Trends and Prospects

UNECE Committee on Forests and the Forest Industry

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Canadian Forest Service
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ABBREVIATIONS

CCFM	Canadian Council of Forest Ministers
CCTF	Climate Change Task Force
CETA	Canada-European Union Comprehensive Economic and Trade Agreement
CFS	Canadian Forest Service
CIFFC	Canadian Interagency Forest Fire Centre
CITES	Convention on International Trade in Endangered Species of Wild Fauna and Flora
CORSIA	Carbon Offsetting Reduction Scheme for International Aviation
CPTPP	Comprehensive and Progressive Agreement for Trans-Pacific Partnership
CUSMA	Canada-United States-Mexico Agreement
CWC	Canadian Wood Council
ECCC	Environment and Climate Change Canada
EMO	Expanding Market Opportunities Program
FIP	Forest Innovation Program
GCWood	Green Construction through Wood Program
GHG	Greenhouse Gas
ICAO	International Civil Aviation Organization
IFI	Indigenous Forestry Initiative
IFIT	Investments in Forest Industry Transformation Program
ISPM	International Standards for Phytosanitary Measures
LCEF	Low Carbon Economy Fund
NAFTA	North American Free Trade Agreement
NBCC	National Building Code of Canada
NDC	Nationally Determined Contribution
NRC	National Research Council
NRCan	Natural Resources Canada
OPEC	Organization of the Petroleum Exporting Countries
OSB	Oriented Strand Board
PCF	Pan-Canadian Framework on Clean Growth and Climate Change
REDD+	Reduce Emissions from Deforestation and Forest Degradation
SFM	Sustainable Forest Management
TWB	Tall Wood Building
UNFCCC	United Nations Framework Convention on Climate Change
WTO	World Trade Organization

Note: All dollar values are in Canadian dollars unless stated otherwise

CANADA

I. General Economic Trends Affecting Forests and the Forest Sector

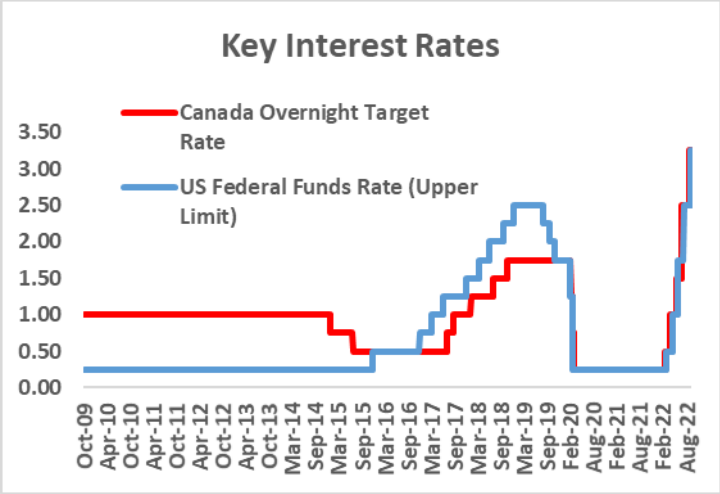
Canada's economy grew in the first half of 2022, marking a continuation of growth from the second half of 2021 following the end of the third wave of the COVID-19 pandemic. The Canadian economy, measured by real Gross Domestic Product (GDP), increased 0.9% in the first quarter of 2022 and 1.0% in the second. This follows slightly stronger growth in Q3 and Q4 of 2021 (1.4% and 1.6%, respectively). The modest growth in Q2 this year was mainly driven by increased business investment in inventories and stronger household spending on services. At the same time, growth was moderated by declines in housing investment and household spending on durable goods.

Source: Statistics Canada

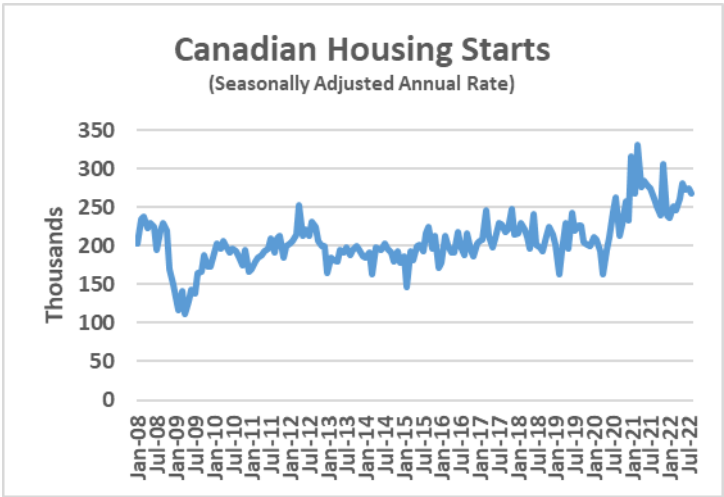
According to Bank of Canada, annual Canadian GDP is projected to grow 3.5% in 2022 before slowing to 1.75% in 2023 and 2.5% in 2024. Reasons for this slowdown is largely due to the impact of high inflation and tighter financial conditions on consumption and housing activity.

Consumer Price Index (CPI) inflation in Canada has been steadily rising since last year and reached 8.1% year over year in June 2021 before easing in July (7.6%) and August (7.0%). Global supply shortages in sectors such as energy, electronics and many consumer durables, triggered by global recovery from the pandemic and amplified by Russia's invasion of Ukraine, is driving the surge in inflation. However, domestic demand pressures are becoming more prominent, causing businesses to raise prices, broadening inflationary pressures. CPI inflation is projected to ease to roughly 3% by the end of 2023 and return to the 2% target by the end of 2024.

The Bank of Canada has raised its key interest rate in response to excess demand. Beginning in March 2022, the Bank raised the interest rate six times, ultimately increasing it from 0.25% to 3.75% (as of October 26, 2022). Given the outlook for inflation, and despite other complementing measures (i.e., quantitative tightening) from the Bank, the interest rate will likely need to rise further. The U.S. Federal Reserve also began raising their key interest rate in March 2022 and it currently sits at 3.75% (as of November 2, 2022).



Canadian housing starts remain above historic levels with monthly totals well above 200,000 units (seasonally adjusted annual rate) since mid-2020. Starts in August 2022 remain above their 2021 level despite rising interest and mortgage rates, alongside cooling home sales and prices. However, high interest rates and decreasing housing affordability may slow the pace of starts in the coming months.

