply chain management and focuses among other things on new sourcing models. These include long-term partnerships accompanied by improved demand planning and standardisation, revising harmonised contract models and tender procedures. We also actively support the development of new technology, production facilities and the sourcing of alternative suppliers and service providers. Furthermore, we employ external project management service providers to staff construction projects in the onshore grid. To counterbalance a lack of internal resources, we pro-actively perform analyses to ensure adequate succession planning.

Ageing infrastructural assets are a challenge in realising our investment portfolio. We continuously work to optimise our organisational processes, including lean decision-making, an emphasis on employee training, and the use of probabilistic schedule analyses. We have made additional resources available for maintenance work and are increasing the efficiency and flexibility of our maintenance programme by monitoring and simplifying internal processes. We consider bottlenecks in outage planning in addition to an increasing duration of unplanned outages still to be a risk.

In a highly dynamic market, there is a certain risk associated with the emergence of new players who may overstretch themselves, fail or go out of business. This may also increase a risk of unreliable supplier support or unavailability of (spare) parts. To mitigate these risks, TenneT assesses the financial stability of suppliers and prescribes the long-term availability of parts and services as one of its contractual pre-conditions.

In addition, our engagement with stakeholders treads a fine line between societal and local interests. What is good for and desired by society is not always welcomed by the local communities affected by our projects. We communicate with a large number of stakeholders, assess different technological options, routing options, interdependencies of work packages between different projects and challenges in the political environment. Delays in licensing (especially mandatory permits issued by authorities) as well as challenges arising from the use of innovative technology (e.g. newly designed 525 kV DC cabling) can also cause delays in project schedules.

TenneT mitigates these risks by identifying possible constraints and the cost of viable solutions in the early stages of the decision-making process, communicating transparently with regional stakeholders, working closely with authorities, enforcing high quality standards and closely monitoring our suppliers and deliverables. We are aware that we will not always meet the requirements from local opposition. The approval process is influenced by the wish to accelerate procedures but at the same time empower local authorities.

Certain environmental developments in Europe pose a challenge to us and may delay projects. These include various European government policies on perfluoroalkylated substances (PFAs) and nitrous oxide. This is embedded in our daily operation.

On the other hand, opportunities in this area, such as digitalisation, could reduce costs and help us achieve a secure energy transition. This may come with some strict requirements, not only regarding data security, but also especially for information management and human resources in terms of designing, developing, maintaining and operating systems. Therefore, TenneT continuously develops its IT capabilities, enhancing its organisation, training employees and reviewing the performance of IT service providers.

Looking ahead, we face possible delays to future projects as the COVID-19 pandemic has made the usual planning and permitting process difficult to sustain. This particularly holds for onshore projects, for which the permitting process relies on face-to-face stakeholder meetings in local communities. For public health safety, we were unable to have these face-to-face meetings due to the measures taken to stop the spread of the COVID-19 virus. Some of these can now continue online, but the knock-on effect from the delay in this pre-construction phase will pose challenges. We managed however to make good progress with online consultations in 2020. We successfully held virtual tender meetings with potential suppliers for our SuedLink, SuedOstLink and BorWin5 projects. This was the first time we have engaged online with suppliers during a tender process and the success of the negotiations showed the possibility for a more efficient way of working in the future, requiring less travel time and expense.



**Yolande Verbeek**  
Managing Director Operations  
Uniper Benelux

Ensure critical infrastructure for society

**Hydrogen: a critical link in the puzzle of the energy transition**

The energy transition is a puzzle with many pieces, players, and dimensions. TenneT aims to play its part to solve this, working closely with various parties. One of these is Uniper, a leading international energy company and front-runner in the development of 'green hydrogen.'

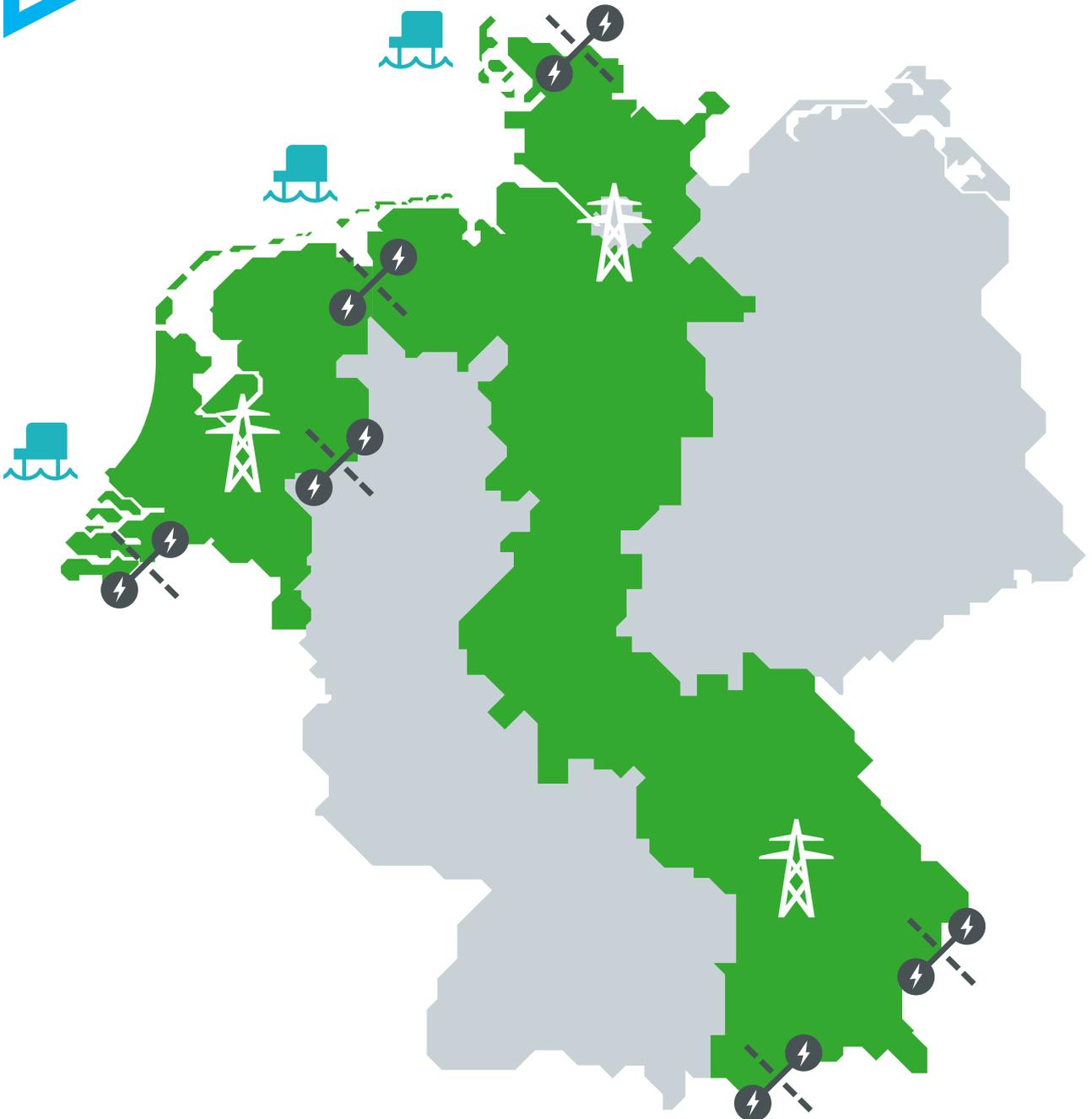
"Green hydrogen is a crucial part of the puzzle in moving towards a carbon neutral energy system," says Uniper's Yolande Verbeek. "However, the necessary hydrogen infrastructure, both up- and downstream, requires thoughtful coordination and an EU-wide level playing field of regulations and support. We need substantial investments in all parts of the hydrogen value chain. At this stage, hydrogen is similar to the early days of wind energy: it needs support to get off to a flying start – but it will be the future and will be competitive sooner than many of us may think," says Verbeek, who adds that the pipe infrastructure for natural gas, such as that owned by Gasunie, the Dutch national gas company, could be used. "We are already working closely together. The challenges can only be solved if we face them together and take initiative."

**“We need substantial investments in all parts of the hydrogen value chain.”**

interconnectors  
**16**  
completed offshore connections  
**14**

substations  
**468**  
KMs of circuit  
**23,866**

**Technical data:**  
pylons  
**over 27,000**



## Create a sustainable workplace

To secure the supply of electricity and drive the energy transition, we rely on the dedication, passion and talent of our most important asset, our people: ‘People are at the heart of TenneT’.

In recent years, we have prepared our people and transformed our organisation so we are ready to meet the challenges society expects from us. We have re-imagined how we harness and nurture the talent of our people, allowing them to perform at their best, with new ways of working and in a safe, inclusive and stimulating environment. Adaptiveness and innovation will be central to fulfilling our role in the green energy future, and our

success will depend on our ability to attract and retain the best talent. We are changing our culture, streamlining our processes, sharpening our talent and performance management processes and building leadership that empowers, inspires and creates opportunities for growth and learning. This is why energising our people and organisation is an integral part of our strategy.

### Our performance in 2020

<b>Safe workforce</b> TRIR (including contractors)	Performance	Target	Status	Trend
	<b>4.05</b>  4.05 2020    4.83 2019    3.74 2018	<b>3.74</b> in 2023		Regrettably, there were two fatal incidents in 2020. This also impacted our overall performance and we did not meet our target this year.
<b>Healthy workforce</b> Absentee rate Netherlands / Germany	Performance	Status	Trend	
	<b>NL 2.7%</b> <b>GE 2.5%</b> 2020 NL 2.7, GE 2.5 2019 NL 3.4, GE 2.8 2018 NL 3.0, GE 3.0		Absentee rate is showing a decrease compared to 2019. However, given the COVID-19 circumstances it is difficult to compare both years.	
<b>Diverse workforce</b> Diversity (% female inflow of total inflow)	Performance	Target	Status	Trend
	<b>33%</b>	<b>30%</b> in 2023		Upward trend in our ability to attract female talent, with a positive effect on the overall population.

