Forest Biomass Action Plan

Draft

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Ontario

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Introduction

As part of Sustainable Growth: Ontario's Forest Sector Strategy, the government of Ontario committed to putting a Forest Biomass Action Plan in place that secures jobs and encourages sustainability in the forest sector, while supporting economic development through the use of forest biomass. Actions identified in this plan will help to realize the goals and vision set out in Sustainable Growth.

Given continued global demand for forest products, consumer interest in sustainable products, and movement to a more circular economy, and under the right operational and economic conditions, there is immense potential to increase the use of Ontario's sustainable forest biomass resources. Creating new business opportunities and initiating new projects that use forest biomass can play an important role in growing the economy while sustaining existing forest sector businesses. In addition to contributing to Ontario's economy, efficient use of forest biomass can also contribute to our province's forest management and environmental objectives. The Made-in-Ontario Environment Plan identifies the opportunity to use forest biomass to reduce greenhouse gas emissions in industrial processes, and as a heating fuel in Ontario's northern, rural, and Indigenous communities.

This action plan was developed in collaboration with a Forest Biomass Action Plan Working Group (the Working Group) comprised of partners from across the forest biomass supply chain. The action plan highlights Ontario's forest biomass advantages, recognizes challenges and seeks to identify means to increase its use. Valuable insights from the Working Group members underscored the importance of bioenergy to existing forest product supply chains. Maintaining and transitioning the province's existing bioenergy infrastructure will create a foundation for future forest biomass investment opportunities and support for Ontario's forest dependent communities.

Building on Ontario's strengths and progress to date, this document ends with a set of actions based on five objectives. Actions identified in this plan will be coordinated over five years with expert oversight from the Working Group in the first year and the Forest Sector Strategy Advisory Committee in subsequent years.

Forest biomass advantage

Wood is a versatile material allowing for a wide range of uses in addition to more familiar forest products like lumber, pulp and paper, or particleboard. Wood, including forest biomass, can be used to produce bioproducts. It is the structure and four main components of wood: cellulose, hemicellulose, lignin, and extractives, that provide for a wide range of products. The examples highlighted below demonstrate current and emerging products that can be derived from trees and forest biomass.

Chemicals

Examples of current uses

- Fertilizers and soil amendments
- Aromatic compounds
- Thickening agents
- Emulsifiers
- Binders
- Food additives
- Fragrances
- Flavouring

Examples of emerging uses

- Sugars and alcohols
- Green solvents and chemicals
- Resins, binders and adhesives
- Medicines and pharmaceuticals
- Paints and dyes
- Plastics and polymers

Materials

Examples of current uses

- Pulp and paper products
- Packaging
- Personal protective equipment
- Timber products
- Veneer
- Particle board
- Rayon fibres
- Landscaping products

Examples of emerging uses

- Mass timber products
- Composites
- Textiles
- Carbon fibre
- 3D printing
- Biochar and carbon
- Cellulose nanocrystals and nanofibrils
- Battery energy storage filaments

Energy

Examples of current uses

- Pellet, wood chip, and cordwood heating
- Combined heat and power
- Drying and industrial processes
- Grid electricity

Examples of emerging uses

- Renewable natural gas
- Modern wood heating
- Biodiesel and liquid biofuels
- Community and district energy systems
- Green hydrogen
- Jet fuel

What is forest biomass?

This action plan focuses on two types of forest biomass that can be converted into bioproducts through new and existing industrial processes:

- **Forest biofibre:** composed of forest resources (trees or above-ground tree parts) that are not normally used for conventional forest products, and that are made available from Ontario's Crown forests under an approved forest management plan, or sourced from private woodlots and other forested lands.
- **Mill by-products:** composed of residues generated as a result of forest product manufacturing (e.g., bark, shavings, sawdust).

In Ontario, the most common use of forest biomass is for bioenergy in the form of heat, power, and combined heat and power (CHP). Use of forest biomass for bioenergy has long been integrated into forest product operations. Mill by-products and forest biofibre are often used as a renewable fuel to provide the necessary heat or electricity to make forest products or to generate electricity for Ontario's electrical grid. This often leads to diverting mill by-products destined for landfill sites and the utilization of forest biofibre. Ontario is also home to manufacturers which make wood pellets and wood chips for use in domestic, commercial, institutional, and industrial heating systems.

While there are opportunities to use forest biomass beyond bioenergy, those uses pose technical challenges. Emerging and future products from forest biomass often use specific components of wood, making consistency in feedstocks key to their development and commercial deployment. To convert wood into consistent feedstocks, processes like biochemical refining or thermochemical refining can be applied. These conversion processes present opportunities for bioproduct creation; however, additional work is needed to make these opportunities commercially viable.

Figure 1 illustrates the technical and commercial readiness of various established and emerging uses for low-grade forest biomass in the form of bark. This demonstrates that new uses for low-grade forest biomass requires significant investments in pre-commercial development.

