BDO Zone Rating: **'A'**

Biofuel Development Opportunity Zone Risk Rating

'A'

The Matawinie, QC Biofuel Development Opportunity Zone is rated 'A' and is characterized by an abundance of woody biomass with a robust and experienced forest industry. Three sites with good infrastructure were identified for new project development.

Rating Parameters:

Category	Rated Quantity	Delivered Cost	BDO Zone Size
Forest Residues	105,000 dmt/yr	$140-$160/dmt	150 km driving distance from Ste-Émélie-de-l'Énergie
Pulpwood	125,000 dmt/yr	$130-$150/dmt	
Sawmill Residuals	130,000 dmt/yr	$40-$205/dmt	

BDO Zone Assets

- **360,000 dry metric tons / year (dmt/yr) of woody biomass available at low-risk**
- **Strong forestry and wood industry sectors with a long history of performance**
- **Numerous sawmills in the region are already supplying a multitude of businesses with Sawmill Residuals**
- **Most salient risk areas can be effectively mitigated through supply chain integration**

BDO Zone Liabilities

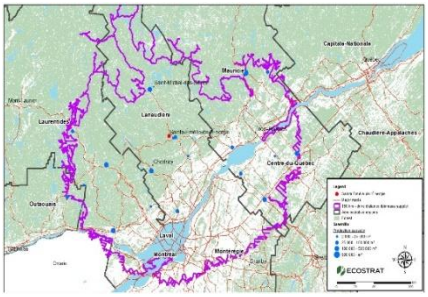
- **Aging logging workforce compounded with higher equipment costs and harder access to capital result in risks related to access to labour**
- **Forest Residues supply chains are not developed and require capital investment to scale up**
- **Sawmill Residual pricing is sensitive to demand. It can significantly increase with a new entrant**

BDO Zone Risk Rating

The Matawinie, QC Biofuel Development Opportunity Zone is rated 'A', or *high quality*.

Risk Rating Grades are defined as follows: AAA (highest quality), AA (very high quality), A (high quality), BBB (good quality).

Matawinie, QC BDO ZONE



Scoring and Ratings Methodology

In assessing the biomass supply chain risk for the Biofuel Development Opportunity (BDO) Zone in Matawinie, Quebec (QC), 71 Risk Indicators from the Canadian Standards for Biomass Supply Chain Risk (BSCR) were applied. These BDO Zone Risk Indicators are the subset of BSCR Risk Indicators applicable to gauging feedstock risk within a BDO Zone.

Feedstock quantity is expressed in dry metric tons per year (dmt/yr), while feedstock cost is expressed in Canadian (CAN) dollars, delivered to Ste-Émélie-de-l'Énergie. Maximum transport distance is based on a 150 km driving distance from this municipality.

The BDO Zone rating is based on an aggregation of the scores assigned to each BDO Zone Risk Indicator (RI) assessed in this report. First, each BDO Zone Risk Indicator is given a **Raw RI** score based on the research and analysis conducted on the feedstock supply chain in the region. Raw RI Scores are scaled between 1 (*low risk*) and 10 (*high risk*).

Next, each Risk Indicator is discounted, or "notched", based on the degree to which the uncertainty drivers are deemed addressable, and whether there is a reasonable expectation that mitigation measures could be put into place within the price parameters for this rating.

The **Notched Salience score** corresponds to the likelihood of each Risk Indicator's described risk materializing given the implementation of reasonable mitigation measures. To arrive at the Notched Salience score, Raw RI scores

are reduced based on the efficacy of the likely mitigation measures. If applicable, notching occurs at one of 3 levels: 25%, 50%, or 75%.

Finally, the potential impact of each Risk Indicator on the supply chain is assessed and scored on a 10-point **Impact Level** scale, as either *low (3.33), moderate (6.66), or high (9.99).* Impact level scores are based on assumptions that key measures were implemented to mitigate uncertainty drivers in the BDO Zone but failed to do so.

The **Loaded RI** score for each Risk Indicator is then calculated as the product of Notched Salience and Impact Level scores. For example, if the Risk Indicator 'Competitor Price and Price Sensitivity' is scored at a Raw Score of 4, a Notched Salience of 2, and the Impact Level is high (i.e., 9.99). The final Loaded RI score for this risk indicator is $2 \times 9.99 = 19.98$ (out of 100).

Loaded RI scores of 33.33 or less are deemed *low risk*; scores greater than 33.33 and less than 66.66 are deemed *moderate risk*; and those that score 66.66 to 100 are deemed *high risk*.

The total risk rating for the BDO Zone is the average of all Loaded RI scores. The BDO Zone score for Matawinie, QC is ***15.13 out of 100, resulting in an 'A' designation.*** All scoring and rationale for each Risk Indicator is provided in Appendix A.

Analyst Notes

The forestry and wood processing industry sectors in the Matawinie BDO Zone are major industries within the region. The majority of timberlands (64%) in the Zone are privately owned whereas the rest (36%) are owned by the State and known as "Crown lands".

Substantial quantities of unutilized woody biomass feedstock were identified within 150 km driving distance from Ste-Émélie-de-l'Énergie, a municipality identified as the center point of the Zone. In fact, a **total of 360,000 dmt/yr of woody biomass feedstock available at low-risk was identified**, out of which 130,000 dmt/yr is Sawmill Residual (wood chip, sawdust/shavings, and bark), 105,000 dmt/yr is Forest Residues, and 125,000 dmt/yr is Pulpwood.

In terms of suppliers, 20 sawmills were identified within the Zone, as well as numerous logging companies and harvesting contractors. It is estimated that identified sawmills generate over 390,000 dmt/yr of Sawmill Residuals of which 130,000 dmt/yr is available at low-risk. However, if a prospective stakeholder exclusively relies on this feedstock, it could significantly disrupt the current market equilibrium.

In 2021, only 57% of the entire volume of roundwood that could be processed by sawmills located within the Zone was processed. The projected consumption of roundwood from these sawmills is 1,075,000 m^3/yr of softwood and 185,000 m^3/yr of hardwood. Logging operations have decreased in recent years due to the increase in supply costs and the closure of sawmills. However, the forest industry in the Zone is still well-developed but might require a certain level of scaling up if the demand for Pulpwood and Forest Residues rises in the coming years.

Forest Residues is a by-product of timber harvesting operations. There is an estimated 210,000 dmt/yr of Forest Residues generated in the BDO Zone, of which we estimate 105,000 dmt/yr is available at in long-term at low-risk.

We identified 34 facilities located within a 200 km driving distance of Sainte-Émélie-de-l'Énergie that utilize woody biomass, primarily pulp and paper mills, cogeneration and biofuel mills (ex. pellet), and panelboard mills. As the estimates provided in this report indicate quantities technically available in addition to current consumption, the existence of a well-developed market for woody biomass is a positive indicator. This shows that the woody biomass supply chain, mainly Sawmille4 Residuals and Pulpwood, is well-established, and that the industry is healthy.

In the province of Quebec, the Forest Ministry performs an annual allowable cut (AAC) calculation. The AAC is a quantitative estimation that helps to establish sustainable forest management standards and monitor their implementation over time so that the quantity of wood harvested in the forest never exceeds the quantity of wood generated by the forest over a five-year period.

The Matawinie BDO Zone affects 8 administrative regions in Quebec: Lanaudière, Laurentides, Mauricie, Centre-du-Québec, Montérégie, Laval, Montréal and Outaouais. The AAC of Crown lands located within the Zone is

estimated at 428,000 m^3/yr of softwood and 436,000 m^3/yr of hardwood for the period 2018-2023. For the period 2023-2028, the estimated AAC of Crown lands located within the Zone is lower by 8% for softwood at 396,000 m^3/yr, and lower by 5% for hardwood, at 414,000 m^3/yr.

As for any other forestlands that are not public, such as private forests, the AAC is significantly higher than the annual harvested volume. Therefore, these non-public forests located within the Zone represent significant sources of feedstock.

The technically available volume of forest residuals in private forests is determined based on the allowable annual cut (AAC) of roundwood, which undergoes multiple reduction factors. As stated in Appendix D, our analysis indicates that approximately 16.5% of the total quantity of forest residues associated with the AAC of roundwood could potentially be available for recovery by the bioenergy sector. It is important to note that these estimations are subject to variations based on factors such as availability, market conditions, and technological advancements. Also, the conservation movement is becoming increasingly popular with private landowners, which limits active forest management and therefore woody biomass availability.

The delivered pricing for Sawmill Residuals within the BDO Zone ranges from $40 to $205 per dmt. More precisely, chips are $205, sawdust/shavings are $160 and bark are $40. Meanwhile, the delivered pricing for Pulpwood ranges from $130 to $150 per dmt depending on the region where pulpwood is coming from. Forest Residues is estimated to have a delivered pricing ranges between $140 to $160 per dmt depending on the distance it is recovered from the facility.

Over the past decade, from 2013 to 2023, prices of sawmill residuals have remained mostly stable, helping pulp and paper mills recover from the forest crisis that occurred between 2008 and 2010, as well as from the market decline for pulp and paper products. However, in 2023, prices suddenly soared due to several factors, including a higher demand for Sawmills Residuals in the bioenergy sector, a new large pulp and paper mill in the North of Quebec, and less feedstock availability resulting from reduced harvesting operations. These factors created a lower offer/demand ratio, leading to the sharp increase in prices.

Salient Risk Indicators

Suppliers operating within the Matawinie BDO Zone are exposed to the same risks. Notably, the forest industry is susceptible to fluctuations in the housing market, which can adversely affect sawmill operations. During periods of downturn in lumber markets, sawmills are at risk of curtailing their operations, leading to reduced availability of Sawmill Residuals, and potentially affecting the supply of Pulpwood and Forest Residue.

Recent observations indicate that competitors in the market for Sawmill Residuals have exhibited a high tolerance for short-term price increases. Between 2022 and 2023, the price of wood chips nearly doubled, indicating that competitors have a low-price sensitivity and the ability to withstand pricing pressures. This trend could potentially give rise to competitors employing an outpricing strategy, temporarily raising prices to deter new market entrants.

The recent price surge aligns with the growing development in the wood pellet sector, driven by heightened international demand for wood pellets, particularly from the UK and EU markets. It is anticipated that there will be an increase in wood pellet production capacity in Quebec; however, it remains uncertain whether any of these developments will occur within the BDO Zone. The demand for competitors' products, especially wood pellets, poses a risk of driving up Sawmill Residual prices.

While higher Sawmill Residual prices can be partially mitigated through substitution with Pulpwood and Forest Residue, there are limitations on the production capacity of logging companies involved in these alternative supply chains. Additionally, there are associated risks with scaling up these supply chains. The logging workforce is aging, equipment costs are rising, and access to capital is becoming more challenging. Consequently, small family-owned logging companies are encountering difficulties in sustaining their operations. Nonetheless, these risks

can be mitigated through the vertical integration of the supply chain.

Opportunities

Despite the inherent risks, our analysis suggests a potential opportunity for the development of bio projects in the BDO Zone. The forest industry, with its extensive decades-long experience, has demonstrated resilience in adapting to shifting markets. This resilience is evidenced by the significant number of currently operational sawmills, pulp and paper mills, and other biomass users. The diverse and abundant presence of suppliers in terms of number, size, and locations creates a favorable environment for a robust supply chain.

Our investigations have indicated that despite the existing facilities producing forest products, there is still room for additional players in the market. In fact, there is a surplus of pulpwood, potential supplies of sawmill residuals, and substantial quantities of currently unutilized Forest Residue. These biomass streams offer readily available resources for new market entrants, despite the aforementioned risks discussed earlier.

In the BDO Zone, Pulpwood emerges as the lowest-risk feedstock stream. This is primarily due to the high capacity of the Pulpwood supply chain, which is currently underutilized. Forest management practices dictate that Pulpwood be harvested alongside sawtimber. With a low demand for Pulpwood, harvesting sawtimber for lumber production becomes economically expensive and often impractical. Therefore, it is generally in the forest industry's best interest to maintain a healthy demand for Pulpwood. Furthermore, the quantities of Pulpwood identified in this report are likely to be guaranteed by the Forest Ministry over the long term, providing a certain level of stability.

Infrastructure

The infrastructure within the BDO Zone presents favorable conditions for new project development, characterized by a low risk profile. Notably, there are a minimum of three industrial parks within the region that offer promising potential as suitable locations for bio projects. Furthermore, each industrial park benefits from an abundant water supply, with access to an aqueduct ensuring reliable water availability. In terms of electricity, the reliable power source of Hydro Quebec is readily accessible to these industrial parks.

All the industrial parks within the BDO Zone enjoy excellent connectivity to roads and highways, facilitating efficient transportation and logistics. Moreover, a new project established in this area would have relatively convenient proximity to rail lines and water ports, offering additional transportation options for incoming and outgoing shipments.

It is important to note, however, that none of the industrial parks have direct access to a natural gas pipeline. Consequently, any new project requiring natural gas would need to arrange for its delivery via truck and establish on-site storage tanks. Additionally, a new project would be responsible for its own wastewater treatment, as this service is currently unavailable at the industrial parks.

Technical Contacts
Marcin Lewandowski
Senior Director, Operations & Risk
Ecostrat Inc.
marcin@ecostrat.com

William Métivier, f. eng.
Project Principal
Ecostrat Inc.
william@ecostrat.com

Business Contact
Jordan R. Solomon
President & CEO
Ecostrat Inc.
jordan.solomon@ecostrat.com

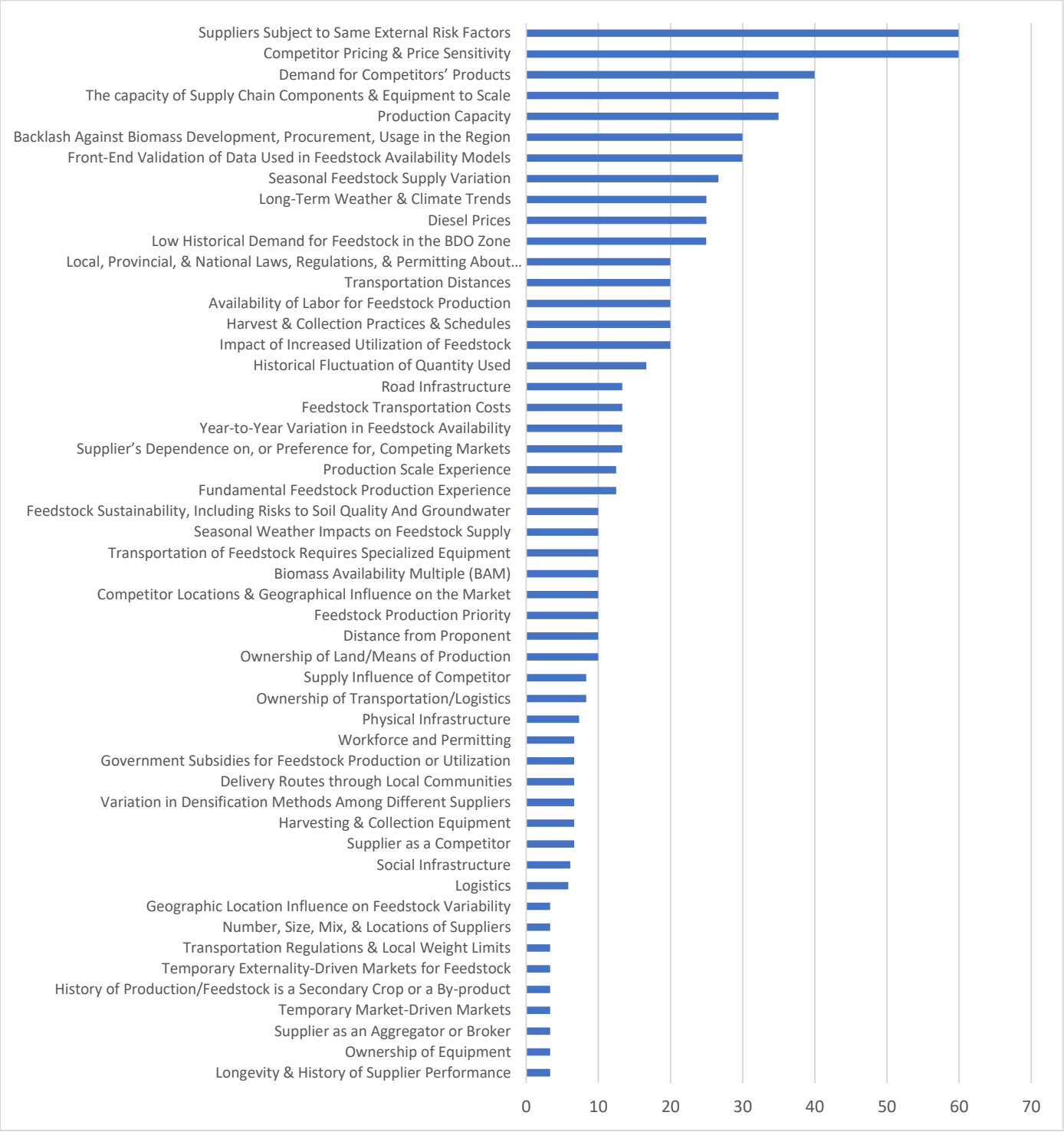

Suppliers Subject to Same External Risk Factors
Competitor Pricing & Price Sensitivity
Demand for Competitors' Products
The capacity of Supply Chain Components & Equipment to Scale
Production Capacity
Backlash Against Biomass Development, Procurement, Usage in the Region
Front-End Validation of Data Used in Feedstock Availability Models
Seasonal Feedstock Supply Variation
Long-Term Weather & Climate Trends
Diesel Prices
Low Historical Demand for Feedstock in the BDO Zone
Local, Provincial, & National Laws, Regulations, & Permitting About...
Transportation Distances
Availability of Labor for Feedstock Production
Harvest & Collection Practices & Schedules
Impact of Increased Utilization of Feedstock
Historical Fluctuation of Quantity Used
Road Infrastructure
Feedstock Transportation Costs
Year-to-Year Variation in Feedstock Availability
Supplier's Dependence on, or Preference for, Competing Markets
Production Scale Experience
Fundamental Feedstock Production Experience
Feedstock Sustainability, Including Risks to Soil Quality And Groundwater
Seasonal Weather Impacts on Feedstock Supply
Transportation of Feedstock Requires Specialized Equipment
Biomass Availability Multiple (BAM)
Competitor Locations & Geographical Influence on the Market
Feedstock Production Priority
Distance from Proponent
Ownership of Land/Means of Production
Supply Influence of Competitor
Ownership of Transportation/Logistics
Physical Infrastructure
Workforce and Permitting
Government Subsidies for Feedstock Production or Utilization
Delivery Routes through Local Communities
Variation in Densification Methods Among Different Suppliers
Harvesting & Collection Equipment
Supplier as a Competitor
Social Infrastructure
Logistics
Geographic Location Influence on Feedstock Variability
Number, Size, Mix, & Locations of Suppliers
Transportation Regulations & Local Weight Limits
Temporary Externality-Driven Markets for Feedstock
History of Production/Feedstock is a Secondary Crop or a By-product
Temporary Market-Driven Markets
Supplier as an Aggregator or Broker
Ownership of Equipment
Longevity & History of Supplier Performance
0
10
20
30
40
50
60
70

