

**TECHNICAL SUPPLEMENT TO CARBON
FOOTPRINT DISCLOSURE
FOR IRVING FOREST SUPPLY CHAIN**

2024

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 19,000 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
- Agriculture

CARBON FOOTPRINT OF THE IRVING FOREST SUPPLY CHAIN

This technical supplement describes the organizational carbon footprint of the Irving Forest Supply Chain¹ (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. The Supply Chain is made up of businesses in the Forestry and Forest Products and Consumer Products sectors, which encompasses all our activities in our lumber, pulp and tissue businesses. The Supply Chain includes the land, forests, wood supply, tree nurseries, silviculture (tree planting and tending), logging operations, sawmills, peat and gardening products, pulp, paper, corrugated medium, consumer tissue and diaper manufacturing facilities. We transport our products by road, rail and sea through many of our affiliated transportation businesses. 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.

GHG emissions and removals are reported for the Forest Supply Chain as these represent the core business of the organization and are the most energy-intensive manufacturing operations with the most extensive distribution network. Therefore, the Forest Supply Chain represents the most significant source of GHG emissions and is of high interest to customers and stakeholders concerned about climate change. Reporting from other businesses may occur in the future depending on interest from stakeholders or customers.

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., The New Brunswick Railway Company, Grand River Pellets Limited, Juniper Organics Limited, Rothesay Paper Holdings Ltd., St. George Pulp & Paper Limited, St. George Power LP, Charlotte Pulp and Paper Co. Ltd., Irving Forest Services Limited, Miramichi Timber Holdings Limited, Allagash Timberlands LP, Aroostook Timberlands LLC, Maine Woodlands Realty Company, Maritime Innovation Limited, Irving Forest Products, Inc., and Forest Patrol Ltd.

This document describes in detail the assumptions and methodology for accounting of the Carbon Footprint in accordance with ISO 14068:2023, the GHG Protocol Corporate Accounting and Reporting Standard, the GHG Protocol Corporate Value Chain (Scope 3) Accounting and Reporting Standard, the GHG Protocol Scope 2 Guidance² and the Carbon Budget Model for the Canadian Forest Sector (CBM-CFS³). These standards were selected, including the GHG Protocol standards, because they are internationally recognized standards or methodologies aligned to ISO 14064-1 requirements.

This technical supplement provides additional details in three major categories for 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 Upstream GHG emissions (Category 1-8),
- 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 technical supplement describes the following:

- 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,
- Changes to the methodology for land use removals
- A Carbon Neutrality Management Plan and Carbon Neutral Pathway

For a complete overview of the Forest Supply Chain activities and discussion of material topics, including additional discussion regarding Climate Change Action & Adaptation, please refer to the Climate, Conservation & Community Impact Report found on the company's website.

² Modified to report transmission and distribution emissions in Scope 2 instead of Scope 3, with no impact of total emissions.

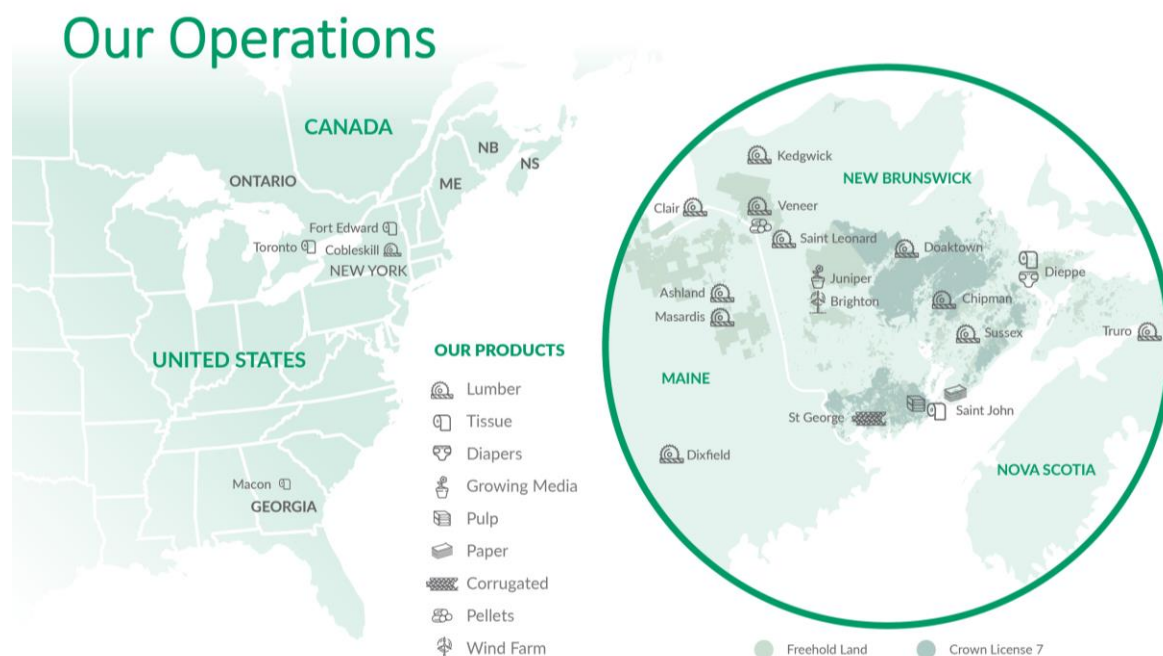
³ Carbon curves from CBM-CFS3 supplemented by internally developed criteria for forest sequestration and emissions.

OPERATIONAL BOUNDARY – GREENHOUSE GAS SOURCES AND SINKS

The information presented follows the financial control method per the GHG Protocol. 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 that support the production of lumber, wood pellets, growing media, Kraft pulp, paper, Tissue, diaper and corrugating medium products and related by-products under the financial control of Irving to the point of sale to third parties (Customers).”

Figure 1. Map of Operations in the Irving Forest Supply Chain⁴



Scope 1: Direct Emissions

Scope 1 emissions result from the combustion of fossil fuels, and CH₄ and N₂O emissions from the burning of biogenic fuels. Emissions are reported from the following sources:

- Mobile equipment in all operating divisions.
- Company owned vehicles.
- Light and heavy oil used in boilers.
- Propane and natural gas in boilers, kilns, and mobile equipment.
- CH₄ and N₂O emissions from biomass boilers.
- Aviation fuels in forest monitoring and protection.
- Corporate air travel.

⁴ Brighton Mountain Wind is announced only

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. Scope 2 emissions are location-based and they do not differ if calculated using a market-based approach (WRI 2015) because no instruments are procured that allocate the specific properties of electricity generation to the consumption.

- Manufacturing facilities, offices, buildings, and garages.

While not directly following the guidance of the GHG Protocol Scope 2 Guidance, consumption factors are used to report Scope 2 emissions and therefore losses from transmission and distribution are added to generation factors, instead of disclosing the emissions from transmission and distribution losses in Scope 3. This administrative change has no impact on the total Supply Chain GHG emissions.

Scope 3: Upstream and Downstream Supply Chain Emissions

Scope 3 emissions result from upstream and downstream sources that are not financially controlled⁵. 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:

Category 1

- Harvesting of roundwood logs or chips for all customers (internal and external) by independent contractors from Freehold, Crown License 7, other Crown lands or harvesting on private lands.
- Purchased roundwood logs (harvested and delivered) from third parties for all customers by independent contractors from private lands.
- Light vehicle commuting by independent contractors in log harvesting and procurement from the Freehold, Crown License 7, Other Crown Lands, and private Lands.
- Procurement of parent rolls of tissue, eucalyptus pulp and hardwood kraft pulp for tissue production, and fluff pulp for diaper manufacturing.
- Chemical purchases for Kraft pulp, paper, or tissue manufacturing.
- Purchased plastics used in diaper manufacturing.
- Consumer packaging and marketing including cardboard and plastic wraps.
- Maintenance and repair parts purchases in the year – consumables and services.

⁵ 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.

Category 2

- Capital goods purchase in the year – property, plant, and equipment.

Category 3

- Upstream emissions from purchased fuels.

