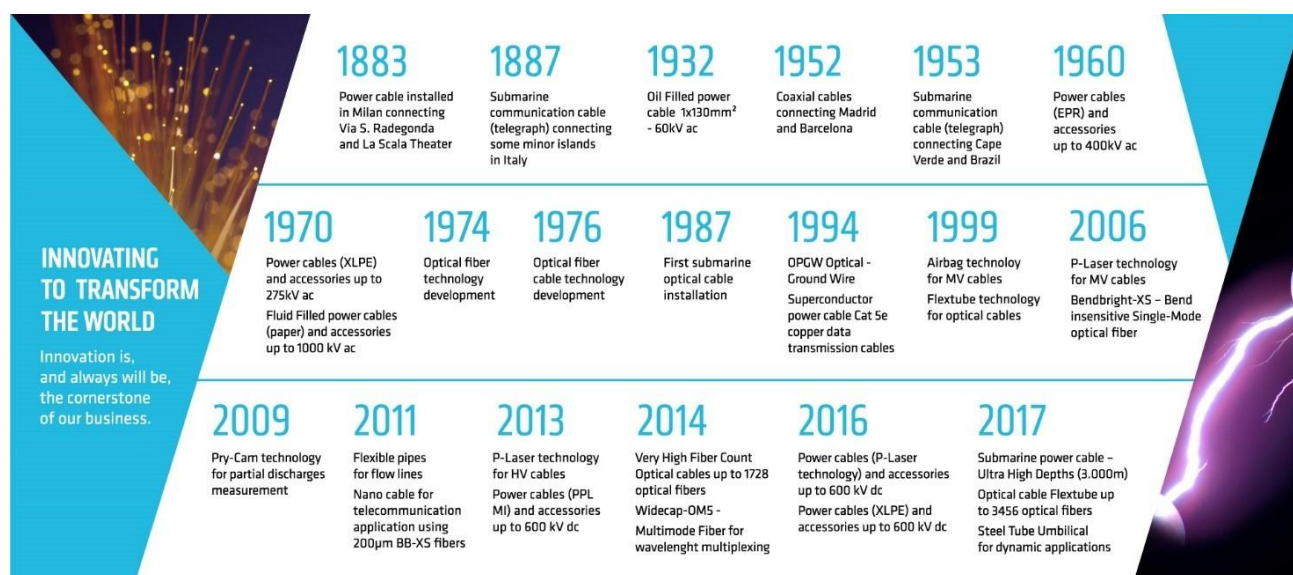


The Group's constant drive to innovate is also supported by 17 Centres of Excellence across the entire globe, which have their central headquarters next to the headquarters in Milan and employ more than 500 experienced professionals.



PRODUCT INNOVATIONS

Prysmian developed numerous R&D projects during the year. This section highlights those that are most significant from the point of view of sustainability.

Work dedicated to the optimisation of costs via the **Design-To-Cost** (DTC) programme has also continued in 2017, used to lower production costs, both when developing a new product and when re-engineering an existing product. Prysmian therefore aims to reduce the quantity of materials used for cable production by redefining the design of the product. This programme achieved cost savings totalling more than EUR 13 million in 2017. More than 1,050 projects have benefited from this programme. The reduction of costs is a direct consequence of the reduction of the material used for the production of cables and therefore a reduction of the resulting environmental impacts. "

ENERGY

Submarine cables

During the year, activities related to the new large diameter aluminium conducting junction techniques were completed (with the possibility of collection on fixed platforms) and the production of a large part of the current COBRA project was completed with 320 kV direct current to connect the Netherlands to Denmark.

The activity related to the junction of conductors of different materials continued with a series of mechanical checks in order to use the solution in structures of a three-pole 220 kV alternating current cable. The geometric configuration of the cables with a three-pole design leads to higher levels of mechanical stress, in particular bending, for the conductors and the related junctions. Full qualification and production are scheduled for 2018. Below are other relevant projects:

- The development of **bimetal junctions** that make it possible to optimise submarine connections from the point of view of the efficiency of the transmitted energy, using the best conductor design for each section of the connection depending on the depth, thus ensuring greater sustainability of the connection itself.

- As part of the **MI** (Mass Impregnated - Paper Impregnated Blending) **cables**, the recovery activity for the WesternLink project and the completion of the stress tests required following the installation for the part of the connection operating in direct current were fulfilled to ensure efficient energy transfer between the north and south of the United Kingdom.
- As regards **the cables installed at high depths**, after completing all the tests to confirm the mechanical feasibility of the developed cable solution, innovative activities were launched and partially completed related to the development of the installation and repair technologies, especially for high depths. Future high-depth submarine systems (up to 03:00 meters) will therefore allow new interconnection and power transmission links, which were previously not achievable, guaranteeing better efficiency and energy sustainability.
- With regard to the project for **600 kV DC extruded cables**, tests have continued for application of the XLPE and P-Laser technologies. In particular, new prototypes were produced in both XLPE and P-Laser with copper conductor sections up to 2500 mm² and aluminium conductors up to 3500 mm².
- On the other hand, in the case of the very high voltage cable versions with solid P-Laser insulation, the development of the "**P-Laser**" **flexible** joint continued with a new so-called intrusion technology by means of which the insulation is extruded by filling in the joint. This technology has been patented and the first internal tests have been carried out on a full-size prototype, with decidedly encouraging results. Cables with P-Laser technology are made of recyclable and eco-sustainable materials and make it possible to lower the environmental impact of circuits while also raising their efficiency and power transportation capacity.
- Tests have been carried out to fine-tune the "**Lead Less**" technology for the production of lead-free metallic sheaths, using a tube-shaped and longitudinally welded copper sheet. Over the next year, this technology will be industrialised at the Pikkala Plant, Finland. The removal of lead from high and extra-high voltage submarine cables is an extremely important milestone for the environment. Furthermore, this technology will also allow the development of dynamic connections for offshore platforms, thus expanding the range of wind systems to even the deepest seas.
- Finally, **monitoring activities** continued (partial discharges) of **submarine systems in EHV, AC or DC** over long distances, using Prycam Gate technology. Research activities have begun to implement diagnostic systems to verify in real time the position of possible problems during cable operation, thus minimising repair times. Diagnostics and monitoring make it possible to reduce the inactivity time of transmission systems, ensuring better energy distribution and improving system sustainability.

