PAS2060 Declaration of Carbon Neutrality

2020 Qualifying Explanatory Statement for the Irving Forest Supply Chain

CONTENTS

PAS2060 DECLARATION OF CARBON NEUTRALITY

Black Brook Woodlands, NB

COVER PHOTO: Ayers Lake, Central New Brunswick

Juniper Nursery, Juniper NB

EXECUTIVE SUMMARY

Since 1882, J.D. Irving, Limited and its affiliates (Irving) have been committed to quality products and service. With headquarters in Saint John, New Brunswick and 18,000 employees across the diverse family-owned operations in both Canada and the United States, Irving contributes to eight business sectors, including:

- FORESTRY AND FOREST PRODUCTS
- SHIPBUILDING AND INDUSTRIAL MANUFACTURING
- TRANSPORTATION AND LOGISTICS
- RETAIL AND DISTRIBUTION
- CONSTRUCTION AND EQUIPMENT
- CONSUMER PRODUCTS
- FOOD AND AGRICULTURE

CARBON FOOTPRINT OF THE IRVING FOREST SUPPLY CHAIN

The core of the Irving strategy is vertical integration, linking the segments of Forestry and Forest Products, and Consumer Products (Forest Supply Chain). Irving's commitment to improving the sustainability of its Forest Supply Chain is rooted in values from long-term forest ownership. We believe that if we look after the forest, the forest will continue to look after us. A key aspect of sustainability is understanding the Carbon Footprint of the Forest Supply Chain .

This document describes the organizational Carbon Footprint of the Irving Forest Supply Chain 1 (Supply Chain). The Boundary of the Supply Chain is not defined by legal or corporate structure, but rather accounts for the Carbon Footprint associated with all forest related operations, including Forest Management, Forest Products processing, manufacturing, related transportation, and administrative activities that support the production of lumber, wood pellets, Kraft pulp, paper, Tissue and corrugating medium products and related by-products under the financial control of Irving to the point of sale to third parties (Customers). This document excludes any declaration as to the Carbon status of any specific product manufactured by the Supply Chain and is expressly limited to the Boundary of the Supply Chain, in its entirety, as described herein.

[1] Includes operations wholly or partially in various Irving entities, including J.D. Irving, Limited, Irving Pulp & Paper, Limited, Irving Paper Limited, Irving Consumer Products Limited, Irving Consumer Products, Inc., New Brunswick Railway Company, Grand River Pellets Limited, Rothesay Paper Holdings Ltd., St. George Pulp & Paper Limited, St. George Power LP, Charlotte Pulp and Paper Co. Ltd., Miramichi Timber Holdings Limited, Allagash Timberlands LP, Aroostook Timberlands LLC, Maine Woodlands Realty Company, Maritime Innovation Limited, Irving Forest Products, Inc., Irving Air Services Inc., and Forest Patrol Ltd. The Supply Chain excludes operations that do not use any wood fiber derived from forests or primary production facilities managed by Irving.

PAS2060 DECLARATION OF CARBON NEUTRAILTY - 2020 QUALIFYING EXPLANATORY STATEMENT

DECLARATION OF CARBON NEUTRALITY

An accounting of the Carbon Footprint of the Boundary has determined that the Supply Chain is Carbon Neutral. This document forms the Qualifying Explanatory Statement (QES) which describes in detail the assumptions and methodology for accounting of the Carbon Footprint in accordance with PAS2060:2014, and the Greenhouse Gas Protocol - Corporate Value Chain (Scope 3) Accounting and Reporting Standard.

The Declaration of Carbon Neutrality (Declaration) encompasses activities in three major categories in the Supply Chain:

- Direct and indirect Emissions,
  - o Scope 1 Direct GHG emissions
  - o Scope 2 Indirect GHG emissions associated with purchased energy
  - o Scope 3 Indirect GHG emissions from activities in the Supply Chain,
- Net Forest Growth from Freehold forests,
- Net transfer of carbon dioxide to Harvested Wood Products.
- In addition to the accounting of GHG emissions and removals, the QES describes the following:
- A detailed description of the activities that make up the Supply Chain,
- Disclosure of Biogenic carbon emissions,
- Exclusions of non-material GHG emissions and rationale,
- Analysis and discussion of inherent uncertainty associated with estimating and accounting for GHG emissions,
- Planned short-term reductions in the Carbon Footprint.

Accounting and disclosure of the Carbon Footprint for the Supply Chain is a first step. Accounting for emissions in the Irving Forest Supply Chain was prioritized due to high interest from stakeholders. Accounting for the Carbon Footprint of other J.D. Irving, Limited companies that are not related to the Forest Supply Chain may be disclosed in future years by way of separate Qualifying Explanatory Statements that are specific to such business or group of businesses. The timing of future accounting and disclosure for other Irving businesses may depend on a number of factors, including requirements of accepted GHG accounting standards or regulations and the level of priority determined by interest from stakeholders.

The Supply Chain is committed to maintaining Carbon Neutrality within the Boundary from the year 2020 until the end of 2022.

In 2022, Irving will repeat this process under PAS2060:2014 and disclose its 2021 Carbon Footprint in the Supply Chain in an updated QES.

Deersdale, NB

1.

CARBON NEUTRALITY DECLARATION

"Carbon Neutrality of the Supply Chain has been achieved in accordance with PAS2060:2014 from January 1, 2020 to December 31, 2020, with a commitment to maintain to December 31, 2022"

The Qualifying Explanatory Statement (QES) contains all the required information on the Carbon Neutrality of the Supply Chain.

KPMG Performance Registrar Inc. (KPMG PRI) has conducted a limited assurance engagement in relation to our assertion of Carbon Neutrality in this QES. The KPMG PRI assurance report can be found on Page 48.

Any material changes to information reported which affects the validity of this Declaration will be updated to reflect the status of the Carbon Footprint and Carbon Neutrality of the Supply Chain.

The QES for the Supply Chain is publicly available at www.jdirvingsustainability.com

Andrew Willett
Director, Research & Development - Woodlands Division
June 15, 2022

Jason Limongelli
Vice President - Woodlands Division
June 15, 2022

This is the first declaration of achievement for the Supply Chain. The letter of limited assurance is attached in Appendix A.

Jesse Stern, Irving Tissue, Macon, Georgia

2.

INTRODUCTION

This document forms the Qualifying Explanatory Statement (QES) to demonstrate that the Supply Chain has achieved Carbon Neutrality. This statement is valid for the period starting January 1, 2020 and ending December 31, 2020 in accordance with the PAS2060:2014 standard, and the GHG Protocol Corporate Accounting and Reporting Standard.

Carbon Neutrality has been achieved through a comprehensive accounting of Scope 1, 2, and 3 emissions and a long-term focus on;

- Reducing CO_2e emissions in manufacturing operations under Irving financial control (sawmills, Kraft pulp, paper, and Tissue manufacturing facilities)
- Investment in manufacturing facilities which increase CO_2 transferred to Harvested Wood Products (HWP).
- Sustainable forest management resulting in improved forest growth and increased CO_2 removals by the forest on Irving owned Freehold lands in the provinces of New Brunswick (NB), Nova Scotia (NS), and state of Maine (ME);

This report includes information which substantiates the Declaration of the Supply Chain achievement of Carbon Neutrality and a commitment to continuous improvement regarding the reduction of GHG emissions in compliance with the PAS 2060:2014 standard.

3.

GENERAL INFORMATION

Entity making PAS2060 Declaration	Supply Chain
Individual(s) responsible for the evaluation and provision of data necessary for the substantiation of the declaration (including that of preparing, substantiating, communicating and maintaining the declaration)	Andrew Willett – Director, Research and Development, Woodlands Division
Subject of PAS2060	Emissions associated with the Irving Forest Supply Chain.
Function of subject	The function of the Supply Chain is to provide a growing supply of quality Forest Products to Customers, sourced from sustainably managed forests.
Activities required for subject to fulfill its function	All forest related operations, including Forest Management, Forest Products processing, manufacturing, related transportation, and administrative activities that support the production of lumber, wood pellets, Kraft pulp, paper, Tissue and corrugating medium products and related by-products under the financial control of Irving to the point of sale to third parties (Customers).
Rationale for selection of the subject	The Supply Chain approach was selected as it reflects all emissions from seedling to point of sale to a third-party (Customer) for Irving forest products produced by organizations under the financial control of Irving. This provides for the identification of more sources of emissions and opportunities to reduce emissions to take steps to maintain carbon neutrality.
Type of conformity assessment has been undertaken	I3P-3 With independent third-party verification[1] to a limited level of assurance
Baseline date for PAS 2060 program	2020 is the baseline year
Achievement period	January 1, 2020 – December 31, 2020
Commitment Period	December 31, 2022

[1] PAS 2060 refers to independent third party 'certification" and "certification bodies" in reference to performance assessment by an independent third party. Annex C Table C.3 of PAS 2060 describes the standards and codes identified as appropriate for assessing performance against the PAS and specifically identifies ISO 14064-3 as appropriate. The terms "verification" and "verification body" are the appropriate terms for assessing performance using ISO 14064-3 and are therefore used in this document.

Sussex, NB

3.1
OBJECTIVES

The Supply Chain objective is to maintain Carbon Neutrality by understanding the balance of GHG emissions and removals. Understanding our Carbon Footprint will provide information to Irving for continuous improvement and is essential to reducing our impact on the changing climate.

Irving started its first sawmill operation in Bouctouche, New Brunswick, Canada in 1882. The values and work ethic developed as a small family-owned business have developed since then to form the commitment we make to all our stakeholders today.

Our approach to sustainability has been simple - if we look after the forest, the forest will look after us. This approach balances the short-term needs of the business with the long-term vision required to nurture generations of forests. Healthy, growing forests are good for today and future generations. We consider it a privilege to be stewards of the forest and strive to be good neighbors to our communities, partners with our stakeholders, and responsible suppliers to our Customers.

Important sustainability topics across the Supply Chain include:

- Reinvesting in Freehold forest lands and manufacturing operations to ensure long-term economic benefits to our employees and local communities where we work and live.
- Long-term management of the forest to increase the wood supply of high-quality Forest Products for our Customers by ensuring that we always grow more wood than we harvest. Key to this strategy is a commitment to planting trees for more than 60 years.
- Managing the forest for multiple values, including clean water, wildlife habitat, biodiversity, and recreation.
- Reducing waste in the forest to ensure we maximize the use of every tree harvested and reducing waste from manufacturing operations.
- Reducing water consumption in manufacturing operations and exceeding water quality regulations.
- Reducing air emissions, including reducing GHG emissions and increasing CO_2 removals on all forest lands.
- Developing strategies for adapting to a changing climate in the forest and manufacturing facilities.

In 2020, we published a comprehensive Forest Products Sustainability Report to highlight our approach to sustainability. To learn more, please visit www.jdirvingsustainability.com for a copy of our most recent report.

3.2

REDUCING GREENHOUSE GAS EMISSIONS AND CARBON NEUTRALITY

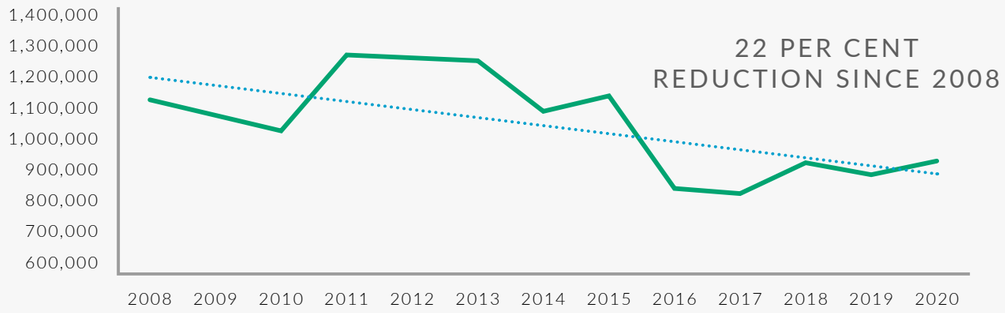
Globally, a reduction in society's carbon footprint is required. Reducing GHG emissions and increasing removals from the forest are two ways we can do our part to contribute to Carbon Neutrality.

Carbon Neutrality is important for four reasons:

3.2.1. DOING OUR PART FOR THE PLANET

Understanding and reducing our Carbon Footprint began with Pulp & Paper operations in the 1990s, and Irving has had internal measurement and reporting in place for Scope 1 and 2 emissions since 2008 across the Supply Chain. Emissions have reduced by more than 22 per cent, with a focus on fuel switching to Biogenic fuels and producing electricity with waste steam.

FIGURE 1. SUPPLY CHAIN SCOPE 1 & 2 EMISSIONS SINCE 2008[1]



[1] Emissions prior to 2020 were not independently reviewed.

In 2013, we participated in a study with University of New Brunswick's Dr. Chris Hennigar (Cameron 2013), to model the carbon balance from forestry activities, manufacturing facilities and forest products to end of life. The study showed that our forestry business would absorb more carbon than emitted over the next 50 years.

Carbon Neutrality expectations have evolved since 2013. To improve transparency, reporting of our Carbon Footprint will follow international standards with independent third-party assurance.

3.2.2. MANAGING CLIMATE CHANGE RELATED RISKS

Managing climate change related risks to the business allows us to continue to provide for our employees, communities, and Customers. Reducing GHG is important to decrease the business risks associated with a changing climate.

In forty years, the trees that we have planted today will be growing and harvested in a very different climate. Changes to temperatures and precipitation will impact tree growth, species composition, pest, and fire risk. Shorter, warmer winters or higher precipitation could impact operations that supply wood to mills. Kraft pulp, paper, and Tissue operations that require significant water resources in manufacturing could be impacted by changes to precipitation and physical assets, by rising seas and more severe storms. Other issues and impacts of climate change may not yet be known, so we must limit future warming by addressing these risks on a global scale.

3.2.3. REDUCING INFLATIONARY RISKS RELATED TO GHG EMISSIONS

Quantifying our Carbon Footprint allows management to understand the business risk from the inflationary costs associated with regulatory prices on CO_2e emissions. Carbon taxes are in effect in Canada with prices planned to increase each year until 2030 and are anticipated in the United States. While carbon taxes and regulations have a direct impact on the cost of Scope 1 and Scope 2 emissions, indirect costs associated with Scope 3 emissions will also rise. These increased costs will eventually be passed through the Supply Chain.

By understanding inflationary risks, Irving can target opportunities for decarbonization across the Supply Chain. Decarbonization is good for the planet and good for business.

3.2.4. INNOVATION AND PARTICIPATION IN THE CIRCULAR BIO-ECONOMY

Understanding the Supply Chain Carbon Footprint helps identify opportunities for innovation in forest related operations . This innovation creates new opportunities for Irving to participate in building the circular bio-economy, producing renewable Forest Products that can replace plastic, concrete, and steel, and produce more green energy.

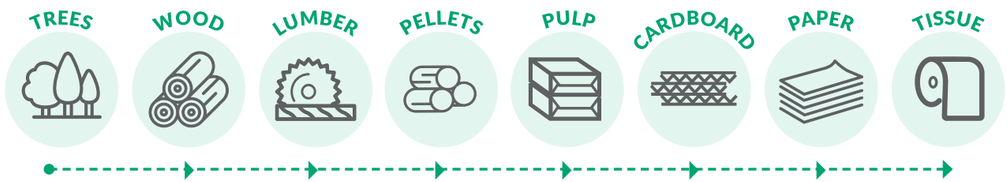
FIGURE 2. MAP OF MANUFACTURING OPERATIONS AND FOREST LANDS IN THE SUPPLY CHAIN

4.

ORGANIZATIONAL BOUNDARIES

Over 139 years in the forest related operations means Irving has a reputation for being a responsible steward of forests and continually investing in healthy forests, modern technology, and infrastructure. Key to our success is delivering high-quality Forest Products to Customers today and into the future, and our security of that supply comes from vertical integration – from seed to shelf.

FIGURE 3. IRVING FOREST SUPPLY CHAIN



The organizational Boundary for the Carbon Footprint of the Supply Chain is defined as:

"All forest related operations including forest management, forest products processing, manufacturing, related transportation, and administrative activities supporting the production of lumber, wood pellets, Kraft pulp, paper, Tissue and corrugating medium products and related by-products under the financial control of Irving to the point of sale to third parties."


Anil Gill, southern New Brunswick woodlands

Juniper Nursery, Juniper NB

4.1.

