

FAMILIES FOR CLEAN AIR

March 20, 2017

Subject: Final Short-Lived Climate Pollutant Reduction Strategy

Dear Chair Nichols and Members of the Board:

We are concerned that the California Air Resources Board did not use the operating costs for electric ductless mini-split heat pumps when preparing the economic assessments in the "wood to electricity" conversion scenario in the Residential Fireplace and Wood Stove Conversion Measure of the final strategy.

Electric ductless mini-split heat pumps are the most energy-efficient home heating appliances. Their use in the conversion scenario would have shown the "wood to electricity" conversion scenario to be virtually on par with the "wood to gas" conversion scenario in terms of cost, as shown in the attached assessment performed recently by the Bay Area Air Quality Management District. We have also attached some additional information regarding electric ductless mini-split heat pumps. You can also find more information at:
https://www.energystar.gov/products/heating_cooling/ductless_heating_cooling.

Given the affordability of electric ductless mini-split heat pumps, we are concerned by language in the final SLCP Reduction Strategy concerning the provision of incentive funds for wood burning heaters in areas "where distributed natural gas is not available" or "where central heat is cost prohibitive." Since the costs of operating electric ductless mini-split heat pumps are comparable to those of natural gas heaters--and are less expensive than wood--it makes little sense to provide incentives for wood heaters in the above cases.

We are extremely concerned that the unintended consequences of implementing this policy would be that of needlessly subjecting economically disadvantaged populations to much higher levels of air pollution. Since electric ductless mini-split heat pumps can provide heat to these areas at a comparable cost to natural gas, such populations should not be subjected to the higher pollution levels (and the resulting health effects) of wood burning heating appliances.

For these reasons, and to make the most effective use of available funds, we urge the California Air Resources Board to only use incentive dollars for non-wood burning devices, except in areas that require the use of wood burning equipment for safety, such as areas that experience heavy snow that traps residents in homes and areas where distributed natural gas or electrical service is not available or electricity loss is frequent.

Sincerely,

Susan K. Goldsborough, Executive Director

Regulation 6, Rule 3 Heating Fuel Costs and Emissions

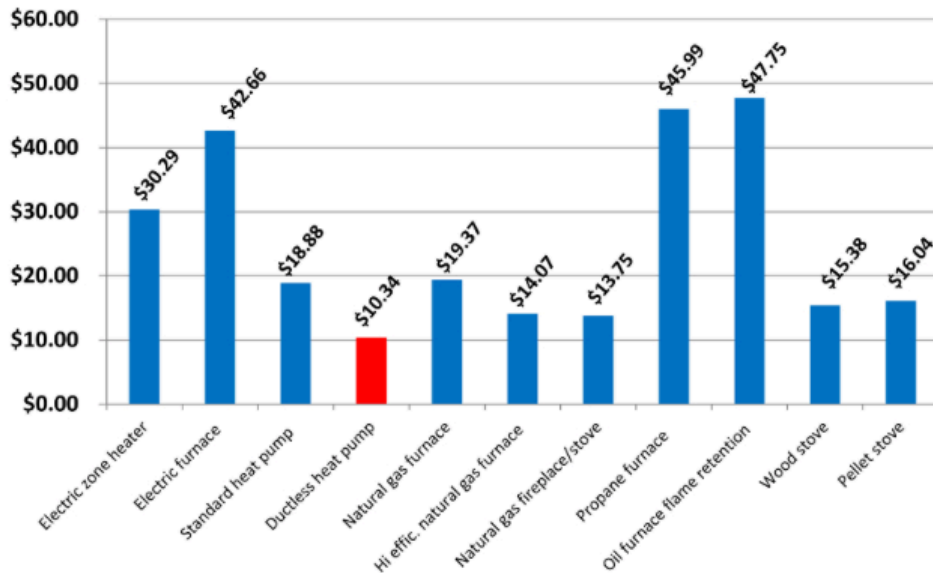
Type of Appliance	NON-CERTIFIED WOOD BURNING DEVICES		EPA-CERTIFIED WOOD HEATERS		GAS-FUELED HEATERS		ELECTRIC HEATERS	
	Fireplace	Uncertified Stove/Insert	Certified Stove/Insert	Pellet Stove/Insert	Gas Furnace	Propane Heater	Baseboard Heater/ Room Heater	Electric Heat Pump
Heat Efficiency	10%	50%	70%	78%	78%	78%	100%	300%
Cost to Heat	\$6504/yr	\$1300/yr	\$929/yr	\$777/yr	\$585/yr	\$1404/yr	\$2190/yr	\$748/yr
	\$542/mo	\$108/mo	\$77/mo	\$64/mo	\$48/mo	\$117/mo	\$182/mo	\$62/mo
PM _{2.5} Emissions	300 lbs/yr	60 lbs/yr	7 lbs/yr	5 lbs/yr	0.2 lbs/yr		0.5 lbs/yr	

