

*P-Laser*

**Prysmian**  
Group

# The future of cabling for today's utilities

Enhanced performance.  
Superior service.  
Environmental sustainability.

01	02	03



 **Performance**

 **Service**

 **Sustainability**

## Linking the future

As the undisputed cable industry world leader, Prysmian Group believes in the effective, efficient and sustainable supply of energy and information as a primary driver of global growth.

We provide major global organisations across many industries with best-in-class cable solutions, based on state-of-the-art technology. With a presence in more than 50 countries, we're close to our customers no matter where they

are. We enable them to further develop the world's energy and telecoms infrastructures, and achieve sustainable, profitable growth.

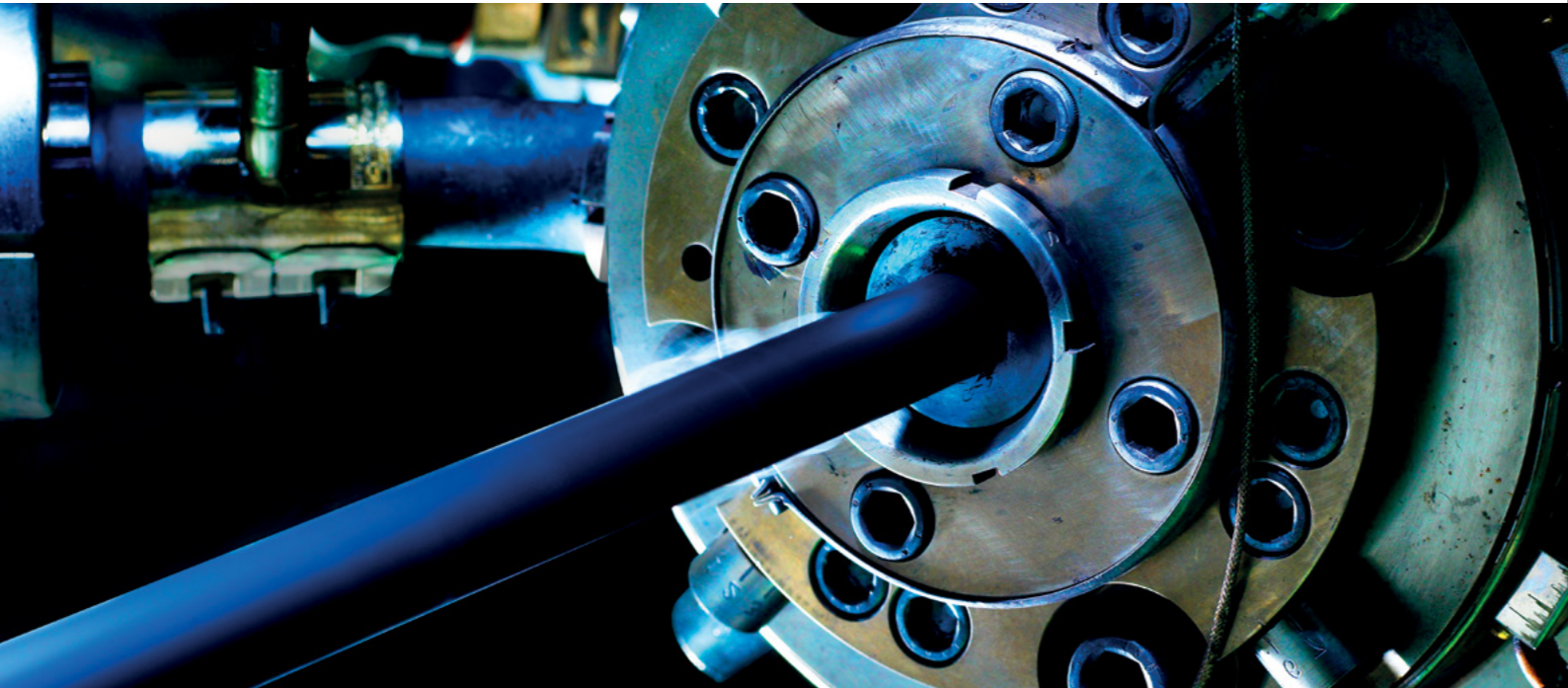
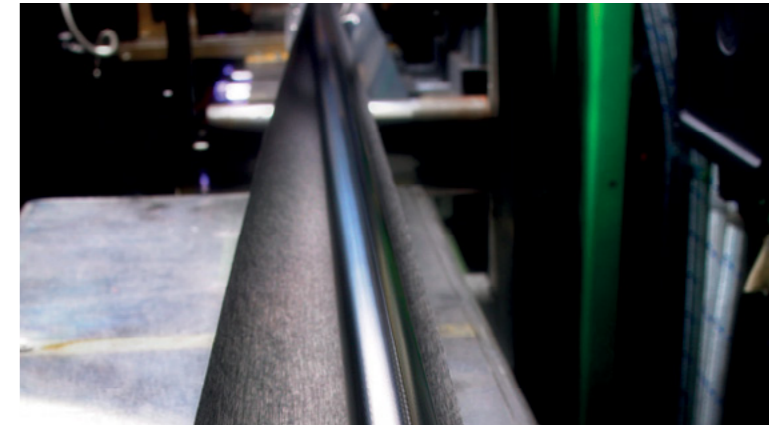
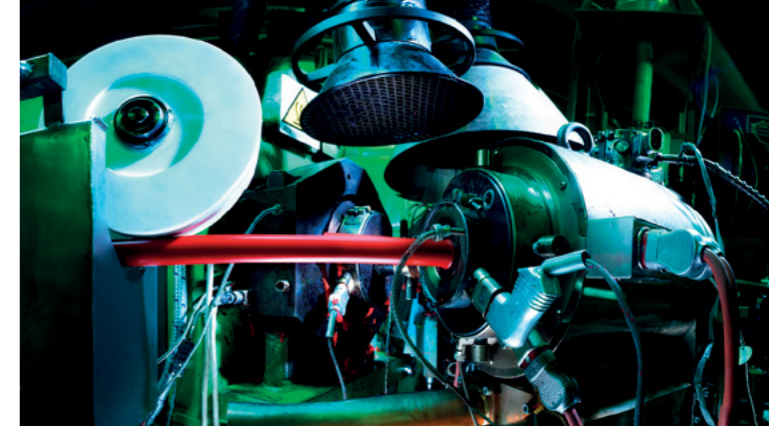
In our energy business, we design, produce, distribute and install cables and systems for the transmission and distribution of power at low, medium, high and extra-high voltage. In telecoms, Prysmian Group is a leading manufacturer of all types of

