



Oil and Gas White Paper

Global oil and gas outlook: Challenges and opportunities

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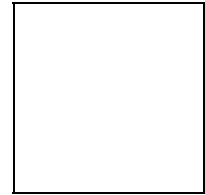
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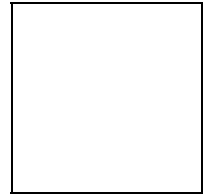
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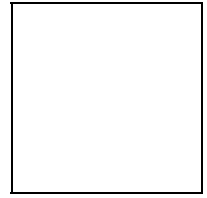
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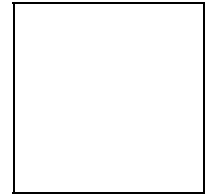
This report is intended to give a general overview of the global oil and gas market, and provide information about how Nexans is serving this market.

It opens with a brief introduction which explains the major challenges now facing the industry on all fronts. The next section explores past and future trends, and especially concentrates on new developments, in the light of industry expectations. The third section focuses on opportunities which must be seized to assure healthy growth and development. This is followed by an overview of the expertise, global presence, performance and partnership resources that Nexans has at its disposal to meet the challenges of oil & gas, discusses its new resources in Asia and a presentation of the overall product offer.

The report is followed by an Appendix containing a list of recent Nexans success stories in oil and gas.







INTRODUCTION: CHALLENGES ON ALL FRONTS

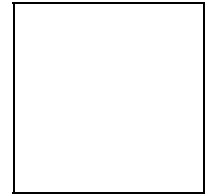
The world's energy future for the first half of this century can be summed up with considerable confidence: demand will grow steadily; oil, natural gas and coal will meet the bulk of that demand, but a slow transition to alternate sources will continue. Because fossil fuel resources are very large, they will continue to be affordable and technology will enable them to meet environmental and consumer standards. Affordable energy, in turn, will drive the long-term economic growth that improves living standards.

Although easily summarized, the details of the energy supply challenge are immensely complex. Much of tomorrow's energy must still be located. All of it must be produced and consumed with minimum environmental impact. The job must be done in a world in which energy is often at the center of economic, political and social issues. And if energy is to continue to be affordable, energy producers and their partners must constantly find ways to lower costs. The importance of energy to the well-being of nations, companies and individuals means expanding opportunity for owners of energy resources and their partners. But it also means new challenges and greater responsibility.

From the reservoir to the refinery it takes sophisticated technology and massive facilities to produce, process and transport oil and gas. Cable makes up the nerve system that connects many of the elements of this global infrastructure to gather data, send control signals and carry fluids. Throughout cable's broad application range, the economic and environmental risks are high. To minimize these risks, producers, refiners and pipeline operators need the right products and technical expertise. But they expect much more of cable suppliers as the oil and gas infrastructure grows more complex.

Suppliers are expected to make the challenges facing oil and gas producers and petroleum refiners their own. Clients expect their goals and values to be shared by their service and technology providers. These common objectives will define a growing number of projects and relationships :

- The safety of people and protection of the environment
- Innovation in products, services and processes
- Economic value and cost-effectiveness
- A partnership approach to project execution



A SEA CHANGE IN THE INDUSTRY

Volatile energy markets, environmental protection concerns, political conflict and growing social needs confront those engaged in providing affordable energy for the future. Energy markets will change even more quickly, making effective risk-management strategies critical to business success. Air and water quality standards will be raised. Producing more energy while reducing its impact will be tough, but not impossible. Horizontal and directional drilling, for example, can recover the same amount of oil or gas with fewer wells, and leave smaller field-development footprints. For each barrel of oil found, more efficient drilling reduces the volume of mud and cuttings that require disposal. Emerging downhole separation technology will reduce produced water volumes, the largest waste stream in oil and gas production.

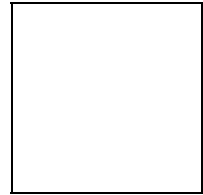
Governments in developing nations will be under increasing pressure to ensure that resource development brings improved living standards and economic growth. Energy companies and their service and contractor partners will be asked to help by training local staff and expanding local content in other ways. Meeting these challenges will require creativity, innovation and steadily evolving technology.

Except for the price spikes of the 1970s and early 1980s, the inflation-adjusted price of crude oil has moved within a range of \$10-30/bbl for 100 years. Despite this long-term price “stability,” the petroleum industry and its markets have changed fundamentally since the oil shocks of 1973 and 1979. The size of the global oil resource has ballooned as advanced technology helped add new reserves. Global energy markets – especially for oil – are far more transparent and better able to respond to supply and demand changes. Natural gas has emerged as a preferred fuel to meet environmental concerns focused on products refined from crude oil.

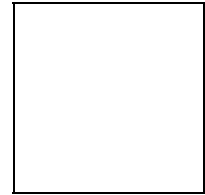
NEW RELATIONSHIPS, NEW PRIORITIES

Perhaps the biggest changes in the waning years of the 20th century were in customer relationships and expectations. This has resulted in broad trends that will continue to influence business strategies:

- Successful companies will share the goals and values of their customers
- An integrated approach to complex projects will require a broader offering of technology, expertise or systems
- Oil and gas producers will continue to move from the traditional “operator” role towards that of “asset manager,” shifting more responsibility to supplier and contractor
- Fierce competition and cost pressures will continue to drive consolidation among oil and gas producers and refiners, and among contractors and suppliers.



Early in the last decade, a few large multinational oil companies began to focus on a “triple bottom line” that measured financial performance, environmental performance and performance on social issues. The trend then spread to other companies – large and small – and to their suppliers and contractors. Royal Dutch Shell now reports annually on year-to-year changes in the frequency of occupational illness and injury, emissions and waste from operations, and provides other indicators to show its support of sustainable development. BP has adopted a zero-defect philosophy: no harm to people, systems, or the environment.