Table 1 - Risk Indicators and Associated Scores

	Feedstock Supply Chain Risk Indicators	Raw RI Score	Notched Salience	Impact Level	Loaded RI Score
	Category 1: Supplier Risk				
1.1	Longevity & History of Supplier Performance	1	1.0	3.33	3.33
1.2	Production Capacity	7	3.5	9.99	34.97
1.3	Supplier's Dependence on, or Preference for, Competing Markets	2	2.0	6.66	13.32
1.4	Supplier as a Competitor	2	2.0	3.33	6.66
1.5	Ownership of Land / Means of Production	1	1.0	9.99	9.99
1.6	Ownership of Equipment	1	1.0	3.33	3.33
1.7	Ownership of Transportation/Logistics	5	1.25	6.66	8.32
1.8	Supplier as an Aggregator or Broker	1	1.0	3.33	3.33
1.9	Feedstock as a Secondary Transformation	1	1.0	9.99	9.99
1.10	Fundamental Feedstock Production Experience	5	1.25	9.99	12.48
1.11	Production Scale Experience	5	1.25	9.99	12.48
1.12	Feedstock Production Priority	4	1.0	9.99	9.99
	Category 2: Competitor Risk				
2.1	Competitor Locations and Geographical Influence on the Market	1	1.0	9.99	9.99
2.2	Historical Fluctuation on Quantity Used	5	5.0	3.33	16.65
2.3	Competitor Pricing and Price Sensitivity	8	6.0	9.99	59.94
2.4	Supply Influence of Competitor	5	2.5	3.33	8.32
2.5	Temporary Market-Driven Markets	1	1.0	3.33	3.33
2.6	Demand for Competitors' Products	8	4.0	9.99	39.96
	Category 3: Supply Chain Risk				
3.1	Biomass Availability Multiple (BAM)	1	1.0	9.99	9.99
3.2	Impact of Increased Utilization of Feedstock	2	2.0	9.99	19.98
3.3	Seasonal Feedstock Supply Variation	8	4.0	6.66	26.64
3.4	Year-to-Year Variation in Feedstock Availability	4	2.0	6.66	13.32
3.5	Front-End Validation of Data used in Feedstock Availability Models	3	3.0	9.99	29.97
3.6	Low Historical Demand for Feedstock in the BDO Zone	5	2.5	9.99	24.96
3.7	History of Production/Feedstock in a New/Secondary Crop or a By-Product	1	1.0	3.33	3.33
3.8	Diesel Prices	5	3.75	6.66	24.98
3.9	Harvest & Collection Practices & Schedules	6	3.0	6.66	19.98
3.10	Harvesting and Collection Equipment	2	2.0	3.33	6.66
3.11	Temporary Externality-Driven Markets for Feedstock	1	1.0	3.33	3.33
3.12	Variation in Densification among Different Suppliers	2	2.0	3.33	6.66
3.13	Availability of Labour for Feedstock Production	6	3.0	6.66	19.98
3.14	Feedstock Transportation Costs	4	4.0	3.33	13.32
3.15	Transportation Distances	3	3.0	6.66	19.98
3.16	Transportation of Feedstock Requires Specialized Equipment	3	3.0	3.33	9.99
3.17	Delivery through Local Communities	2	2.0	3.33	6.66
3.18	Transportation Regulations & Local Weight Limits	1	1.0	3.33	3.33
3.19	Road Infrastructure	2	2.0	6.66	13.32
3.20	Number, Size, Mix, and Locations of Suppliers	1	1.0	3.33	3.33
3.21	Suppliers Subject to Same External Risk Factors	8	6.0	9.99	59.94
3.22	Seasonal Weather Impacts on Feedstock Supply	3	1.5	6.66	9.99
3.23	Long-Term Weather and Climate Trends	5	2.5	9.99	24.98
3.24	Government Subsidies for Feedstock Production or Utilization	2	2.0	3.33	6.66
3.25	Local, Provincial, and National Laws, Regulations, and Permitting pertaining to Biomass	4	2.0	9.99	19.98
3.26	Backlash against Biomass Development, Procurement or Usage in the Region	6	3.0	9.99	29.97
3.27	Feedstock Sustainability, including risks to soil quality and surface and groundwaters.	1	1.0	9.99	9.99
3.28	Geographic Location Influence on Feedstock Variability	1	1.0	3.33	3.33
3.29	Capacity of Supply Chain Components and Equipment to Scale	7	3.5	9.99	34.97
	Category 4: Infrastructure				
4.1	Physical Infrastructure	2.2	2.2	3.33	7.33
4.2	Logistics	1.75	1.75	3.33	5.83
4.3	Social Infrastructure	1.83	1.83	3.33	6.11
4.4	Workforce and Permitting	2	2	3.33	6.66
				Average	**15.13**



Biofuel Development Opportunity Zone Rating Independent Review Committee – Matawinie, QC

Jonathan Landreville – SADC Matawinie
Karen Ferland - Association Forestière de Lanaudière
Claudine Éthier – MRC Matawinie
Hachirou Nassirou – MRC Matawinie
Yves Crits - Biomasse Lac Taureau
Alain Gagnon - Groupe Crête
Jean-François Champoux - Scierie St-Michel

APPENDIX A: RISK INDICATOR SCORING METRICS

CATEGORY 1: SUPPLIER RISK

1.1. Longevity & History of Supplier Performance

Rationale: Number of years in business is a positive indicator of future solvency. Historical performance is an indicator of future performance.	
Raw RI Score: Based on our analysis, a significant proportion of sawmills located within the BDO Zone have demonstrated operational longevity, exceeding a span of 20 years. This extensive operational history is a favorable factor, particularly considering the role of these sawmills as providers of feedstock. It signifies a positive outlook for their future financial viability. Additionally, it is noteworthy that the production of Sawmill Residuals from these mills has displayed a degree of stability since 2017. This consistent production trend bolsters their commendable track record in terms of historical performance, further solidifying their positive standing. The geographical region under consideration has an impressive historical record of robust performance in the forestry sector. The Matawinie BDO Zone spans across eight administrative regions in Quebec and encompasses both privately and publicly owned lands. Privately owned forest lands comprise the majority, accounting for 64% of the Zone's total area, while the remaining 36% consists of publicly owned Crown lands. It is worth noting that the private forests, although primarily situated in the northern part of the Zone, enjoy a more favorable proximity to major municipalities, the road network, and the St. Lawrence River compared to the public forests. These private forests boast a rich heritage of harvesting operations that date back to the 19th century when they were extensively managed to meet the timber demand for urban construction projects. However, the current utilization of private forests for timber production represents only a small fraction of their overall purpose. Today, these forests are primarily employed for activities such as the production of firewood, hunting, conservation easements, or recreational-tourist endeavors. Raw RI Score is 1 out of 10.	**Score 1**
Notched Salience: No adjustment.	**Score 1.0**
Impact Level: RI Impact level is deemed *low*.	**Score 3.33**
Loaded RI Score: Loaded RI Score (Notched Salience × Impact Level) is 3.33.	**Score 3.33**

1.2. Production Capacity

Rationale: Supplier production capacity can be a strong indicator of long-term credit worthiness and future solvency. Higher production capacities denote strength of operational elements, including cash flows, which are important to future solvency.

Raw RI Score: **Score 7**

Sawmill Residuals: Within the Matawinie BDO Zone, there is a total of 20 sawmills actively processing wood, with an annual capacity of 1,740,000 m^3 for softwood and 330,000 m^3 for hardwood. However, the projected consumption rates for softwood and hardwood stand at only 62% and 56% respectively. It is worth noting that only four large sawmills, located within the Zone, have a consumption rate exceeding 100,000 m^3 per year.

The larger sawmills exhibit greater resilience to market fluctuations in the lumber industry compared to their smaller counterparts. This resilience stems from their integration with pulp and paper mills or other industries involved in secondary wood products. Such integration enables them to diversify their revenue streams. Moreover, these larger sawmills often oversee and undertake harvesting operations, which grants them the flexibility to recover Forest Residues or harvest pulpwood when there is a market demand for such products.

In our classification, a sawmill is considered large if its projected consumption exceeds 100,000 m^3 per year. Operating below this threshold makes it challenging to produce and profit from secondary wood products. Among the 20 sawmills in the area, four large sawmills account for a significant 82% of the total roundwood consumption within the supply basin. Therefore, for any prospective stakeholder aiming to secure a supply of forest biomass, exploring partnerships or negotiating deals with these four large sawmills presents potential avenues that can effectively navigate future downturns in the lumber market.

Currently, the combined output of Sawmill Residuals from all 20 sawmills in the Zone amounts to approximately 390,000 dry metric tons (dmt) per year. However, a new operator entering the market could potentially access approximately 130,000 dmt per year of Sawmill Residuals. This estimation assumes a capture rate of 50% and a Biomass Availability Multiple (BAM) ratio of 1.5x, encompassing the following types of residuals: 58,500 dmt/yr of softwood chips, 21,500 dmt/yr of softwood sawdust/shavings, 22,000 dmt/yr of softwood bark, 14,000 dmt/yr of hardwood chips, 9,000 dmt/yr of hardwood sawdust/shavings, and 5,000 dmt/yr of hardwood bark.

Forest Residues: Within the Matawinie BDO Zone, it is estimated that there are approximately 85,000 dry metric tons (dmt) per year of recoverable Forest Residues on Crown lands, while private forest lands offer a higher potential yield of 125,000 dmt per year. However, it is noteworthy that 68% of the Forest Residues on Crown lands and 75% on private forest lands are situated at a driving distance exceeding 75 kilometers from Ste-Émélie-de-l'Énergie.

Pulpwood: Within the Matawinie BDO Zone, there is an estimated availability of 27,714 dry metric tons (dmt) per year of pulpwood on Crown lands. This includes 2,911 dmt/yr of softwood, 3,141 dmt/yr of poplars, and 21,662 dmt/yr of hardwood. It is worth noting that 69% of the pulpwood

resources on Crown lands are situated at a driving distance exceeding 75 kilometers from Ste-Émélie-de-l'Énergie.

On the other hand, private forests within the Zone offer a significantly higher estimated availability of pulpwood, reaching 97,437 dmt per year. This comprises 14,073 dmt/yr of softwood, 9,626 dmt/yr of poplars, and 73,738 dmt/yr of hardwood. However, it is important to highlight that 62% of the pulpwood resources on private forests are located at a driving distance exceeding 75 kilometers from Ste-Émélie-de-l'Énergie.

Raw RI Score is 7 out of 10.

Notched Salience: By creating a stable market for Forest Residue and Pulpwood, a bio-project can enhance the economics of logging operations, thereby incentivizing more workers to join the sector. Moreover, a new bio-project can mitigate the risk of logging labor shortage by purchasing or financing equipment, similar to some of the sawmills currently doing so. Collaborating with local sawmills can aid in this process. The Raw RI Score is notched down by 50%.	**Score 3.5**
Impact Level: RI Impact level is deemed *high*.	**Score 9.99**
Loaded RI Score: Loaded RI Score (Notched Salience × Impact Level) is 34.97.	**Score 34.97**

1.3. Suppliers' Dependence on, or Preference for, Competing Markets

Rationale: Suppliers may have a vested interest in or preference for supplying specific competitors for biomass feedstock. Preferences may be due to historical, long-term, or personal relationships, less stringent feedstock quality requirements, more flexible operating hours by competing markets, or suppliers' dependences on competing markets to accept or purchase other products/by-products. Consequently, during periods of feedstock shortage, such suppliers may be more likely to allocate the scarce supply to a competitor, resulting in supply disruptions for the Proponent.	
Raw RI Score: Our analysis has identified a total of 34 woody biomass markets located within a 230-kilometer driving distance from Ste-Émélie-de-l'Énergie. Based on the available information, we have found no evidence of supplier dependencies on these markets. However, it is important to consider that sawmills and loggers have a vested interest in maintaining a consistent feedstock supply to their existing markets to ensure the ongoing success of their operations. Additionally, long-standing relationships have been established within these markets. Given these factors, it is reasonable to anticipate that sawmills and loggers would prioritize supplying their current markets, even if a new market closer to their location becomes available. This consideration has been taken into account in our assumption of a Sawmill Residual capture rate of 50%. Our estimates of Forest Residues and Pulpwood also reflect the current demand and market dynamics. Raw RI Score is 2 out of 10.	**Score 2**

Notched Salience: No adjustment.	**Score 2.0**
Impact Level: This risk indicator is only applicable to Sawmill Residuals since our assessments of Forest Residue and Pulpwood have already accounted for current consumption. While our conversations with market participants have indicated that supplier-buyer dependencies do not pose a risk, there is still a possibility that unknown relationships exist. RI Impact level is deemed *medium.*	**Score 6.66**
Loaded RI Score: Loaded RI Score (Notched Salience × Impact Level) is 13.32.	**Score 13.32**

1.4. Supplier as a Competitor

Rationale: The risks of feedstock costs going up and availability going down increase if a supplier is also a competitor to the Proponent. In times of feedstock shortage, the risk that supply commitments will not be met increases.

Raw RI Score: **Score 2**

Sawmills Residuals: The forest industry in the province of Quebec has exhibited a degree of hesitation when it comes to investing in new products, particularly within the realm of bio-based projects. It took a considerable amount of time for sawmills to initiate investments in pellet mills. However, as some sawmills have demonstrated the potential for diversifying revenues and mitigating risks associated with sawmill by-products, many have now embraced this opportunity.

Nevertheless, the production of white pellets, while offering certain benefits, yields relatively low added value. This factor discourages numerous large sawmills from investing in pellet mills, as the long-term revenues generated would be marginal. The primary factors contributing to sawmills' reluctance to invest in higher added-value products are the limited availability of funds for investment and a lack of specific technical knowledge regarding bio-based products.

Consequently, there exist significant opportunities for prospective stakeholders to collaborate with sawmills in the development of bio-based projects. Sawmills can provide a stable supply of biomass at predetermined prices and conditions, while the stakeholders bring the requisite expertise and investment to the partnership. Drawing from our experience, this type of collaboration has the potential to catalyze the growth of the bioenergy sector in Quebec.

In the Matawinie BDO Zone, many sawmills currently utilize a portion of their Sawmill Residuals, primarily bark, for internal operations. However, a substantial portion of these residuals remains unused and could be available for purchase. In fact, more than half of the identified sawmills in the BDO Zone have confirmed the availability of project-ready feedstock, including chips, sawdust/shavings, and/or bark. For sawmills with Sawmill Residuals currently under short-term contracts, it is possible that these residuals will become available for purchase once the contracts expire. However, it is important to note that one large sawmill is expected to allocate all of its residuals for pellet production in the near future.

Forest Residues and Pulpwood: Within the Matawinie BDO Zone, it is observed that suppliers generally do not engage in fierce competition for Forest Residues and Pulpwood. However, it is important to highlight a notable risk for new operators seeking to secure available Pulpwood. This risk stems from the presence of a large pulp and paper mill that actively harvests substantial quantities of Pulpwood within the Zone, positioning itself as one of the 34 competing entities. Thus, prospective stakeholders should be aware of the potential challenges associated with this existing competitor in the market.

In contrast, the demand for Forest Residues is currently low, and the collection of such residues is minimal. Consequently, securing this particular feedstock should not pose significant difficulties, as there is a surplus of Forest Residues available in the Matawinie BDO Zone.

Raw RI Score is 2 out of 10.

Notched Salience: No adjustment.	**Score 2.0**
Impact Level: RI Impact level is deemed *low.*	**Score 3.33**
Loaded RI Score: Loaded RI Score (Notched Salience × Impact Level) is 6.66.	**Score 6.66**

1.5. Ownership of Land/Means of Production

Rationale: Suppliers that own land where feedstock is produced, or a production facility, tend to have better control of supply chains and present lower degrees of supply risk.

Raw RI Score: The Matawinie BDO Zone encompasses a diverse landscape of both privately-owned and publicly-owned lands, extending across eight administrative regions within the province of Quebec. Privately-owned forestlands dominate the region, constituting 64% of the total area, while the remaining 36% consists of publicly-owned Crown lands. Notably, the majority of private forests are situated in the northern part of the Zone, enjoying proximity to major municipalities, a well-established road network, and convenient access to the St. Lawrence River. This advantageous positioning sets them apart from the Crown lands within the Zone. **Score 1**

In Quebec, Crown lands are divided into management units to enhance the effectiveness of forest management. The Matawinie BDO Zone impacts six different management units, namely 041-51, 043-52, 061-51, 064-71, 062-71, and 072-51. The majority of Crown lands within the Zone are located in the northern part, at least 50 km away from Ste-Émélie-de-l'Énergie. None of the Crown lands in the Zone are situated on the south side of the St. Lawrence River.

In order to harvest roundwood from Crown lands, sawmills operating within the Matawinie BDO Zone must hold a valid guaranteed supply agreement granted by the Forest Ministry. The process of renewing this guarantee typically occurs every five years and is generally straightforward. The volume of roundwood sourced from Crown lands aligns with the specific amount stipulated in the guarantee.

Presently, sawmills are harvesting all volumes of softwoods available from these lands. However, when it comes to poplars and hardwoods, complete harvesting is not consistently realized. This is primarily due to the absence of a market for these particular species, with the exception of pulp and paper mills that possess a guaranteed supply.

Private forests within the Matawinie BDO Zone are typically harvested by private contractors, who subsequently sell the timber to sawmills. Pulpwood, on the other hand, is sold to pulp and paper mills, pellet mills, and similar entities. For the purpose of this report, private forests encompass forests owned by individuals, as well as residual forests and proximity forests owned by municipalities or Regional County Municipalities (RCMs).

Sawmills maintain control over their own production processes, allowing them to regulate the quantity and quality of Sawmill Residuals. As such, we perceive minimal risk associated with land ownership and biomass production methods.

64% of the forest in the BDO Zone falls under private ownership. Procuring roundwood, Pulpwood, and Forest Residues from private lands in Quebec carries higher risk compared to their acquisition from public forests. Firstly, in the case of public forests, the Quebec government provides guarantees for roundwood volumes, which also grant access to certain quantities of Pulpwood and Forest Residues. Secondly, private forests are not always managed with a primary focus on timber production; instead, their purposes may revolve around firewood production, recreational activities, or conservation initiatives. In fact, the significance of the conservation movement in Quebec has grown in recent years, leading to an increased number of individuals purchasing woodlots for recreational purposes.

Raw RI is 1 out of 10.

Notched Salience: No adjustment.	**Score 1.0**
Impact Level: There is some uncertainty regarding the risks associated with woody biomass in private forests. While we did not identify any challenges in acquiring wood from private forests, there is a possibility that biomass, particularly Forest Residue, may not be readily available for procurement from private forests. RI Impact level is deemed *high.*	**Score 9.99**
Loaded RI Score: Loaded RI Score (Notched Salience × Impact Level) is 9.99.	**Score 9.99**

1.6. Ownership of Equipment

Rationale: In most cases, suppliers that own or lease equipment for harvest, collection, and processing feedstock are lower risk than those who do not. For example, third-party harvesting equipment may not be available when required. Short harvest windows may be missed if a farmer and contractor cannot schedule harvest times that are convenient and quantity shortages can result.

