



Waste biorefinery technologies for accelerating sustainable energy processes

# Production of residues: Portugal case study

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## Where are we located?

Small introduction

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## VALORIZA research center

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## Waste

Municipal solid waste, biomass and olive pomace

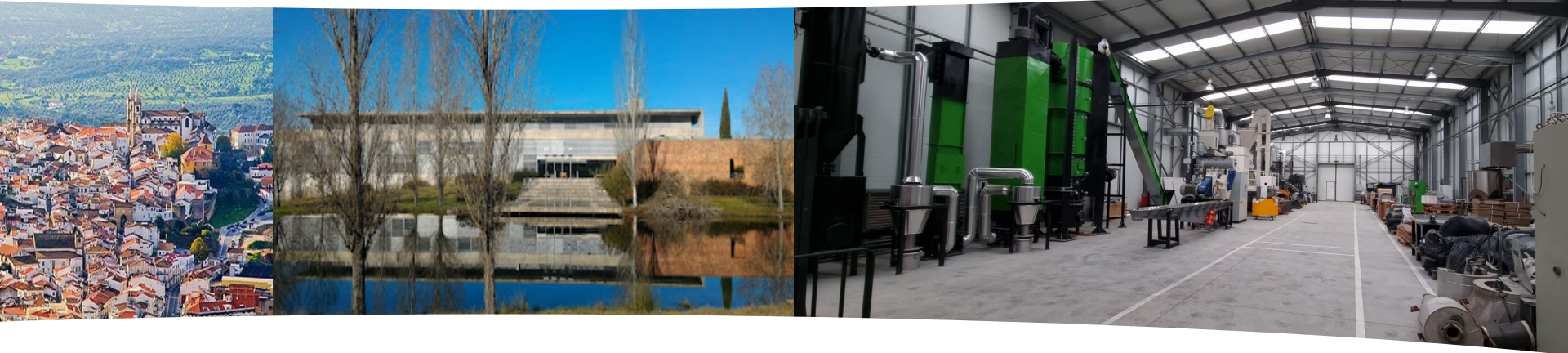
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## Valorization methods of waste

Steps forward







VALORIZA is a research unit with a multidisciplinary profile, whose scope of activities and strategic objectives converge towards the valorization of endogenous resources in low-density, rural, peripheral and cross-border territories .

