

FAMILIES FOR CLEAN AIR

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Comments on the California Air Resources Board's Proposed Short-Lived Climate Pollutant Reduction Strategy

I write today on behalf of Families for Clean Air and our supporters throughout the state.

We support CARB's efforts to reduce Short-Lived Climate Pollutants (SLCPs). Our comments focus on the draft plan's strategy for reducing residential wood combustion. The draft plan discusses two options, namely "wood to wood" and "wood to gas" conversions. **CARB should not subsidize wood to wood conversions.**

The calculations in the draft plan make a compelling case against wood to wood conversions, as CARB's projected reductions in black carbon emissions are calculated to be 13% greater for wood to gas conversions versus wood to wood conversions. Given that residential wood combustion is "forecast to be the largest individual anthropogenic source of black carbon" (CARB strategy report, page 47), it makes sense to pursue the most effective reduction strategy.

Importantly, the calculations in CARB's draft plan do not tell the whole story. The realized SLCP reductions from wood to wood conversions will be far lower than the projected reduction for the following reasons:

- The draft plan uses EPA certification values for the emissions of EPA-certified wood stoves, but it is widely acknowledged that the in-laboratory performance of residential wood heating devices is dramatically different from their performance in the real world.^{1,2} For this reason, the EPA has begun a process to change the certification method as described in their report, *Process for Developing Improved Cordwood Test Methods for Wood Heaters*. It states, "All stakeholders, including industry, have noted that certification values do not correlate well with in-home performance of wood heaters."³

The current EPA test method utilizes kiln dried lumber rather than cordwood, excludes the substantial emissions generated during stove start-up, and uses idealized fuel loading procedures that are not representative of the way wood stoves are used by consumers.

Additionally, many EPA-certified wood stoves rely on catalytic or hybrid catalytic technologies to meet the more stringent emissions requirements recently enacted by the EPA. 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.”⁴

Finally, EPA-certified wood stoves are far too dependent on proper operation and maintenance to achieve lowered emissions. John Gulland, manager of The Wood Heat Organization, a pro-wood heating group states, “...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.”⁵

- The projected black carbon reductions in the draft plan are based on the improved efficiency of EPA-certified wood stoves (i.e. less wood burned per BTU of heat generated) compared to conventional wood stoves—but this efficiency is unlikely to be realized in actual use, especially given the more temperate climates in California.

A more efficient EPA-certified wood stove may indeed generate more heat per unit of wood burned, but because wood stoves do not have thermostats, they continue to heat the home even after it has reached a comfortable temperature. When a home becomes too warm, the wood stove will be operated at less efficient settings as the user reduces the combustion air to the device. Even worse, the fire may be allowed to die when the house warms up, only to be restarted at a later time when the home cools. This will generate massive start-up emissions that are not included in the EPA-certified wood stove certification values used for the calculations in CARB’s draft plan.

A recent study conducted in multiple Australian climates found that 74% of the energy generated from burning fuel in a woodstove is wasted—only 26% is actually used to heat the home.⁶ Most of the waste is not due to the efficiency of the stove but rather to the efficiency of use. The relatively small differences in burning efficiency between EPA-certified wood stoves and conventional stoves are thus insignificant compared to the efficiency of use.

- The projections in the draft plan do not take into account methane. Modern wood heaters emit significant amounts of methane, averaging about 18.7 g of methane per kg firewood.⁶

Subsidizing wood to gas conversions, rather than wood to wood conversions, will not only result in far greater reductions of SLCPs, it will also confer other benefits:

- Wood to gas conversions will result in far lower emissions of carbon dioxide compared to wood to wood conversion. As a fuel source, wood produces almost twice the CO₂ emissions on a kWh basis as natural gas.⁷
- Wood to gas conversions will also reduce particle pollution more than wood to wood conversions. In terms of particle pollution, even the certification values of EPA-certified wood stoves (which, as noted, are not achieved in actual use) are orders of magnitude greater than the values for gas devices.⁸
- In terms of air toxics, wood to gas conversions will virtually eliminate the toxic and carcinogenic air pollutants that are produced by residential wood combustion, which include, but are not limited to, formaldehyde, polycyclic aromatic hydrocarbons (PAHs), benzene, and dioxins. According to the EPA, residential wood combustion accounts for nearly 25 percent of all area source air toxics cancer risks.⁹

EPA-certified wood stoves are not certified to reduce air toxics and carcinogens, although there is an unqualified assumption that toxins will decrease along with particulates. However, the preponderance of available evidence contradicts that assumption. While the research on this subject is limited, a small 2009 study compared the emissions of pollutants from an EPA-certified wood stove to those from a conventional wood stove. Although 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).¹⁰ 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.¹¹ A third technical report prepared for the EPA looked at the long-term performance of phase-2 certified wood stoves and concluded, “The data demonstrate that particulate emissions can not be used as a surrogate measurement for POM [polycyclic organic matter] emissions of woodstoves.”¹²

Regarding the results of other wood to wood changeout programs, CARB’s report notes, “Past incentive programs to replace old polluting wood-burning devices with the cleanest EPA-certified devices have been popular and effective” (CARB strategy report, page 102). On the contrary, the real-world results of wood stove change-out programs have not been compelling and have not proven their cost-effectiveness. For example, every wood stove in the Libby, Montana area was changed out to EPA-certified wood stoves. The 28% reduction in particulate pollution was nowhere near the expected 56% reduction, and the contribution of wood smoke to the PM_{2.5} levels had not changed.¹³ And in British Columbia, a total of 6067 old stoves were replaced as part of a change-out program. An in-depth evaluation of the program several years later noted, “...there has not yet been a clear reduction in fine particulate matter pollution coming from residential wood stoves in BC.”¹⁴

We also respectfully suggest that CARB consider subsidizing conversions from wood to mini-split electric heat pumps, an option that is not included in the draft plan. This option would provide even greater climate, environmental, and public health benefits than either wood to wood or wood to gas conversions.

In closing, while the realized SLCP reductions from wood to gas conversions are likely to mirror the projections in the draft plan, the same cannot be said for wood to wood conversions. Wood to wood conversions will result in much higher emissions of black carbon, methane, carbon dioxide, particle pollution, air toxics, and carcinogens than wood to gas conversions.

Accordingly, we see no reason to subsidize wood to wood conversions, and we respectfully urge CARB not to do so. We appreciate the opportunity to comment. Please feel free to contact us with any questions or for further information.

Sincerely,

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Executive Director, Families for Clean Air

References

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