

Interreg VI – A Italia - Österreich
Cooperation Program 2021 - 2027

The Power of Wood

Interreg
Italia – Österreich



Co-funded by
the European Union

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Date: 01.09.2025

Version: 1.2 - Final

DOCUMENT APPROVAL

Name	Organization	Role	Action	Date
Alexander Berndt	CUAS	Lead	Approval	16.06.2025

DOCUMENT HISTORY

Version	Date	Modifications	Authors
V1.0	22/06/2025	First sketch of idea	Semih Bajrami
V1.1	22/08/2025	Slide deck developed	Semih Bajrami
V1.2	01/09/2025	Slide deck finalized; additional materials prepared	Semih Bajrami
V1.3			
V1.4			



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1. Introduction

This workshop introduces pupils (ages 12–14) to the concept of sustainability through the lens of wood. They will learn how trees act as carbon stores, why wood is an eco-friendly alternative to materials like concrete, steel, or plastic, and how modern technologies such as Cross-Laminated Timber (CLT) make wood a strong and renewable building material. Through presentations, games, and a hands-on activity, pupils will connect everyday material choices to climate change and sustainable design.

1.1 Learning Objectives

- Understand how trees store carbon and why this matters for the climate.
- Compare the environmental impact of wood with steel, concrete, and plastic.
- Experience the strength of wood through a CLT-inspired hands-on activity.
- Encourage creativity, teamwork, and critical thinking about material choices.
- Develop awareness of sustainability and responsible decision-making.

1.2 Required Knowledge

- No prior technical knowledge is needed.
- Basic familiarity with materials (wood, plastic, metals) is helpful.
- Creative thinking and teamwork encouraged.

2. Workshop Structure

The workshop is structured to balance theory, interaction, and practical activities.

Table 1: Workshop structure

Phase	Duration	Activities	Purpose	Materials
Opening	10 min	Welcome, introductions, icebreakers	Set tone and expectations	Name tags, agenda, whiteboard, marker
Context Setting	15 min	Presentation: The Power of Wood	Introduce key concepts	Slides, projector
Main Content	35 min	Activity: Produce your own CLT panel	Deepen understanding, hands-on experience	Wood pieces, glue, hand vice
Wrap-up	5 min	Wrap-up Speech	Summarize topic	Feedback cards

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2.1 Workshop Agenda

Table 2: Workshop agenda

Time	Activity	Format	Duration	Materials	Facilitator Notes
0:00-0:10	Welcome & Introductions	Group discussion	10 min	Whiteboard	Ask: "Where do we use wood vs. plastic/metal daily?"
0:10-0:25	The Power of Wood	Presentation	15 min	Slides	Focus on carbon storage and life-cycle impact
0:25-0:50	Activity: Produce your own CLT	Team Project	25 min	Wood pieces, glue, hand vice	Balance presentation with engagement
0:50-1:00	Test the CLT panels	Final phase	10 min	Test setup	To be discussed

2.2 Required Equipment

Table 3: Required Equipment

Category	Item	Quantity	Purpose	Alternative Options
Technology	Projector/screen	1 set	Presentations	Large monitor, flip charts
Materials	Wood pieces set	1 set/group	Producing CLT panels	/
Materials	Glue	1 per group	Between the layers of CLT	Bio Glue
Supplies	Instruction sheet	1 per group	Information about activity	Digital tools, tablets
Documentation	Feedback cards	1 per person	Learning check & reflection	Verbal answers

2.3 Evaluation Framework

Table 4: Workshop Evaluation

Evaluation Type	Timing	Method	Key Metrics	Follow-up Actions
Immediate	End of workshop	Feedback forms	Understanding of carbon storage and material impact	Adjust difficulty or terminology as needed
Short-term	1-2 weeks later	Online quiz/reflection	Retention of concepts and creativity in application	Share top redesigns or post-event highlights

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Long-term	3-6 months later	Email follow-up	Awareness of material choices in daily life	Encourage similar hands-on eco-projects at school
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3. Detailed Explanation

3.1 Opening Speech

0:00-0:10

Opening Speech:

“Good morning, everyone!

Welcome to our workshop on wood and sustainability. I’m really glad to see you here today. Over the next two hours, we’re going to explore how wood—something we see every day—can actually play a huge role in protecting our planet.

