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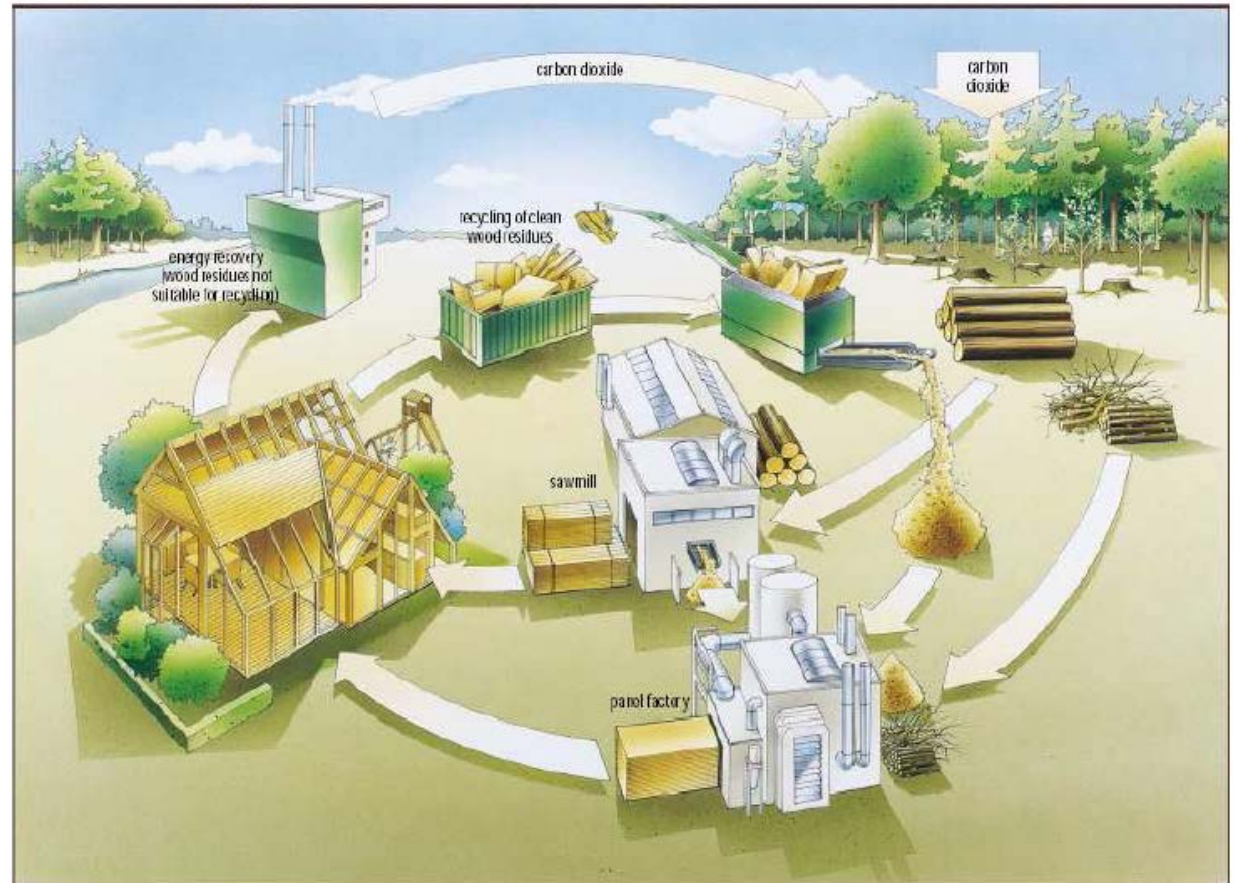
## Task force “**Recycling**”:

*Management, methods  
and technologies of **wood**  
**recycling processes** at  
European level*



