

Ontario's Advanced Wood Construction Action Plan

Draft

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Introduction

As part of *Sustainable Growth: Ontario's Forest Sector Strategy*, the Government of Ontario committed to increasing the use of wood in construction to grow and diversify the market for Ontario's wood products. This commitment will drive economic prosperity in the province, help to bolster the supply of available housing and support workforce development, all while helping to mitigate climate change stemming from buildings sector emissions.

The global buildings and construction sectors are evolving, enabled by new and innovative manufacturing technologies and driven by customers who have become more conscious of the sustainability and environmental impact of materials and products used in construction. Construction processes are moving into factories where significant efficiencies, such as time and waste reductions, can be achieved. There is growing recognition of modern wood-based building systems as contributors to help meet the environmental challenges we face.

Through dialogue with the advanced wood construction community, Ontario has learned that

advanced wood construction provides opportunities to bolster housing supply and affordability, provide economic stimulus, mitigate climate change and increase the health and wellness of building occupants. The roundtable and consultation sessions that informed the development of *Ontario's Forest Sector Strategy* provided a platform for engagement with builders, designers, engineers, educators, fire services, insurers and municipal officials, with a focus on learning what would be needed to position the province as a global leader in advanced wood construction.

This *Advanced Wood Construction Action Plan* highlights Ontario's advanced wood construction advantages, recognizes challenges and identifies means to increase the use of wood in construction. Building on Ontario's strengths and progress to date, this plan includes actions based on 4 objectives to be coordinated over 5 years with the support of partner ministries and stakeholders throughout the advanced wood construction supply chain.

Advanced wood construction advantage

The case for change

There is room in the construction sector for significant improvements in productivity and efficiency, particularly in relation to traditional, site-built construction models. Over the past 20 years, construction in Canada has lagged in terms of productivity and income gains versus most other industries (McKinsey & Co [\[1\]](#)). This productivity gap underscores the pressing need to expedite change and embrace the new materials and technologies that have emerged in recent years to improve efficiency. Modern tools like digital design, Building Information Modeling (BIM) and automation present opportunities for builders and manufacturers to innovate.

Ontario's experience with automation and sophisticated manufacturing techniques, culture of technological innovation, supply chain expertise and

potential for economic diversification offer a solid foundation for the growth of the advanced wood construction sector. By leveraging these strengths, Ontario can position itself as a leader in innovative and sustainable construction practices and create new opportunities for development in the built environment.

Buildings are currently responsible for 39% of global energy related carbon emissions, 28% from operational emissions (from energy needed to heat, cool and provide power) and 11% from materials and construction (World Green Building Council [\[2\]](#)). Adopting low-carbon materials, optimized construction methods, and building systems that support energy-efficient operations will help Ontario to meet climate change related targets and align with growing sustainability expectations.

What is advanced wood construction?

Advanced wood construction goes beyond the standard 2"x4" site-built construction used in most single-family homes. It uses innovative wood-derived materials as a substitute for more carbon-intensive products, and modern factory-based methods of manufacturing to build prefabricated and modular components offsite, for subsequent just-in-time delivery. Advanced wood construction can build larger and taller than conventional wood

construction and is broader in scope. It allows wood to be used for a much wider variety of building types such as taller multifamily residential and office buildings, institutional, commercial, educational and industrial buildings, among others. Advanced wood construction can also be applied beyond buildings, for bridges and other types of infrastructure such as wind turbines, towers, sound barriers, outdoor structures and access roads.

Advanced wood construction starts with sustainable wood fiber in forms ranging from sawn lumber to wood chips and strands, which can be derived from lower-value portions of a tree and less commonly-used tree species. These fibers are then transformed into engineered materials, like cross-laminated timber (CLT) and laminated strand lumber (LSL), and then precision machined and assembled in factories to create sustainable and extremely

efficient building components. These prefabricated components are subsequently delivered to site at the appropriate time to be erected, significantly reducing construction time, labour, site storage requirements, and disruption. Products like electronics and vehicles benefit from assembly line efficiency, reduced waste and factory-precision. Advanced wood construction applies these principles to the construction sector.