IRVING WOODLANDS DIVISION (WOODLANDS)

Woodlands is responsible for two key functions - ensuring a growing, high quality wood supply for future generations and managing the procurement of wood to our internal customers today.

Woodlands is responsible for the management of 1.3 million hectares (3.2 million acres) of Freehold forests in Maine (ME), New Brunswick (NB) and Nova Scotia (NS). Woodlands also acts as the Licensee responsible for managing 1.1 million hectares (2.6 million acres) of Crown License 6 & 7 for the Province of New Brunswick. Crown License 6 & 7 have been under Irving management since 1982 under a 25-year evergreen agreement with the Province of New Brunswick. Woodlands procures additional wood supply as a sub-licensee Other Crown Lands. Woodlands is responsible for purchasing wood supply from large and small landowners (Private Lands) in the region and for selling any surplus wood not required in the Supply Chain.

Forest Management activities include forest inventory, planning, road construction and harvesting, reforestation, stand improvement (pre-commercial and commercial thinning) and forest protection activities. To support this Irving conducts tree improvement research and operates its own seed orchard and two tree nurseries. In 2018, Irving planted its billionth tree – a record for a private company in Canada. Planting trees is critical for growing more than is harvested.

Planted stands are expected to yield four times the volume of naturally regenerated conifer (JDI 2021). Each year, approximately thirteen million seedlings are planted on lands owned or managed by Irving to support long-term wood supply objectives. On Freehold lands the wood supply objective is to double the wood supply by 2060 (JDI 2021).

In addition to wood supply objectives, Forest Management balances non-timber values in the forest with almost 25 per cent of owned and managed lands having a primary objective of conservation (JDI 2021). Clean water, wildlife habitat, biodiversity and recreational opportunities are maintained on owned and managed lands. To protect the forest from the threats of fire and insect outbreaks, Woodlands owns and operates fire trucks, fire-fighting equipment, aircraft, and airstrips for forest protection activities. All managed lands are third party certified to the ISO 14001 and Sustainable Forestry Initiative (SFI) standards. The Maine timberlands are also certified to the Forest Stewardship Council (FSC) standard.

Woodlands contracts with over 400 independent logging and trucking contractors which supply nearly five million tonnes of log and chip supply annually. Woodlands works with local private landowners to purchase an additional one million tonnes of supply for internal mill customers annually.

Denzel Arbeau, Doaktown Sawmill, NB

4.2.
IRVING SAWMILLS DIVISION (SAWMILLS)

Sawmills operates ten facilities in New Brunswick, Maine, and Nova Scotia with production of over one billion board feet of lumber annually from spruce, white pine, and hardwood logs supplied by Woodlands.

4.2.1 SPRUCE

Sawmills operates six spruce/fir sawmills located in Kedgwick NB, St. Leonard NB, Chipman NB, Sussex NB, Ashland ME, and Truro NS that produce kiln dried dimensional lumber for construction. Products produced include 2 x 3, 2 x 4, 2 x 6, 2 x 8 dimensions in both stud and random lengths.

4.2.2 WHITE PINE/HARDWOOD

Sawmills operates four mills that produce quality white pine and hardwood lumber for appearance grade applications such as furniture, flooring, panels, window/door frames and other specialty purposes. Sawmills in Doaktown, NB and Dixfield, ME produce high quality white pine lumber. The sawmill in Veneer, NB and value-added plant at Clair NB produce hardwood lumber and lumber products.

In the process of producing solid wood products, Sawmills produce Residual wood products that are used in the Supply Chain or sold to third parties. The most significant Residual product by volume is wood chips that are used in the production of Kraft pulp and paper. Bark is used as a Biogenic energy source to generate heat and steam. Sawdust is used as Biogenic energy for heat or to manufacture wood pellets. Dry shavings are used in wood pellets, manufactured panels or as animal bedding.

More than 90 per cent of lumber production is sold to Customers in the United States, primarily on the eastern seaboard. The primary mode of transportation is by rail to customer distribution centres. Some shipments are direct by truck to distribution centres or stores.

4.2.3 WOOD PELLETS

Sawmills also operates one wood pellet plant in St. Leonard, NB which uses sawmill Residuals such as sawdust and dry shavings. Wood pellets are sold bulk, at the Port of Belldune, NB to European Customers.

Irving Pulp & Paper, Saint John, NB

4.3.

IRVING PULP & PAPER DIVISION (PULP & PAPER)

Pulp & Paper operates three facilities in New Brunswick producing Kraft pulp, paper, and corrugating medium. Pulp & Paper has reduced GHG emissions with investments in Biogenic energy and energy efficiency projects. In addition to reducing GHG emissions, Pulp & Paper has invested significantly in reducing unfavorable odors from SOx emissions and improving the quality of discharged mill effluents with capital investments and best in class technology.

IRVING PULP & PAPER, LIMITED (IPP)

IPP is a single facility, Kraft pulp mill located in Saint John, NB which produces 335,000 ADMT of softwood and hardwood Kraft pulp per year. In 2020, 86 per cent of the Kraft pulp produced was used by internal customers in the Tissue or paper businesses. IPP generates more than 90 per cent of its energy needs from Biogenic sources; burning waste bark from Sawmills, biomass from Woodlands, and lignin recovered in the Kraft pulping process to generate heat and steam used for drying pulp. IPP generates more than 95 per cent of its own electricity from the waste steam created by Biogenic energy sources.

4.3.1 IRVING PAPER LIMITED (IPL)

IPL is a single facility thermo-mechanical pulp (TMP) and paper mill located in Saint John, NB which produces 420,000 ADMT per year of various specialty grades of paper for printers in the flyer, magazine, and newsprint business using wood chips from Sawmills. TMP is very energy intensive, requiring extensive electricity in the process of making pulp for paper.

Recently, with structural declines in the printed paper business, markets for paper are less North American centric and more global. Therefore, freight to Customers includes rail and increasingly more trans-oceanic freight by ship in 2020.

4.3.2 LAKE UTOPIA PAPER, A DIVISION OF J.D. IRVING, LIMITED (LUP)

LUP, a single facility corrugating medium mill located near Lake Utopia, NB which produces 185,000 ADMT per year of corrugating medium and linerboard used in the manufacturing of cardboard boxes. Approximately 70 per cent the fibre for corrugating medium is from virgin hardwood chips delivered by Woodlands. Approximately 30 per cent of the fibre is from old corrugated containers (OCC) or recycled cardboard that is sourced locally in Atlantic Canada and Maine. LUP has recently invested in a biomass boiler to utilize both mill and Woodlands based biomass as well as a new effluent treatment plant that captures biogas for use in the boiler to produce steam used in the process of making paper. Increased biomass and biogas use reduced the GHG emissions for this site in 2020.

Customers for LUP are primarily in Atlantic Canada and New England, in the United States. Primary transportation modes are by truck.

4.4.

IRVING CONSUMER PRODUCTS (CONSUMER PRODUCTS)

Consumer Products operates five facilities that produce various high-quality grades of at-home facial and bath tissue, napkins, and paper towel products. Consumer Products sells these products under the Royale® brand in Canada and Scotties® in the United States. A significant portion of Consumer Products' production is sold as private label brands in both Canada and the United States. The primary source of Kraft pulp for Consumer Products is softwood and maple Kraft pulp from IPP. Consumer Products also purchases parent rolls of tissue from other North American tissue producers and some eucalyptus pulp from South American suppliers.

The five Consumer Products facilities are: a tissue mill in Saint John, NB, a tissue converting mill in Dieppe, N.B., and three integrated tissue and converting facilities in Toronto, Ontario (ON), Fort Edward, New York (NY), and in Macon, Georgia (GA). The Macon facility was newly commissioned in 2019.

5.

OPERATIONAL BOUNDARY – GREENHOUSE GAS SOURCES AND SINKS

5.1.

SCOPE 1: DIRECT EMISSIONS

Scope 1 emissions result from the combustion of fossil fuels, and CH_4 and N_2O emissions from the burning of Biogenic fuels. Emissions are reported from the following sources:

5.1.1. Mobile equipment in all operating divisions.
5.1.2. Company owned vehicles.
5.1.3. Light and heavy oil used in boilers.
5.1.4. Propane and natural gas in boilers, kilns, and mobile equipment.
5.1.5. CH_4 and N_2O emissions from biomass boilers.
5.1.6. Aviation fuels in forest monitoring and protection.
5.1.7. Corporate air travel.

Removals of CO_2 include Net Forest Growth on Freehold forest lands, including the CO_2 subsequently stored in Harvested Wood Products (HWP).

5.1.8. Net Forest Growth removals from changes in above and below ground biomass on Freehold forest lands.
5.1.9. Changes in storage of CO_2 in HWP.

5.2.

SCOPE 2: INDIRECT EMISSIONS (ELECTRICITY)

Scope 2 emissions result from purchased electricity. Emissions factors vary by jurisdiction (provincial/state) depending on the intensity of grid emissions where facilities are located. Electricity transmission emissions are included in Scope 2.

5.2.1. Manufacturing facilities, offices, buildings, and garages.

PAS2060 DECLARATION OF CARBON NEUTRAILTY - 2020 QUALIFYING EXPLANATORY STATEMENT

5.3.

SCOPE 3: UPSTREAM AND DOWNSTREAM SUPPLY CHAIN EMISSIONS

Scope 3 emissions are reported following the guidance of the Corporate Value Chain (Scope 3) Accounting and Reporting Standard (WRI 2011) except for the exclusions outlined in Section 6.4 as these lie outside the boundary of the Supply Chain.

Scope 3 emissions result from upstream and downstream sources that are not financially controlled . The Scope 3 emissions are calculated using either primary production, spend, or other invoice generated data in combination with various published emissions intensity factors. A summary of the methodology for each emission and the associated factors is included in Appendix B. The Scope 3 emissions evaluated in the Supply Chain are:

5.3.1. Harvesting of roundwood logs or chips for all Customers (internal and external) by independent contractors from Freehold, Crown License 6 & 7, Other Crown lands or harvesting on Private Lands. (Category 1).
5.3.2. Purchased roundwood logs (harvested and delivered) from third parties for all Customers by independent contractors from Private Lands (Category 1).
5.3.3. Light vehicle commuting by independent contractors in log harvesting and procurement from the Freehold, Crown License 6 & 7, Other Crown Lands, and Private Lands (Category 1).
5.3.4. Heavy truck transportation of logs and chips from the Freehold, Crown License 6 & 7, Other Crown Lands, and Private Lands to all Customers (internal and external) including mill yards or between holding yards (Category 4).
5.3.5. Rail freight of logs and chips (including Sawmill Residual chips) from transfer yards to mill yards (Category 4).
5.3.6. Truck freight of Sawmill Residuals to Customers (Category 4).
5.3.7. Truck freight of wood pellets to FOB Port of Belldune (Category 9).
5.3.8. Truck and rail freight of lumber to Customers, including intra-mill transfers (Category 4 and 9).
5.3.9. Truck, rail and ocean freight of Kraft pulp, paper, and corrugating medium to Customers, including purchased old, corrugated containers (OCC) for LUP (Category 4 and 9).
5.3.10. Procurement of parent rolls of tissue and eucalyptus pulp for Tissue production (Category 1).
5.3.11. Freight of finished Tissue goods to Customers (Category 9).
5.3.12. Commercial air travel and vehicle rentals (Category 6).
5.3.13. Emissions from employee commuting (Category 7).
5.3.14. Chemical purchases for Kraft pulp, paper, or Tissue manufacturing (Category 1).
5.3.15. Waste disposal from manufacturing operations (Category 5).
5.3.16. Capital goods purchases in the year – property, plant, and equipment (Category 2).
5.3.17. Maintenance and repair parts purchases in the year – consumables and services (Category 1).
5.3.18. Upstream emissions from purchased fuels (Category 3).
5.3.19. Upstream and downstream leased assets, warehousing (Category 8).

5.4.
A NOTE ABOUT TRANSPORTATION

Irving has a transportation division and various transportation companies that operate by road, rail, and ocean ship that transport both forest products and other products. For the purposes of this analysis, transportation associated with the Supply Chain has been treated as a Scope 3 (indirect) emission rather than including the transportation division as a source of Scope 1 emissions and including emissions associated with other (non forest) products.

5.5.
HARVESTED WOOD PRODUCTS

The manufacturing operations of the Supply Chain focus on tree species found in local forests. The primary Forest Products are solid wood products such as construction-grade lumber from spruce and fir and decorative lumber from white pine and hardwoods. Residuals such as bark, sawdust, shavings, and wood chips from these solid wood products are transformed into energy or paper products like Kraft pulp, tissue, paper, and corrugating medium. Some lower quality trees are directly chipped and sent to pulp and paper mills. Some forest Residues may be collected and used for energy at pulp and paper mills. Many of the Residual energy products (sawdust and bark) are used internally as an energy source in the production of lumber or pulp, and some are sold to third party facilities that produce energy. Some sawmill Residues are used to make wood pellets.

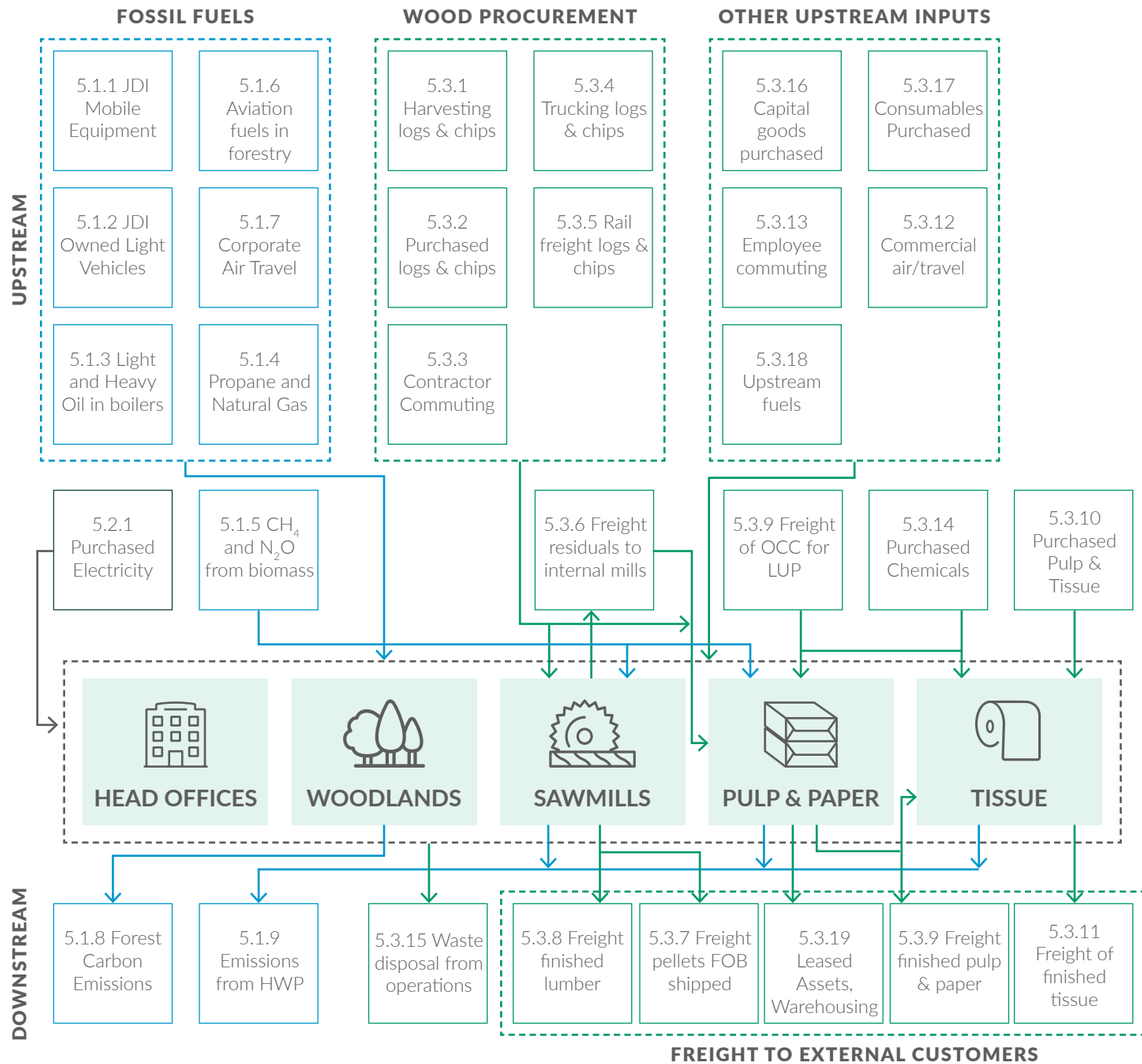
Most forest products store carbon over their lifespan rather than emitting CO_2 back into the atmosphere in the year of production. This storage and the subsequent emissions as the forest products reach their end of life is estimated using the simple decay approach outlined in IPCC 2006.