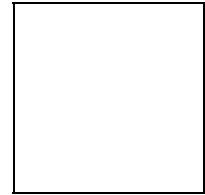


BIGGER PROJECTS , BIGGER ROLES

The increasing size, cost and complexity of energy development projects drive another change in customer expectations. Increasingly, those that manage these projects look to providers with integrated solutions.

In deep water, for example, a supplier whose technology and expertise help manage interfaces between systems can help the customer reduce complexity, risk and cost. The expectation of a broader offering of solutions is also driven by the continuing trend for oil and gas companies to focus on what they do best. As they narrow their focus, it often means a broader role for suppliers and contractors in project execution. Customers now expect their service and technology providers to be more than just a supply store or a “rig and crew for hire” business. Customer and provider increasingly share risk and reward, values and objectives.

In most cable applications, product quality – and cost and schedule predictability – are more important than low cost. And as suppliers take on a wider role in providing project solutions, technical and manufacturing innovation will yield important competitive advantages.



WHERE WE'VE BEEN, WHERE WE'RE HEADED

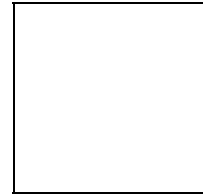
Warnings that the world is running out of oil are as old as the oil industry itself and as contemporary as the last storage drawdown. Yet over the past decades, the more energy the world used, the more it had. World crude oil production has expanded tenfold since the end of World War II to about 25 billion bbl/year. Moreover, in recent decades, natural gas has increasingly become the fuel of choice; the trend from oil to natural gas is part of the evolutionary decarbonization of fuels. Resurgence in liquefied natural gas (LNG) trade also reflects the promise of natural gas. World trade in LNG now represents about 5% of global natural gas consumption.

In its International Energy Outlook 2003, the EIA forecasts world primary energy consumption to increase by 58% between the 2001 and 2025 period. In developing countries in Asia and Central and South America, energy demand will grow robustly, particularly in developing Asia (including China and India), where demand for energy is expected to more than double over the next quarter century. Oil is expected to remain the dominant energy fuel through the forecast period, with its share of total world energy consumption falling only slightly from 39% in 2001 to 38% in 2025. In the developing world, oil consumption is, in fact, projected to increase for all end uses. Natural gas is projected to be the fastest growing primary energy source worldwide, maintaining growth of 2.8% annually over the 2001-2025 period. Gas is increasingly seen as the desired option for electric power, given the efficiency of combined-cycle gas turbines relative to coal or oil-fired generation, and the fact that it burns more cleanly than either coal or oil, making it a more attractive choice for countries interested in reducing greenhouse gas emissions. The natural gas share of total energy consumption is projected to increase from 23% in 2001 to 28% in 2025. Coal's share of the energy mix will continue to increase by some 1.5% worldwide annually. Although it will decline in Western Europe and elsewhere (replaced by cleaner natural gas), there will be increases in the developing world, especially China and India.

Even with decades of oil and gas supplies remaining, renewable energy sources definitely have a future. The question is when that future will arrive. EIA expects world consumption of renewable energy to grow by more than 50% by 2020, but its market share will change little from today's 9% share and the regional pace of development will vary widely. Much of the renewable energy will be used to generate electricity. Connecting source to grid will require reliable cable that can resist severe environments for extended periods.

WHERE ENERGY SUPPLIES WILL COME FROM

Energy analysts usually talk in terms of "proven" reserves, reserves that have been located and are profitable to produce. The Organization of Petroleum Exporting Countries (OPEC) countries own 80% of proven oil reserves and 46% of natural gas reserves. Two-thirds of the world's proven oil reserves lie in the Middle East. Russia and Iran together hold 45% of the world's natural gas reserves. Though fields may be smaller and operating conditions more difficult, much conventional oil and gas will still be found. Large potential exists in Russia, Central Asia – oil in Kazakhstan, natural gas in Turkmenistan – and offshore West Africa and Brazil. Gas production increased in 2000 by 50% in Turkmenistan, Nigeria and Oman, and



by 10% in 11 other countries. Even in the heavily explored onshore US, significant reserves exist in areas currently off-limits.

Advancing exploration technology and sophisticated reservoir management virtually guarantee new discoveries and improved recovery of conventional oil and gas. A key to greater oil and gas exploration success and higher recovery is data – data collected by seismic cable during onshore and offshore exploration, and throughout a field's productive life. Advanced seismic and reservoir monitoring techniques will require cable with new capabilities, but at a competitive cost.

THE PROMISE OF OFFSHORE

International licensing activity shows a pronounced shift in exploration and development spending towards offshore opportunities. By mid 2001, offshore acreage awards were 53% of the total.

Offshore success rates jumped from 26% in the first half of the 1990s to 34% in the last half of the decade. And offshore gas production has increased faster than oil production.

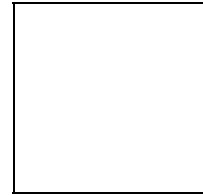


Deepwater proven resources still account for only 3-4% of worldwide reserves, but development activity is accelerating. In the Gulf of Mexico alone, oil production from water depths greater than 1,000 m increased from 12 million bbl to 271 million bbl between 1990 and 2000, raising deepwater production to 52% of US Gulf of Mexico oil output. Natural gas production grew to 1 billion cu ft (28 million cu m). The offshore West African Girassol field in 1,500 m of water will produce at least 700 million bbl during its lifetime, and there are many more discoveries to be developed in the region.

These deepwater developments demand premium cable products and umbilicals, and innovative, service-oriented cable suppliers. Cable installation expertise is critical, as is environmental compatibility. The ability to handle combined functions can help minimize complexity and manage interfaces. And few operating conditions are more severe than those at the bottom of the ocean, making strength and durability fundamental requirements. Surface offshore platforms also require cable that often is exposed to chemicals, high temperatures and high pressures. And in many cases, it must be fire-resistant so it can continue to function in case of emergency.

