

A study of end-of-life fibreboards: their characteristics and availability in Europe

Flore LEBRETON, Abbey HERNDON, Julian MARCADET, Julia BUCHNER, Christophe BELLONCLE and Mark IRLE

EcoReFibre context

Medium Density Fibreboard (MDF) is the type of fibreboard which is the most produced. Global MDF production is now over 100 million m³ per year (FAO 2022), which leads to a large amount of waste (Figure 1).

Currently there is no commercially viable method to recycle post-consumer MDF and, yet, it is an increasingly important part of the recovered wood stream.

European particleboard manufacturers incorporate an average of 44% of recovered wood in their panels (European Panel Federation 2021). Consequently, MDF waste is currently and somewhat unintentionally recycled into particleboards.

The rapid growth in the quantity of MDF waste implies that the proportion of MDF in the recovered wood stream will also increase. Studies have shown that particleboards made with recovered wood containing a large proportion of MDF residues have lower mechanical properties (Lee et al. 2022).

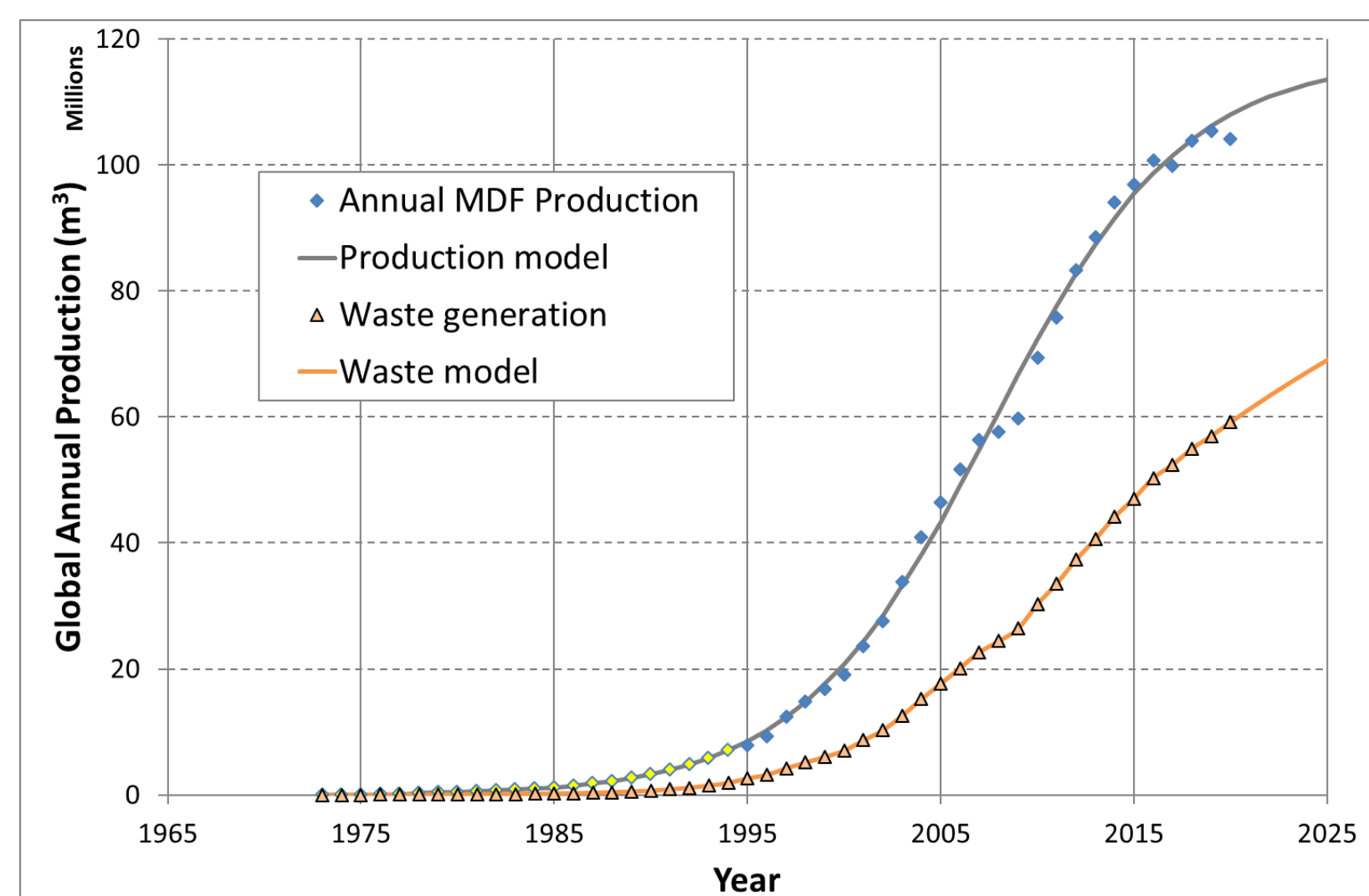


Figure 1: The actual global, annual production of MDF and predicted MDF waste volumes (Mark IRLE).

Thesis aim: To determine the current and predict the future availability of waste fibreboard in Europe and characterise the fibres it contains with a view to their subsequent re-use

Characterise the waste Measure of the proportion of fibreboard present in European waste wood streams

Method

A first collection of recovered wood was carried out in the west of France in summer 2022. This collection focused on class B and “DEA” wood (Figure 2).

The purpose of this experiment is to adjust the model of the historical and future waste fibreboard volumes in Europe.

