



Ontario 

Forest Biomass Action Plan

March 2022



Minister’s message	3
Introduction	4
Forest biomass advantage	6
Chemicals Materials Energy	6
Spotlight: Ontario’s forest biomass sector – a place to grow	7
Spotlight: Contributing to Ontario’s low-carbon hydrogen strategy	10
The case for using forest biomass	11
Ontario’s forest biomass advantage	12
Leadership in the green economy	12
Spotlight: Integrating biomass in Resolute Forest Products’ Northwestern Ontario operations	14
Sustainable forest policy framework	14
Spotlight: Forest biomass and the Managed Forest carbon cycle	16
Available supply	18
Spotlight: Whitesand Bioeconomy Centre	18
Innovation networks	19
Spotlight: Thunder Bay’s Forest Bioeconomy Cluster	19
Growing community support for forest biomass	20
Spotlight: Wikwemikong’s Bioheat Initiative	20
Unlocking Ontario’s potential	21
Spotlight: Reducing regulatory burden	22
Spotlight: Collaboration in the forest	23
Objectives and actions	24
The road ahead	29
Appendix	32
Actions to be completed by 2022	32
Actions to be completed by 2023	32
Actions to be completed by 2026	35
Operational actions to be sustained	34



Minister's Message



The forest industry has always been a vitally important part of Ontario's economy. Today, it generates \$18 billion in annual revenue and supports more than 148,000 direct and indirect jobs.

Forestry is a source of prosperity in Northern, Indigenous, and rural communities in our province. Our government is committed to doing everything we can to support job growth, attract investment, and secure the long-term future of this essential renewable industry. In fact, Ontario can sustainably harvest twice as much wood annually than the sector does today. We must find more economical uses for excess biomass so the forestry sector can reach its full potential.

Our roadmap for prosperity in the forest industry, *Sustainable Growth: Ontario's Forest Sector Strategy*, was released in August 2020. The strategy maps out dozens of actions to grow the industry and guarantee responsible forestry practices.

Since the strategy's release, we have been busy implementing its actions and honouring our commitments to the sector and its workers. One of the signature commitments in *Sustainable Growth* is the development of a Forest Biomass Action Plan. This plan includes working with the private sector to encourage innovation to develop new uses for forest

biomass that would support more sustainable harvesting in Ontario.

Ontario's forest industry excels at producing manufactured goods from timber such as lumber, furniture, packaging, and paper products. These value-added products are the mainstay of the province's forest industry, enjoying a well-deserved international reputation for their high quality and sustainability standards.

Throughout the production cycle, from harvest to delivery, this manufacturing process generates by-products including bark, shavings, and sawdust – along with uncommercial trees and tree parts. These resources are referred to collectively as forest biomass.

A lesser-known but important segment of Ontario's forest industry commercializes forest biomass that might otherwise be discarded. Skilled operators manufacture an impressive array of products – ranging from

landscaping products and food additives to building materials and electricity.

The potential for biomass products is ever-expanding; emerging biomass uses include medicine, bioplastics, 3D printing, mass timber products, biodiesel, and jet fuel, to name a few. Biomass innovations are a sustainable alternative to carbon-intensive products and an exciting new frontier for Ontario's forest sector.

Deriving added value from forest biomass ensures the industry operates at its most sustainable and efficient level. With by-products from one industry segment feeding demand from another, we have the basis for a circular economy – an economy where nothing is wasted and no opportunity is unrealized.

I am pleased to introduce our Forest Biomass Action Plan, the culmination of extensive collaboration with ministry staff and forest industry partners. It is a comprehensive assessment of our forest biomass advantages,

the challenges affecting this sector, and how we can promote increased use of forest biomass in Ontario.

The plan prescribes actions under five objectives: reaching new markets, supporting increased demand, cutting red tape, boosting Indigenous participation and promoting stakeholder awareness. Our government will implement these actions over the next five years. By implementing the plan, we will unlock the enormous potential of Ontario's forest biomass, drive further prosperity in the forest industry, and support job growth, investment, innovation, and sustainability.



The Honourable Greg Rickford,

Minister of Northern Development, Mines,
Natural Resources and Forestry



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, there is immense potential to increase the use of Ontario's sustainable forest biomass resources. Under the right operational and economic conditions, new business opportunities and projects that use forest biomass can play an important role in growing the economy and further supporting existing forest sector businesses. In addition to supporting Ontario's economy, effective use of forest biomass can also contribute to the province's forest management and environmental objectives. As an active partner in research and collaborative networks, the government looks forward to engaging with stakeholders and community partners to investigate ways forest biomass can be utilized that

support sustainability and unlocks the full benefits from Ontario's biomass potential.

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 the use of forest biomass. Valuable insights from the Working Group members highlighted 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 increase support for Ontario's forest dependent communities.

Building on Ontario's strengths and progress to date, this document concludes 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 Committee in subsequent years.



Forest biomass advantage

The versatility and range of applications for wood presents numerous opportunities for forest biomass. Utilizing the four main components of wood (cellulose, hemicellulose, lignin and extractives), a wide range of products can be made that meet the demands of numerous established and emerging industries. In addition to more familiar forest products like lumber, pulp and paper, or particleboard, the examples highlighted below demonstrate current and emerging products that can be derived from wood, including forest biomass.