UNSUNG RESOURCES

“Unconventional” petroleum resources are several times the size of proven conventional reserves. Production continues to increase, for example, from Venezuela’s Orinoco heavy oil



belt where recoverable reserves are estimated at 270 billion bbl. Investment keeps growing in Canada's oil sands that may contain more than 300 billion bbl of crude that can be recovered economically with today's technology. Each of these resources exceeds Saudi Arabia's proven conventional oil reserves and represents more than one-fourth of current global conventional oil reserves.

Unconventional sources of natural gas abound, too. Coalbed methane production is increasing and worldwide reserves are significant. Further into the future is the potential of gas hydrates, a mixture of natural gas and water frozen into ice crystals. Early estimates indicate the amount of natural gas available from hydrates could dwarf all other natural gas sources.

The hydrocarbon resource is adequate to meet expected demand. But finding and delivering affordable energy grows steadily more complex. New oil and gas discoveries are typically smaller and often in more hostile environments, making commercial exploitation more challenging. And continuing to make more of the unconventional hydrocarbon resource economically competitive will be difficult.

REFINERS : MAKE MORE, MAKE IT CLEANER, LIGHTER

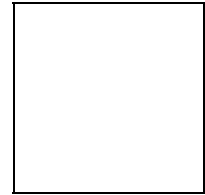
In a broad sense, the key challenges facing refiners are similar to those facing producers: optimize operations, manage market risks and continue to meet higher air and water quality standards. Like energy producers, refiners will depend heavily on data acquisition, computer power and sophisticated software to achieve these objectives. Like oil and gas producers, refiners will depend on a cable nerve system to link process units, control rooms and related facilities. The presence of a variety of chemicals, high temperatures and high pressures puts special demands on cable for refinery and petrochemical plant applications. And fire-resistance is critical for cable in refineries that often must continue to function under extreme emergency conditions.

Not only must refiners produce cleaner, lighter fuels for consumers, they must continue to reduce emissions from their own plants. For example, a new directive limits the amount of sulfur in the fuels that European Union refiners use in their furnaces. Demand for products refined from crude oil will be biased toward gasoline and middle distillates in Asia and in non-Asian emerging market economies.

Vehicle manufacturers will also put new demands on fuels as they develop engines that reduce fuel consumption and lower CO₂ emissions. The move away from today's internal combustion engine and the decarbonization of transportation fuels will continue, but the transition will be very slow since the world's 600 million cars have an average life of 12 years. The evolution of vehicle power systems is expected to move from advanced internal combustion engines, then to "hybrid" vehicles, and finally to fuel cells. Hybrid vehicles powered by a smaller, more efficient internal combustion engine combined with storage batteries for part-time electric drive are already commercially available.

INDUSTRY PARTICIPANTS AND THEIR EXPECTATIONS

Because finding and delivering oil and gas has become more complex while market prices changed little, fierce competition has brought consolidation among all segments of the



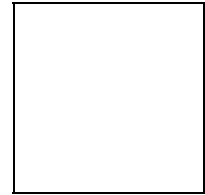
industry. It is a trend that is likely to continue. All customers want the highest quality at the lowest cost. In recent years, however, customers have reorganized their priorities and increased the expectations they have of their service and equipment providers.

Value is more often the key criterion, not cost. Predictability and dependability of equipment and service are more important. More and more, clients also look to providers who share their safety and environmental protection cultures and objectives. As oil and gas development projects become larger and producers focus on their core competency, they ask suppliers and contractors to provide a broader range of integrated products and services. Clients increasingly rely on providers for innovative solutions that will help keep costs in line. Through it all, the best relationships are those that have the look and feel of a partnership – either with shared costs and risks or without – rather than the more adversarial buyer/seller attitudes of the past.

The complexity of the oil and gas market is evident from the array of energy industry suppliers. Some focus on a few products or product lines, others offer broad systems or packages of integrated services. One just has to cite examples of the almost endless variety of possible suppliers, and each project creates its own group of competitors.

The largest suppliers such as Schlumberger and Halliburton have multiple divisions with products and services that span most oil and gas industry operations. More focused, but still offering a broad range of services and systems ranging from total project management to bundled and insulated subsea production systems, are firms such as ETPM and Bouygues. FMC Energy Systems concentrates on wellhead and related production systems, including subsea systems.

A project partnership including Stolt Offshore manufactured and installed umbilicals for West Africa's Girassol field project. Coflexip Stena Offshore also provides umbilicals and ROV services for field development, among other services. Sercel provides seismic cables, as well as integrated seismic data acquisition services for both onshore and offshore. ECA offers electro-hydraulic control systems; Coris specializes in integrating telecommunication and SCADA (supervisory control and data acquisition) systems. PLE Group (of Ruhrgas Industries) provides pipeline engineering and telecommunication services.



OPPORTUNITIES IN FOCUS

The importance of data in meeting the broad spectrum of energy production challenges – its acquisition, integration into operating models, and real-time application to solving problems and controlling processes – is accelerating. More and more, real-time information is a key to increased efficiency, lower geologic and market risks, and greater safety for personnel and the environment.

Whether onshore or offshore, computer power and communications technology can gather and interpret vast amounts of data to increase petroleum exploration success ratios, monitor downhole conditions while drilling, measure reservoir performance, or keep a constant watch on pipeline integrity.

As production, transportation and processing systems become more sophisticated – and often remote – the reliable transmission of operating information and control commands is an ever more critical element of economic and operating success. The following examples are representative of the broad range of applications for advanced cable products and systems.

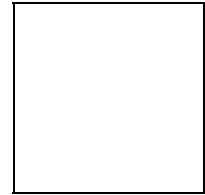
EXPLORATION

Lowering the cost of exploration and raising the success ratio onshore or offshore depends on collecting massive amounts of seismic data. An important future area of advance is multicomponent (4C) ocean-bottom seismic surveys that can reveal better information about structures, and even tell much about the contents of hydrocarbon reservoirs. The use of visualization to provide earth scientists a “picture” of the subsurface will be used more and more to lower costs and improve success ratios. It means a growing need for seismic and other data.

