Enhanced Life-Cycle-Costing in wood construction by novel methods for service life planning

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Project name/website:
https://www.nibio.no/en/projects/WoodLCC
Project acronym: WoodLCC

Dr. Gry Alfredsen, NIBIO, Norway (presenting)
Project leader Prof. Dr. Christian Brischke, University of Goettingen, Germany

Project partners

- University of Goettingen, DE
- Norwegian Institute of Wood Technology, NO
- Norwegian Institute of Bioeconomy Research, NO
- Tallinn University of Technology, EE
- InnoRenew CoE, SI
- Lund University, SE

- Total project budget 1 516 862 €

- Project start May 1, 2022, and end date April 30, 2025
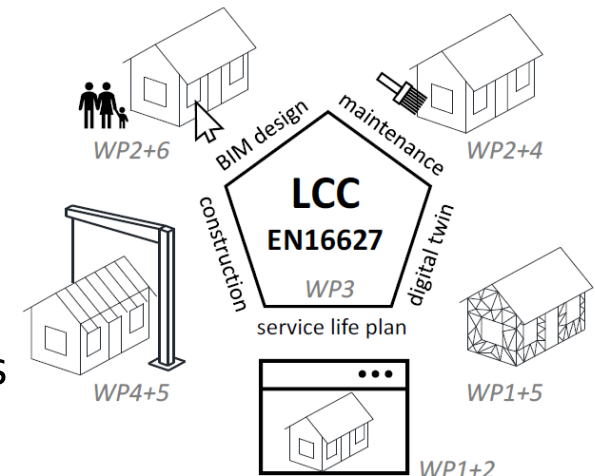
Introduction

Why WoodLCC?

- Tenders must be evaluated as the 'Most Economic Advantageous Tender' (EU 2014)
- Over or under estimation of service life and maintenance in the design phase will lead to increased cost and increased environmental impact
- Currently all the existing user software's are using generic data input for lifetime estimation of wood-based products

Project objective

Enabling robust and precise Life-Cycle-Costing (LCC) based on input from novel models for detailed service life performance specification for wooden components and buildings

DIRECTIVE 2014/24/EU OF THE EUROPEAN PARLIAMENT AND OF THE COUNCIL
of 26 February 2014
on public procurement and repealing Directive 2004/18/EC
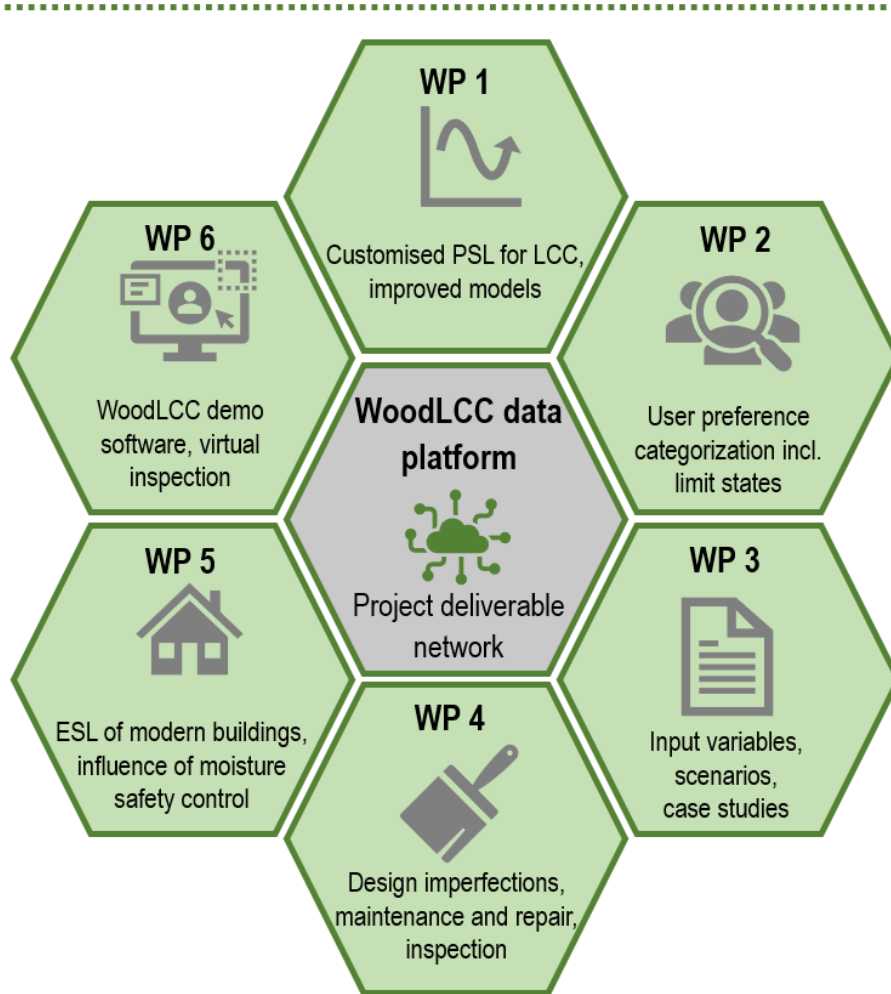(Text with EEA relevance)

