

**Town of Mammoth Lakes’
Environmental Public Benefit Funds
Woodstove Replacement Program 2014-2015**

FINAL REPORT

by Lisa Isaacs, WRP Administrator

Submitted June 30, 2015

**for presentation to the Town of Mammoth Lakes
and Great Basin Unified Air Pollution Control District
*in fulfillment of ‘Environmental Public Benefit Funds’ contract provisions***

Background

Following an early 2014 agreement between the Great Basin Unified Air Pollution Control District (APCD) and Los Angeles Department of Water and Power, APCD Board member agencies, including the Town of Mammoth Lakes (“Town”), received settlement funds allocated on a per capita basis to directly pay for air pollution prevention programs within their districts. The Town was allocated \$274,963 of these “Environmental Public Benefit Funds” or EPB funds.

To receive the allocated EPB funds, the Town was required to submit a brief project proposal and work plan to APCD for review, approval, and tracking purposes. Town Senior Planner and Air Quality Manager, Jen Daugherty, was designated as the Town’s project manager for these funds.

In consideration of several recently successful and popular wood smoke and air pollution reduction programs in Mammoth Lakes, which were also funded by the APCD¹, the Town proposed spending the EPB funds on a woodstove replacement program (WRP) that would immediately and directly reduce wood smoke emissions from wood-log-fueled heating systems in Mammoth Lakes. Furthermore, at the time of EPB funds availability, over 35 people in Mammoth Lakes had placed their names on waiting lists held by several participating vendors in the event more funding became available for additional woodstove replacements.

Proven to directly impact human health, wood smoke is targeted by state and federal regulators for control and reduction. Its airborne particulate matter, or ‘PM,’ is of noted concern, especially particulates measuring 10 or less micrometers² in diameter, to even finer particles of 2.5 PM and less, and soot. Because they’re so small, PM 10 and PM 2.5 particulates are inhaled deeply into the lungs with detrimental effects. Additional components of wood smoke and soot, including sulfur and nitrogen oxides (SOx and NOx), carbon monoxide (CO), volatile organic compounds (VOCs) and other reactive organic gases (ROGs), are also identified as posing a threat to human health.

¹ 2009 Air District voucher program; 2013 ‘Clean Air Projects Program’; 2014 CAPP’s TOML block grant program.

² Unit of measurement equal to one millionth of a meter; a.k.a *micron*.

Especially during periods of very cold, calm winter weather, the APCD’s Mammoth Lakes air quality monitor sometimes registers PM levels that exceed California’s 24-hour air quality standard of 50 micrograms³ per cubic meter (50 µg/m³). However, and likely due in part to recent efforts replacing old wood–burning systems, winter exceedances have dropped from 33 in 2010-2011 to zero in 2014-2015.

In July 2014, the Town received approval from the APCD to use the Town’s EPB funds on a WRP. A work plan was prepared by the Town and approved by the Town Council via Resolution 14-50 on August 6, 2014. The work plan was also approved by APCD in August 2014. The work plan, noting two phases for program implementation, included participation qualifications, administration, rates for new installations, and projected results. An initial WRP budget also broke apart all available EPB funds:

Town Staff Administration -	\$ 10,000
Program Administrator/Consultant -	\$ 10,000
Advertising/Public Outreach -	\$ 2,000
Woodstove Replacements -	\$ 252,963
Total EPB Funds & WRP Costs	\$ 274,963

No additional shared costs were anticipated from the Town; however, to help stretch available funds, shared costs were anticipated from participating property owners, with amounts dependent on equipment selection and specific installation requirements.

