Nexans Perspectives

#1
JULY 2020

THE FUTURE IS ELECTRIC

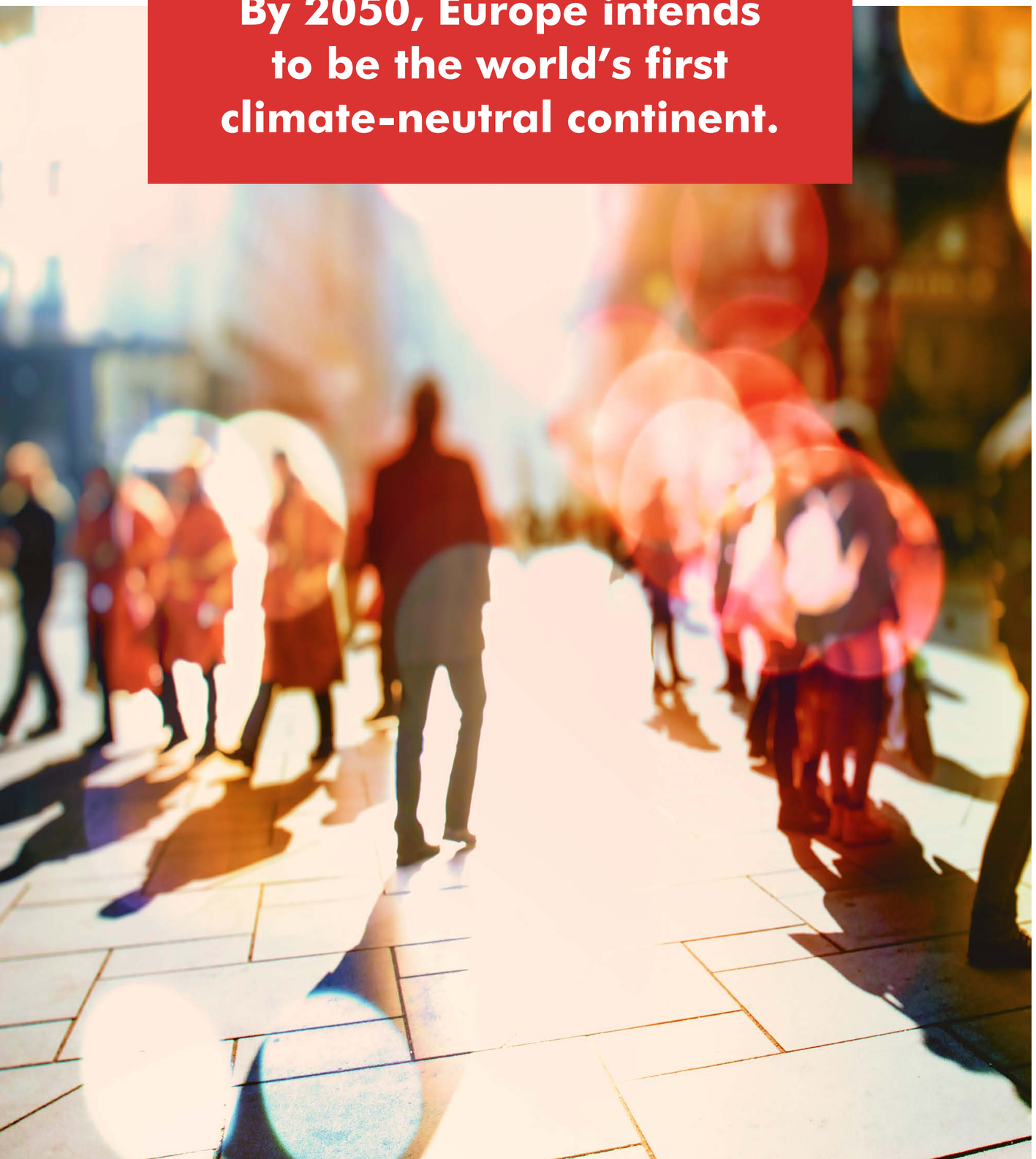
What does the future energy system look like? What challenges need to be overcome?

IEA OPINION

How to make the economic recovery from coronavirus an environmentally sustainable one.

Nexans
BRINGS ENERGY TO LIFE

By 2050, Europe intends to be the world's first climate-neutral continent.



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Powering a greener, brighter future

CHRISTOPHER GUÉRIN
CEO NEXANS

We are living through a time of unprecedented upheaval

Among the global companies, Nexans is in the group of those who better managed the crisis. Thanks to our past experience of safety within plants as an industrial operator and our plants in China we've been able to anticipate the crisis. Almost all our plants kept running, with maximum-security measures to protect the health of all our teams in the field. Very few Nexans' teammates have been infected by Covid-19.

In general, our understanding of our responsibility has immediately changed to place human safety at the forefront of our concerns. The environment has forever changed and nothing will be as it was before.

The crisis has also accelerated the implementation of our New Nexans strategy. More than ever, the climate change is our concern; more than ever, Nexans is committed and focus to bring sustainable solutions for the electrification of the world.

Our fundamentals remain strong and reliable and our order book is full until mid-2022.

The major wins of last year reinforced our global position and they are valuable experiences to prepare calls for tenders expected between now and 2026 for large-scale renewable energy and submarine interconnection projects, energy efficiency program and grid renewal.

Nexans will be even stronger after the sanitary crisis, confirming our strategic path is the right one.

A huge ambition

Nexans is at the forefront of the energy transition and we are a global leader for a sustainable electrification of the world.

In this first edition of our Digital Magazine, we invite you to take a look at some of the most pressing issues and innovative technologies and capabilities that are turning the transition into a reality.

Power grids are at the heart of the transition. A sustainable electrification of the world is a major stake for the coming decades.

Changing patterns of power generation will also have a profound impact on grids. From solar rooftop to windfarms far out to sea, reliable and cost-effective transmission and distribution will become even more important. We examine some of the technologies Nexans is using to help its customers achieve their goals – including innovative superconducting solutions that provide zero loss of transmission.

Renewable energy continues to attract investment.

Demand for electricity is set to undergo massive growth in the next 20 years as the planet is calling for its sustainable electrification. Future grids will provide power to heat our homes and they will put electric cars on our roads. In this edition, we look at some of the ways that power networks can be adapted to meet these new needs. To do so, global companies need to change their mindset, their set of priorities, they must be committed in the climate change battle.

As we are the link that makes energy transition possible, we have the responsibility to provide new innovative services and solutions for a sustainable electrification. Digital tools are in the heart of our research.

But we also need to look at some of the impact of digitalization. All experts agree that in the future, the main stake isn't the electricity production capacities but the use of big data and the carbon footprint generated by any digital solution.

We aim to reconciliate industry through energy transition, as the business should not, never any more, be the enemy of the climate. We need to be virtuous. We will bring our value in the universal battle for the wellbeing of Humanity.

Renewable energy continues to attract investment to design the future world. It has proven to generate attractive returns to investors. It also creates jobs, new jobs to bring economic growth and activities in new geographies.

Nexans has a long and rich history of innovation. We celebrate that heritage in our new film- Nexans Living History of Electricity. The film brings us back to the roots of the company on which we rely to contribute to a new sustainable world. Much has changed in the 120 years since the company was founded, but one thing remains unchanged is our commitment to building the future of electricity. The future is all about sustainability.

Nexans is the leader of the sustainable electrification.

We are ready. We are Nexans.

Nexans living history: a new story starts today

2:48

Watch Video

Over a century of experience

Nexans is proud of its over 120 years of history. 120 years of innovation, flagship projects and international growth.

120 years of destiny that we owe to two remarkable personalities: François Borel, genius inventor, and Edouard Berthoud, brilliant industrialist.

With over a century of experience, Nexans has never stopped building the future of electricity and will continue for the years to come.

These are the beginnings of this adventure that we propose to discover today, before sharing with you the complete story, that we continue to write day after day.

