

SuedLink and SuedOstLink

New power lines for the energy transition

STRABAG is constructing key sections of the underground north-south cable routes

Wind power and photovoltaics instead of coal and nuclear power: Germany is switching from fossil fuels and nuclear energy to renewable sources. Systematic grid expansion is intended to enable the transition to decentralised, weather-dependent and climate-friendly energy. Two major infrastructure projects for the energy transition are already in full swing: With SuedLink and SuedOstLink, the three transmission system operators TenneT Germany, TransnetBW and 50Hertz will ensure that wind power from northern and eastern Germany, for example, can be reliably transported to the south. These largely underground routes for direct current cables are two cornerstones of the energy supply of the future – and STRABAG is playing a key role in their construction.

Cover SuedOstLink construction site between Pfreimd and Pfatter in the Upper Palatinate © TenneT Germany



STRABAG
WORK ON PROGRESS

STRABAG is building 400 kilometres for the energy network of the future

Regional units of STRABAG AG have been awarded six major civil engineering contracts by TransnetBW, TenneT and 50Hertz for construction phases along the two north-south power lines in 2024 and 2025. This involves a total of almost 270 kilometres for the SuedLink and around 120 kilometres for the SuedOstLink, making a total of almost 400 kilometres of route – spread across several construction lots in Bavaria, Lower Saxony, Thuringia and Saxony. The sections – ranging from 35 to 95 kilometres in length – each involve civil engineering and earthworks on an enormous scale rarely seen before. In many cases, forces are being joined to achieve the necessary capacity: in some project teams, two or even three different STRABAG units are working together; the SuedLink section in southern Lower Saxony is being implemented by STRABAG AG in a joint venture with its partner Köster Bau.

The civil engineering task in brief: Where possible, the STRABAG teams excavate trenches along the route, lay the cable protection pipes in them, into which the direct current cables will later be pulled, and finally backfill the trenches with the excavated soil. The so-called open construction method is the norm – but it is unsuitable for overcoming obstacles. Where roads, railway lines or rivers cross the route, for example, horizontal drilling techniques such as HDD flush drilling or microtunnelling are used. This closed construction method using specialised machinery makes it possible to lay pipes underground over distances of several hundred metres without digging.

1 Units of STRABAG AG have been awarded six major contracts to construct longer sections of SuedLink and SuedOstLink. © TenneT Germany

Facts and figures about the power lines

SuedLink and SuedOstLink run largely underground across Germany and will use modern direct current technology (HVDC) to transmit renewable energy over hundreds of kilometres with minimal losses.

In future, **the approximately 15-centimetre-thick cable strands** of the two grid corridors will be able to carry up to four gigawatts of electricity from the wind-rich north-east to the south of Germany – and vice versa from south to north.

To illustrate: one gigawatt (GW) corresponds to the average output of a nuclear power plant unit. The amount of electricity produced with one GW over the course of a year is sufficient to supply around 2.5 million private households with electrical energy for a year.