Bay Area Air Quality Management District presentation October 21, 2015

Cost of heating

PSE Rates as of September 2012

Cost of Heating: 1 million BTU



Easy Installation

Ductless systems do not require expensive and invasive ductwork, allowing you to retain the original aesthetic of your room. A ductless installation is hassle-free and can be completed in a couple days.

Both Heating & Cooling in One Unit

Mitsubishi Electric gives you precise temperature control even in spaces you thought would be impossible to fix. Thanks to Mitsubishi's advanced INVERTER-driven compressor technology and smart, easy-to-use controls, you can achieve consistent temperatures throughout the room **as you are saving energy** all year long, year after year.

Home Efficiency Upgrades

Wouldn't you like to know if there's lots of [air leakage](#) or [poor insulation in your home](#) before you decide to invest in a ductless heat pump? If you put in a new transmission in your car you would want your mechanic to tell you if your engine has no oil, right?

But so many HVAC companies want to just throw a heat pump in without even considering the rest of the home. Not us. We're a little different, and that's a good thing.

Information from Northwest Energy Team (energy efficiency company)



You're shopping San

What can we help you find today?



My Account

Cart | 0 items

Store Finder Truck & Tool Rental Pro Xtra Gift Cards Credit Services Track Order Help

All Departments DIY Projects & Ideas Home Services Local Ad Specials & Offers

Home / Heating, Venting & Cooling / Air Conditioners & Coolers / Air Conditioners / Ductless Mini Splits

Model # DIY-12-HP-115A Internet #207085060



MRCOOL

DIY 12,000 BTU 1 Ton Ductless Mini-Split Air Conditioner and Heat Pump - 115V/60Hz

★★★★★ (6) Write a Review Questions & Answers (19)

\$1,288.00 /bundle

Facebook Pinterest Email Print Save to List

Quantity - 1 +

Not in Your Store - We'll Ship It There

Add to Cart

Free Pickup

Available for pickup
March 24 - March 29

[Change Pickup Store](#)

We'll Ship It to You

Add to Cart

Standard shipping

Expect it
March 24 - March 28

[See Shipping Options](#)

The Buck Stops Here: Why Governmental Agencies Should Not Incentivize Change-Outs to Wood Burning Stoves

Executive Summary

Through robust lobbying, the hearth products industry has pushed an agenda of economic and regulatory incentives designed to encourage the sale of wood burning stoves. While this may have proven to be an economic boon to wood stove manufacturers and retailers, the benefit to the public of this use of tax dollars is less clear-cut.

We recommend that governmental agencies only subsidize or incentivize change-outs to heating devices with real-world emissions values that are far lower than EPA-certified wood stoves and that have a much lower impact on climate change. Specifically, no funding should go towards change-outs to wood-burning devices or towards expanding natural gas service.

Below are some of the reasons why governmental agencies should not incentivize or subsidize the sale of wood-burning stoves:

- Incentivizing change-outs to new EPA-certified wood burning stoves is not the most cost-effective method of reducing PM pollution. Even using the EPA's figures, which are based on best-case laboratory testing rather than actual in-home performance, EPA-certified wood stoves emit at least 169 times more fine particles than a gas furnace and far more than an electric ductless mini-split heat pump.¹
- EPA-certified stove performance in the real world does not match laboratory performance. Industry and the EPA openly acknowledge that real world emissions do not correspond to lab performance.² One reason why testing standards specify the use of kiln-dried lumber arranged in a crib formation, which is obviously not representative of the way wood stoves are actually operated. The EPA sought to switch to testing with cord wood in its latest wood heater rule to more accurately reflect real-world emissions, but they eventually caved to pressure from the wood stove industry.