### Organise for our people to perform at their best and to work as one company

As of 1 July 2020, TenneT's new organisational structure came into being, together with a sharpened strategy and the first steps towards a renewed culture, guided by a new purpose, promise and principles. At the core of this transformation is a commitment to create a sustainable and rewarding workplace for our 5,722 internal and external employees, empowering our people to perform at their best.

Our new organisational structure aims to enable faster action and decision-making with more personal empowerment, clearer roles, and better cooperation across borders and departments. Our strategy can only be executed if we operate as an integrated European TSO. To achieve this, we introduced a new model for TenneT based on functional steering across borders, with greater empowerment at lower organisational levels. It streamlines our structure into 'One TenneT' with 22 new units led by senior leaders who were appointed into their roles in May 2020. Our senior leadership is a diverse team comprising 50% German and 50% Dutch leaders, of whom 32% are female. Six of these senior leaders are new at TenneT.

Our decision-making processes have been streamlined, with more emphasis on ownership and empowerment. Four new decision-making committees (Future Design, Asset, Integrated Work Planning and Systems & Market) replaced multiple existing committees and structures, making our decision-making more effective and less complex. The new organisation had been designed to create a unified company-wide view, supported by end-to-end processes across the entire value chain.

During 2020, the COVID-19 pandemic presented challenges for the implementation of our TenneT transformation. Not being able to meet in person posed difficulties for teams to grow accustomed to the new structure and ways of working. However, the pandemic also provided an unexpected opportunity to accelerate the process of change, allowing us to embed new routines faster. For example, cross-border teams in the new organisational structure quickly adapted into remote working routines and virtual collaboration. Recognising that this process can be challenging, leaders of the new units – including those who had not previously led remote teams – were trained in the skills of motivating and collaborating with their teams in a virtual setting.

We adapted to help our people perform at their best, such as facilitating working from home by providing everybody with the opportunity to improve their home office. We were also conscious that working from home involves specific challenges for different people, physical and also mental. Making sure our people stay connected with their colleagues and paying attention to work life balance and exercise are all important in the new working reality. To facilitate this, we shifted our mental and physical health and vitality programme, Always Energy, into an online programme and provided webinars and real-time engagement to ensure the wellbeing of our colleagues is fully supported.

To measure how we are succeeding in energising our people and organisation and to create this sustainable workplace, we measure the absentee rate in the Netherlands and in Germany. This has resulted in an absentee rate of 2.7 in the Netherlands (2019: 3.4) and 2.5 in Germany (2.8 in 2019). Although the absentee rate has improved, we consider that this image is a bit distorted due to the unusual year we had in 2020 and the circumstances our employees have been and are still working with. Furthermore, we conducted our employee survey in Q4 of 2020. This resulted in an employee engagement score of 82%. The methodology for this survey was updated compared to the prior employee engagement survey, as some questions were confusing. Using the current methodology, the prior employee engagement score was 85%, thus a 3 percent decrease.

### Future-proof our organisation by recruiting the best talent

One of the most important ways to help our organisation achieve its strategic goals is to recruit the right people. We currently need to hire hundreds of people per year to keep pace with the growth of our business and the demands for our services. In 2020, our workforce grew from 4,913 to 5,722, but we continue to need more talent to achieve our strategic goals. That is why we continue to recruit and also aim to bring out the best in our current workforce with additional training for their current role or to help them develop to new positions. This also helps to retain talent. During 2020 with the Transforming TenneT programme, many colleagues transferred internally into new roles and opportunities which helped in their professional development.

We are not alone in the need for talent, as other TSOs and players in the renewable energy business compete for the best people. The resulting skills shortage makes hiring enough people of the right quality a constant challenge.

However, it is a challenge that makes us think more creatively. The changing nature of our business – with more emphasis on data, for example – means we can hire from a broader pool. Today, mathematicians, economists, digital engineers and data scientists can find a role in our business in ways not previously possible.

The COVID-19 pandemic and resulting shift to virtual working has also opened new possibilities for attracting talent. Being located close to one of our offices is no longer so essential, allowing us to draw on a broader geographic and more diverse talent pool. For example, we are now targeting labour markets in Spain, Romania, Poland and other countries. To extend this work, we are undertaking a new accelerator project in our People Unit to help us reach new talent pools, with an emphasis on building a more attractive employer brand and using new communications techniques to connect with potential candidates.

### **Build leadership that empowers, inspires and creates opportunities for growth and learning**

The next phase of our transformation is about shifting mind-set and behaviour. This will enable our employees to be responsive to and ready for all the opportunities and risks facing us in the fast, changing energy landscape. Central to this is embedding a new leadership model that puts our leaders in the driving seat of our transformation, building a new way of working that is open, curious, courageous and focused on learning and growing.

Training for our leaders in our new organisation began in May 2020, with the launch of the Lead Your Team programme. With a focus on people and change management, this is based on the competencies our leaders and all employees will need to meet the challenges ahead. A mandatory requirement for all leaders of the new TenneT departments, Lead Your Team is designed to be a shared journey, helping to embed our principles of Ownership, Courage and Connection and working together with leaders towards a new culture with new behaviours and ways of working.

The training features a carefully selected programme of online workshops, designed to build leadership skills, drive change, and collaborate effectively across departments and borders. The training not only meets the physical challenges of the COVID-19 pandemic by teaching virtual communication, but also the psychological aspects of people management during the pandemic, building skills for empathy, self-awareness, resilience and psychological safety.

As part of becoming a learning organisation, we have also developed the Grow For It learning journey, for all 5,722 TenneT employees. This immerses our people in our culture and strategy and builds a full understanding of our Purpose, Promise and Principles. To further embed our company strategy within all layers of our organisation, we also organised a Strategy Week within TenneT in November 2020. Workshops were held for each strategic pillar with employees invited to learn and share their thoughts with respect to our renewed strategy.

### **Bring out the best in our people in an inclusive and safe environment where people are proud of coming to work**

#### **Inclusion & Diversity**

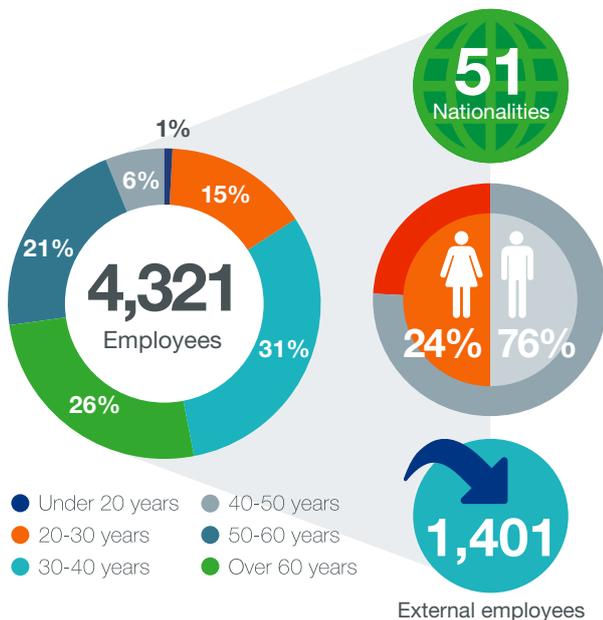
We believe that a diverse working environment – not only in terms of gender, religion, culture and socio-economic background, but also personality, experience and geographic backgrounds – helps us perform better and deliver better value for stakeholders and society. And for diversity to really show its power, it needs inclusion as a key building block. Encouraging diversity while promoting a culture of inclusion will help foster a culture of equal opportunity.

Our aim is to strengthen our focus on inclusion in all phases of the employee journey. This starts with our employer branding, to be an attractive employer for potential colleagues. Next to this we also aim to broaden our recruitment approach and are developing new ways to find the right talent.

As we expand our recruitment to more countries, we aim to monitor closely the diversity of our employees in terms of nationalities. Another new way is to recruit using broader job profiles based on competencies, instead of looking for the perfect match based on education and experience. This approach requires more on-the-job training.

Regarding our ambitions in gender diversity, we have made good progress as we met our 2023 targets for the key performance indicators in this area in 2020. We aimed for 30% female board members in our Executive / Supervisory Board by 2023 and recorded 44% in 2020. Our ambition is also to have 22% of the people hired in management positions and of our workforce in general to be female. We met this target as we recorded 29% of our management positions were female hires and an overall ratio of 24% female employees, which compares favourably to peers in the oil and gas industries and other TSOs.

## Diversity at TenneT



Even though we exceeded our 2023 targets this year, we continue to work on this to ensure that we also reach our ambitions in the years to come.

Furthermore, we feel it's our responsibility to reach out to those who need extra support in the labour market, helping us grow towards a workforce which fairly reflects the European society we serve. An example of this is our partnership with Rising You, where we support employment opportunities for refugee talent at our contractors. Attracting more talent in this way also helps TenneT. For example, our collaboration with Refugee Talent Hub in the Netherlands, led to TenneT providing work opportunities to 7 former refugee talents in 2019 / 2020, with 2 finding permanent employment with TenneT in 2020.

### Safety

For TenneT, safety is a core business value. Every day we are aware of the risks associated with our activities and believe that every safety incident is one too many. TenneT wants every employee to return home safely at the end of each working day. That is why we measure the Total Recordable Incident Frequency Rate (TRIR), which indicates how many incidents (needing medical treatment or even more severe) have occurred per one million hours worked. In 2020, the TRIR was slightly lower than the preceding year, but it is still not at the level we want it to be. We continue working with colleagues and contractors to improve the TRIR and avoid potential accidents.

