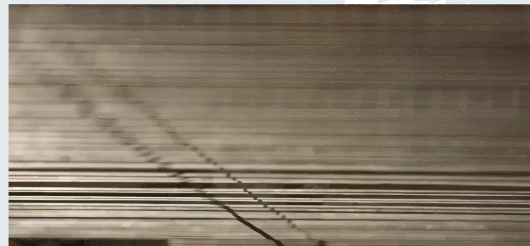
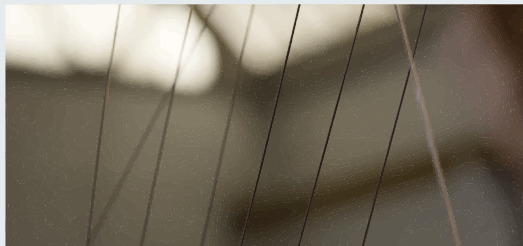


**New business model  
to increase efficiency  
of resources aimed  
at products with  
great durability and  
use of recycled  
materials**



LIFE14 ENV/IT/000082



# The LIFE M&M Project

For the protection of the environment and health

## An eco-sustainable process for wire-coating

The ambitious aim of the **LIFE M&M Man and Metal** project, a research project supported by the European Union through the **LIFE Programme**, is to obtain both an environmental and a technical/qualitative benefit. The scope has been reached thanks to a particular process which foresees that the wires are coated with Al-Zn alloys and pseudo-alloys by thermal-spraying, alternative to the traditional hot dip galvanizing process, in accordance with the principles of the **circular economy**.

The project was implemented by **Metallurgica Abruzzese**, which is part of the **Cavatorta industrial group**, one of the leading European producer of fences and wires for wencing and industry, well known for

«A **circular economy** is based on the principles of designing out waste and pollution, keeping products and materials in use, and regenerating natural systems.» [Ellen MacArthur Foundation]

It plans to reuse materials in subsequent production cycles, minimizing waste.

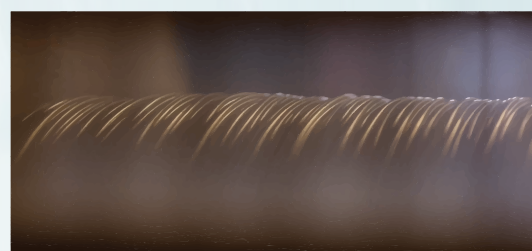
its long commitment to protecting the environment, fully embracing the concept of **Corporate Social Responsibility**, thanks to a constant and continuous research and development activity that led to the introduction of innovation to reduce the

«La **Responsabilità sociale d'impresa** può essere definita come l'**integrazione volontaria** delle preoccupazioni **sociali ed ecologiche delle imprese** nelle loro operazioni commerciali e nei loro rapporti con le parti interessate.»

[Libro Verde della Commissione Europea, 2001]

environmental impact of process and products.

The support of the other project partners, **SACME** of Tortoreto and the Department of Industrial Engineering of the **University of Padova**, was essential for the success of the project.





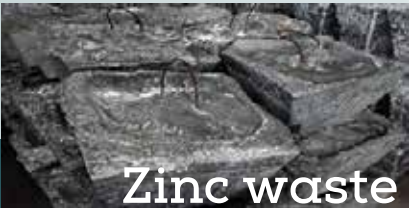


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# The environmental problem

## An industrial challenge for the future

1



**Zinc waste**  
30% of zinc used

### Three problems, a single solution

In Europe, **more than one million tonnes of zinc** is consumed for the production of galvanised wire only. It is estimated that, with current consumption, zinc will be **fully depleted within the next 60 years**.

2



**Zinc consumption**  
1 million tons/year in Europe\*

Wire and meshes are galvanised to increase their corrosion resistance. **Traditional hot dip galvanising** is a **process with high environmental impact**.

\*for the production of galvanised wire only

3



**Traditional galvanising**  
with high environmental impact

Moreover, with traditional galvanising **almost 1/3 of the zinc used**, about 300.000 ton/year (for the production of galvanised wire only), **becomes waste**.

