ECOPULPLAST

Local circular ECOnomy by an innovative approach for recycling paper industry PULper waste into new PLASTic pallets

LAYMAN'S REPORT

LIFE14 ENV/IT/001050
Co-funded by the LIFE 2014-2020
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ECOPULPLAST

Project factsheet

Project no.: LIFE14 ENV/IT/001050
Project Title*:* Local circular ECOnomy by an innovative approach for recycling paper industry PULper waste into new PLASTic pallets
Coordinating Beneficiary*:* SELENE
Associated Beneficiaries*:* LUCENSE, SERVECO, Zero Waste Europe
Official web site*:* www.life-ecopulplast.eu
Official promotional video*:* *https://vimeo.com/243878468*, *https://vimeo.com/280546924*
Start-End date*:* 01-SEP-2015 / 31-AUG -2018
Total Budget*:* € 1,244,978
Funding LIFE Programme*:* €746,986
Location*:* Lucca (Regione Toscana - Italia)

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LIFE ECO-PULPLAST PROJECT SCOPE

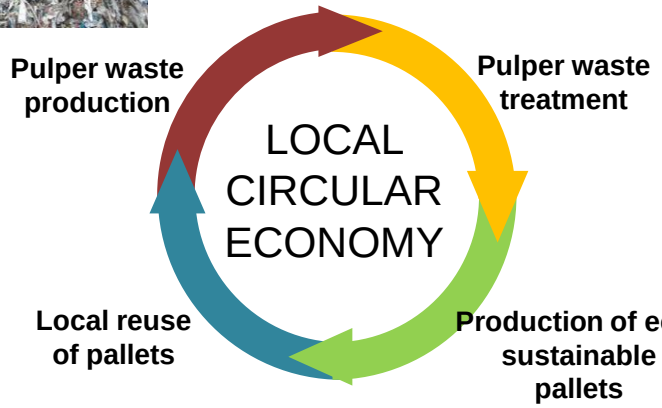
LIFE ECO-PULPLAST is a project about **circular economy and industrial symbiosis** that aims at demonstrating the possibility to recover and recycle cellulose and heterogeneous plastics from “pulper waste”, the industrial waste of paper mills that use paper for recycling.

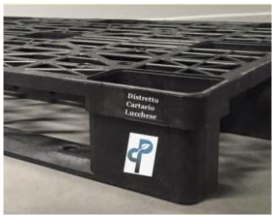
LIFE ECO-PULPLAST is a virtuous model as well as a concrete and innovative example of what can be implemented at local level thanks to the collaboration between different actors of the territory.

The overall objectives of the ECO-PULPLAST project are:

- reduce the amount of pulper waste sent to incinerators and landfills;
- produce new materials and products, such as plastic pallets, starting from pulper waste, mixed with other recycled plastics;
- local reuse of new materials and products, both as pallets for the paper industry and as pellets for the plastics industry.

FROM WASTE…





…TO RESOURCES

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CONTEXT and ENVIRONMENTAL PROBLEM TARGETED

Paper is the most recycled product in Europe, and Europe is the global champion in **paper recycling** with a rate of **74%**. The paper industry has been a driving force in achieving that rate: today 54% of the paper industry's raw material comes from paper for recycling, mostly for the production of paper for industrial use.

Paper for recycling

The use of paper for recycling reduces the paper industry environmental footprint, as it limits the use of virgin cellulose and at the same time reduces the amount of material destined for disposal. Though the paper recycling process is highly optimised, paper for recycling contains a share of materials that cannot be reused and is discarded. This scrap, some 6-7% in weight, constitute the **pulper waste**, which is mostly composed of mixed plastics.

Since a long time pulper waste, which is classified as non-hazardous waste, has been sent to landfills and to incinerators, with significant and no more sustainable environmental and economic impacts.