Category 4

- Heavy truck transportation of logs and chips from the Freehold, Crown License 7, other Crown lands, and private Lands to all customers (internal and external) including mill yards or between holding yards.
- Rail freight of logs and chips (including Sawmill residual chips) from transfer yards to mill yards.
- Truck freight of Sawmill residuals to customers.
- Truck freight of peat and soil products. Truck freight of wood pellets to FOB Port of Belledune.
- Truck and rail freight of lumber to customers, including intra-mill transfers.
- Truck, rail and ocean freight of Kraft pulp, paper, and corrugating medium to Customers, including purchased old, corrugated containers (OCC) for LUP.
- Freight of finished Consumer Products goods to customers.

Category 5

- Waste disposal from manufacturing operations.

Category 6

- Commercial air travel and vehicle rentals.

Category 7

- Emissions from employee commuting.

Category 8

- Upstream and downstream leased assets, warehousing.

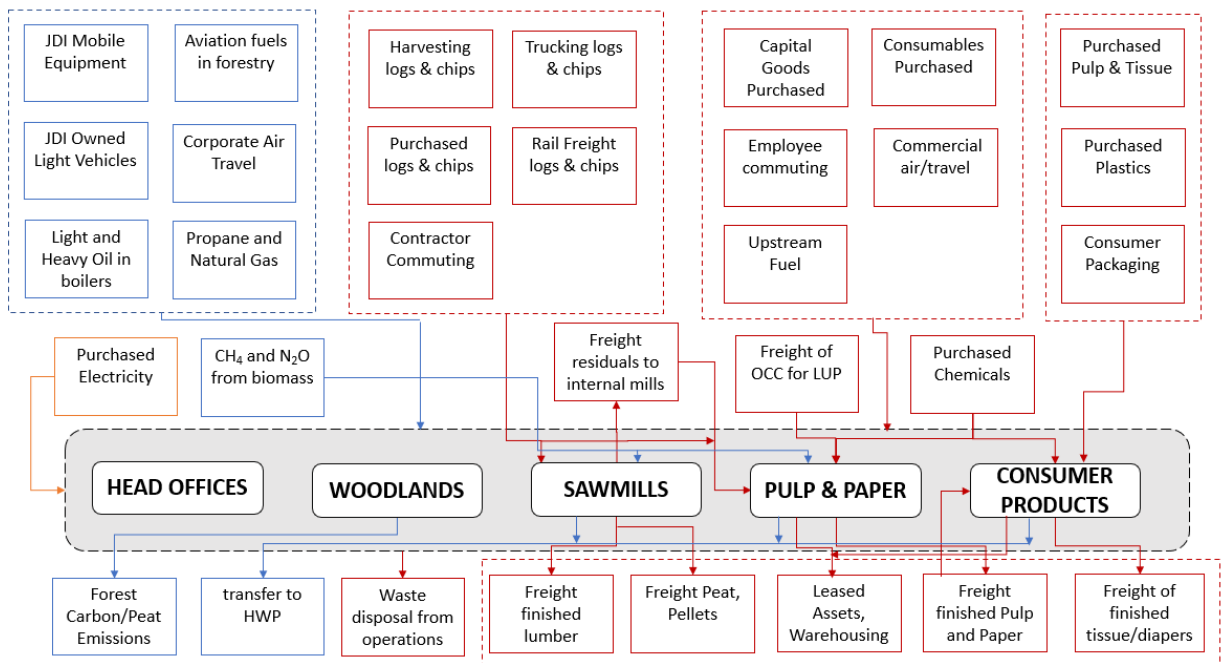
Transfers and Removals

Removals of CO₂ include Net Forest Growth on Freehold forest lands, including the CO₂ subsequently transferred and stored in Harvested Wood Products (HWP).

- Net Forest Growth removals from changes in above and below ground biomass on Freehold forest lands. In 2022 this also includes emissions from the Juniper Organics Limited (“JOL”) peat bog operations.
- Changes in the transfer and storage of CO₂ into HWP.

Double claiming of forest removals is avoided as only removals from private, Freehold forests are used in the organizational footprint. There are no carbon offset credits generated or sold from the Freehold forests included in this footprint.

Figure 2. Organizational Boundary of the Irving Forest Supply Chain



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 CO₂ 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 CO₂ 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 CO₂ 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 CO₂ in HWP used in the simple decay approach are presented in Appendix C.

CO₂e Emissions from Land Use on Freehold and Crown License 7

Freehold lands and Crown License 7 remove CO₂ from the atmosphere with growth and store carbon in above and below ground biomass. All forests also emit CO₂e with natural mortality and working forests emit CO₂e with harvesting. Net changes in land use emissions and removals of CO₂e 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).*

For the organizational carbon footprint of the Supply Chain the annual net change in land use CO₂e from Freehold and Crown License 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 annual National Inventory Reports. Carbon curves from CBM-CFS3 were supplemented by internally developed criteria for forest sequestration and emissions. This configuration to the pre-2023 CBM-CFS3 model improves the accuracy of emissions and sequestration. These changes are outlined in sections 4 (d) and (f) below and the accuracy was supported by testing and analysis.

The process to define the annual stock change in carbon from net forest growth is described below:

1. Producing an Enhanced Forest Inventory (EFI)
2. Updating the Forest Inventory
3. Producing Carbon Yields Using CBM-CFS3
4. Calculating Annual Carbon Stock Change

1. 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 (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.

2. 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, Irving uses 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.

3. Producing Carbon Yields Using CBM-CFS3

Carbon yields were produced using the Carbon Budget Model of the Canadian Forest Sector (CBM-CFS3²). 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.

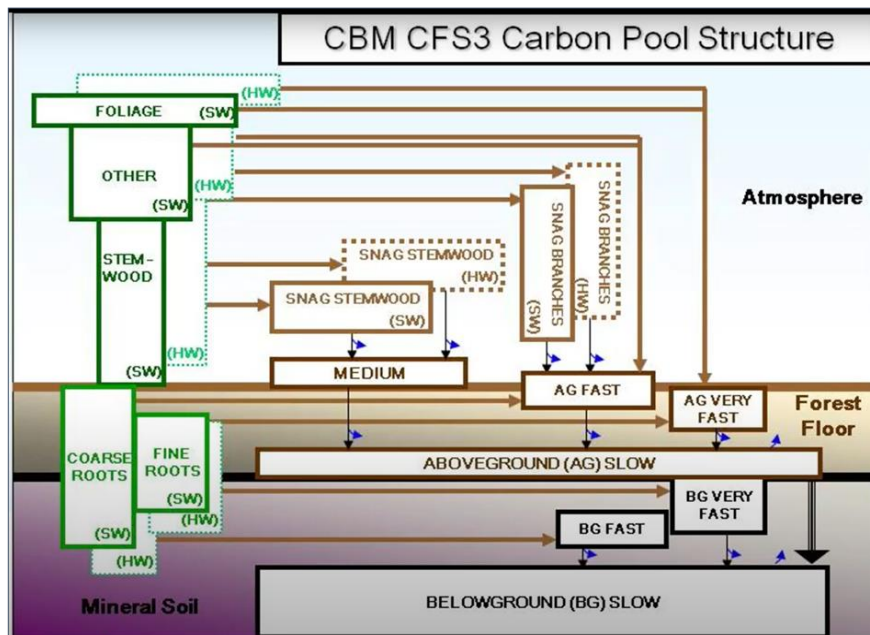


Figure 3. CBM-CFS3 Carbon Pools and Flow

4. Calculating Annual Carbon Stock Change

To calculate the change in carbon stocks from T-0 (end of 2023) to T-1 (end of 2024) requires three calculations:

- Forest inventory at the end of 2023
 - Annual growth to the end of 2024
 - Depletion (harvest) to the end of 2024
- Forest inventory at the end of 2023 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 2023.
 - Annual growth to the end of 2024 requires incrementing the age for each cell by one 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 2024 can now be summed across all development types.