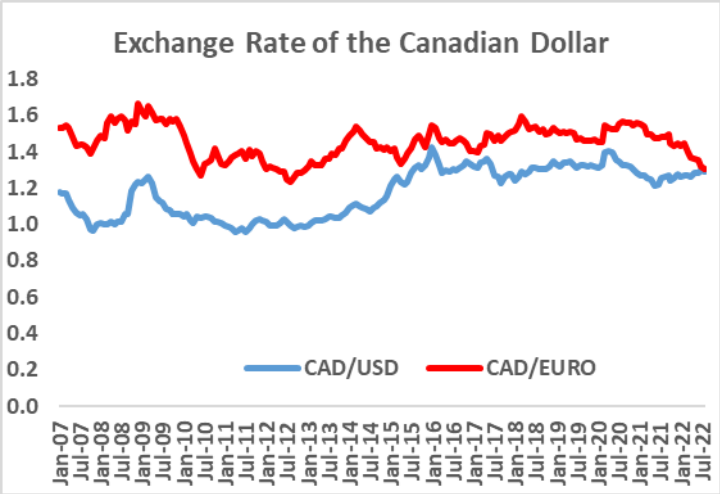


Source: Statistics Canada

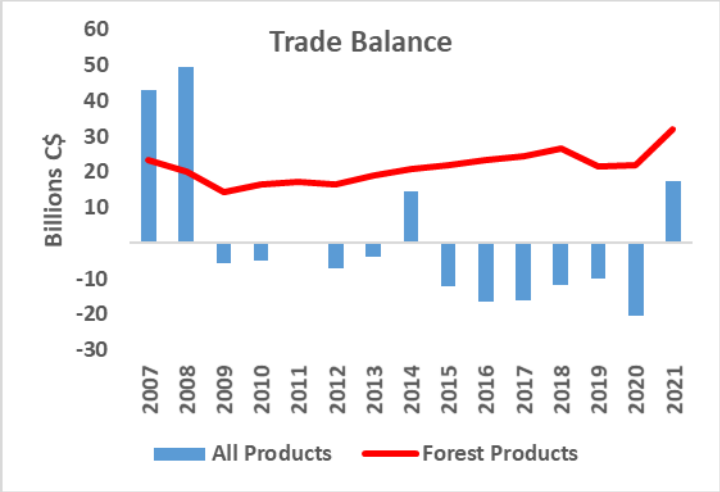
The labour market in Canada is still tight although significantly improved from spring 2021 when COVID-19 restrictions began to be lifted. The unemployment rate reached a historic low of 4.9% in June and July 2022, and the job vacancy rate reached 5.9% in Q2 2022, the highest quarterly number on record.

As of August 2022, following three consecutive months of employment losses, the unemployment rate rose to 5.4%. This was the first increase not coinciding with a tightening of public health restrictions since May 2020, when the unemployment rate reached its pandemic peak.

The Canadian dollar appreciated against all other currencies, including the US dollar and the Euro, following a rebound in oil prices from their precipitous fall at the onset of the pandemic. By late 2021, despite higher oil prices, the CAD began to weaken against the USD, as the U.S. Federal Reserve became hawkish on interest rate hikes and economic uncertainty led investors to safe haven assets like the U.S. dollar. Conversely, the CAD has continued to strengthen against the Euro, owing to recent interest rate hikes from the Bank of Canada and high oil prices.



Canada's forest product exports are a major contributor to Canada's trade balance. While Canada's total merchandise trade balance has mostly been negative each year since 2009, it has been positive for forest products for at least the last two decades. In 2021, forest products accounted for 7.3% of Canada's total exports, totalling over $45 billion. In 2021, Canada was the third largest forest product exporter in the world, behind China and Germany. Canada is the leading exporter of softwood lumber and newsprint.



II. Policy Measures taken in Canada over the last 18 months which might have a bearing on forest management or production and trade of forest products

Raw material supply security

As the economy is recovering from the COVID-19 pandemic, the forest sector in Canada, has resumed production at its mills that previously saw curtailments. However, as a result of the pandemic, forest sector firms continue to face supply chain problems with lack of sufficient rail transportation and a shortage of truck drivers. Additionally, in November 2021, British Columbia experienced severe weather flooding, impacting a significant portion of Canada's forest sector. The floods caused additional curtailments and supply chain problems. In response to declining fibre supplies due to wildfires, Provincial and Territorial governments are working towards ensuring wildfire is an integral part of sustainable forest management. Wildfire season 2021 was one of Canada's busiest fire seasons, with British Columbia, Saskatchewan, Manitoba and Ontario all experiencing well above fire activity in terms of area burned.

Forest Innovation Program

The Government of Canada plays a key role in supporting the transformation and progression of the forest sector in order to position it at the forefront of the emerging bioeconomy. The federal government has implemented a number of initiatives to enhance the competitiveness and environmental performance of the industry, such as the Forest Innovation Program (FIP), which supports collaborative research, development and technology transfer activities. FIP provides funding to four main areas: FPInnovations,[1] the Canadian Wood Fibre Centre,[2] the Forest Biorefinery Initiative[3] and standards development for biomaterials in order to enable commercialization and break down trade barriers. Together, these activities have resulted in the creation and adoption of innovative science-based products and processes.

To help Canada's forest sector continue to innovate and grow through pre-commercial research and development, Budget 2019 provided FIP an additional $91.8 million over three years, starting in 2020–21.

Investments in Forest Industry Transformation[4]

Since 2010, the Investments in Forest Industry Transformation (IFIT) program has been supporting transformational capital projects by forest sector firms to diversify into new product streams and implement innovative process improvements to ensure industry competitiveness. IFIT projects have led to:

- Improved environmental performance through green electricity and renewable fuel production, greenhouse gas emissions reductions, increased energy efficiency, and carbon capture;
- Diversified markets with new value-added products, including innovative biomaterials, biochemicals, and advanced building materials; and
- Increased competitiveness and economic sustainability through the creation of jobs, new revenue streams for companies, and the diversification of product portfolios.

To-date, the program has funded 51 projects involving world-first technologies, producing a range of new bioproducts and generating new revenue streams for forest sector companies. These projects have secured an estimated 6,600 jobs in the forest sector and led to the creation of 460 new direct innovation-related jobs. Results show that for every dollar invested by IFIT, other sources leverage an additional four dollars, meaning the program's funding of $192M to-date represents $922M in total project investments across Canada. IFIT was expanded through Budget 2021, which provided $54.8 million over two years, starting in 2021-22, to enhance the capacity of the program, including working with municipalities and community organizations ready for new forest-based economic opportunities.