Chemicals



Current uses

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

Emerging uses

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

Materials



Current uses

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

Emerging uses

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

Energy



Current uses

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

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?

Forest biomass is a broad term that has multiple meanings depending on the intent of its use and the discipline or industry using it. In the most general sense, forest biomass refers to all biological material (living and dead) in forested landscapes.

Consistent with Ontario’s sustainable forest management framework, 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 provincial forests under an approved forest management plan, or sourced from private woodlots and other forested lands.
- **Mill by-products:** Composed of residues generated from 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.



Spotlight

Ontario’s forest biomass sector – a place to grow

Another common and longstanding use of forest biomass is in the province’s landscaping sector, which creates jobs and sustainable products through the use of Ontario’s mill by-products. Gro-Bark, a subsidiary of Walker Industries, has processed bark, wood chips, and log ends generated by the

forest industry to make soil, composting, and mulch products since the 1980s. Its current operations across Ontario’s Golden Horseshoe, eastern, and northeastern regions serve the domestic and U.S. markets for landscaping products by adding value to leftover mill materials. As Ontario looks to recover from

the impacts of the COVID-19 pandemic and support clean growth, the long success of companies like Gro-Bark serves as an example of the sustainable business opportunities and industry linkages generated as a result of efficient use of forest biomass.

While there are opportunities to diversify the use of Ontario’s forest biomass beyond the province’s current conventional bioenergy and landscaping applications, newer uses also pose technical and operational 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

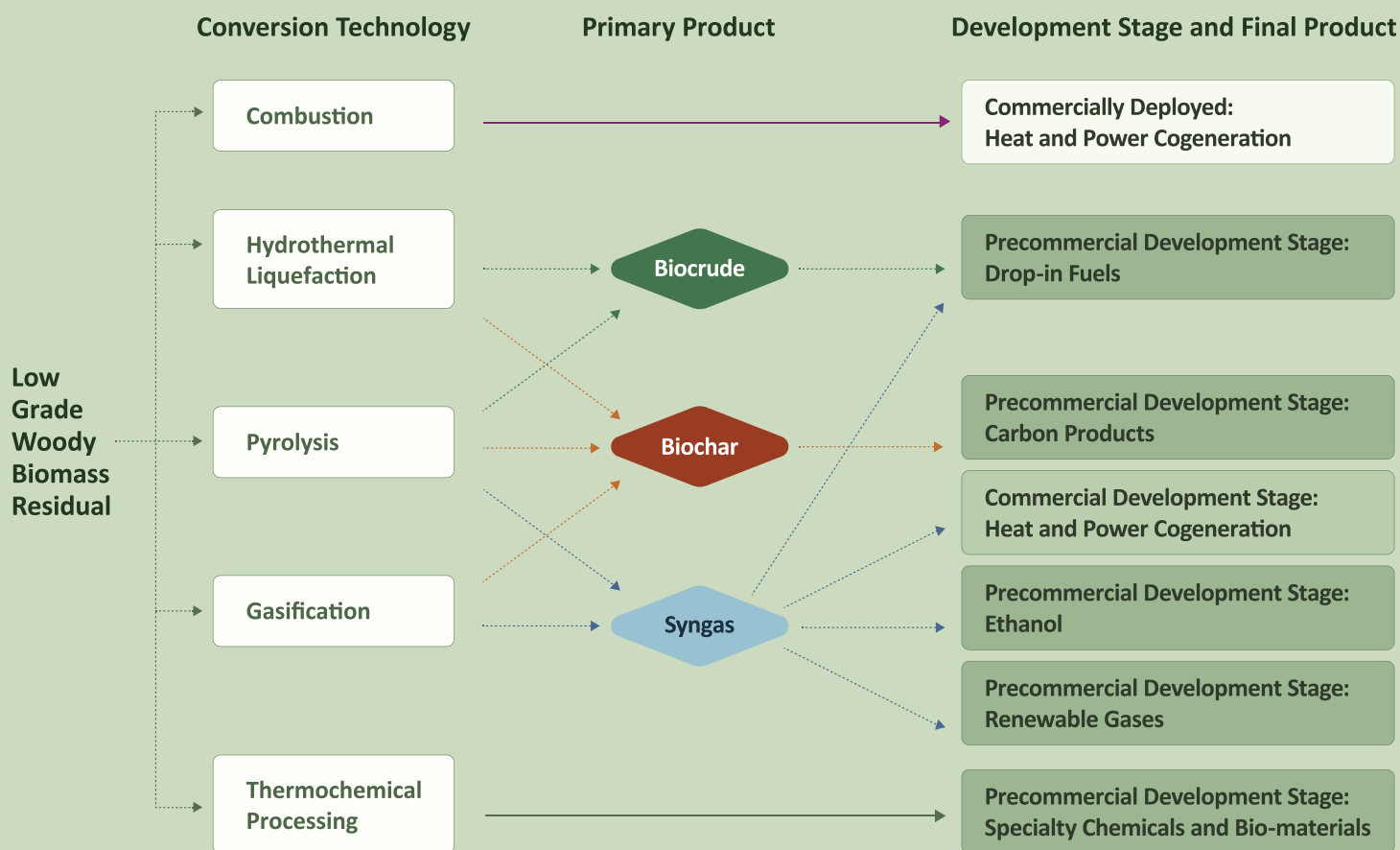
applied. These conversion processes present opportunities for bioproduct creation; however, additional work is needed to make these opportunities commercially viable.