Building Tomorrow's Grid

New ways of generating electricity and new patterns of demand are placing increasing pressure on distribution and transmission networks. How does the grid need to evolve?

The impact of Covid-19 on electricity consumption is unprecedented. Lockdown saw demand fall by 20% or more in some countries.[1] The short-term outlook remains challenging: global demand is expected to fall 5% in 2020[2] – the biggest drop since the 1930s.

Despite this, the long-term trend is towards increasing demand. Demographic trends, changing consumer preferences and policy drivers at both the national and European level are expected to see electricity consumption climb by more than 60% over the next two decades.[3]

Grids will need to be adapted to handle this extra demand. They will also need to accommodate new patterns of generation, including the expansion of both utility scale and domestic renewables.

Boosting urban grids

DSO grids are the focal point of some of the biggest changes. The rise of electric vehicles is one of them – if current driving patterns are replicated in an all-electric future, it would double household power consumption. Ultra-fast refills will require new grid connections to charging stations.

"Digital twin" technology could hold the key to better investment decisions.

Meanwhile, the rise of distributed energy production is turning the traditional model of grid supply upside down. The rapid growth of domestic microgeneration, such as rooftop solar, means that distribution networks increasingly need to cope with two-way flows of energy.

Looking further into the future, the shift to electricity for heating and cooling will further add to loads. Electrification of heating – vital if green goals are to be achieved – could see more than 100 million European households switching from gas and oil to electricity.

How can DSOs adapt their grids to these new demands? Smart meters will help. These provide a clearer picture of consumption, making it possible to fine-tune grid upgrades. They also enable demand-side response – steering demand to cut grid congestion.

Smart meters are not a magic bullet, however. While demand response helps to iron out expensive peaks, it does not remove the need to reinforce DSO grids – many of which will need to handle progressively higher baseloads as the energy transition gains momentum.

DSOs face two key needs. First, they need ways to make long-term investment decisions while taking every factor into account. Second, they need ways to futureproof urban grids and reduce losses.

"Digital twin" technology could hold the key to better investment decisions. The "twin" is a digital model of the entire grid that includes all its physical assets, along with repair, renewal and inspection strategies. The digital twin includes asset-ageing software to run scenarios decades into the future – making it easier to achieve the right grid upgrades at the right cost.

Superconducting cables could also play a vital role in tomorrows' urban grid. A major benefit is the reduced need for high-voltage distribution: superconductors can carry an extremely high current at medium voltage. Losses are eliminated – cables have no electrical resistance – and fewer transformers are required. Land take and disruption are minimal.

Superconducting cables could also play a vital role in tomorrow's urban grid.

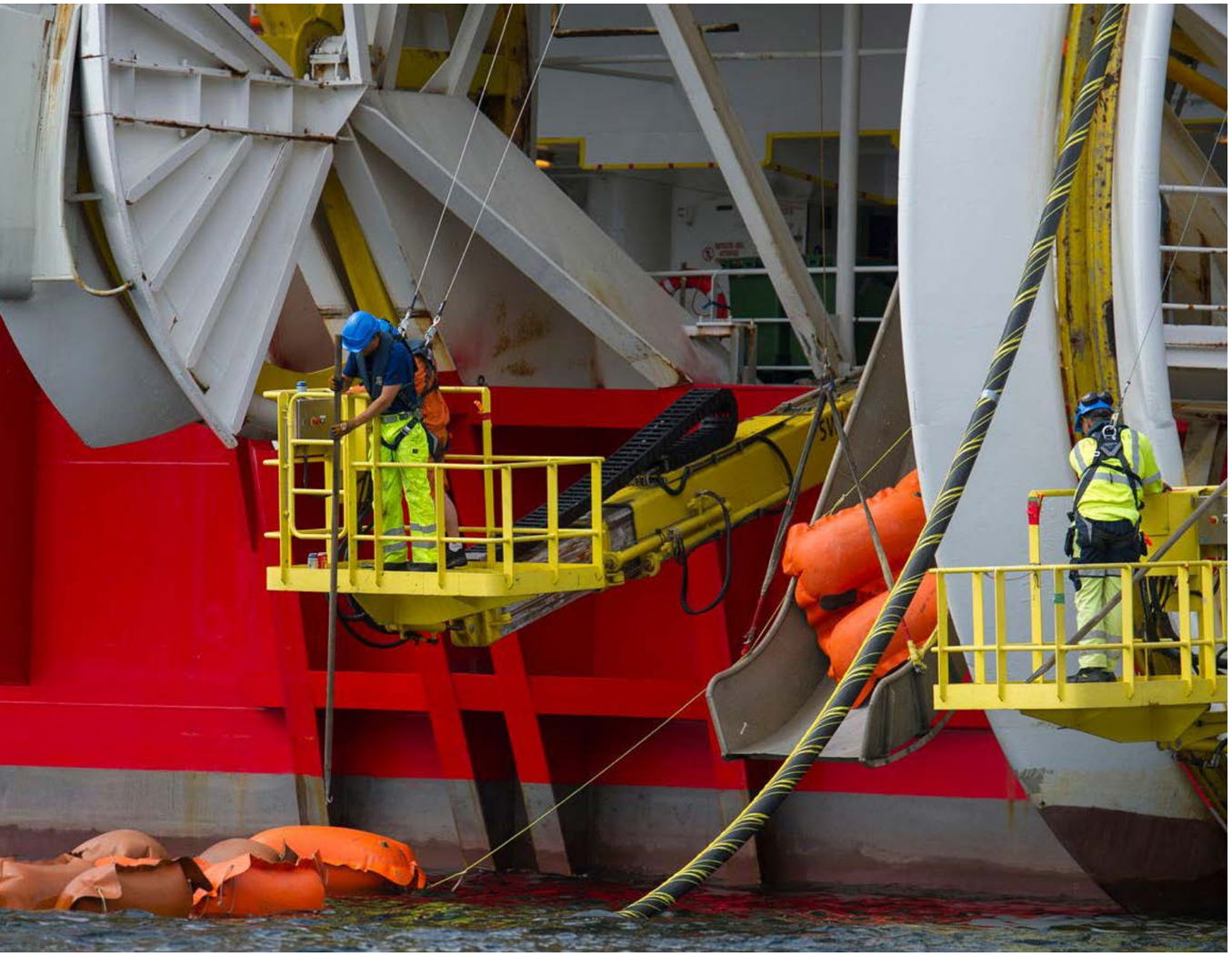
Dawn of the world wide grid

It's not only urban grids that are changing. Big changes are also happening out at sea. Submarine cables are redrawing the energy map, linking wind farms to the land and connecting nations to each other.

Offshore wind farm export cables are a case in point. The trend is towards wind farms more than 100km out to sea where winds are higher and more consistent – far beyond the horizon and invisible from the coast. Cost-effective cabling is a key enabler of such projects.

As well as connecting wind farms to grids, subsea cables are increasingly deployed to provide an interconnection between the grids of different countries.

NordLink is an example.[4] Stretching for more than 600km below the North Sea, NordLink will provide a grid connection between Ger-



many and Norway. Surplus wind and solar power generated in Germany can be exported to Norway, while Norway will be able to export its excess hydropower to Germany.

What makes grid links of this sort so important is that they balance out the peaks and troughs in renewable generation – reducing intermittency, enabling the energy markets of tomorrow and paving the way to a world wide grid.

Nexans breaks submarine cable record

Submarine cables play an increasingly important role in the energy system. As well as serving as interconnectors and export cables for wind farms, they also transport power across lakes and fjords too wide to be spanned by overhead lines.

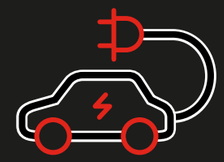
Nexans' 420kV XLPE cabling solution for Norwegian power company BKK sets a new world record in submarine cabling. Nexans developed and produced the cable to work at a depth of 550m – a record for a cable system of this type. The cable spans Fensfjorden and will play a critical role in reinforcing the grid in western Norway.[5]

Submarine cables need special qualities. First, they must be able to withstand the harsh marine environment, including salt water, currents and tides. Second, they must be capable of resisting hydrostatic pressure – the huge pressure exerted by the weight of water above. Finally, they must withstand high mechanical stresses during cable laying.

