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Datagreen® Cable
Lighter cables for planes,
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reducing fuel consumption
and greenhouse
gas emissions



Nexans, global player of the cable industry, provides solutions for the most complex applications and the most demanding environments. With one obsession: help meet essential, growing needs while maintaining the highest levels of safety, performance and respect for people and the environment. Renewable energies stand at the heart of this dedication. They drive Nexans' performance with constant search of innovation and cutting-edge leadership.

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Nexans
Global expert in cables and cabling systems

europacable

Connecting Europe

The accelerated development of more and smarter electricity infrastructure in Europe is critical to enable the integration of the European energy market and a cost-effective implementation of the 2030 climate and energy framework. Increased physical interconnections across Europe will facilitate the integration of renewable electricity sources, create a more competitive European energy system and thereby reduce electricity prices for consumers as well as manufacturing industries.

Europacable member companies are the world leaders in the development and manufacturing of advanced grid technologies. We produce both overhead line electricity systems as well as state-of-the-art underground and subsea cables. We have the expertise and capacity to deliver the infrastructure required for Europe's




changing energy system to 2030 and beyond. European companies must keep this global leadership position.

Due to the significant investments required for infrastructure until 2030, a clear long-term policy direction is needed to attract investors and investments for secure European jobs.

Europacable is proud to support **VISUALIZING ENERGY 2014** highlighting the role of renewables in the energy transition. High quality underground and subsea cables will be an essential part of Europe's future electricity networks. They will largely be invisible, but often that which is not visible is most relevant.

Frédéric Vincent
President, Europacable



While overhead lines continue to play a vital role, increasingly smart grids are going underground.

EUROPE NEEDS MORE GRIDS

They have to be reliable, affordable and publicly acceptable

Writer: Marcello Del Brenna, Member Europacable Executive Board

The integration of the European energy market is critical for a cost effective implementation of the 2030 climate and energy framework. The upgrading and expanding of Europe's electricity distribution and transmission networks is a fundamental and critical step towards reaching this objective.



Europacable believes that there are three key challenges to be addressed. All of them shall be overcome.

1. Security of supply through state-of-the-art technology

Security of electricity supply is one of the predominant needs of our society and demand for reliable power supply will continue to increase. When upgrading and expanding Europe's electricity networks, security of supply shall be a key priority in the design and construction of new electrical infrastructure. Already today, high-tech and quality underground and subsea power transmission cables are state-of-the-art, playing an important role in the European transmission and distribution network. Designed and constructed to meet strict international standards, they provide highly reliable energy transmission in the European grid systems and will become an increasingly important component of Europe's future transmission and distribution networks.

2. Compensating investment costs by societal benefits

Electricity price is one of the key factors determining competitiveness in the global market. Upgrading and expanding Europe's electricity networks shall be a tool to improve Europe's competitiveness by increasing competition in the electricity market and eventu-

ally reducing electricity prices. Nowadays offshore wind projects cannot be operated due to a lack of access to the transmission grid; the internal market is not functioning in an optimal way due to the lack of interconnection capacity resulting in local markets, sub-optimal generation mix and therefore a higher cost of electricity.

Upgrading and expanding Europe's electricity infrastructures will generate considerable socio-economic benefits which will outweigh the initial investment costs.

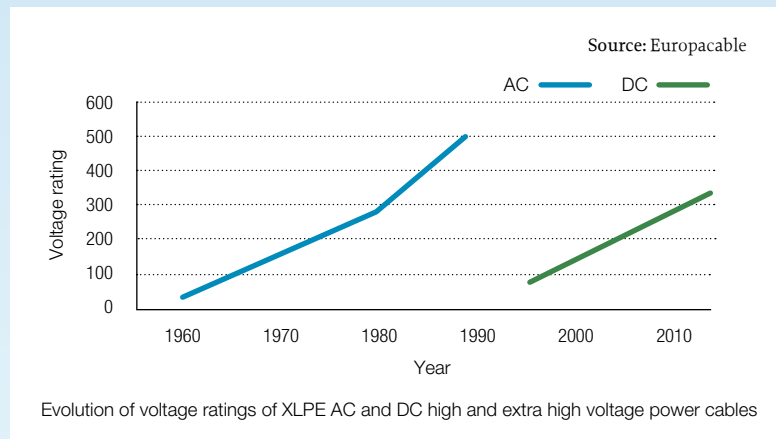
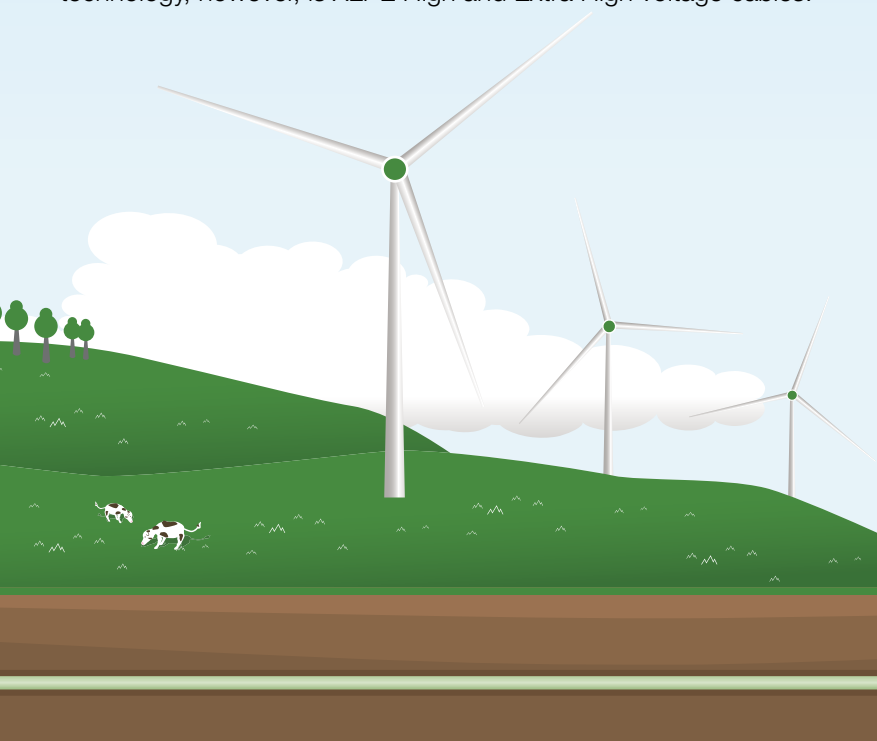
3. Gaining public acceptance through the concept of partial undergrounding