**SUSTAINABLE  
PRODUCTION  
AND  
ENVIRONMENT**

**ENERGY AND  
RECOVERY  
OF WASTE**



Research Centre for Endogenous  
Resource Valorization



# 2.01 billion tons

Of Municipal Solid Waste per year worldwide



# 5.04 million tons

Total production of Municipal Solid Waste in Portugal in 2021



# Principles of Waste Management in Portugal

W I R E



Selective  
waste  
collection



Selective collection  
of biowaste for  
organic recovery



Undifferentiated  
collection and  
subsequent  
sending for MBT



Undifferentiated  
collection and  
subsequent sending  
for energy recovery



Sent to landfill

# Waste in the European Union

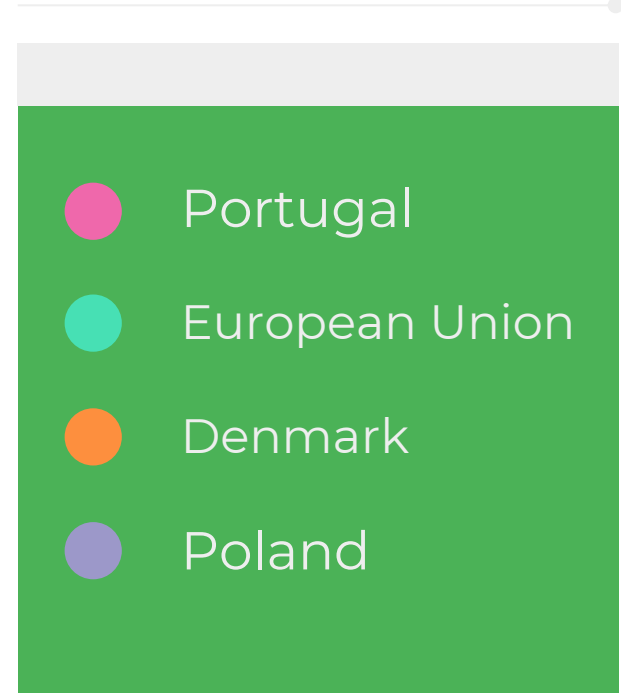
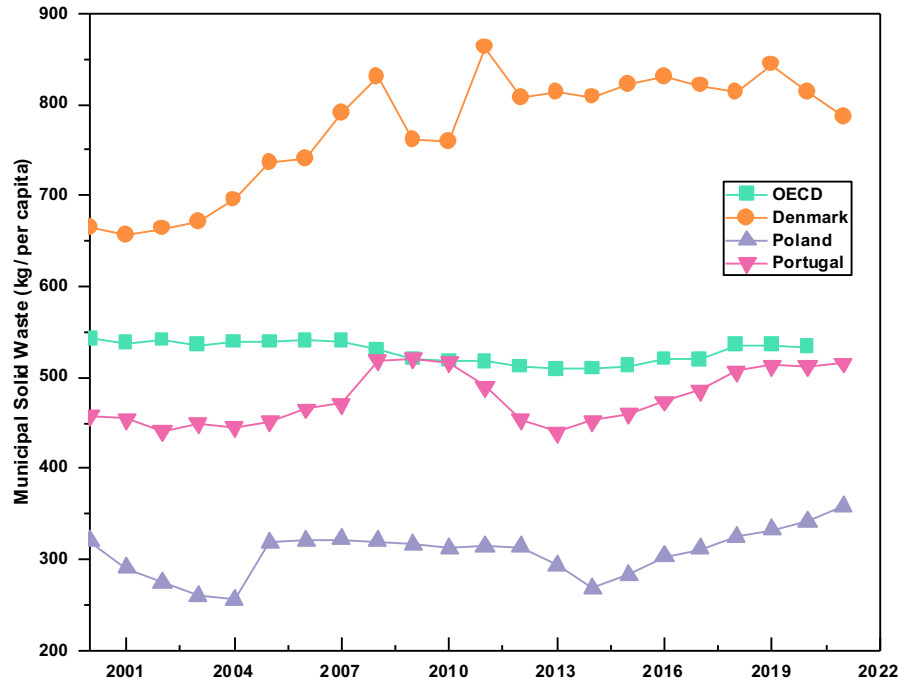


Figure 1- Evolution of the amount of waste (Kg/capita) over the years (from the year 2000 to the year 2021). Data adapted from (OECD, 2023). Note: OECD represents the European Union.

