What biogas can do for the world

5 April 2017, by David Newman and Sarika Jain, Be the First to Comment

Organic waste is produced everywhere, creating greenhouse gases. David Newman and Sarika Jain outline the opportunities to use biogas technologies to help people while cleaning up the planet and creating business value

Livestock emissions account for 14.5% of total anthropogenic GHG emissions globally. Photograph: WBA

Organic waste is generated at every stage and aspect of life and pollutes our environment if not handles appropriately. The rotting waste produces methane, a known greenhouse gas. But via anaerobic digestion (AD)/biogas technologies or landfill gas capture, methane can be put to productive uses such as renewable-energy generation, while the residue organic waste can be used as fertiliser.

The World Biogas Association (WBA) was launched on 15 November 2016 at the

COP22 UN climate change summit in Marrakesh, Morocco. Its mission is to facilitate the adoption of biogas technologies globally, with the belief that this is an essential measure for all countries to achieve their obligations under the Paris agreement and UN sustainable development goals.

The association aims to provide a global voice for the biogas industry and facilitating an increase in the rate of uptake of biogas technologies, by engaging with key multilateral bodies, investors and experts, and providing support at governmental and inter-governmental levels. It aims to share knowledge, experience and best practices from around the globe as well as promote investment in research and innovation.

Following the COP21 climate agreement in Paris in December 2015, the signatory countries are legally bound to reduce their greenhouse gas emissions in order to keep the rise in temperature related to human activities to below 2°C. Methane accounts for 16% of the global greenhouse-gas emissions, with agriculture and waste management two of the largest sources. AD and biogas technologies have much to contribute towards the managing and reducing of these.

- **Organic fraction of municipal solid-waste management** The organic share of the waste rotting in municipal landfills, mainly high-calorific-value food waste, produces biogas gas containing 50-60% methane. While more authorities are starting to view this as a resource for energy generation, landfills still account for 700Mt of methane emissions a year. There are many examples of success in capturing landfill gas. Separate collection and treatment of organic waste will not only reduce emissions, but also recirculate nutrients via digestate that would have been lost otherwise.
- **Sanitation** About a third of the global population, 2.4 billion people, lack basic sanitation, creating unhygienic conditions rife for the spread of bacterial infections and diarrhoeal diseases like cholera. Anaerobic digestion of biosolids, such as those installed in India by Sulabh International, promotes a hygienic environment through local treatment of these wastes.
- **Waste-to-energy production** Once established and fed on a regular basis, AD of organic feedstock produces biogas on a continuous basis, thus producing baseload energy. If production exceeds demand, the energy can easily be stored in the form of biogas to be used when needed, giving it a unique advantage over other renewable-energy technologies, which are dependent on external environmental factors such as the sun shining or the wind blowing.
- **Domestic wastewater treatment** AD is integrated into the treatment of domestic waste water to stabilise the sewage sludge before it is applied as biofertiliser. Digestion also reduces the carbon loading of the water and hence makes the waste water less damaging for aquatic bodies and life, if discharged. Co-digestion of foodwaste and wastewater has been implemented successfully by the East Bay Municipal Utility District, in California, US.
- **Industrial wastewater treatment** Industries producing effluents with a high organic loading, such as breweries in the UK, have reduced the environmental impact of their processes by digesting the waste and generating energy for their operations.

- **Waste management** Proper management of organic waste is essential to prevent the spread of diseases transmitted by rats, flies, and mosquitoes, and for improvement of the air quality in landfill neighbourhoods.
- **Crop residues** The practice of burning crop residues such as rice and wheat straw, is common in India and China, with disastrous consequences for air quality. Dry digestion of the crop residues or co-digestion of these with livestock slurry can help reduce the environmental impact of the disposal of these wastes, conservation of carbon and nutrients to the soils through application of digestate biofertiliser and also diversify the income of the farmers, making agriculture more resilient.
- **Manure management** Livestock emissions account for 14.5% of total anthropogenic GHG emissions, mainly as methane and nitrous oxide. Treating manures through AD?reduces the formation of nitrous oxide and captures the methane as biogas, which can be upgraded for use as fuel or for production of energy.

WBA president David Newman said: "Capturing methane and using it for the production of energy is nothing new – the technologies have been available for decades now, especially for treating farm wastes, sewage and for landfills. Over the last decade technology has developed rapidly for treating food waste, a massive volume of continuously produced waste globally, which contributes to massive health and environmental problems.

"But we forget sometimes that biogas investments are a business decision, not just driven by health or environmental considerations. It is the increasing competitiveness of biogas as an energy producer that will determine its uptake globally. Research, technological change and experience are driving greater efficiencies, and I am optimistic the industry can step up its performance to grasp the opportunities provided by the energy-waste-food nexus."

David Newman is president and Dr Sarika Jain is?research and policy manager of the World Biogas?Association

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