

PRELIMINARY MARKET REVIEW OF POTENTIAL CO-LOCATED BUSINESSES AT THE FOREST BIOMASS BUSINESS CENTER IN CAMPTONVILLE, CALIFORNIA



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The Watershed Research and Training Center
Hayfork, California

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- Chris Friedel, Bioenergy Project Lead
- Cathy Le Blanc, Co-Executive Director

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Project Background

Camptonville Community Partnership (CCP) is a 501(c)(3) non-profit corporation whose mission is: “Rural people working to together for a safe, sustainable, and healthy community.” Since 1995, CCP has provided numerous programs and services to the Camptonville community, including a family resource center, an early childhood education program, and health education initiatives. CCP is currently acting as the fiscal sponsor of the Yuba Watershed Protection and Fire Safe Council (Fire Safe Council).

In 2010, the Fire Safe Council, through the High Sierra Resource Conservation and Development Council, hired TSS Consultants to conduct a feasibility analysis of the potential for siting a biomass fired power generation facility in Yuba County.¹ Based on a preliminary review and qualitative ranking of eight sites in the Yuba County foothills, two sites were chosen for further investigation. One was the former Sierra Mountain Mills site in Celestial Valley, near Camptonville, and the other was located in Oregon House. A third site, at the Teichert Aggregates plant in Marysville, was added after the preliminary review was completed. The feasibility study concluded that small-scale facilities located at Oregon House or Celestial Valley would not be economically viable unless they could secure a price of 13.5 cents per kilowatt-hour, which was higher than the top-end prices paid by the large investor-owned utilities at the time (about 10.5 to 11 cents per kilowatt-hour). TSS Consultants recommended to the Fire Safe Council that the Teichert site be prioritized for construction of a larger scale facility and that federal or state support should be sought for necessary design and engineering work.

After the feasibility study was completed, Teichert Aggregates decided not to pursue the project further. Interest in biomass power in Yuba County was revived in 2012 when Governor Jerry Brown signed Senate Bill 1122 (SB1122) into law, requiring California’s large investor owned utilities to procure 250 megawatts of renewable energy from small-scale bioenergy projects. SB1122 mandates that 50 megawatts of this procurement be for “bioenergy using byproducts of sustainable forest management.”² In practice, implementation of SB1122 will mean that higher prices will be paid for electricity produced by small-scale bioenergy plants (3 megawatts or less) using at least 80% of their fuel sourced from forest management activities. The higher prices facilitated by SB1122 could improve the economic viability of small-scale facilities, such as those proposed in Oregon House and Celestial Valley.

CCP has since chosen to further investigate the viability of a small-scale biomass power generation facility at the Celestial Valley site, which ranked the highest of all the Yuba County foothills sites in TSS Consultants’ qualitative assessment. At the advice of consultants from the Sierra Nevada Conservancy, CCP has begun planning for a Forest Biomass Business Center in Celestial Valley that will locate a biomass plant with other businesses that can utilize incoming streams of forest biomass, or can utilize wholesale power and/or heat generated by the facility. To this end, CCP received a grant in 2013 from the National Forest Foundation to build local capacity and support for this effort. This funding has allowed CCP to create a project website, submit regular updates to local media outlets, conduct a survey of community issues and concerns, and begin a series of in-depth interviews with project stakeholders. In early 2014, a series of public meetings was held, in conjunction with the preparation of a revised Community

Wildfire Protection Plan for the Yuba County foothills, at which input was sought from local residents in five nearby communities. In April 2014, the first meeting was held of a project steering committee to draft project goals and strategies. To this date, the project steering committee has met two more times.

Introduction to the Market Review

As planning for the Forest Biomass Business Center got underway in early 2014, it became clear that CCP needed to conduct preliminary research into what types of businesses could potentially locate with a small bioenergy facility at the Celestial Valley site. CCP was approached by the WRTC and the Sierra Nevada Conservancy with the offer of submitting a proposal for a Rural Business Enterprise Grant (a USDA Rural Development program), on behalf of Camptonville and other communities, for funding to analyze the feasibility of integrated wood campuses. In preparation for the grant, it was decided that CCP should choose 3-4 potential business models, the viability of which could be analyzed if funding were secured. In February 2014, CCP received a small grant from the Statewide Wood Energy Team (administered by the WRTC) to fund this preliminary market review of potential co-located businesses at the Forest Biomass Business Center (FBBC).