Terrestrial cables

- In the field of Product Development of Very High Voltage Cable Systems, new prototypes for **525 kV HVDC** systems insulated with proprietary P-Laser technology were produced. The conductor section, 3500 mm², is the largest produced to date in Prysmian while the choice of the conductor material (aluminium) made it possible to limit the weight of the cable. Thanks to the P-Laser technology, the system can therefore operate at a conductor temperature of 90° C (instead of 70° C as is normally the case for HVDC cables insulated in XLPE) ensuring a power equal to that of a cable of the same voltage but with a conductor of 2500 mm² section in insulated copper in XLPE.
- The industrialisation of the production technology of the new generation of accessories dedicated to **EHVDC applications** continued.
- In the field of future UHV applications in alternating current, the development of materials and technologies suitable for use for voltages up to **800 kV** was started. The cables produced allowed the preliminary evaluation of existing and new generation materials, with new technological solutions for insulation.

- At the Abbeville Plant, South Carolina, the 500 kV (AC) prototype was produced with 2500 mm² conductor (pre-qualification tests according to the IEC62067 standard), while the Mudanya plant (Turkey) started the production of HV cables with longitudinally welded aluminium sheath.

T&I (Trade and Installers)

With regard to the T&I business, 2017 was characterised by the definitive entry into force of the European standard on the homologation of cables according to the CPR (Construction Products Regulation) standards, which establishes specific cable performance requirements in terms of reaction and fire resistance. The intense development activity carried out in previous years to adapt the products to the new European legislation has allowed the various companies of the Group to reach from the outset a prevailing position in the various local markets. However, the work of completing the range and optimising costs will continue intensively throughout 2018. Several product families destined for applications not regulated by the CPR are in any case requesting the adaptation to the same safety standards, intensifying the R&D focus in this direction. The imminent extension of the requirements of the CPR in terms of reaction to fire and fire resistance has already started verification and development activities by Prysmian of products in this category of use, even if the final requirements have not yet been clearly defined. The focus on sustainability has also achieved primary importance with reference to products for the T&I field.

Oil&Gas and Surf

The Group also offers products and services known to the market as "SURF" (Subsea Umbilical, Riser and Flowline) for exploration and the offshore production of oil and gas. In 2017, the Group added a new technology of umbilical cables called steel tube for dynamic applications.

The O&G market crisis has oriented all core cable development activities on the optimisation of design and production costs, also by introducing alternative products on the market. The introduction of CPR in the T&I field is also attracting the interest of the oil companies, requiring developments also for the products of this family.

In the field of cables for submersible pumps (ESP) the technological trend of operators in the oil extraction sector is aimed at simplifying the installation and maintenance phases as well as limiting the relative costs.

This involves developing extremely innovative solutions that require new generation cables with very specific additional performance. This trend also leads to an increasing synergy between the ESP systems and the Downhole Technology systems making strategic the combination of KH on both technologies.

OEMs

In 2017, the intense activity of development and improvement of products for the industrial market continued, including a vast and varied number of applications. The specialisation in some of these sectors, developed at some of the Group's units, must often be transferred to other units due to the increasingly frequent requests for the localisation of markets in emerging countries. It was therefore necessary to enable local plants to produce part of the product portfolio, making it possible, also thanks to the transfer of know-how and technologies owned by the Group, to penetrate new markets.

Monitoring systems

The focus on the development of monitoring systems has assumed an increasingly crucial role as a constant monitoring of the network helps in the management, optimisation and identification of any problems connected to the network, minimising the risk of network default. This led to a greater focus in 2017 on the measurement systems of partial discharges as well as on other parameters, such as temperature, strain, vibration, radiation, with the development of both sensors and monitoring equipment and systems. As part of the PRYCAM

services, which aim to obtain real-time information on the conditions of the cables or network components in the respective connections or circuits, the Group has developed the PryCam Cable, in order to achieve supply and data collection for distributed systems of this type.

TELECOM

Optical fibres

In terms of the optical fibre sector, 2017 saw further improvements in the process of manufacturing fibres at the factories in the USA and Brazil, where an autonomous production process is now operational.

During the year, the production capacity of the BendBrightXS fibres (single-mode fibre completely insensitive to bending for FTTH applications) was also increased through process improvements. This fibre is very appreciated by the market thanks to its high flexibility and ductility, especially after the entry into force of the G657.A1 standard. As a result, the Group is reorienting much of the production in this direction, favouring the production of multimode fibres, insensitive to bending and used in FTTH applications.

Since the standard for OM5 fibres has been ratified in IEC and ISO / IEC, this platform is now used in IEEE to develop the specifications of the physical interfaces of transceivers that will operate at 25/50Gbit/s using up to four wavelengths. This will provide, for example, in an 8-fibre cable, the possibility of transmitting from 40G to 100G up to 400G.

Another important innovation concerns the use of "**Few Mode**" fibre technology that allows digital information to be transmitted using a limited number of "modes", whereas, until now, it has been possible to do so only using single mode fibres. While in the single mode fibres the information is coded and travels in a single lighting mode, in the "Few Mode", different modes are possible to transmit the digital information (with consequent advantage for the information capacity). The first "Few Mode" fibres, in so-called "4-LP mode", are still being tested.

Optical cables

Group activities in the optical cables field principally involved three types of product (Flextube, Blowing, Ribbon).