**COSMOB**

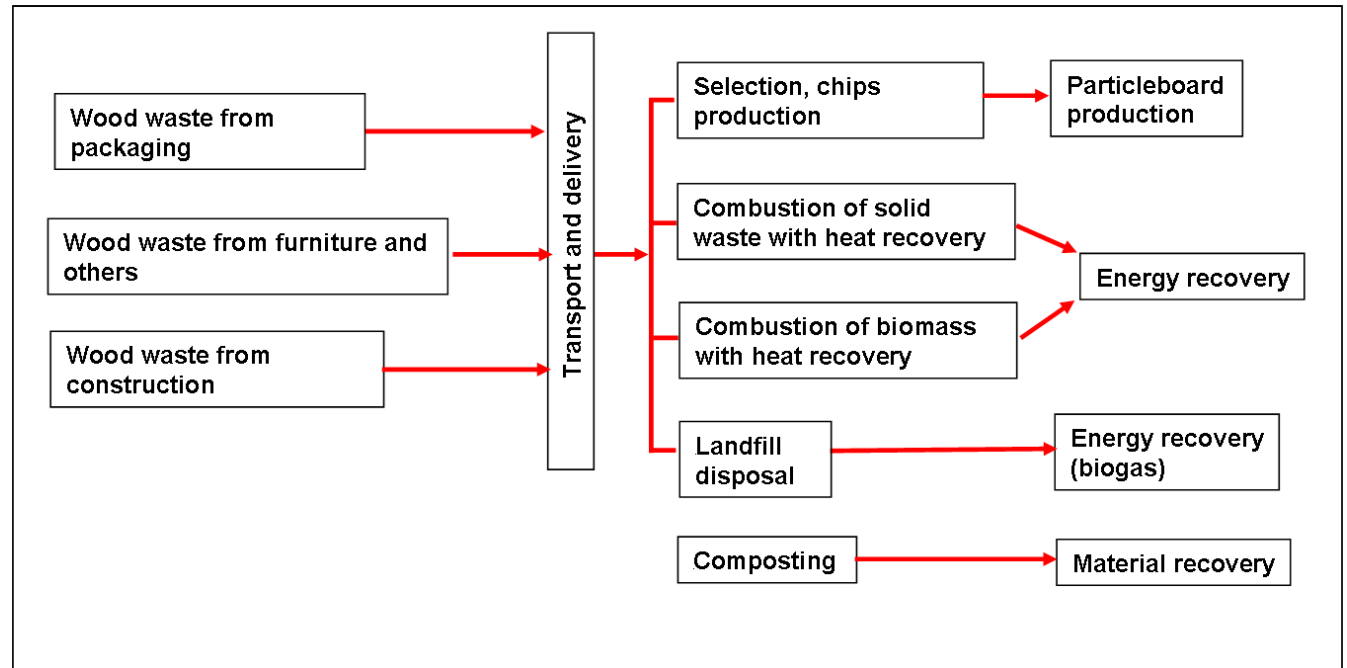
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Collection, treatment, recycling, disposal of wood waste



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COSMOB is involved in European and international research projects about wood recycling processes:

WoodRub Project

Development of Innovative  
Particleboard Panels

27 Partner

Participating in the project

ed Materials

y sustainable transport

Partners

5 Million Euros

iversity of Calabria

MATRECO PROJECT

In collaboration with:



CHRYSLER



CENTRO  
RICERCHE  
FIAT

R&D New Materials



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***The following information is obtained through a questionnaire about management, methods and technologies of wood recycling process at European level within the ECAMOB partnership***

### Recycling process - ECAMOB

Questionnaire about management, methods and technologies of wood recycling process, for the analysis of the state of the art at European level within the ECAMOB partnership

*\*Campo obbligatorio*

#### General Information

Organization name \*

Address

Post code

City

Country

Phone number

FAX





Email \*

<https://docs.google.com/forms/d/1DvRY8wHUnUJZcUKdQeMUxX9obhVdFcMFGbJPvRo9dTE/viewform>

Questionnaire



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- Medite Europe Limited
- Glunz AG
- VHI
- Pfleiderer Holzwerkstoffe GmbH
- Wood Panel Industries Federation
-  CETEM - Technical Research Centre of Furniture and Wood of The Region of Murcia
-  Ecole Supérieure du Bois
-  Cosmob
-  Brunel University, UK
-  Fraunhofer Institute for Wood Research, Wilhelm-Klauditz-Institut WKI