Four out of every five accidents occur with our contractors, as they perform most of the work in high-risk environments, such as on construction sites, and at sea.

We deeply regret two fatal accidents that occurred during 2020. In May 2020, an employee of one of our contractors suffered fatal injuries after a fall when dismantling a temporary pylon frame. The work was executed on an overhead line between Wilhelmshaven and Conneforde, Germany. In November 2020, an employee of one of our contractors suffered fatal injuries, after he became trapped under a heavy winch which was transported in the vicinity of Ehringshausen. We are deeply hurt by these incidents, and our thoughts go out to the families and friends of these two workers.

To prevent accidents, we strive to constantly enhance our employees' safety awareness and devote ongoing attention to optimising our processes. To this end, our Executive Board signed a new Occupational Health and Safety (OHS) policy in August 2020. The policy includes adopting integrated risk-based approaches to safety, based on a continuous improvement process. Apart from prominent risks, softer OHS elements are included as well, like psychological safety (everybody should feel free to speak up), safety culture (having an open and pro-active safety culture within TenneT and its supply chain), and becoming a learning organisation (by sharing information on incidents and best practices to prevent incidents). To embed this comprehensive approach to safety and to make it part of our TenneT culture, we need strong safety leaders, who take ownership for safety, show courage and are connected. To embed this mind-set and new approach across TenneT, we intend to launch a new multi-year corporate Safety Leadership programme at the start of 2021 for all leaders at TenneT.

At the end of 2020 we determined new priorities with respect to safety, striving for more resilience. Next year we will operationalise this concept into practical approaches for our employees. Another initiative that further develops a strong safety culture in TenneT, was successfully passing the Safety Culture Ladder (SCL) follow-up audit. This means TenneT maintained its SCL level 3 certification in 2020.

Safety also played an important part in the establishment of the new TenneT organisation in July 2020. With new structures, positions and people, we aimed to create a safe start from day one. For all our new leaders, and those leaders with a new position (approximately 70), TenneT's Safety and Security department conducted a safety training to onboard the new leaders about safety processes,



procedures and requirements at TenneT, as well as explaining what is expected from a TenneT leader when it comes to safety.

### **What could prevent us from realising our goals?**

The scarcity of qualified short-term and long-term staff remains a key risk. To address this, we focus on tailored sourcing approaches and aim to build an image of TenneT as an attractive employer, as well as actively working on internal succession planning. We are interacting more with potential employees, actively participating in career events and reaching out to students during their studies. We are investing in our future talent pipeline, including initiatives to attract potential employees such as our International Trainee Programme and our High Voltage Trainee programme.

Our ever-challenging pipeline of investment projects and maintenance tasks inherently results in an increased risk of injuries and even fatalities. This also applies, perhaps to a greater extent, to the work of our suppliers. They might consider and apply safety values that are different to TenneT's. We continue to educate our contractors and subcontractors what safety means at TenneT, build awareness of this and to implement safety as one common goal.

Progress made with TenneT's organisational transformation in 2020 boosted confidence in our ability to deliver our strategy. The new organisation structure within TenneT has now been in force since mid-2020, accompanied by the Grow For It and Lead Your Team learning journeys. This important work will help TenneT's people execute our new strategy. Further organisational improvements are ongoing until 2021 and later, including a new end-to-end process structure and implementation of one ERP-system. Although some efficiency can be lost during organisational changes in the short term, this is currently compensated by the high motivation of our employees and efficiency gains we expect in the longer run due to Transforming TenneT. Nevertheless, we remain alert to risks, for example if expected organisational enhancements take longer to embed or the ongoing COVID-19 pandemic affects the Transforming TenneT process.

## Tim van Zuijlen

Trainee Technical Assistant

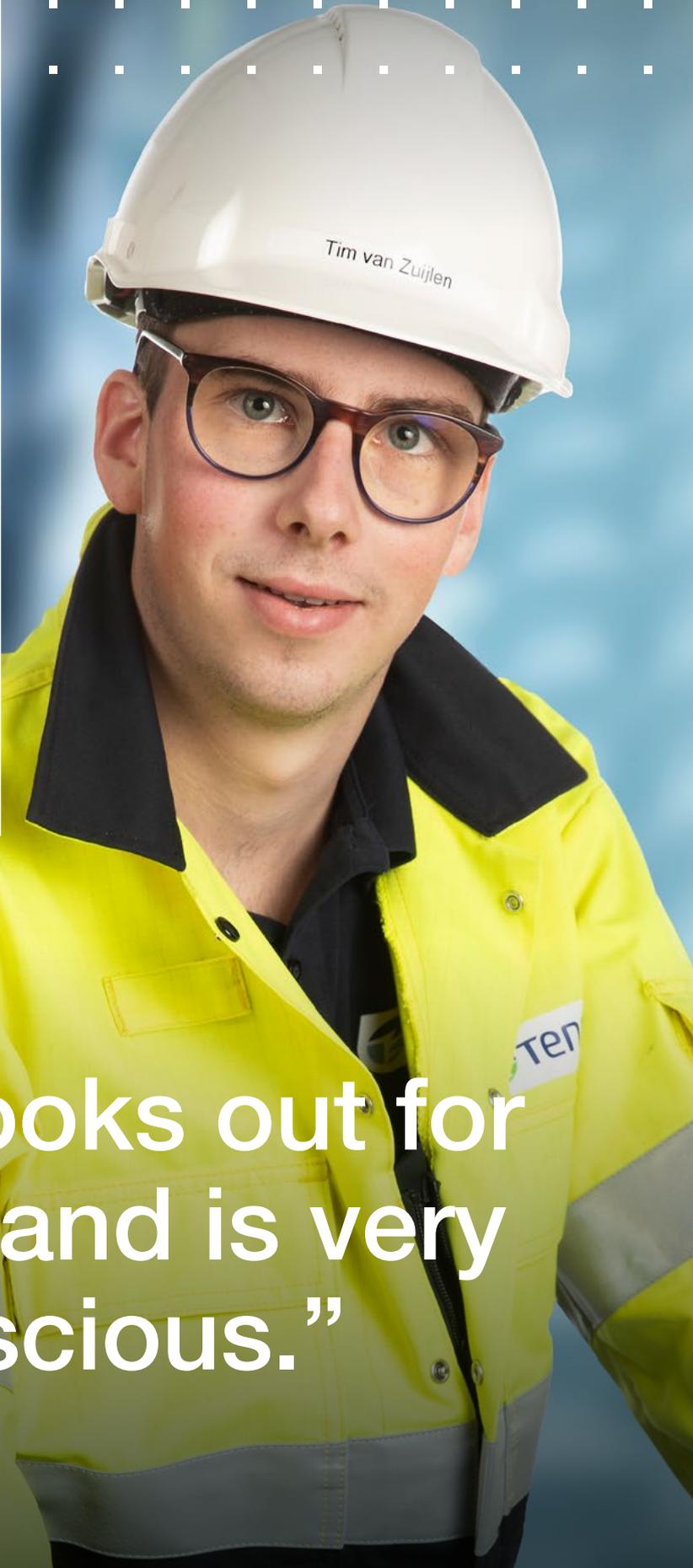
Create a Sustainable workplace

### COVID-19 career-switch: from lighting events to technical maintenance at TenneT

Tim van Zuijlen switched careers in the middle of the COVID-19 pandemic, moving to TenneT from an events agency. “That whole business was knocked out by COVID-19 and will be for the foreseeable future, so I really needed to look around,” says Tim.

At TenneT, Tim can draw on his experience of setting up high lighting rigs for large events and festivals. Now, he is applying these skills as a Trainee Technical Assistant, helping to meet TenneT’s ongoing need for skilled technicians. “I am a technical guy and I love working at heights and with high voltages, which makes TenneT perfect for me.”

In two years’ time, Tim and about ten others – ranging from other career-switchers to recent graduates – will be trained to work on maintenance in the field for TenneT. Given the nature of his work, Tim particularly likes TenneT’s focus on safety and teamwork. “I really appreciate this. Everyone looks out for each other and is very safety-conscious. That’s very important in this business.”



“Everyone looks out for each other and is very safety-conscious.”

## Create value to transition to a low carbon economy

In order to fulfil our ambition to drive the energy transition, we aim to lead as a green and responsible grid operator. This does not only mean providing the renewable energy solutions that enable the transition – it also means reducing our own climate footprint and promoting sustainability throughout our supply chain.

To this end, we measure our progress of our sustainability performance. This relates to our ambition to 'lead as a green grid operator'. This sustainability performance

consists of three main impact areas: Climate, Circularity and Nature. Each area has specific indicators where we track how we are performing and if we are realising our ambitions.

### Our performance in 2020

Climate	Performance	Target	Status	Trend
	CO <sub>2</sub> footprint of our substations, offices and mobility (net emission in tonnes of CO <sub>2</sub> )	Climate neutral in 2025 <sup>1,2</sup>		We have been able to make progress in lowering our net carbon footprint, mainly due to greening more of our grid losses. However, we were unable to fully meet our 2020 climate ambition due to mobility.
Circularity	Performance	Target	Status	Trend
	<ul style="list-style-type: none"> <li>Reduction of virgin copper use</li> <li>Reduction of non-recyclable waste</li> </ul>	25% reduction in 2025 <sup>3,4</sup>		Progress has been made to gain more insights on our virgin copper use and the amount of non-recyclable waste. More information will be disclosed when this is available.
Nature	Performance	Target	Status	Trend
	<ul style="list-style-type: none"> <li>(Net) impact on nature</li> <li>Environmental incidents</li> </ul>	Zero impact on nature in 2020		We regret the environmental incidents and the oil leakages from cables. On the other hand we are proud of the positive biodiversity measures we have taken.

<sup>1</sup> To be climate neutral for our substations, offices and mobility in 2020.

