

Aprovecho Research Center

Advanced Studies in Appropriate Technology Laboratory

79093 Highway 99, PO Box 1175
Cottage Grove, Oregon 97424 USA

541-767-0287
www.aprovecho.org

Proposed Benchmarks For Wood Burning Cooking Stoves

Developed May, 2006
Last Updated April, 2008

The following proposed benchmarks of stove performance are based on measurements of cook stove performance taken at the Advanced Studies in Appropriate Technology Laboratory at the Aprovecho Research Center. Over 50 stoves have been tested in relation to the benchmarks.

Stove performance is reported to complete the 2003 Shell/UCB revised Water Boiling Test (WBT). A minimum of three test repetitions are conducted. Fuel use and emissions are calculated from the average of specific consumption and specific emissions from cold and hot start boiling performance added to simmering for 45 minutes. Fires are carefully and consistently tended to ensure that all stoves are given an equal chance to do well. Fuel used is dry Douglas Fir of equal dimensions unless otherwise specified. Emissions are measured using the laboratory emissions collection hood at the ASAT lab. Coefficient of variation is always less than 25%, and averages about 10% or less, with the exception of the three stone fire.

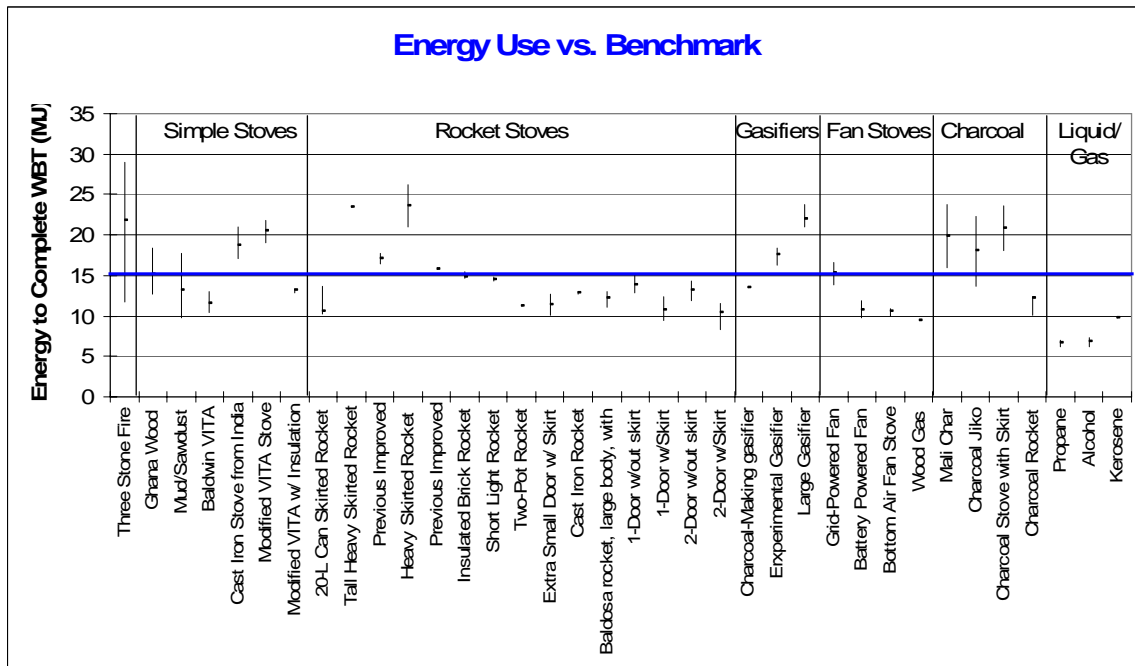
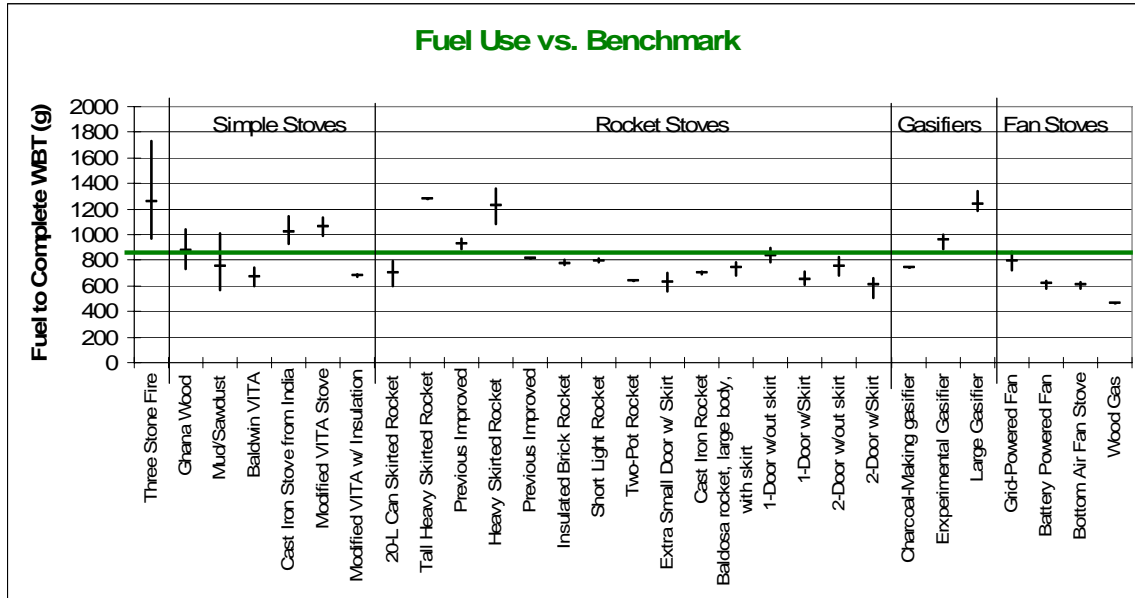
Work is ongoing to investigate the achievable consistency of results between laboratories and regions. So far data has been reproducible at three separate laboratories. A low-cost portable emissions hood is also available from Aprovecho for both lab and in-field emissions measurements. It is hoped that soon benchmark testing will be easily conducted worldwide in an effort to develop better stoves.