WP2+6 BIM design maintenance WP2+4

LCC
EN16627

construction digital twin

WP4+5 service life plan WP1+5

WP1+2

Expected results

Modular aspect (the agreed scope in WoodLCC)

Product Stage			Construction Process		Use Stage					End of Life Stage			Benefits beyond the system boundary
A1	A2	A3	A4	A5	B1	B2	B3	B4	B5	C1	C2	C3/ C4	D
Raw material supply	Transport	Manufacturing	Transport	Construction-installation process	Use	Maintenance	Repair	Replacement	Refurbishment	De-construction	Transport	Waste processing / Disposal	Reuse- Recovery- Recycling- potential

Operational energy use **B6**

Operational water use **B7**

Life cycle stages in modular perspective, which is followed in the LCA and LCC standards
Stages and modules improved for wood-based products in WoodLCC are highlighted in green

Expected results

WP 1 — Customised PSL for LCC, improved models

WP 2 — User preference categorization incl. limit states

WP 3 — Input variables, scenarios, case studies

WP 4 — Design imperfections, maintenance and repair, inspection

WP 5 — ESL of modern buildings, influence of moisture safety control

WP 6 — WoodLCC demo software, virtual inspection

WoodLCC data platform — Project deliverable network

	Work package title	WP Leader	Partners involved
WP 1	Service life prediction and performance specification	Jonas Niklewski LUND	all
WP 2	Service life and cost expectations	Gry Alfredsen NIBIO	all
WP 3	Life-Cycle-Costing and case studies	Roja Modaresi NTI	all
WP 4	Impact of design detailing on LCC	Christian Brischke UGOE	NTI, LUND, TalTech
WP 5	Adaptation of methods to modern building techniques	Targo Kalamees TalTech	UGOE, LUND
WP 6	Software development and validation studies	Anna Sandak InnoRenew	UGOE, NTI, LUND, InnoRenew, TalTech
WP 7	Project management and monitoring	Christian Brischke UGOE	all
WP 8	Transnational dissemination	Gry Alfredsen NIBIO	all

Expected results

WP1   Updated SLP model and service life database for LCC

WP2   Survey and quantification of limit states for different user preference categories

WP3   Compiled database with all the relevant variables and scenarios, case studies

WP4   Data for SL and LCC on effect of inspection, maintenance, and repair intervals

WP5   ESL of buildings and building components where new techniques are used and the influence of moisture safety methods

WP6   Demo software development and validation studies

WP7: Project management and monitoring
WP8: Transnational dissemination

Impacts

- The project will deliver digital specification added value for forest products and ensure an efficient use of resources by optimising the wood product to the end user performance requirements

- The primary impact from WoodLCC is enabling input data for more robust and precise LCC analyses for wooden components and buildings

The value of scientific cooperation

- The common overall goal of the partners are sustainable and durable buildings for the future

- ERA allow a unique group of European experts on LCC, social science, engineering science, building physics, wood material science, service life modelling, mycology and BIM to establish a scientific cooperation

- Backing the common goal, the partners aim to avoid wrong decisions and negative economically and environmentally impacts by enabling robust and precise LCC for wood exposed outdoors and in the building envelope

Unexpected peculiarities / barriers

Yet to be explored… ☺

Thank you!

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