*The Industrial **Paper District of Lucca** (the largest European paper industrial cluster) is located in Tuscany, with 120 large enterprises and SMEs, more than 8,000 employees, an annual turnover of 4,5 billion euros and develops respectively 75% and 40% of the total Italian production of tissue paper and packaging paper.*

*The Lucca Paper District makes large use of paper for recycling for the production of packaging paper and, specialty paper, and generates alone **125,000 ton/year of pulper waste**.*

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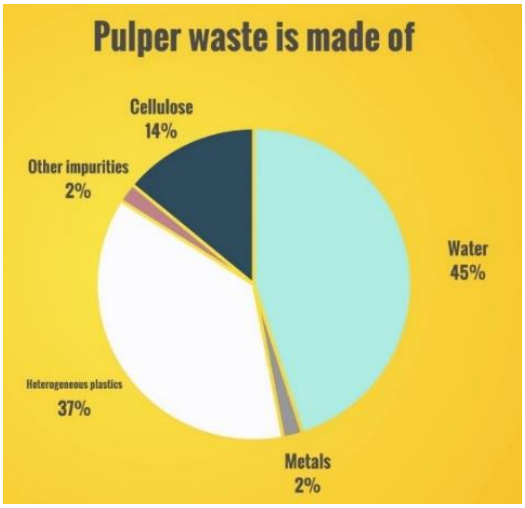
SPECIFIC OBJECTIVES

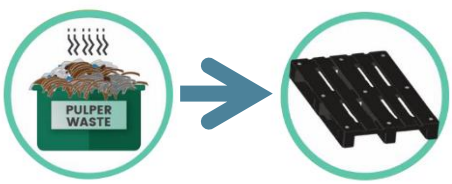
LIFE ECO-PULPLAST project activities aim at meeting the following specific objectives:

- **Reduce pulper waste volume** by recovering cellulose and water in the paper production process
- Separate and recycle mixed plastics with residual impurities to manufacture **plastic compounds and products**
- Demonstrate the technical and economic feasibility of an **innovative technology** to recover and recycle mixed plastics from pulper waste for the production of **plastic pallets**
- Local reuse of the new plastic pallets in the industrial Paper District of Lucca, to create and test a **local circular economy model**
- **Dissemination** of the project approach and outcomes to involve all the main relevant paper mills at local and European level as well as stakeholders at regional, national and European level.

The achievements of the above results and the successful completion of the project will allow to create the suitable conditions for an industrial production of new plastic pallets by recycling pulper waste, with a concurrent **reduction of the amount of pulper waste sent to landfills and incinerators and of the related environmental impacts and CO2 emissions.**



Potential recycling of 30.000 t/year of mixed plastic derived from pulper waste to produce plastic pallets



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TECHNOLOGY and METHODOLOGY IMPLEMENTED

The aim of the project is to develop technologies and competences to foster circular economy and plastics recycling.

The project includes the design, realization and testing of a **prototype moulding line** at industrial scale to recycle pulper waste for the manufacturing of new plastic compounds and plastic pallets.

An intense demonstration activity was conducted on the prototype installed at Selene premises, focusing on:

- development of new compounds based on pulper waste mixed with specific additives and other plastics from recycling, in order to confer the required physical/mechanical characteristics to the final pallets;
- tuning of process parameters; optimisation and improvement of prototype injection moulding machine;
- production and characterisation of plastic pallets, also in compliance to technical regulation UNI EN ISO 8611.

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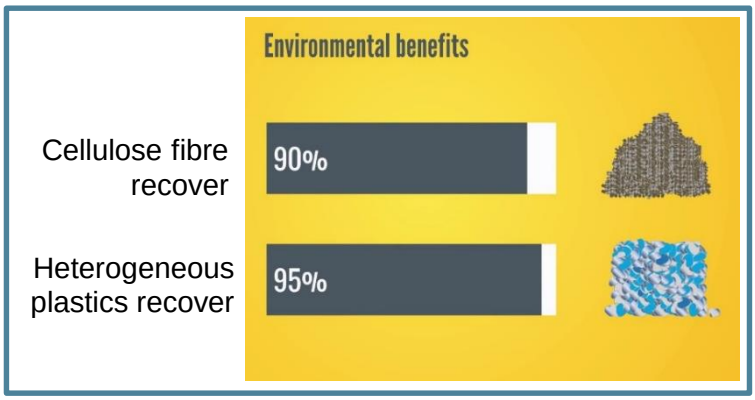
RESULTS and ENVIRONMENTAL BENEFITS