Spotlight

Element5 - St. Thomas, Ontario

Element5 is Ontario's first certified CLT producer and one of North America's most advanced mass timber manufacturers. After opening a large 137,000 sq.ft. state-of-the-art manufacturing facility in St. Thomas, Ontario, in April 2021, Element5 has rapidly ramped up production and begun delivering some of North America's most modern mass timber structures. With Forest Sustainability Council (FSC) certification, and using wood from Ontario forests, Element5 is at the forefront of sustainable construction practices. Moreover, transforming Ontario's natural resources into high-value building components adds significant value within local supply chains and the local economy.

Element5 has notably developed an affordable and rapid prefabricated mass timber multi-unit residential housing concept and subsequently delivered several affordable and supportive housing projects. Requirements of these rapid Housing Initiative-supported projects included extremely rapid build times, cost-effectiveness and innovation. Through such projects, Element5 is enhancing the efficiency and sustainability of construction and demonstrating that advanced wood construction is a significant tool in addressing Ontario's housing affordability and scarcity challenges.



Figure 1. Element5 Manufacturing Facility; St. Thomas, ON.



Figure 2. YWCA Supportive Housing; Kitchener, ON.

Beyond structural products, novel products made from wood are also emerging in product categories like siding, insulation and lignin (derived from wood) is being used in a range of products such as asphalt and adhesives. These new products have the

benefits of reducing embodied carbon in the built environment, increasing carbon storage in long-lived wood products and adding value to abundant sawmilling by-products or underutilized tree species in Ontario's forests.

Spotlight

FPIinnovations lignin-based asphalt project

Wood-derived products are resulting in more environmentally friendly construction choices throughout the built environment, including roads. While asphalt for roads is traditionally manufactured by binding together aggregate with bitumen, a petroleum product, lignin has been explored as a possible substitution for some of the bitumen used in asphalt.

FPIinnovations has worked with partners along the entire value chain to research how lignin, a natural by-product of the pulp-making process, can be a substitute for a portion of the bitumen used in asphalt in Canada. [FPIinnovations' research^{\[3\]}](#) has successfully demonstrated substitution of 15% of the bitumen with lignin does not negatively impact cold weather performance and improves hot weather performance by reducing rutting at high temperatures. The demonstrations that were carried out on 6 road segments across Canada illustrated performance equivalent to that of conventional materials, confirming the technical feasibility of the lignin-asphalt mix in manufacturing and application.

Moving forward, FPIinnovations will focus lignin research activities on improving the economics of lignin production to move applications like lignin in asphalt closer to market opportunities.

For additional information, please refer to the [Greening Canadian Roads video^{\[4\]}](#)



Figure 3. FPIinnovations – Lignin Modified Asphalt Test Sections

Advanced wood construction often comes to fruition in the form of prefabricated assemblies which can include multiple products and materials. However, the wood-based building materials that allow advanced wood construction its advantages can be categorized into 4 main groups:

- **Mass Timber** refers to large solid wood panels or engineered wood components, typically created by stacking and gluing or fastening together layers of lumber or “lamella.” Unlike dimension lumber and engineered wood products, mass timber is composed of large-scale solid wood elements and is distinct from bio-based materials as it is typically used in structural applications.



Figure 4.
Cross-laminated timber^[5]

- **Engineered Wood Products (EWPs)** are manufactured wood materials typically composed of smaller components such as fibers, particles, or strands bonded together using adhesives. EWPs include products such as oriented strand board (OSB) and laminated strand lumber (LSL). They are specifically engineered for strength and performance through the combination of wood fibers with adhesives and can be made from lower value wood, underutilized tree species and mill by-products.



Figure 5.
Laminated strand lumber^[6]

- **Dimension Lumber** is solid sawn wood of smaller cross section, typically referred to as 2”x4”, 2”x6”, etc. and classified by grade and species. Dimension lumber used in advanced wood construction is typically incorporated into prefabricated building components like wall panels, floor panels and roof trusses. These components employ dimension lumber (and EWPs) as their building blocks. Then, through offsite manufacturing, building components are produced, ready to erect.