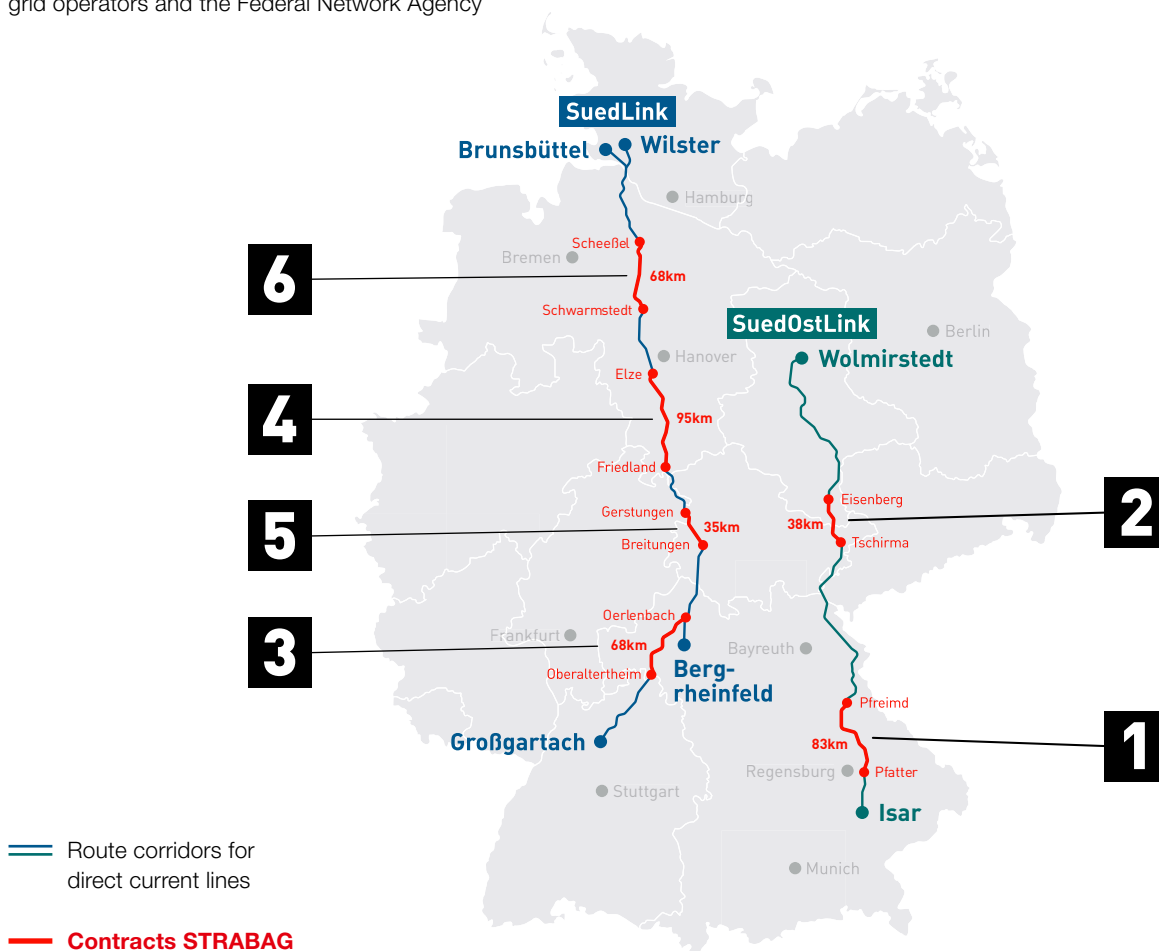


TransnetBW, TenneT and 50 Hertz share planning and operation

SuedLink and SuedOstLink are crucial for the sustainable transition to a stable, climate-friendly energy supply in Germany. The SuedLink route connects Brunsbüttel and Wilster in Schleswig-Holstein with Großgartach in Baden-Württemberg and Bergheimfeld over a distance of around 700 kilometres and two largely parallel lines in Bavaria. It also crosses or touches the federal states of Lower Saxony, Hesse and Thuringia. The 540-kilometre-long SuedOstLink route also connects Wolmirstedt near Magdeburg with the former power plant site Isar near Landshut with two parallel lines, running from Saxony-Anhalt via Thuringia and Saxony to Bavaria. Two grid operators share responsibility for the planning and future operation of each north-south route: SuedLink is being implemented jointly by **TenneT Germany** (northern section) and **TransnetBW** (southern section), while SuedOstLink is being implemented by **TenneT Germany** (in Bavaria) and **50 Hertz** (in Saxony-Anhalt, Saxony and Thuringia).

STRABAG contracts at a glance

Graphic content based on information from grid operators and the Federal Network Agency



1. SuedOstLink, sections D1 and D2 in the Oberpfalz (Bavaria)

- Client: TenneT Germany
- Route: from Pfreimd via Nittenau to Pfatter, east of Regensburg
- Route length: (54 + 29 =) approx. 83 kilometres

2. SuedOstLink, section B, Mixed Lot 1 in Thuringia

- Client: 50 Hertz
- Route: from Eisenberg via Weida to Tschirma, west of Gera
- Route length: approx. 38 kilometres

3. SuedLink, section E1, construction lot 8 in Unterfranken (Bavaria)

- Client: TransnetBW
- Route: from Oerlenbach to Oberaltertheim, north of the Schweinfurt-Würzburg line
- Route length: approx. 68 kilometres