Flextube cables have shown their suitability for many international markets and their production has been extended to multiple Group plants. Prysmian continues to work to increase the number and density of fibres contained in a single cable: the last design involves the housing of **3,456 fibres**, organised into 6 elementary nuclei of 576 fibres each in a single cable (this cable uses the BendBrightXS fibres with a diameter of 200 µm to promote miniaturisation without compromising sensitivity to bends).

The increase in the density of the fibres is also the main objective for the development of cables for installation by means of blowing technique (**blowing**), the so-called "Mini" and "Nano" cables. This family includes drop cables with up to 24 fibres and a maximum diameter of 3 mm and multiloose cables with up to 288 fibres and a maximum diameter of 8 mm. Furthermore, a blowing technique called "overblowing" has been developed that allows "blowing" new cables in the space of the pipe not yet used by previously installed cables, representing a clear advantage for the environmental impact.

In the classic ribbon cables (**Ribbon**) for external and internal use, further improvements and additions to the portfolio have been made. The Totally Dry Ribbon cables with up to 864f have been developed in the Low Smoke Zero Halogen version, while the new generation of Ribbon cables is underway, which provides loose-connected fibres to allow a greater packing density while maintaining the advantage of "mass fusion splicing".

The impact of the choice of broadband access technology on CO₂ emissions was studied in collaboration with the University of Applied Science Südwestfalen. This comparison with xDSL, Hybrid-Coax, GPON, Point-to-Point showed the advantage of full implementation of the FttH, although it should be noted that the impact on energy consumption of customer modems offers room for improvement.

Connectivity

With regard to connectivity, Prysmian has continued to develop new accessories for the use of FTTH (Ultra Broadband Access networks). The Group has focused on the so-called "cabinets", with the development of optical distribution racks (switches), joint boxes for the splicing of cables, and termination solutions for customers with wall-mounted boxes. The family of multifunctional joints has also been launched in several countries, with special characteristics to adapt to the various platforms.

The main innovations involved:

- the development of a new range of **termination caps**, industrialised in the Menzel plant (Tunisia);
- the development of additional **components for the joints**, which have made it possible to extend their use in the network, thus increasing Prysmian's market share;
- the development of **multiple components** and the launch of an extensive test program to qualify the joints. These components are currently being processed and sales are expected to start in the second quarter of 2018.

OPGW (Special and submarine optical cables).

The OPGW technology, in stainless steel with an aluminium coating, has been consolidated up to 96fo, while the spiral space technology has been integrated into the product portfolio. With these technologies, cables have been qualified for various projects in the field of special cables, for example dyke cables with a vertical height of 500 m.

The family of high mechanical strength and chemical (ALPA) or fire integrity (ALPAM) optical cables has been further developed. The production of submarine cables started at the Vilanova plant in Spain. As for submarine cables, a 330-km optical core was successfully produced for the COBRA project.

Multimedia and Data Centre solutions

Some improvements have been made to the 6A U/UTP solution, based on discontinuous metal tape for cables with copper conductors.

The PoE technology (Power of Ethernet) continues to be the main engine for the extension of the product range and use in the field. Wireless access points, cameras, sensors and other IoT devices (Internet of Things) are connected to each other. Even the new Reduced-Twisted-Pair technology is gaining ground: the first projects that will enable, therefore, 1 Gbit/s transmission channels on a single pair have been qualified. This also allows us to support ongoing standardisation work.

For the data centres, cabling solutions have been developed that use both copper and fibre optic (hybrid) combined cables. In collaboration with an industrial partner, the first complete connection of category 8.2 has been qualified and is now available for sale, offering a 40 Gb/s copper solution on a 30 m channel. With the 25 Gb/s speed changeover in IEEE, a solution with the Cat.7a product range seems possible. For high data transmission speeds (40/100 Gb/s) new multimode optic fibre cables have been developed; these cables are based on 8 or 12 fibre modules terminated with multi-fibre MPO connectors. The optical modules used can be of the Flextube micro-module type or 3 mm micro-cables that are assembled to cover the range of fibres from 72 to 144. These families of cables are available in a version with low emissions of fumes and toxic gases and in the Plenum / Riser version.

In 2017, all the product families were qualified according to the European legislation on the homologation of cables according to the CPR (Construction Products Regulation) standards: tests were carried out on existing products, design adaptation and material modifications took place to propose a product portfolio able to cover all the necessary performance classes on the market. Most of our existing products will be classified in accordance with the new fire resistance classes, but development work is in progress in order to achieve the more advanced categories.

INNOVATIVE MATERIALS

Prysmian is strengthening exploratory studies to identify innovative materials for the new technologies employed by cables and accessories. The main results achieved during the year include:

- Realisation of an elastic sheath for aerial cable accessories (in the industrialisation phase), also evaluating new constructions of the elastic joint for which it is intended.
- Studies to understand how to eliminate lead from insulating compounds for medium and high voltage, both from accessories and cables (study still in progress).
- Development of semiconductive compounds for medium voltage disconnectable joints in use at a subsidiary in France.
- Collaboration with an external partner for the development of a coating able to reduce the flame propagation of crosslinked polyethylene, in order to improve the performance of low voltage cables compliant with the CPR standard in order to enhance its characteristics in the future.
- Collaboration with the University of Padua for a preliminary study in order to start a joint project on fire-resistant materials.
- Study on substances that absorb water without subsequently releasing it, which demonstrated the feasibility of a material with an increased impermeability. By inserting this material into the high density polyethylene compounds, impermeability increases by at least one order of magnitude. In the field of low-weight submarine reinforcements, a collaboration was started with a UHMW-based polyethylene fibre producer.
- Completion of tests in use of by-products absorbers in HVDC cables to confirm the reliability of the proposed solution with positive results.
- Collaboration with another external supplier for the development of a new traction element. Experiments are underway to understand how to improve the structure of the catalyst in order to have a cleaner polymer that better absorbs the gas.
- Development of a method to study the electrical characteristics of mica glass tapes at high temperatures (up to 800° C) to evaluate the performance of tapes in current use.
- Collaboration with the Politecnico di Milano study and obtaining of polymers resistant to oils, which led to the creation of a material based on unsaturated polymers that react with each other generating a crosslinked product with good characteristics. If this technique confirms its validity it will be possible to realise sheaths resistant to oils with a consumption of energy much lower than the current one.
- Experiments have been launched to evaluate and approve materials suitable for the production of small-sized optical cables, which are becoming increasingly important on the market
- Studies were carried out with the University of Salerno on a polypropylene used to make the diameter joints in PLaser cables that showed a totally unexpected anomalous behaviour.

