



MEDIA RELEASE

Giving waste a second life, as energy

IMMEDIATE RELEASE

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Waste-to-energy (WtE) involves the physical, chemical and biological processes that give municipal waste a second life - as a resource that will produce renewable energy. The WtE concept, that is gaining momentum in South Africa, is being considered as another alternative for diversion of waste from landfill, depending on whether it passes the rigorous environmental assessments.

The most common way that most municipalities in South Africa have dealt with waste is by landfilling; the waste is compacted, covered and hopefully never seen again. "Landfilling is not desirable when considering the waste hierarchy as it poses many environmental risks if incorrectly located, poorly designed or poorly operated. Consequently, the waste management landscape needs to explore technologies to maximise diversion from landfill, such as the WtE process," says Jan Palm, President of the Institute of Waste Management of Southern Africa (IWMSA).

"Not only does WtE alleviate the burden on available landfill airspace, it also provides an entirely new source of energy for South Africa, which can power many homes," adds Palm.

How does it work?

Municipal solid waste consists of everyday household and garden waste, commercial waste, and sometimes industrial waste. This can be recovered and separated into different parts; recyclable, organic and non-recyclable.

Municipal solid waste first enters a Materials Recovery Facility (MRF) which is a physical separation process used to recover all recyclables to re-enter the market. What remains after the recyclables have been removed is the organic part and non-recyclable part of the waste.

The organic fraction, which consists mostly of food waste and garden refuse, then goes through a biological treatment process known as anaerobic digestion (AD). This involves bacteria that thrive in environments in the absence of oxygen, which break down the organic waste, much the same as what happens inside a landfill. Instead of occurring in an open environment, this happens in closed reactors so that the two by-products, biogas and digestate can be collected. Methane gas, which with carbon dioxide makes up the biogas, can then be used as a source for energy (electricity and/or heat)

production. The digestate can be used to produce low-grade compost or can be added to the non-recyclable part to be thermally treated.

Thermal treatment as part of the WtE process typically occurs in three different ways namely; incineration, gasification or pyrolysis. Incineration, also known as mass burn, is the most common process which involves using the heat that is generated during incineration to turn water into steam. The steam turns a turbine to produce electricity¹. Gasification is a process that turns organic waste into syngas, a gas containing up to 60% carbon monoxide, 25 to 30% hydrogen, 5 to 15% carbon dioxide, and 0 to 5% methane. This syngas is used to produce electricity. Pyrolysis involves heating the organic waste to speed up the decomposition process, however, this occurs in the absence of oxygen so that the waste does not burn. The products of this process include syngas and bio-oil².

“To ensure that air quality regulations are met, WtE plants will implement emission treatment technology followed by an emission monitoring system to ensure air quality compliance. This is normally a condition that follows the environmental impact assessment (EIA) process, which is a statutory requirement before any WtE activity starts,” mentions Palm.

The IWMSA aims to provide insight into the development of the South African waste management landscape, especially moving waste management up the waste hierarchy. “Our country is governed by strict environmental legislation, which will determine the best route for integrated waste management, which includes WtE,” explains Palm. “By utilising WtE as one of the technologies to divert waste from landfill we progress up the Department of Environmental Affairs’ Waste Hierarchy. Landfill, although it will always act as a safety net when all else fails, still remains the least preferred waste management option according to the Hierarchy,” he concludes.

To gain insight into these industry developments, visit the [IWMSA's training schedule](#) and book your spot in one of the many informative sessions, which are facilitated by industry professionals.

For more information on the Institute of Waste Management of Southern Africa visit www.iwmsa.co.za. You can also follow IWMSA on Facebook (<https://www.facebook.com/iwmsa>) and Twitter (<https://twitter.com/IWMSA>).

¹United States Environmental Protection Agency (2017). Energy Recovery from the Combustion of Municipal Solid Waste (MSW).

²United States Department of Agriculture (2017). Biomass Pyrolysis Research.

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