



LIFE  
CO2 PES & PEF

LE FORESTE CHE RIGENERANO L'ECONOMIA

# LAYMAN'S REPORT



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LIFE19 CCM/IT/001201; da 06/2020 a 12/2023

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PROJECT DETAILS:  
**LIFE 19 CCM/IT/001201**  
**Duration:** 03/06/2020 – 30/09/2023  
**Project budget total:** € 1,882,699  
**EU contribution:** € 1,014,215  
**PROJECT AREA:** Italia (Emilia-Romagna e Friuli-Venezia Giulia)  
**Sector:** Land use/Forestry/Agriculture

**Beneficiary Coordinator:**  
Scuola Superiore Sant'Anna

**Associate Beneficiaries:**  
Consortium Comunalie Parmensi  
FederlegnoArredo  
Legambiente Onlus  
Friuli-Venezia Giulia Autonomous Region  
Emilia-Romagna Region  
Union of Municipalities of Romagna Forlivese  
University of Milan


## ABSTRACT: THE PROJECT IN 1 MINUTE

Italy has a high level of forestry protection, yet there are still some significant problems in the programming and management of forestry activities, with only 19% of the national forests being subject to planning and an even lower rate of forestry management. Moreover, despite a high level of forest cover, Italy must still import a lot of its construction timber as the wood supply chain is not well-developed.

This shortcoming has consequences both on the vulnerability of the forests to climate change and to extreme events (such as windthrow and fires), and on the land's social and economic sustainability.

Therefore, the LIFE CO2PES&PEF Project originated from the idea of being able to combine the conservation of the forest, its processes and its services, with the need to increase CO2 absorption, reduce carbon loss due to extreme events and optimise forest growth, without losing their role in the industrial system.

Thus, the project's aim was to find an approach combining wood harvesting with strengthening the forests over time, fostering CO2 absorption and, at the same time, planning for the risks of fire and windthrow.



Forests are a primary resource for sustaining the life of our planet.


## INTRODUCTION

Because of the imbalances that have been created over the last 50 years, in a geological epoch now recognised as the Anthropocene, the role of regulations, aimed at restoring the biodiversity and containing the changes in the climate system, have taken on a great importance. The compromising of or the lack of restoration processes, that make ecosystems function, carries very high costs for society. The report, "The Economics of Ecosystems and Biodiversity", drawn up by the European Commission together with the German government and other partners, estimated, due to the shortage of ecosystem services, an annual loss of global GDP of 50 billion dollars per year, with a potential decrease of 7% in GDP by 2050. And this, only resulting from the loss of the biodiversity.

Based on the above, the LIFE CO2PEF&PES Project had the goal to support the generation of ecosystem services of Italian forests thanks to 2 specific activities:

- sustainable and "climatically intelligent" forestry management, to increase the rate of carbon capture, selecting the trees better suited to quickly absorbing CO2 and producing a renewable resource such as wood, where carbon sequestration is longer term;
- the prevention of the risk of the spread of fires and storm damage, increasingly more likely in a context of climatic crises, that generate a consistent loss of sequestered CO2 and other ecosystem services.

The project developed a methodology attributing a value to the ecosystem services (PES - Payment for Ecosystem Services) supplied by the forests, and created an ecosystem market, for a sustainable forestry management able to produce these services.



A specific role is played by the forestry operators and entities responsible for forestry management. It is crucial they are aware of the difference that a sustainable management can make in providing ecosystem services



Another project objective was to improve the productive system of the forestry-wood supply chain, to increase carbon sink and stock regarding wood products. The method obtained was found to be replicable in other European forestry areas. The companies that make use of forestry products, especially wood, are those mainly interested in knowing about the impact of the materials they use, throughout the entire life cycle. Therefore, the assessment of the ecological footprint of their products (Product Environmental Footprint – PEF) is addressed to them.

Indirect targets, but subjects of specific actions, are the policymakers who are called on for legislative support and policies for the ecosystem services market and, in general, for the recognition of the importance of the forestry sector concerning climate policies. Local, regional, national and European levels have all been recipients of the dissemination of the project.

### PES – PAYMENT FOR ECOSYSTEM SERVICES

LIFE CO2PES&PEF is aimed at supporting the generation of ecosystem services by Italian forestries thanks to 2 specific activities:

- sustainable and “climatically intelligent” forestry management, to increase the rate of carbon capture, selecting the trees better suited to quickly absorbing CO2 and producing a renewable resource such as wood, where carbon sequestration is longer term;
- the prevention of the risk of the spread of fires and storm damage, increasingly more likely in a context of climatic crises, that would generate a consistent loss of sequestered CO2 and other ecosystem services.

