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## Application of 'smallBIOGAS' to 3 pilot case studies in Sweden

**BIOGAS<sup>3</sup>**

Sustainable small-scale biogas production from agro-food waste  
for energy self-sufficiency

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## General statements

The tool smallBIOGAS has been tested in three pilot case studies for the next countries: France, Germany, Italy, Ireland, Poland, Spain and Sweden.

The pilot cases presented have been carried out in order to test the tool and evaluate the viability of small-scale AD installations under different scenarios in the mentioned countries. The data used to create the scenarios has been obtained from the questionnaires (task 2.2) and additional companies interested in the project BIOGAS<sup>3</sup>.

As a result of pilot cases application, all the partners have prepared a list of remarks and comments regarding functionality of the tool, as well as suggestions for modifications. The remarks and suggestions have been - where possible – applied for the tool improvement.

In addition to that, it is possible to identify small-scale AD viable scenarios. Next, it has been included the main conclusions related to viability of small-scale AD as well as a description of pilot case studies in **Sweden**.

As a result of the application of pilot cases, it could be concluded that to reach economy in small scale biogas production in Sweden there are some bottlenecks to overcome:

- Low electricity prices
- Low heat demand during summer
- High investment and maintenance cost for small scale CHP unit

Because of these bottlenecks there are just special situations that provide an economical beneficial situation for small scale biogas production. One example is when there is a process industry available that can use the biogas as a replacement for fossil oil or gas. In those cases where CHP-production is considered, there is important with a high internal demand for electricity to minimize the amount of electricity that has to be sold to the grid. Further there are crucial with a heat demand that covers close to the total heat production.

The detail of each pilot case will be presented one by one in the annexes of this document. All are available in Swedish language.

## Annexes: Results of the application of `smallBIOGAS` to 3 pilot case studies in Sweden (pdf-files)

As a result of the application of `smallBIOGAS`, two pdf-files for each pilot case study have been created. The reference file number includes also the letter 'S' in case of pdf-file with the summary of substrates used for the process of biogas production.

The reference file numbers for Sweden are 139-BG3, 139-BG3S, 332-BG3, 332-BG3S, 334-BG3 and 334-BG3S.

Below it has been included a description of the pilot case studies carried out for Sweden.

*Table1. Description of the case studies and agroindustry addressed*

Case study						Agroindustry addressed	
Ref. Nr.	Location	Objective	Comments	Substrates	Biogas use	Farm	AFI
139-BG3	Gotland	This would be collaboration between a pig farmer and an AFI with a demand for gas to replace oil in the burners.	A high potential both economically (direct replacement of heating-oil) and environmental (large CO <sub>2</sub> -reduction). The farm already has handling system for liquid manure and a demand for more nutrients to the production. The farm is close to the industry so either would the gas be piped to the industry or the manure or digestate be piped to the farm.	Agro food residues, pig manure  Total amount: 6 600 t/year	Burner (partially running on biogas and rest on oil)	x	x
332-BG3	Skåne	This is a chicken producer with own slaughterhouse. Their willingness to treating their own waste and digestate while increasing self-sufficiency in energy.	This facility would solve a waste problem and create more added value to the agro-food industry as the environmental profile would increase.	Slaughterhouse waste, sludge from slaughterhouse wastewater treatment plant and chicken manure  Total amount: 3 021 t/year	CHP engine  116 kW	x	x
334-BG3	Jämtland	This would be collaboration between an egg producer and a neighbouring milk producer. The egg producer both have egg residues and solid manure that are suitable to co-digest with liquid manure	The egg packing centre has a need of heat and electricity. At the same time, there is a waste problem related to residues from the production. Collaboration with a farm and digestion of the residues would close the nutrient circulation.	Poultry manure, residues from eggs and liquid cattle manure  Total amount: 2 293 t/year	CHP engine  27 kW	x	x