RATIONALIZATION AND MANAGEMENT OF MATERIALS

Work on the approval of alternative materials, especially those of major technical or commercial importance, is continuing throughout the Group in order to reduce the use of monopoly suppliers. Therefore, the use of the new method of **preparing supply specifications** (PrySpec) was started in some key countries in order to evaluate all the problems deriving from the procurement in "single source" and, by the end of the experimental phase, all other countries in which the Group operates will be involved.

Furthermore, the **database of compounds** (CompoundDS) of internal production has been completed: the research tool is now operational and can be consulted by all the affiliates in order to facilitate the search for the most appropriate compound for the final application.

THOUGHTS ABOUT THE ENVIRONMENT

The R&D activities of the Prysmian Group dedicate great attention to the social and environmental aspects, seeking to use materials that do not represent a hazard for human health or the environment. Efforts include performing up-front analyses of the data for materials, in order to check their possible impact on the environment and the Group. During the year, the Group therefore developed initiatives and projects designed to reduce the environmental impact of the range of products offered.

In order to increase the efficiency and reliability of finished products while, at the same time, lowering the dissipation of energy and power, Prysmian has worked to reduce the **set-up times** of the machines used and increase the speed with which products are manufactured. As a result of introducing these innovations, the Group has achieved greater manufacturing efficiency, increase the volume produced per unit of time and, consequently, reducing the energy consumed per unit of production.

Additionally, all HV projects have focused on increasing the transmission capacity of links and therefore improving efficiency, while the monitoring systems developed by the Group seek to **facilitate the management of assets, by optimising losses and downtime**.

With regard to the Gas Getters technology, further industrial trials have identified the possibilities and limitations of the absorption system of by-products generated in the production phase. Initial studies of materials capable of absorbing water and gas vapour have produced interesting results.

In line with the principal developments of safe, reliable and sustainable technologies, Prysmian has once again confirmed its pioneering and innovative spirit by continuing to expand the range of Afumex Green cables. With regard to the new generation of Afumex LSOH cables, energy consumption during production has been reduced significantly and better surface finishing has been achieved by the development and industrialisation of new formulas. In the Telecom business, in addition to the permanent objective of reducing **waste** and increasing the **speed** of production lines, much work has been done to increase the number of fibres contained in a cable with the same cross-section as the cable (densification) with a consequent decrease of the fibre protection materials and, therefore, of the energy consumed to extrude them. The Group has also worked to extend and expand the "dry/dry" version of Flextube cables, which allows a considerable reduction in installation time and, therefore, in the total costs of the system, facilitating the recycling and separation of components.

CFP – CARBON FOOTPRINT

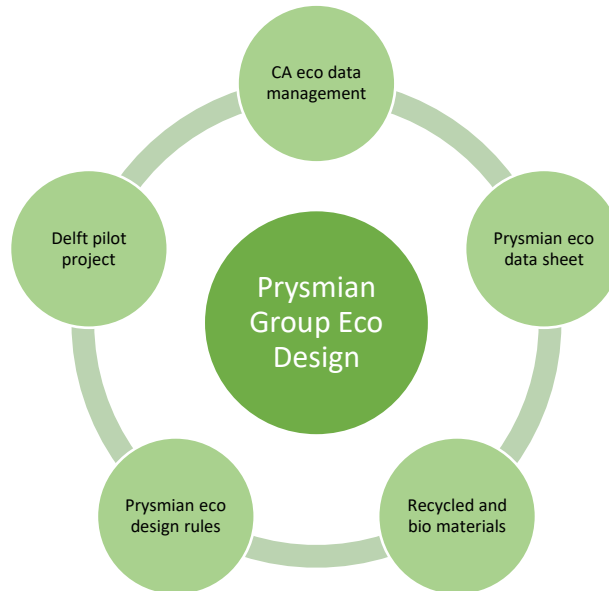
In 2017, the development of the instrument dedicated to the calculation of some important environmental parameters of cables produced in the Group plants has continued: the Carbon Footprint (CFP) and the recyclability at the end of its life.

The development of this activity is the result of an ever increasing commitment by the Group to improve its sustainability performance, starting from the product design and the requests of its stakeholders, such as sustainability assessments requested by suppliers and customers.

The development of the Prysmian Group Eco Design is the result of a combination of different elements.

