MASS TIMBER

AN IMPORTANT CLIMATE SOLUTION AND ECONOMIC OPPORTUNITY FOR CENTRAL NEW ENGLAND & EASTERN NEW YORK

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LETTER FROM STATE LEADERSHIP

We are pleased to endorse the consensus report and recommendations developed by the Mass Timber Dialogue for advancing the development of mass timber in the Vermont, New Hampshire, New York, and Massachusetts region. Mass timber presents our four states with a compelling and exciting opportunity for development of a regional industry that benefits our rural communities, our urban communities, our forests, and the global climate.

The Mass Timber Dialogue engaged experts from a broad range of relevant fields and representatives of each of our states. Diverse interests and perspectives – including those representing the forestry community, the environmental community, and the building and construction community – have aligned around a common vision and recommendations for mass timber development in our region. We are proud to associate ourselves with an effort that brings together diverse stakeholders in all four states to advance common interests.

We applaud the efforts of the Mass Timber Dialogue for providing a roadmap for our region for the development of mass timber and endorse their recommendations. We are committed to working together across our four states and within our states with colleagues in diverse government departments, as well as the private sector, to advance the recommendations in this report.

Richard A. Ball

Commissioner, New York State Department of Agriculture and Markets

Robert Davies

Director, New York Department of Environmental Conservation
Division of Lands and Forests
State Forester, New York

Patrick D. Hackley

Director/State Forester, Division of Forests & Lands, New Hampshire Department of Natural & Cultural Resources

Benoit L. Lamontagne

Business Retention & Recruitment
New Hampshire Division of Economic Development

Julie Moore

Secretary, Vermont Agency of Natural Resources

Kathleen Theoharides

Secretary, Massachusetts Executive Office of Energy and Environmental Affairs

EXECUTIVE SUMMARY

The Central New England and Eastern New York region has an opportunity to work towards achieving climate targets, meet the growing demand for affordable housing, and support local and regional urban and rural economies through the regional sourcing and use of "mass timber" – a familiar yet cutting-edge building technology that can be used to construct even high-rise buildings from small wood sections massed together.

Mass timber (MT), which can be used to build a wide variety of structures, should be incorporated into the mix of building technologies used in the region. It can play a significant role in meeting the growing demand for affordable and workforce housing in cities and communities in the region. MT has particularly strong competitive advantages for construction of 6-12 story buildings, ideal for much-needed multi-family and mixed-use residential housing. MT has been approved for use in low-rise structures for decades, and the 2021 International Building Code (IBC) allows MT's use up to 18 stories for full building structures or in combined designs with light-frame wood, steel, light gauge metal, and/or concrete systems.

In this region, MT is a key building technology because there is the capacity to supply a portion of it from the region's forestlands—creating jobs in MT manufacturing, supporting forest owners and sawmills in rural communities, and keeping forests as forests.

MT's potential as a climate solution results from simultaneous reduction of construction-related greenhouse gas emissions, removal of carbon from the atmosphere by trees, and storage in a long-lived product. MT can also play an important role in both "keeping forests as forests" and maintaining their multiple values to society. Adoption of MT would contribute to realizing critical climate targets for individual states and for the region. It is expected that the greenhouse gas benefits of MT buildings can be enhanced by adopting forest practices that result in added stored carbon in the forests over time or the permanent conservation of working forests (Catanzaro and D'Amato, 2019). Forestry practices overseen by licensed foresters foster a variety of benefits to society (wildlife, watershed, forest health and resilience, rural economy, etc.), and carbon storage is just one societal benefit. Like all climate mitigation solutions, the specific carbon benefits of individual MT projects will need to be verified when applied toward carbon emissions reduction goals.

Markets for local MT may offer incentives to mills and landowners where building owners want to highlight the verified use of forest practices that result in additional net carbon sequestration while maintaining forest productivity and critical ecosystem services.