Research for the preliminary market review was conducted by CCP from February through June 2014. This research consisted of the following:

- Preparation of a list of potential value-added opportunities for utilization of forest biomass and small-diameter wood.
- Compilation of a draft listing of local and regional contacts that could provide market information about potential business models, and/or become business partners with the FBBC (see Appendix A).
- Face-to-face and over-the-phone interviews with project stakeholders and others from the local area and region who have knowledge about the utilization of forest biomass and small-diameter wood.
- Outreach to local forums (community meetings & local media outlets) seeking collaboration with entrepreneurs and existing businesses.
- Communication with other community groups who have been experimenting with development of multi-product biomass utilization campuses.

There are several limitations to this review. For one, CCP staff members were not qualified to make detailed economic assessments of each potential value-added opportunity. Therefore, analysis of each opportunity relied upon the opinions and experiences of the individuals consulted during preparation of the review, and was mostly qualitative rather than quantitative. Secondly, due to the limited amount of time that CCP staff members were able to devote to this effort, these lists and conclusions should not be viewed as comprehensive. Rather, this preliminary market review should be taken as a summary of the best available knowledge gathered to date. In particular, CCP acknowledges that much more time will need to be invested in seeking local and regional business partners for the Forest Biomass Business Center.

Most of these contacts have been acquired through word-of-mouth, and therefore have surfaced slowly.

Value-Added Opportunities for Forest Biomass Utilization

The following list of value-added opportunities for utilization of forest biomass and small-diameter wood was compiled during the course of research for this preliminary market review. Sources included feasibility studies for two other wood utilization campuses in California, a US Forest Service report on woody biomass utilization, and conversations with individuals knowledgeable about the forest products industry.^{3,4,5} In preparation of this list, the categories were retained from the Forest Service report, separating the opportunities according to amount of value added by processing and stage of market development. Interestingly, all biomass-to-energy enterprises were characterized as “developing markets,” indicating either that the needed technologies are not yet commercially proven, or, in the case of wood pellets, the consumer market has not yet developed to its potential levels.

FOREST PRODUCTS	FEEDSTOCK	FEEDSTOCK SPECIFICATIONS
High Value		
Sawlogs (dimensional lumber)	Small to large logs	8.5' long, 5.6" small-end diameter
Veneer logs	Small logs	8' long plus trim, 3.5" core diameter, straight grain, cylindrical, pith in center, etc.
House logs	Small to large logs	25' or more length, 6-18" diameter
Utility poles	Small to large logs	Douglas fir, 20-125' long
Kiln-dried flooring	Small to large logs	Douglas fir
Beams	Large logs	Hardwood
Veneer for engineered flooring	Large logs	Hardwood
Value-Added		
Posts*	Small logs	Ponderosa pine, Doug fir
Poles*	Small logs	Ponderosa pine, Doug fir
Tree stakes*	Small logs	
Trellis poles*	Small logs	
Rustic furniture	Small to large logs	Pine, cedar, Doug fir, lodgepole
Spindles for log-home railings and stairways	Small logs	
Stairway steps	Small logs	
Arches	Small logs	
Character wood (e.g., burls)	Small logs	
Composite wood	Forest biomass	
Wood plastic composites		Clean, dry (2-12% mc) wood flour
Buck and rail fences	Small logs	
Flooring blanks	Small logs	

FOREST PRODUCTS	FEEDSTOCK	FEEDSTOCK SPECIFICATIONS
Value-Added (continued)		
Fencing boards/packages	Small logs	
Honey supers, frames, bee boxes	Small logs	
Crates and boxes	Small logs	
Value-Added from Residuals		
Firewood*	Log segments, end pieces	6"+ log diameter
Animal bedding (shavings)*	Wood residual	Softwood logs (no incense cedar). Equipment: shavings mill.
Landscape chips and bark*	Residuals from log peeler	Small roundwood, easily debarked. Screen to remove fines
Compost*	Small log pieces; forest biomass	Need to add greenwaste (e.g., grass clippings), or use green wood for nitrogen. Equipment: tub grinder; compost turner & tractor.
Dried hog fuel	Wood residual	<10% moisture content
Low-Value		
Paper pulp	Forest biomass	No fire-charring into cambium, <50% rot, 3" minus, bark free
Chips for oriented strand board and other composite lumber	Forest biomass	3" minus, bark free
Developing Markets		
Energy		
Combustion/steam turbine		3" minus, <50% MC
Cogeneration facility		3" minus, <50% MC
Thermal energy production		3" minus, <50% MC
Gasification & generator		3" minus, <50% MC
Gasification & fuel cell		3" minus, <50% MC
Biofuels		
Torrefied wood		
Torrefied pellets		3" minus, bark free, <40% MC
Wood fuel pellets		3" minus, bark free, <40% MC. May require debarking before wood processing.
Fuel bricks*		clean, dry (<15% MC), needles/bark OK
Fire logs		clean, dry (<10% MC), needs to be <1% ash
Liquid bio-oil (to biodiesel)		
Ethanol		
Biochar		

