



PhotoLife Project

LIFE13 ENV/IT/001033 cofinanced by EU LIFE+ program

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1. Prototype construction

The prototype designed and built in the Photolife Project consist of a physical pretreatment section (currently in progress) and a section dedicated to the treatment of the crushed photovoltaic panels (PVP) with suitable chemical reagents.

The physical treatment section consists of a specific shredding and screening system optimized for the photovoltaic panels' treatment. The PVP main component is a high added value glass. The sieving allows the separation of fractions that are then sent to the chemical reagent treatment for the separation of the polymeric fraction from the glass, and to the leaching treatment for the recovery of the metals present in the panels' cells.

The chemical reagent treatment section has been designed, started and tested to handle different types of panels, such as those based on CdTe, Si-based and innovative ones. This unit was installed inside a container to make the most of its mobility and to create a versatile and compact structure. The core of this prototype section is the reactor where the detachment of the EVA from the glass occurs and where the separation of glass from the polymer takes place. The process allows the reuse of the specific reagents after passing through appropriate filters; this minimizes the consumption and the environmental impact associated with this operation. This section is equipped with a devices that control gaseous emissions and a storage area for reagents. In the same container comprehends a control room where the electric and pneumatic panels are installed, the reactor heating boiler and the connections to the utilities (water, air, nitrogen).



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Boiler



Storage tanks



Filter



Reactor

2. Experimental Campaign

The chemical treatment section was started and the first experimental tests were carried out. The obtained glass was analysed to verify its quality after treatment: its transparency and granulometric distribution have been considered suitable for a possible reuse in glassware.



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The current experimental campaign is aimed at optimizing operating conditions (T, time of treatment, number of cycles) to increase the overall process efficiency.



3. Dissemination & Networking

The dissemination of the project was made through various media such as: press release in specialist magazines as “Hi-Tech Ambiente” and “HA PARTS & COMPONENTS” (in press), the publication of scientific articles (Pagnanelli et al., 2017 *Physical and chemical treatment of end of life panels: an integrated automatic approach viable for different photovoltaic technologies*, Waste Management; Pagnanelli et al., 2016 *Photovoltaic panel recycling: from type selective processes to flexible apparatus for simultaneous treatment of different types*, Mineral Processing and Extractive Metallurgy Transactions of the Institutions of Mining and Metallurgy), presentation of the project in fairs and in national and international conferences (Ecomondo 2014, Rimini, Italy; Sustainable Industrial Processing Summit & Exhibition 29 June-3 July 2014 Cancun, Mexico; Sustainable Industrial Processing Summit & Exhibition, 4-9 October 2015 Antalya, Turkey) and workshops (Life-MED Conference, Brescia, Italy 21 January 2016; WEEEnModels Workshop, Genova, Italy 3 November 2016) and the collaboration with other LIFE project on RAEE sector (WeeenModels, Life MED, FRELP).

Stakeholders have already been hosted in the plant site (the Brazilian company Apliquim Brasil Recicle and the GA Energy spa from Frosinone, Italy) and a conference at the end of the project combined with an open day on the pilot plant site in Civita Castellana, Viterbo, Italy is foreseen (to participate contact the staff on the project site at the following link: <http://www.photolifeproject.eu/contact/>).