Overview and Categorization of European Biogas Technologies

- Pumps, Pipes, Valves -

Author(s):	Franz Kirchmeyr (AKBOE) & Bernhard Stürmer (AKBOE)
Review:	AEA, EBA, FVB, GIZ and WIP
Date:	15.04.2020
Deliverable N°:	D2.2

DiBiCoo – Digital Global Biogas Cooperation
Grant Agreement N°857804

This project has received funding from the European Union´s Horizon 2020 research and innovation programme under grant agreement N° 857804. The sole responsibility for the content of this document lies with the authors. It does not necessarily reflect the opinion of the EU.

Executive Summary of D2.2

The following document gives an overview of existing European biogas technologies.

The structure following the introduction section about Anaerobic Digestions (AD) follows the biogas processing logic: from feedstock storage on site and necessary pre-treatment to the various digester technologies. Special chapters on important elements of any biogas plant are elaborated in detail (e.g. on measurement, control and regulation technologies).

Upgrading biogas to biomethane quality as well as various application of Biogas are introduced (e.g. its GHG mitigation potential, as Combined Heat & Power (CHP) plants).

Due to the huge amount of existing information and knowledge on this topic it may occur that not everything is included or considered extensively. We propose this deliverable as a solid starting point getting to know about anaerobic digestion. This doesn´t replace special training courses and at least professional planning. In order to incorporate more relevant technologies and Biogas applications, some sections already outlined in this technology overview (e.g. on various pumps, pipes and valve types; or safety equipment) will be presented in an updated version later in October 2020.

The detailed descriptions of certain technologies are not implying any preference to a technology, service provider or device. Similarly, pictures including company names shall not be seen as a preference to any specific company or technology. It is done for visualization purposes only.

This project has received funding from the European Union´s Horizon 2020 research and innovation programme under grant agreement N° 857804. The sole responsibility for the content of this document lies with the authors. It does not necessarily reflect the opinion of the EU.

Summary of the DiBiCoo Project

The **Digital Global Biogas Cooperation (DiBiCoo)** project is part of the EU's Horizon 2020 Societal Challenge 'Secure, clean and efficient energy', under the call 'Market Uptake Support'.

The target importing emerging and developing countries are Argentina, Ethiopia, Ghana, South Africa and Indonesia. Additionally, the project involves partners from Germany, Austria, Belgium and Latvia. The project started in October 2019 with a 33 months-timeline and a budget of 3 Million Euros. It is implemented by the consortium and coordinated by the Deutsche Gesellschaft für Internationale Zusammenarbeit (GIZ) GmbH.

The overall objective of the project is to prepare markets in developing and emerging countries for the import of sustainable biogas/biomethane technologies from Europe. DiBiCoo aims to mutually benefit importing and exporting countries through facilitating dialogue between European biogas industries and biogas stakeholders or developers from emerging and developing markets. The consortium works to advance knowledge transfer and experience sharing to improve local policies that allow increased market uptake by target countries. This will be facilitated through a digital matchmaking platform and classical capacity development mechanisms for improved networking, information sharing, and technical/financial competences. Furthermore, DiBiCoo will identify five demo cases up to investment stages in the 5 importing countries. Thus, the project will help mitigate GHG emissions and increase the share of global renewable energy generation. The project also contributes to the UN Sustainable Development Goals (SDG 7) for 'Affordable and clean energy", among others.

Further information can be found on the DiBiCoo website: www.dibicoo.org.

Contents

List of Abbreviations

D	Deliverable
T	Task
SC	Steering Committee

List of Figures

Es konnten keine Einträge für ein Abbildungsverzeichnis gefunden werden.

List of Tables

Es konnten keine Einträge für ein Abbildungsverzeichnis gefunden werden.

