EISENMANN

ANAEROBIC DIGESTION TECHNOLOGIES
CONTINUOUS STIRRED-TANK REACTOR

Continuous Stirred-Tank Reactor

The continuous stirred-tank reactor (CSTR) is the economical low solids biogas technology option that provides efficient biogas production on a reduced footprint. The CSTR is most suitable for agricultural or industrial applications with high flow rates for waste.

Waste Conditioning and High Loading
The complete design for agricultural plants includes a feedstock conditioning phase in order to maximize the efficiency of the biogas plant. During this conditioning phase, the substrate will be hydrolyzed and have sand removed as needed. The raw feedstock will be heated and homogenized for digester injection. This allows the CSTR to process feedstocks with high ammonia content.

Maximized Biogas Production
Each digester vessel is equipped with one two-layer propeller to ensure complete mixing and sufficient heat & mass transfer to avoid fermentation dead-zone and local acidification. The digesters are designed to work in series (two-stage) with one another to prevent short-circuit flow of feedstock.

Operational Efficiency
With a life cycle of +30 years, the vessels are designed to reduce solid settling, minimize operation & maintenance costs, and maximize uptime while expecting 5 years between digester internal cleaning and inspections under typical operation.

A Global Alliance

In 2018, Eisenmann signed a global alliance agreement with Hangzhou Energy & Environmental Engineering (HEEE), a world leader in wet anaerobic digestion technology. HEEE has developed 220 biogas plants mainly in the Asia-Pacific and Europe. These plants handle over 35 different organic waste feedstocks from agricultural, municipal, and industrial sources.

As one of Eisenmann's strategic technology alliances, the Chinese company completes a key piece of Eisenmann's organics diversion to biogas platform strategy, bringing technical expertise and know-how, especially in the agricultural and livestock waste sector.

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ANAEROBIC DIGESTION TECHNOLOGIES
WASTE TO ENERGY

Hutubi, Xinjiang / China
Dairy Manure and Straw to CNG

A Circular Economy for Dairy Manure

In 2015, the Xinjiang Hutubi Dairy Manure Biogas Plant was built as a large scale demonstration for capturing biogas from dairy manure and using the remaining digestate to generate an organic fertilizer for commercial sale, a demonstration put on by China's National Development and Reform Commission (NDRC) and the Ministry of Agriculture (MOA). This demonstration project was one of many that was created in the interest of public-private-partnership (PPP) in order to improve efficiency of agricultural investment and accelerate the development of modern agriculture. Built in northwest China, where outside temperatures can reach as low as -40˚F (-40˚C), the Xinjiang Hutubi Dairy Manure Biogas Plant processes over 1,100 tonnes of dairy manure every day. This plant is a model of modern agriculture by creating a standard for greenhouse gas reduction and monetizing both the gas and fertilizer product.

Technical Data Hutubi	
Feedstocks	Dairy Manure and Straw
Throughput	~ 419,000 tons/year
Digester Capacity	6 x 950,000 gal (5,000 m³)
Nominal Biogas Flow	~ 870 SCFD (1,400 Nm³/hr)
Biogas Yield	~ 12.2 million Nm³/year

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Benefits of Biogas Production

Biogas is an attractive renewable energy which has become a critical part of alternative energy plans for both industry leaders and legislative bodies. It directly replaces fossil fuels and can do so (1) as a baseload energy source, unlike solar or wind which is intermittent, and (2) with distributed generation, which lowers the overall cost of energy and raises reliability. Recycling organic wastes such as manure, food waste, and green waste by sending it to an anaerobic digester generates environmental, economic, and agronomic benefits.

Environmental Benefits

Anaerobic digestion and subsequent waste treatment reduce the impact on (1) air pollution by capturing greenhouse gases like methane and dramatically reducing odor, and (2) water pollution by stabilizing nutrients while reducing the volume of land-applied material by concentrating nutrients.

Economic Benefits

Energy offtake opportunities such as power purchase agreements or carbon credits programs create revenue streams where previously there were costs to treat waste. These projects can also create jobs and improve infrastructure in rural areas.

Agronomic Benefits

Anaerobic digestion can provide reductions in pathogen level in land-applied waste. Digestion is an efficient process allowing for faster recovery and recycling of NPK, which can increase crop yield.

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