The experimental activities and industrial tests conducted have allowed to obtain the following results:

- Reduction of waste volume by separating and recovering mixed plastics, cellulose fibres and water composing pulper waste
- Validation of the prototype moulding line able to process mixed plastics and produce plastic pallets
- Production capacity to make small pallets series, typically required to run Customer tests
- Validation of the so called “Eco pallet”, a euro-pallet for light industrial usage (up to 800 kg load), i.e. tissue products of local paper converting companies.
- Development of a Business Plan for the industrial development of the project, which includes 3 complete processing lines with a production capacity of about 1,200,000 pallets/year, corresponding to 60-70,000 t/year of pulper waste.



ENVIRONMENTAL IMPACTS

The impacts of LIFE ECO-PULPLAST activities were defined on the basis of continue monitoring and data/information collection carried out before, during and after the demonstration phase.

The assessment at project level based on the experimental data show significant results in terms of mixed plastics recycling capacity, process efficiency and pallet properties, in terms of impacts reduction on the environment, waste and energy savings, verified already during the development of the project (ex-post situation).

Even more interesting is the high potential of the LIFE ECO-PULPLAST solutions in the medium-long term (2023), reported in the following table.

Environmental impact – projection at 2023	
Pulper waste volume	Volume reduction of 30-40% at paper mills thanks to fibre separation and recovery in the production process
Mixed plastics recycling	Recycling of 30.000 t/y of mixed plastic from industrial waste to produce new pallets
Waste reduction	Reduction from the current value of 120.000 to 50.000 t/y of pulper waste conferred to landfills and incinerators
Moulding technology	Lower operating temperatures and injection pressure than conventional technologies
NOx pollutants	Reduction of transport related NO2 emissions from 38 to 15 kg/day
Pallet environmental sustainability	Lower carbon footprint of plastic pallets from pulper waste as compared to conventional wooden pallets
Pallets recycling	Possibility to recycle the pallets at the end of their life cycle

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ADVANTAGES OF PLASTIC PALLETS

MARKET STRATEGY

The experiences and tests made during the first phase of the project, helped identifying early adoption customer targets for plastic pallets in the following categories:

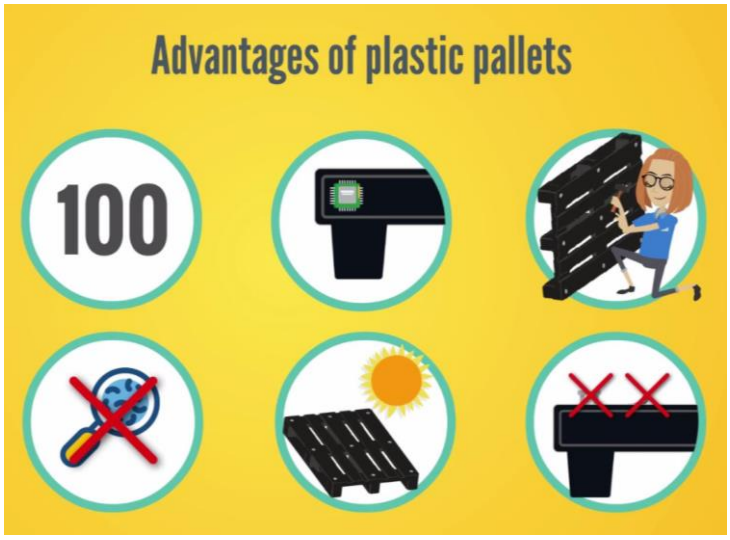
- Chemical/Plastics Producers
- Large Companies active in the “Corporate Social Responsibility”.
- Logistics closed circuits
- Smaller companies careful about tax savings, soon available for those who use recycle materials for packaging

To pursue new business opportunities, it was decided to create a strong brand identity to promote Ecopulplast potential business.