With more than 50,000 km of new high and extra high power transmission lines needed in Europe in the coming decades, more and more communities will be directly affected by new transmission projects. While the vast majority of these lines will continue being constructed with overhead line technology, partial undergrounding can complement them in sensitive areas, increasing public acceptance, therefore minimizing permitting and construction delays. Ultimately this will contribute to the timely development of critical infrastructure for the future of Europe.

Image: Prelaying of pipes before 380 kV cable pulling. Source: TenneT

The Essentials: Underground & Subsea Cables

Since the late 1880s, mass-impregnated paper-insulated cables have been the core technology used to enable the increasing electrification of our societies. They will continue to provide the needed security and comfort of modern life. Today's state-of-the-art technology, however, is XLPE High and Extra High voltage cables.



Today, Extruded Cross Linked Polyethylene (XLPE) high and extra high voltage cables are the core cable technology, both for land and submarine installations. The introduction of a solid dielectric transmission cable featuring cross linked polyethylene (XLPE) insulation in the 1960s marked a significant step in the evolution of power cable technologies.

While many mass-impregnated power cables will remain in service for some years to come, XLPE insulated power cables today represent state-of-the-art in electrical power transmission. They are installed in land and submarine projects in Alternate Current (AC) and Direct

Current (DC). EHV XLPE cables have seen a significant increase in deployment over recent years. **Since 2000, over 200,000 km of high voltage and over 10,000 km of extra high voltage AC cables have been installed around the globe.**



380 kV AC XLPE power transmission cable

Source: Europacable

THE GREAT WAR OF THE CURRENTS

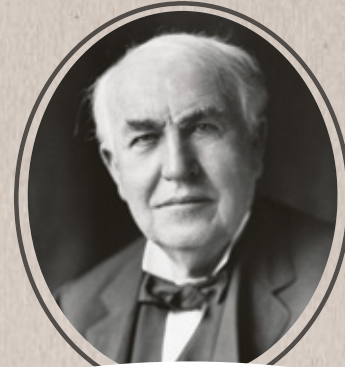


NIKOLA TESLA



AC vs DC

POWER TRANSMISSION



THOMAS EDISON

When projecting Europe's future electricity infrastructure systems, discussions revolve around two possible transmission technologies: Alternate Current (AC) and Direct Current (DC).

Today, the two technologies are seen as complementary: AC power transmission is suitable for relatively short connections while DC is the most appropriate technol-

ogy for carrying high power over long distances practically without any losses. At present, Europe's networks are based on meshed AC electricity grids. In the

future, these will be complemented by a high power DC overlay network. While DC connections today are typically used to transmit or exchange power point-to-point, meshed or multi-terminal DC grids will become available as HVDC switchgear technology gains market access.

This complementarity was not always the case. In the late 19th century, Nikola Tesla laid the foundations of today's alternating current electricity supply systems. Around the same time, Thomas Edison set up an

extended DC system for the illumination of New York City.

Today Tesla's AC systems operate Europe's electricity systems but we can be confident that Edison's dream to create a DC overlay net will become a reality in Europe in the near future. With that, the fierce "war of the currents" fought between two of the world's most ingenious minds will have been settled in a peaceful co-existence.

The Concept of Partial Undergrounding

Writer: Volker Wendt, Director Public Affairs Europacable

Europacable developed the Concept of Partial Undergrounding to offer an innovative solution to the challenge of upgrading and expanding Europe's electricity grid in a reliable, affordable and publicly acceptable way.

The idea is to underground extra high voltage power lines in sensitive areas complementing overhead lines where their installation raises public or environmental concerns.

The Concept of Partial Undergrounding can be applied at any voltage level. Europacable believes that today the biggest potential to facilitate grid extensions lies with 380 kV extra high voltage (EHV) cross linked polyethylene (XLPE) alternate current (AC) cables. Individual sections of up to 20 km can go underground. Beyond that, and depending on the system configuration, compensation may need to be accounted for. It is technically feasible to underground several 20 km sections. Partial undergrounding can also be applied to extra high voltage DC projects. Here the minimum length of an undergrounded section would be at least 50 km.