copper and fibre cables, systems and accessories – covering voice, video and data transmission.

Drawing on over 130 years' experience and continuously investing in R&D, we apply excellence, understanding and integrity to everything we do. We consistently meet and exceed the precise needs of our customers across all continents, while shaping the evolution of our industry.

## P-Laser puts your network a smart step ahead

Thanks to its superior performance and reduced environmental impact, P-Laser is one of the most advanced solutions in Prysmian Group's smart grid range. This eco-friendly MV cable is the perfect way to achieve the balance between achieving a sustainable future for the planet, and satisfying future energy requirements.



## What links power to the world?

Cable solutions to support the development of the world's energy infrastructure

Prysmian's solutions exist to help grid operators, utilities, industrial companies, electrical wholesalers and installers generate and distribute the energy that powers every aspect of our world.

From submarine to high, medium and low-voltage cable solutions, we apply innovation and a commitment to helping customers achieve sustainable, profitable growth. Our best-in-class technology can be found at the heart of many history-making projects across the globe, where power transmission and distribution are critical in the development of tomorrow's communities.

*P-Laser*

## Linking power grids to sustainability

Working in partnership with you. Understanding the challenges of the utilities sector. Helping you deliver the energy that supports lives around the planet.

These are the commitments Prysmian makes to you. That's why we've produced a distribution network cabling solution designed and developed to deliver the performance you need: P-Laser.

## A sustainable solution that integrates seamlessly

When you put us to work for your organisation you'll discover there is finally a partner offering solutions that are better for the planet, and perfectly suited to integrating with your existing networks. A partner that helps you deliver better customer service. A partner whose support means you're ready for the future and the opportunities it presents.



# Leading the world with our utility partners

The introduction of P-Laser is a perfect example of Prysmian's commitment to innovation and to working in partnership with you. It's a story built on years of research and development.

P-Laser is the culmination of this in-depth R&D work, introducing a significant step forward in cabling technology. As well as providing enhanced performance and reliability, it optimises supply chain processes, reduces

total cost of ownership and allows your organisation to operate more sustainably.