RESERVOIR MANAGEMENT

Adding the time element to geologic and production parameters – “4D seismic” – means gathering data throughout the life of the reservoir for interpretation and real-time reservoir management.

DEEP WATER



In deep water, the practical approach to field development is subsea wellheads and manifolds tied to surface facilities with connections that carry fluids, power and control signals. Over 80% of deepwater fields are estimated to have reserves of less than 100 million barrels of oil equivalent (boe), meaning they will likely be tied back to existing production hubs in order to be economically viable. Subsea pipelines and cables that connect subsea wells, manifolds and other facilities must be protected to avoid damage to equipment and the ocean environment.

FLOW ASSURANCE

Flow assurance is especially critical where flowline and equipment are not easily accessible. One element of flow assurance is maintaining oil at a temperature high enough to ensure it will flow in subsea pipelines. There are two practical options: thermal insulation or heat.

PIPELINE MONITORING

The ability to monitor the condition of long-distance pipelines, control pumping or compressor facilities and manage the network from remote locations helps optimize safety, environmental protection and profit. It is especially important in regions where mature pipeline systems are approaching their life expectancy.

INTELLIGENT COMPLETIONS

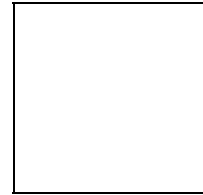
Emerging technologies such as intelligent well completions – “smart wells” – require enhanced communication and control sophistication and are subject to increasingly harsh conditions.

RENEWABLE ENERGY SOURCES

As renewable energies struggle for a place in the energy mix, sources such as wind turbine facilities that are often remote must be connected to the power grids they supply.

CONTROL AND DATA ACQUISITION

Demand will grow for reliable communication of data and control signals under severe operating conditions in refineries and process plants, and on offshore platforms.



NEXANS: A GLOBAL CABLE LEADER FOR OIL AND GAS

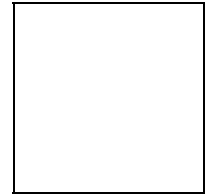
As the foregoing chapters reveal, the oil and gas industry is faced with massive change, and challenges on all fronts. To meet the world's insatiable hunger for energy, it has had to look both forward and backward, extending the life of old fields, while constantly looking for new ones, often far inland (e.g. Kazakhstan), or in deep waters (e.g. Gulf of Mexico, Brazil and West Africa). This often requires new methods and technology. At the same time, offshore companies have to satisfy growing issues and concerns in areas like safety, the environment and sustainable growth, while land-based refineries have to come up with ways to produce better, cheaper products with minimum pollution. The international nature of the business, and these complex challenges demand a mixture of solutions – both upstream and downstream – that only a global cable leader can provide.

AN INTEGRATED FOUR-POINT APPROACH FOR THE INDUSTRY

That is why Nexans takes an integrated four-point approach to meet the extensive needs of its demanding oil and gas customers: **expertise, performance, global presence, and partnership** – which goes far beyond the cable products, themselves, and includes a number of important behind-the-scenes services, like ongoing research, testing, standards, information-sharing and advanced delivery logistics.

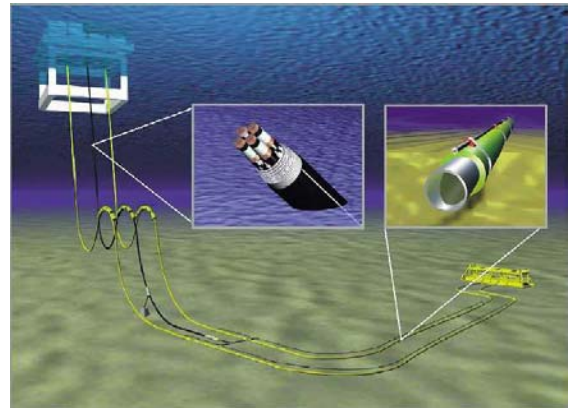
For Nexans, **expertise** means being able to manufacture a broad range of adapted cables for this specific market. The fact that cables are its core business means that it has the special and accumulated skills to supply nearly every cable and cable accessory found on surveying ships, drill rigs and vessels, or onshore in production facilities and refineries. Many of these energy and data cables must function under extremely trying conditions of heat, “mud” in the extraction process, vibration from equipment, movement from sea currents, water penetration, oil and chemical threats, etc. A sampling of Nexans cables shows the full range of products and services available:

- copper and optical data-acquisition cables for seismic exploration
- towed lead-in and gun cables for 3D and 4D marine surveys
- oceanography cables for ship surveillance
- Remote Operated Vehicles (ROVs) for trenching, burying and installation
- “dynamic” cables for ROVs, platforms and production ships
- halogen-free, mud-resistant fire-performance cables for topside
- submarine high-voltage cables for the transmission of energy onshore to offshore
- long “umbilicals” for deep water
- long-distance fiber backbones along pipelines
- copper and/or fiber LAN solutions for platforms and refineries
- unique modeling software for dynamically hanging cables undersea
- submarine pipe-heating cables to prevent flow line blockages
- instrumentation, compensation, power and control cables
- low, medium and high-voltage environmentally-friendly energy cables for refineries



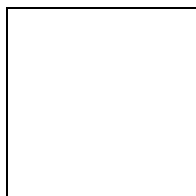
- Halogen-Free, Fire-Resistant (HFFR) and Low-Smoke, Zero-Halogen (LSOH) technologies to protect infrastructure and people
- fully recyclable materials and environmentally-friendly solutions

Apart from the extent of Nexans oil and gas products, expertise also implies “integration” at several levels. Since the company controls the entire production chain from the molecular structure of the raw materials to final installation, every aspect of the cable is optimized to offer the highest product quality, which is essential in an industry where shutdowns can be extremely costly. Integration is also evident in Nexans ability to supply both the energy and telecom sides of oil and gas, often via independent systems, but also through integrated products, like multifunction umbilicals which carry energy, telecommunications, fluids and chemicals essential for extraction.