<sup>2</sup> To be fully climate neutral (SF<sub>6</sub> emissions, grid losses, energy use offices, stations and mobility of our employees) in 2025. SF<sub>6</sub> leakage (%) < 0.28% in 2020, SF<sub>6</sub> leakage (kg) < 1,106kg in 2020.

<sup>3</sup> In 2025 25% less impact of virgin copper use.

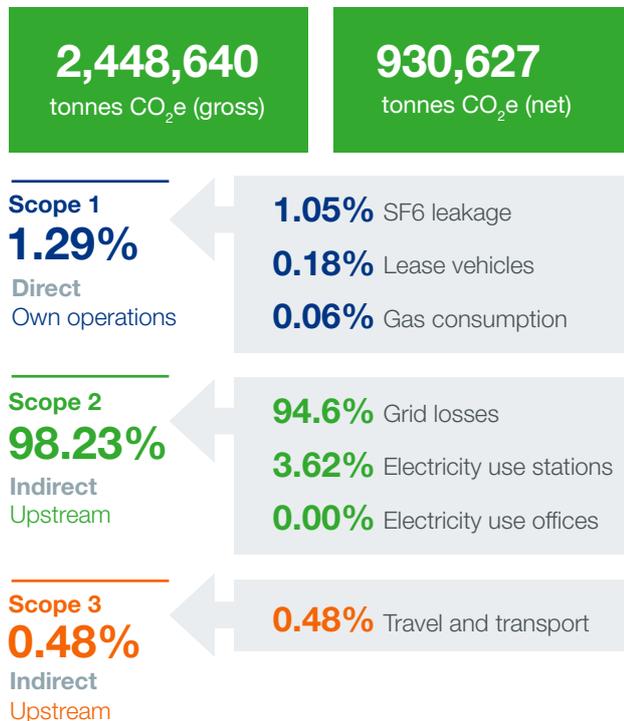
<sup>4</sup> In 2025 25% less impact of non-recyclable waste.

### Climate

In 2020, TenneT formulated its new company purpose: 'To connect everyone with a brighter energy future'. Consequently, we strive to ensure that people living in the areas we serve have access to sustainable electricity through our grid.

That is the reason, we have defined our key impact metric for climate as the equivalent number of households able to switch to 100% renewable electricity, such as wind and solar. Currently, we have started by including our offshore operations and a selection of renewable energy sources

## Carbon footprint



directly connected to our grid. With this, we have been able to provide 9.7 million equivalent households able to switch to 100% renewable energy.

As we connect more and more renewable energy sources (RES) to our grid, we measure our climate impact in terms of avoided emissions. Naturally, these climate figures are not only achieved through our own operations, but also through our partners in the energy sector, such as electricity generation companies and distribution system operators. Working together in 2020, we thus avoided 12.3 million tonnes of CO<sub>2</sub> equivalents. More information (such as the methodology) on these impact metrics is included in our Additional CSR data document.

TenneT also measures climate impact resulting from its own operations. Our biggest climate impact results from our grid losses, accounting for 95% of our carbon footprint. The next largest impact is related to our operations (offices, substations and mobility) and those resulting from the leakage of SF<sub>6</sub> gas. Through a range of initiatives targeting these three areas, TenneT strives to become climate-neutral by 2025.

Overall, we achieved a 10% increase in gross carbon emissions in 2020 (compared to the carbon footprint of 2019 adjusted for the effect of the development in conversion factors) and a decrease of our net carbon

emissions of 40%. This is related to the development in our grid losses, which we describe in more detail below.

### Grid losses

Approximately 95% of TenneT's CO<sub>2</sub> footprint is due to grid losses. Grid losses inevitably occur during power transmission and result from the difference between the energy fed into the grid and the withdrawal. To reduce our net carbon footprint, we will 'green' our electricity consumption with the use of guarantees of origin. Next to the energy use of all our offices and stations, this applies to 100% of the grid losses in the Netherlands and, as of this year, also approximately 47% of the grid losses in Germany. To compensate for the CO<sub>2</sub>-footprint of our German grid losses, we purchase certificates of origin in the relevant amount cancelled in the Netherlands.

Grid losses depend, among other things, on the current, the voltage, but also on the distance electricity is transported. The latter is increasing, as wind and solar electricity are often generated in remote areas, far from where most people consume it. Our grid losses increased to 5,530 GWh in 2020, compared to 5,035 GWh in 2019. As such, there is a tension between grid-losses and the measures we take to drive the energy transition. They inevitably increase as we expand our grid and introduce more RES into the system. An alternative to expanding our grid is to make smarter use of it, but this also presents a paradox. While building less has clear environmental benefits, grid losses will grow if we utilise our existing assets at higher levels.

### Mobility

As for many other companies adapting to the COVID-19 pandemic, the way we work has changed significantly in the past year, with government restrictions requiring employees to work from home. This also resulted in a reduction of our carbon footprint with respect to our mobility and energy use at our offices.

We regard this as a consequence of the COVID-19 situation and not an excuse to stop taking actions to reduce our carbon impact. That is why we have adopted a new action plan to reduce the environmental impact of our mobility, encouraging our employees to travel less and if they do, to use green transportation. We are also greening our company car fleet with electric vehicles. In Germany, we are developing a bike-leasing scheme and, if successful, we will also introduce it in the Netherlands. Promoting sustainable travel is part of a wider commitment via the "Anders Reizen" initiative to halve the CO<sub>2</sub> emissions of all TenneT's business travel by 2030. We are currently exploring how to translate these ambitions into policy.

## Substations

During 2020, we continued to reduce the carbon footprint of our substations with a goal to be climate neutral by 2025. We do this for instance by taking lower climate impact into account in the design when replacing existing substations. An example of how we are addressing this is the project related to our 150 kV station in Etten, the Netherlands. The facility is at the end of its life and needs to be replaced. As we do so, we are taking lower climate impact into account in the design, for example by using solar panels, better isolation and LED lighting. Plans were finalised this year and construction will start in 2021.

## Supply chain

To reduce CO<sub>2</sub> emissions even further, we are taking steps across our supply chain by motivating contractors to reduce their footprint. For example, during the year we started testing a new certification process, requiring suppliers to demonstrate their carbon reduction measures. Furthermore, we integrated an environmental cost indicator (ECI) which allows us to calculate the CO<sub>2</sub> footprint directly into each project's cost evaluation. Having piloted this approach with some of our offshore contractors, we are now extending it further in our operations, for instance in our BorWin6 and 2 GW projects.

## SF<sub>6</sub> gas

Sulfur hexafluoride (SF<sub>6</sub>) is a gas used by TSOs to protect electrical power stations and distribution systems by interrupting electric currents. Although it is a highly effective circuit-breaker, insulator and extinguisher, it is also a powerful greenhouse gas, over 23,000 times more polluting than CO<sub>2</sub>.

Although SF<sub>6</sub> accounts for approximately 1% of our climate footprint, any leakage is damaging to the environment, which is why we continue to find ways to minimise and avoid them across our network. We are also aware of the growing environmental concern about the use of this gas and have accelerated our efforts to explore alternative solutions with pilot projects during 2020.

An example of this is our Westerlee station, where we awarded the tender to a supplier that proposed an alternative gas GIS solution. We motivate our suppliers to accelerate the exploration of alternative technologies. We toughened our approach to SF<sub>6</sub> in our Future of Offshore programme. This provides a roadmap for our offshore projects, setting out clear policies and working practices. As part of this, we are exploring the possibility to exclude SF<sub>6</sub> from bidders' proposals, requiring them to use alternative solutions. We are already using a new approach to work without SF<sub>6</sub> in our BorWin5 project and will use this as a test case for future projects.

This year, we achieved a 0.24% leakage rate, which was comparable to 2019 (0.24%). As we look beyond 2020, we have committed to keep SF<sub>6</sub> leakage below a target of 0.28% until 2025. Knowing that our asset base will increase considerably due to large-scale network expansions, this objective is challenging, but we remain committed to reduce this element of our climate footprint. In the meantime, we are compensating for the carbon emissions from SF<sub>6</sub> leakages, which we have done in full for our 2020 performance in this area.

## Linking finance to our climate performance

To make progress against our climate ambitions even more visible, we have linked our financing costs to our climate performance. Secure access to finance is essential to ensure that we maintain the pace of our investment portfolio. An example of this is our EUR 3.3 billion sustainable Revolving Credit Facility (RCF), which is linked to sustainability performance indicators and targets. In practice this means that, depending on the realisation of our climate-related KPIs, a discount is applied to the interest margin on the RCF. This is related to the green percentage of energy use of our stations (100% in 2020 vs 100% in 2019) and our offices (81% in 2020 vs 84% in 2019). It is also linked to SF<sub>6</sub> (refer to SF<sub>6</sub> section above) and to the net carbon impact of mobility per employee against the total number of employees (2.1 in 2020 vs 3.4 in 2019).

## Circularity

Recycling materials and reducing waste is key to the growth of the circular economy. We share this commitment, with our circularity ambitions focused on minimising our use of scarce materials, re-using materials where possible, and reducing non-recyclable waste in our operations.

We need copper, steel, aluminium and many other raw materials to expand our grid. Although we must work with these materials, we aim to reduce our impact by increasing our focus on circularity. We focus on copper, as it is expected to become scarce in the near future and we have a high dependency on it in our operations.

In 2020, we took our first steps to report our circularity performance. This year will serve as a base year for measuring our progress, with a target to reduce the use of virgin copper and non-recyclable waste by 25% in 2025. Our aim is to reduce, re-use and recycle our waste as much as possible. For example, in our projects we separate sand, soil and concrete from construction sites so they can be recycled. From a circularity perspective, the materials left over at the end of one process can be the input for another. These materials also have a remaining value, so there is an



additional incentive not to dispose of them. Unfortunately, we have not found solutions for all the materials we use, such as synthetic materials used to make temporary roadways on construction sites. We are in contact with our suppliers and look for partnerships to help reduce our non-recyclable waste.

