Boosting a greener and digitalised world with sustainable networks

Prysmian Group

Linking the Future

Executive summary

As Europe seeks to digitalise its economy while reducing carbon emissions, the telecoms and energy industries are more important than ever. Fibre optic providers in general, including Prysmian Group, are contributing to these goals. Prysmian is making big strides in energy efficiency, for example through use of spectrum and by reducing consumption across mobile networks. There are also future-proofing capabilities offered by fibre optic through its compatibility with foreseen iterations of fixed and mobile networks – from fibre to the curb (FTTC) to fibre to the home (FTTH) and from Open RAN to 6G – which further contributes to green targets by reducing emissions from new material development and installation. Reduced energy costs and the capacity to be equipped for future iterations of mobile networking clearly benefit customers across the supply chain, and Prysmian's portfolio of solutions in these spheres is a key offering that differentiates them from the rest of the market.

Prysmian is also introducing new production methods and design processes that are beneficial in enhancing circularity. This paper locates these trends as use of recycled materials and recycling of used materials, as well as reductions in cable size which reduces materials used and cuts emissions across the supply chain such as in transport. On top of this, a range of eco-design solutions are being employed, such as the deployment of sustainable materials and a reduction in raw materials used in the production process. All of these contribute to cutting the carbon footprint of fibre optic, meaning that Europe's digital demands can be met while still protecting environmental and ecological standards and targets. Recycled materials and smaller design also lead to reductions in costs across the supply chain, saving on transport, storage and installation costs for Prysmian's customers.

Prysmian is also deploying innovative solutions to make supply chains more sustainable. Europe has faced issues in critical sectors like telecoms in recent times, such as security concerns over third country suppliers. This means that leading European companies that can provide equally (and often better) reliable materials and products represent low-hanging fruit to lessen dependence on foreign vendors, which reduces the prospective impact of trade barriers or security issues. At the same time, buying European will also positively affect sustainability efforts as emissions will be cut on logistics. With supply chains being more secure and closer to the customer, this benefits the European consumer by ultimately reducing the bottom line of costs, as well as by making our world ecologically healthier. In addition, more than just contributing to environmental sustainability, our industry puts a strong emphasis on transparency and ethics, with actions being taken across the value chain and in the communities that we are serving.

About Prysmian Group

Prysmian Group is the world leader in the energy and telecoms cable systems industry. With almost 140 years of experience in the businesses of underground and submarine cables and systems for power transmission and distribution, Prysmian offers special cables for applications in many different industries, and medium and low voltage cables for the construction and infrastructure sectors. For the telecommunications industry, the Group manufactures cables and accessories for voice, video and data transmission, offering a comprehensive range of optical fibres, optical and copper cables and connectivity systems. Prysmian is a public company, listed on the Italian Stock Exchange in the FTSE MIB Index.

Beyond our state-of-the-art cable solutions, Prysmian prides itself on conducting all our activities to the highest of standards: from performance and innovation, to execution, to ensuring sustainable growth. All these activities are guided by a shared purpose. This unites our individuals around a joint vision of the future which addresses the big challenges of our time: the energy and digital transitions, in Europe and beyond. These are ideas people under the Prysmian Group umbrella can all get behind, from shareholders to stakeholders to customers. A fully functioning digital and connected society brings so many upsides to us all; delivering this in the most sustainable way possible is what drives and unites Prysmian Group.

