



Aprovecho Research Center

Advanced Studies in Appropriate Technology Laboratory

P.O. Box 156 Creswell, OR 97426

541-895-5677

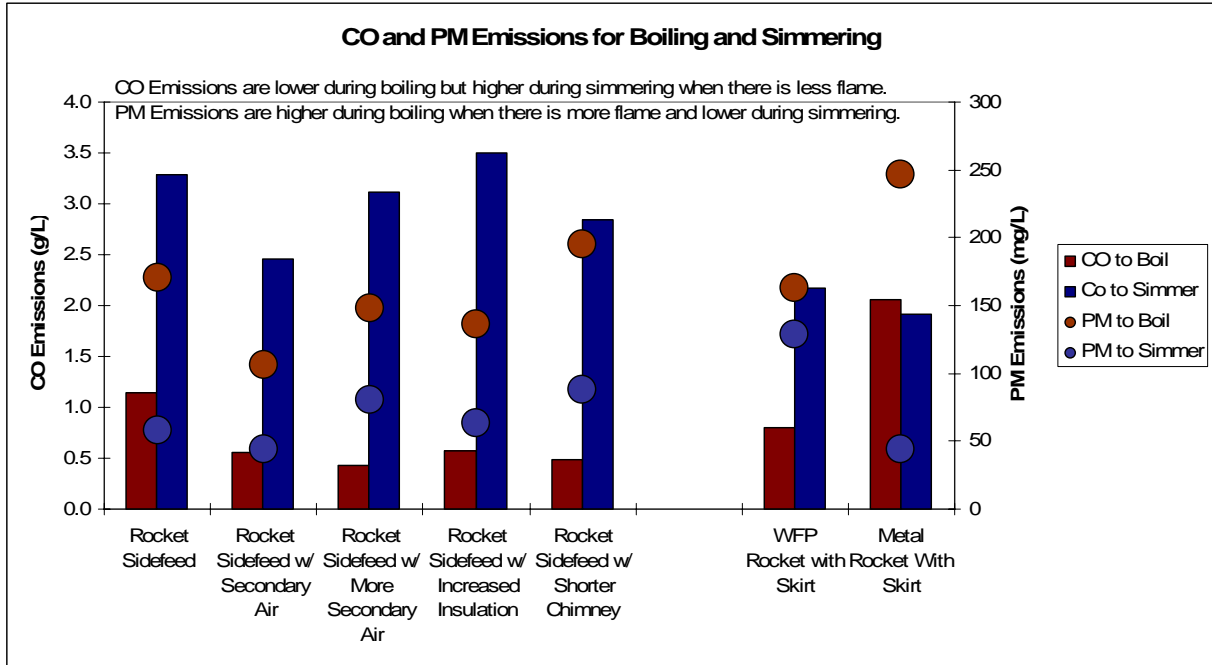
The Relationship between High and Low Power Carbon Monoxide and Particulate Matter Emissions in Rocket Stoves

Dean Still and Nordica MacCarty
July 13th, 2006

The following graphs show preliminary results from seven single tests of various Rocket stoves. The stoves were tested using the 2003 revised UCB water boiling test under the Aprovecho laboratory emissions hood. During the WBT, the stove emissions are recorded at both high and low power when bringing the water to boil and when simmering. The study was funded by the USEPA/Partnership for Clean Indoor Air and the Shell Foundation.

The question has been raised whether measured CO emissions can predict levels of PM. In Rocket stoves during combustion, the levels of CO and PM are often inversely related. It may be that cleaner burning stoves end up producing less CO and PM and that dirtier stoves create more of both types of pollution. However, in a Rocket type stove while the fire is burning:

- CO Emissions are usually lower during boiling but higher during simmering when there is less flame.
- PM Emissions are higher during boiling when there is more flame but lower during simmering.



CO emissions are reduced when the gas is exposed to flame which burns it and converts the CO to CO₂. However, PM is often produced in the flames. For example, in the Rocket side-feed stove with secondary air, CO levels *increased* from 8.3 g/kg at high power to 22 g/kg when the stove was at low power making smaller flames. PM was *reduced* from 1.6 to 0.4 mg/kg when the stove was turned down for simmering.

