

A Portuguese waste-to-oil producer has developed a method for diverting waste oils from landfills

# Extracting oils from 'ugly' wastes

**M**any people have heard of the expression "where there is muck, there is brass". Yet, not many would have heard the saying "where there is muck, there is oil".

The resource management industry in Portugal is due to get used to this expression, especially after recently launching Portugal's first waste-to-oil facility in Santa Maria da Feira, based in the northwest of the country. Waste-to-energy technologies and solutions company ENC Energy unveiled the demonstration facility in January 2015.

The plant is extracting oils from wastes like greases (from grease traps), sludge from domestic wastewater treatment plants (brown grease), sewer fat, flotation fats, agro and food industries sludge, and other liquid waste with some amount of vegetable or animal oil or fat. The extracted oil is used as a raw material for biodiesel production.

One of the advantages of the project is the increase in new sustainable waste feedstock for the production of biodiesel. The diesel produced from these materials is considered an advanced biofuel due to the feedstock origin. Simultaneously, using waste oils provides an environmentally-friendly solution to treating these types of wastes, whose final disposal site is not always ecologically acceptable. An important fact, when



Collecting an oil sample for testing

considering that more than 50% of municipal waste was landfilled in Portugal in 2012, according to Eurostat statistics.

As Portugal runs out of landfill space and businesses face the pressure of increased waste costs, many have discovered the benefits of the new facility. The waste-to-oil plant targets two different markets, namely waste management operators or producers and biodiesel producers or consumers.

The plant is a waste treatment facility and applies tipping fees, which makes it competitive with other treatment technologies with the advantage of supplying a more sustainable waste

recovery method. In 2015, the process was tested and validated with nearly 700 tonnes of waste, and nearly 140 tonnes of oil with free fatty acids (FFA) were extracted. In 2016 the unit started to operate in an industrial mode, with a processing capacity of 3t/h of feedstock.

## The process

So, how does the technology work? ENC Energy facilities are prepared to receive the liquid waste with fat content, which is stored and laboratory tested to ensure its feasibility for the recovery process. The first stage of the process consists of the removal of water and solids

from the waste feedstock by using a mechanical/physical system that allows the extraction of the FFA.

The extracted oil has an 87% FFA content, and due to its origins it can be used to produce advanced biodiesel. Depending on market requirements, the process may then continue into a second stage – a chemical transformation of the FFA in order to reduce its acidity to values under 1% or even continue into the production of biodiesel. Acidity levels are customised to meet clients' needs.

The waste management industry is well-established in Portugal, making it easy for ENC Energy to reach waste

Storage tanks outside an industrial plant



collectors interested in using its waste recovery services. Ensuring the constant inflow of waste feedstock, in order to maintain a regular operational level, is a challenge and a key to the facility's success.

The major challenge at a national level has been access to waste producers, who are still not fully aware of these kinds of waste recovery methods and often transfer the responsibility of waste management to resource collection companies. Due to the broad range of waste received, the optimisation of the recovery process has also been one of the major challenges, which has been overcome with an innovation-oriented approach, combining the use of advanced technology and internal know-how.

### Opportunities

The waste-to-oil project allowed the ENC Energy team to take a leap forward both into the waste management segment and the biofuels industry, bringing together these two worlds through a



Process equipment inside of an industrial plant

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new methodological approach.

This research and development (R&D) project investment was supported by equity and co-financed by EU funds, under the incentives for innovation system by ON2, QREN, and the EU. The total investment (including all R&D activities, tests, and construction of pilot plant) was €4 million.

After the validation period,

ENC Energy is now looking at international opportunities. The company is able to supply turnkey waste-to-oil plants that can be integrated both in the waste management and the biodiesel production value chains, thus contributing to a more sustainable, environmentally friendly waste-to-fuel process.

Industries that are heavy producers of waste oils with

fat content are also facing opportunities to turn their own waste into marketable sustainable products. ENC Energy can help them go green and improve their overall economic and environmental performance. For the biodiesel sector, ENC Energy's process allows the incorporation of a new stream of feedstock, using residual materials that contribute to meeting the sustainability requirements and targets in the sector. ●

### For more information:

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