- c) To determine depletion, each cell in our forest inventory that was harvested during the 2024 calendar year, either clear cut or partial cut, is identified via GPS (Global Positioning System) data mounted on harvesting equipment. This GPS data is validated by foresters on the ground and via satellite imagery. Scale data from our woodlands information system provides additional validation.
- d) Harvested cells were then transitioned depending on the type of harvest activity:
- Commercial thinning cells stayed on their original development type but had a multiplier applied to net down the yields. The multiplier was determined by running representative cells through the CBM-CFS3 model and applying the commercial thinning action. Changes in yields were then averaged to produce a suitable multiplier – in general this is similar to the approach applied to clearcut areas.
 - Other partial cut cells also stayed on their original development type and had a multiplier applied to net down their yields. The multiplier was determined in CBM-CFS3 like commercial thinning but using the CBM partial cut action instead.
 - Post-clearcut DOM levels were netted down as a function of pre-harvest DOM, i.e. the adjustment is simply resetting carbon curve to time zero with a correct time-based value rather than using a different carbon curve to achieve this effect. A multiplier was derived via CBM-CFS3 simulations that scheduled clearcut actions at appropriate ages in representative LiDAR cells. Within the simulations, post-harvest DOM pool fluxes were monitored and proportionalized. Changes in yield between pre- and post-harvest conditions were averaged to produce a suitable multiplier. The approach was applied due to the tendency of the CBM-CFS3 to overestimate DOM at time zero. Overestimates occur because of the regional default disturbance age during the MAKELIST process.
 - Cells harvested pre-2020 that received a harvest activity post the year of LiDAR – i.e. ‘Compromised cells’ – were identified and transitioned depending on the type of harvest activity that occurred. The primary depletion of these cells occurred pre-2020.
 - Unharvested cells increment along their assigned carbon curve on an annual basis.
- e) After harvested cells have been identified and transitioned, the depletion of carbon stocks by pool to the end of 2024 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 2023 to the end of 2024.
- f) Prior to 2023 the CBM-CFS3 only had the ability to support one “last disturbance” event per stand in the MAKELIST initialization routine at a single stand-replacing disturbance interval when initializing stand conditions at the start of a CBM-CFS3 simulation. The timing of this event was defined by default based on the ecozone identified for the stand – 125 years in this region. This timing parameter tended to overestimate DOM at time 0

of the forecast. As of 2023 the stand initialization process supported customizable stand-replacing disturbance intervals. A review indicated that these changes did not lead to a net reduction in uncertainty. Rather, it moved the uncertainty through time.

5. Creating a five-year rolling average

Following the creation of the annual stock change, the current year is added to the previous four years of land use removals and averaged.

Methodology Change for 2024 Reporting Year – Five Year Rolling Average

Prior to the 2024 reporting year, the land use forest removal was calculated using a calendar year stock change approach. In 2024, Irving has moved to a five-year rolling average of the annual land use emissions/(removals). The methodology has changed in 2024 to better align with how Irving governs harvest sustainable levels and the goal stated in the Climate, Conservation and Community Impact Reports to “Maintain a five-year average of forest growth at or above harvest”. 2024 is the first year where five years of land use removals exist to be averaged and is therefore the first possible year for this change in methodology.

The Annual Allowable Cut (AAC) determines the sustainable volume of wood by species and product that can be harvested each year. The AAC is determined for each forest land base using an optimization model with the objective function to achieve a non-declining softwood yield for the eighty-year management plan, expressed in five-year planning periods. The long-term model is re-run approximately every five years for another eighty years in an adaptive planning approach.

Within a five-year period, the actual harvest cannot exceed the five-year AAC. However, it is normal that within the five-year period, that harvest levels fluctuate due to factors such as commodity market conditions, weather, work force availability, or other reasons. Similarly, the forest growth over that period also fluctuates from the model for weather and other biological reasons. Actual harvest levels are determined by mass or volume scaling of forest products as they are delivered to customer mills in the calendar or operating year. The measurement of most forest products is done by mass scale and then the mass is converted to volume using regionally determined mass-to-volume factors.

The AAC may go up in future management plan periods. While the AAC changes with the date of the period, it is a result of accumulated growth over previous periods. Without a rolling average, previously accumulated biological growth is not accounted for.

The AAC is carefully balanced with the organization’s industrial plan to ensure sufficient wood supply exists to make long-term investments and enable future growth. Compliance to the AAC is reported annually as part of independent third-party forest certification.

There are two distinct measurement systems in place: modeled outputs for estimating land use emissions/(removals), and delivered scaled outputs to control the actual harvest levels. While comparing modeled outputs to delivered scale should be directionally similar, direct comparison is

not possible. For example, not all operating areas have viable markets for pulpwood (the portion of the tree too small, crooked, or rotten to make lumber). Therefore, pulpwood is left in the woods where it is harvested. The carbon modeling accounts for the emissions from the harvested pulpwood, but the wood it is not ever scaled by delivery. Estimates of un-utilized products like pulpwood are included in setting the AAC where necessary.

Table 1. 5-year rolling average Forest Removals and AAC – Freehold

Freehold Land	2020	2021	2022	2023	2024	5-Year Rolling Average
Annual Land Use Removal (tonnes CO ₂)	(2,335,282)	(2,480,023)	(2,364,100)	(1,822,800)	(843,914)	(1,969,224)
Cum. Avg. Land Use Removal (tonnes CO ₂)	(2,335,282)	(2,407,653)	(2,393,135)	(2,250,551)	(1,969,224)	N/A
Modeled Depletion (m ³)	2,825,813	2,627,268	2,599,583	2,970,921	3,460,530	2,896,823
Delivered Scale (m ³)	2,851,907	2,887,279	2,571,521	2,688,813	2,883,102	2,776,524
AAC (m ³)	2,939,300	2,939,300	2,947,300	2,894,300	2,894,300	2,922,900
Gap to Delivery (m ³)	(87,393)	(52,021)	(375,779)	(205,487)	(11,198)	(216,376)
Harvest Area (ha)	24,690	21,694	20,553	22,365	25,775	23,011

Table 2. 5-year rolling average Forest Removals and AAC – Crown License 6&7

Crown License (6/7)	2020	2021	2022	2023	2024	5-Year Rolling Average
Annual Land Use Removal (tonnes CO ₂)	(2,448,668)	(1,566,092)	(2,547,400)	(2,351,700)	(1,764,086)	(2,135,589)
Cum. Avg. Land Use Removal (tonnes CO ₂)	(2,448,668)	(2,007,380)	(2,187,387)	(2,228,465)	(2,135,589)	N/A
Modeled Depletion (m ³)	1,430,449	1,767,900	1,409,576	1,713,464	1,844,352	1,633,148
Delivered Scale (m ³)	1,377,380	1,584,562	1,387,364	1,657,019	1,606,818	1,522,629
AAC (m ³)	1,725,000	1,734,700	1,723,700	1,723,700	1,723,700	1,718,760
Gap to Delivery (m ³)	(347,620)	(150,138)	(336,336)	(66,681)	(116,882)	(196,131)
Harvest Area (ha)	11,764	13,441	9,620	11,705	12,427	11,791

The results in Table 1 and 2 above show that both delivered scale and depleted inventory are below the AAC on the five-year rolling average.

Change to Baseline Year for Removals

Restating the baseline year (2020) for removals is not practical as 2016-2019 annual removals were not available to calculate a five-year rolling average for 2020. Therefore, Irving has disclosed above what the comparative annual removal would be for 2024 using the previous methodology and plans to change the baseline to 2024 so that for 2025 reporting onwards the baseline will be directly comparable. There are no targets derived by the Land Use Removal baseline, except for the commitment to maintain organizational carbon neutrality. The change

in methodology does not change the outcome of the state of carbon neutrality in any of the previous years, and therefore a restatement of the baseline year is not relevant to reporting.

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 3. 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 (CO₂e). As presented in Table 3 below, the Supply Chain is Carbon Neutral.

Table 3. Quantification of Carbon Footprint⁶

Type	Detail- Emission/(Removal)	2022 tonnes CO ₂ e	2023 tonnes CO ₂ e	2024 ⁷ tonnes CO ₂ e
Scope 1	Direct Fuels	553,000	516,000	495,000
Scope 2	Indirect Electricity	663,000	551,000	635,000
Scope 3	Upstream and Downstream Supply Chain	909,000	989,000	981,000
Sub-Total: Direct and Indirect Emissions		2,125,000	2,056,000	2,111,000
Transfer	Net transfers (to) / from HWP	(976,000)	(1,048,000)	(1,102,000)
Removal	Net Forest Growth and Land Use – Freehold ⁸	(2,364,000)	(1,819,000)	(1,965,000) ⁹
Sub-Total: HWP Transfer plus Net Forest Growth (Removal)		(3,340,000)	(2,867,000)	(3,067,000)
Total: Net Forest Products Supply Chain Emissions/(Removals)		(1,215,000)	(811,000)	(956,000)

Other Emissions/(Removals)

In addition to Freehold lands, Irving manages Crown License 7. Modeling of net five-year average removals resulting from forest management on Crown License 7 identified an additional 2,135,589

⁶ Emissions are rounded

The figures in this table are rounded to the nearest thousand tonnes CO₂e. Any difference between the Total Net Forest Products Supply Chain Emissions/(Removals) as reported in the 2024 Performance Data Table are due to rounding.