[1] https://fpinnovations.ca/Pages/index.aspx
[2] https://www.nrcan.gc.ca/forests/research-centres/cwfc/13457
[3] https://www.nrcan.gc.ca/simply-science/biorefineries-helping-transform-canadas-forest-industry/20336
[4] https://www.nrcan.gc.ca/forests/federal-programs/13139

***Expanding Market Opportunities Program*[5]**

The Expanding Market Opportunities (EMO) program helps to increase and diversify market opportunities for Canada's forest sector by promoting the broader use of Canadian forest products, both domestically and abroad. The EMO program supports a wide range of domestic and offshore market diversification activities. These measures include codes and standards development, technical research, technology transfer and training, demonstration projects, market research, and marketing. The funding provided to forest industry associations and other stakeholders increases the market opportunities available to the forest sector and provides the capacity to take advantage of them. The EMO program was last renewed in Budget 2019 for up to $64.0 million over three years (2020/21 – 2022/23).

The EMO program has also supported industry efforts to increase wood use domestically in non-traditional buildings such as schools, health care facilities and commercial outlets, as well as mid-rise buildings up to six storeys and tall wood buildings. As a result, industry efforts have led to wood being used in more than 2,580 non-traditional construction projects in Canada since 2007, representing an estimated $1.7 billion in new wood sales for the wood product sector.

Wood in construction

The Green Construction through Wood (GCWood) program, launched in October 2017, supports innovative wood demonstration projects and the adoption of tall wood buildings in Canadian building codes in addition to advancing wood education at Canadian engineering and architectural schools. GCWood has a budget of $54.9M over five years (2018/19–2022/23) and funds projects that encourage:

- Adoption and commercialization of innovative wood-based products and systems in the construction of high-rise buildings, bridges, and low-rise non-residential buildings;
- Advanced training and education and the development of design tools targeted at designers, specifiers, architects, and building officials; and,
- Research that addresses the gap in technical information needed to facilitate and support revisions to the 2020 and 2025 National Building Code of Canada to allow tall wood buildings up to 12 storeys and become more performance-based. Currently wood buildings are limited to 6 storeys in height under prescriptive code provisions.

Three calls for "Expressions of Interest" on tall wood buildings, low-rise non-residential construction and timber bridges were launched starting in October, 2017. Over 20 demonstration projects across the three categories were selected for support, of which 16 now have funding agreements in place, and several demonstration projects either are already completed or are currently under construction.

[5] https://www.nrcan.gc.ca/forests/federal-programs/13133

Biotic and abiotic disturbances of forests, their impacts on forest products markets and trade and current and planned policy measures taken by Canada to mitigate economic and ecologic impacts

Climate Change

There is increasing evidence that most natural disturbances are already being magnified by climate change. The forest area burned has increased by roughly 75% since 1980 in Canada compared to most of the 20th century. Models predict that burned areas will likely increase in boreal forests as a result of climate change. The number of mountain pine beetles that survive the winter weather has increased since 1990. This change occurred because of milder winters caused by climate warming, leading to an unprecedented outbreak that has killed pines across millions of hectares in western Canada. In eastern Canada, the severity of the ongoing spruce budworm outbreak on the Côte-Nord region in Quebec is also unprecedented at this latitude. The frequency and severity of droughts, flooding, blowdown, and thunderstorms are also rising, and damage is expected to increase from these factors in forest ecosystems in the future.

Climate Change Adaptation

The CCFM Climate Change Task Force (CCTF) undertook collaborative work across provinces and territories on adaptation in forestry and completed its mandate after eight years of activity from 2008-2016. The CCTF developed climate change adaptation tools and techniques designed to be readily mainstreamed into day-to-day forest management planning and decision-making. The tools, which are currently being field-tested, include:

- An assessment of tree species vulnerability and management options for adaptation;
- A scalable, nationally-applicable vulnerability assessment framework for sustainable management under climate change;
- A number of adaptation knowledge syntheses; and,
- A guidebook for mainstreaming climate change into sustainable forest management.

The Canadian Forest Service's Forest Climate Change Program undertakes work on regional integrated assessments and science-based adaptation tools, in collaboration with end-users to facilitate climate change adaptation planning and decision-making in the forestry sector and forest-based communities. Since 2016, scientists have been undertaking regional integrated assessments to investigate the effects of climate change on forested landscapes in five vulnerable regions across Canada: Newfoundland and Labrador, the Maritimes, the Eastern Boreal, the Northwest Territories and the Western Boreal. These regional integrated assessments develop baseline data, knowledge and tools that can be used by forest sector decision-makers to adapt to a range of climate change impacts. The Adaptation tools which were developed cover a wide range of topics, including forest composition and productivity, disturbances and extreme weather events, forest regeneration, assisted migration, genomics and adaptive silviculture.

Wildland Fire in Canada

In 2022, large portions of Canada experienced higher than normal temperatures and lack of precipitation; 4,883 wildfires have been recorded nationally, burning at total of 1.46 million hectares (ha). This is well below both the total number of fires and area burned last year, and the 5-year

average (5,143 fires, 2.37 million ha). However, the Northwest Territories, Yukon, Newfoundland and Labrador and Nova Scotia all had an above average area burned. Fire response resources (crews, equipment and aircraft) needs were met by other provinces and territories, and no international assistance was required. This year was the first time Newfoundland and Labrador made a request for resources, and support was provided by Quebec.

Nonetheless, Canada is experiencing the effects of climate change (warmer temperatures, unpredictable precipitation, more lightning strikes, drier forest conditions) that are resulting in longer fire seasons, an increase in the number of large forest fires and the total area burned. Since the 1970's, the annual area burned has almost doubled and the number of large fires (greater than 200k hectares) has increased significantly. Since 1990, there has been an average of 8,000 wildfires burning approximately 2.5 million hectares per year, with these numbers trending upwards. Over the last decade, more than half of the years saw an area burned well above the annual average and experienced large fire events where wildfires grew to greater than 200k hectares in size. Experts predict that by 2100, the average annual area burned could double.[6]

This increase in annual area burned, combined with an increase in the number of people living, working, and taking part in recreation in our forests, has resulted in rising wildland fire management costs, increased property and economic losses and higher post-event recovery costs for governments, citizens, and private industry. Total costs for wildfire management activities over the last decade have ranged between $800 million and $1.4 billion per year, depending on the level of fire activity. Costs have risen by about $120 million per decade since the 1970s, and average annual costs for the country will continue to rise. Devastating fires like those in the province of British Columbia in 2017, 2018, and 2021 and in the province of Alberta in 2016, are extremely expensive to manage, and result in evacuations, damage to homes and businesses, and huge losses of merchantable timber.