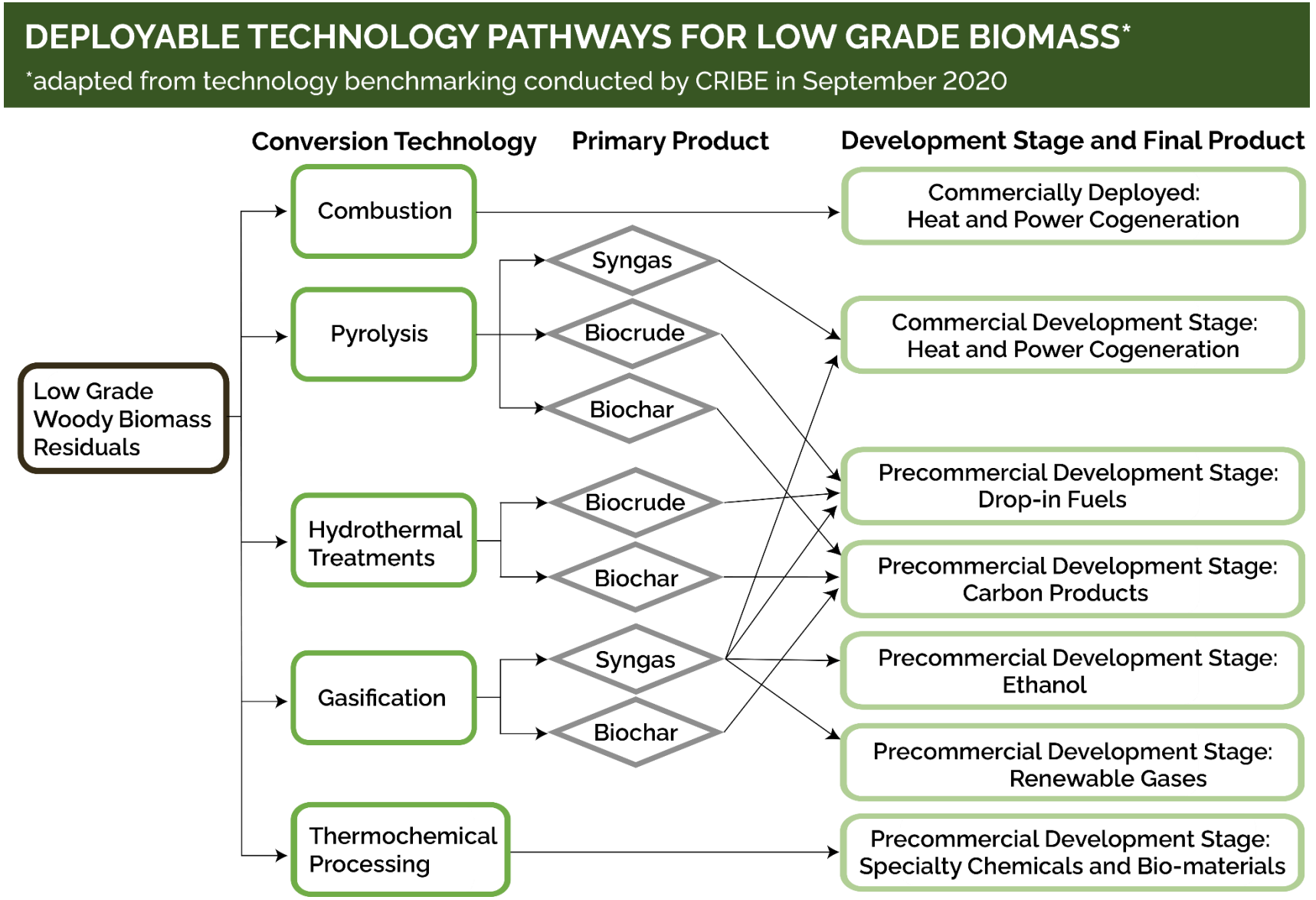

Figure 1. Deployable technology pathways for low grade forest biomass such as bark.

Bioenergy production from low-grade forest biomass can support existing and new uses of wood. Figure 2 illustrates the process that aims to maximize value from forest biomass through generation of high value bioproducts and bioenergy. At the value identification phase, feedstocks are assessed for their use and prepared for processing. Value extraction refers to the processes used to convert forest biomass into high value bioproducts, bioenergy, or both. Production of bioenergy plays an important part in enabling the economic case to produce high value bioproducts by creating a market outlet for low-grade forest biomass.

