

Cow power could generate electricity for millions

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Converting livestock manure into a domestic renewable fuel source could generate enough electricity to meet up to three per cent of North America's entire consumption needs and lead to a significant reduction in greenhouse gas emissions (GHGs), according to US research published today, Thursday, 24 July, in the Institute of Physics' *Environmental Research Letters*.

The journal paper, 'Cow Power: The Energy and Emissions Benefits of Converting Manure to Biogas', has implications for all countries with livestock as it is the first attempt to outline a procedure for quantifying the national amount of renewable energy that herds of cattle and other livestock can generate and the concomitant GHG emission reductions.

Livestock manure, left to decompose naturally, emits two particularly potent GHGs – nitrous oxide and methane. According to the Intergovernmental Panel on Climate Change, nitrous oxide warms the atmosphere 310 times more than carbon dioxide, methane does so 21 times more.

The journal paper creates two hypothetical scenarios and quantifies them to compare energy savings and GHG reducing benefits. The first is 'business as usual' with coal burnt for energy and with manure left to decompose naturally. The second is one wherein manure is anaerobically-digested to create biogas and then burnt to offset coal.

Through anaerobic digestion, similar to the process by which you create

compost, manure can be turned into energy-rich biogas, which standard microturbines can use to produce electricity. The hundreds of millions of livestock inhabiting the US could produce approximately 100 billion kilowatt hours of electricity, enough to power millions of homes and offices.

And, as manure left to decompose naturally has a very damaging effect on the environment, this new waste management system has a net potential GHG emissions reduction of 99 million metric tonnes, wiping out approximately four per cent of the country's GHG emissions from electricity production.

The burning of biogas would lead to the emission of some CO₂ but the output from biogas-burning plants would be less than that from, for example, coal.

Authors of the paper, Dr. Michael E. Webber and Amanda D Cuellar from the University of Texas at Austin, write, "In light of the criticism that has been levelled against biofuels, biogas production from manure has the less-controversial benefit of reusing an existing waste source and has the potential to improve the environment.

"Nonetheless, the logistics of widespread biogas production, including feedstock and digestates transportation, must be determined at the local level to produce the most environmentally advantageous, economical, and energy efficient system."

Source: Institute of Physics

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