APR12-2012-000189

Abstract for an Invited Paper
for the APR12 Meeting of
the American Physical Society

Fuel efficient stoves for the poorest two billion

ASHOK GADGIL, UC Berkeley & Lawrence Berkeley National Laboratory

About 2 billion people cook their daily meals on generally inefficient, polluting, biomass cookstoves. The fuels include twigs and leaves, agricultural waste, animal dung, firewood, and charcoal. Exposure to resulting smoke leads to acute respiratory illness, and cancers, particularly among women cooks, and their infant children near them. Resulting annual mortality estimate is almost 2 million deaths, higher than that from malaria or tuberculosis. There is a large diversity of cooking methods (baking, boiling, long simmers, brazing and roasting), and a diversity of pot shapes and sizes in which the cooking is undertaken. Fuel-efficiency and emissions depend on the tending of the fire (and thermal power), type of fuel, stove characteristics, and fit of the pot to the stove. Thus, no one perfect fuel-efficient low-emitting stove can suit all users. Affordability imposes a further severe constraint on the stove design. For various economic strata within the users, a variety of stove designs may be appropriate and affordable. In some regions, biomass is harvested non-renewably for cooking fuel. There is also increasing evidence that black carbon emitted from stoves is a significant contributor to atmospheric forcing. Thus improved biomass stoves can also help mitigate global climate change. The speaker will describe specific work undertaken to design, develop, test, and disseminate affordable fuel-efficient stoves for internally displaced persons (IDPs) of Darfur, Sudan, where the IDPs face hardship, humiliation, hunger, and risk of sexual assault owing to their dependence on local biomass for cooking their meals.