ELAND®
CABLES

THE GREEN ENERGY FUTURE

Building renewable energy cable networks



INTRODUCTION

Power demands are growing as we embrace electrification, digitalisation and automation projects across industries. Global electricity generation is expected to reach 70,000 TWh by 2050 - with most countries having shifted the focus to renewable energy solutions to meet decarbonisation targets.

Integral to power generation and power distribution is the cable industry which is also experiencing a boost, driven by increased investment in projects to build infrastructure and support network upgrades.

Increased demand for specialised cables

As sustainability takes centre stage, the landscape of energy investment saw global spending on renewable energy infrastructure exceed $1.8 trillion – a 17% increase from the previous year and a new record.

Wind turbines and solar farms, bioenergy & hydroelectric plants, and battery storage facilities all require cables tailored to their specialist applications. But it's not just the installation in isolation, there's a medium voltage grid network needed to distribute the generated power, and that's grown rapidly too. Even the high voltage subsea inter-connector market had risen four-fold to around €12 billion in 2023 with double that predicted in 2024. Cables for green energy projects are in demand.

Not all installations are on the scale of Xlinks - an ambitious project to harness Moroccan sun and wind and transmit back to the UK - but they all work on the same premise - that zero carbon green energy is the best way to support sustainable growth.

We look at some of the key considerations for the cables connecting these green energy technologies.



Operations: It's all about specification

Specifying the right cables is essential to maintaining operations. The aim is to balance performance demands, installation design, and environmental conditions. There isn't a one-size-fits-all solution so these are some things to think about.

Solar cables

EN 50618 H1Z2Z2-K Photovoltaic cables 'daisy-chain' the PV panels together, before connecting the DC combiner cables linked to the Inverter and Transformer. Do these cables have sufficient UV resistance to withstand the elements? Are the cables liable to be sat in water or submerged at any point - have you considered water resistance?

Wind turbine cables

What part of the turbine tower is the cable for? Powering motors and rotor blades in the nacelle requires torsional resistance; with offshore and near-shore installations maybe needing sheathing that withstands the saltwater in the atmosphere. Instrumentation and Control cables that regulate the pitch and direction of turbine blades to ensure optimal performance and efficiency - do these need to be screened for electromagnetic compatibility to avoid signal distortion?

Biomass installations

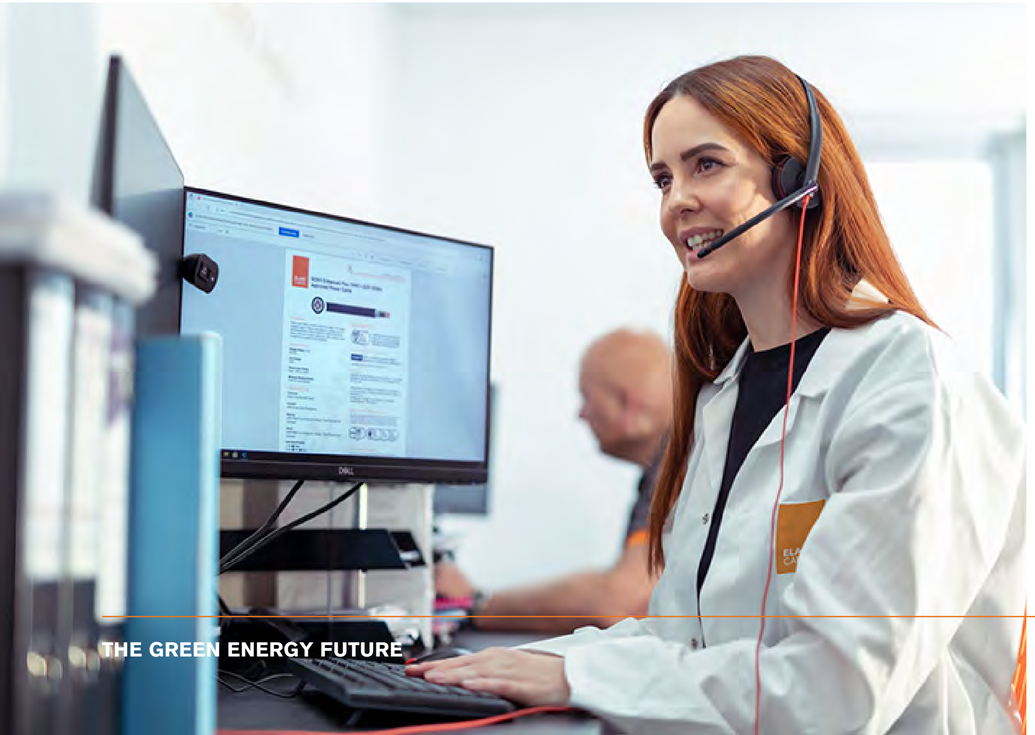
Whether building a new facility or retro-fitting existing plants for change-of-use, you're specifying for cables that will possibly face extremes of temperature, and be exposed to chemicals and oils. Flexible rubber cables like the H07RN-F cable are frequently specified, but does it need the low smoke zero halogen properties of H07ZZ-F instead?

