BIOMASS FEEDSTOCK PROCUREMENT PLAN

Prepared for:
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Wilseyville, California

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The TSS Consultants lead team included:

- Tad Mason, Forester and CEO
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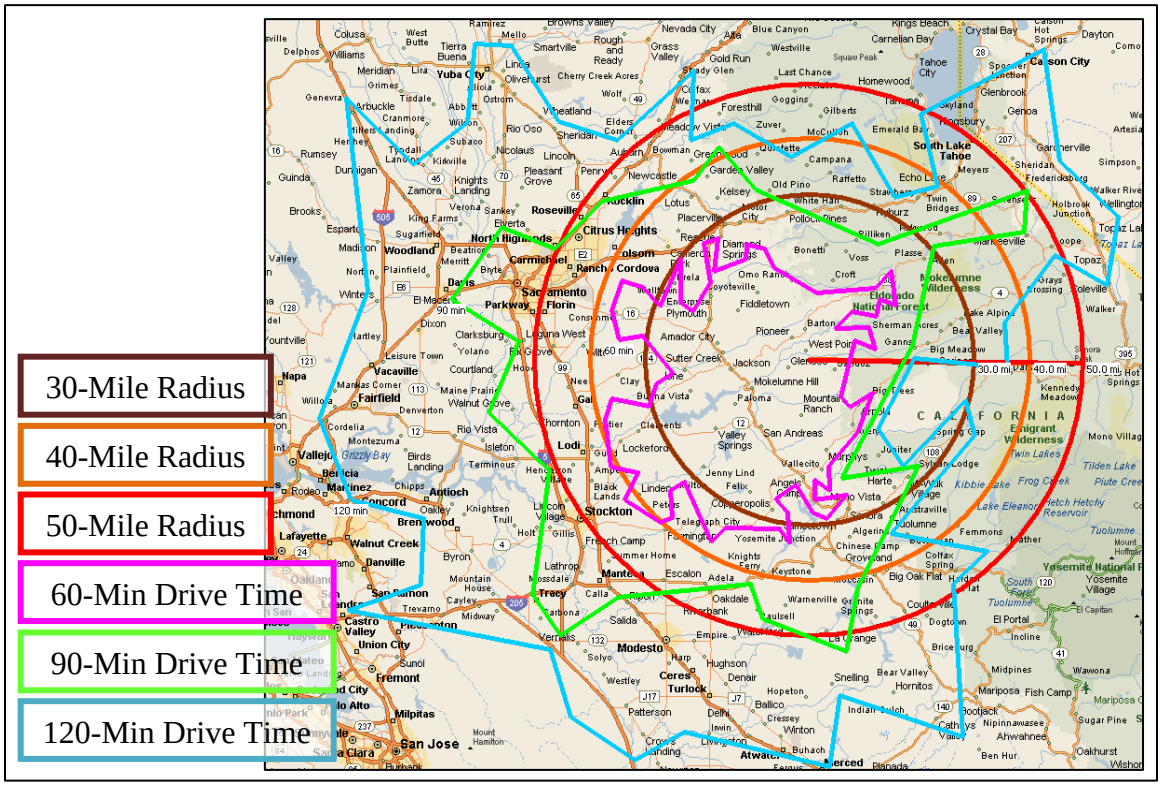
INTRODUCTION

Calaveras Healthy Impacts Products Solutions, Inc. (CHIPS) has partnered with Phoenix Biomass Energy, LLC (Phoenix Energy) to develop a community-scale biomass gasification facility as part of the CHIPS Wilseyville Product Yard. In order to meet the Senate Bill (SB) 1122 program implementation guidelines,[1] woody biomass must utilize at least 80 percent forest-sourced feedstock generated as byproducts of sustainable forest management. This procurement plan will assess feedstock availability and cost based on:

- Forest management objectives (sustainability screens) provided by the Amador Calaveras Consensus Group (ACCG);[2]
- Feedstock consistent with Phoenix Energy feedstock; and
- SB 1122 sustainable forest feedstock guidelines as administered by CAL FIRE.

The feedstock sourcing areas (FSA) utilized for this procurement plan include a 30-mile, 40-mile, and 50-mile radius from Wilseyville, CA (Figure 1). The core 30-mile radius captures the majority of the forest feedstock within 60-minute drive time while the 40-mile and 50-mile radii expand the forest sourcing area significantly to the south and northeast, taking in most of the 90-minute drive time area.

Figure 1. Feedstock Sourcing Areas and Drive Time Maps



[1] Per January 2015 proposed decision issued by the California Public Utilities Commission Administrative Law Judge Simon.
[2] As adopted by the ACCG on February 19, 2014.

Feedstock considered in this procurement plan includes forest-sourced material from both private and publicly managed lands, agricultural residuals, and urban wood including clean construction and demolition wood and green waste.[3]

This procurement plan addresses the availability of technically and economically available feedstock from within these sourcing areas. The technical availability analysis will include an assessment of availability with and without ACCG and CAL FIRE sustainability screens and accessibility based on road systems that will accommodate chip vans. The economically available screens will address current competition and current demand for biomass feedstocks.

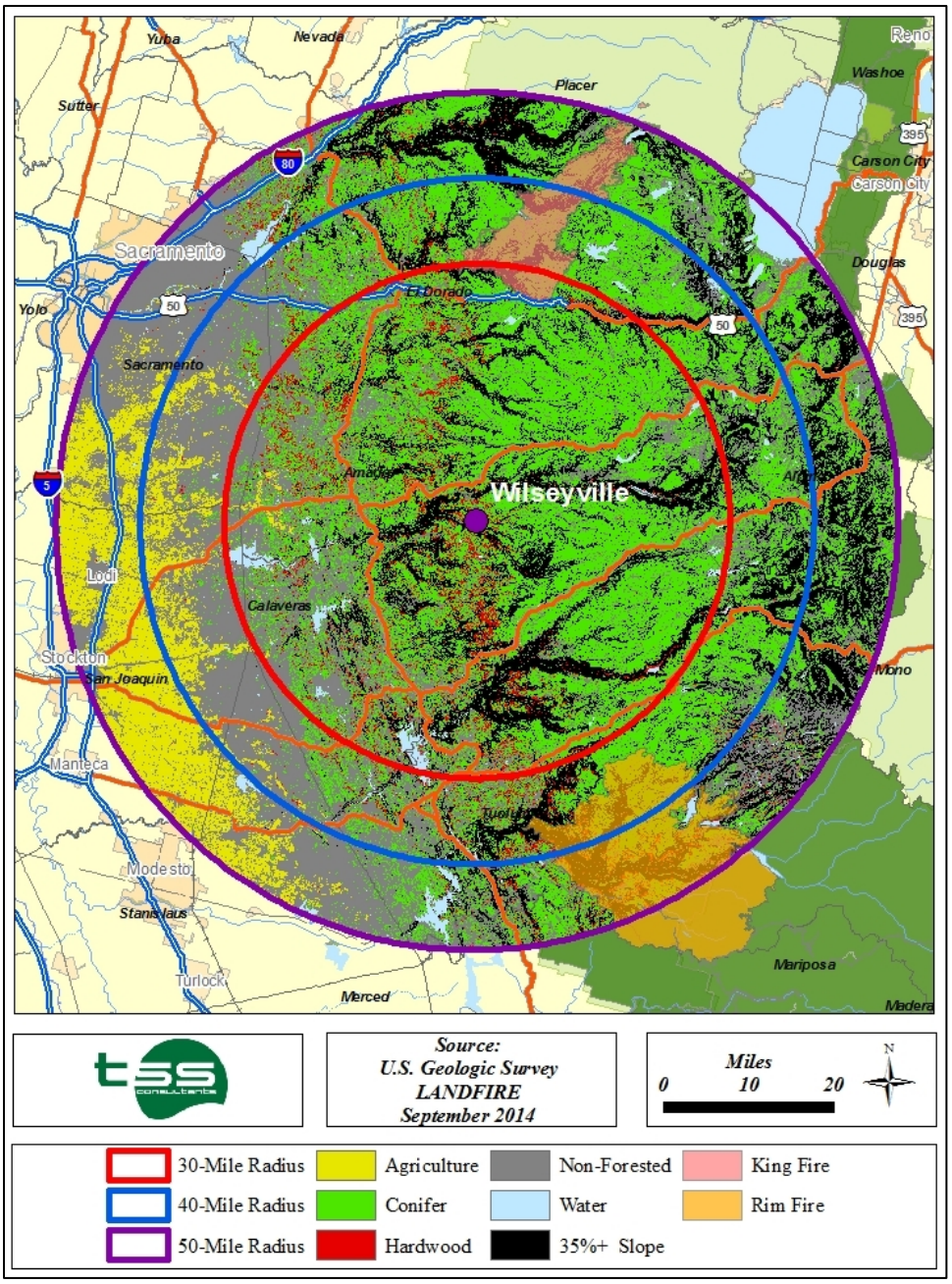
[3] Green waste is primarily made up of tree trimmings and other woody vegetative material.

FOREST FEEDSTOCK

Vegetation Cover

Woody biomass availability for any given region is heavily dependent on vegetation cover, topography, land management objectives, and ownership. Figure 2 shows the vegetation cover type for the FSA using US Geological Survey Landfire data. The vegetation cover types are categorized as agricultural, conifer, hardwood, non-forested areas, and water.

Figure 2. Vegetation Cover Map

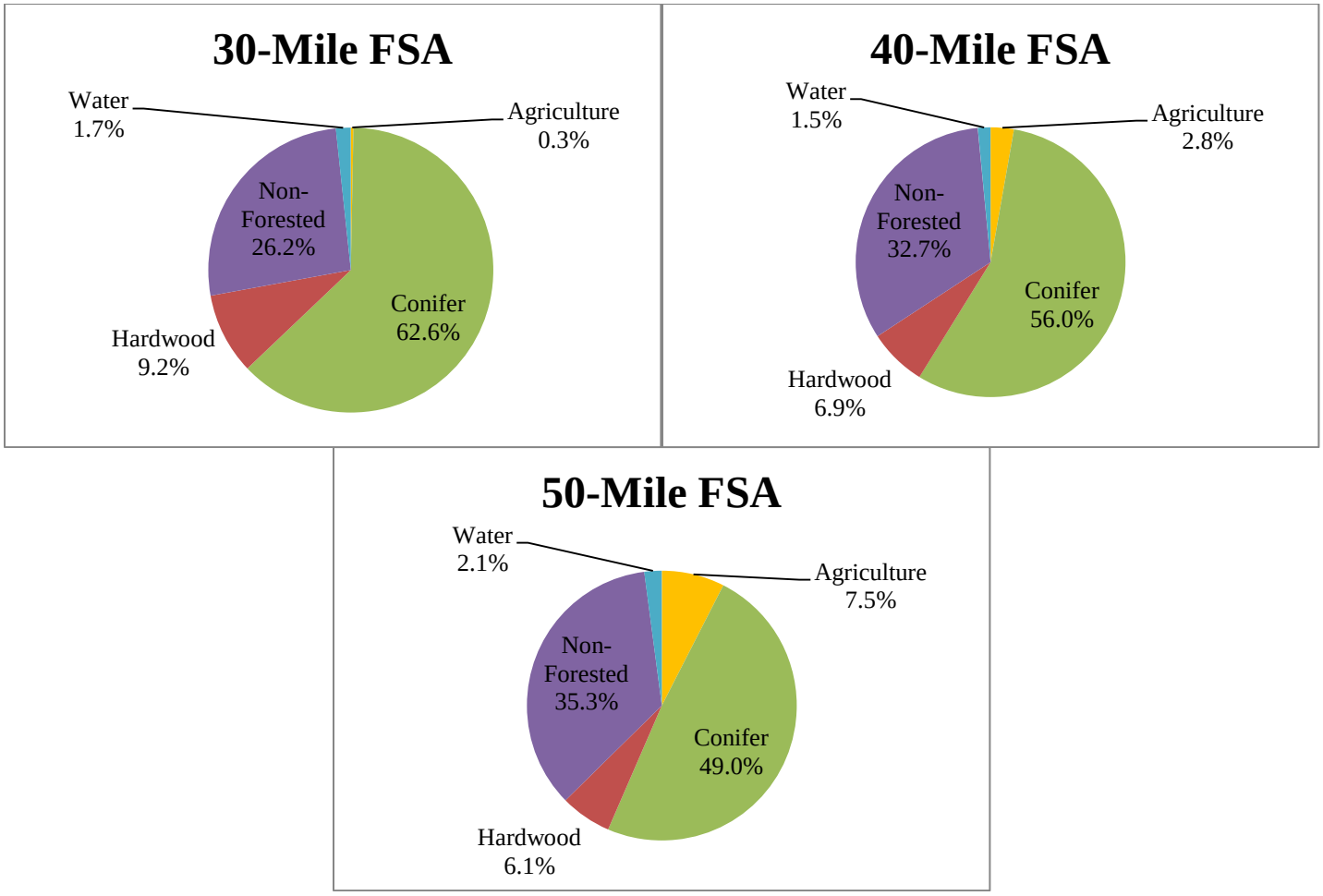


Vegetation cover types influence woody biomass availability. Depending on management objectives, certain cover types could generate significant volumes of woody biomass material for use as feedstocks for value-added utilization (including bioenergy production). Table 1 and Figure 3 summarize vegetation cover by vegetative cover category within the FSA.

Table 1. Vegetation Cover within the FSA

COVER CATEGORIES	30-MILE FSA		40-MILE FSA		50-MILE FSA	
	ACRES	PERCENT OF TOTAL	ACRES	PERCENT OF TOTAL	ACRES	PERCENT OF TOTAL
Agriculture	5,551	0.3%	89,607	2.8%	377,873	7.5%
Conifer	1,132,644	62.6%	1,803,026	56.0%	2,462,746	49.0%
Hardwood	167,013	9.2%	223,434	6.9%	307,542	6.1%
Non-Forested	473,812	26.2%	1,052,286	32.7%	1,773,752	35.3%
Water	30,535	1.7%	48,636	1.5%	104,633	2.1%
TOTALS	**1,809,555**	**100%**	**3,216,989**	**100%**	**5,026,546**	**100%**

Figure 3. Vegetation Cover Distribution



Each of the three FSA is dominated by conifer cover type. Hardwoods are more accessible in the 30-mile FSA (shown in red in Figure 2 and Figure 3). The 40-mile and 50-mile FSA begin to access agricultural land and increase accessibility to urban wood feedstock (due to proximity to communities).

Forest biomass collection activities are generally restricted to topography that will allow ready access for equipment and crew. Steep topography over 35 percent slope gradient is considered to be the breakoff point for ground-based logging and/or biomass recovery equipment on federally managed lands (US Forest Service and Bureau of Land Management). Private land managers typically utilize ground-based equipment on slopes up to 50 percent, but the cost of operating on sustained slopes above 35 percent are typically quite high and are considered prohibitive. Areas with 35 percent slope or higher are highlighted in Figure 2. Note that most of the landscape with 35 percent plus slope gradient is concentrated in riparian areas that are typically considered critical habitat and are not usually targeted for fuels treatment activities. Table 2 summarizes the results of the slope gradient analysis within the forested landscape across the FSA.

Table 2. Slope Assessment for Forested Land Cover Types

FOREST COVER TYPE	30-MILE FSA		40-MILE FSA		50-MILE FSA	
	≤ 35% SLOPE	> 35% SLOPE	≤ 35% SLOPE	> 35% SLOPE	≤ 35% SLOPE	> 35% SLOPE
Conifer	79.0%	21.0%	78.1%	21.9%	75.0%	25.0%
Hardwood	62.5%	37.5%	61.2%	38.8%	56.6%	43.4%
WEIGHTED AVERAGE	**76.8%**	**23.2%**	**76.3%**	**23.7%**	**73.0%**	**27.0%**

As shown in Table 2, slope gradient does limit accessible forestland, as 23 to 27 percent of the forestland within the FSA is affected by slope. Notably, hardwood forest types are more affected, averaging 37 to 43 percent of the total hardwood forestland, compared to conifer forest type where steep slope represents only 21 to 25 percent of the total conifer forestland.

Land Ownership and Jurisdiction

Within the forested portions of the FSA, land ownership drives vegetation management objectives. Figure 4 highlights the locations of the various ownerships and jurisdictions.