Figure 6.
Dimension lumber

- **Bio-Based Materials** are derived from renewable biological resources, such as forest bio-fibre and mill by-products, emphasizing sustainability. Unlike mass timber and EWPs typically used in structural applications, bio-based materials encompass a diverse range of products used in construction such as insulation, membranes and additives.



Figure 7.
Wood fibre insulation^[7]

The examples highlighted below demonstrate current and emerging advanced wood construction products, systems and applications that address these challenges.

Figure 8.
Advanced Wood Construction Products, Systems and Applications

Materials	Technologies	Building systems
<ul style="list-style-type: none"> • Glue-laminated timber • Cross-laminated timber • Nail-laminated timber • Dowel-laminated timber • Laminated strand lumber • Oriented strand board • Oriented strand lumber • Wood fibre insulation • Adhesives, additives, membranes 	<ul style="list-style-type: none"> • Building Information Modelling • Digital Design Tools • Robotics • Computer Numerical Control (CNC) Machinery • Automation 	<ul style="list-style-type: none"> • Volumetric modular • Flat-pack mass timber • Panelized light wood frame • Structural insulated panels • Hybrid systems • Hollow-core mass timber panels
Applications		
<ul style="list-style-type: none"> • Buildings • Bridges • Towers 	<ul style="list-style-type: none"> • Platforms • Wind turbines • Sound barriers 	<ul style="list-style-type: none"> • Access roads • Outdoor structures

The benefits of advanced wood construction

Advanced wood construction is now being recognized globally as a construction industry disruptor and is being adopted at a faster pace than any other building system in history (Forest Economics Advisors, 2022^[8]). By spurring the increased use of advanced wood construction, Ontario can seize the opportunity to use its abundant and sustainable forest resources to position itself as a leader in the current wave of manufacturing and construction sector innovation.

The use of advanced wood construction can yield significant economic benefit. Linking Northern Ontario's forest industry with the advanced manufacturing capacity in the province's south can produce innovative wood construction products and systems that add 2 to 4 times the economic value currently being delivered by sawn lumber (Forest Economics Advisors, 2022).

Value continues to be added when these products move to the construction site with advanced wood construction offering up to 50% reduced construction time and 20% reduced cost (McKinsey & Co.^[9]), alongside notable reductions in construction site labour requirements, waste and carbon footprint.

These advantages present a valuable opportunity for addressing housing scarcity and affordability. The prefabricated assemblies and offsite construction models that are commonplace in advanced wood construction could be of benefit to Northern and Indigenous communities and in remote areas where workforce housing is needed, such as mining camps, and where building materials and skilled labour are not abundantly available, and weather-related challenges can impact traditional construction methods. Modern wood buildings can also provide benefits throughout their operational life through greater energy efficiency, a high level of durability and better overall occupant health, both physical and mental. Increased uptake of advanced wood construction can deliver more functional and efficient homes, faster, for Ontarians.

Did you know?

There is widespread recognition of the benefits of wood construction systems, as evidenced by regulatory changes in recent years.

Changes to Ontario Building Code:

● January 2015

Ontario Building Code allows up to 6-storey wood-framed buildings.

● July 2022

Ontario Building Code adds Encapsulated Mass Timber Construction for buildings up to 12 storeys.

● May 2023

Ontario Building Code allows wood exit stair shafts in wood buildings.

● January 2024

Public consultation is undertaken on proposed changes to the Ontario Building Code to further expand the use of Encapsulated Mass Timber Construction.

● April 2024

Ontario announces intent to amend Ontario Building Code to allow encapsulated mass timber construction in buildings up to 18 storeys.

Canadian building code bodies, including the Ministry of Municipal Affairs and Housing, have recently signaled intent to make amendments to expand mass timber construction opportunities for more types of buildings and for taller buildings, up to 18 storeys. This would represent a threefold increase in allowable height for wood construction since 2015 and would provide a significant expansion of the market for advanced wood construction.

