

Tahoe Basin Biomass Facility Feasibility Assessment

Placer County Executive Office
&
TSS Consultants

February 8, 2008

Background

- The Project
- Project Study Sponsors
- Project Study Funding
- TSS Consultants

The Situation

- Placer County has been focusing efforts working with agencies on thinning forests to reduce wildfire risks and to improve their health
- Forest thinnings produce a significant volume of woody biomass that can become a disposal issue
- Due to current low values of this material there is an associated expense of disposal by pile burning, chipping and spreading, or hauling it to remote disposal sites
- The U.S Forest Service and Placer County are providing matching funds for a technical feasibility assessment for a biomass energy facility in the Lake Tahoe Basin

Fuel Supply Requirements for a Typical Wood Fired Facility

- Sustainable long term supply located within close proximity (25 to 50 mile radius)
- Economically available
- Environmentally available
- Meets quality specifications
- Available in quantities and from diverse sources that support project financing

Woody Biomass Supply Sources in the Tahoe Basin

- Forest fuels treatment residuals
- Defensible space biomass thinnings
- Timber harvest residuals

Woody Biomass Supply for the Burton Creek Project

Scaled at 1 to 3 MW, the project will utilize between 3,000 and 24,000 bone dry tons of woody biomass fuel per year. This equals between 2 and 6 trucks a day. The fuel will be sourced from:

- Forest fuels treatment residuals

 - Public lands – USFS, BLM, Nat'l Park Service, State Parks, California Tahoe Conservancy

 - Private lands – Residential, Commercial

- Timber harvest residuals

 - Public lands – USFS, BLM

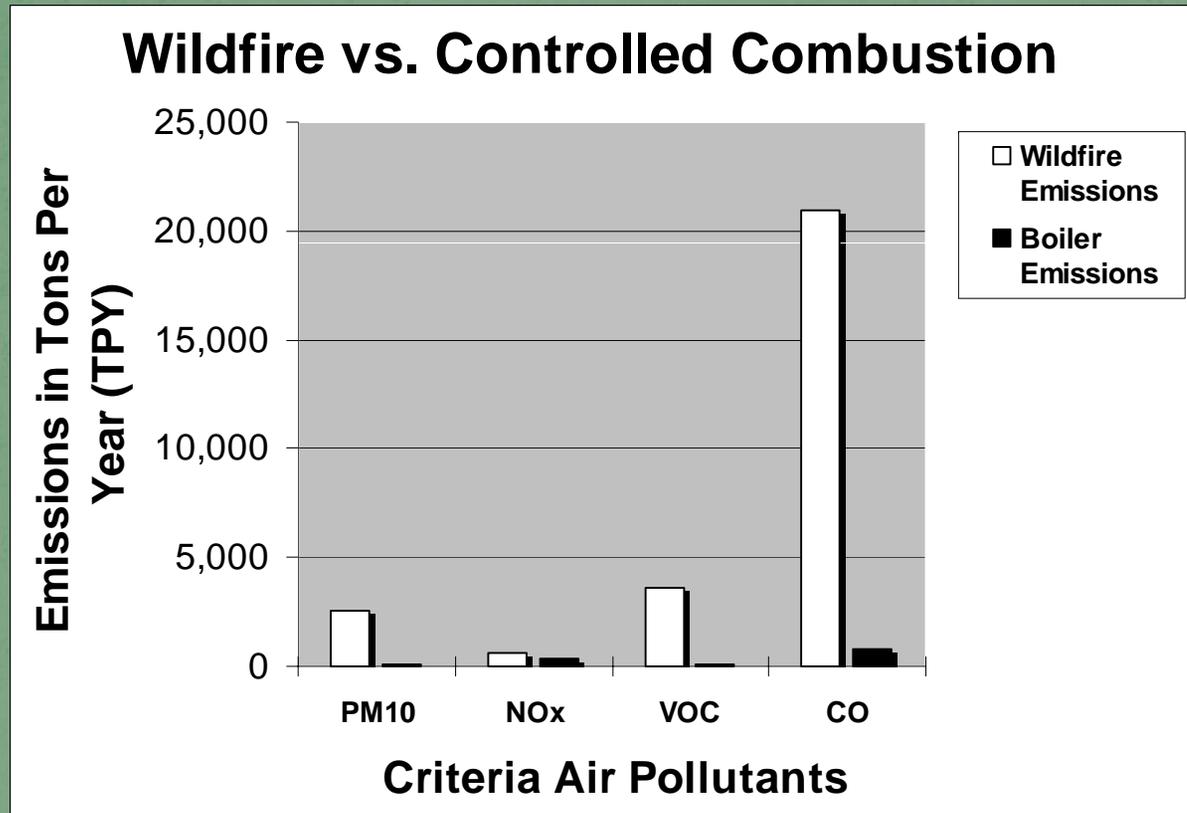
 - Private lands

Air Quality in the Tahoe Basin – A Critical Concern

- The burning of forest materials, whether by wildfire or pile burning, can severely impact air quality



