Physics to tackle how food is cooked in future

June 1 2012

In this month's *Physics World*, Sidney Perkowitz, Candler Professor of Physics Emeritus at Emory University, explains how applied physics led to the innovation of flameless cooking in the late 19th century and addresses the challenge of feeding a rapidly growing population in a cleaner, more efficient way.

In this article, Perkowitz highlights the work of physicist Benjamin Thomson, the creator of the first enclosed, indoor oven, and Percy Spencer, the engineer who, in 1946, discovered that a candy bar melted when it was brought near an operating radar source – the first commercial microwave oven was produced a year later and led to a revolution in cooking.

Although these breakthroughs have led to the widespread distribution of commercial ovens, it is estimated that two to three billion people, mostly in developing countries, still eat food prepared by the ancient method of cooking over open fires or in rudimentary stoves.

Fuelled by wood, agricultural residue, animal dung and coal, these primitive cooking methods present a series of costs. Annually, some two million deaths are caused by respiratory illnesses arising from indoor smoke, while other consequences include atmospheric carbon dioxide and deforestation.

There has been a concerted global effort to mitigate some of these factors and, according to a recent report, some 166 million improved cooking units are now in use; however, rolling this initiative out to the

many hundreds of millions of other people who could benefit is a complex process.

In developing countries where there is access to electricity, the Oorja stove ("Oorja" means energy in Hindi) shows great promise – more than 440,000 units of the Oorja stove have been sold in India to date. The stove incorporates a small, cheap computer cooling fan and can be fuelled by corn cobs and the residue from crushed sugar cane.

A UK-led project called SCORE is developing a cooking method whereby confined gas is heated by a fuel, which, in turn, produces sound waves that vibrate a wire coil, thereby developing a voltage and a current. The eventual goal is to generate 100 W of electrical power, which would be enough to run several household devices.

"As is true for all of the designs, a stove will not be successful unless it works well in real developing-world kitchens and can be produced at a price within reach of poor families, for instance by building it with local materials and methods as much as possible," Perkowitz writes.

More information: *Physics World*: physicsworld.com/

Provided by Institute of Physics