Given the rising costs, impacts to communities, and need to collaborate on wildfire management and research, the Provincial, Territorial and Federal governments are working together to advance the *Canadian Wildland Fire Strategy*[7] through a range of actions. These include improving cross-jurisdictional preparedness and response capability, increasing investments in fire research innovation, and enhancing commitments to resilient communities. Recently, the Canadian Council of Forest Ministers (CCFM) noted that a greater emphasis on wildland prevention and mitigation is needed to increase wildland fire resilience in Canada and reduce future wildfire risk. Positive steps have been taken to advance this priority, such as CCFM endorsing the Canadian Interagency Forest Fire Centre (CIFFC) mandate in September 2020 to include emergency management pillars prevention and mitigation in addition to CIFFC's current mandate on preparation and response. As well, CCFM hosted the Canadian Dialogue on Wildland Fire and Forest Resilience in February 2021, which brought together almost 100 participants from diverse sectors to identify priorities, needs, and opportunities related to wildfire fire prevention and mitigation. Outcomes of the dialogue will inform the development of the Canadian Wildland Fire Prevention and Mitigation Strategy. The Government of Canada recently invested $516 million over 5 years to counter the growing threat of wildfires in Canada, including by providing support to provinces, territories and Indigenous communities for wildfire mitigation, response and monitoring. This support includes: $270 million to help provinces and territories procure firefighting equipment; $39 million to help First Nations communities buy firefighting equipment; $38 million to train 1,000 additional

[6] https://www.nrcan.gc.ca/forests/topics/fires-insects-and-disturbances/blueprint-wildland-fire-science-canada-2019-2029/21614
[7] https://www.ccfm.org/english/coreproducts-wildlandfires.asp

firefighters and incorporate Indigenous traditional knowledge in fire management; and $170 million to deliver a new wildfire monitoring satellite system.

Pests

Spruce Budworm in Eastern Canada

Spruce budworm is one of the most damaging pests in North America, with most regions of Canada reporting defoliation damage each year. During major outbreaks, spruce budworm causes disruptions to the forest industry and affects jobs, recreation and tourism, especially for those communities and regions that are heavily forest-sector dependant. The last extensive outbreak of spruce budworm in Canada reached its peak in the 1970s, and covered more than 50 million hectares across Quebec, Ontario, and Atlantic Canada, resulting in fibre losses of about 500 million cubic metres of spruce and fir, with a commercial value of about $12.5 billion in Quebec alone.

The most recent spruce budworm outbreak began in 2006 in Quebec and spread to northeastern Ontario. As of 2021, it covered more than 12.2 million hectares in Quebec and 1.3 million hectares in Ontario, with the potential to spread further throughout Canada's Atlantic provinces and the eastern United States. Active management programs have been implemented in Quebec since 2009, and Ontario since 2021. These programs have employed a foliage protection approach through spraying a biological insecticide to protect timber and ecological forest values. Treatment programs for 2022 included 625,000 hectares in Quebec and 100,000 hectares in Ontario.

Due to the potential negative effects of a larger outbreak in eastern Canada, the federal government is working with provincial partners, industry, and academia to test and evaluate an early intervention strategy aimed at managing spruce budworm populations while they are still below an outbreak threshold. The Government of Canada provided $74 million during 2019-2022 for the Spruce Budworm Early Intervention Strategy Phase II. It leveraged up to $50 million from the provinces of New Brunswick, Nova Scotia, Prince Edward Island, Newfoundland and Labrador, and industry. The strategy aims to equip the Canadian forest sector with an innovative, science-based, and effective pest management approach that can be applied to impending outbreaks of spruce budworm across Canada. NRCan researchers will continue to work closely with provincial governments and the forest sector across Canada to develop science-based solutions to protect forests and keep spruce budworm populations low. Research results to date are positive, indicating that an early intervention strategy may be a viable option to manage spruce budworm.

Mountain Pine Beetle in Western Canada

The mountain pine beetle is a native insect that attacks pines in western North American forests. Since the current beetle epidemic started in the early 1990s, mountain pine beetle has killed more than 50% of British Columbia's commercial pine trees and have caused widespread timber losses in dense stands of lodgepole pine in the central interior of the province. The beetle has now spread far beyond its historic range into northern British Columbia and eastward into the boreal forest of north-central Alberta. In addition, the infestation in and beyond Canada's national parks in the Rocky Mountains creates risks for surrounding provincial forests and forest industry operations. Scientists have recently completed a risk assessment of the risk that the beetle may continue to spread eastward

across Canada's boreal forest.[8] The Government of Alberta has led an active management program since 2006.

The Government of Canada is concerned about the impact of the beetle infestation on forest communities and is working in collaboration with the provinces, territories, stakeholders and communities across Canada to respond to the challenges it poses. The Government of Canada is providing up to $68 million over three years (2020-21 to 2022-23) to help control, research and mitigate the impacts of the mountain pine beetle on Canada's forests. More specifically, this new funding is helping address the outbreak in Alberta and the Rocky Mountain National Parks while mitigating negative impacts on the forest sector and communities. Ongoing research on mountain pine beetle in newly invaded ecosystems is also supported to assist with strategic approaches to slow the spread of this pest eastward across Canada.

Emerging Issues

Emerald ash borer is an invasive insect introduced in some parts of Canada that represents a serious threat to urban trees and natural forests. Emerald ash borer is now found in southern Ontario and the City of Thunder Bay, Ontario, as well as southern Quebec, southern and western New Brunswick, Manitoba (City of Winnipeg), and Nova Scotia (Halifax County). All native North American ash trees are susceptible to emerald ash borer and it has killed millions of ash trees in Canada and the U.S. In infested areas, 99% of ash trees are expected to die within 10 years from the first detection of the insect. A study in Canada estimated that, over a 30-year time horizon, the potential costs of emerald ash borer to Canadian municipalities could be $524 million or higher. Research helps improve the effectiveness of the detection and management response to limit the economic and ecological impact of the insect.

