



## Pilot A:n testauspaikat

Powerflute Oy:n  
Savon Sellun  
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ZGO Gac Ltd.:n  
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Olawa, Puola

Hagby  
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siipikarjatila,  
Enköping,  
Ruotsi

## BIOJALOSTAMO-PILOTTILAITOKSEN KÄYTTÖKOULUTUS TOTEUTETTU

Kansainvälinen Pilot A:n käyttökoulutus järjestettiin helmikuussa Kuopiossa. Kaksipäiväisen teoriaosuuden jatkoksi järjestettiin viisipäiväinen käytännön osuus Savon Sellun jätevedenpuhdistamon kentällä sijaitsevassa pilottilaitoksessa.

Osallistujina oli neljä tulevaa testaajaa Wroclawin teknillisestä yliopistosta Puolasta sekä kaksi tulevaa testaajaa Mälardalenin yliopistosta Ruotsista. Kouluttajina toimivat Finnoflag Oy:n ja Savonia Tekniikan asiantuntijat.





### Emphasized

Pilot B originally had been constructed as a machine, with the focus to test the feasibility of several substrates on pilot scale. In the ABOWE project it transformed into a place of learning with the focus to train the operator and the social environment.

Vygintas Daukšys is now a trained operator, with experiences, knowledge and competencies in the fields of trouble shooting, feeding strategies, substrate analyses and communication.

Olga Anne enabled diverse contacts to various stakeholders in Western Lithuania who could during the Pilot B Lithuanian testing period get to know different specifications of anaerobic dry digestion.

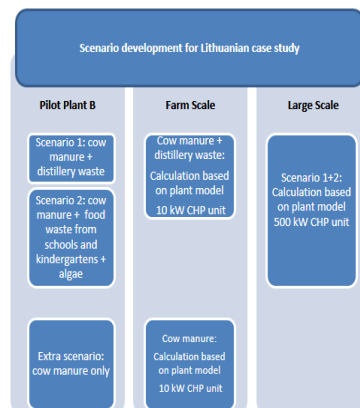
Pilot B is now in Estonia, and in Lithuania it continues to have an impact. Especially in Švėkšna where the implementation of an anaerobic digestion plant shall become more concrete.

## Pilot B in Lithuania – a short review

### Operation

The operation of Pilot B in Lithuania lasted from 30<sup>th</sup> of April until 8<sup>th</sup> of October. In this five month the digester had been fed with different substrates with regard to the scenario development for Lithuania, that is shown in the right figure. Main substrate was cow manure, combined with the co-substrates distillery waste, food waste and algae.

Relevant parameters of the digestion process were analysed on-site and in Ostfalia University of Applied Sciences' lab-scale digesters which had been fed with the same substrates. The results showed, that process of Pilot B and lab-scale performed well, which is an important finding for the further process in Lithuania.



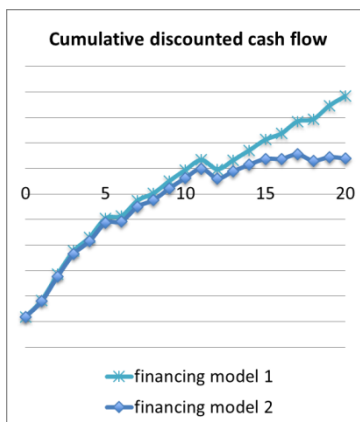
Scenarios for Lithuania.

### Calculations

The technical performance was accompanied by data collection regarding the substrates with economical calculations that will deliver criteria for decision-maker.

For that the investments, costs and revenues for planned plants are considered specifically. The results are shown visually and discussed, so that the sensitivity of different data are clear for possible investors. The figure on the right hand side shows two scenarios that differ considerably.

The basis for the calculation could be created and will be used to calculate possible implementations in the further process in Lithuania.



Economic consideration of scenarios.

### Events

To inform the public and the stakeholders three events were organized:

1. Stakeholder meeting in June, to inform about Pilot B and to gather expectations from the experts.
  2. Stakeholder visit in July to give an on-site impression of Pilot B (see figure).
  3. Investor event in October to present the results of operation and the Investment memo.
- With the events more than 40 national experts and multiplier could be reached personally. One result is to go further in the process in Lithuania by considering in more focused way the implementation of an anaerobic digestion technology in Švėkšna.



National experts at Pilot B.