The half-lives for solid wood products (lumber) reflect the end use of HWP produced by Irving. This is done by allocating Irving production by the proportion of solid wood use by decade in the United States using data published by the United States Department of Agriculture (USDA 2020). This aligns with a key Irving sustainability strategy to increase removal of CO_2 by investing in Supply Chain manufacturing to increase capacity and technology to increase recovery of lumber from logs. The half-life of lumber used in housing construction is longer than the average half-life for solid wood. Therefore, increasing the proportion of lumber production that is used in housing results in longer-term removal of CO_2 from the atmosphere.

Lumber sold in the Canadian market is assumed to have the same end use profile as the United States. More than 90 per cent of solid wood products (lumber) are sold in the US.

For paper products, the half-life reflects paper sold in the United States and Canada using appropriate national factors. The half-life of CO_2 in HWP used in the simple decay approach are presented in Appendix C.

FIGURE 4. OPERATIONAL BOUNDARY OF THE IRVING FOREST PRODUCTS SUPPLY CHAIN



LEGEND

- Scope 1: Direct Emissions
- Scope 2: Indirect Energy Emissions (Electricity)
- Scope 3: Indirect Supply Chain Emissions

Deersdale, NB

5.6.

NET FOREST GROWTH

Freehold lands and Crown License 6 & 7 remove CO_2 from the atmosphere with growth and store carbon in above and below ground biomass. All forests also emit CO_2e with natural mortality and working forests emit CO_2e with harvesting. Net changes in emissions and removals of CO_2e are modeled. All forest areas in ME, NB, and NS are considered managed, aligned with the definition of managed forests by the International Panel on Climate Change (IPCC 2019).

Removals associated with Net Forest Growth on Freehold forest lands are accounted for in this Declaration of Carbon Neutrality. Removals associated with forest management on Crown License 6 & 7 are not included within the declaration but are reported for transparency. The annual net change in CO_2e from Freehold and Crown License 6 & 7 is calculated using the Carbon Budget Model for the Canadian Forest Sector (CBM-CFS3). This is the method used by Environment and Climate Change Canada reporting in the National Inventory Report 1990-2018: Greenhouse Gas Sources and Sinks in Canada (ECCC 2020). The process to define the annual change in net forest growth is described in Appendix C.

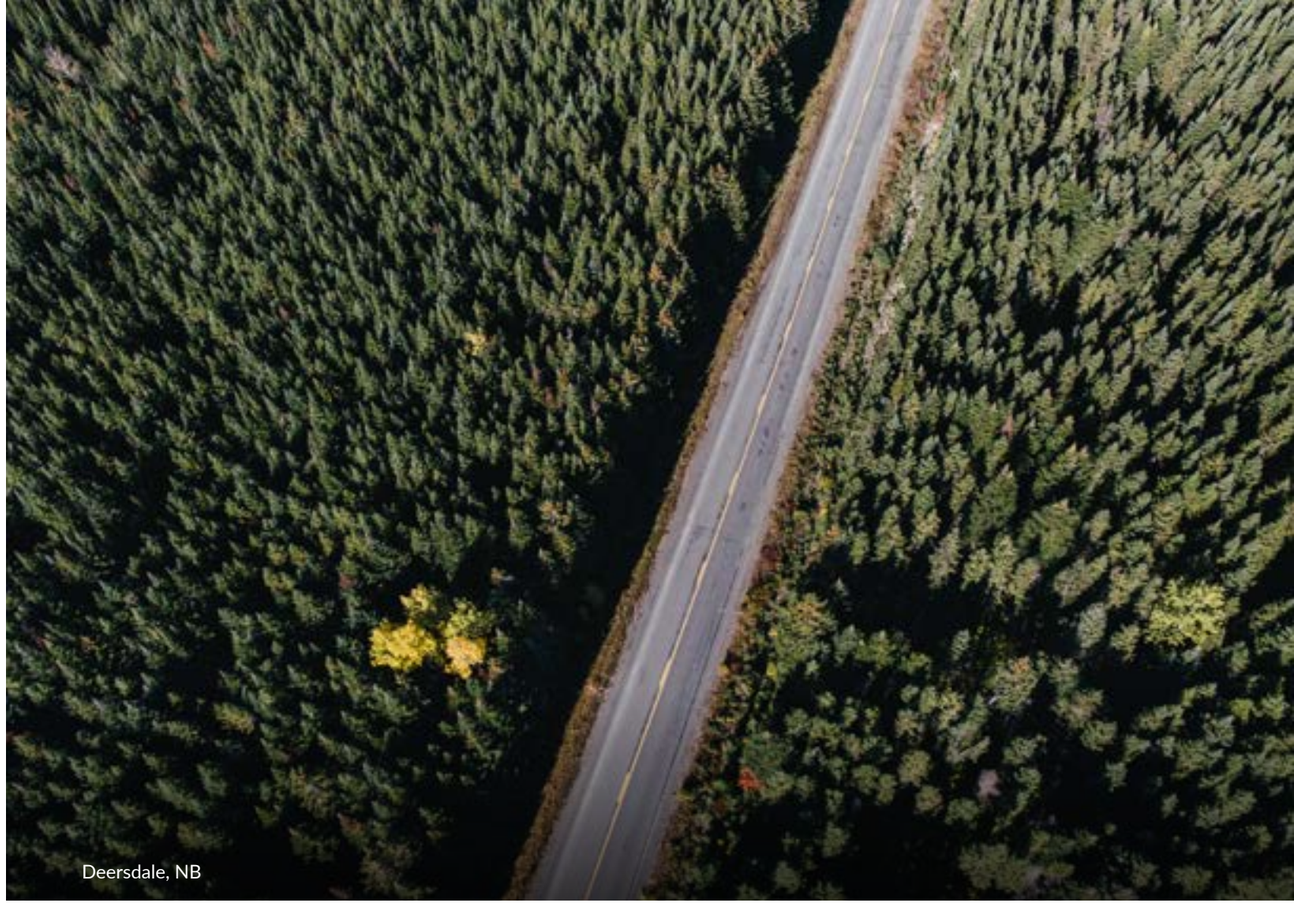
6.

QUANTIFICATION OF CARBON FOOTPRINT

All Scope 1, 2 and 3 GHG emissions and removals within the Boundary of the Supply Chain described above are listed below in Table 6.1. A detailed presentation of all emissions is reported in Appendix D. Unless otherwise noted, emissions or removals are reported in metric tonnes of Carbon Dioxide Equivalents (CO_2e). As presented in Table 6.1 below, the Supply Chain is Carbon Neutral.

TABLE 1. QUANTIFICATION OF CARBON FOOTPRINT

TYPE	DETAIL - EMISSION (REMOVAL)	MTONS CO_2e
Scope 1	Direct Fuels	391,000
Scope 2	Indirect Electricity	505,000
Scope 3	Upstream and Downstream Supply Chain	819,000
Sub-Total: Direct and Indirect Emissions		**1,715,000**
Transfer	Net transfers (to) / from HWP	(588,000)
Removal	Net Forest Growth and Land Use – Freehold	(2,335,000)
Sub-Total: HWP Transfer plus Net Forest Growth (Removal)		**(2,923,000)**
Total: Net Forest Products Supply Chain Emissions/(Removals)		**(1,208,000)**



Deersdale, NB

6.1.

OTHER EMISSIONS/(REMOVALS)

In addition to Freehold lands, Irving manages Crown License 6 & 7. Modeling of net removals resulting from forest management on Crown License 6 & 7 identified an additional 2,449,000 metric tonnes of CO_2 in 2020. Crown License 6 & 7 forest removals are not accounted for in the Declaration as we determined to use the financial control method for 2020 based on our current understanding of reporting expectations for such removals. In future years, if the operational control method is selected, Crown License 6 & 7 removals could be included when accounting for our Declaration. For transparency, the details are presented in Table D.2 of Appendix D.

Biogenic CO_2 emissions within the Supply Chain were 1,551,000 metric tonnes of CO_2 in 2020. A detailed breakdown of these emissions is presented in Table D.3 in Appendix D.

6.2.

TREATMENT OF BIOGENIC CARBON DIOXIDE EMISSIONS

Irving produces energy from biomass and biogas (Biogenic) that is derived from Residual forest products. CO_2 emissions from Biogenic sources are treated differently than CO_2 emissions from fossil fuels. Following the guidance of the Greenhouse Gas Protocol, Biogenic carbon is not reported in any of the scopes but, shall be separately reported (WRI 2011).

Modeling of net removals associated with forest management results in the carbon in all merchantable timber being treated as emitted at the time of harvest except for those amounts added to HWP to reflect storage in wood products. In practice, a significant portion of this carbon is transported from the forest to manufacturing plants where it is subsequently used to generate heat used in the manufacturing process. The associated "biogenic" emissions (i.e. those carbon dioxide emissions resulting from the use of Residual material in boilers to generate heat) are not included within the reported Scope 1 emissions from our faclilities to avoid double-counting these emissions as both forest emissions and facility emissions. Irving will continue to monitor and adapt to best practices and standards for how and where to disclose biogenic emissions. For transparency and consistent with the GHG Protocol, biogenic emissions are currently embedded in our forest level accounting rather than as part of facility emissions. These biogenic emissions are also reported separately for transparency.

Forest level accounting for biogenic sources of emissions from forest residues continues to lead to a net removal of 2.3 million tonnes CO_2 from Freehold land in 2020, accounting for 35 per cent of the wood and biomass supply for the Supply Chain.

Similarly, forest level accounting for forest residues purchased from land not owned by Irving does not lead to that land being a net source of emissions. Crown License 6 & 7 (20 per cent of the wood and biomass supply in 2020), other Crown lands and Private Lands in New Brunswick (29 per cent of the wood supply) and private lands in Nova Scotia (6 percent of wood supply) are reported in this manner to Environment and Climate Change Canada annually for preparation of Canada's National Inventory Report by the Province of New Brunswick and Nova Scotia. Each of these sources is not a net emitter of CO_2 (Ward 2021 re: New Brunswick and Steenberg, 2022: re Nova Scotia). The remaining 10% of the wood supply comes from other private lands in Maine. The most recently available published information for Maine from 2018 shows that Maine forests are a net remover of carbon dioxide (Domke et. al. 2020).

Methane and nitrous oxide emitted as a result of heat generation from biomass in the manufacturing process are included within the Supply Chain emissions.

6.3.

METHODOLOGY

Emissions are reported in accordance with the GHG Protocol (WRI 2011). Scope 1 and 2 reporting methodology follows guidance from the Greenhouse Gas Reporting Protocol (GHGRP) set by Environment and Climate Change Canada (ECCC 2021) and the United States Environmental Protection Agency (EPA 2021) guidance. Following GHGRP guidelines ensures that Scope 1 and 2 emissions reporting aligns with government GHG reporting and allows for comparison to past years.

Scope 3 emissions reporting follows the guidance in the Corporate Value Chain (Scope 3) Accounting and Reporting Standard, except for the exclusions outlined in Section 6.6.

Net HWP removals have been quantified using a simple decay approach and guidelines from IPCC 2006. For pulp and paper products, the emissions were weighted by the proportion of products sold in Canada and the United States. For solid wood products (lumber), the emissions were weighted using the half-life factors for different end-uses and weighted by the proportion of products by end-use as reported in the United States Department of Agriculture (USDA 2020).

Net Forest Growth removals have been quantified using the Carbon Budget Model for the Canadian Forest Sector, version 3 (CBM-CFS3).

A detailed description of the procedures and methodology for calculating each emission is included in Appendices B and C.

To improve conservatism in the Declaration, an uncertainty analysis was applied to each major emission category (Manufacturing and Supply Chain, HWP, Net Forest Growth) to assign a 95 per cent confidence interval to the calculated emissions. A Monte Carlo simulation was developed to model the Carbon Neutral result over a range of one million possible outcomes, given the variation in the emissions or removals due to inherent uncertainty.

6.4.

DATA SOURCES

Primary and secondary data sources have been used to estimate emissions. Wherever possible, primary data sources are linked to financial reporting and audited financial statements. Tables 6.2 and 6.3 outline criteria for the assessment of activity or emission factor data quality.

Primary data sources include:

a. Invoiced fuel purchases including the volume of diesel, gasoline, natural gas, propane, and heating fuels.

b. Invoiced electricity usage by manufacturing facilities, offices, buildings, and garages.

c. Mass of Forest Products including Residues sold, volume of lumber sold, mass of pellets, Kraft pulp, paper, corrugating medium and Tissue products sold reported in internal management systems.

d. For Scope 3 emissions, the mass of wood harvested, delivered, or purchased from internal management systems, the number of employees comes from payroll systems, consumable and capital goods spending from financial statements, kilograms of chemicals purchased from invoice data.

e. For freight-based emissions, distances come from third party invoiced distances or from calculating distances from publicly available mapping systems, tonnes and loads delivered are sourced from internal management systems.

TABLE 2. PRIMARY ACTIVITY DATA QUALITY ASSESSMENT

ACTIVITY DATA QUALITY	ASSESSMENT CRITERIA
Very Good	From audited financial statements, or enterprise management systems. Invoice based. Measured. Very complete. Third party audited or regulatory compliance related.
Good	From enterprise management systems. Invoice based. Mostly complete. May involve secondary conversions or estimates. Not subject to third party or regulatory audit.
Fair	Estimated or incomplete data sources, sampled. Not tied to financial reporting. No audit trail available.
Poor	Incomplete or missing information.

Northern Maine

Secondary data sources include:

a. Emissions factors sourced from published government sources, published papers, or following life-cycle analysis best practices. All factors and standards are referenced in Appendix E.

b. For wood harvesting and delivery, factors are estimated at the machine level by Irving and are tied to the piece work rates paid to contractors.

TABLE 3. SECONDARY EMISSIONS FACTOR DATA QUALITY ASSESSMENT

EMISSIONS FACTOR QUALITY	CRITERIA
Very Good	Factor specific to a region, process, and less than 5 years old. Factors derived from actual data.
Good	National factor, factor between 5-10 years. Factor for a general process.
Fair	Global factor or national factor with significant uncertainty expressed in documentation, or national factor not specific to a process.
Poor	Global factor estimated older than 10 years. Back up documentation incomplete.

Grand River Pellets, St Leonard, NB

6.5.

ASSUMPTIONS AND ESTIMATIONS

All CO_2e emissions and removals are estimates taken from both direct and indirect sources using the best available factors to convert activity data to emissions. To improve the quality of estimates, activity data is based on financial and enterprise reporting systems and has been reviewed. The assumptions and procedures are described in the methodology in Appendix B.

CO_2e emissions and removals from Net Forest Growth are also generated from enterprise systems that facilitate long term Forest Management. These systems include geographic information systems (GIS), enhanced forest inventory, growth, and yield models (G&Y), and forest management planning software. The same systems that calculate forest inventory, growing stock, and calculate annual allowable harvest levels, are used to estimate the net forest carbon emissions. The outcomes of these models are reviewed by governments on Crown License 6 & 7, and independent third-party auditors as part of forest management certification systems. A detailed description of the process to determine the change in CO_2e emissions from Net Forest Growth are described in Appendix C.

6.6.

EXCLUSIONS

Verification of emissions using PAS2060:2014 requires 95 per cent of emissions to be included and allows for the exclusion of minor emissions less than 1 per cent. For completeness and to produce a conservative estimate of emissions, the Supply Chain has included all emissions sources investigated, including those emissions that are less than 1 per cent. A listing of each emission source is presented in Appendix B.

The following Scope 3 emissions outlined in WRI 2011 are excluded. The Supply Chain does not include any franchises (Category 14), or investments (Category 15). Therefore, no emissions from Category 14 or 15 are reported.