Forests and the forest-based industries in a circular bioeconomy

The three main levers for the forest sector to transition to a circular bioeconomy in support of net zero are:

1. Reduce fossil GHG emissions in operations and across value chains.
2. Increase carbon removals through sequestration in sustainably managed working forests, as well as through storage in products and negative emissions technologies (such as bioenergy carbon capture and storage); and
3. Grow the circular bioeconomy through the substitution of non-renewable and fossil-based materials with forest products and bioenergy.

Canada aims to target all three levers to advance its forest bioeconomy and ensure it is sustainable, material efficient and circular. A cornerstone of these levers is a forest biorefinery. In these refineries, both higher-value forest products (e.g., bioplastics) and lower-value products (e.g., heat, wood pellets) are produced from wood-based biomass. They are efficient both in terms of materials, with residuals used further for products, and energy. For example, between 2005 and 2018, the forest industry reduced total energy use by 28% and reduced total fossil GHG emissions (direct emissions plus indirect emissions from purchased electricity) by almost 46%.

[8] http://cfs.nrcan.gc.ca/publications?id=39805

Continuing to invest in forest sector innovation and infrastructure is strategically important for sustainable growth, the reduction of environmental impacts, and achieving a net-zero economy. The recently released *Renewed Forest Bioeconomy Framework* by the Canadian Council of Forest Ministers directly addresses continuing challenges the forest sector faces to realize the potential of the forest bioeconomy in Canada and identifies responsive actions for jurisdictions to implement as appropriate.

Renewable energy policies and their impacts on forest products markets

Clean Fuel Regulations

The goal of the Clean Fuel Regulations is to significantly reduce pollution by making fuels we use everyday cleaner over time. This will require liquid fossil fuel (i.e., gasoline and diesel) primary suppliers (i.e., producers and importers) to gradually reduce the carbon intensity of the fuels they produce and sell for use in Canada over time, leading to a decrease of approximately 15% (below 2016 levels) in the carbon intensity of liquid fossil fuels by 2030. Suppliers can take several pathways to achieve this reduction, including the reduction of GHG emissions at any stage in the supply chain, from extraction to processing, distribution, and end-use. The Clean Fuel Regulations will have an impact on the forest sector as they will create opportunities for the forest sector to supply their feedstock for low-carbon fuel production (i.e., blending renewable diesel).

Clean Fuels Fund

The Clean Fuels Fund is an investment of $1.5 billion over five years which goes towards clean energy projects, facilities, and feedstocks. This commitment will help support the Clean Fuel Regulations, de-risk capital investment required to build new or expand existing clean fuel production facilities, and support the establishment of biomass supply chains. Together with the Clean Fuel Regulations, the Clean Fuels Fund will create economic opportunities for biofuel feedstock providers in the forest sector, while growing a competitive market for forest feedstocks in the rapidly expanding global market for clean energy. The biomass supply chain component of the Clean Fuels Fund will ensure a steady and usable supply of sustainable feedstock is available to clean fuel production facilities across the country. It will support the establishment of regional hubs to gather feedstock from diverse sources and locations.

Clean energy in Indigenous, rural and remote communities program

Many Indigenous, rural, and remote communities use diesel or fossil fuels for heat and power. The Clean Energy in Indigenous, Rural, and Remote Communities (CEIRRC) program seeks to reduce dependency on fossil fuels in these regions with $300 million available until 2027 for Indigenous-led climate action projects. This program supports all stages of clean energy projects that can range from renewable energy technologies, capacity building, energy efficiency, and heat production. The CEIRRC program is an important step towards reconciliation between the Government of Canada and Indigenous communities as it provides autonomy for Indigenous project management while improving environmental and human health in these communities. This will play an important role in the forest sector as most Indigenous and remote communities are also forest-based communities. The use of forest biomass will not only be a valuable feedstock for various clean energy projects but will also provide an outlet for forest residues and contribute to sustainable forest management practices (i.e., forest thinning for wildfire prevention) in these communities.

III. ***Market drivers and how they affect the market for forest products in Canada, whether positively or negatively. This may include but is not limited to construction trends, currency exchange rate fluctuations, export and import restrictions for wood products, extra-regional consumption of forest products, targeted incentives for green building, renewable energy etc.***

Canada's forest sector contracted between 2017 and 2020 after growing steadily from 2013 until 2016. In 2021, and on an annualized basis, the forest sector grew 5.0%, slightly above the pace of the overall Canadian economy (4.5%).

The economic outlook for the forest sector for the next year differs across products and regions. The demand for lumber may decline modestly in the near term from a slowdown in home construction activity driven by high interest rates and decreasing housing affordability, but overall lumber demand is expected to remain robust due to an undersupply of housing, an aging housing stock, and growing demand for mass timber applications. Demand for Canadian pulp should remain stable in the near-term, given supply constraints from unplanned downtime and the Russian invasion of Ukraine, while reduced purchasing power from high inflation is expected to impact the demand for packaging products. Both newsprint and printing and writing paper is expected to continue its downward trend in 2022.

The economic contribution of the sector is heavily influenced by that of traditional trading partners (the U.S.) and on traditional uses of wood (pulp, paper and softwood lumber). Over the past decade, the growth of emerging markets had contributed to significant market diversification. Between 2010 and 2019, exports of forest products to China increased by 72%. However, the COVID-19 pandemic disrupted global economies and interfered with the transportation of goods. As a result, Canada refocused its shipments of forest products to the U.S. Between 2019 and 2021, exports of forest products to the U.S. increased 54%, while forest product exports to China decreased by 17%.

Sustainability

Increased global focus on climate change mitigation, achieving net-zero emissions, environmental sustainability and plastic pollution is driving demand for new, lower impact bio-based products and technologies to substitute for conventional fossil fuel-based products or energy and carbon intensive processes and technologies. For example, mass timber can be used as a renewable alternative to conventional building materials when constructing tall buildings, bioplastics as a substitute for plastics derived from fossil fuels, liquid biofuels as an alternative to fossil fuels, and wood pellets to create thermal energy.