With this budget, it was initially estimated that approximately 130 to 200 woodstoves and fireplaces would be upgraded, resulting in immediate reductions of several thousand pounds of wood-smoke particulate emissions annually throughout Mammoth Lakes. Industry standards of specific emissions for old and new wood and gas burning systems have been reported as follows:⁴

Figure 1

		EMISSION FACTORS**(lbs emissions/cord or ton fuel burned)						
Heating Device	Fuel Type	PM2.5	PM10	CO	NOx	SOx	VOC/ROG	NH3
Open Fireplace: not EPA compliant	Cord Wood	22.7	23.6	149	2.6	0.4	18.9	1.8
Open Fireplace: not EPA compliant	Manufactured Pressed Logs	46.4	48.2	137	6.5	4.2	33.8	0.004
Fireplace Inserts: not EPA compliant	Cord Wood	29.5	30.6	230.8	2.8	0.4	53	1.7
Fireplace Inserts: EPA Phase 2 compliant	Cord Wood	14.1	14.6	140.8	2.28	0.4	12	0.9
Conventional Woodstove: Not EPA compliant	Cord Wood	29.5	30.6	230.8	2.8	0.4	53	1.7
Woodstove: EPA Phase 2 compliant	Cord Wood	14.1	14.6	140.8	2.28	0.4	12	0.9
Pellet Stoves & Inserts	Wood Pellets	2.9	3.06	15.9	3.8	0.32	0.04	0.3
Gas Stoves & Inserts	Propane	7.6	7.6	40	94	0.6	5.5	0.3

*Sources for wood & pellet emission factors: 2002 National Emission Inventory; Mid-Atlantic Regional Air Management Association study (Houck, 2006a); U.S. EPA AP-42 Section 1.10 (U.S. EPA 1996a); Oregon Dept. of Energy study (Barnett, 1992).

**Source for gas emission factors as noted in mmcf (million cubic feet) burned: U.S. EPA AP-42 Section 1.4 (U.S. EPA 1996a).

³ Unit of mass weighing one billionth of a kilogram, one millionth of a gram, or one thousandth of a milligram.

⁴ Emission factors have been revised since initial WRP proposal to reflect more current EPA figures.

Program Implementation

As the first step toward program implementation, Lisa Isaacs, was contracted by the Town to administer the WRP for the term of August 13, 2014 to July 1, 2015. The Town selected Lisa Isaacs due to her recent experience administering woodstove replacement programs for the APCD, including woodstove replacements in Mammoth Lakes. Ms. Isaacs worked closely with Ms. Daugherty to ensure the Town's work plan was followed and goals reached, including adherence to the EPB funds budget.

Contract requirements were outlined for program vendors who would contract with public customers for old equipment removal and the sale and installation of new heating systems. Qualifications for vendor participation were based on a vendor being a locally licensed retailer with licensed installers. Insurance and employer provisions were also required of vendors, and the contract term was set for August 19, 2014 to July 1, 2015.

After review and approval by the Town attorney and Town risk management, all prospective vendors were provided with the contract language, resulting in the following businesses agreeing to the established terms and contract requirements:

1. Clean Sweep LTD (Scott Voss Enterprises), owned and operated by Scott Voss
Contract executed on August 22, 2014
Telephone: 760/934-3453
info@abetterfireplace.com
2. Angelo's Stove & Chimney, owned and operated by Angelo La Barbera
Contract executed on September 3, 2014
Telephone: 760/914-2445
angelosstoves@gmail.com
3. High Country Lumber Inc., owned by Steven Joseph
Contract executed on September 3, 2014
Telephone: 760/873-5874
hclsteve@aol.com
4. S.E.T.T.S. Inc., d.b.a. Alpine Stove & Mercantile, owned and operated by Tom and Susie Walczak
Contract executed on September 23, 2014
Telephone: 760/934-4416
alpinestove@yahoo.com
5. Batchelder Enterprises Inc., owned and operated by George Batchelder
Contract executed on September 24, 2014
Telephone: 760/873-3800
info@batchelder-enterprises.com

Once contracts were executed by Town Manager, Dan Holler, program vendors commenced work on the woodstove replacement program beginning with contacting all people on their existing waiting lists to allow them the first opportunity to participate.

