



DEMETER - Demonstrating more efficient enzyme production to increase biogas yields

XIX National Conference on Composting and Anaerobic Digestion
BIOWASTE MANAGEMENT AND EXPLOITATION

ECOMOMDO 2017 – the green technology expo – 21st edition

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ECOMONDO
the green technologies expo



EU funded Project

This project has received funding
from the European Union's Horizon 2020 Research and
Innovation program
under Grant Agreement N. 720714





PNO at a glance



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- The leading European **innovation management and grants consulting** company: 25 million euro turnover, present in **6 countries** with 30 offices and **250 consultants**;
- More than **5000 industrial and research clients** and partners, among which multinational enterprises and research centers throughout Europe;
- Defining **research roadmaps** and **technology landscape** for international associations, innovating enterprises, and the European Commission;
- **Open Innovation**: each year supporting more than **2,000 organisations** in setting up more collaborative research and innovation projects;
- More than **250 proposals** for EU funding per year;



- **200 Million Euro** of public funding attracted each year for innovation projects.



DEMETER Project



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DEMETER - Demonstrating more efficient enzyme production to increase biogas yields

- **Call identifier:** H2020-BBI-PPP-2015-2-1
- **Topic:** BBI.D7-2015 - Overcoming low product yields from fermentation processes
- **Start/end date:** 1st August 2016- 31st July 2019

DEMETER Consortium:





The Project



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The **transition from an economy based on fossil resources to a bio-based economy** should be realized sooner than anticipated at the moment. The **conversion of biomass into energy sources** (biofuels, biogas) and chemicals plays an essential role in this transition.

To **efficiently convert biomass** and agricultural, industrial and municipal waste into fermentable sugars, chemical building blocks or bio-based materials, **enzymes play an indispensable role**.

However, the use of the currently available enzymes has not lived up to the expectations as little or no effects could be observed.



Genencor International BV has recently developed a **new enzyme product**, derived from ***Myceliophthora thermophila*** C1, that in recent field trials **has shown a promising 10% cost-reduction in the production of biogas** from organic waste





The Objectives

The **main objective** of DEMETER is to demonstrate a **yield increase** and **cost reduction** of the enzyme production process as well as its **positive effect on biogas production** in Europe. The steps are:

- to **improve and scale-up** the enzyme-producing fermentation **process to yield** at least **20%**
- to improve downstream processing leading to a **cost reduction of 15%**
- to demonstrate the improved production process in a 15 000 L **pilot plant**





The Benefits

DEMETER will bring innovation to both the fermentation process used for production of the enzyme, and to the use of enzyme-enhanced fermentation in production of biogas.



Innovation in enzyme production technology



Innovation in the use of enzymes to enhance biogas production



Higher process yields of at least 20% compared to the state of the art



Cost reduction of at least 15% compared to conventional down-stream processing of the fermentation broth



Innovation intelligence in the DEMETER project



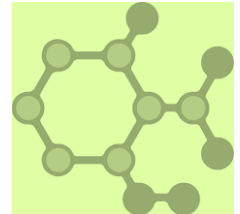
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For the exploitation of DEMETER results **two market sectors** have been identified:



1. Biogas

2. Enzymes for Biogas



For each market sector:

- **Market studies**
- **Stakeholder analysis**
 - Innovators
 - Patent owners and potential Investors
 - Potential business drivers