Beyond the critical role that this *Advanced Wood Construction Action Plan* will play in helping to achieve the goals set out in *Sustainable Growth: Ontario's Forest Sector Strategy*, it will also contribute to other whole-of-government initiatives, including:

- **[Ontario's Forest Biomass Action Plan](#)^[10]**
 - finds alternative uses for low-grade and underutilized wood fibre in various structural applications like CLT, and novel, bio-based building materials like wood fibre insulation
 - supports increased use of, and markets for, bio-based materials
 - increases uptake of bioheat by showcasing the natural synergies between advanced wood construction and green energy sources
- **Ontario's Housing Initiatives**
 - streamlines approvals and cuts costs, prioritizes infrastructure for housing projects, and works to build homes faster for more people
 - supports municipalities with funding and tools to build much-needed infrastructure and more housing, of all types
 - makes it easier and reduces the cost of building different types of housing, from detached homes and townhomes, to infill mid-rise condominiums and apartments, to taller residential buildings in urban centres
 - leverages and grows Ontario's offsite construction sector and new, faster, and more cost-effective building technologies to build more homes faster

Advanced wood construction supply chain

The use of innovative wood products in construction requires collaboration across the forest, manufacturing and construction sector value chains. Wood fibre is first sourced from Ontario's certified sustainably managed forests where, annually, less than 0.5% of managed public forests are harvested. As *Sustainable Growth* highlights, Ontario is using only half of its sustainable annual harvest, leaving 15 million cubic metres of wood available for use. This provides an opportunity for Ontario's forests to supply increased advanced wood construction sector demand. Moreover, employing underutilized species such as poplar and white birch for the manufacture of Engineered Wood Products (EWPs) helps to expand and diversify harvesting opportunities enabling better utilization and assist in the implementation of sustainable forest management plans.

Typically, wood fibre will flow from the forest into sawmilling and primary manufacturing operations which produce products such as sawn lumber and EWPs like LSL and OSB. These primary manufacturing operations also produce mill by-products, such as wood chips from sawmills.

Primary products such as lumber and EWPs are often sold directly into commodity markets. Advanced wood construction provides an opportunity for secondary manufacturing operations to take in these primary products as inputs, and through modern manufacturing processes, to

transform them into innovative, value-added products and assemblies that form modern wood buildings and infrastructure.

Ontario's advanced wood construction sector includes manufacturing operations of various shapes and sizes. From mass timber and EWP manufacturers to light wood frame wall panel and roof truss fabricators, there is a wide range of products and components produced. However, the common thread is that advanced wood construction producers take in sustainable wood fibre and add value to it to produce components and assemblies that supply modern buildings and infrastructure.

Advanced manufacturing technologies such as automated manufacturing and assembly lines, robotic machining equipment, digital design and BIM ensure that building components are designed and manufactured to exact specifications and tight tolerances. When these prefabricated components emerge from the factory, they are ready to be delivered directly to the construction site for just-in-time installation.

Advanced wood construction factories act as a hub through which raw materials and primary products flow, design and manufacturing are performed and finished products are delivered. Advanced wood construction integrates the supply chain from forest, to mill, to manufacturer and on to the builder, maximizing the benefits throughout the supply chain and passing them on to the end consumer.

Figure 9. Example of Mass Timber Value Chain Elements and Interdependencies
 Source: Ontario Mass Timber Value Chain Roadmap (Forest Economics Advisors, 2021)



Growing the market for advanced wood construction

Ontario's forest resource, manufacturing and construction sectors are vital contributors to the economic growth and productivity of the province. Ontario's construction sector represents roughly half of all Canadian construction and the province is also Canada's manufacturing hub, contributing over 40% of national manufacturing GDP in 2022. Moreover, Ontario has the second most forest cover of any Canadian province. These conditions present a significant opportunity for Ontario to grow the market for sustainable forest resources, attract investment and demonstrate leadership in buildings sector innovation.

Growing market share for wood-based building materials in our infrastructure represents a significant opportunity to expand and diversify demand for Ontario's sustainable natural resources, create jobs and economic opportunity in forestry and advanced manufacturing, contribute efficiencies and innovation to the construction sector, and to mitigate the carbon footprint of the built environment.