It should be noted that the benchmarks shall not be used to predict real-world performance. The purpose of the WBT and benchmarks is to develop a technically-optimized stove design before dissemination. Testing with real cooks to investigate user-acceptance and field performance is also essential.

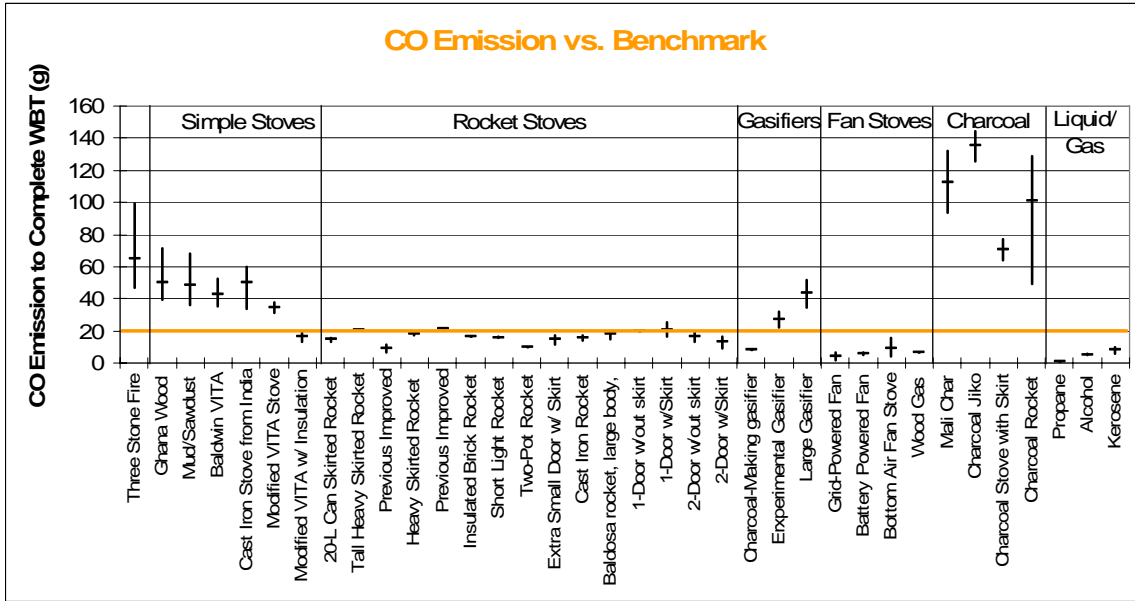
Benchmarks are offered as a reference for project stakeholders and should be used at their own discretion.

