

Survey of Small Scale Boiler Systems in the Sierra Nevada Region

TSS Consultants – May 2015



Survey Region

- Using the Sierra Nevada Conservancy region
 - All or part of 22 counties in the SNC jurisdiction
 - All or part of 15 air districts with the SNC jurisdiction
 - These counties/air districts overlap



Survey Contacts & Methodology

- Contacted the air districts via email and telephone
- Given some of the limited readily available data, also contacted various county Public Works and Facilities Management Departments

Agency Response

Air District*		County*		SNC Region
Modoc	x	Modoc	x	SNC North
Lassen		Lassen		SNC North
Shasta	x	Shasta	x	SNC North
Northern Sierra	x	Plumas		SNC North Central
Northern Sierra		Sierra	x	SNC North Central
Northern Sierra		Nevada	x	SNC Central
Tehama		Tehama		SNC North Central
Butte	x	Butte	x	SNC North Central
Feather River	x	Yuba	x	SNC Central
Placer	x	Placer		SNC Central
El Dorado	x	El Dorado	x	SNC Central
Amador		Amador	x	SNC South Central

Agency Response (cont'd)

Air District*		County*		SNC Region
Calaveras	x	Calaveras	x	SNC South Central
Tuolumne		Tuolumne	x	SNC South Central
Mariposa		Mariposa	x	SNC South Central
San Joaquin Valley	x	Madera	x	SNC South
San Joaquin Valley		Fresno		SNC South
San Joaquin Valley		Tulare		SNC South
San Joaquin Valley		Kern		SNC South
Great Basin	x	Alpine	x	SNC East
Great Basin		Inyo	x	SNC East
Great Basin		Mono	x	SNC East
Respondents	10	Respondents	15	

* - Survey respondents are indicated with an "x"

Survey Questions Posed

- Are there any buildings in your Air District with a boiler heating system?;
- Who is the permit holder or what are the buildings in which the boilers are operating?;
- What city or town are they located in?;
- What is the boiler capacity in million Btu's per hour (MMBtu/h);
- What is the fuel type currently used?

Survey Limitations

- The quantity and quality of information on permitted boilers varied significantly by Air District.
- Air District regulations are not standardized regarding the boiler size exempted from having to obtain an air quality permit to operate a boiler in their jurisdiction.
- When the exempted boiler capacity in MMBtu/hour is large (such as in Amador, Calaveras, Tuolumne, and Mariposa Air Districts), few, if any, permits may be on file

Boiler Permit Exemptions

Air District	Exempted Size in MMBtu/h	District Rule Number
Modoc	5	2.2
Lassen	Not specified	2:01
Shasta	1 (uncertain)	2:05
Northern Sierra	3	402
Tehama	Not specified	2:4
Butte	1	401
Feather River	Not specified	R4-3
Placer	1	501
El Dorado	1	501
Amador	50	402
Calaveras	50	402
Tuolumne	50	402
Mariposa	50	402
San Joaquin Valley	5	2020
Great Basin	15	R201

Compiled Database Format

Air District	County	Town	Building/ Permittee	Fuel Source	MMBtu/h size class	MMBtu/h
Modoc	Modoc	Alturas	County Courthouse	Kerosene	1 to 5	Not specified
Tuolumne	Tuolumne	Sonora	Tuolumne General Medical Facility	Diesel (No. 2)	1 to 5	1.843
Butte	Butte	Oroville	Butte-Glenn Community College	Nat Gas	1 to 5	1.2

Natural Gas in the Sierras

- PG&E natural gas is limited in the Sierra Nevadas
- Propane is the most common heating fuel



Fuel Cost Comparisons

Energy Type	Current Price		Energy Content		Price per Unit Energy		System Efficiency	All-In Price per Unit Energy	
Propane	2.10	\$/gal	91,500	Btu/gal	22.951	\$/MMBtu	0.80	28.693	\$/MMBtu
Propane	2.65	\$/gal	91,500	Btu/gal	28.962	\$/MMBtu	0.80	36.208	\$/MMBtu
Natural Gas*	0.775	\$/Therm	100,000	Btu/Therm	7.754	\$/MMBtu	0.80	9.692	\$/MMBtu
Electricity @ 12¢	0.12	\$/kWh	3,412	Btu/kWh	35.170	\$/MMBtu	0.98	35.888	\$/MMBtu
Electricity @ 17¢	0.17	\$/kWh	3,412	Btu/kWh	49.824	\$/MMBtu	0.98	50.841	\$/MMBtu
Woody Biomass Feedstock	35	\$/BDT	8,500	Btu/lb	2.059	\$/MMBtu	0.70	2.941	\$/MMBtu
Woody Biomass Feedstock	60	\$/BDT	8,500	Btu/lb	3.529	\$/MMBtu	0.70	5.042	\$/MMBtu

Types of Buildings and Potential Outreach

- Public Buildings
- Medical Facilities
- Educational Facilities
- Resorts and Hotels

Recommendations

- Outreach brochure/webpage illustrating potential fuel savings
- Air districts could use a tailored outreach program
- County buildings are a unique opportunity and could use a tailored outreach program
- Continued funding of biomass thermal feasibility studies.

Counties Expressing Interest During Survey

- Bear Valley, Alpine County
- Bridgeport, Mono County
- Cameron Park, El Dorado County
- El Dorado Hills and Placerville, El Dorado County
- Independence, Inyo County
- Mariposa, Mariposa County
- Nevada City, Nevada County
- San Andreas, Calaveras County
- Sonora, Tuolumne
- Oroville, Butte County
- Redding, Shasta County