

# Innovative Technologies to Support the Development of a Circular Economy Model for the Tuscany Region

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## Abstract



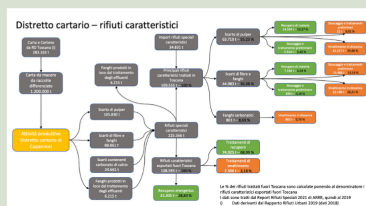
- 11 Roundtables with the regional administration, regional agencies and category associations;
- Elaboration of Circular Economy Regional Strategy;
- Bio-economy as a powerful tool for industrial process efficiency.

## Results



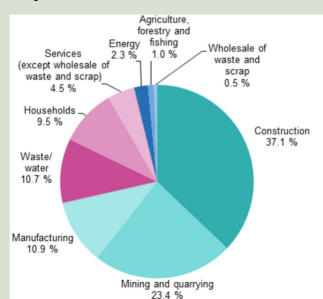
## Goal and Scope

- Scientific support for technology assessment,
- Define the best technologies for a circular economy model,
- Elaborate mass balances and circularity indexes.



## Context

- Importance of CE on policy-making [1-3];
- 2,151 million tonnes in the EU, and 176 million in Italy [4].
- Impact of waste on environmental threats [5].



## In progress



- Definition of technology pattern in Circular Economy through text mining;
- LCA of an innovative Waste to Methanol technology;
- Review of reduction and waste recycling technology for paper sector.

## Main issues

- High landfill disposal rate;
- High production of secondary waste, destined to landfill.

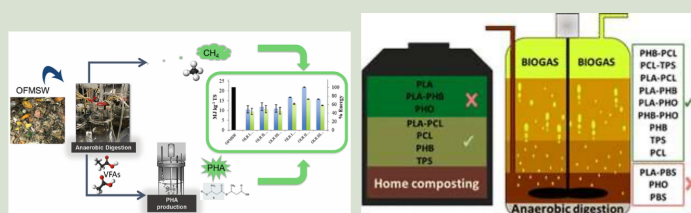
Stream	Amount [ton]	Percentage
Waste treated in Tuscany	12,887,663	100,0%
Recycling	7,546,090	58,6%
Incineration	210,563	1,6%
Prel. treatment for disposal	2,102,197	16,3%
Storage	1,544,463	12,0%
Landfill disposal	1,484,311	11,5%

Stream	Paper	Sewage Sludge
Waste produced in 2019	225,566 t	104,824 t
Recycling rate	0.41	0.58
Recovery rate	0.47	0.64
Landfill disposal rate	0.31	0.36
Import-Export Balance	-74,793 t	ND

- Systematic issues in waste management for paper district and sewage sludge sector.

## Perspectives

- Lab scale plant for PHA synthesis from OFMSW digestate;
- Analysis of the main parameter influence in the process
- Pilot scale plant for bioplastic degradation assessment through anaerobic digestion processes.



[1] COM(2020) 98 final

[2] Ecological Transition Ministry, 2021. National Strategy for Circular Economy

[3] Tuscany Region Act 20 June 2020 n.34

[4] Eurostat 2020, Total Waste generation.

[5] IPCC, 2022: Climate Change 2022: Impacts, Adaptation and Vulnerability.

[6] Castagnoli, A., Pasciocco, F., Iannelli, R., Meoni, C., Pecorini, I., 2022. Keu Contamination in Tuscany: The Life Cycle Assessment of Remediation Project as a Decision Support Tool for Local Administration. Sustainability 14, 14828.

(\*) Article in writing phase.