

# University to develop three-in-one device for the third world

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The University of Manchester will play a major role in a £2m project that aims to deliver a wood-powered all-in-one generator, cooker and fridge into third world communities in five years.

The SCORE project (Stove for Cooking, Refrigeration and Electricity) brings together four major UK universities, a leading US research centre, a multi-national electrical goods manufacturer, an international charity and numerous universities in Asia and Africa.

The aim of this consortium is to reduce poverty in Africa and Asia by understanding the energy needs of rural communities and working with them to develop an affordable, versatile, domestic appliance.

The proposed device will incorporate an electricity generator, a high-efficiency cooking stove and a refrigerator, and will be fuelled by burning biomass products.

The collaboration will ensure the device is affordable, socially acceptable, and there is scope for communities to develop numerous businesses from the manufacture, repair and innovative usage.

The University of Manchester's Dr Artur Jaworski, an expert in thermoacoustic engineering in The School of Mechanical, Aerospace and Civil Engineering, will lead vital research into the engine design for the SCORE device.

In simple terms, thermoacoustics refers to generation of sound waves due to non-uniform heating of gas - a typical example being the 'singing' of hot glass vessels during glass blowing processes, which has been known for centuries. When harnessed by scientists and engineers these phenomena open new possibilities in energy conversion processes.

Using thermoacoustic technology is a more efficient way of using wood as a fuel than using an open fire to cook. It produces less pollutants. The device will also have few moving parts making it more reliable.

The concept of the proposed device is based on proven thermoacoustic engines and refrigerators developed for applications such as combustion-fired natural gas liquefaction and radioisotope-fuelled electric power generation.

Los Alamos National Laboratory in the United States, in collaboration with several industrial partners, has played a lead role in the development of thermoacoustic technology.

Dr Jaworski said: "A multi-purpose thermoacoustic device such as this, powered by biomass, has never been attempted before. Although we have wide experience of this technology and applying it in different ways, this new and exciting project will require plenty of ingenuity and innovation.

"With the depth of experience and expertise we have assembled as part of this international project, we are confident we can meet our aims, deliver a viable appliance and make a real difference to people living in the developing world.

"The benefits could be huge, ranging from better health due to the correct storage of medicines, to improved education through electricity for computers and lighting, to a higher standard of living through the

creation of employment opportunities and associated businesses."

Researchers will need to look carefully at ways of ensuring any design can be assembled cheaply and easily using local labour and indigenous materials. Given the high cost and high-tech nature of current thermoacoustic systems, this represents a significant challenge.

Dr Jaworski, who is an EPSRC Advanced Research Fellow, will work closely with academics at The University of Nottingham, Imperial College London and Queen Mary, University of London.

Other partners are the international charity Practical Action, Los Alamos National Laboratory and GP Acoustics. Universities in developing countries in Africa and Asia will also assist with the design, development, production and introduction of the device.

The SCORE consortium is funded by grants from the Engineering and Physical Sciences Research Council (EPSRC) as part of its initiative on energy and international development.

There will be two stages to the five-year project; the first three years will mainly focus on conducting the necessary social and scientific research, while the final two years will broadly focus on field trials and distribution of the devices into the target communities. More information is available at [www.score.uk.com/research/](http://www.score.uk.com/research/)

Source: University of Manchester

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