# Evolution of Waste in Portugal

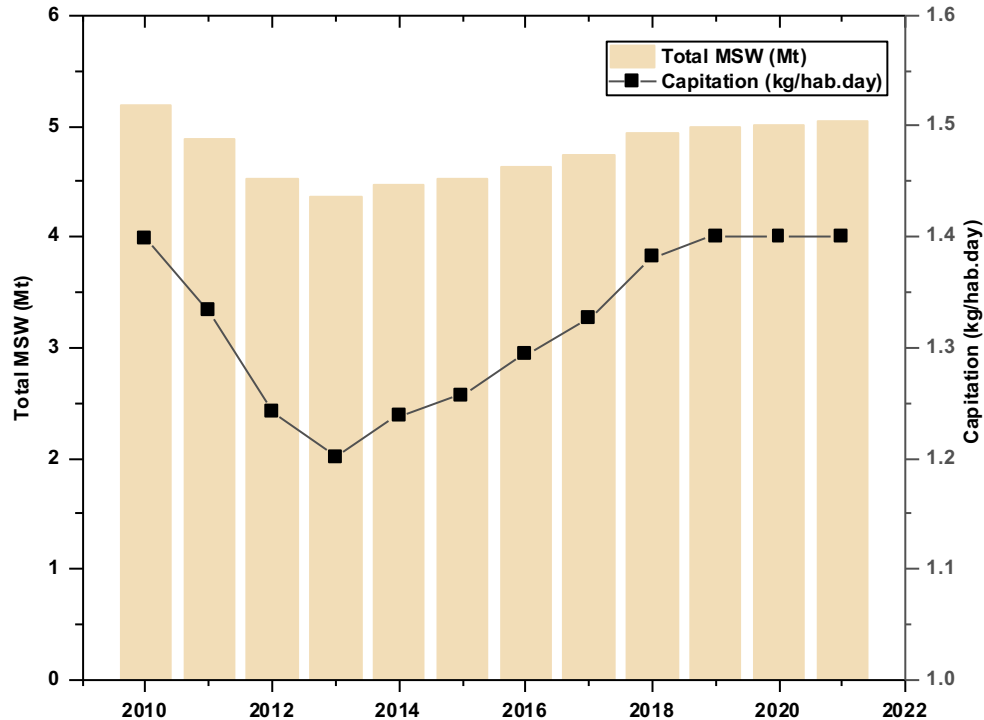
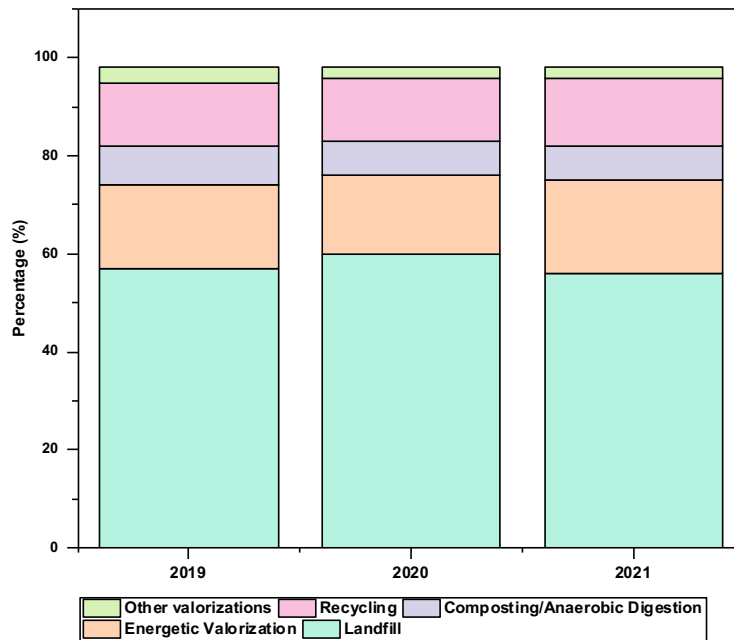


Figure 2- Production and capture of Urban Waste in mainland Portugal from 2010 to 2021. Data adapted from: (APA, 2023) Note: RU- Urban Waste

# Final destination of Waste in Portugal



- Energy Valorization
- Landfill
- Recycling
- Composting or anaerobic digestion
- Other valorization

Figure 3- Graphical representation of the final destinations of Urban Waste in mainland Portugal, from 2019 to 2021. Data adapted from (APA, 2023).