Synergy between one of Selene top products, the Stretch hood, and the new plastic pallets to create an integrated packaging system.

BENEFITS OF PLASTIC PALLETS

- Better properties and longer life-cycle
- Recyclable at end of its life cycle
- Trackable with RFID sensors
- Customisations available upon request: 3D logo, Colour, etc.
- Washable, no fumigation and aseptic
- Resistance to water, chemical, flames
- Stable size and weight
- No nails and splinters



SUSTAINABILITY AND INDUSTRIAL DEVELOPMENT

Several actions have already been put in place to guarantee continuation of project activity and sustainability of its results:

- Local paper mills are investing in facilities to separate mixed plastics from the other materials composing pulper waste.
- Selene will invest in an industrial production line able to process at least 20.000 to 30.000 tons of pulper waste.
- Create a strong brand identity to promote Ecopulplast potential business

ECO-PULPLAST is exploring in three different directions:

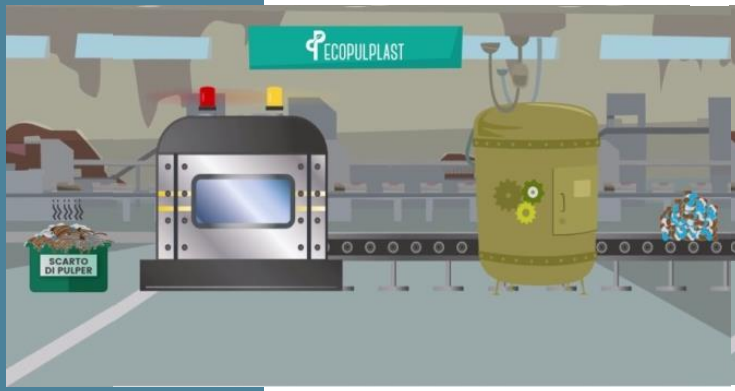
- Proposing pallets, to many different businesses
- Scouting the needs for ancillary products to the pallet that can also be produced in plastics (spacers, cradles, custom-shaped objects)
- Proposing the pellets on the plastics market, in order to explore the opportunity to use it for new applications

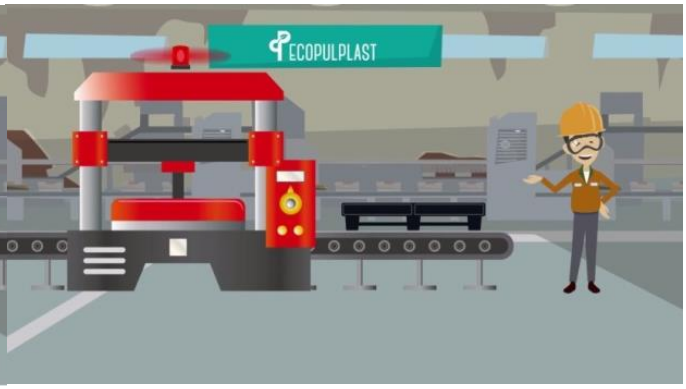
REPLICABILITY

The project technologies and approach could be easily replicated to other European production sites of local paper mills.

TRANSFERABILITY

ECO-PULPLAST business model can apply to other plastic waste streams and/or for the manufacturing of different end-products.





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PARTNERS and MAP of the project

SELENE is a commercial company founded in 1959, leader in the production of flexible packaging for industrial consumption.

LUCENSE is a Research Organization conducting industrial research, experimental development and fostering technology transfer to enterprises

SERVECO is a Consortium of paper mills located in Lucca county dealing with the environmental issues concerning the paper sector

Zero Waste Europe is the European network of communities that adhere to the Zero Waste principle

The success of the project is a joint effort!

Circular Economy requires complementary competences. Project partners closely collaborated to address a large number of issues

- technical and technological
- policy and regulations
- social consensus
- industrial investments
- environmental assessments, etc.

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