According to the approved work plan, program implementation was broken into two phases to address 1) currently compliant and 2) non-compliant properties, allowing for a contingency opportunity to ensure that all available funds were spent. 'Compliant' properties were/are defined as those in compliance with the Town's Municipal Code Chapter 8.30 (Particulate Emissions Regulations).

Phase One – Compliant Properties

Phase One was planned to benefit property owners who were currently in compliance with the Town's Municipal Code Chapter 8.30 regarding heating system upgrades when a property changes title.⁵ Phase One offered financial incentives to replace open fireplaces and old woodstoves not compliant with 'EPA Phase 2'⁶ standards earlier than required by Town Code. Incentives were also offered to replace compliant EPA Phase 2 wood-burning devices (stoves and fireplaces) with less emissive pellet and gas burning systems.

Phase One financial incentives were established as follows, to be paid directly to program vendors who would then credit the amount against customer bills:

- \$1,500 toward the cost of a new EPA Phase 2-certified log-burning system replacing non-certified wood-burning system.
- \$2,000 toward the cost of a new EPA-compliant pellet or gas-burning system replacing any wood-burning system, EPA certified or not.
- \$500 toward the cost of a new pellet or gas heating system⁷ for recent property purchasers who, in compliance with Municipal Code Chapter 8.30, applied for a permit within 90 days of property title change to replace a non-compliant wood-burning system.

Program publicity followed with a press release submitted and picked up by all local media outlets, including *The Mammoth Times*, *The Sheet*, *Sierra Wave* (radio, television and web media), and KMMT/KRHV radio broadcasts. Simultaneously, emails detailing the program were sent to over 200 recipients, including many residents and businesses on the Town's 'Air Quality Updates' distribution list. Additionally, program notices were placed on the Town and APCD's websites. Vendors also reached out to prospective customers with information detailing program incentives while a few advertised the program as part of their business advertising.

Following the *'first come, first served'* process, program participation was immediate with all vendors, other than Batchelder Enterprises who only offered kerosene heating systems, signing up numerous customers. The first installs were completed on August 27, 2014.

In addition to installations, all vendors were required to follow an approved scrapping process to ensure that removed, old equipment would never again be used, and all installs had to be inspected by Town inspectors before invoices could be submitted for payment. Once Ms. Issacs received

⁵ Dated property purchase documents were required when replacing non-EPA compliant systems.

⁶ EPA 'Phase 2' standards are distinct from and unrelated to WRP 'Phase One' and 'Phase Two.'

⁷ Because new property owners were legally required to upgrade from old systems at time of title change, this incentive was offered only for new pellet and gas systems, not new log-burning systems, to encourage upgrading to less emissive systems.

vendor invoices, Ms. Isaacs performed procedural checks to ensure program requirements were followed and all documents were in order, including copies of finalized permits and proof of property purchase dates where required. Once verified, invoices and accompanying documents were then submitted to Ms. Daugherty for final review and payment approval.

Phase Two – Compliant and Non-Compliant Properties

By late February 2015, customer participation had slowed, leading to concern that all EPB funds might not be spent by the program deadline. Therefore, the Town requested and received approval from the APCD to implement Phase Two, opening participation to non-compliant properties.

In addition to Phase One’s requirements and financial incentives, Phase Two also included the incentive of \$500 toward a new EPA-compliant heating system for non-compliant properties, including EPA Phase 2 wood burning replacement systems not offered in Phase One. Proof of property purchase date documents were not required since these properties were non-compliant.

Publicity again followed to ensure those who might have wanted to participate in the past but couldn’t, were informed that they were now eligible. Participation immediately increased, although many new customers were still qualified under Phase One. Most likely, a renewed public awareness/interest was simply stirred by the additional publicity.

Program Results

Overall, this program was very successful. At program conclusion, all funds were completely expended, resulting in 145 new and much cleaner EPA compliant heating systems installed throughout Mammoth Lakes at a cost of \$251,000.⁸ While this was within the initial projection of between 130 and 200 new installs, it is at the lower end due to a significant number of \$2,000 inserts (pellet and gas) installed to replace existing wood inserts in prefabricated fireplaces (“fireboxes”) within multi-unit dwellings. More than 73 property owners utilized the program to install these inserts in compliance with Municipal Code Subsection 15.04.140.C, which requires the replacement of existing wood inserts in prefabricated fireboxes upon sale of the property and no later than October 31, 2022.