Hydro-electric plants

Submersible cables are likely needed here - but to what depth do they need to be rated? For freshwater sites there's the H07RN-8-F to 10m all the way to the 800m Drincable cable for low voltage power transmission. For other cables, PUR sheathing materials help prevent microbial bacteria propagation - is this a factor to consider?

Battery Energy Storage Solutions (BESS)

BESS supports utility-scale and industrial energy optimisation - otherwise the way renewable energy is generated it's 'use-it-or-lose-it'. Do you need flame retardancy and LSZH properties? What about flexibility to aid installation? System compatibility should also be considered.





Independent testing and verification

Quality and Compliance are linked to operational sustainability. Any maintenance or worse, the need to replace a cable, means downtime and additional embodied carbon emissions from both new materials and running of plant equipment.

Seeking verification through rigorous testing against standards mitigates risk of sub-standard or non-compliant cables. It gives assurances of performance at point of commissioning, but also throughout the lifespan of the installation through the use of accelerated ageing techniques.

Construction Products Regulation (CPR)

For European projects, CPR compliance is a key part of specification. Solar, Onshore wind, Biomass, Hydro and BESS projects may all have elements of the fixed cable network laid inside or terminating inside buildings or constructions and so would require CPR-rated cable solutions. Where compliance can be more challenging is navigating any enhanced requirements linked to project-demands or country-specific regulations.

The wider Medium Voltage grid

Underpinning and connecting all these installations is a medium voltage grid network, connecting from point of generation to wider distribution.

This critical power infrastructure is installed in early-phase works, for both private and adopted networks. MV cables are more often installed in the ground, either directly or in ducts, and where this crosses private land it's essential that maintenance works are kept to a minimum throughout the lifespan of the installation.

Whether using international standards like IEC 60502-2, European references such as HD620, or national naming codes such as BS7870-4.10, XHIOE and N2XS(FL)2Y, it's all about the component layers, and their material properties and thicknesses.

Layer on top any regulatory or industry-specific requirements and quality marks and it's become a long checklist of permutations to match against. Here's a few of the key considerations:

- Copper is a better conductor making cables smaller in size than Aluminium cables of the same current carrying capacity - but they're much heavier - is space at premium?
- The choice of insulation material dictates dielectric strength and maximum operating temperature. What is needed to suit system integration?
- Does the metallic screen provide the level of protection required? Whilst cable standards will provide a screen CSA, it can be tailored to suit installation or earthing requirements.
- Armour can help withstand mechanical stress but at the expense of flexibility which can hamper installation. Is it needed?
- Is additional longitudinal and/or radial waterblocking needed to help prevent water ingress where there is risk of occasional flooding or submersion?
- Sheathing material depends on where its going to be installed - in ducts, inside buildings or the turbine towers, direct in the ground. What environmental conditions will it need to withstand?





