

# **Value-Added Forest Material Products and Uses for an Integrated Product Yard in the Foresthill, California Area**

**Prepared for:**

## **Placer County**



**RESOURCE**  
CONSERVATION DISTRICT

**Prepared by:  
TSS Consultants  
Rancho Cordova, CA**



March 2015

## **Introduction**

Foresthill, CA is an unincorporated community with a population of approximately 6,000 located in Placer County. It is situated between the Middle and North Fork of the American River and is surrounded by forested lands managed by the Tahoe National Forest, Bureau of Reclamation, Bureau of Land Management (BLM), and private landholdings.

Wildfire is a constant concern for the community, which is identified as being located in a Very High Fire Hazard Severity Zone by CalFire's State Responsibility Area map. Current practices for managing overstocked forest conditions include fuels treatment and forest restoration activities resulting in byproduct materials primarily in the form of small stems, limbs, and tree tops. Business-as-usual fate for these byproducts is open pile burning.

The Placer County Resource Conservation District has retained TSS Consultants (TSS) to investigate locally-based value-added uses for the forest byproduct material to more efficiently utilize the forest resources, improve regional air quality, support local entrepreneurs, and support increased levels of sustainable forest restoration. TSS worked closely with the Placer County Resource Conservation District and the Foresthill Bioenergy Steering Committee to develop a work product that appropriately reflects the needs of the Foresthill community.

A literature review was conducted prior to the Foresthill evaluation to identify publicly-available information assessing value-added forest material utilization. Appendix A lists literature that was reviewed and deemed relevant to this analysis.

## **Value-Added Opportunities**

TSS identified four major categories of forest product types: Energy Products, Manufactured Products, Landscaping Material, and Agricultural Material. Additionally, forest-based recreation, including hiking, biking, horseback riding, camping, and fishing, has been used as a way to promote economic growth and fund forest restoration. Detailed examples of these forest utilization products are shown in Table 1.

**Table 1. Value-Added Forest Products Overview**

<b>Category</b>	<b>End-Product</b>	<b>Market Potential</b>	<b>Comments</b>
Energy Products	Pellets	Residential and small commercial wood heaters, specialty barbeque	High equipment costs and significant economies of scale required
	Fuel Bricks/Logs	Residential and small commercial wood heaters	Specialty markets, small wholesale market
	Shredded Wood	Community and utility scale biomass boiler, gasification, and anaerobic digestion facilities	Often processed in-field, but may be an outlet for byproducts
	Wood Chips	Community and utility scale biomass boiler, gasification, and anaerobic digestion facilities	Higher operational cost than shredded material with little premium
	Firewood	Residential heating market	Kiln drying could allow for wider distribution but should be considered a secondary operation
Manufactured Products	Posts & Poles	Furniture, utilities, vineyards, agriculture, landscaping	Competing in a commodity market; the wood needs to be treated
	Veneer	Building and landscaping markets	Competing in a commodity market where scale is critical without access to specialty wood
	Pulp/Paper Chips	Wood products and paper markets	Largely overseas at this point and a bulk market; no local markets
	Air Filtration Media	Wastewater treatment plant maintenance contractors and filtration specialists	Can be chipped or shredded wood, some products require impregnating with additional compounds; small niche market
Landscaping Material	Wood/Plastics Composites	Bulk landscape markets	Requires thermoplastics feedstock in addition to wood – high capital expense in a bulk market
	Decorative Bark/Chips	Landscaping, bulk and specialty	Bark and colored chips are valuable in urban areas; requires debarker for clean chips to be colored
	Mulch	Landscaping, bulk	Mixed bark and shredded material is more cost effective to produce than colored chips or bark but leaves out the specialty markets
Agricultural Material	Compost	Agricultural composters/farm operations	Shredded material and chips used as part of compost blend, often processed in-field
	Biochar	Agricultural composters/farm operations	Used for moisture retention; relatively high cost equipment; immature market
	Compost Cover	Composters	Low-value shredded material to serve as cover
	Animal Bedding	Bulk suppliers or direct sales with animal farms, stables, laboratories	Preference to softwood species, low density can increase transport costs

## Case Studies

Successful community-scale forest product yards have thrived in specialty and niche markets along with local business relationships. Community-scale forest product yards traditionally lack the economies of scale and transportation infrastructure to allow them to compete in large markets. TSS has highlighted several case studies of remote product yards that have been successful across the west.

### Crossroads Recycled Lumber

Crossroads Recycled Lumber, located in North Fork, California, focuses on supplying old growth lumber, timbers, flooring, and finish materials to residential and commercial markets across the West Coast. Crossroads Lumber recovers lumber from historic sites, shipwrecks, sawmills, and wineries and reconditions the wood for resale. Recently, Crossroads has added a small sawmill to process sawlogs sourced from hazard tree removal and thinning activities.

