

BIOREG



‘Absorbing the Potential of Wood Waste in EU Regions and Industrial Bio-based Ecosystems — BioReg’

D2.3: LESSONS AND RECOMMENDATIONS DOCUMENT TO REGIONAL AUTHORITIES AND POLICY MAKERS

To the attention of the Research Executive Agency

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BioReg project proposes to create a platform of stakeholders who are able to influence and develop their regions towards bio-based industries and products.

The project runs from January 2017 to December 2019, it involves 8 partners and is coordinated by "le CABINET D'ETUDES SUR LES DECHETS ET L'ENERGIE" (CEDEN).

More information on the project can be found at <http://bioreg.eu/project/>.

ABSTRACT

According the conclusions of WP1 and tasks 2.1 and 2.2 in WP2, this document aims to increase knowledge of how policies related to wood waste and how their valorisation could be improved.

Findings and evidence in WP1 and tasks 2.1 and 2.2 in WP2 will inform BioReg's policy recommendations at regional, national and EU level.

Recommendations proposed in the task have to be provided to regional authorities and policy makers in the model regions of Normandie (France), Alentejo (Portugal) and Lubelskie (Poland), through the BioReg Platform.

EXECUTIVE SUMMARY

This document provides lessons and recommendations to regional authorities and policy makers in recipient regions based on the success factors identified in model regions. Even if the document targets Normandy, Lisboa/Alentejo and Lubelskie, the lessons and recommendations highlighted can be transferred to any European region. Five main lessons and recommendations have been identified:

- Structuring the offer of wood waste products: classification
- Increase of the exploitable deposit by enhancing collection and reducing landfill
- Develop sorting of different classes of wood waste
- Promote the development of material recovery in panels
- Develop and optimize the energy recovery of waste



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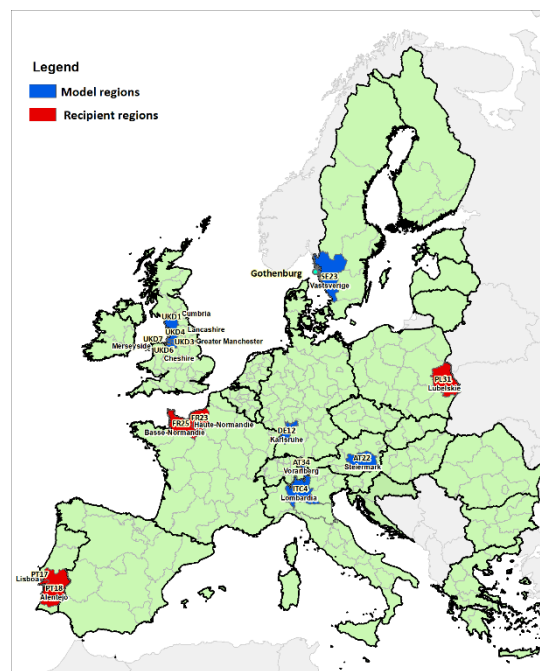
ABBREVIATIONS

All abbreviations shall have the meaning defined either herein or in the Rules for Participation or in the Grant Agreement (GA) including its Annexes without the need to replicate said terms herein.

1 INTRODUCTION

The BioReg project aims to identify good practices that could be implemented in the recipient Regions. Within the project we have identified five model regions, which were analysed and presented in the workshop. The best practices from model regions were identified and presented to the stakeholders from recipient regions.

Map 1. : Regions of BioReg project



This task aims to submit recommendations to regional authorities and policy makers from beneficiary Regions.

Findings and evidences highlighted in WP1 and tasks 2.1 and 2.2 of WP2, as well as discussions within the Strategic Chain Committee (a task force formed on the ministries initiative as part of industrial branch development in France) led to the identification of lessons for policy makers and regional authorities in model regions. These lessons are detailed according to the following five themes:

- Structuring the offer of wood waste products: classification
- Increase of the exploitable deposit by enhancing collection and reducing landfill
- Develop sorting of different classes of wood waste

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- Promote the development of material recovery in panels
- Develop and optimize the energy recovery of waste

Industrial eco-systems identified and described in deliverable 1.3 are options for sustainable valorisation in recipient region, where context is less suitable and favourable. These different eco-systems are not directly applicable in the recipient region. Indeed, if the regulatory framework (policies, incentives...) is more easily transferable, others aspects have to be taken into account in the objective of reproduce conditions of success in recipient regions, and in particular geographical and industrial context, which strongly influence the strategies.

2 STRUCTURING THE OFFER OF WOOD WASTE PRODUCTS: CLASSIFICATION

2.1 NORMANDY

The usual French classification into three classes A, B and C, without a precise definition of characteristics, is inadequate because it does not correspond to the regulations on combustion plants and the European Panel Federation (EPF) standards.

Considering the examples of existing classifications (ISO standards, German, Finnish and British regulations), the specifications and structuring needs in relation to recycling and energy recovery systems, a proposal was drawn up.

The principles of this classification are to distinguish 4 classes of recovered wood:

- two extreme classes: one for waste consisting of pure biomass (Class 1) and the other for wood waste classified as hazardous waste (Class 4)
- two intermediate classes:
 - o Class 2: recovered wood complying with specifications of chemical composition enabling it to be used for panel recycling and energy recovery in combustion plants, under the Installations Classified regarding Environmental Protection (ICPE) 2910 B regime.
 - o Class 3: Non-hazardous wood waste that can be used in energy recovery installations under the ICEP 2771 or 2971 scheme.