The market for wood-based building materials in Ontario has significant room to grow. In Ontario, approximately 21% of the 5-6 storey residential buildings segment is populated by wood-based building systems, while the national average for this segment is 51% [\[11\]](#). Recent regulatory changes, including the May 2023 amendment to the Ontario Building Code, have removed barriers to advanced wood construction in this segment, enabling potential market share growth and supporting the creation of new housing in Ontario.

However, advanced wood construction is not limited to residential construction. In addition, market share growth potential exists in the non-residential segment. Building types such as schools, long-term care facilities, offices and commercial buildings (from small restaurants and commercial retail units to big box stores and warehouses), all present potential market share for advanced wood construction.

The objectives laid out in this action plan have all been developed to drive the overarching goal of increasing market share for advanced wood construction.

Objectives and actions

Ontario's Advanced Wood Construction Action Plan ensures that the many benefits of advanced wood construction, both economic and societal, are realized by Ontarians.

The overarching goals supported by *Ontario's Advanced Wood Construction Action Plan* are to increase the use of Ontario wood and grow wood's market share in construction, establish Ontario as a leader in advanced wood construction and manufacturing, and contribute to broader provincial objectives around housing and the environment.

To support these goals, we have identified four objectives, each with a set of actions that will be pursued over the five-year term of this action plan.

Objective 1: Support **promotion, education and training** initiatives to create awareness, and accelerate adoption of advanced wood construction.

Objective 2: Spur **research, and the advancement of codes, standards and regulations** to remove barriers to, and encourage use of, advanced wood construction.

Objective 3: Stimulate **innovation and investment in advanced manufacturing** facilities and processes to grow Ontario's advanced wood construction capacity.

Objective 4: **Demonstrate and display advanced wood construction** to exemplify innovation, provide opportunities for research and instill confidence in adopting new products and processes.

As the actions in this plan are implemented, Ontario will actively engage with a broad range of partners and stakeholders to identify and overcome barriers and to help stimulate the growth of advanced wood construction in Ontario.

Objective 1: Promotion, education and training

In North America, advanced wood construction building systems are becoming more popular. However, consumers and construction sector stakeholders alike are not necessarily aware of wood-based building material options available to them and traditional systems are often the default choice when better alternatives are available but have not been adequately promoted.

To support the growth of advanced wood construction's market share, active promotion will be undertaken to clearly present the advantages and benefits of advanced wood construction to consumers and decision makers. Online marketing campaigns, social media, events and educational initiatives, such as those undertaken by [Ontario Wood^{\[12\]}](#), can help to build public awareness about the benefits, versatility and potential of advanced wood construction. The Ontario Wood program can also be leveraged by eligible manufacturers to connect businesses with domestic market opportunities and help to showcase the breadth and diversity of Ontario-made wood products.

In the effort to support building sector stakeholders in serving growing demand for advanced wood construction in Ontario, there is a need to provide training and knowledge transfer opportunities. With over 29,000 job openings expected in Ontario's advanced wood construction sector before 2028, targeted education and training will be necessary to ensure adequate proficiency and capacity among

the numerous participants in the construction sector (Canadian Wood Council^[13]).

From the architects, engineers, builders and tradespeople who design and build our infrastructure, to the municipal officials who review and approve these designs, to the fire services, insurers and financial institutions who lend their support during construction and after occupancy, to the general public who are the end occupants, the novelty of advanced wood construction requires that stakeholders are brought up to speed. Advanced wood construction offers many benefits for Ontarians, but these benefits can only be fully realized by a construction sector that has the knowledge and resources to use these materials and systems to their fullest potential and a consumer base informed of the advanced wood construction option. The following actions will benefit from the expertise and networks of key partners, including educators like the Canadian Wood Council, researchers like FPIInnovations and training providers like the College of Carpenters and Allied Trades, to create, maintain and deliver effective education and training resources.

Action 1.1: Leverage existing initiatives, like Ontario WoodWorks, to promote the benefits of advanced wood construction, fostering favorable public perception and enabling informed decisions by designers, builders, developers and the end consumer.

