

Taking
power further





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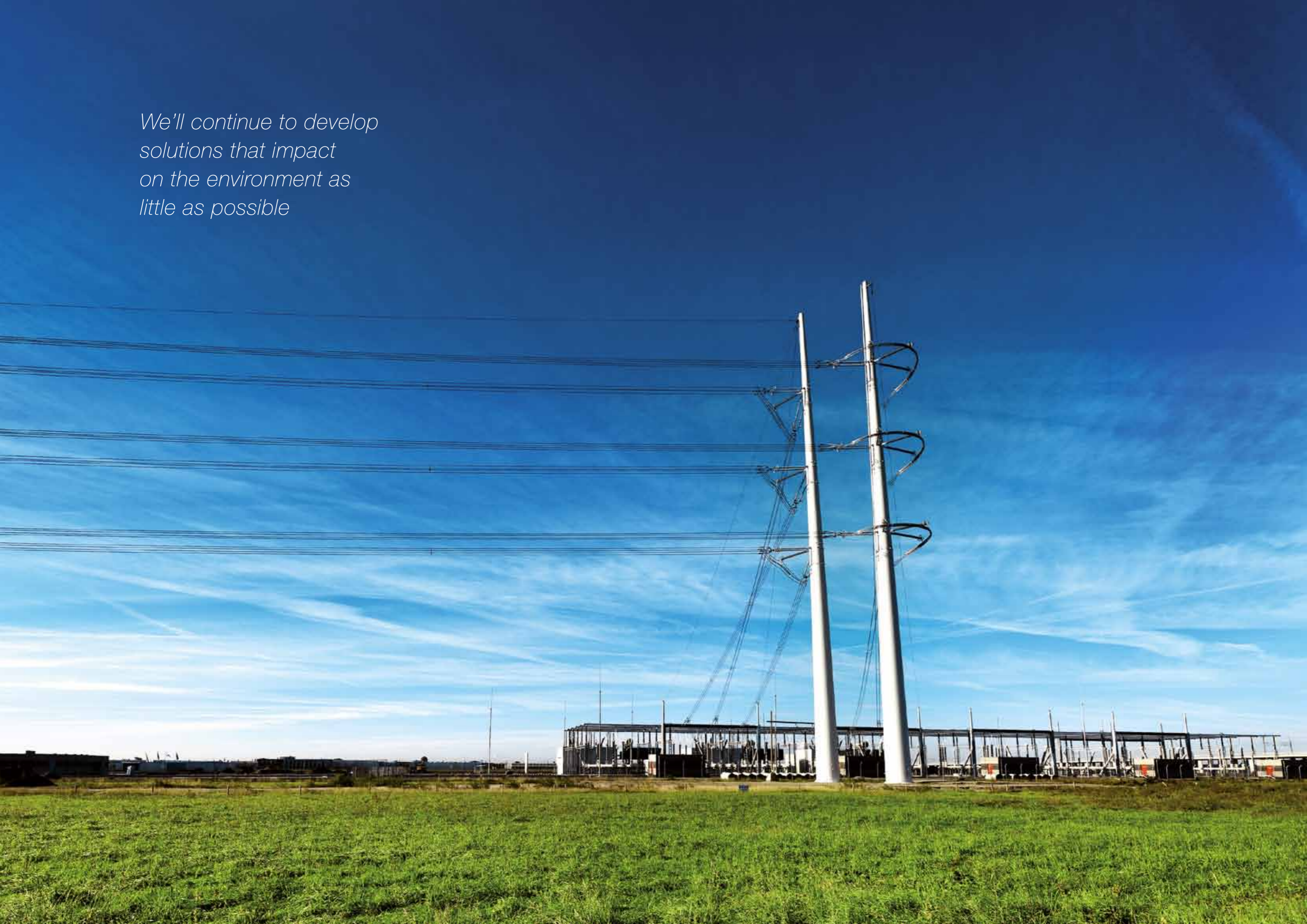
Taking power further

Imagine having no lights, no central heating, no music from the stereo system, no TV pictures and no Internet. Perhaps you can't imagine what it's like, having no electricity. We all take electricity very much for granted. You only miss it when it's gone. As Europe's first cross border electricity transmission operator (TSO), TenneT is the company to get electricity to where it's needed, 24 hours a day, or as we like to put it: 'Power around the clock'.