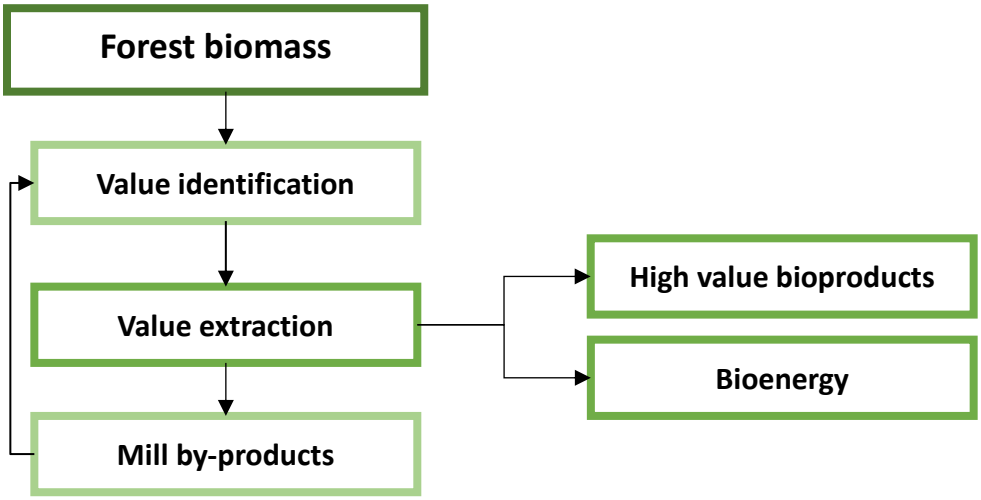

Figure 2. Value identification and extraction from forest biomass. Adapted from FPInnovations Bio-energy and Bio-chemicals Synthesis Report (2011).

The case for using forest biomass

Use of forest biomass supports a resource-efficient forest products sector and has advantages over other feedstocks because of the significant contributions it can make to Ontario's economy, communities, and environment.

Building our economy

- ✓ Diversifies product and revenue streams for the existing forest industry.
- ✓ Attracts new business and investment in Ontario's forested regions.
- ✓ Creates new markets and trade opportunities.
- ✓ Supports cost competitiveness for new uses of wood.
- ✓ Increases revenues and grows the provincial Gross Domestic Product (GDP).
- ✓ Helps to reduce facility energy and disposal costs.

Supporting communities and livelihoods

- ✓ Creates more local jobs than fossil fuels imported from outside of Ontario.
- ✓ Contributes to community capacity and resilience through training opportunities and local business opportunities.
- ✓ Supports opportunities for increased Indigenous participation in forest sector supply chains.
- ✓ Provides energy security and enables other infrastructure investments.
- ✓ Could contribute to domestic production of bioproducts, such as personal protective equipment.

Improving our environmental stewardship

- ✓ Reduces waste and disposal of mill by-products into landfill.
- ✓ Helps to mitigate greenhouse gas emissions by reducing reliance on fossil fuels.
- ✓ Creates sustainable, renewable and low-carbon consumer products.
- ✓ Contributes to provincial forest management objectives.
- ✓ Avoids use of toxic and ecologically damaging fuels and chemicals.
- ✓ Promotes healthy and resilient forests.

Ontario's forest biomass advantage

Leadership in the green economy

The forest sector is a leader in the emerging green economy. In fact, in the early parts of the 20th century, the forest industry was already producing a range of energy services and bioproducts using mill by-products from both solid wood processing and pulp and paper operations. Until lower cost petroleum products were introduced in the 1950s, the wood pulping industry was one of the largest suppliers of specialty chemicals in the world.

The forest sector played an important role in Ontario's phase out of coal for electricity generation. Following a switch from coal to wood pellets at Ontario Power Generation's Atikokan facility, Ontario is home to North America's largest forest biomass-only electricity generating station. This action demonstrated how Ontario's forest sector can contribute to economic and environmental objectives while positioning the province as a leader in the low carbon economy.

Ontario's forest sector is highly integrated. For example, mill by-products from one facility is the feedstock to produce energy for another which helps reduce waste and promotes a circular economy. The existing forest products manufacturing infrastructure provides for a solid foundation to leverage future investments for the development of new bioproduct and revenue streams while avoiding added pressure on landfills.

