Nexans

Complete cable solutions
to develop your windfarm infrastructure

Energy growth still blowing in the wind

The international wind industry market is continuing to grow and diversify geographically. In fact, wind power is now generating over 3.5% of the world's electricity. The most advanced scenarios predict that wind could be providing 12% of the world's electrical energy in some 50 countries by 2020.

Despite occasional lulls, wind power has continued to be an attractive alternative to fossil fuels and nuclear plants, and is expected to grow around 13% annually. It must increase if high expectations are to be met. Declining wind turbine prices make wind power even more cost-effective, while recent positive trends include: a move from onshore to offshore installations, larger wind turbines, and innovations, like deep-water floating wind turbines in Norway and Japan.

Growth demands new kinds of expertise. Onshore, upscaled turbines and generators mean that networks need room for added output, multiple connections and reliable links. Offshore projects (50 to 200 km out) require robust submarine cables, precision maritime installation, and efficient long-distance transmission.

Above all, variable wind energy calls for overall grid stability through monitoring, control, communications and surveillance.

What you expect from a cable manufacturer:

- Onshore and offshore capability for transmission and distribution links
- Professional installation skills, both in remote land-based and on offshore sites, including specialized installation equipment, to reduce total installation cost
- A comprehensive range of high-quality windfarm infrastructure cables and accessories from one supplier
- Secure dispatch of energy to the grid during production/ demand peaks by applying advanced line monitoring on bare OHL conductors
- Constant innovation to meet constantly evolving technologies and standards

Nexans expertise supports your network's evolution

Onshore and offshore, Nexans has the expertise to interconnect large wind turbines and complete wind farms to local or distant grids. For medium and high-voltage cables, we oversee complete installation, from initial pre-qualification, design, customized production, logistics, installation, topside termination, testing and pre-commissioning.
This includes all accessories as well, a key element in any failsafe energy network.

Offshore, we supply and lay MV subsea cables between wind turbines and the transformer platform, and also the MV or HV link to the onshore substation. We also provide terminations on wind turbines and transformer platforms.
Onshore we provide underground cables and all necessary terminations. We have a full range of transmission and distribution cables and bare overhead conductors to feed local power production into the grids.

Not only do we provide a full range of energy cables, conductors and services, we are also experts in the telecommunications infrastructure needed to manage windparks, including control and data cables, copper and fiber Local Area Networks.

Innovative technologies:

- World supplier of underground cables, submarine cables, overhead conductors and data/telecom systems
- Close partnership with developers, power utilities, installers and contractors
- Mastery of maritime conditions based on oil & gas submarine energy and telecom cabling experience
- Unsurpassed onshore and offshore installation and topside termination experience using advanced equipment, special software for overhead lines, and dynamic cable solutions
- Complete range of accessories: separable connectors, cold-shrinkable and heatshrinkable joints and terminations for various types of cable

A range of cable solutions for windfarm infrastructure...

Medium-voltage cables

• Onshore, underground single-core cables (33 kV) connect the strings of wind turbines, linking them in parallel to the substation; also 24 kV and 36 kV "smart cabling solutions" are available: TSLF-O, TSLF-OJ, TSLF-J twisted cables, and TSLF-O and TSLF-J singlecore.

• Cost-efficient submarine 3-core cables with integrated fiber optic elements and customized armor designs.

We provided inter-turbine/ export cables for Anholt (DK), the world's third largest offshore wind farm.

High-voltage cables for transmission

• Onshore AC transmission: cables ranging from 60 kV to 500 kV, XLPE insulated, are used for power transmission between the onshore wind farm substation to the central grid.

• Offshore AC transmission: submarine cables ranging from 60 kV to 500 kV with various designs available: 3-core XLPE cables (60–225 kV); single core XLPE up to 400 kV.

• Onshore and offshore DC transmission up to 500 kV applicable for high transmission requirements and long distances: mass-impregnated cables with Integrated Return Conductor, and Polymer-based insulated DC cables.

For the Lynn-Inner Dowsing windpark, we supplied and installed a 40 km long export cable to shore.

Overhead MV and HV conductors

Although most inter-turbine connections (MV) are underground for land-based windparks, bare overhead conductors are used to deliver power from the generation point to the domestic grid. Enhanced conductors incorporate special alloys and/or composite materials for important benefits.

A wide range of sizes and alloys according to country standards, climate and terrain.

MV accessories designed to reduce installation time

A range of onshore junction cabinets (ONJCs) and offshore junction chambers (OJCs) and frames for use in turbine towers. Pre-terminated leads offer important cost savings. For offshore, ONJCs can be used as a connection point between tower cables and subsea array cables.

Our terminations and joints make installation quick, easy and long lasting.