Raw RI Score: We have assessed the risks associated with equipment ownership from sawmills within the Matawinie BDO Zone and have concluded that there is no significant risk. Suppliers within the Zone either own the equipment required to harvest and collect timber and other forest products, including Forest Residues, or have easy access to it. For instance, one of the sawmills within the Zone engages 20 to 25 logging companies to conduct harvesting operations, indicating the presence of numerous equipment owners and facilitating access to the necessary equipment. While introducing new equipment to accommodate unusual plant specifications may entail some risk, suppliers may be willing to invest in new equipment if appropriate commitments from a proponent are in place. In general, the availability of necessary equipment and the suppliers' willingness to invest in new equipment suggest a low risk related to equipment ownership in the Matawinie BDO Zone. Raw RI Score is 1 out of 10.	**Score 1**
Notched Salience: No adjustment.	**Score 1.0**
Impact Level: RI Impact level is deemed *low.*	**Score 3.33**
Loaded RI Score: Loaded RI Score (Notched Salience × Impact Level) is 3.33.	**Score 3.33**

1.7. Ownership of Transportation/Logistics

Rationale: In most cases, suppliers that own or lease equipment necessary to transport biomass from forest or field are lower risk than those who do not. However, in some circumstances, reliance on third parties to transport biomass is a common practice and does not contribute to risk.	
Raw RI Score: Within the Matawinie BDO Zone, the majority of sawmills possess their own fleet of trucks, predominantly consisting of walking-floor trailers, which they utilize for the transportation of Sawmill Residuals. Conversely, loggers operating in the area own logging trucks that are employed for the delivery of Pulpwood. However, it is important to note that due to the limited demand for Forest Residues, there is likely a shortage of available transport equipment specifically designated for the movement of this material. Raw RI Score is 5 out of 10.	**Score 5**
Notched Salience: In the Matawinie BDO Zone, Pulpwood is less costly than Forest Residues, and it is abundant. Therefore, it is likely that a new bio-project will utilize Pulpwood before turning to Forest Residues, allowing the supply chain to gradually scale up as demand for Forest Residues increases. Raw RI is notched down by 75%.	**Score 1.25**
Impact Level: Due to the lack of detailed data, some uncertainty is associated with transportation ownership. RI Impact level is deemed *medium.*	**Score 6.66**
Loaded RI Score: Loaded RI Score (Notched Salience × Impact Level) is 8.32.	**Score 8.32**

1.8. Supplier as an Aggregator

Rationale: Aggregators may effectively provide supply chain redundancy, eliminating the risk and complexity of dealing with multiple sources of supply by combining supplies into a single master contact. Aggregators can add much needed stability in BDO Zones by increasing offtake stability for both suppliers and markets. An aggregator can be a more reliable long-term offtake for suppliers by virtue of having multiple markets and can be a more reliable long-term supplier for markets by having access to multiple suppliers. Further, when a single supplier breaches, the aggregator can source from another.	
Raw RI Score: At present, the Matawinie BDO Zone faces a notable absence of biomass aggregators, hindering efficient resource management. However, a commendable initiative spearheaded by a group of enterprising individuals is already underway. This initiative focuses on the recovery of Forest Residues, which are subsequently processed into chips intended for small biomass boilers in commercial buildings. Recognizing the significance of such endeavors, the Forest Ministry has proactively embarked on a comprehensive study. This study aims to identify optimal locations for Biomass Valorization Centers (BVC) across Quebec. These strategically positioned centers would assume a pivotal role in the transformation and preparation of Forest Residues into economically viable feedstock, thereby facilitating their utilization by bio-based plants. Promisingly, there is a strong indication that, within the next five years, at least one BVC will be established within the Matawinie BDO Zone. This development would significantly enhance the region's biomass valorization efforts and contribute to the sustainable utilization of available resources. Raw RI Score is 1 out of 10.	**Score 1**
Notched Salience: No adjustment.	**Score 1.0**
Impact Level: RI Impact level is deemed *low.*	**Score 3.33**
Loaded RI Score: Loaded RI Score (Notched Salience × Impact Level) is 3.33.	**Score 3.33**

1.9. Distance from Proponent

Rationale: The greater the distance from a supplier to a plant, the more exposure it has to weather and fuel cost risks, and the greater the competitive pressure (to breach) that a closer competitor can exert.	
Raw RI Score: On average, the distance between Ste-Émélie-de-l'Énergie and the sawmills within the BDO Zone amounts to approximately 90 kilometers. However, it is noteworthy that seven out of the total of 20 sawmills are situated within a 75-kilometer radius of Ste-Émélie-de-l'Énergie,	**Score 1**

representing a crucial proximity advantage. These seven sawmills contribute around 30% of the available Sawmill Residuals within the region.

An analysis of the feedstock supply curve further highlights that approximately 31% of the overall feedstock can be sourced within a 75-kilometer driving distance from Ste-Émélie-de-l'Énergie (refer to Figure C-1 in Appendix C). While it is worth mentioning that certain suppliers have transported bark over distances exceeding 300 kilometers, the relative scarcity of feedstock within the 75-kilometer range increases the vulnerability of the supply chain to risks.

Nevertheless, it is important to acknowledge that the risks associated with limited proximity to Ste-Émélie-de-l'Énergie are somewhat mitigated by the prevailing trend of biomass transportation occurring over distances exceeding 75 kilometers.

Raw RI Score is 1 out of 10.

Notched Salience: No adjustment.	**Score 1.0**
Impact Level: The distance between the supplier and the proposed bio-project is a significant variable that can influence the viability of feedstock access. RI Impact level is deemed *high.*	**Score 9.99**
Loaded RI Score: Loaded RI Score (Notched Salience × Impact Level) is 9.99.	**Score 9.99**

1.10. Fundamental Feedstock Production Experience

Rationale: Risk is higher when a supplier has limited experience with harvesting/processing and/or collecting biomass. Where experience is lacking, the Proponent should show that steps have been taken to ensure proper training, knowledge dissemination, and monitoring.	
Raw RI Score: Within the Matawinie BDO Zone, the supply of Pulpwood and Sawmill Residuals stands on a solid foundation, as demonstrated by the ample inventory, annual harvesting rates, and the successful utilization of these materials by existing markets. The established nature of these feedstocks is evident in their consistent availability and efficient absorption into various industries. However, in contrast to Pulpwood and Sawmill Residuals, the current supply of Forest Residues remains relatively constrained. These valuable by-products are infrequently collected and processed, leading to their limited availability within the market. Despite their untapped potential, the utilization of Forest Residues has yet to reach its full capacity, presenting an opportunity for future development and growth in the region.	**Score 5**

Raw RI Score is 5 out of 10.

Notched Salience: In the Matawinie BDO Zone, Pulpwood is abundant and less costly than Forest Residues. Therefore, it is likely that a new bio-project will utilize Pulpwood before turning to Forest Residues, allowing the supply chain to gradually scale up as demand for Forest Residues increases. Raw RI is notched down by 75%.	**Score 1.25**
Impact Level: The production of feedstock can significantly impact projects that require large quantities of it. The experience of suppliers and producers in the supply chain can ensure a reliable	**Score 9.99**

and stable supply of feedstock. On the other hand, less experienced suppliers may face challenges in meeting the demand for feedstock, making it crucial to work with experienced producers and suppliers. RI Impact level is deemed *high.*	
Loaded RI Score: Loaded RI Score (Notched Salience × Impact Level) is 12.48.	**Score 12.48**

1.11 Production Scale Experience

Rationale: Scale-up entails risk. Risk is higher when a supplier has limited experience with the production of the quantity of feedstock required.

Raw RI Score: **Score 5**

Sawmill Residual: According to our analysis, the sawmills operating in the region produce an estimated annual volume of 390,000 dry metric tons (dmt) of Sawmill Residuals, out of which approximately 130,000 dmt per year is readily available for utilization by a new bio-based project. This significant feedstock supply is particularly advantageous as it is already a by-product of the existing sawmill operations, mitigating concerns related to scale-up risk.

Furthermore, the long-standing presence of local sawmills, operating for several decades, underscores their extensive production-scale experience. This experience further enhances the reliability and consistency of the Sawmill Residuals supply, instilling confidence in the feasibility and sustainability of potential bio-based projects in the region.

Forest Residues: Based on our analysis, the current state of infrastructure for the collection and processing of Forest Residues in the region is hindered by a notable lack of substantial demand. This limited demand scenario presents a considerable scale-up risk when it comes to increasing Forest Residues production. Furthermore, the majority of logging companies operating in the area are relatively small in size, which imposes constraints on their access to capital and ability to procure the necessary equipment for efficient Forest Residues processing and transportation in the near future. As a result, these factors further contribute to the challenges associated with scaling up Forest Residues production.

Given the circumstances, we do not anticipate the involvement of larger companies in the region in the short term when it comes to participating in the recovery efforts for Forest Residues. The current landscape suggests that the focus on Forest Residues recovery and its subsequent utilization may require more time and concerted efforts to address the scale-up risks and overcome the existing limitations in infrastructure and resources.

Pulpwood: Based on our analysis, the logging infrastructure in the region demonstrates a robust and thriving state, as exemplified by the sustained success of the local sawmilling, pellet, and pulp and paper industries. Notably, the lumber market in North America experienced a surge in selling prices during the pandemic, resulting in substantial revenue growth for sawmills and reinforcing the stability of their operational framework. This trend has contributed to the consolidation of their established structure.

Furthermore, the region boasts extensive experience and expertise in logging operations, which further bolsters our assessment of low risks associated with pulpwood harvesting and transportation scale-up. The existing capabilities and knowledge within the local logging sector provide a solid foundation for efficiently managing and expanding these aspects of the industry. Considering the favorable market conditions, coupled with the region's well-established logging practices and expertise, we have confidence in the ability to sustain and even enhance the pulpwood harvesting and transport operations without encountering significant risks. The overall outlook is promising, affirming the favorable conditions for future endeavors in this domain. Raw RI Score is 5 out of 10.	
Notched Salience: In the Matawinie BDO Zone, Pulpwood is abundant and less costly than Forest Residues. Therefore, it is likely that a new bio-project will utilize Pulpwood before turning to Forest Residues, allowing the supply chain to gradually scale up as demand for Forest Residues increases. Raw RI is notched down by 75%. Notched Salience is 1.25.	**Score 1.25**
Impact Level: Given the potential size and scope of large-scale projects, any issues related to production scale up could have substantial impacts on the success of the project. Therefore, even though we are fairly confident in our assessment of production scale up experience, we believe that it is important to consider the potential impact of this risk when evaluating potential feedstock options for large scale projects. RI Impact level is deemed *high.*	**Score 9.99**
Loaded RI Score: Loaded RI Score (Notched Salience × Impact Level) is 12.49.	**Score 12.48**

1.12. Feedstock Production Priority

Rationale: When biomass feedstock is a secondary or non-core line of business, or when it is a by-product or a residual from a more valuable primary product, then suppliers may not put in sufficient effort for consistent production. Risk of breach increases when production and/or delivery of feedstock compromises a supplier's ability to make a primary product.	
Raw RI Score: Sawmill Residuals, being a natural by-product of lumber and other wood products manufacturing processes, enjoy a relatively low production priority risk for their feedstock production. In contrast, Forest Residues face a different scenario within the BDO Zone, as they currently experience low demand, leading to limited infrastructure for their collection, processing, and transportation. While some loggers have shown interest in producing Forest Residues, others have expressed disinterest, likely due to the lower risk associated with the conventional roundwood production business model. Consequently, the production priority risk linked to Forest Residues is assessed as high. On the other hand, Pulpwood, an essential component of mixed forests, undergoes substantial annual harvesting within the Zone. The majority of Pulpwood is sourced from Crown lands, harvested by sawmills and pulp and paper mills with guaranteed supplies, while the remaining	**Score 4**

portion originates from private forests. Our analysis indicates that the technically available volume of pulpwood is primarily concentrated in sectors within Crown lands, marketed by the Lumber Marketing Office (BMMB), where buyers have not yet been identified. In the event of an increase in demand for Pulpwood, we anticipate the complete harvesting of all technically available pulpwood within the Zone on an annual basis. Hence, we consider the production priority risk associated with Pulpwood harvesting to be relatively low. Raw RI Score is 4 out of 10.	
Notched Salience: In the Matawinie BDO Zone, Pulpwood is less costly than Forest Residues and is abundant. Therefore, it is likely that a new bio-project will utilize Pulpwood before turning to Forest Residues, allowing the supply chain to scale up as demand for Forest Residues increases gradually. Raw RI is notched down by 75%. Notched Salience is 1.	**Score 1.0**
Impact Level: Given the potential size and scope of large-scale projects, any issues related to feedstock production priority could have a substantial impact on the success of the project. Therefore, even though we are fairly confident in our assessment of feedstock production priority, we believe that it is important to consider the potential impact of this risk when evaluating potential feedstock options for large scale projects. RI Impact level is deemed *high.*	**Score 9.99**
Loaded RI Score: Loaded RI Score (Notched Salience × Impact Level) is 9.99.	**Score 9.99**

CATEGORY 2: COMPETITOR RISK

2.1. Competitor Locations and Geographical Influence on the Market

Rationale: Competitors' locations relative to a Proponent plant can affect the viability of procuring feedstock and its cost. Accurate and detailed competitor mapping provides an understanding of the geographical influence a competitor may have, including competitive advantages such as short-hauling.	
Raw RI Score: Our analysis has identified a competition zone comprising 34 competitors for woody biomass feedstock within a 200 km driving distance from Ste-Émélie-de-l'Énergie. These competitors encompass a range of industries, including 17 pulp and paper mills, 12 cogeneration and biofuels mills, 4 panelboard mills, and 1 horticultural mulch producer. Collectively, these entities consume approximately 2,425,000 dmt of woody biomass per year, incorporating Pulpwood, Forest Residues, and Sawmill Residuals. However, it is important to note that only a fraction of this feedstock originates from the BDO Zone. Significantly, the majority of these competitors, comprising 27 entities, are situated beyond a distance of 100 km from Ste-Émilie-de-l'Énergie. Consequently, their influence on the BDO Zone is limited, with the exception of one large pulp and paper mill located 220 km away, which engages in substantial Pulpwood harvesting. Our analysis considers the existing competition landscape, and despite this, we have estimated the availability of 360,000 dmt/yr of feedstock for potential projects within the BDO Zone. Based on our comprehensive findings, we assert that while competition for woody biomass feedstock exists in the region, its impact on potential projects within the BDO Zone remains	**Score 1**

relatively low. Furthermore, our assessment of pulpwood and forest residue availability takes into account the current consumption levels, revealing surpluses of each feedstock type.

Raw RI Score is 1 out of 10.

Notched Salience: No adjustment.	**Score 1.0**
Impact Level: Our analysis indicates that the present competition for feedstock in the region has a relatively low impact on potential feedstock availability for new bio-projects, based on our thorough review of competitors. However, we recognize that in situations where a few large competitors have a significant impact on the local market for feedstock, the impact on a new bio-project could be substantial. Such a scenario could result in reduced availability of feedstock, higher prices, or both, which could adversely impact the financial viability of a new project. RI Impact level is deemed *high.*	**Score 9.99**
Loaded RI Score: Loaded RI Score (Notched Salience × Impact Level) is 9.99.	**Score 9.99**

2.2. Historical Fluctuation of Quantity Used

Rationale: Clear understanding of key competitors' consumption of each type of feedstock utilized by the Proponent is essential to quantifying the risks associated with each competitor. Understanding historical trends of feedstock utilization can provide valuable information about feedstock price elasticity during shortages and insights into events impacting future supply conditions. It can also enable more accurate estimates of the sensitivity of feedstock availability to potential future consumption levels or to the impact of external events (e.g., weather events, structural economic changes, seasonality, or policy change).

Raw RI Score: **Score 5**

Sawmill Residuals: There are no historical consumption data available. The lack of data makes it difficult to understand historical consumption trends, increasing the risk associated with this RI.

Forest Residues: Our analysis suggests that Forest Residues has historically seen limited consumption in the BDO Zone, making the lack of historical data on its consumption not a significant risk for potential feedstock sources for bio-projects in the region.

Pulpwood: While facility-level historical consumption data for Pulpwood is not available to us, we have successfully utilized historical pulpwood harvest removal data, provided by the Forest Ministry for each region, to evaluate the consumption patterns of this valuable feedstock source. Our analysis suggests that the risk associated with historical pulpwood consumption is relatively low, and the stability exhibited in the historical pulpwood harvest removal data is a favorable factor for potential bio-based projects in the region.

Raw RI Score is 5 out of 10.

Notched Salience: No adjustment.	**Score 5.0**
Impact Level: Based on information provided above under Raw RI Score evaluation, we deem the impact of this RI *low*.	**Score 3.33**
Loaded RI Score: Loaded RI Score (Notched Salience × Impact Level) is 16.65.	**Score 16.65**

2.3. Competitor Pricing and Price Sensitivity

Rationale: Understanding how much competitors pay for different feedstock types is an essential step in determining competitiveness of Proponent. Historical prices paid by competitors provide insight into their procurement behaviors and ability/willingness to pay premiums for feedstock and exert pressure on Proponent's suppliers during times of feedstock shortage. Competitors who are able to offer higher prices for feedstock during feedstock shortages can pose significant risks to Proponent.	
Raw RI Score: According to our analysis, the current delivered pricing for the assessed feedstock types within the BDO Zone ranges from approximately $140 to $160 per dry metric ton (dmt) for Forest Residues, $130 to $150 per dmt for Pulpwood, and $40 to $205 per dmt for Sawmill Residuals. Our historical pricing analysis reveals that the price of Sawmill Residuals has exhibited relative stability over the past decade, with a sudden surge observed at the beginning of 2023. For example, in 2022, the provincial average price for chips (excluding delivery costs) stood at $80, whereas in 2023, the average price has escalated to $155. This trend suggests that competitors in the market have shown a capacity to accommodate significant price increases for Sawmill Residuals. The prices for Pulpwood and Forest Residues have demonstrated a consistent upward trend over the past two decades. The Forest Ministry has conducted several studies on this subject, which are publicly available online, providing valuable insights into the pricing dynamics of these feedstock types.	**Score 8**
Notched Salience: Historical trends indicate competitors' tolerance to the increase in the prices of Sawmill Residuals. It is unclear, however, whether competitors would have a similar tolerance for price increases in Pulpwood. Assuming a new project's ability to substitute feedstocks, the Raw RI Score is notched down by 25%. Notched Salience is 6.	**Score 6.0**
Impact Level: High degree of competitors' price sensitivity can lead to pricing wars, in case of feedstock shortages. Additionally, there is a high degree of uncertainty related to our understanding of competitors' price sensitivity. RI Impact level is deemed *high.*	**Score 9.99**
Loaded RI Score: Loaded RI Score (Notched Salience × Impact Level) is 59.94.	**Score 59.94**

2.4. Supply Influence of Competitor

Rationale: In some cases, competitors may be able to exert high degrees of pressure on local suppliers, effectively enabling them to control feedstock, especially during shortages. This control can derive from long previous relationships between suppliers and competitors, from verbal or "understood" agreements, or from a competitor being able to assist suppliers in times of surplus by maintaining large inventories that enable suppliers to continue supplying when other markets impose quotas. Understanding and planning around such soft risk factors is important. If such relationships exist in the Proponent's procurement area, they may indicate an increased risk of feedstock shortage or pricing changes.	
Raw RI Score: In the past, certain pulp and paper mills in Quebec employed an "all-or-nothing" strategy to compel sawmills to provide all of their residuals at a low price. This tactic involved pressuring sawmills to comply, under the threat of losing business entirely. However, this approach faced opposition when sawmills united and formed an association to negotiate residual prices at a provincial level. As a result, the establishment of "provincial-average" prices through annual negotiations between the association and pulp and paper mills has contributed to the stability of residual prices within the sawmill industry. Nevertheless, prices may still vary across regions due to demand fluctuations and market dynamics. However, it is important to note that an "all-or-nothing" approach is still employed by certain cogeneration plants, cement factories, and a large panelboard mill in Quebec when sourcing feedstock from sorting centers. While the risk associated with this historical tactic is currently low for potential bio-projects in the BDO Zone, there is a possibility of its resurgence in response to the entry of a new bio-project into the market. Therefore, we consider this approach to be a moderate factor to consider for potential bio-projects in the region. Although the future utilization of this practice remains uncertain, it is crucial for potential investors to be aware of the associated risk and devise strategies to mitigate its potential impact. Raw RI Score is 5 out of 10.	**Score 5**
Notched Salience: The risk related to supply influence of competitor is mitigated by the large quantity of available feedstock. Raw RI is notched down by 50%. Notched Salience is 2.5.	**Score 2.5**
Impact Level: Risks related to competitors' influence over suppliers are limited to Sawmill Residual, and do not affect Pulpwood and Forest Residues. RI Impact level is deemed *moderate.*	**Score 3.33**
Loaded RI Score: Loaded RI Score (Notched Salience × Impact Level) is 8.32.	**Score 8.32**

2.5. Temporary Market-Driven Markets

Rationale: Alternative, non-traditional, market-driven competitors for feedstock can increase feedstock demand in unusual circumstances.	
Raw RI Score: Based on our analysis, we have identified seasonal markets for wood fiber in the BDO Zone, which include firewood, densified logs, and mulch. Although these markets do exist, we	**Score 1**

consider them to be relatively inconsequential when compared to the overall quantity of feedstock available in the region.

Raw RI Score is 1 out of 10.

Notched Salience: No adjustment.	**Score 1.0**
Impact Level: The large quantity of feedstock available renders any temporary market small in comparison. RI Impact level is deemed *low.*	**Score 3.33**
Loaded RI Score: Loaded RI Score (Notched Salience × Impact Level) is 3.33.	**Score 3.33**

2.6. Demand for Competitors' Products

Rationale: Increased demand for competitor's product can cause greater demand for feedstock by the competitor. For example, greater demand for biofuels due to a clean fuels policy can cause increased biofuel production by the competitor, thereby increasing demand for feedstock.

Raw RI Score: Based on our analysis, we project substantial growth in several markets for woody biomass feedstock over the next decade, with a particular emphasis on the wood pellet market. Within a 200 km driving distance of Matawinie, we have identified multiple proposed facilities that have plans to utilize woody biomass as their feedstock. **Score 8**

The global demand for wood pellets is anticipated to experience significant expansion in the coming years, especially in Europe and East Asia. Quebec has already witnessed the establishment of several pellet mills in the past five years, many of which export their products to the thriving European market. This market has demonstrated remarkable growth over the past decade. With five pellet mills already operational in the BDO Zone, we expect the demand for woody biomass from pellet mills to continue rising, either through the expansion of existing facilities or the establishment of new ones.

