Department of Chemistry
Departmental Webinar Series

You are cordially invited to a lecture presented by

Dr. Karen Surridge

Centre Manager, Renewable Energy Centre of Research & Development Clean Energy

SANEDI, South Africa

Date: Friday, 29th May 2020
Time: 10:30
Venue: Webinar link; https://meet.google.com/enj-jbjn-vib
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The Triple B & The Double C

Basic Biogas Biology and Climate Change

Biogas is a biological energy source that is naturally produced from the decomposition of organic waste. When any organic matter, such as food scraps and animal waste, breaks down in an anaerobic (no oxygen) environment it releases a variety of gases that are composed primarily of methane and carbon dioxide. This process of producing biogas is known as anaerobic digestion, which is a natural form of waste-to-energy utilising the process of fermentation to breakdown organic matter. Animal manure, food scraps, wastewater and even sewage are examples of organic matter that can produce biogas through anaerobic digestion. When this digestion is operating close to optimally, a high content of methane in biogas (typically 50-75%) is produced and can be used. Biogas is flammable and produces a deep blue flame that can be used as an energy source for primary energy needs such as cooking, heating and lighting.

Biogas is considered to be an environmentally-friendly energy source because it alleviates two major environmental problems simultaneously: reducing the global organic waste that is taken to dump sites and releases dangerous levels of methane gas every day; and, a reduction in the reliance on primary fossil fuel energy produced to meet global energy demand. Biogas generation recovers and utilises waste materials that would usually be channeled to waste treatment sites, such sites include dumping

in landfills. It also prevents the use of toxic chemicals in waste water treatment plants and reduces cost, energy and additional material by treating waste on-site.

The emission of "Greenhouse Gasses" (GHG) into the environment is believed to be one of the primary causes of global climate change that is affecting the earth. These gasses are produced through many different processes including the fossil fuel industry, waste decomposition, global economic industry, etc. Biogas usage does not require traditional fossil fuel extraction technologies in order to harness energy from its waste source. Instead, biogas technologies allow for conversion of a problematic GHG into a safer, utilisable and thus beneficial form. When burned, and/or otherwise utilised, the methane content present in decomposing waste is converted into carbon dioxide. This is a less environmentally damaging gas because, methane gas has approximately 20 to 30 times the GHG capabilities of carbon dioxide. Instead of allowing methane gas to just release into the atmosphere, as at a landfill site, biogas digester technology provides a system that processes waste into biogas, then channeling this so that its energy can be put to productive use.

A technology perspective reveals that there are several types of biogas digester systems that have been designed to harness and make efficient use of the gas produced. Each technology and design differs depending on input, output, scale and type. However, the biological process that converts organic waste into biogas remains the same. Attend this seminar on Friday to learn more and see some great examples of the Triple B Double C in action.

Short CV of Dr. Surridge

B.Sc., B. Sc (Hons), M.Sc., Ph.D., Postdoctoral Fellow (Claude Leon Foundation)

Dr Surridge was awarded her PhD in 2007 and during 2007-2009 she was a postdoctoral Fellow of the Claude Leon Foundation. An academic career was paralleled by establishing a consulting company specialising in environmental analyses, environmental impact assessments (EIA's), laboratory setup and establishment and consulting to, among others, large energy, environmental consulting and metal industries in South Africa. From November 2011 to present, Dr Surridge was engaged as Centre Manager for the Renewable Energy Centre of Research and Development (RECORD) at the South African National Energy Development Institute (SANEDI). This centre is mandated, through the government act (National Energy Act 2008, no. 34) that established SANEDI, to coordinate renewable energy research and development in South Africa. Finally, Dr Surridge is also currently serving on the council of the South African Solar Energy Association (SASEA).