1 Pumps, Pipes, Valves

1.1 Introduction

1.2 Pump types

1.2.1 Rotary pump

1.2.2 Rotary piston pump

1.2.3 Cavity pump

1.2.4 Peristaltic pump

1.3 Pipes

1.3.1 Requirements on temperature, pressure

1.3.2 Typical material for pipes

1.4 Valves

1.4.1 Introduction (manually vs. automatic)

1.4.2 Steel slide valves

1.4.3 Double security

This project has received funding from the European Union´s Horizon 2020 research and innovation programme under grant agreement N° 857804. The sole responsibility for the content of this document lies with the authors. It does not necessarily reflect the opinion of the EU.

References

AT, U. (2014). AUSTRIA'S NATIONAL INVENTORY REPORT 2014. Vienna: Umweltbundesamt, Austrian Environmental Agency.

Biertümpfel A, G. K. (2018). Silphie-growing optimization, seeding technique and breeding. Chrestensen GmbH.

BMWFW. (2017). Technische Grundlage für die Beurteilung von Biogasanlagen. Vienna: Federal Ministry for Commerce, science and research.

Bontempo G., M. M. (2016). Biogas safety first. Freising: Fachverband Biogas.

Burmeister, J. W. (2015). Auswirkung der Düngung mit Biogasgärresten auf die Bodentiere. Munich: Biogas Forum Bayern.

Control, E. (2019). Statistikbroschüre 2018. Vienna: E Control.

Döhler H., e. a. (2013). Faustzahlen Biogas. Darmstadt: KTBL.

Falkenberg H., E. B. (2019). Evaluierung der Kraft-Wärme-Kopplung. Basel: Prognos.

Foged, H. F. (2011). Inventory of manure processing activities in Europe. Brusssel: Directorate General Environment.

Fuchs W., D. B. (2010). Technologiebewertung von Gärrestbehandlungs- und Verwertungskonzepten. Vienna: BOkU.

Fuchs, J. G. (2017). Studie zur Persistenz von Erdmandelgras und Japanknötierich.

Gerardi, H. M. (2003). The microbiology of anaerobic digestion. Hoboken.

Green J., S. S. (2019). Canadian Anaerobic Digestion guideline. Ottawa: Canadian Biogas Association.

H., T. (2003). Neue Optionen für die Nutzung von Biogas. Vienna: TU Vienna.

Harasek M. (2009). Biogas Netzeinspeisung. Vienna: BMVIT.

Hecht , M. (2008). Die Bedeutung des Carbonat Puffersystems für die Stabilität des Gärprozesses v Biogasanlagen. Bonn: Friedrich Wilhelm Universität Bonn.

Henkelmann G., M. K. (2011). Schlüsselparameter zur Kontrolle des Gärprozesses und Motivation, Voraussetzung u Möglichkeiten für die Prozessüberwachung. Freising: LfL Bayern.

Herrmann C., J. C. (2020). Optimierung der Methanausbeute in landwirtschaftlichen Biogasanlagen. Potsdam: ATB.

Hilpert R., W. J. (1983). Fütterungszusätze und Desinfektionsmittel als Störfaktoren der anaeroben Vergärung. Munich: Oldenbourg Verlag.

Hülsbergen, K. (2016). Humusaufbau von Böden durch die Anwendung von flüssigen Gärprodukten. Munich: TUM: Technical University of Munich.

Kaiser F., M. T. (2010). Sicherung der Prozessstabilität in Biogasanlagen. Freising: LfL Bayern.

Kirchmeyr F., M. S. (2016). Assessment of GHG reduction potentials due to the use of animal excrements and organic waste streams as biogas substrate and the replacement of industrial chemical fertiliser through digestate. Vienna: BIOSURF.

Kliche R., L. (2017). Schaum in Biogasanlagen. München: ALB Bayern.

Lukehurst C T., F. P. (2010). Utilisation of digestate from biogas plants as biofertiliser. IEA.

This project has received funding from the European Union´s Horizon 2020 research and innovation programme under grant agreement N° 857804. The sole responsibility for the content of this document lies with the authors. It does not necessarily reflect the opinion of the EU.

