abowe
Implementing Advanced Concepts for Biological Utilization of Waste

Newsletter 01/2013

Partnership

Lead partner:
Savonia University of Applied Sciences, Finland

Partners:
- Ostfalia University of Applied Sciences, Germany (WP4 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

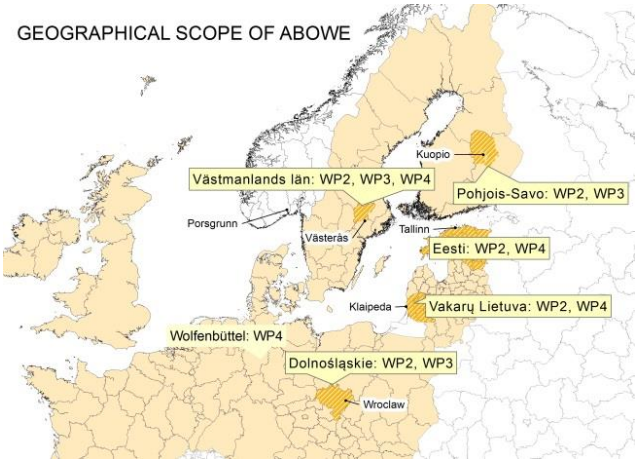
Six testing sites in five countries:
- Farm of Rima Dauksiene, Lithuania
- Savon Sellu Oy, Finland
- OÜ Kaarli Farm, Estonia
- ZGO Gać Ltd, Poland
- Vafab Miljö AB, Sweden
- Hagby Gårdsfågel AB, Sweden

Other associated partners:
- Telemark University, Norway
- North Savo Centre for Economic Development, Transport and the Environment, Finland
- Jätekukko Oy, Finland
- Berndt Schalin Board Advisors Oy, Finland

ABOWE up and running

Interesting possibilities ahead

As REMOWE project (Regional Mobilization of Sustainable Waste to Energy Production) was finalized, at the same time started the extension stage project ABOWE (Implementing Advanced Concepts for Biological Utilization of Waste) to work with two promising technologies, unlocking investments with support from the Baltic Sea Region programme.



Two mobile pilot plants will be built and tested in several Baltic Sea Region countries.

Pilot plant A is planned in Finland for testing enzymatic hydrolysis and microbiological processing (biocatalysis approach) of various wastes by Savonia UAS and Finnoflag Oy.
Pilot plant B is a German dry fermentation process, invested by Osfalia University of Applied Sciences.

The pilots form the basis for know-how transfer, compilation of Investment memos and upcoming Investor events as well as evaluating the new processes' economic and climatic impacts in each region.

The desired outcome from ABOWE is implementer/investor driven continuation projects targeting full scale plant investments of the two technologies.

In these Newsletters, we will inform about proceeding of these ABOWE activities. Updated information will be available at www.abowe.eu

Operational time for ABOWE is 12/2012 - 9/2014.

Ari Jääskeläinen
Project Coordinator
Savonia University of Applied Sciences

Regional modelling as tool for investment memos

Aim to reduce GHG emissions by regional modeling

Diffusion of waste to energy technologies considering pilots A and B will be enhanced by investor events and memos which are supported by regional modelling. Sustainability of biofuel production with pilots as well as regional waste energy potentials are assessed in target regions in Lithuania, Estonia, Finland, Sweden and Poland.

Life cycle assessment approach is used for estimating the sustainability of biofuel production. According to the renewable energy directive (2009/28/EC) sustainable biofuel production can be subsidized .

Potential waste based feedstocks with their energy potentials are mapped in each target regions. Regional feedstock potential data from target region is collected in solid co-operation with all project partners.
Tuomas Huopana
University of Eastern Finland

Baltic Sea Region Programme 2007-2013
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Past and coming Events

- Feb 2013: ABOWE Start-up in Kuopio
- March 2013: Training for Pilot B testing in Wolfenbüttel
- **18.-20. June: Project meeting and Investor Event start-up, Klaipeda; WARMLY WELCOME!**

A more detailed description of Pilot B and experiences so far soon available in the ABOWE-website

Next ABOWE Newsletter will cover also: Investment Memo and Investor Event around Pilot B

Pilot B constructed in Germany, transported to Lithuania and started up for field testing

Right after ABOWE approval, WP4 leader started public procurement for pilot B and went into intensive planning with the service procurement partner afterwards.

