Grid Expansion in Germany
What you need to know
Just a few years ago, energy supply in Germany was a comparatively straightforward affair. Electricity was predominantly generated where it was consumed. This led to numerous coal-fired power plants being constructed around the Ruhr region, and nuclear power plants being constructed to supply the centres of population in the south of the country. In light of climate change and the nuclear disaster at Fukushima, Germany decided to reform its energy policy. The result: the share of CO₂-emitting power plants in electricity generation is to significantly decrease in the long term. Furthermore, nuclear power plants will play no role whatsoever from 2022 onwards. This decrease is to be compensated for with renewable forms of energy. Expansion in this area has accelerated enormously in recent years. However, our electricity networks are not yet ready to cope with the transport of this energy. It’s even reached the point where wind turbines have to be switched off although gusts are strong. Why? The energy generated cannot be transported.

Germany’s changing network landscape

Modern electricity supply is much like a chain – with the generators, or power plants, at one end, and household and industrial consumers at the other. So far, so good – but if there’s movement at either end, this is noticeable in the links in between, and in this case, that’s the electricity networks. At the moment, there’s plenty of movement. The challenges faced by the transmission networks are therefore very big.

Did you know that

Did you know that the tallest wind turbine in Germany is as high as the Berlin television tower (205 metres)?
Electricity grid facing new challenges

There are a number of problems making life hard for the network operators:

- Nuclear and coal-fired plants are large and powerful facilities generating electricity close to the major consumption centres in the south and west of the country. In order to produce the same volumes of energy with renewable sources such as wind and solar power and biomass, however, Germany needs a large number of small generation facilities located throughout the whole country as well as offshore facilities. The electricity generated in a decentralised way therefore needs to be collected, as it were, and transported to each individual consumer.

- Often, it’s a case of renewable generation being particularly available at those locations where little or no electricity is consumed – take offshore wind farms, for instance. In addition, not every industrial region is best suited to being home to a sufficient number of wind turbines. This results in much more energy than before needing to be transported over long distances – particularly from the north to the south and west of Germany. The existing network is already reaching its limits.

- An increasing number of renewable energy generators are now being connected to the low and medium voltage networks. On good days, when for example the sun is shining in a cloudless sky or there are strong winds, more energy may be generated locally than can be used. The excess energy then flows from the bottom up – in other words, from the low voltage level via the medium and high voltage levels into the transmission network. This energy needs to be transported elsewhere to be used.

Electricity market in flux

The growing need for expansion is not down to renewable energy sources alone, however. The single European market for electricity also plays a significant role – as it requires a greater number of more powerful connections.

Consumers – at the other end of the chain – also contribute to the changes in the grid. Unlike in the era of regional monopolies, consumers today have a choice of electricity supplier. This has resulted in a noticeable increase in the number of suppliers on the market in recent years. Electricity is increasingly becoming an internationally-traded commodity. Plenty of movement is shaking up the energy supply chain. Nevertheless, it must always remain stable – and ensuring this is one of the most important aims of German energy policy. But it can only be achieved if we tackle the issue of grid expansion with purpose now.

Did you know that

more than half of the osprey population in eastern Germany nest on electricity pylons?
How it works

There is a broad consensus regarding the need for grid expansion. However, the extent to which new routes are to be constructed and their precise location is yet to be determined. This will now be done on a regular basis in a legally defined process with significant public participation. The aim is to equip the network landscape for the switch to renewable energy sources as quickly as possible and to reach the necessary decisions together with society as a whole.

Federal Requirements Plan
The Network Development Plans and the Environmental Report form the basis for a Federal Requirements Plan Act, establishing the necessity and priority of the projects set out in the Act to meet energy supply requirements.

Did you know that

the physicist Stephen Gray made the world’s first overhead powerline on 14 July 1729 using damp hemp thread and beanpoles?

Federal Sectoral Planning/Regional Planning
Projects designated in the Federal Requirements Plan Act as spanning federal state or national borders are dealt with in a Federal Sectoral Planning process, in which the Bundesnetzagentur decides which corridors are best for the new cables.

Planning Approval Procedure
The exact future route of a new cable in a corridor is decided on in the Planning Approval Procedure. Routes are chosen which impact the least on people and nature.

Scenario Framework
Each year the four transmission system operators (TSOs: 50Hertz, Amprion, TenneT and TransnetBW) draw up a joint Scenario Framework. This presents the likely developments in electricity generation and consumption over the next ten years.