* Recommended for further investigation

During the course of this preliminary market review, CCP staff and members of the Forest Biomass Business Center steering committee have focused in on a smaller subset of opportunities from the above list that have the potential to be economically viable at the Celestial Valley site. These are highlighted in red on the list, and are described further below.

Post and Pole Manufacturing

If a biomass-to-energy facility were constructed at the Celestial Valley site, the Forest Biomass Business Center would be receiving regular loads of woody material from harvests on nearby federal and private lands. The plant would either accept clean chips as a feedstock, or could utilize an on-site chipper or tub grinder to produce chip fuel from small-diameter wood. Since both chips and small-diameter logs could be brought to the site, there are possible efficiencies to be gained by having other on-site enterprises that utilize both of these materials. According to Jim Jungwirth at the Watershed Research and Training Center, post and pole manufacturing (including trellis poles for agriculture) is an ideal value-added product for smaller logs, provided there are efficient production and sorting systems, and markets for the residuals.⁶ It is also considered a viable business by the Mt. Adams Stewardship Project, which has a multi-product biomass utilization campus in southern Washington State.⁷ This project has more customer demand than they can supply. They sell posts and poles to two regional distributors, who supply retail outlets. Hop poles have been a very successful market in Washington State. A pole manufacturing company, Geronimo Pole Co., is currently in operation at the site, but the landowner, Nick Whittlesey, has indicated that the business may be re-locating in the near future.

Feedstock Specifications:

- Straight, low taper softwood is preferred (lodgepole, ponderosa, white fir).
- The process is efficient up to 20' lengths and 12" diameter, and down to 8' lengths and 3" diameter.

Jobs (Full-time Equivalent): 5 – 15

Equipment Needed:

- Post peeler and/or doweller.
- Merchandizing line (log in-feed, out-feed roll, transfer and incline chain) with a de-barker.
- Bucking saw.
- Residual handling (of bark and sawdust) could require a blower, blow pipe, chip bin and van-loading conveyor.
- Truck scale to determine value of small diameter material delivered

Competition:

- Peeler cores from the plywood industry.

- Treated pine posts from Idaho and Montana (where there is a lower cost of insurance and labor).

Challenges:

- Species are generally of lower quality than lodgepole.
- Poles are commodity products in a variable market.
- Seasonal markets mean high inventory costs & challenging cash flow.
- Low profit margin, even with efficient production.

General Notes:

- Can produce up to 4 MBF per shift.
- It is OK to sort after peeling.
- Charlie and Betty Ruff used to run a post-peeling operation on land in the region owned by Soper-Wheeler Co. They logged, peeled posts, and hauled them to a treating plant in Riverbank.⁸
- Jeff Armstrong, in Camino, makes poles with cut-to-length logging equipment from Sierra Pacific Industries fuel break treatments in that district. The machinery is expensive and the haul is also expensive.⁹
- Bark mulch can be sold as a residual product if a de-barker is used to prepare the posts.

Small-Scale Pellet or Brick Manufacturing

Wood pellet or fuel brick manufacturing could utilize both the incoming material streams at the Forest Biomass Business Center and heat produced by the biomass-to-energy plant. Both products require a drying system to bring the feedstock to the appropriate moisture content, and using heat from the energy facility could result in a significant reduction in capital and operating expense. However, most wood pellets are made from sawmill waste, which is free of bark and dirt. Making wood pellets from forest biomass can be problematic. Small amounts of bark and dirt will cause the pellets to fall apart, and the dirt in field chips wears out the extrusion machinery.¹⁰ Therefore, it may be more viable to produce fuel bricks, which are manufactured with hydraulic compression rather than extrusion. There is currently only one pellet producer in California - Mallard Creek, Inc. in Rocklin. They have received federal payments for their production under the Advanced Biofuel Payment Program, a USDA Rural Development program. Mallard Creek could be a good resource for learning about the economics of the pellet business, but so far they have not responded to requests for an interview.