While Crossroad Recycled Lumber does not utilize forest residuals, the business is a model for successful wood

products industries in rural California settings. The business has identified a niche market and is successfully using skill sets of the residents of North Fork, a town that lost its sawmill in 1994.

### Crossroads Recycled Lumber, LLC

More information can be found at [www.crossroadslumber.com](http://www.crossroadslumber.com).

### North Coast Biochar



North Coast Biochar represents a collaborative effort between the Redwood Forest Foundation, the Mendocino Woody Biomass Working Group, Humboldt State University, and a network of independent partners to identify an environmental, economic, and equitable solution to forest biomass residuals utilization. The project uses excess woody biomass from overcrowded forest stands and transforms the material that would otherwise be piled and burned into a value-added soil amendment, biochar. Profits from this collaborative effort will go back into local forest restoration projects.

More information can be found at [www.rffi.org/Biochar.html](http://www.rffi.org/Biochar.html).

### Oregon Woodland Cooperative

The Oregon Woodland Cooperative is a group of over 70 private, family forestland owners. The cooperative provides firewood and a variety of forest products, including furniture. The cooperative aggregates wood products from members' sustainable forestland management activities and provides



access to equipment for wood products processing and marketing of final products. The cooperative is founded on a belief of environmental responsibility and efficient and cost-effective utilization of the region's natural resources.

More information can be found at: [www.oregonwoodlandcooperative.com](http://www.oregonwoodlandcooperative.com).

### Downieville Classic



The Downieville Classic has grown over the years into a renowned mountain biking race with all proceeds supporting the Sierra Buttes Trail Stewardship. While the Downieville Classic does not directly address forest management, the program brings outside investment to the county seat of Sierra county, population 282. The Downieville Classic is an

excellent example of a community using the natural resources that it has to create a tourist and recreational economy that promotes and supports sustainable forest management.

More information can be found at: [www.downievilleclassic.com](http://www.downievilleclassic.com).

### **Product Yards**

Integrated Biomass Resources is one of the only successful value-added product yards across the Inland West. Integrated Biomass Resources, located in Wallowa County, Oregon, was developed by Wallowa Resources, a non-profit organization dedicated to implementing innovative solutions to help the people of Wallowa County and the Intermountain West sustain and improve their communities and their lands.

More information on Wallowa Resources can be found at: <http://www.wallowaresources.org/>

Integrated Biomass Resources is a product yard that accepts unsorted small-diameter logs and operates with three primary product lines: post/pole, firewood, and pulp chip. TSS interviewed Nils Christoffersen, Executive Director of Wallowa Resources<sup>1</sup> and reviewed existing literature on the product yard to develop an understanding of the process and timeline that lead to the successful implementation of the product yard.

In this section, TSS provides a development timeline of the Integrated Biomass Resources product yard history that may serve as an outline for the development of a product yard in Foresthill.

#### 1. Identify Challenges

- Overstocked forest in need of thinning.
- High prevalence of small-diameter stems, particularly on public lands.
  - 56% of stems removed during a thinning project in Wallowa Whitman National Forest were less than 7 inches diameter breast height (dbh).

---

<sup>1</sup> Nils Christoffersen, Executive Director, (541) 426-8053, [nils@wallowaresources.org](mailto:nils@wallowaresources.org).

- 1,500 to 2,000 board feet<sup>2</sup> per acre targeted for removal.
- Long haul distances to markets that accept small-diameter timber.
- Windy access roads increased treatment costs.
- Landing sites rarely had sufficient volume per sort to fill a truck.
- Closure of three local sawmills due to a decline in federal harvest levels.
- No local champion with the resources to guide investment and development.

## 2. Assess Opportunities

- One remaining sawmill, Joseph Timber Company LLC, a random length dimension mill, had existing infrastructure and could utilize small-diameter timber.
- Contractors would embrace the ability to collect unsorted material and deliver locally.
- Wallowa Resources for-profit subsidiary, WR Community Solutions, Inc., could provide leadership and strategic bridge financing.

## 3. Strategic Local Partnerships

- In 2000, partnered with Joseph Timber Company to install a new processing line that would process logs down to a 3 inch top to produce smaller dimension lumber, post and pole, and chips.
- Increased efficiency of Joseph Timber Company.

## 4. Flexibility in Operations

- In 2002, Joseph Timber Company closed its doors.
- Recovering idle assets, a post and pole company, Community Smallwood Solutions, was founded.
- A strategic partnership with the City of Wallowa allowed Community Smallwood Solutions access to industrial land.