What we do

TenneT ranks among Europe's top 5 transmission system operators. Our focus is to develop the north west European energy market and to create a single level playing field with electricity prices that are equal and stable. Furthermore, TenneT is actively contributing to the integration of renewable energy. We are also directly responsible for ensuring a high quality, reliable electricity grid – above ground, below ground, on land and at sea. We are the owner of the high voltage grid from 110 kilovolts (kV) throughout the Netherlands and from 220 kV in a large part of Germany. Energy suppliers are able to deliver electricity to their customers via this grid. We work with the utmost care on guaranteeing a reliable electricity grid. By continuously investing in our network, we are endeavouring to rule out power faults and outages as far as possible. In practical terms, this means that we direct a lot of our own energy into expanding transmission capacity. The demand for capacity is continuing to rise, not least because of the increasing distances between generation and consumption locations and the rising request for capacity at sea. Our job is to be able to meet the demand at all times.

*We'll continue to develop
solutions that impact
on the environment as
little as possible*





TenneT as a 'power hub'

TenneT adopted its 'Strengthen and Build' strategy seven years ago. This strategy established the foundations for the robust transmission grid as we recognise it today. TenneT is keen to take its development as a power hub in the north west European market to an even higher level. For this purpose, the company is investing more than ever in expanding the high voltage grid and in new cross border interconnections. We are doing this not only to guarantee security of supply now and in the years ahead, but also to facilitate the transition to sustainability through renewable energy supplies.

Acquisition of the German extra high voltage grid of transpower enables TenneT, as the first cross border TSO, to make a major contribution to creating a single European energy market. This acquisition means that TenneT is now connected to seven other European countries and has cross-border interconnections in all directions.

Within the next years, TenneT will invest billions of euros in the transmission grid in the Netherlands and Germany

Projects in Germany

We are working to connect new offshore wind farms in Germany over the coming years and are preparing to strengthen the north south connection. New lines will enable wind energy to be transported from the north of the country to the major consumer centres in the west and south of Germany. In all approximately 500 km of new lines are going to be installed on land.

Projects in the Netherlands

Operating jointly

German Dutch cooperation produces economies of scale. Annual costs are incurred in both countries to maintain the balance in the electricity grid, for example. This requires spare capacity that must be worked into national tariffs. Operating together in this field allows the two companies to reduce costs. The same goes for joint procurement. Last but not least, there is much we can learn from each other's knowledge and expertise; our German personnel already possess considerable knowledge of connecting offshore wind farms, while our Dutch staff members have a great deal of know how when it comes to laying submarine cables.

Investing in the network

TenneT will invest billions in expanding and improving the high voltage grid in the Netherlands and Germany in the coming years. Several energy production facilities are going to be built to meet this demand. Most will be coastal power plants or offshore wind farms. Without new high voltage lines, there will be insufficient capacity to transmit electricity from new plants in the future. So expansion of the transmission grid is essential. That is why we are working on numerous new power lines in both the Netherlands and in Germany.

In the Netherlands we are working on three new connections (totalling 425 km) in the Randstad (the highly urbanised west) and in the north and the south west of the country. The Randstad connection will prepare the grid for the future. The northern connection will transmit electricity from a new plant at Eemshaven; the southern connection will transmit electricity from a new plant at Borssele. Among other things we are working on a fourth cross border connection to Germany and in 2011 we will start up a new submarine cable (called BritNed) to the United Kingdom. What's more, some highly promising studies are in progress into installing a cable (Cobra) to Denmark plus two extra cables to Norway (NorNed2 and Nord.Link). All of these interconnections and reinforcements of the land network will place TenneT at the heart of Europe.

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TenneT in society



Society and the economy rely heavily on secure supply of electricity. This places on TenneT a special responsibility for people, the environment and the society.

TenneT keeps a sharp watch on the things that matter to people. A good example is our strong emphasis on safety. Safety is naturally a top priority for an organisation that works with high voltage electricity. Health and training are two more matters that receive our special attention. Examples include our staff sports programme called Committed Power and the TenneT Academy.

Caring for the living environment

We realise that our activities sometimes adversely affect people and the environment. We try to minimise this wherever possible, for example in the day to day usage and maintenance of our pylons, cables, power lines and substations. We make every effort to reduce and 'green' grid losses, for instance. We also implement measures to prevent leaks and to reduce air emissions as much as possible. When developing and installing new connections, we take society's requirements into consideration by including in the decision making process the impact of our activities on the community at large. This covers issues such as minimising electromagnetic fields, the visual pollution of the landscape, and the protection of biodiversity. We work with stakeholders on solutions like underground high voltage routes, Bird Flight Diverters and 'green' corridors. There are benefits in listening to what stakeholders say, because it leads to useful innovations like the Wintrack high voltage pylon.