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 require significant investments in pre-commercial development.

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

Deployable technology pathways for low grade biomass*

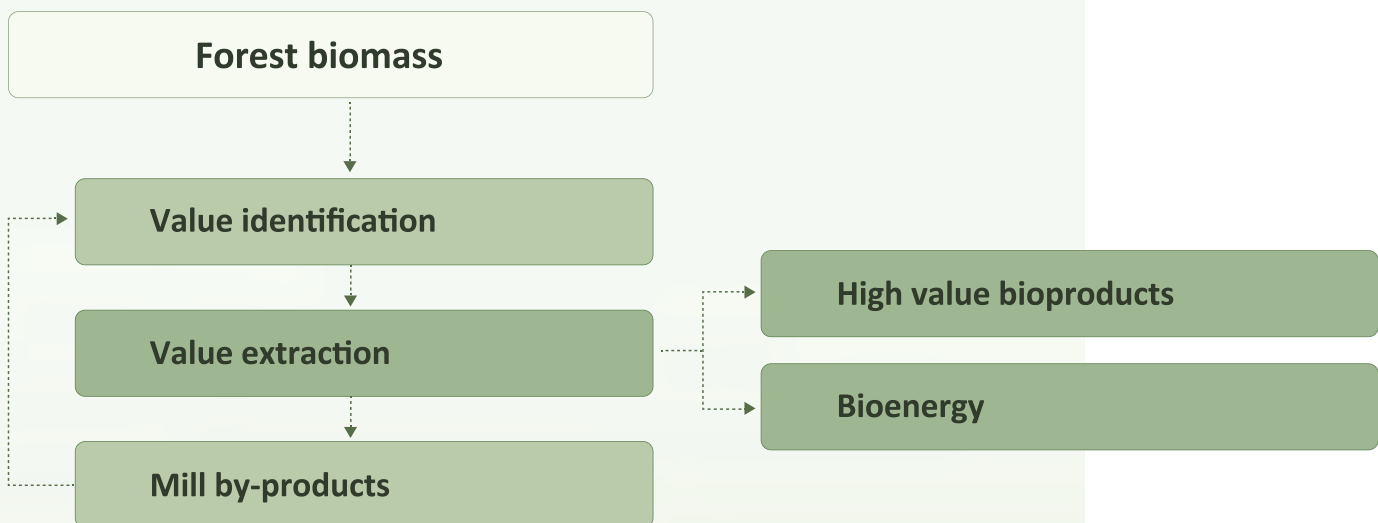
*adapted from technology benchmarking conducted by CRIBE (Centre for Research and Innovation in the Bioeconomy) in September 2020



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 pathway for low-grade forest biomass.

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



Spotlight

Contributing to Ontario's low-carbon hydrogen strategy

As Ontario explores options for a **provincial low-carbon hydrogen strategy**, there is emerging interest in the development of green hydrogen from forest biomass. Green hydrogen is a gaseous low-carbon fuel made from renewable energy sources that has a wide range of potential applications and uses. Increased use of green hydrogen in sectors of the economy like transportation and heating can help to reduce greenhouse gas emissions while maximizing

value from Ontario's forest biomass resources.

There are multiple technology pathways to produce green hydrogen from forest biomass:

- Gasification and pyrolysis are mature conversion technologies that use controlled application of heat, steam, and oxygen to create renewable syngas which can be processed into green hydrogen. In some cases, the by-products from these processes can be

further refined to create additional products like biocrude or biochar (See Figure 1).

- Electrolysis involves the use of electricity to produce green hydrogen and oxygen from water. As a source of renewable bioenergy, forest biomass can be used to power electrochemical processes that create low-carbon hydrogen gas.



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 a resilient 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
- 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 Indigenous community heat and energy self-sufficiency
- Supports opportunities for increased Indigenous participation in forest sector supply chains
- Provides energy security and enables other infrastructure investments
- Contributes to production of essential products, such as personal protective equipment

Improving environmental stewardship

- Reduces waste and disposal of mill by-products in landfills
- Helps to mitigate greenhouse gas emissions by reducing reliance on fossil fuels
- Creates sustainable, renewable and low-carbon consumer products
- Avoids use of toxic and ecologically damaging fuels and chemicals
- Helps to reduce wildland fire risk in the wildland-urban interface
- Contributes to forest management objectives
- Promotes healthy and resilient forests by enhancing the forest ecosystem condition through improved forest renewal and maintenance efforts (i.e., silviculture practices)

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 supported 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.