The Boundary of this Declaration of Carbon Neutrality ends at the point of sale to third parties. Therefore, the processing of sold products (Category 10), the use of sold products (Category 11) and end-of-life treatment of sold products (Category 12) are excluded. The Boundary was defined to provide a complete record of the emissions within the financial control of Irving. Due to the integrated nature of the Supply Chain, emissions from the processing of sold products are substantially reported as Scope 1 and 2 emissions.

The Supply Chain sources eucalyptus pulp from South American producers for a portion of its fibre supply. These sources are Forest Stewardship Council (FSC) certified, indicating that no natural forest conversion to plantation has occurred since 1994 (FSC 2015). Following the International Panel on Climate Change guidance (IPCC 2003), emissions from land conversion reach an equilibrium after 20 years, therefore emissions from land conversion in the purchased pulp Supply Chain do not occur within the Boundary.

Any future changes to reporting standards or control method (e.g. operational control) that require reporting beyond the Boundary as currently defined may impact the Declaration of Carbon Neutrality in future years.

St Leonard, NB

6.7.
UNCERTAINTY

Reporting CO_2e emissions is based on estimates, assumptions, and factors from multiple sources. Therefore, uncertainty is inherent in any reported CO_2e emissions. Uncertainty has been evaluated following the guidance of the Greenhouse Gas Protocol and the published Quantitative Inventory Uncertainty document and online Uncertainty Calculation Tool (GGP 2011). An assessment of the quality of the primary activity data and secondary emissions factor data used in the uncertainty analysis is included in Appendix B and C.

This approach uses a pedigree matrix to assess the quality of both the source activity data and the emission factors used to calculate uncertainty of associated CO_2e emissions. A pedigree matrix was developed for each of the major CO_2e emission categories – Direct and Indirect Emissions; HWP; Net Forest Growth. In this way, cumulative uncertainty across the three major CO_2e emission categories may be calculated and compared.

Using the pedigree matrix approach and the online Uncertainty Calculation Tool, total uncertainty for each category is expressed with a 95 per cent confidence interval of the geometric standard deviation. The tool expresses the absolute value of the emission, so removals (negative emissions) are expressed as a positive value.

To understand how the sum of emission and removal categories, with associated uncertainty, impact the probability of a Carbon Neutral result, a Monte Carlo simulation model was developed, and one million simulations of random scenarios were produced. This allows for the probability of a Carbon Neutral result to be determined over the range of uncertainty calculated in each emission or removal category.

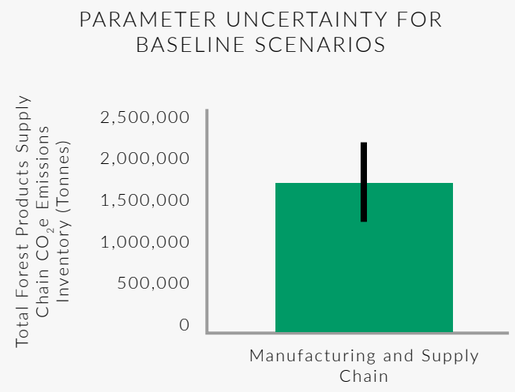
6.7.1. DIRECT AND INDIRECT EMISSIONS

There is inherent uncertainty in the calculated Direct and Indirect Manufacturing and Transportation emissions. To reduce inherent uncertainty, the following steps were taken with the data.

- Use of activity data from financial statements (spending, production) or internal management systems
- Use of published government or academic emissions factors
- Use of current emissions factors

A summary of the total uncertainty analysis is presented below in Figure 5. (Error bars represent the 95 per cent confidence interval of the total uncertainty).

FIGURE 5. UNCERTAINTY ANALYSIS FOR DIRECT AND INDIRECT EMISSIONS WITH 95 PER CENT CONFIDENCE INTERVALS.



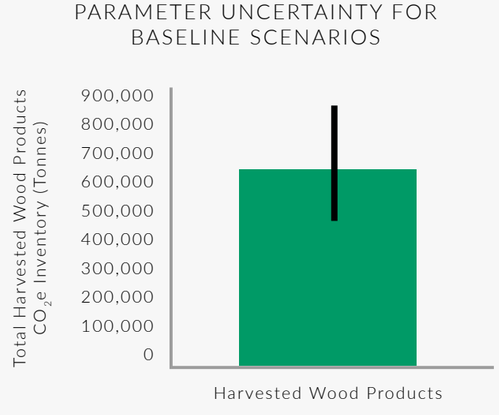
6.7.2. HARVESTED WOOD PRODUCTS (HWP) TRANSFER

There is inherent uncertainty in the calculated transfers to and from HWP. To reduce inherent uncertainty, the following steps were taken with the data.

- Woodlands forest inventory to determine the tree species distribution.
- Regionally based and published tree density factors by species.
- Published product end use half-life factors, rather than average factors.
- Published end use of solid wood products in the United States.

A summary of the uncertainty analysis is presented below in Figure 6. (Error bars represent 95 per cent confidence interval of the total uncertainty). HWP is a net removal and therefore negative, however the output of the tool presents this emission as an absolute value.

FIGURE 6. UNCERTAINTY ANALYSIS FOR HWP TRANSFER WITH 95 PER CENT CONFIDENCE INTERVALS



6.7.3. NET FOREST GROWTH

There is inherent uncertainty in the calculated Net Forest Growth calculations. Emissions and removals were calculated using the CBM-CFS3 model. This model is the current standard in reporting emissions from Net Forest Growth and it is based on the best available science. There is inherent uncertainty in model inputs and forecasts of forest inventory, forest growth and depletion. The modeled parameters are based on permanent sample plot (PSP) data. For these reasons, the user guide for the CBM-CFS3 model states *"At this time, it is impossible to state the level of uncertainty of results obtained with the CBM-CFS3…".*

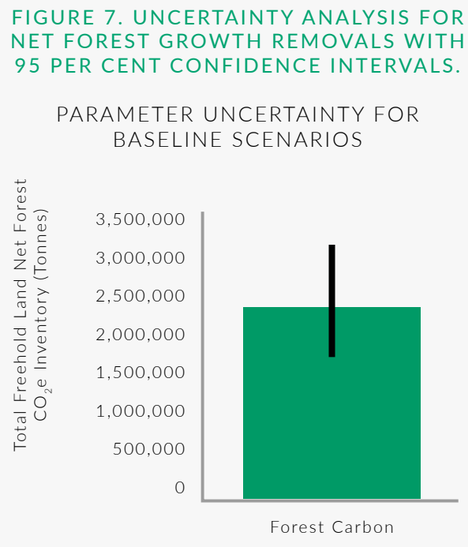
Sources of inherent uncertainty in the net forest growth removal are listed below:

- Uncertainty in the opening forest inventory
- Growth and yield curves used to forecast changes in forest growth
- Depletions of forest inventory (harvesting or natural disturbance)
- Equations used to convert above ground merchantable volume to carbon
- Equations used to convert dead organic matter.
- Disturbance matrices to simulate impacts from management or natural disturbance.
- Algorithms within the CBM-CFS3 model to initialize carbon pools (plot based).

To reduce uncertainty in the inventory and forest growth, Woodlands uses modern technology to determine forest inventory and modern techniques following current scientific guidance. A detailed description of this process is provided in Appendix C, which includes a bibliography of the publications and best practice guidelines used to determine the current inventory, forest depletions and forecasted inventory.

A summary of the uncertainty analysis is presented below in Figure 7. (Error bars represent the 95 per cent confidence interval of the total uncertainty). Like the HWP category, the net forest growth is a removal and therefore negative. The output of the tool presents this emission as an absolute value.

FIGURE 7. UNCERTAINTY ANALYSIS FOR NET FOREST GROWTH REMOVALS WITH 95 PER CENT CONFIDENCE INTERVALS.



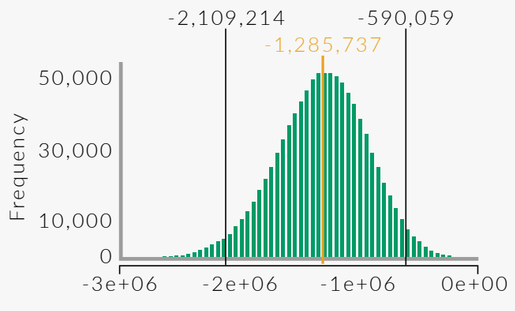
6.7.4. MONTE CARLO SIMULATION OF RESULTS WITH UNCERTAINTY RANGES

A Monte Carlo simulation was developed to determine the net CO_2e emissions from the three categories given the range of uncertainty calculated with the pedigree matrix approach. The probability that the three categories are carbon neutral (X<0) is determined using the following simple equation:

Total Net Emission (X) = Direct and Indirect Emissions – HWP - Net Forest Growth

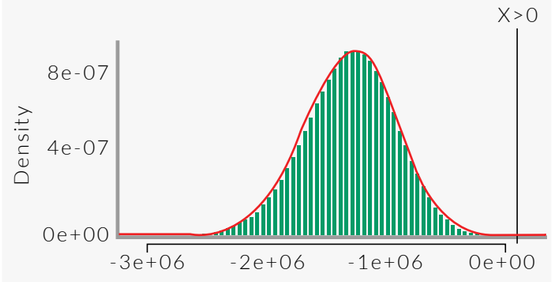
A histogram of the results of one million simulations is presented below in Figure 8, showing a median net emission of -1,285,737 tonnes.

FIGURE 8. HISTOGRAM OF MONTE CARLO SIMULATION RESULTS



The analysis presented in Figure 9 demonstrates the proportion of simulations where the categories yielded a net positive emission (X>0). The net emission of the three categories yielded a positive result in 67 of the one million simulations. Alternatively, the Supply Chain may be considered carbon neutral in 99.9 per cent of simulated scenarios.

FIGURE 9. PROBABILITY OF NON-CARBON NEUTRAL RESULT



Central New Brunswick Woodlands

7.

CARBON FOOTPRINT MANAGEMENT PLAN

7.1. COMMITMENT TO CARBON NEUTRALITY

The Supply Chain is committed to Carbon Neutrality following the PAS2060:2014 standard and is committed to continuing to reduce GHG emissions in the harvesting, processing, and transportation of Forest Products.

In addition, Woodlands is committed to continue Forest Management practices that increase CO_2 removals using nature-based solutions by increasing the growing stock on Freehold and Crown License 6 & 7 forest lands. This effort will increase the wood supply and CO_2 removed by the forest over the long term. Climate change poses risks to long-term forest planning (e.g., through changes in frequency or distribution of natural disturbances, changes in growth and yield). To mitigate this risk, Woodlands uses an adaptive management approach by revising the long-term (80 year) forest management plan every 5 years. There is current research underway to forecast future climate scenarios on forest growth and composition in the local region. Woodlands will continue to monitor this research and incorporate new learning in the management planning process.

Irving has internally forecasted planned business growth, planned emissions reductions and planned future harvest levels to assess the impact on a Declaration of Carbon Neutrality. Forecasted business growth does not negatively impact a commitment to Carbon Neutrality within the current PAS2060:2014 standard and defined Boundary.

Guidance on carbon emissions and removal accounting are currently being revised. The following may impact a future commitment to a Declaration of Carbon Neutrality under PAS2060:2014.

- Future changes to accounting standards for emissions or removals
- Carbon Neutrality reporting standards including changes to PAS2060:2014
- Changes to the organizational Boundary

7.2.
EMISSIONS REDUCTIONS ACTIVITIES

Reduction in GHG emissions is overseen by the Environment, Social and Governance (ESG) committee of senior executives in each of the Supply Chain operations. Emissions sources and operational plans to reduce emissions are identified annually. Scope 1 and 2 emissions have reduced by 22 per cent since 2008 across the Supply Chain to reduce the cost of fossil fuels. Continued reductions are urgent to limit global warming and reduce the cost of fossil fuels as carbon taxes in Canada will continue to increase the costs.

The strategy to continue to reduce carbon emissions is divided into four themes:

1. **Fuel switching** – Increased use of Biogenic fuels to replace fossil fuels, use of waste steam to offset fossil fuel use and reduction of solid waste that can be diverted to better use.
2. **Energy efficiency** – reduction or recycling of heat, more energy efficient systems, reduced equipment idling or waste, increased use of rail or more efficient transportation systems, electricity generation, and productivity improvement.
3. **Increased forest growth** (increased removals from nature-based solutions) – increased Freehold tree planting levels, improved utilization of pulpwood products, and increased yields with precision silviculture tools and techniques to match species and sites.
4. **Increase solid wood product production** – improving recovery of lumber from logs and investments to improve sawmill capacity will transfer more CO_2 to HWP than occurs with shorter-lived products like paper.

Emissions are monitored and reported annually to customers and stakeholders in the Forest Products Sustainability Report (ESG reporting).

7.3.
GHG REDUCTION PROJECTS

To continuously reduce GHG emissions the following is a sample of projects across Irving. Operations within the Supply Chain assess potential projects for decarbonization or productivity improvement (fuel efficiency) as part of the annual budgeting process. Initiatives are included in the budgeting process as they may require capital and impact operating costs. The ESG Steering Committee collects the various projects and initiatives annually. Upcoming projects are listed in Table 2.

PAS2060 DECLARATION OF CARBON NEUTRAILTY - 2020 QUALIFYING EXPLANATORY STATEMENT

TABLE 4. EMISSIONS REDUCTION INITIATIVES

DIVISION	TYPE	PROJECT DESCRIPTION	YEAR
Woodlands	Energy Efficiency	Reducing in-woods flail chipping and replacing with chips produced with electric chip plants .	2021
Woodlands	Energy Efficiency	Increasing tri-drive log trucks to increase payload and reduce the number of trips to move logs to mills.	2021
Sawmills	Energy Efficiency	Commissioning of a new back-pressure turbine at a sawmill using waste steam to generate electricity.	2021
Sawmills	Fuel Switching	Investment in the boiler at a sawmill to use less heating fuel and more biomass in the winter.	2021
Pulp and Paper	Fuel Switching	Use of steam from nearby electrical generation facility to offset use of natural gas to dry paper.	2023
Tissue	Energy Efficiency	Commission of the new CHP plant in Toronto, ON to generate electricity (commissioned in December 2020) – full year of electricity generation.	2021
Tissue	Energy Efficiency	Reduced waste to landfill from Macon, GA by redirecting for beneficial use.	2021

7.4.
CARBON OFFSET PROGRAM

The purchase of third-party carbon offsets is not anticipated to be needed, given the emissions reductions planned and negative emissions associated net forest growth on an annual basis. Surplus carbon removal may be subject to the marketing of forest carbon offset credits to external parties, subject to offset protocol and market conditions.

Black Brook, NB

8.

VERIFICATION PROCEDURE

The declaration of carbon neutrality has been independently third party verified as being in accordance with PAS2060:2014 by KPMG Performance Registrar Inc. (KPMG PRI) of Vancouver, British Columbia. The assurance engagement was conducted in accordance with ISO 14064-3: 2006 to a limited level of assurance.

The scope of KPMG PRI's assurance and the activities undertaken as part of the assurance process are described in KPMG PRI's report in Appendix A.

APPENDIX A: LIMITED ASSURANCE REPORT FROM KPMG PERFORMANCE REGISTRAR INC.

E. Verification Statement

To J.D. Irving, Limited,

We have been engaged by J.D. Irving, Limited to examine the Net GHG Emissions/(Removals) assertion (the Assertion) of J.D. Irving, Limited and its affiliates (Irving) for the Irving Forest Supply Chain for the year ended December 31, 2020 as described in the Company's PAS2060 Declaration of Carbon Neutrality Qualifying Explanatory Statement (the Report).

J.D. Irving, Limited is responsible for the preparation and presentation of the information within the Report. Our responsibility is to express a conclusion as to whether anything has come to our attention to suggest that the Assertion is not presented fairly in accordance with verification criteria, which comprise:

- PAS 2060:2014 Specification for the demonstration of carbon neutrality; and,
- The World Resources Institute / World Business Council for Sustainable Development Greenhouse Gas Protocols *A Corporate Accounting and Reporting Standard (Revised)* and *Corporate Value Chain (Scope 3) Accounting and Reporting Standard.*

Our duties in relation to this report are owed solely to the report addressees. Accordingly, we do not accept any responsibility for any loss occasioned to any third party acting or refraining from action as a result of this report.

We completed our examination in accordance with ISO 14064-3: 2006 *Specification with Guidance for the validation and verification of greenhouse gas assertions*. As such, we planned and performed our work in order to provide a limited level of assurance with respect to the Assertion.