In summary, we anticipate that the growth of the woody biomass feedstock market will have a profound impact on the competitive dynamics within the BDO Zone. The increasing demand for woody biomass, particularly in the wood pellet sector, is poised to stimulate investment and drive innovation throughout the region.

Raw RI Score is 8 out of 10.

Notched Salience: The risk of potential competition for woody biomass from SAF, Renewable Diesel, Green Hydrogen, and BECCS industries is currently mitigated by the fact that their economic feasibility at a commercial scale is unproven. Furthermore, the impact of the wood pellet industry on the availability of woody biomass is expected to be limited, relative to the sheer quantity of feedstock available. Raw RI is notched down by 50%. Notched Salience is 4.	**Score 4.0**

Impact Level: Once all industries reviewed here mature, the impact in the woody biomass supply chain in the BDO Zone is expected to be significant. RI Impact level is deemed *high.*	**Score 9.99**
Loaded RI Score: Loaded RI Score (Notched Salience × Impact Level) is 39.96.	**Score 39.96**

CATEGORY 3: SUPPLY CHAIN RISK

3.1. Biomass Availability Multiple (BAM)

Rationale: Biomass Availability Multiple (BAM) indicates the degree of redundancy in a Proponent's supply chain. BAM is the ratio of biomass feedstock available to a project, at costs, timing, and in quality feasible for the Proponent, divided by the project's feedstock requirements. BAM is a strong indicator of supply chain resilience when stressed by supply shortage and/or supplier breach.

Raw RI Score: Based on the available information, the Matawinie BDO Zone's sawmills produce a significant amount of softwood and hardwood lumber, totaling 1,740,000 m^3/yr and 330,000 m^3/yr, respectively. However, the projected consumption rates for softwood and hardwood are only 62% and 56%, respectively, which indicates a high level of oversupply risk. Furthermore, only four large sawmills located within the Zone consume over 100,000 m^3/yr, implying a potential concentration risk. Currently, all 20 sawmills generate approximately 390,000 dmt/yr of Sawmill Residuals. A new buyer could potentially access about 195,000 dmt/yr of Sawmill Residuals, assuming a 50% capture rate. Additionally, to account for feedstock redundancy thereby ensuring a low-risk supply, a Biomass Availability Multiple (BAM) of 1.5x is applied, resulting in an availability of 130,000 dmt/yr, with the following residual types: 58,500 dmt/yr of softwood chips, 21,500 dmt/yr of softwood sawdust/shavings, 22,000 dmt/yr of softwood bark, 14,000 dmt/yr of hardwood chips, 9,000 dmt/yr of hardwood sawdust/shavings, and 5,000 dmt/yr of hardwood bark.

Score 1

Based on our estimates, there are 85,000 dmt/yr of recoverable Forest Residues on Crown lands and 125,000 dmt/yr on private forests within the Matawinie BDO Zone, which total to 210,000 dmt/yr of recoverable Forest Residues. To ensure a low-risk supply and account for feedstock redundancy, a Biomass Availability Multiple (BAM) of 2x is applied, resulting in an estimated availability of 105,000 dmt/yr of Forest Residue.

The Matawinie BDO Zone has an estimated technically available pulpwood of 28,000 dmt/yr on Crown lands, which includes 3,000 dmt/yr of softwood, 3,000 dmt/yr of poplars, and 22,000 dmt/yr of hardwood. On private forests, the estimated technically available pulpwood is 97,000 dmt/yr, including 13,500 dmt/yr of softwood, 10,000 dmt/yr of poplars, and 73,500 dmt/yr of hardwood. Therefore, the total technical pulpwood availability is 125,000 dmt/yr. It is important to note that the technical availability already accounts for the necessary growth-to-drain ratio to ensure sustainability. Therefore, the Biomass Availability Multiple is already accounted for.

These BAMs have been already accounted for in the quantity parameters. Therefore, Raw RI Score is 1 out of 10. Raw RI Score is 1 out of 10.	
Notched Salience: No adjustment.	**Score 1.0**
Impact Level: Feedstock redundancy, or BAM, is an important variable when assessing feedstock supply feasibility, and its level can impact the supply chain significantly. RI Impact level is deemed *high.*	**Score 9.99**
Loaded RI Score: Loaded RI Score (Notched Salience × Impact Level) is 9.99.	**Score 9.99**

3.2. Impact of Increased Utilization of Feedstock

Rationale: Feedstock utilization in the Matawinie BDO Zone can change over time. Existing consumers of feedstock can expand operations or new facilities can enter the market. Increased utilization puts additional pressure on feedstock and can lead to higher prices, feedstock disruptions, shortages, or supplier breach.	
Raw RI Score: The Forest Ministry's proactive measures to implement the National Lumber Production Strategy at the provincial level, coupled with the establishment of Biomass Valorization Centers (BVCs) in different regions, are anticipated to yield a surge in Pulpwood and Forest Residuals harvesting over the next twenty years. This uptick in woody biomass availability is expected to align harmoniously with the growing demand for feedstock within the bioenergy sector, ensuring its efficient absorption. Raw RI Score is 2 out of 10.	**Score 2**
Notched Salience: No adjustment.	**Score 2.0**
Impact Level: Although we demonstrate large feedstock availability and growth-to-drain ratio, there is uncertainty around the actual scale of increased utilization of feedstock (more detailed discussion in provided in RI 2.6). RI Impact level is deemed *high.*	**Score 9.99**
Loaded RI Score: Loaded RI Score (Notched Salience × Impact Level) is 19.98.	**Score 19.98**

3.3. Seasonal Feedstock Supply Variation

Rationale: Biomass supply can present significant seasonal supply variations; combined with limitations associated with longer-distance transportation and storage, can lead to regional biomass supply imbalances and manifest in shortages and higher costs for Proponents.	
Raw RI Score: The availability of feedstock exhibits noteworthy fluctuations influenced by seasonal changes, harvesting operations, and natural disturbances. These factors contribute to significant	**Score 8**

variations in the accessibility of Sawmill Residuals, Forest Residues, and Pulpwood within the forest. For instance, adverse weather conditions like heavy rainfall or extensive snowfall can temporarily impede logging activities, thereby affecting the production of Sawmill Residuals, Forest Residues, and Pulpwood. Likewise, periods of drought heighten the risk of severe fires, limiting access to forests for feedstock harvesting and reducing the available quantity of feedstock due to burn damage. Our assessment confirms that seasonal variations wield substantial impacts on feedstock supply. However, it is crucial to acknowledge that delays resulting from natural disturbances are typically short-lived. Feedstock suppliers, including sawmills, proactively manage their inventory while accounting for associated risks linked to natural disruptions.

Raw RI Score is 8 out of 10.

Notched Salience: Sufficient inventory would help to mitigate most of the risk associated with delays in feedstock production brought on by seasonality. Raw RI Score is notched down by 50%. Notched Salience is 4.0.	**Score 4.0**
Impact Level: RI Impact level is deemed *moderate.*	**Score 6.66**
Loaded RI Score: Loaded RI Score (Notched Salience × Impact Level) is 26.64.	**Score 26.64**

3.4. Year-to-Year Variation in Feedstock Availability

Rationale: Biomass can have significant fluctuations in year-to-year supply due to variability in yield from biomass harvesting operations.

Raw RI Score: The production of Sawmill Residuals is intricately linked to lumber production, which has experienced fluctuations in recent decades due to changes in the housing industry. However, we anticipate lumber production in the BDO Zone to remain stable in the upcoming years, with a slight increase driven by the strong demand for new houses in Quebec and North America. This positive outlook is favorable for the production of Sawmill Residuals, which is expected to remain steady without experiencing a decrease. **Score 4**

Based on data from the Forest Ministry, Sawmill Residuals production in the Supply basin of the Matawinie BDO Zone has exhibited a slight decline between 2017 and 2021. Comparing the production levels of 2017 to subsequent years, there was a decline of 2%, 4%, 7%, and 3% in 2018, 2019, 2020, and 2021, respectively. Hence, recent historical data indicates a consistent growth in production rather than significant variations.

However, it is important to acknowledge the potential for year-to-year fluctuations in Sawmill Residuals production due to changing lumber markets. The lumber market is known for its cyclical nature, which can impact the availability and pricing of Sawmill Residuals. During periods of market volatility, the availability of Sawmill Residuals may be reduced. Despite these challenges, sawmills in the BDO Zone have demonstrated remarkable resilience to the cyclical nature of the lumber market and have consistently maintained their production levels.

In terms of Forest Residues generation, it is closely tied to roundwood harvesting. Fortunately, we anticipate an increase in roundwood harvesting within the BDO Zone over the next decade, leading to a greater availability of Forest Residues for recovery. Although there has been a growth in net Pulpwood growth in the past decade, it is essential to note that this growth is primarily driven by hardwood species. Softwood species remain highly preferred by sawmills and pulp and paper mills. Therefore, we assess the risk associated with year-to-year variations in Forest Residues and Pulpwood availability to be low. Raw RI Score is 4 out of 10.	
Notched Salience: Potential variation in the availability and pricing of Sawmill Residuals can be mitigated through substitution with Pulpwood and Forest Residue. Raw RI Score is notched down by 50%.	**Score 2.0**
Impact Level: Our analysis of lumber production variation was conducted at a high level through interviews with local experts. Therefore, there is a degree of uncertainty in our assessment of Sawmill Residual year-to-year production variability. RI Impact level is deemed *moderate.*	**Score 6.66**
Loaded RI Score: Loaded RI Score (Notched Salience × Impact Level) is 13.32.	**Score 13.32**

3.5. Front-End Validation of Data Used in Feedstock Availability Models

Rationale: Feedstock supply models can be complex. Lack of clarity about model assumptions and baseline data can result in confusion on the part of the capital markets and drive financing costs for biomass projects. The adequacy and credibility of assumptions and baseline data is paramount to credible model outputs.	
Raw RI Score: The risk of inaccuracies in estimating Sawmill Residual availability is minimal, as our estimates rely on data provided by the Forest Ministry and conversion factors that have been validated by industry experts. We further ensure the accuracy of our estimates by validating them at both the facility level with selected sawmills and at the Zone level with the Forest Ministry. Regarding Forest Residues, our estimates are based on a comprehensive study conducted in 2021 for the Government of Quebec. This study serves as a reliable foundation for our estimation process, enhancing the accuracy of our assessments. When it comes to Pulpwood availability, our estimates are primarily derived from high-level data obtained from the Forest Ministry and the "Forest Chief Bureau (BFEC)." However, it is important to acknowledge that these sources may not account for all variables, introducing a degree of inherent error in the estimation model. Nevertheless, feedback received from sawmill operators and other forestry organizations suggests that the model tends to underestimate the actual availability of Pulpwood in the region. This valuable feedback helps to mitigate some of the modeling inaccuracies and enhances the reliability of our feedstock availability assessments. Raw RI Score is 3 out of 10.	**Score 3**
Notched Salience: No adjustment.	**Score**

	3.0
Impact Level: Because most of our conclusions in this assessment are based on woody biomass availability modelling, errors in our assumptions can have significant impact to supply chain risk. RI Impact level is deemed *high.*	**Score 9.99**
Loaded RI Score: Loaded RI Score (Notched Salience × Impact Level) is 29.97.	**Score 29.97**

3.6. Low Historical Demand for Feedstock in the BDO Zone

Rationale: If the Proponent does not have a history of developing, large-scale feedstock procurement, suppliers may not have sufficient expertise in feedstock production to ensure reliable supply, especially early on.	
Raw RI Score: Sawmill Residuals and Pulpwood have been extensively utilized in the BDO Zone for over a century, establishing a long-standing history of demand for these feedstock types. From a historical perspective, the utilization of Sawmill Residuals and Pulpwood has been consistent and well-established, mitigating any significant risks associated with their demand. On the other hand, Forest Residues, despite being a potential feedstock source, has not traditionally been utilized in substantial quantities within the BDO Zone. The limited historical utilization of Forest Residues indicates a higher level of risk associated with its demand as compared to Sawmill Residuals and Pulpwood. Raw RI Score is 5 out of 10.	**Score 5**
Notched Salience: In the initial years of the project, Pulpwood is likely to be the primary feedstock source as Forest Residues supply chains are scaled up. As they expand, the risks associated with the historical lack of demand for Forest Residues should decrease. Raw RI is notched down by 50%. Notched Salience is 2.5.	**Score 2.5**
Impact Level: The lack of historical demand for large-scale feedstock production in the BDO Zone suggests a potential lack of experience and expertise within the supply chain. This factor could have a significant impact on the overall supply chain. RI Impact level is deemed *high.*	**Score 9.99**
Loaded RI Score: Loaded RI Score (Notched Salience × Impact Level) is 24.96.	**Score 24.96**

3.7. History of Production/Feedstock is a Secondary Crop or a Byproduct

Rationale: If the feedstock is a new/secondary crop or a by-product, suppliers may either lack sufficient experience to mitigate risk or be unable to react to such risk, and producers may be less likely to prioritize production. If the feedstock is a secondary crop, then production can be subject to variables beyond suppliers' control.	
Raw RI Score: Over the past decade, historical data indicates a decline in harvested quantities on both Crown lands and private lands within the BDO Zone. This decline can be attributed primarily to the closure of certain sawmills in the aftermath of the forest crisis of 2008-2010. The closure of these sawmills had a notable impact on supply chains and the overall availability of harvested wood.	**Score 1**

However, the Forest Ministry has recently implemented the National Wood Production Strategy, which is expected to bring about positive changes in the level of harvest on Crown lands in the coming decades. This strategy aims to enhance and optimize the wood production sector, leading to an improvement in supply chains and a potential increase in harvested quantities within the BDO Zone.

Sawmill Residuals, Pulpwood, and Forest Residues have been generated as by-products of timber logging and sawmilling operations for over a century. Based on our analysis, we do not anticipate any significant risks associated with this reliable source of feedstock. The historical continuity of generating these feedstock types ensures a consistent and sustainable supply for potential bio-projects in the region.

Raw RI Score is 1 out of 10.

Notched Salience: No adjustment.	**Score 1.0**
Impact Level: RI Impact level is deemed low.	**Score 3.33**
Loaded RI Score: Loaded RI Score (Notched Salience × Impact Level) is 3.33.	**Score 3.33**

3.8. Diesel Prices

Rationale: Diesel, oil, and PPI can impact feedstock cost of harvest and collection over time. Sensitivities to worst case scenarios should be run.	
Raw RI Score: Based on regional data obtained from the Statistics Canada database, it is evident that diesel prices exhibit volatility and are challenging to predict, particularly in light of recent global events. Currently, diesel prices are showing a slight downward trend and appear to be stabilizing, following a peak in July 2022 (refer to Figure C-2 in Appendix C).	**Score 5**

Raw RI Score is 5 out of 10.

Notched Salience: Some of the risks associated with volatile fuel prices could be mitigated by a project engaging in, and favoring, contracts with suppliers located closer to Matawinie, reducing transportation costs. Raw RI Score is notched down by 25%. Notched Salience is 3.75.	**Score 3.75**
Impact Level: RI Impact level is deemed *moderate.*	**Score 6.66**
Loaded RI Score: Loaded RI Score (Notched Salience × Impact Level) is 24.98.	**Score 24.98**

3.9. Harvest & Collection Practices & Schedules

Rationale: Differences in harvest timing and practices can create risks for both the quantity and quality of the feedstock. For example, feedstock harvested by different suppliers in different windows can undergo varying levels of exposure to sun, wind, and moisture, leading to variations in delivered feedstock quality.

Raw RI Score: The supply chain within the BDO Zone benefits from a well-established and robust infrastructure that encompasses efficient harvest, collection, and scheduling practices. Foresters and fiber producers have implemented standardized procedures for forest management practices and timber harvest, ensuring the reliable and streamlined delivery of raw materials to downstream processing facilities. However, it is important to recognize that certain unforeseen factors, such as adverse weather conditions or prolonged periods of road inaccessibility, can introduce risks to the supply chain. These disruptions have the potential to impact the timely delivery of raw materials and result in delays in downstream processing operations. Furthermore, the humidity content of Forest Residues can vary depending on the duration these biomass materials have been exposed to decay on the roadside. This variability in moisture content can have implications for the quality of the raw materials and, consequently, impact the overall quality of the finished product. Therefore, diligent monitoring of the moisture content of Forest Residues is crucial for foresters and fiber producers. Proper storage and handling practices should be implemented to mitigate any potential degradation issues and maintain the desired quality standards throughout the supply chain. Raw RI Score is 6 out of 10.	**Score 6**
Notched Salience: Maintaining a sufficient feedstock inventory will mitigate the risk of feedstock shortages caused by unforeseen factors such as inclement weather or extended periods of impassable roads. Raw RI Score is notched down by 50%. Notched Salience is 3.	**Score 3.0**
Impact Level: RI Impact level is deemed *moderate.*	**Score 6.66**
Loaded RI Score: Loaded RI Score (Notched Salience × Impact Level) is 19.98.	**Score 19.98**

3.10. Harvesting & Collection Equipment

Rationale: Different types of harvesting and collection equipment suppliers use can significantly impact the quality and availability of feedstock. The use of different types and combinations of harvesting, collection, and processing equipment can lead to non-homogeneous feedstock. In addition, equipment not designed specifically for biomass cultivation, harvesting, and collection can increase feedstock quality risks. The type of equipment should be specified for the sake of product consistency and risk reduction.	
Raw RI Score: The harvesting and collection equipment employed in the BDO Zone conforms to industry standards, ensuring the utilization of suitable machinery for these operations. Moreover, the presence of numerous professional harvesters and the implementation of well-established silviculture practices contribute to minimizing the likelihood of substandard or improper equipment being used. The emphasis on professionalism and adherence to industry standards further enhances the overall efficiency and effectiveness of the harvesting and collection processes.	**Score 2**

While suppliers may need to invest in new equipment to meet the demands of feedstock production, it is important to note that the delivered cost of $140-$160/dmt for Forest Residues and $130-$150/dmt for Pulpwood already takes into account the amortization of these investments made by the suppliers. Therefore, the higher delivery costs themselves already incorporate the associated investment risks. By factoring in the costs of equipment and its depreciation, the delivered pricing reflects the financial considerations and investments undertaken by the suppliers.

Raw RI Score is 2 out of 10.

Notched Salience: No adjustment.	**Score 2.0**
Impact Level: RI Impact Level is deemed *low*.	**Score 3.33**
Loaded RI Score: Loaded RI Score (Notched Salience × Impact Level) is 6.66.	**Score 6.66**

3.11. Temporary Externality-Driven Markets for Feedstock

Rationale: Alternative, non-traditional, externality-driven competitors for feedstock can drive feedstock demand (and cost) in unusual circumstances.

Raw RI Score: The firewood, densified logs, and mulch markets have been identified as the sole alternative and/or non-traditional markets within the BDO Zone. However, we assess these markets as insignificant competitors for feedstock, as their consumption levels are relatively low. In terms of quantity, they do not pose a significant impact on the availability of feedstock within the region. **Score 1**

Furthermore, we have not identified any other temporary markets driven by external factors that would compete for Sawmill Residuals, Forest Residues, or Pulpwood feedstocks. Our analysis indicates that these traditional feedstock sources primarily serve established industries and do not face substantial competition from other emerging or short-term markets.

Raw RI Score is 1 out of 10.

Notched Salience: No adjustment.	**Score 1.0**
Impact Level: RI Impact Level is deemed *low*.	**Score 3.33**
Loaded RI Score: Loaded RI Score (Notched Salience × Impact Level) is 3.33.	**Score 3.33**

3.12. Variations in Densification Methods Among Different Suppliers

Rationale: The shape and density of the unit in which feedstock is supplied can impact feedstock cost and quality.