Targeted actions by policy makers can significantly accelerate both regional supply and demand of MT, providing the region a broad range of economic, ecological, and quality-of-life benefits. To realize MT's adoption at scale, policymakers should build on the strong foundation of work and momentum among diverse partners in the region. Key actions include:

- Adopt the most up-to-date building codes allowing use of MT for projects up to 18 stories.
- Incentivize construction of MT buildings, including catalytic demonstration projects, so that developers become familiar with this technology and uncertainty is reduced for early adopters.
- Stimulate the regional forest economy to develop carbon negative MT building products for both retrofit and new construction in the region, supporting carbon sequestration and storage and economic development.
- Develop standards and design specifications for state-funded MT projects in order to 1) document embodied carbon of products and materials used in the buildings sector and to 2) create broad carbon literacy regarding the impact of materials, while increasing attention to carbon-sequestering products (note: these carbon reductions are outside of the current accounting within climate laws in the region but may be included in the future).
- Invest in research and development for supplying, manufacturing, and using MT.
- Promote professional education to encourage and enable use of MT in diverse projects.
- Encourage development of a sustainable regional supply that both sequesters additional carbon and supports multiple forest management objectives including rural livelihoods and wildlife habitat.

BUILDING TALL, BEAUTIFUL, AND CLIMATE-SMART WITH WOOD

Mass timber (MT), a familiar yet cutting-edge building technology that can be used to construct a wide variety of climate-smart structures, should be incorporated into the mix of building technologies used in our region. With particularly strong competitive advantages for construction of 6-12 story buildings, MT is ideal for much-needed affordable multi-family and mixed-use residential housing in New York and Boston, as well as smaller cities and communities in Central New England (Vermont, New Hampshire, and Massachusetts) and Eastern New York. MT is an effective climate solution, storing carbon removed from the atmosphere by forests in buildings for the long-term. MT also has lower construction-related greenhouse gas emissions than other building materials while being cost-competitive. Furthermore, our region's forests can supply MT - creating jobs and supporting forest owners and sawmills in our rural communities.

The 17-time award winning Olver Design Building at UMass - Amherst highlights the structural utility and aesthetic beauty of wood. Image courtesy of Albert Vecerka/Esto.

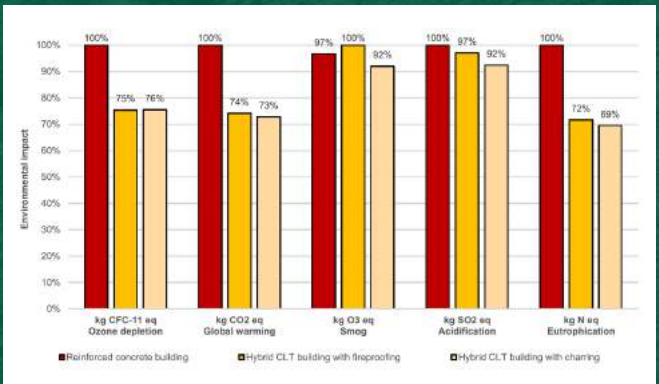
A set of structural building materials, MT assembles a highly renewable resource - smaller wood sections of common lumber such as 2x4s and 2x6s - into large, multi-layered panels, beams, and columns. These materials are strong and fire-resistant for building multi-story, and even high-rise, buildings for commercial, housing, and institutional use. While MT has been approved for use in low-rise structures for decades, the 2021 International Building Code (IBC) allows MT's use up to 18 stories for full building structures, as well as for combined designs with light-frame wood, steel, light gauge metal, and concrete systems. Already widely used in Europe, Canada, Japan, Australia, and New Zealand, MT is growing in popularity in the U.S., with the number of MT buildings completed or in design having increased from approximately 30 in 2013 to over 1,000 in 2020.

The Mass Timber Dialogue: This report is the result of the extensive work of a diverse gathering of experts from both the supply and demand sides of MT. From September 2020 through June 2021, 35+ experts shared information, completed new analyses, and worked hard to develop common recommendations. The Mass Timber Dialogue is unusual because it involved experts from the full life cycle of the product including forest ecology and management, land conservation, forest harvesting and milling, wood building design and engineering, permitting and construction, and climate policy from the public and private sectors in VT, NH, MA, NY, and beyond. This report is also unusual in that it represents a consensus of state government leaders alongside a diversity of stakeholders from four states on a complex issue. The result is a process for collaboration that can be used as a model for MT in other regions where rural, forested landscapes are close to cities. More information on the Mass Timber Dialogue can be found at masstimberregionaldialogue.com/.

Building with wood has long had great appeal around the world - and is about more than just aesthetics. Recent studies show that living, working, and studying in spaces with exposed wood reduces stress, promotes learning, and improves health. MT offers an opportunity for including large amounts of exposed wood in multi-family housing and institutional, office, and commercial spaces due to the fire-resistant nature of the floor, ceiling, and wall panels (Lowe, 2020; Think Wood).