Exchange Rates

Following the end of the 2008/09 global recession, the Canadian dollar (CAD) has been steadily weakening against the US Dollar (USD) and returning to historical levels. This decline accelerated in the first part of 2020 after a significant drop in oil prices which further weakened the CAD. The CAD gradually strengthened as oil prices began recovering from the initial shock of COVID-19. However, by late 2021, despite rising oil prices, the CAD began to weaken against the USD as economic uncertainty led investors to safe haven assets like the U.S. dollar. Given that roughly three quarters of Canada's forest products are exported to the U.S., a weaker CAD relative to the USD will generally benefit the Canadian forest sector. However, there are some negative impacts of a weaker CAD. For instance, Canadian companies holding debt in USD will have higher debt servicing costs.

U.S. Housing Market

The U.S. housing market is a major driver of softwood lumber and wood panel demand in North America. While the U.S. housing market has strengthened considerably from the depths of the 2008 recession, the onset of the pandemic temporarily slowed this recovery, but soon after starts experienced unprecedented growth. Total starts for 2021 came in at an estimated 1.6 million units, a 16% increase compared to starts in 2020, and up almost 24% from 2019, to the highest total since 2006. Builders ramped up the pace of construction in 2021 in response to strong demand after years of underbuilding resulting in significant pent-up demand. Nevertheless, since 2021, the construction market has been increasingly limited by supply-side constraints and, since early 2022, by building cost inflation, rising borrowing costs, overall house affordability issues and a cooling economy, leading to a general slowdown in housing trends. July 2022 housing starts fell for the third month in a row to 1.4 million units (seasonally adjusted annual rate-SAAR), down 4% from August 2021 and 11% below the same period in 2020. Despite this slowdown, as of September 2022, U.S. housing starts remain above rates observed since 2008,

National Building Code Changes

NRCan has funded critical research that led to the successful adoption of 12 storeys encapsulated mass timber construction (EMTC) in the 2020 Edition of the National Building Code of Canada (NBCC), which was released in the spring of 2022. Several jurisdictions in Canada including British Columbia, Alberta and Ontario have adopted the new provisions in their building codes. These provisions have been crucial for the construction of larger and taller wood buildings and have been fostering greater use of mass timber in public and private buildings across Canada.

NRCan is also working closely with the National Research Council (NRC), provincial partners and with the design and construction industry to transition the NBCC to become more performance-based, which will support the adoption of innovative design and construction technologies and help mitigate some of the challenges associated with the current regulatory environment.

IV. Developments in forests and forest products markets sectors

Wood raw materials (e.g., roundwood: sawlogs, pulpwood, chips, residues, and fuelwood)

In 2020, Canada harvested 143 million m^3 of roundwood, comprised of 81% softwood and 18% hardwood (1% being unspecified), with product categories split between 87% logs, 11% pulpwood, 1% fuelwood and 1% other industrial roundwood. The bulk of Canada's harvests comes from British-Columbia (38%, or 54.5 million m^3 in 2020), followed by Alberta (21%, or 29.7 million m^3), Quebec (18%, or 25.9 million m^3) and Ontario (10%, or 14.0 million m^3).

Canada's roundwood harvest has decreased significantly over the past 15 years , with a 32% decline in volumes since peaking in 2004. This decline was led by British Columbia, where the 1999-2015 mountain-pine-beetle outbreaks and the 2017-2018 extreme wildfire seasons have severely impacted fibre availability.

On average, total Canadian exports have been declining by roughly 10% yearly since 2010. In 2021, Canadian logs export totaled 3.6 million m^3, most of which (2.9 million m^3, or 82%) were shipped to Asian countries, dominated by China, followed by Japan and South Korea. Within Canada, BC is the only province with substantial exports of logs to Asia. In 2021, Canadian logs exports to the U.S.

totaled 640 thousand m^3, making it the third largest destination market after China (1.7 million m^3) and Japan (1 million m^3). Exports to South Korea came fourth at 198 thousands m^3. Despite the large majority of logs exports going to China, Japan and South Korea, Canada's market shares in these countries remains marginal due to high log costs and limited log supply relative to competitor countries in Oceania and Eastern Europe (Germany, Russia, Czech Republic). These trends have been so far confirmed with year-to-date 2022 log exports volume of 1.8 million m^3, down 23% compared to the same period last year and 2022 year-to-date volumes dominated by China (38% of total exports volume), followed by Japan (32%), the United-States (25%) and South Korea (5%) .

Log exports account for only a marginal share of Canada's annual harvest (2% of 143 million m^3 roundwood harvested in 2020), with the bulk of Canadian roundwood (98%) consumed domestically.

Wood energy

In 2018 bioenergy accounted for the second largest share of renewable energy production (heat and electricity) after hydroelectricity in Canada. The Canadian forest sector provides over 80% of biomass-based energy in Canada, mainly for cogeneration of heat and power for use in industrial processes and sale to third-parties.

The wood pellets industry continues to expand rapidly. Since 2011, Canada's production capacity has increased 37.5% with year-over-year increases between 5-10% each year since 2014. Increased production was first driven by demand from Europe and today new markets in Asia account for increased demand. For example, Canadian pellet exports to Japan increased 430%, from 105,640 tonnes in 2012 to 560,817 tonnes in 2019. Further, several new Canadian pellet mills are slated to begin production in the next five years, increasing Canada's production capacity by 27% and many of the companies have already announced long-term contracts with utilities in Japan and South Korea. The Canadian pellet industry was minimally impacted by the COVID-19 pandemic. The forest sector was deemed essential in Canada allowing pellet mills to continue operating and since they provide fuel for other essential industries such as heat and electricity, the industrial demand did not decrease. Furthermore, most of the pellets produced in Canada are under long-term contracts ensuring long-term sales and demand for the industry.

Since 2010, the Federal Fuel Regulation has required a minimum of 5% ethanol in gasoline. Provincial mandates may exceed the 5% minimum requirement. The Clean Fuel Regulations which came into force in 2022 for the liquid stream, are expected to further increase demand for liquid biofuels. However, the production of drop-in liquid biofuels from woody biomass has not yet reached commercial-scale, with production in Canada still mostly from agricultural feedstocks.