Questionnaire among ECAMOB partnership





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- Environmental Protection Agency 'THE REGULATION AND MANAGEMENT OF WASTE WOOD'
- Waste Wood Ordinance of 2002 ("Altholzverordnung")
- The German Waste Wood Directive
- "PAS (Publicly Available Standard): 111:2012 'Specification for the requirements and test methods for processing waste wood'
- PEFC-ST 2002:2013 or FSC
- EPF standard (2000) for recycled wood use in particleboard manufacture.
- RILEGNO specifications (2011, Italy)
- Law on Life-Cycle Management (KrWG)
- VDI Standard 4087 "Planning, construction and managing of scrap wood yards"
- Solid recovered fuels – Specifications and classes (DIN EN 15359:2011)
- Recovered wood - quality assurance (RAL-GZ 428)
- Secondary fuels - quality assurance (RAL-GZ 724)

## Management of wood waste:

Laws, standards and directives



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The maximum allowable quantities of contaminants permitted in particle-board manufactured to EPF's Industry Standard (EPF, 2002)

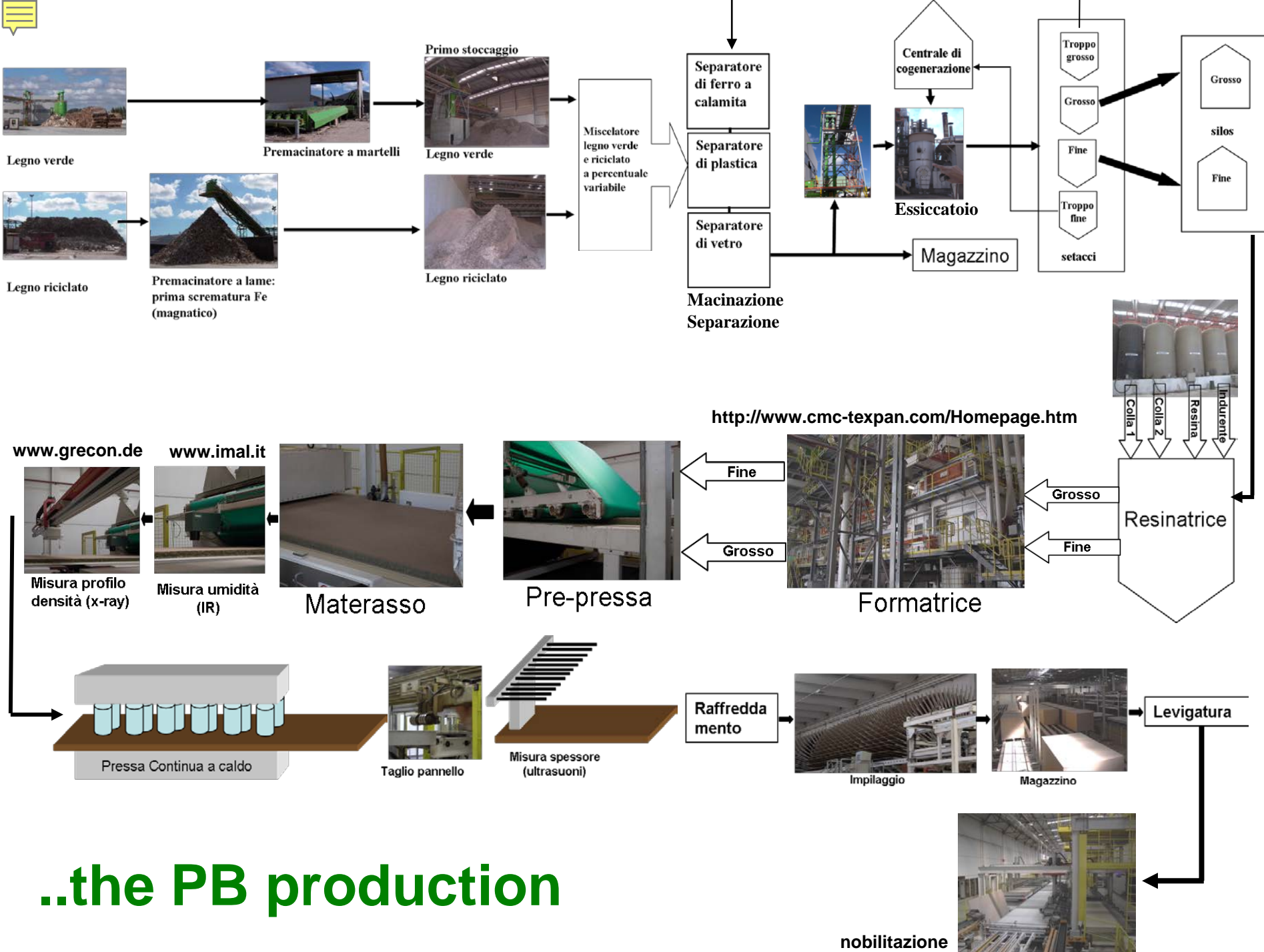
Contaminant	Limit (mg/kg)	Contaminant	Limit (mg/kg)
Arsenic (As)	25	Lead (Pb)	90
Cadmium (Cd)	50	Mercury (Hg)	25
Chromium (Cr)	25	Fluorine (F)	100
Copper (Cu)	40	Chlorine (Cl)	1000
Pentachlorophenol (PCP)	5	Creosote	0.5