Innovation

Corporate social responsibility and innovation go hand-in-hand at TenneT. Modernisations in the electricity grid are driven almost always by wishes that come about in society. TenneT is continually working on a better embedding of high-voltage pylons and lines in a way that makes allowance for the wishes of the market and the locality. Whenever we invest, we make sure that our investments benefit an efficient, sustainable and reliable electricity supply. The community at large and the economy depend heavily on a good supply of energy and this places on us a special responsibility for people, the environment and society. We are aware of this responsibility and act accordingly.

Wintrack pylon

We take the initiative when it comes to innovations with the potential to limit environmental damage. A good example is the Wintrack pylon. Designed by TenneT, the pylon will be used for the first time in the planned high voltage expansion project in the Randstad conurbation. The first pylons were installed in April 2010. The design consists of two separate & slender, tapering poles. The high voltage wires (conductors) are closer together than in traditional pylons, thus generating a relatively small electromagnetic field along the line. Moreover, the simple structure and smooth surfaces of the Wintrack pylon make it virtually maintenance free.

Offshore grid

European governments recognise that the sea is an increasingly important place for generating electricity. To achieve the European environmental targets, it will be necessary to embed renewables like offshore wind energy on a Europe wide scale. TenneT has a lot of experience in offshore wind power, wind forecasting and absorbing grid fluctuations, but also in making interconnections by

means of submarine cables. With this knowledge and experience, TenneT has the capability to develop and create robust grids in the North Sea. In our BorWin2, DoWin1 and HelWin1 projects, we are currently building extra grid connections for offshore wind farms, while other projects are under preparation. By facilitating the transition to renewable energy, TenneT is helping to bring about a more stable and more sustainable European energy market.

Looking ahead

TenneT is tasked with providing an efficient transmission grid that facilitates a high degree of security of supply for electricity, and responds alertly to developments in the energy market such as internationalisation and greater sustainability. For that reason we have prepared a vision of the development of the national transmission grid: an integral vision of the grid from 110 kV and higher. This approach allows us to determine whether proposed grid modifications are future proof. The vision document offers a clear framework for utility and necessity studies into new investments and provides a solid foundation for policy decisions by the government. Our vision document starts by outlining developments in the market and possible scenarios for the future. To be ready for these future developments, we have developed a robust and flexible basic philosophy. Our task is to conduct a continuous and incisive analysis of the effects of developments in the national and international energy markets and translate them into concrete plans for the grid. This enables us to respond flexibly to developments in society.

