A robust solution to upgrade biogas as fuel to PowerGen

Luming Inteligência Energética had an application where the main objective of the system was to generate electricity reusing the energy contained in the biogas. They needed a compact, non-corrosive solution and SWEP brazed plate heat exchangers were able to deliver.

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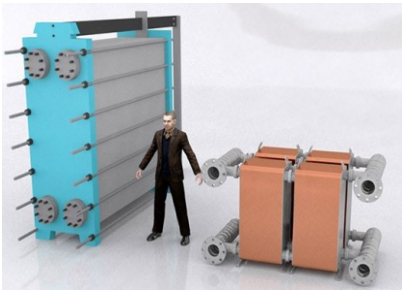
Biogas system where the SWEP B10T All-Stainless brazed plate heat exchangers are installed.

SWEP´s brazed plate heat exchanger technology won the job

Luming Inteligência Energética is an energy company in Brazil that focuses on Power Generation, Cogeneration, Biogas, Natural Gas, Auto Energy Production, Intelligent Energy, Energy as a service, Energy Intelligence, and Distributed Generation. They are a trusted partner in these areas throughout South America, and SWEP was honored to join forces with them on this project. In this specific case, they were using Biogas in order to generate electric energy.

Our brazed plate heat exchanger technology was competing for the job against the older S&T (Shell & Tube) technology and SWEP's brazed plate heat exchanger technology won the job based on our advantage of "size vs performance". The idea for this application was to build modular systems and our brazed plate heat exchangers were perfect for this because they are extremely compact, yet highly efficient compared with other technologies. In fact, the brazed plate heat exchanger footprint can be as little as one tenth that of a shell & tube heat exchanger or half that of a gasket PHE (as shown in the image).



Cool the gas and reheat the gas

Even though SWEP provides an extensive range of brazed plate heat exchangers for multiple applications, not just any model would work in this case. This application called for SWEP's All-Stainless range in order to avoid any corrosion of the heat exchanger. In this specific case, it's necessary to cool the gas to remove moisture and, after that, reheat the gas. Then, the biogas is burned and sent to a turbine to generate electric energy. The system works with poor quality biogas in the beginning. This biogas results from some process within the application and arrives with a mixed composition of substances, such as H2S, water, Methane, Oxygen, CO2, and CO. The intention is to increase the percentage of Methane because it contains more power of combustion due to its composition (CH4). However, due to the presence of H2S, the heat exchanger needed to be produced in 100% Stainless Steel and SWEP was able to provide an All-stainless brazed plate heat exchanger option. SWEP's All-Stainless products are developed for systems demanding 100% stainless steel components, and for high-temperature applications. They can be used with fluids that are corrosive to copper (e.g., ammonia), or for sensitive applications where copper and nickel contamination must be avoided. SWEP's unique process technology enables a compact product with minimal material usage relative to its mechanical strength.

SWEP offered major in-house engineering support to develop and parameterize the fluids in SSP (SWEP Selection Software) specifically for this job in order to make the selections and offer the absolute best solution to our customer. In the end, the selected models were a B10TSHx20 and B10TSHx30 from our All-Stainless offering (B10T model shown below).

This kind of application brings numerous advantages, including:

- A possible carbon footprint certificate
- Benefits on the environmental legislation
- Energy recovery and co-generation
- Energy efficiency (less energy loss)

AMBEV factory where this first system is installed.

First implementation of this innovative system in world

This innovative system is one of the first implemented in an AMBEV plant anywhere in the world. AMBEV is the 2nd largest company that exists in the Brazilian food market today with a presence in 19 countries – boasting 32 breweries, 30 beverage brands, and providing jobs to around 35 thousand in Brazil. Their intention is to replicate this same biogas system in more of their plants in the future using more brazed plate heat exchangers to provide the efficient, ideal solution these plants require.

SWEP is always looking for ways to challenge efficiency across the globe, so we commend Luming for their part in reusing energy in the most effective ways like the ones in this case. We look forward to working together with them in the future on similar projects!

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