

# CALIFORNIA ASSESSMENT OF WOOD BUSINESS INNOVATION OPPORTUNITIES AND MARKETS (CAWBIOM)

## PHASE II REPORT SUMMARY

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### 1.1 INTRODUCTION

The National Forest Foundation (NFF) contracted The Beck Group (BECK), a Portland, Oregon based forest products planning and consulting firm, 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. BECK worked with Carlson, Fido and MB&G and a multi-disciplinary team to complete the project.

The project scope was divided into two phases. In the first phase, BECK developed a list of nearly 50 technologies for converting wood fiber into products. Phase II includes policy recommendations, feasibility assessment, and business planning for the four technologies that were judged to have the best chance of being developed into businesses in California—summarized below and detailed in the report. Phase I and II reports are available [here](#).

BECK identified four technologies that provide the best opportunities for improving the pace and scale of forest ecosystem restoration while improving California's wood products industries. These technologies are: cross laminated timber, oriented strand board manufacturing, small-scale biomass, and veneer manufacturing. From an overarching standpoint, BECK also considered carbon storage as related to these industries. Each of these industries has the ability to increase the pace and scale of restoration and therefore reduce carbon emissions from mega fires and tree mortality as well as sequestering carbon through long-lasting wood products. Biomass utilization of forest products not suitable for these four industries can still displace carbon emissions through controlled burning rather than uncontrolled forest fires.

### 1.2 CROSS LAMINATED TIMBER

Cross laminated timber (CLT) is an engineered wood product manufactured by laminating kiln-dried lumber stacked in alternating directions, pressed to form a solid panel. BECK assessed the feasibility of developing a cross laminated timber (CLT) plant in Northern California. The plant considered would be capable of producing 1.1 million cubic feet of CLT panels annually assuming a single manufacturing line operating two shifts (80 hours) per week. Based on these results, CLT appears to be the most attractive of the four major businesses evaluated as part of the CAWBIOM project.

Financial feasibility – The total estimated cash cost is \$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. Evaluating this business on the basis of payback period or operating margin as a percentage of sales, CLT is by far the most attractive technology analyzed.

Recommended next steps for planning and continued analysis include:

- **Confirm CLT market sales values** – Contact developers of recently completed projects or analyze typical concrete and steel project construction costs to determine the likely competitive pricing point.
- **Research supply constraints** – Speak with Northern California dimensional lumber producers to discuss supply commitments and confirm/refine the custom lumber drying premium.

- **Research and track building codes** – Follow the building code revision processes that include CLT provisions in California, including state and major municipalities, and other Southwestern states.

### **1.3 ORIENTED STRAND BOARD**

Oriented Strand Board (OSB) is an engineered wood particle board formed by adding adhesives and then compressing layers of wood strands in specific orientations. It is most commonly used in sheathing for walls, flooring and roof decking. BECK assessed the feasibility of developing an OSB plant at an industrial site in Anderson, California. BECK recommends additional analysis on the feasibility of OSB manufacturing in California, specifically a robust economic feasibility study.

Financial feasibility – The plant would have an operating margin of nearly \$50/MSF 3/8” basis, which is roughly 24 percent of the product sales value. This translates into an estimated \$23.6 million of operating cash flow annually. This, in turn, translates into a simple payback period of 9.6 years, assuming a 27 month period during which the plant is under planning and development. The preceding set of economics would provide an annual return on capital of 14 percent, assuming 100 percent equity in the project.

Recommended next steps for planning and continued analysis include:

- **Identify a potential developer** – Given the large capital investment required by this business, the complexity of the manufacturing process, and the sophistication of competing producers, BECK believes that the most likely path for an OSB plant to be developed in California is for one of the existing OSB manufacturers to pursue development.
- **Relocate an idled plant** – BECK estimates that pursuing a plant relocation strategy to California would reduce the capital expense by \$18.4 million. Additional analysis is needed to identify a plant that could be dismantled and more precisely estimate the associated costs.
- **Permitting** – numerous parties during the course of the feasibility study mentioned that obtaining an air quality permit in California for a plant of this scale would be very difficult.
- **Supply raw material** – Given very limited markets for sawmill by-products in California, BECK believes that sawmills near an OSB plant would invest in equipment to convert sawmill waste (edgings, slabs, trim ends) into OSB strands as opposed to the current practice of converting those materials to pulp chips.