⁷ The methodology for calculating removals changed in 2024 and therefore cannot be directly compared to 2023 and 2022. We are now using a 5-year rolling average as per methodology change in the preceding section of the report.

⁸ 2023 and 2024 Results includes emissions from peat bog land use change.

⁹ The methodology for calculating removals changed in 2024 and therefore cannot be directly compared to 2023 and 2022. 2024 uses a five-year rolling average.

metric tonnes of CO₂ in 2024. The Crown License 7 forest removal is not accounted for in the Declaration. For transparency, the details are presented in Table D.2 of Appendix D.

Biogenic CO₂ emissions within the Supply Chain were 1,375,714 metric tonnes of CO₂ in 2024. A detailed breakdown of these emissions is presented in Table D.6 in Appendix D.

Treatment of Biogenic Carbon Dioxide Emissions

Irving produces energy from biomass and biogas (biogenic) that is derived from residual forest products. CO₂ emissions from biogenic sources are treated differently than CO₂ emissions from fossil fuels. Following the guidance of the Greenhouse Gas Protocol, biogenic carbon is not reported in any of the scopes (Scope 1) 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 facilities 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 0.8 million tonnes CO₂ from Freehold land in 2024, accounting for 38 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 7 (21 per cent of the wood and biomass supply), other Crown lands (10 per cent) and Private Lands in New Brunswick (18 per cent of the wood supply) and private lands in Nova Scotia, PEI and Quebec (5 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 CO₂ (Ward 2021 re: New Brunswick and Steenberg, 2022: re Nova Scotia). The remaining 7 per cent 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 because of heat generation from biomass in the manufacturing process are included within the Supply Chain emissions.

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 2024) and the United States Environmental Protection Agency (EPA 2025) guidance. Following GHGRP guidelines ensures that Scope 1 and 2 emissions reporting aligns with government GHG reporting and allows for comparison to past years. Reporting follows the GHG Protocol Scope 2 Guidance, location-based reporting is used for Scope 2 emissions, which in the Supply Chain's case, results in the same reported values as market-based reporting.

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

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 carbon curves developed by the Carbon Budget Model for the Canadian Forest Sector, version 3 (CBM-CFS3).

These standards were selected, including the GHG Protocol standards, because they are internationally recognized standards or methodologies aligned to ISO 14064-1 requirements.

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

To improve conservatism, 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.

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 4 and 5 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, air travel invoiced from vendors, and waste from service provider invoices.
- e. For freight-based emissions, distances come from internal or external party invoiced distances or from calculating distances from publicly available mapping systems, tonnes and loads delivered are sourced from internal management systems.

Table 4. 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.

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. Pulping chemicals and Eucalyptus pulp factors are also derived from published sources and actual consumption.

Table 5. 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.
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Assumptions and estimations

All CO₂e 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, whenever possible, 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.

CO₂e 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. A detailed description of the process to determine the change in CO₂e emissions from Net Forest Growth are described in Appendix C and in the 2020 Qualifying Explanatory Statement available online.

Exclusions

95 per cent of emissions are included allowing 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 ends at the point of sale to third parties or at the delivery to third parties if Irving pays for the freight. Therefore, Downstream Transportation and Distribution (Category 9), 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.

In addition to the fibre supplied by local, sustainably managed forests, 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 footprint in future years.

Uncertainty

Reporting CO₂e emissions is based on estimates, assumptions, and factors from multiple sources. Therefore, uncertainty is inherent in any reported CO₂e 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 CO₂e emissions. A pedigree matrix was developed for each of the major CO₂e emission categories – Direct and Indirect Emissions; HWP; Net Forest Growth. In this way, cumulative uncertainty across the three major CO₂e 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.

Direct and Indirect Emissions

There is inherent uncertainty in the calculated direct and indirect 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

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 in the use of:

- 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.

Net Forest Growth

There is inherent uncertainty in the calculated Net Forest Growth calculations. Emissions and removals were calculated using carbon curves developed by 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 B, which includes a bibliography of the publications and best practice guidelines used to determine the current inventory, forest depletions and forecasted inventory.

Table 6. Uncertainty ranges for reported emissions and removals

	Reported Emissions or Removal	Minimum Range	Maximum Range
Scope 1, 2, 3 Emissions	2,114,572	1,635,740	3,184,172
HWP Transfer	(1,101,785)	(1,623,642)	(747,740)
Land Use Removal (Freehold)	(1,965,674)	(3,095,286)	(978,017)

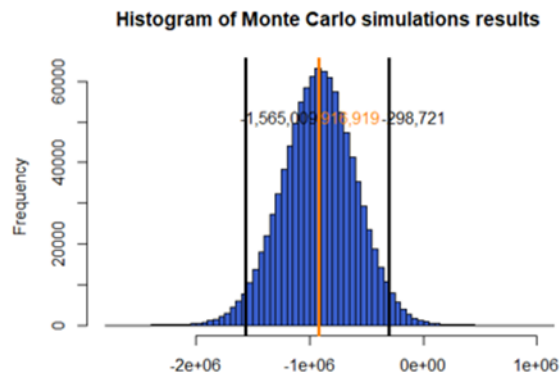
Monte Carlo Simulation of Results with Uncertainty Ranges

A Monte Carlo simulation was developed to determine the net CO₂e 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:

$$\text{Total Net Emission (X)} = \text{Direct and Indirect Emissions} - \text{Transfer to HWP} - \text{Net Forest Growth}$$

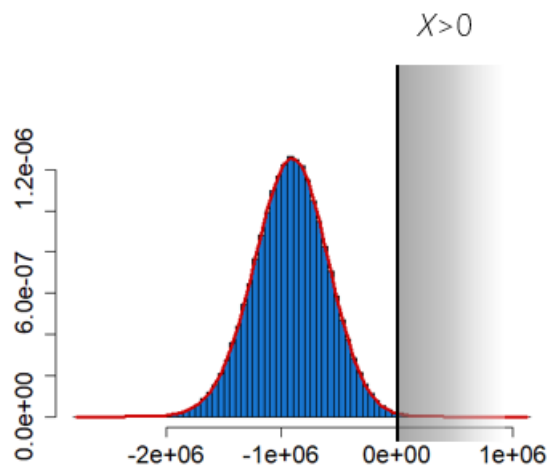
A histogram of the results of one million simulations is presented below in Figure 4.

Figure 4. Histogram of Monte Carlo Simulation Results



The analysis presented in Figure 5 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 (not carbon neutral) in 217 of one million simulations. Alternatively, the Supply Chain may be considered carbon neutral in 99.98 per cent of simulated scenarios.

Figure 5. Probability of Non-Carbon Neutral Result



Policy Regarding Baseline Year and Changes to Reported Emissions or Boundary Changes

The year 2020 was the first year of accounting for the complete GHG footprint of the Supply Chain which included Scope 3 emissions, Net Forest Growth, and the transfer to HWP. Therefore, 2020 is chosen as the baseline year for emissions reporting for the Supply Chain.

Future changes to reporting year-over-year are expected for many reasons as GHG accounting and reporting in the Supply Chain matures. Updates to previous years' reporting could be required due to changes or improvements to methodologies, activity data or emission factors. Changes or improvements that result in changes in total gross Scope 1, 2 and 3 emissions greater than 5%, or HWP transfer and Net Forest Growth emissions/(removals) greater than 10% will result in restating previous years' emissions.

Changes to the organizational boundary could also result in changes to total gross Scope 1, 2 and 3 emissions greater than 5%, or HWP transfer and Net Forest Growth emissions/(removals) greater than 10% will result in restating previous years' emissions.