Wildfire vs. Biomass Facility Emissions

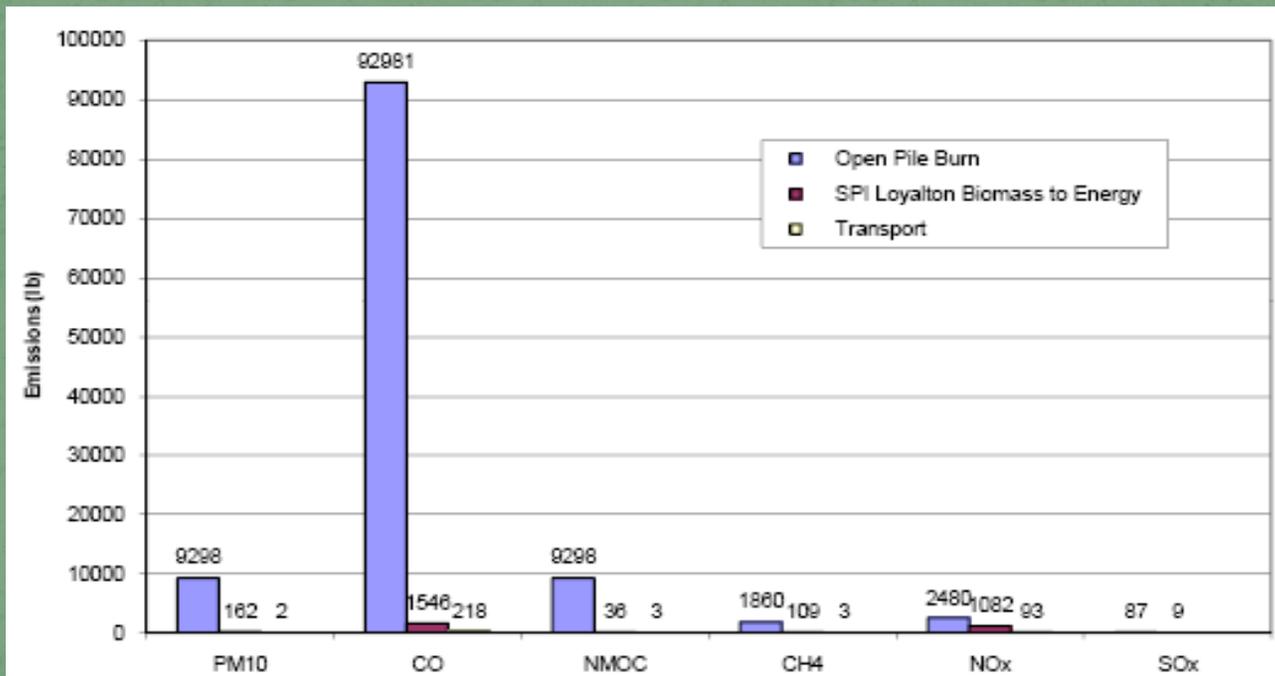


Emission values from U.S. EPA AP-42

Biomass Fuels from Placer County Program to Biomass Plant Comparisons

- As part of the Placer County Green Biomass Box program, 620 tons of woody biomass was diverted from being pile burned in the open to a regional biomass energy plant
- The calculated differences in emissions between pile burning and use as an energy source in a controlled combustion environment were dramatic

Tahoe - SPI Loyalton	PM10	CO	NMOC	CH4	NOx	SOx
	emissions in pounds					
Open Pile Burn	9,298	92,981	9,298	1,860	2,480	87
SPI Loyalton Biomass Plant	162	1,546	36	109	1,082	9.3
Transport (100 miles)	2.2	219	2.7	2.7	93	0