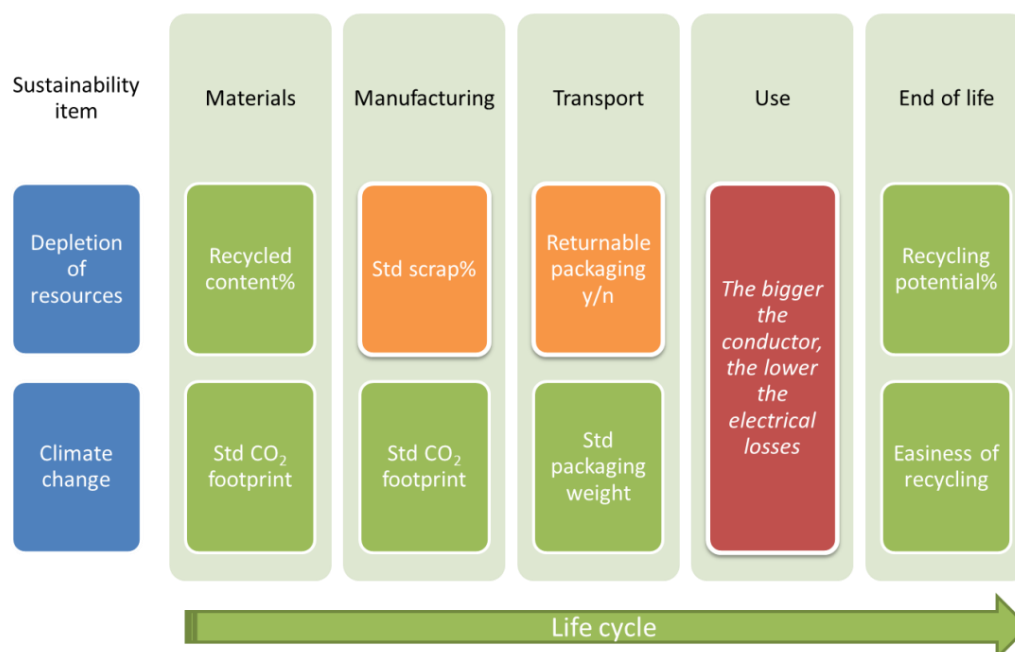
- Common Analysis tool (CA) eco data management.
- Prysmian eco data sheet.
- Recycled and bio materials.
- Prysmian eco design rules.
- Results of the pilot project developed at the Delft plant (Holland).

THE ECO DESIGN PROCESS OF PRYSMIAN



The system in question represents a new feature of the Common Analysis (CA) application, already developed and in use for several years for the calculation of the design and the costs of cables for all the Group's plants. It makes use of the fact that it can utilise the same databases.

Combining CA data (represented by BOMs - the "Bill of Materials" - and Routing, i.e., process data for cable production) with the equivalent CO₂ values attributable to the energy and materials used to build the cables. These values are mostly obtained by combining the emission data provided by the "Ecoinvent" source with an environmental impact methodology focused on the calculation of the "carbon footprint", namely "GHG Protocol". In this way it is possible to have a reliable assessment of the equivalent CO₂ associated with each cable produced in a given factory. The perimeter considered for the assessment of the "carbon footprint" is therefore typical of a partial LCA "from the cradle to the gate", consisting of the sum of the impacts related to the production of raw materials and of the product itself (i.e., in our case the cable). However, with the aim of also considering the end of life of products in the sustainability analysis, it became possible to obtain an assessment for each cable of the quantities of potentially recyclable materials at the end of their life.

"ECO PRODUCT DATA SHEET"

As far as the progress of the project is concerned, in 2017 the Common Analysis implementation of the carbon footprint impact coefficients relating to the various materials and energies was completed, with the aim of making them available for the estimation of the CO₂ equivalent in the cable design phase. The collection of process data relating to the production activities that take place at the Prysmian plants (Routing) is still being completed. The system has been implemented to date for cables designed in 4 Group factories, chosen as characterised by a mix of very differentiated products and production processes and therefore sufficiently representative to test the system, so as to verify reliability in different situations.

In 2018, there is a plan to extend the new functionality to a greater number of production sites, in order to allow an assessment as precise as possible of the environmental parameters of the Group's products.

It should be noted that an accurate evaluation of the CFP value of Optical Fibres (FO) produced internally was carried out in 2017, during a dedicated study performed at the Douvrin plant (France - one of the Group's main centres of optical fibre production). The measurement of material consumption and energy consumption of the factory made it possible to obtain the equivalent CO₂ value of the weight unit of the optical fibre, to be used for the calculation of the CFP of the main TLC cables. This activity was necessary due to the unavailability, both in international databases and in literature, of a CO₂ equivalent value for the optical fibre, given the technological and functional particularity of the material in question.

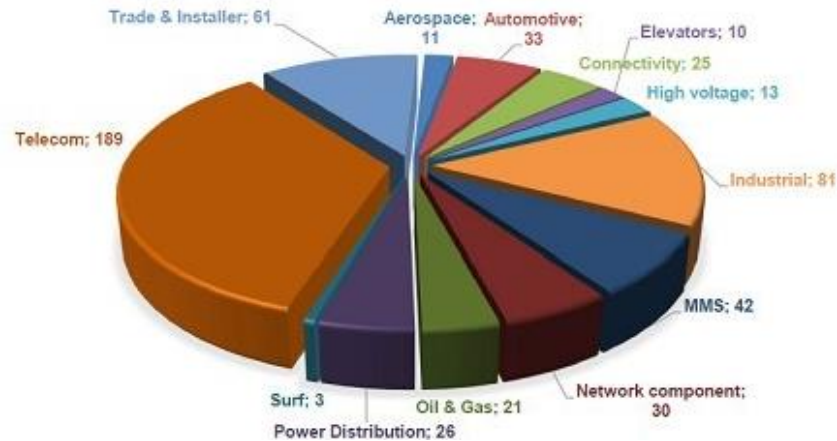
NPI – NEW PRODUCTS INTRODUCTION

The development of the reporting system for New Products (NP) continued, with the aim of extending its use to as many types of Group products and/or businesses as possible. In particular, a feature has been developed that extends the evaluation of sales and NP results to "non-configurable" objects, such as Accessories for Power cables and Connectivity for TLC cables. Also of particular importance is the introduction - still in the pilot version - of a success factor for NPs, based on the time between the availability of the new product and its first

actual sale. The NP system is already applied to a business volume of approximately 70% of the Group's turnover and, from the initial assessments, the sales volume of NPs on the reference turnover (FY2017) can be estimated at around 8.9%. There is a plan to extend the application of the NPI system to around 90% of the business volume by 2018.