For material changes in emissions related to the above, restatement will follow the "Base year recalculation methodologies for structural changes" outlined in Appendix E to the GHG Protocol Corporate Accounting and Reporting Standard (WRI 2005). For boundary expansion or improvements to reporting for business units in the Supply Chain, restatements will follow the "all year" approach by weighting the current year emissions and restating by the previous year's production compared to the current year. For any acquisitions or divestitures, the "pro-rata" approach will be used.

Refer to the disclosure Methodology Change for 2024 Reporting Year – Five Year Rolling Average on pages 12 -14 for the rationale and impact of changes to land use removals in 2024.

CARBON NEUTRALITY MANAGEMENT PLAN

The Carbon Neutrality Management plan has a high level of ambition with a commitment to maintain carbon neutrality for the entire Irving Forest Supply Chain organization. The organization is unique as the carbon footprint is already carbon negative without the use of offsets. Therefore, a standard approach to a target year for carbon neutrality and for residual emissions is not relevant in this instance. Carbon neutrality is achieved from forest removals from Irving private forest lands and the transfer of carbon from living trees into harvested wood products.

The senior management of the Irving Forest Supply Chain organization are committed to maintain carbon neutrality at the organizational level. In addition to maintaining carbon neutrality, senior management recognizes the importance of continuing to reduce emissions on an intensity basis. This commitment is governed by the ESG Steering Committee for the Irving Forest Supply Chain. Annual carbon footprint disclosure is led by a senior executive in the Forest Supply Chain with a cross-functional team that includes engineering, accounting, communications, and data management. The Carbon Neutrality Management Plan will be reviewed annually by the ESG Steering Committee to ensure sufficient initiatives and capital are deployed to meet the plan and/or adjust as necessary.

For more information, please refer to the 2024 Climate, Conservation & Community Impact Report found at www.jdirvingsustainability.com.

The objective is for organizational carbon neutrality to be maintained by continuing:

- Responsible, long-term management of the forest in a way that ensures that growth exceeds harvest and carbon removal exceeds emissions. This includes efficient harvesting and processing of wood products which transfer carbon from living biomass into harvested wood products that store carbon for an additional period of time. Responsible long-term forest management includes forest inventory, forest growth and yield modeling, control of annual harvest levels, production of genetically improved and well adapted local seedlings, reforestation activities such as tree planting and tending, and forest protection activities.
- Continuous improvement initiatives focused on productivity and energy efficiency in manufacturing and transportation.
- Major capital investments to reduce energy costs and GHG emissions.

Forests will continue to be independently certified to third-party forest management standards and major projects could be subject to environmental impact assessment processes and regulatory approval. Annual disclosure of material environmental impacts will continue in the Climate, Conservation & Community Impact Report. Freehold and Licence 6&7 managed forests have long-term management plans, currently forecasting growing stock and non-declining harvest levels to 2094. The forest is managed with a strategy to grow more wood than is harvested, which is reflected with a forecasted increase in the growing stock. Maintaining a healthy forest that is growing more wood than is harvested ensures that the forest removes more carbon than is emitted. Forest management plans are redone on a five-to-ten-year interval, which provides the opportunity to update the plan with the latest forest inventory information and any new climate change related research that could impact forest growth and yield, genetic improvement (adaptability), pests, wildfire, or other disturbances.

The demand for forest products from responsibly managed forests continues to grow with the population. The forest products business is expected to continue to grow with this increasing demand. Major capital investments will slow the rate of absolute increases in emissions; however, absolute emissions are expected to continue to increase with business growth. Therefore, both absolute and intensity-based tracking are used to ensure that energy use efficiency and productivity gains are measured on an emissions per tonne basis

CARBON NEUTRALITY PATHWAY

To be the most useful for the intended end users, the organizational Carbon Management Plan results in a Carbon Neutrality Pathway that maintains carbon neutrality and has been forecasted until 2030. This commitment to carbon neutrality is expected to continue beyond 2030 due to the organization's long-term focus on increasing forest growth above the rate of harvest. Rather than an aspirational pathway that relies on technology or economic conditions that are not yet known, the Carbon Neutrality Pathway focuses on more certain, executable actions with planned capital allocation and

regulatory approvals that the end user can trust and verify from public sources. The Carbon Neutrality Pathway is based on maintaining organizational carbon neutrality and reducing GHG emissions on an emissions intensity basis (Kg CO₂e per tonne of output). The forecasted emissions intensity is compared to an internationally recognized pathway of less than 2°C warming following the IPCC AR6 WG3 methodology. This pathway requires a 2.5 per cent emissions intensity reduction per year (Byers et al., 2022). From current business plans, the major factors that are in the control of Irving in the forecast are:

1. Planned expansion of Tissue Product manufacturing in Macon, GA
2. Major capital investments in renewable energy,
 - a. Project NextGen (IPP Modernization) in Saint John, NB. Construction and operation of a new black liquor recovery boiler and 120 MW turbine (biomass).
 - b. Brighton Mountain Wind Farm near Juniper, NB. Construction and operation of a 350 MW wind farm on JDI owned working forest lands.
3. Increased Kraft pulp, Tissue Product, and lumber production.
4. Continued commitment to responsible long-term forest management so that land use removals exceed emissions.