Data and chart courtesy of the Placer County Air Pollution Control District

A Critical and Viable Solution

- Using woody biomass generated from forest thinnings to generate electrical power and heat is a conversion option that should be pursued
- A critical initial step in the pursuit of this potential opportunity is an understanding of which conversion technologies could be available to optimize the conversion process

Project Objectives

- Assessment of small-scale (1 to 3 MW) biomass combined heat and power technologies for deployment in the Lake Tahoe Basin at the proposed Burton Creek Facility
- Evaluation will have strong emphasis on systems with very low emissions
- Needs to be environmentally compatible with the Lake Tahoe Basin while utilizing locally available biomass fuels

Technology Assessment Scope of Work

- Task 1 – Technology assessment – focus will be on gasification/combustion systems (up to 20) in a Combined Heat and Power (CHP) application
- Assessment will include advanced direction combustion systems which could meet the stringent air quality standards of the Lake Tahoe Basin, Placer County , and state and federal agencies
- Needs to be environmentally compatible with the Lake Tahoe Basin while utilizing locally available biomass fuels

Scope of Work (cont'd)

- Using a systematic approach and methodology to review the benefits, challenges, and tradeoffs of various technologies, the following parameters will be addressed:
 - Air emissions and air quality standards
 - Site considerations such as land use constraints, water supply, etc.
 - Community, regulators, and stakeholder acceptance
 - Power/heat – proposed demand on site

Scope of Work (cont'd)

- Parameters to be addressed (cont'd):
 - Project economics
 - Water use/wastewater discharge
 - Estimated capital investment
 - Ash composition
 - Excess/emergency power potential for the local grid

Scope of Work (cont'd)

- Task 2 – Technology matrix – Biomass technology developers/vendors will be queried with Task 1 parameters to obtain technology utilization and preliminary cost estimates
- This task will summarize potential “fatal flaws” and analyze how these might be overcome
- The matrix and detailed review will be limited up to three of the most promising technologies

Example Evaluation Matrix

<p align="center">Table 6-1 BIOMASS RENEWABLE ENERGY FACILITY EVALUATION MATRIX Weighted Value Range: 0 to 10 10 = highest rank 0 = lowest rank Highest four total scores in red</p>								
	Vendor and Lead Contact	Proven Technology	Biomass Utilization Experience	Biomass Fuel Flexibility	Air Emissions (Projected)	Capital Costs	User Friendly Operation (Projected)	Total Points
13	Emery Energy Company 157 W. Pierpoint Ave. Salt Lake City, UT 84101 801.364.8283 bphillips@emerveregy.com	5	5	5	7	4	5	31
DEFINITIONS:								
Proven Technology: Are there actual units of similar size with operating history in the field on a commercial scale and sold to commercial entities? 10 = Many same scale units operating over 5 years with same design and fuels. 5 = Some similar scale units operating over 2 years with similar design and fuels. 0 = No same size units operating in the field.								
Biomass Utilization Experience: Do they have experience in biomass utilization? 10 = Experience in combusting woody biomass, MSW, biosolids. Proven ability to handle a variety of biomass fuels. 5 = Experience in combusting woody biomass, but not necessarily MSW and/or biosolids. 0 = No experience in combusting woody biomass.								
Biomass Fuel Flexibility: Can they burn a wide range of woody biomass, MSW and biosolids fuels? 10 = Can demonstrate ability to handle a wide range of fuels, including 100% of one type, swinging to 100% of another type, and any combination in between. 5 = Limited experience with a wide range of fuels, relatively narrow moisture content and sizing parameters. 0 = No demonstrated ability to handle a mix of biomass fuels.								
Air Emissions (projected): Demonstrated ability to control air emissions to comply with Best Available Control Technology (BACT) standards. 10 = Demonstrated ability to control air emissions to an "ultra-clean" level. 5 = Demonstrated ability to control air emissions to meet AZ standards. 0 = No demonstrated ability to control air emissions.								

Results and Recommendations

- A working document for stakeholder review will be produced that summarizes the technology assessment, and provides an analysis of project implications, along with technology recommendations
- Next steps
 - RFP process for design and build of system
 - Integrate into Burton Creek Justice Center design process

Future Timeline for Facility

- Decision Point - end of 08
 - Total funding profile 10 million
 - 7 million has been defined
 - Public/private venture
- Multiple analyses - during 08
 - Business plan
 - Environmental
 - Energy Economics
 - Logistical
- Decision point - spring 09
 - Full funding
 - Contract award for biomass system
- Possible completion date - 2010/2011