4. SuedLink, sections B3 & C1, construction lots 1 & 2 in southern Lower Saxony

- Client: TransnetBW
- Consortium partner: Köster Bau GmbH
- Route: from Elze via Einbeck to Friedland, west of the Hildesheim-Göttingen line
- Route length: (51 + 44 =) approx. 95 kilometres

5. SuedLink, section D1, construction lot 5 in Thuringia

- Client: TransnetBW
- Route: from Gerstungen to Breitung
- Route length: approx. 35 kilometres

6. SuedLink, section B1, construction lots 5 & 6 in Lower Saxony

- Client: TenneT Germany
- Route: from Scheeßel to Schwarmstedt, north of Hanover
- Route length: (34 + 34 =) approx. 68 kilometres



2 Earthworks on a massive scale: up to 60 excavators and 36 wheel loaders are in use every day for the construction of the SuedOstLink section in the Oberpfalz.
© TenneT Germany

Trenching and drilling for the SuedOstLink in the Oberpfalz

The SuedOstLink sections D1 and D2 stretch over 83 kilometres in the Oberpfalz, between the towns of Pfreimd and Pfatter. Since summer 2024, STRABAG AG's project team of up to 200 people has been working daily on behalf of TenneT on the section of the power line east of Regensburg. The work is not progressing in a straight line and strictly in sequence – for example, from north to south. Instead, the excavation and drilling work is being carried out in small, individual sections – guided by a flexible, agile schedule and in close cooperation with the TenneT team: „We are moving flexibly along the route, changing work areas to take into account archaeological or nature conservation requirements, for example. Our construction clusters are around 650 metres long on average,” reports Robin Fiedler from the four-person project management team at STRABAG's Bavaria North division.

Work on one of the 100 construction sites usually begins with the construction of access roads to the route and the establishment of a work area for the preliminary work of the polyethylene (PE) welders. The team of specialists begins welding the 12-metre-long sections of the PE empty pipes together in advance of the civil engineering work the lengths that will be required later. In addition, a STRABAG road construction team is building the temporary construction road along the route. And, if possible, before the excavators begin digging, the horizontal drilling teams are called in to use their heavy specialised machinery to pass under any obstacles on the construction site.

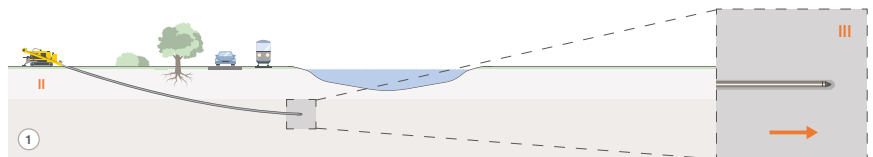
When roads (e.g. the A3 motorway) or rivers (e.g. the Naab and Danube rivers), railway tracks or pipes of all kinds cross the route, the empty conduits are systematically laid using horizontal drilling techniques – either horizontal directional drilling (HDD) or microtunnelling. The HDD flush drilling on the SuedOstLink section in the Oberpfalz is being carried out by a team of experts from STRABAG subsidiary RBS, which is operating eight special drilling rigs between Pfreimd and Pfatter. A total of 68 horizontal boreholes, some of which are several hundred metres long, are planned for this section.

Closed installation method

(Horizontal directional drilling / HDD method)

