Opportunity Study of Hardwood-Based Engineered Wood Products

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1 Executive Summary

Ontario forests are faced with an abundant supply of lesser valued hardwood species such as poplar and birch. While demand for these species had consistently declined over time, their growing proportion complicates access to softwood timber. Meanwhile, there is a sense that construction markets need dimensionally stable products with enhanced performance capable of servicing the needs of builders, designers, structural component manufacturers, and offsite construction fabricators. Building on this premise, this report investigates potential technologies capable of converting lower-grade hardwoods into value-added Engineered Wood Products (EWPs). EWPs are composite materials made from wood fibres, particles, or veneers that are bonded with adhesives to create building materials.

The first section of the report presents a characterization of available hardwood supplies. When factoring existing demand for both high- and low-grade hardwoods, an estimated volume of 2.57 million cubic metres of birch and poplar is available across five Ontario regions described as Northwestern, North Central, Clay Belt, Sault Ste. Marie/Sudbury, and Ottawa Valley. Considering current timber demand, the corridor between Nipigon and Longlac offers the best prospects for the location of a potential EWP plant. This specific region accounts for 700,000 cubic metres of available volume devoid of users. This order of volume was also found to align well with the supply requirements of potential EWP plants. Supply costs were assessed across the five regions. When including delivery costs (for road times between 2 and 3 hours depending on regions), total supply costs vary from a low of $64.22 (Ottawa Valley) to $77.43 (Northwestern) per cubic metre. An argument can be made about the increasing competitiveness of hardwood fibre in wood products manufacturing over the very long term.

The second section provides a market overview of current EWPs and composite panels which could match the scale of available supplies. Long-term projection reinforce the need for increased EWP capacities in North America, despite current markets conditions where supply chains are no longer as tight as they were throughout the pandemic. While installed EWP capacities have decreased over the past decade, there is a case for expecting tight market conditions when U.S. annual housing starts pass the 1.6 million units mark. Considering current demographics, this threshold is likely foreseeable future.

Long-term growth prospects for EWPs are also supported by a variety of developments now taking place in both residential and non-residential construction. These changes include the rapid growth of the mass timber industry, the increasing adoption of offsite construction solutions, the automation of the structural components industry, the increasing market share for wood in non-residential construction, and the development of niche applications such as treated products, or specialty framing and industrial products.

Potential technologies which could match both timber supplies and market demand are then characterized. These were segmented between forefront and secondary technologies. Forefront technologies all have in common the ability to process the whole tree, which turns out to be a prerequisite for low grade hardwood processing in Ontario. Such technologies include Oriented Strand Board, Laminated Strand Lumber (both 4 feet and 8 feet wide manufacturing). Light Strand Board (LSB), Scrimtec, Wood Fibre Insulation, and Composite Pallet Stock. Secondary technologies are veneer-based (Laminated Veneer Lumber, Hardwood Plywood, Parallel Strand Lumber). For each technology, a match is sought between timber supply available and required supply volume and species. From this perspective, LSL and Scrimtec appear to be more suitable than the other technologies investigated. For OSB, the regional available annual volume is not sufficient unless a smaller factory is built, Nonetheless, accordingto the latest news, the report assumes the Wawa mill will be converted into an LP® SmartSide® Trim & Siding mill. Other technologies (LSB, Insulation and Composite Pallet Stock) all make use of lower volumes, making them suitable to available supplies across all regions.

The last section of the report presents a preliminary financial assessment for the forefront technologies. Project investments were modelled using current supply costs (timber, adhesives, energy) and market prices. Capital costs for equipment were provided by technology manufacturers, and full project capital expenditures were estimated according to standard industry ratios between equipment and full project costs. Sensitivity analysis was then performed on the most important variables including capacity utilization, selling prices (alone or in combination), capital expenditures, adhesive costs, interest rates, and energy prices.

The base case scenario shows financial viability for all projects. While this outcome remains true when operating rates are reduced by 10%, Scrimtec and the larger LSL line prove to be less sensitive to market price variations. Increasing capital costs mostly extends the payback period while marginally decreasing the internal rate of return. All projects can absorb significant shifts in adhesive costs, which have become common over the past two years. Energy prices in Ontario are elevated, and the model shows that further increases could also be absorbed across all projects. Raising the discount rate from 11% to 14% keeps the differential between IRR and discount rate positive for all projects.

Of course, the financial assessment can only be preliminary and at high levels in absence of a site-specific project with defined capacity and plant layout. Nevertheless, the analysis is relevant as it allows comparison between technologies making use of similar inputs (timber, adhesives, energy, steam). Rather than prioritizing technologies, success factors and risks for each technology are analyzed.

Using this approach LSL comes in as a mature and timely technology, with positive returns under most conditions. It is argued that successful operating conditions for LSL are narrow, between market prices (which are lower than for most other EWPs) and direct competition with lower-priced materials in several applications. Scrimtec also shows promising returns, despite the lack of production precedent at industrial scale, and seemingly high capital costs. Both LSL and Scrimtec propose the best fit with the scale of available supply. Fibre based insulation and composite pallet blocks operate at smaller scale and would be best adapted to a chip-based supply rather than a log supply. Nevertheless, these technologies appear promising under the right conditions. LSB presents challenges mostly on the market side, as time and investment would be required to develop long term sales.

All technologies should be subjected to further research on the market and the supply sides. Market research is especially mandated for the newer technologies such as fibre-based insulation, light strand board, and composite pallet blocks. On the supply side, site-specific supply analysis and more detailed equipment characterization would be required in pursuing this effort for adding value to Ontario hardwood supplies.