Auxiliary equipment and systems

Mechanical support (hang-off and clamping systems, protective shells / slabs / mattresses)

Easy-to-install hang-offs to fasten energy cables above sea level, available sealed or non-sealed.

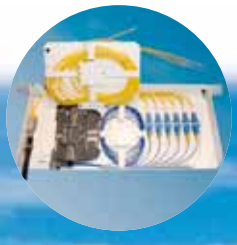
Fiber optic data cables

Overhead MV and HV conductors

Lo-Sag™ composite core

All-in-one solution for Belgian Northwind wind farm

Northwind is a 216 MW offshore windpark in the North Sea, 37 km off the Belgian coast. It consists of 72 wind turbines providing sustainable energy for 230,000 households in the area around Bruges, the "Venice of the North". In addition to type-testing and supplying all XLPE subsea cables, Nexans provided mechanical and electrical accessories. This included the onshore transition joints to connect the subsea cables to land cables, and accessories for two platforms (hang-offs, terminations and repair joints). Since the export cable crossed a sea channel subject to regular dredging, our Capjet ROV buried it 9 meters under the seabed. Nexans also saved money for the developers by providing a giant 1-meter-wide cable delivering power, data, control and monitoring instead of three separate cables.



Fiber optic accessories

Local Area Networks

Onshore junction chamber

Auxilliary equipment and systems

Cable installation software

Medium-voltage cables

High-voltage cables for transmission onshore

Special laying vessels and Capjet trenchers and Spider dredger

...to improve power output and performance

Offshore junction chamber

Fiber optic data cables

Optical fiber cables are increasingly being incorporated into MV and HV energy cables for remote control of rotor speed, blade angle, braking, temperature, hydraulic levels, etc. For new floating deep-water installations, we have developed a long-distance 3 kV umbilical and subsea termination unit for power and fiber-based communications to control cameras and sensors.
For all of our wind farm projects, we have integrated fiber optics according to customer requirements.

Fiber optic accessories

Nexans produces a full range of fiber access routing technologies, including splicing and modular distribution frames. Nexans' FiberArt™ splicing modules optimize fiber routing in towers and substations.
Waterproof closures assure secure connections between submarine cables and terrestrial networks.

Local Area Networks

To assure high levels of windfarm and local infrastructure security, Nexans has both advanced fiber and copper LAN solutions for complete monitoring, control and communications/surveillance functions.
Onshore data speeds now available offshore without retrofitting.

Cable installation software

Power Line Systems (PLS) software ideally positions aerial conductors on the terrain in terms of conductor-type, terrain profile, spans, length, etc.
Custom software determines ideal cable design for wind tower behavior in dynamic environments.

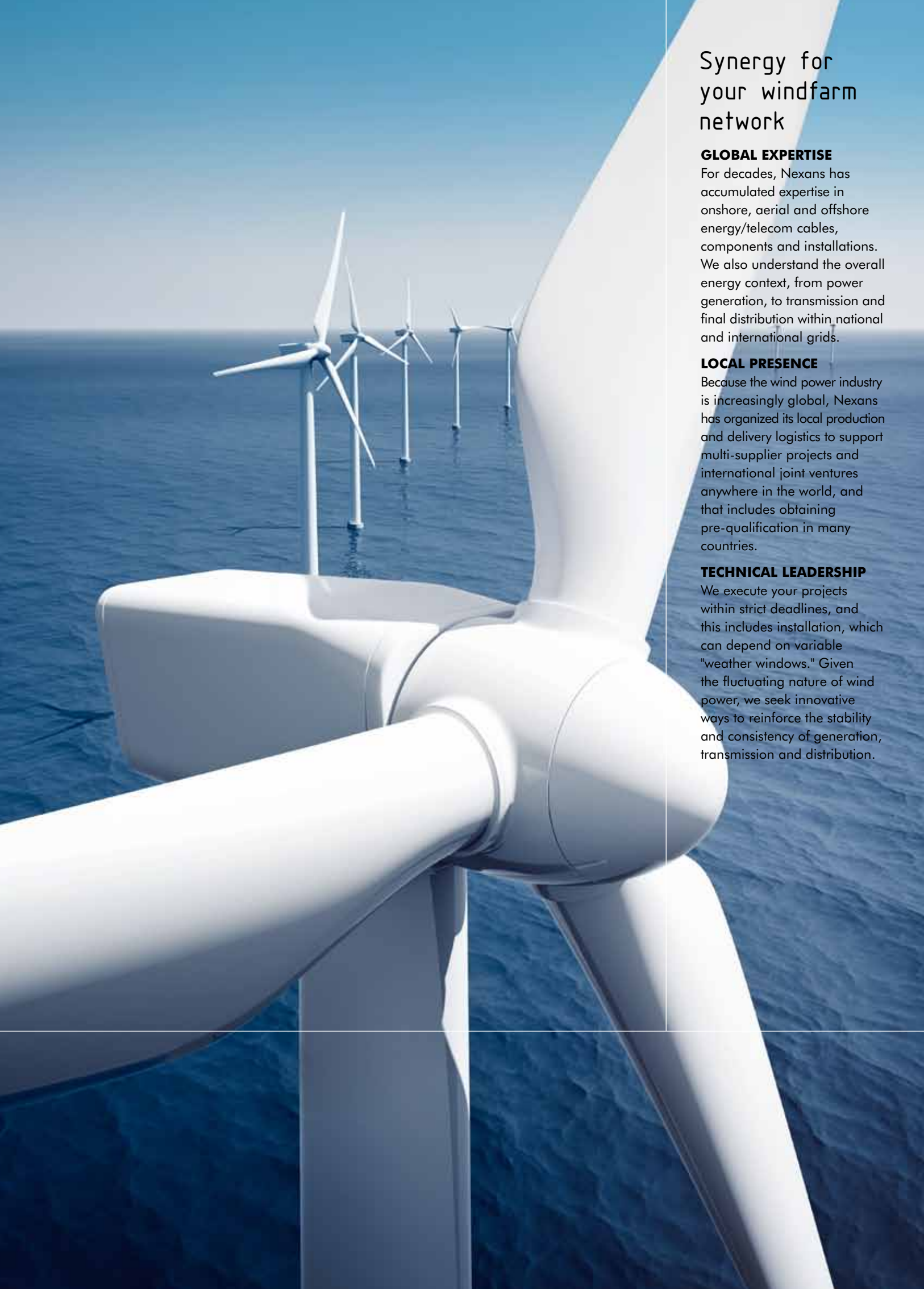
Special laying vessels and CAPJET trenchers and Spider dredger