The maximum allowable quantities of contaminants permitted in the German Waste Wood Ordinance

Contaminant	Limit (mg/kg)	Contaminant	Limit (mg/kg)
Arsenic (As)	2	Lead (Pb)	30
Cadmium (Cd)	2	Mercury (Hg)	0.4
Chromium (Cr)	30	Fluorine (F)	100
Copper (Cu)	20	Chlorine (Cl)	600
Pentachlorophenol (PCP)	3	Polychlorinated biphenyls	5

**Management of wood waste:**  
Laws, standards and directives





..the PB production



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The technologies adopted for wood waste reprocessing and indicated by the institution are:

1. Receiving
2. Sorting/Picking
3. Pre-shredding
4. Shredding
5. Ferrous metal removal
6. Non-ferrous metal removal
7. Screening
8. Density separation
9. Processed wood chip

Technologies for waste wood reprocessing



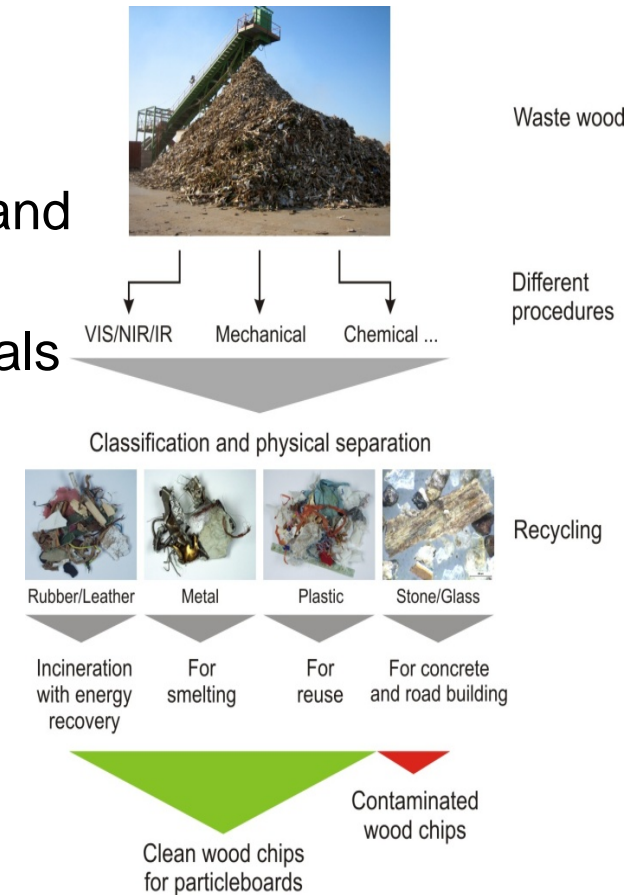


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## Types of treatments (physical/chemical/combination/other) of recovered wood required for new products