The verification activities applied in a limited level of assurance verification are less extensive in nature, timing and extent than in a reasonable level of assurance verification. As a result, the level of assurance obtained is substantially lower than would have been obtained had a reasonable level of assurance verification been performed.

We believe the evidence we obtained is sufficient and appropriate to provide a basis for our conclusion.

Based on our examination, nothing has come to our attention that causes us to believe that the Assertion presented in the Report is not, in all material respects, presented fairly in accordance with the verification criteria.

Greenhouse gas and energy use data are subject to inherent limitations. A number of different measurement techniques may be utilized in accordance with the requirements of the verification criteria which may vary in precision and /or outcome, resulting in materially different greenhouse gas emissions estimates.

KPMG PRI

Vancouver, BC
June 15, 2022

APPENDIX B: METHODOLOGY AND PROCEDURES FOR DATA COLLECTION AND QUANTIFICATION (all listed emissions are included in the declaration)

CATEGORY	EMISSION/ REMOVAL	ACTIVITY DATA QUALITY	EMISSION FACTOR QUALITY	REPORTING OR CALCULATION METHODOLOGY	REFERENCES
5.3.1 5.3.3	Limit harvesting emissions	Very Good	Good	Annual production of roundwood in metric tonnes delivered to all Customer destinations multiplied by the litres per metric tonne factor for the mix of harvesting systems. Hardwood roundwood stratified as converted by a flail chipper or chip plant. Fuel consumption information from detailed machine cost analysis and productivity information from Irving's management system which is tied to contractor per-tonne payment.	ECCC 2021
5.3.1	Limit flail chipping emissions	Very Good	Good	Annual production of flail chips in metric tonnes delivered to Customers multiplied by the litres per metric tonne factor for the mix of flail chipping systems. Fuel consumption information from detailed machine cost analysis and productivity information from Irving's management system which is tied to contractor per-tonne payment.	ECCC 2021
5.3.2 5.3.3	Purchased roundwood emissions	Very Good	Good	Annual purchased volume of roundwood in metric tonnes from all sources (Freehold, Crown License 6 & 7, Other Crown lands, Private lands) multiplied by the litres per metric tonne factor for the estimated mix of harvesting systems. Purchased wood systems are assumed to be consistent with the average Irving harvesting systems. Purchased hog fuel for pulp and paper and purchased Residuals for Grand River Pellets have been excluded as the volumes are de minimis.	ECCC 2021
5.3.4	Limit roundwood and chip delivery emissions (trucking)	Very Good	Good	Annual proforma fuel consumption in litres of roundwood and flail chip trucking from the trucking rate management system. This system calculates the litres consumed (and paid to contractors) on each two-way trip by calculating the distance by road class and the fuel burn by road class (speed) by truck type for each trip for each tonne. Litres per metric tonne factor developed. Includes transportation from yards.	ECCC 2021
5.3.4	Purchased roundwood delivery emissions (trucking)	Very Good	Good	Annual purchased roundwood production in metric tonnes from all sources (Freehold, Crown License 6 & 7, Other Crown lands, Private lands) multiplied by the litres per metric tonne factor calculated from the Irving roundwood trucking. This factor will be created by dividing the Irving roundwood proforma litres by the delivered Irving roundwood metric tonnes.	ECCC 2021

CATEGORY	EMISSION/ REMOVAL	ACTIVITY DATA QUALITY	EMISSION FACTOR QUALITY	REPORTING OR CALCULATION METHODOLOGY	REFERENCES
5.2.1	Woodlands offices and garages	Very Good	Good	Electricity consumption for Woodlands offices and garages from the Sawmill Site NPRI and Sustainability Report. Electricity consumption by invoice converted to CO_2e using the $kgCO_2/kwh$ by jurisdiction.	ECCC 2021 OFR 2021
5.1.1 5.1.3 5.1.4	Woodlands offices and garages	Very Good	Good	Heating fuel, waste oil, propane, gasoline used in Woodlands offices, fire caches and garages from invoices included in the Sawmill Site NPRI and Sustainability Report	ECCC 2021 OFR 2021
5.1.1	Woodlands mobile equipment	Good	Good	Diesel consumption for graders, tractors, excavators, plows, dump trucks, and gasoline for all Woodlands cars, pickups and light trucks will be summarized invoices. Log loaders will be excluded and included in Sawmill fuel consumption. Data comes from Irving Oil cardlock purchases, reported by purchasing.	ECCC 2021
5.1.1 5.1.4 5.1.7	Other woodlands fuels (Nurseries, aircraft)	Good	Good	Invoiced fossil fuels used in nurseries, tree improvement and seed orchard operations. Invoiced aviation fuels used by Forest Patrol Ltd. for fire protection, monitoring, VIP transport, and herbicide application from invoices. Invoiced, non-Irving Oil deliveries to mobile equipment included (Delivery to Deersdale Freehold).	ECCC 2021
5.1.9	Harvested wood products	Very Good	Good	Emissions from net transfer of HWP in 2020 is the sum of the CO_2e removed in 2020 HWP manufacturing and the emissions of CO_2e from HWP produced in prior years. The density of wood products was calculated using the species level percentages from the Irving forest inventory and tree species specific density factors from Gonzalez 1990 for the forest regions where Irving operates. The Emissions from previous years are estimated following guidance in A3.5.3 referenced and using a modified a simple decay approach from lumber, pulp, paper, corrugated medium and tissue using decay factors in developed from half-life factors in USA 2021 and U.S. A weighted average half-life was produced using solid wood products end use data from USDA 2020. Canadian end use of lumber products is assumed to be the same as US end use. Due to the integrated supply chain, Kraft pulp is used internally in both tissue and paper, so only Kraft pulp sold externally is modeled as pulp. Kraft pulp used internally is modeled in its end use tissue or paper.	ECCC 2020 FAO 2020 USA 2021 USDA 2020 Gonzalez 1990
5.2.1	Other woodlands electricity	Good	Very Good	Other electricity not reported in Sawmills Sustainability reports (e.g., nursery and tree improvement operations) Electricity consumption by invoice converted to CO_2e using $kgCO_2/kwh$ by jurisdiction.	ECCC 2021

CATEGORY	EMISSION/ REMOVAL	ACTIVITY DATA QUALITY	EMISSION FACTOR QUALITY	REPORTING OR CALCULATION METHODOLOGY	REFERENCES
5.3.5 5.3.6 5.3.7	Sawmill Residual Freight and Pellet Freight	Very Good	Fair	Emissions from truck freight for Residual chips, hog fuel, sawdust, shavings, to internal customers and pellet freight to the Port of Belldune. Data source is tonnes of product from Irving internal accounting system and route kilometers converted to tonnes of GHG and using the kg/CO_2e by Tonne-km factor referenced. Note: Freight services may be provided by Sunbury Transport and NBMR. Transportation is out of scope for the FPVC for this analysis, therefore the emission is treated as Scope 3.	EPA 2018
5.3.8	Sawmill Lumber Freight to customers (internal and external)	Very Good	Fair	Emissions from rail and truck freight from Sawmills to final destination (store or distribution centre). Data source is miles of freight by rail or truck from the Mercury Gate freight management system. Shipments of lumber in Mfbm by truck and rail converted to metric tonnes from lumber sales. Tonne-km factor for Kg/CO_2e referenced. Note : Freight services may be provided by Sunbury Transport and NBMR. Transportation is out of scope for the VC for this analysis, therefore the emission is treated as Scope 3.	EPA 2018
5.1.1 5.1.3 5.1.4 5.1.6	Sawmill site emissions	Very Good	Good	In accordance with GHGRP reporting, all sawmill site emissions from burning fossil fuels and biomass fuels are recorded and converted to CO_2e. CO_2 from biomass burning is excluded, but CH_4 and N_2O are included. Woodlands log loaders are included with the Sawmills loaders in this reporting. Other Woodlands fossil fuels from garages and local offices are also included in the Sawmill reporting. Fossil fuel consumption by invoice converted to CO_2e using $kgCO_2/kwh$ by jurisdiction, following the guidance in ECCC 2021 for Canadian operations and OFR 2021 for US operations.	ECCC 2021 OFR 2021
5.2.1	Sawmill Site Emissions	Very Good	Very Good	In accordance with GHGRP reporting, electricity consumption for Sawmill sites from the Sawmill Site NPRI and Sustainability Report. Electricity consumption by invoice converted to CO_2e using $kgCO_2/kwh$ by jurisdiction, following the guidance in ECCC 2021 for Canadian operations and OFR 2021 for US operations.	ECCC 2021 OFR 2021
5.1.1 5.1.3 5.1.4 5.1.6	Pulp and Paper Site Emissions	Very Good	Very Good	In accordance with GHGRP reporting, all pulp and paper site emissions from burning fossil fuels and Biogenic fuels are recorded and converted to CO_2e. CO_2 from Biogenic fuels are excluded, but CH_4 and N_2O are included. Fossil fuel consumption by invoice converted to CO_2e using $kgCO_2/kwh$ by jurisdiction, following the guidance in ECCC 2021 for Canadian operations and OFR 2021 for US operations.	ECCC 2021 OFR 2021
5.2.1	Pulp and Paper Site Emissions	Very Good	Very Good	In accordance with GHGRP reporting, electricity consumption for pulp and paper sites from the Pulp and Paper Site NPRI and Sustainability Report. Electricity consumption by invoice converted to CO_2e using $kgCO_2/kwh$ by jurisdiction, following the guidance in ECCC 2021 for Canadian operations.	ECCC 2021 OFR 2021

CATEGORY	EMISSION/ REMOVAL	ACTIVITY DATA QUALITY	EMISSION FACTOR QUALITY	REPORTING OR CALCULATION METHODOLOGY	REFERENCES
5.1.1 5.1.3 5.1.4 5.1.6	Consumer Products Emissions	Very Good	Very Good	In accordance with GHGRP reporting, all Consumer Products site emissions from burning fossil fuels converted to CO_2e. Fossil fuel consumption by invoice converted to CO_2e using $kgCO_2$/kwh by jurisdiction, following the guidance in ECCC 2021 for Canadian operations and OFR 2021 for US operations.	ECCC 2021 OFR 2021
5.2.1	Consumer Products Emissions	Very Good	Very Good	Electricity consumption for Consumer Products sites from the Consumer Products NPRI and Sustainability Report. Electricity consumption by invoice converted to CO_2e using $kgCO_2$/kwh by jurisdiction, following the guidance in ECCC 2021 for Canadian operations and OFR 2021 for US operations.	ECCC 2021 OFR 2021
5.3.14	Pulp and Paper Chemical Use	Good	Fair	Cradle to gate GHG emissions from chemical purchases in the pulp and paper division for the chemicals referenced are recorded and converted to GHG using the factors provided. Chemical use reported as purchased chemicals converted to dry kilograms. 94 per cent by weight of chemicals used have a factor for emissions.	Tomberlin et al 2020
5.3.9	Pulp and Paper Freight to Customers	Good	Fair	GHG emissions from freight of Kraft pulp, paper, corrugated medium to customers (internal and external). ADMT of Kraft pulp, paper, corrugated medium via rail, truck, and ship by distance. Calculate emissions from factors referenced kg CO_2e/tonne- km. Intermodal assumed to be the same as rail.	EPA 2018
5.3.14	Consumer Products Chemical Use	Good	Fair	Cradle to gate GHG emissions from chemical purchases in Consumer Products for the chemicals listed in Tomberlin et al (2020) are recorded and converted to GHG using the factors provided.	Tomberlin et al 2020
5.3.10	Consumer Products Pulp and parent roll purchases	Very Good	Good	Emissions form purchases of parent rolls from external suppliers in tonnes, using published emissions factors. Pulp and parent roll purchases from the Sustainable Forestry Initiative chain of custody reporting. Emissions factors for parent roll purchases from Table 7 referenced.	Tomberlin et al 2020
5.3.10	Consumer Products Pulp purchases	Very Good	Fair	Emissions form purchases of eucalyptus pulp from external suppliers in tonnes, using emission factor from unpublished source. Pulp from the Sustainable Forestry Initiative chain of custody reporting. Comparative Life Cycle Assessment of J.D. Irving, Limited (JDI) Northern Softwood and Hardwood Pulp and Selected Alternative Pulp Fibers for Premium Tissue Making.	Ayer and Laurin 2020
5.3.11	Consumer Products Freight to Customers (internal)	Very Good	Fair	Parent roll transportation between Tissue mills. Parent roll usage from the Sustainable Forestry Initiative chain of custody reporting. Calculate emissions from factors referenced. Freight is by truck.	EPA 2018

CATEGORY	EMISSION/ REMOVAL	ACTIVITY DATA QUALITY	EMISSION FACTOR QUALITY	REPORTING OR CALCULATION METHODOLOGY	REFERENCES
5.1.3	Corporate Head Office Fuels	Good	Good	Fuels used in heating office buildings allocated for Pulp & Paper, Sawmills, Woodlands, Consumer Products, and a proportion of corporate services used in the supply chain for Saint John and Moncton head offices.	ECCC 2021 OFR 2021
5.2.2	Corporate Head Office Electricity	Good	Very Good	Electricity consumption by invoice converted to CO_2e using $kgCO_2$/kwh by jurisdiction, following the guidance in ECCC 2021	ECCC 2021 OFR 2021
5.1.8 5.3.12	Corporate Air Travel	Good	Good	Corporate air travel in the forestry operations supply chain – both commercial and corporate flights.	ECCC 2021
5.3.13	Employee commuting	Good	Fair	Emissions estimated for employee commuting using the number of employees in the supply chain minus the number of company vehicles (Scope 1) and the assumption that each employee vehicle is used only for work commuting, calculating the emissions as referenced for per vehicle per year of 4.6 metric tonnes CO_2e per vehicle for 5/7 days per week.	EPA 2018-2
5.3.15	Waste disposal	Good	Good	Tonnes of commercial/industrial waste disposed of in a landfill.	Ecometrica 2021
5.3.16	Capital Goods Purchased	Good	Fair	Cradle to gate emissions from upstream supply chain purchases of capital goods for manufacturing facilities using annual spending and referenced kg/CO_2e per USD spent (2018) factor for sector 3332 – Machinery for the paper, textile, food, and other industries (except semiconductor manufacturing). Industry sector selected following (US Census Bureau 2021) “3332 Industrial Machinery Manufacturing: This industry comprises establishments primarily engaged in manufacturing industrial machinery, such as food and beverage manufacturing machinery, semiconductor manufacturing machinery, sawmill and woodworking machinery (except handheld), machinery for making paper and paper products, printing and binding machinery and equipment, textile making machinery, and machinery for making plastics and rubber products.”	EPA 2020 USCB 2021 BOC 2021 USBLS 2021
5.3.17	Consumable goods and services purchased	Good	Fair	Cradle to gate emissions from upstream supply chain purchases of consumable goods (parts, wear items, etc.) using annual spending and referenced kg/CO_2e per USD spent (2018) factor for sector 4238 (EPA 2021). Industry sector selected following (US Census Bureau 2021) “Machinery, Equipment, and Supplies Merchant Wholesalers: This industry group comprises establishments primarily engaged in the merchant wholesale distribution of construction, mining, farm, garden, industrial, service establishment, and transportation machinery, equipment, and supplies.” Services sector (US Census Bureau 2021) sector 8113 “Commercial and Industrial Machinery and Equipment Repair and Maintenance”. “Fertilizers” and “Pesticides” factors used to convert Woodland’s nursery and Forest Management use of chemicals.	EPA 2020 USCB 2021 BOC 2021 USBLS 2021

CATEGORY	EMISSION/ REMOVAL	ACTIVITY DATA QUALITY	EMISSION FACTOR QUALITY	REPORTING OR CALCULATION METHODOLOGY	REFERENCES
5.3.18	Upstream emissions from purchased fuels	Good	Fair	Emissions associated with the upstream extraction and distribution of Scope 1 fuels and Scope 2 electricity. Fuel volumes and electricity are converted to GJ using GHGenius and application of upstream emissions factors form GHGenius for High Heating Value and emissions from the upstream fuel cycle. The percentage of fuel for each electrical grid was determined and emissions for upstream electricity fuels calculated.	ECCC 2021 EPA 2020 GHGenius 2021
5.3.19	Upstream and downstream leased assets	Very Good	Fair	Cradle to gate emissions from upstream (office space) and downstream (warehousing) assets. Using annual spending from financial statements spending and referenced kg/CO_2e per USD spent (2018) factor for sector 493 "Warehousing and Storage" and sector 531 rental of "Other Real Estate".	EPA 2020 USCB 2021 BOC 2021 USBLS 2021