The table below details this proposal for the classification of products from wood waste B:

Classes (and matching with UK & German classification)	Chemical composition criteria	Main uses and recovery modes	Targeted origins
1 (A-AI)	Recovered wood Virgin biomass	Material recovery (panels) Combustion installations ICPE 2910 A Regime	Packaging wood Solid wood processing waste without adjuvants



2 (B-AII)	Recovered wood without organohalogenated and heavy metals, respecting specifications regarding concentration thresholds, by waste origin without prior mixing	Material recovery (panels) Combustion installations ICPE 2910 B Regime	Waste from furniture components (DEA) Construction waste Second wood processing companies' waste
3 (C-AIII)	Non-hazardous wood waste	Energy recovery in incineration and co-incineration installations (ICPE 2771 & 2971 regimes)	Demolition and renovation waste Mixed wood waste Construction waste and second wood processing companies' waste not respecting the Class 2 specifications
4 (D-AIV)	Impregnated wood waste classified as hazardous waste	Energy recovery in hazardous waste incinerators (ICPE 2770 regime)	Impregnated wood waste from construction and outdoor installations

The possible uses of the different classes can therefore be summarised as follows:

Product classes	ICPE Regime for energy recovery					Material recovery
	2910A	2910B	2971	2771	2770	
1	x	x	x	x	x	x
2		x	x	x	x	x
3			x	x	x	
4					x	

As these classification principles have been laid down, the chemical composition specifications separating Class 2 from Class 3 have yet to be defined: list of targeted substances and thresholds among other things.

Furthermore, harmonisation of specifications for material recovery in panel board (currently EPF specifications) and for energy recovery in combustion plants 2910 B needs to be considered: these specifications are linked to the proposal presented below on the evolution of regulatory constraints on incoming products for combustion plants (ICPE 2910B).

In addition, to facilitate the development of sorting on wood waste management platforms, an upstream classification of the sorting centre according to origin could be useful.

2.2 LUBELSKIE

At that moment, there is no wood waste classification or document dedicated only in wood waste management in Poland. In many scientific publications, lack of proper wood waste classification is indicated as a one of the biggest problems in this area. One document, which in some way refers to wood waste management, is directive 2000/532/CE about waste classification. It divides waste into 20 main groups depending on the source of their formation. However, the wood waste in the catalogue has not been sufficiently distinguished due to their



usefulness in recycling. Wood waste are mostly in group: 03. Wastes from wood processing and the production of panels and furniture, pulp, paper and cardboard.

In literature, Germany is considered as a model country in terms of legal regulations in the context of wood waste management. Document Altholzverordnung divides wood waste in four groups:

- Group I - waste of "clean" natural wood, without any synthetic additives;
- Group II - wood products other than natural, not containing however, PVC and wood impregnating agents;
- Group III - wood waste other than natural, containing in its PVC composition, but not containing impregnates;
- Group IV - wood waste containing impregnation for wood.

Introduction of such a division would have a positive effect on wood waste management. Many authors note that the lack of such regulations is one of the basic obstacles to the development of this sector.

2.3 ALENTEJO, LISBOA

In Portugal, the only classification that currently exists to qualify wood wastes is the separation between non-hazardous and hazardous wood wastes (wood waste that needs treatment or that it goes to specific landfill dedicated to hazardous waste). This classification, without a precise definition of characteristics, either for the non-hazardous and hazardous wood wastes, makes it difficult, to give to wood wastes a value. For example, in the category of non-hazardous wastes, the "pure" wood wastes, when collected, are usually mixed with wood wastes that are not "pure", hindering its reuse by the panel industry.

Considering the examples of existing classifications (ISO standards, German, Finnish and British regulations), the specifications and structuring needs in relation to recycling and energy recovery systems, and after hearing stakeholders and players, it is recommended for Portugal, and for Lisbon and Alentejo regions, that wood waste could be classified into four groups:

- Group I - waste of "clean" natural wood, without any synthetic additives;
- Group II - wood products other than natural, not containing however, organohalogens and heavy metals and wood impregnating agents;
- Group III - wood waste other than natural, containing in its composition organohalogens and heavy metals, but not containing impregnates;
- Group IV - Impregnated wood waste

Introduction of such a classification would have a positive effect on wood waste management. Moreover, an indication of the targeted origins that match each group, will simplify the process of classification and may enhance the amount of wood waste collected. In addition, following the circular economy principles, the reuse of the wood waste should, preferably, be oriented to the panel industry. Reuse as biomaterial, instead of reusing directly for bioenergy, contributes to fix carbon for a long period, which is a positive aspect.



The following table details the proposal for the classification of wood waste. Landfilling the wood waste should be not an option, and national policies should legislate in conformity. Following the application of the classification proposal and limiting or eliminating the landfill option will, surely, contribute to improve the wood waste recycling numbers in Portugal and Europe.

Classes (matching German/British classification)	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 and demolition 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	Construction and demolition 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

The classification of wood waste in categories I-IV can be clarified if chemical composition specifications, for each end use, are defined. Policy makers should be attentive to this subject. In addition, to facilitate the development of sorting on wood waste management platforms, an upstream classification of the sorting centre according to origin could be useful.

3. INCREASE OF THE EXPLOITABLE DEPOSIT BY ENHANCING COLLECTION AND REDUCING

3.1 NORMANDY

3.1.1 IMPROVE WOOD WASTE COLLECT

Regarding household waste and waste from furniture components (called DEA in France), the ECOMOBILIER and VALDELIA eco-organisations' programmes (Extended Producer's Responsibility), which have started to be deployed since the beginning of their action and will continue to rise in power, must produce significant results. It should be



noted that, in the light of the results of a survey carried out within the framework of the ECIRBEN project, the development of specific DEA skips in waste collection centres does not mean that the wooden skips that were in place will disappear (in particular for others waste wood generated by handiwork: renovation, etc.)