# Sectoral waste in Portugal

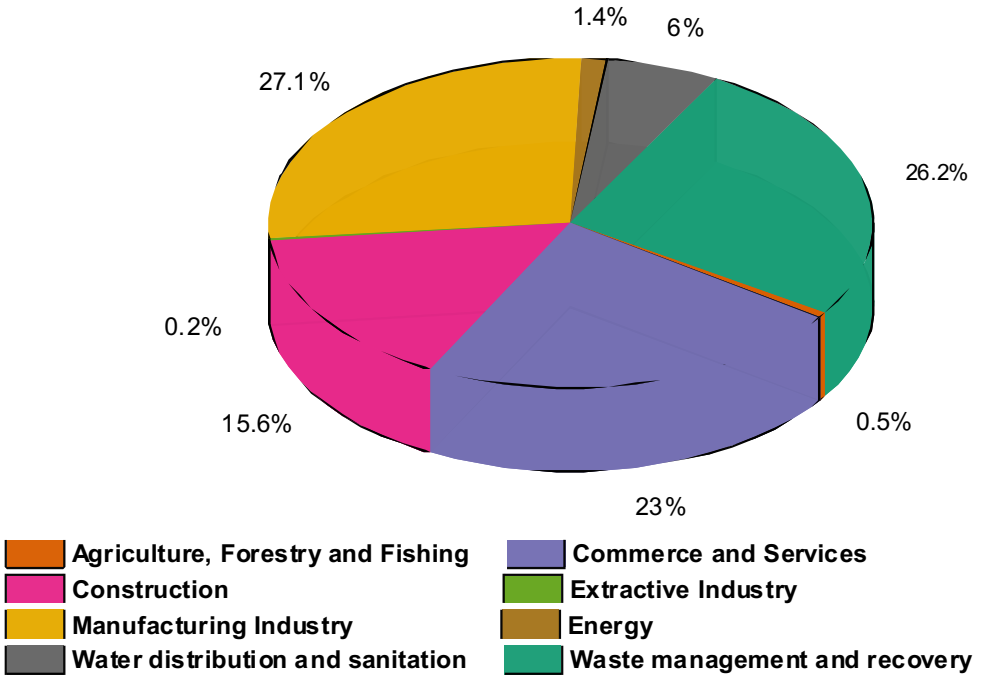


Figure 4 – Distribution (%) of Non-hazardous sectoral waste by economic sectors. Data adapted from: (National Institute of Statistics, 2020)

# 6.5 million tons

Of biomass waste available per year in Portugal



# Biomass classification

## Wood and woody biomass

Stems, branches, foliage, bark, seeds, pellets, briquettes, sawdust, and others from the most varied forest species;

## Herbaceous and agricultural biomass

Existing cultivation crops. These are grasses, flowers, straw, pruning residues and waste;

## Animal biomass

Bones, chicken litter, manure of various origins

## Contaminated biomass and industrial biomass waste

Demolition wood, sewage sludge, hospital waste, chipboard, cardboard, pressed wood, etc.;

## Aquatic plants

Algae, macroalgae, microalgae, aquatic flora

## Gases and Liquids

Recovered from the decomposition of non-fossilized and biodegradable organic matter;



Material produced exclusively from olives during the mechanical extraction of olive oil.

The olive paste with the least amount of oil and seeds is called olive pomace.



