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CO-LOCATED BIOMETHANE PLANT CLOSES THE CIRCLE

By Emma Love | 12 April 2022

By running anaerobic digestion and composting processes in tandem, Entsorga's bio-methane plant in Northern Italy has achieved zero waste to landfill – a completely circular facility.

Since 2020, a composting facility in Santhià, a municipality in Northern Italy, has been home to a circular bio-methane plant. The co-located plant collects organic waste, converting it into compost, bio-methane, and Secondary Solid Fuels (SSF).

The plant was built by Entsorga, an Italian waste management company specialising in green solutions. Entsorga's bio-methane plants use semi-dry anaerobic composting and digestion processes, reducing the liquid output of such facilities: "Over the years, we have

understood that the anaerobic digestion process continued to produce too much liquid waste, which was expensive to treat," explained Group President, Pier Paolo Cella Mazzariol.

He continued: "In 2019, we exclusively secured the semidry anaerobic digestion process from Zenviro Tech, further developing it based on our experience. The technology uses little water, which then completely evaporates during the composting phase. The implementation of this upgrade, combined with our composting and refining technologies, has eliminated liquid waste and made the recovery of organic waste even more efficient."

The co-located plant uses anaerobic digestion and composting in tandem. In the first phase, the organic waste undergoes mechanical treatment and biological degradation in the absence of oxygen, which produces a solid digestate. Biogas – a gas that is rich in methane – is also produced, ready to be further purified and transformed, through an upgrade system, into bio-methane ready to be inserted into the grid.

The second phase sees the digestate, mixed with a material of vegetable origin, collected using an automized bridge-crane and then subjected to a biological composting treatment. This process takes place in a close environment and is accelerated by an automatic mechanism of forced aeration, as the air, temperature and humidity are monitored. After about 40 days, the fermented mixture is refined and tested to eliminate non-compostable elements such as aggregates, plastic and glass, after which it is sent to the plant's bio cells for slow maturation, then for storage.

After a minimum period of three months from the arrival of the waste in the plant, the compost is ready to be used. 90 days is the legal minimum required for biowaste composting in Italy and ensures stability of the biomass, allowing for the elimination of ammonia and nitrate issues.

The plant's integrated treatment lines allow for increased performance levels. Water accounts for around 45 per cent of the weight of waste entering, which evaporates during the aerobic process. 20 per cent is transformed into bio-methane, with another 20 per cent transformed into quality compost. The remaining 15 per cent is mostly made up of plastics and other residues that contaminated the differentiated organic fraction. Entsorga uses a

refinement system to convert this material into Secondary Solid Fuels (SSF), which can be used in cement factories instead of traditional fossil fuels.

The co-located currently processes 40,000 tonnes of organic waste every year, a quantity which is set to increase to 80,000 with a second digester. Construction is already underway. At full operation, Entsorga says that the plant will transform the organic waste of around one million inhabitants into five million cubic metres of bio-methane, 20,000 tonnes of high-quality compost, and 16,000 tonnes of SSF. This, the company states, will save the environment emissions equivalent to 50,000 tonnes of CO_2.