Raw RI Score: The densification methods employed by suppliers within the BDO Zone exhibits minimal variation. While the quality of feedstock may differ based on the specific source and stage of processing, the methods used for harvesting and collection align with industry standards. This consistency in practices ensures a level of uniformity in the overall approach to densification across suppliers in the region. Raw RI Score is 2 out of 10.	**Score 2**
Notched Salience: No adjustment.	**Score 2.0**
Impact Level: RI Impact Level is deemed *low*.	**Score 3.33**
Loaded RI Score: Loaded RI Score (Notched Salience × Impact Level) is 6.66.	**Score 6.66**

3.13. Availability of Labor for Feedstock Production

Rationale: Skilled labor shortages can be difficult to remedy in the short term. Availability of suitable labor in an area can impact the ability to procure sufficient feedstock quantities on schedule. Labor risks are higher for facilities where supply chains are not yet active; or for Proponent's for whom large feedstock requirements, or development of new (or expanded) supply chains, demand significant additions to the local labor force.	
Raw RI Score: The province of Quebec is currently experiencing its lowest unemployment rate, posing a challenge in securing skilled workers, particularly in smaller municipalities like Ste-Émélie-de-l'Énergie. The limited pool of workers in the region further exacerbates the labor shortage. However, there are promising efforts being made in St-Michel-des-Saints, situated in the Lanaudière region, where two prominent organizations have implemented a program focused on training young individuals for employment in the forestry and mining sectors. This initiative serves as a positive step towards addressing the shortage of skilled labor in the area. Based on our assessment, we recommend integrating the development of the feedstock supply chain within the Matawinie BDO Zone with the existing roundwood supply chain of the forest industry. This integration serves multiple purposes, including addressing labor concerns. By ensuring that trained employees involved in feedstock production become an integral part of the forestry sector, we can mitigate the risks associated with their potential migration towards higher-value product sectors. The diverse opportunities available within the Matawinie BDO Zone would provide compelling reasons for these skilled workers to remain engaged in the region's forestry sector, thus enhancing stability and continuity in the labor force. Raw RI Score is 6 out of 10.	**Score 6**
Notched Salience: By creating a stable market for Forest Residue and Pulpwood, a bio-project can enhance the economics of logging operations, thereby incentivizing more workers to join the sector. Moreover, a new bio-project can mitigate the risk of logging labor shortage by purchasing or financing equipment, similar to some of the sawmills currently doing so. Collaborating with local	**Score 3.0**

sawmills can aid in this process. For these reasons, Raw RI Score is notched by 50%. Notched Salience is 3.0.	
Impact Level: RI Impact Level is deemed *moderate.*	**Score 6.66**
Loaded RI Score: Loaded RI Score (Notched Salience × Impact Level) is 19.98.	**Score 19.98**

3.14. Feedstock Transportation Costs

Rationale: Transportation can be one of the most significant cost components of biomass supply chains. The average transportation cost and percentage of total feedstock cost attributable to transportation should be known.	
Raw RI Score: Transportation costs for woody biomass feedstocks are primarily influenced by fuel prices, distance traveled, and labor expenses. In recent times, fuel costs have experienced significant increases, which have directly impacted transportation expenses. This surge in fuel prices has led to an average rise in transportation costs from $5.50 to $7.20 per loaded mile or $4.50 per loaded kilometer in 2022. To illustrate the average cost of transporting biomass, let's consider a load of 17 dry metric tons of biomass and an average trucking distance of 90 kilometers. In this scenario, the approximate transportation cost for biomass would amount to $25 per dry metric ton. Given these figures, transportation costs account for approximately 16% to 19% of the total delivered costs for Pulpwood and Forest Residues. For Sawmill Residuals, transportation costs represent a wider range, ranging from 12% to 62% of the total delivered costs. Specifically, transportation costs make up 12% for wood chips and a substantial 62% for bark. It is important to note that these percentages may fluctuate depending on specific factors such as the type of feedstock, distance traveled, and prevailing fuel prices. However, the analysis highlights the significant role transportation costs play in the overall delivered costs of woody biomass feedstocks. Raw RI Score is 4 out of 10.	**Score 4**
Notched Salience: No adjustment.	**Score 4.0**
Impact Level: RI Impact Level is deemed *low.*	**Score 3.33**
Loaded RI Score: Loaded RI Score (Notched Salience × Impact Level) is 13.32.	**Score 13.32**

3.15. Transportation Distances

Rationale: Transport distances of 50-100 km for biomass feedstocks are typical but larger distances can be common. When the average transport distance from suppliers to the Proponent is high, the	

supply chain is subject to greater sensitivities to risks, such as increases in diesel cost, weather impacts, mechanical breakdown, and the demand for feedstock from competitors closer to the source. Understanding average transport distance can help flag higher-risk suppliers where transport distance materially exceeds the average.	
Raw RI Score: The average distance between suppliers and Ste-Émélie-de-l'Énergie is approximately 90 kilometers. However, it is important to acknowledge that certain suppliers have successfully transported bark over distances exceeding 300 kilometers, demonstrating the potential for longer transportation distances. This suggests that longer distances can be feasible within the supply chain. In our analysis of the feedstock supply curve, we have determined that only 31% of the total feedstock is accessible within a 75-kilometer driving distance from Ste-Émélie-de-l'Énergie. This indicates that a significant portion of the feedstock is located beyond this radius, requiring transportation over greater distances to reach the intended destination. These findings emphasize the need to consider transportation logistics and the associated costs when assessing the feasibility of feedstock supply in the region. While the average distance is 90 kilometers, the availability of feedstock at greater distances showcases the potential for suppliers to extend their reach and tap into additional resources. Raw RI Score is 3 out of 10.	**Score 3**
Notched Salience: No adjustment.	**Score 3.0**
Impact Level: RI Impact Level is deemed *moderate.*	**Score 6.66**
Loaded RI Score: Loaded RI Score (Notched Salience × Impact Level) is 19.98.	**Score 19.98**

3.16. Transportation of Feedstock Requires Specialized Equipment

Rationale: Requirements for specialized transport equipment can increase supply chain risk. Where there is low availability in required transportation equipment, equipment owners have increased leverage over transportation prices and supply chain resiliency can be lower.	
Raw RI Score: The forestry and wood processing industry in the Matawinie BDO Zone has a long-standing presence, indicating a well-established infrastructure. This industry's maturity suggests a high probability of standardized equipment being utilized across operations. Furthermore, the consistent transportation of feedstocks observed in recent years further reinforces the notion of equipment standardization within the region. Open-top and live-bottom trailers are the predominant types of trailers employed for transporting feedstock. These trailers offer efficient and reliable means of transportation, ensuring the smooth flow of feedstock within the supply chain. Dump trucks, on the other hand, are used as a secondary option when other trailer types are unavailable. Due to their smaller capacity and higher susceptibility to breakdowns, dump trucks are primarily utilized for transporting smaller volumes of feedstock.	**Score 3**

It is worth noting that facilities that receive feedstock transported by live-bottom or dump trailers do not require a self-unloading ramp. This distinction could potentially provide a competitive advantage, as the need for additional infrastructure is minimized, resulting in streamlined operations and potentially lower costs.

Overall, the widespread use of standardized equipment and the consistent transportation practices within the Matawinie BDO Zone contribute to the efficiency and reliability of the feedstock supply chain, supporting the smooth operation of the forestry and wood processing industry in the region.

Raw RI Score is 3 out of 10.

Notched Salience: No adjustment.	**Score 3.0**
Impact Level: RI Impact Level is deemed *low.*	**Score 3.33**
Loaded RI Score Loaded RI Score (Notched Salience × Impact Level) is 9.99.	**Score 9.99**

3.17. Delivery Routes through Local Communities

Rationale: Biomass transportation can become a nuisance to local communities, especially if large numbers of trucks pass through residential and school areas. Local communities often have the power to force regulations regarding truck transport, impeding a Proponent's ability to transport feedstock. This risk is greater in greenfield projects than operational ones.	
Raw RI Score: The forestry and wood industry has held a prominent position in the Matawinie BDO Zone for several decades, providing employment opportunities for multiple generations. This long-standing presence has facilitated the development of well-established delivery routes that play a crucial role in supporting the local communities within the Zone. These delivery routes serve as vital conduits, ensuring the smooth flow of raw materials and finished products throughout the region. Moreover, Ste-Émélie-de-l'Énergie boasts several potential industrial sites that can help mitigate the inherent risks associated with industrial operations. By situating these sites outside the main residential area, the potential impacts on local communities can be minimized. This strategic placement not only addresses safety concerns but also promotes a harmonious coexistence between industrial activities and the surrounding residential areas. The existence of these potential industrial sites in Ste-Émélie-de-l'Énergie provides an opportunity for the expansion and growth of the forestry and wood industry within the Zone. It allows for the establishment of modern facilities and infrastructure that can support the evolving needs of the sector while ensuring the well-being of the local community. The utilization of these designated industrial sites demonstrates a proactive approach to managing the industry's impact and fostering sustainable development in the Matawinie BDO Zone.	**Score 2**

Raw RI Score is 2 out of 10.

Notched Salience: No adjustment.	**Score**

	2.0
Impact Level: RI Impact Level is deemed *low.*	**Score 3.33**
Loaded RI Score: Loaded RI Score (Notched Salience × Impact Level) is 6.66.	**Score 6.66**

3.18. Transportation Regulations & Local Weight Limits

Rationale: In many regions, transportation is regulated based on seasonal road conditions. These regulations (e.g., "frost laws") often take the form of weight restrictions or limits on the number of trucks allowed on roads. Such regulations can impede the Project's ability to source sufficient feedstock or increase the cost of doing so at certain times of the year.	
Raw RI Score: Given the substantial volume and weight of timber regularly transported within the Matawinie BDO Zone, it is highly improbable that transportation regulations would impede the acquisition or transportation of feedstock. The existing infrastructure and well-established practices in the region are designed to accommodate the efficient movement of large quantities of timber and other forest products. Transportation regulations are typically implemented to ensure safety, environmental compliance, and the smooth flow of goods. In the case of the Matawinie BDO Zone, where the forestry and wood industry have a longstanding presence, the transportation infrastructure has been adapted to meet the specific requirements of the sector. This includes the availability of suitable road networks, well-maintained bridges and overpasses, and appropriate signage to facilitate the transportation of feedstock. Moreover, regulatory authorities responsible for overseeing transportation regulations are typically aware of the unique characteristics and needs of the forestry industry. They work closely with industry stakeholders to develop and enforce regulations that strike a balance between safety and operational efficiency. Considering these factors, we can confidently assert that the current volume and mass of timber transported in the Matawinie BDO Zone are well within the capacity of the existing transportation infrastructure. The industry's long-standing presence and collaboration with regulatory authorities ensure that transportation regulations do not pose significant hindrances to the acquisition or transportation of feedstock. Raw RI Score is 1 out of 10.	**Score 1**
Notched Salience: No adjustment.	**Score 1.0**
Impact Level: RI Impact Level is deemed *low.*	**Score 3.33**
Loaded RI Score: Loaded RI Score (Notched Salience × Impact Level) is 3.33.	**Score 3.33**

3.19. Road Infrastructure

Rationale: Feedstock cost and availability can be a function of the accessibility of road infrastructure**.** Problems with road networks will translate directly to risks to feedstock supply.	
Raw RI Score: Based on our assessment, the road network within the Matawinie BDO Zone is deemed adequate to support the forestry and wood industry sectors. Industrial sites are strategically located in proximity to major roads, ensuring convenient access to other regional destinations and facilitating the transportation of goods. Furthermore, the forest and timberland road networks in the Matawinie BDO Zone have been extensively developed to accommodate the substantial volume of timber harvested and transported within the area. These dedicated road networks are designed to withstand the weight and size requirements of forestry machinery and logging trucks, ensuring smooth and safe transportation of timber from the harvesting sites to processing facilities. Raw RI Score is 2 out of 10.	**Score 2**
Notched Salience: No adjustment.	**Score 2.0**
Impact Level: It is likely that all feedstock for a new project will move exclusively by roads. Therefore, the impact of road infrastructure is significant. RI Impact Level is deemed *medium.*	**Score 6.66**
Loaded RI Score: Loaded RI Score (Notched Salience × Impact Level) is 13.32.	**Score 13.32**

3.20. Number, Size, Mix, & Locations of Suppliers

Rationale: In general, a portfolio of multiple suppliers of various sizes is important for ensuring steady and uninterrupted feedstock supply with minimal price fluctuations. If a small number of large suppliers provide a high proportion of total feedstock, a disruption or supplier breach will have a greater impact on the supply chain. In such cases, the risk of disruption is lower, but the impact of those disruptions is higher. Conversely, a large number of small suppliers is less likely to have the capacity to withstand internal disruptions and may be more likely to breach. Here, the risk of disruption is higher, but the likely impact is lower. The number of suppliers and the ratio of small to large suppliers should be optimized. There is no pre-determined number or optimal ratio of suppliers—either too many or too few can pose higher degrees of risk.	
Raw RI Score: In our assessment of the Matawinie BDO Zone, we have identified a total of 20 suppliers involved in the production of feedstock. Among these suppliers, the distribution of Sawmill Residues generation varies. Only one sawmill generates over 100,000 dry metric tons (dmt) of Residues per year, while three sawmills generate between 30,000 to 65,000 dmt/yr, and two sawmills generate between 10,000 to 30,000 dmt/yr. The remaining 14 suppliers generate less than	**Score 1**

10,000 dmt/yr. Based on this analysis, it is evident that a new operator's portfolio could easily encompass ten different suppliers, ensuring a diversified and reliable feedstock supply.

To effectively recover Forest Residues and Pulpwood, the involvement of new operators in the area is of paramount importance. These operators are expected to primarily come from the forestry sector, as their expertise and existing infrastructure can be seamlessly integrated into the well-established roundwood supply chain. It should be emphasized that the participation of additional operators and the availability of specialized equipment are essential factors in ensuring a sufficient supply of feedstock for potential bio-based projects.

Considering the current demand for feedstock, it is noteworthy that Forest Residues and Pulpwood together account for less than 50% of the available feedstock within the BDO Zone. Therefore, the associated risk with this indicator is considered low. However, it is crucial to monitor the evolving demand for feedstock. If the demand increases to a level where Forest Residues and Pulpwood constitute more than 50% of the total feedstock available in the Zone, the associated risk will be reassessed accordingly to ensure the continued stability and sustainability of the feedstock supply chain.

Raw RI Score is 1 out of 10.

Notched Salience: No adjustment.	**Score 1.0**
Impact Level: RI Impact Level is deemed *low.*	**Score 3.33**
Loaded RI Score: Loaded RI Score (Notched Salience × Impact Level) is 3.33.	**Score 3.33**

3.21. Suppliers Subject to Same External Risk Factors (Non-Weather & Equipment Based)

Rationale: When a single risk event can impact the feedstock production ability of all (or most) suppliers, then feedstock risk is higher and supply chain resiliency is lower. Resilience is maximized when biomass supply chains exhibit diversity in their locations, production practices, and other elements of supply chain structure such that the impact of single, high-risk events have varying impacts on suppliers.

Raw RI Score: Suppliers operating within the Matawinie BDO Zone are exposed to various common external risks that can significantly impact their operations. Economic conditions play a crucial role in the performance of the forest products industry, with its fortunes closely tied to the overall state of the economy. During prosperous periods, the industry tends to thrive, while during economic downturns, it faces challenges. Solid wood products, such as softwood lumber, are particularly sensitive to economic conditions as they serve as vital raw materials for new construction, and their demand is closely linked to the housing market. Similarly, wood furniture, especially wood cabinets, is strongly influenced by the housing market, while packaging materials like corrugated boxes, bags, and fiber drums rely on shipments of finished goods. Consequently, the pulp and paper sector closely track the overall economic climate (Dahal et al., 2013). **Score 8**

Logging activities within the Zone are also subject to macroeconomic factors, notably the housing market. Downturns in the market can pose a threat to the viability of sawmills, subsequently impacting the harvest of sawtimber and Forest Residues. For instance, the current low prices of lumber have led to sawmill curtailments, affecting the availability of feedstock. Furthermore, increased prices of natural gas can introduce risks to the industry. In response, facilities may opt to burn their own residuals, particularly sawdust and bark/hog fuel, for energy generation purposes. This can result in these materials being less available and more expensive for potential bio-based projects. Therefore, it is crucial for new operators in the Matawinie BDO Zone to be cognizant of these external risks and incorporate them into their business plans to effectively navigate and mitigate potential challenges. Nonetheless, the risk is limited by the sheer number of sawmills in the BDO Zone. Raw RI Score is 8 out of 10.	
Notched Salience: Sufficient inventory levels moderately mitigate this risk. Raw RI Score is notched down by 25%. Notched Salience is 6.0.	**Score 6.0**
Impact Level: Although unlikely, major economic shifts can have significant impact on the entire forest products industry in the BDO Zone. RI Impact Level is deemed *high.*	**Score 9.99**
Loaded RI Score: Loaded RI Score (Notched Salience × Impact Level) is 59.94.	**Score 59.94**

3.22. Seasonal Weather Impacts on Feedstock Supply

Rationale: Seasonal weather impacts are defined as deriving from natural weather variations (e.g., spring thaws, rainy seasons, or dry seasons) as opposed to singular weather events (like fires, droughts, or hurricanes). Seasonal weather changes can be a significant risk factor affecting feedstock availability, quality, and price.	
Raw RI Score: Within the Matawinie BDO Zone, temporary disruptions can arise during periods of heavy rain or snowfall, presenting challenges for fiber producers in accessing and clearing trees from timberland. Such weather conditions can render dirt roads impassable, affecting the overall production of feedstock. However, it is important to note that these disruptions are typically temporary in nature and tend to last no more than a few weeks. Furthermore, seasonal delays in the generation of Forest Residues and Pulpwood are also possible, particularly during the spring season. These delays may arise due to factors such as weather conditions and specific harvesting practices. Nonetheless, it is worth noting that these delays are generally manageable and do not significantly hinder the overall supply of feedstock in the long term. Raw RI Score is 3 out of 10.	**Score 3**
Notched Salience: Since seasonal delays typically last days or weeks, having a modest but well-maintained feedstock reserve on site would significantly reduce the risk. Raw RI Score is notched by 50%. Notched Salience is 1.5.	**Score 1.5**
Impact Level: RI Impact Level is deemed *moderate.*	**Score**

	6.66
Loaded RI Score: Loaded RI Score (Notched Salience × Impact Level) is 9.99.	**Score 9.99**

3.23. Long-Term Weather and Climate Trends

Rationale: In certain regions, climate trends and significant potential changes to future weather patterns can create feedstock risk.	
Raw RI Score: Climate change is anticipated to have significant repercussions on the Matawinie BDO Zone, leading to heightened occurrences and intensities of floods and droughts. Among the various feedstock types, hardwood species of pulpwood are projected to be particularly susceptible to the impacts of drought. Moreover, wildfires pose a substantial threat to the feedstock supply chain within the Zone, as they can result in the destruction of inventory and disrupt transportation networks. The infestation of spruce budworm is also a major concern for the forests in the Zone, given its previous impact on other regions in the province of Quebec. While the exact timing of its impact on the forests within the Zone remains uncertain, it is plausible that the infestations could potentially increase feedstock availability. Despite the unpredictability of climate change effects, historical data indicate no significant variations in harvest removals or feedstock growth from year to year. Nevertheless, it is imperative to proactively prepare for potential future risks and implement appropriate measures to mitigate their adverse effects. By staying vigilant and taking necessary precautions, the forestry and wood industry in the Matawinie BDO Zone can better adapt to the challenges posed by climate change and safeguard the resilience of the feedstock supply chain. Raw RI Score is 5 out of 10.	**Score 5**
Notched Salience: Feedstock flexibility with respect to species and feedstock type would significantly mitigate the long-term risks of climate change. Raw RI is notched down by 50%. Notched Salience is 2.5.	**Score 2.5**
Impact Level: There is a great deal of uncertainty related to climate change and its effect on the BDO Zone. RI Impact Level is deemed *high.*	**Score 9.99**
Loaded RI Score: Loaded RI Score (Notched Salience × Impact Level) is 24.98.	**Score 24.98**

3.24. Government Subsidies for Feedstock Production or Utilization

Rationale: Feedstock that is directly subsidized through government programs can pose greater long-term risk than feedstock that is not. Subsidies may be subject to amendment or repeal, sometimes with minimal notice.	