An increasing number of reference cases show that partial undergrounding of EHV transmission lines can help to address concerns of local communes affected by the impacts of transmission lines. Partial undergrounding can break the deadlock of transmission projects, some of which have been delayed by more than ten years.

By reducing permitting times of transmission projects, partial undergrounding can serve as an enabler to integrate renewable energy sources into Europe's future energy mix.

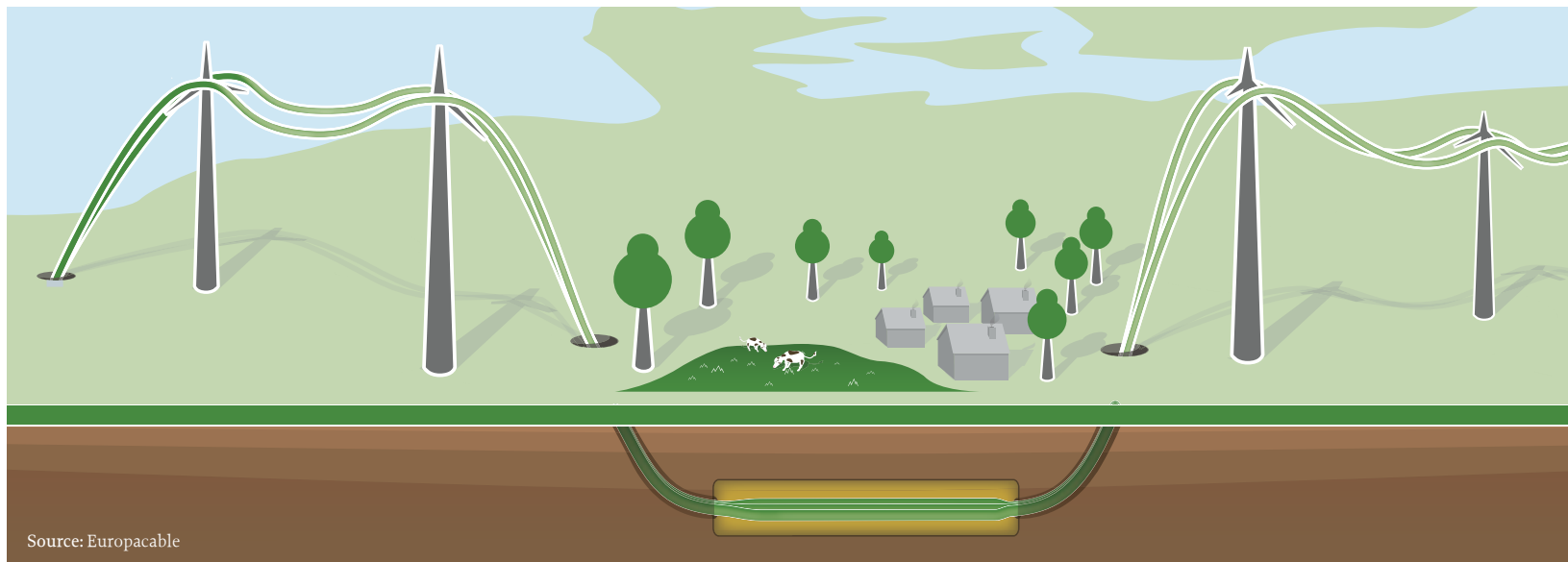




Image: The Joint Bay of the 380 kV double system after installation Source: nkt cables

380 kV AC Cable Installation in Partial Undergrounding Solutions

Following an invitation of the European Commission DG Energy, Europacable and ENTSO-E published a Joint Paper outlining the feasibility and technical aspects of partial undergrounding of Extra High Voltage (EHV) power transmission lines (AC 220 – 400 kV) in January 2011.

The Joint Paper confirms that “partial undergrounding may, in some cases, be part of a solution of transmission projects of vital interest for the development of the EU transmission network”, and stresses that:

“Given the complexity of integrating partial undergrounding into high voltage transmission systems, all projects will require a case-by-case analysis of the technical specifications required for partial undergrounding.”

Key aspects of installing 380 kV XLPE cables in partially undergrounded sections:

- 380 kV XLPE cables are usually directly buried in the ground. Cables will be installed at a depth of around 1.60 meters. Thermal backfill material will be deployed around the cable. Above that the original soil will be refilled (see Figure 1).
- Due to logistical constraints arising from the weight and size of cable drums, cables are usually delivered in lengths up to 1,000 meters. Individual cables are connected by so-called “joints” which are typically also buried directly in the ground. Joints can be installed in “joint bays” which are not visible above ground.
- Depending on the power to be transmitted, 380 kV cable sections would usually comprise 3-4 cable systems, for example 9-12 cables requiring a total width of some 20 meters (see Figure 2).
- While the installation represents a considerable impact on the environment, vegetation will be re-installed after 1-2 years. There are no limitations to farming or agriculture on top of the cable trench apart from deep-rooted trees.
- Cables are tested after production and after installation in the ground according to international standards. Once in the ground, they are well-protected against any adverse weather conditions, hence offering reliable electricity transmission.

