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## Before the
## Committee on Energy and Natural Resources
## United States Senate
## Forest Management, Forest Products, and Carbon

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### Introduction

Chairman Manchin, Ranking Member Barrasso, and members of the Committee, thank you for the opportunity to submit testimony to you today about innovative wood products. My name is Jennifer Cover and I serve as the President and CEO of WoodWorks.

WoodWorks is a nonprofit entity that provides project support to members of the design and construction community seeking to improve the sustainability and carbon footprint of buildings in the U.S. At no cost, we help developers, design teams and general contractors navigate the design and construction of projects that utilize innovative wood structural systems. Last year alone we provided technical assistance on over 400 projects, including offices, schools, hotels, and commercial buildings. Each year, we also offer more than 300 educational opportunities nationwide.

WoodWorks is a true public/private partnership where industry matches government funding on a 3:1 ratio. Our primary industry partner is the Softwood Lumber Board, an agricultural check-off program funded by the softwood lumber industry. Our key government funding partner is the U.S. Forest Service. Under Chief Christiansen's leadership, the Forest Service has been a huge champion and supporter of the WoodWorks program, and we have made significant advancements toward both their and our mission.

### Building materials that turn our cities into carbon sinks

Long-term carbon storage in buildings – As a tree grows it absorbs carbon dioxide from the air and locks it away in its cellular structure. When a tree is harvested and converted into building products, that carbon remains stored in the wood fiber. When those products are used to construct buildings, those buildings become giant carbon sinks, storing the carbon for the life of the structure (which can be 60-100 years) and longer if the material is reused. Meanwhile, a new tree grows in the harvested tree's place and the cycle of absorbing and sequestering carbon begins again.

Wood products remove carbon from the overall system. Wood is about 50% carbon by dry weight, having been drawn from carbon dioxide in the atmosphere by the growing tree. Wood is the physical storage of carbon that was previously in the air. Left to natural processes, the tree will die and decay, releasing carbon back into the atmosphere. Instead, when a tree is harvested and used as a wood product the carbon will continue to be stored using that solid material in building products. This also makes room for new trees to be planted to pull additional carbon out of the atmosphere. Solid wood materials can be reused indefinitely. Once they are no longer needed for their original purpose, they can form the basis of other products.

***The significance of embodied carbon*** – The global population is increasing, which means we need more places for people to live and work. When we look at global carbon dioxide ($CO_2$) emissions across various

sectors, we see that the building industry accounts for 40%. That is total emissions, coming from the energy to manufacture the building materials plus the operational energy of the building after construction. Breaking this down further, just *getting buildings built* accounts for 11% of global $CO_2$ emissions. Wood products require less energy to manufacture than more traditional construction materials, so in addition to the carbon sequestration that takes place as the material grows, when wood products are used in place of more traditional materials, there is a significant offset to the carbon emitted as a result of the differences in the manufacturing processes. Wood-constructed buildings, including those built with CLT, avoid carbon emissions during manufacturing and store carbon after the building is constructed, which has resulted in worldwide interest in expanding its use in the built environment. This combination of carbon absorbed in the material and carbon avoided to manufacture the product, represents the overall embodied carbon of the wood building material.

***The climate mitigation opportunity*** – GHG emissions associated with the manufacturing, use and disposal of building materials are more important than many people realize. First, because most emissions occur in a relatively short period of time before a project is built, they present an excellent near-term opportunity for carbon reduction. Second, as buildings approach net-zero energy, material impacts will make up most of the carbon footprint of the built environment. Embodied carbon, as it is known, has long been overlooked in sustainability strategy, but this is starting to change. Internationally, many green building programs and policies now recognize the importance of reducing embodied carbon through design decisions and we are starting to see an understanding and recognition of this issue growing in the U.S. as well.

This is where wood fits in as a climate mitigation tool. Wood is the only building material that is renewable, that can be produced using minimal amounts of fossil fuel-based energy, that stores massive quantities of carbon for long periods of time, and that can be reused again and again before the solar energy stored within the materials are recovered for energy production. Given the pervasiveness of non-renewable and energy-intensive building materials currently used in non-residential construction, there is particular potential to reduce carbon emissions and increase carbon storage through greater use of wood in commercial/industrial, health care, government, and multifamily buildings.