NOTE: This risk indicator refers to direct feedstock subsides only; it does not apply to government subsidies that pertain indirectly to the operations of the Proponent, such as Loan Guarantees, or to the markets for products produced by the Proponent.	
Raw RI Score: To the best of our knowledge, the Sustainable Forest Management Program is the sole existing source of subsidies aimed at promoting feedstock production in the Matawinie BDO Zone. New operators have the opportunity to access funds from this program to establish their businesses and enhance the biomass supply chain, such as by implementing a Biomass Valuation Committee (BVC). However, it is important to note that government funding is not the primary means of support for suppliers in the Zone when it comes to feedstock production. While the Sustainable Forest Management Program provides an avenue for financial assistance, suppliers primarily rely on other sources of support and revenue generation to sustain and expand their feedstock operations. Raw RI Score is 2.	**Score 2**
Notched Salience: No adjustment.	**Score 2.0**
Impact Level: Raw RI Impact level is deemed *low*.	**Score 3.33**
Loaded RI Score: Loaded RI Score (Notched Salience × Impact Level) is 6.66.	**Score 6.66**

3.25. Local, Provincial, & National Laws, Regulations, & Permitting Pertaining to Biomass

Rationale: Feedstock production directly dependent on local, provincial, or national laws or government regulations can pose greater long-term risk than feedstock that is not, since laws and regulations may be subject to amendment or repeal. If utilization of biomass requires specific permits (e.g., percentage removal of Forest Residues or corn stover, allowable cut limits, air emission, storage permits, rights-of-way, overweight permits for trucks, cross-border permitting for shipment of biomass, chain of custody, or certification of sustainability), the likelihood of obtaining such permits and/or complying with permitting requirements should be examined.	
Raw RI Score: To the best of our knowledge, no local or state laws or regulations exist in the Matawinie BDO Zone that would impose restrictions or limitations on biomass removal from the forests, except for the determination of the allowable annual cut (AAC) for Crown lands and private forests. Although there might be certain municipal laws governing forestry operations on private lands, these are not anticipated to have a substantial impact on the availability of woody biomass for a new operator. Overall, the regulatory landscape in the Zone is conducive to biomass extraction, and there are no significant legal barriers or prohibitions that would impede a new operator's ability to procure and utilize feedstock from the region's forests.	**Score 4**

Raw RI Score is 4 out of 10.	
Notched Salience: Any future regulations will likely pertain to Forest Residues. Therefore, risks related to regulations can be mitigated through substitution with other feedstocks, such as Sawmill Residuals and Pulpwood. Raw RI Score is notched down by 50%.	**Score 2.0**
Impact Level: Regulations can have significant impact on the availability of biomass. There is a high degree of uncertainty pertaining to future regulations around Forest Residue. RI Impact Level is deemed *high.*	**Score 9.99**
Loaded RI Score: Loaded RI Score (Notched Salience × Impact Level) is 19.98.	**Score 19.98**

3.26. Backlash Against Biomass Development, Procurement or Usage in the Region

Rationale: Public backlash against biomass development in the Proponent region can directly impact Proponent's ability to procure, transport, trans-load, store, or utilize feedstock by affecting local policies, regulations, and Proponent's ability to obtain necessary permitting.	
Raw RI Score: During our comprehensive analysis, it came to our attention that there exists a prevailing negative public perception or opposition towards new bio-based projects within the Matawinie BDO Zone. This sentiment can be attributed, in part, to the establishment of a pellet mill in Saint-Michel-des-Saints in 2019, which regrettably ceased operations after a mere six months, leading to substantial job losses. The closure of the mill left a lasting impact on the local community. To enhance the social acceptability of future projects, it is imperative for new operators to invest time and effort in effectively communicating their initiatives to the communities in which they operate. Engaging in open and transparent dialogue can help dispel any concerns or misconceptions, and provide an opportunity to foster positive relationships and garner support. Additionally, such interactions can serve as a means to attract potential workers from these communities, contributing to local employment opportunities. Furthermore, it is important to note that in Quebec, there exists a negative sentiment surrounding the utilization of pulpwood for energy production. There is a strong belief that clear-cutting entire stands of forests, primarily composed of pulpwood that may not hold significant economic value but possess ecological value, for energy purposes is not favored or endorsed. This viewpoint reflects the importance placed on preserving ecological integrity and maintaining the balance between economic activities and environmental considerations within the region. Lastly, it is worth acknowledging the growing popularity of the conservation movement among private landowners. This movement emphasizes the role of forests in combating climate change and views certain forestry operations as potentially counterproductive to these efforts. As a result, private landowners are becoming increasingly cautious and discerning when it comes to engaging in forestry activities. In light of these observations, it is essential for new operators to address and navigate these concerns, incorporating sustainable practices and emphasizing the positive environmental impact	**Score 6**

of their projects. By aligning with local values, demonstrating responsible forest management, and actively engaging with stakeholders, new operators can work towards fostering greater acceptance and cooperation within the Matawinie BDO Zone. Raw RI Score is 6 out of 10.	
Notched Salience: The proponent can mitigate the risk related to potential backlash against feedstock use by an educational campaign focusing on economic development, job security, as well as sustainability of operations and the "waste-to-product" concept. Raw RI is notched down by 50%. Notched Salience is 3.0.	**Score 3.0**
Impact Level: Local opposition can be detrimental to new projects and stifle their development. RI Impact Level is deemed *high.*	**Score 9.99**
Loaded RI Score: Loaded RI Score (Notched Salience × Impact Level) is 29.97.	**Score 29.97**

3.27. Feedstock Sustainability, Including Risks to Soil Quality, & Surface & Groundwaters

Rationale: Public concerns about the sustainability of feedstock production can jeopardize biomass feedstock operations. Sustainability certification schemes should be utilized where applicable to ensure that feedstock comes from sustainable sources. Soil sustainability can be defined as the management of soil in a way that does not exert any negative or irreparable effects on the soil or any other systems. There is a diversity of approaches to soil sustainability in jurisdictional guidelines for biomass harvesting and production. Different feedstock types have unique thresholds at which feedstock removal causes significant negative consequences on the soil. Excessive nutrient runoff from biomass feedstock production can accumulate in surface waters and result in algal blooms and hypoxia, which can lead to habitat loss for aquatic species higher up the food chain and alter aquatic ecosystem food webs. Damage to aquatic ecosystems can cause a social and regulatory backlash. Water intake issues can also increase risk.	
Raw RI Score: All Crown lands encompassed within the Matawinie BDO Zone are subject to rigorous certification processes, with a focus on sustainable forest management practices. These lands hold certifications from either the Sustainable Forestry Certification (SFC) or the Sustainable Forestry Initiative (SFI), guaranteeing that forest operations conducted within these areas meet the highest standards for sustainable harvesting. These certifications encompass a comprehensive range of criteria, including but not limited to sustainable harvest practices, watercourse protection, soil conservation, and more. As a result, the utilization of roundwood for the production of Sawmill's Residuals and pulpwood poses minimal risk. Private forests within the Zone also fall under the purview of the Sustainable Forest Management Program, which establishes guidelines for responsible forest management. This program sets forth regulations and practices aimed at ensuring the sustainable use of forest resources on private lands.	**Score 1**

By adhering to these guidelines, private forest owners contribute to the preservation of forest health and the promotion of sustainable practices.

To further enhance the sustainable recovery of Forest Residues, it is crucial to uphold stringent compliance with local and provincial regulations. The responsible utilization of this biomass necessitates a thorough understanding of its impact on forest ecosystems. Fortunately, collaborative efforts between organizations in the province of Quebec and Natural Resources Canada have resulted in the development of a tool that outlines healthy practices for the removal of Forest Residues. This tool serves as a valuable resource, providing guidance to stakeholders involved in the recovery process.

By adhering to recommended guidelines and complying with regulatory frameworks, the increased availability of woody biomass can be effectively harnessed without compromising forest health. This ensures that the bioenergy sector can continue its sustainable growth trajectory, foster economic development and contribute to the overall well-being of local communities.

Raw RI Score is 1 out of 10.

Notched Salience: No adjustment.	**Score 1.0**
Impact Level: Sustainability concerns are significant to bio-projects. RI Impact Level is deemed *high.*	**Score 9.99**
Loaded RI Score: Loaded RI Score (Notched Salience × Impact Level) is 9.99.	**Score 9.99**

3.28. Geographic Location Influence on Feedstock Variability

Rationale: Feedstock from different regions may differ in quality due to variations in soil quality, topography, harvest practices, weather, fertilizer applied, etc.

Raw RI Score: **Score 1**

The geographical location of the Matawinie BDO Zone is not anticipated to exert a substantial influence on feedstock variability. While there might be some topographic variations across the forests, it is unlikely to significantly impact the existing diversity observed among the feedstock categories. Moreover, modern biomass feedstock utilization systems possess the resilience and adaptability to mitigate potential variations in feedstock quality.

The primary distinctions in feedstock characteristics are expected to arise from variances in humidity content and the presence of impurities, such as sand and rocks, which can be found within the feedstock. These factors may introduce some variations in the physical properties of the biomass. However, advanced biomass utilization technologies are designed to accommodate such differences and optimize the conversion process accordingly.

Overall, the geographical features of the Matawinie BDO Zone are not projected to exert a pronounced influence on feedstock heterogeneity. The focus should primarily be on managing the humidity levels and addressing any impurities present in the feedstock to ensure efficient and effective utilization in biomass conversion processes.

Raw RI Score is 1 out of 10.

Notched Salience: No adjustment.	**Score 1.0**
Impact Level: RI Impact Level is deemed *low.*	**Score 3.33**
Loaded RI Score: Loaded RI Score (Notched Salience × Impact Level) is 3.33.	**Score 3.33**

3.29. Capacity of Supply Chain Components & Equipment to Scale

Rationale: Scale-up risk increases if supply chain components or underlying feedstock infrastructure necessary for these components cannot scale to handle Proponent feedstock requirements and throughput capacity. Capacity to scale should be demonstrated.	
Raw RI Score: In order to expand the supply chain infrastructure in the Matawinie BDO Zone to accommodate potential bio-projects utilizing Forest Residues as feedstock, substantial capital investments would be necessary from prospective suppliers. The scaling-up process would primarily entail procuring wood processing equipment such as grinders, chippers, and potentially dryers, rather than focusing on transportation equipment, given the already robust hauling capacity in the region. This risk assumes significance due to the aging workforce in the logging industry and the escalating operational costs associated with logging operations. Some sawmills have already recognized this challenge and are making investments in their own equipment and employing dedicated crews, as the existing logging capacity falls short of meeting the demand.	**Score 7**

Raw RI Score is 7 out of 10.

Notched Salience: The proponent can mitigate the risk by building up initial inventory and implementing a procurement strategy that prioritizes readily available feedstock to allow for a gradual scale-up of the supply chain. Furthermore, the proponent can reduce this risk by purchasing or financing equipment and collaborating with sawmills to ensure a sufficient logging workforce. Raw RI Score is notched down by 50%. Notched Salience is 3.5.	**Score 3.5**
Impact Level: The capacity of the supply chain to expand and meet the feedstock requirements of a new bio-project can have a significant impact on its success. RI Impact Level is deemed *high.*	**Score 9.99**
Loaded RI Score: Loaded RI Score (Notched Salience × Impact Level) is 34.97.	**Score 34.97**

CATEGORY 4.0: INFRASTRUCTURE RISKS

4.1 Risk Factor: Physical Infrastructure

4.1.1 Land Parcel

Raw RI Score: There is suitable land available in varying parcel sizes within existing industrial parks that include– (1) Parc industriel de Saint-Félix-de-Valois is 30 km from Sainte-Émélie-de-l'Énergie, and has a total area of 207,263 m², available area of 138,000 m² ; (2) Parc industriel de Rawdon is 40 km from Sainte-Émélie-de-l'Énergie, and has a total area of 101,171 m², available area of 18 360 m²; and (3) Industrial zone in Municipality of Saint-Donat is located north west of the territory with 696,000 sq ft. The most ideal location is the industrial park in Saint-Félix-de-Valois, which lies close to Route 131 and railway line. Raw RI Score is 1 out of 10.	**Score 1**
Notched Salience: No adjustment.	**Score 1.0**
Impact Level: RI Impact level is deemed *low*.	**Score 3.33**
Loaded RI Score: Loaded RI Score (Notched Salience × Impact Level) is 3.33.	**Score 3.33**

4.1.2 City Ownership

Raw RI Score: The city owns most parts of the industrial sites referenced above, including Parc Industriel de Saint-Félix-de-Valois. However, there are a good number of private properties within the industrial parks (Appendix C, Map C-5, C-6, C-7) showing land parcels owned by the City and Private entities). Raw RI Score is 1 out of 10.	**Score 1**
Notched Salience: No adjustment.	**Score 1.0**
Impact Level: RI Impact level deemed *low.*	**Score 3.33**
Loaded RI Score: Loaded RI Score (Notched Salience × Impact Level) is 3.33.	**Score 3.33**

4.1.3 Industrial Land Use Zone

Raw RI Score: Approved land use and zoning within existing industrial parks is in place for commercial, light, medium and limited heavy industrial development. However, the land use does not authorize industries that produce certain hazardous substances during the production process. Further information can be obtained by contacting the Department of Economic Development.	**Score 3**

Raw RI Score is 3 out of 10.	
Notched Salience: No adjustment.	**Score 3.0**
Impact Level: RI Impact level is deemed *low.*	**Score 3.33**
Loaded RI Score: Loaded RI Score (Notched Salience × Impact Level) is 9.99.	**Score 9.99**

4.1.4 Natural Gas Line

Raw RI Score: The industrial parks do not have access to Natural Gas, and the projects which require natural gas must maintain their own natural gas tanks (propane) serviced by companies such as Bellgaz. Further information can be obtained from the Department of Economic Development.	**Score 4**
Raw RI Score is 4 out of 10.	
Notched Salience: No adjustment.	**Score 4.0**
Impact Level: RI Impact level is deemed low.	**Score 3.33**
Loaded RI Score: Loaded RI Score (Notched Salience × Impact Level) is 13.32.	**Score 13.32**

4.1.5 Electrical

Raw RI Score: Electrical is provided by Hydro-Quebec. Parc industriel de Saint-Félix-de-Valois is located adjacent to Route 131, where the main cable lies. According to local economic development office, the electrical distribution system is sufficient to supply new industrial development.	**Score 2**
Raw RI Score is 2 out of 10.	
Notched Salience: No adjustment.	**Score 2.0**
Impact Level: RI Impact level is deemed *low.*	**Score 3.33**
Loaded RI Score: Loaded RI Score (Notched Salience × Impact Level) is 6.66.	**Score 6.66**

4.1.6 Fresh Water Supply

Raw RI Score: The Public Works Department manages the water system; and all projects in the industrial park will have access to aqueduct for their water requirements. The Municipality has many pumping stations to ensure adequate pressure in the water	**Score 2**

system. Also, an expansion of the industrial park in Saint-Félix-de-Valois is in development for 2024, with an aqueduct extension in Chemin de la Ligne-Frédéric over a length of 600 m with a budget of $305,000; and in Saint-Jean road for 170 m with $141,000.

Raw RI Score is 2 out of 10.

Notched Salience: No adjustment.	**Score 2.0**
Impact Level: RI Impact level is deemed *low.*	**Score 3.33**
Loaded RI Score: Loaded RI Score (Notched Salience × Impact Level) is 6.66.	**Score 6.66**

4.1.7 Sewage Disposal Trunk Line

Raw RI Score: The projects must have their own wastewater treatment and disposal system. The system design and installation are subject to the issuance of an authorization under section 32 of the Environment Quality Act.	**Score 3**

Raw RI Score is 3 out of 10.

Notched Salience: No adjustment.	**Score 3.0**
Impact Level: RI Impact level is deemed low.	**Score 3.33**
Loaded RI Score: Loaded RI Score (Notched Salience × Impact Level) is 9.99.	**Score 9.99**

4.1.8 Drainage and Stormwater Management

Raw RI Score: The stormwater drainage system in Matawinie consists of a network of pipes, culverts, infiltration systems and detention basins; along with natural systems to manage the stormwater runoff efficiently. Sufficient measures are being taken by the city to prevent/prepare for landslides/floods, caused due to the increase in water level of the Assomption River during heavy rainfall (Appendix C, Map C-8) showing land areas that are prone to landslides).	**Score 3**

Raw RI Score is 3 out of 10.

Notched Salience: No adjustment.	**Score 3.0**
Impact Level: RI Impact level is deemed *low.*	**Score 3.33**
Loaded RI Score: Loaded RI Score (Notched Salience × Impact Level) is 9.99.	**Score**

	9.99

4.1.9 Available ICT (Information & Communication Technology) Services

Raw RI Score: High speed broadband and telecommunication services are available and can be tailored to the needs of individual industries. The industrial parks have high speed internet fiber optic network with download/upload speed up to 3 Gbps, provided by Bell and Cooptel. There are also cable and satellite internet services available. Raw RI Score is 2 out of 10.	**Score 2**
Notched Salience: No adjustment.	**Score 2.0**
Impact Level: RI Impact level is deemed *low.*	**Score 3.33**
Loaded RI Score: Loaded RI Score (Notched Salience × Impact Level) is 6.66.	**Score 6.66**

4.1.10 Infrastructure – Landfill/Alternative Markets for Waste Disposal

Raw RI Score: There are 15 Ecocentres and Recycling Centres in the territory of Matawinie that accept a wide range of waste including household waste, hazardous waste, electronic waste, and construction and demolition debris. The region also has several landfill sites and composting facilities- Écocentre de Saint-Félix-de-Valois, Écocentre de Rawdon, Écocentre de Saint-Donat, Écocentre de Chertsey, Entrelacs, Écocentre de Notre-Dame-de-la-Merci, Écocentre de Saint-Alphonse-Rodriguez, Écocentre de Saint-Côme, Saint-Damien, Écocentre de Sainte-Béatrix, Écocentre de Sainte-Émélie-de-l'Énergie, Écocentre de Sainte-Marcelline- de-Kildare, Saint-Jean-de-Matha Écocentre Fiset, Écocentre de Saint-Michel-des-Saints, Écocentre de Saint-Zénon. All industrial areas have disposal sites located close by, and the industry is responsible for their solid waste management including hauling to waste disposal facilities. Raw RI Score is 1 out of 10.	**Score 1**
Notched Salience: No adjustment.	**Score 1.0**
Impact Level: RI Impact level is deemed *low.*	**Score 3.33**
Loaded RI Score: Loaded RI Score (Notched Salience × Impact Level) is 3.33.	**Score 3.33**

4.2 Risk Factor: Logistics

4.2.1 Road and Highway Access and Intersection

Raw RI Score: Matawinie has good network of roads and is easily accessible by the highways 131, 347, 337 and 125; and is located 30 Km from Joliette; 60 km from Laval; and 75 km from Montreal. Parc industriel de Saint-Félix-de-Valois, the primary industrial area	**Score 1**

is located adjacent to Route 131; Parc industriel de Rawdon is located adjacent to Route 337; and Industrial zone in Municipality of Saint-Donat is located at the intersection of the roads 125 and 329. Raw RI Score is 1 out of 10.	
Notched Salience: No adjustment.	**Score 1.0**
Impact Level: RI Impact level is deemed *low.*	**Score 3.33**
Loaded RI Score: Loaded RI Score (Notched Salience × Impact Level) is 3.33.	**Score 3.33**

4.2.2 Ocean/River Access

Raw RI Score: The Port of Trois-Rivières is 104 Km from Sainte-Émélie-de-l'Énergie, the centrepoint of the BDO Zone. It is one of the largest ports in Quebec (area of 457,000 m^2), with nine commercial dock sections, three general cargo sheds, eight dry bulk sheds, two tank farms, grain elevators, outdoor storage areas and two harbour cranes. Another port closer to Matawinie is the Port of Montreal, located 113 km from Sainte-Émélie-de-l'Énergie, and is the largest container port in Eastern Canada. The port provides access to international markets in Europe, Asia, and South America. To transport goods from Matawinie to these ports, there are several options including trucking, rail, and intermodal transportation. Local logistics and transportation companies can assist with these services. Raw RI Score is 2 out of 10.	**Score 2**
Notched Salience: No adjustment.	**Score 2.0**
Impact Level: RI Impact level is deemed *low.*	**Score 3.33**
Loaded RI Score: Loaded RI Score (Notched Salience × Impact Level) is 6.66.	**Score 6.66**