Another reason that laboratory testing does not reflect real world emissions is that wood stoves generate a large amount of emissions when they are started up, but these emissions are not "counted" in the EPA testing procedure. Testing does not begin until the stove has begun to burn more cleanly. This understates the actual emissions of these stoves.

- In-home performance is far too dependent on the operator: air-flow settings and fuel choice radically affect the actual emissions, and these settings are determined by the user.

For example, typical wood-stove operation for home heating involves "dampering down" at bedtime or during temperate weather. Since oxygen is a necessary component of combustion, this can create much higher levels of pollutants, as incomplete combustion means more smoke.

John Gulland, Manager of the Wood Heat Organization, a pro-wood heating organization, puts it this way: "...people who don't care about the impacts of their actions on neighbours and are content to remain ignorant of good wood burning practice will make a lot of smoke, regardless of the emissions rating of the appliance they choose."³

- Anecdotally, many of the calls that Families for Clean Air, the American Lung Association, and other health organizations receive are from people impacted by the emissions from homes using EPA-certified wood stoves.
- The real-world results of wood stove change-out programs have not been compelling and have not proven their cost-effectiveness.

The wood stove industry (i.e. the Hearth, Patio and Barbeque Association) touts the Libby, Montana change-out program as proof that change-out programs are effective. But the numbers don't add up:

- HPBA, EPA, and the state paid to change out EVERY wood stove in the Libby area.
- They also invested in education programs and proper installation.
- Yet using industry's own numbers from an industry-funded study, PM was only reduced by 28%. If EPA stoves performed as claimed, PM reduction should have been approximately 56% (83% of Libby's winter PM came from residential wood burning before the change-out, and the EPA claims certified stoves emit at least 70% less PM).
- If the subsidies had gone to change-outs to propane or electric heat, PM levels would have dropped almost 80% while also reducing air toxics and carcinogens.^{4,5}
- Many EPA stoves rely on catalytic components to achieve lower emissions. To meet the lower emission values in the recently adopted EPA wood heater rule, even more will need to use catalysts, or a combination of secondary-burn and catalytic technologies.

However, the performance of wood heating devices equipped with catalytic components degrades with use, and the catalytic components must be replaced regularly to maintain low emissions. One study notes, "Structurally, wood heaters and particularly catalysts degrade with use and emission factors increase...when a catalyst is fully degraded the particulate emissions of a catalyst heater generally is similar to that of an uncertified conventional heater."⁷

Clearly there is no economic incentive for the user of the stove to replace the catalytic components. There is also no functional reason for the end user to replace the catalytic components: the negative consequences of degraded catalytic components, which are primarily increased emissions, occur outside the end user's home and have little effect on them while they are inside operating the device.

Thus, there is no reason to think that owners will replace the degraded catalytic components or expend the effort to maintain them properly. Even using the industry's most optimistic claims, the maximum lifespan of a wood heater's properly maintained catalytic components is 8–10 years,⁸ while the EPA states that the lifespan of a wood heater is greater than 20 years.⁹ Therefore, after a few years of use, wood smoke emissions from catalytic devices will potentially be as high as those from an uncertified conventional wood heater.

- EPA studies have also shown that even the performance of non-catalytic certified stoves degrades with use.¹⁰
- EPA-certified wood stoves have not been shown to reduce emissions of dioxins, furans, or other air toxics. They are not tested for emissions of these compounds. Some studies have shown that EPA stoves emit *more* dioxins and furans than conventional wood stoves.