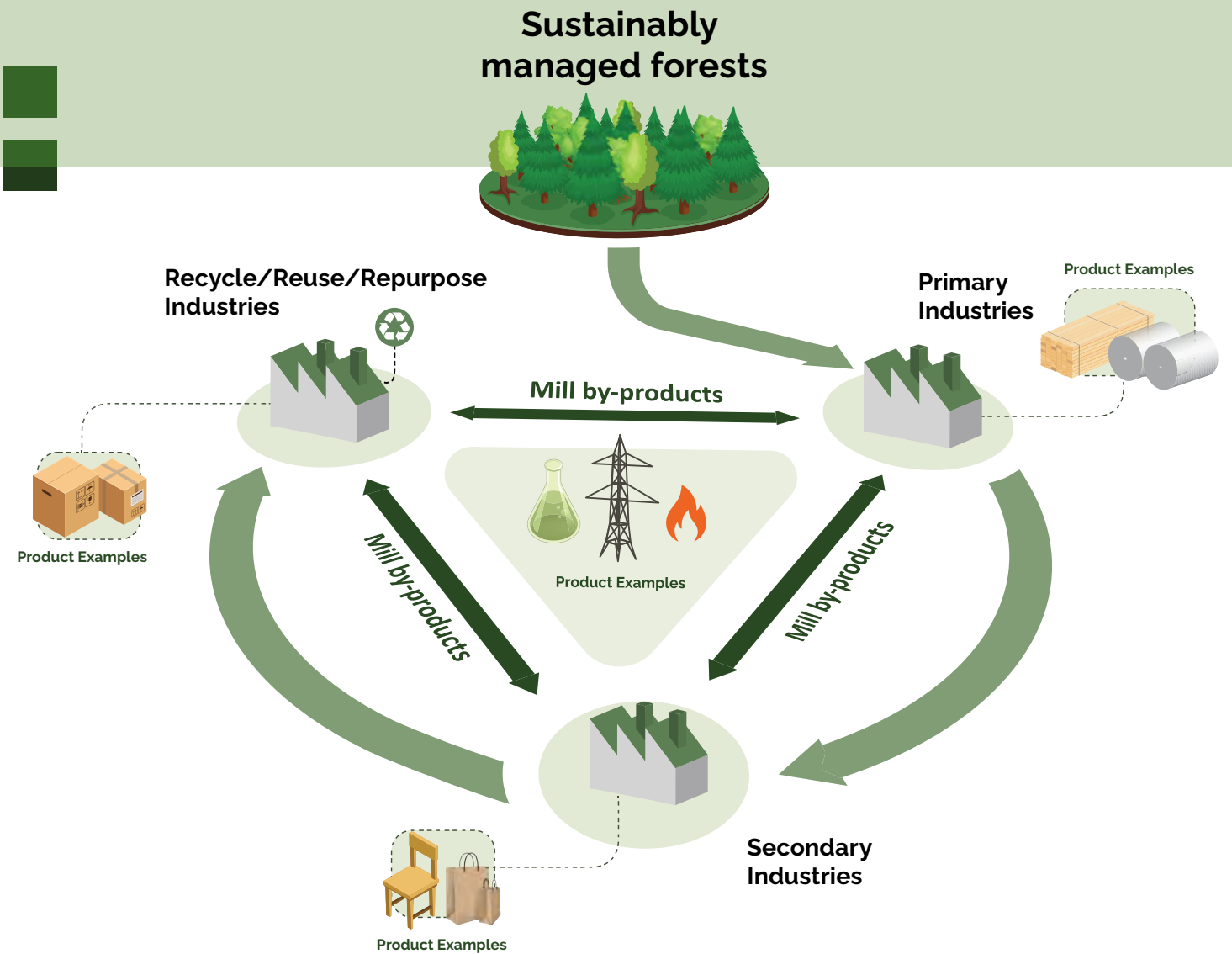
Ontario's forest sector is highly integrated. For example, mill by-products from one facility serve as the feedstock to produce energy for

another, helping to reduce waste and promote a circular economy. Figure 3, below, is a simple illustration of how forest biomass (biofibre and mill by-products) supports integration and interconnectivity between forest product industries. The result is a robust set of efficient supply chains that create a diverse range of sustainable industry and consumer products.

The existing infrastructure for manufacturing forest products provides a solid foundation to leverage future investments for the development of new bioproducts and revenue streams while avoiding added pressure on landfills. As other sectors of the economy 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.



Figure 3. A flow chart illustrating the integration and interconnectivity of forest biomass use within the forest product sector.



Spotlight

Integrating biomass in Resolute Forest Products' Northwestern Ontario operations

Resolute's Northwestern Ontario operations are an example of moving towards a circular economy. In a circular economy, resources gain value through process improvements, waste reduction and repurposing. This creates new and innovative business opportunities while reducing a product's 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 is 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. Ash leftover from the combustion process is 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 policy framework

Ontario is a leader in sustainable forest management. The provincial forest managed under the Crown Forest Sustainability Act (CFSA) (Managed Forest) is governed by a robust forest policy framework consisting of legislation, regulations, manuals and guides that provide for long-term forest health. The CFSA provides for the sustainable management of the Managed Forest

in a manner that must have regard for environmental, social and economic values.

Forest management plans (FMP) are developed in accordance with the Forest Management Planning Manual and forest management guides. FMPs provide direction on forest management activities such as road use and construction, where harvest