## 5. Diversified Product Lines

- Without the sawmill partnership, Community Smallwood Solutions had too narrow a log specification.
- A firewood production line was added to accommodate greater variety in log sizing.

## 6. Community Investment

- With addition of the firewood line, Community Smallwood Solutions had demonstrated profitability and increased revenue.
- 16 private parties (including WR Community Solutions, Inc.), mostly from Wallowa County, agreed to invest and provide critical capital to improve operational efficiencies.
- Ownership and operations evolved into Integrated Biomass Resources LLC in 2009 through the acquisition and aggregation of all collocated enterprises.
- In 2012, as a result of Wallowa County's acquisition of industrial land left vacant after the County's last sawmill closed in 2007, Integrated Biomass Resources has a new location that allows for continued expansion.

---

<sup>2</sup> One board foot represents the amount of wood in a board measuring 1" thick, 12" long and 12" wide.

As shown in the timeline, the development of the product yard into a sustained, profitable business is a time-intensive process that required significant flexibility and innovation. Throughout its history, the product yard maintained its core benefits to the community and local contractors by ensuring cost savings to timber removal, making treatment more cost effective. Ability to receive unsorted logs from harvest and thinning operations and diversification of product lines proved instrumental to the product yard's success.

## **Foresthill Needs**

The Foresthill Bioenergy Steering Committee has identified five specific goals for the value-added products yard.

- Sustained Long-Term Markets: The Foresthill Bioenergy Steering Committee is seeking opportunities that create products that have commercial track records of robust market demand.
- Low-Cost Capital: Low-cost capital projects can mitigate risk by limiting early-stage investment in infrastructure.
- Local Employment: The Foresthill Biomass Steering Committee is seeking value-added product yards that can generate sustainable jobs which support local skill sets.
- Co-Benefits in a Campus Setting: Synergistic business partnerships can increase project viability and offer staged investment to a complete product yard.
- Collocate with an Energy Facility: The Foresthill Biomass Steering Committee, in an independent evaluation, is assessing the potential for the development of a community-scale renewable electricity generating facility. The development of an energy facility offers unique opportunities for collocation.

TSS, through interviews with local industry leaders, has identified several existing forest-product enterprises in the Foresthill area, including:

- Green Mountain Enterprises: Green Mountain Enterprises is a locally-owned company focusing on the collection and utilization of forest residuals. Working with large and small, public and private landowners, Green Mountain Enterprise utilizes small logs and forest residue for firewood, sourcing to small log mills, and production of biomass feedstock.
- Foresthill Lumber & Wood Products: Foresthill Lumber & Wood Products is a local family-owned small company providing onsite saw milling services to cut a wide array of products including lumber, fence posts, railing, stakes, siding, boards, bracing, and wood construction products.
- Volcano Creek Enterprises: Volcano Creek Enterprises is a brush clearing, logging, and hazardous tree removal company. Volcano Creek Enterprises is located in Foresthill and focuses on shaded fuel breaks, brush management and mastication, and sustainable logging.
- Brushbuster Inc.: Brushbuster offers wood waste grinding, hauling and mastication services to support hazardous fuels treatment and land clearing. Headquartered in

Foresthill and providing services since 2001, Brushbuster is equipped to process wood waste for use as bioenergy feedstock or landscape products. They also have mastication equipment to create defensible space near communities or for roadside mowing. For additional information: <http://www.brushbusterinc.com/home.html>

## Value-Added Products Assessment

Based on the findings from stakeholder meetings and interviews, TSS has evaluated the value-added product markets identified in Table 1 in relation to the Foresthill community. The findings are shown in Table 2.

