



# Wood waste management: The best practices

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## Context in EU



- ❖ Wood is a versatile raw material that can be used for various applications:
  - ❖ paper, packaging, furniture, timber industries, building sector, etc.
- ❖ After the original use, wooden products can be reused and recycled, and combusted in a heat and power installation or in a heat boiler
- ❖ Each of these aspects has specific impacts in the field of CO<sub>2</sub> reduction, carbon storage, resource efficiency and resource productivity



## Context in EU



- ❖ Absorbing the potential of wood waste in EU regions and industrial biobased ecosystems is the objective of the BioReg project funded by the European Union
- ❖ Overall, the project aims to identify, develop and fully unlock the unused wood waste potential at European level and allow for the implementation of the full range of wood waste valorisation practices among European regions



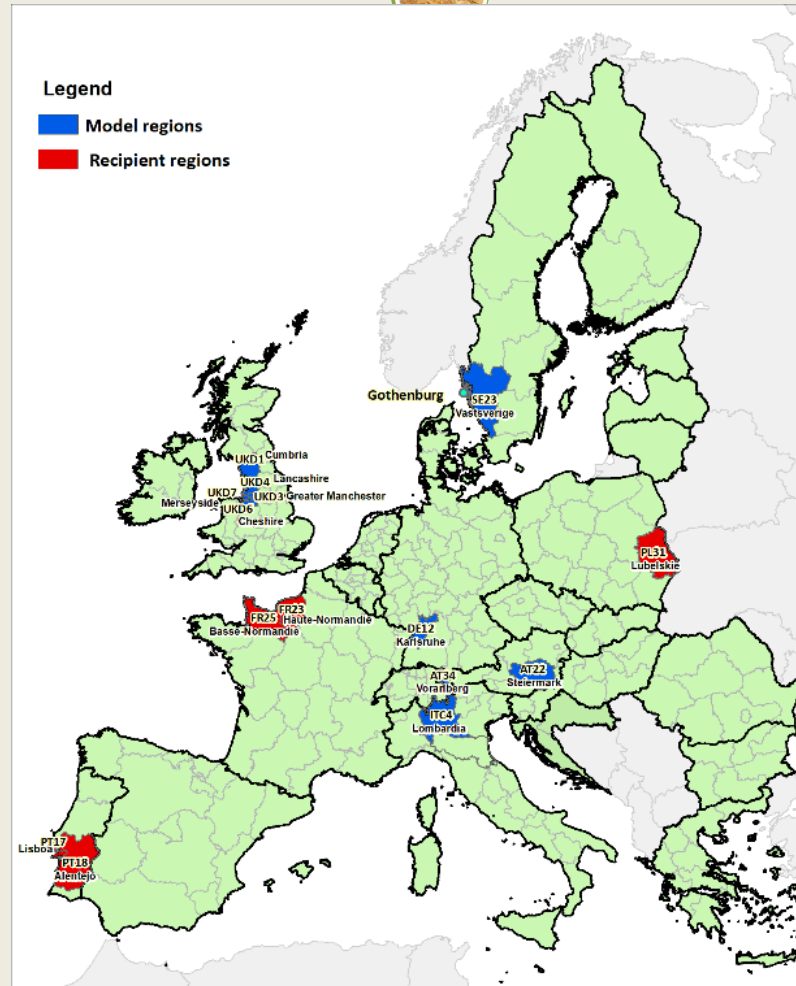
## Context in EU



- ❖ Five model regions were analyzed and three recipient regions will be engaged in replication of good practices.
- ❖ Demonstrator case studies have been selected among European regions which have set up renewable wood waste-based systems at different stages of the waste wood value chain including different wood waste source, pre-sorting, sorting, collection, recycling and wood waste treatment (to materials, biochemicals or biofuels).
- ❖ Recipient regions were selected for this project in regards to their unused waste wood potential



# Model & recipient regions



# Wood waste management in Gothenburg region (Sweden)



## Legislation and policies that promote wood waste valorization

- Landfilling is not allowed

## Existence of classification, conditioning and sorting platforms

- Sorting by waste wood and impregnated wood
- Waste wood, separated between treated and non-treated

## Valorization as energy

- Non-treated, clean wood, energy recovery in biomass Combined heat and power plants (CHP)
- Treated wood, sold for Energy recovery mainly to produce energy for the pulp and paper industry
- Impregnated wood, sent to the Waste-to-Energy plant

## Recycling

- Non-existence

# Wood waste management in Baden-Württemberg region (Germany)



## Legislation and policies that promote wood waste valorization

- Landfilling is not allowed
- Biomass plants to substitute coal and nuclear energy

## Existence of classification, conditioning and sorting platforms

- Sorting facilities

## Valorization as energy

- Waste wood, sent to biomass power plants to provide heat to district network and industrials, and electricity
- Wastewood to produce wood chips to provide energy to industrials

## Recycling

- Recycling by incorporation into particle boards, MDF (35% in Germany)

# Wood waste management in Lombardy (Italy)



## Legislation and policies that promote wood waste valorization

- A minimum share of renewable energy in the production of energy is imposed
- Prohibited the landfilling of combustible waste with a calorific value greater than 13 MJ / kg

## Existence of classification, conditioning and sorting platforms

- Sorting facilities, optimized collection of wood waste

## Valorization as energy

- Mechanical treatment to all the collected wood waste, wood part not exploited to be auto- used for energy

## Recycling

- Recycling by incorporation into panel boards, use 100% recycled wood on the entire range of particle board
- Recycling of wooden packaging, household wood waste to furniture