**The LIFE M&M project is a solution to all these environmental problems, adopting the concept of the circular economy.**



**high energy consumption**



**use of hazardous substances**



**industrial atmospheric emissions**



**high waste generation**



**high water consumption**



2

**LIFE M&M**



# Project actions

From preliminary studies to the final products

## 1. Pseudo-alloys from waste

Materials and pseudo-alloys (Al, Zn and

Zn-Al pseudo-alloys) **from waste**, to be used for wire coating, have been identified and obtained.

## 2. Thermal spraying

After testing several **prototypes**, the

**thermal spraying line** for wire coating, operating with **electric wire arc spray** technology, has been realised and successfully tested.

## 3. Post-treatment

The wire coated with thermal spraying

technology is subjected to a **densification** treatment by shot blasting with Zn or Al powders.

## 4. Realisation of electrowelded meshes

The **electrowelding line** has been used

to obtain samples of **new panels and meshes** entirely coated with the new technology.

## 5. Characterisation of the products

All new products obtained (**wires and electrowelded meshes**) have been

subjected to characterisation (metallographic analysis, thickness measurement, mechanical tensile, micro-hardness and corrosion tests).

## 6. Field tests and LCA

The samples obtained have been **tested "in the field"** by selected customers in

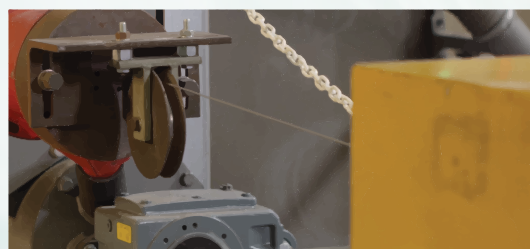
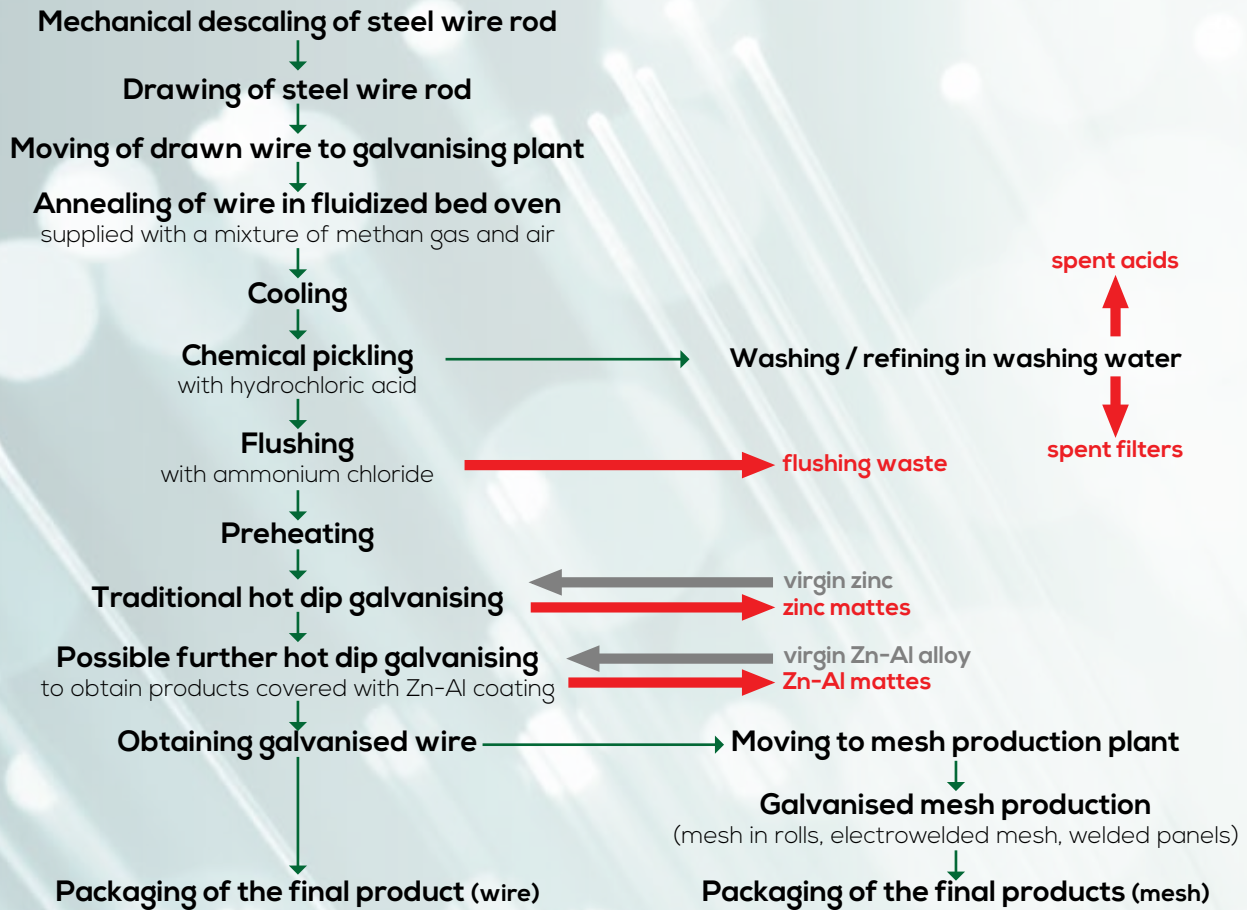
the **agricultural, livestock and fishfarming industries**, with excellent results. **LCA (Life Cycle Assessment) study** confirmed the benefits of the project.