Figure 4. Land Ownership and Jurisdiction within the FSA

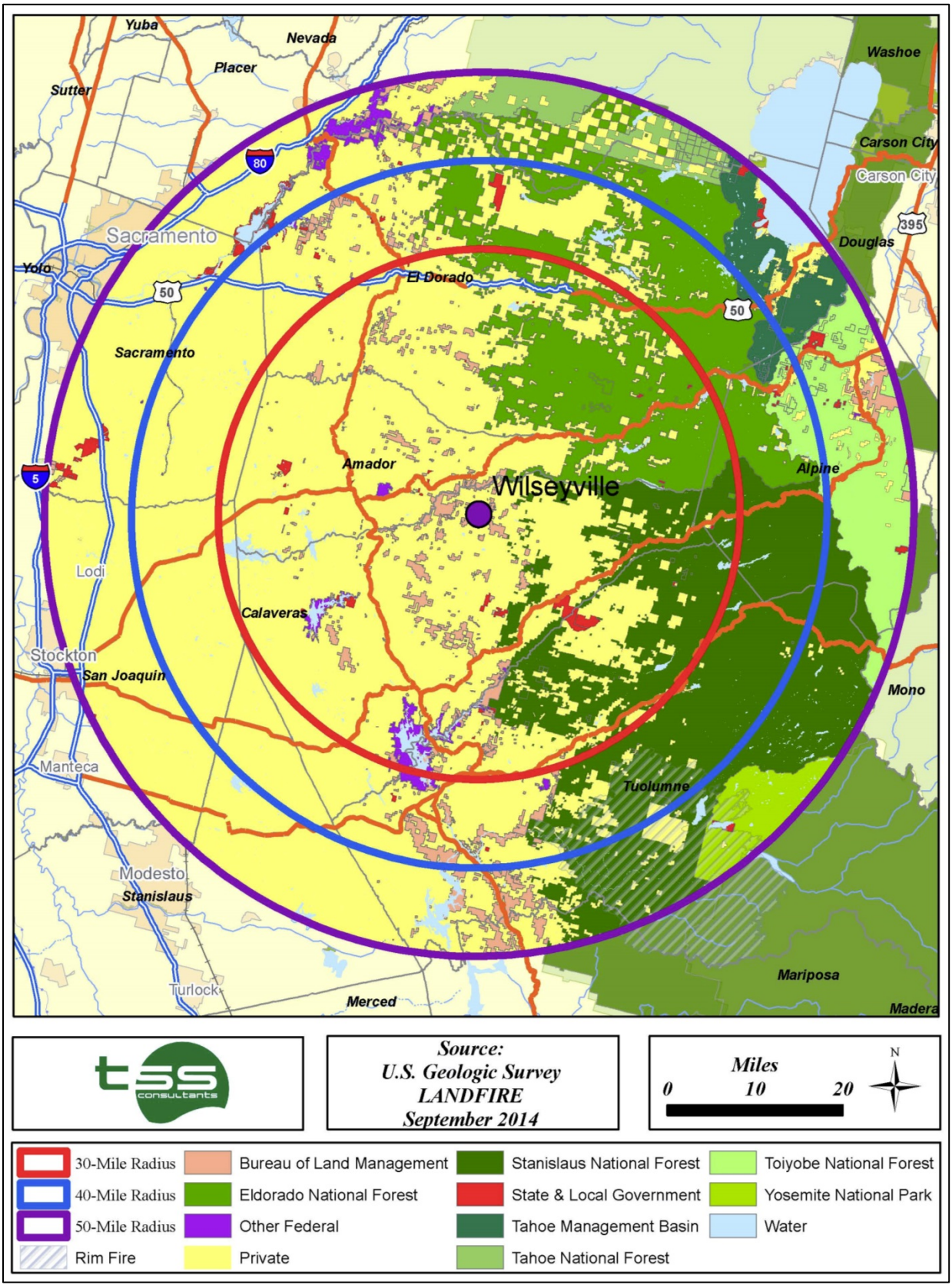
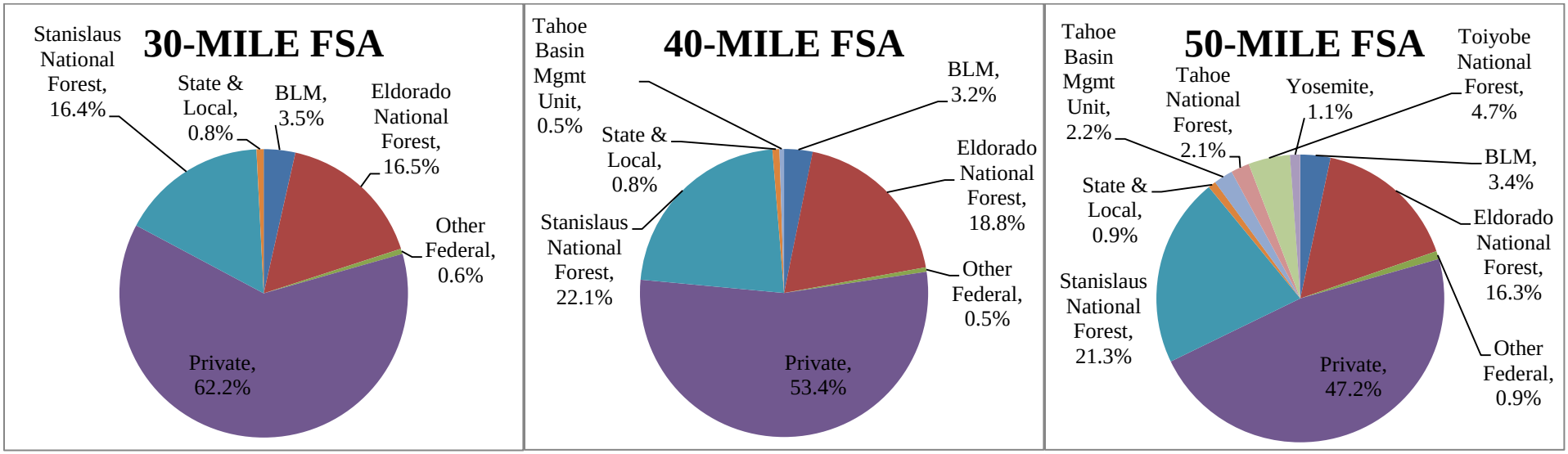


Table 3 and Figure 5 summarize land ownership and jurisdiction within the forested areas of the FSA.

Table 3. Land Ownership and Jurisdiction of Forested Acres within the FSA

OWNERSHIP	30-MILE FSA			40-MILE FSA			50-MILE FSA		
	CONIFER (ACRES)	HARDWOOD (ACRES)	PERCENT OF TOTAL FOREST ACREAGE	CONIFER (ACRES)	HARDWOOD (ACRES)	PERCENT OF TOTAL FOREST ACREAGE	CONIFER (ACRES)	HARDWOOD (ACRES)	PERCENT OF TOTAL FOREST ACREAGE
BLM	34,241	10,786	3.5%	49,731	13,222	3.2%	73,961	17,201	3.4%
Eldorado National Forest	200,169	9,804	16.5%	358,734	14,050	18.8%	421,269	17,419	16.3%
Other Federal	5,780	1,715	0.6%	7,590	2,311	0.5%	19,036	5,165	0.9%
Private	677,172	115,834	62.2%	912,558	146,791	53.4%	1,099,699	170,551	47.2%
Stanislaus National Forest	189,763	19,498	16.4%	405,343	32,121	22.1%	515,398	57,321	21.3%
State and Local	8,876	1,358	0.8%	13,800	1,664	0.8%	20,493	2,943	0.9%
Tahoe Basin Management Unit	0	0	0.0%	10,061	3	0.5%	57,981	176	2.2%
Tahoe National Forest	0	0	0.0%	0	0	0.0%	51,478	4,376	2.1%
Toiyobe National Forest	0	0	0.0%	14,877	4	0.8%	125,050	1,046	4.7%
Yosemite National Park	0	0	0.0%	0	0	0.0%	24,800	5,968	1.1%
TOTALS	**1,116,001**	**158,995**	**100%**	**1,772,694**	**210,166**	**100%**	**2,409,165**	**282,166**	**100%**

Figure 5. Land Ownership and Jurisdiction Distribution



For each of the FSA, private lands, the Stanislaus National Forest, and the Eldorado National Forest represent the largest land management jurisdictions tributary to Wilseyville. As the FSA radii increase, the proportion of forestland under private ownership decreases and the FSA begin to include the Tahoe National Forest, Lake Tahoe Basin Management Unit, and Toiyobe National Forest. Private land management activities located tributary to Wilseyville are clearly the most significant feedstock sourcing opportunity, followed by federal land management agencies, primarily US Forest Service (USFS) and the Bureau of Land Management (BLM).

Due to recent large-scale wildfires such as the 2013 Rim Fire, 2013 American Fire and the 2014 King Fire, there are limited opportunities to expand the FSA radii past 50 miles. In addition, the Mokelumne Wilderness area and Yosemite National Park severely limit FSA expansion opportunities to the east and southeast of Wilseyville.

Forest-Sourced Biomass

Timber Harvest Residuals

Timber harvest residuals can provide significant volumes of woody biomass material. Typically available as limbs, tops and unmerchantable logs,[4] these residuals are byproducts of commercial timber harvest operations. As such, these residuals have very limited market value though they can be a relatively economic raw material feedstock source for bioenergy production.[5] Once collected and processed using portable chippers or grinders, this material is an excellent biomass feedstock.

Timber harvest activity within the State of California is monitored by the State Board of Equalization (BOE). The BOE levies timber harvest taxes based on annual timber harvest levels. A review of the 2009 through 2013 BOE timber harvest data was conducted to confirm historic timber harvest activities within the FSA. BOE data is provided separately for commercial timber harvests on both private and public lands. Table 4 and Table 5 provide results for private timber harvests, expressed in thousand board feet (MBF)[6] per year.

[4] Unmerchantable logs are typically too small or defective (diseased or dead) for manufacturing into lumber.
[5] Biomass power plants such as Buena Vista Biomass Power, Pacific Ultrapower Chinese Station, and SPI Standard are currently procuring forest feedstock from the FSA.
[6] MBF = thousand board foot measure. One board foot is nominally 12" long by 12" wide and 1" thick.

Table 4. 2009 through 2013 Timber Harvest Volume Estimates for Private Sawtimber by County

COUNTY	2009 (MBF/YR)	2010 (MBF/YR)	2011 (MBF/YR)	2012 (MBF/YR)	2013 (MBF/YR)	AVERAGE (MBF/YR)
Alpine	28	0	0	0	0	6
Amador	5,927	7,718	8,183	9,609	12,987	8,885
Calaveras	16,162	19,285	32,315	36,420	33,356	27,508
El Dorado	20,108	15,588	34,518	36,847	57,451	32,902
Mariposa	2,229	1,534	4,344	3,031	5,080	3,244
Mono	0	0	0	0	0	0
Placer	9,317	33,699	18,542	11,754	33,542	21,371
Sacramento	0	0	0	0	0	0
San Joaquin	0	0	0	0	0	0
Stanislaus	0	0	0	0	0	0
Tuolumne	19,530	11,798	38,069	28,323	63,601	32,264
TOTALS	**73,301**	**89,622**	**135,971**	**125,984**	**206,017**	**126,179**

Table 5. Private Timber Harvest Volume Estimates by County within the FSA

	30-MILE FSA		40-MILE FSA		50-MILE FSA	
COUNTY	PERCENT IN FSA	WEIGHTED AVERAGE (MBF/YR)	PERCENT IN FSA	WEIGHTED AVERAGE (MBF/YR)	PERCENT IN FSA	WEIGHTED AVERAGE (MBF/YR)
Alpine	6.5%	0	40.7%	2	86.5%	5
Amador	98.9%	8,784	100.0%	8,885	100.0%	8,885
Calaveras	91.9%	25,282	100.0%	27,508	100.0%	27,508
El Dorado	40.6%	13,351	76.4%	25,134	98.2%	32,298
Mariposa	0.0%	0	0.0%	0	4.9%	159
Mono	0.0%	0	0.0%	0	0.4%	0
Placer	0.0%	0	1.0%	212	30.1%	6,435
Sacramento	4.1%	0	31.6%	0	67.6%	0
San Joaquin	2.1%	0	18.5%	0	45.1%	0
Stanislaus	0.0%	0	7.5%	0	22.6%	0
Tuolumne	19.6%	6,339	45.6%	14,714	73.0%	23,560
TOTALS		**53,757**		**76,454**		**98,849**

Table 6 and Table 7 provide results for public timber harvests, expressed in MBF per year.

Table 6. 2009 Through 2013 Timber Harvest Volume Estimates for Public Sawtimber by County

COUNTY	2009 (MBF/YR)	2010 (MBF/YR)	2011 (MBF/YR)	2012 (MBF/YR)	2013 (MBF/YR)	AVERAGE (MBF/YR)
Alpine	0	2,164	0	0	0	433
Amador	0	0	1,796	985	198	596
Calaveras	0	6,394	1,346	3,038	2,900	2,736
El Dorado	73	4,244	5,949	11,700	11,767	6,747
Mariposa	0	3,579	219	0	0	760
Mono	13		30	2,349	444	709
Placer	1,775	8,372	10,161	9,197	25,720	11,045
Sacramento	0	0	0	0	0	0
San Joaquin	0	0	0	0	0	0
Stanislaus	0	0	0	0	0	0
Tuolumne	7,445	11,798	6,095	7,036	16,906	9,856
TOTALS	**9,306**	**36,551**	**25,596**	**34,305**	**57,935**	**32,880**

Table 7. Public Timber Harvest Volume Estimates by County within the FSA

	30-MILE FSA		40-MILE FSA		50-MILE FSA	
COUNTIES	PERCENT IN FSA	WEIGHTED AVERAGE (MBF/YR)	PERCENT IN FSA	WEIGHTED AVERAGE (MBF/YR)	PERCENT IN FSA	WEIGHTED AVERAGE (MBF/YR)
Alpine	6.5%	28	40.7%	176	86.5%	375
Amador	98.9%	589	100.0%	596	100.0%	596
Calaveras	91.9%	2,514	100.0%	2,736	100.0%	2,736
El Dorado	40.6%	2,738	76.4%	5,154	98.2%	6,623
Mariposa	0.0%	0	0.0%	0	4.9%	37
Mono	0.0%	0	0.0%	0	0.4%	3
Placer	0.0%	0	1.0%	109	30.1%	3,326
Sacramento	4.1%	0	31.6%	0	67.6%	0
San Joaquin	2.1%	0	18.5%	0	45.1%	0
Stanislaus	0.0%	0	7.5%	0	22.6%	0
Tuolumne	19.6%	1,937	45.6%	4,495	73.0%	7,197
TOTALS		**7,806**		**13,265**		**20,892**

The FSA is comprised of portions of up to eleven counties and using GIS analysis, TSS was able to determine the portion of each county that lies within the FSA (as shown in Table 5 and Table 7). Using this data, a weighted average timber harvest figure was calculated for each county. The 2009 through 2013 historic record of private and public timber harvest across all counties results in a weighted average annual harvest of 61,563 MBF within the 30-mile FSA, 89,719 MBF within the 40-mile FSA, and 119,741 MBF within the 50-mile FSA.

Results of historic timber harvest data analysis confirm that total harvest levels within the FSA have been inconsistent over time, ranging from 52% below average harvest in 2009 to a high of 166% above average harvest in 2013. A primary driver is the demand for sawlogs, which was significantly diminished in 2009 and 2010 due to a general downturn in the economy which impacted housing starts and concomitantly, the demand for lumber products and sawlogs. 2013 harvest levels suggest that demand for sawlogs has rebounded.

TSS's experience with forest biomass recovery confirms that a recovery factor of 0.9 bone dry ton (BDT)[7] per MBF of sawlogs harvested would apply for commercial timber harvests in mixed conifer stands within the FSA. This amounts to a gross potential availability of 55,407 BDT per year of timber harvest residuals as feedstock from the 30-mile FSA, 80,747 BDT per year from the 40-mile FSA, and 107,767 BDT per year from the 50-mile FSA.

Not all road systems will accommodate biomass recovery operations. Slope gradient has a significant impact on forest road layout. Slope analysis (see Table 2) confirms that between 23 and 27 percent of the forestland in the FSA is over 35 percent slope gradient. Based on the timber harvest residual analysis conducted by TSS for CHIPS in 2012 (as part of the feasibility study completed in 2012) and for the purposes of this feedstock analysis, it is assumed that 70 percent of the timber harvest operations is located on road systems that will support biomass feedstock transport using conventional chip vans.

In addition to road systems, the other technical availability screens are compliance with ACCG screens and compliance with Senate Bill 1122. See Appendix A for the ACCG biomass feedstock screens.

SB 1122 clearly designates CAL FIRE as the lead agency to determine forest feedstocks that qualify as byproducts of sustainable forest management. Appendix B includes the full text of SB 1122. CAL FIRE convened a series of workshops during the fall of 2013 and developed suggested guidelines to meet the intent of SB 1122. In December 2014, the full California Public Utilities Commission (CPUC) accepted the SB 1122 implementation decision which included the CAL FIRE sustainability guidelines. See Appendix C for the SB 1122 forest feedstock sustainability guidelines.

Forest biomass that qualifies as feedstock consistent with SB 1122 must be sourced as one of four forest sources:

- Fire Threat Reduction
    - Consistent with Fire Plan approved by CAL FIRE
    - Consistent with fuels treatment activities on federal lands
- Fire Safe Clearance Activities
    - Near homes, businesses, consistent with state Public Resources Code sections requiring defensible space clearance
    - Also applies to 150' Fuel Reduction Exemption
- Infrastructure Clearance Projects
    - Power lines, substations, roads, railways, switchyards

[7] Bone dry ton equals 2,000 dry pounds (no moisture content).

- Other Sustainable Forest Management
    - Must meet at least 12 of 16 items that address:
        - Habitat, temporal, and spatial diversity objectives
        - Habitat elements
        - Forest health and fire management objectives
        - Air and water quality protection
        - Societal and economic benefits

During the February 18, 2015 meeting of the ACCG, discussion regarding acceptable feedstocks included a review of the SB 1122 sustainability guidelines. The consensus of the ACCG members in attendance was that if forest feedstocks met the compliance standards of the SB 1122 guidelines (as developed by CAL FIRE and accepted by the CPUC), then the feedstocks would be considered as acceptable by the ACCG.

As noted above, the SB 1122 guidelines suggest that forest biomass material sourced from sustainable forest management activities must meet at least 12 of 16 eligibility criteria listed (Section II of the guidelines). Much of the private land management activities in the FSA is carried out using even-age management prescriptions. It is not clear if even-age management will meet 12 of the eligibility criteria. TSS contacted CAL FIRE representatives[8] to discuss how the agency plans to interpret and implement the sustainability guidelines. CAL FIRE staff[9] confirmed that the Energy Division staff at the CPUC are tasked (as a result of the SB 1122 Implementation Decision) with implementing third-party verification and monitoring of feedstock sources and will likely do so within the next 12 months.

In the meantime, TSS will assess timber harvest residual feedstock availability using two methodologies: with and without byproducts of even-age forest management activities.

The SB 1122 guidelines require that at least 80 percent of the forest feedstock meet the sustainability criteria. The remaining 20 percent of the feedstock can be made up of byproducts from even-age management activities, agricultural operations and/or urban wood waste (no treated or painted wood). TSS recommends that due to the more cost-effective nature (as noted in Table 20) and wintertime availability of agricultural byproducts and urban wood waste, the 20 percent feedstock blend not include material sourced from even-age forest management activities (even though this is currently allowed by SB 1122 guidelines).

Interviews with foresters managing private forestlands[10] within the FSA confirmed that about 80 percent of the commercial timber harvested is from even-age management activities. Interviews with foresters managing public lands confirmed that no even-age management activities occur on publicly managed forests within the FSA.

Forest biomass feedstock considered technically available has been screened for topography (slope gradient) and road systems that allow biomass transport and for SB 1122 guidelines

[8] Gary Whitson, Forest Practice Inspector, CAL FIRE, Kim Carr, Assistant Deputy Director, CAL FIRE, Duane Shintaku, Deputy Director, CAL FIRE.
[9] Kim Carr, Assistant Deputy Director CAL FIRE.
[10] Tim Tate, Sierra Pacific Industries, Steve Cannon, Consulting Forester.

assuming even-age management is compliant, and with even-age management considered non-compliant.

Table 8 shows the timber harvest residuals considered technically available on an annual basis with even-age management considered SB 1122 compliant.