**Table 2. Assessment of Value-Added Product Opportunities**

Category	End-Product	Local Long-Term Market	Capital Requirements	Local Employment	Co-Benefits	Prevalence in the Foresthill Community
Energy Products	Pellets	B	C	C	A	No
	Fuel Bricks/Logs	C	C	C	A	No
	Ground Wood	A	A	B	A	Yes
	Wood Chips	A	A	B	A	Yes
	Firewood	A	A	A	A	Yes
Manufactured Products	Posts & Poles	A	B	A	A	Yes
	Veneer	A	C	B	A	No
	Pulp/Paper Chips	B	C	A	B	No
	Air Filtration Media	C	B	A	A	No
Landscaping Material	Wood/Plastics Composites	A	C	C	C	No
	Decorative Bark/Chips	A	B	A	A	No
	Mulch	A	A	A	A	No
Agricultural Material	Compost	B	A	A	A	Limited
	Biochar	B	C	C	B	No
	Compost Cover	C	A	A	A	No
	Animal Bedding	B	A	A	A	No
Local Long-Term Markets A – Robust local long-term market currently exists B – Limited local long-term market currently exists C – No local long-term market currently exists						
Capital Requirements (based on equipment needs) A – Relatively low capital investment required B – Moderate capital investment required C – Significant capital investment required						
Local Employment A – Does not require specialty certifications or training B – Requires some certifications or training that can be provided locally C – Requires specialty certifications or training						
Co-Benefits A – Has business synergies with existing local value-added products operations B – Does not have synergies with existing local value-added products operations, but can productively be collocated with a community-scale biomass facility C – Does not have synergies with existing local value-added products operations and cannot productively be collocated with a community-scale biomass facility						

Energy products, specifically firewood, ground wood, and wood chips received high rankings; however, these markets are already addressed with local enterprises. Energy markets that are not currently addressed, including pellets and fuel bricks, received low rankings for capital cost due to the processing equipment necessary to produce the desired product.

The evaluation of manufactured products ranged significantly by product type. Locally there is already some presence of entrepreneurial engagement in Foresthill on a limited scale for some of the higher ranking opportunities (e.g., post and pole). Manufactured products, unless aimed at specific niche markets, are challenging because of the economies of scale that are available to large manufacturers of these commodities, which makes market entry very challenging. There are active local participants in the niche manufactured wood product markets.

Landscaping offers the most promising opportunities with mulch, decorative bark and chips receiving the highest ratings. These potential markets offer low-cost opportunities to utilize forest residues that have not yet been realized in Foresthill. Landscaping material has relatively local markets with homes and businesses throughout the area and a large market to the west in the Greater Sacramento Area.

Agricultural markets overall are challenging due to the location of the primary markets in the Central Valley. With the distance from Foresthill to commercial and industrial agricultural operations (vineyards represent the closest large-scale operations), TSS anticipates significant competition from agricultural composting operations located close to vineyard operations. One agricultural market that may show promise is animal bedding products. Sold in bulk or in bags, animal bedding can be produced using relatively low-cost wood shavings equipment that utilizes softwood species (ponderosa pine is preferred) as small as two-inch diameter.

## **Start-Up Opportunities and Challenges**

Developing wood product yards in an area lacking robust private infrastructure investment offers opportunities and challenges that can be proactively addressed by the Foresthill Bioenergy Steering Committee through outreach and project management.

### **Community Outreach**

Community outreach is a critical component of a successful enterprise development. The Foresthill Bioenergy Steering Committee seeks to promote local business development and therefore needs a robust and targeted community outreach plan to ensure full participation of local stakeholders and community leaders. TSS recommends the regularly scheduled public workshops be planned and held to step through the processes with engaged community members. Community outreach events should target:

- review of this value-added forest material utilization assessment;
- identification of active and engaged community stakeholders;
- outreach to community members identified as active in the field, but not yet engaged in the process;
- coalescence around a mutually beneficial value-added product goal; and
- development of a project timeline that includes regular public updates.

Community participation is essential to project success and will dictate the tenant mix for the product yard site along with the need for additional entrepreneurs. A successful project must integrate with existing successful local business enterprises to create cost-effective business relationships and support, not competition.

## Optimized Location

An integrated product yard offers economies of scale from shared equipment and professional expertise along with minimizing transportation costs of intermediate products. Several criteria should be reviewed when searching for the optimized location for the project yard.

- Space: The product yard should have ample open space for multiple businesses to offer services. There should be ample level and open space for a sort yard, chipping or grinding operation, composting, firewood, and road access throughout the campus. Space requirements will vary by equipment type and scale. Coordinated stakeholder meetings will help identify what type of space will be necessary. Conversely, if space is limited, identifying the appropriate potential industrial-zone parcels will be critical to successful conceptual product yard design.
- Road Access: Transportation of wood in log trucks and chip vans will be common in an active yard and may receive 10 to 50 trucks per day depending on the scale of the operations. Road access in and out of the product yard is essential to managing the flow of products.
- Zoning: An integrated wood products yard is an industrial land use. Selecting an industrial-zoned parcel will be critical to cost-effective development, as the conditional use permitting process is typically significantly less expensive and faster than implementing a land-use zoning change.
- Infrastructure: Wood product yards typically consume a significant amount of electricity and may require water storage or availability for fire protection purposes. Existing water supply, fire hydrants, and electricity to the site will limit upfront project expenditures.