CATEGORIES OF NEW PRODUCTS

ECO-SUSTAINABLE SOLUTIONS



Afumex family

In line with the principal developments of safe, reliable and sustainable technologies, Prysmian has once again confirmed its pioneering and innovative spirit by continuing to expand the range of Afumex Green cables. The new member of the Afumex family, Afumex Green 1kV, is the safest and most sustainable cable on the market. With this launch, the traditional petroleum-derived polyethylene, used for insulation purposes, is replaced with bio-polyethylene ("green" polyethylene) derived from sugar cane, which is 100% renewable, certified at international level and reduces CO₂ emissions. It is calculated that for every tonne of green polyethylene produced, more than two tonnes of carbon dioxide are captured from the atmosphere.

P-Laser - The first fully recyclable HVDC cable

The Group is ready with the market launch of a completely innovative product offering better performance at a lower cost. In particular, the new P-Laser 600 kVDC cable (HVDC technology) represents a point of strength for Prysmian, as it will be manufactured using materials that are completely recyclable with, at the same time, a reduction in CO₂ emissions. The manufacturing process has just one continuous phase, without chemical reactions, thereby making the product faster with a lower consumption of energy and release of greenhouse gases. At the same time, the technology employed also achieves a 10% reduction in power transmission costs with respect to the classic XLPE technology.

P-Laser 600 kV HVDC

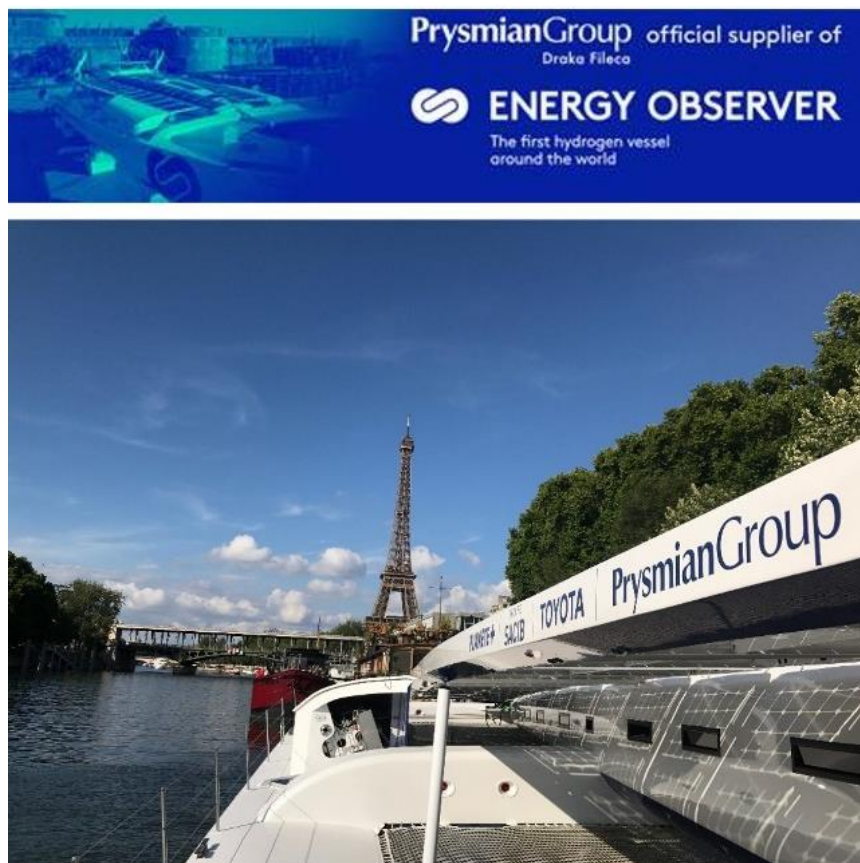
P-Laser 600 kV HVDC Prysmian has launched an innovative technology for power transmission networks that guarantees better electrical performance, lower costs and greater environmental sustainability. The 600kV P-Laser cable, designed for direct current (HVDC) applications, is more efficient to manufacture than traditional XLPE cables. The world's most powerful cable solution for the transmission of electricity is considered to be an innovation of strategic importance in the field of high voltage cables. In particular, the product is able to

reach the maximum level of power transmissible while reducing costs by up to 30% per MW transmitted.

Energy Observer - Self-sufficient energy vessel

Prysmian participated in the Energy Observer project, the first catamaran in the world powered exclusively by renewable sources, engaged in a six-year navigation around the world.

The Group has been chosen as the official supplier of the cables that feed the boat, which, thanks to their efficiency, reliability and a reduced weight compared to standard solutions, distribute the energy generated by renewable sources, both wind and solar, to the engines of the boat.



COMMITMENTS FOR THE FUTURE

In 2018, the Prysmian Group will strengthen its commitment to increase the efficiency and reliability of products with the aim of reducing, at the same time, the dissipation of energy and power. Implementation of the Design To Cost (DTC) project will also continue, resulting in reductions in the weight of conductors and direct materials used in the production of cables.

THE PROTECTION OF OUR INTELLECTUAL PROPERTY

Protecting the portfolio of patents and trademarks is a key part of the Group's business, particularly in relation to its strategy of growth in high-tech market segments. During the year, the Group continued to increase its patent assets, especially in segments with higher added value and in support of the significant investments made in recent years.

As of 31 December 2017, the Prysmian Group holds **4,871 patents** and patent applications throughout the world, covering 746 inventions (of which 211 in the Energy Projects and Energy Products segments, 15 in the Oil&Gas segment and 520 in the Telecom sector). A total of 28 patent applications were filed during 2017, of which 18 in the Telecom sector, 8

in the Energy sector, and 2 in the Oil&Gas sector. Following examination, 187 patents were granted during the year, 52 by the European Patent Office (EPO) and 33 in the United States. The most important products, typically involving specific characteristics or a specific production process, are protected by trademarks that allow them to be identified and guarantee their uniqueness. As of 31 December 2017, the Prysmian Group owns 586 trademarks, with 2,514 registrations in the various countries in which we operate, covering the names and logos of our companies, activities, products and product lines.

