

# California Assessment of Wood Business Innovation Opportunities and Markets (CAWBIOM)

## Phase II Project Summary Report: Feasibility Assessment of Potential Business Opportunities

Completed for:

The National Forest Foundation

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# EXECUTIVE SUMMARY

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## 1.1 INTRODUCTION

Through funding provided by the U.S. Forest Service, State & Private Forestry, California Region, the National Forest Foundation issued a Request for Proposal to assess the status of California's forest products industry and identify forest products business opportunities that will help the U.S. Forest Service increase the pace and scale of forest ecosystem restoration.

The Beck Group, a Portland, Oregon based forest products planning and consulting firm, was selected to complete the project. BECK formed a multi-disciplinary team with expertise in forest inventory and timber supply (MB&G), forest products technology and biomass steam & power technology (BECK, CSPC), and business feasibility and planning (BECK, CSPC, & FIDO). Throughout the project, a multi-agency, public/private Steering Committee provided direction, contacts, references, and insights (see Appendix 3 for list of steering committee members).

The project scope was divided into two phases. In the first phase, BECK assessed the status of California's forest products industry and analyzed nearly 50 technologies for converting wood fiber into products. From that process four technologies were identified that were deemed to have the greatest chance for being developed into viable businesses in California. The Phase I report is available [here](#).

This report documents the Phase II effort and includes more detailed technical, market, organizational, and financial feasibility assessments for the four technologies. It also describes where additional analysis is needed. In addition, policy recommendations are included to enhance these and other business opportunities. The ultimate objective of the feasibility studies and policy recommendations is increasing the pace and scale of forest ecosystem restoration on public and private lands in California.

The following sections summarize key feasibility findings for each technology.

### 1.1 ORIENTED STRAND BOARD

BECK assessed the feasibility of developing an OSB plant at an industrial site in Anderson, California. OSB is a structural panel used in a variety of building and industrial applications. The main reasons it was chosen for analysis are: strong markets for OSB in California, no nearby competing OSB producers, and the large volume of raw material the plant would consume annually, much of which could be small diameter stems.

The plant considered in the analysis would produce 475 million square feet (3/8" basis) of OSB annually and would have a capital cost of \$166.2 million. Financial analysis indicated that such a plant would have an operating margin of nearly \$50/MSF, which is roughly 24 percent of the product sales value. This translates into an estimated \$23.57 million of operating cash flow annually. This, in turn, translates into a simple payback period of 9.6 years. The preceding set of economics would provide an annual return on capital of 14 percent (assuming 100 percent equity

in the project). To aid in further development of this business opportunity, BECK recommends the following:

- *Identification of a Potential Developer* – Given the large capital investment required, the complexity of the manufacturing process, and the sophistication of competing producers, BECK believes the most likely path to a California OSB plant is for an existing OSB manufacturer to pursue development.
- *Raw Material Supply* – Because the markets for sawmill byproducts are limited, sawmills near an OSB plant are likely to invest in equipment to convert sawmill waste (edgings, slabs, trim ends, etc.) into OSB strands. Additional research is needed to validate this concept.
- *Relocating an Idled Plant* – There are a number of idled OSB plants that could be relocated to California. BECK estimates relocating a plant would reduce the capital expense by \$18.4 million relative to the estimate of \$166.2 million for all new equipment. However, additional analysis is needed to identify a plant that could be dismantled and to more precisely estimate the associated costs and benefits.
- *Environmental and Permitting* – Numerous parties suggested that obtaining an air quality permit in California for an OSB plant would be very difficult. Additional analysis is needed to understand a plant’s emission profile relative to California air regulations.

### **1.2 SMALL SCALE BIOMASS**

Senate Bill 1122<sup>1</sup> created a unique opportunity to develop a total of 50 MW of 3 MW and smaller biomass fueled power facilities in California. A requirement of the program is that the plants must be fueled from the products of sustainable forest management. A typical 3 MW plant would consume between 25,000 and 30,000 bone dry tons of fuel annually.