4.2.3 Railway Service

Raw RI Score: At the south-east of the territory of Matawinie, in the town of Saint-Félix-de-Valois, 30 km from Sainte-Émélie-de-l'Énergie, there is a transhipment site that connects the national railway of Canadian Pacific to majors cities like Montréal, Trois-Rivières and Québec. Goods from the industrial park in Saint-Félix-de-Valois can be transported through the shortline- Quebec Gatineau Railway (CFQG), and then further connect to the Canadian National Railway (CN). Raw RI Score is 1 out of 10.	**Score 1**
Notched Salience: No adjustment.	**Score 1.0**

Impact Level: RI Impact level is deemed *low.*	**Score 3.33**
Loaded RI Score: Loaded RI Score (Notched Salience × Impact Level) is 3.33.	**Score 3.33**

4.2.4 Accessibility to Airport

Raw RI Score: The International Aeroport of Mirabel (Montreal) is in the Region of Laurentides, and is 130 km from Sainte-Émélie-de-l'Énergie, the centre of the BDO Zone. This airport provides handling infrastructure and expertise for heavy and oversized shipments, ground equipment to handle multiple cargo flights simultaneously, and runways/ taxiways that can accommodate B747-8Fs. Raw RI Score is 3 out of 10.	**Score 3**
Notched Salience: No adjustment.	**Score 3.0**
Impact Level: RI Impact level is deemed *low.*	**Score 3.33**
Loaded RI Score: Loaded RI Score (Notched Salience × Impact Level) is 9.99.	**Score 9.99**

4.3 Risk Factor: Social Infrastructure

4.3.1 Healthcare Facilities

Raw RI Score: Centre Hospitalier de Lanaudière in Joliette is the main hospital that provides acute care services, emergency care, and specialized care in areas such as oncology, cardiology, and neurology. The residents in Matawinie travel to Joliette, 45 km from Sainte-Émélie-l'Énergie, centre of the BDO zone, to visit the main hospital. Other hospitals/medical clinics in/near Matawinie are- Centre de Santé et de Services Sociaux de Montcalm, Clinique médicale de Saint-Jean-de-Matha, Clinique médicale de Rawdon and Clinique Médicale Rive-Nord. People with serious conditions who require specialized treatment travel to hospitals in the City of Montreal. Raw RI Score is 3 out of 10.	**Score 3**
Notched Salience: No adjustment.	**Score 3.0**
Impact Level: RI Impact level is deemed *low.*	**Score 3.33**
Loaded RI Score: Loaded RI Score (Notched Salience × Impact Level) is 9.99.	**Score 9.99**

4.3.2 Educational Facilities

Raw RI Score: There is a wide range of educational institutions and programs available in the region. Matawinie has 18 primary schools, 5 secondary schools, 2 vocational training establishments (Samares multi-service centre), 3 CEGEPs (Regional Cégep de Lanaudière) and 3 university campuses nearby (CRUL). Some of the Universities/Colleges nearby are- Centre universitaire de Joliette (UQTR), Université du Québec à Montréal – Campus Lanaudière; and University of Québec at Trois-Rivières. Raw RI Score is 2 out of 10.	**Score 2**
Notched Salience: No adjustment.	**Score 2.0**
Impact Level: RI Impact level is deemed *low.*	**Score 3.33**
Loaded RI Score: Loaded RI Score (Notched Salience × Impact Level) is 6.66.	**Score 6.66**

4.3.3 Recreational Facilities

Raw RI Score: There is a wide variety of recreational amenities in Matawinie including parks, biking, swimming, playgrounds, galleries, theaters, tennis courts, golf courses, sportsplex, hiking trails, rivers, kayaking, canoeing, fishing, skating rinks, skiing, snowshoeing, tube sliding etc. Raw RI Score is 1 out of 10.	**Score 1**
Notched Salience: No adjustment.	**Score 1.0**
Impact Level: RI Impact level is deemed *low.*	**Score 3.33**
Loaded RI Score: Loaded RI Score (Notched Salience × Impact Level) is 3.33.	**Score 3.33**

4.3.4 Cultural Facilities

Raw RI Score: There is a wide variety of cultural amenities in Matawinie including art galleries, museums, theatres/film, music and festivals. Matawinie is famous for hosting the Festival Mémoire et Racines, the festival that celebrates Quebec's traditional music and dance annually. The Centre culturel de Joliette hosts exhibitions, performances, and workshops in visual arts, theater, music, and dance. Musée d'art de Joliette art museum features a collection of Canadian art from the 19th century to the present. Raw RI Score is 1 out of 10.	**Score 1**
Notched Salience: No adjustment.	**Score 1.0**

Impact Level: RI Impact level is deemed *low.*	**Score 3.33**
Loaded RI Score: Loaded RI Score (Notched Salience × Impact Level) is 3.33	**Score 3.33**

4.3.5 Public Safety Facilities

Raw RI Score: Matawinie is considered a safe place to live, with a relatively low crime rate compared to other cities in Canada. According to the Canadian government, the crime rate in the Lanaudière region, which includes Matawinie, was 3,932 incidents per 100,000 population in 2019. This represents a decrease from the previous year and is lower than the national average crime rate of 4,437 incidents per 100,000 population. Also, St-Félix-de-Valois Fire Station provides emergency services; and the civil security emergency services are available year-round 24/7. Raw RI Score is 2 out of 10.	**Score 2**
Notched Salience: No adjustment.	**Score 2.0**
Impact Level: RI Impact level is deemed *low.*	**Score 3.33**
Loaded RI Score: Loaded RI Score (Notched Salience × Impact Level) is 6.66.	**Score 6.66**

4.3.6 Housing

Raw RI Score: There is a wide variety of housing (rental and ownership) available within Matawinie, and the average value of a housing unit is $278,400. Out of the 37,357 housing units in total; 20,545 of them are occupied by owners; and 5,670 are occupied by the renters. A significant number of units rented in Matawinie are between $ 1000 to $ 1500, whereas the high-end rentals range between $ 2,000 to $ 2,500. Raw RI Score is 2 out of 10.	**Score 2**
Notched Salience: No adjustment.	**Score 2.0**
Impact Level: RI Impact level is deemed *low.*	**Score 3.33**
Loaded RI Score: Loaded RI Score (Notched Salience × Impact Level) is 6.66.	**Score 6.66**

4.4 Risk Factor: Workforce and Permitting

4.4.1 Labour Availability

Raw RI Score: There is a good labour market for new industrial development. According to Statistics Canada 2021, the major industries in the region are- Health care and social assistance (3,315 people); Retail trade (3,085 people); Construction (2,905 people); Manufacturing (2,495 people); Educational services (1,685 people); Accommodation & food services (1,320 people); Transportation & warehousing (1,185 people); and Waste management & remediation services (1,130 people). Matawinie has an Employment rate of 47.7%; Unemployment rate of 8.83% and an Activity rate of 52.5%. The educational attainment in Matawinie is as follows- High school level 24.58 %; Semi-specialized trade certificate 22.24 %; Collegial degree 14;84 %; and University degree 15.59 %. The median age in the region is 55, and there are over 31,945 people between the age of 15 and 64.	**Score 2**

Raw RI Score is 2 out of 10.

Notched Salience: No adjustment.	**Score 2.0**
Impact Level: RI Impact level is deemed *low.*	**Score 3.33**
Loaded RI Score: Loaded RI Score (Notched Salience × Impact Level) is 6.66.	**Score 6.66**

4.4.2 Labour Cost

Raw RI Score: The minimum wage rate in Quebec is $13.50 per hour for most workers. According to Statistics Canada 2020, the average hourly wage in Matawinie is $21.30, while the range varies between $20 to $35 per hour based on the occupation and experience. Also, the median income per capita is $35,600; and the median household income is $80,067.	**Score 2**

Raw RI Score is 2 out of 10.

Notched Salience: No adjustment.	**Score 2.0**
Impact Level: RI Impact level is deemed *low.*	**Score 3.33**
Loaded RI Score: Loaded RI Score (Notched Salience × Impact Level) is 6.66.	**Score 6.66**

4.4.3 Training Programs / Community College

Raw RI Score: There is a wide range of educational institutions and programs available in the region. Matawinie has 2 vocational training establishments (Samares multi-service centre), 3 CEGEPs nearby (Regional Cégep de Lanaudière) and 3 university campuses nearby (CRUL). Some of the Universities/Colleges nearby are- Centre universitaire de	**Score 2**

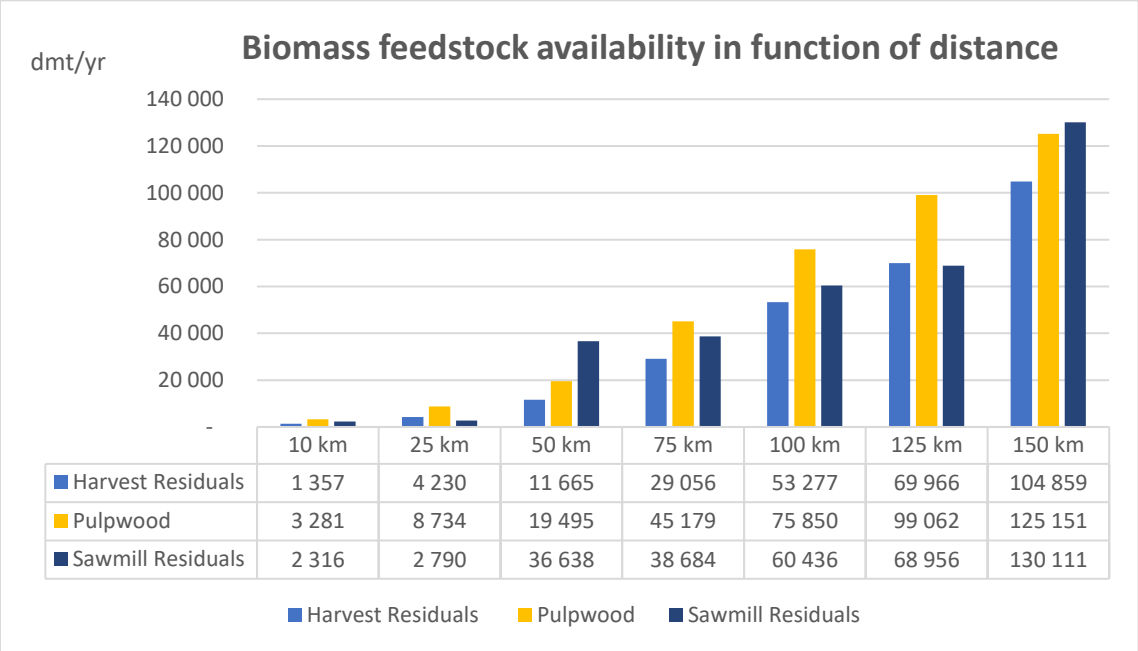
Joliette (UQTR), Université du Québec à Montréal – Campus Lanaudière; and University of Québec at Trois-Rivières. Raw RI Score is 2 out of 10.	
Notched Salience: No adjustment.	**Score 2.0**
Impact Level: RI Impact level is deemed *low.*	**Score 3.33**
Loaded RI Score: Loaded RI Score (Notched Salience × Impact Level) is 6.66.	**Score 6.66**

4.4.4 Permit Process

Raw RI Score: Permitting process is described on the Matawinie Municipal Website. The county has a history of welcoming economic development and supporting timely processing. In general, the permitting process ranges between 2 to 4 months. Raw RI Score is 2 out of 10.	**Score 2**
Notched Salience: No adjustment.	**Score 2.0**
Impact Level: RI Impact level is deemed *low.*	**Score 3.33**
Loaded RI Score: Loaded RI Score (Notched Salience × Impact Level) is 6.66.	**Score 6.66**

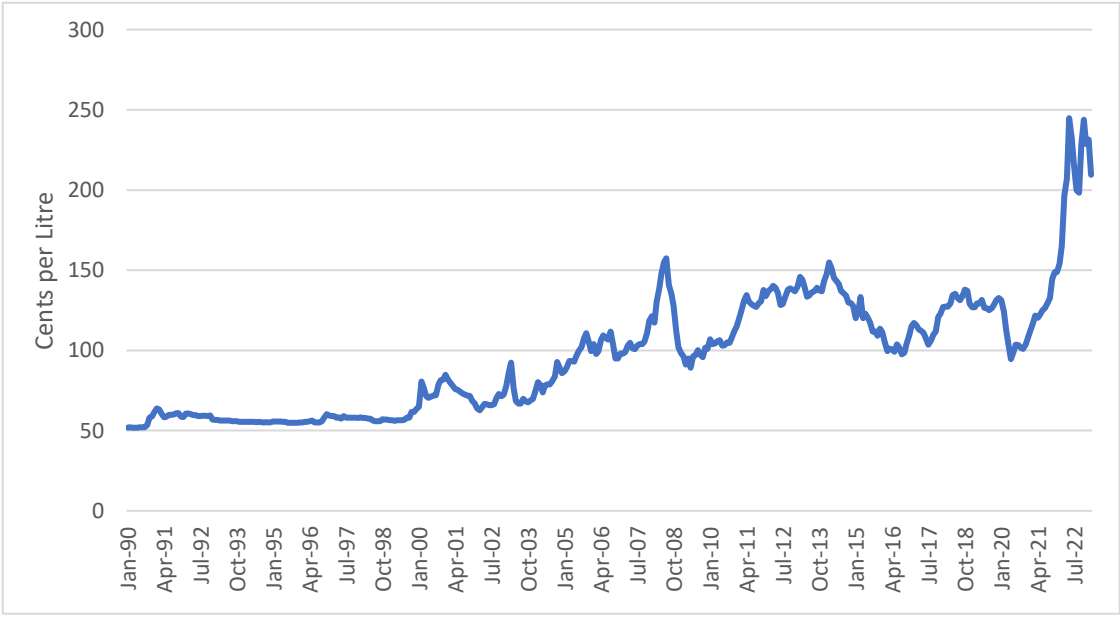
APPENDIX B: FIGURES, MAPS

Figure B-1. Biomass supply curve: potential availability as a function of distance.

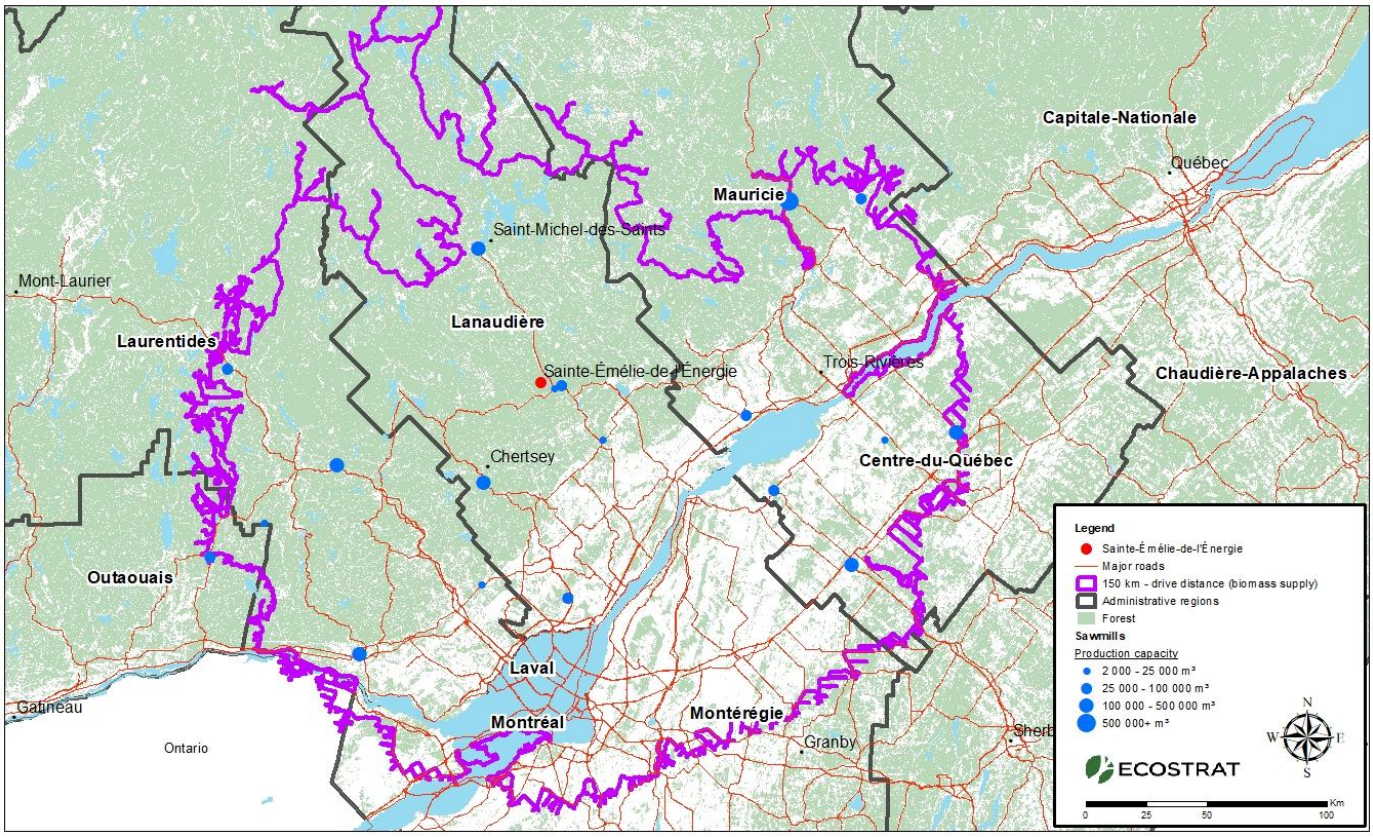


	10 km	25 km	50 km	75 km	100 km	125 km	150 km
Harvest Residuals	1 357	4 230	11 665	29 056	53 277	69 966	104 859
Pulpwood	3 281	8 734	19 495	45 179	75 850	99 062	125 151
Sawmill Residuals	2 316	2 790	36 638	38 684	60 436	68 956	130 111

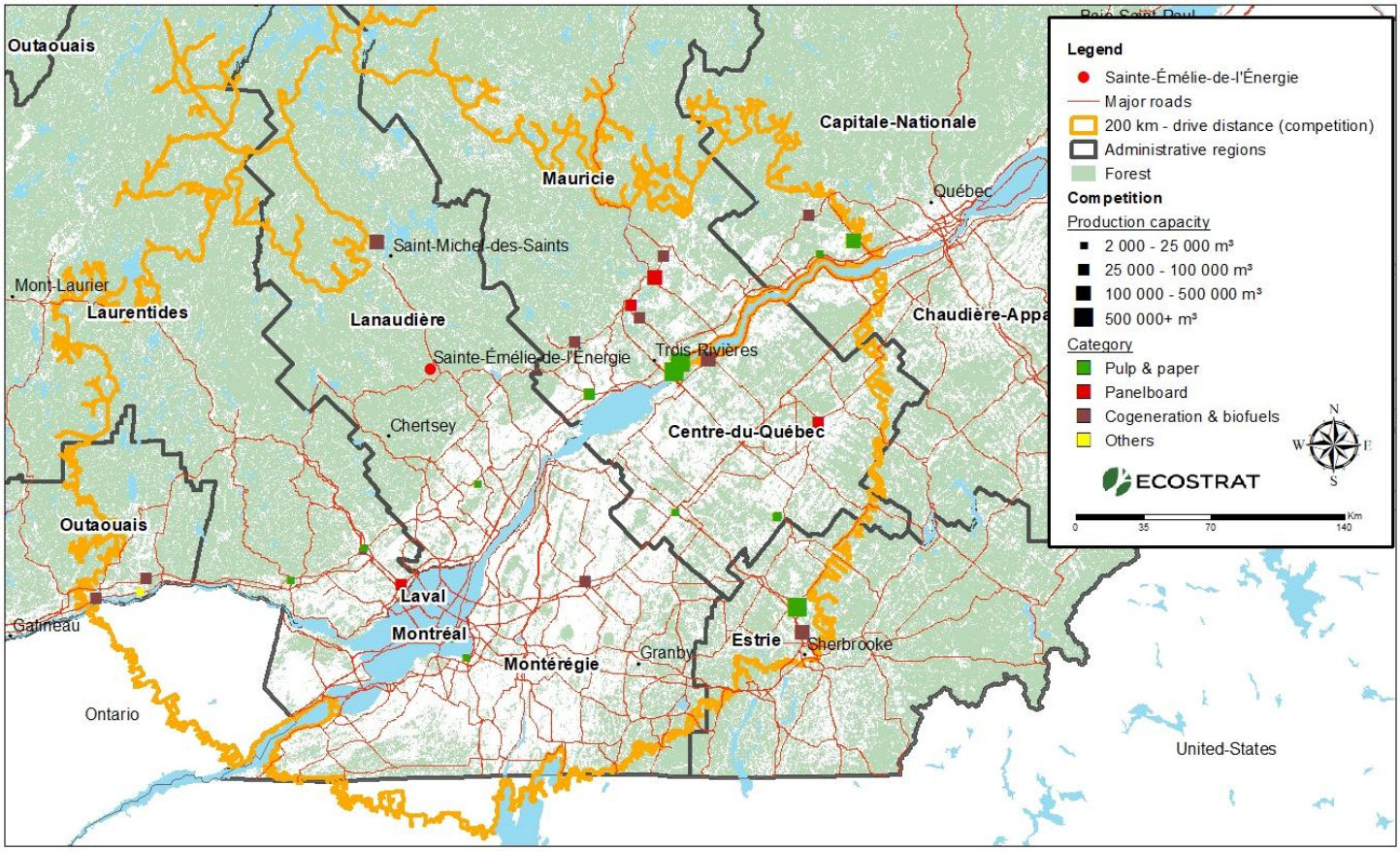
Figure B-2: Historical diesel prices for Quebec, 1990–2023



