

**Turnkey cable solutions
to ensure the reliability of your energy network**

New power perspectives

Electrical energy is at the very heart of modern life. Indeed, nearly all human activities depend on electricity. We need it for warmth, light, the ability to cook, wash, travel, work, survive and amuse ourselves. Today, worldwide electricity consumption is increasing 2.4% annually, with developing Asia increasing by 3.7%. However, there are still 1.6 billion people in the world without electricity, and this could reach 2 billion by 2020. In the wake of numerous blackouts, there has been heated discussion about the cheapest, most efficient and safest way of producing electricity in terms of primary fuels and technology. There is also concern about the transmission and distribution side of the business. Infrastructure reliability and grid interconnectability are now seen as the keys to a sustainable supply of low-cost electricity.

Among recent trends, developing nations are rapidly “electrifying,” while developed ones are consolidating their systems for better conservation and efficiency. The fuel used for generation has been shifting, mainly from coal and oil to cleaner burning natural gas. Hundreds of wind turbine projects, mostly offshore, are underway in 90 countries, with

experts predicting that 12% of the world’s electricity could come from wind power by 2020. Hydro electricity, too, is continuing to expand, especially in South America, and many nuclear sites are undergoing massive extension programs. All of these activities require innovative, reliable cabling, and often turnkey solutions, to optimize operations and achieve the highest levels of safety.

What power utilities expect from cable manufacturers:

- Advanced knowledge of all power plant types, and their cabling needs
- A comprehensive range of high-quality transmission and distribution cables and accessories
- Turnkey capability for high-voltage transmission links, both underground and submarine
- Expertise and engineering assistance at the design stage
- Advanced data and telecom cables (including broadband capacity cables) for control and grid management
- Ability to transport, deliver, install, and maintain anywhere in the world
- Constant innovation in areas like Extra-High-Voltage (EHV) and superconductivity
- Full environmental responsibility, including recycling



Nexans helps you bridge the energy gap



Nexans has the products and expertise to serve power generation and transmission/distribution networks. From thermal coal-burning plants to gas turbine systems, from hydro-electricity to windfarms, Nexans provides you with a full range of quality energy and data cables. Moreover, Nexans is Nuclear Qualified for all types of reactors, offering fire-safe special cables for power plant management. Our transmission and distribution cables include all technologies. For high-voltage, Nexans offers turnkey capability, from initial system design to final installation (using specialized software and dedicated tools, including vessels and remote operated vehicles for submarine installation). Having pioneered fluid-filled cables, still frequently used for submarine HVAC and HVDC transmission, we continue to develop and improve the performance and properties of XLPE cables for medium-, high- and Extra-High-Voltage applications, and have an extended range of bare overhead conductors, with composite core and with special alloys for enhanced high-temperature performance, and AERO-Z® designs for greater capacity.

We are especially adept at bringing local power production to national grids and supergrids, and are world leaders in Extra-High-Voltage and superconductivity. All of our cable solutions include the option of a complete range of Nexans-designed accessories from 1kV to 525kV. To further enhance electrical networks, we often “twin” optical fiber with energy cables, thus providing your transmission lines with broadband capability and with thermal monitoring for network management.

Nexans expertise for reliable generation and a robust infrastructure

- World supplier of all energy/data cables and components for power utilities
- Ability to innovate and provide customized solutions for a state-of-the-art industry
- System integrators, able to merge power plant management capability with complex transmission and distribution networks (grids and supergrids)
- Expertise in the design and manufacture of underground cables, submarine cables and overhead conductors

- Close partnership with power utilities, independent systems operators (ISOs), engineering procurement and construction companies (EPCs), installers, and sub-contractors
- Reliable delivery through dedicated logistics, and available plant capacity worldwide
- Unsurpassed installation experience, using advanced equipment (e.g. ROVs), special software for overhead transmission line design, and maritime cable installations
- Complete range of purpose-designed splices, terminations, transition joints between various types of cable
- Compliance with world standards: IEC, NF, BS, CSA, ASTM, EDF, ICEA, etc.
- Training for cable operators and maintenance personnel



Nexans provides a comprehensive range of power utility cables...