In the case of **construction waste**, the development of separate containers on site for the collection of wood waste is an obvious measure, already widely practised on sites of a certain scale; obstacles to its generalisation are either the available space on site in the case of construction works in dense urban areas, or the size of the site, where wood waste may represent a small volume. In this context, the implementation of **multi-compartment containers** for small construction sites could be a suitable option. Besides, it is necessary to densify the network of specific collecting centres for building companies.

Waste from **secondary wood-processing companies**: there is an expressed need for the development of collection centres with a fine-meshed network and the possibility for small businesses and craftsmen to access community's waste collection centres (in some territories). The draft decree on the takeover of construction waste by distributors could partly meet this need; however, the limits of this instrument would have to be examined further so as to know which companies are concerned and whether the network of these companies in the territory is sufficient.

Moreover, the information available at FCBA (the Forest, Cellulose, Wood construction and Furnituring technological Institute) indicates that a significant proportion of the production waste of these companies is made up of solid wood and glued solid wood elements; these elements represent a quality raw material for panel manufacturers, which is not captured today because of the strong geographical dispersion; it is therefore interesting to study the possibility of optimised logistic systems allowing the collection of this deposit.

3.1.2 LOWER LANDFILLING

The first proposal concerning all deposits is the regulatory ban on landfilling of identified wood waste: the decree "5 flows" answers in part. This decree is applicable to companies (producers and holders of waste) that do not use the services of local authorities to manage their waste as well as to companies that use the services of local and regional authorities and produce or hold more than 1,100 litres of waste per week.

This decree concerns waste recovered by companies in the course of their activities, whether it is waste thrown by their customers in their facilities or by their employees.

These companies will have to separate waste paper, metal, plastic, glass and wood from the rest of their waste for reuse or recovery.

A second proposal, specific to building waste, presented by the French Building Federation organisations (National union of demolition companies and union of building and public works recyclers), would be the exemption from the landfilling tax on recycled rejects from sorting centres that recover more than 70% of their flows.

At last, study of model regions as part of the first tasks carried out under Bioreg showed that landfilling ban for some specific waste than can be recycled or recovered, or a high landfilling tax entails an increasing of waste



valorisation (recycling or recovery). In France, landfilling is cheap (50-80 €/t including a waste tax of around 15-25 €/t) and accordingly incentive.

It is then recommended:

- Either to ban landfilling to waste likely to be recycled or recovered,
- Or increase the waste tax.

These proposed actions can only be taken at the national scale, and not specifically in Normandy.



3.2 LUBELSKIE

In the Lubelskie voivodeship, there are no legal regulations that would prohibit the storage wood waste on landfills, so from a legal point of view it is possible. However, information obtained from discussions with local waste management companies shows that technically, there is no wood waste that would end up in a landfill. In the RIPO (Regional Installation of Municipal Waste Treatment) wood waste is sorted (mostly bulky waste), then used as material for the production of RDF.

The burning of wood waste in home heating installations or fireplaces is still a big problem. Wastes that often contain hazardous substances (waste from group III and IV) are burned, which should be disposed of in appropriate conditions.

Actions to increase public awareness of the effects of burning wood waste at home were beneficial. It should be made clear to people what substances are released into the atmosphere when burning waste at home, and what effects it brings. A social campaign targeted at residents, in particular regions where free-standing buildings dominate, could have the desired effects.

Action to ensure that all wood waste is duly sorted should be taken. This process is crucial in the further stages of using this waste. Thanks to it, their rational use will be possible.

3.3 ALENTEJO, LISBOA

In Portugal, wastes are classified with codes and for wood waste there are several codes, following the indications from European legislation. According to national rules, there are commitments to recycle wood packaging and to make use of wood waste. The recovery of the wood wastes is high. On average in Portugal, 89% is being recovered. Concerning non-contaminated wood waste, traditionally, those are reused for pellets and energy or incorporated in new materials (such as panel board). Concerning contaminated wood waste: it is mandatory that those wastes are channelled to CDR (waste-derived fuels) production units where industrial pellets are produced. These industrial pellets are delivered to cement factories that have the license, and are certified, to use them in their furnaces. The aim is not to deliver those wastes to landfill. So, all the efforts concerning the sorting of wood waste are for its reuse and recycling. However, it is proposed that policies can be improved in order to ban the delivery of wood wastes to landfill or to increase the taxes associated with these wastes delivered to landfill.

The collected wood waste in Alentejo and Lisbon regions is mostly coming from commercial and industrial sources (ca. 55%), and municipal collection (16%). The amount collected from construction and demolition wastes is very low (only 4%). But there are ca. 25% of wood waste from other sources not specified.

There are options for improvement regarding collection of wood waste, especially because there is no knowledge on how the wood waste is being reused to more than half of the wood waste recovered (156 thousand tons, 57% of the total wood waste).

Concerning municipal wood waste, in 2013, only 14% of the total produced in Portugal was selectively collected, and 86% went to the mixed municipal waste. Although there are no numbers to confirm this, it is known that in the mixed wastes there are still wood wastes that can be selectively collected. So, a recommendation to the regional authorities and policy makers is to raise campaigns oriented to improve the selective collection of



household wood waste (furniture, etc.). Moreover, campaigns and programs could be raised to use links between furniture retailers and consumers. For example, by delivering new furniture to consumers, a reduction in the price could be achieved if the old furniture was collected by the furniture retailer. This reduction in price could be covered by the sorting facilities where the furniture retailers would deliver the wood wastes. All stakeholders agree that, for the dimension of the country, the existing network of collection centres for wood waste is appropriate to respond to demands. This collecting could be carried out through the implementation of a tax under the producer's responsibility system, promoted by European directive on waste of 2008.