140
YEARS OF EXPERIENCE

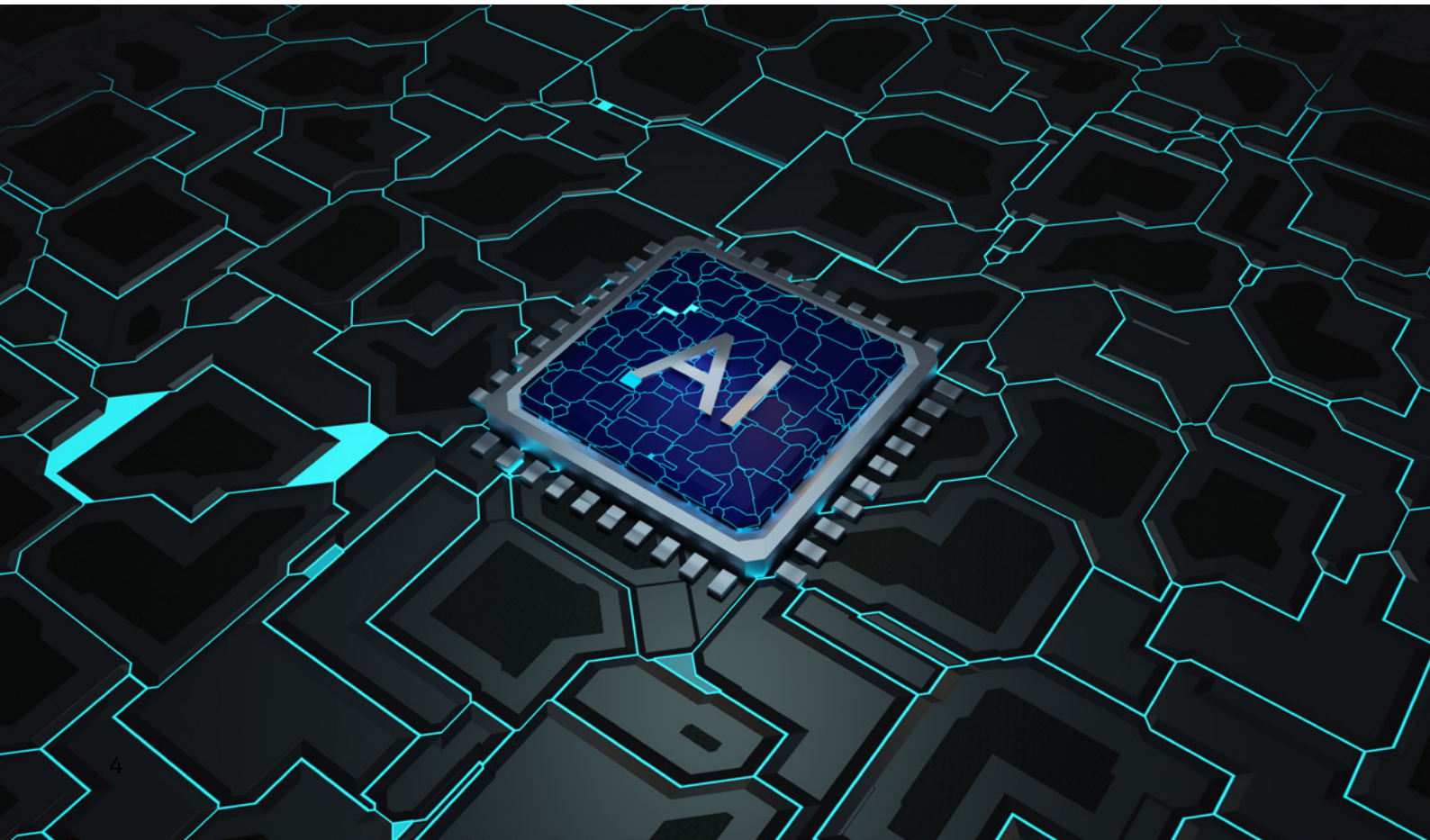
25
R&D CENTRES AROUND THE WORLD

The role of very-high-capacity networks in the economic recovery

The COVID-19 pandemic and the European Union's "Next Generation EU" economic relief instrument represent a unique opportunity to invest in digitalising Europe's society and industry while also accelerating the bloc's transition to a low-carbon economy.