Action 1.2: Develop technical resources, support training opportunities and engage directly with municipalities to increase competency with advanced wood construction and accelerate project approvals.

Action 1.3: Develop training, create technical resources and transfer knowledge to fire services, insurers and financial institutions, enabling greater acceptance and reducing cost of advanced wood construction.

Action 1.4: Work with partner ministries and educational institutions to leverage funding and support the development of curricula and training programs, so that workers are equipped to build with advanced wood construction products and systems.

Action 1.5: Develop technical resources and support training opportunities to accelerate advanced wood construction uptake by infrastructure decision makers such as engineers, architects, builders and procurers.

Objective 2: Research, codes and standards

Advancement in the construction sector is underpinned by research to ensure that the building systems and materials used are safe and functional. This valuable research, when incorporated into building codes and standards, enables a high level of confidence in Ontario's built infrastructure.

To support the continued expansion of codes and standards for advanced wood construction it is important that public and private research organizations continue their work to determine where further changes should be made. By working with partners, such as the Canadian Wood Council, FPInnovations, partner ministries and academia, to ensure that Ontario's building codes and standards are based on sound science, we can continue to move forward and realize all the benefits of advanced wood construction.

Action 2.1: Support research into new building materials and systems to evolve technical understanding and advance commercialization of advanced wood construction.

Action 2.2: Collaborate with partner ministries and advanced wood construction stakeholders to support the advancement of current building codes and standards to expand the allowable scope of advanced wood construction.

Action 2.3: Use best available research to develop evidence-based policy and regulation, such as through the submission of comprehensive Building Code Change Requests to the Canadian Board for Harmonized Construction Codes.

Objective 3: Innovation and advanced manufacturing

Construction is the world's largest industry, accounting for approximately 13% of global GDP. Productivity has improved by 1% annually for the past twenty years (McKinsey & Co. [\[14\]](#)). The current shift towards pre-fabrication and modularization is likely to disrupt the broader construction industry, creating productivity gains throughout.

The advent of new technologies such as BIM and the digitization and automation of manufacturing and construction in tandem with innovative new materials like mass timber and EWPs are paving the way for a shift to off-site construction. Through targeted investments and initiatives, Ontario can leverage the efficiency and productivity benefits of these new manufacturing technologies and processes, helping to alleviate challenges of housing scarcity and affordability.

With Ontario's existing strength as a manufacturing hub, its vast and sustainable forest resources, and its large construction market, accounting for half of the broader Canadian construction sector, Ontario is well-poised to become a leader in the advanced offsite manufacturing of our next generation of building infrastructure.

By engaging in efforts to link the northern wood fibre supply with southern Ontario's manufacturing hub, advanced wood building products made from Ontario wood can be produced to facilitate construction, from forest to frame, and can support job creation across Ontario. By encouraging a shift towards innovative modern construction methods such as prefabricated and modular construction, Ontario can support the use of wood while helping to reduce building costs and construction time, and capture economic benefit for communities across the province.

Action 3.1: Support the growth of Ontario's advanced wood construction manufacturing sector by validating the business case for advanced wood construction, engaging directly with potential investors and offering financial support for new/expanding manufacturing facilities (e.g. through programs like the Forest Biomass Program and Forest Sector Investment and Innovation Program).

Action 3.2: Work with partner ministries to encourage the use of modular and innovative building systems through government initiatives such as the Modular Housing Strategy, which is in development.

Action 3.3: Engage with industry through discussion forums to investigate the best pathways forward for the use of advanced wood-based building materials.

Action 3.4: Develop and commercialize innovative, wood-based building materials by working with partners such as the Centre for Research and Innovation in the Bio-Economy (CRIBE), FPInnovations and Ontario universities specializing in wood construction.

Objective 4: Demonstrate and display advanced wood construction

As our understanding of what is achievable with advanced wood construction grows, there is a corresponding increase in the scale and complexity of what we can build, and in our understanding of how innovative building products and systems can achieve higher efficiency and help to overcome some of our most pressing challenges around housing. While research, innovation and education grow our understanding, there is also a need to translate this into practical application.