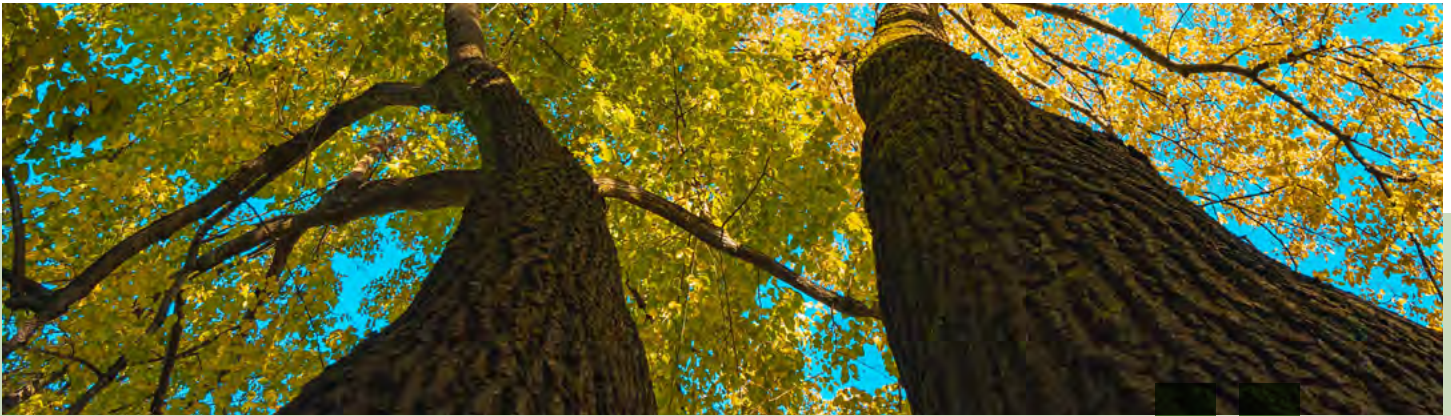
can occur and the regeneration of trees within all harvested areas. Preparing an FMP includes Indigenous community, public and stakeholder involvement at all stages of plan development.

Ontario's forest policy framework uses an adaptive management approach. Through the forest management planning process, forestry professionals gather knowledge (traditional, scientific, and social), plan, implement, monitor, report, evaluate and re-plan forest management activities based on achievement of FMP objectives and the evaluation of new information, science, and Traditional Ecological Knowledge.

The forest management guides are based on the best available science with the overall objective of forest sustainability. This is achieved by emulating natural disturbance (e.g., wildfire, insect outbreaks, windthrow) and landscape patterns (e.g., young, mature, and old forest patches on the land) while protecting forest values such as soil health, water quality, and biodiversity. The guides provide direction to support the sustainability of forest biomass

harvesting, which can also promote site productivity (e.g., soil quality, tree growth). This approach means that the conservation, allocation and utilization of Ontario's provincial forests, for all forest products, is ecologically sustainable.

Forest management can also occur on private land. Ontario's private woodlots and other forested lands can provide a source of sustainable forest biomass. Ontario supports good forestry practices on private woodlots through initiatives like the Managed Forest Tax Incentive Program (MFTIP). The MFTIP provides a property tax incentive for landowners to work with a certified Managed Forest Plan Approver to put in place a Managed Forest Plan for their property, which may include sustainable harvesting according to good forestry practices. When a landowner is preparing for a commercial harvest, to ensure it follows good forestry practices, they should have a prescription prepared by a qualified member of the Ontario Professional Foresters Association such as a Registered Professional Forester (R.P.F.) or a qualified Associate R.P.F.



Spotlight

Forest biomass and the Managed Forest carbon cycle

Ontario's forest policy framework supports a healthy and diverse Managed Forest that can withstand the impacts and reduce the effects of climate change, while providing a sustainable supply of renewable wood products (Figure 4). The framework also provides the flexibility to implement forest management actions that can influence the amount of carbon released from or stored in forests and harvested wood products.

