

## Life Cycle Assessment of U.S. Wood Pallet Production

Packaging used for shipping is an important component of the complex supply chain of many products. Currently in the United States, more than 1.8 billion pallets are in service, being used to transport a variety of goods. This number is expected to increase 1.9% per year (NWPCA 2016, PR Newswire 2016). With increasing demand and implementation of sustainable production and services at the global level, wood pallet manufacturers must provide verified data on current performance of wood pallet production and increase their environmental performance to enhance their competitiveness in the market and satisfy customer needs. A comprehensive environmental assessment of U.S. wood pallet production is required to achieve this.



Wooden pallets used for shipping purposes in the United States (NWPCA 2016).

### Background

Wood pallet manufacturers must evaluate and implement sustainability measures because of increasing pressure on manufacturers for sustainable processes. This increasing pressure is the result of stricter environmental regulations and rising consumer demand for environmentally sustainable products. Implementing these measures requires producers to optimize their systems to improve environmental performance, and this requires an accurate and meaningful evaluation of the process chain to determine areas for improvement. This can be achieved through a comprehensive environmental assessment of U.S. wood pallet production throughout its life cycle using the internationally accepted life-cycle assessment (LCA) method. Results of the analysis will provide a comprehensive understanding of the environmental

performance of U.S. wood pallet production and can be used to identify potential solutions and improvements in the sector.

### Objective

The objective of this project is to develop cradle-to-grave LCAs for U.S. wood pallets for both domestic and international consumption for the eventual creation of wood pallet environmental product declarations (EPDs) by the National Wooden Pallet and Container Association (NWPCA).

### Approach

A detailed questionnaire will be used to survey wood pallet facilities and develop a life-cycle inventory

(LCI) for softwood and hardwood wood pallet production. This survey will track all measurable raw material inputs (including energy), product and by-product outputs, and pertinent emissions to water, air, and land for those unit processes representing the current state of wood pallet production in the United States. The life-cycle impact assessment (LCIA) will then be performed using the LCI developed for evaluation of environmental impacts associated with wood pallet manufacturing. The U.S. LCI database will be used for background processes, and the system will be modeled using SimaPro 8.1 software (NREL 2012, PRé Consultants 2016). The LCIA will be performed using the “Tool for the Reduction and Assessment of Chemical and Other Environmental Impacts” (TRACI) 2 method. The LCIA results will be verified by an acceptable third-party agency. In addition to completing the two LCAs, the LCIA results will be used to develop two wood pallet EPDs by NWPCA.

### Expected Outcomes

The expected outcomes will be environmental performance assessments of the current state of U.S. wood pallet manufacturing for domestic and international consumption using up-to-date data. The outputs can be used for identification of hotspots and areas of improvement in the wood pallet sector that would further enhance existing efforts toward sustainable manufacturing.

### Timeline

The project will begin in October 2016 with the detailed facility surveys to be used in LCI development. Surveys will be sent to U.S. wood pallet manufacturing facilities in January 2017. The timeline will cover a two-year period, where LCA analysis and LCA verification will be completed within the first quarter of the second year. Findings will be presented at a future conference with a focus on LCA or green building.

### Cooperators

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### References

- National Wooden Pallet and Container Association (NWPCA). 2016. Environmental benefits of wood-use for pallets. <https://www.palletcentral.com/?page=DidYouKnow> (April 6, 2016).
- NREL (2012) Life-cycle inventory database project. National Renewable Energy Laboratory. [www.lcacommons.gov/nrel/search](http://www.lcacommons.gov/nrel/search). (March 16, 2016).
- PR Newswire. 2016. US pallet market. <http://www.prnewswire.com/news-releases/us-pallet-market-300138714.html>. (April 6, 2016).
- PRé Consultants. 2016. SimaPro 8 life-cycle assessment software package, Version 8. Plotter 12, 3821BB Amersfoort, The Netherlands. [www.pre.nl/](http://www.pre.nl/). (March, 16 2016).