

Robust decentralised low-energy faecal sludge dewatering leading to sustainable energy resource, sanitation and clean water

132711, Early Stage, 1 February 2017 to 31 January 2018, £307,982

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The project concerns faecal sludge dewatering/treatment leading to energy security/generation, sanitation utilising locally-available resource and GHG emission savings. The technical/financial feasibility study is to develop standalone dewatering process for rural UK/EU, increasing energy efficiency/generation, reducing transport costs/carbon footprint and in developing countries (DC) as a low-cost faecal sludge management (FSM) system for decentralised/localised sanitation leading to integrated anaerobic digestion (AD) based off-grid energy generation.

Market opportunity

Two primary business opportunities aimed at UK/EU and DC markets. UK/EU opportunities are based on energy efficiency and energy generation using underutilised energy resource potential of rural primary sludge/industrial waste waters whereas in DC it is based on providing low-cost off-grid energy generation via AD, replacing current non-existent and poor localised sanitation systems and leading to the developments of local entrepreneurship with sales of renewable electricity/biogas/heat, FSM services (non-sewered sanitation provision), fertiliser and clean water. A Millennium Development Goal is to provide sanitation to 50% of estimated 2.6 billion people globally without sanitation with a global annual sanitation market of ~US\$8 billion.

Innovation

Testing will build on preliminary work in developing a prototype system that will assess system throughput and efficacy to meet a commercially-viable technology. System design will be tested on a bench scale unit and design and findings will be further enhanced by CFD modelling using Fluent software. Financial viability will be completed together with a detailed system LCA.

Exploitation route

The project will undertake discussions with water companies for an energy-efficient and cost-effective, modular (pre-cursor to AD) and potentially transportable dewatering unit as a valuable process unit operation addition for treating rural primary sludge, with extension to high COD waste waters for wastewater collection companies. The project will further develop financial model reflecting TCO, ROI, IRR and NPV and will determine optimal range for both capex and opex. A similar approach with DC-established teams will approach NGOs/Charities and funding agencies (such as UNDP, DFID).

Outcome and next steps

Present work includes confirming technical and financial viability of the technology and its potential to address all aspects of the energy trilemma in providing a sanitation and localised energy generation solution that significantly impacts on GHG emissions. Next stage of the project will aim at the building of a pilot-scale unit that will be tested in the UK and in a DC to commercialise the technology.

Further information: <http://gtr.rcuk.ac.uk/projects?ref=132711>

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