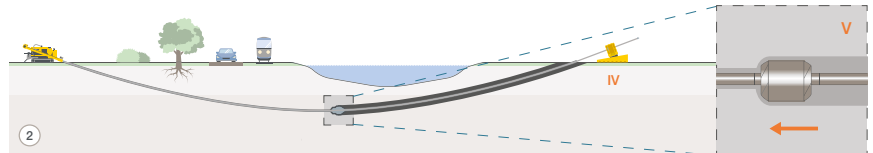
1. Pilot drilling

- II Horizontal drilling rig (HDD rig)
- III Controllable drilling head



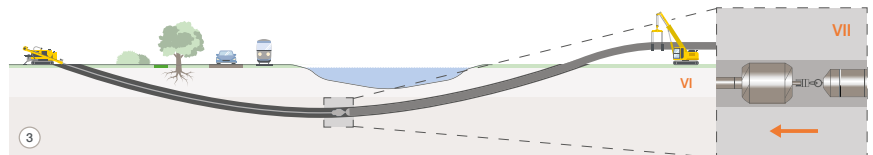
2. Expansion of the drill channel

- IV Clamping and breaking device
- V Clearing tool



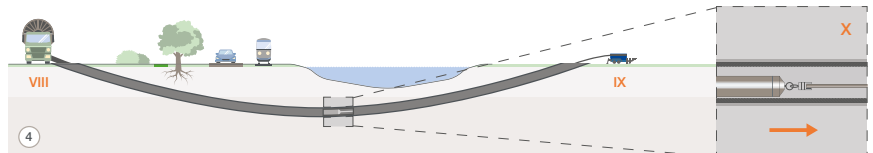
3. Pulling in cable protection pipe

- VI Excavator for stabilising the cable protection pipe
- VII Attached cable protection pipe



4. Pulling in DC underground cable

- VIII Cable drum on low-loader truck
- IX Cable winch
- X Direct current underground cable



Up to 60 excavators and 36 wheel loaders in use for the cable trenches

In open route construction, the STRABAG team is constructing the two cable trenches, each around 2 metres deep and 2.20 metres wide, one after the other along the entire length of the cluster. Excavating earth on such a massive scale requires a large number of skilled workers and machines: among other things, up to 60 excavators and 36 wheel loaders are for the SuedOstLink in the Upper Palatinate. Once the two trenches have been dug, the project team will lay the 28-centimetre-diameter PE empty conduits, into which the heavy direct current cables will be pulled in a new work step after backfilling. The work on one of the construction sites, which are around 650 metres long on average, will take three to four weeks. For the section-by-section cable pulling along the route section, the STRABAG team first constructs the so-called sleeve pits and sets up unloading areas for the cable drums, which weigh several tonnes, as well as suitable heavy-duty access roads if required.



3 STRABAG carefully separates the excavated soil layers and specifically improves the thermal conductivity of the layer close to the pipes before reusing it to backfill the trenches. © STRABAG AG

The construction project meets high standards of nature conservation and sustainability. „We have to build reversibly,“ emphasises Robin Fiedler. This means that the route area must be fully usable again for farmers. That is why STRABAG carefully separates the excavated soil layers and improves them before recycling them at the thermal conductivity of the layer close to the pipes when backfilling the trenches. This is to ensure that the heat generated during subsequent operation of the power cables is dissipated effectively. In the SuedOstLink D1 and D2 project, STRABAG is also having the construction site certified as sustainable by the DGNB during construction and is specifically addressing the comprehensive requirements associated with this. For example the project team's electricity requirements in the construction containers are covered entirely by a photovoltaic system with 60 modules installed on the roofs.

Milling machine and liquid soil: Innovative technology at SuedLink in Unterfranken

More than 200 kilometres further west, in Unterfranken, STRABAG is working on behalf of TransnetBW on the SuedLink section between Oerlenbach and Oberaltertheim on the Bavaria/Baden-Württemberg border. On the approximately 68-kilometre-long section of the route, the joint STRABAG project team from Baden-Württemberg and Bavaria is using an innovative construction method that is both particularly environmentally friendly and efficient. STRABAG is combining the use of a special trench cutter with backfilling using liquid soil. To prepare for the milling work, the topsoil is first removed. The trench cutter then cuts two trenches, each only 80cm wide, one after the other and lays the empty conduits for the direct current cables in the same step. The installation process designed by STRABAG speeds up the earthworks and minimises the environmental impact: compared to conventional excavation of cable trenches, the milling process reduces the amount of earth excavated by a quarter. This protects the soil and, in combination with the liquid soil formula further developed by STRABAG, offers additional sustainability and speed advantages.

To backfill the cable trenches, the excavated soil is treated with water and clay minerals to give it a flowable consistency. The big advantage is that the liquid soil used by STRABAG is volume-stable and therefore does not need to be compacted separately, but compacts automatically under its own weight. The result: rapid hardening tends to shorten the construction time required. And it is also particularly environmentally friendly: the stored excavated soil is completely recycled in a plant close to the construction site to produce liquid soil. This specifically avoids additional resource consumption and long CO₂-intensive transports.



4 Milling instead of excavating on SuedLink: STRABAG combines the use of a trench milling machine with backfilling using liquid soil for the route construction in Unterfranken. © STRABAG AG / 5 Two or more regional STRABAG units often join forces for route construction projects. © TenneT Germany

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