For example, a small 2009 study compared the emissions of pollutants from an EPA-certified wood stove and a conventional wood stove. While the particulate emissions from the certified stove were lower than from the conventional stove, the combined dioxin/furan emissions were much higher from the certified stove (2–3 times higher, depending on whether maple or spruce was burned).¹¹ Another EPA-funded study found that at a medium burn rate, a certified stove emitted higher levels (not lower levels) of organic compounds, including PAHs, than a non-certified stove.¹²

- In terms of the environment, wood as a fuel source results in almost twice the CO₂ emissions (on a kWh basis) of natural gas.¹³ This comparison does not take into account the soot, or "black carbon," generated by wood and other biomass combustion. Most climate scientists now state that black carbon is the second largest contributor to climate change.¹⁴

Modern wood heaters also emit significant amounts of methane, averaging about 18.7 g/kg of methane per kg firewood.¹⁵

One recent comparison study concluded, "Depending on the time horizon, the sustainability of the firewood supply, whether GWP from AR4 or Shindell et al. (2009) are used, and whether warming from CO is included, wood heating could be considered to cause more than 10 times as much global warming as gas or reverse cycle air-conditioning [electric ductless mini-split heat pumps]."¹⁵

For these reasons, the UN Environment Program and the World Meteorological Association recommend phasing out wood-burning heaters in developed countries to reduce climate change.

References

1. **Relative Emissions of Fine Particles.** United States Environmental Protection Agency. <http://www.epa.gov/burnwise/energyefficiency.html>.
2. **EPA Wood Heater Test Method Variability Study: Analysis of Uncertainty, Repeatability and Reproducibility based on the EPA Accredited Laboratory Proficiency Test Database.** 2010. Curkeet (Intertek Testing Services) and Ferguson (Ferguson, Andors & Company).
3. **Acknowledging the Human Factor in Wood Heating.** 2011. Gulland (The Wood Heat Organization Inc.)
<http://www.resilience.org/stories/2011-03-08/acknowledging-human-factor-wood-heating>.
4. **Clearing the Smoke: The Wood Stove Changeout in Libby, Montana.** Hearth, Patio and Barbeque Association.
http://www.woodstovechangeout.org/fileadmin/PDF/Libby_Report-Final.pdf.
5. **Fine particulate matter source apportionment following a large woodstove changeout program in Libby, Montana.** 2010. Ward T, Palmer CP, Noonan CW. *Journal of the Air & Waste Management Association*. 60: 688–93. <http://www.ncbi.nlm.nih.gov/pubmed/20564994>
7. **Emission Factors for New Certified Residential Wood Heaters.** 2008. Houck and Pitzman (OMNI Environmental Services).
8. **The Complete Catalytic Combustor.** 2010. Neufeld, C. The Chimney Sweep News.
<http://www.chimneysweepnews.com/Combustors.htm>.
9. **Standards of Performance for New Residential Wood Heaters, New Residential Hydronic Heaters and Forced-Air Furnaces.** 2015. United States Environmental Protection Agency.
<http://www2.epa.gov/sites/production/files/2015-02/documents/20150204-residential-wood-heaters-nsp.pdf>.
10. **Long-term performance of EPA-certified phase 2 woodstove, Klamath Falls and Portland, Oregon: 1998-1999.** November 2000. Fisher et al. (OMNI Environmental Services) and McGaughey (Eastern Research Group). EPA document. <http://nepis.epa.gov/Adobe/PDF/P100EY70.pdf>
11. **Residential Wood Combustion – 2000 Source Characterization and Outreach Efforts.** 2009. Anita Wong (Environment Canada). Presentation.
12. **Wood Stove Emissions: Particle Size and Chemical Composition.** 2000. McCrillis (US EPA) National Risk Management Research Laboratory, Air Pollution Prevention and Control Division.
13. **Specific Carbon Dioxide Emissions of Various Fuels.** German Energy Transition: Renewables and Climate Protection. http://www.volker-quaschnig.de/datserv/CO2-spez/index_e.php.
14. **Bounding the role of black carbon in the climate system: A scientific assessment.** 2013. Bond, TC et al. *Journal of Geophysical Research (Atmospheres)*. 118, 5380–5552.
15. **Australian wood heaters currently increase global warming and health costs.** 2011. Robinson DL. *Atmospheric Pollution Research*. 2: 267-274