Table 8. Total Timber Harvest Residual Technically Available within the FSA Assuming Even-Age Management Meets SB 1122 Guidelines

COUNTIES	30-MILE FSA		40-MILE FSA		50-MILE FSA	
	PRIVATE (BDT/YR)	PUBLIC (BDT/YR)	PRIVATE (BDT/YR)	PUBLIC (BDT/YR)	PRIVATE (BDT/YR)	PUBLIC (BDT/YR)
Alpine	0	18	1	111	3	236
Amador	5,534	371	5,597	375	5,597	375
Calaveras	15,928	1,584	17,330	1,723	17,330	1,723
El Dorado	8,411	1,725	15,835	3,247	20,348	4,172
Mariposa	0	0	0	0	100	23
Mono	0	0	0	0	0	2
Placer	0	0	133	69	4,054	2,095
Sacramento	0	0	0	0	0	0
San Joaquin	0	0	0	0	0	0
Stanislaus	0	0	0	0	0	0
Tuolumne	3,994	1,220	9,270	2,832	14,843	4,534
SUBTOTALS	**29,873**	**3,698**	**38,896**	**5,525**	**47,432**	**8,628**
TOTALS	**33,571**		**44,422**		**56,060**	

Table 9 shows the timber harvest residuals considered technically available on an annual basis with even-age management considered non-compliant with SB 1122 criteria.

Table 9. Total Timber Harvest Residual Technically Available within the FSA Assuming Even-Age Management does not Meet SB 1122 Guidelines

COUNTIES	30-MILE FSA		40-MILE FSA		50-MILE FSA	
	PRIVATE (BDT/YR)	PUBLIC (BDT/YR)	PRIVATE (BDT/YR)	PUBLIC (BDT/YR)	PRIVATE (BDT/YR)	PUBLIC (BDT/YR)
Alpine	0	18	0	111	1	236
Amador	1,107	371	1,119	375	1,119	375
Calaveras	3,186	1,584	3,466	1,723	3,466	1,723
El Dorado	1,682	1,725	3,167	3,247	4,070	4,172
Mariposa	0	0	0	0	20	23
Mono	0	0	0	0	0	2
Placer	0	0	27	69	811	2,095
Sacramento	0	0	0	0	0	0
San Joaquin	0	0	0	0	0	0
Stanislaus	0	0	0	0	0	0
Tuolumne	799	1,220	1,854	2,832	2,969	4,534
SUBTOTALS	**5,975**	**3,698**	**7,779**	**5,525**	**9,486**	**8,628**
TOTALS	**9,672**		**13,305**		**18,114**	
REDUCTION COMPARED TO EVEN-AGE	**71%**		**70%**		**68%**	

Table 9 confirms that there is a significant reduction in timber harvest residuals across the FSA if even-age forest management sourced feedstocks are deemed to be non-compliant with SB 1122 guidelines. Sourcing of feedstocks will need to expand well into the 50-mile FSA in this scenario, adding significant transport expense.

Timber harvest residual availability will fluctuate based on sawlog demand and landownership management goals and objectives. As Table 4 and Table 6 confirm, sawlog harvest can and will vary annually and by county.

Of the 11 counties analyzed, only four are likely to provide significant volumes of timber harvest residuals; Amador, Calaveras, El Dorado and Tuolumne. Private timber harvest activities represent 85 to 89 percent of the timber harvest residual availability across the FSA (without taking into account the SB 1122 guideline as a screen). Clearly, private landowners will be a major source of forest feedstock availability.

Fuels Treatment/Plantation Thinning/Utility Line Clearance

Calaveras County is home to numerous communities with residential neighborhoods situated within the wildland urban interface (WUI). Due to high fire danger conditions within the WUI, there are concerted efforts across all forest ownerships to proactively reduce hazardous forest fuels in support of defensible communities. In addition, forest landowners are conducting pre-commercial thinning activities within plantations in order to achieve fuels treatment and stocking

control (reduce the number of trees per acre as plantations age over time and tree size increases). Utility line clearance activities are also a potential source of forest feedstock.

Discussions with the Eldorado National Forest,[11] Stanislaus National Forest,[12] Fire Safe Councils,[13] Natural Resource Conservation Service,[14] Pacific Gas and Electric (PG&E)[15] and foresters[16] managing private lands provided data on fuels treatment, plantation thinning, and utility line clearance projects and confirmed plans for future treatments. Summarized in Table 10 are the results of those interviews.

Table 10. Forest Fuels Treatment Activities Planned Across all FSA

SOURCE	FOREST TREATMENT ACTIVITIES	
	LOW RANGE (ACRES/YR)	HIGH RANGE (ACRES/YR)
Fire Safe Councils	50	300
Private Landowners	300	400
BLM	100	300
Eldorado NF[17]	1,200	2,000
Stanislaus NF[18]	1,500	2,400
Utility Line Clearance	100	200
CHIPS	100	150
TOTALS	**3,350**	**5,750**

Due to very limited value-added markets for woody biomass material generated as a byproduct of forest fuels treatment activities, most of the fuels treatment operations are processing (mastication or chipping) excess forest biomass and leaving it on site or piling and burning as primary disposal techniques. Discussions with project coordinators and foresters indicated that if a ready market for biomass material existed, with values high enough to cover most of the collection, processing and transport costs, significant biomass volume would be diverted away from current business-as-usual activities (e.g., mastication, chip, lop and scatter, pile and burn).

In addition to fuels treatment and plantation thinning within the FSA, PG&E conducts power distribution and transmission line clearance activities. Discussions with PG&E vegetation management staff[19] confirmed that power distribution and transmission line clearance in support of hazard tree trimming and removal is conducted regularly within the FSA. Based on operations over the last five years, approximately 1,250 to 2,500 BDT per year of forest biomass residuals are generated along utility line corridors across all of the FSA.

[11] Bob Broderick, Forester, Amador and Placerville RD.
[12] Kevin Zeman, Forester, Calaveras RD, Dave Horak, TMO, Stanislaus NF.
[13] Kathy Koos Breazeal, Executive Director, Amador Fire Safe Council.
[14] Matt McNicol, Forester, Natural Resources Conservation Service.
[15] Rand Smith, Supervisor, Program Manager, Vegetation Management, PG&E.
[16] Steve Andrews, Forester, Applied Forest Management, Tim Tate, District Manager, Sierra Pacific Industries.
[17] Placerville and Amador RDs (source - Bob Broderick).
[18] Calaveras, Miwok and Groveland RDs (sourced – Kevin Zeman and Dave Horak).
[19] Kevin Buteau, Vegetation Management Transmission, Richard Yarnell, Vegetation Management Program Manager, PG&E.

Interviews with forest managers and fiber procurement foresters confirmed that between 10 and 15 BDT per acre of biomass are considered recoverable during fuels treatment and plantation thinning activities. Assuming an average recovery factor of 12.5 BDT per acre and using the acreage figures as provided in Table 10, between 41,875 BDT (low range acreage treated) and 71,875 BDT (high range acreage treated) are potentially available per year.

Fuels treatment activities and power line maintenance operations are spread across all of the FSA and cannot be reliably forecasted in any one of the FSA. TSS assumes that an average of 56,875 BDT per year of fuels treatment byproducts are potentially available as feedstock. Applying the 70% factor for forest roads that will accommodate chip removal and steep slopes, results in a technically available figure of 39,812 BDT per year.

Potential Forest Feedstocks

Episodic events such as wildfire and insect infestations can have a significant impact on forest health and the volume of byproducts available during restoration activities. Events such as the 2013 Rim Fire, 2013 American Fire and 2014 King Fire will generate significant quantities of non-merchantable material that could be utilized as forest feedstock. Feedstocks available as byproducts of forest restoration activities meet both the ACCG availability screens and the SB 1122 guidelines. Because wildfire and insect infestations are not predictable, they are not included in this feedstock assessment and are considered potential forest feedstocks.

Findings

Summarized in Table 11 are findings regarding forest-sourced feedstock availability across the FSA. TSS allocated fuels treatment activity feedstock proportionately across the FSA based on approximate location of projects (clearly a rough estimate).

Table 11. Forest-Sourced Biomass Feedstock Technically Available within the FSA Assuming Even-Age Management does not meet SB 1122 Guidelines

SOURCE	30-MILE RADIUS (BDT/YR)	40-MILE RADIUS (BDT/YR)	50-MILE RADIUS (BDT/YR)
Timber Harvest Residuals	9,672	13,305	18,114
Forest Fuels Treatments	23,887	31,850	39,812
TOTALS	**33,559**	**45,155**	**57,926**

Urban-Sourced Biomass

Construction and Demolition Wood

Wood waste generated by local residents, businesses, and tree service companies (not including utility line work) within the FSA regularly generate wood waste in the form of construction debris, demolition wood, industrial byproducts (e.g., wood pallets) and tree trimmings. Based on TSS's experience with urban wood waste generation, approximately 11.5 pounds per capita of waste are generated daily with 10.5 percent of the solid waste stream made up of wood waste.

Urban wood feedstock is assumed to have a 20 percent moisture content factor.[20] Of the total gross volume of urban wood feedstock, about 65 percent is recoverable as clean[21] wood waste. Table 12 identifies clean urban wood waste considered technically available across all three FSA.

Tree Trimming Material

Working from previous studies performed by TSS, it is estimated that approximately 100 dry pounds of tree trimmings (not including utility line clearance) suitable for feedstock are generated annually per capita. TSS assumes approximately 65 percent of this wood waste is actually recoverable[22] as biomass feedstock. Table 12 identifies urban-sourced biomass feedstock (including tree trimming material) considered technically available across all of the FSA.

Table 12. Urban-Sourced Biomass Feedstock Technically Available within the FSA

SOURCE	30-MILE RADIUS (BDT/YR)	40-MILE RADIUS (BDT/YR)	50-MILE RADIUS (BDT/YR)
Construction and Demolition	27,011	100,902	210,385
Tree Trimming	7,661	28,617	8,950
TOTALS	**34,671**	**129,519**	**219,335**

Agriculture-Sourced Biomass

As noted in the vegetation cover analysis (see Table 1), only a relatively small percentage of each FSA (0.3%, 2.8%, 7.5%, respectively) includes land dedicated to commercial agriculture. Many of these acres are committed to raising commercial crops that produce significant volumes of wood waste from orchard removal activities and annual pruning practices. Table 13 summarizes commercial orchard acreage currently in production[23] within the FSA.

Table 13. Commercial Orchard Acreage by Crop within the FSA

COVER CATEGORIES	30-MILE FSA		40-MILE FSA		50-MILE FSA	
	ACRES	PERCENT OF TOTAL	ACRES	PERCENT OF TOTAL	ACRES	PERCENT OF TOTAL
Almonds	72	16.0%	1,642	8.0%	37,987	33.0%
Cherries	28	6.2%	1,927	9.4%	14,460	12.6%
Olives	9	2.0%	530	2.6%	1,696	1.5%
Other Tree Crops	7	1.6%	791	3.9%	2,702	2.3%
Walnuts	335	74.3%	15,633	76.2%	58,327	50.6%
TOTALS	**451**	**100%**	**20,523**	**100%**	**115,172**	**100%**

[20] From TSS experience procuring urban wood waste feedstocks.
[21] Clean wood waste is woody debris that is free of paint, resins, pesticides or chemical treatment.
[22] From TSS experience procuring urban wood waste feedstocks.
[23] Data courtesy of National Agricultural Statistic Service.

Clearly, nut orchards (almond and walnut) are the most significant woody crop across all the FSA.

Woody crops are removed on a rotational basis that varies by crop. TSS, in collaboration with U.C. Davis Agricultural Extension and local orchard removal contractors, has identified replacement intervals and biomass recovery rates for major tree crops within the FSA (Table 14). Crop replacement intervals help provide an assessment of expected biomass material availability assuming constant annual acreage planted.

Table 14. Commercial Crop Replacement Interval and Biomass Recovery Rates

CROP	REPLACEMENT INTERVAL (YEARS)	BIOMASS RECOVERY RATE (BDT/ACRE)	AVERAGE RECOVERY RATE (BDT/ACRE-YEAR)
Almond	28	28.5	1.02
Cherries	20	12.7	0.64
Olives	500	26.0	0.05
Walnut	30	28	0.93

Using the replacement interval and biomass recovery rates identified in Table 14, TSS calculated gross availability of agriculture-sourced feedstock within the FSA. To be conservative, TSS did not include the potential biomass from:

- Other Tree Crop acreage (as listed in the National Agricultural Statistic Service database.
- Grape vines, as grape vines removed are contaminated with trellis wire and metal stakes that are impractical to extricate.
- Orchard prunings, as these are currently shredded and distributed in the orchards.

Table 15 provides an overview of technically available orchard material.

Table 15. Agriculture-Sourced Biomass Feedstock Technically Available within the FSA

SOURCE	30-MILE RADIUS (BDT/YR)	40-MILE RADIUS (BDT/YR)	50-MILE RADIUS (BDT/YR)
Almond	73	1,671	38,665
Cherry	18	1,224	9,182
Olive	0	28	88
Walnut	313	14,591	54,439
TOTALS	**404**	**17,513**	**102,374**

Biomass Feedstock Competition Analysis

Current Competition

Currently there are very limited markets for forest biomass material generated within the FSA. Existing biomass power generation facilities procuring biomass feedstock in the region that may occasionally source feedstock from the FSA are summarized in Table 16.

Table 16. Facilities Currently Sourcing Biomass Feedstock from the FSA

FACILITY	SCALE (MW)	ANNUAL FEEDSTOCK USAGE (BDT/YEAR)	LOCATION	HAUL DISTANCE FROM WILSEYVILLE (MILES)[24]
Buena Vista Biomass Power	18	145,000	Buena Vista	34
Pacific Ultrapower Chinese Station	20	160,000	Jamestown	50
Sierra Pacific Standard	8	65,000	Standard	57
DTE Stockton	45	380,000	Stockton	61
Rio Bravo Rocklin	25	200,000	Rocklin	70
Sierra Pacific Lincoln	18	145,000	Lincoln	80
TOTALS	**134**	**1,095,000**		

Interviews with fuel procurement managers in the region confirmed that very little forest biomass feedstock is currently sourced from the FSA. Only Buena Vista Biomass Power and Pacific Ultrapower Chinese Station procure forest feedstocks that are considered tributary to Wilseyville. In addition, the Buena Vista Biomass Power facility is constrained in its ability to procure forest biomass feedstock due to its commitment with the Center for Biological Diversity to source no more than 15 percent of its total feedstock needs (averaged over a three-year period) from forest operations.[25]

TSS estimates that between 17,000 and 22,000 BDT of forest-sourced feedstock may be procured annually from within the FSA as feedstock for existing biomass power plants. Note that none of these existing facilities are held to the SB 1122 forest feedstock guidelines. There will likely be minimal competitive impacts on forest feedstock volume considered economically available for a project at Wilseyville because existing biomass power plants have ready access to all forest biomass (are not subject to SB 1122 screens) generated within the FSA.

Urban and agriculture feedstocks are also utilized by existing biomass power plants and other enterprises as landscape cover, soil amendment, alternative daily cover, and firewood. As part of the economically available screens, TSS assumed that 25 percent of the tree trimmings and 30 percent of the construction/demolition wood (for more details see discussion in the Urban-Sourced Biomass section) is available after adjustment for existing competition. For agriculture-sourced feedstock, TSS assumed that 20 percent of the orchard removal material (for more details see discussion in the Agriculture-Sourced Biomass section) is available after adjustment for existing competition.

Potential Competition

There are two proposed community-scale bioenergy facilities that may compete for forest feedstock with the Wilseyville facility. Table 17 identifies these potential bioenergy facilities.

[24] Distance figures were derived using Mapquest driving directions.
[25] Per discussions with John Romena, Biomass Procurement Manager, Buena Vista Biomass Power.

Table 17. Facilities Potentially Competing for Feedstock

FACILITY	LOCATION	SCALE (MW)	HAUL DISTANCE FROM GRASS VALLEY (MILES)
Foresthill	Foresthill	1-2	91
Grass Valley	Grass Valley	2-3	101

At this time, it is too early to predict if the potential bioenergy facilities might compete with a bioenergy project at Wilseyville. Both facilities are located some distance (90+ miles) from Wilseyville. Due to significant feedstock transport distances (and costs), TSS assumes that feedstock competition from these facilities will be minimal.

Findings

Table 18 summarizes the feedstock by source that is technically available within the FSA.

Table 18. Biomass Feedstock Technically Available within the FSA

SOURCE	30-MILE RADIUS (BDT/YR)	40-MILE RADIUS (BDT/YR)	50-MILE RADIUS (BDT/YR)
Forest	33,559	45,155	57,926
Urban	7,902	29,518	53,939
Agricultural	404	17,513	102,374
TOTALS	**41,865**	**92,186**	**214,239**

In order to calculate the economically available feedstock volumes, TSS estimated current demand from existing biomass power plants and competing uses (firewood, landscape cover, animal bedding) by FSA. The Wilseyville bioenergy facility will be able to compete more cost effectively for feedstocks located close in to the facility (30-mile and 40-mile FSA) due to haul cost advantages. Table 19 summarizes economically available volumes by feedstock source and by FSA.

Table 19. Biomass Feedstock Economically Available within the FSA

SOURCE	30-MILE RADIUS (BDT/YR)	40-MILE RADIUS (BDT/YR)	50-MILE RADIUS (BDT/YR)
Forest	30,203	38,382	49,237
Urban	6,322	11,807	10,788
Agricultural	323	8,757	20,475
TOTALS	**36,848**	**58,946**	**80,500**

SB 1122-compliant forest feedstock considered economically available totals 49,237 BDT per year. Assuming the community-scale bioenergy facility is scaled at 3 MW (the maximum scale allowed by SB 1122) and utilizes 24,000 BDT per year of forest feedstock, there is a feedstock

coverage ratio of 2.05:1. The private financial sector typically requires a feedstock coverage ratio of at least 2:1 as a critical feedstock availability screen for bioenergy project financing.

The CPUC requires that 80% (19,200 BDT per year) of the feedstock blend be forest feedstocks (meeting sustainability guidelines). Forest feedstocks are typically the most expensive of the three feedstock sources so it is very likely that the remaining 20% (4,800 BDT per year) of the feedstock blend will be made up of more cost effective urban and agricultural feedstocks. If urban and agriculture sourced feedstocks are included in the calculation (80,500 BDT available), then feedstock coverage ratios are as follows:

- Forest feedstock coverage ratio of 2.56:1
- Urban and agricultural feedstock coverage ratio of 6.51:1

FEEDSTOCK COST ANALYSIS

Existing Market Prices

As noted earlier in this report, there are several existing biomass power plants operating in the region (see Table 16). Existing market prices paid by these facilities are summarized in Table 20.