The ability to provide cost-effective high-voltage cable links in deep waters has important implications for future energy grids, which will increasingly rely on subsea interconnectors and export cables.

1 — https://www.iea.org/reports/global-energy-review-2020/electricity
2 — https://www.iea.org/reports/global-energy-review-2020/electricity
3 — https://www.iea.org/data-and-statistics/charts/electricity-demand-by-sector-and-scenario-2018-2040
4 — https://www.nexans.com/newsroom/news/details/2018/12/NordLink-Nexans-has-successfully-completed-the-installation-of-four-interconnector-cables-for-2018-.html
5 — https://www.nexans.com/newsroom/news/details/2019/07/Nexans-qualifies-high-voltage-cable-to-world-record-water-depth-to-create-power-connection-across-a-Norwegian-Fjord.html

Key Figures



350kW

Power rating of ultra-rapid electric vehicle chargers versus 3kW for home charging

100 million+

Number of European homes switching from fossil fuels to electricity for heating by 2050

60%

increase in global electricity demand over the next 20 years

Website

How to make the economic recovery from coronavirus an environmentally sustainable one

DR. FATIH BIROL
EXECUTIVE DIRECTOR

In just a few short months, the coronavirus pandemic has overwhelmed hospitals around the world, killing thousands of people, disrupting travel and trade, and shuttering economies in an unprecedented global crisis.

But while the world's attention is rightly focussed on these urgent public health and economic issues, we should not lose sight of the global challenge of climate change.

Given the collapse in economic activity around the world, it is all but certain that carbon dioxide emissions will decline this year. This comes after emissions flatlined last year[1] even as the global economy grew.

But I see no reason to celebrate a coronavirus-driven dip in emissions that will likely be achieved on the back of premature deaths, widespread suffering and economic hardship. As economies kick back into gear, emissions will rebound.

Governments will resolve this health crisis. And as they do so, the measures they put in place to help the world economy recover from this extraordinary shock should be designed with our climate challenge in mind. Their stimulus plans should seize the clear opportunities for creating jobs and improving vital infrastructure while accelerating the all-important transitions to cleaner energy.

Every country's energy system has its own cha-

racteristics, and the use of public resources needs to be tailored to each situation. But there are five broad areas where governments can act:

Ignite demand through "cash for clunkers"

Consumer spending tends to fall sharply during downturns, so governments should encourage people to start shopping again for big-ticket purchases like cars and washing machines. Cash-for-clunkers[2] scrappage programmes, with economic incentives focussed on improving energy efficiency across a wide variety of major household goods, would boost consumer demand and achieve lasting reductions in emissions.

Put clean energy jobs at the centre of stimulus packages

Despite stunning declines in the cost of wind and solar technology in recent years, they have yet to attract the level of investment needed to meet international climate goals. Government-driven support for wind and solar farms is a fast way to create new jobs all along the supply chain. Investing in energy efficiency also has large benefits for employment; previous stimulus plans in the United States and elsewhere supported large numbers of jobs by fuelling demand for the labour-intensive work of upgrading buildings, so they use less energy to keep warm in winter or cool in summer.

Build state-of-the-art electricity systems

The coronavirus has precipitated a massive experiment in teleworking and home schooling as millions of adults and children find themselves suddenly confined to their homes. This highlights our societies' dependence not only on the internet but also on an affordable and reliable electricity supply. Electricity networks are helping us get through the current crisis, but they are not ready for a more electrified future in which wind and solar account for a rising share of power generation. Investment to strengthen our grids and to integrate smart digital technologies in their operation should be a priority everywhere.

Develop and scale up the next generation of energy technologies

There is no single or simple solution to tackling the world's climate challenge. Doing so will require using a wide range of different energy technologies. Three in particular – batteries, hydrogen and carbon capture – are at a pivotal moment where mass manufacturing and deployment could turn them into vital elements in clean energy transitions worldwide. A strong push from stimulus packages can help these technologies reach the scale where they become increasingly competitive on costs, building new job-creating industries in the process. Through investment in energy venture capital funds and targeted research and development, public money can also lay the foundations for new technologies needed to reach the growing number of net-zero emissions targets being set by governments, including in the UK.

Bring in more private money

All of these efforts will be far more effective if policy makers establish broader energy plans that provide the long-term clarity that private investors are seeking. Getting price signals right by removing fossil fuel subsidies or pricing carbon, or offering loans and co-investment for clean energy projects, can help reduce many of the risks that have previously deterred private money.

Today, we are seeing the critical importance of government leadership in responding to the coronavirus crisis. This leadership is also needed to advance clean energy transitions. Directly or indirectly, governments drive more than 70 per cent of global energy investments, according to IEA analysis.

We have two curves we need to quickly bend onto downward trajectories. The curve of coronavirus infections, and the curve of global emissions. Neither will be easy. But through smart, timely action and cooperation, governments can ensure we achieve both.

1 — https://www.iea.org/news/defying-expectations-of-a-rise-global-carbon-dioxide-emissions-flatlined-in-2019
2 — https://en.wikipedia.org/wiki/Car_Allowance_Rebate_System

Harnessing the Winds of Change

Innovation in offshore wind technology is playing a critical role in decreasing the cost and increasing the speed of turbine deployments

These are testing times for the energy sector. The Covid-19 pandemic has hit hard, bringing with it supply chain disruption, plummeting energy demand and questions over long-term financing.

The economic headwinds are real. Yet there is still room for optimism, particularly when it comes to renewables. Offshore wind is a case in point. This remains one of the world's fastest growing industries[1] and it could play a vital role in post-crisis recovery – providing governments with an opportunity to pursue economic stimulus and Green Deal goals at the same time.

Driving down costs

One factor that makes the offshore wind sector attractive is its track record of innovation. Despite the relative newness of the sector – utility-scale offshore wind is less than 20 years old – it has made massive strides in terms of efficiency. Costs have fallen dramatically.

To put this in context, both offshore and onshore wind costs have dropped by more than 50% on average over the past five years. The cost of offshore fell by nearly a third between 2018 and 2019 alone, research by Bloomberg New Energy Finance shows[2].

One factor that makes the offshore wind sector attractive is its track record of innovation.

So how are these savings being achieved? And what innovations can be expected in the future?

Taller towers, bigger blades

Bigger is always better in the world of power engineering: the laws of physics dictate that large machines are always more efficient than small ones. In the case of wind turbines, larger rotors with longer, lighter blades allow greater energy capture, even at relatively low wind speeds.

Towers are getting taller. Wind speed increases with height, so higher towers allow rotors to tap into stronger and more consistent airflows – reducing intermittency. Currently, the tallest turbine is 260m and capable of generating 12MW – enough to power around 16,000 homes. Turbines with a capacity of 15MW are expected by the mid-2030s.[3]

Bigger turbines are not only more efficient at generating electricity, but are also more cost effective to deploy. Fewer turbines are required, so installation and maintenance costs are lower. Together, these factors contribute to a low levelised cost of energy.

Floating foundations

One of the big challenges with offshore wind is building foundations for turbine towers. The conventional method is to fix the structure directly to the seabed. A number of approaches are adopted. These range from relatively simple monopile foundations, suitable in shallow waters, to complex jacket foundations for depths over 30m.

The problem with conventional foundations is that they are not economically viable in deep water. This matters because most of Europe's wind resource – 80% of it – occurs over waters that are 60m deep or more.