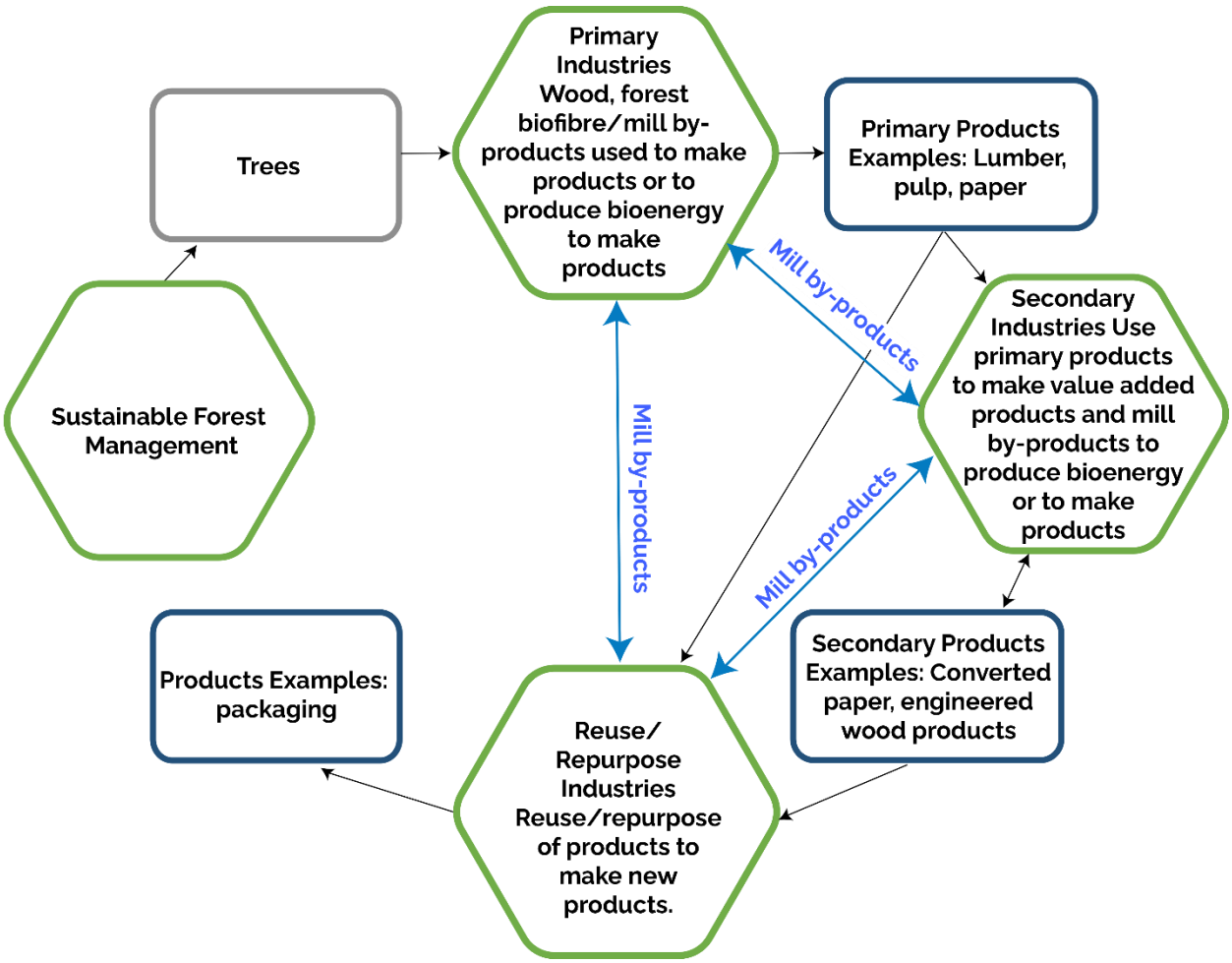

Figure 3. A flow chart illustrating the circular nature of the forest sector highlighting the integration and interconnectivity of forest biomass.

As other sectors of the economy move to transition away from fossil fuels and toward more circular and sustainable alternatives, the forest sector can provide valuable supply chain benefits to participants in the emerging green economy.

Spotlight: Integrating biomass in Resolute Forest Products' Northwestern Ontario operations

Resolute's Northwestern Ontario operations is an example of moving towards a circular economy. In a circular economy, resources gain value as they are optimized through process improvements, waste reduction and repurposing. This creates new and innovative business opportunities while reducing a products' environmental footprint.

Wood is harvested to produce pulp and paper at Resolute's Thunder Bay mill and for lumber at their sawmills in Thunder Bay, Atikokan and Ignace. Wood chips generated from their lumber mills feed their pulp mill; sawdust generated from their lumber mills are used to create wood pellets at their Thunder Bay pellet mill; and wood shavings feed their wood drying kilns. Other sawmill residues, harvest

residues and unmarketable trees are consumed by their BioEnergy Generating Station producing heat for the pulp mill and paper mills and electricity for the provincial grid with ash leftover from the combustion process used by local farmers for soil nutrient enhancement. The BioEnergy Generating Station is the heart of this integrated model allowing Resolute to utilize renewable biomass and be at the forefront of a cleaner more competitive circular economy.

Sustainable forest management framework

Ontario's Crown forests are managed sustainably in accordance with the Crown Forest Sustainability Act, its regulated manuals, and approved forest management guides. Ontario delivers a world-renowned forest policy framework that is supported by the best available science and the principle of adaptive management. Through the forest management planning process, forestry professionals gather knowledge (traditional, scientific, and social), plan, implement, monitor, report, and re-plan based on performance and the evaluation of new information, science, and Traditional Ecological Knowledge. This approach ensures that the allocation and utilization of Ontario's Crown forests, for forest biomass and traditional wood products, will be ecologically sustainable.

Ontario's private woodlots and other forested lands also provide a source of sustainable forest biomass. Ontario supports implementation of sustainable forest management practices on private woodlots through initiatives like the Managed Forest Tax Incentive Program.

Available supply

Approved forest management plans for Ontario's Crown forests identify 30 million cubic metres of wood supply that can be harvested annually. Currently, approximately 15 million cubic metres is harvested per year. The unused wood supply could potentially support further investment in the forest sector. Increasing the harvest within the limits of what can be sustainably removed can be accomplished while maintaining Ontario's high standards of forest management. Forest biomass harvesting offers an opportunity for the forest industry to further utilize the available supply identified in approved forest management plans.

