TERI COOKSTOVE TECHNOLOGY

Context

Four out of every five rural and one out of every five urban households primarily depend on direct burning of solid biomass fuel like fuel wood, crop residue and cattle dung in traditional mud stove/ three stone fire for cooking.

Such traditional cooking practice is characterized by incomplete combustion of biomass fuels resulting in emission of toxic smoke. Women (and accompanying children) who get exposed to this smoke every day during cooking food in a mud stove, particularly in poorly ventilated kitchens, face increased risk of pneumonia, respiratory diseases, etc. Kitchen smoke is responsible for half a million premature deaths in India annually. The toxic smoke also contains climate change agents like carbon monoxide and black carbon. Such traditional mud stoves also have low thermal efficiency (~15%) that results in high fuel consumption (~1 kg/person/day of firewood) thereby contributing to deforestation in some areas.

TERI Technology Innovation

TERI felt the need to utilize the forced draft (using fan to inject air into the combustion chamber) micro-gasification technology to develop an improved biomass cookstove. After two years of intensive research, field-testing and customization we have developed a single port metal stove that can cater to cooking requirements of a family of up to 7 members. Fuel wood, agriculture residue and cattle dung cake can be used as fuel for this stove. The power charger has dual charging mode (both AC/ grid power supply and solar power supply) to cater to households in unelectrified areas. Quality components have been used to make the stove performance long lasting. Steel (Grade 304) has been used to fabricate the stove body and 11.1 V, 2.2 Ah Lithium Cobalt Oxide batteries has been used to power the fan.

Indian Institute of Technology, Delhi (IIT-D) has tested the stove and certified that it has passed all applicable government performance benchmarks. IIT-D has reported that the stove has combustion efficiency of 98.8% thereby reducing particulate matter emission (per unit of energy delivered) and carbon monoxide by 72% and 80% respectively in comparison to a traditional mud stove. As it has high (~37%) thermal efficiency, the stove also reduces fuel consumption by 54% vis-à-vis mud stove that leads to lesser drudgery for women/ children in terms of fuel collection and processing. For users, there is also additional benefit of faster cooking and less blackening of vessels.

Ministry of New and Renewable Energy (MNRE), Government of India has approved the TERI stove technology and made it technically eligible for all government funded projects. One commercial manufacturer has already used our patent-pending design to manufacture and sell more than 2,000 cookstoves. More manufacturers have shown interest to produce and market this TERI designed stove.