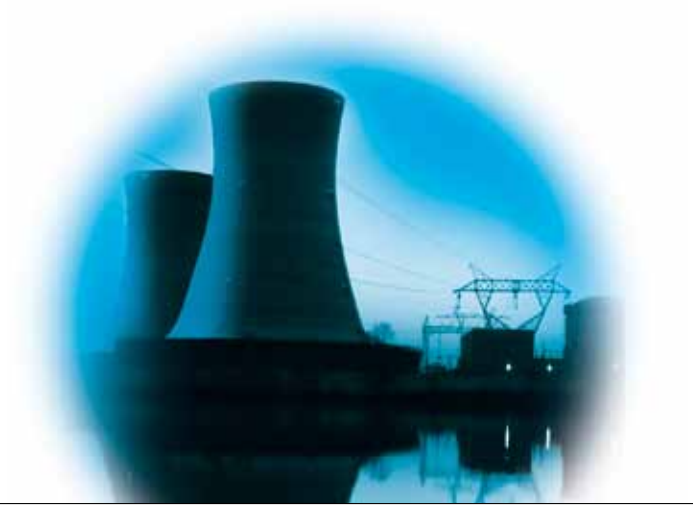
Nexans



Safe and reliable cable solutions for the world's nuclear industry

Nuclear viability...

Recent years have seen a renaissance of nuclear power worldwide. There are some 435 nuclear power reactors in operation which account for 14% of the world's electricity, and 30% within the European Union. New reactors are being built in China, India, Japan, the Russian Federation, South Korea, France, Finland, Slovakia, Romania and Bulgaria.

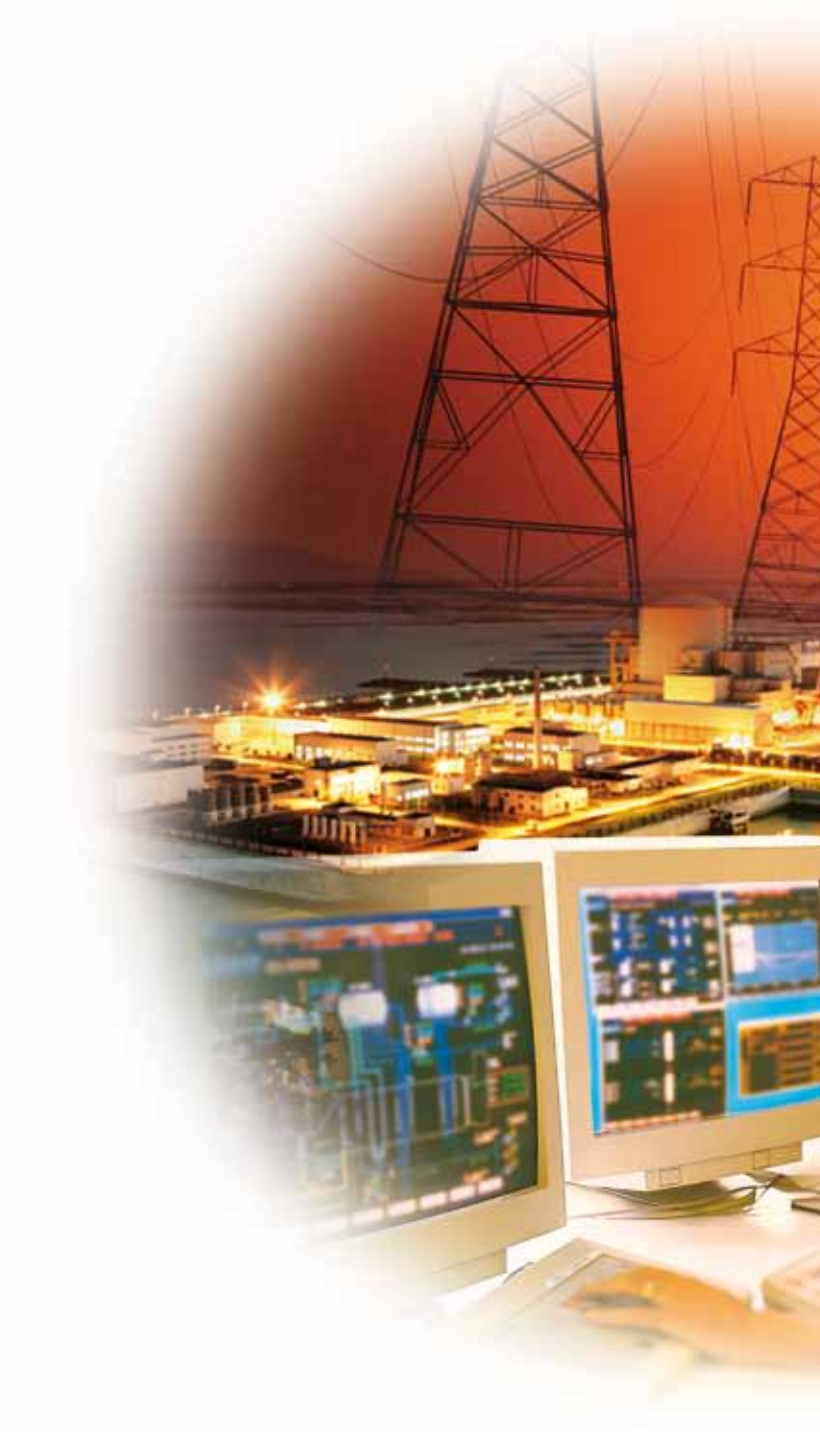
Aside from obvious economic benefits, nuclear energy can help curb global pollution and greenhouse gases, and reduce dependency on fossil fuels. However, to win wide public acceptance, nuclear power has to be perceived as being absolutely safe, under all conditions and far into the future.