Table 20. Current Biomass Feedstock Market Prices

FEEDSTOCK SOURCE	DELIVERED PRICES TO EXISTING BIOMASS POWER PLANTS	
	LOW RANGE ($/BDT)	HIGH RANGE ($/BDT)
Forest	$38	$45
Urban	$24	$30
Agriculture[26]	$32	$42

Costs to Collect, Process and Transport Biomass Feedstocks

Commercial-scale infrastructure to collect, process, and transport biomass material currently exists within the TSA. TSS relied on interviews with local contractors in addition to TSS's past experience to analyze these costs. Table 21 provides results of the cost analysis.

Table 21. Biomass Collection, Processing and Transport Costs and Market Prices

BIOMASS MATERIAL SOURCE	DELIVERED MATERIAL	LOW RANGE ($/BDT)	HIGH RANGE ($/BDT)
Timber Harvest Residuals	Chips	$46	$60
Fuels Treatments – USFS/BLM/Private	Chips	$55	$70
Urban	Chips	$24	$30
Agriculture	Chips	$32	$42
Local Homeowners (delivering unprocessed clean wood waste)	Cull logs, Limbs, Construction Debris, Miscellaneous Wood	$10	$15

Assumptions used to calculate the range of feedstock costs:

- No service fees or cost share arrangements are available from public agencies or private landowners.
- One-way transport averages 30 miles for biomass feedstocks. Note that if SB 1122 guidelines confirm timber harvest residuals from even-age management activities are in

[26] Orchard removal material.

compliance, then a 20-mile average haul cost would be more representative. This haul cost savings amounts to about $3.50/BDT.

- Forest biomass is collected and processed (chipped) into the truck at the landing at a cost of $25 to $44/BDT.
- Haul costs are $100/hour for a walking floor chip trailer.
- Local homeowners deliver raw wood (limbs, small trees, clean construction wood) with processing (portable chipper or grinder) costs on site at Wilseyville ranging from $10 to $15/BDT.
- Delivered costs for urban and agriculture feedstocks are based on current biomass feedstock market prices.[27]
- Biomass feedstock deliveries average 14 BDT/load to the Wilseyville yard.

Note that topography, stand density (pre-treatment), stem size, and road systems all have significant impacts on the costs to collect, process, and transport forest feedstocks. Harvest equipment (e.g., feller bunchers and skidders) does not operate as cost effectively on steep topography (e.g., 35 percent-plus slope conditions) as on level topography. Forest stands that are considered dense (removal rates of 14 to 20 BDT per acre) allow harvest equipment to operate efficiently and cost effectively. Forest stands considered less dense (e.g., 8 BDT or less per acre) require more travel time between trees by the feller bunchers and longer distances between biomass bundles for skidders.

As shown in Table 20, the delivered cost of forest feedstock from fuels treatment activities is significant ($55 to $70 per BDT). There is potential for cost-share funding (federal and state) from existing programs that are designed to support fuels reduction, forest health improvement, and watershed protection. Programs administered by the USFS, CAL FIRE, and the Natural Resources Conservation Service may provide cost-share funding that reduces the delivered cost of forest feedstocks from fuels treatment activities.

The most cost-effective forest feedstock will be sourced from timber harvest residuals stockpiled at the landing. As a byproduct of commercial timber harvests, this material (limbs, tops) has been harvested and skidded to the landing in conjunction with sawlog harvesting. The current fate of this material is disposal, using open burning as the preferred technique.[28] In addition to being the most cost-effective forest feedstock, utilizing this wood waste as biomass feedstock for bioenergy significantly reduces air emissions[29] when compared to the current pile/burn technique.

Local homeowners generate significant quantities of limbs and small stems consistent with fuels reduction activities near homes. In addition, miscellaneous wood waste (e.g., clean construction wood) is potentially available and could be utilized as feedstock. As noted in the 2012 Feasibility Study for the Wilseyville Product Yard, wood waste currently received at the Wilseyville transfer station could be taken in and utilized at the Wilseyville product yard. TSS recommends that the Wilseyville bioenergy facility consider accepting woody material from both

[27] Consistent with delivered feedstock prices paid by commercial scale biomass power facilities in the region.
[28] Per discussions with local foresters.
[29] Bruce Springsteen, Tom Christofk, Steve Eubanks, Tad Mason, Chris Clavin, and Brett Storey, "Emission Reductions from Woody Biomass Waste for Energy as an Alternative to Open Burning," *Journal of the Air and Waste Management Association*, Volume 61, January 2011, pp. 63-68.

Calaveras and Amador County homeowners and tree service companies. This material can be stockpiled on site, and a mobile chipper or grinder can be utilized from time to time (e.g., every 60 days) to process this material for use as a feedstock.

Delivered Price Forecast

The optimized feedstock blend for the Wilseyville facility is shown in Table 22 and represents an SB 1122-compliant feedstock mix (80% forest, 20% urban/agriculture). Noting that there is more than enough feedstock to sustain a bioenergy facility scaled at 3 MW, TSS assumed an annual feedstock demand of 24,000 BDT.

Table 22. Optimized Feedstock Blend

SOURCE	VOLUME (BDT/YR)	PERCENT OF TOTAL
Forest	19,200	80%
Urban	3,000	13%
Agriculture	1,800	7%
TOTALS	**24,000**	**100%**

Table 23 provides a five-year biomass feedstock cost forecast for a community-scale bioenergy facility at Wilseyville. The five-year forecast commences in 2017, as this would likely be the earliest that a community-scale bioenergy facility at Wilseyville could attain commercial operations. The starting cost of $47.45 per BDT is based on the weighted average of feedstock cost (Table 21) and optimized feedstock blend (Table 22).

Table 23. Five-Year Feedstock Cost Forecast 2017 to 2021

	2017	2018	2019	2020	2021
Delivered Price	$47.45	$49.10	$49.41	$49.84	$50.33

The feedstock cost forecast presented in Table 23 is based on the following assumptions.

- The feedstock supply chain is fully developed with feedstock available from forest-based operations.
- Diesel fuel prices remain under $4 per gallon through 2017, then escalate at no more than 1.5 percent per year.
- Labor rates remain stable through 2017, then climb at no more than 2 percent per year.
- The Chinese Station and Rio Bravo Rocklin facilities curtail operations in 2017 and 2018 (as current power purchase agreements terminate), causing regional urban and agriculture feedstocks to drop slightly in market value.
- Biomass feedstock costs escalate at a 1 percent annual rate due to increased diesel fuel and labor costs from 2017 through 2021.

FEEDSTOCK PROCUREMENT

Feedstock Specifications

Discussions with the project developer (Phoenix Energy) confirmed that the technology of choice (thermal gasification) will require feedstock meeting certain specifications for heating value, moisture content and sizing. In order to assure consistent operations at baseload (24/7), it will be important that feedstock meet or exceed these specifications (see Appendix D).

Feedstock Providers

The primary feedstock utilized at the Wilseyville facility will be forest-sourced material. Guidelines as provided by the CPUC require that at least 80 percent of the feedstock utilized per year be from SB 1122 compliant forest management operations. Due to the relatively undeveloped forest biomass market in the region, there are very few local contractors that are equipped to collect, process and deliver forest biomass feedstock. Interviews with local fuel procurement managers and foresters[30] confirmed the following commercial-scale contractors are operating in the region.

- CTL Forest Management, Placerville
- Mountain Enterprises, Coloma
- Bordges Timber, Shingle Springs

It is anticipated that the local cooperative, Amador Calaveras Cooperative Association for Biomass Utilization (ACCABU), will be actively engaged in providing forest feedstocks to the Wilseyville facility as it enters commercial service in 2017.

Urban-sourced feedstocks will be available from regional transfer stations and local homeowners delivering raw wood to the Wilseyville site. Arrangements with the transfer stations to stockpile wood waste on site for processing several times per year (bring in portable grinders) may be the most cost effective approach. Wood waste material from local homeowners can be stockpiled on site for processing every 60 or 90 days using a portable grinder.

Agricultural feedstocks are available primarily in the fall and winter months from commercial orchard removal contractors in the Central Valley. There are a number of contractors operating within a 50-mile radius of Wilseyville, including:

- G + F Agri Services, Ripon
- Lionudakis Firewood, Modesto
- Louis & Lewis Orchard Removals, Modesto

In addition to orchard removal material, agricultural byproducts such as nut shell, peach pits, and orchard prunings may be available.

[30] John Romena, Buena Vista Biomass Power, Tim Tate, Sierra Pacific Industries, Steve Cannon, Foothill Resource Management.

Feedstock Supply Agreements

TSS has developed feedstock specifications (see Appendix D), a letter of intent, as well as short-term and long-term feedstock purchase and sales agreement templates for use by CHIPS. Please note that these documents serve as templates and should be reviewed by legal counsel and the project developer.

Summarized below is a brief description of feedstock procurement agreements commonly utilized in North America.

Letter of Intent

A non-binding agreement to formally begin discussions regarding feedstock availability and pricing. This is typically the initial agreement, one that brings the parties to the table (see Appendix E).

Binding Letter of Intent

Similar to the letter of intent but with language that "binds" the parties to a commitment for feedstock volume and pricing. This is commonly used by project developers seeking project financing. It demonstrates to the private financial markets that binding commitments for feedstock are available.

Short-Term Purchase and Sales Agreement

Feedstock procurement agreement with a duration of less than one year. Typically used for spot market purchases. Defines delivery schedule, feedstock specifications, volume committed, and pricing. May have defined monetary incentives for delivery of quality feedstock (low ash, high Btu) and/or for pro-rated volumes of feedstock (higher feedstock delivery volumes equal higher delivered prices) (see Appendix F).

Long-Term Purchase and Sales Agreement

Similar to short-term purchase agreement, but the contract term is two plus years in duration. The feedstock pricing may be indexed to account for increases in labor and diesel fuel costs. Typically, the Consumer Price Index and New York Mercantile Exchange diesel price index are utilized if price indexing is considered (see Appendix G).

Seasonal Management Strategy

Discussions with Wilseyville area foresters[31] confirm that the typical season for field operations is April 15 through November 15. A variety of factors impact this, including inclement weather patterns, snow depth, and wet conditions (e.g., concerns regarding potential soil disturbance). Considering the seasonal availability of forest feedstock, there will need to be accommodations on site at the bioenergy facility in order to assure that feedstock is stockpiled for use during winter months when access to forest operations is minimal. TSS recommends that a feedstock procurement strategy be developed that assures feedstock sourcing be concentrated at upper elevation locations during summer months and lower elevation locations in the winter. This will optimize the operating season for feedstock suppliers while mitigating the need to stockpile large volumes of feedstock at the bioenergy facility.

[31] Steve Cannon, Foothill Resource Management, John Heissenbuttel, Heissenbuttel Resource Management, Tim Tate, Sierra Pacific Industries.

Agriculture-sourced feedstock is typically available in the fall and winter months (after nut harvest) and aligns well with feedstock procurement to facilitate wintertime delivery. SB 1122 guidelines allow for up to 20 percent of the annual feedstock volume to be made up of by-products from even-age management activities, agricultural byproducts, or urban wood waste (no treated or painted wood). TSS recommends that most of the 20 percent feedstock considered for the Wilseyville facility be sourced during winter months from urban and agriculture sources. There may be an opportunity to recommend to local residents that tree pruning be conducted during late fall and winter when there are optimal conditions (trees are typically dormant) and the bioenergy facility has room for additional feedstock on site.

Feedstock Supply Risk Management

Feedstock supply availability risk and delivered cost must be addressed in order to assure financially viable operation long term. The private financial sector is very risk averse and will likely ask to review the feedstock procurement plan and all feedstock procurement agreement templates as part of their due diligence. Debt financing is typically contingent on well thought out procurement plan implementation that balances long-term feedstock procurement agreements with short-term feedstock opportunity purchases.

Forest landownership within the 50-mile FSA (see Table 3) is split almost evenly between private and public lands. This is an advantage considering that the private landowners likely have more flexibility to commit to long-term feedstock procurement agreements. Both private and public land managers working in the greater Wilseyville area have expressed an interest in providing forest feedstock, noting that the current disposal method (pile/burn) is quickly becoming a liability (air emissions issues, fire liability issues). Several federal land managers[32] are suggesting that long-term stewardship contracts (e.g., Integrated Resource Service Contract) should be pursued. The ACCG Operations Work Group is currently in discussions with the Eldorado and Stanislaus National Forests and the BLM to pursue a 10-year Stewardship Contract or Stewardship Agreement.

[32] Bill Haigh, BLM, Bob Broderick, Amador Ranger District, Rick Hopson, Amador Ranger District, Dave Horak, Stanislaus National Forest.

CONCLUSIONS

This procurement plan confirms the long-term sustainable availability of significant volumes of forest, urban, and agricultural feedstocks. Over 80,000 BDT per year of SB 1122 compliant feedstocks (see Table 19) are available with feedstock coverage ratios consistently over 2:1 as summarized below.

- Forest feedstock coverage ratio of 2.56:1
- Urban and agricultural feedstock coverage ratio of 6.51:1

While year one (2017) delivered feedstock cost is estimated to be $47.45/BDT, there is opportunity to reduce this cost. US Forest Service and/or BLM service contract fees ($400 to $700/acre) may be available to offset a portion of the cost to harvest, collect and process excess forest biomass. AB 32 Cap and Trade funding administered through CAL FIRE and the GHG Reduction Fund may be available to offset some fuels treatment costs.

RECOMMENDATIONS

CHIPS is very close to qualifying as a participant in the upcoming SB 1122 Bioenergy Market Adjusting Tariff (BioMAT) auction that is likely to commence this summer (July 2015). The availability of sustainably sourced feedstocks at a predictable delivered cost will provide CHIPS and the project development team with key data. This data will help determine at which wholesale power price point the CHIPS project team should strike during the BioMAT auction process. In addition, this procurement plan will provide due diligence regarding the long-term availability of feedstock meeting project specifications that will be of interest to the private financial sector firms that may provide debt financing for the CHIPS Wilseyville bioenergy project.

Next Steps

In order to secure debt financing, the CHIPS project team will need to provide assurance of long-term feedstock supply commitments in the form of contracts and/or purchase agreements. TSS recommends that the CHIPS Board of Directors consider implementation of this procurement plan as outlined in the task list/timeline in Table 24.

Table 24. Task List and Timeline for CHIPS Wilseyville Bioenergy Facility Feedstock Procurement

TASK LIST	COMPLETION DATE
Commence discussions with US Forest Service and BLM regarding long-term stewardship contract(s).	Done
Define feedstock specifications (for feedstock procurement agreements) by feedstock type (forest, urban, agriculture). Timing of this task assumes that preferred combustion or gasification technology has been selected by this date.	May 2015
Draft feedstock procurement agreement templates reviewed by legal staff and select financial institutions.	June 2015
Confirm target locations for fuels treatment/forest restoration projects included in stewardship contract(s).	June 2015
Contact CPUC to confirm SB 1122 forest sustainability guidelines - third party oversight selection. Contact third party to review critical items listed in guidelines in the context of even-age and uneven-age forest management.	July 2015
Confirm NEPA process progress with US Forest Service and BLM (for stewardship contract(s)).	July 2015
Finalize feedstock procurement agreement templates.	August 2015
Create prioritized short list of potential feedstock providers. Commence discussions with top tier suppliers. Use Letters of Intent to confirm indicative pricing and suppliers' interest to begin negotiations leading to long-term feedstock supply agreements.	September 2015

TASK LIST	COMPLETION DATE
Contact County Solid Waste Departments to begin discussions regarding stockpiling of urban wood waste for processing by CHIPS supplied contractor.	October 2015
Review SB 1122 feedstock monitoring guidelines with CPUC appointed third party. Set up accounting guidelines accordingly.	October 2015
Draft long-term feedstock procurement agreements delivered to select feedstock suppliers.	November 2015
Finalize long-term feedstock procurement agreements with suppliers. Secure signatures.	December 2015
Finalize agreements with county Solid Waste departments for stockpiling of urban wood.	January 2016
Review USFS and BLM stewardship contract template with financial institutions.	February 2016
USFS and BLM launch stewardship contract solicitation and request for proposals.	June 2016
Submit stewardship contract proposal for submittal to USFS and BLM.	July 2016
Finalize stewardship contract(s). Secure signatures	September 2016

Appendix A. ACCG Feedstock Sustainability Screens

ACCG Consensus on Acceptable Sources of Biomass Feedstock

Overarching principles that apply to all numbered items:

- For saw logs: Only otherwise unmerchantable saw logs considered sustainable for biomass.
- Projects should leave adequate viable habitat for plants and wildlife (e.g. structural elements, wildlife trees); protect important watershed features (e.g. soils, streams, riparian areas); and protect key cultural resources. (Projects that are CEQA and/or NEPA compliant are typically consistent with this principle, but ACCG will need to review each project on a case by case basis).
- Projects should be consistent with adopted ACCG principles (as adopted 8/18/2010).

Adopted April 17, 2013 (edited March 19, 2014 to delete conditions that duplicate the overarching principles and one duplication)

1. Shaded (breaks within a fire/fuels management program or CWPP.
2. Power line tree trimmings (clippings, limbs, branches)
3. BLM Variance Program
4. Agricultural waste: general/orchard/ stock/ rotations/ trimmings/ vineyard waste (nontoxic)
5. Community road-side chipper waste
6. Defensible space clearing within 200' of homes and structures
7. GTR-220-consistent projects done at an ecologically sound pace and scale
8. Material from meadow restoration
9. Native American cultural site restoration
10. Road construction and maintenance
11. Riparian Zone restoration
12. Trees damaged by storms threatening public safety (down trees on roads, etc.)
13. Municipal green waste/ homeowner green waste (non-treated woods)
14. Municipal green waste/ homeowner green waste (nontreated woods)
15. Mill by-products and mill waste (nontoxic)
16. Consistent with Firewise Program
17. Any slash/fuel/biomass pile on the ground the day before agreement is reached (date of support letter)
18. Cooperative and other fuelbreaks with a management plan that meets ACCG principles

Adopted February 19, 2014

19. Trees damaged by natural disasters (fire, wind, volcanoes, etc)
20. WUI fuel reduction treatments with appropriate management plans (Consistent with ACCG Principles and Policies adopted 8/18/2010).
21. Nontoxic, untreated products from construction and industrial wood waste

22. Any material that would otherwise be open-burned in an ACCG-approved project. (Consistent with ACCG Principles and Policies adopted 8/18/2010).
23. Projects that are intended to restore the forest to a more-resilient structure consistent with the normal range of variability found in similar forest types where fire is not excluded.
24. Plantation thinning to increase stand diversity over time and enhance wildlife habitat or other ecological objectives.

