Placer County
AIR POLLUTION CONTROL DISTRICT

Placer County Community Biomass Removal Program

Final Report Clean Air Grant Program - 2008

Placer County
California

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Placer County Community Biomass Removal Program

Program Overview

With the Placer County Air Pollution Control District (PCAPCD) Clean Air Grant (contract number 25299), and matching funds Placer County implemented our Community Biomass Removal Program. The Community Biomass Removal Program consists of multiple facets including a Biomass Box option and a Regional Biomass Collection system option.

In the spring of 2007 with partial funding from a PCAPCD Clean Air Grant and matching funds Placer County implemented a "Biomass Box" program. The program objective was and remains twofold: First, it encourages county residents to clear defensible space around their homes to improve fire safety and survivability. Secondly, it provides a means for collection (the "box" or the regional location) and utilization of the resultant brush, tree limbs, natural debris, etc. (or as its called, "biomass") for use as fuel for producing energy. Use of biomass wastes in this manner is in marked contrast to the current practice of open burning on site. This program was continued for this grant and has been hugely successful.

Open burning of biomass

During this project we collected 1,944 green tons (1,069 Bone Dry Tons) of material that was converted to 1,160 MW of electrical energy (enough to power 115 homes for one year). Because this material was burned in a controlled facility instead of open burning the net air pollution reduction was over 70 tons of particulate matter and ozone causing air pollutants.

Program Details

The first step of the program provided residents of urban forested areas with information, training, and assistance in clearing biomass and maintaining "defensible space" around homes and businesses. Clearing during spring, summer, and fall was encouraged in order to reduce the effects of wildfire, something most prevalent in the "fire season" which occurs annually from May to November.

Biomass Box Program:

For this program numerous "biomass boxes," large 20' to 40' industrial containers, were placed throughout the participating communities for collection of biomass materials. Boxes were placed throughout the County from the Tahoe region in the east to the extreme western end of the County. Local fire agencies, homeowners associations and Fire Safe Councils organized and promoted the use of the boxes.

A typical 40' biomass box

Finally, our regional waste management partners -- Auburn Placer Disposal (now known as Recology) in the west end of the county, and Tahoe Truckee Sierra Disposal in the east end, were able to efficiently pick up the boxes. Typically the boxes were delivered on a Friday and filled all weekend supervised by the groups, and then picked up on a Monday. They would then deliver them to a regional drop off station, grind the biomass into useable fuel that energy companies accept. This "chipped biomass" was then loaded onto larger trucks and hauled to one of three biomass utilization facilities (Rio Bravo Rocklin in the west and SPI Loyalton and Carson City in the east).

Loading Biomass in a truck for transport to energy facilities

Regional Biomass Collection Program:

The County worked directly with fire prevention agencies, fire safe council groups, home owner associations and local trimming contractors to allow materials to flow into regional areas rather than ending up burned at local residences. Several location in and around the Lake Tahoe basin were operational. No regional sites were developed in the West end of the county during this grant period. The grant funding was used to work with a regional business (CTL Inc.) that captured the material, ground it into chips then

transported that material to the nearest energy facility (this was to Loyalton, California or Carson City, Nevada). We had several landings throughout the region to have woody biomass stored until the portable tub grinder (state and PCAPCD approved) came to chip the material and haul it to the biomass plants. The dollars they received from the biomass sales were placed back into our program to stretch the grant and matching dollars as far as possible. CTL has proven exceptional in their performance not only in the grinding, hauling and selling of the biomass material at market but as an invaluable asset in their overall analysis support of our future programs by providing business insight into operations. They are one of the only contractors that have been authorized to work projects in the delicate environmental setting of Lake Tahoe.

A Regional Biomass Collection Location

Some regional location's were able to store material, have it ground on-site and then loaded into trucks for delivery, others were located in neighborhoods (such as a homeowners association) where the forest slash material had to be loaded onto a truck and then delivered to another regional site to be ground and hauled to the energy facility.

A Regional Biomass Location - Material needed to be hauled to a central grinding location

All of CTL's portable equipment and engines were registered with the State (as required by PCAPCD), and were operated in compliance with permit requirements as documented by PCAPCD staff inspection and program observations.

Collection Location:
Grinding and loading Biomass in a truck for transport to energy facilities

Both Programs complement other county fire prevention programs, including Defensible Space Inspections, chipping and Shaded Fuel Break Maintenance. The County continues to try and meet the demand for this highly successful program throughout the region. We appreciate the CAG funding for this and other projects that remove biomass from open burning to clean energy production.

Problems Encountered / Services not performed from Original Grant Application

No significant problems were encountered but we did have some issues at one or two of the regional sites that we were able to make changes to affect the outcome for future operations. The program was well received, residents and businesses were enthusiastic and grateful for the program, and it was, in all, a great success. Considerations for future efforts include:

- As stated above we did encounter a problem at one location. One of our regional locations was not supervised during all hours. This location was an established site that was run by one of the fire agencies during the summer and fall. Various forms of garbage were dropped off and not found prior to the grinding operations

which caused several blades to break and have to be replaced. The community had thrown metal chains and other artifacts into the pile. Subsequently all operations were halted at that site and more rigorous vigilance was used before completing operations at that location.

- The other factor at the regional locations was that of dirt and rocks within the piles. Often when multiple operations are combined in one location issues exist. In one of our regional locations we shared operations with road work operations. Several drop-offs of the wrong material into our biomass piles were found so that the material contained too much dirt and rocks to be valuable at the biomass market locations. Further a fire was started at one of the piles and the local agency reacted to put dirt into the pile as they tried to put the fire out by a loader. We were forced to take that mixed material to the transfer station where they sorted out the material. We have since changed the operational conditions on that site to keep the two operations clear from each other.