To maximise circularity we need insight in our material usage in projects. Therefore we request material passports in our tenders. This records all raw materials used in a specific product, stating which include recycled and recyclable material. This way, the passport provides transparency of resource mix, and provides a basis to increase the circularity of product components. Working with our contractors, we aim to include a raw material passport system in all our new tenders, giving us a comprehensive view of circularity in our supply chain. For both our non-recyclable waste and our virgin copper use, we have made progress by working together with our suppliers to obtain preliminary insights on the percentage of waste that is non-recyclable and the percentage of virgin copper, which will be included in the projects that have been tendered in 2020. Unfortunately, as not all data is available yet when this report is published, we will disclose this information in our Additional CSR data document, which we will update when the data is available. Based on our current insights from our previous year's waste reporting related to a significant part of our German operation, our estimate is that around 60-75% of the copper we use is virgin copper and around 10-25% of our waste is non-recyclable.

We also pursue innovations in underground cabling, allowing us to increase the sustainability and circularity of the materials used. An example is the innovative plastic-insulated 525 kV underground cables for our SuedLink and SuedOstLink projects. This is the first time these cables have been used worldwide, setting new standards in technology, and reducing environmental pollution. As well as being fully recyclable, the cables can transmit significantly more power than conventional 320 kV cable systems. This means that less cables are needed, allowing the route to be narrower, with less civil engineering work required. This significantly reduces the impact on the environment.

We are also researching the use of these more resource-friendly and higher capacity cabling systems in our offshore projects. This should lead to a standardised cable system that TenneT can use in the BalWin, (German North Sea) and IJmuiden Ver (Dutch North Sea) projects as well as in future projects with the same power and voltage. We have reached agreements with eight cable manufacturers to develop a new standard for a DC submarine 525 kV cable

system instead of the existing technology of 320 kV standard. This new cable system will be required for our 2 GW offshore grid connections in Germany and the Netherlands, which will set a new standard for connecting offshore wind farms (see Critical Infrastructure chapter).

## Nature

Unfortunately, we have an unavoidable impact on nature as we build, maintain and operate our assets in the natural landscape. However, we also aim to create positive impacts, such as promoting biodiversity at our substations and considering our impact on nature early in the process of realising a project. By doing so, we ultimately aim to have a zero net impact on nature.

Regarding our negative impacts on nature, we were unable to meet our goals in 2020 as we aimed for a 17% reduction of our 2019 oil leakages from cables (maximum of 1,529 litres). We reported 57 environmental incidents, which is a bit more than the 50 incidents reported in 2019 and 5,391 litres of oil leaked from cables (1,842 litres in 2019), mainly in the Western Netherlands. These cables are relatively old and are therefore more prone to leakage, with great difficulties to locate and repair leaks in time. Nevertheless, we regret the amount of oil leaked and the negative impact this had on the environment near our assets. We are working on resolving these leakages and finding ways to further improve in this area going forward. On the other hand, we are pleased with the progress we made to create more positive impact on nature. TenneT is involved in a coalition called 'Groene Netten' comprised of companies that operate critical infrastructure in the Netherlands. Together, the coalition members manage over 922 square kilometres of ground and water with an impact on nature. This is related to more than 800.000 kilometres infrastructure. In 2020, Groene Netten has presented the 'ecologische hoofdinfrastuctuur', a digital map which can be used to work together and increase biodiversity in our projects. Amongst other things, this has the potential to bring together data such as biodiversity hotspots, ground water levels and relevant GIS data to help identify opportunities for biodiversity protection.

To achieve our ambitions, we created a nature roadmap, which sets the targets for the coming year and our definition of zero impact on nature. As part of this, we announced in May 2019 a plan to promote biodiversity at all of our 468 high-voltage substations in the Netherlands and Germany, especially as regards to protecting and increasing bird and insect populations.

The plan builds on positive results from a pilot project at three substations in the Netherlands, revealing that nature-friendly



maintenance of these sites, including non-linear “sinus” grass mowing, conserved up to 72% of the insect populations. This way of maintaining the grass around our assets has been shown to have a positive effect on biodiversity. We also extended our biodiversity substation pilots in Germany in 2020, related to the two projects at Irsching and Wurgau. This includes conducting a bio-diversity study at each location and identifying what measures can be taken to protect and promote different species, as well as sinus mowing and planting European flower seeds to attract birds and bees.

We are taking the same bio-diversity approach underneath our powerlines, with so-called “flower lines” of insect and bird-friendly planting. An example is our ‘Honey Highway’ undertaken in early 2020, this is a rich bio-diverse landscape along the 110 kV cable connection between Bolsward and Heerenveen, running for over 30 kilometres. After soil restoration work, flowers were sown on several strips. Many of these biodiversity projects are performed in co-operation with our project partners, such the project consortium (Siemens, Ganesa and Van Oord), Visser Smit Hanab and others.

In our offshore projects, we have a similar approach. For example, we are involved in a research project with a consortium of partners including Wageningen Marine Research and the Naturalis Biodiversity Center Nederland, in which we are studying the effects of electromagnetic fields from subsea power cables on North Sea marine life. For new offshore projects, we aim to have nature-inclusive design built into tender proposals. In 2020 we concluded a tender to build two new 700 MW offshore wind substations in the Dutch North Sea, Hollandse Kust Noord and Hollandse Kust Zuid. These are our first new offshore projects to incorporate nature-inclusive design, which will make them our most sustainable platforms when they become operational. Examples of nature-inclusive design are: fish hotels, artificial reefs, eco-friendly scour protection and ecological cable crossings.

Together with NGOs, such as the North Sea Foundation, we have come up with possible measures to improve biodiversity for marine life near and at our assets. We are currently including this element as part of our tender procedures and this concept will be used in the Hollandse Kust (Noord) offshore project – due to come on stream in 2023.

### What could prevent us from realising our goals?

The decarbonisation of society has an impact on business, regulatory frameworks, financing, and the availability and prices of products and services.

National and European actions to achieve climate goals are becoming more concrete. Examples include the European Green Deal, setting new goals for renewable energy production, the use of (green) hydrogen and the stimulation of green and ethical investments. These factors are increasing the scale and pace of TenneT’s investment portfolio and increasing the relevance of future projects, such as system integration with gas infrastructure.

When considering risks to our ambition as a green and responsible grid operator, we should consider the global economic and political context. These include a potential economic slowdown resulting from anti-pandemic measures, regulatory changes, geopolitical conflicts, financial market turmoil and rapid advances in technology. On a positive note, the new US administration has decided to return to an international consensus on climate targets, but “trade “games”” may continue. A severe economic crisis could impact the current focus on climate change and energy transition. However, it currently seems more likely, that national and European-level investments in infrastructure projects might be used to stabilise the economy. Nevertheless, the affordability of projects could come under increased scrutiny, as could the question to what extent society is willing to accept the cost of the energy transition.

Due to the nature of TenneT’s business, we must consider climate-related risks and opportunities in order to achieve our strategic goals. To this end, we have adopted the recommendations from the Taskforce for Climate-Related Financial Disclosures. We discuss climate-related risks and opportunities in workshops and dialogues with senior leadership and embed these elements into our strategy and risk procedures. An example of this is considering the impact of climate adaptation, including scenarios related to drought, flooding and more extreme weather events, such as in Noordwaard, where flooding submerged part of a pylon (Mast 58) on the 380 kV line between Krimpen aan den IJssel and Geertruidenberg. We designed a new steel base for the mast, coated to withstand water, and raised the pylon by 4 metres – all while maintaining the power supply. This has never been done before in the Netherlands. For more information on how we have assessed our climate related financial disclosures and opportunities, please refer to the Governance and risk management chapter of this report.



**Maria van der Heijden**

Director of MVO Nederland, a foundation setting out a network for entrepreneurs in the new economy

Create value to transition to low carbon economy

**TenneT joins fellow infrastructure operators to work towards a greener future**

With its focus on establishing a new circular economy through collaboration and sharing of best practices, MVO was ideally positioned to set up the so-called “Groene Netten” coalition. This comprises other companies that, like TenneT, operate critical infrastructure in the Netherlands, including railways, cables, tunnels and pipes, stretching over 800 square kilometres of land throughout the Netherlands. The participants, ProRail, Rijkswaterstaat, KPN, Alliander, Enexis, TenneT, Gasunie and Stedin, aim to ensure the management of their infrastructure is climate neutral and circular.

“One of the big successes of Groene Netten can be seen in our biodiversity work. For example, ecologists advise to allow for longer grass around infrastructure, so insects can thrive. We are now applying that approach as much as possible,” says Maria van der Heijden, who also shares her knowledge and best practice more broadly with other interested parties, such as local municipalities. “Everyone works at their own speed, but we are all working towards the same vision. It is very inspiring. TenneT has a good role to play as a public company with ambitious goals for the energy transition.”

“Everyone works at their own speed, but we are all working towards the same vision.”

## Secure a solid financial performance and investor rating

Providing the infrastructure that we need for a secure and reliable supply of electricity – today, and in the future – requires constant vigilance, efficient operations, and sustainable investments. Broad and sustainable access to financing is a prerequisite to implement our strategy and realize our investment portfolio. This requires a strong financial performance, a strong investor rating and a robust and reliable regulatory framework. That is why it is important to us to secure a sound financial future.

Within the next five years, we are committed to invest EUR 5 – 6 billion annually to play our part in the European transition to sustainable energy. It is up to us to ensure that

this is financed with the right mix of equity and debt. In doing so we must always balance affordability against the need for security of supply and sustainability.