Appendix B. Senate Bill 1122

Senate Bill No. 1122

Passed the Senate August 31, 2012

_____

Secretary of the Senate

Passed the Assembly August 30, 2012

_____

Chief Clerk of the Assembly

This bill was received by the Governor this _____ day of _____, 2012, at _____ o'clock ___M.

_____

Private Secretary of the Governor

CHAPTER _____

An act to amend Section 399.20 of the Public Utilities Code, relating to energy.

LEGISLATIVE COUNSEL'S DIGEST

SB 1122, Rubio. Energy: renewable bioenergy projects.

Under existing law, the Public Utilities Commission has regulatory authority over public utilities. Existing law requires every electrical corporation to file with the commission a standard tariff for electricity generated by an electric generation facility, as defined, that qualifies for the tariff, is owned and operated by a retail customer of the electrical corporation, and is located within the service territory of, and developed to sell electricity to, the electrical corporation. Existing law requires an electrical corporation to make the tariff available to the owner or operator of an electric generation facility within the service territory of the electrical corporation, as specified, until the electrical corporation meets its proportionate share of a statewide cap of 750 megawatts, as specified.

This bill would require the commission, by June 1, 2013, to direct the electrical corporations to collectively procure at least 250 megawatts of cumulative rated generating capacity from developers of bioenergy projects that commence operation on or after June 1, 2013. The bill would require the commission, for each electrical corporation, to allocate shares of the additional 250 megawatts based on the ratio of each electrical corporation's peak demand compared to the total statewide peak demand. The bill would require the commission to allocate those 250 megawatts to electrical corporations from specified categories of bioenergy project types, with specified portions of that 250 megawatts to be allocated from each category. The bill would require the commission to encourage gas and electrical corporations to develop and offer programs and services to facilitate development of in-state biogas for a broad range of purposes. The bill would authorize the commission, in consultation with specified state agencies, if it finds that the allocations of those 250 megawatts are not

appropriate, to reallocate those 250 megawatts among those categories.

The people of the State of California do enact as follows:

SECTION 1. Section 399.20 of the Public Utilities Code is amended to read:

399.20. (a) It is the policy of this state and the intent of the Legislature to encourage electrical generation from eligible renewable energy resources.

(b) As used in this section, "electric generation facility" means an electric generation facility located within the service territory of, and developed to sell electricity to, an electrical corporation that meets all of the following criteria:

(1) Has an effective capacity of not more than three megawatts.

(2) Is interconnected and operates in parallel with the electrical transmission and distribution grid.

(3) Is strategically located and interconnected to the electrical transmission and distribution grid in a manner that optimizes the deliverability of electricity generated at the facility to load centers.

(4) Is an eligible renewable energy resource.

(c) Every electrical corporation shall file with the commission a standard tariff for electricity purchased from an electric generation facility. The commission may modify or adjust the requirements of this section for any electrical corporation with less than 100,000 service connections, as individual circumstances merit.

(d) (1) The tariff shall provide for payment for every kilowatthour of electricity purchased from an electric generation facility for a period of 10, 15, or 20 years, as authorized by the commission. The payment shall be the market price determined by the commission pursuant to paragraph (2) and shall include all current and anticipated environmental compliance costs, including, but not limited to, mitigation of emissions of greenhouse gases and air pollution offsets associated with the operation of new generating facilities in the local air pollution control or air quality management district where the electric generation facility is located.

(2) The commission shall establish a methodology to determine the market price of electricity for terms corresponding to the length

of contracts with an electric generation facility, in consideration of the following:

(A) The long-term market price of electricity for fixed price contracts, determined pursuant to an electrical corporation's general procurement activities as authorized by the commission.

(B) The long-term ownership, operating, and fixed-price fuel costs associated with fixed-price electricity from new generating facilities.

(C) The value of different electricity products including baseload, peaking, and as-available electricity.

(3) The commission may adjust the payment rate to reflect the value of every kilowatthour of electricity generated on a time-of-delivery basis.

(4) The commission shall ensure, with respect to rates and charges, that ratepayers that do not receive service pursuant to the tariff are indifferent to whether a ratepayer with an electric generation facility receives service pursuant to the tariff.

(e) An electrical corporation shall provide expedited interconnection procedures to an electric generation facility located on a distribution circuit that generates electricity at a time and in a manner so as to offset the peak demand on the distribution circuit, if the electrical corporation determines that the electric generation facility will not adversely affect the distribution grid. The commission shall consider and may establish a value for an electric generation facility located on a distribution circuit that generates electricity at a time and in a manner so as to offset the peak demand on the distribution circuit.

(f) (1) An electrical corporation shall make the tariff available to the owner or operator of an electric generation facility within the service territory of the electrical corporation, upon request, on a first-come-first-served basis, until the electrical corporation meets its proportionate share of a statewide cap of 750 megawatts cumulative rated generation capacity served under this section and Section 387.6. The proportionate share shall be calculated based on the ratio of the electrical corporation's peak demand compared to the total statewide peak demand.

(2) By June 1, 2013, the commission shall, in addition to the 750 megawatts identified in paragraph (1), direct the electrical corporations to collectively procure at least 250 megawatts of cumulative rated generating capacity from developers of bioenergy

projects that commence operation on or after June 1, 2013. The commission shall, for each electrical corporation, allocate shares of the additional 250 megawatts based on the ratio of each electrical corporation's peak demand compared to the total statewide peak demand. In implementing this paragraph, the commission shall do all of the following:

(A) Allocate the 250 megawatts identified in this paragraph among the electrical corporations based on the following categories:

(i) For biogas from wastewater treatment, municipal organic waste diversion, food processing, and codigestion, 110 megawatts.

(ii) For dairy and other agricultural bioenergy, 90 megawatts.

(iii) For bioenergy using byproducts of sustainable forest management, 50 megawatts. Allocations under this category shall be determined based on the proportion of bioenergy that sustainable forest management providers derive from sustainable forest management in fire threat treatment areas, as designated by the Department of Forestry and Fire Protection.

(B) Direct the electrical corporations to develop standard contract terms and conditions that reflect the operational characteristics of the projects, and to provide a streamlined contracting process.

(C) Coordinate, to the maximum extent feasible, any incentive or subsidy programs for bioenergy with the agencies listed in subparagraph (A) of paragraph (3) in order to provide maximum benefits to ratepayers and to ensure that incentives are used to reduce contract prices.

(D) The commission shall encourage gas and electrical corporations to develop and offer programs and services to facilitate development of in-state biogas for a broad range of purposes.

(3) (A) The commission, in consultation with the State Energy Resources Conservation and Development Commission, the State Air Resources Board, the Department of Forestry and Fire Protection, the Department of Food and Agriculture, and the Department of Resources Recycling and Recovery, may review the allocations of the 250 additional megawatts identified in paragraph (2) to determine if those allocations are appropriate.

(B) If the commission finds that the allocations of the 250 additional megawatts identified in paragraph (2) are not appropriate, the commission may reallocate the 250 megawatts

among the categories established in subparagraph (A) of paragraph (2).

(4) For the purposes of this subdivision, "bioenergy" means biogas and biomass.

(g) The electrical corporation may make the terms of the tariff available to owners and operators of an electric generation facility in the form of a standard contract subject to commission approval.

(h) Every kilowatthour of electricity purchased from an electric generation facility shall count toward meeting the electrical corporation's renewables portfolio standard annual procurement targets for purposes of paragraph (1) of subdivision (b) of Section 399.15.

(i) The physical generating capacity of an electric generation facility shall count toward the electrical corporation's resource adequacy requirement for purposes of Section 380.

(j) (1) The commission shall establish performance standards for any electric generation facility that has a capacity greater than one megawatt to ensure that those facilities are constructed, operated, and maintained to generate the expected annual net production of electricity and do not impact system reliability.

(2) The commission may reduce the three megawatt capacity limitation of paragraph (1) of subdivision (b) if the commission finds that a reduced capacity limitation is necessary to maintain system reliability within that electrical corporation's service territory.

(k) (1) Any owner or operator of an electric generation facility that received ratepayer-funded incentives in accordance with Section 379.6 of this code, or with Section 25782 of the Public Resources Code, and participated in a net metering program pursuant to Sections 2827, 2827.9, and 2827.10 of this code prior to January 1, 2010, shall be eligible for a tariff or standard contract filed by an electrical corporation pursuant to this section.

(2) In establishing the tariffs or standard contracts pursuant to this section, the commission shall consider ratepayer-funded incentive payments previously received by the generation facility pursuant to Section 379.6 of this code or Section 25782 of the Public Resources Code. The commission shall require reimbursement of any funds received from these incentive programs to an electric generation facility, in order for that facility to be eligible for a tariff or standard contract filed by an electrical

corporation pursuant to this section, unless the commission determines ratepayers have received sufficient value from the incentives provided to the facility based on how long the project has been in operation and the amount of renewable electricity previously generated by the facility.

(3) A customer that receives service under a tariff or contract approved by the commission pursuant to this section is not eligible to participate in any net metering program.

(*l*) An owner or operator of an electric generation facility electing to receive service under a tariff or contract approved by the commission shall continue to receive service under the tariff or contract until either of the following occurs:

(1) The owner or operator of an electric generation facility no longer meets the eligibility requirements for receiving service pursuant to the tariff or contract.

(2) The period of service established by the commission pursuant to subdivision (d) is completed.

(m) Within 10 days of receipt of a request for a tariff pursuant to this section from an owner or operator of an electric generation facility, the electrical corporation that receives the request shall post a copy of the request on its Internet Web site. The information posted on the Internet Web site shall include the name of the city in which the facility is located, but information that is proprietary and confidential, including, but not limited to, address information beyond the name of the city in which the facility is located, shall be redacted.

(n) An electrical corporation may deny a tariff request pursuant to this section if the electrical corporation makes any of the following findings:

(1) The electric generation facility does not meet the requirements of this section.

(2) The transmission or distribution grid that would serve as the point of interconnection is inadequate.

(3) The electric generation facility does not meet all applicable state and local laws and building standards and utility interconnection requirements.

(4) The aggregate of all electric generating facilities on a distribution circuit would adversely impact utility operation and load restoration efforts of the distribution system.

(o) Upon receiving a notice of denial from an electrical corporation, the owner or operator of the electric generation facility denied a tariff pursuant to this section shall have the right to appeal that decision to the commission.

(p) In order to ensure the safety and reliability of electric generation facilities, the owner of an electric generation facility receiving a tariff pursuant to this section shall provide an inspection and maintenance report to the electrical corporation at least once every other year. The inspection and maintenance report shall be prepared at the owner's or operator's expense by a California-licensed contractor who is not the owner or operator of the electric generation facility. A California-licensed electrician shall perform the inspection of the electrical portion of the generation facility.

(q) The contract between the electric generation facility receiving the tariff and the electrical corporation shall contain provisions that ensure that construction of the electric generating facility complies with all applicable state and local laws and building standards, and utility interconnection requirements.

(r) (1) All construction and installation of facilities of the electrical corporation, including at the point of the output meter or at the transmission or distribution grid, shall be performed only by that electrical corporation.

(2) All interconnection facilities installed on the electrical corporation's side of the transfer point for electricity between the electrical corporation and the electrical conductors of the electric generation facility shall be owned, operated, and maintained only by the electrical corporation. The ownership, installation, operation, reading, and testing of revenue metering equipment for electric generating facilities shall only be performed by the electrical corporation.

Approved _____, 2012

_____

Governor

Appendix C. SB 1122 Forest Derived Biomass Supply Eligibility

Forest Derived Biomass Supply Eligibility under

SECTION 1. Section 399.20 of the Public Utilities Code

Background

At the request of the Energy Division staff at the California Public Utilities Commission (CPUC), the Department of Forestry and Fire Protection (CAL FIRE), with the assistance and facilitation of Sierra Nevada Conservancy and a variety of other stakeholders, this whitepaper was prepared to assist in determining fuel sourcing bioenergy production eligibility criteria for "byproducts of sustainable forest management" consistent with the term as used in Public Utilities Code Section 399.20 (f)(2)(A)(iii). The intent of this whitepaper is to: 1) propose a definition of "sustainable forest management" and 2) provide recommendations for a process for certification, verification, and monitoring to be utilized by sellers and purchasers of eligible by-products to verify that biomass feedstocks utilized by a particular facility are supplied in a manner consistent with the statutory provision for sustainable forest management Section 399.20.

Since submission of the whitepaper in late 2013, staff from CAL FIRE and Board of Forestry and Fire Protection (BOF) identified the need for some changes in the original document. Changes have been made to ensure that the objectives of SB 1122 are achieved, while recognizing the current adequacy of regulations governing commercial timber operations under the Z'berg-Nejedly Forest Practice Act and BOF forest practice regulations.

Issue 1-Recommendations for Defining of "Byproducts of Sustainable Forest Management"

SB 1122 directs 50Mw of bioenergy using byproducts of sustainable forest management allocated based on the proportion of bioenergy derived from Fire Threat Treatment Areas as designated by the Department of Forestry and Fire Protection. The current Fire Threat Treatment Area designation by the Department was completed in 2005 and reflects an index of expected fire frequency and fire behavior based upon fuel ranking and anticipated fire frequency (Sethi, et.al, 2005). Estimates of bioenergy which are to be used for allocation purposes from Fire Threat Treatment Areas were made based on datasets which reflected inventories and vegetation structure on forested lands and shrublands.

The categories of potential bioenergy sourcing were adapted from the Public Interest Energy Resources publication titled "An assessment of biomass resources in California" published in 2004. Categories included in the assessment for development of biomass and bioenergy estimates included 1) logging slash, 2) forest thinning, 3) mill wastes, and 4) shrub. These categorizations are sufficient to support an allocation of the 50Mw to the investor owned utilities (IOUs).

However, given the assumptions utilized to develop the overall estimates and the scale at which the bioenergy estimates were developed, the Department concurs with the Black and Veatch draft consultant report (April, 2013) that the resource potential and data assumptions for forest materials that would be considered sustainable at the project level needs to be refined for the purposes of determining whether a particular project which supplies by-products, meets the sustainable forest management criteria.

The process for determining sustainable forest management byproduct eligibility under the provisions of SB 1122 relies on the definition of sustainable forestry in part 2 of the Society of American Foresters definition (Appendix A) as well as the federal level defined in FS-979 (Appendix B) and a series of public workshops which were held to refine these broad definitions for the purposes of determining byproduct eligibility under SB 1122. To meet eligibility requirements all biomass feedstocks that are used within this program must be derived from projects that are conducted in conformance with local, state, and federal policy, statutes and regulation, including CEQA and the National Environmental Policy Act (NEPA). This whitepaper, however, does not support requiring CEQA or NEPA review on projects that would not have otherwise been required to be reviewed under those laws.

The workshop process was planned and facilitated to assist in refining and integrating the key elements of the two definitions of forest sustainability applicable to the determination of feedstock eligibility for purposes of compliance with PUC Section 399.20. This five month process included stakeholders from the environmental, community, governmental and private industry sectors. Numerous background materials were prepared and circulated, three workshops were held to facilitate input and build consensus and multiple drafts of this white paper were circulated for comment. This paper reflects a balance of viewpoints and attempts to ensure that the majority of biomass feedstock is derived from sustainable forest management practices while providing the biomass energy operators enough flexibility to be able to use diverse sources to ensure year-round reliability.

Environmental stakeholders expressed concerns focused on the potential for markets for biomass materials to lead to utilization of components of existing vegetation types which have not been traditionally utilized at a pace and scale that would not be sustainable over time. This concern also mirrors concerns raised in literature review including a comprehensive literature review done by Stewart et. al. (July, 2011).

Paraphrasing Stewart, et. al. the structural stand components most likely to be harvested or manipulated during woody biomass operations include:

1. Dead or downed wood (pre-existing) and harvest generated slash,
2. Understory shrub, herbaceous plants and non-merchantable trees,
3. Wildlife structural trees (decaying live trees, cavity trees, mast producing trees, etc.)

Stewart further notes:

> "The maintenance recruitment of structural elements such as large tree and snags, logs, and coarse woody debris that would otherwise not be replaced under an intensive biomass harvesting regime is an issue of critical concern for biodiversity and food webs related to these elements."

There was general concurrence from the workshop participants regarding these key areas and recognition that approaches to evaluating the potential impacts of a proposed forest management vary somewhat between federal, private, and state ownerships both in terms of environmental permitting requirements, review, approval, implementation, inspections, enforcement, etc. Furthermore, the literature reviewed as part of this process did not make specific recommendations on prescriptive retention standards.

There was also general concurrence that there be some certainty for supply of by-products and that the process for verifying that by-products were eligible be kept as simple and straightforward as possible.

Existing California Sustainable Forest Management Regulatory and Management Framework for Non-federal and Federal lands.

Forest management activities on federal, state and private ownerships in California, that could provide biomass to 3Mw or less electric generation facilities as defined in Section 399.20(b), are subject to numerous statutes and regulation.

Existing Regulatory Framework for Non-federal Lands - Forest management activities conducted on state and private forest ownerships, meeting the statutory definition of *timberland*, involving the barter or sale of biomass byproducts, is subject to regulation under the provisions of the Z-berg-Nejedly Forest Practice Act (Division 4, Chapter 8, Public Resources Code) and associated regulations under Title 14, California Code of Regulations, Chapter 4. The Public Resources Code and its associated regulations apply to activities that include a wide range of prescriptive standards designed to protect water quality, wildlife habitat, fisheries habitat, soils productivity, archaeological resources, aesthetics, and forest productivity. Landowners with more than 50,000 acres of forestland are required by regulation to demonstrate how their planned management activities will meet long-term sustained yield objectives.

Private forest land owners with less than 2,500 acres of timberland are eligible to submit a Non-industrial Timber Management Plan which outlines the long term management strategy for the property. Once approved through a multi-agency review, the landowner can conduct timber operations under a Notice of Timber Operations. Non-industrial Timber Management Plans have a core component that requires an assessment of long-term sustained yield based on an uneven-age silvicultural prescription. The practice of uneven aged management requires demonstration of natural regeneration and the maintenance of a balanced forest stand structure. State and private landowners may also conduct timber harvesting operations designed to address fuel management, including biomass harvesting, under a variety of exemptions and emergency notice provisions.

It is also anticipated that forest management activities that will generate biomass from private or state forest landownerships that do not meet the definition of timberland, under the Z'berg-Nejedley Forest Practice Act, will be eligible. These lands would typically not support a stand of commercial tree species, but may still support other non-commercial tree species or other woody vegetation. While these projects are not subject to regulation under the Forest Practice Act, they would generally fall under the provisions of the California Environmental Quality Act (CEQA). Therefore, the types of forest management activities that generate biomass feedstocks from most forest fuel hazard reduction activities will fall within the definition of sustainable forest management given their alignment with subpart (f) of the attached definition of sustainable forestry endorsed by the Society of American Foresters (Appendix A), as well as by meeting the intent of SB 1122. As such, these feedstocks will be classified as eligible.