To produce pellets, woody material is first been passed through a hammer mill to create a uniform mass. The mass is then fed to a press, where it is squeezed through a die with holes of the required size (usually 6 mm diameter, though sometimes 8 mm or larger). High pressures in the press cause the temperature of the wood to increase, causing the lignins in the wood to plasticize slightly and form a natural glue that holds the pellets together when they cool. The major steps in the production process are as follows:¹¹

1. **Drying** – Moisture content of the material needs to be maintained at approximately 15 percent. If the material becomes too dry, the heat caused by friction in the press will burn the pellet surfaces. If too moist, the build-up of steam pressure will weaken internal bonds, leading to breakage and dust formation during handling.
2. **Milling** – A hammer mill is used to reduce the size of the feedstock. Then the material may be treated additionally, such as with steam conditioning to soften the lignin that binds the cellulose together, to facilitate pellet formation during extrusion. Binding agents may be added to minimize breakage during transport.
3. **Pressing** – The resulting mass is extruded through dies and the emerging ribbons are cut to desired lengths.
4. **Cooling** – The hot pellets are cooled in a counter-flow cooler to allow lignin to reset and form a hardened pellet. The finished product is then bagged for sale in regional markets, or shipped in bulk to larger markets.

Torrefied pellets, which are made from woody material that has been heat-treated to increase energy density and material stability, are another potential product, but this process is not yet commercially available.

Feedstock Specifications:

- Wood fuel pellets: clean, dry wood chips (about 15% moisture content). Needs to be less than 1% ash.
- Wood fuel bricks: clean, dry wood chips (about 15% moisture content). Needles and bark are okay.

Jobs (Full-time Equivalent): 3 - 15

Equipment Needed:

- Pellet mill or brick machine
- Dryer
- Cooler
- Hammer mill
- Packaging machine

Challenges:

- Limited local and regional markets
- Lack of efficient access to global markets (transport)

General Notes:

- Japan and South Korea may become viable export markets for wood pellets produced on the west coast of North America.
- Affordable natural gas is likely to limit the growth of wood pellet consumption in North America.

Firewood Processing

Commercial firewood processing could be successfully co-located with other on-site enterprises, benefiting from efficiencies created by sharing equipment, adding value to material waste streams, or utilizing the heat produced by a biomass-to-energy facility. For example, as demonstrated by the Watershed Research and Training Center, a firewood processing operation can be successfully paired with a post manufacturing operation. The firewood is created from the short lengths of round wood, rotten log segments, and end pieces generated as residuals of the post manufacturing process. The firewood is of varying value depending on species. White fir and pine logs are of lower value, while Douglas fir firewood was worth between \$140 and \$180 per cord in 2009. The value of the firewood generated from the peeler residuals may be less than this, because of the percentage of pieces that would be less than the standard 16 to 18 inches long.

The Mt. Adams Stewardship Project in Washington State is demonstrating an innovative approach to adding value to firewood. They have received a Rural Business Enterprise Grant to install a “cooperative” wood drying kiln that could be used to produce higher-value seasoned firewood (free of insect pests). The kiln will also be designed to dry lumber and will be used cooperatively by local sawmills.¹²

Feedstock Specifications:

- Roundwood logs (hardwood is preferred)
- Certain dimensions are required in order to be processed by an automated firewood processor.

Jobs (Full-time Equivalent): 2 - 8

Equipment Needed: Log splitter or firewood processor

Competition:

- Numerous firewood contractors already in place. Certain large contractors have a significant market share (e.g., California Hotwood).

Challenges:

- Any operation should be careful not to put smaller local operators out of business.

General Notes:

- Campgrounds are a good local/regional market.
- Could be marketed to urban centers in boxes or bundles.
- Randy Pew, in Greenville, has started bundling de-limbed, small diameter, 8-foot logs into half-cords that can be loaded into a pickup. He uses a Chambers DeLimbinator.

