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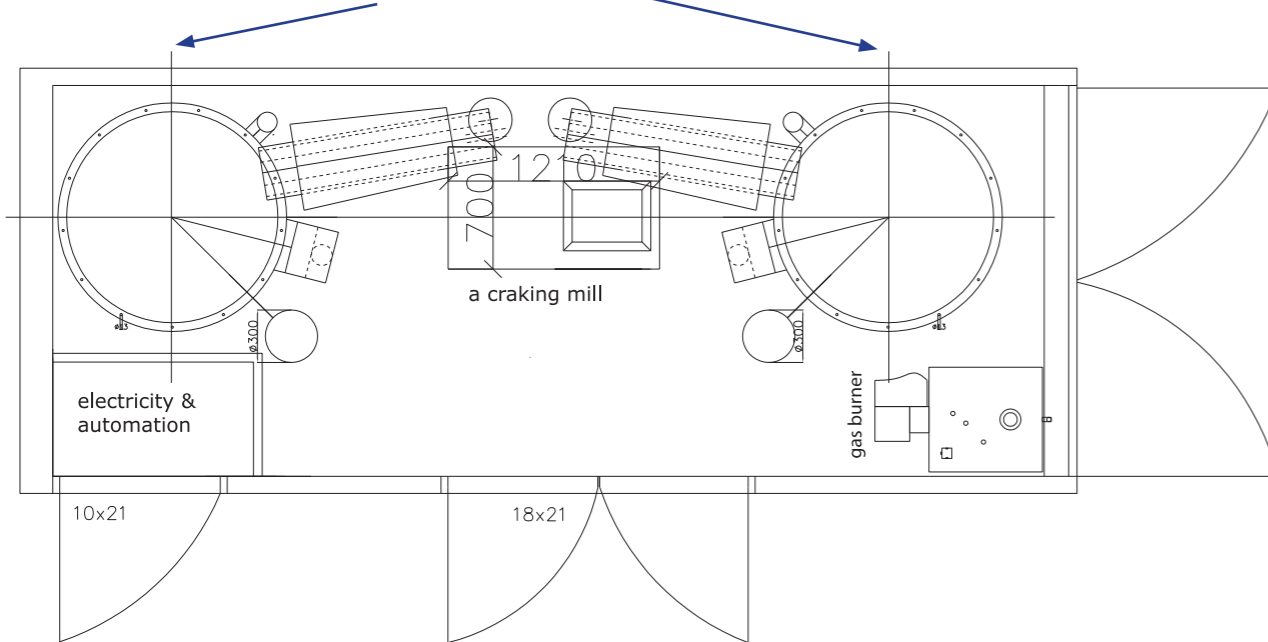
ENVIRONMENTAL TECHNOLOGY

Savonia Biogas research

Leverage from
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Layout Reactor 1 & 2



increase the gas production. In fact, the research materials are being fed into the reactors and removed from them in the same way as in the actual biogas plants. The gas is then collected and examined like in the batch tests. Typically, this equipment is used in tests lasting from one to several months.

Mobile biogas plant

Savonia's mobile biogas plant uses a technology that is to a great extent similar to a full scale biogas plant using wet digestion. The plant is built inside a container, and thus, it can be easily transported to the research location with a lorry. Location can be for example a farm, a waste water treatment plant or an industrial plant.

With the mobile biogas plant, it is possible to examine the biogas production capacity of liquid materials alone or of the mixture of liquid and solid materials. The facility comprises two reactors, a pump for liquids, and a craking mill and screw feeders for solids. The quantity of the biogas and its methane content is measured. The test takes at least three months, since it is necessary to reserve enough time for the process start up. The test results give information on how the material behaves in the biogas process and what is the potential of different materials to produce energy. These results can be applied to a larger facility.



It is environmentally rational to use biogas in heat or power production and as fuel for vehicles. Biogas can replace fossil fuels, while burning the gas reduces its greenhouse effect notably. At the same time, energy can be recovered from materials classified as waste, and furthermore, the method improves the fertilizing quality of manure.

Biogas technology can help farms, municipalities and enterprises to utilize different organic waste materials in renewable energy production. Biomethane in the biogas can be transformed into heat, power or transport fuel. Energy production capacity is dependent on the feeding material, and Savonia offers research services in laboratory and pilot scale to evaluate the properties of different feeding materials.

Savonia's biogas research is centred to the environmental technology laboratory at Kuopio Technopolis. The laboratory carries out biogas research on different sample materials and their mixtures according to the needs of the customers. It is possible to determine the biogas production potential by using batch tests or lab reactors simulating biogas production plants. Furthermore, Savonia has a mobile biogas plant for performing biogas tests in pilot scale. The plant can be transported on the spot to carry out the research. It is also possible to perform different kind of tests in parallel.

Biogas Batch Tests

In biogas batch tests, biogas is recovered using five-litre glass bottles together with biomass and inoculum containing biogas bacteria. The bottles are placed in an incubator at an optimal temperature for biogas production,

and the obtained gas is collected in bags suitable for gas storing. The quantity and the composition of the collected gas is measured during the tests.

Batch tests usually take about four weeks, and it is easy to determine the ability of different materials to produce methane. The test includes establishing the dry matter content, the organic content and the pH of the materials. It is also possible to determine the BOD and the COD.

Laboratory Reactors

The continuous biogas reactors allow simulating biogas production in small scale. Different liquids can be fed into four parallel ten-litre reactors to determine their biogas production potential. In the process, these reactors are heated up to an optimal temperature. The reactors are furthermore equipped with an automatic stirring system to