Proposed Benchmarks of Performance

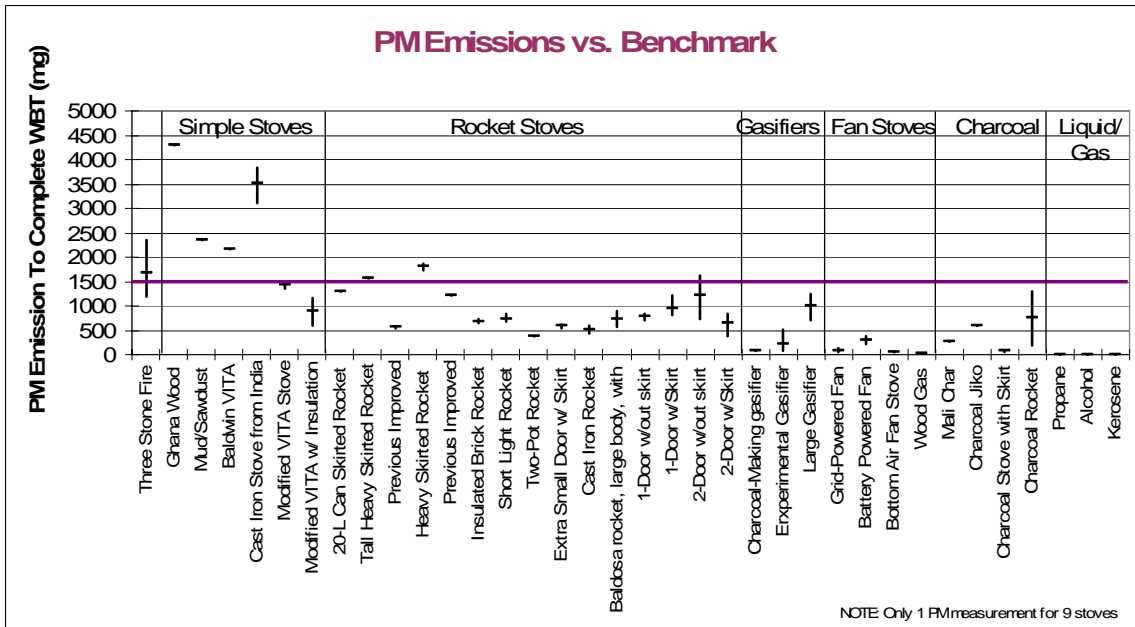
1.) **Fuel use:** Using the International Testing Pot a wood burning stove without a chimney should use less than 850 grams (15,000 kJ) of wood to bring to boil 5 liters of 25 degree C. water and then simmer it for 45 minutes during the UCB revised Water Boiling Test.



2.) **Emissions:** The wood burning stove without a chimney should produce less than 20 grams of Carbon Monoxide to boil 5 liters of 25 degree C. water and then simmer it for 45 minutes during the UCB revised Water Boiling Test.



3.) **Emissions:** The wood burning stove without a chimney should produce less than 1500 milligrams of Particulate Matter (2.5 microns or smaller) to boil 5 liters of 25 degree C. water and then simmer it for 45 minutes during the UCB revised Water Boiling Test.



4.) **Chimney Stoves Emissions Exemption:** Wood burning stoves with chimneys are exempt from the above standards if the stove does not allow more than an average of 50 parts per million of Carbon Monoxide to pollute the air anywhere within 30 cm of the stove. Exempt stoves with Chimney shall use less than 1500 grams (30,000 kJ) of fuel to boil and simmer for 45 minutes 5L of water according to the Shell/UCB revised water boiling test.

