

LIFE12 ENV/IT/000374

PROJECT OBJECTIVES:

The increasing demand for recycled wood to produce particleboard and MDF panels has resulted in the need to improve the cleaning process of post-consumer wood (e.g. pallets/wood packaging material, demolition waste, used furniture), eliminating in a more effective and efficient way plastic impurities. Now MDF panels are mainly obtained from virgin wood and only a small number of producers use post-consumer recycled wood (up to 10%, based on PAL internal studies on the market), because:

- the process requires multiple steps of cleaning that are not enough to completely remove impurities
- MDF panels are of low quality and not compliant with EN 622-5 and EPF Standard for delivery conditions of recycled wood.
- there are not systems in the market capable of achieving a good removal of impurities (see the State of Art paragraph).

LIFE+ PLASTIC KILLER main objective is to set up and demonstrate the viability of an energy efficient pilot plant able to finely separate post-consumer recycled wood from plastics impurities, in order to use it primarily for MDF panels production and secondarily as "purified" biomass.

This project will contribute to:

- pave the way for a new generation of more sustainable and affordable MDF panels produced by up to 60% of post-consumer recycled wood, compliant with EN 622-5 and EPF Standards;
- produce "purified" post-consumer wood that can be also introduced in the EU market as biomass for energy production, reducing the dioxin produced during the combustion;
- limit the use of virgin wood, supporting the non deforestation through the prolonged lifecycle of the recycled wood;
- foster the post-consumer wood recycle approach in the EU, open up new business and jobs opportunities; this also will contribute in the middle perspective to decongesting dumps.
- demonstrate the socio-economic and environmental sustainability, the potentialities of market replication and penetration of the proposed pilot plant.



plastickiller.eu



This project is funded by
the European Community

Total Cost: € 1.874.423
(contribution LIFE+: 49,78%)



Partner



CEPRA



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DI PADOVA

EXPECTED RESULTS

(OUTPUTS AND QUANTIFIED ACHIEVEMENTS):

- According to more achievable targets within the new time span, the following estimations are provided: input power of about 58kW maximum, a flow up to 30m³/h of waste (post-consumer wood).
- If we assume that the pilot will treat 78t/day of waste (post-consumer wood) and that from PAL's experience it's possible to estimate that there are about 0.78t/day of plastic impurities in this waste, 0.741t/day of plastic impurities can be eliminated and further recycled.
- Considering in a conservative way that 130t/day of virgin wood are needed to produce about 130t of MDF panels, the pilot plant will replace 78 t/day of virgin wood with the purified post-consumer wood, corresponding to avoid the cut of 40 trees per day from local forests. In addition, assuming that i) 0.9t of CO₂ are trapped in 1m³ of tree, ii) 9,600trees/year are not mobilised and transported by truck, iii) an average CO₂-emission factor for road transport operations of 62g CO₂/tonne-km [McKinnon 2011] and iv) an average distance from forest to sawmill of 300km [Le Net. 2011], additional CO₂ savings are possible.
The whole CO₂ trapping and saving amount is about 88teCO₂/day.
- Under the assumption of the Life+ project time span and treating 78 t/day of waste (post consumer wood) in such demonstrating context, the challenging but realistic targets can be reformulated as follow: the estimated annual savings of water by PLASTIC KILLER are about 9,288m³, corresponding to the annual water consumption of about 46European families.
- Considering the Life+ time span in a pilot configuration and that the PLASTIC KILLER pilot is going to substitute in weight = 78t/day of virgin wood with the purified post-consumer wood in MDF panels production, there will be enormous economic savings that justify the proposers investment in the project. In fact, assuming the following as average costs (70€t virgin wood or pre-consumer wood; 40€t post consumer wood), the economic savings are about 2,340€day (503,100€year)
- In a pilot configuration, it is expected that using 78t/day of post-consumer wood, the pilot plant will eliminate about 741kg/day of plastics impurities out of 780kg/day, which will avoid the dioxin emission of about 563ng TEQ/day (considering a density of 150kg/m³ and the estimation from Schatowitz, see section B2).

PLASTIC KILLER PROGRESS

The technical phase of the project is now at its end. All the components indicated in the pilot plant have been constructed, and the whole system went through a cycle of tests in order to verify its functioning. The tests demonstrated that the pilot plant is able to remove up to 95% of plastic impurities from the recycled wood, as expected by the project objectives.

The “purified” wood, output of the pilot plant, has been used as input in the process of MDF panels production: during the last months, PAL, in collaboration with another company potentially interested in the technology of the prototype, produced many tons of MDF panels, combining the purified wood with some virgin wood. The surface quality of the panels was excellent and their properties have been always compliant with the EN 622-5 standard. In the next few months, the pilot plant will work at its full capacity, and a higher quantity of MDF panels will be produced.

PAL, with the help of some LCA experts, completed the environmental impact analysis of the Plastic Killer scenario, comparing it with the traditional scenario. The aspect that most affects the analysis is the reduced environmental impact of the Plastic Killer scenario, because most of the impacts due by forestry processes can be avoided, thanks to the fact that the supply chain allows the use of 60% post-consumer wood and the consequent reduction of virgin wood. All these results have been disseminated during some national and international fairs, and they will be spread during the next exhibitions attended by PAL and its partners.



PROJECT FLOW