Benefits to the Air District and Placer County from the Implementation of the Community Biomass Removal Project

Placer County wishes to thank Bruce Springsteen of the PCAPCD for his assistance in all of the calculations regarding pollutants.

Table 1 shows, under the Placer County Biomass Removal Program in the Years 2008 and 2009, the quantity of biomass that was collected, processed, and transported for use as fuel to the biomass-to-energy facilities, and biomass used for erosion control at a ski resort:

Green Tons	1,944
Bone Dry Tons	1.069
Cubic Yards	15,507

Table 1. Biomass Production under the Placer County 2008 Biomass Collection Program

Project / Contractor	Biomass Plant	Material Moved			Loads
		Yards	Tons green	Tons dry	
ERLF	Loyalton	153	27.8	15.3	1
Recology Auburn	Rio Bravo	511	92.9	51.1	4
TTSD	Loyalton	2794	508.0	279.4	21
CTL					
Tahoe Vista (07/29/08-07/31/08)	Loyalton	1372	249.5	137.2	6
Dollar Point (07/31/08-08/26/08)	Loyalton	1003	182.3	100.3	5
North Star (08/13/08-08/21/08)	Northstar ski resort	2100	381.8	210.0	16
Homewood (08/27/08-09/08/08)	Carson City	1553	282.4	155.3	11
Homewood (07/03/08-09/03/08)	Loyalton	2258	410.6	225.8	13
Carnelian Woods (10/21/09-11/4/09)	Loyalton	1049	190.7	104.9	7
TOTAL MOVED TO POWER PLANT		10693	1944.3	1069.3	68
TOTAL USED FOR SKI SLOPE EROSION CONTROL		2100	381.8	210.0	16

Emissions reductions were determined by comparing:

- Biomass Box Program -- Emissions that occurred from the collection, processing, and transport of biomass for use as fuel at biomass power plants, and emissions from the biomass power plants.

- Regional Biomass Collection Program -- Emissions that occurred from the collection, processing, and transport of biomass for use as fuel at biomass power plants, and emissions from the biomass power plants.

- Baseline Avoided -- Emissions that would have occurred had the biomass been open pile burned in the field.

Emissions were determined for:

- CO (carbon monoxide)
- NO_x (nitrogen oxides)
- PM_{10} (particulate matter, diameter less than 10 microns)
- NMOC (non-methane organic hydrocarbons)
- CH_4 (methane)
- CO_2 (carbon dioxide)

Table 2 summarizes the emissions benefits from use of the Biomass Removal Program. Appendix A shows background information, including emissions factors that were used by PCAPCD staff to make the emission determinations.

Table 2. Emissions Reductions Achieved by Placer County 2008 Biomass Collection Program

	Air Emissions (tons)				
	NOx	PM10	VOC	CO	CO2
Biomass Project					
Biomass Boiler	1.34	0.184	0.053	5.00	1960.6
Biomass Processing and Transport					
Tub Grinder, Loader	0.07	0.105	0.004	0.09	19.3
Chip Van Transport	0.15	0.004	0.005	0.36	20.1
TOTAL	1.56	0.292	0.062	5.46	1999.9
Baseline (Without Biomass Project)					
Open Pile Burning	3.05	7.619	5.079	63.49	1926.5
Displaced Power, Existing Grid	0.08	0.046	0.010	0.16	452.8
TOTAL	3.13	7.665	5.090	63.65	2379.3
Emission Reductions	1.57	7.373	5.028	58.20	379.4
% Reduction	50%	96%	99%	91%	16%

Program Summary

The value of the PCAPCD funding to the health and well-being of the citizens of Placer County can be in part judged by the amount of biomass material not burned in the open lessening the amount of pollution released into the atmosphere. More importantly, the program provides a landmark opportunity for providing an economically self-sustaining solution to the problem of reducing the effects of over forestation in a healthy manner. Placer County appreciates the Air Pollution Control District's support, through this grant and supporting guidance that will allow the biomass removal program to continue to grow and shrink the amount of material burned thereby reducing pollution.

Appendix A

	A	B	C	D	E	F	G	H
3	Process	Units	NOx	PM10	NMOC	CO	CO2	CH4
4	Open Pile Burning	lb/dry ton wood	6	15	10	125	3667	6
5	Chip Van Engine	g/mile	17	0.4	0.5	40	2222	
6	Chip Van	g/mile unpaved road		2.1				
7	Grinder Engine Tier III	lb/wet ton wood	0.072	0.003	0.004	0.093	19.8	
8	Grinder	lb/green ton		0.105				
9	SPI Loyalton Boiler	lb/dry ton wood	2.5	0.344	0.1	9.36	3667	
10	California Electricity Grid	kg/MWh	0.067	0.04	0.009	0.14	390	
11								
12								
13	Miscellaneous Factors							
14								
15	Other factors	Units						
16	Open Pile Burning Efficiency	tons wood burned/dry ton	0.95					
17	Chip Van Engine Mileage	miles/gal	4.5					
18	Diesel CO2 Emissions	kg CO2/gal diesel	10					
19	Grinder Efficiency	gal diesel/wet ton wood	0.9					
20								
21								
22	Program Performance							
23								
24	Performance	Units						
25	Wood Moved	BDT	1069.3					
26	Wood Moisture	%	45					
27	Wood Moved	green tons	1944.2					
28	Wood Heating Value (Btu/dry lb)	Btu/dry lb	8500					
29	Wood Firing Rate	MMBtu	18178.1					
30	Boiler Efficiency	%	22%					
31	Electricity Output	MWh	1159.8					
32	Chip Van Loads	loads	68.4					
33	Round Trip Van Distance	miles	120					
34	Total Miles Traveled	miles	8208					