To support the ecosystem services provided by the Italian forests and the development of a new and sustainable wood industry, the project set up a register and a system of ecosystem credits, similar to those in the international agreements on carbon emissions but, instead, oriented to a voluntary market. A protocol of service validation translates the ecosystem services considered in products into a monetary value.

### PEF – PRODUCT ENVIRONMENTAL FOOTPRINT

The PEF is a calculation method that allows for measuring the environmental impacts of a product and/or service using indicators (impact categories), such as greenhouse gas emissions, water use and resource consumption. The PEF methodology is based on the life cycle approach (LCA – Life Cycle Assessment) that allows for assessing a product’s “environmental footprint” from the extraction of the raw material used in its production through to its consumption or disposal, thus taking into account all impacts throughout its life cycle.

In the LIFE CO2PES&PEF Project, the development of a preliminary analysis for some wood sector products was foreseen and, based on the results, a guideline was drawn up referring to the Product Environmental Footprint Category Rules (PEFCR) that will support other Italian and European organisations in further developing the methodology.

## THE OBJECTIVES

The LIFE CO2PES&PEF Project was set up with 3 specific and measurable objectives:

### **The identification of a set of ecosystem services and the evaluation of their benefits in 3 pilot forest areas.**

For this, an analysis of the ecosystem services already present in the 3 geographic areas and their eventual implementation was carried out to:

- assess the contribution of the sustainable management of the forests, the conservation and the capacity of carbon sink and carbon stock and of the other ecosystem services analysed;
- establish certification registers of the ecosystem services referring to scientific literature on the issue and already tried and proven experiences;
- provide an economic evaluation of the ecosystem services supported and/or incentivised and/or deriving from the bureaucratic procedures of forestry management, to be used to create a system of “ecosystem credits”.

### **The improvement of the wood production system.**

The life cycle of wood products produced in these 3 areas complying with the PEF methodology and the EU Rec 2013/179 was analysed and, as well, the impacts from industry were reduced to a minimum. Thus, studies, operative plans and instruments useful for the companies working in the forestry and wood sector

were established. Specifically, these included:

- a screening of the wood industry, a PEFCR (Product Environmental Footprint Category Rules) and support studies for its verification;
- an operative plan to improve the companies involved in the PEFCR support studies, which could reduce the industries' impact by 2%;
- a toolkit for the companies in the forestry and wood sector, making the PEF analyses replicable in other areas and supporting them in the process of providing the certification for Green Public Procurement activities.

### **The creation of an ecosystem credit system to finance the ecosystem services.**

This type of credit in the voluntary market was introduced through the role the category associations play in the sector. Moreover, the carbon credits developed in the project were uploaded on the public register ECO2Care (<https://www.eco2care.org/>), managed by the CE.Si.S.P. of the University of Genoa.

As well, the following support elements were provided, addressed to the relevant politicians, to be replicated not only in other regions, but also at national and international levels:

- information to draw up adaptation plans;
- indications concerning good practices that increase the forestry ecosystem services which can be included in the Regional Rural Development Plan;
- incentives for the use of wood based on the “cascade” methodology.

The LIFECO2PES&PEF Project created a protocol for the validation of services, which can be certified, thus transforming the ecosystem services considered into “products” with a monetary value



## THE ACTIONS

The project was developed along 3 main lines:

1. the measurement of carbon stock and carbon sink of the 3 relevant areas and the evaluation of the additional activities allowing for the increase in ecosystem services over a period of at least 100 years;
2. the monitoring of the resources and the environmental impacts along the wood supply chain, to improve as far as possible the entry flows and reduce the negative exit impacts of the wood production system;
3. the creation of a financial tool for the productive system in general, which uses the forests as an indirect productive source, so as to create the financial means to implement the additional activities in forestry management.

The project actions were carried out in 3 specific forest areas of the Tuscan-Emilian Apennines and alpine forests:

- the Forlivese Regional Forestry Land: a forest area of 24,000 hectares belonging to the Emilia-Romagna Region, with the presence of different forestry companies which harvest about 10,000 m<sup>3</sup> of wood per year, mainly for energy use;
- the Consortium Comunalie Parmensi: a forest area of about 8,000 hectares belonging to the Emilia-Romagna Region, with 2,000 hectares PEFC certified forest and managed by the Adaptation Plans approved by the regional government. The 100 or so local forestry companies harvest about 10,000 m<sup>3</sup> of fuel wood per year, and mainly produce wood for energy use;
- the Fusine Regional Land: a PEFC certified forestry area of 2,000 hectares belonging to the Friuli-Venezia Giulia Autonomous Region, which produces 2,000 m<sup>3</sup> of wood per year. The specific feature of this area is related to the type of wood grown here, timber suitable for use in the furniture industry and in construction.

