

Position Paper

Spatial integration of high-voltage lines and substations



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TenneT devotes careful attention to integrating newly built high-voltage lines and substations into the landscape. In the planning preparations for grid expansions, we make every effort to achieve the best possible balance between security of supply and integration into the surroundings.

TenneT follows detailed procedures for planned expansions of the high-voltage grid to ensure that all the relevant legal requirements with regard to environmental protection and landscape integration are met. The whole process may take several years and, during that time, we carefully examine aspects such as environmental impact, technical feasibility, lead time, and estimated cost. The public is consulted at various stages during the procedure. The impact on the surroundings is assessed by experts to ensure that the new line or substation fits into the landscape in the most logical and effective way.

TenneT uses its extensive experience in infrastructural projects to achieve optimum spatial integration of new pylons and substations. We apply a made-to-measure approach, since the various landscapes and types of environment (from urbanised districts to peat lands) each require a different solution.



Optimum spatial integration of new pylons and substations

Electricity substations in rural areas, for instance, can be optimally integrated into their surroundings through effective design of green spaces. Similarly, a smart greenery plan can keep a substation in an urban environment out of sight of residents as far as possible.

In the case of new high-voltage lines, the new route will run along an existing connection if possible. This can be achieved by constructing the new power line alongside an existing connection or other existing infrastructure like motorways or railway lines, or by combining the lines of two connections on a single series of pylons. Furthermore, electricity connections are constructed in straight lines and using the same type of pylon as much as possible, to ensure visual calm in the landscape. In addition, TenneT is deploying a new type of high-voltage pylon called Wintrack for new electricity connections in the Netherlands. Each Wintrack pylon consists of a pair of poles from which the high voltage wires are suspended. To the eye, these slender, tapering poles appear as separate visual elements. Their basic, minimalist design creates visual calm.



Q&A

How can local residents exert influence on the way substations and power lines are integrated into the surroundings?

New connections and substations are constructed in accordance with detailed procedures, with opportunities for public consultation about the plans at several stages during the process. Regional and local authorities are also frequently consulted. TenneT attaches great importance to open and clear communication with local residents and enters into dialogue with residents' associations and other stakeholders to hear their ideas and create maximum support for the integration of new infrastructure.

Why not install substations or high-voltage lines underground? That would remove the problem of integration into the landscape.

Technically speaking, high-voltage connections with a voltage level of 150 kV or lower can be installed underground. TenneT believes that it is not yet advisable to install connections of 220 kV and higher underground on a large scale as this would endanger the security of supply. That is why we are seeking the best possible above-ground solution for these connections. High-voltage substations cannot be built underground.

Does TenneT take other spatial development plans – such as expansions of residential areas or industrial estates – into consideration when planning the route of new connections and substations?

Developments laid down in structural visions, land use plans and other spatial planning policy documents are taken into account. Other developments may be blocked because high-voltage connections qualify as 'vital infrastructure'.

TenneT is Europe's first cross-border grid operator for electricity. With approximately 20,000 kilometres of (extra) high voltage lines and 36 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

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