You might think of wood as just the stuff our desks, pencils, or chairs are made of. But wood is much more than that. Trees absorb carbon dioxide from the air as they grow, and that carbon stays stored inside the wood—even when it becomes a table, a floor, or even part of a building. That means every piece of wood you see is actually helping the fight against climate change.

Today, we’ll discover why wood is so special, how it compares to materials like steel or concrete, and then we’ll do something really exciting: you’ll build your very own mini CLT panel—the same technology that’s used to construct modern wooden buildings, even tall ones. At the end, we’ll even test how strong your panels are compared to single wooden sticks.

So, this isn’t just about listening—it’s about thinking, creating, and building. By the end, I promise you’ll look at wood in a whole new way.

But first, let’s warm up with a simple question. There are no right or wrong answers, I just want to hear your ideas:

Icebreaker Question:

“What everyday objects can you name that are made from wood?”

Or: “If you could replace one plastic object in your life with wood, what would it be?”

3.2 Presentation

0:10-0:25

Slide 1: Global Warming

Speaker Notes: “Let’s start by understanding global warming.

First, what is it? Global warming means that the Earth’s average temperature is rising. This happens because greenhouse gases, like CO₂, trap too much heat in our atmosphere – like a blanket that’s getting too thick.

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Second, why is it happening? The main reason is human activity. When we burn coal, oil, and gas for energy, or cut down forests, we release huge amounts of CO₂. This extra CO₂ builds up and makes the planet warmer.

And finally, what can we do? We actually have solutions. We can switch to renewable energy like solar and wind, we can protect and plant more forests, and we can store carbon naturally in things like trees and wooden products.

So global warming isn't just a future problem – it's happening now, but we also have the power to reduce it."

Slide 2: Trees as Carbon Stores

Speaker Notes: "Trees are amazing because they act like natural carbon stores. While they grow, they **absorb CO₂** from the air and lock it away in their wood, leaves, and roots.

That carbon stays stored as long as the tree—or any product made from it—exists.

But we must be careful: if we cut down too many trees without replacing them, that balance is lost. The rule is simple—**never cut more than can grow back**. This way, forests keep working as powerful carbon banks that help fight climate change."

Slide 3: Wood Products as Carbon Banks

Speaker Notes: "Wood doesn't stop storing carbon once the tree is cut. Products like furniture, paper, and houses keep that carbon locked inside.

The longer a wooden product lasts, the longer CO₂ stays out of the air. For example, a wooden house can store carbon for many decades.

That's why every wooden product acts like a **carbon bank**, helping fight climate change."

Slide 4: Material Impact: Wood vs. Concrete & Steel

Speaker Notes: "When we talk about building materials, it's important to think about their environmental impact.

Concrete and steel are the most common materials, but they come with a cost. Producing them uses a lot of energy and releases huge amounts of CO₂ into the atmosphere. For example, cement production alone is responsible for about 8% of global CO₂ emissions. (World Economic Forum. (2024))

Wood, on the other hand, requires much less energy to process. It doesn't need to be melted or fired at extreme temperatures like steel or cement, which makes it a much lower-carbon material.

This is where **mass timber** comes in. According to Turner & Townsend (2022), buildings made with mass timber can reduce CO₂ emissions by about **30% compared to concrete buildings** and **50% compared to steel buildings**.

So, when we choose wood for construction, we're not only using a renewable material, but we're also cutting down significantly on the greenhouse gases that warm our planet."

Slide 5: End-of-Life Options

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Speaker Notes: “When a wooden product reaches the end of its life, it still has value. There are three main options:

First: Recycle. Wood can be chipped and turned into **particle boards or paper**. This keeps carbon stored and avoids using new raw materials. Wood recycling helps extend carbon storage time and reduces waste.

Second: Reuse. Large pieces like beams and planks can be used again in **new buildings**. This means we don’t need to produce as many new materials, saving both resources and emissions.

Third: Bioenergy. Waste wood that cannot be reused or recycled can be burned to produce energy. Yes, this releases carbon, but it **replaces fossil fuels**, which would have released even more emissions.

So, even at the end of their life, wooden products continue to play an important role in reducing emissions and supporting sustainability.”

Slide 6: Sustainable wood: Building the Future

Speaker Notes: “Now let’s watch a short video about Sustainable wood and future of wood.”