**Research and Development sits at the heart of everything we do.**

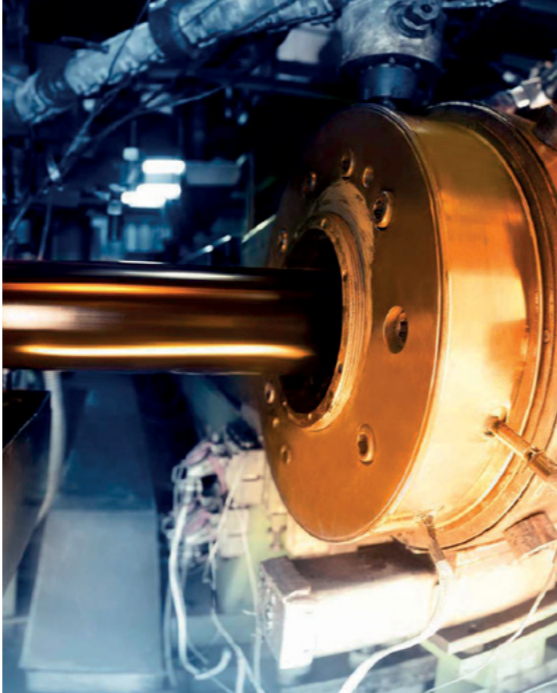
## Our R&D expertise

 130 years' experience

 5,600 patents granted or filed

 25 R&D Centres of Excellence

 900 R&D professionals



# P-Laser gives you more in three ways

P-Laser is the first eco-sustainable cable for electrical grids. It provides an ideal solution for delivering enhanced network reliability, whilst simultaneously delivering operational and environmental benefits.



## CO<sub>2</sub> equivalent emissions reduced by 40%

P-Laser helps you meet your environmental responsibilities, providing energy in a way that safeguards the future for everyone.

P-Laser uses 100% eco-friendly HPTE (High-performance Thermoplastic Elastomer) and fully recyclable materials, operating with zero-gas technology, for increased energy efficiency and reduced greenhouse gas emissions.

In August 2019, Pignataro Maggiore – where P-Laser is produced – was awarded official ISO 14067:2018 certification for meeting Carbon Footprint requirements for a Product (CFP).



## Operating temperature range increased by 20%

P-Laser maintains its integrity in temperatures as high as 130 °C. So, in emergencies or cases of grid congestion, it delivers greater capability, superior network reliability and reduced risk for financial penalties.



## Superior service with production time cut from days to hours

The process of producing P-Laser is more efficient and reliable than ever. With the removal of the degassing process, and the introduction of uninterrupted, single-line production, you can now receive the cable you need faster than ever, and in a form that's fully compatible with your existing networks.

## Meeting the demands of your business and our planet

Whether you're ensuring you meet your sustainability objectives, or simply reducing your impact on the planet, environmental concerns are never far down the agenda of a utilities organisation like yours.

That's why P-Laser cabling is the ideal answer. Manufactured using thermoplastic and fully recyclable materials, the solution is 100% eco-friendly. What's more, its innovative production process and 'zero-gas technology' deliver increased energy efficiency and reduced greenhouse gas emissions. So, from your operations, to your impact on the planet, you know you're satisfying the demands placed upon your business.

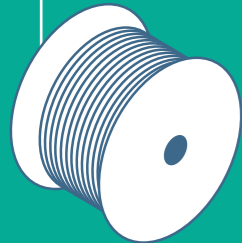
### Meeting regulatory requirements

Along with all other Prysmian products, P-Laser is manufactured to comply with major national and international standards across Europe. The Prysmian sites which manufacture P-Laser are certified to ISO 18001 Quality Management Systems standards, and to ISO 14001 Environmental Quality standards.

Plus, in August 2019, SGS Italy issued a certificate of compliance with **ISO 14067: 2018** standards for the Pignataro Maggiore plant, where P-Laser is produced. This standard – confirming adherence to Carbon Footprint standards – was calculated for LV and MV cables produced in the plant, with other Prysmian plants in Argentina, Portugal, Spain and Romania working to obtain the same certification.



**1 km of P-Laser = 500 kg of recyclable plastic**



Thanks to fully recyclable materials, 500 kg of high-quality plastics are recovered from every 1 km of 185 mm<sup>2</sup> cable core section.