More specifically, the set of actions drawn up and implemented by the project foresaw:

- an analysis and an assessment of the ecosystem services, through a detailed measurement of the carbon sink and stock in 3 selected areas for a more precise measurement of the average value recorded in the IPCC Reports. Following, 2 sets of ecosystem services – one regarding the regulation (forestry management activities) and one aimed at risk prevention (fires and windthrow) – were studied. As well, there was a more in-depth study on cultural services (mushroom harvesting);
- a direct action to develop the analysis of the life cycle of the wood industry

resulting from the areas studied in line with Rec. 2013/179. In this action, a complete PEFCR was created and an improvement plan for the companies participating in the pilot study was drawn up;

- an assessment of the carbon stock in the wood products originating from the forest, particularly those used in construction with a long-term duration;
- the establishment of a certification standard for ecosystem services;
- an action focused on evaluating how the latter may be modified in monetary terms and to define procedures and rules necessary to activate an EESP scheme (ecosystem and environmental services payment) able to enter the market directly through the companies (with the mediation of the category associations) or as an added component of the green bonds;
- an action to establish the support instruments for the regional policy;
- an action to evaluate the transferability and replicability of these support instruments, of the LCA analysis activities and of the management of the ecosystem credits in other regional bodies, in the Ministry for the Environment and in other European countries;
- actions for the project management and prevention of any problem and risk that could arise.



**A full communication activity was from time to time designed for the target audience and the different project recipients. The main objectives of the communication activities were:**

- to bring the project to the attention of the largest number of people possible, especially among the groups of recipients directly and indirectly identified;
- to inform and create a link amongst the project recipients, through actions of networking, replicability and the dissemination of the results;
- to reduce the gap between the business world, companies, civil society, the academic world and citizens, explaining the project's innovative aspects and the short-, medium- and long-term common objectives.

Besides the external communication actions, a flow of internal communication that was regular and constant among the various project partners by means of a mailing list, allowed for knowing and sharing the development of the project amongst the different partners. These included:

- 50 on web channels and in newspapers
- 11 dissemination events
- more than 300 participants in the project's dissemination events in
- 11 national and 5 international events
- participation in 6 international scientific meetings
- 1 website with 12,099 visits and 29,911 pages viewed
- 1 final conference at Ecomondo with more than 70 participants

## THE RESULTS

LIFE CO2PES&PEF has contributed to improving forestry management, increasing CO2 sequestration, mitigating the hydro-geological risks, and reducing the risks of fire and windthrow, which would result in added CO2 emissions.

Through the actions aimed at analysing the PEF (Product Environmental Footprint) of the wood industries involved in the experimental areas and the actions to improve the hotspots, there resulted a reduction in CO2 emissions in the activities of wood cutting, sawing and, if present, carpentry, and a decline in water use and energy consumption.

The project provided useful instruments for companies, technicians in the forestry sector and policy-makers, at local, national and European levels through creating and defining:

- a toolkit for companies in the wood industry and forestry sector, to make the application of the PEF replicable in other contexts and support companies in enhancing the path taken in the project, also regarding Green Public Procurement;
- a screening study on 3 wood industry products, representative of the 3 pilot forest areas following the PEF methodology (EU Rec 2013/179);
- an operative plan to support the companies in the improvement of the environmental performance of their products where the environmental footprint was calculated;
- the development of a certification standard for ecosystem services in order to link them to an economic quantification and include them in the environmental compensation market;
- the drawing up of an ecosystem credit negotiation scheme;
- the verification of the regulations and organisational and management procedures to include the ecosystem credits in the green bonds;
- the drawing up of guidelines for the policies of the regions involved;
- an increase in monitoring the forestry activities, the forestry certification activities, and the certification and management of the ecosystem credits.



In the replicability and transferability strategy, an important role was played by the ecosystem credit exchange platform, a software for managing the register, and the annulment and marketing of the ecosystem credits generated in the 3 forest areas. This software is free for all those who wish to manage these new credits, both nationally and internationally, such as certification bodies, professional offices, associations, public entities and companies.

Finally, the PEF CR of the wood supply chain and the toolkit for SMEs to apply the PEF to their wood product life cycle were distributed in workshops and dissemination events, also at international level.

**The platform to calculate the net carbon stock of lumber is available at <https://app.lifeco2pefandpes.eu> on registration.**

## REGIONAL POLICIES

The LIFE CO2PES&PEF Project, thanks to the results achieved in the selected intervention areas, has produced an effective and efficient model for forestry management protocol applicable in all Italian wooded areas, being in line with the National Forestry Strategy.