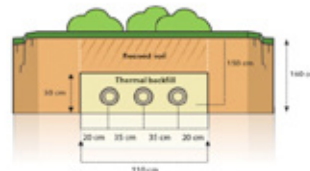
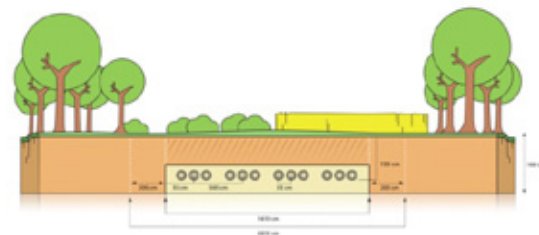


Fig 1: Example of a single AC 400 kV system carrying 1,250 MVA (space depends on soil resistivity)

Fig 2: Example of two double AC 400 kV circuits carrying 5,000 MVA



Source: Europacable ENTSO-E Joint Paper, 2011

The TenneT Randstad Project

European infrastructure has local impact. With the Randstad Project, TenneT has taken an innovative approach to grid solutions: stakeholder involvement, new mast design and partial undergrounding solutions make the TenneT Randstad Project in the Netherlands a best practice for grid solutions in Europe.

Writer: Mel Kroon, CEO TenneT



Image: 380 kV cable pulling in open trench with two systems. Source: TenneT

Listening to local communities and NGOs

Taking care of local and NGO interests is more than informing – it means listening to people, understanding their interests and integrating them whenever possible into projects. TenneT is fully aware that high-voltage lines enter the social environment of local people. When installing new overhead lines, TenneT tries to avoid affecting residential as well as natural conservation areas.

When existing lines are involved, TenneT works extensively with stakeholders to minimize the impact. In 2013, the Dutch government launched a 15-year cabling program, focused on 150 kV lines in urban areas. The project aims to address the social concerns of people living close to these lines. **TenneT has been deeply involved in the process, working with government and municipal authorities on implementation possibilities**, and also looking closely at the legislation framework. At TenneT it is common practice to reach out to local stakeholders, in regular public feedback information sessions. In Germany alone, with a view to the large onshore projects underway, more than 500 of these sessions are planned in 2014. TenneT facilitates this community engagement long before official licensing procedures start so that stakeholders really have the

chance to weigh in on the project design from the beginning.

Reducing impact with new mast designs

The new slim-line Wintrack pylon which TenneT developed is a good example of an innovative solution that addresses an important issue raised by our local stakeholders: minimizing the impact of our projects on the environment and society. Wintrack pylons allow our infrastructure to blend into the landscape, being less visually intrusive than conventional designs, and reducing the width of the electromagnetic field zone. These play an important role in helping TenneT gain acceptance for pylons above ground. Achieving this kind of societal acceptance is essential if we are going to realize the projects that are necessary to achieve the energy transition on time.

TenneT is conscious that the impact of its projects on nature and local habitats can be significant and we seek to comply with all applicable environmental laws and regulations. TenneT takes extensive steps to minimize its impact, often through intensive analysis and by commissioning reports detailing the potential impact on the environment. TenneT then seeks to mitigate and compensate for any impact wherever possible. TenneT is confident that its approach of building environmental consensus



Image: 380 kV Wintrack pylons of the Randstad Project. Source: TenneT

while engaging with local and regional coalitions contributes to improving the acceptance of grid infrastructure.

Innovation: partial underground solutions

Energy infrastructure is often considered intrusive, both esthetically in people's backyards and in nearby forests or in agricultural fields. As a result, underground construction

of lines is becoming an increasing area of focus. Currently, TenneT is installing 20 km of 380 kV underground cables in the densely populated Dutch Randstad region, with 10 kilometers already in use. The length of this stretch, and the scope of the project, is making it a global leader today. Together with researchers from the technical University of Delft, and in participation with the technical University of Eindhoven, TenneT is monitoring the results and the influence on the stability



Image: Two years later: the 380 kV cable trench. Can you spot it? Source: nkt cables

of the grid. In Germany, TenneT has launched a common initiative with Europacable and the Universities of Hannover and Delft to monitor the future German cable pilot projects appointed by German law. In January 2013, TenneT and Europacable announced that they endorse:

- the deployment of partial undergrounding in sensitive areas in the context of an accelerated realization of the cable pilot projects
- the creation of an evaluation program for partial undergrounding accompanied by independent scientific experts
- the creation of framework requirements for

partial undergrounding for future projects of the German transmission grid following the completion of the evaluation program

TenneT is convinced that its innovative approach to grid solutions will contribute to overcoming Europe's grid bottlenecks. They still have a lot to learn and it is important to caution that a fully undergrounded 380 kV grid is a long way from completion. It is essential that stakeholders understand the limitations of what is possible and the obstacles that need to be overcome, not least underground treasures, like archaeological remains, that need to be protected. This is far more complex than is widely realized. This said, there has been much progress made thus far. 🌐



We take power further

Responsible



Engaged



Connected



TenneT is Europe's first cross-border grid operator for electricity. With approximately 21,000 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 north-west European energy market and to integrate renewable energy.