Sustainable aviation fuel (SAF) will play an important role in reducing GHG emissions of the aviation sector in Canada (Canadian air operators were responsible for 22 MT of GHG emissions in 2022). The airline industry is a growing a sector with limited decarbonisation options (hydrogen and electricity are not an option in the short and medium term). In 2016, Canada became a signatory to the International Civil Aviation Organization (ICAO) Carbon Offsetting Reduction Scheme for International Aviation (CORSIA). The agreement requires the aviation industry to reduce total carbon emissions by 50% by 2050 compared to 2006. Forest biomass is an attractive feedstock to produce SAF and collaboration between the private sector and the Government of Canada is supporting its development. The Sky's the Limit Challenge $5 million prize was awarded in March 2022 to Enerkem for its project who has produced SAF from forest biomass as well as from municipal solid waste (MSW). A lot of additional work has been done to improve the performance of SAF and biofuels based

on the fermentation of forest biomass. This approach has the competitive advantage of producing high value intermediary chemicals such as lignin and furfural, increasing the financial viability of forest-based SAF projects. The forest sector can also contribute to GHG reduction efforts in the aviation sector by providing a source of credit offsets for trading in compliance markets such as ICAO's CORSIA.

Bioenergy and Carbon Capture, Utilization and Storage

The Intergovernmental Panel on Climate Change, the International Energy Agency, and the International Renewable Energy Agency, all recognize bioenergy with carbon capture and storage (BECCS) as essential for limiting global warming to 1.5°C by 2050, reducing as much as 52% of necessary global emissions by 2050. In 2021, the Government of Canada invested $319 million over seven years to advance the commercial viability of carbon capture, utilization and storage (CCUS) technologies. The Energy Innovation Program, with an annual budget of $24 million, announced 11 projects for CCUS front-end engineering design studies that have advanced to a final due diligence phase, and is currently receiving proposals for carbon capture, utilization and storage RD&D projects. The Government of Canada has also introduced an investment tax credit for businesses for capital invested in CCUS projects for which the required legislative amendments are currently being developed.

Certified forest products

Canada has a comprehensive legislative and regulatory framework that governs forest management in each province and territory which ensures that Canada's forests are managed sustainably. These laws, regulations, and policies govern land use planning, forest management, public consultations, Indigenous participation, protected areas, forest tenure, allocation of wood for harvesting, and the regeneration of forest land.

Third-party sustainable forest management certification further demonstrates Canada's commitment to sustainable forest management practices. As of December 2020, Canada had 164 million hectares of forest land independently certified as sustainably managed by one or more of three globally recognized certification systems: the Canadian Standards Association, the Forest Stewardship Council and the Sustainable Forestry Initiative. The Sustainable Biomass Program, a certification program for woody biomass (e.g., wood chips and wood pellets) is also now well established in Canada.

Sawn Softwood (also known as Softwood Lumber)

In Canada, softwood lumber is mainly used in construction, as well as in repair and remodeling (R&R) and furniture manufacturing. In 2021, Canada produced 55.8 million m^3 of sawn softwood. North American sawn softwood prices surged during the first half of 2021 and reached an all-time record high during the second quarter of 2021, with high volatility over the remainder of the year. Price fatigue and the post-pandemic reopening of the economy have led many consumers to postpone their expenses in the Do-it-Yourself and the repair-and-remodeling segments in favour of leisure and travel activities which were postponed earlier in the pandemic. Demand in the construction market has remained robust and above historical standards but has been increasingly affected by supply-chain disruptions and, since early 2022, by inflation, increased mortgage rates, and home affordability issues. At the same time, many sawmills ramped up production in response to high prices over the past couple of years, but demand tapered off quickly in mid-2022, resulting in an over-supplied market. This has caused

lumber prices to decline throughout the second and third quarters of 2022, but they remain above pre-pandemic averages.

The United States is the primary destination for Canadian sawn softwood exports. In 2021, 87%, or 32 million m^3, of Canada's sawn softwood exports (37 million m^3), by volume, went to the U.S., slightly higher (+4.7%) than in 2020. Beginning in May 2017, the U.S. Department of Commerce began levying countervailing and anti-dumping duties on certain softwood lumber products imported from Canada. Final combined duty rates, currently averaging 8.59%, have caused instability in softwood lumber prices and export levels. Canada has challenged the U.S. duties before WTO, NAFTA and CUSMA panels. Victories in these challenges are expected to put increased pressure on the U.S. to return to the negotiating table.

In 2021, China remained the second largest destination for Canadian sawn softwood products, slightly ahead of Japan. From 2000 to 2013, the volume of sawn softwood exports to China increased on average by more than 50% per year. However, since 2013, export volumes have decreased at an average rate of nearly 10% annually, with COVID-19 driving steeper declines. In 2021, sawn softwood export volumes to China decreased by 42% over 2020 levels. In the first six months of 2022, exports continued to decline, falling by 24% compared to the same period in 2021. Slower growth in China and increased competition from Russia and other European imports have contributed to the decline in Canada's share of China's import market. As of result, exports volumes to China have dropped below those to Japan in the first half of 2022, despite steady declines (10% per year on average) since 2013 of exports volumes to Japan. While exports values to Japan in 2021 were up 100% from 2020 levels, thanks to high prices for specialty lumber, both exports volumes and values to Japan are unlikely to grow further due to a slowing economy, aging demographics, and an increasing reliance on domestic production. Overall, total Canadian softwood lumber exports have been decreasing, with 2022 year-to-date total exports down 10% in volume compared to the same period in 2021, due to worrisome economic conditions including rising interest rates, high inflation and falling demand.

Sawn hardwood (temperate and tropical)

In Canada, sawn hardwood is typically used for non-structural, visual applications such as furniture, flooring and cabinet doors. High-quality hardwoods are made into lumber and veneers, while low-grade hardwoods can be used in oriented strand board. In 2021, Canada produced 880 thousand m^3 of hardwood lumber, the majority of which came from Quebec (53%) and Ontario (11%).

52% (453 thousand m^3) of the hardwood lumber produced in 2021 was exported, and the rest (48%) consumed domestically. The majority of hardwood lumber exported went to the United States (62%), followed by China (19%) and Western Europe (7%). While total hardwood volume exports have increased 15% between 2010 and 2019, they have since decreased by 23%. 2022 year-to-date hardwood lumber exports (272.5 thousand m^3) were roughly equal to volumes exported in 2021 over the same period.

Wood-based panels (particle board, fibreboard and MF, OSB, plywood)

Oriented Strand Board (OSB), which makes up the great majority of wood-based panel exports, is included below under housing and construction.

