Rice as a source of electricity

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Rice yields an abundance of biowaste: Husks make up around one quarter of the weight. Only a small fraction of this is utilized, for instance, to fire distillery furnaces. Researchers at Hanoi University of Technology now also want to use rice husks to generate electricity.

Researchers from the Fraunhofer Institute for Factory Operation and Automation IFF in Magdeburg engineered a fluidized bed firing system to do this.

Fluidized bed firing systems are state-of-the-art in Germany but predominantly burn coal. Researchers of this technology also want to utilize them in the future for biomass. “Simply put, such systems consist of a vertical pipe with an air distribution plate,” explains Dr. Eyck Schotte, who oversaw the engineering of the Vietnamese fluidized bed firing system. “The air distribution plate is covered by a bed material, usually quartz sand, mixed with the fuel. As the gas flows through the nozzles, it entrains the bed material with the combustible material to the top where the fuel is converted.”

New fuel is gradually fed into the fluidized bed from the side. Since the temperature in this method is approximately equal in the entire pipe, temperature peaks are not produced that would release particularly large amounts of emissions.

Not all biomass is the same however. Straw burns differently than wood and in turn differently than rice residues. Hence the German researchers implemented the principle of fluidized bed firing for their colleagues in

Hanoi in such a way that they can test various fuels' combustion behavior. "For instance, we can replace the conveying screws that convey other fuels into the combustion chamber and thus continually feed both coarse rice husks and fine coal dust into the combustion chamber," says Schotte.

The circulating fluidized bed is equipped with extensive metrology such as a volumetric flowmeter, thermocouples and pressure sensors. A programmable logic controller displays and stores every measured value, thus enabling the researchers to directly monitor the combustion process and precisely analyze it afterward. The PLC can also regulate the quantity of air fed in or its temperature. Vietnamese engineers will be testing the extent to which energy can be recovered from rice residues and whether they can be mixed with fossil fuels such as coal.

Source: Fraunhofer-Gesellschaft