

Matrix (Draft) of Biomass Stove Types and Characteristics, Plus Notes

(Version 2, dated 2007-03-19, by Paul S. Anderson) (This is a working DRAFT to obtain comments.)

The first version was dated 2006-11-18 and was prepared by Paul S. Anderson at the SIFAT Conference. Preparers of later versions should identify themselves.

\\ Stove Types	3-Stone	Clay/Ceramic Traditional		Rocket Stoves			Quasi-Gasifiers			UpDraft Gasifiers	
Characteristics		Portable Potter clay	Not portable; Cast cement	Simple	Eco-stoves	Onil	China	Vesto	Fan-jet Philips	TLUD	AVUD Chip Energy
1. Number in use. M = Millions; K = thousands	400 M	10 M	1 M	20 K	30 K	10 K	200 M	2 K	2 K	500	6
2. Cost (US\$)	Free	2 - 10	5 - 30	5-20	30 - 90	120	???	85	20 - 85	20 - 60	30 - 150
3. Number of pots	1 - 2	1	2	1	2 - 3	2 - 4	2 - 4	1	1	1	1 - 4
4. Portability	Easy	Yes	No	Yes	Mixed	No	No	Yes	Yes	Yes	Yes
5. Safety	Bad	Modest	Good	Good	Very good	Super	Good	Very good	Very good	Modest - good	Very good
6. Chimney	No	No	Majority yes	No	Yes	Yes	Yes	No	No	No	Yes
7. Chimney cleaning	N/A	N/A	2 - 3 weeks	N/A	2 - 3 weeks	2 - 3 weeks	2 - 4 weeks	N/A	N/a	N/A	Not needed
8. Fuel types & varieties	Sticks plus Misc.	Sticks plus local biomass such as dung, corncobs, etc		Small stick wood			Stick plus	Stick plus	Chip & pieces	Chip and chunky, pellets, briquettes	
9. Fuel savings	Bad	30 - 50 %	30 - 50 %	60 - 70 %			60 - 70 %	60 - 70 %	60 - 70 %	60 - 70 %	60 - 80%
10. Fuel feeding/Attending the fire	Irregular	10 - 20 minutes		7 - 12 minutes			10 - 20 min	10 - 20 min	1 - 3 min	10 - 45 min	Automation possible
11. Emissions	High	Moderate	Moderated	Moderate	Low	Low	Low	Low	Very low	Very low	Very low?
12. Emissions measured # times	40 ?	10	10	200 plus			4	None	4	3	Not tested
13. Natural draft	Yes	Yes	Yes	Yes			Yes	Yes	No	Champion = Yes	Either
14. Forced air	No	No	No	No			No	No	Yes	Reed = Yes	
15. Understanding by users	Easy & tradition	Very good	Very good	Good	Good	Good	Okay	Okay	Need training	Need instruction	Need instruction
16.											
17.											

Notes:

- In general, the Stove Types are in the following order across the page from left to right:
 - Oldest technology to newest.
 - Most IAP emissions to least.
 - Most installed/in-use units to fewest units
 - Least expensive (mainly built by local people) to more expensive (with some potential for industrial production and alternative materials for lower costs.)
 - Largest pieces of fuel to smallest pieces, but small low-value or waste-biomass can become pellets and briquettes for automated fuel feeding into gasifiers.
 - Most studied (through time and funded research) to least studied (but most potentially fruitful frontier for research when funding becomes available).

2. A general ranking of energy sources and stove types from highest to lowest IAP emissions: (fuel quality from dung to hardwood can make a difference)

A. Dry biomass w/ Traditional Burning; B. Dry biomass with air control; C. Gas-making from biomass; D. Gas-making from biomass; E. Renewable Liquid; F. Processed fossil fuel; G. Non-substance energy sources
 3-Stone & "Container fires"; Rocket Stoves & Quasi-Gasifiers; Gasifiers (dry) & Biogas (wet); Alcohol & Biodiesel; Kerosene & LPG & Nat. Gas; Solar & Retained Heat & Electric