APPENDIX C: QUANTIFICATION OF HWP AND NET FOREST GROWTH REMOVAL

C.1. HARVESTED WOOD PRODUCTS

TABLE C.1 REFERENCE HALF-LIFE (YEARS) FOR HWP

FOREST PRODUCT	HALF-LIFE (YEARS)
Wood in Single Family Houses – 1960-1979	81.9
Wood in Single Family Houses – 1980 +	83.9
Multi-Family and Non- Residential (per cent of single family)	0.61
Renovations and Remodeling (per cent of single family)	0.30
Other Sawnwood – USA	38
Pulp and Paper - Canada	2
Pulp and Paper – USA	3

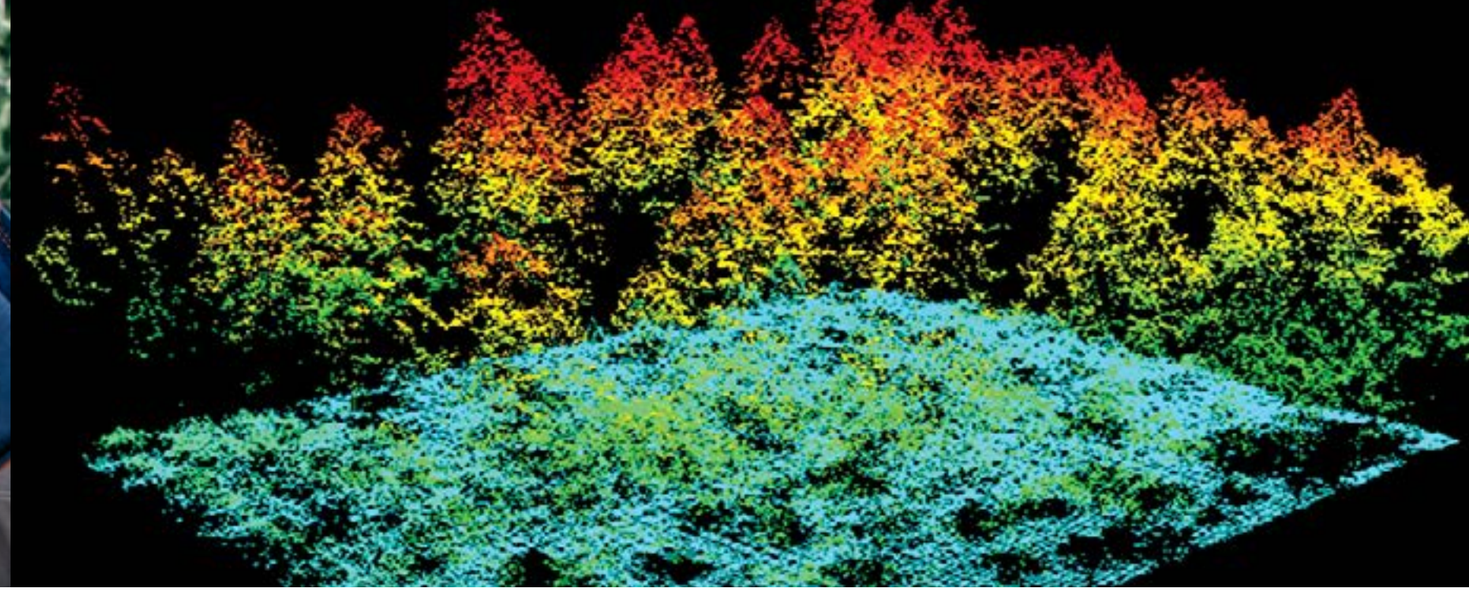
TABLE C.2 CALCULATED HALF-LIFE (YEARS) USED FOR HWP

FOREST PRODUCT	HALF-LIFE USED (YEARS)
Lumber (Pre-1980)	51.42
Lumber (Post-1980)	48.49
Kraft Pulp	2.90
Corrugated Medium	2.50
Paper	2.87
Tissue	2.50

TABLE C.3 DATA QUALITY ASSESSMENT FOR UNCERTAINTY ANALYSIS

UNCERTAINTY	QUALITY
Activity Data	Very Good to Good
Emissions Factor Data	Good to Fair

Saint Leonard, NB



C.2. PRODUCING AN ENHANCED FOREST INVENTORY

Light Detection and Ranging (LiDAR) has been transformative technology for forest inventory. Airborne scanning LiDAR, referred to as Airborne Laser Scanning (ALS) data has become a valuable source of information for enhanced forest inventories (EFIs), providing accurate measurements of tree heights and detailed characterizations of forest vertical structure. This ALS- derived information is subsequently used in conjunction with spatially accurate ground plot measurements in an Area-Based Approach (ABA) to model forest inventory attributes such as mean height, basal area, and volume. Not all required inventory attributes (e.g., tree species, age) can be derived from ALS data, however ALS-based EFIs enable greater detail, accuracy, and precision for a range of attributes when compared to conventional inventory systems.

Irving acquired its first ALS data set in 2013. Irving produced its first wall to wall area-based inventory at a 20 m x 20 m (400 m2) resolution in 2017.

EFI was produced based on a network of spatially accurate ground plots known as Continuous Land Inventory (CLI) plots. Plots are distributed to be representative of the landscape and sample a range of conditions. Once the plot measurements are completed, the data is summarized to describe standing forest inventory (tree height, basal area, live crown, merchantable volume, tree size, etc.) using the Open Stand Model (OSM).

Model training data is produced by matching the calibration plot summaries with their associated LiDAR statistics. Machine learning algorithms (or Random Forest Models) are produced using this training data. Percent variance is reported as an indicator of model performance.

Once the computer algorithms are produced, LiDAR statistics are extracted for each 400 m2 cell across the forest land base. The algorithms are then applied across the entire land base to produce wall to wall forest metric predictions.

C.3. UPDATING THE FOREST INVENTORY

While LiDAR derived EFI provides a wealth of forest inventory metrics, it does not provide species or age. The former is addressed through more conventional inventory methods based on interpretation of aerial photography. This interpretation is on a 10-year refresh cycle. Age or more specifically change due to harvesting and silviculture activity between refresh cycles is addressed through annual updates. The footprint of harvest and silviculture operations occurring throughout each year are collected digitally via satellite imagery and their attributes and spatial configurations are used to update the GIS hosted forest inventory.

How the forest changes over time through growth and mortality is determined by creating projections (yield curves) which use today's forest inventory description as a starting point. Specifically, we use the Open Stand Model (OSM) and based on the US Forest Service Forest Vegetation Simulator (FVS).

OSM is an individual tree growth simulation model calibrated for the Acadian Forest using an extensive library of sample plots and individual tree measurements.

C.4. PRODUCING CARBON YIELDS USING CBM-CFS3

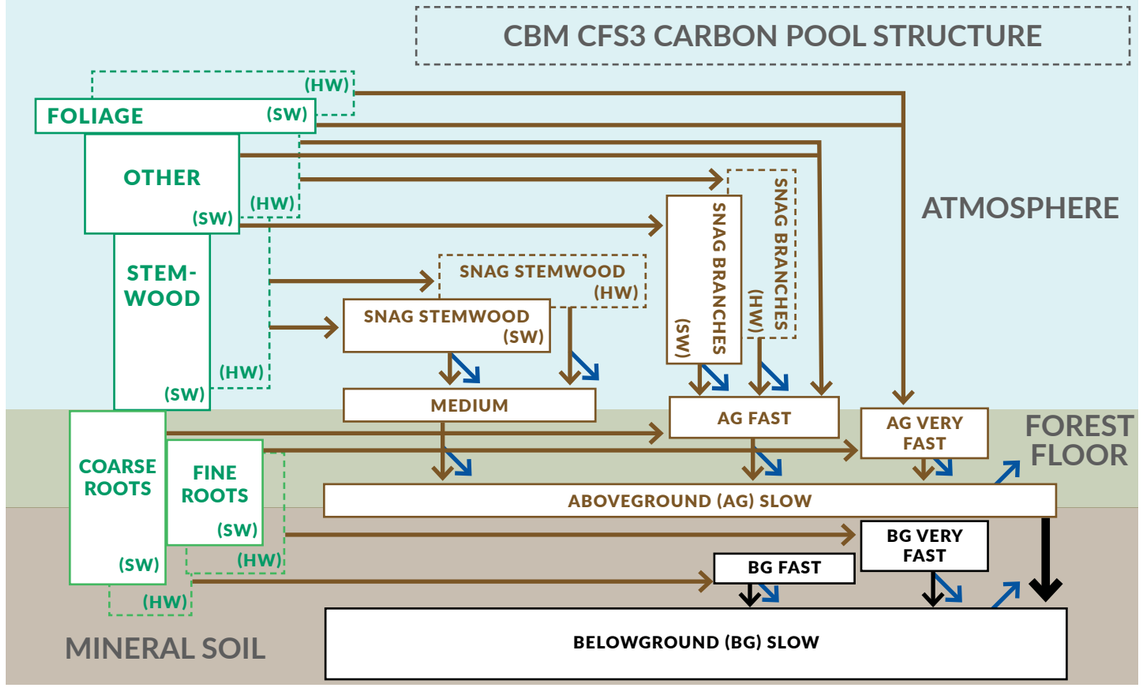
Carbon yields were produced using the Carbon Budget Model of the Canadian Forest Sector (CBM-CFS3). This is an operational scale aspatial modeling framework that simulates the dynamics of the forest sector carbon stocks: above and below ground biomass, litter and dead wood, soil, and organic carbon. The model applies carbon estimation methods outlined in the Intergovernmental Panel on Climate Change (IPCC).

The CBM-CFS3 requires aspatial forest inventory data including the following:

- Inventory of key development types by leading species and average age
- Merchantable growth and yield curves for each key development type
- Land use change information
- Transition matrices
- Natural disturbance information

The carbon pools modeled in CBM-CFS3 are outlined below. Arrows show the direction of transfer from one pool to another including the atmosphere, starting with softwood (SW) and hardwood (HW) trees. The general rate of decay is indicated (from very fast to slow) for the pool.

FIGURE 10. CBM-CFS3 CARBON POOLS AND FLOW



C.5. CALCULATING ANNUAL CARBON STOCK CHANGE

To calculate the change in carbon stocks from T-0 (end of 2019) to T-1 (end of 2020) requires 3 calculations:

- Forest inventory at the end of 2019
- Annual growth to the end of 2020
- Depletion (harvest) to the end of 2020

Forest inventory at the end of 2019 is calculated by summing up the CBM yield curve estimates for each development type at the assigned age. Once all transitions and age assignments are applied, the carbon stocks by pool from the CBM model are summed across all development types to produce the inventory at the end of 2019.

Annual growth to the end of 2020 requires incrementing the age for each cell by 1 year. This moves each development type along its corresponding CBM yield curve one year. The growth in carbon stocks by pool to the end of 2020 can now be summed across all development types.

To determine depletion, each cell in our forest inventory that was harvested during the 2020 calendar year, either clear cut or partial cut, is identified through our satellite change detection process. This change detection was validated through GPS (Global Positioning System) data and scale data from our woodlands information system. Harvested cells were then transitioned depending on the type of harvest activity.

After harvested cells have been identified and transitioned, the depletion of carbon stocks by pool to the end of 2020 can now be summed across all development types. The final step is to subtract depletion from growth to produce the change in carbon stocks by pool from the end of 2019 to the end of 2020.

C.6 UNCERTAINTY

Table C.4 below summarizes the general uncertainty used in the pedigree matrix approach. Some slight modifications were used from these general summaries based on expert opinion within the uncertainty tool. However, if data was measured by LiDAR, it was considered very good. If it was estimated from traditional sampling methods, it was not considered very good. The other biomass (above and below ground) was estimated from the merchantable volume, so the activity data quality is reduced. Estimates made from measured data were considered better than estimates from sampled data. Similarly, the dead organic matter (DOM) is estimated and was not considered as good as other biomass. Emissions factors are national factors from the CBM-CFS3 model and are considered good.

TABLE C.4 ACTIVITY DATA QUALITY ASSESSMENT FOR UNCERTAINTY ANALYSIS

POOL	COMMENT	ACTIVITY DATA QUALITY	EMISSIONS FACTOR QUALITY
NB Freehold Merchantable	Measured with LiDAR	Very Good	Good
ME Freehold Merchantable	Measured with LiDAR	Very Good	Good
NS Freehold Merchantable	Sampled data	Very Good, Good, Poor	Good
NB Other Biomass	Estimated from measured data	Very Good, Good	Good
ME Other Biomass	Estimated from measured data	Very Good, Good	Good
NS Other Biomass	Estimated from sampled data	Very Good, Good, Fair	Good
NB DOM	Estimated from measured data	Very Good, Good, Fair	Good
ME DOM	Estimated from measured data	Very Good, Good, Fair	Good
NS DOM	Estimated from sampled data	Very Good, Good, Poor	Good
License 7 Merchantable	Measured with LiDAR	Very Good	Good
License 7 Other biomass	Estimated from measured data	Good	Good
License 7 DOM	Estimated from measured data	Fair	Good

PAS2060 DECLARATION OF CARBON NEUTRAILTY - 2020 QUALIFYING EXPLANATORY STATEMENT

C.7. BIBLIOGRAPHY OF REFERENCES FOR CALCULATING THE NET FOREST GROWTH AND LAND USE EMISSIONS

Erdle T., MacLean D.A. 1999. Stand growth model calibration for use in forest pest impact Assessment. January/February1999, Vol. 75, No. 1, The Forestry Chronicle Downloaded from pubs.cif-ifc.org by 198.73.125.180 on 10/12/21

Hennigar, C. 2019. Ground-plot Calculations for LIDAR-Based Forest Inventory Calibration in New Brunswick. Unpublished internal document for the New Brunswick Department of Energy and Resource Development.

Hennigar C., Weiskittel A., Allen H.L., MacLean D.A. 2017. Development and evaluation of a biomass increment-based index for site productivity. Can. J. For. Res. 47: 400–410 (2017) dx.doi.org/10.1139/cjfr-2016-0330

Kull S.J., Rampley G.J., Morken S., Metsaranta J., Neilson E.T., Kurz W.A. 2019. OPERATIONAL-SCALE CARBON BUDGET MODEL OF THE CANADIAN FOREST SECTOR (CBM-CFS3) VERSION 1.2: USER'S GUIDE. Canadian Forest Service Northern Forestry Centre. https://d1ied5g1xfgpx8.cloudfront.net/pdfs/39768.pdf

Lamb SM, MacLean DA, Hennigar CR, Pitt DG. Forecasting Forest Inventory Using Imputed Tree Lists for LiDAR Grid Cells and a Tree-List Growth Model. Forests. 2018; 9(4):167. https://doi.org/10.3390/f9040167

Li, Rongxia, Weiskittel, Aaron, Dick, Adam, Kershaw, John, Seymour, Robert. 2012. Regional Stem Taper Equations for Eleven Conifer Species in the Acadian Region of North America: Development and Assessment. Northern Journal of Applied Forestry

New Brunswick Department of Natural Resources. 2015. NBDNR Enhanced Forest Inventory Data Collection Protocols. Unpublished.

Pitt, D. 2018. 2018 EFI JDI In-House Rebuild. A report prepared for J.D. Irving Limited, on behalf of the 2018 EFI Rebuild Team. Unpublished.