Concerning wastes (non-hazardous) from wood transformation: sawmill, panel industry, carpentries, joineries...these wastes are collected and reused for the production of pellets, briquettes as well as wood panels, or directly recovered in energy on site for heat needs of the process. This sector is well organized in order to reuse as much as possible and add value to the waste. Although this sector already exploits wood wastes in large percentage, there are always options for improvement.

Regarding construction and demolition wastes, wood wastes collected are most of the times mixed with other wastes, making it difficult to add value to those wastes. However, in the last years, efforts are being made by this sector, to selectively collect the wastes produced. Stakeholders are already aware of the need to do it, and understand the reasons behind. Initially, stakeholders focused on processes that contributed to hazardousness prevention and minimization of the use of landfills. Sorting at source, recycling and other forms of recovery is being gradually implemented. Incentives linked with the material selectively collected could improve the numbers linked with those wastes. For example, by reducing some taxes according to the amount of selectively collected wood wastes. Nevertheless, the logistics of those actions still need improvements and studies towards optimization, e.g. specific collecting centres for building companies network.

4 DEVELOP SORTING OF DIFFERENT CLASSES OF WOOD WASTE

In this area, the general proposal is to 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. To achieve this objective, leads are presented below.

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.

Firstly, concerning building waste, it seems appropriate to:

- Separate new construction waste (rather clean wood waste) and demolition-renovation waste as soon as it is received.



- Promote the development of platform sorting, aimed at separating batches whose characterization results show significantly different contaminant levels:
 - o Unpainted and untreated wood on the one hand,
 - o Doors and windows, exterior wood and composites on the other hand.

With regard to the detection, separation, preparation, characterisation and traceability of the different types of waste, possible solutions have been addressed in various studies (ECIRBEN, DEMOWOOD, CAREWOOD); the research and development priorities concern the following subjects:

- Technologies for the sorting of fibreboard and other undesirable for panel recycling,
- Combined visual sorting and screening systems to reach the chemical composition levels of the contract specifications,
- Characterization methods at acceptable cost.

Finally, an effective measure would be to encourage the establishment of sorting centres, in close collaboration with user sites, to facilitate the development of a market. By encouraging the establishment of waste sorting platforms within particleboard production sites, for example, which often also have an energy recovery facility; it is possible to create efficient synergies for the management and recovery of this waste, by simply guaranteeing that the products resulting from the sorting process can be used.

The same type of synergy can be envisioned between a sorting platform and an energy recovery facility depending on the specificities of each territory.

Multi-level authorities can play a major role in supporting projects. Mechanisms can be devised to support R&D projects aimed at improving the collection, sorting and preparation of waste as well as for financing the most mature operational project by using:

- European FEDER Funds
- Regional subsidies

The French Environmental Agency (ADEME) in Normandy, the Ministry of the Environmental and Chief Inspectorate of Environmental in Lubelskie and the Portuguese Environmental Agency (APA), in Alentejo and Lisbon regions, can also be an important partner in technical assistance.

5 PROMOTE THE DEVELOPMENT OF MATERIAL RECOVERY IN PANELS

With regard to the social acceptability of customers and consumers, it turned out that there is no major problem identified if the quality of the recovered material is guaranteed. It was even suggested that the recycling rate could even become a "plus product". For example, IKEA requires its suppliers 35 % of recycled wood in the panels, for the manufacture of its furniture.

Regarding technical constraints, practices in other European countries (production in Italy of panels with a very high-recycled content) and R&D (DEMOWOOD) show that the objective of increasing the recycled content by up to 50% while guaranteeing the quality of products is possible.



For this development of the use of recycled 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:
 - o Investments in sorting/preparation plants at panel manufacturers
 - o The expected additional costs of improving sorting to meet quality specifications:
 - o Support will be needed for investments in panel manufacturing sites.

Multi-level authorities can play a major role in supporting projects. Mechanisms can be devised to support R&D projects aimed at improving techniques for incorporating wood waste into existing processes as well as for financing the most mature operational project by using:

- European FEDER Funds
- Regional subsidies

In Normandy, the French Environmental Agency (ADEME) can also be an important partner in technical assistance.

Regarding additional sorting costs, an incentive scheme could help to take them into account. The CSF (Strategic Chain Committee) agreed on the interest of working on the mechanism of an eco-modulation of eco-participation on furniture, according to the rate of recycled in the panels used. Quite complex issues arise at this stage, such as the measurement and control of this rate (evidence mode) and the determination of the point of origin. In Normandy, LINEX is a panel producer, which use only virgin wood. Incentives like ones described above could motivate this company in using recycled wood.

In Alentejo, and **Lisbon** regions, as also in other regions of Portugal, the wood transformation sector (sawmill, panel industry, carpentries, joineries) already have an existing well organized network that reuse as much as possible and add value to the wood waste. Yet, those wood wastes are used not only in the production of wood panels but also on the production of pellets and briquettes. As virgin biomass is sometimes used for the production of pellets and briquettes, an effort should be made to prevent this and to send this waste to the production of panels. This will prolong the time length of the carbon sink then if reused for energy, with benefits towards carbon credits.

As reuse of wood waste as material represents only 28% of the total wood waste being produced in Portugal (77 thousand tons), increasing this number is a target that can be reached if local authorities and policy makers together with stakeholders converge towards achieving this objective. So, to transfer all the virgin wood waste (e.g. from packaging or solid wood processing waste without adjuvants) to the production of panels or other biomaterials should be ranked first in giving waste wood a value.