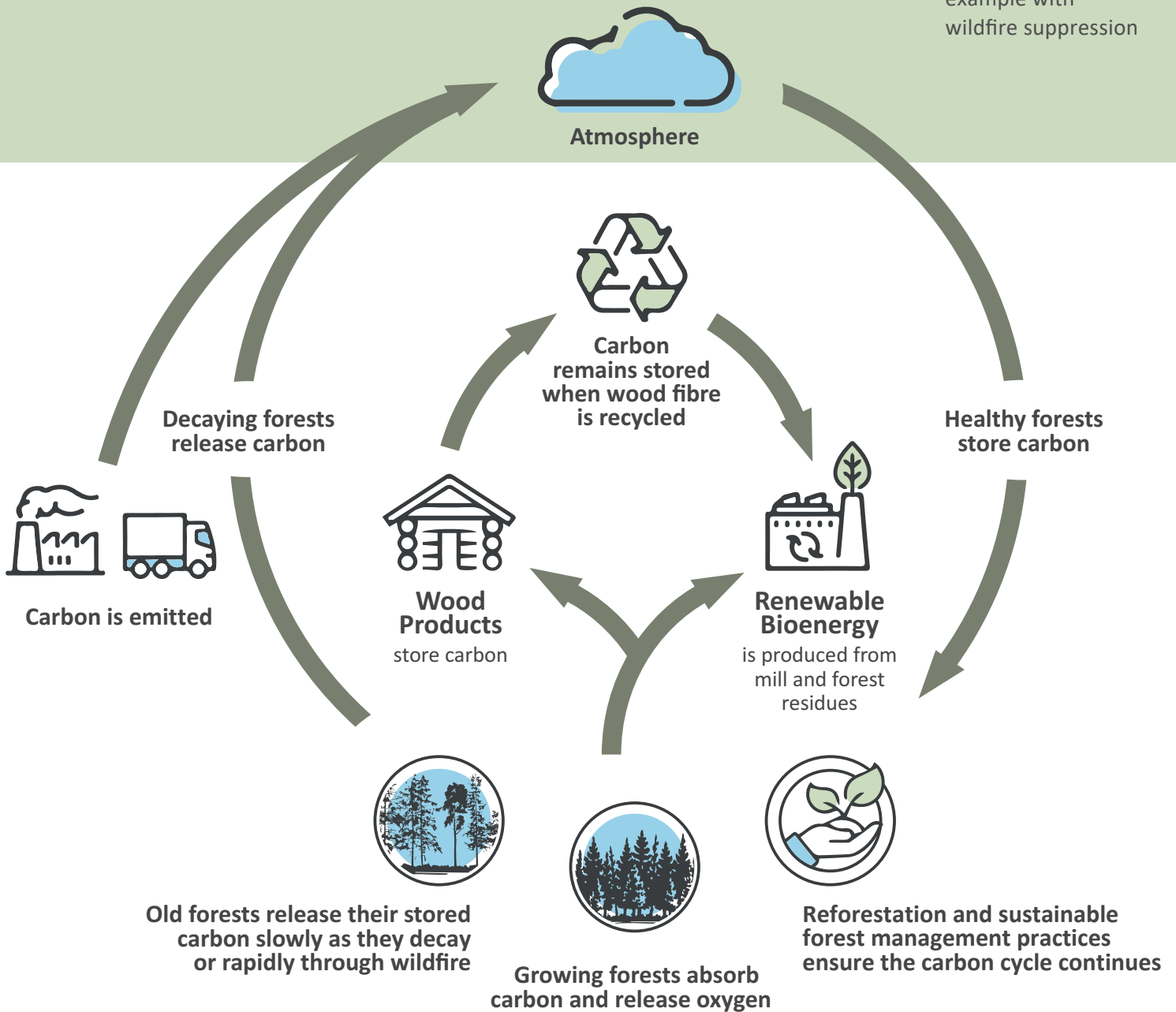
Forest ecosystems can moderate the impacts associated with climate change by sequestering carbon from the atmosphere and storing carbon (temporarily) in trees, soil and dead organic matter. The amount of carbon stored in forest ecosystems depends on the balance among forest conditions and

productivity, forest management activities, and the frequency and extent of natural disturbances such as fire, insects, and windthrow. In the long term, maintaining or increasing the amount of carbon stored in forest ecosystems and in wood products can provide carbon and greenhouse gas emission mitigation while also providing other environmental, social and economic services.

As part of approved forest management plans, the harvest and use of forest biomass can provide carbon and other benefits. Harvesting forest biofibre can contribute to good silviculture practices by helping to develop natural and desirable growth conditions for tree species. It can enhance forest utilization, reduce waste, and contribute to the

use of lower quality logs that currently have no markets. Using sustainably-sourced forest biofibre and mill by-products can provide carbon and climate benefits by substituting carbon-intensive products in buildings and construction, providing renewable feedstocks for industries such as steel, lime, and cement, and when replacing fossil fuels used to generate heat and power. As new data and information become available, Ontario's adaptive management approach provides for the long-term sustainability of forest biomass harvesting and use.

Figure 4. Sustainable forest management and carbon storage using an Ontario boreal forest example with wildfire suppression



Available supply

Approved forest management plans for Ontario's Managed Forests identify 30 million cubic metres of wood supply that can be harvested annually. Currently, approximately 15 million cubic metres of wood supply 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 used can be accomplished while maintaining Ontario's high standards of forest management. In particular, forest biomass harvesting offers opportunities for the forest industry to further utilize the available supply identified in approved

forest management plans. By helping to reduce the cost of accessing stands and encouraging more natural and desirable growing conditions, forest biomass harvesting can play a unique role in supporting cost competitiveness and putting Ontario's available supply of wood to work.

Opportunity also exists to utilize forest biomass on private woodlots and other forested land. Furthermore, mill by-products from forest product manufacturing operations provide an additional supply of sustainable materials that can be used in new product and revenue streams.

Spotlight

Whitesand Bioeconomy Centre

Whitesand First Nation, in Northwestern Ontario, is preparing for the construction of a Bioeconomy Centre to support new forest biomass and wood processing facilities. The Centre will include a 6.5-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 Wabadowgang Noopming and Black Spruce Forests. Utilizing these unmarketable species and parts of trees will allow the sustainable harvest of additional low-sawlog-quality stands that were previously considered 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.

In 2021 Ontario's bioeconomy took another step forward with the beta release of ForestEDGE, a web-based geo-spatial platform developed by CRIBE to help communicate information about Ontario's available forest resources and to attract investments in new and cutting-edge uses of wood.

Spotlight

Thunder Bay's Forest Bioeconomy Cluster

In addition to hosting CRIBE, Thunder Bay is emerging as a regional cluster of expertise through 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, create local jobs and reduce reliance on fossil fuels. Community heating and energy projects like the Wiikwemkoong Wood Heating Initiative are being pursued by several groups, including Indigenous communities looking to implement forest biomass projects and become active partners in forest product supply chains.

In other parts of Ontario, the use of wood pellets, generated from sawdust and mill shavings, and wood

chips provides an affordable and reliable source of heating that displaces imported carbon-intensive fuels. As Ontario's communities explore options for local climate-friendly infrastructure, many are looking to the example set in northern European countries, where centrally located bioenergy producers feed clean heat and power to efficient, multi-building district energy systems.

