



## BIO-UP

**Biomethane from the Farm!**

## Bio-Up

The Bio-Up biogas upgrading system is especially designed for the smaller capacities that come with farm scale digestion. Proven techniques from the larger plants have been downscaled and reinvented to a budget friendly small scale upgrading unit. The scale is reflected in the available capacities of 20 and 40 m<sup>3</sup> of bio methane per hour.

A typical situation in the Netherlands is a dairy farm with 200 cows. The fresh manure can be used to produce about 300.000 m<sup>3</sup> of biogas per year. This can be upgraded to biomethane, natural gas with grid quality. In the Netherlands this will lead to almost 200.000 m<sup>3</sup> of natural gas. Selling direct to grid is very profitable since you compete on the consumers market.

Instead of selling to grid one can choose to use the bio methane as transport fuel. The preferable option is highly dependent on local and geographical circumstances.

Bio-Up is designed according the amine scrubbing technology at atmospheric pressure. The amine absorbs the CO<sub>2</sub> from the biogas, what gives a product gas consisting of mainly (bio)methane. In the Netherlands the gas needs to be downgraded to meet the relatively low natural gas standards. This is done by blending in a small percentage of raw biogas and/or nitrogen.

Because the upgrading systems works at nearly atmospheric pressure, there is no need for compression of the gas. Therefore the energy use is low and the combination with the low-pressure gas grid fits excellent.

## Field experience

The first Bio-Up was built on the research farm of Wageningen University and Research, KTC De Marke in Hengelo (Netherlands). At this first location the manufacturers of Bio-Up have proven that the installation can work standalone and be in operation for longer time periods without any human interaction.

The numbers in this leaflet correspond with another farm than this research farm. These numbers are deducted from the offers signed by this farmer. At this moment this plant is not yet in operation.



## Short description of the process

The Bio-Up is connected to an ordinary manure digestion installation (this can be a new one build by Bio-Up, but can also be an existing installation). The first step of treatment is the removal of H<sub>2</sub>S with activated carbon. After this step the biogas is led through the washing column, where the CO<sub>2</sub> is absorbed in the washing fluid. The stream of almost pure (>98%) biomethane is mixed with nitrogen (N<sub>2</sub>) and/or biogas to meet the grid specifications. In other countries where grid standards are higher, this step is not necessary. When the biomethane is used for vehicle fuel, this 'down-grading' of the bio methane is not useful either.

When the biomethane meets the grid standards, the gas odour is added to the gas and the gas will be injected in the local gas grid.

In a parallel process, the washing fluid is heated. At this higher temperature, the CO<sub>2</sub> will be released and the washing fluid can be used again in the process. The heat needed for this regeneration step can be delivered by burning biogas, biomass, or from some other external sources. The low-temperature excess heat is used to heat the digester.

The installation can be monitored 24/7 via remote access. The all-day maintenance serves guarantees that in case of any trouble the installation is up-and-running again as soon as possible.

## Key data

**Start of operation:** 2015

**Supplier:** Bio-Up

[www.bio-up.nl](http://www.bio-up.nl)

**Type of plant:** Biogas upgrading system

**Location:** Dairy farm, the Netherlands

**Gas production:** 480.000 m<sup>3</sup>/y biogas

**Biomass treated:** 10.000 m<sup>3</sup>/y manure

**Investment:** € 400.000

**Gross annual income:** €250.000

**Annual operational costs:** €50.000

**Nett annual income:** € 200.000

**Payback period:** 5 years\*

\*payback period is incl. digester

## Production data

**Biogas in:** 65 m<sup>3</sup>/h

**Biomethane out:** 40 m<sup>3</sup>/h

**Biomethane production:** 300.000 m<sup>3</sup>/y

**Electricity consumption:** 60.000 kWh/y

## Technical data

**Technology:** Amine scrubbing

**Process pressure:** Atmospheric (<500 mbar(g))

**Output pressure:** 200 mbar(g)

**Average labour needs:** 3-4 hours per week for checks and small maintenance

**Dimensions:** 40 ft. container

The project BioEnergy Farm II wants to inform farmers about the benefits of micro scale digestion and give farmers a view on the feasibility of this technology for their business.

Are you curious about the feasibility of micro scale digestion on your farm?

From September 2015 we offer personal guidance at home! Our biogas experts have software tools to calculate the feasibility of micro scale digestion on your farm. Contact us!



[www.BioEnergyFarm.eu](http://www.BioEnergyFarm.eu)



#BioEnergyFarm

[info@cocos.nl](mailto:info@cocos.nl)



Co-funded by the Intelligent Energy Europe  
Programme of the European Union