As a nuclear power plant authority or operator, you not only expect new plants to achieve new levels of safety and reliability, you are currently revamping existing plants to extend operational life and reduce risk. Whether you are running a light-water reactor (Pressurized Water Reactor/ PWR, French EPR/European Pressurised Reactor, Russian VVER, or Boiling Water Reactor/BWR), a heavy-water reactor (advanced CANDU type), a Gas Cooled Reactor, (GCR), a Liquid Metal Fast Reactor (LMFR), or Accelerator-Driven System (ADS), you are also looking to improve performance, while lowering construction and operating costs.

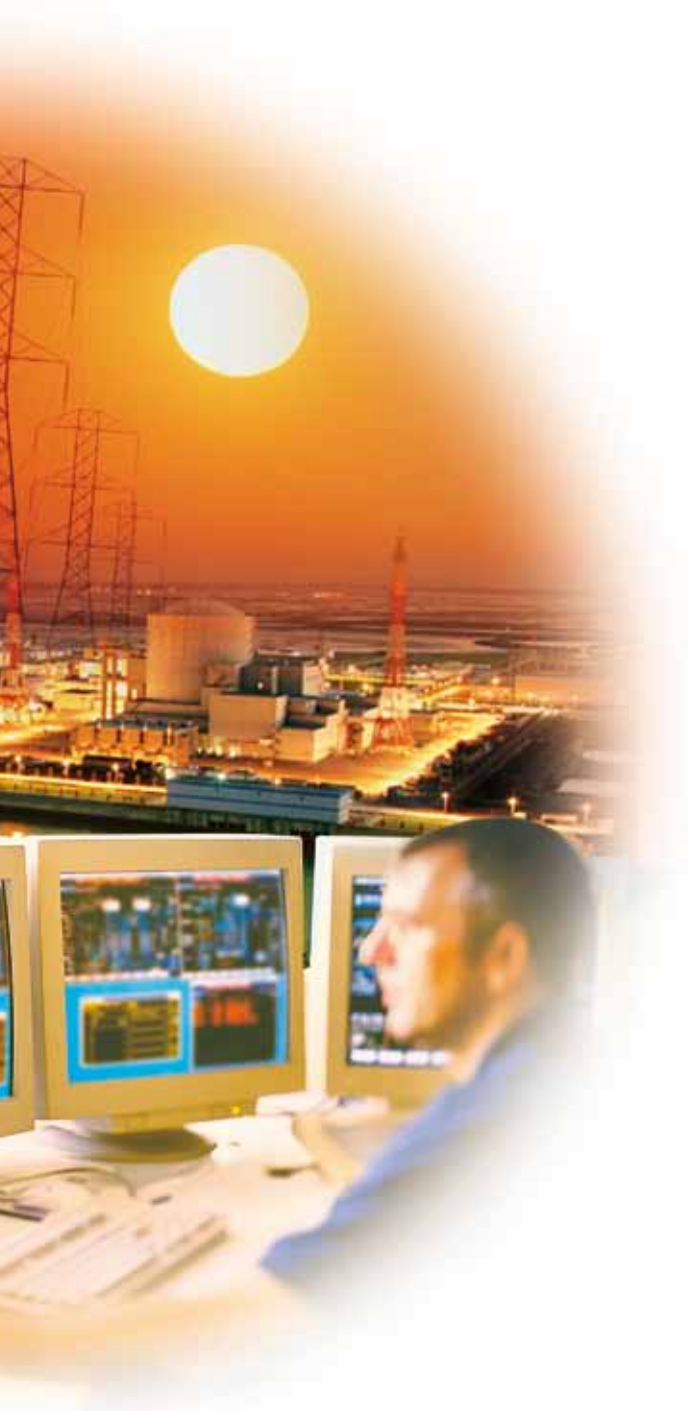
That is where custom-designed, nuclear-qualified cables play an important role by providing long-term viability, and assuring fail-safe operation indefinitely.