Public Acceptance of Power Transmission Lines: A Political Challenge

Writer: Thomas Neesen, Secretary General Europacable

Across Europe, the lack of public acceptance and the delays caused by this lack of acceptance is a major challenge to the realization of the needed grid upgrading and extension to integrate renewable energies.

Public debates are understandably emotional. NIMBY (Not In My Back Yard) or BANANA (Build Absolutely Nothing Anywhere Near Anything) are well known acronyms. Individuals are concerned about a loss in property values if overhead lines are built too close to their homes, touristy areas are concerned about the economics and environmental groups fear the destruction of sensitive areas.

If policy makers are serious about grid extensions, a clear legal framework of when to apply partial undergrounding and when not needs to be developed. This will help to address public concerns, provide planning security for Transmission System Operators and consequently for the supplying industries. This includes the role of national regulators, which as of today have the legal obligation to minimize installation costs yet can not take into account socio-economic benefits that may arise from a faster project realization due to partial undergrounding.

Europacable is of the view that most of the planned power transmission lines in Europe shall be built using overhead line technology. To address the public concerns and speed up the building of the needed transmission lines Europacable firmly believes that the concept of partial undergrounding in "sensitive areas" can be an appropriate tool.

This concept has been agreed in the Joint Europacable/ENTSO-E paper under the umbrella of the European Commission.

Facts about Extra High Voltage (EHV) Underground Cables

State-of-the-art technology: XLPE cables are available, well established and operate safely in accordance with international standards. Integrating a partially underground section into a grid is complex and needs to be analysed on a case-by-case basis – but it is entirely feasible.

High Reliability

XLPE cables are checked according to international standards after production and when installed. Once in the ground they are well protected against any external adverse conditions. Spare parts are to be kept in stock to shorten repair times in case of fault. In any case, thanks to the N-1 criterion, electricity supply will not be interrupted in cable systems due to single cable faults.

Limited Environmental Impact

While installation works are a considerable intrusion into the environment, vegetation will be re-installed after 1 or 2 summers. There is no limitation to agriculture or farming on top of the cable trench. The width of the cable trench depends mainly on the desired transmission capacity. For example, for a 400 kV XLPE AC cable system (3.600 A per circuit, 4 trenches) 20-25 meters will be required. Under normal load operations, the cable temperature will not lead to a drying of surrounding soil.

No Risk to Human Health

Above an underground cable system carrying 400 kV the exposure to magnetic fields does not exceed the reference level of 100µT based on EU Recommendation 199/519/EC. As the underground cable is shielded, there is no exposure to an electric field above ground.

Societal Benefits

Higher investment costs can be compensated through societal benefits: Partial undergrounding will increase the cost factor of an entire transmission project by a factor of 1.2-2.0. These higher investment costs can be compensated through the socio-economic benefits arising from a faster project realisation.

Myths & Realities

There are many myths and realities about what underground cables can and can not do. Europacable addresses those myths, presents the facts and offers a view on the most important issues.



The technical information we provide here is based on the Joint Paper Europacable prepared with ENTSO-E under the guidance of the European Commission DG Energy. The brochure is available via our website at www.europacable.com

High Voltage Direct Current (HVDC)

Carrying High Power Over
Long Distances

Writer: Ernesto Zaccone, Chairman Europacable High Voltage Systems Group



High Voltage Direct Current (HVDC) cable installations have seen a significant increase over the past years. HV XLPE DC cables will be a key technology moving into the future.

They allow for long distance, point-to-point transmission of high power: lower power connections are in use to connect islands to mainland or feed offshore platforms; and more powerful connections are used for interconnection and connection of offshore wind generation. Over recent years, a continuous increase in transmittable power has been achieved. Most recent projects have reached voltages of ± 320 kV with a capacity of 800-1,000 MW. This trend will continue in the years to come.

With switchgear technology becoming available, meshed HVDC networks will be gradually introduced, and Europe will see the creation of an additional HVDC overlay network. With current networks operating in AC, any DC connection needs to be converted back into AC. The required converter technology is fully available today and will certainly see further evolution in the future.