Total shared costs paid by property owners amounted to \$388,127 or 141 percent of the total EPB budget of \$274,963, and 155 percent of install costs provided to the vendors (\$251,000).

Installation breakdown with costs by vendor*

- Alpine Stove & Mercantile: 26 installs for \$48,000 / \$75,681 billed in shared costs (158%)
- Angelo’s Stove & Chimney: 50 installs for \$84,000 / \$126,005 billed in shared costs (150%)
- Clean Sweep: 66 installs for \$117,500 / \$176,975 billed in shared costs (151%)
- High Country Lumber: 3 installs for \$1,500 / \$9,466 billed in shared costs (631%)⁹

*Batchelder Enterprises did not perform any installs for the program despite inclusion in all advertising. This was possibly due to the perceived decreasing popularity of kerosene heating systems.

⁸ Several property owners were turned away from program participation once all funds were expended.

⁹ High Country Lumber’s shared costs were much larger by percentage than other vendors because their three installs received the lower \$500 program incentive rate. Their total install costs were on par with all other vendors.

Installation breakdown by type

- Non-compliant woodstove replaced with EPA 2-compliant woodstove: 13
- Non-compliant woodstove replaced with compliant pellet stove: 12
- Non-compliant woodstove replaced with compliant gas stove: 1
- Non-compliant open fireplace replaced with compliant fireplace: 2
- Non-compliant open fireplace fitted with compliant wood insert: 1
- Non-compliant open fireplace fitted with compliant pellet insert: 14
- Non-compliant open fireplace fitted with compliant gas insert: 7
- Non-compliant fireplace insert replaced with compliant pellet insert: 3
- EPA-compliant woodstove replaced with compliant pellet stove: 18
- EPA-compliant woodstove replaced with compliant gas stove: 1
- EPA-compliant wood fireplace insert replaced with compliant gas insert: 4
- EPA-compliant wood fireplace insert replaced with compliant pellet insert: 69

Total installs = 145*

*Seven of these installs were for newly purchased properties at \$500 each, while 13 others were completed during Phase Two for non-compliant properties also at \$500 each.

In consideration of these replaced and new heating systems, and emission amounts per cord or ton of fuel burned (or mmcf of propane burned) as noted in *Figure 1* on page 2 and appended to the end of this report, the 145 replaced wood-burning systems collectively created around 2,697 pounds of PM2.5 and 2,797 pounds of PM10 emissions for every 145 tons or cords of wood burned, or one ton/cord burned per system. Comparatively, the 145 new systems collectively emit around 600 pounds of PM2.5 and 700 pounds of PM10 to create the same amount of heat, equating to a collective reduction of around 1,886 pounds of PM2.5 and 1,939 pounds of PM10 Town-wide for every 132 tons or cords burned (13 wood-burning systems were replaced with propane heating systems).¹⁰ Extrapolating these emission amounts out to an average of three cords or tons burned annually per wood and pellet system (not accounting for less fuel required by new, more efficient systems), this amounts to a rough estimate of more than 5,658 pounds of PM2.5 and 5,817 pounds of PM10 reduced per year Town-wide, or **over 11,475 pounds / 5.7 TONS** of particulates combined, as well as a significant amount of additional, targeted wood smoke components per *Figure 1*.

Accounting for the additional 50 new installs in Mammoth Lakes funded by the previous APCD programs (1 through the 2009 voucher program; 28 through 2013 Clean Air Projects Program; 21 through CAPP's 2013-14 block grant program), it's safe to say that well over 6 tons of particulates and *many* pounds of additional air pollution have been removed from Mammoth Lakes' immediate atmosphere by concerted efforts between the Town and the APCD to replace and upgrade emissive wood-burning systems.