White, J.C.; Wulder, M.A.; Varhola, A.; Vastaranta, M.; Coops, N.C.; Cook, B.D.; Pitt, D.; Woods, M . 2013. A best practice guide for generating forest inventory attributes from airborne laser scanning data using an area-based approach. Natural Resources Canada, Canadian Forest Service, Canadian Wood Fibre Centre, Victoria, BC. Information Report FI-X-010 https://cfs.nrcan.gc.ca/publications?id=34887

White, J.C.; Tompalski, P.; Vastaranta, M.; Wulder, M.A.; Saarinen, S.; Stepper, C.; Coops, N.C. 2017. A model development and application guide for generating an enhanced forest inventory using airborne laser scanning data and an area-based approach. CWFC Information Report FI-X-018, 38 pp. https://cfs.nrcan.gc.ca/publications?id=38945

Weiskittel A., Kershaw J., Crookston N., Hennigar C. 2017. The Acadian Variant of the Forest Vegetation Simulator: Continued Development and Evaluation. Forest Service Southern Research Station e-General Technical Report SRS-224, September 2017

APPENDIX D: EMISSIONS/(REMOVALS) DETAIL

TABLE D.1 DIRECT AND INDIRECT EMISSIONS

DIVISION	EMISSIONS	SCOPE	MTONS	%
Woodlands	Direct Fuels	1	6,588	0.4%
Sawmills/Woodlands	Direct Fuels	1	25,028	1.5%
Pulp and Paper	Direct Fuels	1	165,710	9.7%
Consumer Products	Direct Fuels	1	192,989	11.3%
All	Air travel (Corporate)	1	190	0.0%
Head Office	Direct Fuels	1	279	0.0%
Sub Total: Scope 1			**390,784**	**22.8%**
Head Office	Electricity	2	276	0.0%
Woodlands	Electricity	2	453	0.0%
Sawmills/Woodlands	Electricity	2	52,399	3.1%
Pulp and Paper	Electricity	2	323,093	18.8%
Consumer Products	Electricity	2	128,556	7.5%
Sub Total: Scope 2			**504,777**	**29.4%**
Woodlands	Wood procurement	3	123,316	7.2%
Sawmills/Woodlands	Woodlands rail freight	3	4,972	0.3%
Sawmill	Residue freight	3	39,241	2.3%
Sawmill	Freight to customers	3	43,148	2.5%
Sawmill	Pellet freight to port	3	6,743	0.4%
Pulp and Paper	Freight to customers	3	127,424	7.4%
Pulp and Paper	Chemicals	3	60,364	3.5%
Consumer Products	Chemicals	3	6,005	0.4%
Consumer Products	Finished goods to customers	3	25,762	1.5%
Consumer Products	Internal freight	3	8,256	0.5%
Consumer Products	Pulp and parent roll purchases	3	95,292	5.6%
All	Air Travel and Rentals	3	594	0.0%
All	Capital spending	3	120,420	7.0%
All	Supply chain consumables	3	21,102	1.2%
All	Employee commuting	3	11,881	0.7%
All	Upstream fuel emissions	3	101,393	5.9%
All	Leased assets (warehousing)	3	15,720	0.9%
All	Waste disposal	3	7,225	0.4%
Sub Total: Scope 3			**818,858**	**47.8%**
TOTAL EMISSIONS: SCOPE 1, 2 AND 3			**1,714,419**	**100%**

PAS2060 DECLARATION OF CARBON NEUTRAILTY - 2020 QUALIFYING EXPLANATORY STATEMENT

TABLE D.2 HWP TRANSFER AND NET FOREST GROWTH EMISSIONS/(REMOVALS) DETAIL

DIVISION	TRANSFER / EMISSION	MTONS
Sawmill	HWP – Lumber	(441,977)
Pulp and Paper	HWP – Kraft pulp	23,510
Pulp and Paper	HWP – Corrugating medium	(14,827)
Pulp and Paper	HWP – Paper	224
Consumer Products	HWP – Tissue Products	(154,464)
Sub-Total: Transfer to HWP		**(587,532)**
Woodlands – Freehold	Softwood Merchantable Emission/(Removal)	(1,207,287)
Woodlands – Freehold	Hardwood Merchantable Emission/(Removal)	(244,900)
Woodlands – Freehold	Other Biomass Emission/(Removal)	(1,762,961)
Woodlands – Freehold	DOM Emission/(Removal)	879,865
Sub-Total: Net Forest Growth and Land Use – Freehold		**(2,335,282)**
Total: HWP transfer plus Net Forest Growth Emissions/(Removals)		**(2,922,814)**
Woodlands – License 7	Softwood Merchantable Emission/(Removal)	(1,367,441)
Woodlands – License 7	Hardwood Merchantable Emission/(Removal)	(389,338)
Woodlands – License 7	Other Biomass Emission/(Removal)	(1,920,718)
Woodlands – License 7	DOM Emission/(Removal)	1,228,829
Sub Total: Net Forest Growth (Crown License 7)*		**(2,448,668)**

*Crown License 7 emissions/(removals) are shown for transparency. These emissions/(removal) are not counted in the declaration of carbon neutrality.

TABLE D.3 BIOGENIC CO_2 EMISSIONS DETAIL

DIVISION	BIOGENIC EMISSION	MTONS CO_2
Sawmill	Waste Bark (Hog Fuel)	436,937
Pulp and Paper	Waste Bark (Hog Fuel)	253,677
Pulp and Paper	Pulping Liqour	844,889
Pulp and Paper	Biogas	15,988
Total: Biogenic CO_2		**1,551,491**

APPENDIX E: REFERENCES

Ayer, Nathan., Laurin, Lise. (2020). Comparative Life Cycle Assessment of J.D. Irving, Limited (JDI) Northern Softwood and Hardwood Pulp and Selected Alternative Pulp Fibers for Premium Tissue Making (unpublished).

Bank of Canada (BOC). (Accessed May 20, 2021) https://www.bankofcanada.ca/rates/exchange/annual-average-exchange-rates/

Cameron R.E., Hennigar, C.R., MacLean, D.A., Adams, G.W., Erdle, T.A. 2013. A Comprehensive Greenhouse Gas Balance for a Forest Company Operating in Northeast North America. Journal of Forestry. http://dx.doi.org/10.5849/jof.12-043

Domke, Grant M.; Walters, Brian F.; Nowak, David J.; Smith, James, E.; Ogle, Stephen M.; Coulston, J.W.; Wirth, T.C. (2020). Greenhouse gas emissions and removals from forest land, woodlands, and urban trees in the United States, 1990-2018. Resource Update FS-227. Madison, WI: U.S. Department of Agriculture, Forest Service, Northern Research Station. 5 p. https://doi.org/10.2737/FS-RU-227

Ecoinvnet 2007. Overview and Methodology https://ecoinvent.org/wpcontent/uploads /2020/08/200712_Frischknecht_jungbluth _overview_ methodology_ecoinvent2.pdf

Ecometrica https://emissionfactors.com/ef/search Accessed September 3, 2021

Environment and Climate Change Canada (2021). TECHNICAL GUIDANCE ON REPORTING GREENHOUSE GAS EMISSIONS – 2020 DATA http://publications.gc.ca/collections/collection_2021/eccc/En81-29-2020-eng.pdf

Environment and Climate Change Canada (2020). National Inventory Report 1990–2018: Greenhouse Gas Sources and Sinks in Canada Annual 1990/2020. Part 2 http://publications.gc.ca/collections/collection_2020/eccc/En81-4-2018-2-eng.pdf

https://publications.gc.ca/collections/collection_2020/eccc/En81-4-2018-3-eng.pdf

Environmental Protection Agency (2021). Sub-Chapter 3 Air Programs – Part 98 Mandatory Greenhouse Gas Reporting. Accessed via e-CFR. https://www.ecfr.gov/cgi-bin/text-idx?c=ecfr&SID=be77ce6e756f0befaa0dd95743e3342e&tpl=/ecfrbrowse/Title40/40cfr98_main_02.tpl

Environmental Protection Agency. 2020. eGRID Summary Tables.

https://www.epa.gov/sites/default/files/2020-01/documents/egrid2018_summary_tables.pdf

Environmental Protection Agency (2018). Emissions Factors for Greenhouse Gas Inventories. https://www.epa.gov/sites/production/files/2018-03/documents/emission-factors_mar_2018_0.pdf

Environmental Protection Agency (2018-2). Greenhouse Gas Emissions from a Typical Passenger Vehicle. https://www.epa.gov/greenvehicles/greenhouse-gas-emissions-typical-passenger-vehicle

FAO, ITTO and United Nations. 2020. Forest product conversion factors. Rome. https://doi.org/10.4060/ca7952en

Forest Stewardship Council. 2015. FSC Principles and Criteria for Forest Stewardship. Document reference code: FSC-STD-01-001 V5-2

Gonzalez, J.S. 1990. Wood Density of Canadian Tree Species. For. Can., Northwest Reg., North For. Cent., Edmonton, Alberta. In£. Rep. NOR-X-31 5.

International Panel on Climate Change. 2019: Climate Change and Land: an IPCC special report on climate change, desertification, land degradation, sustainable land management, food security, and greenhouse gas fluxes in terrestrial ecosystems [P.R. Shukla, J. Skea, E. Calvo Buendia, V. Masson-Delmotte, H.-O. Pörtner, D. C. Roberts, P. Zhai, R. Slade, S. Connors, R. van Diemen, M. Ferrat, E. Haughey, S. Luz, S. Neogi, M. Pathak, J. Petzold, J. Portugal Pereira, P. Vyas, E. Huntley, K. Kissick, M. Belkacemi, J. Malley, (eds.)]. https://www.ipcc.ch/site/assets/uploads/2019/11/SRCCL-Full-Report-Compiled-191128.pdf

International Panel on Climate Change. 2003. Good Practice Guidance for Land Use, Land-Use Change and Forestry IPCC National Greenhouse Gas Inventories Programme UNEP Edited by Jim Penman, Michael Gytarsky, Taka Hiraishi, Thelma Krug, Dina Kruger, Riitta Pipatti, Leandro Buendia, Kyoko Miwa, Todd Ngara, Kiyoto Tanabe and Fabian Wagner https://www.ipcc-nggip.iges.or.jp/public/gpglulucf/gpglulucf_files/ Chp3/Chp3_1_Introduction.pdf

International Panel on Climate Change. 2006. 2006 IPCC Guidelines for National Greenhouse Gas Inventories. Chapter 12: Harvested Wood Products. https://www.ipcc-nggip.iges.or.jp /public/2006gl/pdf/4_Volume4/V4_12_Ch12_HWP.pdf

J.D. Irving, Limited. 2021. Forest Products Sustainability Report. www.jdirvingsustainability.com

National Archives and Records Administration's Office of the Federal Register (OFR) - Electronic Code of Federal Regulations (e-CFR) (2021). https://www.ecfr.gov/cgi-bin/text-idx?c= ecfr&SID=be77ce6e756f0befaa0dd95743e3342e&tpl= /ecfrbrowse/Title40/40cfr98_main_02.tpl

GHGenius https://www.ghgenius.ca/index.php/downloads/64-ghgenius-5-01e (Accessed September 30, 2021

Greenhouse Gas Protocol. 2011. Quantitative Inventory Uncertainty. https://ghgprotocol.org/calculation-tools

Greenhouse Gas Protocol. 2011. Calculation Tools. https://ghgprotocol.org/calculation-tools

Steenberg, James. 2022. Personal Communication. Resource Analyst, Nova Scotia Department of Natural Resources and Renewables.

Tomberlin, K.E., Venditti, R., Yuan, Y. (2020). "Life Cycle Carbon Footprint Analysis of Pulp and Paper Grades in the United States Using Production-line-based Data and Integration. BioResources 15(2) 3899-3914. https://bioresources.cnr.ncsu.edu/resources/life-cycle-carbon-footprint-analysis-of-pulp-and-paper-grades-in-the-united-states-using-production-line-based-data-and-integration/

United States of America. 2021. National Inventory Report. Annexes to the Inventory of U.S. GHG Emissions and Sinks. (Accessed September 9, 2021) https://unfccc.int/documents/272415

U.S. Bureau of Labor Statistics (USBLS) (Accessed May 20, 2021). Change in CPI December 2018-December 2020. https://www.bls.gov/data/inflation_calculator.htm

United States Census Bureau. North American Industry Classification System. (Accessed May 17, 2021). https://www.census.gov/naics/?input=4238&year=2017&details=4238, https://www.census.gov/naics/?input=3332&year=2012&details=33324, https://www.census.gov/naics/?input=3365&year=2017&details=3365, https://www.census.gov/naics/?input=23&year=2017&details=2373 https://www.census.gov/naics/?input=8113&year=2017

United States Department of Agriculture (2020). "Status and Trends for the U.S. Forest Products Sector" (Accessed September 2, 2021). https://www.srs.fs.usda.gov/pubs/gtr/gtr_srs258.pdf

U.S. EPA Office of Research and Development (Last Modified May 5, 2020) Supply Chain Emissions Factors for US Industries and Commodities. https://pasteur.epa.gov/uploads/ 10.23719/1517796/SupplyChainEmissionFactorsforUSIndustriesCommodities.xlsx

Ward, Chris (2021). Personal Communication. Assistant Deputy Minister, New Brunswick Department of Natural Resources and Energy Development.

World Resources Institute (2011). "Corporate Value Chain (Scope 3) Accounting and Reporting Standard. Supplement to the GHG Protocol Corporate Accounting and Reporting Standard. https://ghgprotocol.org/sites/default/files/standards/Corporate-Value-Chain-Accounting-Reporing-Standard_041613_2.pdf

APPENDIX F: QUALIFYING EXPLANATORY STATEMENT CHECKLIST

TABLE F.1 CHECKLIST FOR QES SUPPORTING DECLARATION OF COMMITMENT TO CARBON NEUTRALITY

#	ITEMS	STATUS	SECTION IN THE QES
1	Identify the individual responsible for the evaluation and provision of data necessary for the substantiation of the declaration including that of preparing, substantiating, communicating, and maintaining the declaration.	✓	3.0
2	Identify the entity responsible for making the declaration.	✓	Executive Summary
3	Identify the subject of the declaration.	✓	3.0
4	Explain the rationale for the selection of the subject. (The selection of the subject should ideally be based on the broader understanding of the entire carbon footprint of the entity so that the carbon footprint of the selected subject can be seen in context; entities need to be able to demonstrate that they are not intentionally excluding their most significant GHG emissions (or alternatively can explain why they have done so)).	✓	3.0
5	Define the boundaries of the subject.	✓	4.0
6	Identify all characteristics (purposes, objectives, or functionality) inherent to that subject.	✓	3.1
7	Identify and take into consideration all activities material to the fulfilment, achievement, or delivery of the purposes, objectives, or functionality of the subject.	✓	5.0
8	Select which of the 3 options within PAS2060 you intend to follow.	✓	3.0
9	Identify the date by which the entity plans to achieve the status of “carbon neutrality” of the subject and specify the period for which the entity intends to maintain that status.	✓	3.0
10	Select an appropriate standard and methodology for defining the subject, the GHG emissions associated with that subject and the calculation of the carbon footprint of the defined subject.	✓	6.3
11	Provide justification for the selection of the methodology chosen. (The methodology employed shall minimize uncertainty and yield accurate, consistent, and reproducible results.	✓	6.3
12	Confirm that the selected methodology was applied in accordance with its provisions and the principles set out in PAS2060.	✓	1.0

#	ITEMS	STATUS	SECTION IN THE QES
13	Describe the actual types of GHG emissions, classification of emissions (Scope 1, 2, or 3) and the size of the carbon footprint of the subject exclusive of any purchases of carbon offsets.	✓	6.0
	a. All greenhouse gases shall be included and converted to tCO_2e	✓	6.0
	b. 100 per cent of the Scope 1 (direct) emissions relevant to the subject shall be included when determining the carbon footprint.	✓	5.1
	c. 100 per cent of the Scope 2 (indirect) emissions relevant to the subject shall be included when determining the carbon footprint.	✓	5.2
	d. Where estimates of GHG emissions are used in the quantification of the subject carbon footprint (particularly when associated with Scope 3 emissions) these shall be determined in a manner that precludes underestimation.	✓	6.3
	e. Scope 1, 2 or 3 emissions sources estimated to be more than 1 per cent of the total carbon footprint shall be taken into consideration unless evidence can be provided to demonstrate that such quantification would not be technically feasible or cost effective. (Emissions sources estimated to constitute less than 1 per cent may be excluded on that basis alone).	✓	6.6
	f. The quantified carbon footprint shall cover at least 95 per cent of the emissions from the subject.	✓	6.6
	g. Where a single source contributes more than 50 per cent of total emission, the 95 per cent threshold applies to the remaining sources of emissions.	N/A	N/A
	h. Any exclusion and the reason for that exclusion shall be documented.	✓	6.6
14	Where the subject is an organization/company or part thereof, ensure that:		
	a. Boundaries are a true and fair representation of the organizations GHG emissions (i.e., shall include all GHG emission relating to the core operations including subsidiaries owned and operated by the organization). It will be important to ensure claims are credible – so if an entity chooses a very narrow subject and excludes its carbon intensive activities or if it outsources its carbon intensive activities, then this needs to be documented.	✓	5.0
	b. Either the equity share or control approach has been used to define which GHG emissions are included. Under the equity share approach, the entity accounts for GHG emissions from the subject according to its share of the equity in the subject. Under the control approach, the entity shall account for 1005 of the GHG emissions over which it has financial and/or operational control.	✓	3.0