MT is a cost-competitive, environmentally sound, and low-carbon building material. Recent life cycle analyses (LCAs) of two potential building projects in Boston show that MT substitution for conventional materials can reduce the emissions associated with a building's materials while also storing carbon in the wood components. These LCAs showed a range of reduction of the building's embodied global warming potential from 14 to 52%, depending on the amount of MT substituted in the structure (Jensen et al, 2020).

Because approximately half the dry weight of wood is carbon, MT keeps carbon out of the atmosphere during the lifetime of the building and beyond, as long as materials are re-used. MT construction also results in comparatively less air and water pollution and lower waste generation (Pierobon et. al. 2019) and MT buildings have important advantages for reducing energy for heating and cooling (Harte, 2017, p.122).



Comparative LCA results from: Pierobon, F., Huang, M., Simonen, K., & Ganguly, I. (2019). Environmental benefits of using hybrid CLT structure in midrise non-residential construction: An LCA based comparative case study in the US Pacific Northwest. Journal of Building Engineering, 26, 100862. Image courtesy F. Pierobon.

We recognize that responsible forest management overseen by professional foresters to promote ecological, economic, and social health, as is common across the region, can also increase climate benefits. Current incentives to landowners practicing responsible forestry should be strengthened and include carbon storage goals. Responsible forestry conserves multiple forest attributes including forest health and resilience, timber, wildlife, recreation, water, soil, and carbon and reduces forest conversions. As carbon markets develop, MT may offer landowners interested in demonstrating enhanced forest resilience and forest carbon storage the possibility of receiving market-based incentives for additional carbon storage in the future. Because the market for MT is a small part of the whole forest product market, other goals of sustainable forestry can be balanced with the climate-focused goal.

Why Mass Timber?

- Utilizes climate-friendly building materials that can help meet targets for reducing greenhouse gas emissions in states and the region.
- Helps meet the growing demand for affordable housing by filling the gap in 6-12 story buildings.
- May use locally-produced renewable products for construction.
- Supports human well-being through documented health benefits of exposed wood in biophilic designed buildings.
- Keeps forests as forests by supporting local and regional rural economies and local forest owners (D'Amato et al, 2010).[1]
- Developing a MT market for its carbon benefits may help to increase the already high percentage of forests under the care of professional foresters.

Interior of a model mass timber building. Image courtesy of John Klein/Generate.

Supply and use of MT in our region at scale can help us realize critical climate targets. When sourced from healthy, resilient, well-managed forests, widespread adoption of MT would serve as a potent climate mitigation and resilience strategy. This assessment is based on an extensive review of relevant literature (Himes and Busby, 2020), as well as our own modeling.[2] The specific carbon benefits of individual MT projects can be verified, including life cycle analysis that considers the magnitude of emissions reduction from material substitution, C stored in wood products, and in-forest carbon benefits. Adding in-forest impacts, including harvest and sequestration, to carbon analyses of MT projects can further clarify MT's full GHG impacts and potential to enhance those impacts through improved forest practices.

WHY IS A MASS TIMBER MARKET A GOOD FIT WITH THE REGION'S FORESTS?

Central New England and Eastern New York have species that could support a small supply chain providing MT for a portion of the MT buildings that may eventually be built in the region.[3] Recent research at University of Massachusetts, Amherst, demonstrates that Eastern hemlock and white pine can be used to create MT panels that will meet building codes (Kaboli et al, 2020). Eastern and Central New York also have extensive spruce forests that are already approved for MT use. Further research is needed to show the utility of less-used hardwood species such as black birch, beech, and red maple for niche use in panels and ancillary acoustic structures. The region has more than a dozen small- to medium-sized sawmills that could supply a small, regional MT supply chain. Investment by states to modernize this infrastructure would help the rural economy and make the MT supply chain even more ready. The region has a long history of using timber framing to construct long-lasting and beautiful houses and buildings.[4] MT is a modern continuation of this important cultural tradition.