It is our task to translate developments into concrete plans for the grid



Our key facts and figures

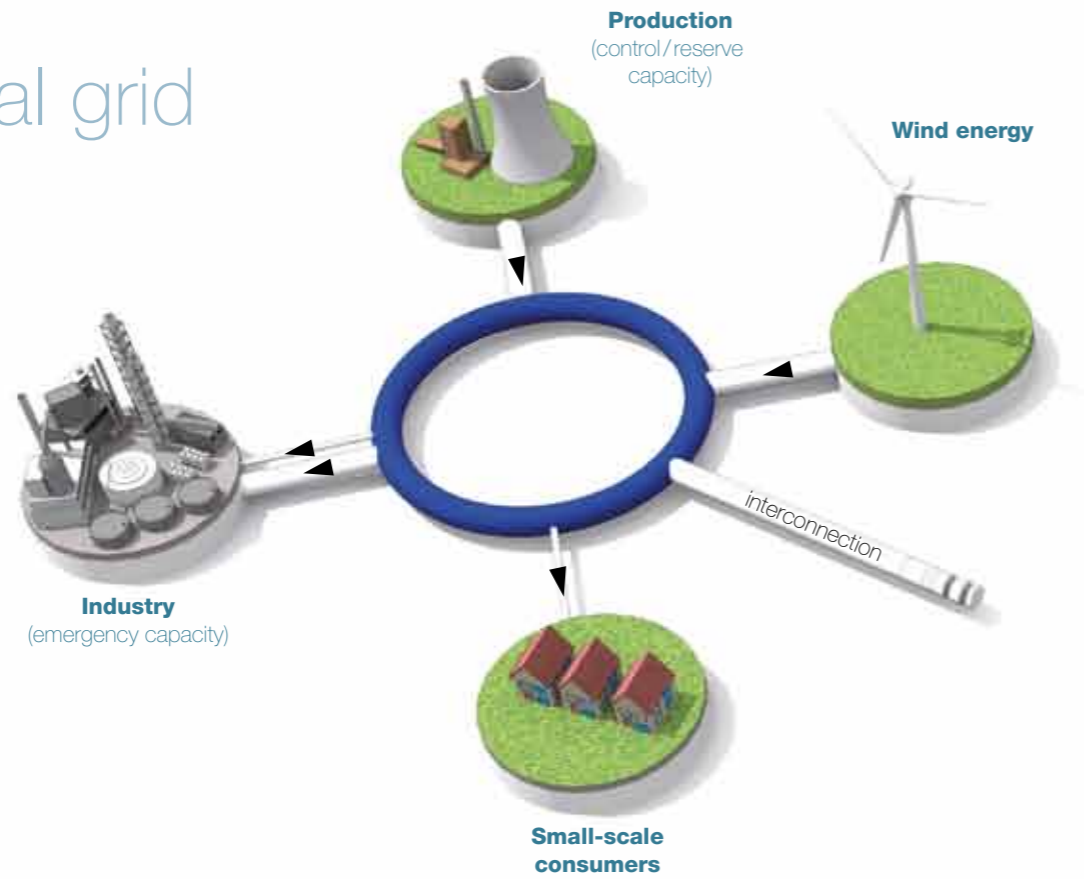
- **Number of kilometres of high voltage lines**
20,000 km
- **Number of high voltage stations**
370
- **Installed capacity**
82,000 MW
- **Installed wind energy capacity**
11,800 MW
- **Offices**
The Netherlands: Arnhem (head office), Hoogeveen, Weert and Waddinxveen
Germany: Bayreuth, Dachau, Lehrte and Bamberg
- **Number of control centres**
4
- **Balance sheet total (2009)**
EUR 5,9 billion
- **Turnover (2009)**
EUR 2 billion
- **Employees**
1725



*We all take electricity for granted;
you don't miss it until you don't have it*

Traditional grid

One-way power flow



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Flexibility is a precondition for large scale integration of renewable energy sources. The challenge is to transform the conventional electricity system into a more flexible one.