Wood Shavings for Animal Bedding

Wood shavings for animal bedding are created in a specially designed manufacturing plant. Clean, debarked logs are sent through a machine with motors and blades for shaving. Shavings and dust are dried in a separate machine to bring moisture level to 10-12%. A regional example is American Wood Fibers, who acquired California Wood Shavings (in Jamestown, CA) in July 2011 from California Wood Shavings (former owner, Bob Brewster). The company has 10 operating plants across the country, in small towns with access to abundant wood resources. The company buys logs from USFS and private timber companies. The Jamestown plant is a “zero-waste” facility, with log ends going to a firewood processor in the Central Valley, and the wood dust used to create heat that dries the shavings.

Feedstock Specifications: Small roundwood (ponderosa pine preferred).

Jobs (Full-time Equivalent): 2 - 6

Equipment Needed:

- Shaving machine
- Screens
- Drying machine
- Packaging machine

Competition:

- American Wood Fibers

General Notes: This concept needs to be researched further.

Markets for Residuals

The value-added opportunities discussed thus far are “stand-alone” enterprises, which would nevertheless benefit from the efficiencies generated by co-locating with each other and the proposed biomass-to-energy facility, through the sharing of equipment, infrastructure, and sorting operations, or through utilization of process heat from the facility. These enterprises would also generate residuals that could be further processed into value-added products. These opportunities are discussed in this section.

Soil Amendments/ Compost

In the Yuba County foothills, and in nearby western Nevada County, there is a significant demand for soil amendment products. An informal survey of local garden supply stores revealed that most, if not all, soil amendments currently being sold in the region are trucked in from other locales. There is potentially a niche market for locally produced compost or other soil amendments, provided that reliable sources of the necessary raw materials are secured.

In March 2014, CCP staff spoke with the owner of a soil amendment company who expressed interest in potentially co-locating with a biomass-to-energy facility at the Forest Biomass Business Center in Camptonville.¹³ His product (called “California Humus”) is not technically compost, because it does not go through the required thermal stages to be certified as such. Rather, he calls it a “managed decomposition” process. The parent material is all woody biomass, and the process is much longer than a typical commercial composting operation. Currently, the company is looking to expand its operations due to an “overwhelming” response from customers. Currently, his biggest customer is Malibu Compost Company, who uses the humus as an ingredient in their soil mixes. He hopes to next target the national home garden market, and then sell to farmers and the agricultural industry.

A key point learned from this conversation was that the business model necessitates a limited cost (or no cost) to acquiring material. All the costs are then in production. In the past, this company has partnered with co-generation facilities and mushroom growing operations to secure access to woody material at no cost. In order to create a profitable enterprise at the Forest Biomass Business Center, this example of a soil amendment business would need access to a stream of residuals (sawdust, bark, or other woody material) that is left over from other operations on site.

A more traditional thermal composting operation would require mixing woody feedstocks with some amount of more nitrogen-rich material. Another composting operation in Trinity County needed to purchase alfalfa to add to wood chips in order to achieve the necessary carbon-to-nitrogen ratio for proper thermal composting, which reduced the profitability of the operation.¹⁴

Another possibility is the use of biochar from the biomass-to-energy facility, combined with other organic materials, to create a composted biochar product, which would have a higher value than the biochar alone.

Feedstock Specifications: Bark, sawdust, shavings. Also green waste (tree trimmings, grassing clippers). For thermal compost, a 50/50 mixture of woody material and green material is optimal.

Jobs (Full-time Equivalent): 2 – 6

Equipment Needed:

- Tub grinder
- Screen
- Windrow turner and tractor

Challenges: Soil amendment market is seasonal

Notes: Typically shares the same site with a mulch operation

Decorative Bark

Bark generated during pole processing or other de-barking operations can be sold as decorative mulch. This product has a high value in urban areas. As sawmill residuals become scarce, the value of bark for landscape cover has increased.

Feedstock: Small roundwood that is easily debarked. Raw bark from sawmills is a common feedstock source.

Jobs (Full-time Equivalent): 2 – 6

Equipment Needed:

- Debarker (flail, ring or rosser head)
- Screen (Trommel or flat)

Pine Needle Wattles

If a significant quantity of conifer needles is generated through other activities at the site, these could be further utilized as a feedstock for additional value-added products. An example is the pine needle wattles for erosion control that are currently fabricated and used by Integrated Environmental Restoration Services, Inc. in Tahoe City.

