Position Paper for Biogas lagoon digester.

Preface

The EU Interreg 5a project Groene Kaskade (Green Cascade) facilitates small and medium companies and knowledge institutes in Germany and the Netherlands to develop innovative technologies for the biogas value chain. The focus is on the improvement of the economic viability and better utilisation of the input- and output materials. The framework of the project is the development of the biobased economy in the German-Dutch border region.

Adverio BV participates in the sub-project Refitting that aims to renovate existing biogas installations with innovative plugin technical modules.
This fact sheet is one of a series of seven, it presents a modular unit for lagoon digestion.

Project principle.

A biogas-lagoon is a flexible digester/storage for liquid manure/digestate and biogas. In the flexible tanks is biogas produced from manure / digestate through anaerobic digesting (AD). This biogas is stored in the top part of the Biogas lagoon. The biogas can be used for electricity / heating / gas to grid (after biogas cleaning).

Market opportunity.

The biogas lagoon can be utilised as;

- Standalone basic digester.
- Expansion of existing digester capacity.
- Extra storing capacity for manure/digestate and biogas.
- It has a relatively low investment and fast installation time.
- Temporary storage and biogas production in case of problems with an existing installation.

By utilizing the available energy in the manure, the biogas is used and will reduce the environmental impact of manure emission (thus GGH-emissions) to the minimum.

Project overview.

The existing digester has a residence time of 40 days and a biogas storage capacity of 150 m^3. After installing the biogas lagoon there is a post-digester available with the capacity of 700m^3.

- Biogas 200 m^3
- Liquid digestate 500 m^3

The total available biogas storage has increased to 350 m^3 and the residence time increased to more than 55 days

Digestate is pumped form the digester into the biogas lagoon, the biogas is transported by an 80m HDPE pipe to the same biogas lagoon. The biogas is transported by its own created pressure in the digester.
A new biogas pipe is installed between biogas lagoon and CHP, the CHP can run continuous.

With installing the biogas lagoon the complete installation is running under the latest regulations.

The project is commissioned in October, 2019.

Project Partners

Genap 'sHeerenberg
Genap is the specialist in the field of foil structures and foil applications for the horticultural and agricultural sectors and for civil engineering infrastructure projects. Customised foil structures are produced at the factory in 's-Heerenberg in the Netherlands, where they also have their own laboratory and research & development department.

Adverio Engineering
Adverio employs full time engineers and project managers, and has a broad network of partners and experts to offer a complete service to its customers. With a primary focus on methanisation and ethanol production from biodegradable materials. Adverio has built or helped developing over 35 projects in a ranging from 340kW to 7000 Nm3 biogas.

Customer/test location
Cattle Dairy Farm Heck in Nidrum Belgium. A farm with 150 – 200 cows and an existing digester with capacity problems.

Project Location.

The installation is installed at the farm of the family Heck in Nidrum, Belgium.

The farm has an running digester of more than 10 years old. This digester became too small.

1. The residence time in the digester wasn't long enough so there was a loss of biogas production.
2. The storage capacity of the biogas in the digester was too small so the CHP could not run continuous.

Project status.

The project is engineered, constructed, tested, installed and started by the team of Adverio and Genap. The biogas lagoon is in operation and in full production since October 2019.