Moreover, all the non-hazardous wood waste that is non-virgin, should be also transferred to the production of panels in order to increase the amount of recycled material incorporated. However, to do this, the recycled wood used should be characterized and controlled in a manner that the final product incorporated with the recycled wood complies with the required quality characteristics (chemical composition, undesirable elements, and physical characteristics). Incentive schemes applied can help to overcome the economic constraints associated with



investments needed to characterize the materials or to improve sorting to meet quality specifications. For example, by reducing taxes according to the amount of recycled material incorporated.



6 DEVELOP AND OPTIMIZE THE ENERGY RECOVERY OF WASTE

6.1 NORMANDY

6.1.1 LARGE-SCALE INSTALLATIONS (>20 MW)

The inventory shows that there are now four main installations of high power and a few small ones in the whole country (only one in Normandy), allowing the recovery of wood waste (non-hazardous) under an adapted ICPE regime (2771). It represents an insufficient capacity compared to the flows produced by the sorting centres, especially since the increase in the collection and sorting capacity of DEAs (waste wood from furniture).

The proposal is therefore to encourage the development of this type of installations, as close as possible to major urban sources (Waste from construction industry and from furniture components), under the appropriate ICPE regime to consume recovered wood of class 3, but also class 2, or even class 1 and biomass. The equilibrium between these classes will be regulated by the price of fuel, which will encourage maximum consumption of waste wood.

In comparison with a conventional biomass combustion plant, under the ICPE 2910A regime, the investment in a plant of this power level, under the type of incineration or heat production from recovered fuel (ICPE 2771 or 2971) represents an additional cost of about 20 to 30%. Given the required flue gas cleaning systems and ash management technologies, there are also additional operating costs.

In order to take into account of these different additional costs, the proposal consists in encouraging the development of this kind of installations through call for tenders launched by the Energy Regulation Commission (CRE) dedicated to CHP Plants allowing the recovery of wood waste (under adapted ICPE regime). The purchase of the electricity and heat (industrial needs, district heating network) produced would thus make it possible to cover the additional operating costs.

To maintain flexibility, the supply plan could be composed of different classes of recovered wood or even biomass, but the facility with the capacity to consume Class 3 recovered wood would be encouraged by prices to maximize the use of this resource.

Stakeholders highlight the difficulty of social acceptance of this type of installation, which will have to be anticipated by working on the communication in relation to this type of project, to be presented as a biomass energy production plant rather than a waste incineration plant. Regarding these aspects, community, regional and national authorities must be involved in supporting project promoters in order to ensure better acceptability of such facilities.

Another significant obstacle to consider for this type of project is the cost of ash management, for which economically viable management solutions will have to be developed.

However, the development of such high-powered plants will have two major advantages: the flexibility of supply and lower additional investment costs due to scale effects.



6.1.2 SMALLER COMBUSTION PLANTS FOLLOWING ICPE 2910 B REGIME, TO CONSUME RECOVERED WOOD OF CLASS 2 AND CLASS 1

There are currently no 2910 B installations outside the industrial sector, i.e. excluding self-consumption. The reasons for this are as follows:

- Highly selective chemical composition criteria for incoming products, based on low natural biomass reference values
- Laboratory fuel control costs

The proposals to allow the development of this type of installation are therefore as follows:

- To revise the fuel constraints of the regulatory framework 2910 B: the aim is to change certain thresholds on the composition of incoming products, without modifying the thresholds for air emissions, based on a shared analysis protocol. The objective would be that these modified thresholds, which would become the thresholds of the specifications for Class 2, could be reached by sorting measures. These changes would be justified by demonstrating the capacity of the installations to comply with the existing thresholds on emissions. For this purpose, data from characterization and combustion studies will be submitted to the services of the Ministry;
- To develop the offer of wood class 2, with this demanding specification: this can be done in sorting centres by implementing measures of selection of origin, visual sorting, and screening;
- To lighten controls on incoming products in order to reach an economic feasibility of projects, while guaranteeing its composition: this last aspect will have to be subject to control procedures at sorting centres.

The constraints of this development, in economic terms, will be the additional costs of fuel sorting compared to incineration type installations.

The issue of the management of ashes produced by these plants will also have to be addressed in order to obtain economically viable management methods, possibly recovery, while guaranteeing a high level of health and environmental protection over time.

The development of a set of such plants (revised regime ICPE 2910B), in addition to high-power incineration plants, would have several advantages:

- A possible grid of the territory with installations of lower power and being able to establish themselves in less urban areas than high power installations;
- Lower investment and operating costs than incinerators;
- Better acceptability by neighbourhood.



These developments could be promoted either by **Fonds Chaleur** provided by ADEME for District Heating Network and for heat needs of industrials (with eventual co-funding from regional authorities and European FEDER Funds) or CRE's call for tenders (CHP Plants only).



6.2 LUBELSKIE

There is no big biomass energy plant in Lubelskie region. There are only 2 energy plants, which are using biomass as a fuel. One is located in Biułgoraj, uses biomass from waste in furniture production. The second is Hrubieszów district and uses biomass in co-burning with coal.

Near the border of the Lublin province there are several power plants that use biomass as a material in the co-incineration process, or as a main fuel. In Polaniec was created, the largest energy block (with a capacity of 225 MW) in Europe, powered only by biomass. Biomass from forest waste and wood industry is used there. The demand for this resource is very large, over 1 million ton.

