

# Potato peels to green power

**E**UROPE's food and beverage producers are highly focused on minimising waste and making the most of by-products in re-use, recycling and recovery. In Verrebroek, Belgium, exporter of processed potato products, Remo-Frit, has demonstrated the environmental and economic benefits of converting waste products into green energy, transforming a potential problem into a sustainable solution for greater profitability. It has invested in a treatment plant and a RAPTOR™ plant from Global Water Engineering Ltd (GWE). Flemish government minister president Kris Peeters inaugurated the facility in the presence of GWE and Remo-Frit owners and management. The government invested 0.5 million euro as a grant.

Remo-Frit specialises in the production of fresh chilled potato products, manufacturing French fries and potato specialties and exporting a range of products to markets in Africa, Europe, America, Asia-Pacific and elsewhere.

The Remo-Frit RAPTOR system inaugurated this year converts nearly all of the potentially environmentally harmful organic content of the solid wastes into green electricity and valuable fertilizer products. The RAPTOR process is complemented by and integrated with a high-efficiency GWE wastewater treatment plant to achieve the very high wastewater quality standards and the optimum biogas production efficiencies specified by Remo-Frit.

By harnessing both of its organic waste streams – contained in wastewater and organic solids – the company is setting world



The Raptor system converts nearly all of the potentially environmentally harmful organic content of the solid wastes into green electricity and valuable fertilizer products

## Remo-Frit, producer of potato products, achieves energy benchmarks for food processing as it invests in GWE wastewater treatment

green energy and water purity benchmarks for food processing, says Pascal Pipyn, executive vice president, Process and Research and Development for GWE, who represented GWE at the inauguration.

The RAPTOR (Rapid Transformation of Organic Residues) is an anaerobic digestion process which in this application consists of a mechanical pretreatment of the organic residues (mainly the potato peels), thermophilic hydrolysis in a TAR (Thermophilic Acidogenic Reactor) followed

by methane fermentation in a thermophilic digester of the ANAMIX™-T type.

Out of a 3,300 m<sup>3</sup> digester for the potato peels and primary sludge, GWE is able to produce up to 14,150 m<sup>3</sup> of biogas per day from ± 230 tonne of organic residues per day (potato peels + primary sludge). On top of that, the anaerobic wastewater treatment plant produces another 3,350 m<sup>3</sup> of biogas per day. Together, this amount of biogas is equivalent to 8,410 kg or 9,834 l of light fuel oil per day or 3,106 tonnes of fossil fuel a year, worth nearly Euro 3 million or nearly \$4 million.

A biogas engine (CHP) of 1,200 kW was installed in a first stage of the project, a second one of about 500 kW is being ordered to be able to cope with increasing biogas production due to factory expansion.

Along with electricity production from biogas produced from wastewater and solid residue, steam is produced from the hot exhaust gases from the biogas engine. It is used for cooking higher grade organic residues intended for animal feed. The cooling water of the engine is used to maintain thermophilic conditions throughout the RAPTOR process and mesophilic conditions in the UASB (ANUBIX™-B).



## The treatment process

The ca. 3,500 m<sup>3</sup> per week of waste water generated by the factory (5,000 m<sup>3</sup> a week after expansion of the factory) is treated in a new primary clarifier, with the primary sludge sent to the RAPTOR™ plant, followed by an existing Upflow Anaerobic Sludge Blanket (UASB) type of anaerobic reactor of 2,045 m<sup>3</sup>, and further processed in a new nitrification/denitrification plant. Finally it passes to a new tertiary treatment with coagulation/flocculation and Dissolved Air Flotation (DAF) treatment.

This newly upgraded and expanded wastewater treatment system is setting new benchmarks for wastewater effluent quality. The system attains 99.5% chemical oxygen demand (COD) reduction, from 22,300 mg COD/l down to a very low 50/60 COD/l. Furthermore, nitrogen and

phosphorous levels of less than 10 and 3 mg/l respectively are obtained.

Biogas produced from Remo-Frit's waste streams undergoes sweetening (sulphur removal) for environmental and plant reliability purposes, using GWE's BIO-SULFURIX™ process, followed by drying in GWE's GASODRIX™ system. A set of blowers feeds the gas to the electric power generators. An environmentally friendly incineration type ground flare is installed for emergency purposes.

Energy savings produced by biogas production are achieved in perpetuity, with fossil fuel equivalent savings totaling \$US40 million (nearly Euro 30 million) in the first decade at today's prices.

Savings quickly repay the cost of the plant – typically inside two years – while achieving permanent environmental benefits by replacing fossil fuel, says the Chairman

and CEO of GWE, Mr Jean Pierre Ombregt.

Food processors such as Remo-Frit – including breweries, fruit, food waste, agro industries, and energy crops including corn – can easily use this technology to generate energy for use in powering factory plant such as boilers or to feed electricity generation sets to produce electricity for the production plant or for feeding back to the local grid. The process can produce environmental and production efficiency gains globally.

The wastewater treatment plant sized for 1,000 m<sup>3</sup>/day is treating the factory wastewaters and the digestate of the RAPTOR process. It consists of a primary clarifier, a UASB type of anaerobic reactor (ANUBIX™-B), a pre- and post denitrification, a nitrification and post aeration, a clarifier and a final DAF for phosphorous removal with iron chloride. Finally the effluent is discharged in a river. **FAMJEA**

# Energy savings in bottled water production

## A quick upgrade leads to lower operating costs for Turkish water producer

**I**N TURKEY, sales of bottled water grew by 4% to a national total consumption of 11 billion litres in 2012. As with other markets, this growth came about primarily as a result of the move from tap water to bottled water. Bottled still water is the most popular “soft” drink consumed throughout the day or accompanying meals. The high consumption levels are certainly helped by its low cost to the consumer. As cities and urban areas continue to expand through increasing population, the bottled water market is expected to follow.

Local water producer, Sude has production facilities in Inegol County in Turkey's Bursa City. The source of the water is in Uludag, within the forests of beeches and pines at a level of 1,500m above the sea. The region is full of granite and quartzite structures, rocks that are said to provide the best tasting water.

During most of the year, the area is usually covered by snow. The water reaches

the production line in its natural state retaining the original taste and purity from its source in Uludag. It is bottled automatically under strict conditions of hygiene, with no human contact. In the company's laboratories, Sude Natural Spring Water, undergoes daily analysis. The Turkish Ministry of Health and Regional Health Directorate also conduct regular quality controls.

### Upgrade lowers energy use

With demand for bottled water increasing, Sude needed to upgrade its equipment, and it did so with the help of Sidel, a leading PET liquid packaging provider. Their partnership is another of the success stories we read about new technologies that reduce energy consumption.

Sude installed an Ecoven on its blower made also by Sidel, in the filling facility. By doing so, it was able to reduce its use of energy by 35%.



“We are happy with our machine's performance and are always on the lookout for upgrades that help us perform better while saving energy and costs,” said Mustafa Demiray, owner of the Sude bottling facility.

The Combi 20 SBO delivers high output rates with outstanding bottle quality. The Ecoven uses fewer lamps for heating the preforms, substantially reducing its energy consumption by 35%. The Sidel Combi line runs at output rates of 40,000 bottles per hour (bph) for the 0.33 and 0.5 litre formats, and at speeds of 26,000 bph for the larger 1.5 litre bottles. **FAMJEA**