



ASSESSMENT ON THE LIFE CYCLE ANALYSIS OF STRUCTURAL TIMBER AND BIOMASS FOR ENERGY

LIFE CYCLE ANALYSIS – SUSTAINABLE
FOREST MANAGEMENT

D3

CPF



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LIFE16 CCM/ES/000065

CLIMARK

Forest management pro-
motion for climate change
mitigation through the
design of a local market
of climatic credits

DELIVERABLE

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Deliverable: Assessment on the life cycle analysis of structural timber and biomass for energy

This deliverable belongs to the Action D3, life cycle analysis – sustainable forest management. Originally, for this action D3, according to the Midterm report, two deliverables were to be delivered: one for the assessment on the life cycle analysis of structural timber and another for the biomass for energy. However, since the written study from the external consulting Marcel Gómez-Consultoria Ambiental includes both analyses, it was decided, eventually, to submit only one deliverable including both.

The study includes the impact assessment on C balances for the obtainment, distribution, use and end-life of the different forest products. The products are compared with fossil-based materials to assess the substitution effect of wood.

The works to accomplish this action started in 2019, with CPF feeding the external assistant, Marcel Gómez-Consulting with all basic relevant information on context, type of products, silvicultural models, sawmill contacts and relevant forests/carbon literature. Several preparatory meetings took place along the first semester of 2019 to discuss the approach of the analysis, reaching consensus on: i) Products to be analysed and compared with fossil-based materials. At first it was planned to consider 2 products but eventually, 4 products were chosen, accounting for the most common products from the main pine and oak species of Catalonia (biomass, timber pallet, wood beam and CLT panels); ii) Forestry treatments to consider: It was agreed to start with the analysis of *Pinus sylvestris*, being the main contributor to the Catalan timber market and with the wider range of products. 6 silvicultural models were selected (3 for high quality sites and 3 for medium ones). Differences between them refer to even/uneven-aged management or short/long rotation.

In June 2020 Marcel Gómez – Environmental Consulting delivered to the CPF the final report: “Anàlisis del Cicle de Vida de productes de fusta derivats de diferents pràctiques de gestió forestal” (Annex 1).

Results of the LCA:

- Depending on the forest management model applied, the results per ton of commercial wood obtain at the forest show relevant differences, up to 50 % in some impact categories.
- The higher the consumption of fossil-fuel (benzene, diesel) per ton of harvested timber, the higher the environmental footprint. That is the reason why the most interventionist forest practices, even if they consume more fuel, show a lower consumption ratio than less interventionist practices since they allow to harvest more wood.
- The medium quality and even-aged practice (Ps8) has the lower environmental footprint yet the one with medium quality and uneven-aged practice (Ps10) has the higher impact results.
- The environmental impact related to timber transport process can be much higher than the forest management environmental impact. In a distance of 50 km, the transport equals or even double the production impact in some categories.
- The process of sawing timber is a relevant one, mainly when the side products are not used, since all the impacts are assigned to the main product.
- When the process of transport and sawing are added, the differences per ton of sawn timber lessen up to 20 %

- Regarding the comparison with the fossil-based products:
 - In most of the considered impact categories, wood chip has a lower impact than diesel to produce 1 MJ of heat.
 - In all the considered impact categories, wooden pallet shows less impact than the non-reusable plastic pallet. The results of wooden pallet from Ps8 are slightly lower than the ones from Ps10.
 - The impact of 1 m³ of timber beam to the doorstep's factory is smaller than the concrete beam. However, these results should be based on an equivalent use.
 - The impact of 1 m² of indoors wall to the doorstep's factory shows that the CLT can have both lower and higher impacts than the ones from exposed brick. However, these results should be based on an equivalent use.
 - The impact of structural use compared to reinforced concrete seems to be lower.