Hazardous wood waste are a big problem. They have to be utilized in special condition. In region almost all hazardous waste are used as a fuel in cement plant. There is two of them in region. Fuel from hazardous wood waste it is highly caloric, and willingly use by cement companies,

Potential of energy recovery of wood waste in region is quite high; almost all is already used. It would be necessary to pay special attention to the earlier mentioned burning of wood waste at home. These installations are not prepared to use this kind of fuel.

Another option is to produce pellet from wood waste. In region, there is several pellet company. Pellet fuel is more environmental friendly than traditional fuels, when burning less tar substances get into atmosphere. Therefore, promoting this type of fuel is justified.

6.3 ALENTEJO, LISBOA

Statistics of Portugal indicate that 10 thousand tons of wood wastes are being recovered for energy (3.5% of the total wood waste). Yet, part of the collected wood waste with unknown use (25% of the total wood waste, which is a significant number) is in fact being used for energy (especially in households, in home heating systems), with possible harmful emissions in the atmosphere.

In order to valorize the wood waste to energy, there are currently in Lisbon region 4 pellet and briquettes companies. In Alentejo, there are 3 pellet companies. Those companies can produce material to be used in home heating systems (in this case, waste wood is prohibited). In the North of Portugal (Mortágua), located 200 km to Lisbon and Alentejo region, there is a biomass power plant (10 MW) that receives mostly forest residues, but it can accommodate waste wood from category II. In Lisbon and Alentejo region there are other biomass power plants (0.1 MW) but those power plants are linked to companies functioning with biomass wastes from those companies (e.g., in Alentejo, with olive oil wastes). In Alentejo region, the Industrial Complex of Setúbal has a Biomass power plant of 12.5 MW that uses forest residues and wastes from pulp for paper production, and this power plant can accommodate also wood waste residues, category II. In Central region of Portugal, in the boundaries of Alentejo region, there are also two biomass power plants that can also accommodate wood waste, category II. One of the biomass power plant (6 MW), uses forest residues, pine bar, sawdust, waste olive cake. The other biomass power plant (13.7 MW), uses forest residues, and wastes from pulp paper factory. On June 2017, the current government publish a diploma to promote the installation and operation by municipalities or intermunicipal communities of



new biomass power plants that use organic matter such as forest residues, to produce energy and to promote forest cleaning. The diploma also provides support and incentive measures to ensure their implementation, with the main objective being the protection of forests, forest management and preservation and the fight against fire. The location of the new biomass power plants will have to take into account the municipalities with close proximity to critical fire zones or with forest stands and also the proximity to other biomass power plants or forestry/biomass industries. These installations should also focus on industrial zones or parks that allow or complement the use of thermal energy. The new legislation establishes that the injection power can not exceed 60 MW in the continental territory and 15 MW per plant. Therefore, there is potential to reuse wood waste into energy.

In order to optimize the energy recover from wood wastes, especially from wood wastes from category III and IV (hazardous wastes), incineration and co-incineration are optional pathways in line with the current state of art in Europe. In the region of Lisbon, two incinerators are active to receive and incinerate non- hazardous and hazardous wastes. In Lisbon, the current Incinerator of Urban Solid Wastes (50 MW), can accommodate wood wastes (category III). Two cement plants, one in Lisbon region (Cimpor – Alhandra) and another one in the vicinity of Lisbon, but already in Alentejo region (Secil – Outão) can incinerate (co-incinerate) wood hazardous wastes. In Alentejo, there are two Hazardous Wastes Treatment Units (SISAV and Ecodeal). The Ecodeal Unit uses wood pellets as a source of energy for the treatment of organic residues, an example of circular economy. Those wood pellets, if incorporated with recycled wood waste, represent an example on how recycling of wood waste can be promoted.

Lessons and recommendations	Targeted audiences	Stakeholders involved		
		Normandy	Lubelskie	Lisboa/Alentejo
Classification	Policy makers	Parliament	Parliament	Parliament
	National authorities*	DGEC, DGPR, Ministries, CIBE, AMORCE, FEDEREC	Chief Inspectorate Of Environmental Protection, Ministry of the Environmental	Portuguese Environmental Agency
Improve wood waste collection	National authorities*	Eco-organisms (ECOMOBILIER and VALDELIA), FEDEREC, AMORCE	Chief Inspectorate Of Environmental Protection, Ministry of the Environmental Stowarzyszenie polski recykling	Portuguese Environmental Agency, CVR – Centro de valorização de Resíduos
	Regional authorities	Région Normandie	Lubelskie voivedship	CCDR LVT, CCDR A (Commission for Regional Coordination and Development)
	Local authorities	Waste collection and treatment Union, Municipalities	Municipalities, PSZOK	Waste collection, Technology centers, Treatment units, Municipalities
Lower landfilling	Policy makers	Parliament	Parliament	Parliament
	National authorities*	DGPR, DREAL, AMORCE, FEDEREC	Ministry of the Environmental	Portuguese Environmental Agency



Develop sorting of different classes of wood waste	National authorities*	ADEME, Eco-organisms, FEDEREC	Chief Inspectorate Of Environmental Protection, Ministry of the Environmental, Eco-organisms,	Portuguese Environmental Agency, CVR – Centro de valorização de Resíduos
	Regional authorities	Région Normandie	Chief Inspectorate of Environmental in Lubelskie	CCDR LVT, CCDR A (Commission for Regional Coordination and Development)
	Local authorities	Waste collection and treatment Union, Municipalities	Municipalities PSZOK	Waste collection, Technology centers, Treatment units, Municipalities
Promote material recovery	National authorities*	FEDEREC, UIPP, ADEME	Chief Inspectorate Of Environmental Protection, Ministry of the Environmental Stowarzyszenie polski recykling	CVR – Centro de valorização de Resíduos
	Regional authorities	Région Normandie	Lubelskie voivedship	CCDR LVT, CCDR A (Commission for Regional Coordination and Development)
	Local authorities	-	Municipalities	Bio-based industries (e.g. panel board or pellet making industries)
Promote and optimize energy recovery	National authorities*	ADEME, FEDENE	Ministry of the Energy	ADENE, DGEG (Direção-Geral de Energia e Geologia), CBE
	Regional authorities	Région Normandie	Lubelskie voivedship	CCDR LVT, CCDR A (Commission for Regional Coordination and Development)
	Local authorities	Municipalities	Municipalities	Waste to Energy power plants, Municipalities