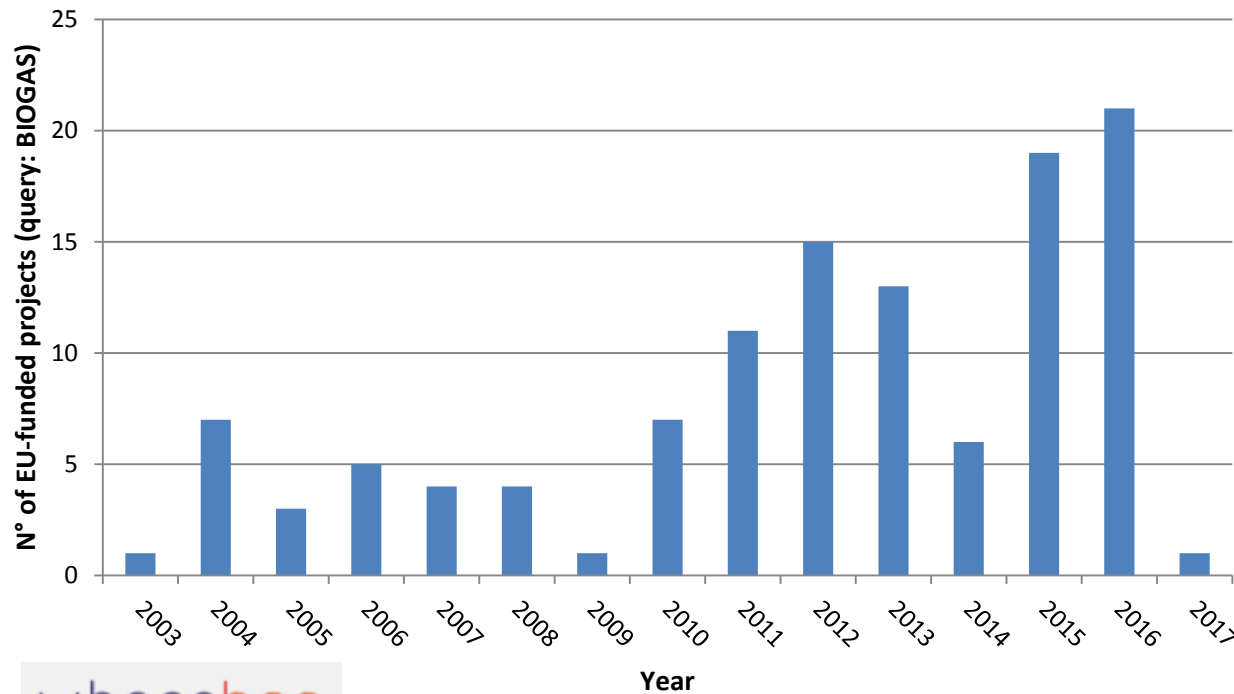
DEMETER Stakeholder Analysis: The Innovators



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Target market: Biogas



INNOVATORS
are identified
by the
analysis of
**EU-project
participants**

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From 2003 to 2017 Europe funded **118 projects** about the **biogas** topics.

The analysis revealed a sensible increase of the projects number from 2010.





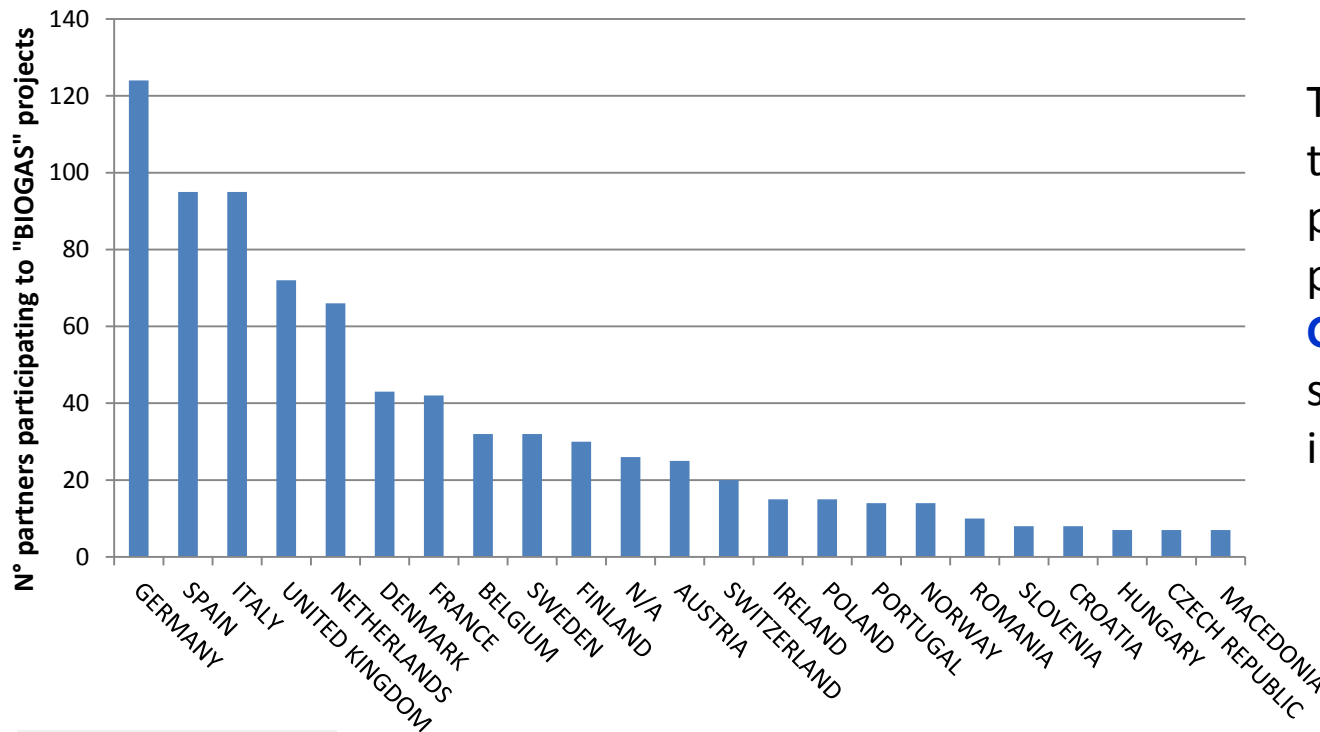
DEMETER Stakeholder Analysis: The Innovators