The EU already possesses a fibre-optic industry with the expertise and know-how to produce high-quality, sustainable fibre "Made in Europe". As member states prepare for the post COVID-19 era, quality passive optical networks will be essential to enable their digital transformation. However, while broadband traffic soared as millions of people around the world shifted to remote working, optical fibre connections account for just 26% of total broadband connections on average in the Organisation for Economic Co-operation and Development (OECD). Increasing the share of fibre connections will be crucial to ensuring the EU can benefit from emerging technologies and to delivering information to people and things at optimum speed and low latency.

At Prysmian, we believe that very-high-capacity networks have a key role to play in powering a greener, more digital and more resilient Europe. For our part, this means designing fibre solutions that are more energy efficient, using eco-friendly materials, and cutting out unnecessary emissions in the supply chain while still providing our customers with high-quality and reliable fibre infrastructure. This whitepaper outlines in more detail how optical fibre systems can provide the sustainable digital infrastructure that is necessary to underpin the EU's digital ecosystem.

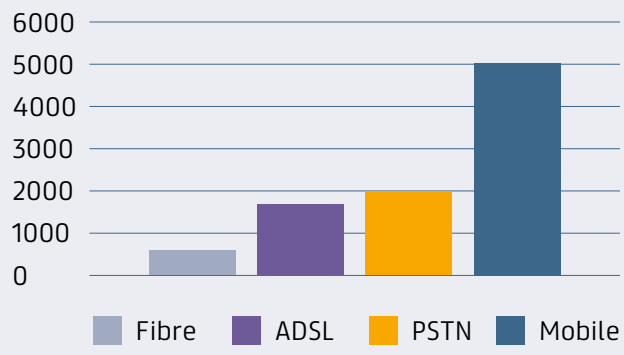


Fibre's contribution to a more sustainable Europe

Improving energy efficiency

The role of fibre in improving energy efficiency
The sky-rocketing growth of data traffic in an ever more connected Europe also means that more energy will have to be dedicated to processing this data. However, this does not necessarily have to be the case, as beyond fibre's near-unlimited bandwidth capacity, it is also more energy efficient than other solutions.

Optical fibre helps to reduce energy consumption, in production and when in use. During production, this is facilitated by the potential to switch off when the graphite furnace is unutilised.[1] These gains can then be further built upon when optical fibre is being utilised, across networks (from fixed networks to mobile front/back/midhaul), and for last mile connectivity. This is possible through its use of spectrum which can be lit on demand – rather than constantly – at each end point.[2] Bend-insensitive single mode fibre is also the only fibre capable of securing the whole fibre spectrum, especially at the longer wavelengths (1,625 nm and above), by minimising losses linked to macro- and micro bends.[3] The outcome of this is reduced consumption, as demonstrated below: fibre far outperforms its rivals in terms of minimising annual consumption.



Source: ARCEP, Future Networks – Digital tech's carbon footprint (21 October 2019)

Fibre enhances efficiency of mobile networks
Specifically when used to connect an antenna; it reduces energy consumption, while still ensuring the ability to handle extra constraints on the optical network. This makes fibre vital for fixed, enterprise and mobile customers, and as such, is an essential asset common to all telecoms networks. This is important given the increasing wavelength requirements of passive optical networks and the proliferation of 5G as Europe pushes for its rollout across the bloc.

Fibre is also more energy efficient as it has enhanced stability and reliability. And it has a longer lifespan due to its bend resistance.[4] This enhances its repair resilience, meaning that it has a longer expected network lifetime – particularly important in dynamic network environments. This saves money for ompanies, but more importantly reduces the carbon footprint of the telecoms sector as there is less material being used.

In summary, fibre is more energy efficient through its reduced energy consumption, its reliability, its longer lifespan and its future-proofed capacities, even more so when choosing a high-quality bend-insensitive fibre. (Amongst the various international standard fibre families, the choice of a G.657.A2 fibre type is recommended for maximising robustness and future-fit.)