To meet the submarine cable challenge, Nexans operates special cable laying vessels, CAPJET seabed trenchers and the "Spider" dredging system.
Our CAPJET ROVs have buried more than 3,500 km of cables worldwide.

Nexans, a long-term supplier for DONG Energy in Denmark

Denmark's DONG energy has the largest portfolio of offshore wind farms in northern Europe, and are dedicated to bringing down the cost of electricity through larger turbines, and the optimization of operations, maintenance and cable installations. Nexans has signed a framework agreement for the delivery of up to 900 kilometers of medium-voltage submarine cables over several years. We have been delivering up to 150 kilometers of high-performance cables every year for new offshore wind farms to connect the individual wind turbines with each other and with the transformer platforms out at sea. The scale of this ongoing contract and the fact that DONG is steadily ordering submarine cables for wind farms from Nexans demonstrate the quality and competitiveness of our products.

High-voltage cables for transmission offshore



Synergy for your windfarm network

GLOBAL EXPERTISE

For decades, Nexans has accumulated expertise in onshore, aerial and offshore energy/telecom cables, components and installations. We also understand the overall energy context, from power generation, to transmission and final distribution within national and international grids.

LOCAL PRESENCE

Because the wind power industry is increasingly global, Nexans has organized its local production and delivery logistics to support multi-supplier projects and international joint ventures anywhere in the world, and that includes obtaining pre-qualification in many countries.

TECHNICAL LEADERSHIP

We execute your projects within strict deadlines, and this includes installation, which can depend on variable "weather windows." Given the fluctuating nature of wind power, we seek innovative ways to reinforce the stability and consistency of generation, transmission and distribution.

Nexans

Global expert in cables and cabling systems

Nexans brings energy to life through an extensive range of cables and cabling solutions that deliver increased performance for our customers worldwide. Nexans' teams are committed to a partnership approach that supports customers in four main business areas: Power transmission and distribution (submarine and land), Energy resources (Oil & Gas, Mining and Renewables), Transportation (Road, Rail, Air, Sea) and Building (Commercial, Residential and Data Centers). Nexans' strategy is founded on continuous innovation in products, solutions and services, employee development, customer training and the introduction of safe, low -environmental- impact industrial processes. In 2013, Nexans became the first cable player to create a Foundation to introduce sustained initiatives for access to energy for disadvantaged communities worldwide. We have an industrial presence in 40 countries and commercial activities worldwide, employing close to 26,000 people and generating sales in 2013 of nearly 6.7 billion euros. Nexans is listed on NYSE Euronext Paris, compartment A.

Nexans S.A. – 8, rue du Général Foy – 75008 Paris – France
Tel: +33 (0)1 73 23 84 00 – Fax: +33 (0)1 73 23 84 84 – www.nexans.com
marcom.info@nexans.com