



Communication and Marketing Department
Isebe loThungelwano neNtengiso
Kommunikasie en Bemerkingsdepatement

Private Bag X3, Rondebosch 7701, South Africa
Welgelegen House, Chapel Road Extension, Rosebank, Cape Town
Tel: +27 (0) 21 650 5427/5428/5674 Fax: +27 (0) 21 650 5628

www.uct.ac.za

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UCT team awarded R2.5m NRF grant for SA biogas projects

Alternative energy systems to be tested in urban and rural settings

A project led by the University of Cape Town to convert organic waste into an alternative energy source has been awarded a R2.5-million grant by the National Research Foundation (NRF) to support research into the emerging biogas innovation sector in South Africa.

Associate Professor Harro von Blottnitz, of the Department of Chemical Engineering in the Faculty of Engineering & the Built Environment at UCT, said: "As part of this project we will be supporting biogas demonstration projects, both in urban settings in Cape Town and in rural settings, collaborating with the Department of Physics at the University of Venda, which has already developed some expertise in biogas technology in rural settings."

Khayelitsha community garden helps set example

The first two of these demonstration activities are small-scale biodigesters operating solely on food waste. These are already operational at UCT's Leo Marquard Hall residence and at a community food garden in Khayelitsha, and two more facilities are expected to be installed over the next 12 months: one by the University of Venda and one in an informal setting in Cape Town.

Earlier this year members of the UCT student chapter of Engineers Without Borders (EwB) designed and donated a biodigester to the Siyazama Community Allotment Garden Association (SCAGA), the first large-scale community garden in Khayelitsha. EwB's volunteering work is backed up by PhD student Rethabile Melamu, one of the authors of the proposal to the NRF, titled: "Towards a Technology Specific Innovation System for Harnessing Waste-Based Bioenergy". The award was granted through the NRF's Global Change, Society and Sustainability Research Programme, which aims to address the challenges of "science and technology for global change, with a focus on climate change".

Melamu and von Blottnitz argue: "Africa is still waiting for its green revolution. Previous studies have established that bio-energy from waste materials is cheaper and greener. In Africa, lots of organic waste is either not treated at all, or under-utilised." They are inspired by the German biogas industry and the widespread use of biogas installations in Asia, and

aim to develop an understanding of these success stories to help step up implementation of bio-energy projects in South Africa.

How a biodigester works

A biodigester, or anaerobic digester, creates methane gas (versatile fuel) from organic waste products. The SCAGA biodigester also produces liquid fertiliser for the SCAGA gardens. The methane gas is piped to the SCAGA kitchen, where it fuels a gas cooker.

Organic waste, be it vegetable matter, human waste, or otherwise, is added to a sealed, water-filled chamber containing certain anaerobic bacteria (which live without atmospheric oxygen). These bacteria then ingest the organic waste and release methane as a byproduct. The methane is captured and diverted to a traditional gas hob, where it is used for cooking. Another byproduct of this process is liquid slurry that contains high volumes of nutrients necessary for fertilising crops.

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Issued by: UCT Communication and Marketing Department

Patricia Lucas

Tel: (021) 650 5428 Fax (021) 650 5628

Cell: 076 292 8047

E-mail: pat.lucas@uct.ac.za

University of Cape Town

Rondebosch

Website: www.uct.ac.za