

From Trash to Tank: Upcycling of Landfill to Fuel Demonstrated in Japan

SEKISUI CHEMICAL CO., LTD. and LanzaTech announce breakthrough in conversion of municipal solid waste to ethanol.

(Chicago, December 6 2017) SEKISUI CHEMICAL CO., LTD. ("SEKISUI"), the multibillion dollar Japanese diversified chemicals company and carbon recycling company, LanzaTech, have made significant progress on a waste to chemicals platform converting municipal solid waste (MSW) to new products.

Today, many MSW streams are incinerated or super-heated to produce a synthesis gas made up of carbon monoxide and hydrogen, which is then combusted for power and emitted as carbon dioxide (CO₂). With the fall in global renewable power costs and the rise of emissions reductions targets, SEKISUI wanted to do better. Together with LanzaTech, they have taken an existing gasification system at a landfill site and added LanzaTech's fermentation capability to a slipstream of the gas. They have shown that it is possible to recycle the carbon from unsorted MSW destined for landfill or the incinerator and ferment it to make new products, that would otherwise come from fossil resources or sugars.

In contrast to traditional fermentation that uses yeast to convert sugars into products such as ethanol, LanzaTech ferments gases and produces ethanol and a variety of chemicals using a naturally occurring bacteria. These chemicals are precursors to plastics, rubber and synthetic fibres and can be used to produce new packaging, sneakers, cell phone covers and yoga pants while avoiding the need for more fossil resources to come out of the ground.

This technology, which was first demonstrated in 2013 in a laboratory unit, has now been demonstrated at pilot scale achieving commercial productivity and stability targets.



20,000 L per year municipal solid waste pilot facility.



Unsorted non recycled, non-compostable municipal solid waste fed directly to gasifier and continuously converted to ethanol.

Senior Managing Executive Officer, Responsible for Corporate Research and Development, Satoshi Uenoyama says, "Garbage is an important resource. It is essential our society effectively utilizes this valuable and abundant resource as the 'urban oil field' of the future enabling the creation of a sustainable society. It is our mission to replicate this technology widely."

This technology aligns with Japan's "3R" strategy of reducing, reusing and recycling resources and supports the nationwide movement to reduce emissions by 26% below 2013 levels by 2030 according to Japan's Paris Climate commitments.

"We must focus on using carbon for products not power, giving carbon a second chance of life," said LanzaTech CEO, Jennifer Holmgren. "Imagine being able to look at your trash can and know that you can lock all that waste carbon into a circular system, avoiding CO₂ emissions and maximising our precious carbon resources. That is a carbon smart future!"

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For more information about SEKISUI please visit: <http://www.sekisuichemical.com/>
SEKISUI CHEMICAL CO., LTD.

Public Relations Group, Business Strategy Department
Fax: +81-(0)3-5521-0510

For more information about LanzaTech please visit: <http://www.lanzatech.com>

Media Contact:

Freya Burton

+1 (630) 347 8054

freya@lanzatech.com