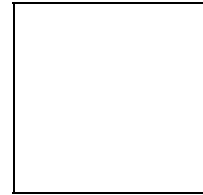
Finally, integration means the ability to combine complex functions in a unified, compatible way, often facilitating remote monitoring and control. Not just an off-the-shelf supplier of cables and components, Nexans often works closely with its customers to design, develop and install complete systems which require expertise in several different areas.

The second approach followed by Nexans concerns quality **performance** guarantees through constant innovation and a respect for the environment. Nexans heavily reinvests in R&D to constantly develop new products for the oil and gas industry. Theoretical research is done in close cooperation with universities and international research bodies in areas like polymers, plastic optical fiber, deep-sea technologies, safe and non-polluting materials, etc. Meanwhile, applied research is done in Nexans’ International Research Center in Lyon, France. Once feasibility is proven, responsibility is transferred to 10 competence centers located in 10 countries.



Factory plant of Halden (Norway)

For example, the competence center in Halden, Norway, are experts in high-voltage submarine XLPE power cables, composite cables and umbilicals for the offshore industry. In a unique high-voltage testing laboratory, it tests power cables and components in accordance with international standards for rated voltages up to 765 kV AC and 800 kV DC. Besides testing its own products, it also offers its customers facilities for testing virtually any component



for power transmission systems. Other competence center research areas relevant to oil and gas are chemicals, electro-technical development, materials and extrusion, and metallurgy. Finally, onsite R&D is done in all of Nexans plants worldwide, often in close association with customers.

The third approach adopted by Nexans is its **global presence**, to serve an industry that by its very nature operates internationally. Nexans has the broadest geographical presence in the cable industry, with plants on five continents, and representatives in over 65 countries. Not only can oil and gas customers fill every cable need from a single vendor, but they can count on the logistics necessary to get what they need when they need it to meet production schedules, or to rapidly carry out essential repair work, without having to tow equipment back to coastal shipyards.

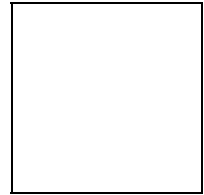
Global presence also requires a mastery of international standards, and here Nexans has obtained approval certificates from the IEC and critical ISO 9001 qualifications, and also all of the main classification bodies, like Det Norske Veritas (DNV), Lloyds, etc. Moreover, as an active member on world standards committees, Nexans has pioneered many breakthroughs, including Halogen-Free, Fire-Resistant cables which are continuing to play an important safety role on land and sea.

Finally, Nexans is dedicated to **partnership** with its customers. During its 40-year involvement in oil and gas, the company has gained invaluable experience by working closely with engineers, oil platform and ship designers, construction yards, refineries installers, repairers – and especially the major oil companies, themselves – to find solutions which respect their many priorities, which extend from concerns of cost, efficiency and safety to wider issues of reducing CO² emissions and environmental friendliness.

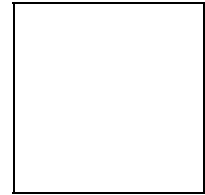
With its customers Nexans is anxious to see sustainable growth achieved in the face of inevitably diminishing supplies and expanding demand. It wants to protect the environment and make a contribution to controlling climate change. It seeks to safeguard biodiversity and protect human and animal health, and wants to see positive globalization and equitable development everywhere. In operational terms, Nexans works closely with its customers to facilitate prospecting for new resources, while making existing ones easier to exploit. Because oil and gas operators are incorporating renewable sources of energy in their business, Nexans is now working with them to develop products to facilitate solar, wind, water, hydrogen projects, etc.

Increasingly Nexans, has been recognized as an industry leader and “privileged supplier” by its many clients. To fulfill this role, it strives to understand the entire “supply chain,” especially from the customer’s point of view. Rather than assume that buyers are looking for the cheapest product, Nexans recognizes that expensive downtime, the danger of accidents in a dangerous operating environment, and oil spills pose real threats to long-term viability. That is why the products, technologies and systems that Nexans offers are intended to reduce loss, prolong product life, and above all assure the highest standards of safety.

Nexans strongly believes that partnership involves sharing both risks and responsibilities. To free oil and gas companies to do what they do best, Nexans is increasingly assuming R&D responsibilities on their behalf in areas like deep-water drilling and remote “smart well” technologies. In the same vein, Nexans’ market intelligence and information about new industrial trends is shared with its customers in order to facilitate major contracts. It offers



customers counseling in terms of design, implementation and maintenance of oil and gas facilities, and assumes total responsibility for installing complete turnkey systems and networks worldwide.



NEXANS RESOURCES IN ASIA

One of the most dynamic areas in the world for Oil & Gas development is the Far East. Not only is this an area of the world with positive economic growth (especially China, which is currently experiencing 6-8% growth annually), it is also a part of the world which will see spectacular jumps in energy consumption of all kinds, with energy demands expected to more than double over the next quarter century.

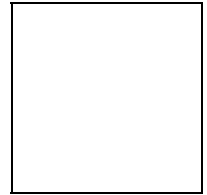
Although both China and India can count on considerable reserves of coal (27% of world consumption for electricity production), there is increasing interest in Oil & Gas, not only as a source of fuel, but also as a part of heavy industry. The production of offshore plants is closely linked to the shipbuilding industry where the two frontrunners are Japan and South Korean (with approximately 31% of market share each). Meanwhile, China (with presently 7%) is aiming to expand its market share. Asian shipyards produce a full range of Oil & Gas offshore plants and vessels, including platforms, rigs, and Floating Production, Storage and Offloading (FPSO) vessels, and also survey and research ships, Liquid Natural Gas carriers, and ocean going tankers of all types.