Future-proofed solutions

Prysmian fibre solutions bring added benefits as they are geared for the future. This contributes to reduced energy consumption as it means any changes to networks – from 5G, to 6G to future generations, or to Open RAN – will not mean replacing full sets of equipment or adding new materials. Prysmian solutions do this through offering:

- Smaller connectivity devices – meaning easier installation and use of smaller ducts.
- Optimised total cost of ownership – making networks quicker and easier to install, and more 'future-fit'.
- Pay-as-you-grow – enhances scalability and reduces upgrade costs.
- OPEX savings – thanks to easy installation and superior robustness.

[1] SUSTAINABILITY IN FOS ENERGY SAVING, Battipaglia, February 2021
[2] Europacable, 'Energy efficiency in networks – study outcomes', 9 June 2020
[3] Whitepaper on bend insensitive fibre
[4] Breko Study Nachhaltigkeitsvergleich der Zugangsnetz-Technologien, FTTC und FTTH, May 2020, Prof. Dr.-Ing. Kristof Obermann

Accelerating the shift towards a more circular economy

The role of fibre in improving circularity

The fibre optic production industry is seeking to reduce environmental and ecological impact. One common solution being employed is the Plan-Do-Check-Act model. The **PDCA model** is an iterative process used by organisations to ensure continuous improvement. Fibre optic companies are applying this as an environmental management system in a step-by-step process:

- **Plan:** establish the environmental objectives and the processes necessary to obtain results in accordance with the environmental policy of the organisation.
- **Carry out:** implement the planned processes.
- **Check:** monitor and measure processes against environmental policy, including commitments, environmental objectives and operational criteria, and report results.
- **Act:** carry out actions for continuous improvement.

Outcomes from the endeavours to make fibre production processes more sustainable include a number of design trends. One of these is the **increased weight** of the fibre preforms. This allows for a reduction in both the percentage of unusable glass and the percentage of set-up time in the process. The melting of glass at the beginning of the process (which consumes energy) is done less frequently with larger preforms, meaning an overall reduction in energy consumption.

Another general trend is the use of **recycled materials.** Prysmian exemplifies these endeavours through its development of the first fibre-optic network using over 90% recycled polyethylene. This reduces the impact of raw material production, which translates into a reduction of the CO_2 emissions during Phase 1 (production of raw materials).

Prysmian re-used 54% of our drums in 2020 in order to lower our impact on product packaging. Besides using recycled materials, we monitor the percentage of waste we recycle: the baseline in 2019 was 63%, and we set the goal of reaching 64-66% by 2022 – however in 2020 we already exceeded this target. We further support our circularity activities through an overarching monitoring system which analyses the carbon footprint of our products. Until 2019, 70% of Prysmian product families were covered by carbon footprint measurement, with a target of reaching 85% in 2022.

Furthermore, as well as being recycled, **cables are becoming smaller.** For example, Sirocco HD cables have been roughly halved in diameter, meaning there is a 50% reduction in the volume of plastic used. They also use smaller ducts (for example a 96 fibre Sirocco HD uses a 10 mm duct instead of a 14 mm duct). This leads to a direct reduction in CO_2 footprint in the design process. This also has a knock-on effect on the rest of the supply chain: it is possible to fit more cables per drum and fewer drums per shipment, significantly reducing carbon emissions in transport. In addition, more cable and tubes fit on a reel, which reduces the cutting losses and the number of wooden reels used by up to 70%.[5] In summary, these design features mean a reduced environmental footprint, as well as reduced costs for customers.

Scaling solutions

Prysmian is scaling solutions to increase reach and environmental impact by partnering with KPN to install connections using the new Prysmian cable for its customers across the EU. This enhances the uptake of circular and sustainable products and means our innovative use of materials contributes as much as possible to EU green targets. We hope to enhance this impact even further through working with other telecoms firms.