Extra-High-Voltage cables and superconductivity

EHV cables can carry 500 kV; cryogenic cables cooled by liquid nitrogen allow more current to be carried in reduced cable diameters.

Nexans is designing a 138 kV superconductive cable and accessories (qualified to 161 kV) for the Long Island Power Authority (USA) which will be a world first and important technological milestone.

High-Voltage DC cables

Fluid-filled and mass-impregnated HVDC cables can deliver high power capacity over longer distances, especially in submarine installations.

To connect Northern Ireland and Scotland, Nexans provided two unique HVDC submarine cables with an Integrated Return Conductor (IRC) which eliminates the magnetic field.

XLPE High-Voltage cables

Originally designed for underground HV transmission, these cables are rapidly replacing fluid-filled cables undersea, as well.

To upgrade the DK6 thermal plant in Dunkirk, Nexans provided Alstom with 18.5 km of 225 kV XLPE cables, comprising 2,000 mm² enameled

copper conductors, an innovation which allows a 15% gain in current capacity.

Overhead lines:

Aluminum conductor steel or composite reinforced, all aluminum alloy conductors, and other overhead conductors. New thermo-resistant conductors operate up to 200°C without increasing the sag, and with reduced tension on the towers. Nexans has also developed a new generation of insulated aerial lines.

Z-profiled AERO-Z® conductors, developed in Belgium, and used increasingly worldwide, allow greater amperage on the same cross-section, less Joule loss, reduced drag, lower galloping, etc.

XLPE Medium-Voltage cables

Widely used by power utilities in developed and developing countries, these reliable cables provide practical solutions to most network problems.

Nexans provided MV interconnections between turbines and the composite 170 kV three-phase power cable with integrated fiber optic elements between shore and the world's largest offshore windpark, Horns Rev, Denmark.

MV and HV accessories

All types of connectors and plugs for bare and insulated cables. Insulated connectors for distribution and transmission equipment (transformers, switches), as well as cable joints and terminations.

Nexans provided Tunisia's national power company STEG with easy-to-install, durable cold shrink joints for 12, 17.5 and 36 kV underground cables, an African first.

Low-Voltage underground cables and LV accessories

For plant applications, and subscriber distribution. Accessories include LV cabinets and straight and branch joints.

Underground LV cables provide optimum safety and environmental-friendliness in cities.

Aerial Bundled Conductors (ABCs)

0.6/1 kV XLPE aluminum core cables used for both network and residential connections; the latter can have one or two copper conductor(s) for monitoring purposes.

Thousands of km of Nexans' ABCs are being installed by the energy utility, Tatenergo, in the Republic of Tatarstan under a 5-year contract. This cable is also being widely used in many other countries.



Local and Wide Area Networks

to assure power plant and infrastructure security



Power, control, instrumentation, fieldbus, compensation and coaxial cables (HFFR)

to control power plant pumps, motors, relays, valves and provide video surveillance



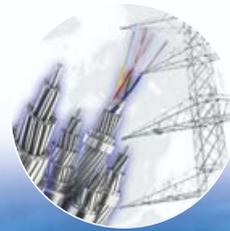
XLPE Medium-Voltage cables
for energy transmission
(up to 60kV)



XLPE High-Voltage cables
for aerial, underground and
undersea energy transmission