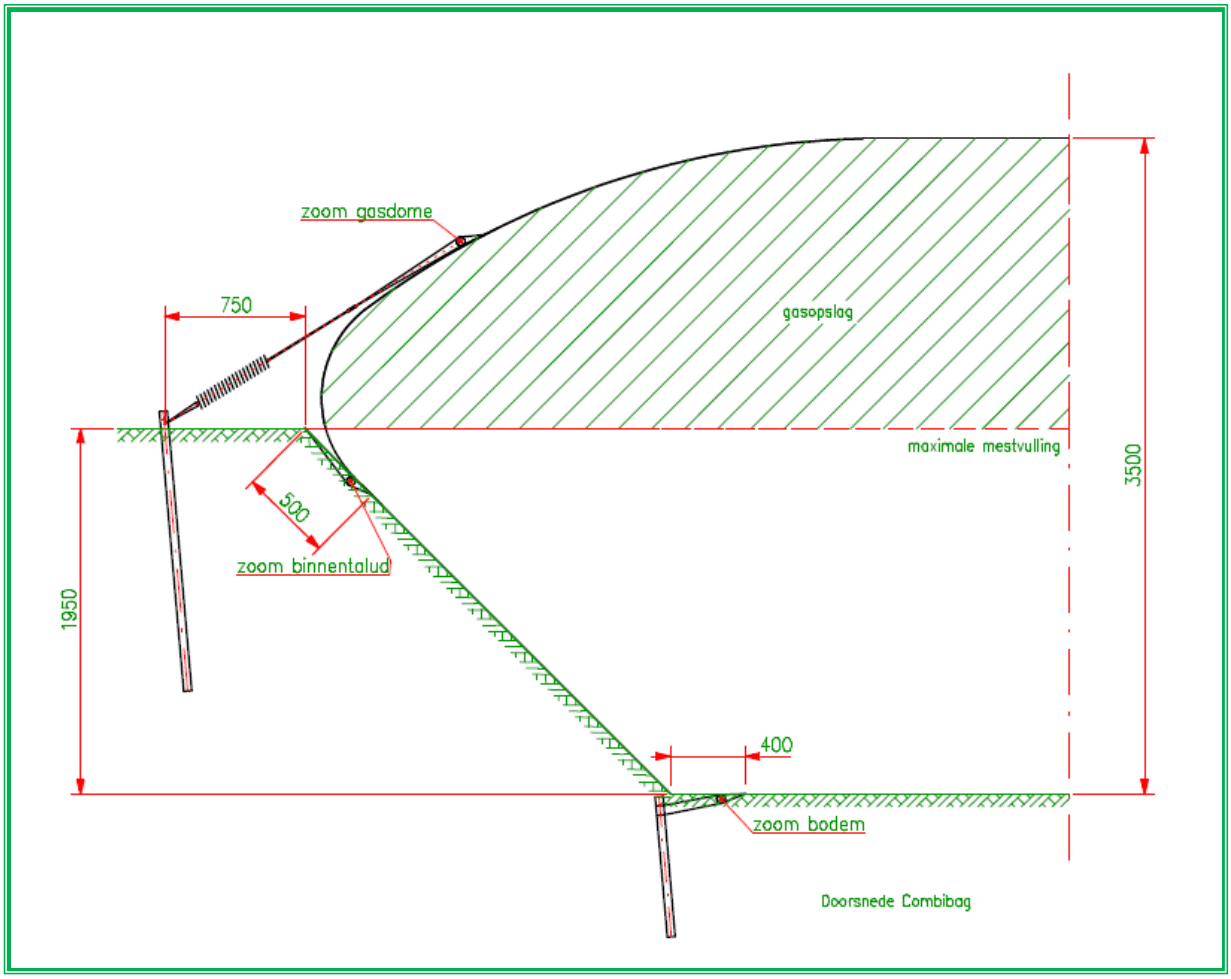


Figure 1 - Cross section

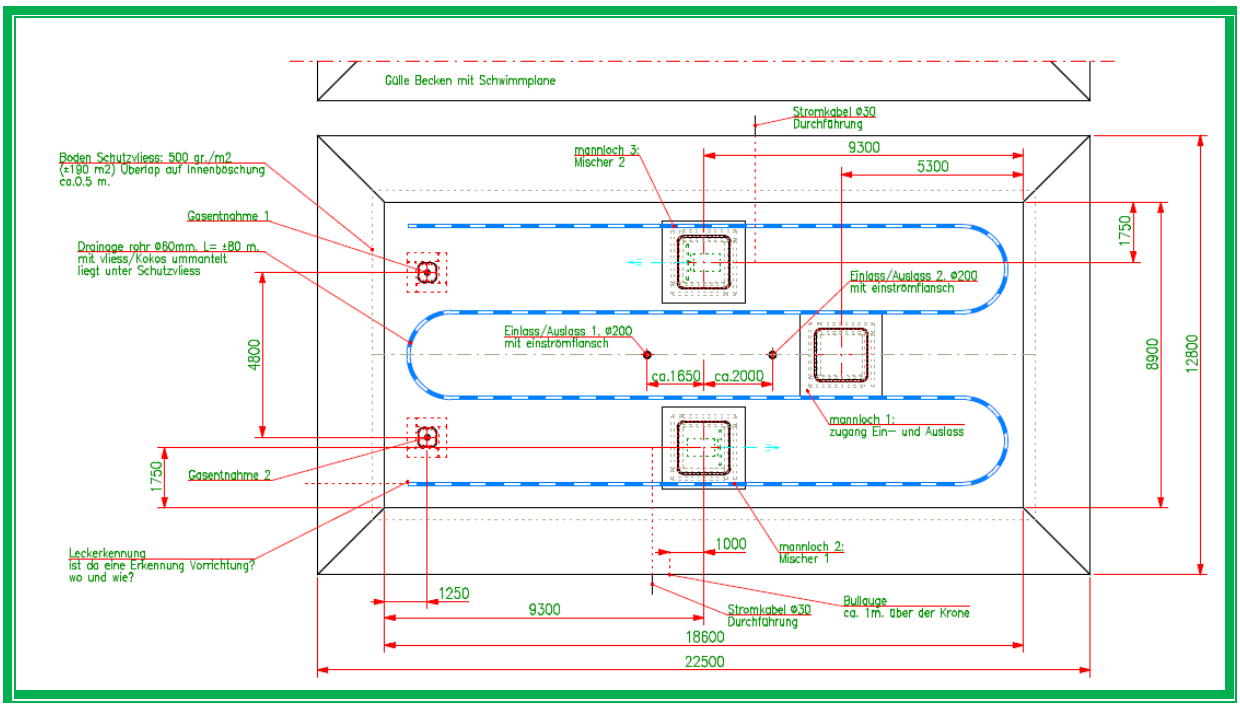
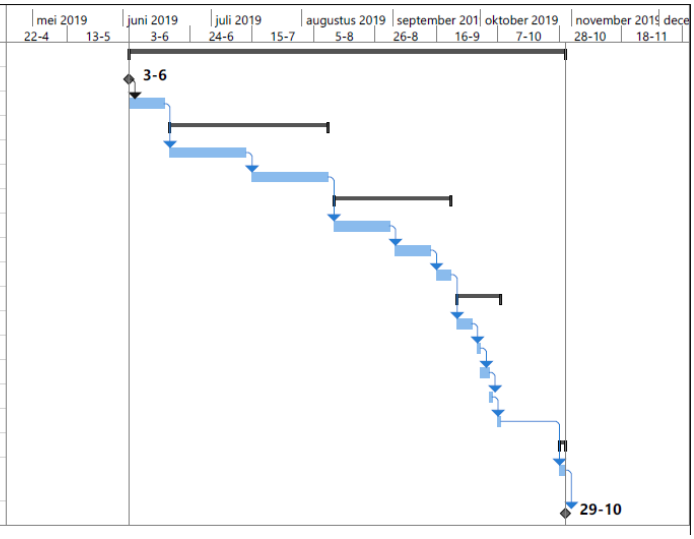


Figure 2 – Topview


Figure 3 - Installed Biogas lagoon (Nidrum, Belgium)

Project timeline.

Id	Taaknaam
1	**Biogas Lagoon 700m3**
2	Find end customer
3	Negotioating with end customer
4	**Engineering**
5	Basic engineering
6	Detail engineering
7	**Production**
8	Order materials
9	Production biogas lagoon
10	Make ready for transport
11	**Installation**
12	Transport Biogas lagoon
13	Travel Genap crew
14	Installing
15	Testing
16	Startup/Commissioning
17	**After sales**
18	Detailed check of the complete installation
19	Finalizing



Investment

The biogas lagoon required an investment of € 66.000,- This is including a mixer, overpressure valve and excavation work.

The project can be separated in multiple activities: 1. Engineering and Project Management. 2. Construction (prefabrication). 3. Transport, 4. Installation on site. 5 Instruction / Training / Operations Manual. 6 Start-up. 7 After sale support.

For the yearly operations of the lagoon an average extra budget of € 1.000,- for extra maintenance and staff costs is required. The operational project risks are low because of the low pressure and quality and number of installed equipment.

Economic benefits:

- Flexible storage and collecting of produced extra biogas.
- Easy permitting process.
- Fast delivery and installation.
- Low investment costs.
- Extra storage for manure in seasons when spreading is not permitted.
- As post-digester of a biogas installation.
- Expansion capacity of a biogas installation