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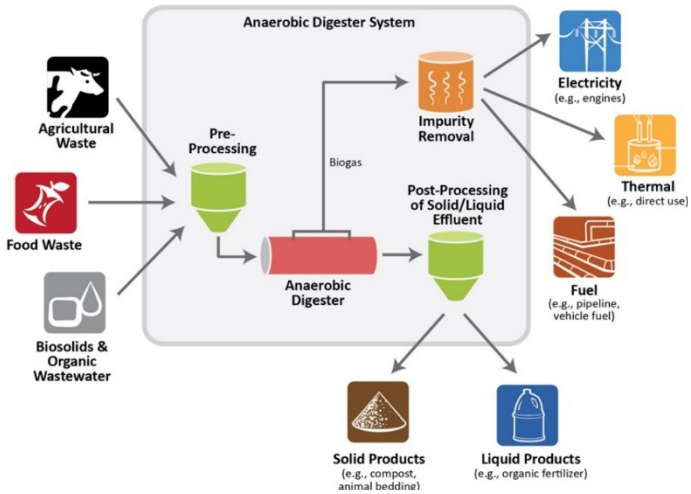
ADOPTION OF AGRO-INDUSTRIAL TECHNOLOGIES



CORRESPONDING MODULE 6

Introduction

The installations for efficient production of green energy through biological or thermal decomposition of biomass make it possible to cover the energy needs of own production facilities by simultaneous production of electricity, heat, cold or steam.

These systems allow the utilization of organic refuse from production facilities – waste biomass, and the adherence to the current emission standards for pollution, while at the same time making the customer energy independent thanks to the production of energy from its own waste.

ADOPTION OF AGRO-INDUSTRIAL TECHNOLOGIES (SUCH AS GASIFICATION OR ANAEROBIC DIGESTION)

CORRESPONDING MODULE 6

Description

Balkanika Energy Plc. is a company established with the aim of complete realization of investment projects in the production and utilization of energy from renewable, conventional, and alternative energy sources, and protection of the environment through sustainable systems for waste recovery. An important part of their activities is also connected with the implementation of projects for increasing the energy efficiency of industrial enterprises, buildings, and communities.

Biomass suitable for processing by wet anaerobic digestion can be all types of farm manure from cows, pigs, poultry, sheep, etc.; waste feed, scrapped grain, flour and bran, slaughterhouse waste, whey, vegetable waste, food waste, etc. After the process of anaerobic (oxygen-free) decomposition of biomass, the residual material – a thick liquid containing nitrogen, phosphorus and potassium compounds (NPK), can be used directly as a soil fertilizer or be separated to dry and liquid fertilizer for easier storage and usage.

Biomass suitable for processing by dry anaerobic digestion can be organic, pre-separated part of the municipal solid

ADOPTION OF AGRO-INDUSTRIAL TECHNOLOGIES (SUCH AS GASIFICATION OR ANAEROBIC DIGESTION)

CORRESPONDING MODULE 6

waste (MSW), fresh stems of plants – grass, cornstalk, etc. After the process of anaerobic (oxygen-free) decomposition of biomass, the residual material – a dry mass containing nitrogen, phosphorus and potassium compounds (NPK), fiber and fine aggregates can be used for landscaping and re-cultivation. The construction of biogas plants is simplified – cubic concrete cells with airtight doors, without moving parts and sophisticated equipment.

Multiple organic materials can be combined in one digester, a practice called co-digestion. Co-digested materials include manure; food waste (i.e., processing, distribution and consumer generated materials); energy crops; crop residues; and fats, oils, and greases (FOG) from restaurant grease traps, and many other sources. Co-digestion can increase biogas production from low-yielding or difficult-to-digest organic waste.

ADOPTION OF AGRO-INDUSTRIAL TECHNOLOGIES (SUCH AS GASIFICATION OR ANAEROBIC DIGESTION)

CORRESPONDING MODULE 6

Advantages and challenges

The main advantages of the anaerobic digestion gasification plants are:

- 60%-80% energy saving than natural gas and liquefied gas
- CO emissions lower than national environmental protection standards
- Ash content lower than 1-1,5%
- Flue gas emissions lower than 50 mg/M
- Low-temperature anaerobic cracking
- Stable gas production
- Due to the high performance and reliability, the biogas plants have the shortest time of return of investment

The projects are based on the long-standing German experience and knowledge – more than 400 dry fermentation biogas plants built and operating in many European cities during the last 25 years.