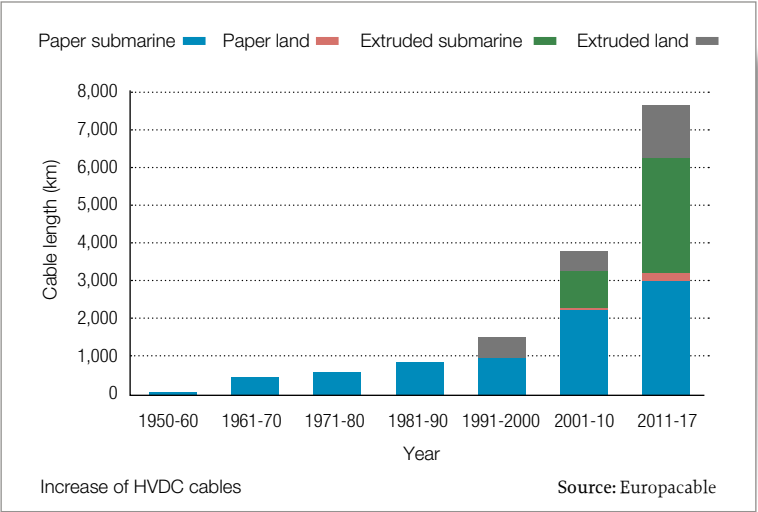
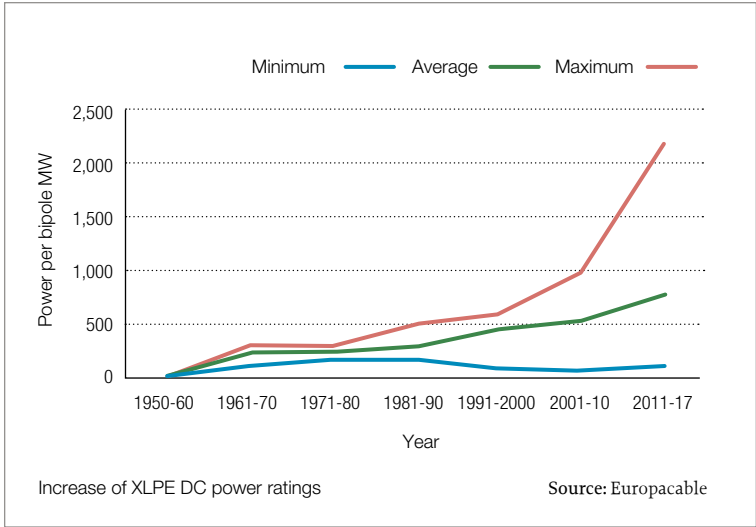


Image: On-site pulling operations of EHV cable. Source: General Cable



HVDC Subsea Cables

High Voltage DC subsea cable systems are a key technology for the development of future European electricity transmission networks. They serve two functions:

1. to interconnect countries or islands separated by sea; and
2. to connect remote offshore platforms to main transmission grids.

For interconnections today, HVDC subsea transmission technology is largely applied in single point-to-point connections. Among the latest best practices in Europe is the Western Link UK, connecting Scotland to England via a 425 km submarine cable link deploying a bi-pole with two mass-impregnated cables of ± 600 kV for the transmission of 2,200 MW. **The Western Link UK will be the most powerful HVDC connection ever realized with a maximum water depth of 350 meters.** Looking into the future, meshed HVDC subsea systems will become available, thereby interconnecting remote parts of the European Union to one single electricity network.

In addition to serving as an interconnector, HVDC subsea cable systems can also connect offshore substations on platforms to mainland grids. Offshore platforms can export electricity generated from one or several offshore wind parks to land or they can serve as a power distribution hub for

offshore oil and gas operations. Current best practices include the Borwin 2 Project, a large scale offshore wind installation in the North Sea located some 120 km north of the German coast. When completed, two XLPE DC cables ± 300 kV 800 MW will connect the Borwin beta platform to the transmission grid over a distance of 75 km.

The installation of HVDC XLPE subsea cable systems is a considerable challenge: the maritime environment adds a significant complexity to the cable installation, operation and maintenances. A distinction needs to be made dependent on the laying depth: in shallow waters up to a maximum depth of 500 meters, burial is mandatory to protect the cable against the risk of damage from fishing gear and anchors; in waters of 500 to a maximum of 2,000 meters deep, potential threats from fishing gear and anchors are non-existent and consequently the cable can be laid directly on the seabed.

As access to subsea cable systems is difficult once installed a cautious and precise installation by highly-skilled experts is key to ensure long-term reliability. Installation vessels and submarine robots are at the center of the installation operation. Depending on the cable weight and diameter, typically up to 100 km cable length can be carried on a rotating turntable on the laying ship.

Image: Transpooling of submarine cable. Source: Prysmian Group

HVDC Underground Cables

Generally speaking, HVDC power transmission on land can be reliably installed either as overhead line or as an underground cable. HVDC mass-impregnated underground cables have a long operational track record of over 40 years and are a proven and reliable transmission component. HVDC XLPE AC underground cable technology has been in service in voltages up to ± 200 kV since 2002. Europacable expects XLPE to be the key DC cable technology of the future with voltages up to ± 550 kV.

In principle the installation of HVDC XLPE underground cables is similar to that of XLPE underground cables, yet the environmental footprint is smaller as less cables


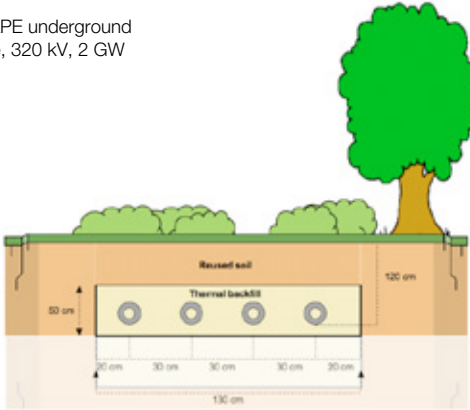
are required. This allows for comparatively narrower trenches as can be seen in Figure 3. Individual cable sections are linked by so called joint bays which are typically directly buried into the ground. If required, joint bays may be placed into an underground structure which has no or only very little visibility above ground. As for AC power transmission projects, partial undergrounding is also technically available for DC land interconnectors today. For DC projects, partial undergrounding sections may cover distances from 50 km onwards. Hence, the concept of partial undergrounding can also be applied as an intrinsic characteristic for Europe's future HVDC overlay grids. 