BECK assessed a plant that would use direct combustion technology and have a capital expense of \$24 million. BECK calculated that such a plant would have to sell power between \$190/MWH and \$225/MWH to generate a 12 percent rate of return on equity over 20 years. Such a price is likely to be reached within the BioMAT program. To assist in identifying potential thermal energy users that would help lower the required selling price, BECK completed a high level analysis of seven potential forest products co-located businesses. To aid in further developing small scale biomass projects, BECK recommends the following:

- *Secure Fuel Supply* – It is imperative, for financing purposes, that the facility has contractual access to the required amount of acres/fuel on a long-term basis. Lenders consider a 10 year fuel supply arrangement a minimum. The contracts could be with private landowners or a long-term stewardship contract with a public entity. In either case, BECK recommends that developers engage landowners in discussions.

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<sup>1</sup> Initially the term “SB 1122” was used to refer to this program. More recently, however, the term BioMAT has been used as its name. The term ReMAT has also been used to describe the program. Throughout this report the terms SB 1122, ReMAT, and BioMAT are used interchangeably.

- *Fuel Source Verification* – BECK has assumed that the logging slash produced from sustainable forest management activities qualifies as an allowable fuel under BioMAT. BECK recommends that project developers verify this interpretation of the program’s rules since a differing interpretation could substantially increase the delivered cost of fuel and, in turn, significantly increase the required power sales price.
- *Project Qualification* – BioMAT allows the price at which a utility will buy power to increase until a developer finds the price acceptable. However, this process only occurs when there are at least three projects in the queue. Therefore, BECK urges prospective project developers to quickly qualify projects for the queue, which is currently forming ahead of a first auction to be held on February 1, 2016. The qualification process and associated costs are described in Chapter 4, Section 4.6.
- *Identify Potential Steam Hosts* – BECK recommends project developers partner with entrepreneurs or existing businesses that utilize thermal energy. Selling thermal energy improves project economics by up to an estimated \$25/MWH and could allow a project to begin construction ahead of non-CHP projects and before a BioMAT price review.
- *Technology Selection* – BECK concludes that direct combustion technology will allow developers to meet BioMAT power delivery requirements. In BECK’s judgment, gasification technology using forest-derived fuels is not reliable enough at this point. However, gasification technology could provide additional revenue streams. Therefore, BECK recommends that developers monitor advances in gasification technology.

### **1.3 CROSS LAMINATED TIMBER**

CLT is a heavy timber panel product made from laminated layers of lumber. It is used in structural applications including walls, floors, and roofs in multi-story buildings. BECK assessed the feasibility of developing a CLT plant in Northern California. While development of this type of business does not currently directly relate to increased utilization of small diameter trees, it is included because it has potential for huge market growth and the presence of such a plant(s) in California would help preserve forest products industry infrastructure in the State. The presence of a forest products industry is a prerequisite for cost effective forest restoration.

The plant considered would produce 1.1 million cubic feet of CLT panels annually and would require a raw material supply of 24 million board feet of lumber annually. The capital cost is estimated at \$16.7 million. Lumber purchasing, one of the key operating expenses, is assumed to cost \$355 per thousand board feet delivered, including a \$50/MBF cost for custom drying. The CLT average panel sales price is estimated to be \$21 per cubic foot.

With these assumptions, the total cash cost (lumber, glue, manufacturing) is estimated to be \$13.17 per cubic foot, resulting in an operating cash flow of \$7.84 per cubic foot, or \$8.6 million per year. Assuming a 12 month construction period and 100 percent equity investment, the simple payback period is 3.3 years. To aid in further development of CLT manufacturing, BECK recommends the following:

- *Confirm CLT Sales Values* – CLT is a relatively new product in North America. Therefore, published pricing for the material is not available. BECK recommends additional price analysis through a combination of surveys of developers of recently completed North American CLT projects and analysis of pricing for competing materials such as concrete and steel, which would allow a more informed estimation of CLT sales price.
- *Raw Material Supply* – BECK found that an adequate volume of lumber is produced in California to supply a CLT plant. However, additional research and analysis is suggested to verify whether the mix of species, grades, and sizes produced is aligned with what is allowed for use in CLT manufacturing. Additionally, BECK recommends assessing the business case for producing CLT from currently underutilized species such as small diameter ponderosa pine.
- *Validate the Lumber Drying Premium* – BECK assumed that existing sawmills would be able and willing to supply lumber that meets the moisture content specifications of CLT manufacturing. This assumption, however, needs verification through additional research and discussion with existing lumber producers in the region.
- *Assess the Impact of Foreign Currency Exchange Rates on CLT Pricing* – A very recent trend in the lumber industry is that the increase in the strength of the U.S. dollar relative to other currencies such as the Euro allows manufacturers in other countries to supply lumber to the U.S. market at prices that are very competitive against U.S. manufacturers. Research is needed to see if the same is true among CLT manufacturers, especially since most of the existing manufacturers are in European countries.
- *Building Code Adoption* – CLT use has been adopted into U.S. and international building codes, but is facing opposition from other building material suppliers. The rate at which adoption filters down to California’s local and regional municipalities is evolving rapidly. BECK recommends that prospective CLT developers monitor this situation closely.