Displaying advanced wood construction, including through demonstration testing, and building showcases, offers valuable firsthand experience, fostering familiarity and comfort with these innovative building systems. Additionally, supporting the utilization of advanced wood construction to address housing availability and affordability for lower-income populations, Indigenous communities and remote workforces offers repeatable real-world examples, and provides valuable learning opportunities and platforms for training, knowledge transfer and stakeholder engagement within the building sector.

Advanced wood construction can also serve as a platform to highlight the benefits of other wood-based technologies, such as bio-based heating systems. By combining the efficiencies of both wood-based building and heating systems, our infrastructure can be made more sustainable, less carbon intensive and can be domestically sourced, supporting local supply chains and economies.

Ontario can also lead by example by demonstrating the use of advanced wood construction in publicly funded infrastructure. By using wood-based products for publicly funded infrastructure, Ontario can provide

numerous venues to educate stakeholders about advanced wood construction, allow for the use of innovative materials to be studied in the real world and help to set precedents serving to advance codes and standards. Additionally, the use of these products in publicly funded infrastructure will generate demand and bolster the growth of Ontario's advanced wood construction sector and the broader forest bioeconomy.

Action 4.1: Collaborate with partner ministries to explore how Ontario can encourage the use of advanced wood construction products and bioheat in publicly funded infrastructure.

Action 4.2: Support projects demonstrating rapid and affordable modular housing concepts to de-risk innovation and pave the way for future advanced wood construction.

Action 4.3: Examine the use of advanced wood construction to address housing challenges and support economic opportunities in Indigenous and Northern communities and as a solution for remote workforce housing.

Action 4.4: Leverage advanced wood construction projects as case studies and as living labs for long-term study of advanced wood construction performance.

Action 4.5: Work with federal government partners to support demonstrations, such as through the Natural Resources Canada - Green Construction through Wood program, and to advance initiatives that promote design repeatability, such as Housing, Infrastructure and Communities Canada's standardized housing design catalogue.

The road ahead

This action plan is an important component of achieving the vision identified in *Sustainable Growth: Ontario's Forest Sector Strategy*. Growing the advanced wood construction sector supports the Ministry of Natural Resources' priorities to increase the use of Ontario wood and grow wood's market share in construction, promote innovation and sustainability and encourage strategic investment.

During the development and approval of *Sustainable Growth*, 10 partner ministries committed their support in implementing shared goals. Ministries such as Municipal Affairs and Housing; Infrastructure; Environment, Conservation and Parks; and Economic Development, Job Creation and Trade share mandates that intersect with the Ministry of Natural Resources' commitment to increase the use of wood in construction. Fostering a collaborative environment built on open discussions, regular information sharing and cross-ministry engagement will make significant contributions to the successful implementation of this plan, helping to identify and act on opportunities for Ontario's forest sector.

With the help of both internal and external partners, the actions in this plan will be implemented over the next 5 years. The Appendix provides a summary of the actions, their associated timeframes and performance measures to indicate their success.

Appendix

Indicators

Objective 1: Support promotion, education and training initiatives to create awareness and accelerate adoption of advanced wood construction.

Indicators:

- Growth in the building sector market share for advanced wood construction.
- Increased advanced wood construction training opportunities for professionals and tradespeople.
- Publication of educational/training resources.

Objective 3: Stimulate innovation and investment in advanced manufacturing facilities and processes to grow Ontario's advanced wood construction capacity.

Indicators:

- Increase in Ontario's advanced wood construction manufacturing capacity.
- Commercialization of new advanced wood construction materials, products and systems.

Objective 2: Spur research, and the advancement of codes, standards and regulations to remove barriers to, and encourage use of, advanced wood construction.

Indicators:

- Amendment of building codes relating to advanced wood construction.
- Publication of advanced wood construction research.

Objective 4: Demonstrate and display advanced wood construction to exemplify innovation, provide opportunities for research and instill confidence in adopting new products and processes.