Other Value-Added Opportunities

Cooperative wood kiln: This idea came from the Mt. Adams Stewardship Project, who has used a Rural Business Enterprise Grant to build a kiln. Their intention is that the kiln will be available for use on an as-needed basis by local sawmill operators. Also, the kiln will be modified to be able to heat treat bundled firewood.

Playground chips: There is a substantial market for clean chips of a certain size and shape to be used in playgrounds and other public areas.

Conditioned wood chips for local biomass boilers: If a significant number of local heating oil boilers are converted to wood-fired boilers, there will be a local market for conditioned (dried) chips. Although wood-fired boilers can be a more significant up-front capital investment, this will eventually be paid off because of the a higher price/btu for heating oil compared to wood feedstocks. The Sierra Institute for Community and Environment, in Taylorville, California, is investigating the potential for these types of district heating systems in their community.

High-value processed wood products: Flooring, cabinets, and veneers are all examples of high-value woody products that could potentially be manufactured profitably at a small scale. This topic deserves further investigation.

Options Considered and Rejected

In the course of research, it was determined that making dimensional lumber from small diameter wood is probably economically infeasible. It is too much of a challenge competing with large, computerized sawmill operations that currently dominate the lumber market in California.

Shared Equipment

The capital, operation, and maintenance costs of following pieces of equipment could be shared by multiple enterprises, thus improving the efficiencies (and therefore, profitability) of each:

- Truck scale
- Forklift
- Truck dump

Uses for Process Heat from Biomass-to-Energy Facility

The success of a biomass-to-energy facility at the Forest Biomass Business Center will depend in part on its relationship to the other wood-based businesses that are co-located at the site. Planning for all enterprises would ideally be done in conjunction with one another. An example of this is the utilization of process heat (sometimes referred to as “waste heat”) from the bioenergy plant. Depending on the technology chosen, there may be a significant amount of heat produced during the production of electricity, which could be used for other processes on site. While there is no nearby existing heat load, such as a large building that needs to be heated or cooled seasonally, or a district heating systems, on-site value-added enterprises could use heat from the plant during their manufacturing processes.

As discussed in further detail in the previous sections, examples of this include:

- Lumber and/or firewood drying kiln
- Drying for small-scale wood pellet or wood fuel brick plant
- Drying for animal bedding shavings

Lessons Learned

During the preparation of this document, CCP staff time was mostly spent collecting information that was used to select a small list of potential business models that are likely to successfully integrate with a biomass-to-energy facility in Celestial Valley. CCP conducted limited outreach to potential business partners or entrepreneurs who might be interested in co-locating with the facility. For instance, as mentioned above, phone messages were left with a regional pellet manufacturer and a pole manufacturing operation. These messages were not answered, but further outreach might yield greater success. Contact information for local

firewood producers was compiled, but outreach was not initiated to this sector. A potential business partner was identified for a soil amendment business, but no outreach was conducted to producers of animal bedding, decorative bark, pine needle wattles, or other value-added products.

In June 2014, CCP staff met with representatives from the Yuba County Economic Development office and the Yuba-Sutter Economic Development Corporation to discuss strategies for recruiting entrepreneurs to the Forest Biomass Business Center. Both agencies spoke of the challenges involved with locating a business in Camptonville, which is not centrally located with respect to the County's population center in Marysville. It was noted that businesses located along Hwy 20, between Loma Rica and Marysville, would have a higher chance of success. Both agencies recommended that outreach to potential local business partners should not be conducted rigorously until the feasibility of a biomass-to-energy facility at Celestial Valley has been demonstrated and planning is underway for the facility's construction.

Next Steps – Additional Needed Capacity

In September 2014, CCP will begin analyzing the feasibility of a biomass-to-energy facility in Celestial Valley. This work will be made possible by a grant from the Sierra Nevada Conservancy. If the feasibility study, completed by a consultant with industry experience, shows that such a facility is technically and economically feasible, the Forest Biomass Business Center may have reached a sufficient stage of readiness for the recruitment of local entrepreneurs and business partners. At this time, CCP will need additional capacity to undertake the necessary outreach. It is recommended that this outreach consist of the following actions:¹⁵

- Identifying local and regional entities that have contact with appropriate businesses and entrepreneurs;
- Using emails, flyers, phone calls and other outreach tools to identify appropriate businesses and entrepreneurs;
- Making presentations at appropriate business events (such as trade association meetings, meetings of Chambers of Commerce, Yuba-Sutter Economic Development Corporation meetings, etc.) regarding the opportunities presented by the Forest Biomass Business Center for businesses and entrepreneurs;
- Obtaining information on business recruitment, technical assistance, financing assistance and other resources available locally for biomass-based businesses;
- And contacting technical and financial assistance programs to discuss potential resources for businesses.