In addition, we have high confidence that development of MT will help to support the long tradition of good forest management in the region. "Keeping forests as forests" is a long-standing and widely shared value among forest landowners and conservationists in the region. D'Amato et al. (2010) studied woodland owners in rural western Massachusetts and concluded that economic benefits of timber income and "current use" forest tax laws exceed the costs to landowners of taxes over time, and payment for conservation easements provides even larger long-term value to landowners. A survey with responses from 450 Massachusetts private forest owners who recently completed a forest stewardship plan with a professional forester found that over 40% were seriously considering permanent conservation options and had contacted conservation organizations.[5] Another recent study, using U.S. Forest Service permanent inventory plots in the Southeastern U.S., analyzed the connection between forestry and forest conversion and concluded that "stronger timber markets enhance the area of forests and alter patterns of land use change including patterns of development" (Kim et al., 2018).

Forest management can be done to enhance range of these diverse forest values - habitat, watershed, forest resilience and health, soil conservation, carbon storage, outdoor recreation, timber value, and other ecosystem services. The four states all have forest "current use" tax programs and other forestry programs which encourage high-quality forest management under the guidance of a licensed forester. Private forest landowners, who own the majority of our woodlands, manage their forests for a combination of the above goals depending on each landowner's interests. State agencies in all four states manage state forests to balance the age and species diversity to provide for the above values. This diversity of valid social goals for forest management underlies the strength of the region's forests. Keeping forests as forests is critical because forest conversion to development results in both significant carbon emissions and destruction of the forest's carbon sequestration and storage capacity.[6]

MT can connect the woodland owner to urban-dwellers in the region occupying beautiful, locally-sourced wood buildings. Builders may want to encourage wood supply from well-managed forests by 1) supporting the conservation of forests with working forest conservation easements and keeping forests as forests or by 2) even further increasing professional foresters' supervision of harvests in the supply chain. States may be most helpful in providing incentives for sawmill infrastructure modernization to stem the steady loss of sawmills in the region and increase efficiency, reduce waste, allow better utilization and lumber recovery from smaller diameter logs, and make improvements that will help MT and other products be more efficient. States may also be helpful in funding the costs to mills for chain of custody systems that improve the ability to trace the source of timber. This may help expand the demand or lower the price for the MT product where builders want to highlight the verified use of forest practices that result in additional net carbon sequestration while maintaining forest productivity and critical ecosystem services. The Dialogue is confident there are ways to incentivize woodlands supervised by professional foresters to supply MT without limiting the market and the ease of supplying wood. MT can be an important tool to meet multiple societal goals and is enhanced by its local supply and manufacture.

A POTENTIAL SOLUTION TO INCREASE AFFORDABLE HOUSING

Mass timber offers a compelling solution to the challenges of building affordable, high quality housing in our cities. MT is well suited for new 6-12 story residential construction, offering up unique opportunities for creating new housing. Typical multi-family housing developments are in the range of 4-6 stories, often utilizing podium or pedestal construction of 1-2 stories of steel and concrete construction topped with 3-5 stories of light frame wood construction. Beyond these heights, building codes require steel or concrete framing, and to justify the added costs of these materials, projects often go much taller. This has created a critical gap in housing developments in the range of 6-12 stories. MT provides an opportunity to create housing at this scale – and changes to the 2021 IBC allow the use of MT in projects up to 18 stories.

MT housing developments in this range include:

- McEvoy Apartments in San Jose, CA, consisting of two 12-story towers providing 365 units of affordable housing[7]
- 340+ Dixwell in New Haven, CT, consisting of a 4-story, 69-unit affordable housing development[8]
- 11 E Lenox in Boston, MA, consisting of a 7-story, 34-unit market rate housing project[9]
- INTRO in Cleveland, OH, consisting of a 9-story, 288-unit market rate apartment building[10]
- Akari House in Seattle, WA, consisting of an 18-story, 135-unit housing development[11]

The use of MT housing for 6+ story developments can expand housing near mass transit hubs, such as commuter rail stations and subway/bus lines. In such locations, new MT construction can enable more residents to access mass transit at the same or lower housing price points – an intersection of housing and transit that can improve job mobility and long-term residential quality for residents.