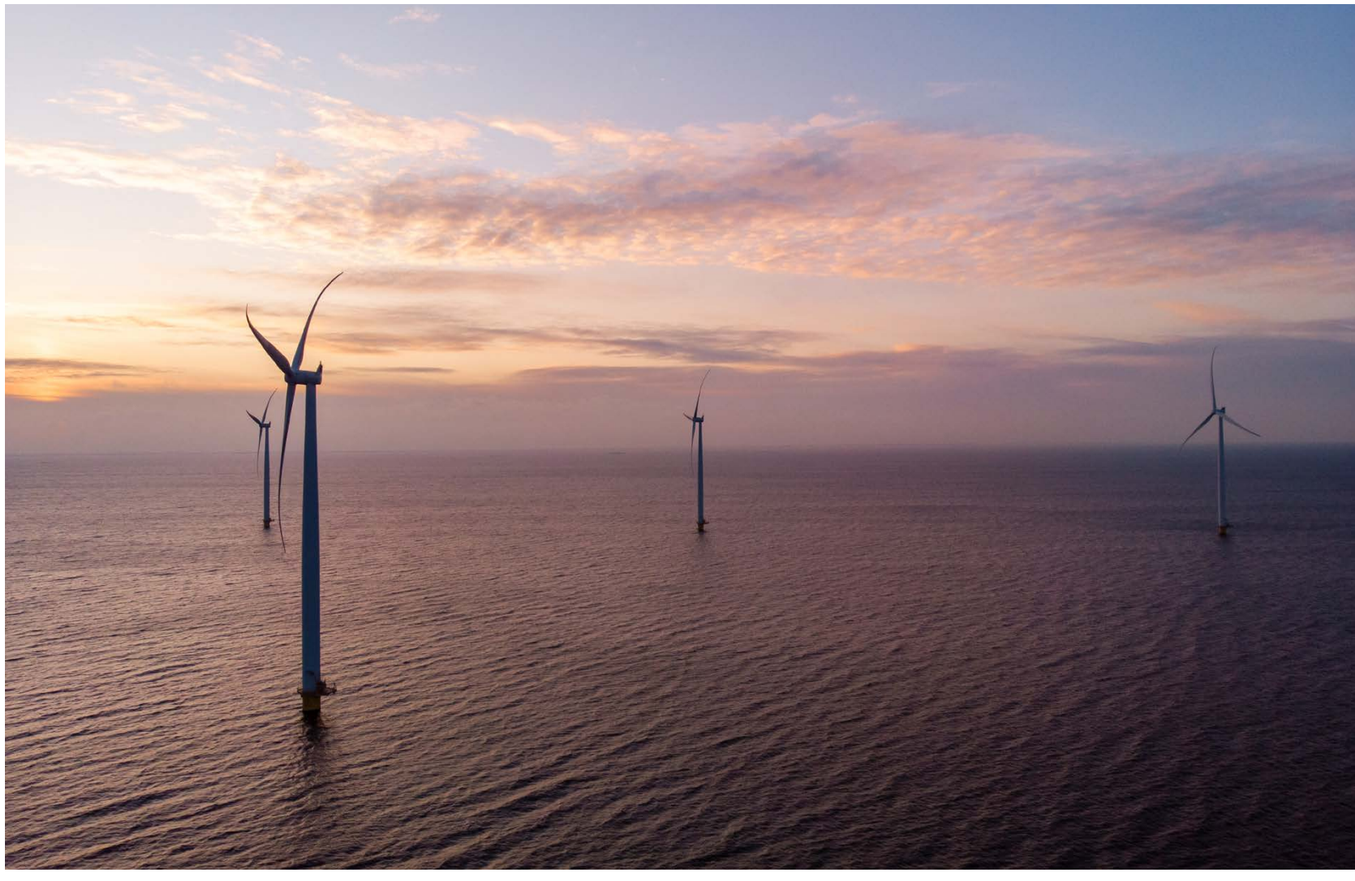
The answer could be floating offshore wind. Floating turbines do not require conventional foundations. Instead, turbines stand on a floating substructure that is tethered to the seabed with mooring lines and anchors.

Offshore and onshore wind costs have dropped by more than 50% on average over the past five years.

The technology is proven: the world's first commercial floating wind farm, Hywind Scotland, has been in operation since 2017. The beauty of floating turbines is that they allow developers to tap into stronger and more consistent winds further out to sea, transforming the economics of offshore wind.

Zero-loss transmission

As wind farms grow in size and are built further out to sea, new approaches to cabling are needed. Electrical resistance is a key constraint: in order to overcome transmission losses, the current must be kept to the minimum. This means that



high-voltage transmission is required.

The trend towards higher export voltages is already established with 220kV AC increasingly the standard. However, limitations inherent in AC transmission mean that high-voltage DC systems are becoming more prevalent for long-distance export.

Both AC and DC export solutions use conventional cabling, so high voltages are essential. But what if you could export electricity without the need to step up the voltage?

Superconducting cables could hold the key. Unlike conventional copper and aluminium cables, superconducting cables offer no resistance. This means they can handle extremely high currents at medium voltage. As well as eliminating resistive losses, superconductors have the potential to reduce the amount of equipment and maintenance needed offshore.

Innovations like these hold the key to enabling the energy infrastructure of the future – and to providing clean, cost-effective electricity for decades to come.

Cutting the cost of offshore wind

Nexans solutions and services are designed to drive down costs and accelerate the deployment of offshore wind. Our innovative WINDLINK® cable harnesses for wind turbines are an example. These plug-and-play kits make turbine installation quick and easy – and provide years of reliable service. That's why Nexans is a preferred supplier to the offshore wind industry, with customers including Iberdrola, Ørsted, Siemens Gamesa and Vestas.

Nexans is present throughout the offshore value chain with a complete offer that includes advanced submarine cabling systems, accessories and services from design engineering to maintenance. And in 2021, we're launching CLV Nexans Aurora, the world's most advanced cable laying vessel – underlining our commitment to helping our customers achieve their biggest ambitions.

1 — https://gwec.net/wind-power-will-be-a-key-building-block-for-economic-recovery-industry/
2 — https://gwec.net/global-wind-report-2019/
3 — https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/839515/L2C156060-UKBR-R-05-D_-_potential_to_improve_Load_Factors_of_UK_offshore_wind_to_2035.pdf