What you expect from a cable producer:

- wide range of state-of-the art cables for existing and new projects
- optimized operation, maintenance, and power plant life management (PLIM)
- proven solutions adapted to national standards and requirements
- performance and reliability over time (up to 60 years)
- protection against intrusion, attack, emergencies and natural catastrophes
- rapid response to technical requests and a long-term supply of replacement cables
- R&D knowledge and support for plant extension and upgrades



...requires safe and reliable cables



Nexans nuclear cables help assure a clean source of economical energy for coming generations.

From basic power to complex control and communications, Nexans cables are omnipresent in the nuclear industry.
To satisfy the most rigorous safety standards, Nexans has designed exceptionally robust cables and developed a line of halogen-free cables that keep operating during an emergency, while protecting people and infrastructure.
We draw on 35 years experience in thermal, radiation and design-based event testing.

Our close partnership with nuclear engineers has meant cables customized and fully-adapted to nuclear needs.
Where radiation-protection and LOCA (Loss of Cooling Accident) procedures are required for fast automatic shutdown, Nexans manufactures highly reliable K1 (1E-LOCA) cables. Elsewhere, K3 (1E non LOCA and non-1E) cables assure flawless performance over a lifetime. Both K1 and K3 cables provide the highest levels of performance by limiting the spread of fire and emitting little smoke and toxic gases.

A complete range of cables for quality and performance

- reliability in extreme hot/cold, humidity, abrasion, vibration, etc.
- fire-performance in emergency situations: fire retardancy/ fire-resistance
- low smoke and low toxicity through halogen-free materials
- technical and R&D support for total life management
- reduced construction costs due to standardized products
- quality assurance through ISO 9001/ISO 14001, approved by AFAQ and IAEA 50 C/SG-Q
- compliance with US NRC Regulatory Guide, ASME, NQA and IAEA Code of Practice
- performance standards in keeping with IEC, NF, CSA, ASTM, ICEA, GOST, BS.

Specific nuclear qualifications

- RCCE: Design and Construction Rules for Electrical Equipment for Nuclear Island
- CST/BTS: Book of technical specifications: Electrical Cables for Nuclear Power Plants
- IEEE 323: for nuclear power plant equipment
- IEEE 383: for (1) thermal aging, (2) radiation, and (3) LOCA test ; with (1) (2) and (3) for last day accident simulation, and (2) and (3) for first day of operation.

Safety classification systems comparison

	Safety classified		Not safety classified
American	1E LOCA	1E non LOCA	Non 1E
Russian	K0, K1	K3	
Korean	Q	R	
French	K1	K3	Non Classified

Nexans provides a full range of cables and accessories...

THE NUCLEAR ISLAND

Houses the nuclear core, steam generator and support systems which feed the turbine in the Conventional Island: averages 1,800 km of fire-retardant and halogen-free cables per unit.

LV/MV energy cables

These 1 kV to 10 kV cables are used to power all the pumps including the primary ones which move water between the reactor vessel and the steam generators in the containment area.

Nexans produced K3 and K1 cables for operation and automatic shutdown for the EPR Taishan 1+2 project in China.

Control cables

500 V to 1,000 V control cables are used to provide control for primary pumps, safety valves, chemical and volume control, residual heat removal, containment sprinkling system (EAS), primary waste treatment, ventilation, air-conditioning, etc.