THE MAIN INVESTMENTS IN INNOVATION

During the year, Prysmian continued to invest in all corporate businesses, with particular attention to the submarine cables business and the optical fibre business and cables for Telecom applications, further strengthening its presence in a segment with high added value.

The Prysmian Group's production activities are characterised by a strongly decentralised model, which leverages **82 factories** across **50 countries**, and which allows the company efficiency and effectiveness in meeting the various market demands at the global level. Once again, during 2017, the Group has continued to implement an industrial strategy based on the following factors:

- creation of products with higher added value and technological content in a limited number of establishments destined to become centres of excellence with high technological skills, exploiting economies of scale, with consequent improvement in production efficiency and reduction of capital invested;
- constant search for greater manufacturing efficiency in the commodities sector, while maintaining a well-diversified geographical presence in order to minimise distribution costs.

In 2017 the value of gross investments amounted to EUR 257 million, up approximately 10% compared to the previous year (EUR 233 million), including the item relating to the purchase of assets of the Chinese plant located in Yixing and managed previously by ShenHuan Cable Technologies, active in the production of HV cables, and the further acceleration of investments in the Telecom sector (fibre and optical/data cables). The incidence of investments linked to the industrial footprint remains in line with previous years, with the objective of optimising the cost structure and guaranteeing an adequate saturation of the plants within the various countries.

CAPACITY / PRODUCT MIX

Investment to increase production capacity and take account of changes in mix accounted for 49% of the total.

Energy Projects

During the year, the most significant investment was related to the completion of the acquisition of assets previously owned by ShenHuan Cable Technologies with the aim of creating a centre of excellence in China serving the entire area of the Far East so as to offer all high voltage cable technologies to APAC customers. The site can count on production and logistics facilities located in an area of over 190,000 m² and has 5 insulation lines inside it, including 2 vertical extrusion lines for the production of Extra High Voltage cables up to 500kV.

Also within the High Voltage business, at the Gron plant in France, there was an increase in the production capacity of cables up to 2 km to meet the ever-increasing demand for direct current connections over long distances.

Lastly, in Argentina, Prysmian is completing the installation of a line for the production of cables with welded aluminium sheath, thus complementing the current range of products equipped with a lead sheath offered to South American customers today.

With reference to the submarine cables business, work has been completed in Pikkala, Finland, for a new vertical extrusion line that will allow the production of the Cobra cable for the submarine link between Denmark and the Netherlands. Investments for the Group's fleet of cable laying vessels dedicated to installation services remain stable. The fleet comprises three cable-laying units: "Giulio Verne", "Cable Enterprise" and "Ulysses".

Energy Products

The Energy Products segment has been invested globally to ensure the satisfaction of a growing demand in some value-added sectors. Investment in Suzhou, China, has increased the production capacity of Trade & Installer, Rolling Stock and Automotive cables.

In general, great impetus was given to the whole area of the Far East, where investments are also under way in Malaysia to strengthen the Instrumentation and Control market and, especially in Indonesia, where an additional line is being installed for the catenary extrusion of medium voltage cables in order to make greater use of the growth opportunities that this geographical area presents in all the business sectors in which the Group operates. Finally, in Mexico, an investment was made to increase capacity in the Durango automotive plant, so as to better serve local suppliers of automotive components. Like last year, Prysmian Group also consolidated its investments in the subsidiary Oman Cables Industry, after acquiring an absolute majority of its capital during the previous year. These investments principally focus on low and medium voltage cables, which are used by local utilities as well as the major EPC (Engineering Procurement and Construction) companies active in the Arabian Peninsula.

Telecom

In the Telecom business area, in the optical fibre plant of Claremont (North Carolina), the Group made investments to create a verticalised production structure, increasing spinning capacity to meet the demand for fibres destined for the production of optical cables. In this regard, the Group is also increasing the production capacity of ribbon cables in the Lexington plant (South Carolina), also following an important supply agreement signed with Verizon Communications to support the expansion of the American telephone operator's optical network to include 5G services and an increase in the 4G LTE capacity of the broadband network.

The factories of Douvrin, France, and Battipaglia, Italy, have also been the subject of further investments by the Group with the aim of increasing the production of single-mode fibre and of serving the continental optical cables market for telecommunications.

EFFICIENCY AND INDUSTRIAL FOOTPRINT

Total investments destined to reduce variable costs (mainly product design and materials used) and fixed costs amounted to around 27% of the total. The Group is continuing to perform an important cost optimisation activity for the entire production chain of the Telecom business segment. Two new factories were almost completed in Eastern Europe: in Slatina (Romania) for the production of optical cables used in telecommunications, and in Presov (Slovak Republic) for the production of optical cables for multimedia applications, in addition to the current production of copper cables. In Durango (Mexico), work has now been completed for the construction of an optical telecommunications cable factory to meet the growing demand in North and Central America. Lastly, in the European optical fibre factories of Battipaglia (Italy) and Douvrin (France), efficiency investments continued, with a significant reduction in the cost of fibre manufacturing, with particular emphasis on increasing the size of the preforms and on the spinning speed.

As for the Energy business, it is worth mentioning the start of work on the creation of a new Centre of Excellence in South America, within the industrial pole of Sorocaba, in Brazil: this pole will also host the entire structure of the production unit currently located in Santo André (São Paulo) and, at the end of the works, will be one of the most modern Prysmian offices in the world.

IT, R & D

7% of investments were allocated to the development of Group information systems and Digital Transformation initiatives.

In 2017, activities continued for the completion of the "SAP Consolidation (1C)" programme, based on the innovative SAP HANA technological infrastructure and aimed at the harmonisation of back-office processes, with the geographical extension of the Group platform in Argentina and partially in the United States.

In the Operations area, a pilot project was launched in Calais for the development of the Factory 4.0 project, the Group's first "Global Manufacturing Execution System", with the aim of increasing the efficiency and effectiveness of industrial processes and improving customer service, ensuring complete traceability of the components used in production cycles.