Key Figures

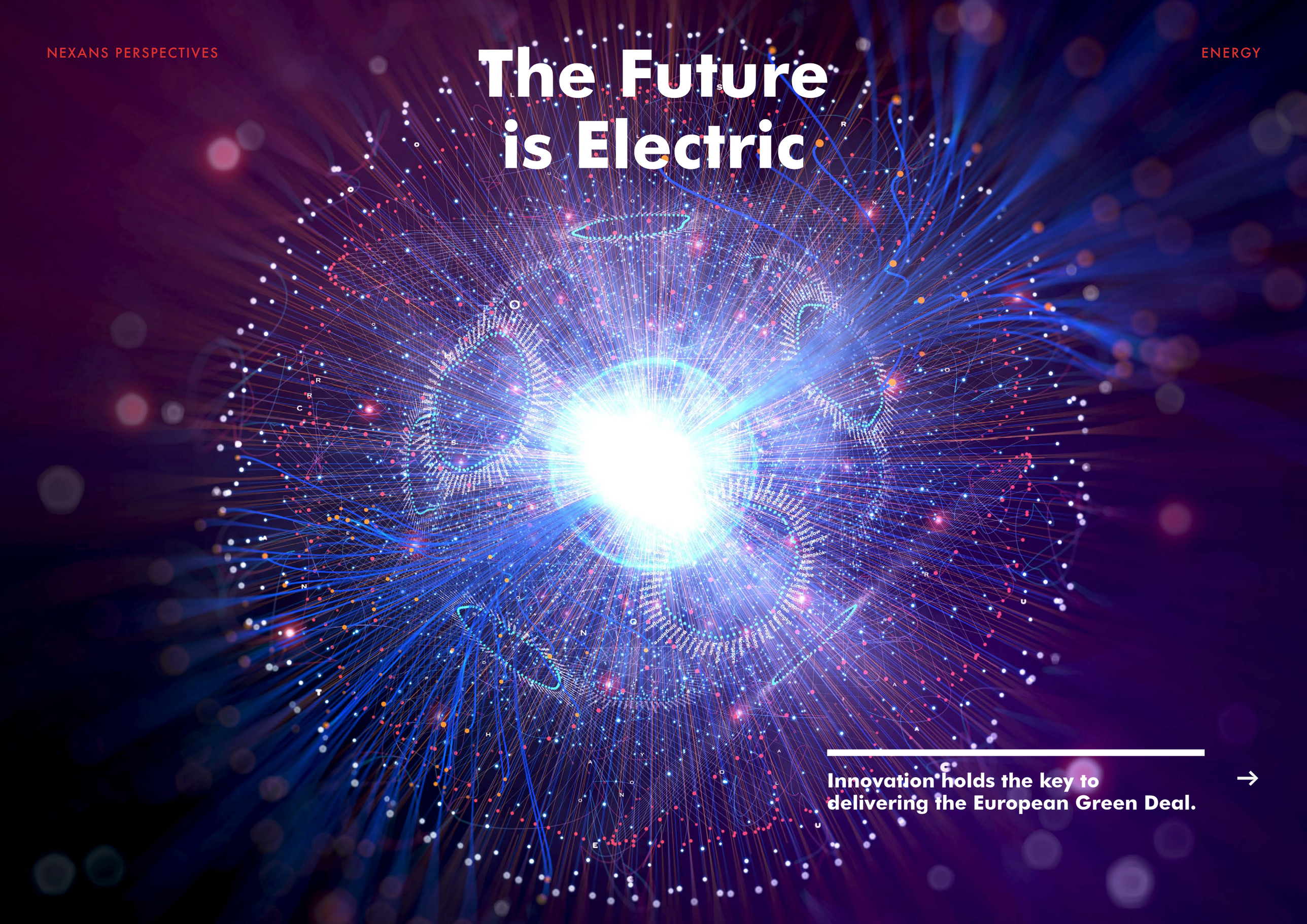
120,000GW

technical potential of global offshore wind. Current offshore capacity is 29GW

4 million

potential jobs in wind energy by 2030, up from 1.2 million in 2018

The Future is Electric



Innovation holds the key to delivering the European Green Deal.

The ambition is huge. By 2050, Europe intends to be the world's first climate-neutral continent.[1] To achieve this, renewable generation will need to replace the electricity currently produced using fossil fuels. This must be achieved while catering for a rapid increase in global electricity demand, which is expected to rise by more than 60% over the next 20 years.[2]

The energy transition is not only about new ways of generating electricity. It is also about new ways of using it. Electricity will largely replace petrol and diesel as a fuel for road vehicles. It will also replace the natural gas and oil we burn to heat our homes and run our industries. In short, electricity will grow in importance as a carbon-free energy carrier.

Electrification of final demand has huge implications not only for generation, but also for transmission and distribution. So what will the future energy system look like? What challenges must be overcome? And what part will technological innovation play in achieving the transition?

A glimpse into the future

Let's imagine it's 2050. Renewables will be the primary source of electricity generation, much of it from offshore wind farms and solar plants. However, households and businesses will also play a part through rooftop solar generation. There is potential for more than 150 million of these mini power stations in Europe by 2050. As generation becomes more decentralised, it will need to become more collaborative.

It's not only generation that will be different. The pattern of consumption will also change. Two things stand out. The first is the electrification of transport – vital if emissions are to be curbed. Tomorrow's vehicles will be electric and there will be millions of them. Even in the short term, numbers are expected to rise rapidly with 13 million zero and low-emission vehicles on the road by 2025, up from fewer than one million today.[3]

The second big change is likely to be the electrification of space heating. This matters because heating is the single biggest source of domestic energy demand. Today, 51% of us depend directly on burning gas, oil or coal to keep our homes warm. In 2050, most space heating will need to be done without the help of carbon. More than 100 million European households will need to make the switch from fossil fuels to electricity for heating.

The net-zero challenge

Achieving net zero will require big changes to the energy system. The opportunities are huge, but so are the risks. Industry participants are turning their attention to three key areas – supply security, affordability and sustainability.

Supply security – the quality and reliability of supplies will become even more important as electricity becomes the primary energy carrier. Grids and distribution networks will need to be smarter and more resilient to cater for new loads, increased decentralisation and higher levels of intermittency. Subsea grids and new interconnectors will be needed to promote energy trading and to improve energy security.

Affordability – the energy transition needs to be affordable for everyone: consumers, developers and operators. Renewable energy developers need ways to reduce the cost of implementing new wind and solar infrastructure at scale. Grid and distribution system operators, meanwhile, need cost-effective ways to upgrade, reinforce and extend their networks so generators and consumers can participate easily in the emerging, decentralised energy system.

Sustainability – increasing electrification will go hand in hand with increasing demand for electricity. This is likely to result in network congestion, particularly in cities. Congestion wastes energy and causes assets to age prematurely. Grid and distribution system operators therefore need ways to reduce system losses and protect grid assets.

In 2050, most space heating will need to be done without the help of carbon.

How will innovation enable the future energy system?

At Nexans, we believe that innovation holds the key to accelerating the delivery of the future energy system. Here are some of the ways we are

helping our customers to ensure that the transition is smooth, swift and cost effective:

Innovations for renewable energy developers. We're helping the world's leading renewable energy developers to increase the speed and reduce the cost of deploying new infrastructure. Our innovative plug-and-play cable harnesses for offshore wind turbines and onshore solar plants reduce installation time while increasing reliability during routine operations. Our expertise in turnkey submarine cabling and offshore transmission grids allows operators to connect to markets rapidly. And 2021 will see the launch of Nexans Aurora, the world's most advanced cable-laying vessel.[4]

Innovations for grid and distribution system operators. We're working to create a more resilient energy system at every level – from high-voltage electrical interconnectors that span oceans to advanced cabling for national grids and regional distribution networks. Nexans is pioneering the development of superconducting cable technology[5] that eliminates losses and allows our customers to boost the capacity of congested city networks. Meanwhile, our superconducting fault current limiters (SFCLs) provide system operators with a unique tool to get more out of their existing networks.

We also have new digital tools to help Distribution System Operators to get the most out of their infrastructure. Nexans' Asset Electrical[6] is a strategic asset management solution that provides DSOs with insights into how their power networks are used – and helps them to make better, data-driven decisions about investment. Asset Electrical enables DSOs to achieve the perfect balance between network performance, capex, opex and risk, including financial, regulatory, security and environmental factors. And the integration of data from smart meters will provide even more ways to optimise network performance.

Together, these technologies will play a decisive part in ensuring that tomorrow's energy system is secure, affordable and sustainable.

1 — https://ec.europa.eu/info/strategy/priorities-2019-2024/european-green-deal_en
2 — https://www.iea.org/data-and-statistics/charts/electricity-demand-by-sector-and-scenario-2018-2040
3 — https://ec.europa.eu/commission/presscorner/detail/en/fs_19_6726
4 — https://www.nexans.com/newsroom/news/details/2019/11/Nexans-power-umbilicals-will-play-critical-role-in-Ormen-Lange-Phase-3-project.html
5 — https://www.nexans.com/newsroom/news/details/2017/03/Super-cool-power-highways.html
6 — https://www.nexans.com/fr/business/Building---Territories/Power-networks/Asset-management.html

Nexans' Asset Electrical is a strategic asset management solution that provides DSOs with insights into how their power networks are used.

Website

Gartner

Analysts Answer: How Will Coronavirus Impact Technology Investment Across Verticals?

MEGHAN RIMOL

The coronavirus outbreak presents opportunities for technology and service providers as various industries invest in technology to improve their resiliency[1].

Across industries, organizations around the world are feeling the impact of the coronavirus outbreak on their operations. While many end-user organizations are facing an immediate slowdown, some industries will see increased technology investment in the long term as businesses look to recover and leverage technology to improve their resiliency.