¹⁰ Emission factors for old and new equipment are from EPA's most recently reported data; however total amounts for NEW equipment are estimates only, given that emission factors for propane are calculated using an entirely different factor and resultant PM emission amounts are extremely small in comparison to wood.

Budget – Final Cost Accounting

The original budget was approved in conjunction with the work plan in August 2014. During the initiation of Phase Two in March 2015, the Town notified the APCD of some budget adjustments. These adjustments included additional costs for the program administrator and decreased costs for Town staff administration and advertising. The final budget numbers below show that excess Town staff administration and advertising funds realized at the end of the program were allocated to woodstove replacements.

	Original Budget (August 2014)	Adjusted Budget (March 2015)	Final Budget
Administrator Contract (Ms. Isaacs)	\$10,000	\$17,500	\$17,500
Town Administration	\$10,000	\$7,500	\$6,463
Advertising	\$2,000	\$500	\$0
Woodstove Replacements	\$252,962	\$249,462	\$251,000
		Total	\$274,963

Recommendations and Lessons Learned

Considering the numerous program variables, including various vendors, contract requirements, and the finite budget, this program required a significant amount of administrative time and close attention to detail by everyone involved to ensure all requirements were met with no budget over-runs. Importantly, because the EPB fund is public money, attention to detail cannot be overstated. Toward this end, it's also a very good idea to have at least two experienced administrative personnel scrutinizing program documents to help ensure errors are caught and clarifications made. With this in mind, good working relationships are essential for smooth, accurate program operations, not only between administration personnel, but also between administration and program vendors. Toward this end, both Ms. Isaacs and Ms. Daugherty's participation was invaluable, ensuring the program proceeded smoothly.

It would have been better, however, if Ms. Isaacs administrative contract had extended one month beyond the vendors' contracted term to allow ample time for closing out the program, including tallies, findings, and final report. Unfortunately, both Ms. Isaacs administrative contract and vendors' contracts were all written to expire on July 1, creating a tight crunch for the final administrative requirements that were only possible once vendors were finished. Forecasting this approaching conflict, Ms. Isaacs repeatedly directed the vendors to have all installs completed with final reports and invoices submitted 'before' the end of June, allowing a few days to wrap up final reporting. However, the vendors needed the full contract term to complete all installs, which proved challenging. Furthermore, in regards to installs, the winter of 2014-2015 was very light on snowfall, allowing installations to proceed without weather-related interruptions. If the winter had been heavy or extreme, it would likely have been necessary to extend contracted terms.

Considering past program results, it's apparent that customers' shared costs can affect participation. The subsidized amounts varying between \$500 and \$2,000 per new system weren't significantly prohibitive, as illustrated by the full expenditure of funds. The vendors did report a few customers backed out when they realized the amount of shared costs required, but for every one of them, another customer was willing and able to pay.

Related to shared costs, it is advisable that all vendors require customers to pay significant deposits on their shared costs, or all shared costs, up front before the installation commences to help vendors with initial cost outlays as well as discourage customers from backing out late into the process after some costs have been incurred.

It is also noteworthy that business insurers are moving away from providing liability coverage for jobs contracted by homeowners associations or multi-unit commercial developments. According to one carrier, this is due to the fact that these types of jobs are the ones most likely to end up with lawsuits. Therefore, going forward, installations funded by like programs should be restricted to those contracted directly through property owners only.

Lastly, but noteworthy nonetheless, it is apparent that many property owners are moving away from wood-burning systems in favor of systems that are much easier to operate and cleaner – most notably pellet systems. One potential concern regarding this shift is that retailers may need to significantly increase the amount of pellet fuel they regularly stock so that during harsh or long winters sufficient pellet fuel remains available.