BSI Cable Testing Verification Kitemark

The critical nature of these medium voltage cable connections means many companies seek third-party quality marks to offer independent verification and confirmation of compliance.

Cable Testing Verification under the BSI Kitemark programme is a rigorous assessment, conducted on every medium voltage cable at Eland Cables, over-and-above the testing regime of the The Cable Lab. For quality-conscious and high profile installations, this quality assessment mark can be applied across all project cables.



Quality is not always visible

The reason for the emphasis on testing is because even microscopic imperfections can have a significant impact on performance and longevity. MV cables are manufactured in clean environments to avoid particulates within the insulation which cause partial discharge - which can in turn lead to the premature failure of MV cables.

The risk of sub-standard or non-compliant cables remains a factor to remain vigilant against.

Renewable energy and the changing the regulatory landscape

Whether it's utility-scale projects or individual industrial and commercial installations, the regulatory landscape is changing for all. Sustainability and renewable green energy are being placed at the core of these new directives as countries continue the push to meet the goals of the Paris Accords.

The European Green Deal

The European Green Deal is a legally-binding package of concrete policy initiatives aimed at making Europe achieve net-zero greenhouse gas (GHG) emissions by 2050. The interim step is to reduce emissions by at least 55% by 2030 compared to 1990.

Part of the deal sees a new Social Climate Fund dedicating €65 billion from the EU budget to support vulnerable citizens and small businesses with the transition to renewable energy. In a practical sense, this will support cable network upgrades in remote regions.

Corporate Sustainability Reporting Directive (CSRD)

In force from January 2025, CSRD will require companies to assess sustainability risks and the impact on the environment of operations, and identify hotspots. The use of renewable energy being a key action to reduce carbon emissions.

UN Global Compact Sustainable Development Goals (SDGs)

The 2030 Agenda for Sustainable Development was adopted by all United Nations Member States in 2015 as a shared blueprint for peace and prosperity for people and the planet. The 17 Sustainable Development Goals (SDGs) at its heart are an urgent call for action to tackle climate change and key global issues. They include goals promoting the shift towards renewable energy and more sustainable infrastructure:

Goal 7: Ensure access to affordable, reliable, sustainable and modern energy for all. Relevant targets for 2030 include doubling the global rate of improvement in energy efficiency.

Goal 9: Build resilient infrastructure, promote inclusive and sustainable industrialization and foster innovation. Relevant targets for 2030 include upgrading industrial technological capabilities and supporting domestic technology development and innovation.

Goal 12: Ensure sustainable consumption and production patterns. Relevant targets for 2030 include achieving sustainable management and efficient use of natural resources, substantially reducing waste generation and rationalising inefficient fossil-fuel subsidies.

Carbon Border Adjustment Mechanism

CBAM imposes tariffs on EU imports of carbon-heavy products, at this stage including Aluminium and Steel. Whilst it doesn't apply to completed electrical cables at present, it impacts other aspects of renewable energy builds.

COP28

The Conference of the Parties (COP) refers to the annual meeting of UN member states to review their progress in limiting climate change. At COP28 in late 2023, several key goals were set:

Triple the world's installed renewable energy generation capacity to at least 11,000 GW by 2030.

Double the global average annual rate of energy efficiency improvements from around 2% to over 4% every year until 2030.

Place the principle of energy efficiency as the 'first fuel' at the core of policymaking, planning and major investment decisions.





The right cables come with sustainability in mind

Your chosen cable supplier can play an influential role in supporting sustainability goals as well as project delivery. After all, green energy projects and supplier green credentials should go hand-in-hand.

Use of renewable energy

An obvious one - is your supplier and their supply chain using renewable energy in their own operations? Our solar panels generate 100% of our annual electricity needs, powering our sites, plant and batteries, and charging our EV fleet.

How is it being delivered to your site

The emissions from diesel fuels can have a sizable impact on overall embodied carbon in a product. By switching to sustainable HVO biofuel for our HGV fleet is reduces emissions by up to 90% - and green routes are planned.