### **1.4 SMALL-SCALE BIOMASS**

Small-scale biomass converts wood products waste and small diameter trees into energy. Senate Bill 1122 created a unique opportunity to develop 50 MW of small ( $\leq 3$  MW) biomass power facilities in California fueled by the products of sustainable forest management. Because of the potential value to the SB 1122 project and since it would ultimately result in more forest acres being treated, BECK completed a high level analysis of seven potential forest products co-located businesses.

Financial feasibility – A 3 MW plant with power sales for 8,200 hours/year produced a sales price range of \$190 – \$200/MWH. Beck analyzed a companion stand-alone project with lower capital, fuel and operating costs, but with no thermal energy sales. The result was a required power selling price of \$215 – \$225/MWH.

Recommended next steps for planning and continued analysis include:

- **Secure fuel supply** – Connect plant developers with suppliers to craft long-term supply agreements prior to seeking financing for plant construction as lender often requires a minimum of 10-year contracts with suppliers.

- **Verify fuel source** – Ensure that biomass sourced from sustainable forest management products is allowable under Senate Bill 1122.
- **Qualify projects** – Ensure adequate power price rates by qualifying projects under Senate Bill 1122.
- **Identify potential steam hosts** – Coupling small-scale biomass with existing or potential users of thermal energy improves project economics by an estimated \$25/MW.
- **Select correct technology** – Varying biomass technologies, such as direct combustion and gasification, are more or less reliable. Selecting the right technology while monitoring new and changing technology will be critical to project longevity and success.

## 1.5 VENEER MANUFACTURING

Veneer is a very thin layer of wood that can be glued or laminated to other materials, e.g., particle board, medium-density fiberboard, to create an appearance of solid wood panels. A lathe is used to peel the thin layers of veneer from logs. BECK examined the feasibility of developing a green wood veneer manufacturing plant in Northern California. The prospective plant would be capable of producing 170 million square feet of veneer from 50 million board feet of logs. BECK recommends additional analysis on the feasibility of green veneer manufacturing in Northern California.

Financial feasibility – 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.

Recommended next steps for planning and continued analysis include:

- **Investigate supply chains** – Identify long-term availability of timber appropriate for peeling.
- **Research fish tail veneer markets** – Find alternative uses of this apparently oversupplied product.
- **Identify potential plant investors** – Find potential investors for a new green veneer plant. The most likely candidates would be existing veneer users that are transporting significant quantities of veneer from distant locations.
- **Collaborate with U.S. Forest Service** – Determine interest within the U.S. Forest Service for providing a long-term stewardship contract in California to provide raw materials.

## 1.6 CARBON

A policy issue overarching all of these potential small-diameter wood utilization businesses is California's substantial commitment to future reduction of net carbon emissions through the passage of Assembly Bill 32 or California's Cap-and-Trade program.

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. However if current trends continue, e.g., drought, mega fires, climate change, California's forests may soon become net carbon emitters, which would be a disaster for California's carbon reduction efforts. The Governor recognized this potential and recently issued an Emergency Order regarding the effects of drought on tree mortality throughout California's forests.

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. 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.

## **1.7 OVERARCHING POLICY RECOMMENDATIONS**

There are numerous policy and regulatory recommendations consistent across the four industries discussed in this summary. The following recommendations will increase the likely success of any of the industries described in this report including factors related to restoration, supply, research & development and governmental policies.

### **Forest Service Recommendations**

- **Developers Must Obtain Long-Term Supply Contracts** – Any lender financing the initial capital investment of a forest products business will require the business owner to demonstrate that an adequate supply of raw material is available and that the supply is in the developer’s control. Long-term stewardship contracting is a tool that has been increasingly used over the last 10 to 15 years. The length of stewardship contracting terms could allow business developers to secure longer term supply.
- **Continue Support for CLT Market Development** – During the summer of 2015, the International Code Council considered a request from the American Wood Council for the development of an International Code Council Tall Wood Ad-Hoc Committee. The purpose of the committee is to identify appropriate opportunities to expand the current building standards to recognize use of mass timber construction in taller buildings and craft the accompanying requirements. BECK recommends that the USDA, particularly, the Forest Service, continue their ongoing efforts to support this and other initiatives aimed at conducting the required research toward advancing the appropriate use of wood products such as CLT.