Nielsen K., H. M. (2018). Entwicklung der Bodenfruchtbarkeit beim Einsatz von Gärprodukten aus Biogasanlagen. Berlin: IASP, FNR.

Paterson M., K. W. (2012). Guide to Biogas . Gülzow: FNR.

Petz, W. (2000). Auswirkung von Biogasgülledüngung auf Bodenfauna und einige Bodeneigenschaften. Linz: Amt der OÖ Landesregierung, state government of Upper Austria.

Pfundtner, E. S. (2010). Untersuchungen zur Verbreitungsgefahr von samenübertragbaren Krankheiten, Unkräutern und austriebsfähigen Pflanzenteilen mit Fermentationsendprodukten aus Biogasanlagen. Vienna: AGES.

Reinhold, G. Z. (2008). Eigenschaften und Humuswirkung von Biogasgülle. Jena: Thüringer Landesanstalt für Landwirtschaft - TLL.

Reuland G., D. M. (2020). EBA 2020 - European Biogas Association Statistical REport: 2019 European Overview. Brussels: EBA.

Schulz H., E. B. (2006). Biogas Praxis. Staufen.

Stürmer B., P. E. (2020). Legal requirements for digestate as fertilizer in Austria and the European Union compared to actual technical parameters. Journal of Environmental Management.

Stürmer, B. K. (2019). Biogas 2019. Vienna: Federal Ministry of sustainability and tourism.

Szerencsits, M. (2014). Synergetische Biogaserzeugung aus Zwischenfrüchten und nachhaltigen Fruchtfolgesystemen. Vienna: Klima u Energiefonds.

Wilken D., R. S. (2018). Digestate as Fertilizer. Freising: Fachverband Biogas.

Wilken D., S. F. (2017). Biogas to Biomethane. Freising: Fachverband Biogas.

Zeller, V. H. (2012). Basisinformationen für eine nachhaltige Nutzung von landwirtschaftlichen Reststoffen zur Bioenergiebereitstellung. Leipzig: DBFZ.

The DiBiCoo Consortium

COORDINATOR

giz Deutsche Gesellschaft für Internationale Zusammenarbeit (GIZ) GmbH

PARTNERS FROM EXPORTING COUNTRIES

WIP RENEWABLE ENERGIES

AUSTRIAN ENERGY AGENCY

EBA European Biogas Association

kompost & biogas verband

Fachverband BIOGAS

Latvia University of Life Sciences and Technologies

PARTNERS FROM IMPORTING COUNTRIES

INTA

SELECTRA WASTE • WATER • BIOENERGY

iceaddis innovation . collaboration . entrepreneurship

GreenCape

rdi Resilience Development Initiative

SEES INSTITUTE FOR SUSTAINABLE ENERGY AND ENVIRONMENTAL SOLUTIONS

Digital global Biogas Cooperation

Project website: www.dibicoo.org

Project Coordinator Contact	
Dr. Johannes Anhorn Deutsche Gesellschaft für Internationale Zusammenarbeit (GIZ) GmbH	Wielinger Straße 52 82340 Feldafing, Germany
www.giz.de	johannes.anhorn@giz.de

Author(s)
Franz Kirchmeyr & Bernhard Stürmer, Austrian Compost & Biogas Association, Vienna, Austria

Review
Frank Hofmann (FVB), Michael Rohrer (AEA), Mieke Dekorte (EBA), Angela Sainz (EBA), Ann-Kathrin van Laere (GIZ), Dr. Johannes Anhorn (GIZ), Dominik Rutz (WIP), Felix Colmorgen (WIP)

Photo credits:
Franz Kirchmeyr (AKBOE) if not otherwise stated.

Vienna, 2020

This project has received funding from the European Union´s Horizon 2020 research and innovation programme under grant agreement N° 857804.
The sole responsibility for the content of this document lies with the authors. It does not necessarily reflect the opinion of the EU.