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 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, power, or CHP and it is a feedstock for the manufacture of wood pellets and landscaping products. There are several obstacles that complicate diversification of forest biomass, making it likely that heat, power or CHP 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.

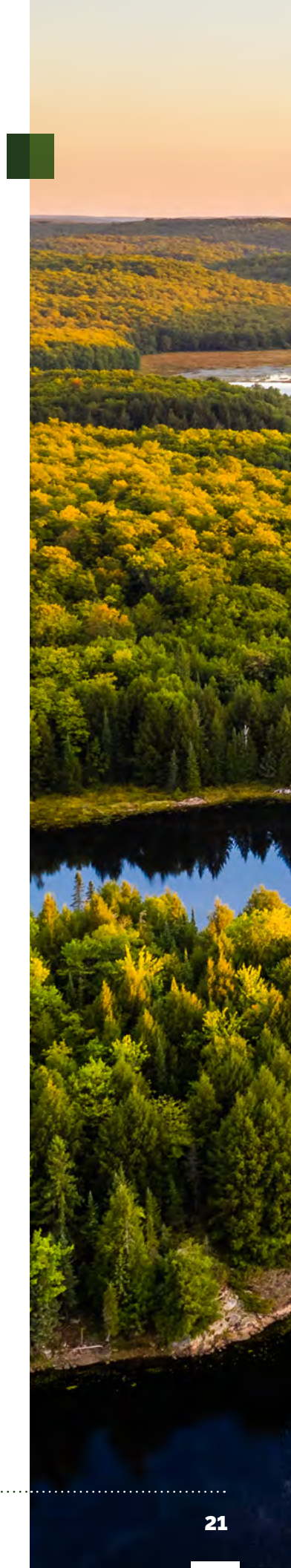
According to Statistics Canada the five most cited obstacles faced by biomass establishments are difficulty entering the commercial marketplace, cost of biomass, cost and timeliness of regulatory approvals, lack of financing, and unreliable quantity of biomass.¹ Considering these barriers and recommendations from the Working Group, this action plan addresses

areas Ontario can most influence, as indicated by the objectives in the following section.

The Government of Ontario has taken initial steps to encourage the use of forest biomass. 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. The province's climate policy and Made-In-Ontario Environment Plan recognize 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 homes and communities.

¹ Rancourt, Y., C. Neumeyer and N. Zou. 2017. [Results of the Bioproducts Production and Development Survey 2015](#). Statistics Canada. Accessed September 2, 2020.

Note: refers to agricultural and forest biomass



Spotlight

Reducing regulatory burden

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 and by adding certified small wood-fired combustors into the Environmental Activity Sector Registry.
- 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 and better aligning the required level of provincial approval with other comparable energy technologies, and with the level of environmental impact.

As part of the 2021 Fall Economic Statement, Ontario is proposing to fund the above-market costs of near-term re-contracting of existing biomass electricity generators in Northern Ontario through the Renewable Cost Shift initiative. Funding these contracts would support clean electricity generation, while maintaining electricity rate stability for businesses and households. Taking this approach will provide time for the execution of actions listed in the following section of this plan.

To unlock Ontario's forest biomass

potential, collaboration between all forest sector partners, including federal, provincial, and local governments, industry, Indigenous communities, and research organizations, will be essential. A strong and growing bioproduct sector will also require an engaged public, which understands and values the environmental, social, and economic contributions that forest biomass can deliver for Ontario. Under the right conditions, co-operation will help to diversify the forest sector's product mix, augment existing markets for





forest biomass with new users, expand supply chains, and build public awareness. By leveraging the province'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 plastics and packaging, sustainable chemicals, and natural consumer products also present new opportunities to attract investment and create jobs across the province.

Spotlight

Collaboration in the forest

Ontario recognizes that Indigenous communities have an important relationship with the land, and exercise Aboriginal and treaty rights in forests. In *Sustainable Growth: Ontario's Forest Sector Strategy*, the province committed to continuing to build strong, mutually beneficial relationships and partnerships with Indigenous communities across the province. This Forest Biomass Action Plan is intended to help deliver on that commitment and can contribute to reconciliation between Indigenous people and the province.

As Ontario works toward securing jobs and ensuring sustainability through the use of forest biomass, our government recognizes the need to focus on capacity building, partnerships

and community readiness. These actions will help build holistic, culturally relevant pathways for Indigenous community involvement in biomass use.

Reconciliation, in the context of this action plan, empowers Indigenous communities to take a leadership role in developing a collaborative working model to better participate in community biomass use. Collaboration may take various forms, including: providing information, dialogue, use of Traditional Ecological Knowledge and working with communities to support their use of biomass. Actions taken through this plan will be collaborative as opposed to prescriptive, in order to reflect the vision, capacities and priorities of individual communities.

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 complement 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 technological 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 lifecycle 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 to inform policy under Ontario's Policy Framework for Sustainable Forests.

Objective 2:

Support demand for forest bioenergy and bioproducts.

Action 2.1: Ensure that existing facilities that consume biomass for electricity generation and are approaching the end of their contract are provided the opportunity to negotiate a new contract with the Independent Electricity System Operator, balancing the benefits to the forestry sector and regional economies with value for the ratepayer and taxpayer.

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: Develop a provincial bioheat strategy to increase the production and domestic consumption of biofuels for heat, drawing from expertise of the Ontario Bioheat Initiative and input from a range of partners and stakeholders.