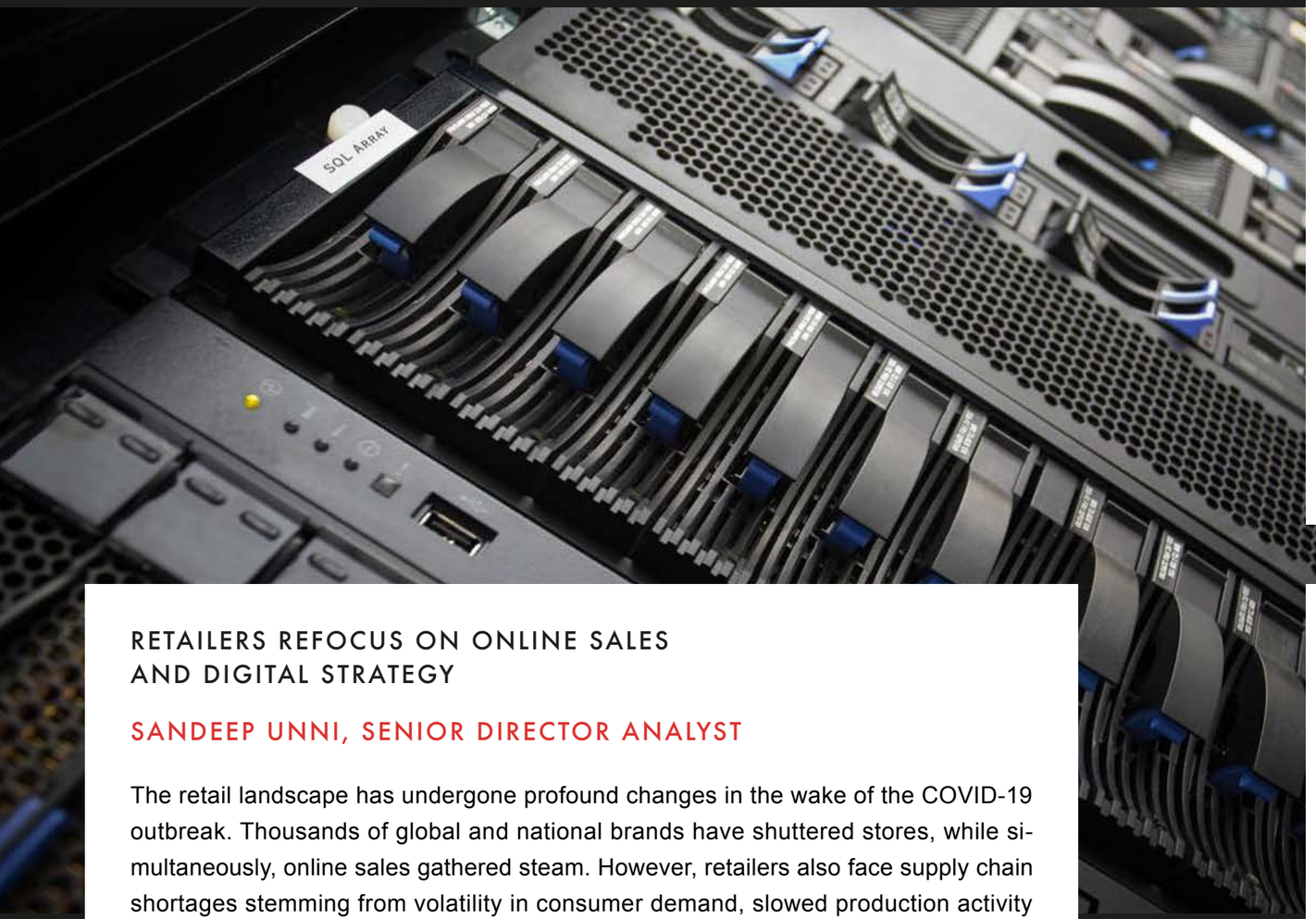
Smarter With Gartner asked our analysts about the impact that COVID-19 will have on technology investments across industries including banking and securities, education, government, healthcare and retail.

INVESTMENT SERVICES SHIFTS TO REMOTE WORK

MOUTUSI SAU, VP ANALYST

The banking and securities industry has experienced significant volatility since the start of the coronavirus outbreak, particularly in investment services. As we saw with the closure of the New York Stock Exchange trading floor, it's likely that electronic trading will become more prevalent. Roles that have always been delivered from an office location due to security and compliance concerns are now being considered for remote working[2].

This shift will require significant technology investment over the long term. Technology and service providers selling surveillance and compliance tools have a huge untapped market in investment services. There will also be a need for SaaS office applications and unified communication tools that enable the markets to run successfully remotely.



RETAILERS REFOCUS ON ONLINE SALES AND DIGITAL STRATEGY

SANDEEP UNNI, SENIOR DIRECTOR ANALYST

The retail landscape has undergone profound changes in the wake of the COVID-19 outbreak. Thousands of global and national brands have shuttered stores, while simultaneously, online sales gathered steam. However, retailers also face supply chain shortages stemming from volatility in consumer demand, slowed production activity and bottlenecks in transportation of goods.

As e-commerce sees increased sales in the near-term, many retailers will revisit their digital strategy[3] and investments. We expect to see an increase in technology investments that enable retailers to provide consumers with a compelling omnichannel retail experience. To overcome supply chain challenges, technology and service providers should also steer investments in use cases for artificial intelligence and machine learning spanning core supply chain planning, forecasting, inventory and merchandising functions.

HEALTHCARE DELIVERY ORGANIZATIONS LEAN ON TELEMEDICINE

LISA UNDEN-FARBOUD, SENIOR DIRECTOR ANALYST

Currently, most healthcare delivery is done through face-to-face meetings. The advent of COVID-19 is putting pressure on hospitals and government agencies to quickly embrace alternative models like telemedicine as an option for delivering care. Telemedicine can be beneficial as a first consultation on virus expectation, and can also help reduce the burden on hospitals for monitoring and caring for patients in quarantine.

As such, digital health solutions could see an immediate investment impact during the coronavirus crisis. Technology and service providers should accelerate efforts to showcase the benefits of their telemedicine and virtual care solutions to healthcare delivery organizations. Investment in these systems will be dependent upon the ability to quickly integrate data and ensure compliance with local regulations and laws.