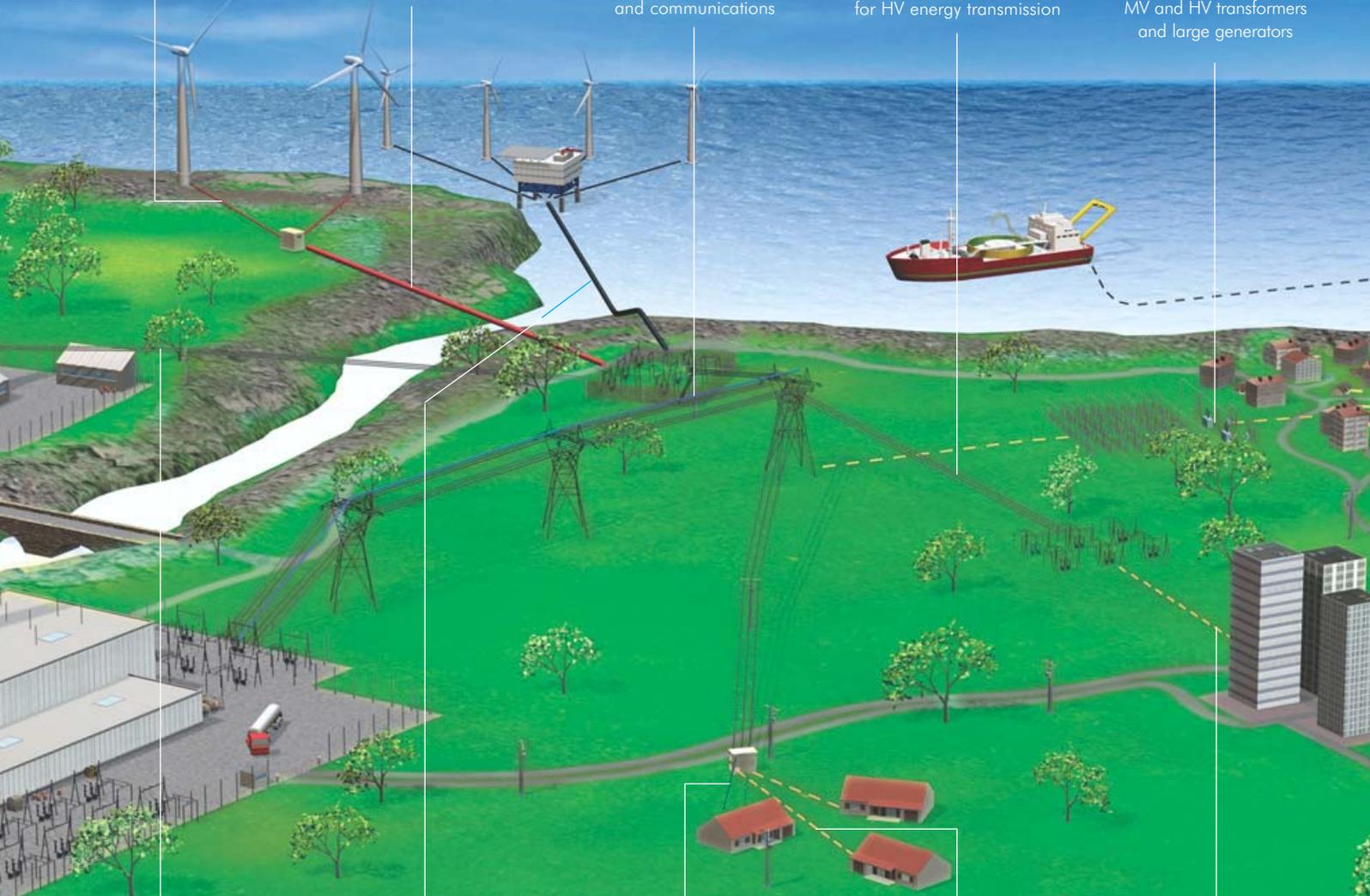
**Fiber optic data cables and
accessories** (and OPGWs)
for plant management, control
and communications



Overhead lines
(aluminum or
aluminum alloys)
for HV energy transmission



Winding Wires
(self-bonding wires, CTC, etc.)
for timers, valve relays, small,
MV and HV transformers
and large generators



Cable installation software
for aerial conductor positioning



High-Voltage DC cables
(fluid-filled and mass-impregnated)
to deliver high power capacity
over longer distances



**Aerial Bundled
Conductors (ABCs)**
for network and
residential connections



**Low-Voltage underground
cables and LV accessories**
for plant applications and
subscriber distribution



**Medium- and
High-Voltage accessories**
for distribution and
transmission equipment

...to make your network safe from blackouts



Special laying ships and ROVs
for submarine cable laying,
trenching and back-filling

Winding wires

For timers, valve relays and small transformers, but also self-bonding wires for electrical motors of all sizes, and large generators.