In closing, thank you very much for the opportunity to administer Mammoth Lakes' EPB-funded woodstove replacement program. For further questions or to request additional information, please contact us as follows:

Lisa Isaacs, WRP Administrator
P.O. Box 100 – PMB 331
Mammoth Lakes, CA 93546-0100

email: ljm.isaacs@gmail.com
telephone: 760/914-0388

Jen Daugherty, Town of Mammoth Lakes, Senior Planner
P.O. Box 1609
Mammoth Lakes, CA 93546

email: jdaugherty@townofmammothlakes.ca.gov
telephone: 760/934-8989 ext. 260

TOWN OF MAMMOTH LAKES FINAL EPB INSTALL TOTALS
August 2014 - June 30, 2015

	Alpine Stoves	Angelos	Clean Sweep	High Country Lumber	TOTAL installs
non-EPA FS woodstove to EPA FS woodstove:	3	3	7		13
non-EPA FS woodstove to FS pellet stove:			9	3	12
non-EPA insert to pellet insert:	1	2			3
non-EPA fireplace to EPA fireplace:			2		2
non-EPA fireplace to EPA wood insert:			1		1
non-EPA fireplace to pellet insert:	1	9	4		14
EPA FS woodstove to FS pellet stove:		5	13		18
EPA wood insert to pellet insert:	18	24	27		69

non-EPA FS woodstove to FS gas stove*:		1			1
non-EPA fireplace to gas insert*:	2	4	1		7
EPA FS woodstove to FS gas stove*:		1			1
EPA wood insert to gas insert*:	1	1	2		4
TOTALS	26	50	66	3	145

\$500 non-comp installs		6	4	3	13
\$500 90-day installs	2	2	3		7

EMISSIONS FACTORS (lbs emissions/ton wood & pellets burned)

old model emissions - PM2.5	total old emissions - PM2.5	new model emissions - PM2.5	total NEW emissions - PM2.5	LBS REDUCED - PM2.5	old model emissions - PM10	total old emissions - PM10	new model emissions - PM10	total NEW emissions - PM10	LBS REDUCED - PM10
29.5	383.5	14.1	183.3	200.2	30.6	397.8	14.6	189.8	208
29.5	354	2.9	34.8	319.2	30.6	367.2	3.06	36.72	330.48
29.5	88.5	2.9	8.7	79.8	30.6	91.8	3.06	9.18	82.62
22.7	45.4	14.1	18.2	27.2	23.6	47.2	14.6	29.2	18
22.7	22.7	14.1	14.1	8.6	23.6	23.6	14.6	14.6	9
22.7	317.8	2.9	40.6	277.2	23.6	330.4	3.06	42.84	287.56
14.1	253.8	2.9	52.2	201.6	14.6	262.8	3.06	55.08	207.72
14.1	972.9	2.9	200.1	772.8	14.6	1007.4	3.06	211.14	796.26
TOTALS	2438.6		552	1886.6		2528.2		588.56	1939.6

EMISSIONS FACTORS (lbs emissions/ton wood burned; lbs emissions/million cf propane burned*)

29.5	29.5	7.6*	7.6*	N/A	30.6	30.6	7.6*	7.6*	N/A
22.7	158.9	7.6*	53.2*	N/A	23.6	165.2	7.6*	53.2*	N/A
14.1	14.1	7.6*	7.6*	N/A	14.6	14.6	7.6*	7.6*	N/A
14.1	56.4	7.6*	30.4*	N/A	14.6	58.4	7.6*	30.4*	N/A
TOTALS	258.9		98.8*	N/A*		268.8		98.8*	N/A*

*propane emission factors equate to mmcf = lbs per million cubic feet burned. Total reductions not reported due to inability to compare ton to mmcf burned

Sources for wood & pellet emission factors: 2002 National Emission Inventory; Mid-Atlantic Regional Air Management Asso. study (Houck, 2006a);

U.S. EPA AP-42 Section 1.10 (U.S. EPA 1996a); Oregon Dept. of Energy study (Barnett, 1992).

Source for gas emission factors: U.S. EPA AP-42 Section 1.4 (U.S. EPA 1996a).