GOVERNMENTS PRIORITIZE EMERGENCY-RELATED INVESTMENTS

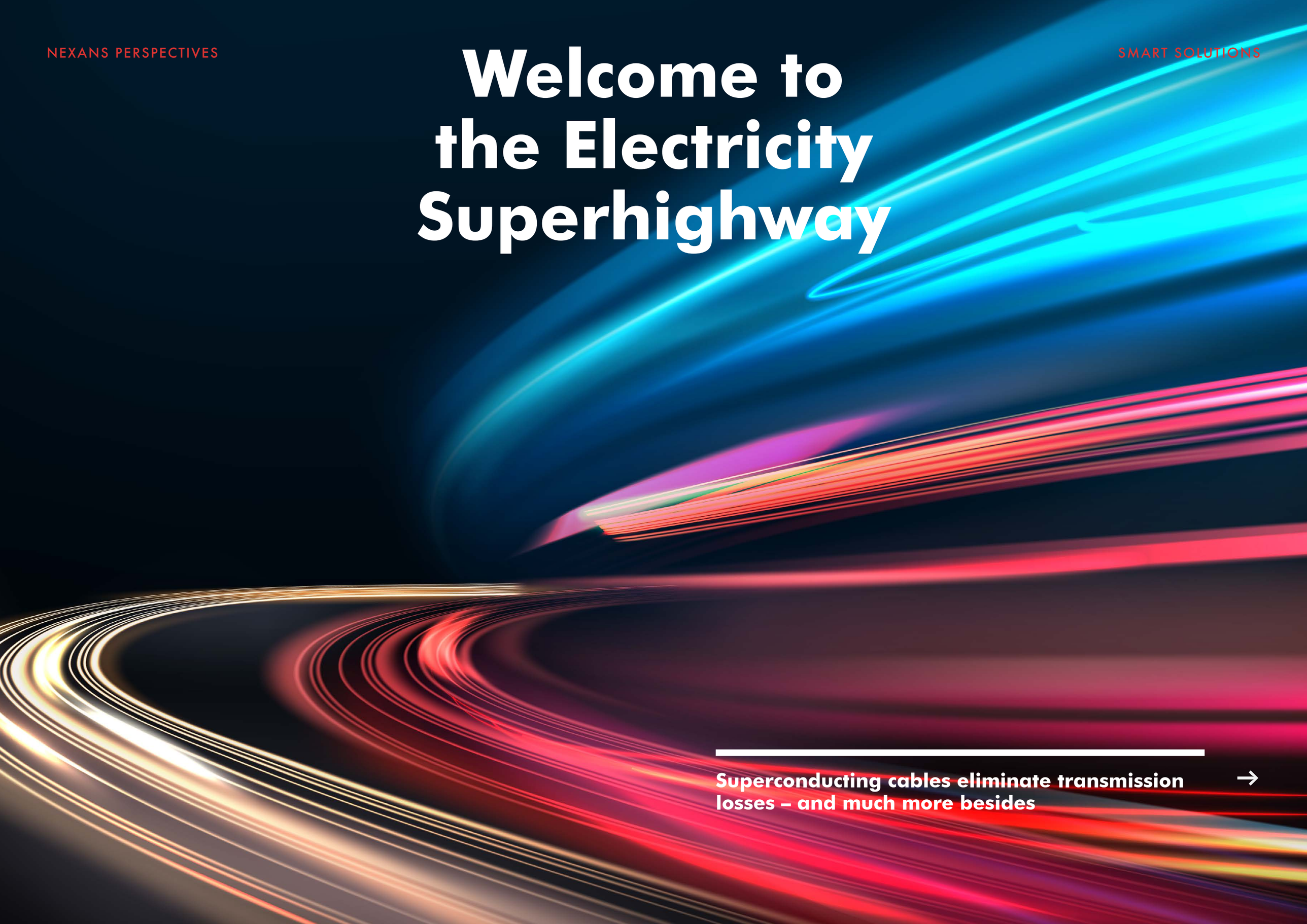
IRMA FABULAR, SENIOR DIRECTOR ANALYST

COVID-19 has amplified the need for government leaders globally to quickly mobilize resources to respond to, mitigate and recover from crisis situations. Emergency-related investments will be prioritized in the short to midterm, as governments focus on mitigating the outbreak and maintaining essential public services.

These investments will include website content management, cloud services and other public communications infrastructure, as well as mission-critical applications for public safety, emergency management and disease surveillance. In the longer term, government organizations will likely accelerate investments in digital public services, scalable IT and communications infrastructures, predictive data[4] analytics and artificial intelligence.

1 — https://www.gartner.com/smarterwithgartner/create-a-resilient-business-model-in-the-face-of-covid-19/
2 — https://www.gartner.com/smarterwithgartner/with-coronavirus-in-mind-are-you-ready-for-remote-work/
3 — https://www.gartner.com/smarterwithgartner/how-retailers-can-compete-with-e-commerce-giants/
4 — https://www.gartner.com/smarterwithgartner/analyst-answers-how-it-leaders-should-invest-in-data-and-analytics/

Welcome to the Electricity Superhighway



Superconducting cables eliminate transmission losses – and much more besides

→

How can I reduce my transmission losses? Electrical engineers have puzzled over this question ever since the first power station opened nearly 140 years ago. Transmission technology has come a long way since then. But losses remain a problem.

Missing megawatts

Just over 6% of the electricity generated in Europe never makes it to the consumer. Some of it – about a quarter – is lost in transformers. But most of it vanishes on its journey through transmission and distribution systems. These systems use copper or aluminium conductors. When electricity flows, heat is generated in the conductor and energy is lost.

Six percent may not seem very much – and Europe's grids are highly efficient by global standards. But the losses add up to a surprisingly large amount. In fact, the total amount of electricity lost in an average year is about 180TWh.[1] Or put another way, enough to power Paris, London and Berlin combined.[2]

Could superconducting systems help?

Superconductors are perfect electrical conductors. There is no resistance, no heating and no loss. Superconducting systems for the electricity industry – which include cables and fault current limiters – are built using High Temperature Superconducting (HTS) materials.

Superconductors are perfect electrical conductors. There is no resistance, no heating and no loss.

The word "high" in this context is relative to absolute zero. HTS materials are actually very cold – minus 200 degrees centigrade. HTS cables incorporate thermal insulation and the coolant used is liquid nitrogen, which is inexpensive and does not harm the environment.

Another characteristic of HTS cables is that they are surprisingly small. A single 17cm diameter cable can transmit 3.2GW, equivalent to the power of three nuclear reactors. They are also capable of carrying extremely high currents. And there is no electromagnetic field, so interference with surrounding power and telecoms cables is eliminated.

Superconductors meet real needs

Superconducting systems solve many of the most pressing problems faced by distribution and transmission system operators. Here are some of the ways they can help.

Zero loss transmission. HTS systems turn the vision of lossless, high-capacity transmission into a reality. Grid congestion is eliminated, so system operators can make the best use of all generation resources, no matter how far away they are. This capability is becoming more important as reliance on remote offshore generation increases.

Less hardware. The beauty with HTS systems is that they enable grid operators to do more with medium voltage. Because superconductors offer no resistance, it is possible to boost the power transmitted by increasing the current instead of the voltage. Step-up and step-down transformers are not needed. This reduces equipment costs, as well as eliminating the need to build new substations – a key consideration when upgrading an urban grid.

Reduced land take. HTS cables save a huge

amount of space. This means acquisition and permitting costs are reduced while disruption and routing problems are minimised. An additional benefit is freeing-up land for other purposes – a key benefit in today's crowded cities. There is also scope to get more out of valuable urban infrastructure, such as cable tunnels. Beyond this, HTS cables have the potential to revolutionise cross-country transmission: the footprint for a high-capacity underground HTS cable route is just 5.5m – more than 20 times less than the width of the equivalent corridor for overhead transmission.

Kinder to the environment. HTS cables reduce the impact of electricity transmission. Visual amenity is preserved because cables run underground. This can play a critical part in winning public acceptance for new transmission projects. Habitat disruption is minimal, because route corridors are narrow. This also means there is less need for land sterilisation to protect the infrastructure.

Our references include the world's longest superconducting cable, delivered for RWE in the city of Essen in Germany.

The road ahead

Superconducting cables are still relatively expensive compared to their conventional copper cousins. Yet when considered as part of the whole transmission system, the economics look increasingly attractive. The costs of land, equipment, permitting and civil works are all lower with HTS systems.

Meanwhile, industrialisation of the manufacturing process means that the cost of HTS solutions is on a steady downward trajectory. And that will increasingly put this innovative technology within reach of transmission and distribution system operators.

Superconducting systems in action

Did you know that Nexans is a world leader in the design, development and deployment of superconducting systems?

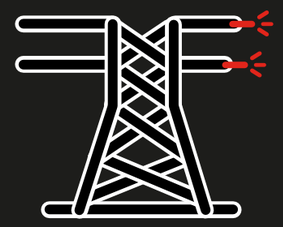
Our references include the world's longest superconducting cable, delivered for RWE in the city of Essen in Germany. This is a 10kV, 2300A HTS cable that does the same job as a 100kV conventional cable. This cable has now been in continuous use for six years.

We also manufacture superconducting fault current limiters (SFCLs). These are used in conjunction with conventional cabling systems to protect against fault currents. They require no human intervention.

Nexans' HTS cables and HTS fault current limiters are commercially available in a large number of configurations for both AC and DC applications.