# Wood waste management in North-West England (UK)



## Legislation and policies that promote wood waste valorization

- Landfilling is not allowed

## Existence of classification, conditioning and sorting platforms

- Sorting facilities

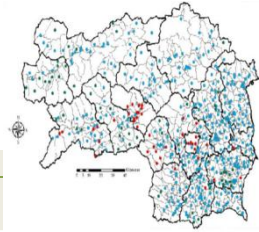
## Valorization as energy

- Projected biomass power plant fuelled primarily by recycled wood (CHP)

## Recycling

- Largest and ancient wood recycling plants
- Recycling through animal bedding, mulches, compost, coverings, paths, rides, arenas, garden products

# Wood waste management in Styria (Austria)



## Legislation and policies that promote wood waste valorization

- Ban of waste with an organic carbon content > 5 % (weight) from landfilling

## Existence of classification, conditioning and sorting platforms

- Sorting facilities

## Valorization as energy

- Waste wood, sent to produce combined heat & power and cooling plants - district heating plants, waste wood incineration plant

## Recycling

- Recycling is being focused and wood burned for energy is being limited
- Recycling and pre-treatment waste wood treatment plant
- Recycling and sent to panel industry (out of the region)

# Lessons and recommendations for recipient regions



## **1 - Structure the offer of wood waste products by setting up a classification**

- It is recommended for beneficiary regions, that wood waste could be classified into four groups:

Classes	Composition criteria	Targeted origins	Main uses and recovery modes
I	Recovered virgin wood waste	Packaging wood; Solid wood processing waste without adjuvants	Material recovery (panels)
II	Recovered wood without organohalogens and with low levels of heavy metals	Waste from furniture components; Construction waste; Second wood processing companies' waste	Material recovery (panels) Combustion installations
III	Recovered wood with organohalogens and heavy metals, but not considered as hazardous waste	Demolition and renovation waste; Mixed wood waste; Second wood processing companies' waste. All wood waste that do not respect the Class II specifications	Energy recovery in incineration and co-incineration installations
IV	Impregnated wood waste classified as hazardous waste	Impregnated wood waste : creosote wood (railway sleepers), autoclaved wood CCA (outside wood like cladding, garden huts, wooden terraces)	Energy recovery in hazardous waste incinerators

# Lessons and recommendations for recipient regions



## **1 - Structure the offer of wood waste products by setting up a classification**

- Introduction of a classification will have a positive impact on wood waste management.
- Indication of the targeted origin that match each group will simplify the process and enhance the amount of wood waste collected.
- Following the circular economy principles, the reuse of wood waste should, preferably, be oriented to material recovery (in panels for instance) when an industrial ecosystem is located nearby. Another positive aspect would be that the reuse as biomaterial contributes to carbon fixing for a longer period.



# Lessons and recommendations for recipient regions



## **2 - Increase the mobilizable deposit**

### • **Enhancing collection :**

- For waste from furniture components, the implantation of the Extended Producer's Responsibility promoted by European directive on waste (2008) is the right answer and enhance a large collection of wood waste from this origin.
- Regarding construction and demolition wastes, wood wastes collected are most of the times mixed with other wastes, making it difficult to add value to this deposit. Efforts can be made by the sector to selectively collect the wastes produced (using dedicated skips or multi-compartment containers).
- Actions to increase public awareness of the effects of burning wood waste at home. It should be made clear what substances are released in the atmosphere and their effects.

### • **Lowering landfilling:**

- Landfilling ban for some specific waste that can be recovered
- Introduce a high landfilling tax



# Lessons and recommendations for recipient regions



## **3 - Develop sorting of different classes of wood waste**

- Promote the technical and organisational development of sorting centres to enable the various grades of wood waste to be placed on the market for panels, combustion, incineration or co-incineration.
- The developments to be implemented concern:
  - Possible links between upstream classes (origin of waste) and downstream uses: mixing of waste with different levels of contaminant concentration should be avoided;
  - Sorting and preparation techniques for reducing contaminant levels;
  - Techniques and practices for detecting, separating, characterising and tracing the different types of waste



# Lessons and recommendations for recipient regions



## 4 - Promote the development of material recovery and energy recovery

- With regard to the social acceptability, it turned out that there is no major problem identified if the quality of the recovered material is guaranteed.
- For the development of the use of recycled material in panels, the imperative condition is to obtain the quantities of waste wood with the required quality characteristics (chemical composition, undesirable elements, and physical characteristics). Economic constraints are :
  - Investments in sorting/preparation plants at panel manufacturers;
  - The expected additional costs of improving sorting to meet quality specifications;
  - Support will be needed for investments in panel manufacturing sites.
- Regarding energy recovery, either large scale waste-to-energy plants or smaller combustion plants can be implanted depending of the energy needs and of the wood waste origin (steam for industrial process, district heating network,...).



# Conclusions



- Based on the information collected lessons and recommendations for sustainable wood waste valorization can be implemented.
- This implementation can help recipient Regions and other regions to construct a robust system that will enable the valorization of wood waste.
- However, in order to increase the sustainability of wood waste valorization systems, and to build more effective decision support systems, in the near future, more information is needed towards knowledge on the environmental, social and economic impact of the wood waste value-chains.





# Conclusions



- Lifecycle analysis, environmental impact analysis, life cycle cost assessment and social life cycle assessment studies are needed to build SWOT and Integrated sustainability assessment reports that can complement the recommendations presented.
- Also, the technological limitations and constraints associated with each value-chain should be clarified.
- This will help Regions to identify and depict the most sustainable options in value chains in order to boost wood waste valorization systems.





Thank you for your attention