



First Biogas International, Inc.



Biogas Plants for Stillage



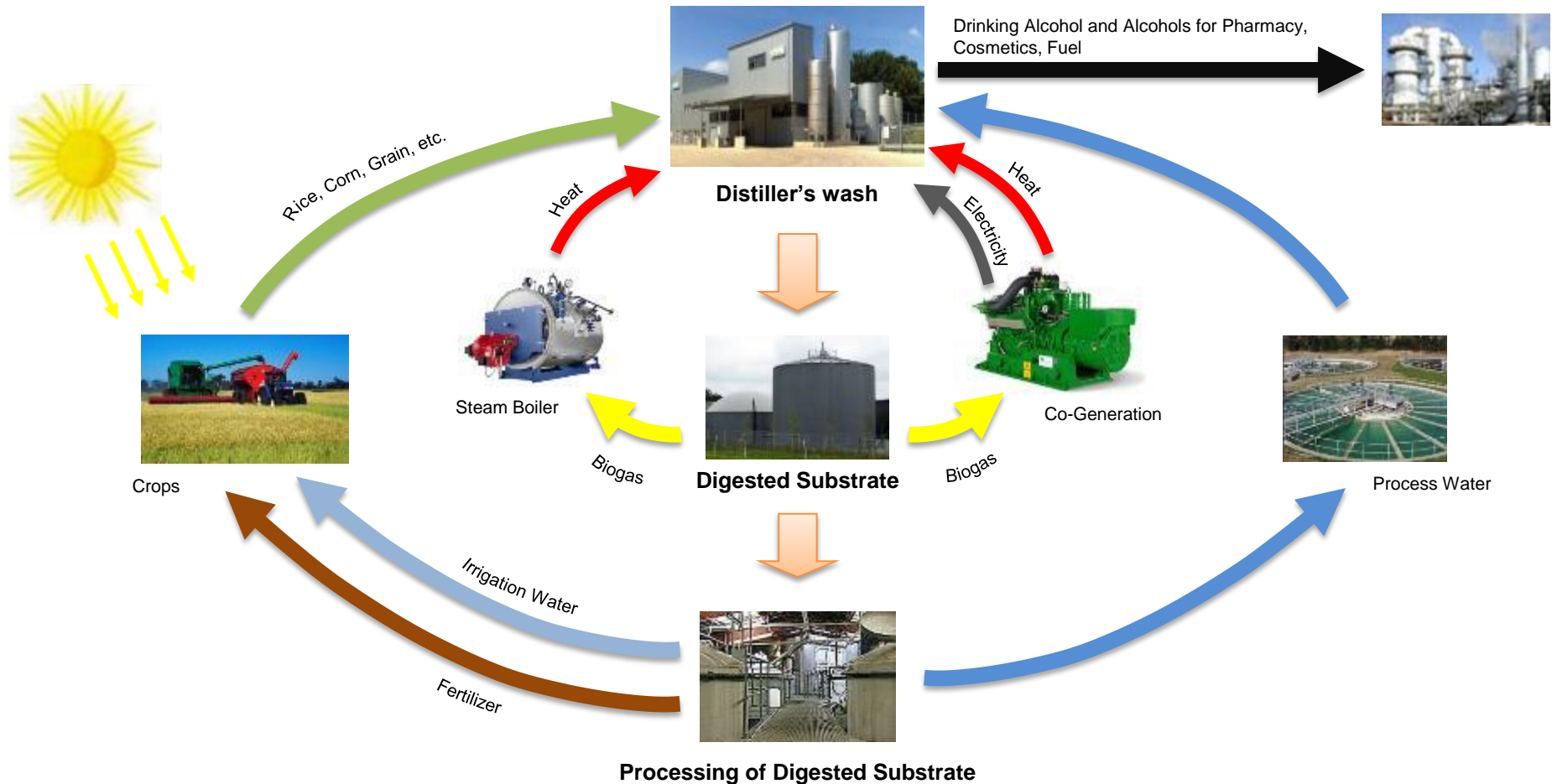
The perfect complement for every distillery

The Independent Distillery



Biogas plants for energy production of distillery residues have been in use for more than 30 years. They provide a closed cycle of green energy and materials.