Existing Regulatory Framework for Federal Lands - Federal policy for sustainability activities on National Forest Lands is described in the National Forest Management Act of 1976 (P.L.94-588). National Forests are required to prepare Forest and Resource Land Management Plans to guide how forests are managed and to guide design of project level activities consistent with 36 CFR 219. The first priority under 36 CFR 219.2 is to maintain or restore ecological sustainability of national forests to provide for a wide variety of uses, values, products and services and to conform to all applicable environmental laws and regulations. Additional federal policy on sustainability is outlined in the *National Report on Sustainable Forests—2010* (FS 979). Current guidance regarding management activities on federal lands in the

National Forest System in California emphasize application of restoration principles identified in General Technical Report (GTR)-220 (North, et.al., 2009) with management guidance provided in GTR-237, titled *Managing Sierra Nevada Forests* (North, 2012).

Biomass Utilization and Sustainable Forest Management

A number of authors have recognized the clear benefits of reducing density of vegetation, particularly on dry forest types to achieve numerous goals including reducing impacts associated with fire, improving forest health, improving resilience of forests in light of anticipated climate change, and maintaining sustainable carbon stocks and sequestration capacity of forested landscapes (Naeem, et. al. 1999, Aber, et. al., 2000, Franklin and Johnson, 2013, Forest Guild 2013, Franklin and Johnson, 2012). In addition, reducing density of vegetation while maintaining important forest structure elements like snags, down woody debris and native oaks often increase forest structural diversity and enhance wildlife habitats (Spies and Franklin, 1991, Hayes et al., 1997), and increase overall wildlife and native plant biodiversity at both the project and landscape scale (Hayes et al., 2003, Rupp et al. 2012, Verschuyl et al. 2011, Zwolak, 2009).

Markets for biomass feedstocks generated from forested landscapes in California have generally been confined to those areas in close proximity to existing biomass facilities. It is anticipated that build out of 50 new Mw of capacity under the provisions of Public Utilities Section 399.20 will expand existing markets for biomass feedstocks.

Sustainable Forest Management Definition Recommendations for Purposes of Determining Byproduct Eligibility

While the Department recognizes that timber operations on private timberlands must address sustained yield, sustainable forest management practices within the context of PUC Section 399.20 encompasses a broader set of criteria and includes acreage in federal ownership. Given the emphasis of SB 1122 on fire threat treatment linked to sustainable forest management activities and the input from workshop participants, the Department recommends that CPUC staff focus on utilization of the definition developed by the Society of American Foresters as a basis for determining sustainable forest management. Further, the Department recommends that eligible project types for the purposes of determining byproduct eligibility focus on 1) projects that incorporates the specific element in the SAF definition associated with maintenance of long term socioeconomic benefits associated with public safety, jobs, air quality, and economic benefits fuel treatment will provide if markets are found for by-products of fuel treatments, [Paraphrase of SAF definition subpart 2(f)] as well as, 2) projects that maintains biodiversity, productivity, regeneration capacity, vitality and potential to fulfill relevant ecological, economic, and social functions[Paraphrase of SAF definition subpart 2].

Specifically, the Department recommends that CPUC staff consider the following definition of **sustainable forest management** for purposes of determining eligibility of by-products—

> *Qualifying byproducts from sustainable forest management include materials derived from projects that are conducted to reduce fuels which pose a threat to public and the environment in an around communities as well as projects which can be demonstrated to contribute to restoration of forests, enhance the resilience of forests through reduction in fire threat, contribute to restoration of unique forest habitats or maintains or restores forest biodiversity, productivity and regeneration capacity.*

Issue 2-Verification, Certification, and Monitoring of Feedstock Eligibility

Consistent with the above definition, to meet the sustainable forest management eligibility fuel sourcing criteria the owner or operator must ensure that biomass feedstock from any project is sourced from one or more of the following project types and that, where appropriate, a third-party verification process addresses the key elements and gaps related to sustainable forest management risk associated with biomass operations identified by Stewart and others. The key elements to be evaluated are listed in appendix C-2:

Eligible Byproduct Sources:

I. ***Fire Threat Reduction*** *- biomass feedstock which originates from fuel reduction activities identified in a fire plan approved by CAL FIRE or other appropriate state, local or federal agency. On federal lands this includes fuel reduction activities approved under 36 CFR 220.6(e)(6)ii and (12) thru (14).*

II. ***Fire Safe Clearance Activities*** *- biomass feedstock originating from fuel reduction activities conducted to comply with PRC Sections 4290 and 4291. This would include biomass feedstocks from timber operations conducted in conformance with 14 CCR 1038(c) (150' Fuel Reduction Exemption) as well as projects that fall under 14 CCR 1052.4 (Emergency for Fuel Hazard Reduction), 14 CCR 1051.3-1051.7 (Modified THP for Fuel Hazard Reduction), and 14 CCR 1038(i) (Forest Fire Prevention Exemption), and categorical exclusions on federal lands approved under 36 CFR 220.6(e)(6)ii and (12)-(14).*

III. ***Infrastructure Clearance Projects*** *- biomass feedstock derived from fuel reduction activities undertaken by or on behalf of a utility or local, state or federal agency for the purposes of protecting infrastructure including but not limited to: power lines, poles, towers, substations, switch yards, material storage areas, construction camps, roads, railways, etc. This includes timber operations conducted pursuant to 14 CCR 1104.1(b),(c),(d),(e),(f) &(g).*

IV. ***Other Sustainable Forest Management*** *– biomass feedstock derived from sustainable forest management activities that accomplish one or more of the following: 1) forest management applications that maintain biodiversity, productivity, and regeneration capacity of forests in support of ecological, economic and social needs, 2) contributes to forest restoration and ecosystem sustainability, 3) reduces fire threat through removal of surface and ladder fuels to reduce the likelihood of active crown fire and/or surface fire intensity that would result in excessive levels of mortality and loss of forest cover or, 4) contributes to restoration of unique habitats within forested landscapes.*

It is recommended by the Department that by-products which do not meet the criteria listed above would not be eligible by-products of sustainable forest management. Based on input from the workshop participants, it was recognized that some flexibility be provided to producers relative to mix of fuel sources and that some provision be provided to allow a producer to utilize material sourced from projects that would not meet the eligibility criteria listed above. To accommodate this need for some supply flexibility the Department recommends that CPUC staff consider allowances for up to 20% of the by-products be sourced from "other" sources as described below.

***Other Eligible Supply Sources**:* Eligible byproducts from this category include the following:

I. biomass feedstocks derived from other forest management activities that fail to meet 12 out of 15 of the eligibility criteria in the checklist found in Appendix C-1 and C-2.

ii. biomass feedstocks that will be used at the facilities from "other" waste streams identified in SB 1122

Establishing the Basis for and Use of Eligibility Criteria

It is recommended that by-products from projects which fall into the Fuel Reduction, Fire Safe Clearance, and Infrastructure Categories as defined above (i, ii and iii) be presumed to be eligible and would not be required to fill out the eligibility criteria form in Appendix C-1 and C-2. These projects will, however, need to submit a certification form (Appendix D) and be compliant with other applicable federal, state and local laws.

With some exceptions, as noted below, forest management activities not associated with the above referenced categories are required to fill out the eligibility form in Appendix C-1 and C-2 to determine if the biomass to be generated by the project is eligible and meets the criteria of Sustainable Forest Management Practices for the purposes of SB 1122.

Evaluations, completed by a Registered Professional Forester or appropriate federal officer, with exceptions noted herein, must be done on a project-by-project basis upon an assessment of the applicable management practices.

Evaluation of biomass supply eligibility from by-products of sustainable forest management for federal projects - Federal projects which generate biomass on National Forest System Lands or other federally owned or managed lands which incorporate management principles identified in GTR-220 and GTR-237 will generally be eligible as being sourced from Sustainable Forest Management. To document the consistency of a specific project with the restoration principles in the GTR guidance document, the appropriate Forest Officer or agency official will utilize the eligibility form to determine whether biomass feedstock meets sustainability criteria and can be certified as a by-product of sustainable forest management consistent with Section 399.20. The Forest Biomass Sustainability Byproduct Eligibility Form is used to help evaluate the project to determine and document if byproducts from a forest management project are eligible as a sustainable forest management source.

Evaluation of biomass supply eligibility from by-products of sustainable forest management from projects subject to regulation under the Z'Berg-Nejedley Forest Practice Act - For timber harvesting conducted on state and private timberlands, removal of biomass material for sale constitutes a commercial activity and is subject to regulation under the Forest Practice Act. Current forest practice rules generally do not have c prescriptive regulatory requirements specifically addressing biomass harvesting because the low volume harvesting of small woody material (tree tops, branches, slash from logging operations, and small sapling/pole sized conifers and hardwoods) has not been viewed as an activity likely to result in significant adverse or cumulative impacts. CAL FIRE would expect that biomass harvesting, incidental to the more common types of commercial timber operations, not to rise to the level of potential significant adverse impacts, and therefore the requirements of CEQA (disclosure, evaluation and mitigation) would not be triggered. However, in cases where a fair argument for

significant adverse impacts is raised, CAL FIRE would expect the registered professional forester preparing the timber harvesting plan (THP) to address those impacts in sufficient detail to mitigate the impacts.

Since the Board of Forestry and Fire Protection's forest practice rules are not tied to the proposed definition of 'sustainable forest management' as described in Appendix A of this document, it is recommended that CPUC should recognize the need for a separate governance process for biomass harvesting operations that would be subject to Section 399.20 of the Public Utilities Code. CAL FIRE does not view the two processes in conflict (enforcement of the Forest Practice Act by the department and enforcement of Section 399.20 by PUC). THPs are intended to address significant adverse impacts, and not necessarily intended to address the broader definition of sustainable forest management as described in this whitepaper. While the Forest Practice Regulations (FPRs) governing THPs generally address "the stewardship and use of forests and forest lands in a way, and at a rate, that maintains their biodiversity, productivity, regeneration capacity, vitality, and potential to fulfill, now and in the future, relevant ecological, economic, and social functions at local, national, and global levels", the FPRs were not intended for the type of specificity required in determining byproduct eligibility under SB 1122 . The FPRs do not explicitly mention stewarding lands to fulfill economic and social functions at a local or national level. Nonetheless, the department and many participants in the aforementioned workshops deemed this to be an important consideration.

A checklist approach for certification has been provided in Appendix C-2; however, this should be viewed as a recommendation, where the specific content could be modified or edited by PUC as improvements, clarifications, or new issues are identified.

For each of the elements to be addressed in Appendix C-2 it is recommended that the seller of biomass describe the planned operations and potential positive and/or negative impacts to each resource issue to be addressed in Appendix C. Review of concepts from GTR 220, GTR 237, CEC-500-2011-036, (Stewart, et.al), and GTR 292 (Jain et. al., 2012) are recommended as important references to assist in assessing and addressing the sustainability of proposed operations where biomass removals are proposed to achieve forest management, forest restoration, and/or fire threat reduction objectives.

Utilization of this approach will facilitate environmental review by third party verifiers, as well as completion of Appendix C-2 (Forest Biomass Sustainability Byproduct Eligibility Form) for determination of whether the biomass generated by the project meets eligible byproducts under PUC Section 399.20.

For ownerships with approved Sustained-Yield Plans or Programmatic Timber Environmental Impact Reports, harvest documents may rely on the assessment of sustainability contained in the programmatic documents to the extent that those elements are addressed and summarize the operational elements applicable to any project under the appropriate area in Appendix C-2.

Exceptions to the requirement to apply Appendix C-1 and C-2 for Biomass Produced During Restoration Projects and Small Projects: The following project types are assumed to meet the sustainable forest management criteria or small project size and are recommended to be exempted from completing the Forest Biomass Sustainability Byproduct Eligibility Form (Appendix C-2).

1) Sustainable forest management projects implemented on state, federal, and private ownership which involve meadow restoration, restoration of wetlands, restoration of aspen and other similar activities which are undertaken for restoration purposes and are subject to environmental review under CEQA or NEPA.

2) Operations conducted pursuant to an approved Non-Industrial Timber Management Plan where the plan or amendment to the plan evaluates and provides for a discussion of intended biomass operations and byproducts that may have potential significant adverse impacts, evaluates potential significant impacts, and mitigates potential significant impacts.
3) Operations conducted pursuant to an approved Timber Harvesting Plan or Modified Timber Harvesting Plans on non-industrial timberland ownerships where the landowner is not primarily engaged in the manufacture of wood products and where the approved plan or amendment to the plan evaluates and provides for a discussion of intended biomass operations and byproducts that may have potential significant adverse impacts, evaluates potential significant impacts, and mitigates potential significant impacts.
4) Operations with a total estimated volume of 250 bone dry tons or less.

These projects will need to submit a certification form (Appendix D) and be compliant with other applicable federal, state and local laws.

Certification, Verification and Monitoring to Determine Biomass/Byproduct Eligibility Requirements

Certification: For projects on private timberlands, completion of the "Forest Biomass Sustainability Byproduct Form (Appendix C-2)" by a Registered Professional Forester as defined in Title 14 of the California Code of Regulations, Chapter 10 is recommended. Representations of the Registered Professional Forester in completion of the form and certification will be subject to the disciplinary guidelines as described in Public Resources Code Sections 774-779 and the provisions of the California Code of Regulations, Chapter 10, Sections 1612-1614.

For federal projects certification will be completed by the appropriate federal officer with authority to approve project decisions pursuant to Forest Service Manual 2400 and all subtitles. Representatives with responsibility for accuracy of the certification are subject to personnel procedures outlined in Code of Federal Regulations Title 5, Subpart 430, Performance Management.

Certification by the Registered Professional Forester or appropriate federal representative should be completed utilizing the certification form included in Appendix D. It is expected that each project will have an identifier, map, certification relative to fuel source and an estimated volume by fuel source category or categories.

Verification: The owner/operator of the bioenergy facility will be responsible for verifying that the fuel has been appropriately certified. Trip tickets and loads origin will demonstrate a chain-of-custody to the project source. Information shall be available at the bioenergy facility for audit.

Monitoring for Compliance with Eligibility Criteria: It is recommended that a random audit procedure be established to ensure compliance with program requirements. The consequences for failure to comply should be discussed and developed collaboratively between the CPUC, appropriate federal agencies and CAL FIRE.

Recommended Audit Period and Remediation: It is also recommended that for purposes of verifying that an individual biomass facility is securing supplies from eligible biomass feedstock sources in a proportion consistent with the targets, the compliance with biomass feedstock supply mix criteria shall be determined based on a 5-year rolling average. It is also recommended that CPUC staff develop a process or processes that bring the biomass feedstock supply mix into conformance with the eligibility

requirements, if it is determined that a given facility is out of compliance. A process for facilities to alter the eligible biomass feedstock mix should also be developed.

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APPENDIX A

Society of American Foresters: The Dictionary of Forestry

(sustainable forestry) (SFM) *this evolving concept has several definitions* **1.** the practice of meeting the forest resource needs and values of the present without compromising the similar capability of future generations —*note* sustainable forest management involves practicing a land stewardship ethic that integrates the reforestation, managing, growing, nurturing, and harvesting of trees for useful products with the conservation of soil, air and water quality, wildlife and fish habitat, and aesthetics (UN Conference on Environment and Development, Rio De Janeiro, 1992) **2.** the stewardship and use of forests and forest lands in a way, and at a rate, that maintains their biodiversity, productivity, regeneration capacity, vitality, and potential to fulfill, now and in the future, relevant ecological, economic, and social functions at local, national, and global levels, and that does not cause damage to other ecosystems (the Ministerial Conference on the Protection of Forests in Europe, Helsinki, 1993) —*note* criteria for sustainable forestry include (a) conservation of biological diversity, (b) maintenance of productive capacity of forest ecosystems, (c) maintenance of forest ecosystem health and vitality, (d) conservation and maintenance of soil and water resources, (e) maintenance of forest contributions to global carbon cycles, (f) maintenance and enhancement of long-term multiple socioeconomic benefits to meet the needs of societies, and (g) a legal, institutional, and economic framework for forest conservation and sustainable management (Montréal Process, 1993) —*see* biological legacy, certify, chain of custody, criteria and indicators, criterion, ecosystem management.

This definition last updated 10/23/2008.

APPENDIX B

United States Department of Agriculture: Forest Service: "*National Report on Sustainable Forests", June 2011 (* FS-979).

Sustainable forest management definition:
The stewardship and use of forests and forest lands in such a way, and at a rate, that maintains their biodiversity, productivity, regeneration capacity, and vitality, and forest's potential to fulfill, now and in the future, relevant ecological, economic, and social functions at local, national, and global levels, and not cause damage to other ecosystems.
The criteria and indicators are intended to provide a common understanding of what is meant by sustainable forest management. They provide a framework for describing, assessing, and evaluating a country's progress toward sustainability at the national level and include measures of:

1. Conservation of biological diversity.
2. Maintenance of productive capacity.
3. Maintenance of forest ecosystem health.
4. Conservation and maintenance of soil and water resources.
5. Maintenance of forest contribution to global carbon cycles.
6. Maintenance and enhancement of long-term multiple socioeconomic benefits to meet the needs of society.
7. Legal, institutional, and economic frameworks for forest conservation.

APPENDIX C - 1

SB1122 Forest Biomass

Forest Biomass Sustainability Byproduct Eligibility Form**:**

Instructions and Worksheet

Instructions

Projects which fall into the Fuel Reduction, Fire Safe Clearance, and Infrastructure categories as defined under sustainable forest management are presumed to be eligible and are not required to fill out Appendix C-2. Projects which meet the sustainable forest management criteria, but are exempt from submitting Appendix C-2 must still meet the minimum sustainability criteria outlined in Appendix C-2. Projects conducted under "I", 'ii", "iii" or "iv" (including exempt projects) must submit a certification form (Appendix D).

With the exception of projects types noted below, forest management activities not associated with forest biomass categories "i", "ii", and "iii", referenced below, will require use of the Forest Biomass Sustainability Byproduct Eligibility Form (Appendix C-2) to determine if the biomass generated by the project is eligible, and meets the criteria of Sustainable Forest Management Practices under PUC 399.20.

Ranking criteria have been developed to reflect and support the broad criteria described within the above referenced definition of Sustainable Forest Management. Evaluations, completed by a Registered Professional Forester or appropriate federal officer with exceptions noted herein, must be on a project-by-project basis upon an assessment of the applicable management practices.