### **1.4 VENEER MANUFACTURING**

There are attractive markets for products made from veneer. In addition, a cluster of existing veneer using manufacturers in Southern Oregon is forced to source veneer from distant locations. Therefore, BECK examined the feasibility of developing a green (i.e., undried) veneer manufacturing plant in Northern California. The plant considered would have a capital cost of \$30 million and be capable of producing 170 million square feet of veneer annually from 50 million board feet of logs.

BECK estimates such a plant would generate nearly \$204 per thousand square feet in sales with log costs of \$125 per thousand square feet and cash manufacturing costs of just over \$50 per thousand square feet. This results in an operating cash flow of over \$28 per thousand square feet or \$4.8 million per year. Assuming a construction period of 18 months, the expected simple payback period is 7.8 years. For further development of this business, BECK recommends the following:

- *Investigation of Fish Tail Veneer Markets* – BECK found that markets for fish tail veneer (a low grade of veneer) in the Northern California Region are likely oversupplied. Research is needed on ways to mitigate this issue.

- *Identification of a Potential Developer* – Given that there are several existing manufacturing operations in the region that are sourcing significant quantities of green veneer from outside suppliers in distant locations, the logical developer would be an existing veneer, plywood, or LVL manufacturer in the region.
- *Security of Supply* – The most critical aspect of this business is a secure supply of the required log volume. BECK recommends that potential developers engage the U.S. Forest Service in discussions for providing a long term stewardship contract in the North Interior region.
- *Supply Mix* – The raw material supply analysis for this project was completed at a relatively high level. BECK recommends additional analysis to confirm that the size and species mix of the log supply is appropriate for producing veneer used in products such as LVL and for plywood produced in the region.

### 1.5 CARBON

A number of policy recommendations are provided in the full report. However, a policy issue overarching all of these potential businesses is California's substantial commitment to future reduction of net carbon emissions through the passage of Assembly Bill 32 and several pieces of follow-on legislation.

California's forests have historically played a major role in maintaining the carbon balance by absorbing a substantial percentage of California's total carbon emissions. With the ongoing drought, a changing climate, and increasing forest wildfire, continuation of the forest's traditional role is in doubt. It has been speculated that if current trends continue, California's forests may soon become net carbon emitters, which would be a disaster for California's carbon reduction efforts.

The Governor has recognized this potential and recently issued an Emergency Order regarding the effects of drought on California's forests. The order calls for various State agencies to take actions to reverse this trend. A key goal of this study is to identify businesses that, if initiated, could assist with increasing the pace and scale of forest restoration in California. Forest restoration, done correctly and at scale, could remove drought killed trees and lower stand densities to the current carrying capacity of the land. The goal is to restore health and net growth to the forest, as well as to change and interrupt fire behavior.

Another aspect of developing forest products businesses is that the carbon stored in the wood fiber and then placed into service in products such as OSB, Veneer, and CLT continues to sequester carbon. In addition, biomass material not suitable for forest products can be used for energy production instead of being openly burned in the forest. Utilizing the material in this way displaces carbon emissions from both fossil fuel energy production and from open burning. Assessing the carbon impact (environmental and financial) of these businesses was beyond the scope of this study. However, BECK recommends this topic as an area for potential follow up research. As part of their ongoing efforts to implement AB32, the California Air Resources Board is tasked with developing protocols for various carbon reduction efforts. BECK urges them to include forest product carbon sequestration and open burning reductions in their protocol efforts.