At present, Chinese shipyards are in the process of expanding their shipbuilding market share to 15% of the world shipbuilding market, especially in commercial vessels, with the support of the Chinese Government. This has had an important impact on Korean shipbuilding. Korean shipyards are continuing to expand their product range of Oil & Gas plants to keep their shipbuilding levels high and assure constant profitability.

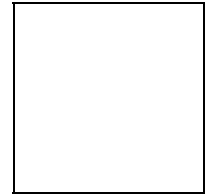
Compared to many other shipyards in the East, Korea's major shipyards have broad experience in the design and construction of offshore plants, and they are very competitive in this field. Both energy and telecom cables play an important role on any offshore plant in terms of operational efficiency and safety for both crew and equipment.

However, since the Korean currency, the Won, has been appreciating against the US dollar since the end of 2003, and steel prices (a major material for construction) are soaring, Korean shipyards are faced with some major challenges. These translate into high expectations of cable suppliers. They demand a competitive price for all cables; they want a high level of safety and fire-protective performance from cables; they need lighter, thinner and more flexible cables for quick and easy installation; and they expect exceptional logistics service.

To meet these challenges, Nexans has two plants in South Korea which are able to meet all requirements for high-performance, quality products online via e-procurement. The first one is **Kukdong**, a fully-owned subsidiary which (along with Nexans) currently supplies 33% of the global shipboard cable market, including offshore plants. With over 300 employees, Kukdong produces a full range of offshore and marine cables, especially rubber-insulated cables (normally used in shipbuilding) and LAN cables for networking. **Nexans Korea**, of comparable size, also produces offshore power and telecom cables, as an extension of its onshore products, mainly sold to KEPCO (the Korea Electric Power Corporation) and various telecoms. The main offshore customers for both plants are shipbuilders, who are also building offshore plants for Oil & Gas, primarily Hyundai Heavy Industry and Samsung Heavy Industry who both appreciate the fact that Nexans can supply fire-protected, fire-resistant cables for the confined and isolated offshore environment.



According to forecasts, the offshore plant market will continue to grow in Korea to follow up demands of offshore Oil & Gas drilling to meet the growing energy demands of the region.



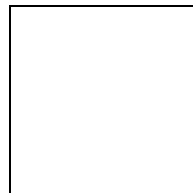
A STRING OF INNOVATIONS AND RECORDS FOR OIL AND GAS

Nexans ongoing concern with Research and Development has led to a long list of innovative products for oil and gas, and a number of world records.

In the area of exploration, for seismic research contractors Nexans has developed copper and optical **data acquisition systems** which are not only highly sensitive with low cross-talk, but able to function in difficult conditions, both on land and in shallow water. For the oil-research contractor Sercel, Nexans designed customized lighter data-acquisition cables that could provide far greater mobility in the field.

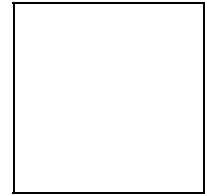
To meet the challenges of deep-water environment, Nexans has produced a string of innovations. For **deep-water seismic acquisition**, it manufacturers towed lead-in and gun cables for 3D surveying, and developed the first full-scale, permanent 4D system laid on the sea-bottom, allowing for a reservoir to be profiled and analyzed over the long term. Nexans data acquisition cables are designed for prolonged survival in a corrosive environment. Its FOWM cable can monitor reservoir temperature and pressure up to 200°C and 1,000 bars pressure. To meet its customer's strict security demands, Nexans also manufacturers **cables for oceanography**. Originally used for defense purposes, these cables allow the monitoring of vessels coming into or leaving a drilling area.

In busy seas, anchors and trawling pose a constant threat to all undersea infrastructure, and that is why cables and pipelines often need to be trenched and buried, to avoid costly breakdowns for operators if a line is severed. A series of water-jetting **CAPJET Remote Operated Vehicles** (ROV) were developed through Norwegian expertise. An alternative to costlier burying with heavy equipment (which can cause damage to cables and pipes), the lightweight CAPJETs use water jetting for trenching and propulsion.



The system has buried more than 3,000 kilometers of cables and pipelines, often in harsh North Sea conditions. Moreover, it has been increasingly used to bury fiber-optic cables, steel and flexible flow lines and large diameter oil and gas pipelines at depths down to 2,000 meters.

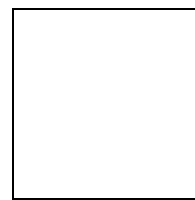
To accommodate offshore's move away from onboard generators towards land-based energy (in compliance with the Kyoto Protocol), Nexans provides a full range of efficient and environmentally friendly **high-voltage XLPE and mass-impregnated cables** of up to 2,500 mm² for voltages up to 525 kV AC. Aside from allowing dangerous CO² emissions to be lowered, both kinds of cable are "dry" technologies: there is no danger of leakage, and they are also easily recoverable and recyclable. All materials that go into a cable are carefully tracked, so that cables can be controlled during their entire lifecycle, from conception to



disposal. In addition, these cables often incorporate fiber optic cables for secure offshore telecommunications. Recently, a record-breaking 67 long 52 kV cable was installed to link land facilities with the Troll platform in the North Sea.

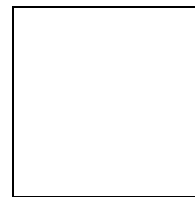
For conventional and next-generation “smart well” applications, Nexans produces a full range of **instrumentation, compensation, control and power cables**. These hybrid energy and data cables make it possible to monitor sensors and activate control, safety and bleed valves to regulate oil, water and gas flow. They accurately measure and control temperature, and deliver up to 36 kV for pumps, motors and relays. They are available with special shielding for the abrasive and corrosive drill rig and wellhead environment.