## Mass timber can alleviate a sizeable percentage of U.S. carbon emissions

When we refer to mass timber, we refer to large structural panel products such as cross-laminated timber (CLT), nail-laminated timber (NLT), and dowel-laminated timber (DLT). They are constructed with many pieces of lumber, which is why they offer both forest health and end-use construction benefits. Mass timber can utilize small-diameter logs and even underutilized species, creating high-value end-use markets for what has traditionally been low-value material in U.S. forests. Growing the mass timber market establishes an economic incentive for forest thinning and other landscape restoration efforts that keep forests healthy and reduce the risk of wildfire. There are a few manufacturers that are currently exploring the use of alternative species and various hardwoods or that are looking at the inclusion of insect damaged materials (including blue stain material) and both are showing promising results.

Mass timber panels are typically between 4 and 12 feet wide, 16 and 60 feet long, and 4 to 12.5 inches thick. They are revolutionary because their strength and other performance capabilities allow them to be used as the main structural material in taller buildings, offsetting more fossil fuel intensive options. Building codes have evolved to recognize these capabilities, and the 2021 International Building Code (IBC) allows mass buildings up to 18 stories. The tall wood code provisions from the 2021 IBC were adopted in advance by several jurisdictions, including Oregon, Washington, Utah, and Denver, Colorado. Others are

evaluating adoption, and California has approved tall wood code amendments.

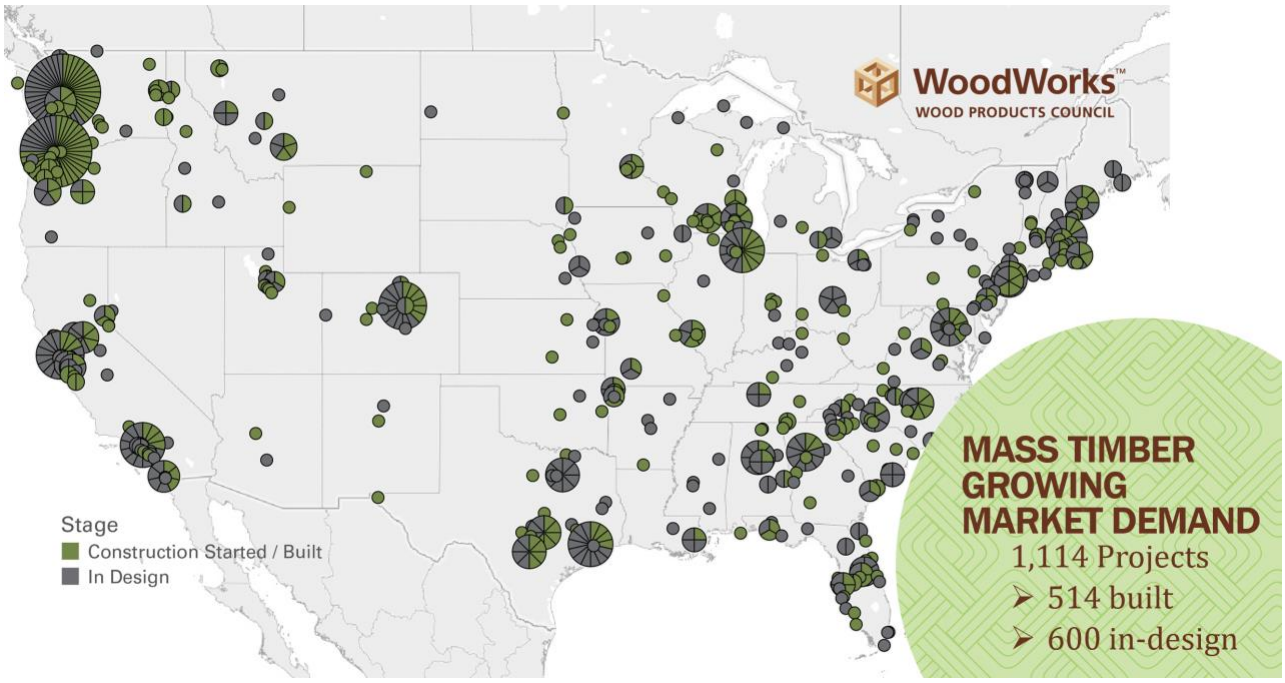
With the availability of innovative wood systems and building code advancements, developers and design/construction teams are increasingly choosing mass timber to improve the carbon footprint of their projects.