### **State of California Recommendations**

- **Explore Protocols for Large Biomass Power Facilities** – The CAWBIOM study recommends that the California Public Utilities Commission move aggressively to assist the IOUs and biomass power industry in crafting replacement contract amendments that will allow existing plants to cost effectively run at a high annual capacity factor and allow recently closed plants to restart. Such amendments should extend to the end of the existing PPAs or 2020, whichever is later. Longer term, the value of the biomass power facilities, both existing and new, in greenhouse gas reduction efforts in California should be analyzed and reported by CARB so that a Biomass Power Protocol can be developed and facilities can be allowed to produce carbon credits for sale.
- **CPUC Should Explore Changing BioMAT Price Adjusting Protocol** – Currently, the bidding protocol for the SB 1122 program requires three pre-approved parties in the bidding queue before programmed price changes can begin. It is widely expected that prices must increase substantially from the \$127.72/MWH starting price before parties can accept the price. Once a producer of 1MW of capacity or more accepts the price, the queue requirement for further price changes expands to five parties in the queue. BECK's analysis of existing development efforts found that it may not be possible to have five parties simultaneously seeking contracts, so the queue size requirement should stay at three parties.
- **Quantify Benefits of Controlled Forest Waste Burning** – BECK recommends that CARB recognize the air quality benefits of forest waste combustion under controlled conditions versus open burning of the same materials. CARB should petition EPA to allow consideration of regional air quality benefits and

avoided open burning cost in the permitting process for biomass power and CHP facilities. Once approved, CARB should distribute such authority to local permitting agencies in California.

- **Expand Forest and Biomass Protocols for Forest Restoration** – The need to restore forest health and function and prevent open burning of forest byproducts have quantifiable GHG reduction benefits that can be analyzed by CARB. The recovery and use of traditional non-merchantable material is very expensive; however, and so the long term sequestration of the carbon in products or the use of the material to offset fossil fuel use should be encouraged through the granting of scientifically-determined saleable offset credits.
- **Study Opportunities for Enhancing Wood Pellet Feasibility** – Global demand for wood pellets is expected to rise to over 50 million metric tons by 2025. California could potentially capitalize on the expected growth in the pellet market in Asia as there are many sawmills in the state that currently have limited markets for their sawmill byproducts. There are no pulp mills operating in California to purchase the chips, and there is only one particleboard plant operating in the state to purchase sawdust and shavings. Thus, the clean fiber portion of the mill byproduct production would appear to represent a stable, relatively low cost fiber resource that could be utilized for manufacturing wood pellets. BECK estimates that level of lumber manufacturing translates into the production of about 1.3 million bone dry tons of clean mill byproducts (i.e., 900,000 BDTs of chips, 220,000 BDTs of sawdust, 180,000 BDTs of shavings). BECK recommends follow-up analysis to survey sawmill firms in the state to gather data about the market values of their mill residues and gauge their interest in either supplying a pellet manufacturing operation or possibly developing a pellet manufacturing operation and identify a port that is best suited for pellet export infrastructure development.

## **1.8 CONCLUSION**

BECK's analysis shows that there are four technologies ripe for expansion and investment. In addition to providing solid returns on investment, these technologies would also increase the pace and scale of forest restoration in California's federal-, state- and privately-managed forests. BECK further identified opportunities to improve the policy and regulatory environment for using California's carbon markets as opportunities to improve forest health and increase business viability. Finally, BECK provided overarching policy recommendations that apply to all industries that show the greatest potential for increasing the pace and scale of forest restoration in California. For the full Phase I and II reports see [www.nationalforests.org/ca](http://www.nationalforests.org/ca) and click the assessment link on the left-hand side of the page.