#	ITEMS	STATUS	SECTION IN THE QES
15	Identify if the subject is part of an organization or a specific site or location and treat it as a discrete operation with its own purpose, objectives, and functionality.	✓	3.0
16	Where the subject is a product or service, include all Scope 3 emissions (as the lifecycle of the product/service needs to be taken into consideration).	N/A	N/A
17	Describe the actual methods used to quantify GHG emissions (e.g., use the primary or secondary data), the measurement unit(s) applied, the period of application and the size of the resulting carbon footprint. (The carbon footprint shall be based as far as possible on primary activity data.) Where quantification is based on calculations (e.g., GHG activity data multiplied by greenhouse gas emissions factors or the use of mass balance/lifecycle models) then GHG emissions shall be calculated using emission factors from national (Government) publications. Where such factors are not available, international or industry guidelines shall be used. In all cases the sources of such data shall be identified.	✓	6.3
18	Provide details of and explanations for the exclusion of any Scope 3 emissions.	✓	6.6
19	Document all assumptions and calculations made in quantifying the GHG emissions and in the selection or development of greenhouse gas emissions factors. (Emissions factors used shall be appropriate to the activity concerned and current at the time of quantification).	✓	Appendix B
20	Document your assessments of uncertainty and variability associated with defining boundaries and quantifying GHG emissions including the positive tolerances adopted in association with emissions estimates. (The statement could take the form of a qualitative description regarding the uncertainty of the results, or a quantitative assessment of uncertainty if available (e.g., carbon footprint based on 95 per cent of greenhouse gas emissions: primary sources are subject to variation over time; footprint is best estimate based on reasonable costs of evaluation)).	✓	6.7
21	Document carbon footprint management plan:		7.0
	a. Make a statement of commitment to carbon neutrality for the defined subject.	✓	7.1
	b. Set timescales for achieving carbon neutrality for the defined subject.	✓	Already Achieved
	c. Specify targets for GHG reduction for the defined subject appropriate to the timescale for achieving carbon neutrality including the baseline date, the first qualification date and the first application period.	✓	Already Achieved
	d. Document the planned means of achieving and maintaining GHG emissions reductions including assumptions made and any justification of the techniques and measures to be employed to reduce GHG emissions.	✓	7.3
	e. Specify the offset strategy including an estimate of the quantity of GHG emissions to be offset, the nature of the offsets and the likely number and type of credits.	✓	7.4

PAS2060 DECLARATION OF CARBON NEUTRAILTY - 2020 QUALIFYING EXPLANATORY STATEMENT

#	ITEMS	STATUS	SECTION IN THE QES
22	Implement a process for undertaking periodic assessments of performance against the Plan and for implementing corrective action to ensure targets are achieved. The frequency of assessing performance against the Plan should be commensurate with the timescale for achieving carbon neutrality.	✓	7.2
23	Where the subject is a non-recurring event such as weddings or concert, identify ways of reducing GHG emissions to the maximum extent commensurate with the enabling of the event to meet its intended objectives before the event takes place and include post event review to determine whether the expected minimization in emissions has been achieved.	N/A	N/A
24	For any reductions in the GHG emissions from the defined subject delivered in the period immediately prior to the baseline date and not otherwise considered in any GHG emissions quantification (historic reductions), confirm: • The period from which these reductions are to be included; • That the required data is available and that calculations have been undertaken using the same methodology throughout; • That the assessment of historic reduction has been made in accordance with this PAS, reporting the quantity of historic reductions claimed in parallel with the report of total reduction.	N/A	N/A
25	Record the number of times that the declaration of commitment has been renewed without declaration of achievement.	✓	1.0
26	Specify the type of conformity assessment: a. Independent third-party certification b. Other party validation c. Self-validation	✓	3.0
27	Include statements of validation where declarations of commitment to carbon neutrality are validated by a third-party certifier or second party organizations.	✓	1.0
28	Date the QES and have it signed by the senior representative of the entity concerned (e.g., CEO of a corporation; Divisional Director, where the subject is a division of a larger entity; the Chairman of a town council or head of the household or family group).	✓	1.0
29	Make QES publicly available and provide a reference to any freely accessible information upon which substantiation depends (e.g., via websites)	✓	1.0
30	Update the QES to reflect changes and actions that could affect the validity of the declaration of commitment to carbon neutrality.	✓	1.0

TABLE F.2 CHECKLIST FOR QES SUPPORTING DECLARATION OF ACHIEVEMENT OF CARBON NEUTRALITY

#	ITEMS	STATUS	SECTION IN THE QES
1	Define standard and methodology use to determine its GHG emissions reduction.	N/A	N/A
2	Confirm that the methodology used was applied in accordance with its provisions and the principles set out in PAS 2060 were met.	✓	1.0
3	Provide justification for the selection of the methodologies chosen to quantify reductions in the carbon footprint, including all assumptions and calculations made and any assessments of uncertainty. (The methodology employed to quantify reductions shall be the same as that used to quantify the original carbon footprint. Should an alternative methodology be available that would reduce uncertainty and yield more accurate, consistent, and reproducible results, then this may be used provided the original carbon footprint is re-quantified to the same methodology, for comparison purposes. Recalculated carbon footprints shall use the most recently available emissions factors, ensuring that for purposes of comparison with the original calculation, any change in the factors used is considered).	✓	6.0
4	Describe how reductions have been achieved and any applicable assumptions or justifications.	✓	3.2.1
5	Ensure that there has been no change to the definition of the subject. (The entity shall ensure that the definition of the subject remains unchanged through each of every stage of the methodology. If material change to the subject occurs, the sequence shall be re-stated based on a newly defined subject.)	N/A	N/A
6	Describe the actual reductions achieved in absolute and intensity terms and as a percentage of the original carbon footprint. (Quantified GHG emissions reductions shall be expressed in absolute terms and shall relate to the application period selected and/or shall be expressed in emission intensity terms (e.g. per specified unit of product or instance of service).	N/A	N/A
7	State the baseline/qualification date.	✓	3.0
8	Record the percentage economic growth rate for the given application period use as a threshold for recognizing reductions in intensity terms.	N/A	N/A
9	Provide an explanation for circumstances where a GHG reduction in intensity terms is accompanied by an increase in absolute terms for the determined subject.	N/A	N/A
10	Select and document the standard and methodology used to achieve carbon offset.	✓	7.4

#	ITEMS	STATUS	SECTION IN THE QES
11	Confirm that:	✓	
	a. Offsets generated or allowance credits surrendered represent genuine, additional GHG emissions reductions elsewhere.	N/A	N/A
	b. Projects involved in delivering offsets meet the criteria of additionality, permanence, leakage, and double counting. (See the WRI Greenhouse Gas Protocol for definitions of additionality, permanence, leakage, and double counting).	N/A	N/A
	c. Carbon offsets are verified by an independent third-party certifier.	N/A	N/A
	d. Credits from Carbon offset projects are only issued after the emission reduction has taken place.	N/A	N/A
	e. Credits from Carbon offset projects are retired within 12 months from the date of the declaration of achievement.	N/A	N/A
	f. Provision for event related option of 36 months (about 3 years) to be added here.	N/A	N/A
	g. Credits from Carbon offset projects are supported by publicly available project documentation on a registry which shall provide information about the offset project, quantification methodology and validation and verification procedures.	N/A	N/A
	h. Credits from Carbon offset projects are stored and retired in an independent and credible registry.	N/A	N/A
12	Document the quantity of GHG emissions credits and the type and nature of credits purchased including the number and type of credits used and the period over with the credits were generated including”	N/A	N/A
	a. Which GHG emissions have been offset	N/A	N/A
	b. The actual amount of carbon offset	N/A	N/A
	c. The type of credits and projects involved	N/A	N/A
	d. The number and type of carbon credits used and the period over which credits have been generated.	N/A	N/A
	e. For events, a rationale to support retirement of credits in excess of 12 months including details of any legacy emissions savings, considered.	N/A	N/A
	f. Information regarding the retirement/cancellation of carbon credits to prevent their use by others including a link to the registry or equivalent publicly available record, where the credit has been retired.	N/A	N/A

#	ITEMS	STATUS	SECTION IN THE QES
13	Specify the type of conformity assessment: a. Independent third party certification; b. Other party validation; c. Self-validation	✓	3.0
14	Include statements of validation where declarations of achievement of carbon neutrality are validated by a third-party certifier or second party organizations.	✓	1.0
15	Date the QES and have it signed by the senior representative of the entity concerned (e.g. CEO of a corporation, Divisional Director, where the subject is a division of a larger entity; the Chairman of a town council or the head of the household for a family group.	✓	1.0
16	Make QES publicly available and provide a reference to any freely accessible information upon which substantiation depends (e.g. via websites).	✓	1.0

TABLE F.3 QES OPENNESS AND CLARITY

	ENTITIES SHOULD SATISFY THEMSELVES THAT THE QES	STATUS
1.	Does not suggest a reduction which does not exist, either directly or by implication.	✓
2.	Is not presented in a manner which implies that the declaration is endorsed or certified by an independent third-party organization when it is not.	✓
3.	Is not likely to be misinterpreted or be misleading as a result of the omission of relevant facts.	✓
4.	Is readily available to any interested party.	✓

PAS2060 DECLARATION OF CARBON NEUTRAILTY - 2020 QUALIFYING EXPLANATORY STATEMENT

GLOSSARY OF TERMS

Biogenic: CO_2 emissions from the burning of biomass products. Energy is converted to steam for heating or drying (lumber, pulp, paper, Tissue). Waste steam may be used to generate electricity. Biogenic CO_2 emissions come from hog fuel and lignin.

biomass: plant material derived from trees.

Boundary: all Forest Management, Forest Products processing, manufacturing, related transportation, and administrative activities that support the production of lumber, wood pellets, Kraft pulp, paper, Tissue and corrugating medium products and related by-products under the financial control of Irving to the point of sale to third parties (Customers).

carbon: unless otherwise noted carbon means greenhouse gases (GHG) or carbon dioxide equivalents (CO_2e). In the case of forest or tree growth, carbon means CO_2 only.

Carbon Dioxide Equivalents (CO_2e): gases including carbon dioxide (CO_2), methane (CH_4), nitrous oxide (N_2O) and various fluorinated gases, also referred to as greenhouse gases (GHG). Gases are weighted by their individual global warming potential (GWP) to equal a CO_2e.

Carbon Footprint: the accounting of GHG emission or removals within the Boundary

Carbon Neutral: condition in a stated period where there is no net increase in the global emissions of GHG to the atmosphere resulting from the GHG emissions and removals associated with the Boundary.

Carbon Neutrality: the state of being Carbon Neutral

chip (or wood chip): Residual product of sawmilling used to make pulp or paper products from conifer or deciduous logs. May also result from pulpwood converted to chips in mills or directly from low quality trees from the forest.

corrugating medium: paper that once combined on two sides by linerboard, forms the centre of cardboard box. Corrugating medium adds strength to cardboard boxes.

Crown License: New Brunswick provincial owned land, managed by a company with forest products manufacturing facilities in NB. The manager is responsible for all Forest Management activities and is referred to as the Licensee.

Crown License 6 & 7: New Brunswick Crown Licenses managed by J.D. Irving, Limited.

Customers: Irving's customers where the transfer of ownership occurs. This may be warehouses, distribution centres, ports, stores, brokers, wholesalers, other manufacturers, etc . For clarity, Irving's customers are not end-use retail consumers.

Direct and Indirect Emissions: Scope 1, 2 and 3 GHG emissions related to harvesting, processing, manufacturing, supply chain and freight to Customers.

Declaration: formal statement in respect of Carbon Neutrality

Forest Management (Forestry): all activities related to forest inventory, planning, road construction and harvesting, reforestation, stand improvement (pre-commercial and commercial thinning) and forest protection activities.

forests: any forest ownership including Freehold, Crown License 6 & 7, Other Crown lands, and Private Lands.

Forest Products: finished and semi-finished wood-based products including lumber, pulp, paper, corrugating medium, tissue, and products used to generate biomass energy including wood waste or hog fuel (e.g., scrap wood, bark, saw dust, shavings), or wood pellets.

Freehold: Irving owned private forest lands.

Greenhouse Gas (GHG): gases converted to Carbon Dioxide Equivalents (CO_2e) including carbon dioxide (CO_2), methane (CH_4), nitrous oxide (N_2O) and various fluorinated gases, also referred to as Carbon Dioxide Equivalents (CO_2e). Gases are weighted by their individual global warming potential (GWP) to equal a GHG.

Harvested Wood Products (HWP): solid wood products like lumber and paper products like pulp, paper, corrugating medium and tissue that transfer and store carbon, with defined decay rates (expressed as half-life). Net Harvested Wood Products is the sum of carbon transferred in the year of manufacturing minus the carbon emitted from prior years' production.

hog fuel: Residual biomass fuel that comes from the processing of wood products. Includes scrap wood, bark, sawdust, or shavings.

Irving Forest Supply Chain (Supply Chain): Includes operations in various Irving entities (wholly or partially), including J.D. Irving, Limited, Irving Pulp & Paper, Limited, Irving Paper Limited, Irving Consumer Products Limited, Irving Consumer Products, Inc., New Brunswick Railway Company, Grand River Pellets Limited, Rothesay Paper Holdings Ltd., St. George Pulp & Paper Limited, St. George Power LP, Charlotte Pulp and Paper Co. Ltd., Miramichi Timber Holdings Limited, Allagash Timberlands LP, Aroostook Timberlands LLC, Maine Woodlands Realty Company, Maritime Innovation Limited, Irving Forest Products, Inc., Irving Air Services Inc., and Forest Patrol Ltd.

Kraft pulp: semi-finished Forest Product used to make tissue, paper, and other end-use products.

Leakage: process by which carbon is removed within the boundary but emitted elsewhere outside the boundary by way of a similar activity. Example: Forests remove carbon within the boundary with harvesting not exceeding growth rate, but forests outside the boundary are overharvested to supply mills, leading to more carbon being emitted outside the boundary. Leakage is counterproductive and leads to less total carbon removed globally, than reported within the boundary.

lignin: approximately 50 per cent of the composition of wood. Wood is made of fibre and lignin holds the fibres together. In the process of making chemical pulps, wood is broken down into fibre and lignin. and lignin is the waste product and can be burned as directly as Biogenic energy or as biologically digested into CH_4.

linerboard: paper that forms the inside and outside of a cardboard box.

log or sawlog: portion of either a conifer or deciduous tree, harvested with the primary purpose of producing lumber.

lumber: solid wood product from either coniferous or deciduous trees used in construction, furniture, flooring, packaging etc.

Net Forest Growth: GHG emissions or removals related to tree growth and mortality, including live above and below ground biomass, soils, and dead organic matter (DOM) both above and below ground.

Other Crown lands: New Brunswick Crown lands managed by a non-Irving Licensee that supply wood to various other customers (referred to as Sub-Licensees). Irving is a sub-licensee of Other Crown lands.

parent rolls: semi-finished tissue product that is converted and packaged into end-use consumer Tissue products (e.g., facial, bath, napkin, paper towel).

Private Lands: small, medium, or large sized private ownership by individuals or companies that may be used to supply forest products, but not financially or otherwise controlled by Irving.

pulp: wood product that results from converting solid wood chips to a wood-based slurry by chemical or mechanical processes. The slurry then forms a sheet that is dried with heat and pressure to make paper. Kraft pulp may be sold semi-finished to other end-users or pulp may be converted directly in the process to make other semi-finished paper products.

pulpwood: portion of either a conifer or deciduous tree, harvested with the primary purpose of becoming wood chips for pulp or paper. Typically, the portion of a tree that is too small to be log/sawlog or has defects that prevent the production of lumber.

Residues (Residual): by products from the processing of conifer or deciduous logs or pulpwood by sawmills that include wood chips (chips), sawdust, shavings, or bark. Residues/Residuals are used to supply downstream operations such as pulp and paper manufacturing or are used as biomass energy products.

Tissue: end-use consumer products such as facial, bath, napkin, and paper towel products.

PAS2060 DECLARATION OF CARBON NEUTRAILTY - 2020 QUALIFYING EXPLANATORY STATEMENT

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