The rising demand for materials such as wood undeniably contributes to the depletion of natural resources and global warming. Recycling our wood waste intelligently could help to curb this phenomenon and have a significant ecological impact. This wood waste can be in the form of beams or pallets and could be considered as wood slats. They could be combined, assembled, and glued to create Cross-Laminated Timber (CLT) panels for the construction industry.

We aim to develop optimization techniques to recycle raw wood waste by providing the layout schemes to create CLT panels. The objective can be either to maximize the CLT panel production or to minimize the wood surplus when a given set of panels should be built.

We conducted a literature review to identify relatively similar problems in the operations research field. The skiving stock problem and the dual bin packing problem are the two closest problems to our. The second's name is quite misleading since our problem is technically not a dual version of the cutting stock/bin packing problem, but a problem on its own as shown in the literature.

In this work, we propose a clear description of our problem and different mathematical formulations with cuts for the variants. The results of various numerical experiments with field data from the wood industry are presented. As it is an NP-hard problem, we identify the limit size of the instances for which the problem can still be solved in a reasonable amount of time.