### Our performance in 2020

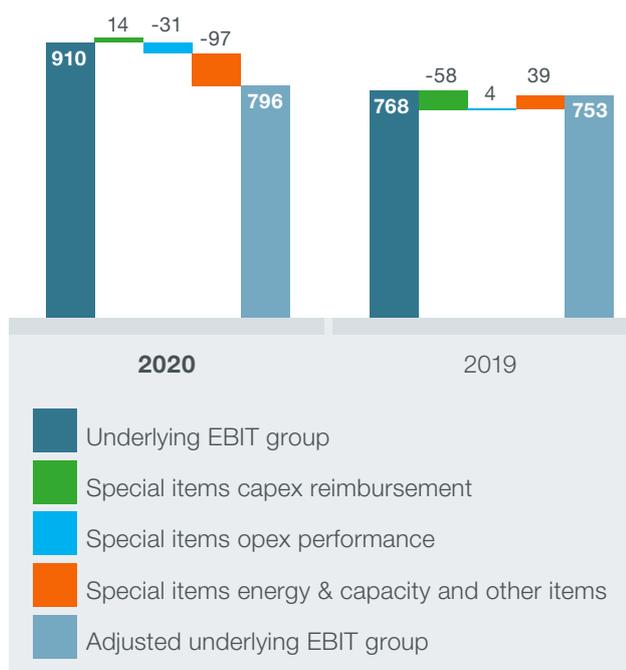
	Performance	Target	Status	Trend
<b>Healthy financial operations</b> Adjusted underlying EBIT group <sup>1)</sup> (EUR million)	<b>796</b>  796 753 826 2020 2019 2018	<b>712</b>		Adjusted underlying EBIT group was higher compared to 2019, due to higher regulatory reimbursement as a result of new investments.
<b>Satisfied capital providers</b> ROIC group (%)	<b>5.1%</b>  5.1 5.1 6.2 2020 2019 2018	<b>4.0%</b>		ROIC was above budget, mainly due to higher EBIT.
<b>Safeguarded capital structure<sup>2)</sup></b> Adjusted FFO/ Net debt group	<b>11.3%</b>  11.3 12.9 14.1	<b>8.5%</b>		FFO to Net Debt has developed according to expectation. The increase of the FFO was offset by a bigger increase in the net debt position.

1. Reference is made to next page.
2. Reference is made to Note 17 of the financial statements.

## Deliver a return on capital in line with the expectations of our capital providers

### Underlying EBIT group\*

EUR million



\* Refer to note 2 of the financial statements.

Special items Capex reimbursement are related to an adjustment of the useful lives of tangible fixed assets. Special items OPEX mainly relate to the higher OPEX offshore reimbursement for previous years in the Netherlands due to the Income Decision by ACM. Special items Energy & Capacity and other items is mainly related to the release of the provision for offshore liabilities.

### Raising the necessary external financing

As our investment portfolio grows, so does our need for additional financing. To attract funds from the capital markets we use a range of instruments, including green debt and equity financing. In mid-2020, we issued green hybrid securities of EUR 1 billion, which were 2.5 times oversubscribed, underlining strong market appetite. In addition we secured a EUR 250 million loan from the European Investment Bank to finance the new Zuid-West 380 kV high-voltage connection between Borssele and Tilburg in the Netherlands. In November, we issued green bonds of EUR 1.35 billion.

Together with the three other German TSOs, TenneT is responsible for the financial management of the 'Renewable Energy Sources Act' (Erneuerbare Energien-Gesetz (EEG)), which has a significant impact on TenneT's cash flow, although it does not affect our financial performance. Based on this law, German end-users pay a levy to finance the green energy transition in Germany. The EEG levy is used to subsidise the EEG feed-in tariffs which are paid to producers of renewable energy who receive a guaranteed price for their produced green electricity exceeding the market price. The EEG levy is determined based on forecasted renewable energy volumes and electricity prices for the subsequent year.

To prevent negative EEG balances and the necessity of additional short-term bridge financing, a liquidity buffer is included in the EEG levy. TenneT raised an additional 12-month liquidity financing of EUR 1.5 billion and uncommitted financing of EUR 0.5 billion in 2020 at very low interest rates, to cover significant unforeseen variations in renewable energy volumes and wholesale electricity prices.

As a result of the Climate Programme 2030 ('Klimaschutzprogramm 2030') the four German TSOs will receive EUR 10.8 billion from the German government to finance the EEG in 2021. TenneT will receive 32% of this amount in three instalments (January 2021: EUR 1,632 million, May 2021: EUR 960 million and October 2021: 864 million) and will use the payments to finance payments made to renewable energy producers.

During 2020, our A- credit rating from Standard & Poors and our A3 rating from Moody's were reaffirmed – which underpins our ability to secure financing for the future. We also saw an improvement in our Environmental, Social and Governance (ESG) evaluations from external rating agencies. For example, Sustainalytics ranked us in the 'low risk' category and among the frontrunners in our sector. Meanwhile, our ISS / Oekom rating remained at level B.

In 2020 a declaration of intent between the Dutch and German governments was signed and published to stress the mutual energy policy interests. The declaration includes arrangements to expand collaboration on energy between the two countries and to explore a possible participation by the German state in TenneT with additional equity capital.

### Maintain a regulatory framework to support our financial strategy

A forthcoming financial challenge could be a possible policy change in Germany concerning redispatch costs. These cover the system operations measures we need to take to manage congestion on our grid. Traditionally, TSOs are compensated for these grid stabilisation measures, but a proposed policy change in Germany calls for this compensation to be capped. We consider this proposed policy change to be suboptimal, since redispatch costs inevitably increase as renewable energy generation is prioritised and more volatile renewable energy is fed into the grid. As a result, redispatch is a temporary and inevitable cost of driving the energy transition. In 2020 grid stability measures, such as redispatch costs, reached EUR 257 million in Germany, compared to EUR 264 million in 2019.

A further financial challenge stems from mid-2019, when TenneT's efficiency scores were updated by CEER's TCB18 European Efficiency Benchmarking. TenneT's efficiency score in the Netherlands dropped significantly. It is expected this will have a significant short-term impact on our revenues. Since the general and specific reports did not provide sufficient insights, a shadow benchmark has been performed, showing large differences between the two benchmarks. How the results of the shadow benchmark will be reflected in the method decisions will become clear in the next months.

The nature of our business and the scale of the energy challenge requires us to think 30 or more years ahead to assess how we need to invest today and tomorrow. Our investments in electricity infrastructure have a long-term character. The technical and regulatory life time of investments can range from 20-50 years. Therefore these investments need to be supported by a regulatory framework with a long-term focus. While regulatory periods are typically only established for a period of 3-5 years the underlying methodologies are providing a stable long-term regulatory framework in both the Netherlands and Germany. This relates to the recognition of investments in the Regulatory Asset Base (RAB), methods used to determine the cost of capital, and the fact that TSOs do not incur a volume risk.

This stability is needed and recognised by investors and serves as a prerequisite for being able to finance the increased level of investments. The stability also has benefits for our customers as it reduces risk and consequently leads to lower tariffs as investments can be financed very efficiently.

### What could prevent us from realising our goals?

In order to fund our investment portfolio and raise the required financing, TenneT needs to secure an appropriate credit rating by attracting sufficient additional equity. As such, we work closely together with the Dutch Ministry of Finance on alternative solutions for equity financing.

Our revenues are predominantly dependent on the regulatory frameworks in the Netherlands and Germany. The growing concern about the increasing cost of energy is putting more pressure on the reimbursement systems. Adverse changes in any of the regulatory systems might impact our financial performance.

The regulatory reimbursement schedules (revenue cap) in both the Netherlands and Germany aim to allow TenneT to recover the efficiently incurred costs including a market based return. The regulatory methods underlying the revenue cap are typically established for a period of 3-5 years. The main risks for TenneT are that market returns are continuously decreasing as a result of the low interest environment on the capital markets and that it is increasingly difficult to accurately forecast efficiently incurred expenses for future periods as the past no longer reflects the future due to the significant developments in the electricity market.

Both developments could lead to significant deviations between the allowed revenue in a given year of the regulatory period and the actual costs needed to run the business. Although this risk is partially mitigated by the fact that TenneT receives additional income on top of the revenue cap for specific investments it remains an area of debate between TenneT, Regulators and Market Parties.

This risk and the resulting regulation is also a very important factor in financing investments as credit rating methodologies assign significant weight on their assessment of the regulatory regime. As such TenneT strives for reasonable regulatory solutions that treat TSOs and customers fairly and thus provide a fair long term solution for both parties. This also supports the credit rating and leads to efficient costs of capital which is also in the interest of our customers.

Investments in green businesses and economies are increasingly favoured by large investors and banks. To date, this has resulted in a relatively high attractiveness to provide debt and equity to TenneT's infrastructure projects. However, this could be diminished by lower regulatory rates of return on capital as determined by the national regulatory authorities.



**Manon Leijten**

Board member of the Dutch Authority for Consumers & Markets (ACM)

Secure a solid financial performance and investor rating

**Contributing to a successful energy transition**

As a society we are faced with the major and complex task of drastically reducing the consumption of fossil fuels to limit CO<sub>2</sub> emissions. TenneT has an important role in this. The ACM wants to play its part in promoting the energy transition and removing obstacles wherever possible. We want to ensure that there is room for sustainable innovation and initiatives within the legal possibilities. Reducing congestion is important in this. The ACM is contributing by, for example, ensuring that network operators have a well-supported investment plan and that they actively implement congestion management. It is of great importance to the ACM that the energy transition is affordable and safe and that customers can count on a reliable energy supply, now as well as in the long term.

With TenneT and other players in the energy market, we are working, each from our own position and role, to promote the public interests of sustainability, affordability, and security of supply. Together, we are contributing to the success of the energy transition.