Thorsten Ahrens  
Ostfalia University of Applied Sciences





## Pilot B

### Past and coming steps

- Pilot B is implementing dry digestion technology for the production of biogas.
- Pilot B activities have been finished in Lithuania.
- The first Investor Event was held on 4. October in Klaipeda, Lithuania in which information from pilot tests, regional modeling and business models was presented and discussed.
- Pilot B activities will next take place in Estonia and then in Sweden.

## Investment events started from Lithuania around Pilot B - dry digestion system

ABOWE Investor events around Pilot A and Pilot B aim to support investments for a dry digestion system in the target regions with the help of

- technology testing period in the testing site,
- business model workshops as well as
- regional modeling of the system.

Business model workshops were started by Savonia University of Applied Sciences in Lithuania and respective workshops will be organized in Estonia, Finland, Poland and Sweden.

University of Eastern Finland carried out regional modeling of biodegradable waste with joint collaboration of Klaipeda University project team which used official Lithuanian data sets. In addition, Ostfalia University of Applied Sciences produced practical testing information for modeling in the Lithuanian target area which considered Telšiai, Šiauliai, Taurage, Klaipeda and Panevėžys provinces.

Savonia University of Applied Sciences is elaborating Investment memos around the pilot technologies. The Business Model CANVAS is utilized with some added features.

The used business model process includes evaluation and ranking of business model items, which is helpful and practical in the identification of the core business model.

The methodology has been developed and tested in SME pilots in Finland and Oregon, USA, and will be implemented in Lithuania.

In order to find out the most suitable options for Lithuanian SME's biogas model, the Lithuanian experts had been invited for pre-discussion in the middle of September at Klaipeda University (Figure below). This meeting between Savonia University of Applied Sciences and Lithuanian experts determined Lithuanian vision and conditions relating to dry digestion solution for biodegradable wastes.

Olga Anne  
*Klaipeda University*

Tuomo Eskelinen, Miika Kajanus, Mervi Lappi  
*Savonia University of Applied Sciences*



Feasibility of the dry digestion system was discussed with local experts at Klaipeda University.





### Partnership

**Lead partner:**

Savonia University of Applied Sciences, Finland

**Partners:**

- Ostfalia University of Applied Sciences, Germany (Pilot B leader)
- Marshal Office of Lower Silesia, Poland
- Klaipeda University, Lithuania
- Mälardalen University, Sweden
- Estonian Regional and Local Development Agency, Estonia
- University of Eastern Finland, Finland

External service provider for microbiological and bioprocess consultancy for Pilot A investment and testing:

Finnoflag Oy, Finland

Six testing sites in five countries:

- Farm of Rima Dauksiene, Lithuania
- Savon Sellu Oy, Finland
- OÜ Kaarli Farm, Estonia
- ZGO Gać Ltd, Poland
- Vafab Miljö AB, Sweden
- Hagby Gårdsfågel AB, Sweden

**Other associated partners:**

- Telemark University, Norway
- North Savo Centre for Economic Development, Transport and the Environment, Finland
- Jäteukko Oy, Finland
- Berndt Schalin Board Advisors Oy, Finland

## Regional modeling was used to support decision-making in Lithuanian target region

Modeling consisted of calculating regional feedstock potentials, maximizing operational income for the system as well as GHG allowance reduction potentials and labor demands for the optimized system (Figure below).

The largest and most important biodegradable feedstock potentials from cattle solid manure as well as municipal solid waste were mapped in the target region.

System considered biodegradable waste utilization in the biogas CHP system considering feedstock transportation, biogas heat and electricity production as well as the delivery of heat and digestate to the end users.

The most cost-efficient solutions for biodegradable waste utilization in biogas electricity production were found in provincial scale. Two biogas CHP plant would be able to handle successfully household biowaste from the target region while most of the district heating networks would be potential areas for systems that utilize cattle solid manure.

Feasible electricity production potentials from household biowaste and cattle solid manure were found to be in total 15 GWh/year and 41 GWh/year, respectively. These kinds of systems would give direct work for some tens of actors in transportation and plant operations.

Based on the modeling results, actual planning in practical level can begin. As regional potentials and feasibility of the system has been now elaborated, it is up to actors in the field what kind of business plan, agreements, feedstock, technology, end users and revenue can be obtained in each specific cases.

Lithuanian case results can be downloaded from ABOWE website in the beginning of 2014.

Tuomas Huopana  
*University of Eastern Finland*

Olga Anne  
*Klaipeda University*