“Prysmian’s aim is to partner utilities engaged in upgrading and developing their electrical grids while seeking to reduce the environmental impact of such grids.”

**Francesco Fanciulli**  
Executive Vice President  
Energy Business,  
Prysmian Group



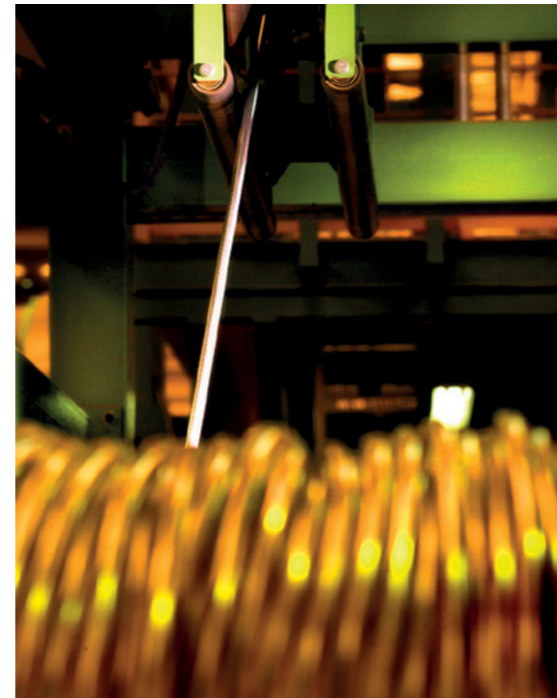
# Rising network temperatures don't mean falling reliability, with P-Laser

When there's a network emergency or grid congestion, power surges and increased traffic can cause cable temperatures to rise – reducing the life expectancy of cabling solutions.

P-Laser is different. Manufactured using thermoplastic to medium- or high-voltage capacity, its performance at higher temperatures surpasses other cabling technologies. So you know when the pressure's on, your network will remain intact.

	XLPE	HEPR	P-Laser
Operating temperature	Up to 90 °C	Up to 105 °C	Up to 110 °C
Emergency temperature	105 °C	130 °C	130 °C
Dielectric strength	Excellent	Good	Excellent
Electrical breakdown	Very good	Good	Excellent
Dielectric losses	Excellent	Good	Excellent
Thermo-pressure resistance	105 °C	130 °C	130 °C
Handling characteristics	Good	Excellent	Excellent

 :Best in class



In a world where energy can now be derived from wind, solar or hydro-electric sources, your network requires cabling that can deal with sudden fluctuations in network supply and demand. It's just one of the reasons P-Laser technology, with its ability to perform at higher temperatures, is your perfect solution.

# A production process that means better service for you

P-Laser's production is more efficient and reliable than has ever been achievable with existing cabling solutions.

P-Laser is manufactured using a high-performance thermoplastic elastomer (HPTe) developed by Prysmian's R&D laboratories, and covered by patents and patent applications.

This use of thermoplastic means degassing is no longer required, so it's

possible to manufacture P-Laser on a single, uninterrupted production line.

Product and production process are now completely integrated, significantly streamlining the supply chain and reducing factory lead times significantly. So not only does the product deliver

performance benefits, you'll also enjoy advantages in service and supply.

Finally, P-Laser is a product developed to satisfy the bespoke requirements of networks in various countries, and is 100% compliant with current network components.



	Standard process		P-Laser process	
	Elapsed time	°C	Elapsed time	°C
Insulation	11 hours	130-300	5 hours	200
Degassing	48+24 hours	80		
Jacketing	8 hours	200		
Total	91 hours (≈ 4 days)		5 hours (-94%)	

"P-Laser's production processes mean significant reductions in lead time and real advances in product availability."

**Andrea Pirondini**  
Chief Operating Officer,  
Prysmian Group





# Total Compatibility

P-Laser technology has been designed to meet your precise requirements. Every stage of its production – and its performance – has been optimised to deliver the maximum benefit to you. P-Laser represents a major step forward in distribution network cabling, but its implementation in the field is entirely consistent with existing processes.