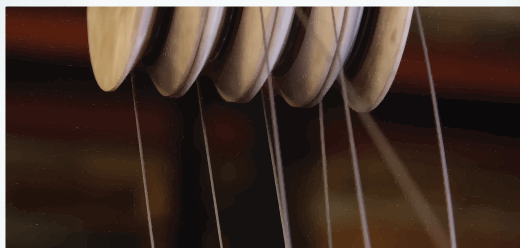
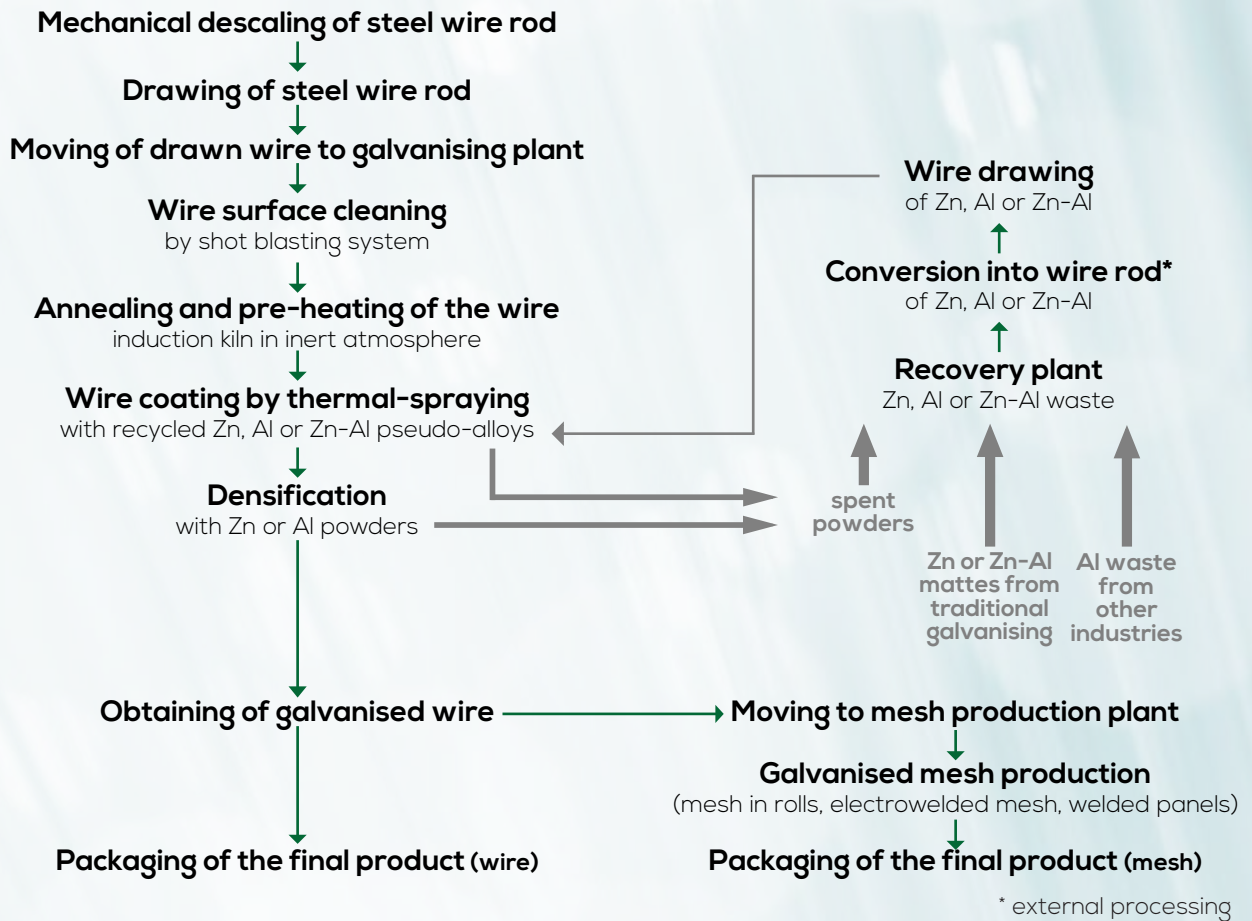
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# The traditional production cycle





