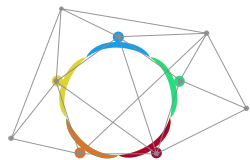


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D6.4 3D Printing of recycled plastic demonstrator:

The Green FabLab use case at the Université de Lorraine



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1 Executive Summary

This report describes the open manufacturing demonstration facility of “*3D printing of recycled plastic demonstrator*” developed in the INEDIT project. The main goal is to validate the logistical and technical feasibility of recycled assets to be used in the Do-It-Together (DIT) approach. Therefore, a complete technical description is presented to transform certain plastic wastes into functional objects using 3D printing and desktop plastic injections through multiple experimentations. The activities were oriented to produce objects for the purpose of 1) manufacturing prototypes for validation prior to production stage, 2) personalization of furniture and 3) spare parts for reparability to enlarge the life of discarded furniture.

These technical and logistical elements were implemented in a recycling pilot platform known locally as the ‘*Green FabLab*’ at the city of Nancy, France. The technical development was based on an open design approach in order to be replicable to other countries. The integration was validated according to Key Performance Indicators.

There are two major outcomes of the work done within task 6.4 and documented in this report:

1. Describe the methodological concept of the distributed recycling via additive manufacturing (DRAM) system oriented to the revaluation of plastic.
2. Demonstrate in a relevant environment to prove the integration of a distributed and local plastic recycling with the INEDIT process.

The development of open-source technologies that enable the main stages for plastic recycling constitute a first chain validation. Moreover, the implementation and development of Use Case 3 proved to validate the technology maturity level from TRL4 to TRL6 and market readiness level from MRL 1 to 3/4 for technologies used such as the smart collector and fused granular fabrication. In addition, the creation of a local and distributed plastic recycling chain at a territorial level constitutes an important output for the impact of the project given the high level objectives of INEDIT.

1.1 Outline

The report is structured into three main parts. The section Section 3 provides a baseline introduction regarding the plastic recycling issues in European Union. Then, section Section 4 gives an overview of the context where the 3D printing of recycled plastic demonstrator have been developed, characterizing its main methodological and technical features. After, the section Section 6 presents in detail the operationalization of the demonstrator in the DIT approach. This is illustrated the step-by-step technical elements to consider each element and the illustrative experimentations made to validate each of the DIT process. The rapport finish with a conclusion section.