The same tool



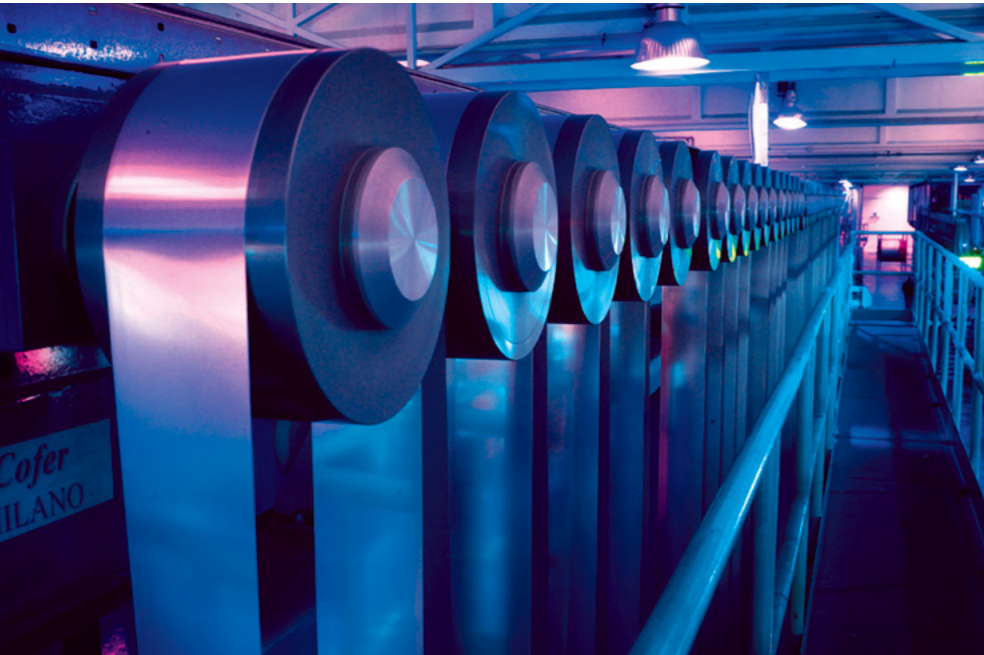
The same joints



The same preparation methods



The same technicians



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“From the outset of the P-Laser project, compatibility has been at the forefront of our thinking. We were determined to develop a product that integrated seamlessly with all existing technology, be that Prysmian’s or indeed competitor products, and required no re-training.”

**Alberto Bareggi**  
R&D Product Development Manager  
Power Distribution, Prysmian Group

# P-Laser – a history of innovation

The history of Prysmian Group is punctuated by many notable innovations. From the laying of cabling between Italy and the American continent to a submarine telephone line between Europe and South America, we've constantly led the world in cable solutions. P-Laser is a further continuation of this commitment to innovation, representing a breakthrough in sustainability and performance.

- 2003 Start of development activity in R&D, Milan Laboratory
- 2005 Prototype production in Pignataro Maggiore (Italy)
- 2006 Installation and plug-in in Italy for triplex 185 mm<sup>2</sup> 12/20 kV in Enel electrical network
- 2007 Installation and plug-in in The Netherlands for triplex solid 240 mm<sup>2</sup> 6/10 kV in Nuon/Liander network
- 2008 National approval release according to CEI 20-86 standard (Italy)
- 2009 Production of 3,000 km core achieved in Pignataro factory to support Italian customers
- 2010 Production of airbag cable with P-Laser technology. 7 layers extrusion in one single production step
- 2011 Extension of product range up to 30 kV for Wind projects

- 2012 Incorporation in the European standard for MV cables, Cenelec HD 620, of Italian and Dutch cable constructions with high-performance thermoplastic insulation
- 2013 Installation and plug in of 150 kV AC prototype in Italian Transmission network
- 2014 Long term test of 150 kV AC system
- 2015 PQ test for 320 kV DC 90 °C
- 2016 Type tests for 525 and 600 kV HVDC systems
- 2018 Qualification PQT HVDC for P-Laser 525 kV Cenelec HD620 compendia has been released for review; the new thermoplastic material will be included as standard
- 2019 P-Laser reaches 50,000 km production milestone

## P-Laser track record

More than 17,000 km core produced in Europe to deploy P-laser technology around Europe.

- Italy:**  
 ENEL  
 Acea  
 Acegas  
 EN.IT  
 ELCE,  
 AGO Renewables  
 F.E.R.A.