* Groups of interest, federations, administrations, institutions



7 IMPACTS OF THE IMPLEMENTATION OF RECOMMENDATIONS

The implementation of the recommendations will, among others aspects, contribute to:

- The fulfillment of European objectives
- The reduction of harmful emissions
- The creation of local employment
- The preservation of financial flows on the territory

7.1 ENVIRONMENT

7.1.1 FULFILLMENT OF EUROPEAN OBJECTIVES

Circular economy package (Waste Framework Directive, Packaging Waste Directive, Landfill Directive, Electrical and Electronic Waste Directive)

Member States approved the text on the circular economic package on 22 May 2018. The European Parliament adopted the text on 18 April.

The new legislation targets 55% of municipal waste to be recycled by 2025, 60% by 2030 and 65% by 2035. As a result, only 10% of municipal waste will be landfilled by 2035. It will also encourage the use of extended producer responsibility (EPR) regimes. In addition, household hazardous waste, bio-waste and textile waste "will have to be collected separately" in 2022, 2023 and 2025 respectively.

Member States will have to recycle 55% of their municipal waste by 2025. A target that will increase to 60% in 2030 and 65% in 2035. It should be noted that municipal waste, collected by local authorities, represents only 10% of the annual tonnages produced in the EU.

The recycling rate of packaging waste should be even better: 65% on average in 2025 and 70% in 2030.

Landfilling will be limited to 10% of municipal waste by 2035. This objective has already been achieved in Germany, Austria, Belgium, Denmark, the Netherlands and Sweden.

A new separate collection is also required for textiles and hazardous household waste in 2025. Bio-waste is subject to separate collection or composting by 2024.

Climate energy package

The 2008 climate and energy package aims to achieve the "20-20-20" or "3x20" objective of:

- increase the share of renewable energies in the European energy mix to 20%
- reduce CO₂ emissions in EU countries by 20%
- increase energy efficiency by 20% by 2020



The 2014 climate and energy package sets new targets for 2030:

- 40% reduction in greenhouse gas emissions compared to 1990
- 27% renewable energy in the energy mix
- 27 % of energy efficiency

7.1.2 REDUCING HARMFUL EMISSIONS

Beyond the achievement of European, national and even local objectives in some cases, the establishment of a regional ecosystem for the recovery of wood waste will lead to a significant reduction in pollutant emissions.

Structuring the supply and demand for wood waste will enable us to give value to flows that until now have been a burden and which, in the future, will follow the collection, sorting and appropriate preparation processes. This will involve a reduction in wild deposits and open burning volumes and thus avoid the proven production of pollutants in the atmosphere. It should be noted that, according to a report of the United Nations Environment Programme, open burning of demolition wood waste produces 60 µg ITEQ / tonne of dioxins, which is 100 times higher than the regulatory threshold allowed for incinerators in France.

The implementation of a regional ecosystem will also imply a relocation of flows that are currently exported to more local recovery chains.

Finally, whether wood waste is incorporated into particleboard or recovered for energy according to its quality, each recovery process has environmental interests.

Material recovery in panelboard:

Several scientific publications have studied the environmental benefits of recycling wood waste in the panel industry compared to virgin biomass. These include the work of Mi Hyung Kim & Han Byul Song (« Analysis of the global warming potential for wood waste recycling systems) and Md. Uzzal Hossain & Chi Sun Poon (“Comparative LCA of wood waste management strategies generated from building construction activities”).

The latter have shown that greenhouse gas emissions are lower when producing particle board with wood waste than with virgin wood. Considering a particle board with a density of 675 kg/m³ composed of 80% wood waste, this benefit, although relative, is between 6 and 18 kgeqCO₂/ 1 000 tons of wood waste only because of a drying step that requires less energy.

They also estimated the carbon storage of particleboard produced from wood waste at 409 kgeqCO₂/ 1 000 tons of wood waste.

Energy recovery:

As a substitute for fossil fuels, the energy recovery of wood waste is of considerable interest in reducing greenhouse gas emissions, as the carbon footprint of wood combustion is considered neutral.



In the most favourable case, i.e. in substitution of natural gas, it is estimated that the emission of 514 teqCO₂/1 000 tons of wood waste is avoided and 833 teqCO₂/1 000 tons in substitution of coal. This analysis corresponds to a heat-only recovery. In the case of a CHP plant, the CO₂ emissions avoided for renewable electricity production depend on the Member State's energy mix.