Opportunity also exists to utilize forest biomass on private woodlots and other forested land. Furthermore, mill by-products provide additional product and revenue streams.

Spotlight: Whitesand Bioeconomy Centre

The Northwestern Ontario Indigenous community of Whitesand First Nation is preparing for the construction of a Bioeconomy Centre to support new forest biomass and wood processing facilities. The Centre will include a five-megawatt combined heat and power plant, a wood pellet plant, and a wood processing and merchandizing yard. The project will create approximately 77 direct and 55 indirect full-time jobs in the communities of Whitesand First Nation and Armstrong Station,

and represents a decade long development partnership between Ontario, Canada and Whitesand.

Whitesand First Nation has partnered with Resolute Forest Products on wood supply management. Once their pellet plant and co-generation plant are in operation, they will be using 264,128 cubic metres of forest biofibre per year sourced from hardwood and underutilized softwood (undersized trees and tree tops) from the Armstrong and Black Spruce Forests. By utilizing these unmarketable species and parts of trees, it will allow the sustainable harvest of additional low-sawlog-quality stands that were previously uneconomical to harvest. This will result in an additional 154,200 cubic metres of softwood logs being feasible for harvest and use by Resolute's Thunder Bay mills.

Innovation networks

Innovation and collaboration will be key to transforming the forest sector and increasing the use of available forest biomass resources. Fortunately, Ontario is home to a growing cluster of expertise in forest product innovation and the forest bioeconomy. In 2009 the province established the Centre for Research and Innovation in the Bio-Economy (CRIBE) to support new job and business creation in the bioeconomy using forest biomass. Alongside other forest innovation stakeholders like FPInnovations and industry associations, CRIBE supports research and development and contributes to the knowledge-base around Ontario's forest resources and forest product supply chains. Building from regional and provincial strengths in forestry, CRIBE established Nextfor, an industry-led ecosystem of collaborators aiming to accelerate new technologies and next generation forest products in Ontario.

Spotlight: Thunder Bay's Forest Bioeconomy Cluster
In addition to hosting CRIBE, Thunder Bay is emerging as a regional cluster of expertise and know-how in the development and commercialization of forest biomass.

Research and demonstration facilities: Lakehead University is building research strengths in wood product processing and transformation through demonstration facilities and research labs such as its Biorefining Research Institute (BRI), Green Chemistry Lab, Wood Science Testing Laboratory, and Fire Testing and Research Laboratory. The BRI creates research and development opportunities, new technology models and jobs, and value-added products from renewable resources that can ultimately lead to reduced dependence on fossil fuels and lower greenhouse gas emissions.

Piloting innovative new processes and products: Thunder Bay is home to the TMP-Bio Plant, an FPInnovations supported project in Resolute Forest Products' local pulp and paper complex. TMP-Bio can treat 100 metric tonnes of biomass annually

and produces lignin and sugars that will be used to develop new bioproducts, diversifying Resolute's product mix, and adding new revenue streams.

Growing community support for forest biomass

Across Ontario there is growing interest in leveraging the province's forest biomass resources to meet community energy needs and create local jobs. Community heating and energy projects like the Wiikwemkoong Wood Heating Initiative are being pursued by several groups, including Indigenous communities looking to reduce their reliance on fossil fuels and become active partners in forest product supply chains.

Spotlight: Wikwemikong's Bioheat Initiative

Wiikwemkoong Unceded Territory in northern Ontario is undertaking a Bioheat Initiative to become energy self-sufficient and to create forest bioeconomy-related jobs. The Bioheat Initiative involves vertically integrating Wikwemikong's community wood heating project with their Nairn Centre Wood Pellet Plant project.

The community wood heating project is modernizing homeowners' existing wood heating stoves with high-efficiency wood heating appliances and reducing the use of fossil fuels in heating community buildings and residences. So far, this project has seen eight community buildings and 102 homes converted to wood pellet heating. A further 40 more residences are slated for complete switching from fossil fuels to pellet heating.

Sourcing their own fuel is the next step for Wikwemikong's Bioheat Initiative through the Nairn Centre Wood Pellet Plant project. The project is to construct a pellet mill next to EACOM's Nairn Centre sawmill, their wood supply partner. The new plant will have the capacity to produce 150,000 tonnes of premium wood pellets annually to supply the community, northeastern Ontario, and export markets.

Unlocking Ontario's potential

In Ontario, forest biomass is primarily used to produce heat, electricity, or CHP and is a feedstock for the manufacture of wood pellets and other bioenergy products. There are several obstacles that currently make diversification of forest biomass use difficult, making it likely that heat and power will remain the primary end-use for Ontario's forest biomass in the short-term. To enable new uses for forest biomass the province must begin to lay the groundwork for commercialization of new bioproducts to be ready for future opportunities as they emerge.

According to Statistics Canada the five most cited obstacles faced by biomass establishments are difficulty entering the commercial marketplace, cost of biomass, cost and timeliness of regulatory approvals, lack of financing, and unreliable

quantity of biomass[1]. Considering these barriers and recommendations from the Working Group, this action plan addresses areas Ontario can most influence, as indicated by the objectives in the following section.