Pulp and paper

Wood Pulp

The majority of wood pulp exports from Canada are destined for China and the U.S. Over the last decade, these two countries have accounted for three quarters of wood pulp exports (by value) on average, with China accounting for 42% and the U.S. for 34%. Northern bleached softwood kraft (NBSK) is the major variety of market pulp produced in Canada and exported to China and the U.S. NBSK is commonly used for printing and writing specialty papers and premium tissue and towel products.

Due to the COVID-19 pandemic, global demand for wood pulp dampened in 2020 as a decline in wood pulp demand for printing and writing paper was partially offset by strong demand for tissue products. The total value of Canadian wood pulp exports fell 16% in 2020. In particular, the value of NBSK exports from Canada fell 17%. The decline in the volume of NBSK exports was more subdued (-7%) as a result of low NBSK prices. In 2021, the wood pulp market tightened following a rebound in the global economy, combined with significant pulp mill downtime and supply disruptions and logistical challenges. The total value of Canadian NBSK exports rose 15% in 2021, despite the volume of NBSK exports declining 7%, as NBSK prices surged.

Looking forward, global pulp demand is expected to remain relatively stable in the near-term, while supply is expected to remain tight given supply constraints from unplanned downtime and the ongoing Russian invasion of Ukraine. Tight supply should increase the need for Canadian pulp, especially from China the main driver in pulp demand growth and Canada's top export destination.

Paper and Paperboard

In 2020, 81% of paper and paperboard products that Canada exported (by value) were destined for the U.S. Total exports of paper and paperboard products rose 7% in 2021, partly due to an increase in newsprint exports, which rose 5% in 2021 after falling over 30% in 2020. Despite the rise in newsprint exports from Canada in 2021, newsprint demand has been on a long-term downward trend that is projected to continue going forward.

Canadian exports of paperboard products may face challenges in the near-term. Reduced purchasing power from high inflation is expected to impact paperboard demand through declines in retail sales volumes. These impacts will be felt more in paperboard demand for luxury end-use items and consumer electronics, while demand for key end-use items like food packaging should remain resilient.

Value-Added Wood Products[9]

In 2021, Canada exported about $9.0B of value-added products, nearly exclusively to the U.S. (98%). Exports of value-added wood products increased 59% in 2021, primarily caused by an increase in particle board demand. Mass timber products are part of Canada's growing segment of value-added wood products. This growth is exemplified by the surge in 2018 of mass timber products all across the globe and this is expected to continue as countries (Canada included) continue to promote the use of

[9] In Canada, value-added wood products include wood windows and doors, factory-built homes, millwork and joinery products, shingles and shakes, containers and pallets, wooden furniture, engineered wood products such as I-beams, roof trusses, Cross-Laminated Timber and other structural products.

mass timber in non-traditional construction sectors such as tall buildings. Part of this increase in demand is attributed to recent changes to building codes to allow tall wood buildings up to 12 storeys, which will make it easier for builders to use mass timber in their construction projects, as well as the interest in taller and larger wood buildings due to the environmental benefits and speed of construction. The availability of a new generation of engineered mass timber products and the implementation of certain wood-friendly policies is also contributing to this.

To track the growth of mass timber buildings and manufacturing in Canada, Natural Resources Canada published the first of its kind State of Mass Timber in Canada report (May 2021). This report established a baseline dataset of nearly 500 completed or under construction projects since 2007 and data on 20 mass timber manufacturing facilities in Canada. Some key findings include: the number of mass timber projects has steadily increased from 2007-2019 (on average over 10% each year); and the average size of projects is also growing steadily each year. Likewise, projects are becoming more complex as there is more choice in mass timber products and growing market acceptance. To further track and analyze the growth of mass timber in Canada, an interactive State of Mass Timber web-based map[10] and data dashboard was developed and published to support the report. The map is updated on a quarterly basis and now highlights over 700 mass timber projects.

Bioproducts

There has also been further innovation through the creation of higher-value added bioproducts that can replace fossil fuel-based products. Two examples are worth highlighting. In 2021, FPInnovations, a private not-for-profit R&D organization creating solutions in support of Canada's forest sector, introduced the world's first ready-to-produce biodegradable and eco-friendly non-medical mask. Canada invested $3.3 million in the bio-mask, which was developed in response to the huge amount of plastic pollution generated by the use of fossil-fuel based masks at the height of the pandemic. A second example is lignin-modified asphalt, a green technology that could improve road performance while creating value from forest residues. The product replaces some of the bitumen in asphalt, with testing and demonstrations underway to ensure the new product's economics, workability, and performance were not sacrificed in the drive to create green solutions.

In Canada, the domestic market for biopolymers and bioplastics was worth an estimated $165.2 million USD in 2019 and is projected to reach $353.2 million USD by 2025. From 2018 to 2020, the Innovative Solutions Canada program hosted a series of Plastics Challenges ranging from sustainable alternatives to plastic packaging to the improved compostability of bioplastics. In 2021, the Government of Canada announced $1.3M to support five projects that aim to reduce plastic waste, prevent plastic pollution and support the transition to a national circular plastics economy.

The Canadian market for lignin is estimated to be worth $15.8 million USD and is projected to reach $19 million USD by 2025. The most significant application of lignin in Canada is as a concrete additive, representing 50.9% of the domestic market. Kraft lignin is the fastest growing market segment in Canada. At the moment, Canada has one commercial lignin recovery operation.

The nanocellulose market in Canada was estimated to be worth $10.9 million USD in 2019 and is projected to reach $28.5 million USD by 2025. The nanocellulose product segment with the largest and fastest growing market share (65.3%) is cellulose nanocrystals. By application, composites and

[10] https://nrcan-rncan.maps.arcgis.com/apps/dashboards/041e338d2a4d4b3a82ff2c238a9f0f93

packaging are the largest segment (30.2%) of the domestic nanocellulose market, with personal care products representing the fastest growing application.

Housing and construction

Oriented Strand Board (OSB)

OSB represents 88% of Canada's total structural panel exports by value. In 2021, almost all (98%) of Canada's OSB exports were destined for the U.S., where it is mainly used in housing construction. OSB exports doubled in 2021 by value, largely as a result of significant price increases for OSB in North America, primarily from increased demand from the housing sector. North American demand for OSB is forecasted to grow 3% in 2022 (as of June 2022); a reflection of persistent growth in the residential construction sector which has been dampened slightly by soaring prices lowering product usage. This upward trend is anticipated to retreat somewhat in 2023.