For platforms and floating production ships, Nexans offers a **mud-resistant, halogen-free** outer sheath for all critical cables, both energy and data, which resists the corrosive threat of “mud,” – the artificial, physico-chemical substance which is added in the oil extraction process. Meanwhile, Halogen-Free, Fire-Resistant (HFFR) and Low-Smoke, Zero-Halogen (LSOH) cables assure maximum protection for infrastructure and oil-platform workers.

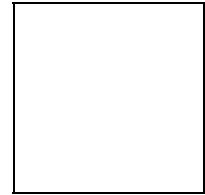


These cables meet the rigorous NEK 606 standard and are approved by DNV (Det Norske Veritas). For the potentially dangerous topside environment, they are reliable, maintenance-free, and can continue operating in temperatures of up to 1,000°C for up to three hours (750°C is the norm).

In the area of **umbilicals**, there are no off-the-shelf products. All umbilicals are custom-designed to meet the specific needs of users, many of whom would like to eliminate platforms altogether, and operate facilities remotely from onshore. Because of environmental concerns, redundancy is a special concern, and a common solution is to have two backbones: one to carry only fluids and chemicals, and one to carry electricity and communications. Nexans holds several world records for offshore umbilicals.



For example, in the Nakika project in the Gulf of Mexico (Shell), it achieved a 2,300 meter depth, which beats the previous record by some 400 meters. Also, the company laid a 125 km single length umbilical in Shell’s Mensa project.



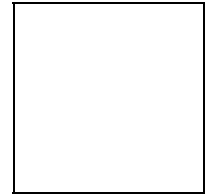
Marine Local Area Networks (LANs) are another area where Nexans is making important breakthroughs to upgrade communications capability offshore to equal what is available onshore. Aside from offering a host of mixed and all-fiber solutions, the company has enhanced copper solutions, including a Category 7 cable which can deliver up to 10 Gbit/s (i.e. equal to the speed of today's LAN fiber backbones). The latter are fully backward compatible, and avoid the necessity of expensive refitting later. For isolated and autonomous maritime facilities, there is an added safety feature. These onboard cables, which are Low-Smoke, Zero-Halogen (LSOH) are linked into a complex surveillance and fire-fighting system. Nexans cables thus not only guarantee a continuous flow of data to prevent breakdowns in the first place, but monitor, control and resolve emergencies, while protecting vital equipment and personnel.

Co-operation with oil and gas companies has given rise to innovative products to improve efficiency and performance in maritime conditions. The need of positioning umbilical cables in the face of high waves, currents and platform movement resulted in **a dynamic-positioning software package** allowing cables to be dynamically connected to subsea wells under the platform/vessel in free-hanging "catenaries."

Another area of customer-driven innovation is **pipe-heating cables** which prevent hydrates or paraffin plugs from forming in deep-sea pipelines, thus reducing or even stopping the flow permanently. If shut down, a line "freezes," becoming totally unusable, an extremely costly event. The traditional solution was to add chemicals to the flow lines, but this remains a messy solution, with the ever-present danger of leakage posing an environmental threat. The Nexans answer was to either apply thermal insulation to the pipeline (using the CAPJET), or more radically, to electrically heat the pipeline by strapping a heat cable to the pipeline during the manufacturing process. This produces an induced current and a steady 27°C temperature which keeps production flowing even in freezing deep-sea conditions for lengths of up to 50 km and more. The system is now installed in Statoil's Åsgård and Huldra fields in Norway, and is being applied elsewhere in the world.

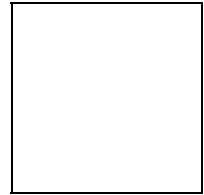
As part of its global offer to customers, Nexans also manufactures a wide range of **cable accessories** to cover all energy and telecom needs: joints and terminations, pressure systems, pumping plants, pull-in heads, terminations, buoyancy elements, branching units, amplifiers, etc.

Meanwhile, on land, given often long distances between drilling sites and refineries, Nexans provides **optical fiber backbones** based on right-of-way (ROW) technologies which allow them to either be incorporated during pipeline construction, or added later if the terrain permits. An added bonus is that fiber optic cables along pipelines provide leakage monitoring, remote control of pumping stations and network management. In addition, they allow oil and gas companies to generate added income by the leasing of dark fiber to telecom operators.



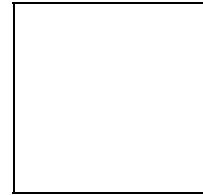
For shore-based refineries, Nexans supplies a host of energy and telecommunications cables, including high, medium and low-voltage cables. With its customers, Nexans shares a concern about the necessity of using lead sheathing to protect cables from water and chemical aggression, a fact which makes cables expensive to produce, heavier and less flexible. Current research is now being concentrated on finding a **thermoplastic substitute** for lead which will be safe and recyclable. To upgrade security in refineries, Nexans offers a wide mix of **shore-based LAN solutions** using copper and/or optical fiber, with the same advanced capacity mentioned above for marine applications.

Finally, Nexans has kept pace with oil and gas concerns for **alternative sources of energy**. Recently, Nexans has been participating in offshore wind turbine experiments requiring advanced marine cabling technology. The company was deeply involved in the Danish Horns Rev project which has moved 80 noisy wind turbines offshore into shallow water. Twenty-one kilometers of Nexans cables link the hubs which gather energy from the wind turbine network to the land-based power station, which feeds it into the local power grid.



CONCLUSION

Nexans sees its role in the next quarter of a century as a “privileged supplier” to the oil and gas industry as it continues to move towards global procurement policy, integrated buying and shared responsibilities. More than ever before, Nexans believes that there is a need to go “beyond cable” in order to add value to products, do innovative research, and provide a host of behind-the-scenes services – ranging from new product design to the kind of long-term support that “energy” companies need to make the transition to a sustainable future possible.