For example, an engineering firm in Denver wanted to design a unique office building that would give their client a differentiated space with aesthetic appeal. They wanted to pursue mass timber, and specifically CLT. However, they also wanted to understand the environmental impact of this decision, so they undertook a comparative life cycle assessment (LCA) of the same building—a five-story, 150,000-square-foot structure—designed in wood as well as more traditional building materials. The cost was almost the same for all three materials, but because of the carbon stored in the mass timber building and the reduced emissions during the manufacturing process, the carbon footprint was dramatically better than the other two.

Another example is the first CLT school built in West Virginia, Franklin Elementary. The decision to use mass timber instead of a more traditional, fossil fuel-intensive material resulted in a total potential carbon impact equivalent to taking 600 cars off the road for an entire year. One third of this carbon impact is a result of the carbon sequestered and stored in the CLT and two thirds is from the carbon avoided during manufacturing by using CLT over a traditional material. Combined, the embodied carbon impact is impressive.

That is one building. There are 17,000 buildings built in the country every year that could be built with wood solutions but are currently not. In most instances, it costs about the same to build with wood, yet the environmental benefits are significant and the only key hurdle is awareness and understanding. Building with innovative wood products from properly managed, sustainable forests is a relatively easy way to alleviate a sizeable percentage of U.S. carbon emissions and the building and design sectors are increasingly seizing the opportunity.

There are currently 1,114 mass timber projects in the U.S. that are either built or in-design. The momentum in the design and construction industry is clearly there, but we are still at the very beginning of this building revolution and support is needed from leadership that is interested in decreasing this countries' carbon footprint, improving the health of our forests and increasing higher quality job opportunities in rural communities.




### The U.S. is playing catch-up with the rest of the world on embodied carbon

Europe and the United Kingdom have a number of policies focused on reducing the embodied carbon in buildings.[i] While each country takes a distinct approach, LCAs are critical components in most strategies. For example:

- In France, President Emanuel Macron announced that all new public buildings should use 50% timber or another bio-sourced material after 2022.
- In Sweden, the "Climate Declaration When Constructing Buildings," will enter into force on January 1, 2022. It introduces a reporting requirement for construction of new buildings and involves the development of a national database containing climate data to inform decision making.
- The UK Green Building Council offers guidance to help professionals measure embodied carbon. In 2012, they worked with the UK Government to establish a joint industry-government board focused on green construction, the Green Construction Board. This board created The Low Carbon Routemap for the Built Environment, a tool that accounts for both embodied and operational emissions and outlines policies and actions to advance the government's goal of cutting GHG emissions by 80% by 2050.

These are just a few examples of international policies that align with the increased use of mass timber for significant environmental gains.

### Good for the environment *and* rural communities

Mass timber manufacturing is typically located in rural, forest communities. Increased demand for these products will create more and better jobs in these communities. Because mass timber products are highly engineered and machined to minuscule tolerances, manufacturing facilities require skilled workers, such as computer and software engineers. Although the U.S. is playing catch-up in mass timber manufacturing, there are now six mass timber plants producing building grade material operating in the U.S. so far, in Riddle and Lyons, OR, Spokane and Colville, WA, Dothan, AL, and Columbia Falls, MT. There are three more

starting up plus six plants focused on just producing CLT mats for non-building usage. The addition of high-tech jobs can have a significant positive impact on these communities—and others, as demand for mass timber increases and more facilities are needed.

## Conclusion

WoodWorks is a small program, but we are nimble and this allows us to meet the quickly evolving needs of the mass timber market. Having the support of the agricultural check-off program and the U.S. Forest Service is critical to our success. We work closely with the Forest Service, including the Forest Products Lab collaborating on research analysis, synthesizing research for application and providing technology transfer, to ensure the research efforts are utilized in market applications.

Supporting mass timber means supporting an innovative building solution that:

1. Reduces the environmental impact of the built environment by sequestering carbon and reducing GHG emissions
2. Brings improved jobs to rural communities
3. Provides a sustainable and competitive option for developers
4. Creates work and learning environments that are aesthetically pleasing and have biophilic benefits
5. Improves forest health by creating economic incentives for landscape restoration efforts

Thank you again for supporting innovation and job creation in the forest and construction sectors. I hope you will consider encouraging government entities in your states to consider mass timber for their buildings. Additionally, WoodWorks fully supports the adoption of the most current building codes at the state and local levels. As always, WoodWorks is available to support design and construction teams at no cost to help them realize successful wood projects.

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[i] *Understanding the Role of Embodied Carbon in Climate Smart Buildings: Report on Carbon Reduction Policy and Design Best Practices*, Think Wood, February 2020.