Nexans' Continuously Transposed Cable (CTC) for MV and HV transformers are easy to wind, enhance performance and reduce electrical loss.

Power, control, instrumentation, fieldbus, compensation and coaxial cables

To control power plant pumps, motors, relays, valves, and provide video surveillance.

All the above are available in halogen-free, low-smoke, low-corrosive, fire-retardant or fire-resistant designs to protect power plants and substation infrastructure and personnel.

Fiber optic data cables and accessories

For plant management, control and communications. Optical fibers can also be integrated into XLPE, or aerial Optical Ground Wires (OPGWs).

For the island of Smøla (Norway) windfarm: Nexans designed and installed a composite 145 kV three-phase AC High-Voltage cable and fiber optic communications and control cables.

For a connection between Spain and Morocco: Nexans is providing a fiber optic submarine cable, for control and telecom services.

Local and Wide Area Networks

To assure power plant and infrastructure security, Nexans has both advanced fiber and copper LANs/WANs solutions.

The kind of data speeds achievable means that power utilities can now plan a decade ahead without expensive retrofitting.

Cable installation software

Nexans uses sophisticated CAD software for positioning aerial conductors in keeping with conductor type, terrain, optimum tower position, ideal span.

To "hang" cables dynamically offshore, Nexans' custom software determines layout according to currents and waves, avoiding the need for expensive on-site mechanical testing.

Special laying ships and ROVs

Special cable-laying vessels, trenchers and excavators are guided via a Global Positioning System (GPS) for secure seabed touchdown and burying.

Nexans' CAPJET Remote Operated Vehicles which position, trench and back-fill cables to protect them from anchors and trawlers, have buried over 3,500 km of cable worldwide.



Extra-High-Voltage and superconductivity

to allow more current to be carried in reduced cable diameters

Extensive services to meet your grid requirements

To help you meet your energy goals, especially HV on land and offshore, Nexans goes beyond cable to offer a number of important services:

Expertise

Over many decades, Nexans has accumulated expertise in land-based, aerial and maritime energy/telecom cables, components and installations. We understand the overall energy context, from power generation, to transmission and distribution within national and international grids. We are especially concerned with finding the most economic cable solution to meet customer expectations, though cable types and standards vary widely around the world. Wherever possible, we provide you with complete answers to every aspect of your business.

Global presence

Being pre-qualified in many countries worldwide, we are well-positioned to take on multi-supplier projects and international joint ventures. With plants on five continents and representatives in over 65 countries, we can follow you with ease.

We can even count on our local production plants to provide power utilities with needed cable on the spot. Nexans stands behind each of its products, wherever it is manufactured. We are key players on a host of infrastructure projects, both onshore and offshore, worldwide.

Performance

We execute our projects within strict deadlines, including installation which can depend on variable "weather windows." Since technical specs are often locally-determined, we find appropriate, interconnective solutions. Given the fluctuating nature of multiple energy sources, we seek innovative ways to reinforce the stability and consistency of power production, storage, transmission and distribution. Our tested and durable accessories play an important role in preventing malfunctions which cause power shortages and grid-wide blackouts.

Partnership

We are concerned with developing solutions for tomorrow's low-carbon environment in which renewable energy will play a leading role. Sometimes this is done internally with members within Nexans' research and development resources. But this is also done with outside firms who have complementary skills and products. By working together, we aim at finding cabling solutions which will be beneficial to all parties involved. The important thing is to bring value to the table for each and every project, and develop cooperative solutions.

To bridge the energy gap, Nexans serves the complex power generation market, and reinforces transmission and distribution grids to help you provide reliable electrical energy for generations to come.





Global expert in cables and cabling systems

Nexans is the worldwide leader in the cable industry, with an industrial presence in 29 countries and commercial activities in 65. The Group employs 17,000 people. Its sales amount to 4 billion Euros. Nexans brings an extensive range of advanced copper and optical fiber cable solutions to the infrastructure, industry and building markets. Its cables and systems can be found in every area of people's lives, from telecommunications and energy networks, to aeronautics, aerospace, automobiles, railways, buildings, petrochemicals, medical applications, etc.

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