Eligible Forest Biomass Categories

i. ***Fire Threat Reduction*** *- biomass feedstock which originates from fuel reduction activities identified in a fire plan approved by CAL FIRE or other appropriate, state, local or federal agency. On federal lands this includes fuel reduction activities approved under36 CFR 220.6(e)(6)ii and (12) thru (14).*

ii. ***Fire Safe Clearance Activities*** *- biomass feedstock originating from fuel reduction activities conducted to comply with PRC Sections 4290 and 4291. This would include biomass feedstocks from timber operations conducted in conformance with 14 CCR 1038(c) 150' Fuel Reduction Exemption,* as well as projects that fall under 14 CCR 1052.4 (Emergency for Fuel Hazard Reduction), 14 CCR 1051.3-1051.7 (Modified THP for Fuel Hazard Reduction), and 14 CCR 1038(i) Forest fire Prevention Exemption, Categorical exclusions on federal lands approved under 36 CFR 220.6.(e).(6)ii.,

iii. ***Infrastructure Clearance Projects*** *- biomass feedstock derived from fuel reduction activities undertaken by or on behalf of a utility or local, state or federal agency for the purposes of protecting infrastructure including but not limited to: power lines, poles, towers, substations, switch yards, material storage areas, construction camps, roads, railways, etc. This includes timber operations conducted pursuant to 14 CC1104. 1(b),(c),(d),(e),(f) &(g).*

iv. ***Other Sustainable Forest Management*** *– biomass feedstock derived from sustainable forest management activities that accomplish one or more of the following: 1) forest management applications that maintain biodiversity, productivity, and regeneration capacity of forests in support of ecological, economic and social needs, 2) contributes to forest restoration and ecosystem sustainability,*

3) reduces fire threat through removal of surface and ladder fuels to reduce the likelihood of active crown fire and/or surface fire intensity that would result in excessive levels of mortality and loss of forest cover or, 4) contributes to restoration of unique habitats within forested landscapes.

The following project types meet the sustainable forest management criteria and are exempted from submitting the Forest Biomass Sustainability Form (Appendix C-2)

1) Sustainable Forest Management projects implemented on state, federal, and private ownership which involve meadow restoration, restoration of wetlands, restoration of aspen and other similar activities which are undertaken for restoration purposes and are subject to environmental review under CEQA or NEPA.
2) Operations conducted pursuant to an approved Non-Industrial Timber Management Plan where the plan or amendment to the plan evaluates and provides for a discussion of intended biomass operations and byproducts that may have potential significant adverse impacts, evaluates potential significant impacts, and mitigates potential significant impacts.
3) Operations conducted pursuant to an approved Timber Harvesting Plan or Modified Timber Harvesting Plans on non-industrial timberland ownerships where the landowner is not primarily engaged in the manufacture of wood products and where the approved plan or amendment to the plan evaluates and provides for a discussion of intended biomass operations and byproducts that may have potential significant impacts, evaluates potential significant impacts, and mitigates potential significant impacts.
4) Operations with a total estimated volume of less than 250 bone dry tons.

Section I

Ownership Category: identify if the parcel on which the project is conducted is owned by a private entity, the state or the Federal Government
Number of Acres: Identify how many acres are being treated / harvested by the project
Type of Harvest Document (if applicable): Identify the type of harvest document, State Permit, Federal Permit or exemption that apply to this project
Harvest Document Designator: Identify the State or Federal entity that issued the harvest permit, exemption or other document that applies to this project
Facility Identifier: Provide the identifier for the SB1122 (or other) forest biomass facility which will receive and utilize the forest waste (biomass) to generate energy.

Section II

To qualify under forest biomass category **"iv"**, treatment activities must provide co-benefits for at least 12 of the 16 items identified in Appendix C-2, Section II, Items A – E. In addition, at least one item must come from each of Section II A – D. A Registered Professional Forester should determine if planned activities meet the sustainability criteria under section "iv".

APPENDIX C - 2

Forest Biomass Sustainability Byproduct Eligibility Form

SECTION I

Ownership Category: ☐ Private ☐ State ☐ Federal Number of Acres: _____

Type of Harvest/NEPA Document: _____Harvest/NEPA Document Designator: _____

Facility Identifier: _____

SECTION II

Note: Please keep responses brief (under 250 words) and focused on the basis for the determination that the project will support sustainability of the specific objective. In lieu of providing a written response or in addition to the written response, where appropriate provide source references to the approved harvest/NEPA document where discussion of potential significant adverse impacts, evaluation and mitigation measures are provided.

A. Habitat, Temporal and Spatial Diversity Objectives (Pick all that apply)

☐ Openings for shade intolerant species were created to promote regeneration and habitat diversity.
Please describe percent and distribution of areas in small openings less than 2.5 acres in size and planned regeneration methods:

_____

_____

☐ Multi-age, multi-species tree habitats were created at the project level.
Please describe how the project immediately post harvest will support maintenance, enhancement and/or restoration of canopy cover and maintain or increase the QMD of an overstory of multi-age, multi-species tree habitats.

_____

_____

☐ Understory vegetation was retained and distributed across the project site consistent with fire threat reduction and habitat objectives and contributes to spatial heterogeneity by varying treatments to retain untreated patches, openings and widely spaced single trees and clumps.
Please describe objectives for retention of understory shrubs and trees and estimate post-harvest areas of untreated patches and openings.

_____

B. Habitat Elements: (Pick all that apply)

☐ Snags are retained consistent with safety, FPRs, and fire threat reduction goals.
Please describe post harvest snag retention objectives and estimate the percentage of existing snags to be removed as part of the planned forest management activities.

☐ Down logs with benefit to habitat diversity are retained consistent with fire threat reduction goals.
Please describe project treatment objectives for retention of existing or project related down woody material.

☐ Large hardwoods and Legacy trees are retained as post treatment stand components and habitat.
Please describe post harvest retention objectives for hardwoods and legacy trees.

☐ Management practices and harvesting associated with the project impacts are consistent with objectives of retaining or recruiting large trees at the project and landscape level.
Please describe post harvest old growth tree retention objectives:

C. Forest Health and Fire Management Objectives: (Pick all that apply)

☐ Fire threat is reduced through treatment of ladder fuels and surface fuels to achieve reduction in incidence of crown torching in overstory trees and to avoid active crown fires under most conditions.
Please describe post harvest spatial arrangement objectives for retention of understory shrubs and trees in relation to overstory trees.

☐ Outcomes support reintroduction of prescribed fire.
Please describe, if applicable post harvest surface and ladder fuel conditions and proposed use of prescribed fire.

☐ Improvement of overall forest health through reduction in overstocking in small tree sizes and reduction of competition for soil moisture with overstory trees.
Please describe:

565 D. Air and Water Quality Protection: (Pick all that apply)

☐ Avoided emissions by eliminating need for open burning of slash piles and/or decomposition.
Please describe the relative reduction in emissions attributable to removal of material from the project site for use as fuel for energy generation in comparison to piling and burning or piling and decomposition.):

☐ Measures have been incorporated to address moist microsites, and near stream habitats.
Please describe what measures will be employed to protect moist microsites and near-stream habitats.

☐ Soil protection measures used to minimize compaction and loss of A-horizons and soil carbon. Please describe.

☐ Operational plans provide for the retention of fine woody debris to minimize potential threats to soil productivity and meet fire threat reduction objectives. Please describe.

566 E. Societal and Economic Benefits: (Pick all that apply)

☐ Project contributes to societal benefits of local communities by way of fire safety, improved environmental health and overall quality of life. Please describe.

☐ Project contributes to local economies by way of providing additional local employment opportunities and investment.
Please describe .

567
568

APPENDIX D **SB1122 Forest Biomass**

Project Eligibility Certification

Ownership Category: ☐ Private ☐ State ☐ Federal Number of Acres: _____

Type of Harvest/NEPA Document: _____ Harvest/NEPA Document Designator: _____

Facility Identifier: _____RPF License Number (if Applicable): _____

Eligible Fuel Source: (Pick one)

To meet the eligible fuel sourcing criteria the owner or operator must ensure that biomass feedstock from any project is sourced from one or more of the following project types:

☐ ***Fire Threat Reduction*** *- biomass feedstock which originates from fuel reduction activities identified in a fire plan approved by CAL FIRE or other appropriate, state, local or federal agency, Categorical exclusions on federal lands approved under 36 CFR 220.6.(e).(6)ii.*

☐ ***Fire Safe Clearance Activities****- biomass feedstock originating from fuel reduction activities conducted to comply with PRC Sections 4290 and 4291. This would include biomass feedstocks from timber operations conducted in conformance with 14 CCR 1038(c) 150' Fuel Reduction Exemption, or Categorical exclusions on federal lands approved under36 CFR 220.6(e)(6)ii and (12) thru (14).*

☐ ***Infrastructure clearance projects****- biomass feedstock derived from fuel reduction activities undertaken by or on behalf of a utility or local, state or federal agency for the purposes of protecting infrastructure including but not limited to: power lines, poles, towers, substations, switch yards, material storage areas, construction camps, roads, railways, etc. This includes timber operations conducted pursuant to 14 CC1104.1(b),(c),(d),(e),(f) &(g).*

☐ ***Other Sustainable Forest Management* –*** *biomass feedstock derived from sustainable forest management activities that accomplish one or more of the following: 1) forest management applications that maintain biodiversity, productivity, and regeneration capacity of forests in support of ecological, economic and social needs, 2) contributes to forest restoration and ecosystem sustainability, 3) reduces fire threat through removal of surface and ladder fuels to reduce the likelihood of active crown fire and/or surface fire intensity that would result in excessive levels of mortality and loss of forest cover or, 4) contributes to restoration of unique habitats within forested landscapes.*

Other Fuel Sources:

Eligible fuel from this category includes the following:

☐ *biomass feedstocks derived from other forest management activities that fail to meet the requirements of the checklist found in Appendix "C".*

☐ *biomass feedstocks that will be used at the facilities from " other " waste streams covered by SB 1122*

I hereby certify that the information contained in this certification is complete and accurate to the best of my knowledge and conforms to State and Federal Laws,

Print Name:_____ Signature:_____

As appropriate attach Forest Biomass Sustainability Byproduct Eligibility Form.

615 * **The following project types are assumed to meet the sustainable forest management criteria and**
616 **are exempted from completing the Forest Biomass Sustainability Form (Appendix C-2)**

617 1) Sustainable Forest Management projects implemented on state, federal, and private
618 ownership which involve meadow restoration, restoration of wetlands, restoration of aspen
619 and other similar activities which are undertaken for restoration purposes and are subject to
620 environmental review under CEQA or NEPA.
621 2) Operations conducted pursuant to an approved Non-Industrial Timber Management Plan
622 where the plan or amendment to the plan evaluates and provides for a discussion of
623 intended biomass operations and byproducts that may have potential significant adverse
624 impacts, evaluates potential significant impacts, and mitigates potential significant impacts.
625 3) Operations conducted pursuant to an approved Timber Harvesting Plan or Modified Timber
626 Harvesting Plans on non-industrial timberland ownerships where the landowner is not
627 primarily engaged in the manufacture of wood products and where the approved plan or
628 amendment to the plan evaluates and provides for a discussion of intended biomass
629 operations and byproducts that may have potential significant adverse impacts, evaluates
630 potential significant impacts, and mitigates potential significant impacts.
631 4) Operations with a total estimated volume of less than 250 bone dry tons.

632

Appendix D. Feedstock Specifications

FOREST- SOURCED FEEDSTOCK SPECIFICATIONS

1. **Feedstock Description**. Feedstock shall be sourced from forest based operations and will include processed tree limbs, tree tops, cull logs, brush, and small diameter stems. (Paragraph 5 below lists certain excluded materials.) The Higher Heating Value ("HHV") of the Feedstock shall be a minimum of 8,200 British Thermal Units ("Btu") per dry pound, for each delivery. The ash content, as determined by an independent third party testing service shall not exceed two (2%) by dry weight of each delivery.

2. **Maximum Moisture Content**. The maximum moisture content for the Feedstock delivered to the facility shall be forty percent (40%) by weight. Moisture content with respect to any delivery shall be determined in accordance with ASTM specifications and procedures, or equivalent.

3. **Maximum Size**. Ninety percent (90%) or more of a delivery by volume shall be less than three (3) inches in every dimension. One hundred percent (100%) shall be less than four (4) inches in any dimension.

4. **Minimum Size**. (**Fines and Sawdust)**. Fines and sawdust, defined as Feedstock of a size 1/4 inch or less, shall comprise no more than ten percent (10%) of gross tonnage for any individual truckload.

5. **Excluded Materials**. Feedstock shall not contain any foreign material, including, but not limited to, soil, sand, stone, metal, glass, rubber, plastics, pressure treated or lead based painted wood, chemicals, and any hazardous or toxic substances as defined under California or federal law.

6. **Consistent with SB 1122 Guidelines**. All forest feedstock will be sourced as byproducts of sustainable forest management (per Senate Bill 1122 guidelines).

Appendix E. Letter of Intent

WOOD FEEDSTOCK LETTER OF INTENT

This is a Letter of Intent between _____(known as the "Owner"), and Calaveras Healthy Impacts Products Solutions (known as "CHIPS").

Attached is a feedstock specification sheet that provides standards that define forest wood waste as feedstock for the CHIPS facility.

The Owner will produce approximately _____ bone dry tons (BDT) of wood waste. CHIPS desires to receive _____ BDT of this wood waste as feedstock for use in its bioenergy facility.

This Letter of Intent serves to confirm the Owner's interest in delivering to CHIPS approximately _____ BDT of this wood waste and confirms the interest of CHIPS in receiving this wood waste. Payment terms for wood feedstock delivered and accepted by CHIPS are as follows:

Insert details here.

The Owner may not assign this Letter of Intent without the written consent of CHIPS.

Each of the parties has caused this Letter of Intent to be executed by its duly authorized representatives as of the last date set forth below.

_____:

By _____

Title _____

Date _____

CHIPS

By _____

Title _____

Date _____

Appendix F. Short-Term Purchase and Sale Agreement

SHORT TERM PURCHASE AND SALE AGREEMENT

Insert Contract #

This Agreement for the sale of wood waste is made effective on _____(the "Effective Date") by and between _____ ("Buyer"), whose wood waste fueled energy facility is located at Wilseyville, California ("Buyer's Facility") and ("Seller") as shown below, whose facility is located at the _____near _____ ("Seller's Facility").

SELLER: _____
_____
_____

ATTN: _____

1. TERM

The term of this Agreement shall commence on _____ and terminate at midnight on _____.

2. QUANTITY/PRICE

Buyer agrees to purchase and accept and Seller agrees to sell and tender:

SUPPLIER NO.	TYPE OF FEEDSTOCK	QUANTITY	PRICE - $/BDT
_____	_____	_____	_____

3. FEEDSTOCK DELIVERY

Feedstock will be delivered by _____ with freight paid by **Seller.**

(a) Plant delivery hours: Monday through Friday: 6:00 a.m. to 8:00 p.m. Feedstock delivery will be made using self-unloading trailers and tractor-trailer combinations.

4. DESCRIPTION AND SPECIFICATIONS

(a) General Description. For purposes of this Agreement, "Wood Feedstock" shall mean processed (chipped) wood waste consisting of sawmill residuals, tree limbs, tree tops, and small tree stems meeting the specifications described in Section 4(b) of this Agreement. Demolition wood, wood coated with lead paint, and pressure treated wood are specifically excluded as acceptable materials.

(b) Acceptable Wood Feedstock. The maximum dimension of individual pieces of Wood Feedstock to be delivered under this Agreement shall be two and one half inches (2-1/2") or less. Oversize pieces (up to 4 inches maximum) shall comprise no more than one percent (1%), by weight, of any delivery. Pieces less than one quarter inch (1/8"), maximum dimension ("Fines"), shall comprise no more than ten percent (10%), by weight, of any delivery.

The moisture content of Wood Feedstock to be delivered under this Agreement, as measured by testing representative samples using customary laboratory procedures, shall not exceed forty five percent (45%) of any delivery.

The ash content of Wood Feedstock to be delivered under this Agreement, as measured by testing representative samples using customary laboratory procedures, shall not exceed three percent (3%), by weight, of any delivery on a "bone dry" basis.

The moisture free higher heating value ("HHV") of Wood Feedstock to be delivered under this Agreement, as measured by testing representative samples using customary laboratory procedures, shall be 8,000 BTU per bone dry pound or greater for any delivery.

Wood Feedstock shall be commercially free of oversize pieces, bone, slate, earth, rock, or any other extraneous foreign materials such as, but not limited to, plastics, metals, glue, lead paint, tar paper, petroleum or other impurities. Seller further warrants that Wood Feedstock delivered under this Agreement shall be free of any and all toxic or hazardous materials.

(c) Unacceptable Wood Feedstock. In the event Wood Feedstock delivered to Buyer at Buyer's Facility fails to meet the description, quality and specifications as described in Sections 4(a) and 4(b) above, such Wood Feedstock will be unacceptable (hereinafter referred to as "Unacceptable Wood Feedstock"). Unacceptable Wood Feedstock will be accepted and paid for by Buyer at a mutually agreed upon reduced price, which shall in no event be greater than fifty percent (50%) of the Wood Feedstock price set forth in Paragraph 2 of this Agreement, unless the Wood Feedstock is deemed unusable.

(d) Unusable Wood Feedstock. Buyer shall also have the right to refuse delivery of, or reject payment for, any truck load of Unacceptable Wood Feedstock reasonably determined by Buyer to be completely unusable in Buyer's operations ("Unusable Wood Feedstock") before or after the truck has been unloaded at Buyer's Facility. Buyer shall collect for Seller's inspection a representative sample of the Unusable Wood Feedstock from the rejected load. Buyer shall notify Seller as soon as reasonably practical upon rejection of any load of Unusable Wood Feedstock, including explanation of any reason(s) why the Wood Feedstock was determined to be unusable. Buyer may require that Unusable Wood Feedstock be removed from Buyer's Facility by Seller at Seller's expense promptly upon Buyer's determination that such feedstock is Unusable Wood Feedstock. Buyer may also require Seller to cease further deliveries of Wood Feedstock until Seller has corrected the problem which caused the Wood Feedstock to be unusable. Buyer's acceptance of the delivery of any Unusable Wood Feedstock shall not constitute a waiver of any such default, or of any rights which Buyer may have under this Agreement or as provided by law.