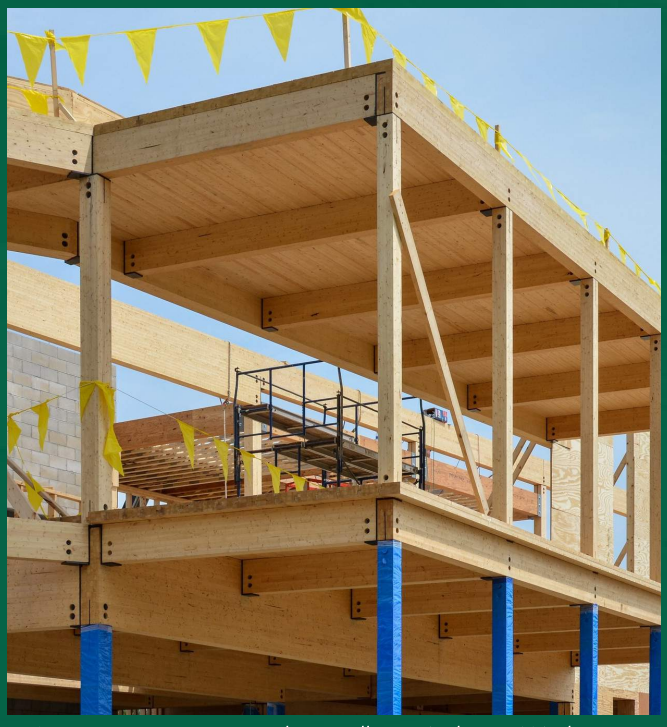
McEvoy Apartments in San Jose, CA, currently under development. It will provide high density housing for working individuals and couples, as well as families with children. Image courtesy of First Community Housing and SERA Design.

MEETING URGENT DEMAND FOR AFFORDABLE HOUSING WITH INNOVATIVE, SUSTAINABLE BUILDINGS

In New England, there is approximately 37,000,000 square feet of new construction for which MT can be utilized annually (based on an average of the last five years), including multi-family residential, educational, commercial, and institutional applications in the 1-18 story range. MT building technology offers high value due to its cleaner, quieter, safer, and faster construction from its factory quality-controlled manufacturing and inherent modular nature; potential for reduced foundation costs as a lightweight structural system (even enabling vertical additions to existing buildings); and market differentiation through its unique biophilic aesthetics (design that connects people with nature) that promote occupant well-being and healthy environments.

Because MT has competitive advantages for construction of 6-12 story buildings, it is especially suited for high quality, affordable, aesthetically uplifting, and dense urban development of multifamily projects and mixed-use retail. New England builders are already planning to use MT in projects in Boston, New Hampshire, New York, Portland (Maine), and New Haven (Connecticut), indicating that excitement and interest in using MT are growing.

Rhode Island School of Design's North Hall, opened in 2019 with a cross-laminated timber (CLT) and steel-frame hybrid structure. Images courtesy of John Horner and NADAAA.



R.W. Kern Center in Hampshire College, Amherst, MA during its construction. The Kern Center is the 17th certified Living Building in the world. Image courtesy of Alexander Schreyer.

MT technologies can be utilized to create a full wooden structural building system or combined with steel and concrete to create hybrid structures. These building technologies have the capability to create a wide range of new jobs from digital design and fabrication to robotics and novel engineering technology that can position our region as a national leader in emerging sustainable building technologies that tackle climate change.

SUPPLYING MASS TIMBER TO KEEP CENTRAL NEW ENGLAND AND EASTERN NEW YORK FORESTS AS FORESTS

In addition to yielding economic and climate benefits, increasing MT use and utilizing local wood as a renewable raw material for buildings helps keep our forests as forests. MT construction sourced from sustainably produced local wood offers climate mitigation through long-term storage of carbon in buildings, reduced product transport, and substitution for more carbon-intensive building materials. These emissions reductions are typically greater than emissions increases from forest harvesting, resulting in a net climate mitigation benefit (Mass Timber Regional Dialogue Work Group 2, 2021; Chen et al, 2018).[12] The connection between suppliers and users of MT has great potential for market-based incentives, including "working forest easements" and payments for landowners and mills not typically seen with existing certification programs that have less connection to local products.

At both the state and federal level, emerging climate policies acknowledge the role of wood products. In our region, increasing production of MT can help us achieve ambitious state climate goals, such as New York and Massachusetts' "No Net Carbon Emissions" goals for 2050. Substitution and building storage carbon gains can be enhanced if market-based incentives encourage forest resilience and carbon storage practices among MT suppliers.