APPENDIX A: Local and Regional Contacts for Forest Biomass Business Center

Contacted?	Category	Location	Business Name	Phone	Name	Email	Website	Notes
X	Animal bedding	Rocklin	Mallard Creek	(916) 645-1681		info@mallardcreekinc.com	http://mallardcreekinc.com/	
	Animal bedding	Olivehurst	American Wood Fibers	(530) 741-3700				
	Animal bedding	Jamestown	American Wood Fibers	(209) 984-1150	Mike Krol			
X	Bark & mulch	Rocklin	Mallard Creek	(916) 645-1681		info@mallardcreekinc.com	http://mallardcreekinc.com/	
	Bark & mulch	Rocklin	Applied Landscape Materials	(916) 214-2503			http://www.appliedlandscapematerials.com/index.html	
X	Bark & mulch	Grass Valley	Rare Earth Landscape Materials	530-477-9901			http://www.rareearthlandscapematerials.com/	
X	Compost	Sebastopol	California Humus		Phil Engfer	soilfarmsbarlow@gmail.com		
	Compost	Malibu	Malibu Compost	1-800-282-6676		info@malibucompost.com	http://malibucompost.com/home	
	Compost	Arcata	Foxfarm Soil & Fertilizer Co.	707-443-4369		foxfarm@foxfarmfertilizer.com	http://foxfarmfertilizer.com/	Bought Happy Frog
	Compost	Marysville	Feather River Organics	(800) 208-2370			http://www.featherriverorganics.com/	Part of Recology
	Compost	Marysville	Mushroom Adventures	(530) 741-2437			https://www.mushroomadventures.com/	
	Compost	Marysville	Pacific Wood Recycling	(415) 472-7263				
	Compost	Olivehurst	Sun Gro Horticulture	(916) 737-0665				
	Compost (retail)	Camptonville	Rebel Ridge Organics	(530) 288-3222				
	Compost (retail)	North San Juan	Sweetland Garden Supply	530-292-9000		Sweetlandgs@gmail.com	http://www.sweetlandgs.com/Home_Page.html	
X	Compost (retail)	Grass Valley	Rare Earth Landscape Materials	530-477-9901			http://www.rareearthlandscapematerials.com/	
X	Compost (retail)	Nevada City	Vital Garden Supply	530-470-0124			http://www.vitalandscaping.com/	
	Entrepreneur	Camptonville	family farm (CSA)	530-288-3655	Ledsens			
	Entrepreneur	San Juan Ridge	Mountain Bounty Farm	(530) 292-3776	John Tecklin		http://mountainbountyfarm.com/	
	Entrepreneur	Sweetland	Sierra Timberframers	(530) 292-9449	Martha & Doug Lingen		http://sierratimberframers.com/	
X	Entrepreneur	San Juan Ridge	Heaven and Earth Farm	530 292-3619	Amigo Bob Cantisano	orgamigo@gmail.com		
	Firewood	Grass Valley	Mac's Firewood	(530)-272-4464		mccaffreelogging@yahoo.com	http://www.macsfirewood.com/	
	Firewood	Nevada City	Ron's Fire Wood	(530) 615-7409				
	Firewood	Greenville	J & C Enterprises	(530) 258-7702	Jared & Randy Pew			Uses a Chambers Deliminator
	Firewood	Oroville	California Hotwood, Inc.	(209) 333-5480		mark@hotwood.com		
	Firewood	Berry Creek	Shute Mountain Firewood	530-228-9048	Jeff Winfrey			Recommended by Steve Andrews (AFR)
	Furniture	Camptonville	Moonshine Forest Management	530-288-3666	Bob Prout			
X	Furniture	San Juan Ridge	Erickson Woodworking		Bob Erickson	bob@ericksonwoodworking.com		
	Furniture	Penn Valley	Coomler Century Stair Co.		Darren Coomler			Retired