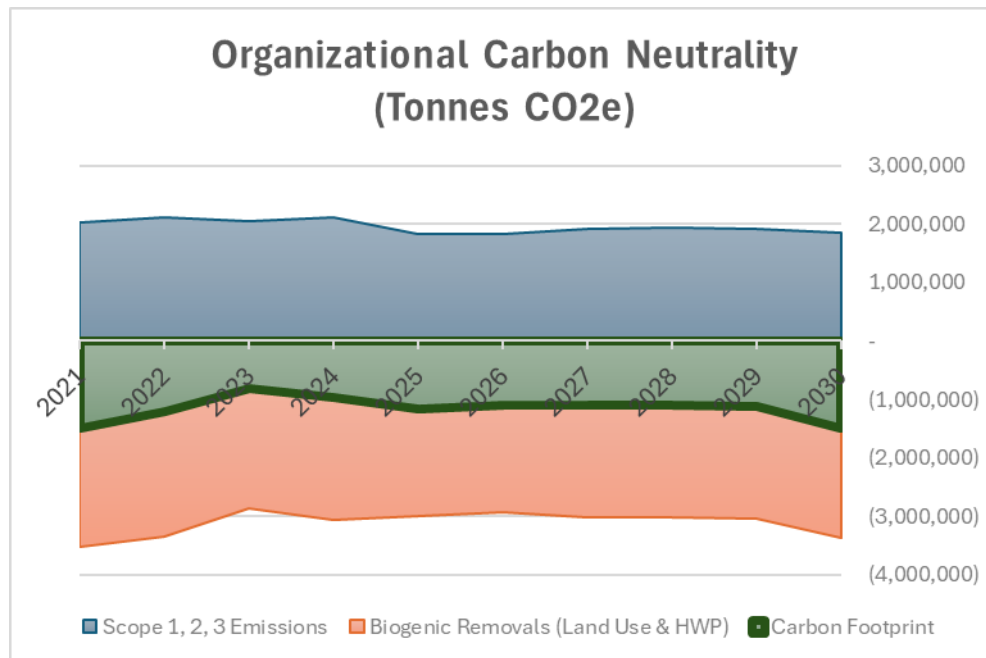


Figure 6. Organizational Carbon Neutrality for the Irving Forest Supply Chain

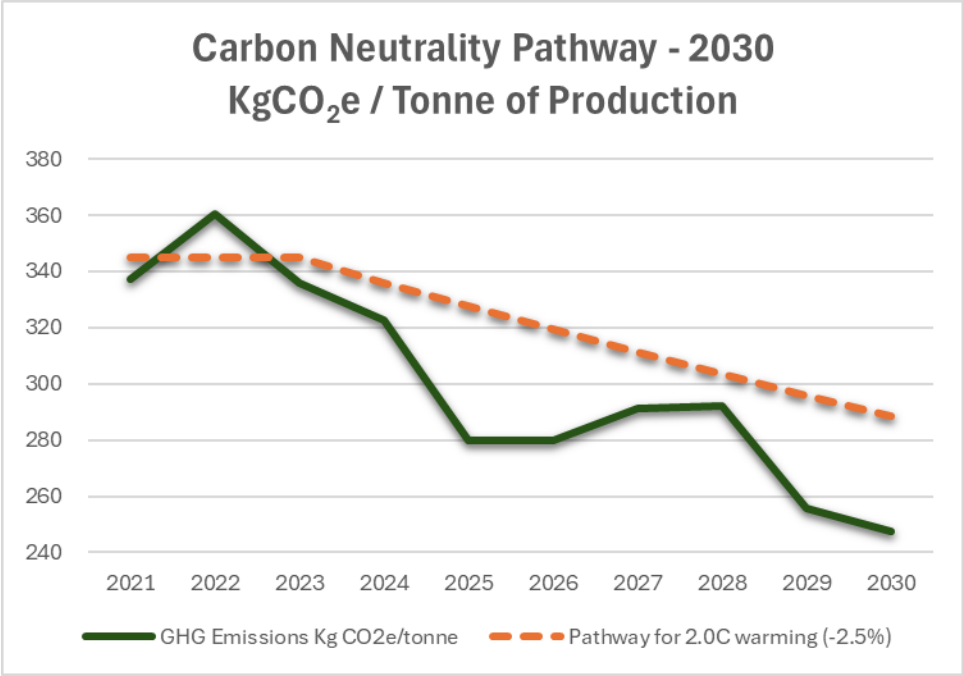


Figure 7. Intensity-based Carbon Neutrality Pathway

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

Table 7. Methodology and Data Quality by Emissions Source

Category	Emission/ Removal	Activity Data Quality	Emission Factor Quality	Reporting or Calculation Methodology	References
3-1	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 calculated based on 2023 data.	Internal Factor
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 calculated based on 2023 data.	Internal Factor
3-1	Purchased roundwood emissions	Very Good	Good	Annual purchased volume of roundwood in metric tonnes from all sources (Freehold, Crown Licence 7, other Crown lands, private lands) multiplied by the litres per metric tonne factor calculated based on 2023 data for the estimated mix of harvesting systems. Purchased wood systems are assumed to be consistent with the average Irving harvesting systems.	Internal Factor
3-1	Limit roundwood and chip delivery emissions (trucking)	Very Good	Good	Annual proforma fuel consumption calculated based on 2023 data 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.	Internal Factor
3-1	Purchased roundwood delivery emissions (trucking)	Very Good	Good	Annual purchased roundwood production in metric tonnes from all sources (Freehold, Crown Licence 7, other Crown lands, private lands) multiplied by the litres per metric tonne factor calculated based on 2023 data from the Irving roundwood trucking. This factor was created by dividing the Irving roundwood proforma litres by the delivered Irving roundwood metric tonnes.	Internal Factor

Category	Emission/ Removal	Activity Data Quality	Emission Factor Quality	Reporting or Calculation Methodology	References
1	Woodlands offices, garages, nurseries and forest protection activities.	Very Good	Good	Emissions calculated following the NIR from fuels reported from the financial systems and invoices. Heating fuel, waste oil, propane, gasoline used in Woodlands offices, fire caches and garages. Diesel consumption for graders, tractors, excavators, plows, dump trucks and gasoline for all Woodlands cars, pickups and light trucks. Log loaders are excluded and instead included in Sawmill fuel consumption. 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.	ECCC 2024 EPA 2025
Transfers	Harvested Wood Products - Lumber	Very Good	Fair to Good	HWP emissions are the sum of CO ₂ e stored in sold lumber products in 2024 and the emissions in 2024 from the retirement of previously produced lumber. Lumber products are reported in board feet are converted to m ³ using FAO 2020 Forest Products conversion factors based on the species and actual and nominal dimensions of lumber products produced. A weighted average density of each lumber product category was calculated using factors from Gonzales (1990) and species distribution from Irving Forest Inventory used in the production of that product. Carbon factors for dry wood products from IPCC (2006). The emissions from previous years are estimated using a simple decay approach using half-life factors in USA 2021. Canadian end use of lumber products is assumed to be the same as US end use.	ECCC 2024 FAO 2020 USA 2021 USDA 2020 Gonzalez 1990 IPCC 2006
Transfers	Harvested Wood Products – Kraft pulp, paper, corrugated medium, and tissue	Very Good	Fair to Good	HWP emissions are the sum of CO ₂ e stored in sold products in 2024 and the emissions in 2024 from the retirement of previously produced products. Pulp and Tissue products reported in tonnes and density factor is from Table 12.4 of IPCC 2006 for pulp and paper products. The emissions from previous years are estimated using a simple decay approach using a weighted average half-life for pulp and paper end uses. 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 2024 FAO 2020 USA 2021 USDA 2020 Gonzalez 1990
2	Woodlands Electricity	Very Good	Good	Electricity consumption for Woodlands sites from the Woodlands financial records and invoices converted to CO ₂ e using kgCO ₂ /kwh by	ECCC 2024 EPA 2025

Category	Emission/ Removal	Activity Data Quality	Emission Factor Quality	Reporting or Calculation Methodology	References
				jurisdiction, following the guidance in ECCC 2023 for Canadian operations and EPA 2025 for US operations.	
3-4	Sawmill Residual Freight and Pellet Freight, Horticultural product freight.	Very Good	Fair	Emissions from truck freight for residual chips, hog fuel, sawdust and shavings to internal and external customers, pellet freight to the Port of Belledune and horticultural products shipped to customers by truck or rail. Data source is tonnes of product from Irving internal accounting system and route kilometers converted to tonnes of GHG and using the kg/CO2e by tonne-km factor referenced.	EPA 2025
3-4	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/CO2e referenced.	EPA 2025
1	Sawmill Site Emissions	Very Good	Good	In accordance with NIR reporting, all sawmill site emissions from burning fossil fuels and biomass fuels are recorded and converted to CO2e. CO2 from biomass burning is excluded, but CH4 and N2O are included. Woodlands log loaders are included with the Sawmills loaders in this reporting. Other Woodlands fossil fuels from garages and local offices are no longer included in the Sawmill reporting. Fossil fuel consumption by invoice converted to CO2e using kgCO2/kwh by jurisdiction, following the guidance in ECCC 2023 for Canadian operations and EPA 2025 for US operations.	ECCC 2024 EPA 2025
2	Sawmill Site Electricity	Very Good	Good	Electricity consumption for Sawmill sites from the Sawmill financial records and invoices converted to CO2e using kgCO2/kwh by jurisdiction, following the guidance in ECCC 2023 for Canadian operations and EPA 2025 for US operations.	ECCC 2024 EPA 2025
1	Pulp and Paper Site Emissions	Very Good	Very Good to Good	In accordance with GHGRP reporting, all Pulp and Paper site emissions from burning fossil fuels and biogenic fuels are recorded and converted to CO2e. CO2 from biogenic fuels are excluded, but CH4 and N2O are included. Fossil fuel consumption by invoice converted to CO2e using kgCO2/kwh by jurisdiction, following the guidance in ECCC 2023 for Canadian operations	ECCC 2024
2	Pulp and Paper Electricity	Very Good	Very Good	In accordance with GHGRP reporting, electricity consumption for pulp and paper sites from the Pulp and Paper Site financial records and invoice	ECCC 2024

Category	Emission/ Removal	Activity Data Quality	Emission Factor Quality	Reporting or Calculation Methodology	References
				converted to CO2e using kg CO2/kwh by jurisdiction, following the guidance in ECCC 2023 for Canadian operations.	
1	Consumer Products Emissions	Very Good	Very Good to Good	In accordance with GHGRP reporting, all Consumer Products site emissions from burning fossil fuels converted to CO2e. Fossil fuel consumption by invoice converted to CO2e using kgCO2/kwh by jurisdiction, following the guidance in ECCC 2023 for Canadian operations and EPA 2025 for US operations.	ECCC 2024 EPA 2025
2	Consumer Products Electricity	Very Good	Very Good	Electricity consumption for Consumer Products sites from the Consumer Products financial records and invoices converted to CO2e using kgCO2/kwh by jurisdiction, following the guidance in ECCC 2023 for Canadian operations and EPA 2025 for US operations.	ECCC 2024 EPA 2025
3-1	Pulp and Paper Chemical Use	Very Good	Good to 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 in 2024, to calculate a CO2e/kg of chemicals used factor. Chemical use reported as purchased chemicals converted to dry kilograms and converted to GHG using the 2024 factor for emissions per kg for Pulp and Paper mills.	Tomberlin et al 2020
3-4	Pulp and Paper Freight to Customers	Very Good	Good to Very Good	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 CO2e/tonne-km. Intermodal assumed to be the same as rail. Emissions such as those arising from water vapour, soot, and black carbon have not been included in the carbon footprint.	EPA 2025
3-1	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 in 2024, to calculate a CO2e/kg of chemicals used factor. Chemical use reported as purchased chemicals converted to dry kilograms and converted to GHG using the 2024 factor for emissions per kg for tissue mills.	Tomberlin et al 2020
3-1	Consumer Products fluff pulp and parent roll purchases	Very Good	Good	Emissions from purchases of fluff pulp and parent rolls from external suppliers in tonnes, using published emissions factors. Fluff pulp and parent roll purchases from the internal accounting systems. Emissions factors for parent	Tomberlin et al 2020