Fig 3: HVDC XLPE underground cables: 2 Bipole, 320 kV, 2 GW



Source: Europacable Introduction to HVDC underground cables, 2011

Keeping the lights on

Writer: Fabio Romeo, Chairman Europacable Executive Board

High quality energy and communication cables are primordial for the functioning of modern life. Europacable member companies are fully committed to meeting the highest technology and production standards to ensure a reliable and safe functioning of their products.

The products manufactured by Europacable member companies meet the highest EU standards and customer specifications aimed at ensuring the security of energy supply and the ever-increasing need to transmit information. Installed in private homes, public

buildings, distribution, transmission and mobile networks, cars, trains and airplanes and literally any electrical and communication equipment – wires and cables are the key component to the functioning of modern societies.

Image: Frankfurt, Germany, by night



Looking Forward to an Integrated Europe

Planning European Electricity Highways for 2050

Writer: Gerald Sanchis, e-Highway2050 Coordinator



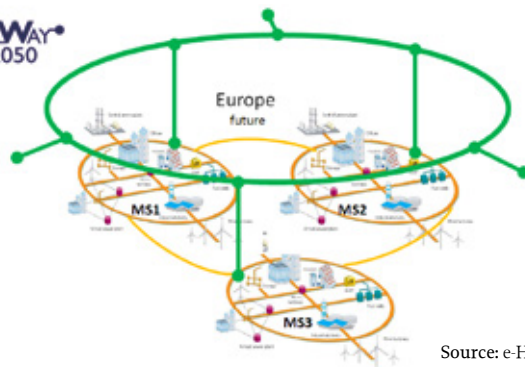
Objectives

e-Highway2050 is a 40-month EU-funded research and development project, launched in September 2012, which aims at developing a new planning methodology able to deliver a first version of coherent Modular Development Plans of the pan-European power transmission system, going from 2020 to 2050.

The resulting pan-European grid is expected to enable electricity market integration and to meet the 2050 decarbonization goals of the electricity system by integrating large quantities of energy from renewables to be transported over long distances from production sites to load centers.



Source: e-Highway2050



Source: e-Highway2050

Workflow

The newly developed top-down, modular, long-term planning approach follows five main steps:

1. The generation of different long-term energy scenarios set on the basis of technical and macroeconomic data, where the energy adequacy between generation, exchanges and consumption is ensured at the European level whatever the energy scenario studied.
2. The development of scenario quantification, using assumptions about the generation mix, exchanges and consumption by area and based on a European grid model. The energy adequacy between generation, exchanges and consumption is ensured at the European and country level whatever the energy scenario studied.
3. The use of market and power flow simulations to identify feasible and efficient pan-European grid architectures under each energy scenarios by 2050.
4. A verification that the selected reinforcement options and novel network architecture options alleviate critical issues focusing on overload and possible voltage and stability problems for a given level of system reliability.
5. The development of implementation routes from now to 2050 of the pan-European transmission system, covering each scenario, and optimized by taking into account social welfare, environmental constraints, as well as grid operations and governance issues.

In parallel, the possibility to mathematically formalize long-term planning methods is investigated using enhanced optimization and advanced simulation tools.

Image: Installation of subsea power link to upgrade electricity transmission network. Source: Nexans



First results

At the mid-term of the project development, five "extreme but realistic" scenarios at the 2050 time horizon have been built defin-

ing the most challenging contexts for the European power system at that time horizon. The five 2050 scenarios are:



1. Deployment of large-scale RES technologies with the support of centralized storage solutions



2. High GDP growth and market-based energy policies based on an internal EU market, EU-wide security of supply and coordinated use of interconnectors for cross-border flows exchanges in Europe



3. Large fossil fuel deployment with CCS and nuclear electricity: electrification of transport, heating and industry mainly at centralized level. No flexibility is needed due to low level of variable generation from PV and wind



4. 100% RES electricity: Large and small-scale storage technologies as well as links with North Africa are required to balance the variability in renewable generation



5. Small and local solutions dealing with de-centralized generation, storage and smart grid mainly at distribution level


A European grid model in 96 clusters has been developed and used for the scenario quantification. For each scenario, the localization of installed capacities and the level of electricity demand and imbalances have been computed over the 96 clusters. In parallel, a data base on a selection of power technologies gathers likely evolutions of their

cost and performances for the next decades. These elements will feed the power system simulations which will prioritize the candidate reinforcement options and define feasible and efficient European grid architectures at 2050 for each scenario.

Future exploitation



Within the future exploitation of e-Highway2050 results, the grid planning methodology and the resulting modular plans at 2050 will constitute a core tool for future

pan-European network expansion studies by ENTSO-E, European TSOs and stakeholders of the electricity value chain. 