The first examples of success have arrived from the 2 project partner regions (Emilia-Romagna and Friuli-Venezia Giulia), that transformed the activities carried out through the project into specific policy actions at regional level, also replicable at national and international levels.

The purpose of this protocol is to provide useful suggestions to promote the harvesting of wood from the forests nationwide fostering a cascade use for a lasting CO2 sequestration (that foresees the use of wood in different phases, used as a raw material or in construction, thus, prolonging its life cycle), being both ecologically and economically advantageous.



## PROTOCOL FOR THE CASCADE USE OF WOOD

The protocol aims at enhancing the national wood supply chain and promoting, when possible, the transformation into long-lasting, reusable and/or recyclable products, to allow for long-term CO2 sequestration.

Objectives:

- establish a system to provide incentives for the use of wood of national origin;
- apply the principle of the cascade use of wood in the productive transformation process.

PRODUCTS GENERATED: <https://lifeco2pefandpes.eu/deliverables/>

## REPLICABILITY

A replicability manual was produced, illustrating the results, methodologies and the instruments transferable to other national and European geographic areas, as well as 3 workshops addressed to the public institutions within important national events, for training public employees.

The manual has the goal of transmitting the practical instruments so as to replicate some initiatives carried out within the LIFE CO2PES&PEF Project in other European geographic areas, especially in those countries where there is a significant need to support local actions concerning the governance of decision-making processes in the protection of forests, intended as primary resources for the maintenance of the ecosystem life cycle.

The main recipients of the LIFE CO2PEF&PES Project are the companies in the forestry supply chain, and, first and foremost, those in the wood, paper and construction industries.

Below are some activities developed in the following actions:

ACTION	PARTNER	OBJECTIVE	ACTIVITY
Action C2	SSSUP	Develop an analysis of the life cycle of the wood industry in the studied area in line with EU Rec. 2013/179; create a complete PEFCR and obtain an improvement in the companies participating in the pilot study	<ul style="list-style-type: none"> <li>• Governance for the creation of the PEFCR: Steering Committee (SC), Technical Secretariat (TS)</li> <li>• PEF screening</li> <li>• PEF support studies for the PEFCR in 3 companies</li> <li>• Drawing up of plan for improving the environmental impacts revealed</li> <li>• Validation and dissemination of the PEFCR at local level: training of local operators, creation of a SME toolkit and communication actions</li> </ul>
Action C3	FLA	Evaluate the carbon reserves in the wood products, especially those of construction that last for more than 100 years	<ul style="list-style-type: none"> <li>• Assessment methods of the carbon stock in wood products</li> <li>• Development of a recording system for the wood species</li> <li>• Evaluation of the benefits for the stakeholders</li> </ul>

Action C4	CCP	Establish a certification standard for ecosystem services	<ul style="list-style-type: none"> <li>• Creation of a standardisation system that quantifies the ecosystem credits deriving from sustainable forestry management</li> <li>• Setting the criteria for assigning the monetary value to the ecosystem credits</li> <li>• Application of the standardised rules to the project areas</li> </ul>
Action C5	SSSUP	Evaluate how the ecosystem services can be modified in monetary terms and establish procedures and rules necessary to activate an EESP scheme (ecosystem and environmental services payment) allowing the companies direct market entry (with category association mediation) or as an added component of green bonds	<ul style="list-style-type: none"> <li>• Development of a voluntary market for CO2 emission credits</li> <li>• Set the criteria to avoid greenwashing</li> <li>• Establish the compliance criteria for the ecosystem credits with the European green bond standard</li> </ul>
Action C6	RER	Draw up, through establishing a dataset, the support instruments for the regional forestry policies of the project partners	<ul style="list-style-type: none"> <li>• Establish the dataset</li> <li>• Promotion of the cascade use of wood</li> </ul>

## THE NUMBERS

**3** forest areas

**4,000** PEFC certified hectares

**34,000** hectares of forest managed

**203** local stakeholders involved

**1** platform to calculate the carbon stock of lumber

**2** regional resolutions

More than **30,000** carbon credits generated

Reduction in emissions along the wood supply chain of **0.42 kg** per m<sup>3</sup>

## CONTACTS

<p>Project coordinator</p> <p>Scuola Superiore Sant'Anna di Pisa Piazza Martiri della Libertà, 33 56127 Pisa (Italy)</p>	<p>Head of Communication</p> <p>Legambiente Protected Areas and Biodiversity Office Via Salaria 403 – 00199 Rome tel. +39 06 86260368; Fax: +39 06 23325775 Website <a href="http://www.lifeco2pefandpes.eu">www.lifeco2pefandpes.eu</a></p>
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## GLOSSARY

### **Sustainable forestry management**

According to the current definition, adopted in 1993 by the Ministerial Conference for the Protection of Forests in Europe, sustainable forestry management means “the stewardship and use of forests and forest lands in such a way, and at a rate, that maintain their biodiversity, productivity, regeneration capacity, vitality and their potential to fulfil, now and in the future, relevant ecological, economic and social functions, at local, national and global levels, and that does not cause damage to other ecosystems”.