[5] KPN, Sustainability R&D paper, 2020

On top of circularity, Prysmian is deploying **eco-design solutions** to create sustainable materials. Umicore and Prysmian have worked together for many years on environmentally-friendly materials. The culmination of this work is the development of 100% sustainable germanium for optical fibre production. Through this, we are optimising and expanding germanium recycling possibilities and capabilities and providing germanium generated as a by-product of base metal production. This work is having significant impact: it reduces our annual CO_2 emissions by 60%, which is equivalent to taking roughly 6,800 combustion-engine cars off the road. We are also tracking eco-design solutions through our ECO CABLE label to complement the net zero Scope 3 target. This is based upon six criteria:

1. Carbon footprint.
2. Absence of extremely hazardous substances.
3. Recyclability / circularity.
4. Recycling input rate (usage of recycled as raw materials).
5. Environmental benefits (low carbon enabling products* and CPR – Construction Products Regulation).
6. Cable transmission efficiency.

By assessing these criteria, we are holding Prysmian to high standards and ensuring transparency, to empower consumers in making sustainable choices. The ECO CABLE label rating has been launched in Italy in 2021, and will follow in France, Spain, the Netherlands and Germany.

Acceleration on climate change

Prysmian Group has announced a new ambitious climate strategy adopting science-based targets, in line with the requirements of the Paris Agreement (COP 21), and endorsing the Business Ambition (1.5°C) with the "net zero" target expected to be achieved between 2035 and 2040 with regard to the emissions generated by its operations (Scope 1 and 2) and by 2050 for emissions generated by the value chain (Scope 3).

* All business areas, or those among them, that are classified as "low carbon enabling" have been identified by applying the taxonomy defined by the Climate Bond Initiative.

Environmental management and monitoring

Prysmian's French fibre plant (Douvrin) is certified by the ISO 14001 environmental management system, developing low energy consumption equipment (e.g., LED cure, low power consumption inductive furnaces, low helium consumption process, recycling all waste material). It offers a systemic approach to environmental sustainability.

Prysmian Group also reports environmental impacts. These are consumption of energy and water; disposal of hazardous and non-hazardous waste; and greenhouse gas emissions linked to sources of energy:

- We continue our efforts aimed at reducing water consumption in several countries around the globe: in La Pointe, Canada, we reduced water usage by perfecting an automatic dosage system that reduces the frequency of discharging and refilling; in Tetla, Mexico, water consumption was reduced by daily monitoring.
- The efforts made to cut waste at our plants are continuous. Here are a few highlights: In Montereau, the plant reduced waste from the extruder; in Tetla, Mexico, energy consumption was reduced by the optimisation of machine start-ups and the hours of maximum usage; in Paragould, a new evaporator drastically reduced emulsion waste.
- On greenhouse gas emissions, for four years in a row Prysmian Group has obtained a B score (on a scale of 8 values from A to D) in the CDP Climate Change Report, as part of its Climate Change Program. Moreover, many of our EU plants have acquired Guarantee of Origin (GO) certificates for electrical energy with the aim of reducing our indirect GHG emissions. This is an ongoing process which we are committed to delivering across more and more plants.
- Among the most important initiatives in this area is the Group's Pikkala plant, chiefly dedicated to the production of cables for offshore wind farms, which will become the first net zero plant, where 100% of the energy used will be obtained from certified renewable sources.

Making our supply chains more sustainable

Reducing carbon footprint of transport for fibre solutions

Prysmian is also striving to further reduce CO_2 emissions through savings on logistics, storage, and packaging materials. We are testing these approaches with KPN (a Dutch landline and mobile telecommunications company). In addition, as touched on previously, Prysmian's products are becoming smaller and lighter. Therefore, besides consuming less energy, they also help with supply chain transportability as they can be packed more tightly. This leads to a reduced carbon footprint across the supply chain. In September 2020, KPN sought to translate these design features into environmental impact in transport. When tracking Prysmian's smaller Sirocco HD in 11,000 connections during the trial, the result was that this required six fewer full freight transports than if the conventional cable and duct system had been used. The research showed a 31% saving on CO_2 emissions for transport.[6] In summary, these design features mean a reduced environmental footprint in both production and transport, as well as reduced costs for customers.