# New LIFE M&M production cycle





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# Objectives and results

The objective of LIFE M&M is to **develop a new business model** to obtain metallic wires and meshes with improved durability and corrosion resistance, through a **new production cycle with low environmental impact** ensuring **lower consumption of exhaustible natural resources** and **waste recovery**, in compliance with the principles of the **circular economy**.

The **results obtained** thanks to the project are:

### Waste recovery

It is possible to reuse **Zinc, Zn-Al** and **Aluminum** (even form mattes) to the wire coating.

**3,3\***  
**26\*\*** tons/year

### Sustainable production cycle

thanks to the elimination of the **traditional hot dip galvanising** and the **annealing in furnace with methane gas** and **chemical pickling with acid**. The new process will also allow a **reduction in energy consumption**.

### Savings of natural resources

as **Zinc** (a rapid depleting natural resources) and **Aluminum**

**8,3\***  
**66\*\*** tons/year

### Better final products

with **increased durability** and **corrosion resistance**

\* estimated value using the prototype line

\*\* estimated value after the industrialisation of the process



saving of natural resources



products with increased durability



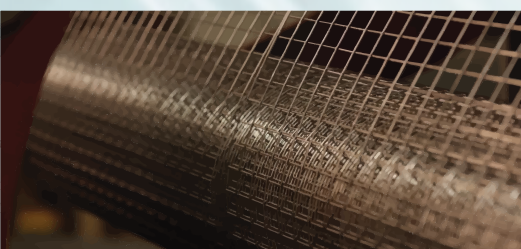
production costs reduction



traditional galvanising suppression



energy consumption savings





## Partnership

When research meets industry

### **METALLURGICA ABRUZZESE**

**Metallurgica Abruzzese S.p.A.**, part of Cavatorta group, is active in the field of wire rod by-products since 1974.



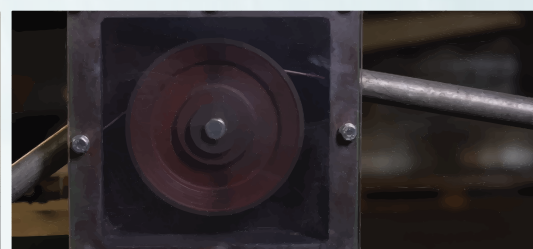
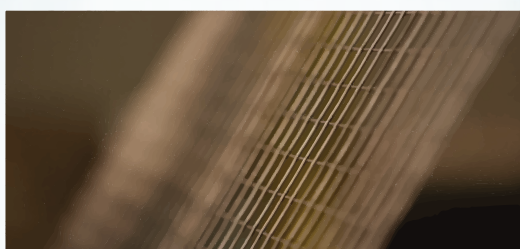
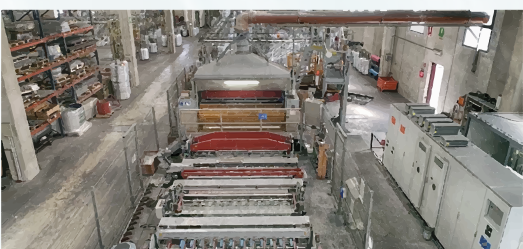
**Cavatorta group**, born in 1961, is an international group with production factories in Italy, France and Romania, subsidiaries in Great Britain, Portugal and the United States and distributors in over fifty countries.