In the Marketing and Communication area, the roll-out of 29 Local Websites was completed, according to the model developed for the Group Website (www.prysmiangroup.com), with particular attention to the business needs of business and employer branding of each country in which the Group operates.

BOX "Industry 4.0"

Prysmian Group commenced in 2017 the launch of its first Factory 4.0 pilot project at the optical cable plant in Calais (France). The project, called "Fast Track", represents a step forward in the implementation of the Group's "Fast Forward Operations" programme aimed at creating smarter establishments by leveraging the integration of digital skills and people's know-how. The "Fast Track" project will be realised thanks to the collaboration with Dassault Systèmes, 3D Experience Company, world leader in 3D design software, 3D Digital Mock Up and Product Lifecycle Management (PLM) solutions. The partnership with Dassault Systèmes allows Prysmian to leverage the best applications in the sector created for the use of IoT technologies at the forefront of production processes and for the analysis of Big Data. The launch of the pilot project in Calais will allow the Group to develop more extensive plans with the aim of progressively installing Factory 4.0 solutions in all of its 82 plants worldwide. The "Fast Track" approach ensures full traceability of production activities and materials used, better management of events that could jeopardise production processes, and provides in real time all the relevant information needed to identify causes and possible solutions.

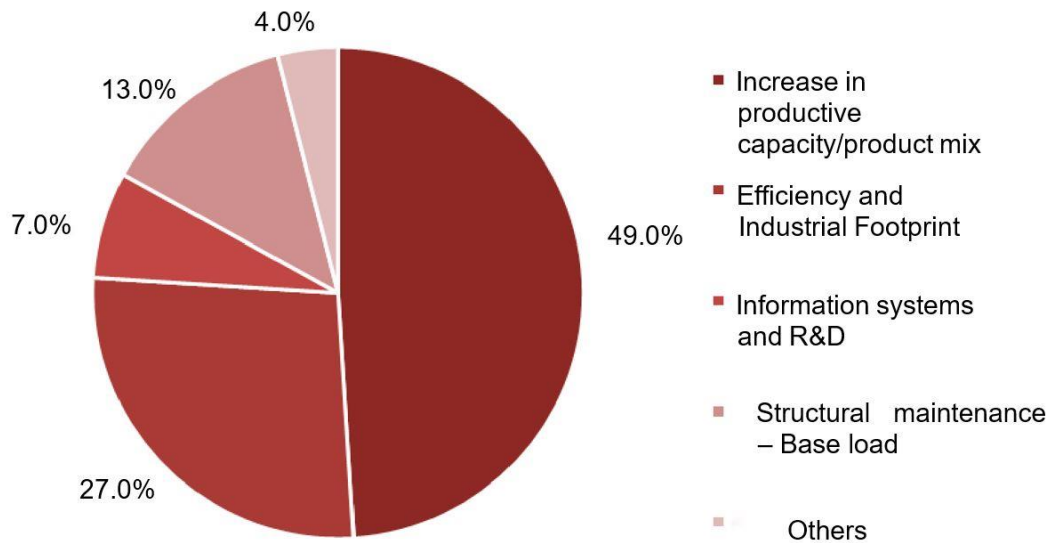
STRUCTURAL MAINTENANCE - BASE-LOAD

Capital investment to maintain capacity amounted to about 13%, in line with prior years. A significant part is related to the removal of all asbestos present at every Group factory around the world.

OTHER

In this last category (4% of the total) we include the purchase of a building in Taunton (Massachusetts, USA) linked to the current plant operating in the Industrial cable sector, so as to support its future growth plans; along with this investment, it is worth mentioning the completion of the works in the Ansaldo 20 industrial area, in the Bicocca district of Milan for the construction of the new headquarters of the Group, which covers an area of over 20,000 m² and brings together all the company functions located in Milan in a single location, with a consequent saving on management costs compared to the past.

GROUP INVESTMENT IN 2017



RESEARCH AND DEVELOPMENT: THE PARTNERSHIP

Prysmian has established consolidated collaborative relations with major universities (more than 35 agreements) and research centres in various countries around the world: Such collaborations are strategic for Prysmian, in order to stay constantly up to date with all technological innovations and ensure adoption of the most advanced technologies available to the scientific community.

Among the numerous collaborations, those with the following bodies are particularly worthy of mention:

- Politecnico di Milano (Italy)
- Università degli Studi di Milano, Genova, Salerno, Palermo e Padova (Italy)
- National Electrical Energy Research & Application Center (USA)
- Georgia Institute of Technology (USA)
- University of South Carolina (USA)
- Centro di Pesquisa e Desenvolvimento em Telecomunicacoes (Brazil)
- Universidade de São Paulo (Brazil)
- Universitat Politecnica de Catalunya (Spain)
- Shanghai TICW (China)
- University of Applied Science Südwestfalen (Germany)
- University of Lille 1 (France)
- University of Central Florida (USA)
- Nokia Bell Labs France and (USA)
- Technical University of Eindhoven (Holland)
- CaiLabs (France)
- PA Consulting (UK)
- CEA (France)
- Nanocomp (USA)

The Prysmian Group organised in 2017 the second edition of the **Technology for Human Beings** contest (in collaboration with the Human Foundation) for the selection of bachelor's and master's degree thesis on the applicability of new technologies for sustainable development. The contest, aimed at students of engineering, physics and material sciences enrolled at Italian universities or colleges, was inspired by the Sustainable Development Goals (in line with the Group's Sustainability strategy) and involved the following thematic areas:

- Resilient infrastructure, fair, responsible and sustainable innovation and industrialisation;
- Access to information and communications technology;
- Sustainable models of production and consumption: sustainable and efficient management of natural resources;
- Technologies and access to economic, reliable, sustainable and modern energy systems;

The competition has awarded 6 students - 3 bachelor's theses and 3 master's thesis - with cash prizes, while the first winners of each category were offered the possibility to carry out a six-month internship within the Prysmian Group.