Experts in energy and nutrient recovery

We make biomasses and waste to your profit
Renewable energies for future generations

In the light of the increasing scarcity of fossil resources, the phasing out of nuclear power, as well as political and social demands relating to climate change, new and economically viable concepts in environmental protection, waste disposal and energy production are required.

Catalytic hydrothermal high-pressure gasification (HTG) (supercritical) allows energy and nutrients to be recovered during the disposal and conversion of aqueous biomass and waste. It is based on years of research at the Paul Scherrer Institute (PSI) in Switzerland and is a patented process. This innovative method allows biomass and waste to be converted into biomethane within just a few minutes.

Since 2010, KASAG has been involved in the development and construction of apparatuses and plants for the industrial use of catalytic hydrothermal high-pressure gasification (HTG). With KASAG as your partner in the conception, design, engineering and construction of plants and operation, you ensure sustainable innovative solutions and remain a step ahead.

Using this process, biomass components in the feed are converted into biogas/methane, and nutrients, such as phosphorus and nitrogen in the form of ammonium salts and minerals, are recovered. If the main aim is waste disposal, the yield in terms of biogas/methane, nutrients and clean process water makes a valuable contribution to reducing disposal costs and generate a profit. The biogas produced with this method can easily be refined into biomethane for feeding into the public gas network or converted directly into electricity in a combined heat and power plant. The nutrients recovered are processed further in accordance with their intended use (e.g. as fertiliser).
For the disposal and conversion of biomass and waste

Method
Aqueous biomass and waste with a dry matter content of 10% to a maximum of 30% can be disposed directly and used as energy. Traditional processes require energy-intensive steps, such as removal of water from the feeds and drying them. With catalytic hydrothermal high-pressure gasification this is not necessary, as the water does not change state in the supercritical range, i.e. is not converted into steam. The pumpability of the feed is a prerequisite.

In this process, aqueous organic and non-organic residues are disposed and converted into biogas/methane using catalytic high-pressure digestion, and reusable residues, such as phosphorus, are returned to the circular economy. The patented method of the Paul Scherrer Institute (PSI) contributes to global environmental protection in the field of renewable energies.

Applications
The process offers solutions for feeds from private and public organisations, forestry and agricultural firms, waste disposal firms, waste recyclers and energy producers that have access to biomass inputs derived from animal and plant matter, as well as organic waste from industrial plants, such as sewage sludge, industrial wastewater, biomass residues from distilleries, biodiesel production, bioethanol processes, "Kompogas" plants, the pulp and paper industry, food production, meat processing, agriculture, mining, oil and gas production, fracking, etc.

Approximately 0.25 kg of methane CH₄, ready for feeding into energy systems, can be obtained from one kilogram of organic dry matter. Organic components that cannot be fermented are also completely gasified during the process.
"The use and disposal of aqueous biomass or aqueous waste as energy sources, with simultaneous recovery of energy and nutrients, profits the environment."

Based on the type of feed and its mass throughput for waste disposal and/or energy and nutrient recovery, the plant is designed for the relevant intended use.

Do you have any questions?

Should you require a quote or have any general questions regarding renewable energies, our experts will be glad to assist you:

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Technology
The feed (aqueous biomass, aqueous waste with 10% to 30% maximum dry matter content) enters a first heat exchanger via a high-pressure pump. At 300–360°C and an operating pressure of 250–350 bar, the gasifiable solid components liquefy in the feed. In the subsequent salt separator, the feed is heated further to 400–450°C and the inorganic components are precipitated in brine (nutrients) and removed from the system. Nutrients such as phosphorus, ammonium salts etc. can be recovered from the brine and used for a new purpose. Biomass components are converted into methane in the supercritical range in the catalytic reactor. The feed is subsequently used for energy recovery. At the end of the process, the feed is separated in the phase separator into biogas and water. Depending on the outgoing feed, the water is so clean that, after prior analysis, it can be released into the sewage treatment plant. Part of the gas is used for generating hot air and operating the salt separator by means of a gas burner that provides the necessary process energy for the overall process.
With KASAG Swiss AG as a partner, you ensure sustainable innovative solutions and remain a step ahead.

Benefits of this outstanding technology
- Aqueous biomass and waste are separated into biogas/methane, nutrients and process water within a few minutes
- The technology is suitable for waste disposal as well as energy recovery
- The method is highly energy-efficient: efficiency levels of 60% or more
- As well as energy recovery in the form of biogas/methane, any nutrients present, such as phosphorus and other elements, can be recovered from the brine and returned to the circular economy

Trials
Would you like to try out this innovative process on your feed (aqueous biomass and aqueous waste)? You can use the Konti-C (1 kg/h) or Hydro Pilot (up to a maximum of 110 kg/h) test plants at the Paul Scherrer Institute (PSI). Just contact us.

Plant concepts for pilot and industrial plants
There are industrial plant concepts for a maximum feed of up to 1000 kg/h. For larger plants, further engineering services will be required beforehand. Just contact us.
For technical exclusivity worldwide