**“We want to ensure that there is room for sustainable innovation and initiatives within the legal possibilities.”**

## Solve societal challenges with stakeholders and through partnerships

At TenneT, we want to connect everyone with a brighter energy future. To do this, we aim to drive the energy transition, enabling the shift to renewable, fossil-free power. Ambitious climate targets require a social, political, economic and technical evolution, driven by collaboration and collective thought leadership. The challenge is too big for any player to tackle alone.

That is why we use the power of strategic partnerships to drive scalable solutions in fields like flexibility, integration of renewables (offshore wind and solar) and digitalisation. And because the energy transition requires a host of new skills and technologies, we are broadening our partnerships in new sectors, such as data, automotive and green hydrogen, and scaling up from pilots to full projects. This way, we trust to find the solutions we need for a green energy future. We don't only draw on the power of partnerships to meet technological challenges – other forms of collaboration also help us meet our strategic goals to safeguard our financial health and energise our people and organisation.

A representative sample of our collaborative efforts is provided below.

### Our performance in 2020

#### Partnerships to drive the energy transition

Our aspiration is to drive, not just facilitate the energy transition. To do this, we aim to work with other ambitious players to find ways to transition to a low-carbon economy. To this effect, we are working on large-scale offshore wind integration, ways to reduce our environmental footprint and design the energy system of the future.

#### Scaling up offshore wind power: North Sea Wind Power Hub

An accelerated deployment of large-scale offshore wind hubs in the North Sea is expected to play an important role in achieving the Paris climate targets and establishing the North Sea as Europe's renewable energy 'power house' of the future. Our collaboration on the North Sea Wind Power Hub project exemplifies this vision. This partnership consists of Gasunie, Energinet and TenneT (and the Port of Rotterdam as a strategic partner). The project entails the evaluation and development of concepts for an internationally coordinated roll out of 'hub-and-spoke' power hubs in the North Sea. These will connect onshore energy markets with offshore wind power and use smart solutions to integrate wind-powered electricity into the onshore energy grid, including power to gas technology.

#### Building model solutions for the future: SINTEG

TenneT is a partner in the Smart Energy Showcases – Digital Agenda for the Energy Transition (SINTEG). This involves the creation of large-scale showcase regions that can be used to develop and demonstrate model solutions for a secure, efficient, and environmentally compatible energy supply. The programme is focused on building smart networks, linking energy supply and demand, and on innovative grid technology and operating strategies. It addresses key challenges of the energy transition, including the integration of renewables into the system, flexibility, digitisation, system security, energy efficiency and the establishment of smart energy systems and market structures. The project makes an important contribution to the digital transformation of energy supply and the overall energy transition.

#### Solutions for integrating North Sea wind power: NSON II

TenneT, together with project partners Fraunhofer IEE, Leibniz University Hanover and University of Kassel, has been invited by the German Federal Ministry of Economic Affairs and Energy (BMWi) to participate in this research project, which explores the cost efficient and international integrated connection of offshore wind energy in the North Sea. TenneT's main input is in system and grid control and optimised (grid-) planning and operation of offshore systems.

#### Advancing HVDC Offshore Transmission Networks: PROMOTioN Offshore

TenneT is a key player in this leading European research programme that aimed for an offshore grid development plan, which was concluded in the end of 2020. The programme aims to develop meshed HVDC offshore grids, based on cost-effective and reliable technological innovation in combination with a sound political, financial and legal regulatory framework.

#### Finding cleaner alternatives for SF<sub>6</sub> gas

As we want to minimise the emission of greenhouse gases from our operations, we are implementing pilot projects to

investigate alternatives to this highly-pollutive SF<sub>6</sub> as an isolating and switching gas in our technical installations. This includes collaborations with Siemens and GE with whom we are testing the use of different gas mixtures in the field, such as Fluornitrile and Fluoroketone and natural gases. Work in this area was further boosted this year with an order placed for a 145 kV Gas Insulated Switchgear for BorWin5, replacing SF<sub>6</sub> with an alternative gas.

### Harnessing the power of hydrogen: Element Eins

TenneT is working with Gasunie and Thyssengas to develop solutions using the gas network to distribute and store electrolysed hydrogen as a flexible energy source. The partners are working on a pilot project called Element Eins. This involves the construction of a power-to-gas installation with a capacity of 100 MW in Lower Saxony, Germany, which is expected to come into operation gradually from 2022 onwards. By bringing electricity and gas together in this way, we can create an integrated energy system, capable of serving our needs in a green energy future. The German federal government has selected the project as one of 20 'living laboratories of the energy transition' for a government grant, reflecting its strategic importance.

### MVO Nederland and Groene Netten

TenneT is a member of MVO Nederland, a Dutch network of entrepreneurial businesses aiming to build a climate-neutral, inclusive and circular economy with fair supply chains. We are also part of a coalition called the Groene Netten, which is supported by MVO Nederland. Here we are working with companies that manage other critical infrastructure in the Netherlands, such as roads, rail, telecom, gas and electricity infrastructure. We work together on themes such as circularity and biodiversity. For more information on this, please refer to the chapter 'Create value to transition to a low carbon economy.'

### Unlocking flexibility in the grid with crowd balancing: Equigy

Feeding volatile wind and solar power into the electricity system creates a complex challenge: keeping the grid balanced, while ensuring security of supply. Traditionally, TSOs have used fossil-fuelled power plants to provide the flexible power needed to keep the grid balanced. Now, they are looking for renewable sources of flexibility. One innovative solution is to access energy stored in privately owned decentralised energy sources, like electric vehicles, home batteries and heat pumps. To harness the flexibility offered by these storage devices, TenneT has teamed up with other TSOs in Italy and Switzerland to create a European crowd-balancing joint-venture, called Equigy.

The platform uses blockchain technology to register and validate a multitude of transactions with owners of distributed energy sources. It gives TSOs visibility of the flexible capacity offered by home-storage devices and allows them to manage the transactions securely. So far, Equigy has been launched in the Netherlands, Germany, Italy, and Switzerland, but it is a platform designed to accommodate a bigger scale. The plan is for it to progressively roll out in other European countries and discussions with other TSOs and partners (manufacturers of electric appliances and aggregators) are ongoing. For more information on Equigy: [www.equigy.com](http://www.equigy.com).

### Partnerships to secure supply, today and tomorrow

In a fast-changing energy landscape, we understand that the way we secure supply today might not be the same to secure supply tomorrow. Innovative solutions and partnerships will be crucial to this, not just to build more assets, but also to make smarter use of our grid. We are involved in multiple collaborative initiatives to increase grid utilisation through new technologies and data solutions.

### Optimising system operations for the energy transition: InnoSys 2030

In InnoSys 2030, TenneT is working with partners to find new solutions to help shape the future energy landscape. This programme was initiated by the German government and the four German TSOs to find innovative solutions to boost grid flexibility and automation, thereby allowing existing grid networks to handle greater capacity while ensuring security of supply and preventing system failure. InnoSys aims to design future-proof electricity systems, optimised for the complexities of renewable energy in the years ahead.

### Working together with other European TSOs in ENTSO-E

TenneT works together with other TSOs in the European Network of Transmission System Operators for Electricity (ENTSO-E). This is a collaboration of 42 TSOs from 35 countries working together in key areas including establishing technical and market-related network codes, coordinating plans to develop European infrastructure and promoting technical cooperation between TSOs. As a member of ENTSO-E, TenneT is helping to build a more integrated European electricity market, contributing to a sustainable energy landscape, and ensuring electricity in Europe is affordable, sustainable and secure.

## Developing the energy grid of the future: Kopernikus project ENSURE

TenneT is a key partner in the Kopernikus project ENSURE in which scientists, industrial companies and civil society organisations are developing the energy grid of the future. The Kopernikus projects are among the largest research initiatives in Germany in the field of the energy transition. Their aim is to make it possible for Germany to be climate-neutral by 2050. Power-to-X technologies play a key role in this, as they can transform electricity into other forms of energy, for example fuels (Power-to-Fuel), gases (Power-to-Gas), and heat (Power-to-Heat). In this way, electricity will become a raw material for gas, heating and transport. Another challenge is to re-design the electricity grid so it can cater for volatile in-feeds from renewable energy sources. A re-designed power grid is an essential requirement for a successful energy transition. The ENSURE project develops potential concepts for such a grid and the route to its realisation.

## Partnerships to energise our people and organisation

### Partnerships for Refugee Talent

We are hiring refugee talent in the Netherlands and Germany providing apprenticeships and vocational training to them. To find qualified refugee talents in the Netherlands, we partnered up with the Refugee Talent Hub and TENT Partnership – both initiatives linking refugee talent and employers, with paid employment as the goal. The Refugee Talent Hub and TENT Partnership provide a network, bringing affiliated employers into contact with job-seeking newcomers through small-scale, customised meet & greet meetings. In 2019 / 20 TenneT Netherlands gave 7 newcomers work opportunities, with 2 finding permanent employment with TenneT in 2020. TenneT Netherlands provided a learning path ('opleidingstraject') for these 7 refugee talents to learn more about the company and gain insights into the working culture in the Netherlands. In addition to this learning path for newcomers, their leaders and teams have been coached to be more inclusive and understand the cultural background of refugee talent.

### Cooperation with educational institutes

Sharing expertise and insights with educational institutes plays an important part in building knowledge for our sector and also educating the new generation of technical talent. In the Netherlands we collaborate with Netbeheer Nederland in the MBO-Covenant Klimaattechniek. This is a collaboration between the educational sector, government and grid operators and includes agreements to create more training positions and job guarantees for technical MBO students. By creating more opportunities for technical

talent, we hope to alleviate the skills shortage in the energy sector. TenneT is further tapping into talent of the future via the Integrated High-Voltage Laboratory at TU Delft. Through this, TenneT can gain insight into the latest knowledge and research undertaken by Masters and PhD students.