The province has taken initial steps to encourage the use of forest biomass. Crown forest biofibre is managed according to the province's rigorous sustainable forest management framework. Projects that use forest biomass are considered in economic development and industry support programs. Ontario has streamlined regulations for wood combustors and adopted world class standards into the province's air quality regulatory framework to enable the use of forest biomass in heating applications. Climate and environmental objectives laid out in the Made-in-Ontario Environment Plan identify the role that forest biomass can play in reducing emissions when used as a bioenergy feedstock for other industries (e.g., steel, lime, cement) and as a heating fuel for northern, rural, and Indigenous communities.

Spotlight: Regulatory burden reductions

The Government of Ontario has made advancements to improving the policy environment for the use of forest biomass for heat and combined heat and power (CHP), including:

- Creation of Guideline A14: Guideline for the Control of Air Emissions from Small Wood-Fired Combustors (< 3 MW), to streamline approvals and reduce burden for low-risk wood-fired combustion systems.
- Introduction of new alternate rules under the Operating Engineers Regulation that reduce unnecessary burden on bioheat and CHP system operating engineers while maintaining public safety standards.
- Ontario is helping more communities and businesses benefit from combined heat and power (CHP) technologies that use wood biomass as fuel, by exempting certain low impact CHP systems from requiring an environmental approval.

To unlock Ontario's forest biomass potential, collaboration between all forest sector partners including, government, industry, Indigenous communities, northern and rural communities, and research organizations, will be essential. This collaboration will help to diversify the forest sector's product mix, augment existing markets for forest biomass with new users, and expand supply chains. By utilizing Ontario's advantages and existing economic base, there are significant opportunities to support supply chain integration with other large industrial and manufacturing operations. Community-based renewable energy, low carbon fuels, bio-based

[1] Rancourt, Y., C. Neumeyer and N. Zou. 2017. Results of the Bioproducts Production and Development Survey 2015. Statistics Canada. <https://www150.statcan.gc.ca/n1/pub/18-001-x/18-001-x2017001-eng.htm>. Accessed September 2, 2020.

Note: refers to agricultural and forest biomass

plastics, sustainable chemicals, and natural consumer products also present new opportunities to attract investment and create jobs across the province.

Objectives and actions

The goals of the Forest Biomass Action Plan are to secure jobs, support economic development, and encourage sustainability in the forest sector through the use of Ontario's forest biomass. To support these goals, we have identified five objectives, each with a set of actions that will be pursued over the five-year term of this action plan:

- **Objective 1:** Identify pathways to markets for forest biomass.
- **Objective 2:** Support demand for forest bioenergy and bioproducts.
- **Objective 3:** Improve the business and regulatory environments for the use of forest biomass.
- **Objective 4:** Support holistic, culturally relevant pathways for Indigenous community involvement in forest biomass value chains to support reconciliation between Indigenous communities and the Crown.
- **Objective 5:** Communicate, collaborate, and inform on forest biomass opportunities.

In the short-term we aim to have a better understanding of Ontario's forest biomass resources and determine where our forest biomass opportunities are in the emerging green economy. Over the longer-term, this understanding will assist in stimulating new investments and compliment government efforts to support demand and improve the business and policy environments for forest biomass use. Acknowledging Indigenous leadership in the development of Ontario's forest biomass resources, Ontario will work collaboratively to increase Indigenous participation in, and benefits from, forest biomass supply chains. As the actions in this plan are implemented, Ontario will actively engage a broad range of partners and stakeholders to overcome barriers and help realize new and innovative uses for the province's forest biomass resources.

Objective 1: Identify pathways to markets for forest biomass.

Action 1.1: Further refine Ontario's inventory of forest biomass using tools such as CRIBE's Economic Fibre Supply Model.

Action 1.2: Publish a report that summarizes the types of forest bioproducts and their technology and commercial readiness.

Action 1.3: Publish a report that describes the current and future market demand for bioproducts made from Ontario's forest biomass.

Action 1.4: Complete a jurisdictional scan to inform bioproduct development and commercialization approaches for Ontario's forest biomass.

Action 1.5: Develop a life cycle inventory for traditional and non-traditional wood products (material/energy inputs and emissions), study biomass carbon dynamics, and refine life-cycle impact assessment models to build understanding of the environmental performance of forest biomass.

Action 1.6: Support development of regional clusters that increase value generation from the use of forest biomass.

Action 1.7: Conduct collaborative research studies on soil quality, stand development, productivity, and biodiversity to ensure long-term ecological sustainability of forest biomass harvesting.

Objective 2: Support demand for forest bioenergy and bioproducts.

Action 2.1: Ensure that existing facilities that consume biomass for electricity generation are provided ongoing access to the provincial market at fair compensation for the value they provide to Ontario's electricity system. This includes recognizing and, where possible, removing barriers that prevent biomass facilities from optimizing their assets.