The Independent Distillery

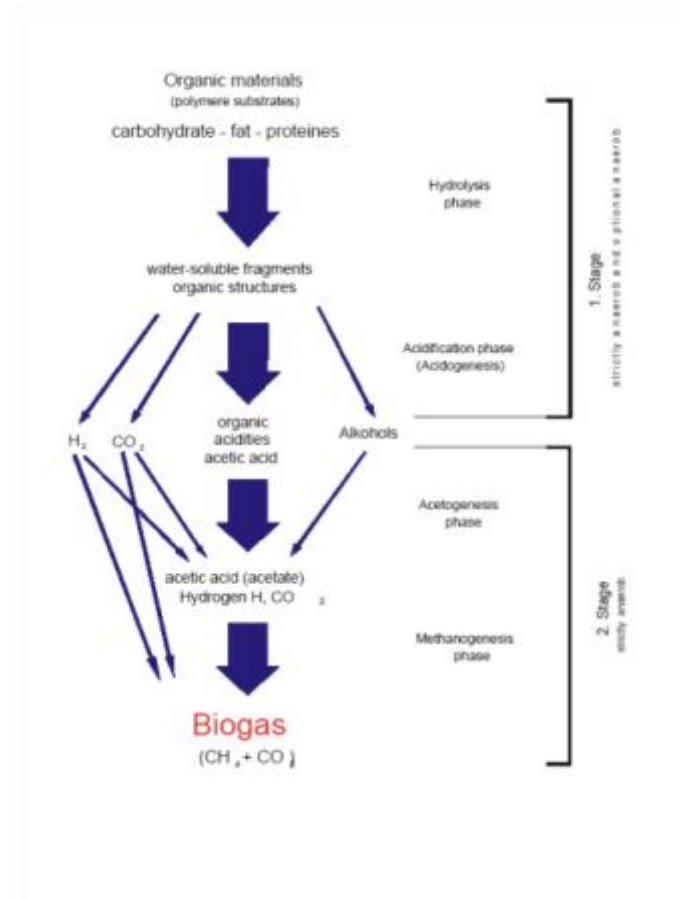


First Biogas International uses the INNOVAS technology for stillage biogas plants. This technology was developed in 1980 and has been continuously enhanced to make it perfect.

It doesn't matter on what the stillage is based on: rice, corn, grain, or potato, sugar cane or molasses; all this kinds of slop are well digestible. In a distillery biogas plant, there can also be processed rectification waste, surplus yeast and superposed raw material.

All the residues from a distillery can be digested as mono-substrate but also in mixtures with other organically residues like vegetable process residues, glycerin and process waste water from biodiesel production. Then, possible inhibition by higher salt concentration or other contends has to be considered.

A stillage biogas plant must be designed as a two-step digestion system; this means that the hydrolysis phase must be separated from the mechanization.



Some typical biogas yields from (full) stillage. For better comparableness, everything was calculated at 7.0 % DM:

Kind of distiller's wash	DM/ODM (%)	Raw fat (g/kg TS)	Proteins (g/kg TS)	Carbo-hydr. (g/kg TS)	Crude fibre (g/kg TS)	spezific gas-production rate (m ³ /kgOTS)	Biogas per 1 m ³ mash (m ³ /m ³)
Mash with potato	7,0 / 85 %	17 g	285 g	451 g	106 g	0,60 m ³ /kg	36 m ³
Mash with wheat	7,0 / 88 %	67 g	362 g	416 g	97 g	0,65 m ³ /kg	38 m ³
Mash with rye	7,0 / 88 %	54 g	431 g	406 g	56 g	0,68 m ³ /kg	40 m ³
Mash with corn	7,0 / 94 %	82 g	297 g	466 g	104 g	0,70 m ³ /kg	45 m ³

Example for fatty acid composition and degradation of a biogas plant:

Fatty acids	C-2 acetic	C-3 propionic	i-C-4 isobutyric	C-4 butyric	i-C-5 isovaleric	C-5 valeric	C-6 capronic	C-7 oenanthic	Sum
Hydrolysis (mg/l)	4357	1606	104	2612	145	1413	1722	666	12623
Methanogenesis (mg/l)	206	16	5	22	5	30	28	14	323
Degradation (%)	95,3	99,0	95,7	99,2	96,2	96,5	97,9	98,4	97,4

Distillery Biogas Plants



Depending on the requirements Biogas plants for digestion of distillery residues could be very large.....



12 digesters with a volume of 6'000 m³ each.

Design concept for a bio-fuel factory with 100,000 m³ biofuel per year

Distillery Biogas Plants



..... but also very small and mobile



This stainless steel tank has a volume of 30 m³.

The biogas plant was erected in 1999 in Japan at the Kyushu Island and is working for a small special distillery.

Biogas plant for the Distillery “Spradau”, Germany



This biogas plant was in operation from 1982 until 2002, when the distillery was closed.

Located in the center of a small village, the biogas plant worked without any interruption and without any disturbance of the neighborhood.

More than 10 Mio.m³ of biogas was produced.

20 Year ! of experience...

Biogas plant for the Distillery “Altheim”, Germany



This Biogas plant was erected in 1998 and is still in operation. The input material is stillage from potato and/or from grain.

Like a typical monopole based distillery, the campaign lasts only half a year.

Out of the season, the biogas plant is running with starch pulp or mash from tritcale.

More than 5 other biogas plants for distilleries were designed and erected.

The utilization of distillers wash in biogas plants is a fully developed and reliable technology with long term operating experience, even as mono-digestion.

Stillage is predestinated for anaerobic digestion. The composition is rich on valuable components and the material is well structured. The biogas process for such plants takes place in a aqueous environment.

The additional use of residues from biodiesel production (like glycerin) or others is generally possible, but it has to be taken care of their impurities. Nonetheless, glycerin contains a very high energy potential, e.g. more than 1'000 liter of biogas per kg (of 100 % glycerin) is possible. But it is only usable as co-digestion substrate depending on the basic substrates composition and their nutrient and thrash elements content.

With a well-designed operating concept, the profitability (of the distillery) will be in-creased and secured for the future.