



ABOWE Pilot B Activities in Brief

Pilot testing in three sites in Lithuania, Estonia, and Sweden provided proof of concept of the plug flow dry digestion technology.

The financial aspect of the implementation of biogas in the Baltic Sea Region was focused.

The Dry Digestion Biogas Pilot B in ABOWE

During the ABOWE project (Implementing Advanced Strategies for Biological Utilization of Waste) a pilot scale plug flow dry digestion system for biogas production has been successfully tested in three different partner countries, Lithuania, Estonia and Sweden.

Dealing with different substrates, from cow manure to municipal solid waste, the technical testing periods gave proof of concept of the plug flow dry digestion technology. As the project developed, also other types of dry digestion technology came into focus. For example a garage fermentation could successfully be implemented in the work done in Sweden.

Besides being a place of research the pilot plant worked as a place for learning (knowledge transfer, training of operators) as well as a demonstrational object for people that were interested about biogas production technology.

The financial aspect of the implementation of biogas in the Baltic Sea Region was another major focus of the ABOWE project. The development of cumulated cash flow calculations went hand in hand with the results from practical on-site testing with the local partners. In a continuous learning process the calculations were developed regarding their influencing factors and accuracy.



In this Newsletter the final news regarding Lithuanian, Estonian and Swedish ABOWE activities around Pilot B are presented.





Communication between stakeholders has been addressed: a participative business model creation process was carried out in each region and Investment memos were prepared which combine all information

Business Models and Investment Memos

A participative business model creation process has been carried out in each region, which is a communication and learning process between the stakeholders, technology providers, researchers and implementers. In the BM creation Extended Business Model Canvas was used and applied. BM ideas were evaluated and ranked by using advanced internet based evaluation tools and multicriteria decision support (MDS) analysis.

Information from regional modeling, business environment, piloting and testing, business model, feasibility and business strategy towards the market was presented in Investment events and compiled to Investment memos for each region.

The communication between project partners and potential stakeholders was another issue that had carefully been taken care of. To help keeping everyone up to date, various strategies of marketing and education have been applied. In regular intervals e.g. newsletters have been sent to all partners and stakeholders. The organization of events in every participating country helped to understand the needs of the stakeholders and to keep them informed about the ongoing activities.

There are a lot of possibilities given for future cooperative projects. The continuation in the case of Švėkšna in Lithuania, cooperation in Sweden (Örebro, grass utilization) and Poland (Wrocław, municipal solid waste digestion with garage fermentation) are being discussed at the moment. Together with the other pilot in ABOWE, the novel biorefinery (Pilot A), multiple opportunities for joint test runs can be thought off. These two technologies could lead to greener production of e.g. chemicals from waste streams.

All ABOWE reports and newsletters are downloadable from the project web-site

www.abowe.eu





Lithuania

Švėkšna village as a potential stakeholder case study

- Capacity 79 kW
- Biogas 174.240 m³ CH₄ / a
- Power 692.777 kWh_{el}/a
- Heat 510.577 kWh_{th}/a

Biogas Feasibility and Plans in Lithuania

During the last ABOVE period a biogas residue microbiological analysis was performed:

- Enterobacter – not found;
- Clostridium perfringens - 1.1 x 10³;
- Escherichia coli - <1.0 x 10;
- Helminth- not found

The results showed that biogas residues based on cow manure met the Lithuanian legal requirements criteria.



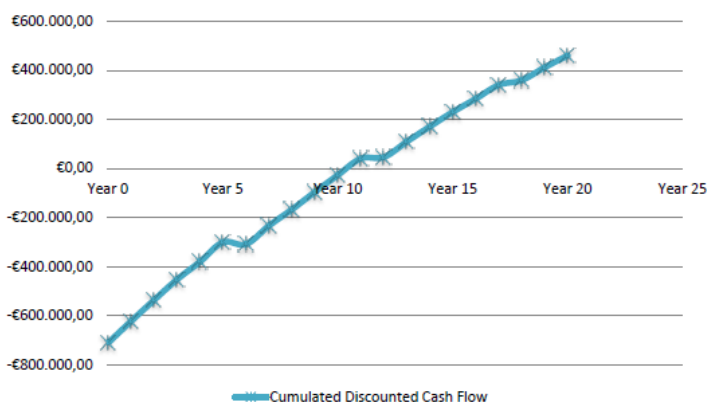
During the last period of the project Lithuanian team together with project partners from Germany finished the Švėkšna case biogas production study. The study showed that in Švėkšna it would be appropriate to build a 79 kW biogas plant, which would produce:

- Biogas – 174.240 m³ CH₄/a;
- Electricity – 692.777 kWh/a;
- Thermal energy – 510.577 kWh/a.

Such a biogas plant's initial investment could reach max € 700.000, but it was estimated that the investment pays off after 10 years. The payback time is presented below.

The feasibility study estimated that the payback time could be changed taking into account possible variations in electricity prices, wage growth and etc. that could have impact on the biogas plant investment. However, a greater impact on the amortization period should be insufficient biogas substrate utilization amount and further planning for such activities must take into account especially this aspect.

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Cash flow for the small biogas plant in Sveksna





Estonia

In the Estonian business model analysis was combined both technologies represented by ABOWE Pilot A and Pilot B as they were found to add value best when complementing each other.

Conclusion of the Estonian Business Model

Estonian business case uses the results of ABOWE and REMOWE to model indicative business plan for producing not only electricity, heat and/or fuel but high market value chemical products (as demonstrated with ABOWE Pilot A novel biorefinery) as the main output. It also includes the general marketing aspects and arguments for attracting the possible investors.

Although the initial investment for developing a mobile bio-refinery plant is considerable (approximately 3,5 million EUR) and also the operational costs together with depreciation costs are not low (approximately 350 000 EUR per year), the solution will still yield a sufficient profit in due time (2-3 years). The global trends for the demand of 2,3-butanediol is increasing with a special emphasis on producing it from bio-waste. Likewise the global race for being among the first to produce a full-scale industrial solution is tightening.

Thus on a macro-scale the solution will be remarkably profitable for the manufacturing company while on the micro-scale the same applies to large waste-owners and –handlers.

Also ABOWE Pilot A related reports and newsletters are available at the project web-site.

An article about complementary utilization of the novel biorefinery and the dry digestion is available at Science & Technology publication, March 2015 volume, pages 94-95 at:
<http://www.paneuropeannetworks.com/science-publications/science-technology-publication/>





Sweden

It can be concluded that the construction of a biogas plant based on the piloted technology is a massive investment. Apart from the investment costs related to the construction the costs of administration, operations and maintenance in relation to the amount of waste treated and amount of gas produced have to be considered.

Biogas Business Model in Sweden

The assessment of responses from key stakeholders representing academia, municipalities and the waste-to-energy sector suggests that the main customers in Västmanland are municipalities and waste handling companies. The customer needs are improved solid waste handling and the need to produce products of higher value from the collected waste. A majority of respondents emphasised the need for improved technology that can increase the value of products produced from bio-waste.

There are several competitors in the waste-to-energy sector in Sweden, not least in Västmanland. There are several energy plants that use bio-waste to produce energy.

The most important resources required for a successful business were a reliable and sufficient supply of waste and finances allowing for investment, operations and maintenance of the technology.

The highest priority was given to conducting extended technical and economic feasibility assessments before an investment decision of a full-scale dry digester can be made based on the piloted technology.

The most important revenue streams were said to be waste handling fees collected from households and sales of produced energy, mainly to municipalities and companies with large vehicle fleets, e.g. bus and transport companies.

