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S.R. CWA 17484:2020

Anaerobic digestion plants - Feasibility assessment methodology for integrating a Volatile Fatty Acid Platform Technology

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CEN WORKSHOP AGREEMENT

CWA 17484

September 2020

ICS 13.020.55; 03.100.99; 27.190

English version

Anaerobic digestion plants - Feasibility assessment methodology for integrating a Volatile Fatty Acid Platform Technology

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Contents

Page

European foreword ... 3
Introduction ... 4
1 Scope ... 5
2 Normative references ... 5
3 Terms and definitions ... 5
4 Symbols and abbreviations ... 6
5 Intention and drivers for establishing a Volatile Fatty Acid Platform (VFAP) technology ... 8
6 Identification and description of framework to be considered ... 9
6.1 Non-Technical aspects ... 9
6.1.1 Arguments in favour of a VFA platform ... 9
6.1.2 Multi-criteria decision-making tool based on non-technical criteria ... 11
6.1.3 Political and regulatory context ... 15
6.2 Multi-criteria decision-making guide based on technical criteria ... 18
6.2.1 General ... 18
6.2.2 Raw materials ... 18
6.2.3 Impact of and on current anaerobic digestion plant ... 25
6.2.4 Available VFA conversion technology ... 27
6.2.5 Application of produced VFA ... 28
7 Assessment Methodology ... 31
7.1 General ... 31
7.2 SWOT Analysis ... 31
7.3 Life Cycle Assessment ... 34
7.4 Cost Analyses/ Economic Feasibility Study ... 36
7.4.1 Definition of Cost Components ... 36
7.4.2 Methodology and financial equations ... 39
7.4.3 Economic Feasibility Assessment & Interpretation ... 40
7.5 Process – Modelling ... 40
7.5.1 Gather data on biowaste type & availability vs distance to treatment location ... 40
7.5.2 Scope and identify the alternative options for biowaste treatment ... 41
7.5.3 Emissions inventory & Gather and validate cost data ... 41
8 Summary ... 42
Annex A (informative) Fact sheet of the VOLATILE project ... 43
Bibliography ... 45

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European foreword

CWA 17484:2020 was developed in accordance with CEN-CENELEC Guide 29 "CEN/CENELEC Workshop Agreements – The way to rapid agreement" and with the relevant provisions of CEN/CENELEC Internal Regulations - Part 2. It was agreed on 2020-05-25 in a Workshop by representatives of interested parties, approved and supported by CEN national member DIN Deutsches Institut für Normung e. V. following a public call for participation made on 2018-06-13. It does not necessarily reflect the views of all stakeholders that might have an interest in its subject matter.

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Introduction

In the light of the climate targets to be achieved, major efforts have been made in recent years in Europe to promote the production of renewable energies[1,2]. In this context, the construction and operation of biogas plants - in particular for energy and heat generation - have received substantial support. Today, around 17,000 biogas plants are in operation in Europe[3].

Although the installation and operation of biogas plants has received such great support over many years, plant operators today are confronted with a number of challenges, some of which represent an extensive threat[4,5]:

1) It is expected that the prices for fossil raw materials and energy sources will remain at a low level within the coming years.

2) There are very large market fluctuations in the renewable energy sector, which can be seen as a major problem in the economic operation of biogas plants.

3) Subsidies for renewable energies have been reduced or phased out in the recent past. However, many biogas plants, especially smaller ones, are currently not economically viable without financial support.

4) In the context of energy and non-energy services, there is often high administrative bureaucracy, which in turn prevents urgently needed investments in biogas plants.

5) Existing uncertainties regarding continuity and legal certainty also prevent larger, long-term investments.

6) Very often there are uncertainties in the evaluation of (new) technologies and products, also from the perspective of immature markets. These ambiguities are usually an additional obstacle to investment.