MT can also create a new market in our region, benefiting rural communities and tying buildings in regional towns and cities to locally sourced forest products. Our region's wood supply chain is characterized by diverse small ownerships, relatively small-scale sawmills, and the strong involvement of licensed foresters. The working forests of Central New England and Eastern New York are extensive, well-stocked, and cover 65-90% of the land base, depending on the state, making it one of the most densely forested regions in the world (Nowak 2012, World Bank). They are a net carbon sink with annual growth well in excess of harvest removals and mortality (Leefers et al, 2020). Massachusetts, New Hampshire, New York, and Vermont grow from two to six times more wood than is harvested plus natural mortality (U.S. Forest Service, 2020).

Forested areas in Eastern New York, Vermont, New Hampshire, and Massachusetts. Map produced by the Massachusetts Executive Office of Environmental Affairs on May 24, 2021.

Forest data sources are courtesy of:

- *NH GRANIT - New Hampshire Land Cover Assessment, 2001*
- *NYS Department of Environmental Conservation - Division of Lands and Forest, 2017*
- *Vermont Center for Geographic Information - National Land Cover Database, 2016*
- *MassGIS/NOAA - C-CAP Regional Land Cover, 2016*

A portion of the region's MT buildings can be constructed from wood harvested and manufactured regionally. The four-state region's supply of wood is from hundreds of thousands of woodlots owned mostly by local landowners, and harvesting is supported by thousands of loggers, more than a dozen larger sawmills, and scores of local smaller mills throughout our region. However, while these local sources are readily available, MT used in construction in the Northeast U.S. is currently fabricated in Europe or in other parts of North America. Bringing that construction home and using local wood for MT would help support local economies, yield jobs, and encourage a close connection between a well-managed forest, housing in regional cities and a tool for climate mitigation and resilience. Currently, there is great interest among forest landowners and consumers in tangible ways to participate in actions to reduce climate impacts.

5-layer Eastern Hemlock CLT panel fabricated in University of Massachusetts Amherst's Wood Mechanics Lab. Image courtesy of Peggi Clouston.

MT could have further economic and climate benefits if a CLT plant were co-located with a facility using low-grade material that produces long-term storage for wood, such as a wood fiber insulation plant. This co-location would maximize value from harvested trees and provide more forest management options by removing low value trees that are used in MT and storing more wood products in modern buildings. There also is early research into the potential incorporation of regionally abundant low-grade materials into MT.

A robust MT supply would result in little additional harvest volume. We estimate that fiber supply to a MT facility represents less than 2% of net growth.[13]

Learning from Maine: Central and Northern Maine are poised to locate the first MT plant in New England in the spruce-fir region. Current conditions in Maine are favorable for MT development given extensive spruce-fir (already approved for use in MT) and recent loss of existing wood markets. The State of Maine and the University of Maine's Advanced Structures and Composites Center are working cooperatively with the local forest industry to advance MT development. Lessons learned as MT progresses in Maine will inform efforts to explore MT production to the south in the Northern and Central hardwood and white pine forests. The Dialogue benefited from input from experts involved in Maine's MT effort.

RECOMMENDATIONS TO ACCELERATE MASS TIMBER USE AND MANUFACTURE IN CENTRAL NEW ENGLAND AND EASTERN NEW YORK

Now is the time for state policymakers to consider incentives for mass timber's use. Action to advance MT use now will build on momentum among diverse partners in our region to foster increasing MT production and use, including state and federal investments in research, private sector research and development, new buildings completed and under construction, and growing advocacy for MT use among building and design professionals.

Key strategies to realize MT's adoption at scale to combat climate change, build affordable housing, and promote local and regional economic development include the following:

- **Encourage MT Buildings Including Catalytic Demonstration Projects:** MT's adoption remains limited as a building technology - partly due to the lack of familiarity of project stakeholders (developers, contractors, lending institutions, and governing authorities) with MT. Government leadership can provide support by creating incentives for architects and builders for catalytic demonstration projects. Built projects with MT can serve to de-risk the technology for industry stakeholders. Ideal projects include those that are open and visible to the public, such as train stations, schools, and community centers. The expansion of state-funded MT projects should include both retrofits and new construction. Demonstration buildings can be used to both create public awareness and generate teaching opportunities for those interested in learning more about the technical aspects of using MT, including cost estimation.
- **Lead the Emerging Field of Carbon Reductions from Building Manufacturing and Construction:** Although embodied carbon is not included in current state carbon accounting, this is a quickly emerging field, and embodied carbon may be included in the future. Interested states can provide assistance to expand local manufacturing for products that are made of carbon sequestering materials which would include MT or are lower in embodied carbon (e.g., low carbon concrete). States can also work with their local universities to develop modeling programs to estimate the reductions offered by MT and work to include these savings in established buildings and materials rating systems.
- **Update Building Codes:** Adopt the most up-to-date building code information. The IBC 2021 creates new opportunities for mid- to high-rise MT projects of up to 18 stories. In jurisdictions that have not adopted the IBC 2021, authorities should provide clear documentation on how design teams should propose and design these taller projects. Providing a clear path for tall timber from a permitting and approvals perspective will alleviate concerns associated with the extra time and money required to propose a design that is "beyond code," at least in terms of what version of IBC a certain jurisdiction may have currently adopted. This could be in the form of code amendments or a form saying, "If building is designed in accordance with the 2021 IBC MT construction types, the project will not require alternate design approval."

- **Invest in Further Analysis for Removing Barriers for Supplying, Manufacturing, and Using MT:** Advance MT by moving quickly to fund more engineering research to promote additional Central New England/Eastern New York wood species[14] that are not yet evaluated for use in CLT panels and supporting technologies. Governments can also further support research documenting carbon benefits of MT and its potential to achieve state carbon targets, including through consequential life cycle assessments that account for forest carbon consequences of various scenarios for expanding MT supply and use in the region. Governments can also conduct further analysis of additional barriers (beyond confidence in future demand) to locating a MT plant in the Central New England/Eastern New York region (e.g., added dry kiln and sawmill capacity) and offer incentives to supply-chain participants based on this analysis.
- **Promote Education on Enabling Use of MT:** MT is permitted in many versions of the IBC including those prior to the 2021 edition (for low- and mid-rise buildings). More education of and outreach to building developers and designers now will increase the demand for MT. IBC 2021 tall wood education programs are needed for building code officials and fire, inspection, and permitting departments as well as architecture, engineering and construction professionals. The American Wood Council and WoodWorks Wood Products Council are well positioned to provide this education and project support. For universities and community colleges, MT education programs can be developed and deployed throughout our region.
- **Ensure Development of a Sustainable Regional Supply:** The MT market, even with two MT manufacturing plants (located in the eastern and western parts of the region), will represent a small percentage of existing harvest volume in the region.[15] To realize MT's economic and environmental benefits and support regional sourcing as part of a systems approach to realize the climate benefits of this new market, we encourage a continuous analysis of forest ecosystem carbon stocks and forest management practices associated with the MT market so that market-based incentives can yield meaningful climate mitigation benefits. Findings of these analyses can be used for regular improvement of MT incentive programs in order to:
    - Provide incentives to forest landowners for licensed foresters' involvement in planning and supervising harvests to promote responsible forest management.
    - Support new MT manufacturing facilities and other supply chain needs such as kiln drying through tax incentives, low interest financing, and other incentives (for example, to conduct research and help to offset costs associated with structural certification for new MT products made from promising Central New England and Eastern New York species such as Eastern hemlock and hardwood species).
    - Provide incentives now to sawmills in the region which have been struggling for decades to help upgrade existing processing and milling technologies, including the installation of sophisticated dry kilns and more efficient computerized sawing systems which will help regional mills operate more efficiently today while also positioning them with the right technology to help supply a local MT facility as this market emerges.

CONCLUSION

Targeted actions by policymakers can significantly accelerate both regional supply and demand for mass timber, providing our region a broad range of benefits. These include reducing greenhouse gas emissions, supporting local and regional rural economies including forest owners, supporting sustainable management of forests in Massachusetts, New Hampshire, Vermont and Eastern New York, and helping to meet the demand for affordable housing. Action now to advance MT supply and use will build on a strong foundation of work among the diverse partners in our region and leverage an opportunity for our four states to collaborate on a better future for us all.

ABOUT THE AUTHORS

This consensus report was developed by the Regional Dialogue on Incentivizing Mass Timber to Reduce Climate Change (August 2020 through June 2021), a collaborative process engaging 35+ experts covering the range of ecological, supply, design and engineering, and demand issues in the public and private sectors related to MT, facilitated by Meridian Institute and supported by the ClimateWorks Foundation. All members of the Dialogue listed below support the contents of this report.