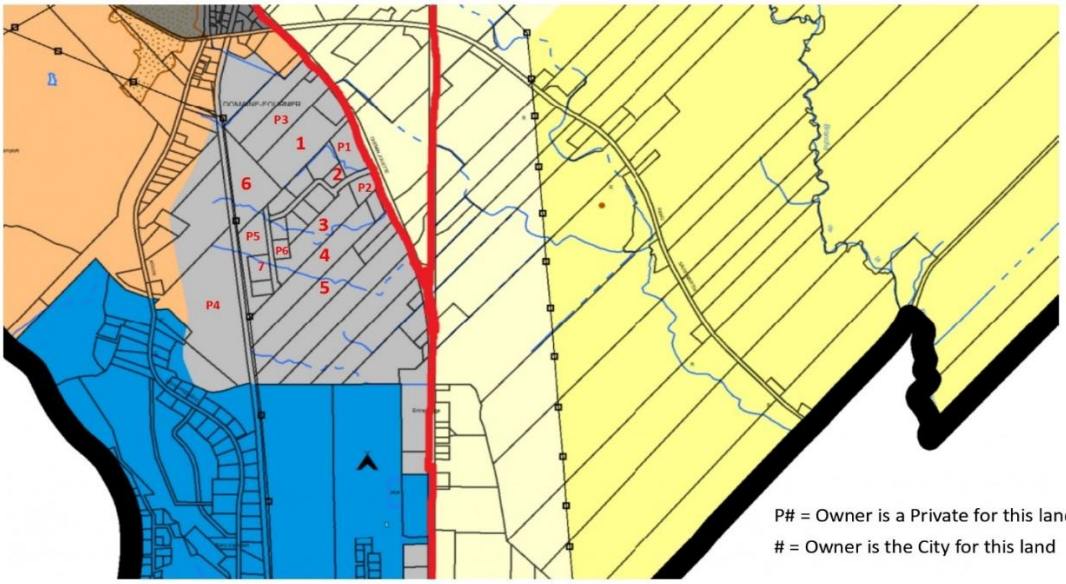
Map B-3. Sawmills within 150 km drive distance from Ste-Émélie-de-l'Énergie



Map B-4. Current competitors for feedstock within 200 km drive distance from Ste-Émélie-de-l'Énergie



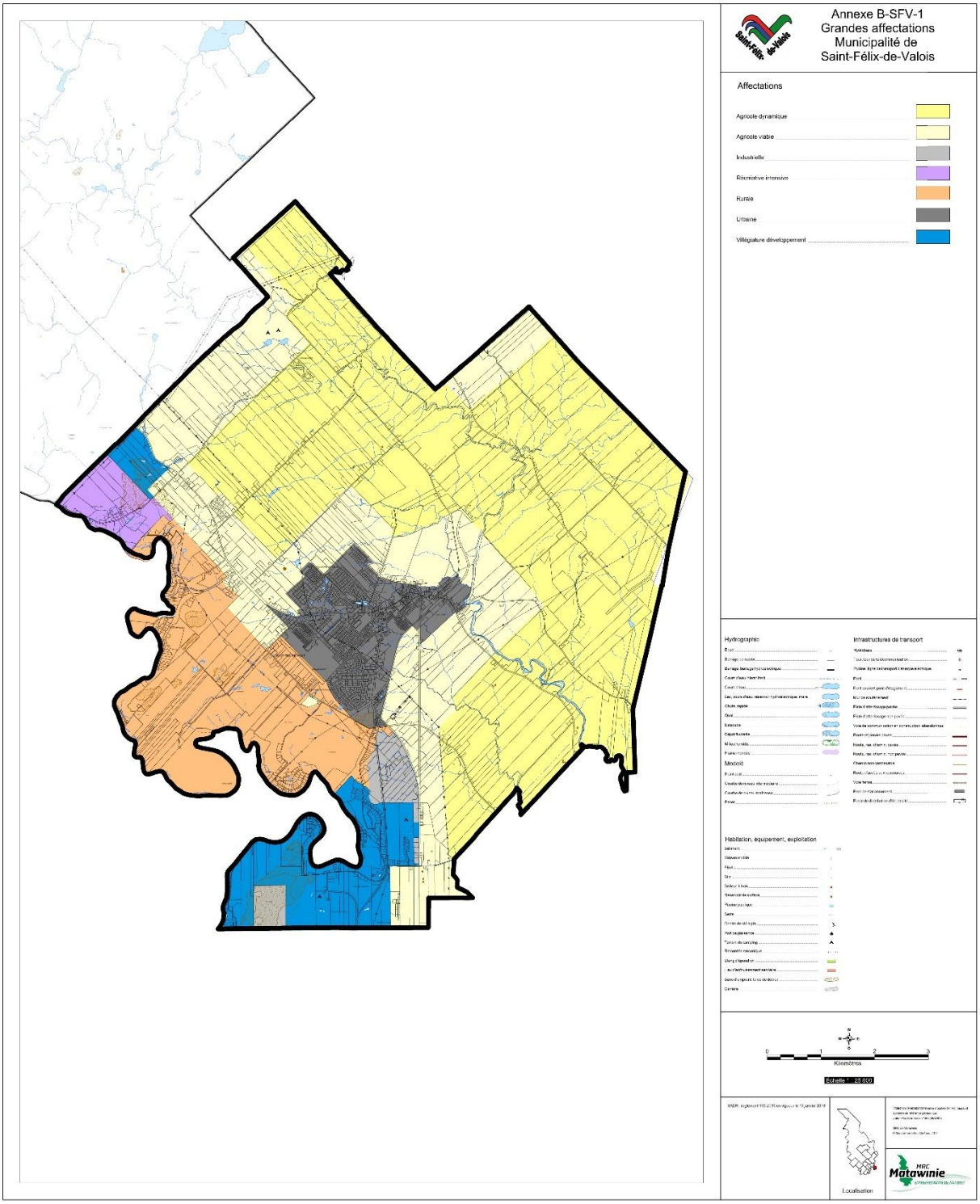
Map B-5: Parc industriel de Saint-Félix-de-Valois- city and private ownership of land parcels



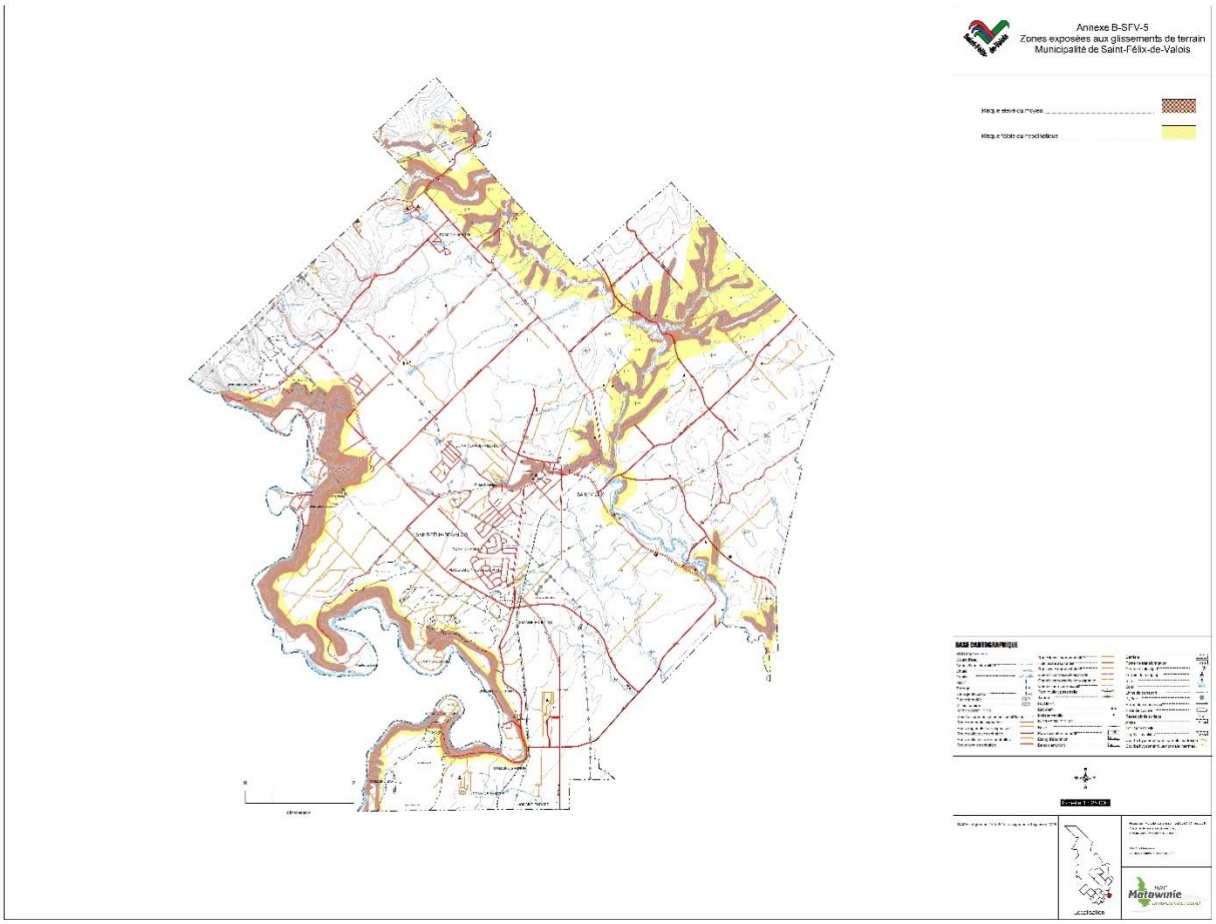
Map B-6: Parc industriel de Saint-Félix-de-Valois- Vacant land parcels available for development



Map B-7: Municipality of Saint-Félix-de-Valois- Land Use Zone



Map B-8: Municipality of Saint-Félix-de-Valois: Areas prone to landslides



APPENDIX C: METHODS AND ASSUMPTIONS

Sawmill Residuals

The following is the procedure used and associated assumptions made to estimate Sawmill Residuals generation:

1. Based on data available online from the Forest Ministry website, all sawmills within a 150 km drive-distance from Ste-Émélie-de-l'Énergie were listed as well as their respective production capacity (m^3/yr) by category of dominant wood type (softwood and hardwood);

2. The projected consumption of roundwood was calculated for each sawmill using the utilization factor[1] corresponding to the region where they are located;

   Utilization factors used per region:

Mauricie	69%
Centre-du-Quebec	53%
Lanaudière	53%
Laurentides	62%
Outaouais	42%

3. Sawmill Residuals production was obtained by converting the projected consumption of roundwood (cubic meters per year) to weight (dry metric tons per year) using the following factors:

   - Yield production of chips by sawmills for softwood (dmt/m^3) = 0.167
   - Yield production of chips by sawmills for hardwood (dmt/m^3) = 0.174
   - Yield production of sawdust-shavings for softwood / production of chips of softwood (dmt) = 33%
   - Yield production of sawdust-shavings for hardwood / production of chips of hardwood (dmt) = 40%
   - Yield production of bark for softwood / production of chips of softwood (dmt) = 41%
   - Yield production of bark for hardwood / production of chips of hardwood (dmt) = 43%

   The factors above represent provincial average calculated from data provided by the Forest Ministry in a document untitled: "Compilation des données issues des registres forestiers 2021".

[1] The utilization factor is calculated every year by the Forest Ministry for each region. It represents the % of roundwood consumption (m^3/yr) over the production capacity (m^3/yr) of all the sawmills located in the same region.

Forest Residue

The procedure to estimate the quantity of Forest Residues that is technically available on public and private forest within the Matawinie BDO Zone comes from a study done by the firm WSP in 2021[2].

Forest Residues correspond only to branches and crowns of harvested trees. Roots and stumps are not accounted for since it is not permitted, for conservation reasons, in the province of Quebec to harvest this biomass.

There are different operating methods for harvesting Forest Residues. First of all, for whole-tree harvesting sites, it is then a question of recovering the Forest Residues in the delimbing and piling areas located at the edge of the road, which is the fastest and least expensive type of recovery operation.

For cut-to-length timber harvesting sites, the recovery operation consists of sending a forestry carrier to the cutting area to recover the residual forest biomass. This type of residual forest biomass harvesting operation is longer and more expensive than whole-tree harvesting operations.

Tailings are usually shredded or crushed before loading into trucks for transport. For maximum profitability, harvesting Residues should be done quickly after a short drying period: we must prevent rot from reducing the value of the Residues.

For Crown lands

To calculate the quantity of Forest Residues that is theoretically available within the BDO Zone, this procedure uses data from the "Bureau du Forestier en Chef (BFEC)" which are calculated every 5 years based on the annual allowable cut (AAC). Then, based on the Bios software from FPInnovations, a 43% reduction factor was applied to account for the fact that it is impossible to harvest the sum of all branches and tree-crowns following harvesting operations. Indeed, depending on various factors such as the harvesting method (whole-tree vs. cut-to-length), the type of species, the type of biomass that is recovered (branches, tree-crowns, foliage) and the loading method applied, it is estimated that only 57% of all Forest Residues can technically be recovered. Finally, to estimate the net quantity of Forest Residues technically available, this procedure substrates the quantity of Forest Residues that is harvested annually per region. In 2021, the 5-year average regarding the harvest of Forest Residues on public land corresponded to 6,7% of all technically available Forest Residues.

For private forests

Due to the lack of reliable data regarding Forest Residues on private forests, the procedure uses the same factors as for Crown lands. First, the quantity of Forest Residues that is theoretically available within the BDO Zone was determined by converting the AAC (m^3/yr) associated to the private forests of all regions into green metrics tons per year (gmt/yr) using a 49,5% conversion factor (this factor is representative of the Crown lands). Then, green metric tons (gmt/yr) were converted in dry metric tons (dmt/yr) using a conversion factor of 0,5. Finally, a 43% reduction factor was applied to account for all the Forest Residues that cannot be harvested due to the aforementioned factors.

[2] WSP. 2021. *Inventaire de la biomasse disponible pour produire de la bioénergie et portrait de la production de la bioénergie sur le territoire québécois,* Rapport réalisé par WSP Canada Inc., pour le compte du Ministère de l'Énergie et des Ressources naturelles. Réf. WSP : 201-03354-00. 277 pages et tableaux, figures, cartes et annexes.

APPENDIX D: DEFINITIONS

Feedstock availability

Availability refers to the state of being accessible, usable, or ready for use. It is a commonly used term to describe the degree to which a system, resource, or service can be accessed and operated within a specified timeframe. In simpler terms, availability measures how reliably and consistently something can be accessed and utilized when needed or expected. This is often quantified as a percentage, indicating the proportion of time that a system or service remains operational and accessible out of the total time considered. In the context of forest biomass, availability is dependent on various factors, including seasons, wood market conditions, workforce availability, natural disturbances, government policies, and investments. Due to the influence of these factors, our experience has shown that only a portion of the total biomass generated can be consistently and reliably accessible to potential buyers. To address this, we employ the Biomass Availability Multiple (BAM) as an estimation tool to determine the quantity of biomass that is typically available when needed within a specific timeframe. Typically, the timeframe for BAM calculations is three months if the buyer has prior experience with the supplier, and six months if they have no prior engagement. For this particular BZO Zone Rating, we apply a BAM ratio of 1.5x for Sawmill Residuals and 2x for Forest Residues. Pulpwood, on the other hand, does not require a BAM ratio as the estimates already incorporate the technical pulpwood availability, accounting for all the aforementioned factors.

Feedstock types

Sawmill Residuals: Primary mills convert roundwood products (i.e., tree trunks and logs) into other wood products, including sawmills that produce lumber, pulp mills, veneer mills, etc. Secondary mills use the products from primary mills to produce other products such as millwork, containers, pallets, buildings, mobile homes, furniture, flooring, and pulp/paper products. Both primary and secondary mills produce sawmill residuals, comprised of wood chips, sawdust, shavings and bark.

Wood chip
Wood chip is a process residual made from low-grade or off-specification wood and off-cuts, essentially wood that remains after processing sawtimber into lumber. In Quebec, 42% of raw log ends up as wood chip. Aside from slightly lower moisture contents, wood chip produced from sawmilling operations is structurally identical to clean chip made from pulpwood. If woodchip comes from kiln-dried wood, it is considered "dry" (~10-20% moisture content), while if it comes from non-dried wood, it is referred to as "green" (~40-50% moisture content). Wood chip is frequently used by markets like pulp mills and wood pellet mills. In Quebec, in 2021, approximatively 41% of the biomass from all harvested logs ended up as wood chips.

Sawdust
Sawdust is a sawmill residual defined as being less than 2.5 mm in diameter. Approximately 8.75% of softwood and 14% of hardwood sawmill inputs by weight end up in sawdust form. Dry sawdust has ~10-20% moisture content, while "green" sawdust has ~40-50% moisture content.

Shavings
Shavings are process residuals defined as being between 2.5 and 15 mm in any dimension. Shavings are generated primarily from planer operations, with approximately 7.75% of softwood and 7% of hardwood

sawmill inputs ending up in this form. Shavings are used by higher end markets, such as animal bedding and pellet manufacturing.

Bark
Bark, also referred to as "hog fuel," is a by-product of debarking operations and is typically used as boiler fuel. Bark tends to be uniform in size and shape. Approximately 5.2% of softwood and 10.8% of hardwood mill inputs end up as bark. The moisture content of bark is typically 55 – 65%.

Forest Residues: Forest Residues, alternatively "slash" or "hog fuel," is a by-product of in-woods forestry operations, including pulpwood production. This typically includes limbs, small low-grade logs, bark and crowns of harvested trees, as well as unwanted trees that have been cut or knocked down and left on site. Examples of this include dead and cull trees, as well as growing stock removed in forest silvicultural operations. Harvest residue is generally processed in woods to reduce the size and increase bulk density for transportation.

Pulpwood: Pulpwood is defined as roundwood with small diameter, usually up to 11-inches at breast height (dbh). Additionally, sub-quality roundwood (deformed, species with no markets) that cannot be processed by a sawmill is also considered as pulpwood. Pulpwood had been traditionally used to make paper, paperboard, oriented strand board (OSB), and medium density fiberboard (MDF). Currently, large quantities of pulpwood are also used to produce wood pellets. The moisture content of pulpwood is generally between 45% to 50% (as received)5 depending on the harvest season.

APPENDIX E: LEGAL DISCLAIMER

This BDO Zone Rating (the "Rating") is prepared for, and provided to, Matawinie, QC community, and is intended to be read and used in its entirety and not in parts. Separation or alteration of any section or page from the main body of this Rating is expressly forbidden. In preparing this Rating, Ecostrat has used information obtained from third parties or otherwise publicly available. All such information has not been independently validated, verified, or confirmed by Ecostrat (except where otherwise specifically indicated) and Ecostrat makes no representation or warranty as to the accuracy or completeness of any information provided by third parties or otherwise publicly available.

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