Beyond environmental sustainability: ethical supply chains

We have seen that there are actions in place to lessen the carbon footprint of European supply chains for fibre. However, sustainability is also being pursued in making supply chains more transparent and ethical. Suppliers are increasingly committing strongly to adherence to international standards and norms such as the UN Sustainable Development Goals (SDGs) and human rights. This makes the sector more sustainable, as respect for the people who prop up the value chain and make the service offerings possible is so important in the long term.

At Prysmian, we take a whole-of-supply-chain and human-centric approach to sustainability. Regarding the supply chain itself, we have social, health and safety and environmental prerequisites which are strongly enforced and can lead to cessation of business relations if not adhered to. The Group is backing this up through the introduction of new standards, including:

- Using suppliers that are applying sustainability in their production
- Only using high quality authorised materials
- Developing strategies that guarantee continuity of supply
- Steadily reducing emissions generated by our products.

Beyond the supply chain, we also believe that sustainable and ethical business starts with our employees (as well as any of our subsidiaries, such as contractors or suppliers), who all follow our Code of Ethics. This is centred upon principles of honesty and transparency. We strive to ensure fair play in our business dealings and back this up by maintaining accurate records which are open to relevant stakeholders.

These principles extend beyond the Prysmian Group umbrella to also guide our interactions with our customers and the communities we work in. Regarding customers, we have strict quality, safety and performance standards, and back this up with

[6] KPN, Sustainability R&D paper, 2020

reliable customer care. Finally, we recognise we do notwork in isolation, and so, we seek to integrate ourselves into the communities where we are based and to who we are servicing. Prysmian Group often takes part in projects centred on the welfare of our local communities.

Prysmian is guided in these endeavours by our 'integrated sustainability' concept. It drives the integration of environmental, social and governance factors within the Company's DNA. This concept becomes manifest through our governance structure, built upon three pillars: People, Culture and Organisation; Sustainable Innovation and Lean Manufacturing; and Extended Value Chain (the latter is our pathway for future sustainability, centred on customer relationships and the supply chain).

Our 'people' pillar enabled Prysmian to receive positive employee engagement rates (65%) in 2020, as we invested in health and safety and sought to balance the gender profile of our workforce. We have also operationalised our 'sustainable innovation' principle to leverage economies of scale, making production more efficient and affordable. Looking forward, we will drive ahead with similar gains within Prysmian and beyond – we see the extended value chain as a 'pillar' for which we can support meaningful change. For example, 48% of our annual revenues are now from 'low-carbon enabling' products, and we want this to go up and up in the future. In this way, we can have a truly whole-of-supply-chain approach to sustainability.

While we have focused here on the actions of Prysmian, these elements are becoming the norm in the fibre industry, with top-down frameworks such as the UN SDGs guiding this and offering consistency. The UN SDGs outline 17 goals, ranging from poverty alleviation to clean oceans to international governance in support of peace and justice. Prysmian has built its Sustainability Policy (published in 2017) around this, using benchmarks such as the Dow Jones Sustainability Index and the EcoVadis Supplier Sustainability Ratings as metrics to benchmark our actions. An overarching framework such as the UN SDGs allows the sector to make the right decisions for the business, for the land and ocean around us, and for the people at the centre of our communities.

In order to further accelerate the Group's path towards sustainability, Prysmian adheres to the UN's Global Compact, the principles and spirit of which are reflected in the culture, values and practices of the Group. Environmental, Social and Governance (ESG) values are deeply embedded in the Group's DNA, inspiring its strategic priorities and influencing day-by-day behaviours. Prysmian Group will share with the UN Global Compact and all its stakeholders its progress on an annual basis, covering the following key areas: human rights, labour, environment and anti-corruption. This commitment further demonstrates the transparency and rigour of Prysmian Group in achieving and communicating its sustainability goals, in line with the UN SDGs.

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Prysmian

Draka

General Cable

PRYSMIAN GROUP
Via Chiese, 6 – 20126
Milano / Italy
T +39 02 64491
telecom@prysmiangroup.com

prysmiangroup.com

Follow us