Action 2.2: Publish a report that quantifies the financial contribution of forest biomass to individual facilities and the entire forest sector, and its socio-economic contribution to local communities and the provincial economy.

Action 2.3: Provide resources for the development of community-led projects that use forest biomass.

Action 2.4: Advance the use of forest biomass in the production of biofuels for heat through the Ontario Bioheat Initiative.

Action 2.5: Create a provincial bioheat strategy to increase production and consumption of domestic biofuels.

Action 2.6: Engage with potential industry users to integrate forest biomass into supply chains.

Action 2.7: Pursue government procurement to reduce the embodied and operational carbon footprint of buildings, energy, and other products through the use of strategies such as life cycle assessment and certified sustainable materials.

Objective 3: Improve the business and regulatory environments for the use of forest biomass.

Action 3.1: Review and update Ontario's Forest Biofibre Directive.

Action 3.2: Streamline permitting and reduce regulatory burden for all sectors which use forest biomass.

Action 3.3: Look for opportunity to make forest biomass projects eligible in relevant economic development and business support programs.

Action 3.4: Integrate the benefits of forest biomass use in provincial Emissions Performance Standards and relevant provincial strategies.

Action 3.5: Advocate on behalf of Ontario's forest biomass users and provincial interests during the creation and implementation of national climate change initiatives, such as the Clean Fuel Standard.

Objective 4: Support holistic, culturally relevant pathways for Indigenous community involvement in forest biomass value chains to support reconciliation between Indigenous communities and the Crown.

Action 4.1: As part of readiness building, provide opportunities for Indigenous businesses to build capacity and knowledge in the use of forest biomass. This includes understanding of:

- where biomass feedstocks are available and present feasible opportunities;
- how to optimize location to create best opportunities for success;
- complexity in forest product supply chains;
- Ontario's regulatory environment for forestry activities; and
- how to access forest biofibre through the Crown Forest Sustainability Act.

Action 4.2: Work with Indigenous communities to take a stepwise approach to bring about greater Indigenous involvement and benefit from the use of forest biomass:

- create network connections;
- foster partnerships with industry; and
- encourage agreements between industry and Indigenous communities.

Action 4.3: Support Indigenous participation in forest biomass project investments through provincial funding programs and explore additional opportunities for enabling investments through capacity building, skills training, access to expertise, and knowledge transfer.

Action 4.4: Support Indigenous community applications to federal funding programs for projects that use forest biomass.

Action 4.5: Facilitate preferred access to forest biomass for proposals with Indigenous participation, where and when forest biomass is available, as can be facilitated through regulations under the Crown Forest Sustainability Act.

Action 4.6: Support Ontario's Far North Indigenous communities in the development of bioenergy systems to replace base load power generation using diesel fuels with local forest biomass.

Objective 5: Communicate, collaborate, and inform on forest biomass opportunities.

Action 5.1: Create information, communication, and marketing materials to support prospective forest biomass users.

Action 5.2: Support and participate in forest sector innovation networks that aim to deliver solutions for challenges to using forest biomass.

Action 5.3: MNRF's Forest Industry Division will facilitate discussions between other ministries, federal agencies, investors, technology providers, and forest sector partners to increase the use of forest biomass.

Action 5.4: Engage with partners and stakeholders to ensure alignment between regional, provincial and federal initiatives.

The road ahead

This action plan is an important component of achieving the vision identified in Sustainable Growth: Ontario's Forest Sector Strategy. By supporting our government's priorities of job creation, reducing administrative burden, and promoting economic growth and prosperity, the Forest Biomass Action Plan will play a role in building a resilient forest sector that encourages innovative uses of forest biomass that contribute to the province's forest management and environmental objectives.

Actions laid out in this plan will be implemented over the course of five years. The Appendix provides a summary of the actions and their associated timeframes. Progress and completion of these actions will be tracked through an interim (2023) and final report (2026) published by Ontario's Ministry of Natural Resources and Forestry. Indicators for each objective are identified below, which will be used to track progress on objective achievement. To achieve the objectives set out in this action plan our government looks forward to the continued contribution and advice provided by the Working Group.

Objective 1: Identify pathways to markets for forest biomass.

Indicators:

- Information available regarding Ontario's forest biomass characteristics. For example, types, quality, quantity, geography and economics.
- Identification of Ontario's potential forest biomass markets, commercial and technological readiness.

Objective 2: Support demand for forest bioenergy and bioproducts.

Indicators:

- Socio-economic contribution to local communities and the provincial economy.
- Number and range of facilities using forest biomass in their operation.
- Regional interest and implementation of forest biomass projects.

Objective 3: Improve the business and regulatory environments for the use of forest biomass.

Indicators:

- Regulatory burden reductions in the use of forest biomass.
- Number of biomass projects funded through federal and provincial programs.
- The role of forest biomass in climate change initiatives and programs.

Objective 4: Support holistic, culturally relevant pathways for Indigenous community involvement in forest biomass value chains to support reconciliation between Indigenous communities and the Crown.

