Market Opportunity Analysis of Wood-Fibre Insulation Manufacturing in British Columbia

Community Energy Association

In 2022, CEA initiated a market opportunity analysis of wood-fibre insulation manufacturing in BC for the Government of British Columbia. The project team included Elisabeth Baudinaud and Rob van Adrichem from CEA and the following industry experts:

Nicholas Sills, Principal - **Whirlwind Consultants**
Jieying Wang, Senior Scientist – **FPInnovations**
Joshua Kelly, Energy and Environmental Manager – **Sinclar Group Forest Products Ltd.**
Doug Rooke, General Manager, and Trevor Tatarczuk, Business Development Director – **Winton Homes and Cottages**

This team represented diverse experience and expertise on different aspects of the market opportunity for wood-fibre insulation. This diversity contributed to the team's triple bottom line approach, as did the location of team members in Prince George, Nelson, and Vancouver. The report was completed in March 2023.

Executive Summary

This project explored the potential addition of a wood-fibre insulation manufacturing plant in British Columbia. This certainly seems like an opportune time to explore additional value-added capacity for wood product manufacturing in BC, given industry changes over the past many years that have resulted in mill closures and thousands of job losses.

Wood-fibre insulation as a response to climate change?

In addition to being an option for stimulating employment and developing higher-value products from BC forests, wood-fibre insulation could also be a critical part of BC's climate response. In Canada, buildings represent one of the **top three sources** of greenhouse gas emissions, as a result of the energy consumed in heating and cooling as well as in the emissions associated with producing, transporting, and ultimately disposing of the materials used during construction. Both "operational" and "embodied" emissions, therefore, can be addressed by using wood-fibre insulation. The project team's overview of insulation materials currently available in BC found that wood-fibre insulation performs better than any other insulation materials for their embodied emissions, due to low energy intensity to manufacture and credit for storing carbon in the product itself. In regards to thermal performance, most wood-fibre insulation products have a comparable thermal insulation value but larger thermal mass effect than many other insulation materials on the market. Further, in terms of price, the analysis conducted within this project indicates comparability with other insulation products of similar thermal performance when produced in BC.



Types of wood-fibre insulation. From left: loose-filled, board, batt

Identification of a Case Study

Despite the benefits, dry-process wood-fibre insulation is not yet manufactured in North America so the project team identified a facility west of Munich, Germany, that would serve as a case study for whether a similar facility could be located in British Columbia. **Schneider-Holz** (pictured below) manufactures a diverse range of forest products including wood-fibre insulation. The equipment used in the plant was supplied by **Dieffenbacher**, which is also the manufacturer of the equipment being installed at **TimberHP** in Maine. Dieffenbacher equipment, therefore, was selected for possible implementation in BC.

Building and testing the financial model

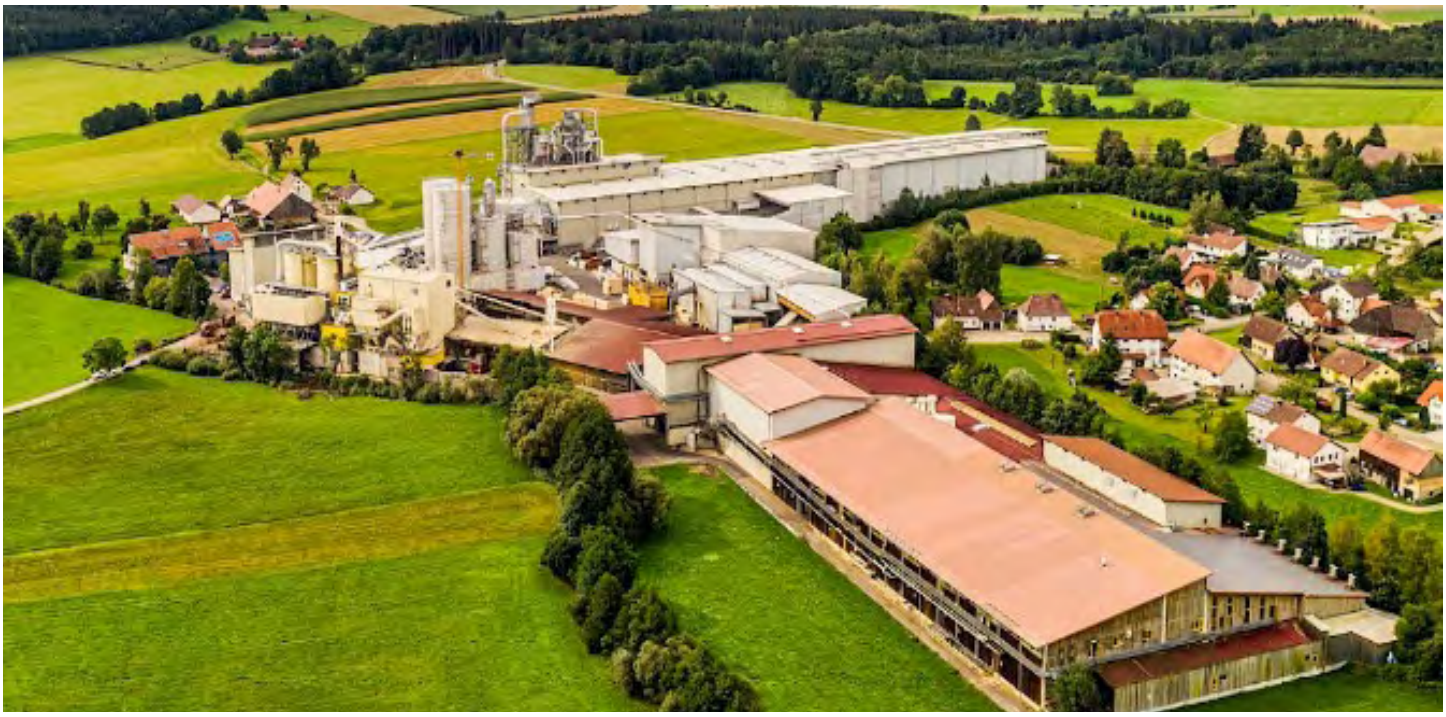
In conducting the analysis, the project team was guided by a core question:

Should wood-fibre insulation be manufactured close to the resource or close to the market?

Using costs, specifications, and other operational information provided by Dieffenbacher along with fibre-acquisition costs from Central BC, the project team developed a model with approximately 300 inputs that analysed the potential installation of a wood-fibre insulation plant in seven communities around BC: Mackenzie, Vanderhoof, Prince George, 100 Mile House, Castlegar, Powell River, and Merritt. The results of this analysis identified Merritt as the "base case" because the financial return on investment (42%) and internal rate of return (27%) on the initial capital cost were best in Merritt, largely because it is closest to the largest potential markets for wood-fibre insulation among the potential sites. Transportation is the largest contributor to the cost of the completed product, with transport of the product from the plant to the market accounting for 23% in the base case.

Various alternatives to the base case were modelled. These included different locations (at former pulp mill sites, in Northern BC, and co-located with another manufacturing operation) and different production levels and markets, including lower production and restricted product lines. Although the results of the various scenarios varied in relation to the base case and relied on various assumptions, many of these alternatives were seen to be financially viable as long as high levels of market penetration and access to fibre were secured.

In summary, the financial assessment of wood-fibre insulation in British Columbia determined that "close to the market" was the answer to the project team's core question.



Sourcing fibre and establishing the market

Two major questions remain regarding the actual implementation of the case study in British Columbia: fibre availability and demand for the product.

On a provincial scale, it would appear that the allowable annual cut in British Columbia could provide the fibre necessary to establish wood-fibre insulation manufacturing at the scale identified in the case. However, at a practical level, more than one-quarter of BC's timber supply areas don't support a harvest large enough to provide the fibre needs of the plant and even those timber supply areas that could support wood-fibre insulation manufacturing are seeing significant drops in annual fibre availability. Securing the fibre is likely to require competing with other existing forest industry operations, including those that use low-value wood and chips for pulp, paper, pellets, and energy production.

Demand for wood-fibre insulation would have to grow considerably in order to utilize the output of the plant. At full productivity, the model plant would satisfy an average of 30% of all new builds forecast for British Columbia, Alberta, Washington, and Oregon. While this is the average, the market penetration was weighted heavily to British Columbia, where approximately 60% of the insulation needs of new builds would be satisfied by the output of the plant. Accelerating incorporation of embodied emissions requirements into building codes is essential for stimulating wood-fibre insulation adoption at the level identified in this report.

Conclusions

The project team is left with the impression that implementing the case modelled in this report would be difficult. However, while the results of the various scenarios varied in relation to the base case and relied on various assumptions, many of these alternatives were seen to be financially viable as long as high levels of market penetration and access to fibre were secured.

Demand for wood-fibre insulation would have to grow considerably in order to utilize the output of the plant modelled in this report; this demand could be realized through ambitious sustainability goals set by the Province given wood-fibre insulation's superior embodied emissions performance compared to any other insulation materials currently available.

The project team was assembled because of the diverse perspectives and experiences of its members, and the group is left with some key thoughts:

- Wood-fibre insulation is worthy of additional consideration by Government because this report shows it to be a viable opportunity for the Province, industry, First Nations, and forest-based communities.
- Wood-fibre insulation is poised for growth as embodied emissions requirements are scaled up.
- Without government intervention, wood-fibre insulation manufacturing would most likely be established in southwestern BC.
- A large facility such as the one modelled in this project would benefit from economies of scale, but forecasted challenges with securing fibre and ensuring adequate levels of market uptake suggest that smaller operations that are regionally dispersed should be explored.
- Building off this analysis of the market opportunity for wood-fibre insulation specifically, a follow-up project should explore the possible role of wood-fibre insulation as one part of a forest products cluster/ecosystem that would recognize existing manufacturing capacity, know-how, and vacant industrial sites. This review could specifically address operational and embodied carbon emissions and consider the role of First Nations.