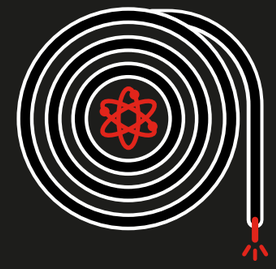
1 — https://ec.europa.eu/eurostat/statistics-explained/index.php/Electricity_production,_consumption_and_market_overview
2 — https://ec.europa.eu/eurostat/documents/2995521/9967985/3-10072019-BP-EN.pdf/e152399b-cb9e-4a42-a155-c5de6dfe25d1

Key Figures



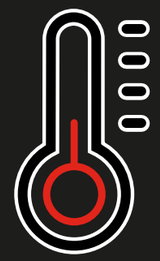
180TWh

annual electricity transmission loss in Europe – enough to power Paris, London and Berlin.



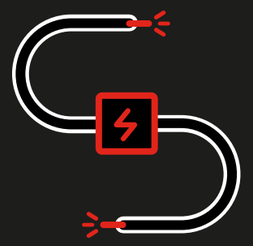
17cm

a superconducting cable of this diameter can transmit the power of 3 nuclear reactors.



-200°C

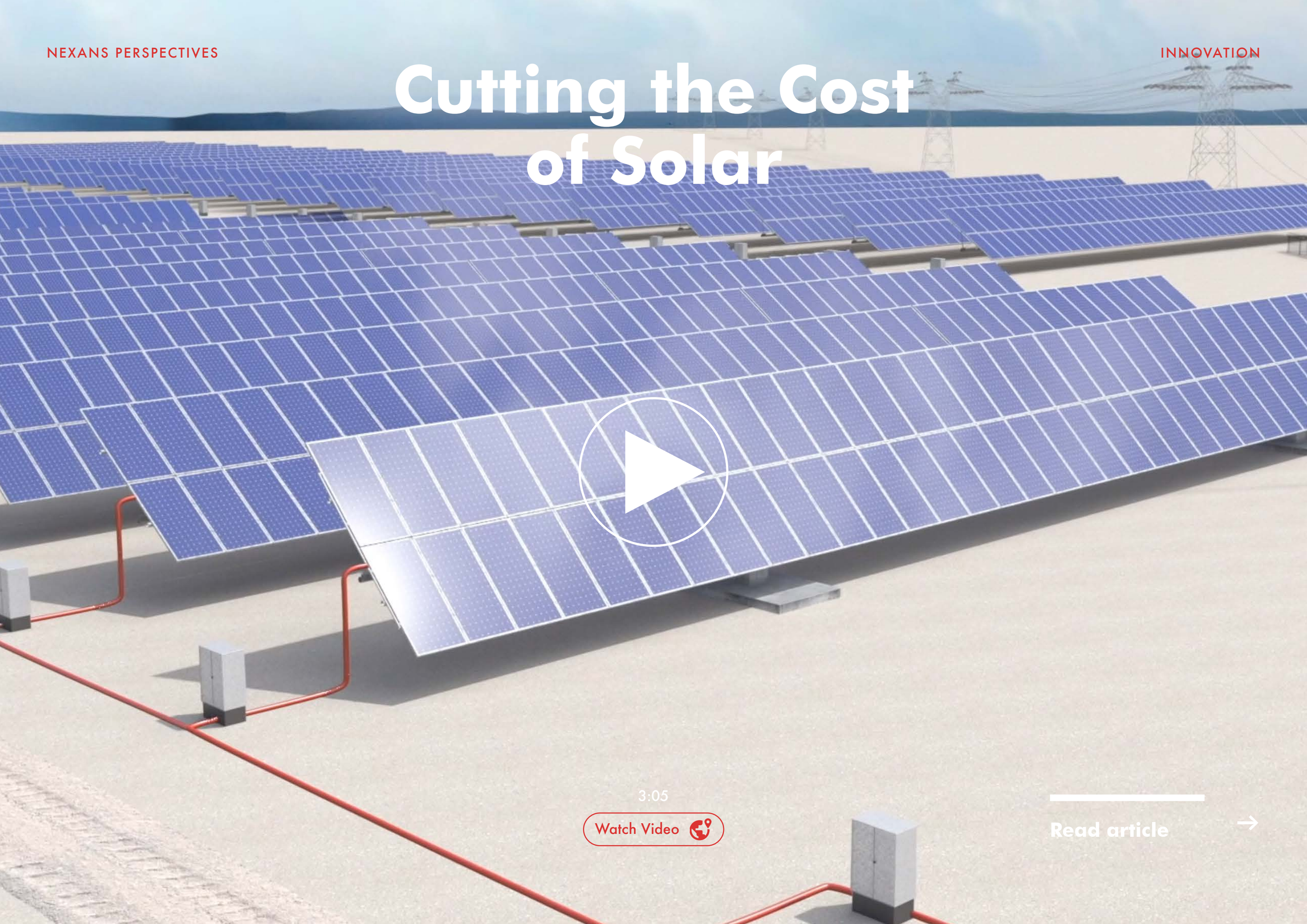
temperature inside a superconducting cable, achieved with liquid nitrogen.



0%

energy loss in a superconducting transmission system.

Cutting the Cost of Solar



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Watch Video

Read article

Nexans' innovative KEYLIOS® Photovoltaic Harness reduces low-voltage DC cabling costs on solar farms by 15%

Solar power is booming. 2019 saw new installations soar to a near-record high with 16.7GW of solar deployed in Europe – twice the 2018 total.[1]

The solar surge looks set to continue. Industry forecasts suggest Europe will see rapid growth with up to 53GW of new capacity added over the next three years. Meanwhile, global solar output is predicted to double to 1TW by 2022.[2]

Cabling exceeds 4,000km on the largest solar farms

The attractions of solar are clear. Utility-scale solar has the lowest levelized cost of energy (LCOE) of any renewable energy source and ROI is rapid. As a result, subsidy-free projects are becoming the new normal.

Are further cost reductions possible?

Although utility-scale solar is already competitive, there's still room for improvement. Cabling is one area where developers, EPCs and operators can make potential CAPEX and OPEX savings.

First, developers need ways to reduce the amount of cable and components they use during installation. This matters because the cable requirement on solar farms is huge – more than 4,000km on the largest installations.

Second, there's a need for high-quality "ready to connect" products, so solar strings can be hooked up quickly with no need for risky cable preparation on site. There's also a need to reduce the cutting waste associated with conventional installation.

Finally, developers need reliable cabling solutions for the whole life of the system. Cabling products must be zero maintenance. And they must be designed to eliminate risks such as cable connection faults and fire, which together account for 50% of installation failures.

Solar cabling made simple

Nexans' KEYLIOS® Photovoltaic Harness meets all of these needs.[3] Manufactured to your specifications and delivered in easy-to-handle kits, our photovoltaic harness is a perfect match for your installation. And it's ready to connect, with no cutting or crimping required on site.

It reduces capital costs by 15% and cuts low-voltage cable lengths by up to 36%.

The harness is designed to provide our customers with maximum value. It reduces capital costs by 15% and cuts low-voltage cable lengths by up to 36%. And less cabling means it's possible to reduce the size and cost of components, such as combiner boxes. Smarter use of materials also reduces the overall environmental impact of the installation.

Quality is of paramount importance. KEYLIOS® Photovoltaic Harnesses are manufactured under controlled conditions in our factories. Cables are precision cut and joints ultrasonically welded, eliminating defects. Junctions and inline fuses are overmoulded and IP67 rated.

Thanks to our global footprint, we can deliver KEYLIOS® Photovoltaic Harnesses anywhere to a tight deadline and we can quote within 24 hours. We can also manufacture in-country if you require a certain level of local content for your installation.

Nexans' KEYLIOS® Photovoltaic Harness exemplifies our commitment to the energy transition – and to maximising ROI and minimising risk for our renewable energy customers.

1 — https://www.solarpowereurope.org/eu-solar-boom-over-100-solar-market-increase-in-2019/
2 — https://www.solarpowereurope.org/eu-market-outlook-for-solar-power-2019-2023/
3 — https://www.youtube.com/watch?v=Lyk4tsACxig&t=55s