



INTERVIEW WITH KRIEG & FISCHER INGENIEURE

Krieg & Fischer Ingenieure is an engineering company, one of the leading technology providers for biogas and biomethane plants all over the world. The company develops tailor-made solutions for biogas and biomethane plants; competent, innovative and independent of equipment suppliers and subcontractors.

Krieg & Fischer Ingenieure was founded by Torsten Fischer and Andreas Krieg, both working in the field of biogas since the beginning of nineties. Starting from simple farm-scale biogas plants for fermenting agricultural waste at that time, it is now a leading firm in the complex industrial anaerobic fermentation technologies for organic waste and by-products from the industry and municipal waste biogas plants. With extensive experience in biogas plant design, engineering, construction and improvement, its reference list includes more than 160 projects in over 40 countries.

The company has carried out projects all over Europe, North & South America, Asia and Africa, spanning from biogas plants in special climate conditions between -40°C and $+40^{\circ}\text{C}$ to those constructed in the earthquake zones.

Interview with Raphael Thies, Managing Director at Krieg & Fischer Ingenieure GmbH.

Easy Engineering: What are the main areas of activity of the company?

Raphael Thies: Krieg & Fischer Ingenieure GmbH provides full engineering and consultancy services for biogas and biomethane projects, tailoring solutions to meet the unique needs of each client. From concept to commissioning and start-up of the plant, clients benefit from particular process know-how and independence.

In addition to engineering complete biogas plants, company delivers consultancy services to evaluate and improve existing biogas plants and provides expertise to other biogas companies in special biogas projects. The team of experienced engineers and experts prepares different studies and expert opinions and responds to specific requests in the development of biogas projects. These include delivering pre and detail planning of biogas plants, hazard assessments, documents for permits, tender documents and advice on obtaining equipment from experienced suppliers. As expert witnesses in the field of biogas, experts of Krieg & Fischer Ingenieure GmbH prepare reports for courts and insurance companies. While the team is open minded to cooperate with local companies in different countries, work is according to the German technical standards, with the particular emphasis on safety technology.



E.E: What's the news about new products?

R.T: Krieg & Fischer Ingenieure GmbH has been active in the field of biogas for 30 years. With tailor-made solutions, each project is unique, and our engineers create sophisticated concepts based on the specific substrate composition and site conditions, tailored to regional needs and customer requirements.

Some of Krieg & Fischer's projects have made brake through for the whole biogas industry. The latest example is biogas plant in in Rio Cuarto Rio, Argentina, which shows that anaerobic digestion is a solution for thin stillage from corn-based ethanol production, commonly evaporated with high energy consumption. For outstanding work on an integrating biogas and bioethanol plants in Rio Cuarto, Krieg & Fischer Ingenieure GmbH received the AD & Biogas industry Award 2020 from the World Biogas Association.

Krieg & Fischer Ingenieure GmbH provides expertise in biomethane production. First reference with upgrading biogas into biomethane dates back to 2010 and company now has experience with biomethane in Germany, Netherlands, United Kingdom, USA, China. Since 2019, Krieg & Fischer Ingenieure GmbH has been active in the field of Hydrogen Powerto- Gas (PtG).

E.E: What are the ranges of products?

R.T: Krieg & Fischer Ingenieure GmbH works for different industries and well-known companies. Customer base includes: food industry, sugar industry, farmers, energy suppliers and utilities, local authorities, project developers and general contractors for large turnkey biogas, other engineering offices.

In recent years, company's key accounts are public and private companies that need support in reducing CO₂ emissions and fulfilling their commitment to cleaner and more sustainable energy. Krieg & Fischer Ingenieure GmbH has worked as owners' engineers on some of the biggest biogas plants in the world.

Clients trust Krieg & Fischer Ingenieure with large biogas projects. In 2002, Krieg & Fischer Ingenieure GmbH designed and constructed the world's biggest biogas plant at that point in time with the capacity of 8.3 MWe in Wietendorf, Germany. The list continues with biogas plants in Huntstown, Derby, Prince Edward Island, Belgorod, Vierverlaten, among others.

E.E: At what stage is the market where you are currently active?

R.T: Krieg & Fischer Ingenieure GmbH is active in the biogas and biomethane sector worldwide. with ongoing projects in Europe, the USA, Asia and upcoming projects in Africa. These markets are in different stages of the development.

Especially the oversea markets (USA, Asia) have a high demand in renewable energies and at the same time, compared to Germany, Denmark and France, limited experience in the anaerobic digestion of high solid input materials. This refers to the engineering and the supply of adapted technical components (Tanks, mixers, pumps, solid feedstock injection systems, Biogas Upgrading Units). The cooperation with an experienced European engineering firm has therefore important benefits.

Being German-based, Krieg & Fischer Ingenieure GmbH is also active in the local market. Germany is well-established biogas market, where projects often involve converting from electricity to biomethane and hydrogen. In Europe, there are ongoing projects in the Netherlands and Poland.

The biogas and biomethane market in the United States has been growing in recent years, driven by the increasing demand for renewable energy sources and supportive policies. The use of biomethane as a clean fuel alternative in the transportation sector is also increasing. In the USA, Krieg & Fischer Ingenieure GmbH developed a state-of-the-art biogas plant for a large petrochemical company that processes more than 100,000 m³ of agricultural organics per year, with biogas production of >4,000 m³ per hour, upgraded to RNG.

E.E: What can you tell us about market trends?

R.T: In recent years, there has been a significant interest in biogas as a way to reduce greenhouse gas emissions and improve energy security. Countries and businesses around the world set targets for reducing greenhouse gas emissions, creating a growing demand for renewable energy sources like biogas.

There is a trend of clients seeking to decrease their dependence on energy markets, particularly natural gas, in order to ensure stability in their production operations. Some examples from Krieg & Fischer recent projects include big slaughterhouse in Germany investing in a biogas plant to integrate their waste and wastewater management with energy production, sugar production in Poland, ethanol industry in the US with supplementation of fossil energy with biogas and reuse of liquids after the AD process. large-scale projects for different industries in USA.

Most interesting form of biogas utilisation becomes biomethane, either injected into the grid or used as vehicle fuel.



E.E: What are the most innovative products marketed?

R.T: In most of Krieg & Fischer projects, there are challenges that require customised and sometimes innovative solutions. Whether dealing with substrates that have not been used for industrial-scale biogas production earlier, those with inhibiting features for AD (high acidity for example) or high viscosity, wastewater sludge and so on, Krieg & Fischer engineering team finds the solution. This is how of our dependable solutions for different industries have been developed, especially applicable for the sugar, ethanol, and alcoholic beverage production.

In addition, Krieg & Fischer Ingenieure GmbH is working on the integration of biogas and green hydrogen, where biogas is first upgraded to pure methane, which is then blended with the green hydrogen to create a renewable natural gas. After successful project in Germany, this will be offered abroad.

E.E: What estimations do you have for 2023?

R.T: Overall, the biogas industry is poised for continued growth and innovations in the coming years as demand for renewable energy continues to increase and technology improves.