Since nuclear power plant cables must offer higher reliability than ordinary cables, insulation and design are optimized to last up to 60 years, as required for EPR Flamanville (France), and Taishan (China).

Instrumentation/ sensor cables

Individually or collectively screened multi-pair, triad or quad cables are used for constant system surveillance by measuring steam pressure, water and component temperature, liquid levels, flow rates, and vibration, etc.

Nexans instrumentation/sensor cables can be bi-metallic (for thermocouples) and are designed according to K1 and K3 requirements to offer maximum reliability during normal operating conditions and in the event of incidents and accidents.

Control room cables

With over 100,000 connections throughout the power plant, these cables are its nervous system, transmitting all crucial energy and information: from low-voltage systems for lighting, ventilation and climate to measurement, control and telecommunications cables for safe operations.

Nexans furnished all control and instrumentation cables for the control room of Mochovce 3+4 (Slovakia), and others.

THE CONVENTIONAL ISLAND

Contains the turbine, the AC generator and the condenser, plus additional safety equipment: averages 300-500 km of cables per unit.

LV XLPE cables and connectivity

Copper (or aluminum) XLPE energy cables are used to connect the generator to the HV transformer. Nexans produces connectors, as well as cable joints and terminations.

These cables are widely used around the world by conventional electrical generating systems.

ALSECURE® fire-retardant and ALSECURE® PLUS fire-resistant cables

Energy cables (up to 1 kV) prevent fire propagation and dramatically reduce smoke emission, while the latter provide LV power for alarms, smoke evacuation, lighting, sprinklers and equipment during a fire.

Nexans is provided energy cables for Areva's III-generation EPR reactor in Flamanville (France).

Control/instrumentation/ sensor cables

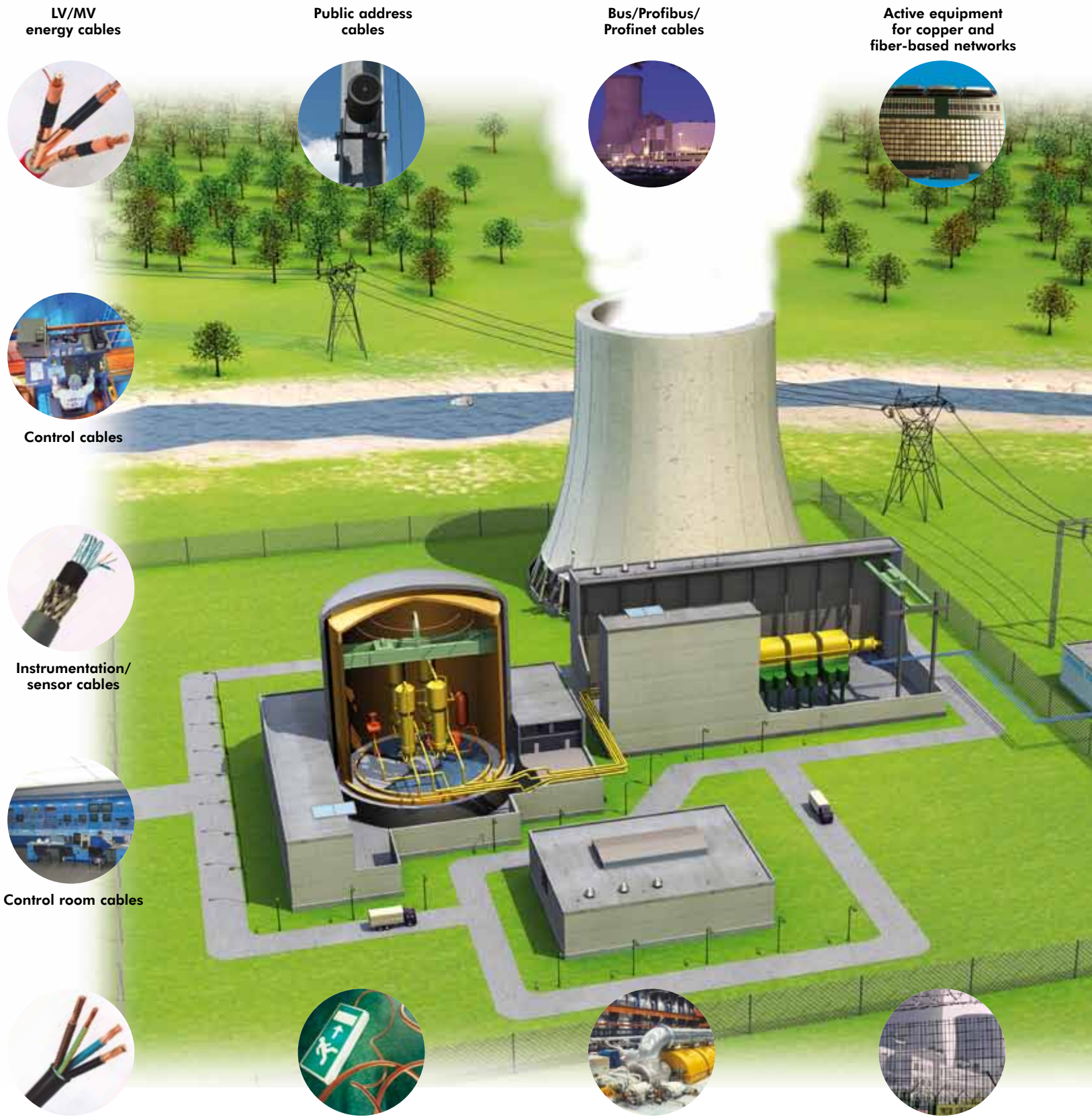
Same as for Nuclear Island, but now they are controlling the pressure and temperature of the steam going to the high-pressure and low pressure turbine elements, and other systems, including the condenser and heaters. They can be nuclear-qualified, according to customer requirements.