APPENDIX

SOME RECENT NEXANS SUCCESS STORIES IN OIL AND GAZ

2004

BP's "Plutonio" FPSOs being equipped with Nexans cables

Nexans has been approved to supply British Petroleum's "Plutonio" FPSOs being built by Hyundai Heavy Industry. Kukdong is the only local manufacturer who has been approved and listed for supplying cables for the project.

June 2004

Indian Oil and Natural Gas Corporation chooses Nexans

Nexans (Kukdong) is supplying energy, instrumentation and control, and LAN cables for a platform being built near Mumbai for the Oil and Natural Gas Corporation (ONGC) of India.

Nexans delivers broad range of cables to Sakhalin (Shell)

Nexans (Kukdong) has obtained important orders for Shell's Sakhalin island project (between Japan and Russia) from Samsung Heavy Industry to supply halogen-free, mud-resistant, cold-resistant, rubber-insulated and sheathed cables.

March 2003

Nexans develops new sensor fiber technology for monitoring purposes

Based on developments in ROV, composite power cables and large umbilicals, Nexans new sensor fibers are used to monitor temperature, pressure, stress and overheating, so flow changes and "wax" can be predicted and controlled.

February 2003

Nexans provides umbilicals for Norwegian "Snow White" project and Gulf of Mexico deep water projects

In the new Norwegian Snøhvit ("Snow White") project off Hammerfest, a single 170 km long umbilical will transfer all wellhead functions to shore, thus eliminating costly platform facilities.

January 2003

New windpark project off the coast of Belgium

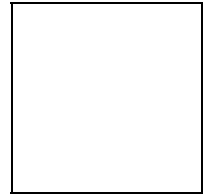
Nexans wins the design, manufacture, laying and burial of a 22 km 36kv cable in Belgium, as part of the Tractobel SEANERGY Project. Nexans is also responsible for connections to the land cable, and the windmill terminations

Nexans furnishes cables for major French refinery

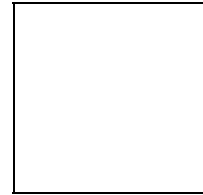
Nexans supplies instrumentation and LV cables for the large Exxon Mobile PJ21 refinery at Notre-Dame-de-Gravenchon in the north of France.

November 2002

Category 7 links in the Caspian Sea boosts application sharing



In the Caspian Sea, Nexans Category 7 cables allow application sharing. Instead of having to pull three separate cables, a single cable (containing four individually screened cables) handles telephony, Internet, data and TV. This project was a cooperative effort by Nexans UK and Nexans Norway.



Nexans and Sercel successfully carry out tests for a new state-of-the-art submarine seismic system

Nexans and Sercel SA successfully carry out a first on-site testing of a new submarine seismic system, called "Deep Sea Link," on which both companies have been working on for several years. This trial which took place in a Norwegian fjord at a depth of 500 meters resulted in various processing exercises during a five-day period. The trials were judged to be extremely satisfactory.

Nexans provides Hyundai with 17 km of mud and fire-resistant cables

Nexans wins a contract to provide 17 km of mud and fire-resistant telecommunications cables (FRC-2) to Hyundai Heavy Industries (Ulsan, South Korea).

July 2002

17.5 million Euro contract for Norway

The contract includes provision of 75 km of umbilical cables for the Mikkell oil field exploited by Statoil in the North Sea.

20 million Euro contract to equip the world's largest wind turbine park in Denmark

Nexans delivers and installs the world's most powerful AC cable. This 150 kV, 21-kilometer-long, submarine, three-conductor cable will directly link the system with the earth-based grid of Eltra (Danish electricity company serving the Jutland peninsula). Nexans also furnishes 63 km of 30 kV XLPE cables.

June 2002

Exelon chooses Nexans as a supplier for \$20 million worth of XLPE cables

With over 5 million customers, Exelon Inc. (NXE.ECX) is one of North America's leading energy and gas utilities. The company chooses Nexans as privileged supplier of XLPE energy cables.

May 2002

Canadian White Rose project opts for Nexans instrumentation, compensation, control and power cables

Nexans supplies a full range of energy and data cables for Samsung Heavy Industry (Korea) who are building an FPSO (Floating Production Storage and Offloading Vessel) for the White Rose project off the coast of Newfoundland (CANADA). These cables are designed to support the harsh environment of the Canadian coast (-40°C).

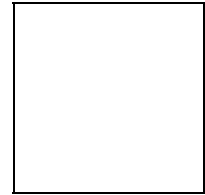
Nexans wins a contract for deepwater umbilicals in the Gulf of Mexico

For BP, Nexans will be delivering umbilicals capable of operating at 2,200 meters depth in the Thunder Horse Field (delivery July 2004) and Atlantis Field (delivery Feb 2006) in the Gulf of Mexico.

March 2002

Shell awards Nexans a new contract to supply umbilical cables

Nexans wins a contract to supply additional 43.4 km of umbilical cables as part of the Nakika project in Shell's Columbia oilfield. This umbilical cable includes steel tubes for transporting hydraulic fluids to control the wellhead, plus 3 conductors for delivering power and information between the Nakika platform and the undersea wellhead.



January 2002

Nexans provides umbilicals to Norsk Hydro

Nexans obtains an 11 million Euro contract from Norsk Hydro to supply umbilical cables for the Fram Vest project in the North Sea. Nexans provides two cable sections, one of 50 meters placed between the Fram Vest wells; and the other, 25 km long, which connects the Troll C platform.

July 2001

Multinational petrochemical project opts for Nexans energy cables

Nexans provides no-lead MV, LV and instrumentation cables for the French-Japanese-American built Q-Chem petrochemical complex in Qatar (delivery December 2002).

1999

Nexans links North Sea platforms with marine fiber backbones for savings and safety.

For Statoil, Nexans is links several North Sea platforms between Norway and the UK so as to avoid repeated systems and achieve cost savings and better safety.