Since 2003 **S.A.C.M.E.** dedicates its activity to the design and production of plants and equipments to be used in the steel industry.



**UNIVERSITÀ  
DEGLI STUDI  
DI PADOVA**

**University of Padua** has a history of almost 800 years (it was founded in 1222) and in 1678 conferred the first degree in the world to a woman. The Department of Industrial Engineering is involved in the project.





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# The LIFE Programme

## The EU instrument for the environment

The **LIFE Programme** is the **financial instrument supporting environmental** and climate action projects through the European Union.

The **general objective of LIFE** is to contribute to the implementation, the updating and development of EU environmental and climate policy and legislation by co-financing project with European added value.

EU regulation no. 1293/2013 launched the fifth phase of LIFE for the period 2014-2020. The European Commission (**DG Environment & DG Climate Action**) manage the LIFE programme together with the Executive Agency for Small and Medium-sized Enterprises (**EASME**).

The LIFE Programme is divided into two sub-programme: **Environment** and **Climate action**.

**1992**

year of birth of LIFE

**3954**

co-funded LIFE projects\*

**3,1**

billions of € cofinanced\*

**5**

phases of LIFE

LIFE I  
LIFE II  
LIFE III  
LIFE+  
LIFE

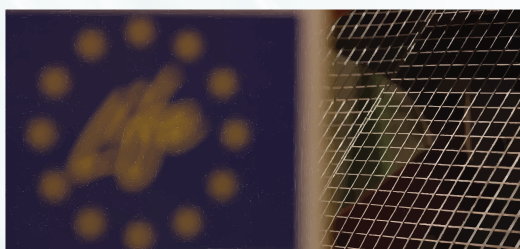
**LIFE Environment**

Environment and resource efficiency;  
Nature and biodiversity;  
Environmental governance and information

**LIFE climate action**

Climate change mitigation;  
Climate change adaption;  
Climate governance and information.