Action 2.5: Engage with potential industry users to integrate forest biomass into supply chains.



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 that 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 where they 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.

Action 4.6: Support Indigenous communities in Ontario’s Far North in the development of cost effective 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: The Ministry of Northern Development, Mines, Natural Resources and Forestry 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*. Four pillars of action were identified in the Strategy: promoting stewardship and sustainability, putting more wood to work, improving our cost competitiveness, and fostering innovation, markets and talent.

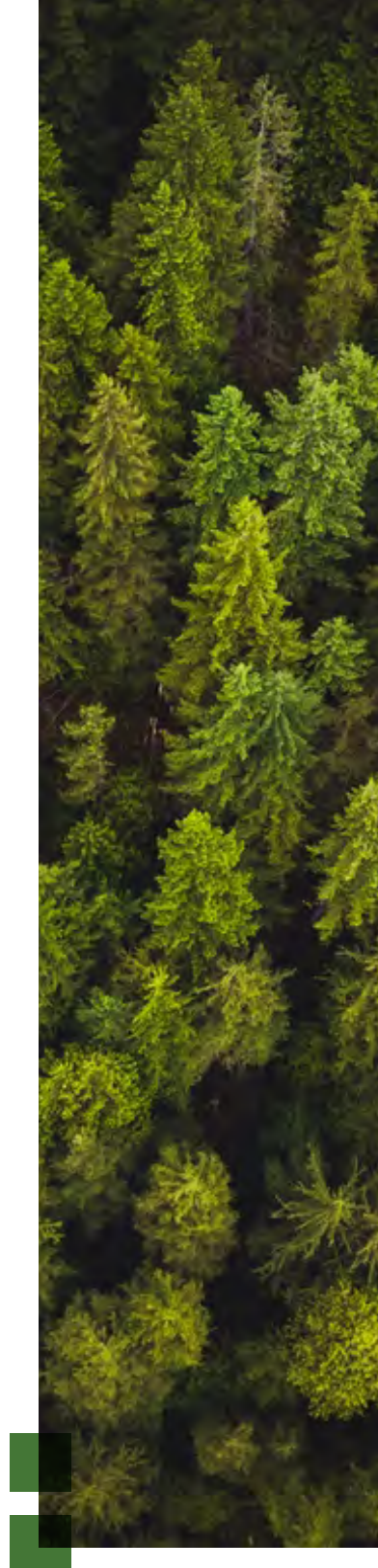
As Ontario looks to strengthen its position as a world leader in making and selling sustainable and renewable forest products, it is clear that the actions listed in the province's Forest Biomass Action Plan will play a role in supporting and reinforcing each of the key pillars of *Sustainable Growth*.

The ongoing sustainability of Ontario's forests depends on good stewardship and effective forest management that is adaptive, collaborative, and relies on the best available science together with Traditional Ecological Knowledge.

Integration of forest biomass into the province's various industrial sectors is key to the long-term viability of Ontario's forests in light of a changing climate. By taking action to increase forest biomass use, the province can realize significant economic and environmental benefits while putting its available supply of wood to work for the people and communities of Ontario.

Faced with changing markets and strategic challenges, enhancing the cost competitiveness of our forest sector will also require effective uses and markets for all forest resources, including forest biofibre and mill by-products generated by existing facilities.

By supporting our government's priorities of job creation, reducing administrative burden, and promoting growth and prosperity, the Forest Biomass Action Plan will contribute



The ongoing sustainability of Ontario's forests depends on good stewardship and effective forest management.

to our government’s vision for a resilient forest sector that fosters innovation and sustainable markets, and engages and inspires the best talent.

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 estimated timeframes. Progress and completion of these actions will be tracked through an interim (2023)

and final report (2026) to be published on Ontario.ca.

Indicators for each objective are identified below. They 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 regarding Ontario’s forest biomass characteristics. For example, types, quality, quantity, geography and economics
- Potential forest biomass markets, commercial and technological readiness

Objective 2: Support demand for forest bioenergy and bioproducts.

Indicators:

- Socio-economic contribution of forest biomass to local communities and the provincial economy
- Use of forest biomass in operations and supply chains
- Regional interest and implementation of forest biomass projects

Objective 3:

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

Indicators:

- Regulatory environment for the use of forest biomass
- Biomass projects receiving supports from federal and/or provincial funding 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.

Indicator:

- Communities have the capacity, knowledge, and ability to participate in the use of forest biomass

Objective 5:

Communicate, collaborate, and inform on forest biomass opportunities.

Indicators:

- Materials 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 and are approaching the end of their contract are provided the opportunity to negotiate a new contract with the Independent Electricity System Operator, balancing the benefits to the forestry sector and regional economies with value for the ratepayer and taxpayer.
- **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 lifecycle 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 2.4:** Develop a provincial bioheat strategy to increase the production and domestic consumption of biofuels for heat, drawing from expertise of the Ontario Bioheat Initiative and input from a range of partners and stakeholders.
- **Action 2.5:** Engage with potential industry users to integrate forest biomass into supply chains.
- **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 where they 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 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.
- **Action 4.6:** Support Indigenous communities in Ontario's Far North in the development of cost effective 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:** NDMNRF 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.



Ontario 

Ministry of Northern Development,
Mines, Natural Resources and Forestry