Improvement of C&D waste management from the perspective of circular economy

POLITECNICO MILANO 1863
DIPARTIMENTO DI INGEGNERIA CIVILE E AMBIENTALE
AWARE Assessment on WAste and REsources

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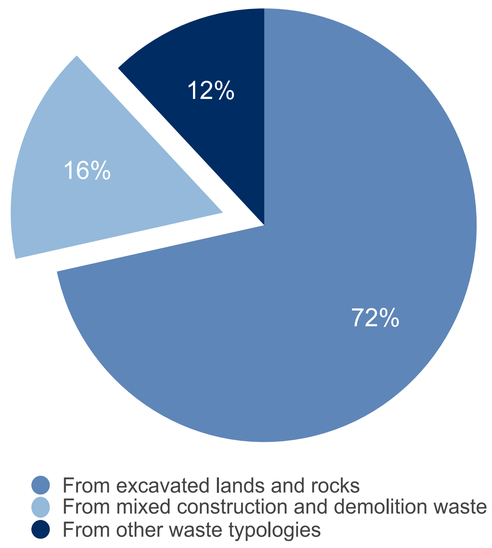
Construction and Demolition Waste

According to recent studies, in Italy most of the mineral waste from construction and demolition (C&D) activities is already sent for recovery, but the closure of the circle, necessary for the realization of the circular economy, is not yet reached. Despite of the good performance in terms of recycling rate there are still obstacles that prevent the widespread use of the secondary resources produced in the recycling activities.
The waste from the construction and demolition sector was around 57 million tonnes according to the latest ISPRA report (2019).

Origin of C&D Waste (ISPRA)

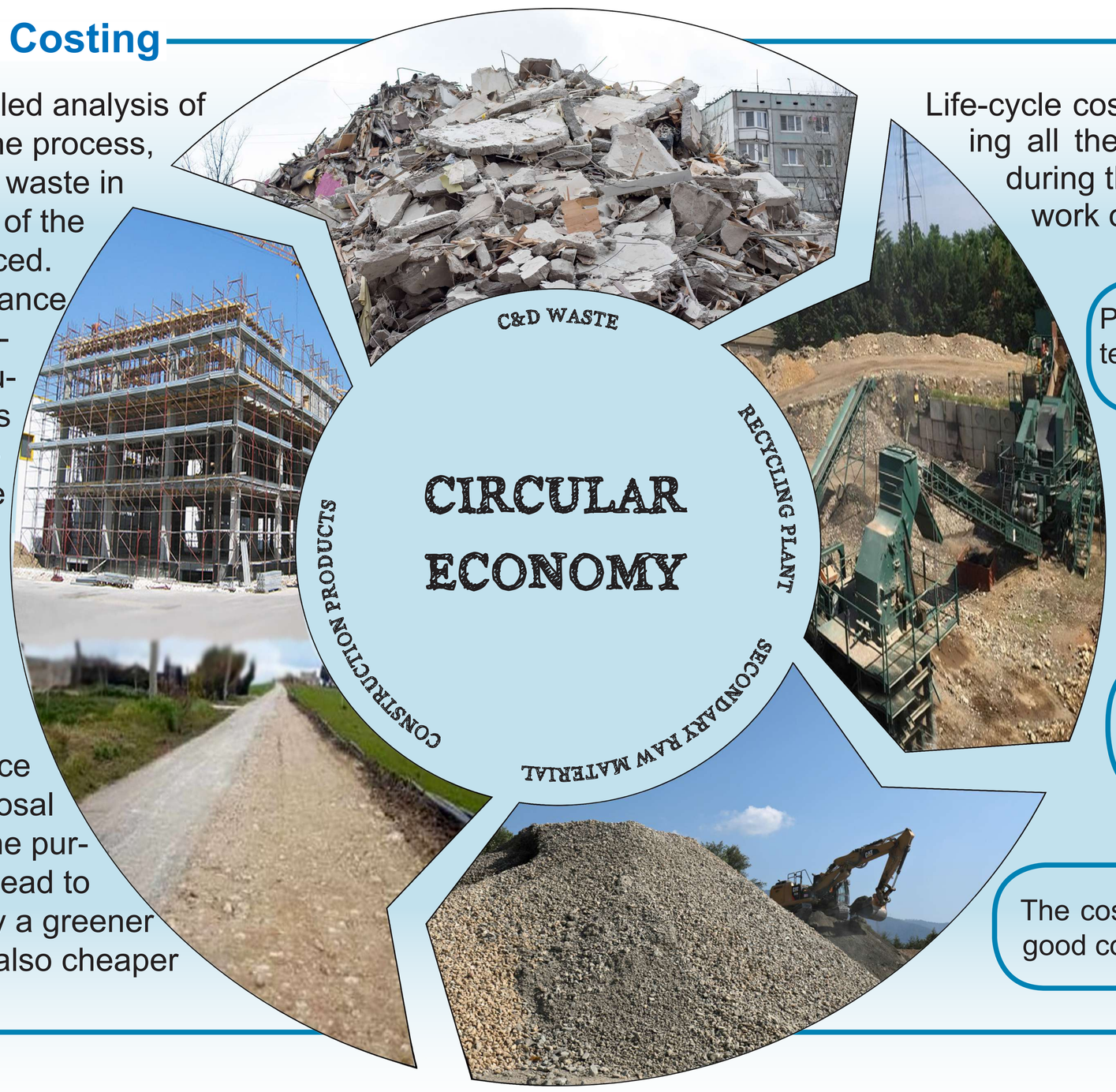


As part of the collaboration agreement between Regione Lombardia and ENEA, a research project will be developed during 3 years of PhD.

ENEA
Regione Lombardia

STEP 1 - Life Cycle Costing

The first step will be a detailed analysis of all the different phases of the process, from the generation of inert waste in demolition yards to the use of the recycled aggregates produced.
The environmental performance and costs of the entire management chain will be evaluated with the methodologies based on the life cycle concept. By applying Life Cycle Costing method and comparing the final result with natural inerts will be declared the best choice from an economic point of view.
Public purchasers take into account the costs of resource use, maintenance and disposal which are not reflected in the purchase price. Often this will lead to 'win-win' situations whereby a greener product, work or service is also cheaper overall.



Life-cycle costing (LCC) means considering all the costs that will be incurred during the lifetime of the product, work or service:

Acquisition Cost
Purchase price and all associated costs (delivery, installation, insurance, etc.)

Operation Cost
Operating costs, including energy, fuel and water use.

Disposal Cost
End-of-life costs or residual value (i.e. revenue from sale of product)

Maintenance Cost
The costs incurred to keep an item in good condition or good working order.

STEP 2 - Test field

At the same time, experiments will be carried out on the possible use of recycled aggregates. There are two possible paths that can be followed.

Case 1 - Realize a Pilot plant

A small pilot plant for the treatment of C&D waste will be built inside the ENEA laboratories with a "test field" through which the field performances of the recycled aggregates will be tested for the different uses identified.

Case 2 - Use an existing plant

Work on an existing recycling plant in order to carry out a more larger-scale experiment and test directly the field performances of the recycled aggregates realizing also a piece of road surface or a concrete constructive element.

Final GOAL

The final purpose of this project is to design a regional system for the building and construction sector aimed at maximizing its circularity and resource efficiency based on environmental and economic considerations. The ultimate goal is the preparation of guidelines for demolition and recycling plants so that from the demolition activity passing through the recycling plants we can arrive at the actual reintegration in the market of the resources used in the construction of the building then demolished, in a circular economy perspective.

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