\*from 1992 to 2012





**More info about the LIFE M&M Project:**

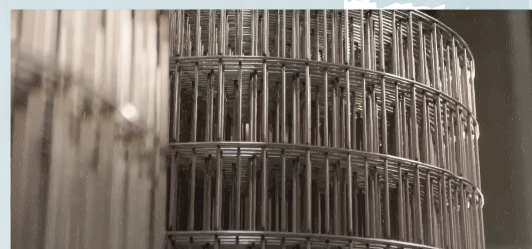
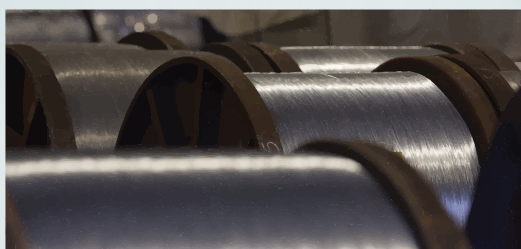
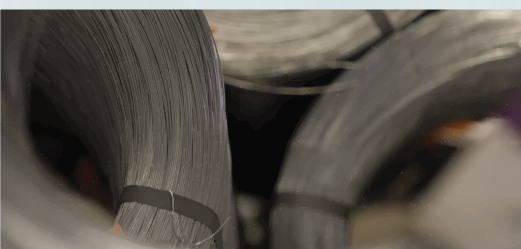
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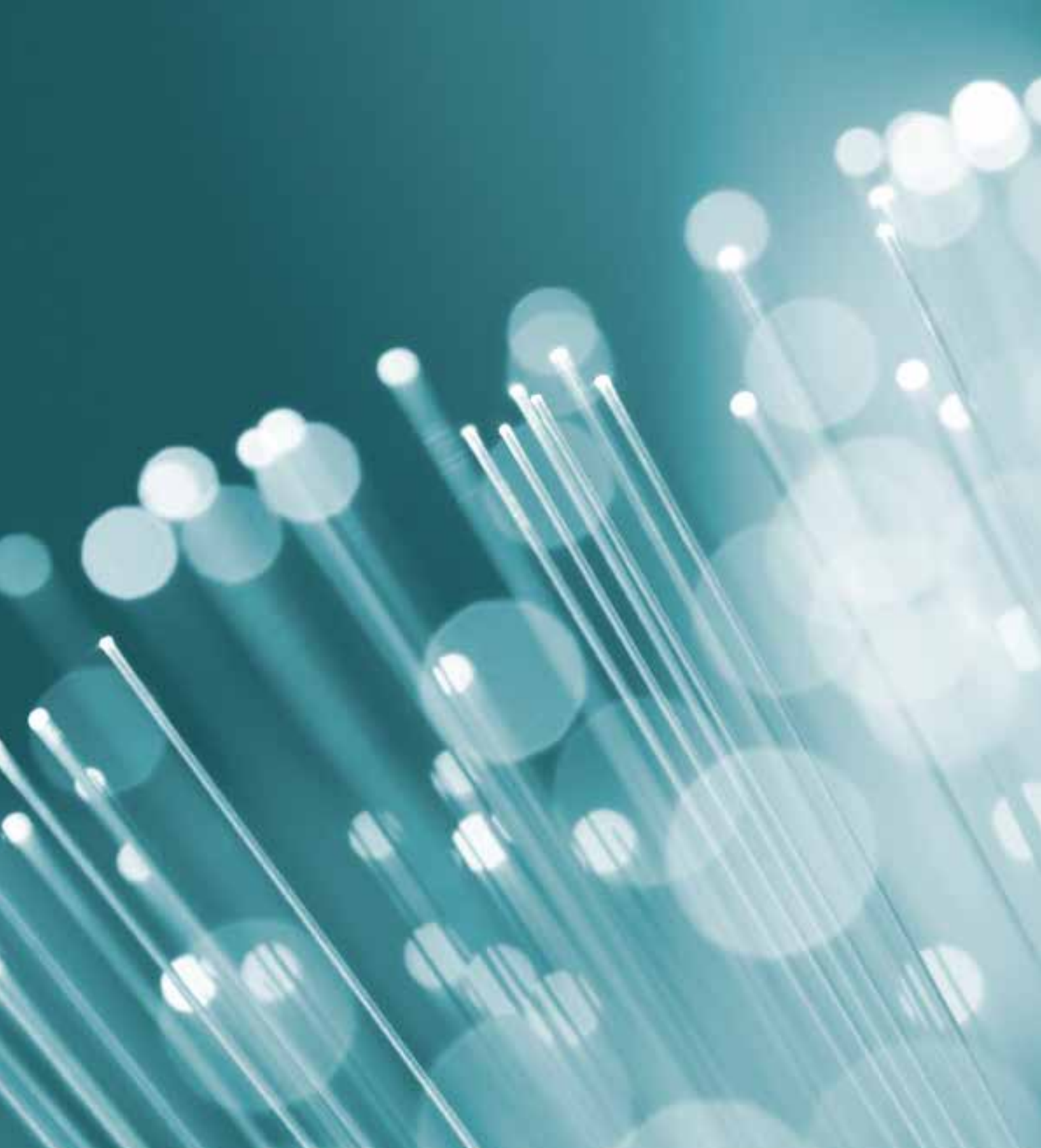
**More info about the LIFE Programme:**

<https://ec.europa.eu/easme/en/life>

**Italian National Contact Point:**

<https://www.minambiente.it/pagina/life-2014-2020>





 **METALLURGICA  
ABRUZZESE**

 **SACME** srl



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DI PADOVA

Project developed by Metallurgica Abruzzese Spa, SACME Srl, Università degli Studi di Padova  
with the contribution of LIFE, the financial instrument for the environment of the European Union