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PHOTOVOLTAIC PANELS RECYCLING TO CREATE SILICON VALUE CHAIN: PARSIVAL PROJECT

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Abstract

Apulia in Italy and Extremadura in Spain are regions characterized by an intensive installation of photovoltaic (PV), which are expected to generate a large amount of PV waste in the next 15 years (~300k tons in Apulia and ~380k tons in Extremadura) but there are no dedicated PV recycling plants in these areas. PARSIVAL aims to solve this problem by proposing PV refurbishment and End-of-Life (EOL) PV recycling technologies.
The PARSIVAL technology for recycling, one of the most advanced in Europe, is able to recover all the valuable materials contained in PV panels (aluminium, glass, copper ribbons, silver, silicon PV cells), but further research is needed to refine the recovered materials in order to commercialize them and, in particular, to find a final market for the recovered PV cells. The latter contain mainly silicon that is a Critical Raw Material, but the presence of paste of aluminium and silicon nitride hinders its reuse.
Therefore, the project is also investigating the most profitable ways to valorise silicon, which can be recovered from PV waste, in three different applications (Li-ion batteries, ferroalloy, and aluminium industry). In addition, PARSIVAL is evaluating the feasibility of a refurbishing and recycling plant in Apulia and the replicability of the results in Extremadura contributing to the creation of refurbishment and recycling networks and professionals, through Higher Education Institutions (HEIs) in these areas.
The project results were promising: both refurbishment and recycling processes have been validated and the recovered silicon was successfully tested in the addressed applications.

Key words: photovoltaic, recycling, refurbishment, silicon

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