Swayana Brings Carbon Recycling to South Africa

Carbon Capture and Reuse Technology to Recycle Emissions from Ferroalloy Sector

(Pretoria, South Africa, 31th July 2017) South African company, Swayana is collaborating with carbon recycling company, LanzaTech, with headquarters in Chicago USA, to introduce their proprietary carbon capture technology to South Africa.

LanzaTech's first commercial facility will be online at the end of 2017 in China, producing fuel grade ethanol from captured steelmaking off-gas. The successful application of LanzaTech's innovative platform in steel making, has led to commercial engagement with companies in the ferroalloy sector. Swayana has signed a Memorandum of Understanding (MoU) with LanzaTech to collaborate on developing projects for the production of ethanol and higher value products from waste gases in the ferroalloy and titania smelting sectors.

The possible impact of using off-gases from this sector is considerable. South Africa has the potential to produce more than 400 000 tonnes per annum ethanol from existing ferroalloy and titania producers. This would sequester over 700 000 tonnes of carbon dioxide (CO_2) per annum - the equivalent to removing 250 000 cars from South Africa's roads.

In this collaboration, a first commercial ethanol production facility is in the prefeasibility (PFS) phase and it is based on off-gases from an existing smelter site in the Mpumalanga province of South Africa. As part of the process development of this plant, a pilot unit was shipped to South Africa, and successful fermentation tests have been conducted with the smelter off-gas, supporting the PFS design.

The air quality of the industrial areas of Mpumalanga is under substantial environmental pressure, and this plant will contribute significantly to the green- and sustainability drives in the area by reducing the carbon footprint, contributing to cleaner air, generating jobs, and developing a new industry based on ethanol and its chemical derivatives.

Such projects facilitate social uplift and infrastructure generation in areas of high regional unemployment. This technology not only reduces carbon, but echoes the actions of the South African government in prioritizing initiatives that can bring such societal benefits to the country.

The Department of Trade and Industry of South Africa (dti) is working with Swayana to realize the implementation of the project. Swayana has applied for a Black Industrialist Programme and the application is in progress. InvestSA, a division of the dti, is assisting in facilitating the project both in the USA and in SA.

"South Africa currently supplies a large percentage of the worldwide demand in ferroalloys and titania slag and is an ideal place for LanzaTech's carbon capture technology and this first facility will open up the market for a green based chemicals technology based on one of SA strengths, namely mining and beneficiation of minerals" said Mr Joseph Zinyana of Swayana.

"The large volume of waste gas produced at industrial facilities cannot be stored or transported, rather it must be combusted and is therefore emitted as carbon dioxide," said Jennifer Holmgren, CEO of LanzaTech. "Capturing these emissions prior to combustion enables our partners to create value and to turn a liability into an opportunity. We are excited to be working with Swayana to bring carbon recycling to South Africa."

The LanzaTech Technology

LanzaTech's gas fermentation technology uses carbon-containing gases as both a nutrient and energy source for micro-organisms that, in turn, produce fuels and chemicals.

In the LanzaTech process, a carbon monoxide (CO) gas source, is introduced into a bioreactor vessel. Fermentation proceeds in a liquid medium where the microbes grow and produce specific products. These naturally occurring microbes are entirely contained in the bioreactor and have no direct interaction with the outside environment.

As the reaction proceeds the end-products are recovered and separated from the water, which can be returned to the bioreactor, and prepared for their intended downstream markets. The products that come from this process are quite diverse and depend on the specific microbes.

"The upgrading of the CO rich waste gas to ethanol is similar to adding a beer brewery followed by a whiskey distillery next to the ferroalloy plant" says Dr Jacobus (Kokkie) Swanepoel of Swayana.

About Swayana

Swayana was established in 2016 and is a South African registered, Level 2 BBBEE company utilizing carbon footprint reducing technologies - one of which is ethanol from industrial CO containing off-gases, using the LanzaTech microbial fermentation technology. The ethanol will be sold as a green fuel into the global market initially, but with larger

production volumes anticipated it can be used as feedstock to the chemical industry, specifically for ethylene and polyethylene production.

Swayana is owned by the Zinyana and Swanepoel families and the company is managed by Mr. Joseph Zinyana and Dr. Kokkie Swanepoel. Joseph and Kokkie have independent engineering companies - New Age Engineering Solutions and Thermtron Scientific, respectively - and have been working together for the last 15 years on different projects, including the turnkey design and supply of the highly successful uranium coating facility for the PBMR® company in 2006.

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