Indicators:

- Use of advanced wood construction in publicly funded infrastructure.
- Development of tools and resources supporting advanced wood construction procurement.
- Support provided for advanced wood construction demonstration projects.

Timelines

Short-term actions (1-2 years)

- **Action 1.4:** Work with partner ministries and educational institutions to leverage funding and support the development of curricula and training programs so that workers are equipped to build with advanced wood construction products and systems.
- **Action 3.3:** Engage with industry through discussion forums to investigate the best pathways forward for the use of advanced wood-based building materials.
- **Action 4.1:** Collaborate with partner ministries to explore how Ontario can encourage the use of advanced wood construction products and bioheat in publicly funded infrastructure.
- **Action 4.2:** Support projects demonstrating rapid and affordable modular housing concepts, de-risk innovation and pave the way for future advanced wood construction.

Medium-term actions (2-3 years)

- **Action 2.3:** Use best available research to develop evidence-based policy and regulation, such as through the submission of comprehensive Building Code Change Requests to the Canadian Board for Harmonized Construction Codes.
- **Action 4.5:** Work with federal government partners to support demonstrations, such as through the Natural Resources Canada - Green Construction through Wood program, and to advance initiatives that promote design repeatability, such as Housing, Infrastructure and Communities Canada's standardized housing design catalogue.

Long-term actions (3-5 years)

- **Action 4.3:** Examine the use of advanced wood construction to address housing challenges and support economic opportunities in Indigenous and Northern communities and as a solution for remote workforce housing.
- **Action 4.4:** Leverage advanced wood construction projects as case studies and as living labs for long-term study of advanced wood construction performance.

Operational actions (current/ongoing)

- **Action 1.1:** Leverage existing initiatives, like Ontario Wood, to promote the benefits of advanced wood construction, fostering favorable public perception and enabling informed decisions by designers, builders, developers and the end consumer.
- **Action 1.2:** Develop technical resources, support training opportunities and engage directly with municipalities to increase competency with advanced wood construction and accelerate project approvals.
- **Action 1.3:** Develop training, create technical resources and transfer knowledge to fire services, insurers and financial institutions, enabling greater acceptance and reducing cost of advanced wood construction.
- **Action 1.5:** Develop technical resources and support training opportunities to accelerate advanced wood construction uptake by infrastructure decision makers such as engineers, architects, builders and procurers.
- **Action 2.1:** Support research into new building materials and systems to evolve technical understanding and advance commercialization of advanced wood construction.
- **Action 2.2:** Collaborate with partner ministries and advanced wood construction stakeholders to support the advancement of current building codes and standards to expand the allowable scope of advanced wood construction.
- **Action 3.1:** Support the growth of Ontario's advanced wood construction manufacturing sector by validating the business case for advanced wood construction, engaging directly with potential investors and offering financial support for new/expanding manufacturing facilities (e.g. through programs like the Forest Sector Investment and Innovation Program).
- **Action 3.2:** Work with partner ministries to encourage the use of modular and innovative building systems through government initiatives such as the Modular Housing Strategy, which is in development.
- **Action 3.4:** Develop and commercialize innovative, wood-based building materials by working with partners such as CRIBE, FPIInnovations and Ontario universities specializing in wood construction.

Endnotes

- 1 **[McKinsey & Co - Reinventing construction: a route to higher productivity \[PDF\]](https://www.mckinsey.com/~media/mckinsey/business%20functions/operations/our%20insights/reinventing%20construction%20through%20a%20productivity%20revolution/mgi-reinventing-construction-a-route-to-higher-productivity-full-report.pdf)**
<https://www.mckinsey.com/~media/mckinsey/business%20functions/operations/our%20insights/reinventing%20construction%20through%20a%20productivity%20revolution/mgi-reinventing-construction-a-route-to-higher-productivity-full-report.pdf>
- 2 Embodied Carbon - World Green Building Council (worldgbc.org)
- 3 **[FPInnovations' research](https://web.fpinnovations.ca/tackling-climate-change-one-road-at-a-time/)**
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- 4 **[Greening Canadian Roads video](https://www.youtube.com/watch?v=kvv_20W1cl0)**
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