In early March 2013 the first practical training period at WP4 leader's laboratory took place for three weeks. There were participants from Lithuania, Sweden and Finland.

In April 2013 the construction of the pilot plant B was finished and a first functional testing in Germany was done. Installation and first technical start-up took place without any problems.

After transportation and on-site installation the operational procedures began; first step was filling the plant with inoculum and starting the first feeding steps.

Actual activities with pilot B are:

- Second start-up procedure with strong observation of lessons learned from first start-up.
- Preparation of installation of gas utilization unit to pilot B.
- Search for waste-based co-substrates for pilot B in the region (successfully done).

Prof. Thorsten Ahrens
WP4 Leader, Ostfalia
University of Applied Sciences

Loading procedure of pilot B in Germany

Initial filling of pilot B fermenter with manure in Lithuania

Fermenter unit of pilot B

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Pilot A engineering proceeded well

Current status with Pilot A

- Weekly engineering meetings have been held with Finnoflag Oy and engineers from Savonia UAS
- Lay-out chart nearly ready
- Process chart ready
- Equipment list drafted
- First components procured
- Container will arrive to Kuopio in early June
- Gas chromatography start-up in early June
- Swedish testing site visited by the Swedish and Finnish partner
- Down-stream processing started as a student project in Germany
- Envisaged Start-up 1.10.2013

With the novel biorefinery technology proposed by Dr. Elias Hakalehto, Finnoflag Oy, organic wastes are refined with processes resembling the ones microbes are using in the nature.

Valuable chemical and energy products are produced from waste materials by utilizing microbes and their enzymes. The objective is to balance the human economy to nature economy. Via collaboration between human and nature it is possible to prevent from accumulation of environmental problems and design ecologically sustainable ways to produce energy and chemicals.

The biorefinery process' novelty is in improved productivity and versatile product repertoire. As products can be produced faster, the minimum facility size reduces enabling lower investment.

Moreover, downstream processing of products is more affordable, when end product concentrations can be increased and the total duration of the process shortened.

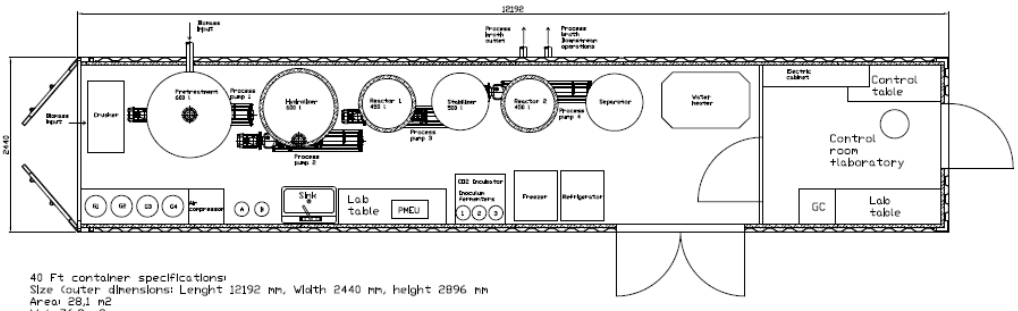
AIMS OF ABOWE PILOT A TESTS

- Effective pretreatments and hydrolysis of various industrial and municipal wastes.
- Enhanced microbial bioprocess for the upstream production of fuels and chemicals.
- Preliminary planning of the downstream processing

The engineering and manufacturing team consists of Finnoflag Oy and engineers and engineering students mainly from Savonia UAS. Versatile know-how from process and instrumentation, lay-out, electrical, mechanical, automation, IT, environmental and manufacturing is utilized for the common goal.

Dr. Elias Hakalehto, Finnoflag Oy and Ari Jääskeläinen, WP3

ABOWE Pilot A Plant, 40 ft
Anssi Suhonen, Elias Hakalehto



40 ft container specifications:
Size (outer dimensions: Lenght 12192 mm, Width 2440 mm, height 2896 mm
Area: 28,1 m2
Vol: 76,3 m3
Weight: 4700 kg
Insulation U-value 0,17
Drainage in process area
Left end opened completely
3 x doors + one internal wall structure

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