Nexans has provided these cables for both Ling Ao 3+4 (China), Temelin 1+2 (Czech Republic), and other projects.

Access-control cables

Secure cables that give a simple on/off signal for doors, gates, hatches, sliding panels, etc.

Nexans also designs special cables for motion detectors in sensitive nuclear plant areas.



LV/MV
energy cables

Public address
cables

Bus/Profibus/
Profinet cables

Active equipment
for copper and
fiber-based networks

Control cables

Instrumentation/
sensor cables

Control room cables

LV XLPE cables
and connectivity

ALSECURE® fire-retardant
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Control/instrumentation/
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Access-control
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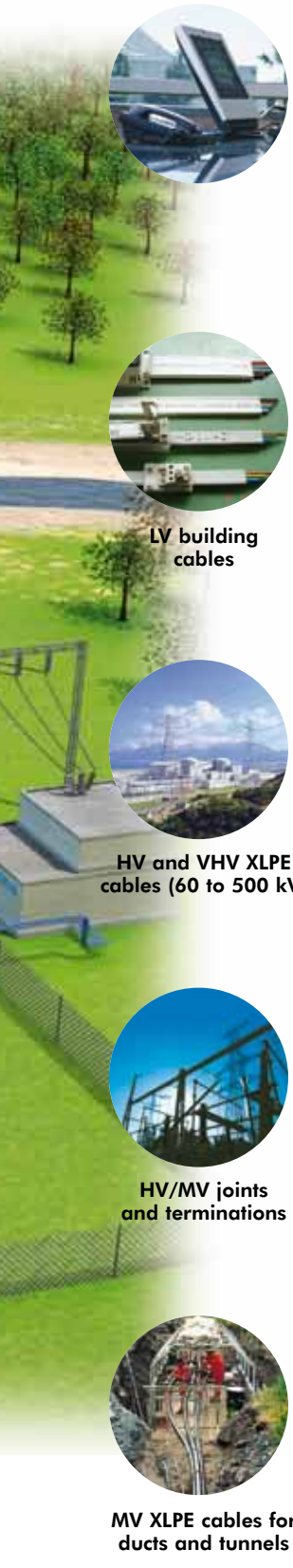
...for all nuclear plant infrastructures



Advanced LANs/WANs

LV building cables

HV and VHV XLPE cables (60 to 500 kV)

HV/MV joints and terminations

MV XLPE cables for ducts and tunnels

BALANCE OF PLANT (BOP)

Includes offices, warehouses, workshops, emergency diesel generators, spent fuel storage, outside transformer, etc.: averages 600 km of cables per unit.

MV XLPE cables for ducts and tunnels

For the energy backbone to maintain power in all circumstances for surveillance, management, comfort, safety and control. Includes the diesel backup system in case of power failure.