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Target market: Biogas



The research revealed that the majority of the partners of these projects come from **Germany**, followed by a significant participation in **Spain**, **Italy** and **UK**

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This data is in accordance with the fact that **Germany** is the largest producer of biogas (311 PJ, or 7.4 Mtoe) in the EU which is 50% of the Europe, followed by **Italy** and **UK**



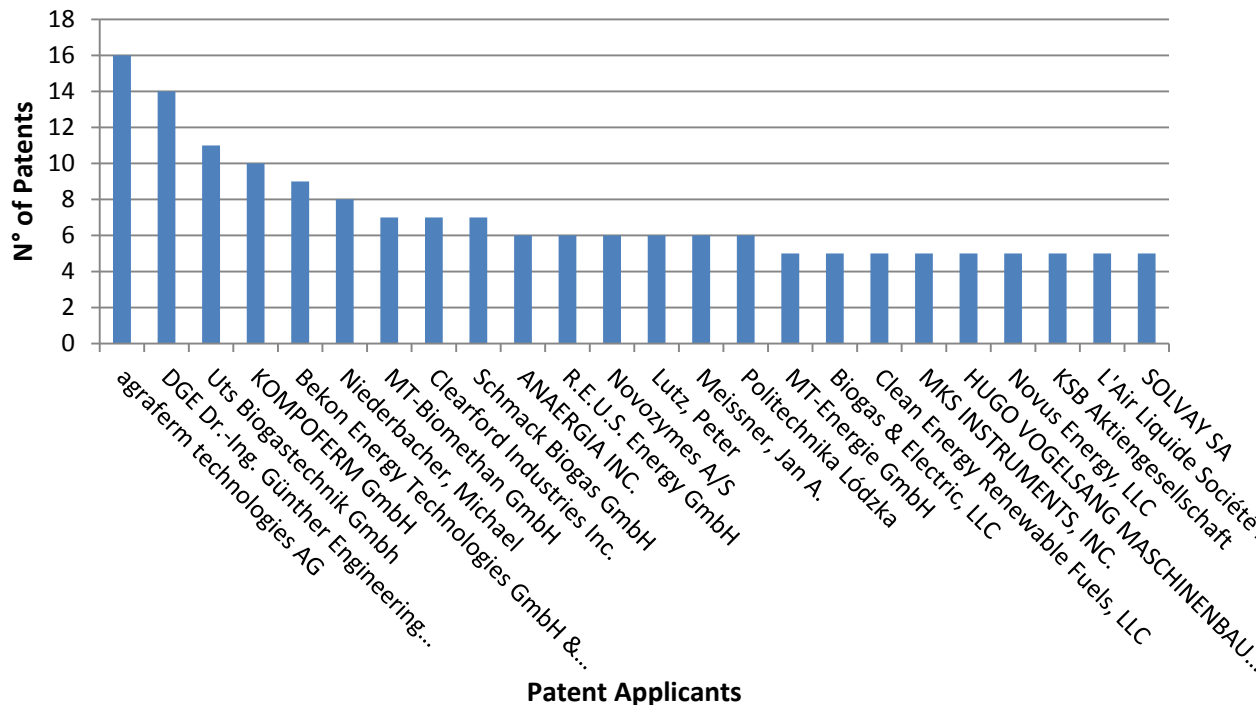
DEMETER: Patent owners and potential investors



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Target market: Biogas



PATENT OWNERS and POTENTIAL INVESTORS are identified by the analysis of the **patents**

From 2010 to date about **700 patents** have been identified in the biogas sector

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This analysis reported the potential **major actors** in the field of **biogas technology innovation**





The benefits of the stakeholder analysis in DEMETER



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- Finding potential **partners** for **business collaborations**

- Identifying potentially **interesting innovations** to integrate in products



- Spotting **innovation trends, incumbent or dis-investing players and competitors**



- Increasing the **exploitation potentials**





Acknowledgements



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