The volume of food products that have passed the expiration date in Europe is constantly growing mainly due to the increase of legislation and wealth. In addition, rejection during production, spoilage during transport, and restaurant waste contribute to high enough volumes for profitable recycling systems. Market research conducted by Mavitec Green Energy in 2007 showed there was enough interest in the clean organic end products produced by recycling these waste materials to warrant development of new technology by Mavitec and The Dupps Company.

The art of processing organic co-products from the industrial and agricultural sector is no secret to Mavitec/Dupps in Europe. Multiple projects have lead to a wide range of reliable systems, including the companies’ food depackaging line for wet co-products and “Depackarater” for dry co-products that can remove packaging from the various organic co-products. The finished material is then used in biogas installations to create electricity and heat, green gas, and even pet food and animal feed.

Upon request of a customer in 2007, Mavitec started developing food recycling equipment that resulted in the first machines, named “the Martinater,” a hammer mill, and the “Shop Return Press.” The Martinater reduced the organic products in size and opened the packaging; the Shop Return Press separated the packaging and organic material. Organic material is collected under the Shop Return Press and is pumped for further processing to a storage tank or directly into a biogas installation. The removed packaging is transported to the washing drum by a screw conveyor where fats and organic residues are removed by warm water. The packaging chips are collected for further recycling and/or incineration.

The Dupps Company is developing and installing food recycling systems in North America. In Ohio, the first food depackaging line is running successfully at a biogas facility.

The Mavitec/Dupps food processing system is not the best in terms of volume processing; however, a purity of over 99.5 percent of the finished organic end product is truly unparalleled. Similar systems produce a maximum of 95 percent purity. Imagine what spreading the digestate (residue of biogas production) across the land ultimately means for farmers. Plastic scraps and other packaging residues pollute the ground. Furthermore, the Mavitec system handles organic material with an average dry solid content of up to 26 percent without adding water during the separation process making this system unique. A dry solid content of 18 percent is the standard in the food recycling industry. Therefore, the Mavitec/Dupps solutions are beneficial for the biogas industry.

Newest Member of the Food Recycling System
The company’s new Depackarater adds a next step for the depackaging of dry organic co-products. This system uses a vacuum technique that is capable of removing the packaging from dry co-products with a separation efficiency of up to 100 percent. The Depackarater is able to handle up to 120 units per minute on such products as packaged bread, cookies, chips, vegetables, fruits, candies, and many other foodstuffs. Using this dry separation system ensures organic products stay dry, undamaged, and is purely organic, making it suitable even as animal feed.

Utilization of Other Equipment
Some biogas systems need to sterilize the organic co-products before the organic end product (digestate) of the biogas installation can be used as a fertilizer on agriculture land. Biogas producers in Europe are able to use Mavitec/
Dupps rendering batch cookers to sterilize organic material and/or manure at 133 degrees Celsius/271.4 degrees Fahrenheit and three bar/43.5 pounds per square inch for 20 minutes, conforming to European Commission regulation No. 1069/2009. Using the biogas of the biogas installation and/or the rest warmth of the combined heat and power to fuel the batch cooker is very efficient.

Mavitec/Dupps has also successfully installed for several clients its T-pump that transports shredded food waste, slaughter by-products, and even thickened sewage sludge. The T-pump is a heavy-duty piston pump that uses a relatively low amount of kilowatts. It is capable of pumping materials over 150 meters (about 500 feet) under a working pressure of up to 50 bar. The pump has a capacity around 10 metric tons (22,000 pounds) per hour, depending on the composition of the material being pumped. The companies are still exploring opportunities for undiscovered applications for the T-pump.

**Used Cooking Oil Melting Bins**

Mavitec Green Energy is building one of the largest fat melting bins in Europe, situated in The Netherlands. This client is located in the harbor of Amsterdam and is a large collector of used cooking oils. The bin has a unique design and was developed in cooperation with the client. One of the distinctive parts of the bin is a moveable floor. Within the yellow grease/fat melting bin, it is possible to move the floor up and down in a large range via a unique hydraulic system.

The fat melting bin consists of a stainless steel melting bin, a sediment conveyor for the solids, multiple drain points for the melted fats and oils, and a hydraulic moveable floor. Using simultaneously-controlled special ceramic sealed hydraulic cylinders, the hydraulic moveable floor is capable of moving up to 80 metric tons in and out of the indirect steam heated bin. A single hydraulic unit can set the moveable floor on each required position with a maximum stroke of 3.5 millimeters.

The moveable floor meets all safety regulations, including sidewalls and hydraulics, and has electrical and mechanical safety features in order to create a safe working environment. It can be produced from both stainless steel and high tensile carbon steel, and a wide range of perforated decks is offered.

**Entering new markets**

Retrieving energy out of organic residues is still a relatively new concept. In 2005, companies with biogas installations became interested in food recycling systems. Mavitec and Dupps are actively on the lookout for market potential. The questions being asked are: Who are the major players in the co-product management? Where are the biogas installations? What are the legislations, and are subsidies available for biogas production? Now, the United Kingdom is appealing because in 2020 all landfill sites have to be closed. Landfill costs are rising, so many companies are searching for effective recycling solutions, which is evident in the number of requests for the Mavitec/Dupps food recycling system. If costs rise and combustion is not economically the best solution, then food recycling becomes appealing.

The company’s test location, a 200 square meter (2,100 square foot) production hall built in 2010, is paying off by demonstrating how the process works using co-products of current clients and allowing clients to test their own products.

The future looks bright for Mavitec Green Energy/The Dupps Company food recycling systems because waste of waste is a waste.