7.2 SOCIAL

It is essential to associate the implementation of a waste recovery chain, whatever it might be, with the creation of local activities that cannot be relocated. In the case of wood waste, it is easy to see that jobs can be created throughout the value chain. Several studies have also enabled the number of direct, indirect and induced jobs to be assessed for:

- The collection, sorting and preparation of wood wastes:

Employment intensity for recycling by material (FTEs/10,000 tpa)

Material	Gray <i>et al.</i> 2004	Cascadia (2009) citing Seldman (2006)	Friends of the Earth (2010) Value for 2020	Eunomia 2014
Glass	7.5	26	7.5	7.5
Paper	35	18	18	18
Plastic	156	93	93	93
Iron & Steel	54	-	54	54
Aluminium	110	-	110	110
Wood	7.5	-	7.5	7.5
Textiles	50	85	50	50
WEEE	400	(computer reuse) 296	-	400
Furniture	136	-	-	136
Biowaste	5 collection + 8 processing	4	4	5 collection
MRFs	-	10	-	-
Average all recycling	62	50	49	-

Source: Evidence review of the potential wider impacts of climate change Mitigation, Scotland's Rural College

- Energy recovery compared to fossil fuels :

The substitution of fossil energy by the energy recovery of wood waste generates jobs from the construction of an energy production plant to its deconstruction and maintenance. Work carried out by a research group at the



University of La Coruña (“Comparative analysis of direct employment generated by renewable and non-renewable power plants”) estimated the direct jobs created according to the type of fuel used (FTEs/GWh energy produced):

Energy	Min	Max	Mean
Coal	0,1065	1,4246	0,5502
Lignite	0,1196	2,4281	0,8468
Oil	0,1076	1,3322	0,5466
Natural Gaz	0,0992	1,1403	0,3691
Biomass	0,2663	2,0856	0,9768

If natural gas is substituted by wood waste, considering a calorific value of wood waste of 3,2 MWh/ton and a production efficiency of 80%, an additional activity creation coefficient of 0,237 FTE/1 000 tons is established.

It is more difficult to approach the jobs created by recycling wood waste depending on whether it is a new activity or a replacement for virgin biomass.

It should be added that, in addition to job creation, the local development of a resource enables financial flows to be maintained on the territory.

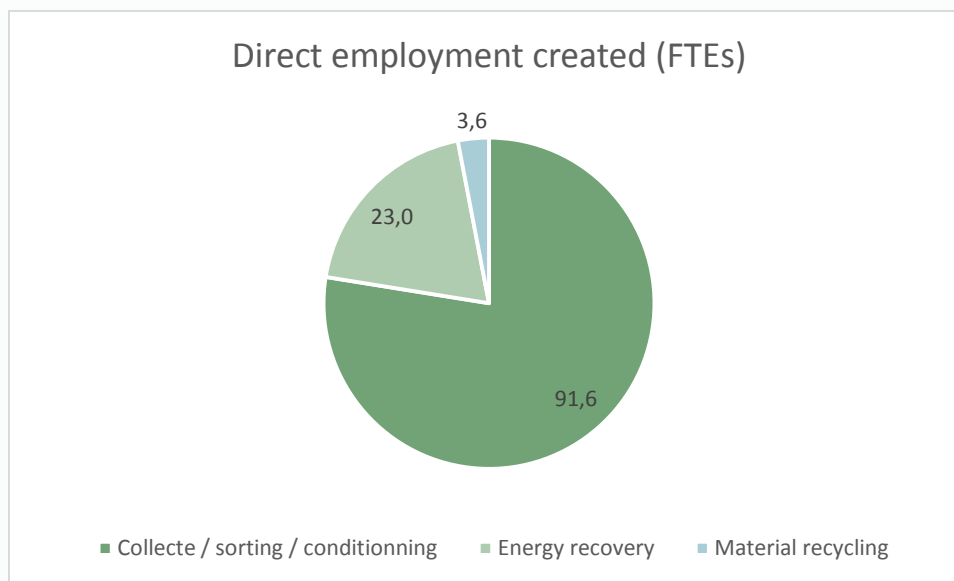


Impact of the implementation of a wood waste ecosystem on the environmental and social performance - Focus on Normandy:

Normandy has the advantage of having precise figures on which it is quite simple to rely. It is estimated, for example, that 360 000 tons of wood waste are produced annually and that the untapped or exported potential is around 40%. To date, and taking into account the presence in the Region of a panel industry, it can be estimated that 1/3 of the resource will be oriented towards this industrial company and that the remaining 2/3 will be recovered in energy as a replacement for natural gas.

On the basis of these assumptions, it would be possible to avoid around 50 000 tons eqCO₂ by locally recovering wood waste in Normandy (99% in energy recovery and 1% in material recycling) and a carbon storage in panels of around 20 500 tons.

With regard to direct job creation, it is estimated that 118 direct jobs would be created at the regional level, distributed as follows:



By using a multiplier coefficient of 1,5 to approach the number of indirect jobs and 1,75 for the number of induced jobs, it can be estimated at first approach that the establishment of a wood waste recovery sector in Normandy would create 530 jobs, representing 3,6 FTEs/1 000 tons of wood waste.



Impact of the implementation of a wood waste ecosystem on the environmental and social performance - Focus on Alentejo/Lisbon Regions:

It is estimated that 94 000 tons of wood waste are produced annually in Alentejo and Lisbon Regions and that the untapped or exported potential is around 57%. To date, it can be estimated that 1/3 of the resource that is collected will be oriented towards the material recovery and reuse, but only 3.5% are being recovered in energy.

If both regions follow the recommendations, 2/3 of the total wood waste could be reused for energy, avoiding around 13 000 tons eqCO₂ and 1/3 of the total wood waste could be reused as material, and therefore the carbon storage would be around 5 400 tons. As currently, only 43% of the wood waste is being valued, options for improvement are still in place.

With regard to direct job creation, it is estimated that 45 direct jobs would be created at the regional level, distributed as follows: 34 – collect/sorting/conditioning; 9 – energy recovering; 2 – material recycling. In this study the number of indirect jobs was not quantified, but, if we assume that at least twice this number can be linked indirectly with direct job creation, than in total, 135 jobs can be associated with the wood waste recovery sector.