The technologies and equipment used are of the highest quality and reliability, thanks to which a performance guarantee of 8 years can be offered.

The biogas plants are equipped with the most modern

Project Number:
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ADOPTION OF AGRO-INDUSTRIAL TECHNOLOGIES (SUCH AS GASIFICATION OR ANAEROBIC DIGESTION)

CORRESPONDING MODULE 6

systems for remote monitoring and management, due to which their work is fully automated and controlled by German specialists, with guaranteed maximum performance and trouble-free operation.

By using the best German expertise and technology, up to 20% higher yield of biogas (biomethane) is guaranteed, and respectively – larger amount of energy produced from each ton of inputs.

The biogas is purified and injected in the grid or burned in a combined heat and power generator (CHP).

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ADOPTION OF AGRO-INDUSTRIAL TECHNOLOGIES (SUCH AS GASIFICATION OR ANAEROBIC DIGESTION)

CORRESPONDING MODULE 6

Successfully implemented projects

References:

1. http://www.balkanikaenergy.eu/en/
2. https://www.haiqiwastetopower.com/news/haiqi-biomass-gasifier/biomass-gasification-chp-systems-bulgaria
3. https://link.springer.com/article/10.1007/s12649-019-00914-4
4. https://www.globalmethane.org/documents/gmi%20benefits%20report.pdf
5. https://www.epa.gov/agstar/how-does-anaerobic-digestion-work
6. https://www.epa.gov/agstar/how-does-anaerobic-digestion-

Project Number:
2021-1-FR01-KA220-VET-00034605

ADOPTION OF AGRO-INDUSTRIAL TECHNOLOGIES (SUCH AS GASIFICATION OR ANAEROBIC DIGESTION)

CORRESPONDING MODULE 6

Project Hisar – feasibility study, technical design, detailed design, and preparation of a business plan and operational strategy for the project “Construction and commissioning of a power plant for energy production up to 1500 kW with commercial purposes through chemical-biological gasification of biomass in Chernichevo village, Hisar municipality”.

work#:~:text=Anaerobic%20digestion%20is%20a%20process,in%20the%20absence%20of%20oxygen.

ADOPTION OF AGRO-INDUSTRIAL TECHNOLOGIES (SUCH AS GASIFICATION OR ANAEROBIC DIGESTION)

CORRESPONDING MODULE 6

Project Elvi, Velkovtsi Village, is related to the engineering, procurement, construction, and commissioning of a biogas plant COCCUS Titan 500 kW. The customer will utilize its own waste: cow manure, whey, corn silage, fodder and straw residues. The biogas produced – 2 176 447 cubic meters per year – will be used for cogeneration of 499 kW per hour electricity and 507 kW per hour heat – hot water of 90˚C for the technological needs of the dairy production and some of the biogas will be used directly to produce steam for the milk sterilization thus replacing the conventional fuel used. The final residual material of the organic waste processing – liquid fertilizer – will be used to fertilize the customer's own corn crops for silage.

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ADOPTION OF AGRO-INDUSTRIAL TECHNOLOGIES (SUCH AS GASIFICATION OR ANAEROBIC DIGESTION)

CORRESPONDING MODULE 6

Project Number:
2021-1-FR01-KA220-VET-00034605

ANNEX - STRUCTURE OF MODULE CONTENT TO PREPARE SLIDES

Module Name: The name of the partner: Country:

The name of the module	
Target group involved	
Current information about the topic	
Principles of the specific module	
Basic terms/measures of the module/topic	
Training materials (tasks, case studies, exercises)	
Short description of the materials	
Link of the online resources (film or video resources)	
Specific images (to support the purpose of the resources)	
Duration	
Materials	
No of Learners/Representatives	
Individual or group work	
Step by step guide	