

Title: Cooking Stoves for Developing Countries: Saving Lives, Time, Wood and the Environment

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Abstract:

More than three billion people eat meals cooked using biomass fuel, with two billion cooking over an open fire. The emissions from such stoves or fires create a tremendous health problem for women and children, and is thought to be the four leading cause of death in the under-developed parts of the world. Furthermore, the low efficiency of such stoves causes excessive and unsustainable consumption of wood and other biomass and produces twice the air pollution. The excessive wood consumption also requires enormous amounts of time for women and children to gather wood and carry it back to their homes.

This presentation will focus on a joint research program between Colorado State University and Baylor University to develop a clean burning, fuel efficient, biomass cooking stove that will last five years and be affordable to poor people. This is a daunting set of constraints for engineering a biomass cook stove. However, if the efficiency could be certified to be double that for open fires or other widely used cook stoves, with low emissions and a five year lifetime, the stoves would be eligible for \$125 of carbon credits at the current price they are being sold in Europe, making the stove more affordable for poor people. Shell Foundation is willing to invest \$25,000,000 to produce 10,000,000 such stoves in the next 10 years if this project is successful.

The operating temperature in biomass cook stoves can exceed 900C, and with ~1000 thermal cycles per year. These conditions are similar to the requirements for jet engines, except that the biomass fuel is much very dirty compared to jet fuel, including such corrosive elements as potassium, sodium, chlorine, and phosphorus. Various ceramics, cements, and ferrous alloys are being investigated as potential candidates for the combustion chamber, which is the "Achilles heel" of cooking stoves.

This presentation will include updates on the progress that has been made and the likely costs for such a stove. It will also include the economic opportunities that the production and sales of such stoves will provide in the various countries where they will be produced.