Nexans provides energy cables for the diesel generating sets in Mochovce 3+4 (Slovakia), Changjiang 1+2 (China) and others.

LV building cables

A wide range of proven building cables for every power need, from lighting to heating, from PCs to cleaning equipment.

Nexans LV flat cables, with movable junction boxes, are ideal for modular corridors and warehouses.

Advanced LANs/WANs

Copper and/or fiber optic networks for general management and telecommunications.

As with the two Islands, a very wide range of applications can be highly centralized. Nexans has provided complete LANs in French NPPs.

Active equipment for copper and fiber-based networks

Switches and converters for cable ducts, work stations, and outside installation.

Also provides power-over-Ethernet for IP cams, VoIP phones and WLAN applications.

Bus/Profibus/Profinet cables

ASI-bus cables provide signal transmission for building security, lighting and indoor climate control, while Profibus delivers 12 Mbits/s for complex control, and industrial Profinet cables offer 100 Mbit/s (Fast Ethernet) which fully merges control and operational functionalities.

Outside plant can withstand tough weather conditions, including extreme heat and cold.

Public address cables

High-performance loudspeaker cable for reliable public announcements and emergency instructions.

These silver-copper cables deliver a full sound spectrum and continue to function during a fire.

GRID INFRASTRUCTURE

Comprises the entire The transmission system beyond the transformers or the gas-insulated switchgear (GIS) feeds the domestic and international grids. Nexans delivers turnkey projects, from civil engineering, cables and accessories, to connection, testing and commissioning.

HV and VHV XLPE cables (60 to 500 kV)

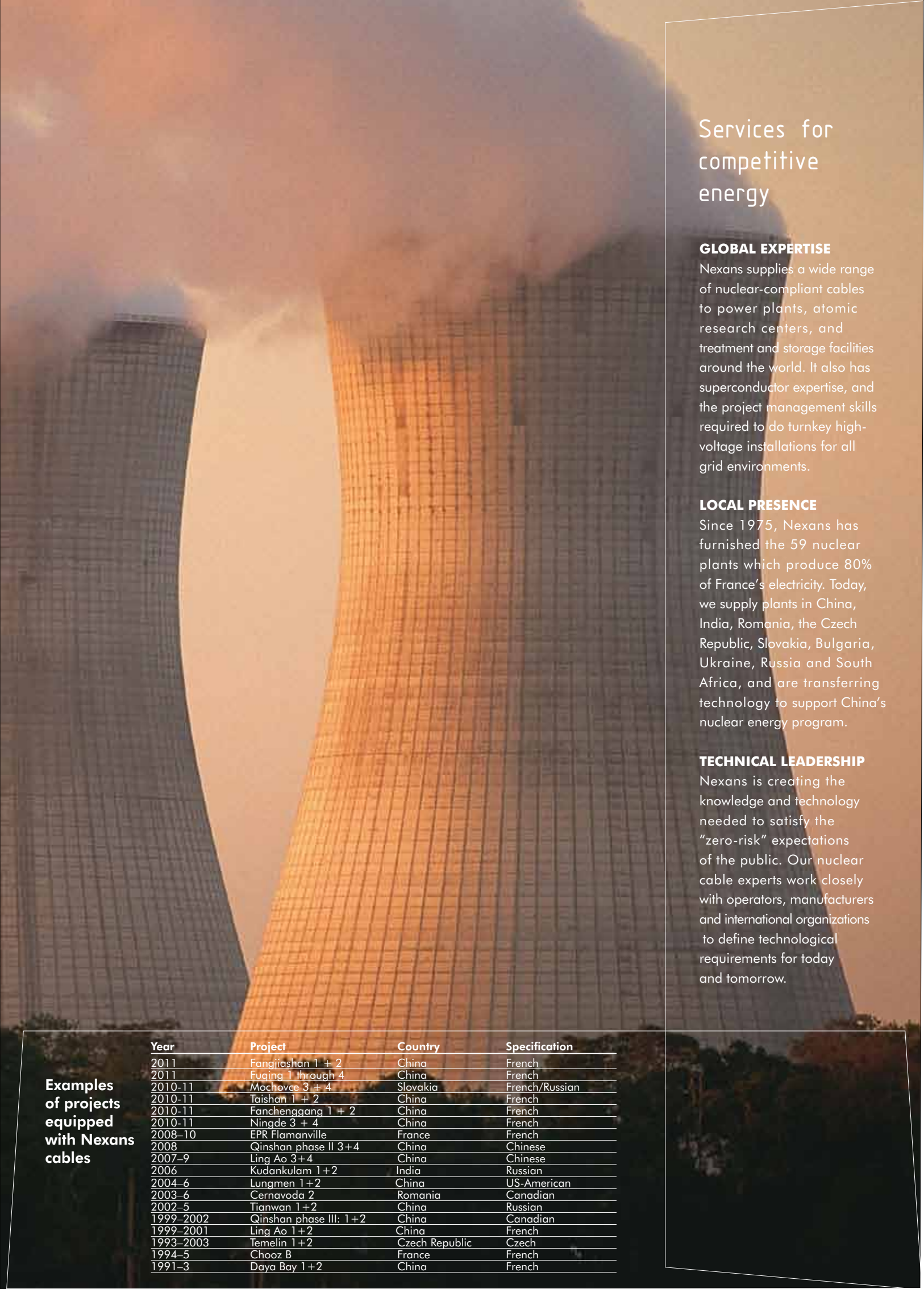
For the transmission of up to 1 gigawatt of electricity to the grid network. Very robust, with low maintenance and simple accessories, these XLPE cables are usually buried in ducts or installed in galleries until reaching the grid substation.