## Partnerships to safeguard our financial health

### Our cooperation with co-investors

To finance the expansion of offshore grid connections, TenneT cooperates with external co-investors such as Copenhagen Infrastructure Partners (CIP) and Chubu Electric Power. Via separate legal entities the co-investors contribute equity and receive economic participation rights in return. Their contribution helps to ensure adequate financial ratios. Furthermore their participation strengthens TenneT's interest in a reliable and stable regulatory framework as reasonable co-investors interests are communicated towards policy makers and regulators.

### Raise the necessary funding: TenneT's house banks

Without a solid financial position, TenneT would be unable to achieve its strategic goals and fulfil its role in the energy transition. Our financial stability is built on our good relationship with our shareholder, the Dutch state, and through close contacts with the banks participating in TenneT's Revolving Credit Facility (RCF).

ABN AMRO, BNG, BNP Paribas, Commerzbank, Deutsche Bank, HSBC, ING, Lloyds, Rabobank, NatWest and SMBC are participating in our current sustainable RCF of EUR 3.3 billion. The majority of these house banks also participated in TenneT's 2009 RCF, showing our commitment to long-term relationships.

With the support of our house banks we issue the necessary debt to finance our projects and have become one of the largest corporate issuers of sustainable, green debt financing in Europe. In 2020, TenneT issued with the support of its banking partners EUR 2.35 billion of Green (Hybrid) Bonds. Through this partnership, we are able to secure a solid financing and ensure that we can drive the energy transition in a more affordable way.

## What could prevent us from realising our goals?

To be able to drive the energy transition and lead as a green grid operator, it is important to create societal acceptance of the energy transition. Lack of acceptance could lead to the inability to fulfil our ambitions and delay the transition to a low-carbon economy.



Societal acceptance of our infrastructure remains important. TenneT's construction and operation of substations, underground cables and transmission lines, and investments in sustainable energy solutions may affect a large number of people and interests. Because grid expansion projects take years to develop and cost billions of euros, the impact of project delays, difficulties or shutdowns may be significant.

The expansion of our high-voltage electricity grid may significantly alter landscapes in a way that can affect the livelihood of surrounding residents. The debate with respect to potential health risks related to our overhead transmission lines and magnetic fields is ongoing. As TenneT, our aim is to comply with rules and regulations and take sufficient caution in the construction and operation of our assets.

We are also currently working together with the respective authorities and other involved stakeholders to include their views as we are in the process of updating our policy with respect to magnetic fields.

In our view, forming long-term partnerships within and outside the TSO work field is an opportunity to drive the energy transition. Initiatives like integration of energy system, crowd balancing and big data need strong partnerships between several industries and local and national governments.

## Christopher Jones

Part-time professor of Energy Law, EUI and former Deputy Director-General for Energy at the European Commission

Solving societal challenges with stakeholders and through partnerships

### Equigy sees Europe move from analogue to digital energy legislation

Launched by a consortium of leading national TSOs – TenneT, Swissgrid and Terna – Equigy is one of the most innovative initiatives to help drive the energy transition in Europe. The blockchain-based platform allows TSOs to access electricity stored in small and distributed consumer-based units, such as electric vehicles and domestic heat pumps. This source of flexibility can be used to keep the grid in balance, offsetting intermittent in-flows of power from renewable energy sources.

Christopher Jones was involved from the start of the Equigy project to help assess what legal adjustments are needed at a European level to link batteries for crowd balancing. “Although it is of course extremely complex, technically, and legislatively, it is definitely doable. It is a matter of selectively adjusting some of our European energy regulations – which were after all drafted 20 years ago – for an entirely different system. We are moving from analogue to digital legislation.”

Professor Jones says Equigy has a crucial role in achieving Europe’s Green Deal Targets. “Equigy is a real game-changer and really puts the EU ahead. It is cost-effective, offers standardisation and has great potential for scale-up. It could play a crucial role in achieving our Green Deal Targets.”

“We are moving from analogue to digital legislation.”

## Statements of the Executive Board

The Executive Board is responsible for designing and operating TenneT's risk management and internal control system, and for reviewing its effectiveness.

### In control statement

The Executive Board is responsible for designing and operating TenneT's risk management and internal control system, and for reviewing its effectiveness.

The risk management and internal control system consists of the following elements:

- The enterprise risk management system aimed to identify, analyse, define mitigating measures and monitor the development of risks relevant to TenneT;
- The internal control framework aimed to manage and control critical processes, including control self-assessments to document the effectiveness of control processes;
- Business plans and quarterly reports with information on financial and non-financial objectives and their achievement;
- Internal audits of key processes and follow-up to audit findings with relevant management;
- Actions based on recommendations made in the external auditor's management letter;
- An upwardly cascading internal Letter of Representation (LOR) process, resulting in a company-wide LOR signed by the Executive Board;
- A compliance management system that enables TenneT to demonstrate its compliance with relevant laws- and regulations, industry codes and standards, as well as its commitment to good corporate governance, best practices, ethics and stakeholder expectations.

The Executive Board periodically reviews and analyses the strategic, operational, financial and compliance risks to which TenneT is exposed. It also regularly assesses the design and effectiveness of the risk management and internal control system. The results of these assessments are shared with the Audit, Risk & Compliance Committee, acting as a committee of Supervisory Board, the Supervisory Board itself and the external auditor.

The risk management and internal control system does not provide absolute assurance that all corporate objectives will be fully achieved, nor does it give full assurance that material errors, losses, fraud or violations of laws and regulations will not occur in the operational processes and/or the financial reporting.

Taking the above into account, the Executive Board is of the opinion that TenneT's risk management and internal control system provides reasonable assurance that TenneT's financial reporting does not contain any errors of material significance and that the risk management and internal control system has operated effectively in the year under review.

### Statement of responsibility

We confirm that, to the best of our knowledge, the financial statements for the period 1 January to 31 December 2020 have been prepared in accordance with IFRS, as adopted by the EU, and with Part 9, Book 2 of the Dutch Civil Code; that the disclosures in the financial statements are a true and fair view of TenneT's assets, liabilities, financial position and results as a whole; and that the disclosures in the annual report give a true and fair review of TenneT's financial performance, results and position, together with a description of the most significant risks and uncertainties the company faces. Furthermore, we confirm that to the best of our knowledge, the Group has adequate resources to remain in operation during the next 12 months and consequently the financial statements have been prepared on a going concern basis.

Arnhem, 8 March 2021

M.J.J. van Beek  
O. Jager  
T.C. Meyerjürgens  
M.C. Abbenhuis

## Our Executive Board



**M.J.J. (Manon) van Beek**

Chair Executive Board /  
Chief Executive Officer

50, Dutch (f)

**Initial appointment:**

1 September 2018

**End of first term:**

31 August 2022

**Other positions qualitate qua:**

- Chair Aufsichtsrat TenneT TSO GmbH
- Member Board TenneT Verwaltungs GmbH

**Other positions:**

- Chair Supervisory Board Kanker.nl Foundation
- Chair Board Giving Back Foundation
- Chair Board Refugee Talent Hub Foundation
- Member of Advisory Board Top Woman of the Year Foundation (until 1 November 2020)
- General Member Board of German-Dutch Chamber of Commerce DNHK
- Council of the Thinktank Agora Energiewende
- Chair of the Roundtable for Europe's Energy Future (REEF)



**O. (Otto) Jager**

Member of the Executive Board / Chief Financial Officer

51, Dutch (m)

**Initial appointment:**

1 August 2013

**Second appointment:**

1 August 2017

**End of second appointment:**

31 July 2021

**Other positions qualitate qua:**

- Member Board TenneT TSO B.V.
- Member Board TenneT TSO GmbH

**Other positions:**

- Chair Advisory Council of the New CFO Executive Program, Erasmus University Rotterdam



**T.C. (Tim) Meyerjürgens**

Member of the Executive Board / Chief Operating Officer

45, German (m)

**Initial appointment:**

1 March 2019

**End of first appointment:**

29 February 2024

**Other positions qualitate qua:**

- Member Board TenneT TSO B.V.
- Member Board TenneT TSO GmbH
- Member Board TenneT Verwaltungs GmbH
- Member Board TenneT Offshore GmbH

**Other positions:**

- Member Executive Board WAB (Wind Energy Association Bremerhaven)
- Member Advisory Board Offshore Wind Energy MBA
- Member Board of Trustees German Offshore Wind Energy Foundation
- Member Advisory Board Federal Association of Wind Farms Offshore
- Member Board of Directors FGH (Forschungsgemeinschaft für Elektrische Anlagen und Stromwirtschaft e. V.)
- Board of Trustees FGE (Forschungsgesellschaft Energie e. V.)
- Member of the German National Committee of CIGRE



**M.C. (Maarten) Abbenhuis**

Member Executive Board / Chief Operating Office

47, Dutch (m)

**Initial appointment:**

1 January 2021

**End of appointment:**

31 December 2024

**Other positions qualitate qua:**

- Member Board TenneT TSO B.V.
- Member Board TenneT TSO GmbH

**Other positions:**

- Formal representative Vereniging Nederlandse EnergieData Uitwisseling (NEDU)
- Member Board Netbeheer Nederland (as of 14 January 2021)
- Member Cooperation Board TSCNET Services GmbH (as of 1 January 2021)



**B.G.M. (Ben) Voorhorst**

Member of the Executive Board / Chief Operating Officer

61, Dutch (m)

**Initial appointment:**

1 December 2007

**Reappointment:**

1 December 2019

**End of appointment:**

31 December 2020

**Other positions qualitate qua:**

- Member Board TenneT TSO B.V.
- Member Board TenneT TSO GmbH

**Other positions:**

- Member Board Netbeheer Nederland (Until 31 December 2020)
- Member Cooperation Board TSCNET Services GmbH (Until 13 January 2021)
- Member Supervisory Board ETPA
- Member Standing Committee on European Integration of the Advisory Board on International Issues
- Member Supervisory Board Energiefonds Overijssel B.V.