Contacted?	Category	Location	Business Name	Phone	Name	Email	Website	Notes
	Logging	Grass Valley	McCaffree Logging	(530)-272-4464		mccaffreelogging@yahoo.com	http://www.macsfirewood.com/	
	Logging	Camptonville	Moonshine Forest Management	530-288-3666	Bob Prout			
X	Logging	San Juan Ridge	Killigrew Co.	530-292-9155	Theo Des Tombe			
	Logging	Oroville	Rod Short Logging	(530) 532-0287	Rod Short			Work for CHY; has processor; can do in-landing processing
	Logging	Placerville	Ault Logging & Brush Removal	(530) 644-2119	Kurt Ault	kurt@aultlogging.com	http://www.aultlogging.com/	Work for CHY
	Logging	Lotus	Mountain F Enterprises	(530) 626-4127		mar15@hughes.net	http://mtfent.com/	Work for CHY; multi-product harvests, has chipper
	Logging	Westwood	Medici Logging	(530) 256-3633	Jack Medici			Works for CHY; cable logger
X	Lumber	Camptonville	Moonshine Forest Management	530-288-3666	Bob Prout			
	Lumber	Grass Valley	Kubich Lumber Company	(530) 272-8540		info@kubichlumber.com	http://kubichlumber.com/	
X	Lumber	San Juan Ridge	Killigrew Co.	530-559-5618	Theo Des Tombe	killigrewco@gmail.com		
	Native plant nursery	Grass Valley	Clear Creek Natives	650-888-6392		clearcreeknatives@gmail.com		
X	Playground fiber	Rocklin	Mallard Creek	(916) 645-1681		info@mallardcreekinc.com	http://mallardcreekinc.com/	
	Playground fiber	Rocklin	Applied Landscape Materials	(916) 214-2503			http://www.appliedlandscapematerials.com/index.html	
	Poles (manufacturer)	North San Juan	Geronimo Pole Co.	(530) 265-2836		geronimoadam@aol.com	http://www.geronimopole.com/	
	Wood pellets (logistics)	Stockton	Dover Resources, Inc.	508 785 1763		dave@dovrr.com	http://www.doverresources.com	
X	Wood pellets (producer)	Rocklin	Mallard Creek	(916) 645-1681		info@mallardcreekinc.com	http://mallardcreekinc.com/	Only mill in California
	Wood pellets (retail)	Grass Valley	Energy Logs & Wood Pellets	(530) 273-1678			http://energylogs.net/	North Idaho energy logs, Atlas wood pellets
	Wood pellets (retail)	Olivehurst	American Wood Fibers	(530) 741-3700				
	Wood pellets (retail)	Auburn	Renewable Energy Products	530-887-8170	Dee Dee Vierra			

References

- ¹ TSS Consultants (2010). *Yuba Foothills Biomass Feasibility Study*. Prepared for the High Sierra Resource Conservation and Development Council and the Yuba Watershed Protection and Fire Safe Council. Rancho Cordova, CA.
- ² http://www.cpuc.ca.gov/PUC/energy/Renewables/hot/SB_1122_Bioenergy_Feed-in_Tariff.htm
- ³ TSS Consultants (2012), *Wilseyville Woody Biomass Value-Added Product Yard Feasibility Study*, Prepared for Calaveras Healthy Impact Product Solutions, Inc. Rancho Cordova, CA.
- ⁴ USDA Forest Service (2007). *Woody Biomass Utilization Desk Guide*. Washington, D.C.
- ⁵ Watershed Research and Training Center (2009). *Integrated Wood Utilization Campus Feasibility Study*.
- ⁶ Jim Jungwirth, personal communication, March 2014.
- ⁷ Nathan Ulrich, personal communication, May 2014.
- ⁸ Paul Violett, personal communication, April 2014.
- ⁹ Tim Feller, personal communication, May 2014.
- ¹⁰ Jim Jungwirth, personal communication, March 2014.
- ¹¹ Little, M.G. et al. (2013). *North Carolina's Role in the Global Biomass Energy Market*. Biofuels Center of North Carolina.
- ¹² Nathan Ulrich, personal communication, May 2014.
- ¹³ Phil Engfer (Biologic Innovations), personal communication, March 2014.
- ¹⁴ Jim Jungwirth, personal communication, March 2014.
- ¹⁵ This list has been modified from tasks associated with an analyst-level position described in a proposed agreement between the Sierra Nevada Conservancy and the Placer County Resource Conservation District to assist with bioenergy development projects in the region.