For more information: www.e-Highway2050.eu Twitter: [@e_Highway2050](https://twitter.com/e_Highway2050)

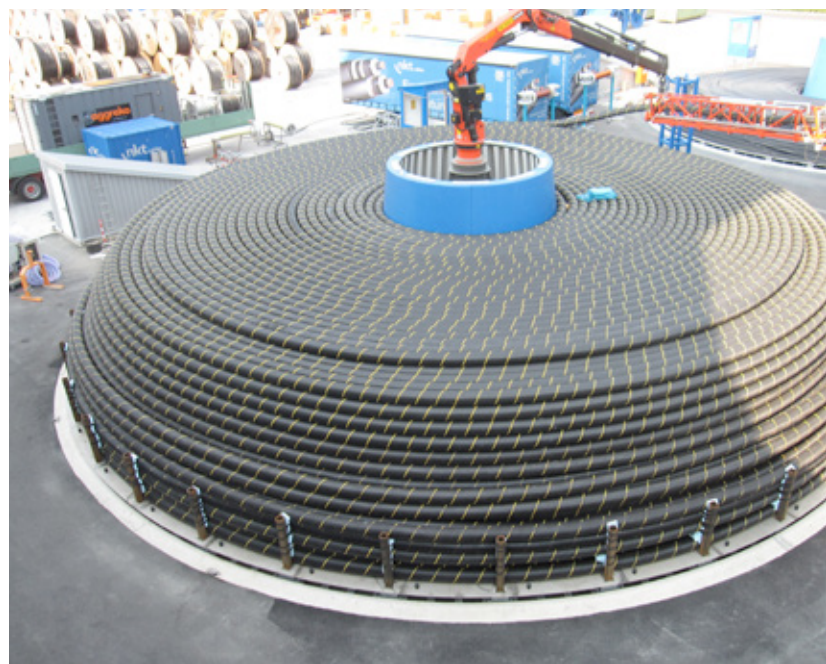
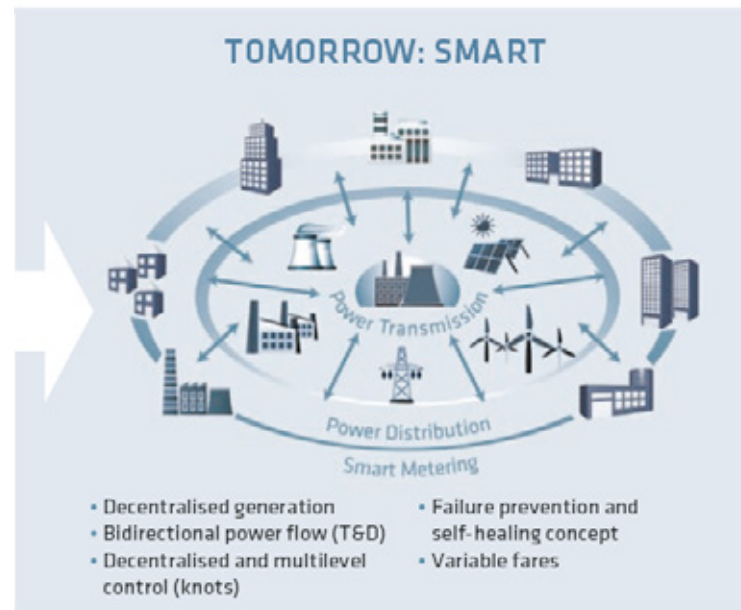


Image: A high voltage cable turntable for power transmission cables. Source: nkt cables



Source: Europacable

Moving towards smarter grids

Writer: Eric Devey, Member Europacable Utilities Board

Today's energy networks are primarily based on large central power stations with a one-way power flow from the power station to the passive consumer. As can be seen from the graphic above, future energy networks need to become "smarter".

Smarter energy networks will be more resilient and will be able to avoid black-outs; they will allow significant savings in energy with better interconnections; they will enable an active role for consumers;

and they will increase the use of renewable energy resources by better integrating them.

The re-engineering process from current networks to smart energy networks covers a

complex range of issues from market design to organizational, regulatory and technical issues. Research activities are needed to develop new technologies which will make transmission and distribution networks stronger and smarter. In particular, this means enriching the networks with information technologies such as sensors, digital meters and a communication network.

Cables systems will play a central role in enabling this evolution towards smarter

power networks. So-called "hybrid power and communication cables" will enable powerful information transmission systems, allowing both a data collection and a network monitoring while at the same time offering a high reliability for electricity distribution and transmission. By deploying such cable technologies, adequate responses to an always evolving situation of the distribution network as well as better monitoring of power flows on the existing distribution networks will become available. ☺



Europe's wire and cable industry is one of the few manufacturing industries where European companies are global technology leaders

Europacable member companies comprise both large multinationals as well as highly-specialized small- and medium-sized cable manufactures.

Our members alone provide over 70,000 jobs globally, of which over 50% are located in Europe, with more than 300 international production facilities. In 2012, sales exceeded 21 billion; 50% of which was in the EU.

Europacable is listed in the European Commission's transparency register under 453103789-92 and is a partner of CENELEC.

Our member companies:



Try
life
without
us

WHAT LINKS POWER TO THE WORLD?



Cable solutions to support the development of the world's energy infrastructure

Prysmian solutions exist to help grid operators and utilities, industrial companies, electrical wholesalers and installers generate and distribute the energy that powers every aspect of our world.

From submarine to high, medium and low-voltage cable solutions, we apply innovation and a commitment to helping customers achieve sustainable, profitable growth, our best-in-class technology can be found at the heart of many of globally significant projects, where power transmission and distribution are critical in the development of tomorrow's communities.

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Image: Partial undergrounding of 380 kV Randstad Project in the Netherlands Source: TenneT