Category	Emission/ Removal	Activity Data Quality	Emission Factor Quality	Reporting or Calculation Methodology	References
				roll purchases from Table 7 in the referenced paper.	
3-1	Consumer Products Pulp purchases	Very Good	Fair	Emissions from purchases of eucalyptus pulp (EUC) from external suppliers in tonnes, calculated using emissions from two of three (77% of EUC consumed) EUC suppliers to create a weighted average EUC pulp factor. EUC suppliers provided emission detail delivered to US ports, then rail freight emissions were estimated to each ICP mill, for a weighted average factor unique to each mill. EUC pulp from internal accounting systems. Emissions such as those arising from water vapour, soot, and black carbon have not been included in the carbon footprint.	Internally derived factor from 3 rd party reviewed supplier emissions
3-4	Consumer Products Freight to Customers (internal)	Very Good	Fair	Parent roll transportation between tissue mills. Parent roll usage from internal accounting systems reporting. Calculate emissions from factors referenced. Freight is by truck.	EPA 2025
1	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 2024 EPA 2025
2	Corporate Head Office Electricity	Good	Good	Electricity consumption by invoice converted to CO2e using kgCO2/kwh by jurisdiction, following the guidance in ECCC 2023.	ECCC 2024
3-6	Corporate Air Travel	Good	Good	Corporate air travel in the forest products supply chain – both commercial and corporate flights.	ECCC 2024
3-7	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 CO2e per vehicle for 5/7 days per week for 48/52 weeks a year.	EPA-420-F-23-014
3-5	Waste Disposal	Good	Good	Tonnes of commercial/industrial waste disposed of in a landfill.	EPA 2025
3-2	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/CO2e per USD spent (2022) factor for sector 3332 – Machinery for the paper, textile, food and other industries (except semiconductor manufacturing). Industry sector	EPA 2025 USCB 2024 BOC 2024 USBLS 2024

Category	Emission/ Removal	Activity Data Quality	Emission Factor Quality	Reporting or Calculation Methodology	References
				selected following (US Census Bureau 2023) “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.”	
3-1	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/CO2e per USD spent (2024) factor for sector 4238 (EPA 2025). Industry sector selected following (US Census Bureau 2024) “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 2024) 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 2025 USCB 2024 BOC 2024 USBLS 2024
3-3	Upstream Emissions from Purchased Fuels	Very Good	Good to Very Good	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 from 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 2024 EPA 2025 GHGenius 2022
3-1	Plastic Manufacturing Inputs	Very Good	Fair	Cradle to gate emissions from upstream supply chain purchases of plastic manufacturing inputs (325111) used in the manufacturing of diapers using annual spending and referenced kg/CO2e per USD spent (2022) factor for sectors referenced (EPA 2025).	EPA 2025 USCB 2024 BOC 2024 USBLS 2024
3-1	Consumer Packaging	Very Good	Fair	A circular footprint formula (CFF) was used to create cradle –to gate emissions from upstream supply chain purchases packaging materials to	Tomberlin et al 2020 EPA 2021 USCB 2022

Category	Emission/ Removal	Activity Data Quality	Emission Factor Quality	Reporting or Calculation Methodology	References
				account for the proportion of recycled products included in packaging materials. Cardboard packaging, cores and paperboard are calculated from the tonnes purchased and emission factors from Tomberlin et al (2020). Adhesives and plastic wraps (326110), using annual spending and referenced kg/CO2e per USD spent (2018) factor for sectors referenced (EPA 2021).	BOC 2022 USBLS 2022 USEPA2020a USEPA2020b Wolf et al., 2019 Zamperi & Pant 2019
3-8	Upstream and Downstream Leased Assets	Good	Fair	Cradle to gate emissions from upstream leased assets (office space and storage on sold products). Using annual spending from financial statements spending and referenced kg/CO2e per USD spent (2022) factor for sector 493 “Warehousing and Storage” and sector 531 rental of “Other Real Estate.” Includes additional heating and electricity emissions where required in lease.	EPA 2025 USCB 2024 BOC 2024 USBLS 2024
Land Use	Peat Emissions (land use)	Very Good	Good	Land use change emissions from peat bog following the guidance of Dessureault et al, 2020.	Dessureault et. al 2020

The table below summarizes the general uncertainty used in the pedigree matrix approach for land use. 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 8. Data Quality Assessment for Land Use

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, Fair	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, Fair	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

More detail including a bibliography regarding the forest inventory and forest carbon modeling can be found in the 2020 QES www.jdirvingsustainability/2020

APPENDIX C – QUANTIFICATION OF HWP AND NET FOREST GROWTH REMOVAL

Table 9. 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 Sawwood – USA	38
Pulp and paper - Canada	2
Pulp and paper – USA	3

Table 10. Calculated Half-Life (years) Used for HWP

Forest Product	Half-Life Used (Years)
Lumber (Pre-1980)	51.42
Lumber (Post-1980)	48.80
Kraft pulp	2.63
Corrugated medium	2.47
Paper	2.70
Tissue	2.65

Table 11. Data Quality Assessment for Uncertainty Analysis

Uncertainty	Quality
Activity Data	Very Good to Good
Emissions Factor Data	Good to Fair

APPENDIX D – EMISSIONS/(REMOVALS) DETAIL

Table 12. Manufacturing and Supply Chain Emissions Detail

Division	Emission	Scope	2024 Tonnes CO ₂ e	%
Woodlands	Direct Fuels	1	11,784	0.6%
Sawmills	Direct Fuels	1	22,884	1.1%
Pulp and Paper	Direct Fuels	1	181,014	8.6%
Consumer Products	Direct Fuels	1	279,333	13.2%
Sub Total: Scope 1			495,015	23.5%
Woodlands	Electricity	2	1,320	0.1%
Sawmills	Electricity	2	71,820	3.4%
Pulp and Paper	Electricity	2	375,932	17.8%
Consumer Products	Electricity	2	185,697	8.8%
Sub Total: Scope 2			634,769	30.1%
Woodlands	Wood procurement	3-1	133,152	6.3%
Pulp and Paper	Chemicals	3-1	59,000	2.8%
Consumer Products	Chemicals	3-1	13,493	0.6%
Consumer Products	Pulp and parent roll purchases	3-1	122,255	5.8%
Consumer Products	Plastics	3-1	43,759	2.1%
Consumer Products	Consumer Packaging & Marketing	3-1	58,299	2.8%
All	Supply chain consumables	3-1	29,382	1.4%
All	Capital spending	3-2	56,938	2.7%
All	Upstream fuel emissions	3-3	126,453	6.0%
Sawmill	Residue freight	3-4	47,493	2.3%
Sawmill	Freight to customers	3-4	53,409	2.5%
Sawmill	Pellet freight to port	3-4	3,314	0.2%
Pulp and Paper	Freight to customers	3-4	138,422	6.6%
Consumer Products	Finished goods to customers	3-4	55,832	2.6%
Consumer Products	Internal freight	3-4	6,566	0.3%
All	Waste disposal	3-5	7,255	0.3%
All	Air Travel and Rentals (commercial)	3-6	1,283	0.1%
All	Employee commuting	3-7	15,739	0.7%
All	Leased assets (warehousing)	3-8	8,503	0.4%
Sub Total: Scope 3			980,547	46.5%
Total Emissions: Scope 1, 2 and 3			2,110,331	100.0%