Sustainable forestry management guarantees that the forestry activities yield social, environmental and economic benefits, balance the competing needs, and maintain and improve the forest functions for today and the future so as not to compromise the conservation of forests, a fundamental resource for our planet.

### **Carbon sink, carbon stock, carbon footprint**

Forests act as a natural carbon deposit and play an important role in stabilising the climate and global warming and, in the framework of international and European commitments to reducing greenhouse gas emissions, are a strategic instrument in achieving a low CO<sub>2</sub> emissions economy by 2030.

Carbon sink is defined as any element of the biosphere (forests and oceans) able to absorb and stock more carbon dioxide than is produced.

Carbon stock is defined as the quantity of carbon contained in a forest “pool” or system with the capacity to accumulate or release carbon.

Carbon footprint is the parameter to measure the quantity of greenhouse gas emissions produced by human actions.

### **Carbon credits**

Carbon credits are a market-based instrument that represents the removal of the equivalent of one tonne of CO<sub>2</sub> emissions from the atmosphere. It represents the emission of greenhouse gases (GHG) that were prevented, reduced or sequestered through a project and that can be acquired to compensate the emissions. A certified carbon credit is indicated with a VER (Verified Emission Reduction), CER (Certified Emission Reduction) and a VCU (Verified Carbon Unit).

### **Ecosystem services**

Ecosystem services are the multiple benefits provided by ecosystems for human beings. They fall under 4 main categories:

1) supply of products obtained from ecosystems such as food, pure water, fibre, combustibles, medicine;

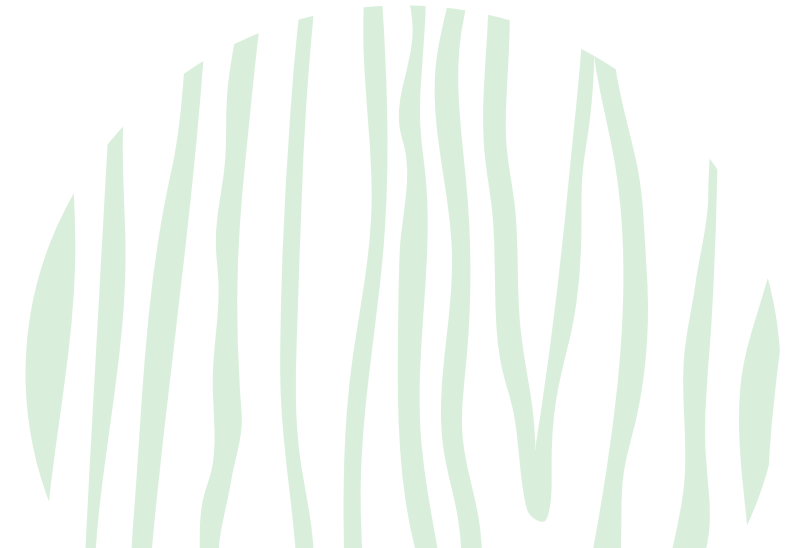
2) regulation where the benefits come from the regulation of ecosystem processes, for example, in relation to the climate, the water system, pathogen action;

3) cultural, understood as all the non-material benefits obtained from the ecosystems such as the spiritual, ethical, recreative, aesthetic, social relations aspects;

4) support, which include the necessary services to produce all the other ecosystem services such as soil formation, the nutrient cycle and the primary production of biomass.

### **Ecosystem services market**

The estimate of the economic value of one or more ecosystem service does not automatically translate into remuneration. For this to happen, many instruments need to be brought into play, often synergetically. Over the last decades, the market based on incentives and compensations has been preferred, especially those linked to voluntary adhesion in creating new markets. For example, the payments for environmental services (PES) aimed at fostering the generation of positive externalities, transforming them into actual exchangeable products on the market.







# LIFE CO2

PES & PEF

LE FORESTE CHE RIGENERANO L'ECONOMIA

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### Project partners:



Sant'Anna  
Università del Piemonte Orientale

Regione Emilia-Romagna



UNIVERSITÀ DEGLI STUDI DI MILANO