1 - Collecting



Table 1: French classification for recovered wood origins

A class : non-chemically treated wood
C class : chemically treated wood
B class : assortment and mixture
DEA : Déchets d'Eléments d'Ameublement bois (waste of wood furniture)

2 - Sieving



Utilisation of 3 trays : 8 mm | 4 mm | base

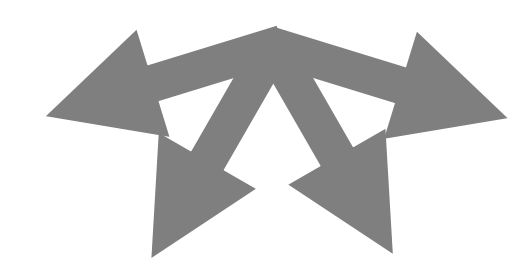
3 - Picking



Figure 2: Fibreboard waste extracted from recovered wood stream

Focus on particles retained by an 8 mm sieve.

Separation in 4 fractions:



Solid wood
Fibreboards (Figure 2)
Other panels
Non-wood

4 - Weighing

Table 2: Proportions of the 4 groups of elements in the 8 mm sieve after the picking process (Abbey HERNDON and Julian MARCADET)

Type of waste	B class	DEA
Proportions average (%)		
Fibreboard	2	11
Other panels	19	57
Solid wood	77	26
Non-wood	2	6

First observations

- MDF waste has a clearly identifiable, round shape (Figure 2)
- B class recovered wood contains only 2% of MDF waste
- “DEA “ stream shows an average of 11% of MDF waste
- Interest of separating those 2 streams because of MDF waste quantities

References:
- Organisation des Nations unies pour l'alimentation et l'agriculture (FAO). 2022. « FAOSTAT ». FAOSTAT. (<https://www.fao.org/faostat/en/#data/FQ>).
- European Panel Federation. 2021. Annual Report 2020-2021.
- Lee et al. 2022. « Particleboard from Agricultural Biomass and Recycled Wood Waste: A Review ». Journal of Materials Research and Technology 20 (September): 4630-58. <https://doi.org/10.1016/j.jmrt.2022.08.166>.



CONTACT
ÉCOLE SUPÉRIEURE DU BOIS
Rue Christian Pauc | 44306 Nantes
Flore LEBRETON | flore.lebreton@esb-campus.fr



Funded by
the European Union

ecorefibre.eu