## Capital Finance

Capital financing requires a defined set of essential business elements. The Foresthill Bioenergy Steering Committee can serve in a leadership role as the project manager to ensure that each business development element is addressed.

- Project Team: Any business enterprise requires a committed project team with relevant experience and expertise. Identifying the project team early will be essential to the success of the community enterprise.
- Business Plan: The value-added product yard will require a sound business model addressing the local opportunities, support from existing enterprises, defined products and markets, and a thorough long-term financial model including revenue and costs such as labor, operations, maintenance, insurance, energy, property, and equipment.
- Market Strategy: The project team, as part of the business plan, should develop a clear market plan including product marketing, market location and proximity, historic market pricing, and the identification of long-term buyers.
- Funding Opportunities: The Foresthill Bioenergy Steering Committee can play an important role interfacing with affected agencies, including the U.S. Forest Service, the Sierra Nevada Conservancy, U.S. Department of Agriculture (Rural Development), and Placer County, to identify the potential for grant funding to support project start up.

## **Grant Funding Options**

Grant funding opportunities can provide pre-development funding necessary to move the project forward. Several California and federal agencies offer grant funding opportunities to promote the use of forest residues.

*USFS Wood Innovation Program:* The USFS has released the Wood Innovation program (formerly Woody Biomass Utilization Grant and Wood-to-Energy) with proposals typically due in January or February each year. The Wood Innovation program focuses on reducing hazardous fuels and improving forest health on national forest systems and other forest lands, reducing costs of forest management and promoting the economic and environmental health of communities. Historically, the USFS has supported wood utilization projects and is expected to continue funding project development costs over the near term.

*Sierra Nevada Conservancy Grant Programs:* The Sierra Nevada Conservancy historically has funds available for pre-development advancement of forest biomass utilization programs. In 2014, the Conservancy's Proposition 84 grant program was completed. The Task Force should monitor the Conservancy as their next grant program is developed, likely in response to Proposition 1 funding. Proposition 1, the Water Bond, is focused on protecting and restoring California rivers, lakes, streams, and watersheds. Community-scale, value-added woody biomass product yards promote healthy and sustainable forest management which has many links into improved watershed health. The new grant program is expected to have opportunities for projects utilizing forest residue.

*National Forest Foundation:* The National Forest Foundation has a variety of assistance programs designed to support conservation work in America's national forests. In particular, the Forest Stewardship Fund is designed to support on-the-ground conservation work through a partnership with local businesses on or near national forests.

*U.S. Department of Agriculture, Rural Business Enterprises Grant:* Administered through the U.S. Department of Agriculture to improve, develop, or finance business, industry, and employment and improve the economic and environmental climate in rural communities.

## **Recommendations and Next Steps**

Based on the findings from this assessment, TSS recommends the pursuit of landscaping and agricultural opportunities such as mulch, decorative bark and chips, and animal bedding. TSS believes that these operations complement existing local entrepreneurs and provide low-cost opportunities. Outreach to local entrepreneurs will be important to the successful development of a wood products yard, as their participation will be necessary to support the infrastructure and operations of a new facility.

The Foresthill Bioenergy Steering Committee can offer program management services to facilitate the incubation of new enterprises, including organization of community meetings and targeted outreach to local markets, as well as provide an interface with public funding agencies.

## Appendix A. Relevant Literature

Han, H., Bilek, T., Dramm, R., Loeffler, D., Calkin, D. “Financial Feasibility of a Log Sort Yard Handling Small-Diameter Logs.” 2009 Council on Forest Engineering Conference Proceedings: “Environmentally Sound Forest Operations.” Lake Tahoe, June 15-18, 2009.

North East State Foresters Association, “The Economic Importance of New York’s Forest-Based Economy.” 2013. [http://www.dec.ny.gov/docs/lands\\_forests\\_pdf/economicimportance2013.pdf](http://www.dec.ny.gov/docs/lands_forests_pdf/economicimportance2013.pdf). Accessed January 2015.

North East State Foresters Association, “The Economic Importance and Wood Flows from Vermont’s Forests.” August 2007. <http://www.vtfpr.org/includes/documents/ecimportfor.pdf>. Accessed January 2015.

TSS Consultants, “Wilseyville Woody Biomass Value-Added Product Yard Feasibility Study.” January 11, 2012. <http://ucanr.edu/sites/swet/files/176215.pdf>. Accessed January 2015.

U.S. Department of Agriculture Forest Service, Pacific Northwest Research Station, “Proceedings: Linking Healthy Forests and Communities Through Alaska Value-Added Forest Products.” July 2000. <http://www.fs.fed.us/pnw/pubs/gtr500.pdf>. Accessed January 2015.