Richard Birdsey | Senior Scientist, Woodwell Climate Research Center*

Peggi Clouston | Professor of Wood Mechanics and Timber Engineering, University of Massachusetts, Amherst

John Dalzell | AIA, LEED Felow, Senior Architect, Boston Planning & Development Agency*

Jason Drobnack | Private Land and Forest Utilization Program Lead, New York State Department of Environmental Conservation

Chris Egan | Executive Director, Massachusetts Forest Alliance

Andy Fast | Extension State Specialist, University of New Hampshire, Cooperative Extension

David Foster | Senior Conservationist, Harvard Forest*

Paul Frederick | Wood Utilization & Wood Energy Program Manager, Vermont Department of Forests, Parks and Recreation

William Guinn | Administrator and Chief, Forest Management Bureau, New Hampshire Division of Forests and Lands

Giovanni Holmquist | Director of Industry Development, New York State Empire State Development

Jeffrey Hutchins | Founder and Chief Executive Officer, Trävirke LLC

John Klein | Chief Executive Officer, Generate Architecture + Technologies

Nicole St. Clair Knobloch | Principal, Olifant

Ricky McLain | Senior Technical Director - Tall Wood, WoodWorks

Bob O'Connor | Director of Forest & Land Policy, Massachusetts Executive Office of Energy & Environmental Affairs

Robert Perschel | Executive Director, New England Forestry Foundation

Jack Savage | President, Society for the Protection of New Hampshire Forests

Evan Smith | President, Placetailor

Eric Sprague | Vice President for Forest Restoration, American Forests

Mark Wishnie | Chief Sustainability Officer BTG Pactual Timberland Investment Group

**Affiliations listed for identification purposes only*

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ENDNOTES

[1] Documented benefits to woodland owners of timber income, current use forest laws and conservation easements.
[2] Work Group 2 of the Mass Timber Dialogue developed guidelines for carbon accounting and boundary analysis for mass timber. The Work Group undertook an illustrative analysis using these guidelines to show how the regional forest resource could change and what the implications would be for net emissions of GHGs in a strong demand scenario. See Work Group 2 of the Mass Timber Regional Dialogue Group (2021).
[3] Although the amount of wood used per square foot of buildings varies, the average of four MT buildings examined that ranged from 4-17 stories was 9 board feet per square feet of building. Based on the expected volume of wood processed by a MT plant of 20 million board feet per year, one new plant in the region would be able to produce the panels and beams for about 6% of the new buildings appropriate for MT. This is the equivalent of about 20 buildings of the size of the UMass Olver Design Building (4 stories and 87,500 s.f.).
[4] See http://www.westernmasswood.org/stories/from-woods-to-home/ for a case study of a modern hemlock timber frame house from the wood on a western Massachusetts farm.
[5] Survey conducted by the Massachusetts Executive Office of Energy and Environmental Affairs (MA EEA) - personal communication from Robert O'Connor, April 2021.
[6] See Massachusetts De-carbonization Roadmap Land Sector Technical Report: https://www.mass.gov/info-details/ma-decarbonization-roadmap#final-reports-full-links-.
[7] Source: https://www.lendlease.com/-/media/llcom/investor-relations/media-releases/2020/october/mcevoy-press-release_final.pdf.
[8] Source: https://www.newhavenindependent.org/index.php/archives/entry/beulah_grate/.
[9] Project is currently undergoing zoning, state building code, and Boston Planning and Development Agency BPDA approvals (as of April 2021) Source: https://www.mfds-bos.com/project/11-e-lenox/.
[10] Source: https://introcleveland.com.
[11] Source: https://www.connectcre.com/seattles-tallest-mass-timber-building-grows/.
[12] Refer to endnote 2.
[13] Andrew Fast, Extension State Specialist, Forest Industry, University of New Hampshire. Personal communication, 3/23/21. Net annual growth was based on Public Sector Consultants and Andrew Fast, 2020. Standard and published conversions were used. Plant size based on a recently constructed CLT plant.
[14] Spruce-fir species already evaluated for use in CLT are found primarily in Northern New England and NY state. Published work at the UMass Olver Design Building shows how Eastern hemlock and white pine can also be used in CLT (See Kaboli et al, 2020).
[15] One MT plant is estimated to make up less than 2% of NH forests net growth and less than 7% of the softwood net growth for the forests of Eastern/Central New York (Andrew Fast pers. com. and Crawford 2018).