- The Netherlands:**  
 Alliander  
 Enexis

- Spain:**  
 Iberdrola

### Global use of P-Laser in MV Cables:

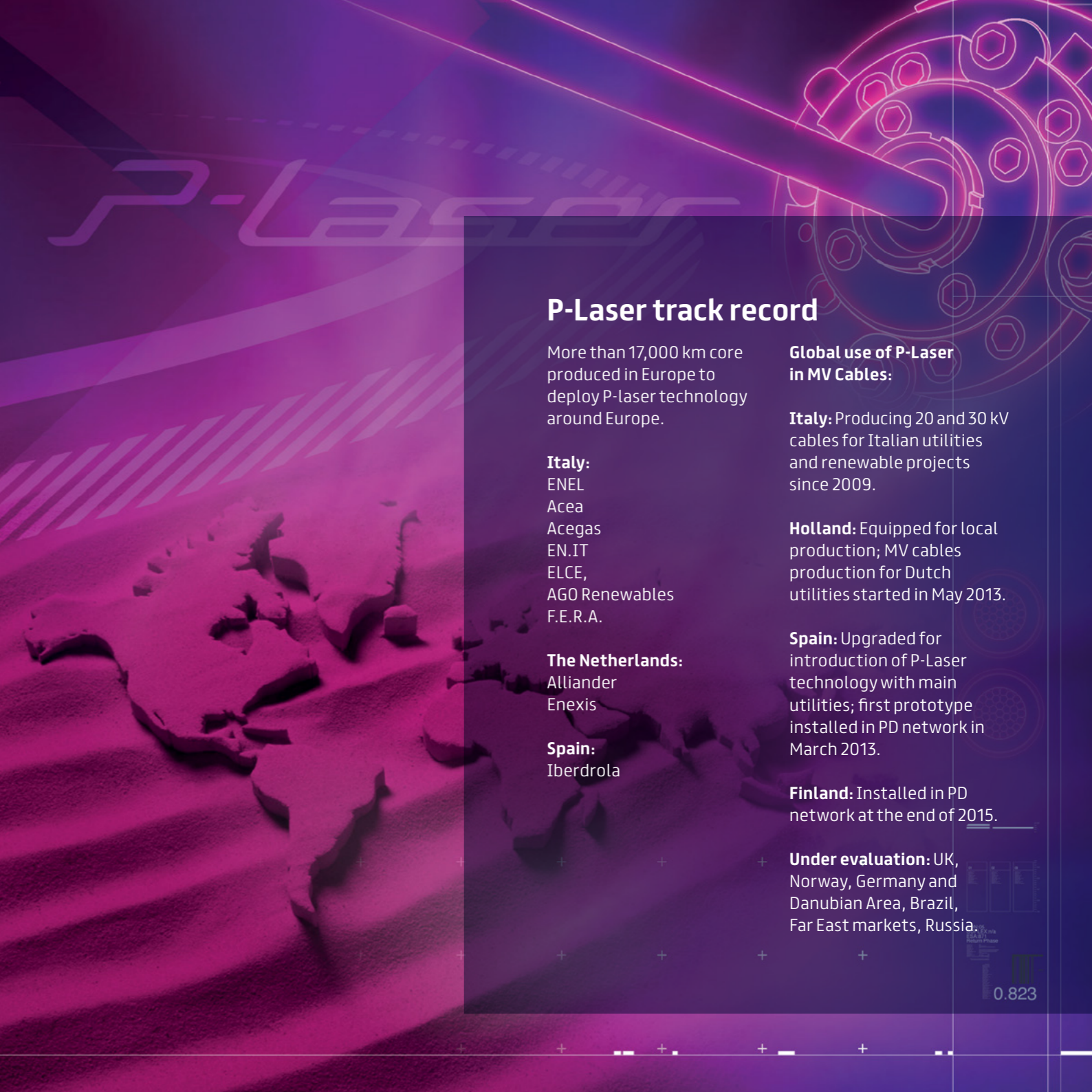
**Italy:** Producing 20 and 30 kV cables for Italian utilities and renewable projects since 2009.

**Holland:** Equipped for local production; MV cables production for Dutch utilities started in May 2013.

**Spain:** Upgraded for introduction of P-Laser technology with main utilities; first prototype installed in PD network in March 2013.

**Finland:** Installed in PD network at the end of 2015.

**Under evaluation:** UK, Norway, Germany and Danubian Area, Brazil, Far East markets, Russia.



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# The future of power distribution

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