7) Biogas plant managers encounter difficulties in achieving a stable and affordable supply of biomass to be used as feedstock[6]

Due to the above mentioned persistently low market price for fossil fuels, changing (subsidy) policy requirements and changes in legislation, many biogas plant operators are urgently looking for new value chains (like material use) in order to be able to operate continuously in an economically viable way. At the same time, legal changes associated with ecological grievances and growing ecological awareness are creating new markets for sustainably manufactured products.

Technologies for coupled energetic and material use of biogenic residues and waste materials and the integration of these technologies into already existing biogas plants are increasingly being perceived as

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[1] https://ec.europa.eu/commission/energy-union-and-climate/state-energy-union_en

[2] http://unfccc.int/paris_agreement/items/9485.php

[3] http://european-biogas.eu/biogas/

[4] http://european-biogas.eu/2017/12/14/eba-statistical-report-2017-published-soon/

[5] http://european-biogas.eu/wp-content/uploads/2015/01/EBA-Biogas-Report-2014.pdf

[6] Poeschl M, Ward S, Owende P (2010) Prospects for expanded utilization of biogas in Germany. Renew Sustain Energy Rev 14: 1782–1797. doi:10.1016/j.rser.2010.04.010

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a possible alternative application (VOLATILE[7], Optigär[8], URBIOFIN[9]). Recently, a BREF document for waste treatment[10] has been published which describes within the section of anaerobic digestion the conversion of organic waste to carboxylates, carboxylic acids or polymers by fermentation with mixed cultures. Although promising approaches have been developed in this field recently, legal uncertainties and ignorance of existing technologies and their potentials amongst others, prevent urgently needed investments in this area.

Integrating a Volatile Fatty Acid Platform in an existing anaerobic digestion plant allows a company to move its practices in the preferred direction of the responsible waste management hierarchy. Rather than recovering the energy of organic waste in the form of biogas, the organic waste can be recycled into new materials. A move towards recycling and reuse of waste is in line with the European Commission's Circular Economy Action Plan, which wants to ensure less waste and that resources are kept in the economy for as long as possible. Nevertheless, this is a rather new technology and governmental incentives have yet to shift in favourable direction for materials created out of waste.

This high complexity requires uniform, simple guidelines to assess the ecological and economic sense of an upgrading of existing biogas plants for coupled energetic and material use. Therefore, the aim of EvaVOLATILE is to develop a guidance document that allows an evaluation of the integration of a Volatile Fatty Acid Platform (VFAP) technology into existing biogas systems with only a little financial and time expenditures. The innovative VFAP technology could be used for the bioconversion of municipal solid biowaste fractions and sludgy biowaste from other industries into volatile fatty acids. The acids could be recovered continuously applying i.e. membrane technologies and used as feedstock / carbon source for value added fermentation targets like PHA, single cell oil and omega-3 fatty acids.

1 Scope

This CWA provides guidance for biogas plant operators, investors, and municipalities on how to assess whether the changeover of a given biogas plant to a coupled energetic and material use is ecologically and economically reasonable under certain conditions. For this purpose, the CWA uses a simple evaluation methodology.

2 Normative references

There are no normative references in this document.

3 Terms and definitions

For the purposes of this document, the following terms and definitions apply.

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[7] http://volatile-h2020.eu/

[8] https://fnr.de?id=11150&fkz=22410212;

https://fnr.de?id=11150&fkz=22400515;

https://fnr.de?id=11150&fkz=22400615

[9] https://cordis.europa.eu/project/id/745785/

[10] Pinasseau, A., Zerger, B., Roth, J., Canova, M., Roudier, S. (2018). Best Available Techniques (BAT) Reference Document for Waste treatment Industrial Emissions Directive 2010/75/EU (Integrated Pollution Prevention and Control); EUR 29362 EN; Publications Office of the European Union, Luxembourg, 2018; ISBN 978-92-79-94038-5, doi:10.2760/407967, JRC113018

https://eippcb.jrc.ec.europa.eu/reference/wt.html

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