Slide 7: CLT Panels – Modern Wood Technology

Speaker Notes: “

- **What is CLT?**
 - CLT stands for *Cross-Laminated Timber*.
 - Imagine stacking several wooden boards on top of each other, but each layer is turned 90 degrees before gluing.
 - This crisscross pattern is what gives CLT its name.
- **Why is it strong?**
 - Normal wood can bend or crack along the grain.
 - But when we place layers in different directions, the weak points are balanced out.
 - That’s why CLT is more stable and doesn’t warp as easily.
 - It’s a bit like weaving – the cross pattern makes it stronger.
- **Where is it used?**
 - CLT is a modern building material, often called “*the concrete of the future*.”
 - It’s used in houses, schools, sports halls, and even tall wooden skyscrapers.
 - Builders like it because it’s light to transport, quick to build with, and stores carbon, which is good for the environment. “

Slide 8: References

Speaker Notes:

- Hidayatullah, M. (n.d.). Global warming: Causes, effects, and solutions to save our planet. Vocal Media.
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- Geng, A., Yang, H., Chen, J., & Hong, Y. (2017). Review of carbon storage function of harvested wood products and the potential of wood substitution in greenhouse gas mitigation. *Forest Policy and Economics*, 85(P1), 192–200. <https://doi.org/10.1016/j.forpol.2017.08.007>

3.3 Activity: Produce your own CLT

0:25-0:50

3.3.1. Activity Slides

Slide 1: Activity: Produce CLT panel – Materials

Speaker Notes: “Before we start, let me quickly introduce the materials we’ll use:

- A **set of wood sticks**
- **Glue** (or bio-glue for a sustainable option)
- **Hand vices** to press the layers together”

Slide 2: Activity: Produce CLT panel – Procedure

Speaker Notes: “Here’s what we expect you to do:

- Line up at least **five sticks side by side** to form your first layer.
- Apply glue evenly across the surface.
- Place a **second layer of sticks perpendicular** to the first one.
- Repeat this process for **3–4 layers**.
- When you’re finished, use the **hand vices** to press the layers together and let them dry.
- This way, you’ll see how CLT gains its strength from the cross-layered pattern. At the end, we will also **test the strength** of your panels to compare them with single-layer sticks.
- Before we begin: **Are there any questions? or Is everything clear?”**

Slide 3: Activity: Test CLT panel

Speaker Notes:



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3.3.2 Instruction Sheet “How to Make Your Own Mini CLT Panel

Goal: Build a small Cross-Laminated Timber (CLT) panel to see how layering wood makes it stronger.

Steps:

1. **Prepare your first layer**

- Take **5 wood sticks** and line them up side by side.
- Make sure they touch each other and form a flat layer.

2. **Add glue**

- Spread glue evenly across the top surface of the first layer.
- Don't use too much—just enough to cover the sticks.

3. **Make the second layer**

- Place another 5 sticks **perpendicular (90°)** to the first layer.
- This cross pattern is what gives CLT its strength.

4. **Repeat the process**

- Add more glue and continue with new layers (3–4 layers total).
- Remember: each layer should be **crossed** compared to the one below.

5. **Press the layers**

- Place your hand vices (clamps) on the panel to hold everything tightly together.
- Make sure it is pressed firmly and flat.

6. **Let it dry**

- Leave the panel under pressure until the glue sets.
- Drying time depends on the glue—ask your instructor for guidance.

7. **Test the strength**

- Once dry, carefully remove the clamps.
- Compare your CLT panel to a single wood stick.

Remember:

- Work carefully and as a team.
- Always keep your fingers safe when using vices.”

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3.4 Wrap-Up and Q&A

Wrap-up Speech: “Great job, everyone!

Today you learned that wood is not just an everyday material—it’s a natural way to store carbon, a renewable resource, and, when used smartly, a strong alternative to concrete and steel.

By making your own CLT panels, you saw for yourself how the cross-layer pattern makes wood stronger and more stable. This same idea is used in real buildings all over the world.

I hope this workshop showed you that the choices we make about materials can have a big impact on the environment. Even small changes—like choosing wood over plastic—can add up to something meaningful.

So, next time you see something made of wood, remember: it’s more than just material—it’s a piece of nature helping to build a sustainable future.

Thank you for your great energy and creativity today!”