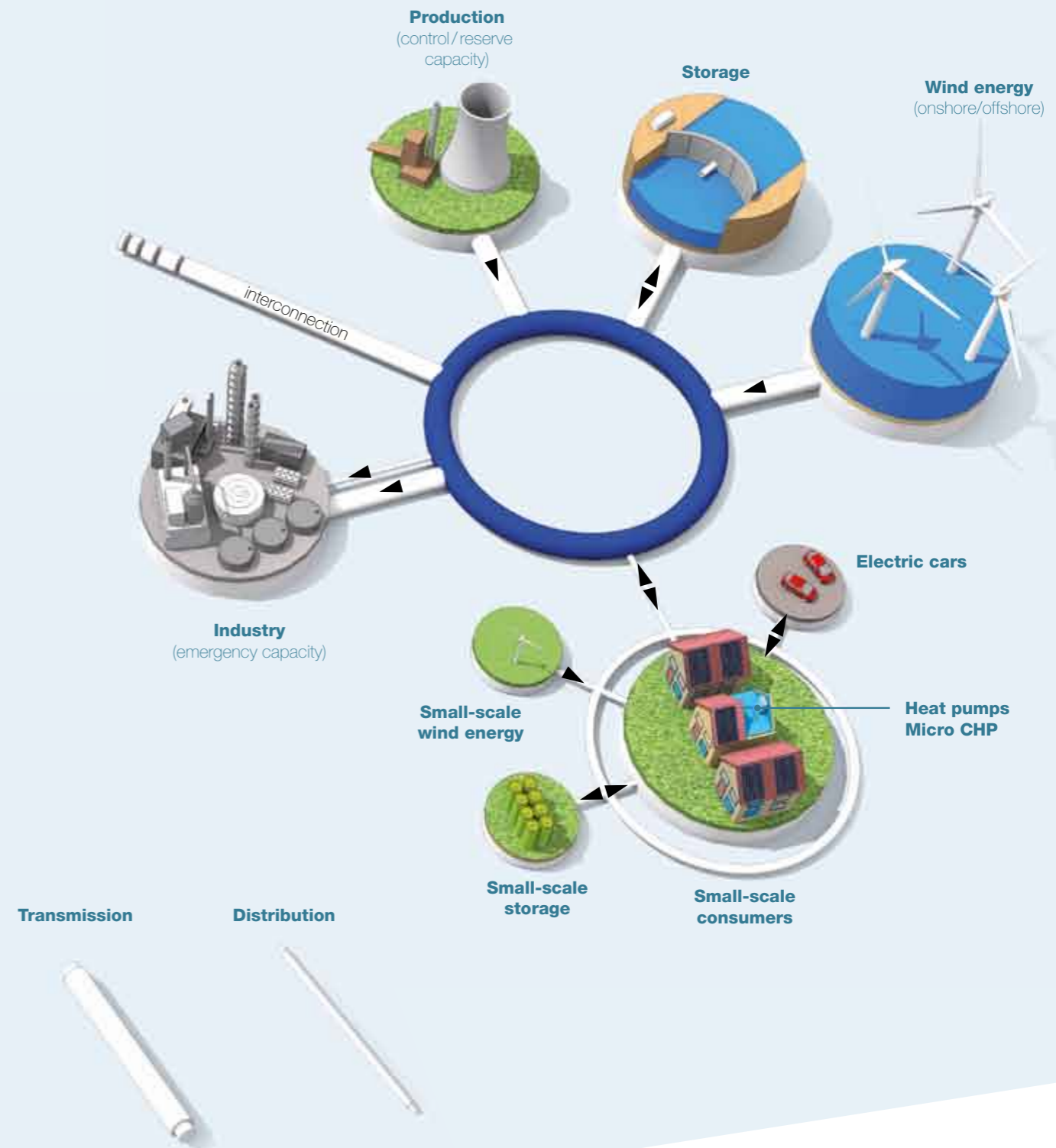
Vision of the future

The traditional, centrally controlled system leans heavily towards transmitting electricity in one direction, i.e. from large electricity stations to local consumers 'downstream'. With this model, generation follows demand in the sense that there is top down operational planning within the system. In contrast, the systems of the future will combine large scale generation far away from where a demand exists (e.g. offshore wind energy, electricity stations on the coast) with local generation (photo-voltaic, combined heat/power). Large

and small storage systems will form integral parts of this system. It will result in electricity being transmitted in more directions and will bring consumption into system management. Wind energy generated at sea during the night will be stored in electric vehicles or in storage systems in the Alps, for example. Production and demand will be matched through real time information exchange and through efficient market mechanisms with price incentives, thus ensuring efficient integration of renewable energy sources.

Future grid

Multi-way power flow



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TenneT in brief

*Our organisation wants to
serve as a linking pin*

Our task as the premier electricity transmission operator is to watch over the continuity of electricity supplies in the Netherlands and a substantial part of Germany: 24 hours a day, 365 days a year.

Our activities consist of transporting electricity and monitoring the supply and demand balance. We are also responsible for maintaining and developing the high voltage network. Embedding renewable energy (for example from North Sea wind farms or via cables from water basins in Norway) has high priority.

Our customers include electricity producers, traders and ultimately everybody who uses electricity (i.e. consumers). TenneT strives to provide optimum service for an efficiently functioning electricity market.

Our strategy is intended to create a single level playing field and to guarantee a consistently high security of supply. We are investing more than ever before in enlarging the high voltage grid, in new cross border interconnections and in a properly functioning north-west European market.

Our organisation wants to serve as a linking pin, one that connects producers and consumers with each other and engages in a permanent dialogue with the community at large. TenneT is an innovative company. We are able to do all of this thanks to our size, our expertise and also our ambitions.

Our employees are essential for achieving our ambitions. In the fulfilment of its public duties, TenneT offers its workforce an opportunity to address technological and innovational challenges in an increasingly international environment.



*TenneT in dialogue
with the community*

TenneT is Europe's first cross-border grid operator for electricity. With approximately 20,000 kilometres of (extra) high voltage lines and 35 million end users in the Netherlands and Germany we rank among the top five grid operators in Europe. Our focus is to develop a Northwest European energy market and to integrate renewable energy.

Taking power further

TenneT TSO B.V.

Utrechtseweg 310, Arnhem
P.O. Box 718, 6800 AS Arnhem
The Netherlands

Telephone +31 (0)26 373 17 17

Fax +31 (0)26 373 13 59

E-mail servicecentrum@tennet.eu

Twitter @tennetsvc

www.tennet.eu

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