Network Development Plans and Environmental Report
The TSOs use the Scenario Framework to work out which parts of the electricity grid need reinforcing. The result is the Electricity Network Development Plan and the Offshore Network Development Plan. These feature all the optimisation, expansion and reinforcement measures needed. Negative effects on people and nature must be avoided wherever possible. This is why the potential impact on the environment must be taken into consideration early on in all decisions relating to grid expansion. Alongside examining the plans, the Bundesnetzagentur produces an Environmental Report listing all possible environmental effects.
The Bundesnetzagentur’s new responsibility

The demands on the energy networks of the future are diverse. Consumers want a reliable energy supply at attractive prices. Energy suppliers need framework conditions in which their investments will pay off. Conservationists want to make sure that animals and plants are not affected by the changes. Local residents expect their property to be protected. The Bundesnetzagentur’s role is to find the right balance.

The Grid Expansion Acceleration Act (NABEG), the Energy Act (EnWG) and the Planning Approval Responsibilities Ordinance (PlfZV) gave us an extensive range of new tasks relating to the expansion of Germany’s extra-high voltage networks.

- approves the Scenario Framework, having evaluated the responses to the public consultation,
- examines, consults on and confirms the Electricity and Offshore Network Development Plans,
- assesses the impact of the network projects on the environment and compiles an Environmental Report,
- submits the Electricity and Offshore Network Development Plans as the draft for a Federal Requirements Plan to the federal government,
- decides on route corridors in the Federal Sectoral Planning process, and
- decides on cable routes in the Planning Approval Procedure.

Did you know that

by using renewable energy sources we can reduce CO₂ emissions by more than 130 million tonnes each year?

Making your voice heard

The expansion of the grid infrastructure is a project that affects society as a whole. All citizens should have the opportunity to get involved and all legitimate interests should be taken into consideration. The legislator has thus provided for public participation proceedings for all decisions relating to grid expansion. In addition, the Bundesnetzagentur is going beyond its legal obligations and inviting citizens to take part in open discussion sessions.

Who can get involved?

Depending how advanced proceedings are for line construction, the Bundesnetzagentur targets different groups. When fundamental decisions are to be made, every citizen can and should make their voice heard. Where specific projects are involved, those personally affected have additional rights. In addition, throughout the entire proceedings, experts, environmental associations and public interest groups are called upon for their specialist knowledge.
Taking part in identifying requirements

The first step in the process of identifying requirements is the Scenario Framework, which is released for public consultation by the Bundesnetzagentur. This means that anyone interested can look at and comment on the draft. It is the same for the Electricity and Offshore Network Development Plans, which are put out for public consultation once by the TSOs and once by the Bundesnetzagentur.

The Bundesnetzagentur also takes a close look at the Plans to evaluate any potentially significant impact on the environment. This is known as the Strategic Environmental Assessment. Before doing so, the Bundesnetzagentur consults with officials, experts and environmental associations to decide on the exact scope of the assessment. The Strategic Environmental Assessment involves looking at how the planned overhead and underground cables might affect people and nature.

The results of the Strategic Environmental Assessment form the Environmental Report, which is published for consultation by the Bundesnetzagentur together with the Electricity and Offshore Network Development Plans.

The responses received during the public consultations feed into the Bundesnetzagentur’s decision-making processes.

Taking part in Federal Sectoral Planning

This stage involves the TSOs fleshing out their projects for the first time. The TSOs submit an application for each individual project, which is then discussed in a Scoping Conference. This conference is open in particular to federal state representatives, authorities and environmental associations, although anyone interested can generally take part.

Following presentation of all the documentation, the public interest groups are again asked for their views. This is also where the people living near the planned corridors come in. Anyone can look at the planning documents on the Internet or in person to see if they will be affected by a new route. It is very important for people to take up this opportunity – because only those who speak out at this stage can take part in the subsequent public inquiry.

Did you know that

the sun provides enough energy to supply the world’s needs 5,000 times over?

Taking part in the Planning Approval Procedure

The planning approval decision – like planning permission – lays down all the key details of the new extra-high voltage line, including the exact route and the transmission technology to be used. Participation in the Planning Approval Procedure begins with a Scoping Conference, which can be attended by the TSOs, public interest groups and environmental associations.

As with the Scoping Conference in the Federal Sectoral Planning stage, this conference is also open to the public.

Where individuals’ rights are concerned – for instance if a pylon is planned on private property – those personally affected can, naturally, become directly involved. A hearing following on from the Scoping Conference is held where anyone affected can state their views.
Grid expansion affects everyone – not only those in politics, but also companies, associations and, above all, the country’s citizens. This brochure tells you what you need to know about grid expansion:

Why is grid expansion necessary?

What is the process from identifying requirements to constructing new lines?

What is the Bundesnetzagentur’s role?

How can you play a part?