Table 13. Direct and Indirect Emissions History

Division	Emission	2022 tonnes CO ₂ e	2023 tonnes CO ₂ e	2024 tonnes CO ₂ e	% Change
Woodlands	Direct Fuels	11,532	12,218	11,784	-4%
Sawmills	Direct Fuels	68,387	32,787	22,884	-30%
Pulp and Paper	Direct Fuels	208,862	196,374	181,014	-8%
Consumer Products	Direct Fuels	264,377	274,918	279,333	2%
Sub Total: Scope 1		553,158	516,297	495,015	-4%
Woodlands	Electricity	1,187	1,023	1,320	29%
Sawmills	Electricity	64,315	56,471	71,820	27%
Pulp and Paper	Electricity	406,649	308,875	375,932	22%
Consumer Products	Electricity	190,569	184,708	185,697	1%
Sub Total: Scope 2		662,720	551,077	634,769	15%
Woodlands	Wood procurement	121,544	131,153	133,152	2%
Pulp and Paper	Chemicals	67,706	66,469	59,000	-11%
Consumer Products	Chemicals	12,554	12,424	13,493	9%
Consumer Products	Pulp and parent roll purchases	116,706	97,197	122,255	26%
Consumer Products	Plastics (Diapers)	44,405	31,551	43,759	39%
Consumer Products	Consumer Packaging & Marketing ^a	72,687	70,492	58,299	-17%
All	Supply chain consumables	32,211	32,016	29,382	-8%
All	Capital spending	53,270	51,406	56,938	11%
All	Upstream fuel emissions	138,356	128,644	126,453	-2%
Sawmill	Residue freight	36,644	39,421	47,493	20%
Sawmill	Freight to customers	45,533	47,068	53,409	13%
Sawmill	Peat & Pellet freight to customers	5,503	5,758	3,314	-42%
Pulp and Paper	Freight to customers	55,059	174,224	138,422	-21%
Consumer Products	Finished goods to customers	53,381	50,030	55,832	12%
Consumer Products	Internal freight	6,010	5,827	6,566	13%
All	Waste disposal	7,353	7,190	7,255	1%
All	Air Travel and Rentals (commercial)	1,800	1,789	1,283	-28%
All	Employee commuting	15,127	15,840	15,739	-1%
All	Leased assets (warehousing)	22,989	20,106	8,503	-58%
Sub Total: Scope 3		908,838	988,605	980,547	-1%
Total Emissions: Scope 1, 2 and 3		2,124,716	2,055,979	2,110,331	3%

Table 14. Reporting Changes from 2023

Note	Category	Explanation
a	Consumer Products	Addition or improvement to reporting emissions category from 2023 for purchased eucalyptus pulp factor.

Table 15. Major Emissions Increases/(decreases) from 2023

Emission Category	Detail	Scope 1 tonnes CO₂e	Scope 2 tonnes CO₂e	Scope 3 tonnes CO₂e	Total tonnes CO₂e
Sawmills Direct	GLT Bark Boiler re-commissioned in June 2023	(7,499)			(7,499)
Pulp and Paper Scope 1	Irving Paper, Fuel Switching Natural gas and Light Fuel Oil	(7,527)			(7,527)
Scope 2	New Brunswick Emission Factor increase vs. 2023		98,913		98,913
Scope 2	Irving Paper production decrease		(10,227)		(10,227)
Pulp and Paper Scope 3	Pulp and Paper Freight Mix and Distance			(35,802)	(35,802)
Consumer Products Scope 3	Increase purchased EUC in overall hardwood pulp mix			25,058	25,058
Consumer Products Scope 3	Irving Personal care Production Increase			12,208	12,208
Total		(15,026)	88,686	1,464	75,124

Table 16. HWP Transfer and Net Forest Growth Emissions/(Removals) Detail

Division	Transfer/Emission	2022 tonnes CO ₂ e	2023 tonnes CO ₂ e	2024 tonnes CO ₂ e
Sawmill	HWP – Lumber	(883,750)	(894,457)	(949,590)
Pulp and Paper	HWP – Kraft pulp	35,367	(54,362)	(64,195)
Pulp and Paper	HWP – Corrugating medium	3,138	(5,021)	(8,331)
Pulp and Paper	HWP – Paper	13,006	22,815	33,915
Consumer Products	HWP – Tissue Products	(144,119)	(117,416)	(133,584)
Sub-Total: Transfer to HWP		(976,358)	(1,048,441)	(1,101,785)
Woodlands – Freehold	Softwood Merchantable Emission/(Removal)	(1,321,300)	(1,112,800)	(1,266,719)
Woodlands – Freehold	Hardwood Merchantable Emission/(Removal)	(315,200)	(122,100)	(178,823)
Woodlands – Freehold	Other Biomass Emission/(Removal)	(1,853,450)	(1,545,100)	(1,445,870)
Woodlands – Freehold	DOM Emission/(Removal)	1,125,850	957,200	922,188
Juniper Organics Limited ¹	Peat Bog Land Use Change Emission/(Removal)	0	3,727	3,766
Sub-Total: Net Forest Growth – Freehold		(2,364,100)	(1,819,073)	(1,965,458)¹⁰
Total: HWP Transfer plus Net Forest Growth Emissions/(Removals)		(3,340,458)	(2,867,514)	(3,067,243)
Woodlands – License 7	Softwood Merchantable Emission/(Removal)	(1,302,500)	(1,080,100)	(1,156,126)
Woodlands – License 7	Hardwood Merchantable Emission/(Removal)	(409,000)	(411,300)	(351,396)
Woodlands – License 7	Other Biomass Emission/(Removal)	(1,873,600)	(1,620,800)	(1,621,254)
Woodlands – License 7	DOM Emission/(Removal)	1,037,700	760,500	993,187
Sub Total: Net Forest Growth (Crown License 7)²		(2,547,400)	(2,351,700)	(2,135,589)¹¹

¹Emission included in Land Use Change instead of Scope 1 (Direct Emissions). 2022 was not reported.

²Crown License 7 emissions/(removals) are shown for transparency. These emissions/(removal) are not counted in the Declaration of Carbon Neutrality.

Table 17. Biogenic CO₂ Emissions Detail

Division	Biogenic Emission	2022 tonnes CO ₂	2023 tonnes CO ₂	2024 tonnes CO ₂
Sawmills	Waste Bark (Hog Fuel)	209,736	297,868	291,360
Pulp & Paper	Waste Bark (Hog Fuel)	251,757	238,455	279,504
Pulp & Paper	Pulping Liquor	759,797	785,411	788,572
Pulp & Paper	Biogas	22,888	21,445	20,310
Total: Biogenic CO₂		1,244,178	1,343,178	1,379,746

¹⁰ The methodology for calculating removals changed in 2024 and therefore cannot be directly compared to 2023 and 2022. 2024 uses a five-year rolling average

¹¹ The methodology for calculating removals changed in 2024 and therefore cannot be directly compared to 2023 and 2022. 2024 uses a five-year rolling average

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GLOSSARY OF TERMS

Biogenic: CO₂ 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 CO₂ 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 (CO₂e). In the case of forest or tree growth, carbon means CO₂ only.

Carbon Dioxide Equivalents (CO₂e): gases including carbon dioxide (CO₂), methane (CH₄), nitrous oxide (N₂O) and various fluorinated gases, also referred to as greenhouse gases (GHG). Gases are weighted by their individual global warming potential (GWP) to equal a CO₂e.

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.

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 7, Other Crown lands, and Private Lands.

Forest Products: finished and semi-finished wood-based products including lumber, pulp, paper, wood pellets, growing media, corrugating medium, Tissue, diapers, 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 (CO₂e) including carbon dioxide (CO₂), methane (CH₄), nitrous oxide (N₂O) and various fluorinated gases, also referred to as Carbon Dioxide Equivalents (CO₂e). Gases are weighted by their individual global warming potential (GWP) to equal a GHG.

growing media: peat moss, soils, and mulch products used by in the horticultural and landscaping industries.

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 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., The New Brunswick Railway Company, Grand River Pellets Limited, Juniper Organics Limited, Rothesay Paper Holdings Ltd., St. George Pulp & Paper Limited, St. George Power LP, Charlotte Pulp and Paper Co. Ltd., Irving Forest Services Limited, 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 CH₄.

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.

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

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.

Supply Chain: all the activities or steps linked to produce and distribute products from raw materials to Customers.