(e) Modification of Specifications. In the event that Buyer deems it necessary, for mechanical or economic reasons, or because of a change in government regulation, or for any other reason affecting the operation of Buyer's Facility, to change the acceptable Wood Feedstock specifications contained in Section 4(b) above, Buyer shall notify Seller, and Buyer and Seller shall each exercise best efforts to cooperatively establish appropriate revised specifications which will preserve the balance of benefits and burdens under this Agreement.

5. PAYMENT

Payments for delivered and accepted Wood Feedstock shall be made on the 25th day of each month for Wood Feedstock received from the first through the 15th day and on, or about, the 10th day of each month for Wood Feedstock received from the 16th day through the end of the previous month.

6. MEASUREMENT

For the purpose of this Agreement, two thousand (2,000) pounds of delivered weight of wood, as determined by Buyer, shall constitute one (1) unit of Wood Feedstock and shall be referred to as a Bone Dry Ton (BDT). Buyer shall determine the weight of each delivery by using a certified commercial weigh scale. Buyer's weight records and its methods of measurement and of testing for moisture content and ash content shall be subject to review by Seller at all reasonable times. Seller may make check measurements and tests for the purpose of reviewing the accuracy of Buyer's measurements and if any error is found therein, Buyer shall make appropriate changes in its measurement practices. No error shall be grounds for adjustment with respect to Wood Feedstock measured prior to the discovery of any such error.

7. REDIRECTION

Consistent with Section 3 of this Agreement, Buyer shall have the right, at any time, to direct that Wood Feedstock deliveries under this Agreement be made to any location or facility in the State of California which is capable of receiving such deliveries, provided that Buyer shall ensure that Seller is reasonably compensated, at cost, for any additional transportation and handling costs it may incur as the result of such redirection by Buyer.

8. INSURANCE

Each party shall, at their own expense, furnish and keep in force at all times during the term of this Agreement at least the following minimum insurance coverage: (i) Worker's Compensation and employer’s liability insurance coverage as required by law for the protection of all employees engaged in performing this Agreement in an amount not less than one million dollars ($1,000,000) each occurrence; (ii) Comprehensive General Liability insurance covering personal injury and property damage to a combined single limit in an amount no less than one million dollars ($1,000,000) each occurrence; (iii) Comprehensive Automobile Liability insurance coverage including owned, non- owned and hired vehicles covering bodily injury and property damaged to a combined single limit of not less than one million dollars ($1,000,000) each occurrence. Buyer shall be named an additional insured as respects its interests. Seller shall cause its policies to be

primary to Buyer's policies and shall cause its insurer to waive subrogation against Buyer.

9. FORCE MAJEURE

Seller shall be excused for failure to deliver Wood Feedstock to Buyer and Buyer shall be excused for failure to accept deliveries of Wood Feedstock from Seller, in the event, to the extent and during the time such failure is caused by labor disputes, extreme weather conditions, or by reason of partial or complete curtailment of its operations by any casualty or by any other cause beyond its reasonable control.

10. SUSPENSION AND TERMINATION

Either party may, without liability to the other, suspend performance under this Agreement when its performance is delayed or prevented by an act of God, labor dispute, government acts, or any eventuality beyond control of the suspending party; except when Wood Feedstock, stated in Section 2 above has been produced by Seller and can be delivered, by Seller and accepted by Buyer. This Agreement may be terminated by either party without further notice three (3) days after written notice of any default, which remedy shall be available in addition to all other remedies available under applicable law.

11. TITLE

Seller warrants to Buyer that Seller has lawful possession of and title to all Wood Feedstock delivered to Buyer under this Agreement and shall hold Buyer harmless from any competing claimant to such title.

12. INTEGRATION

This Agreement constitutes the entire Agreement between the parties pertaining to the subject matter hereof; supersedes all prior agreements and understandings, whether oral or written, which the parties may have in connection herewith; and may not be modified except by written agreement of the parties.

13. INDEMNITY

Seller shall protect defend, indemnify and hold harmless Buyer, its affiliates of any tier, the Buyer's directors, officers, officials, employees, other agents of any of them, from and against any cost, expense, loss, claim or liability whatsoever, including attorney's fees, and including appeals, for injury to any person or loss or damage to any property arising out of the performance or nonperformance of Seller's obligations under this Agreement including (a) the negligence or wrongful conduct of Seller, its directors, partner, officers, employees, agents or subcontractors of any tier; (b) the failure by Seller, its directors, partners, officers, employees, agents or subcontractors of any tier to comply with applicable law; or (c) any breach by Seller of any representation or warranty. Subject to Seller's obligation to initially defend, Seller is not

required to hold harmless or indemnify any indemnitee for any cost, expense, loss, claim or liability determined ultimately to have been caused by an indemnitee's sole negligence.

Buyer shall protect, defend, indemnify and hold harmless Seller, and its affiliates and subsidiaries of any tier, Seller's parent, co-venturers, partners, the directors, officers, officials, employees, consultants, other agents of any of them, from and against any cost, expense, loss, claim or liability whatsoever, including attorneys' fees, and including appeals, for injury to any person or loss or damage to any property arising out of or under this Agreement to the extent caused by the sole negligence or willful misconduct of Buyer, its directors, partners, officers, employees, agents or subcontractors of any tier.

14. ATTORNEYS' FEES

If any litigation or arbitration is commenced between the parties concerning any provision of this Agreement or the rights or duties of any person in relation thereto, the party prevailing in such litigation or arbitration will be entitled, in addition to such other relief as may be granted, to reasonable attorneys' fees and expenses incurred in connection with such litigation or arbitration.

15. WAIVER

Failure of either party at any time or from time to time to enforce any of the terms of this Agreement shall not be construed to be a waiver of such term or of such party's right to thereafter enforce each and every provision hereof. No waiver of any term or condition of this Agreement shall be affected unless made in writing, signed by the party against whom any such waiver is sought to be enforced.

IN WITNESS WHEREOF, the parties have caused this Agreement to be executed by their duly authorized representatives as of the date first set forth above.

BUYER	**SELLER**
BUYER: _____	SELLER: _____
TITLE: _____	TITLE: _____
DATE: _____	DATE: _____

Appendix G. Long-Term Purchase and Sale Agreement

LONG TERM PURCHASE AND SALE AGREEMENT

Insert Contract #

Agreement made as of _____ between _____ located at Wilseyville, California, hereinafter referred to as "Buyer", and _____, a California corporation located in _____, _____ doing business as _____, hereinafter referred to as "Seller".

RECITALS

WHEREAS, Buyer owns and operates a wood-fired energy facility located at Wilseyville, California ("Buyer's Facility"), and Seller processes biomass from its wood waste processing operation located at _____ in _____, California ("Seller's Facility").

NOW, THEREFORE, in consideration of the mutual covenants contained herein, it is agreed as follows:

AGREEMENT

1. Purchase and Sale:

Seller agrees to sell and deliver to Buyer, and Buyer agrees to purchase and receive from Seller, processed wood residues (hereinafter referred to as "Wood Feedstock") in the quantity, of the quality, at the price, and upon the terms and conditions set forth herein.

2. Description and Specifications:

(a) Seller agrees to provide Wood Feedstock consisting of processed tree limbs, tree tops, tree stems and sawmill residuals such as chips and bark, meeting the specifications described in Exhibit A-1 to this Agreement.
(b) Unacceptable Wood Feedstock: In the event Wood Feedstock delivered to Buyer at Buyer's Facility fails to meet the description, quality and specifications as described herein, such Wood Feedstock will be unacceptable (hereinafter referred to as "Unacceptable Wood Feedstock"), Buyer shall have the right to reject Wood Feedstock reasonably determined by Buyer to be Unacceptable Wood Feedstock. Unacceptable Wood Feedstock shall be removed from Buyer's Facility by Seller at Seller's expense or by Buyer at Seller's expense promptly upon Buyer's determination and notification to Seller that such feedstock is Unacceptable Wood Feedstock. Buyer's acceptance of the delivery of any Unacceptable Wood Feedstock shall not constitute a waiver of such default, or of any rights which Buyer may have under this Agreement or as provided by law.

3. Measurement:

(a) The unit of measurement shall be that quantity of Wood Feedstock which contains two thousand (2,000) pounds of wood fiber and is hereinafter referred to as a "Bone Dry Ton" and designated by the symbol "BDT".
(b) Buyer shall determine the net weight in pounds of each truckload of Wood Feedstock delivered to Buyer's facility by weighing the loaded vehicle and deducting the tare weight of the truck and trailer.
(c) Buyer agrees to pay weigh service fees for Seller to use local certified weigh scales. The weigh scales used must be certified by the State of California. Seller shall have the right to have its agent present at any weighing, and shall also have the right to have weigh scales and/or related equipment inspected and tested for accuracy by a qualified technician at Seller's expense.
(d) Buyer's records with respect to determination of weight and fiber content of Seller's shipments shall be available for inspection by Seller at Buyer's Facility at any reasonable time. If error is discovered, Buyer shall immediately make appropriate changes. If an error is repetitive or continuous, Buyer's records and payments to Seller shall be adjusted to correct such error retroactive to the point in time reasonably determined by Buyer and Seller as the initial occurrence of the error.

4. Delivery:

(b) Seller agrees to deliver Wood Feedstock to Buyer F.O.B. trucks at Buyer's Facility. Deliveries may be completed between the hours of 6:00 A.M. and 8:00 P.M., Monday through Friday. For purposes of this Agreement, "truck" includes self-unloading trailers and tractor-trailer combinations.
(c) Seller agrees to deliver Wood Feedstock using self-unloading trailers. Buyer may reject any truck, which Buyer considers unsafe for unloading.
(d) Notwithstanding anything to the contrary contained in Article 4 or Article 7 herein, Buyer shall have the right, at any time, to direct that Wood Feedstock deliveries hereunder be made to any Facility within the State of California which is capable of receiving such deliveries, provided that Buyer shall provide Seller with verbal notification of its intention to so direct at least forty-eight (48) hours in advance of required delivery. Buyer shall compensate Seller for actual additional transportation costs incurred by Seller as a result of such redirection by Buyer.
(e) Seller's trucks shall be maintained at all times in a safe and legal condition. Prior to the first delivery hereunder, and subsequently as reasonably requested by Buyer, Seller shall provide evidence to Buyer's satisfaction that Seller's trucks and truck drivers are insured at least to the minimum standards required by law, but not less than one million dollars ($1,000,000) general liability and property damage per incident.
(f) Seller shall keep Buyer informed of its production schedule so that the parties can make the necessary arrangements with each other and with third parties for efficient delivery of the Wood Feedstock purchased and sold hereunder.

5. Term:

(a) This Agreement shall become effective upon execution. The Term of this Agreement shall commence _____ and shall terminate _____, unless extended in accordance with Article 5(c) herein.
(b) The Term shall consist of five (5) years ("Contract Years"). Contract Years shall be consecutive, and shall begin on January 1st and end on December 31st of each calendar year.
(c) The Term of this Agreement shall be automatically extended for an additional three years on _____, and shall be automatically extended on each subsequent December 31st for an additional three years, unless either party hereto provides written notice of no extension of the Agreement to the other party no less than 90 days before December 31st.

6. Quantity:

(a) Seller shall sell and deliver to Buyer at Buyer's Facility, and Buyer shall purchase and receive from Seller, _____Bone Dry Tons of Wood Feedstock during each Contract Year (hereinafter referred to as the Annual Quantity").

7. Price:

(a) Base Price: The Base Price for which Seller agrees to sell and deliver to Buyer's Facility, and at which Buyer agrees to purchase and receive Wood Feedstock hereunder, shall be fixed during the first Contract Year ($_____/BDT) as follows:
(b) Annual Escalation: Effective on the first day of the second Contract Year (specifically, _____, and on the first day of each succeeding Contract Year, the Base Price in effect during the prior Contract Year shall be increased by two percent (2%) and shall remain at the increased level for the duration of the then-current Contract Year. Notwithstanding the foregoing, no price increase shall take effect in any Contract Year unless and until the Annual Quantity of Wood Feedstock required to be sold and delivered to Buyer by Seller during the previous Contract Year (as described in Article 5(b) herein) is purchased and received by Buyer. The following schedule defines volume and price during the initial term of this Agreement.

Contract Year	Price/BDT
1	$ _____
2	$ _____
3	$ _____
4	$ _____
5	$ _____

8. Payment:
(a) Payments for delivered and accepted Wood Feedstock shall be made on the 25th day of each month for Wood Feedstock received from the first through the 15th day and on, or

about, the 10th day of each month for Wood Feedstock received from the 16th day through the end of the previous month.

(b) Buyer shall forward to Seller with Buyer's periodic payment Buyer's certificate showing net weight of each delivery made during the accounting period for which payment is being made. If within thirty (30) days of receipt of the statement, Seller does not make a report in writing to Buyer of an error, Seller shall be deemed to have waived any error in Buyer's statement and payment, and they shall be considered correct and complete.

9. Binding Effect: Successors and Assigns:

(a) This agreement shall be binding upon and inure to the benefit of the parties hereto and their respective successors and assigns.

(b) Neither party hereto shall assign or otherwise convey any of its rights, titles or interest under this Agreement without the prior written consent of the other party hereto (which consent shall not be unreasonably withheld); provided, however, that without any such consent, either party hereto or its respective successors or permitted assignee may assign any or all of its rights, titles and interest hereunder to:

(I) any person, corporation, bank, trust company, association or other business or governmental entity as security in connection with obtaining or arranging financing for such party; or

(II) any person, corporation, bank, trust company, association or other business or governmental entity in order to enforce any security assignment described in Article 9(b)(I).

(c) Unless otherwise agreed by the parties hereto in a separate writing, no permitted assignment described above shall relieve the assigning party from any of its obligations under this Agreement.

10. Notices:

Each party shall designate in writing a representative to receive notices hereunder. Any notice, given by either party to the other party to the other bearing on this Agreement shall be sent by telegram or by certified mail, postage prepaid, return receipt requested, properly addressed to such representative. The representatives so designated are as follow:

Buyer:

Seller:

If notice is sent by overnight mail as provided hereunder, it shall be deemed delivered as of two (2) business days after it is transmitted; if notice is sent by certified mail as provided hereunder, it shall be deemed delivered as of three (3) business days after it is deposited in the U.S. Mail as provided herein. Either party may change the person or address specified in this Article upon giving the other party written notice of such change. Routine operating instructions, requests,

directions and notices shall not require a notice as above provided and may be given in such manner and to such persons as may be customary or practicable.

11. Default and Remedies:

(a) The failure by Buyer or Seller (the "Defaulting Party") to fulfill substantially any material obligations to the other party (the "Nondefaulting Party') under this Agreement unless excused by Force Majeure shall constitute an Event of Default; provided that no such failure, action, or event shall constitute an Event of Default unless and until:

(I) The Nondefaulting Party shall have provided written notice to the Defaulting Party specifying that an act, event or failure to act ("Default") has occurred which will, unless cured, constitute an Event of Default; and
(II) The Defaulting party shall not have cured such Default within thirty (30) days from receipt of notice from the Nondefaulting Party.

(b) If during the Term of this Agreement, an Event of Default shall occur, then in any such case, in addition to any other remedies it may have, the Nondefaulting Party, at its option, may terminate this Agreement by providing written notice to the Defaulting Party.

12. Force Majeure

(a) Any delays in or failure of performance by Buyer or Seller, other than payment of money owed for Wood Feedstock delivered and accepted under the terms of this Agreement, shall not constitute default hereunder if and to the extent such delays or failure of performance are caused by occurrences beyond the reasonable control of Buyer or Seller, as the case may be, including but not limited to acts of God, or the public enemy; expropriation or confiscation of facilities; compliance with any law, change of law, or government regulation or judicial or governmental order; act of war, rebellion or sabotage or damage resulting there from; fire, flood, earthquake, explosion, accident, breakdown of machinery, riot, strike or other concerted acts of workmen, whether direct or indirect; or any causes which are not within the reasonable control of Buyer and Seller, respectively, and which by the exercise of reasonable diligence Buyer or Seller are unable to prevent.
(b) If either party is rendered wholly or partly unable to perform its obligations under this Agreement because of Force Majeure, that party shall be excused from whatever performance is affected by the Force Majeure to the extent so affected, provided that:

(I) the non performing party, promptly after the occurrence of the Force Majeure, gives the other party written notice describing the particulars of the occurrence, and its plans to repair or to take other actions to cure its inability to perform;
(II) the suspension of performance is of no greater scope and of no longer duration than is reasonably required by the Force Majeure.

(III) If the event of Force Majeure continues for one year or longer the party not requesting excuse of performance may terminate this Agreement by providing written notification to the other party.

13. General Provisions

(a) Entire Agreement. This Agreement and any exhibits attached hereto shall constitute the entire agreement between the parties, and there are no representations or understandings, oral or written, between them as of the date hereof other than as set forth herein.
(b) Relationship of the Parties. Seller shall at all times act as an independent contractor with respect to the performance of this Agreement. Neither Seller nor any employees or agents of Seller shall be considered an employee or agent of Buyer for any purpose. Neither Seller nor any employee or agent of Seller shall represent themselves to be an employee nor is agent of Buyer and Seller totally responsible for its operations.
(c) Amendments. No wavier, alteration, modification or termination of this Agreement or any of the provisions hereof shall be binding unless in writing and duly executed by the party to be bound thereby.
(d) Governing Language. This Agreement and the rights and obligations of the parties hereto shall be governed by and construed under the laws of the State of California.
(e) Waiver. The failure of either party at an time or from time to time to enforce any of the terms of this Agreement shall not be construed to be a waiver of such term or of such party's right to thereafter enforce each and every provision thereof.
(f) Ownership: Legal Compliance. Seller represents and warrants that it has all right, title, and interest in the Wood Feedstock delivered hereunder and that the same is free from all liens and encumbrances. Seller guarantees that all Wood Feedstock delivered under this Agreement shall be produced and delivered incompliance with all applicable federal, state, and local laws and regulations, including without limitation OSHA and environmental regulations.
(g) Indemnity. Each party shall indemnify, defend and hold harmless the other party, its officers, directors, agents, and employees against all loss, claims, damage, expense, and liability to third persons for injury to or death of persons or injury to property, proximately caused by the indemnifying party's negligent of willful acts or omissions in connection with this Agreement. The indemnifying party shall, on the other party's request, defend any suit asserting a claim covered by this indemnity. The indemnifying party shall pay all costs that may be incurred by the other party in enforcing this indemnity. Obligations of the parties pursuant to this Article 13 shall continue in full force and effect notwithstanding the termination of the remainder of this Agreement.

BUYER	**SELLER**
BUYER: _____	SELLER: _____
TITLE: _____	TITLE: _____
DATE: _____	DATE: _____