Olive pomace

**658 thousand  
tons**

Of olive pomace produced in Portugal between 2019-2020



# Waste recovery processes

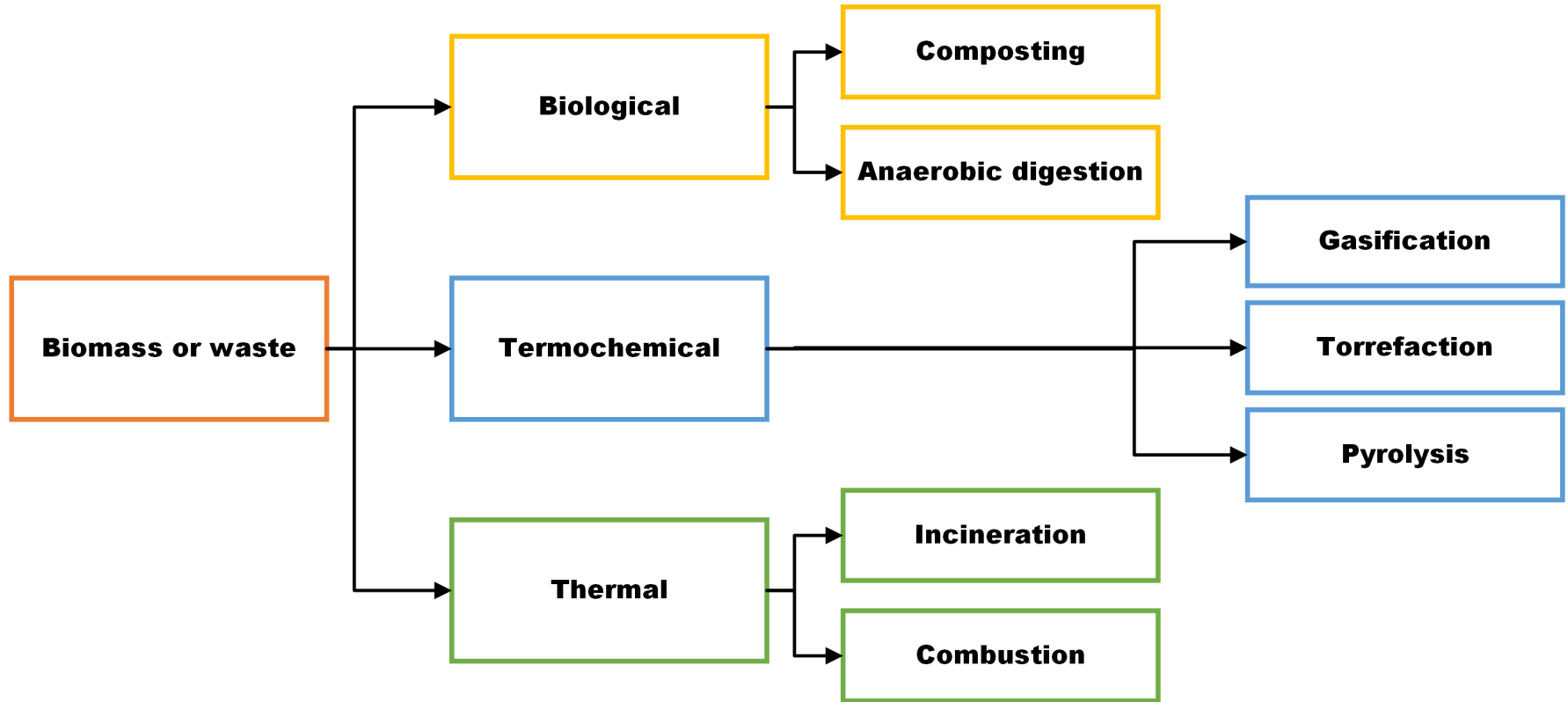
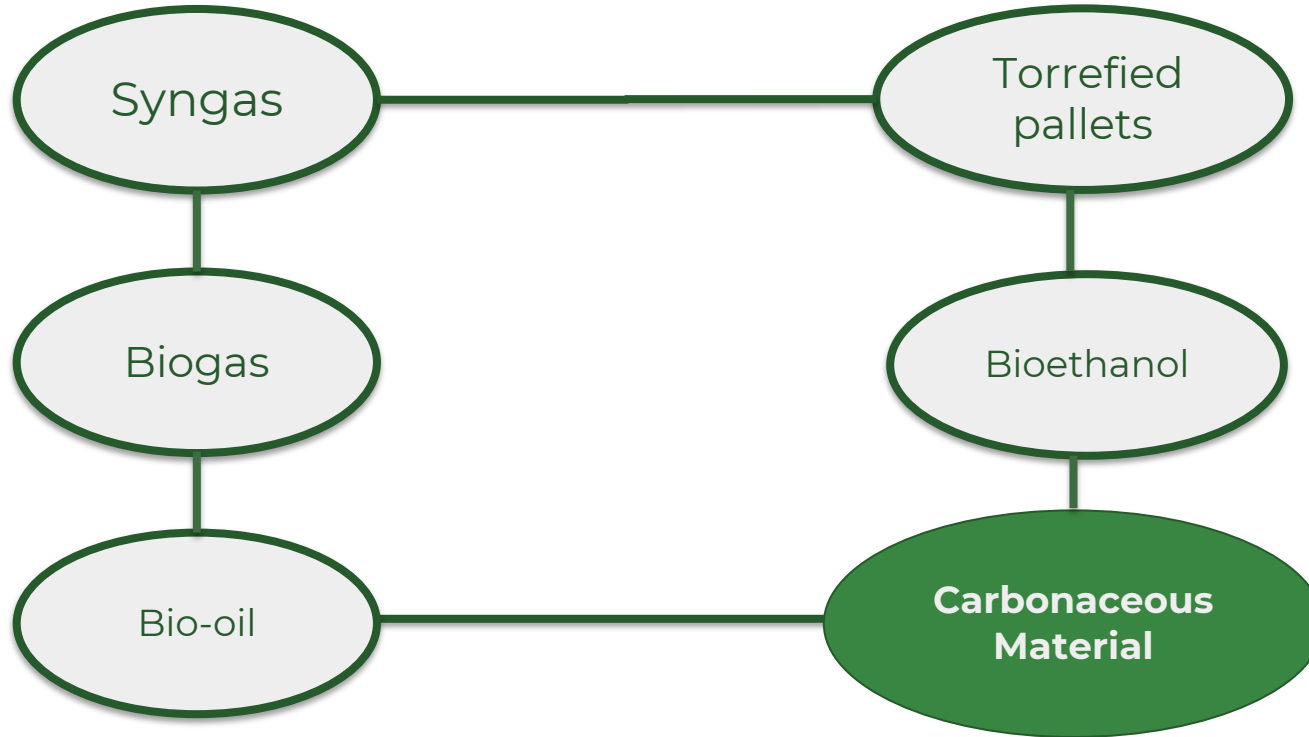


Figure 5 – Main waste recovery processes.

# By-products from waste recovery



# Acknowledgements



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