Also consider aspects like on-time delivery rates - late delivery or damage in transit leaves contractors downing tools and puts timelines at risk.

What about empty drum collection - if secure storage is at a premium onsite, collecting empty drums and cable waste can relieve this pressure.

On-site cable recycling service

That cable waste should be recycled, going back into the circular economy. 99% of a cable can be separated and reused - something our onsite recycling facility can do for our own operations and our customers' projects. These materials then go onto local foundries to process the metals, whilst the polymer sheathing and insulation is also processed for use in new applications outside the cable industry.

LifeCycle Analysis documentation

To deliver continuous improvement against sustainability goals you have to understand the baseline - what's the embodied carbon emissions in a product and can anything be done to improve upon this.

Considering all aspects from mineral extraction, manufacturing and processing, the various stages of transportation and package, through to arrival on site and even end-of-life actions, an LCA gives a value in tCO2e - in cable terms per tonne of finished product. It helps highlight hotspots and support sustainable procurement.

More detailed Environmental Product Declarations (EPDs) are also available but require details of electrical design and load.

Third-party accreditations and public commitments

Looking for suppliers that have set Science Based Targets is a good indication of their commitment to sustainability goals, whilst being a signatory to the UN Global Compact SDGs presents a pathway to achieving this. Globally recognised accreditations like ISO14001 Environmental Management, ISO50001 Energy Management and ISO14064-1 Carbon Footprint Verification all show strong internal processes and accurate reporting.

Platforms such as Ecovadis can also provide a snapshot indication of ESG credentials - we're rated Silver Medal status.



Eland Cables - Case Studies



Our commitment to sustainability extends beyond our own operations. Leveraging our comprehensive range of renewable energy cables, technical expertise and logistical excellence, we've supported projects around the world aimed at facilitating the transition to sustainable energy sources.

Here's a few of the case studies on our website:

Ørsted, UK

Construction of the Hornsea 1 offshore wind farm with 174 turbines in the North Sea required LV & MV power, data, instrumentation and control cables. The Cable Lab customised these cables to better withstand the airborne saltwater exposure, rigorous testing all cables before despatch and installation. Additional technical support was also provided from the outset.

Addax BioEnergy, Sierra Leone

A new sugarcane-based sustainable bioenergy plant was built to deliver up to 15MW of power to the country's national grid. It required the complete package of low and medium voltage power, control and instrumentation cable, with over 20 full containers delivered over a two year period. Eland Cables worked closely with the client's technical team to determine the specification, with project delivery teams co-ordinating throughout the installation.

Solar Nigeria Programme, Nigeria

Construction of solar-hybrid power solutions across several Nigerian states. The project required overhead line, power and control cables and accessories to retrofit and upgrade rural health and education centres. Cables were supplied from stock and on short manufacturing timelines to meet project schedules.

SunEdison, UK

Four large-scale solar farms with a collective power output of 60mW. Onsite cables to connect the panels arrays and monitor output, connecting to inverters and transformers, but also requiring utility-approved cables for the contestable network for connection to and adoption by the National Grid.

Extensive technical support and bespoke solutions for onsite security measures were also supplied.





CONCLUSION

As the transition to sustainable energy accelerates, the cable industry stands ready to innovate and collaborate to keep pace with demand and the evolving regulatory landscape. Where performance and reliability is prized, and the energy generated so important to all industries, the importance of the cable network can't be underestimated.

The Eland Cables team of technical experts and industry specialists are on-hand to support the tightly tailored specification needed. Our world-class cable testing facility, The Cable Lab, are uncompromising in their verification of quality and compliance, ensuring the cables you use can be installed with confidence of longevity. Our wider team then work with you to meet project timelines across our project management, customs & logistics, sustainability, and customer service teams.

Contact us today to learn how we can support your requirements.

REACH OUT TODAY

To discuss your current or upcoming project, speak to the Eland Cables team today.

Call **020 7241 8787** Email **sales@elandcables.com**
Visit **elandcables.com**