- **Physical:** Separation, Cutting and sanding.
- **Chemical:** Treatments with biocides, UV stabilizers, finishing

- Presence and identification of **contaminants** and **preservatives**
- Presence of **toxic chemicals**
- Presence of **metal particles**
- **Heterogeneity of material** because of different physical and chemical properties
- Low limit values for heavy metals and regulation inflexibility
- Processing **time in lab**
- **Transport and handling**





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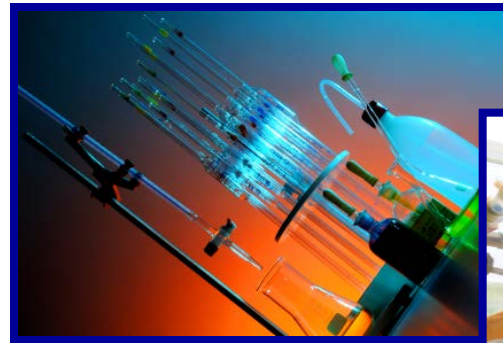
Moisture content	100%
Morphological size of pieces, shavings, chips, etc	77%
Colour and degradation	77%
Storage conditions	33%
Physical contamination: presence of metals, stones, earth, etc.	100%
Chemical contamination: glues, paints, mealmines, PVC, etc.	89%

Qualitative controls usually made on incoming wood material



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- Automatic scanning and sorting lines
- Technologies for contaminated particles removal (e.g. Image analysis (NIR, UV, IR), XRF, LIBS)



Better technologies to be adopted for wood  
recovering





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The table below attempts to summarise the potential each of the techniques described above to detect the range of contaminants of interest to the particleboard manufacturing industry. Cells containing “?” indicate that the technique is either under development or has low sensitivity to the contaminant.

Substance	AAS	ICP	LIBS	XRF	Wickbold	GC	NIR	HPLC
As	✓?	✓	✓	✓				
Cd	✓	✓	✓					
Cr	✓	✓	✓	✓				
Cu	✓	✓	✓	✓				
Pb	✓	✓	✓	✓				
Hg	✓?	✓	✓	✓				
Cl					✓			
F					✓			
PCP						✓	✓?	
Creosote						✓?	✓?	✓



Creating markets for recycled resources

Development of methods and  
sampling protocols for measuring  
contaminants in recycled wood for  
use in the panelboard sector

Project code: W003-007

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- MDF, OSB, chipboards and particleboards panels manufacturing
- Wood/Plastic composites manufacturing
- Fuel
- Pellets
- Biomass
- Fall protection
- Animal bedding outside UK
- Insulation
- Bespoke elements in buildings

**Possible new uses of the recovered wood**



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Innovative solutions that could be implemented are also well defined by the institutions, and they are related to several fields:  
***normative, managerial, operational and technological*** :

- Development of a specification for the end use of recycled wood
- European dumping ban for wood
- Elimination of notifications for transport across borders
- European waste wood ordinance in order to lighten cross border commerce
- Harmonized classification system
- Individuation of the right limit values for such contaminants
- Development of analytical system for chemical content of contaminants by statistical sampling
- Development of technologies to improve the cleanliness of recovered wood
- Development of technologies/processes to process/dispose contaminated particles removed from the waste stream
- Benchmarking of contamination levels found in different wood
- Bulky waste as a new source for recovered wood

Possible new uses of the recovered wood and suggestions

- To identify & check available knowledge and actors, capitalise and share results (**draft report**)
- To identify short-term gaps (local scale, existing institutional/economic frameworks)
- To determine long-term needs (EU scale)