

A Real Gas



“Biogas is untapped potential for most of the world’s sugar producers,” says Torsten Fischer, founder and managing director of Krieg & Fischer. “It offers an opportunity to shift from fossil fuels, reduce carbon emissions and increase profitability. Our first reference from the sugar industry dates back to 2011, with a Dinteloord biogas plant designed for a Dutch-based sugar producer. Based on this successful cooperation, the same client awarded contracts for two more biogas plants to our office and became one of the largest biomethane suppliers in the region.”

Krieg & Fischer Ingenieure GmbH is an expert engineering company specializing in biogas technology. The company boasts more than 30 years of experience in biogas plant design, engineering and construction, developing tailor-made solutions for biogas plants independent of equipment suppliers and subcontractors.

Krieg & Fischer is globally active in the biogas sector. Their experience includes more than 160 references all across Europe, the Americas, Asia and Africa. The German-based company works according to German technical standards, with a special focus on safety technology and reducing the impact of emissions on the environment.

Starting from simple farm-scale biogas plants for fermenting agricultural waste 30 years ago, Krieg & Fischer is now a leading firm in complex, multi-stage, industrial anaerobic fermentation technologies for organic waste and byproducts from the industry,

How biogas is contributing to the success of sugar producers

as well as municipal waste biogas plants.

Every year, about 500,000 metric tons of organic material from the sugar industry are converted into more than 10.5 billion gallons of biomethane in biogas plants designed by Krieg & Fischer. These organics include sugarbeet residues, fragments and leaves, sugarbeet pulp, processing residues and molasses.

Solutions developed by the engineering team at Krieg & Fischer are designed for maximum availability and gas production and flexible in gas utilization. These plants have been in operation for 10 years.

A decade ago, engineering of these biogas plants for the sugar industry was a challenging task. The main input substrate for the biogas plants in the sugar industry is beet pulp. The Krieg & Fischer engineering undertook comprehensive, continuous laboratory tests over six months. Important data such as organic load rates were collected and became the basis for the layout of the plants.

While production in a sugar factory is based on seasonal processing of beets, the consumption of organics in the biogas plant is all year-round.

This results in a buffer; fresh input substrates are to be ensilaged. Feeding is done via a fully automatic solid feeder and without additional water supply directly into digester tanks.

The central component of these biogas plants for the sugar industry is high digester tanks with top-mounted mixers and external heat exchangers. Digesters are made from glass-coated, high-quality stainless steel for all gas-exposed surfaces. A sand removal device at the bottom of the tanks allows removal of sedimentation. As little equipment as possible is located outside the digester tanks. Mixing is done via a 24/7 operation with a slowly rotating mixer, which is also completely manufactured from stainless steel. All this delivers high-level availability of the system for the operation in the sugar industry.

Behind the digester tanks, a secondary digester tank is located. This allows maximum biogas production. A double-membrane gas holder roof is located on top of this tank.

After desulfurization and pre-treatment, the biogas ends up in a CHP or upgrading system, depending on the wishes of the client. Produced CNG is delivered directly into the natural

gas grid. Digestate is recycled for agricultural use as a fertilizer. Solid digestate is produced if required, with available decanter centrifuge.

The whole plant operation is done with a process control system that allows the staff to take care of relevant maintenance. A staff of just five people working a single shift can operate the plant throughout the year, though standby service overnight and over the weekend is required.

Right from the beginning of plant operation, the performance in real life delivered stronger results than laboratory tests. Over the years, performance has improved due to the increased skills of the staff and the addition of trace elements. Two out of three plants decided to invest in a plant extension.

Over the years, the team at Krieg & Fischer has learned what sugar engineers and biogas plant operators want, and they have grown into one of the leaders in biogas plants for the sugar industry worldwide.