Nexans XLPE HV cables continue to provide safe and secure grid power handoff for France's 59 nuclear reactors, and for the Kozloduy NPP in Bulgaria.

HV/MV joints and terminations

To interconnect and terminate several sections of the energy network.

Cold-shrink joints make for easy connection.



Services for competitive energy

GLOBAL EXPERTISE

Nexans supplies a wide range of nuclear-compliant cables to power plants, atomic research centers, and treatment and storage facilities around the world. It also has superconductor expertise, and the project management skills required to do turnkey high-voltage installations for all grid environments.

LOCAL PRESENCE

Since 1975, Nexans has furnished the 59 nuclear plants which produce 80% of France's electricity. Today, we supply plants in China, India, Romania, the Czech Republic, Slovakia, Bulgaria, Ukraine, Russia and South Africa, and are transferring technology to support China's nuclear energy program.

TECHNICAL LEADERSHIP

Nexans is creating the knowledge and technology needed to satisfy the "zero-risk" expectations of the public. Our nuclear cable experts work closely with operators, manufacturers and international organizations to define technological requirements for today and tomorrow.

Examples of projects equipped with Nexans cables

Year	Project	Country	Specification
2011	Fangjiashan 1 + 2	China	French
2011	Fuqing 1 through 4	China	French
2010-11	Mochovce 3 + 4	Slovakia	French/Russian
2010-11	Taishan 1 + 2	China	French
2010-11	Fanchenggang 1 + 2	China	French
2010-11	Ningde 3 + 4	China	French
2008–10	EPR Flamanville	France	French
2008	Qinshan phase II 3+4	China	Chinese
2007–9	Ling Ao 3+4	China	Chinese
2006	Kudankulam 1+2	India	Russian
2004–6	Lungmen 1+2	China	US-American
2003–6	Cernavoda 2	Romania	Canadian
2002–5	Tianwan 1+2	China	Russian
1999–2002	Qinshan phase III: 1+2	China	Canadian
1999–2001	Ling Ao 1+2	China	French
1993–2003	Temelin 1+2	Czech Republic	Czech
1994–5	Chooz B	France	French
1991–3	Daya Bay 1+2	China	French

Nexans

Global expert in cables and cabling systems

With energy as the basis of its development, Nexans, worldwide expert in the cable industry, offers an extensive range of cables and cabling systems. The Group is a global player in the infrastructure, industry, building and Local Area Network markets. Nexans addresses a series of market segments: from energy, transport and telecom networks to shipbuilding, oil and gas, nuclear power, automotives, electronics, aeronautics, material handling and automation. Nexans is a responsible industrial company that regards sustainable development as integral to its global and operational strategy. Continuous innovation in products, solutions and services, employee development and engagement, and the introduction of safe industrial processes with limited environmental impact are among the key initiatives that place Nexans at the core of a sustainable future. With an industrial presence in 40 countries and commercial activities worldwide, Nexans employs 24,500 people and had sales in 2011 of 7 billion euros. Nexans is listed on NYSE Euronext Paris, compartment A.

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