Indictors:

- Number of Indigenous communities engaged in forest biomass projects.
- Range of forest bioproducts created by and/or used by Indigenous communities.
- Number of Indigenous communities engaged in learning about forest biomass.
- The number of Indigenous communities that have forest biomass integrated into their community's comprehensive plan.

Objective 5: Communicate, collaborate, and inform on forest biomass opportunities.

Indicators:

- Materials created and utilized to support prospective forest biomass users.
- Participation in stakeholder discussions, industry innovation network events and workshops.

Appendix

Actions to be completed by 2022

- **Action 1.2:** Publish a report that summarizes the types of forest bioproducts and their technology and commercial readiness.
- **Action 1.4:** Complete a jurisdictional scan to inform bioproduct development and commercialization approaches for Ontario's forest biomass.
- **Action 2.1:** Ensure that existing facilities that consume biomass for electricity generation are provided ongoing access to the provincial market at fair compensation for the value they provide to Ontario's electricity system. This includes recognizing and, where possible, removing barriers that prevent biomass facilities from optimizing their assets.
- **Action 2.2:** Publish a report that quantifies the financial contribution of forest biomass to individual facilities and the entire forest sector, and its socio-economic contribution to local communities and the provincial economy.

Actions to be completed by 2023

- **Action 1.1:** Further refine Ontario's inventory of forest biomass using tools such as CRIBE's Economic Fibre Supply Model.
- **Action 1.3:** Publish a report that describes the current and future market demand for bioproducts made from Ontario's forest biomass.
- **Action 3.1:** Review and update Ontario's Forest Biofibre Directive.

Actions to be completed by 2026

- **Action 1.5:** Develop a life cycle inventory for traditional and non-traditional wood products (material/energy inputs and emissions), study biomass carbon dynamics, and refine life-cycle impact assessment models to build understanding of the environmental performance of forest biomass.
- **Action 1.6:** Support development of regional clusters that increase value generation from the use of forest biomass.
- **Action 2.3:** Provide resources for the development of community-led projects that use forest biomass.
- **Action 2.5:** Create a provincial bioheat strategy to increase production and consumption of domestic biofuels.
- **Action 2.6:** Engage with potential industry users to integrate forest biomass into supply chains.
- **Action 2.7:** Pursue government procurement to reduce the embodied and operational carbon footprint of buildings, energy, and other products through

the use of strategies such as life cycle assessment and certified sustainable materials.

- **Action 3.2:** Streamline permitting and reduce regulatory burden for all sectors which use forest biomass.
- **Action 3.3:** Look for opportunity to make forest biomass projects eligible in relevant economic development and business support programs.
- **Action 3.4:** Integrate the benefits of forest biomass use in provincial Emissions Performance Standards and relevant provincial strategies.
- **Action 3.5:** Advocate on behalf of Ontario's forest biomass users and provincial interests during the creation and implementation of national climate change initiatives, such as the Clean Fuel Standard.
- **Action 4.1:** As part of readiness building, provide opportunities for Indigenous businesses to build capacity and knowledge in the use of forest biomass. This includes understanding of:
    - where biomass feedstocks are available and present feasible opportunities;
    - how to optimize location to create best opportunities for success;
    - complexity in forest product supply chains;
    - Ontario's regulatory environment for forestry activities; and
    - how to access forest biofibre through the Crown Forest Sustainability Act.
- **Action 4.2:** Work with Indigenous communities to take a stepwise approach to bring about greater Indigenous involvement and benefit from the use of forest biomass:
    - create network connections;
    - foster partnerships with industry; and
    - encourage agreements between industry and Indigenous communities.
- **Action 5.1**: Create information, communication, and marketing materials to support prospective forest biomass users.

Operational actions to be sustained

These are actions that will continue through the duration of the Forest Biomass Action Plan and into the future.

- **Action 1.7:** Conduct collaborative research studies on soil quality, stand development, productivity, and biodiversity to ensure long-term ecological sustainability of forest biomass harvesting.
- **Action 2.4:** Advance the use of forest biomass in the production of biofuels for heat through the Ontario Bioheat Initiative.
- **Action 4.3:** Support Indigenous participation in forest biomass project investments through provincial funding programs and explore additional opportunities for enabling investments through capacity building, skills training, access to expertise, and knowledge transfer.
- **Action 4.4:** Support Indigenous community applications to federal funding programs for projects that use forest biomass.
- **Action 4.5:** Facilitate preferred access to forest biomass for proposals with Indigenous participation, where and when forest biomass is available, as can be facilitated through regulations under the Crown Forest Sustainability Act.
- **Action 4.6:** Support Ontario's Far North Indigenous communities in the development of bioenergy systems to replace base load power generation using diesel fuels with local forest biomass.
- **Action 5.2:** Support and participate in forest sector innovation networks that aim to deliver solutions for challenges to using forest biomass.
- **Action 5.3:** MNRF's Forest Industry Division will facilitate discussions between other ministries, federal agencies, investors, technology providers, and forest sector partners to increase the use of forest biomass.
- **Action 5.4:** Engage with partners and stakeholders to ensure alignment between regional, provincial and federal initiatives.