

IEA Bioenergy Task 37

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THE ROLE OF ANAEROBIC DIGESTION AND BIOGAS IN THE CIRCULAR ECONOMY





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The role of Anaerobic Digestion and Biogas in the Circular Economy

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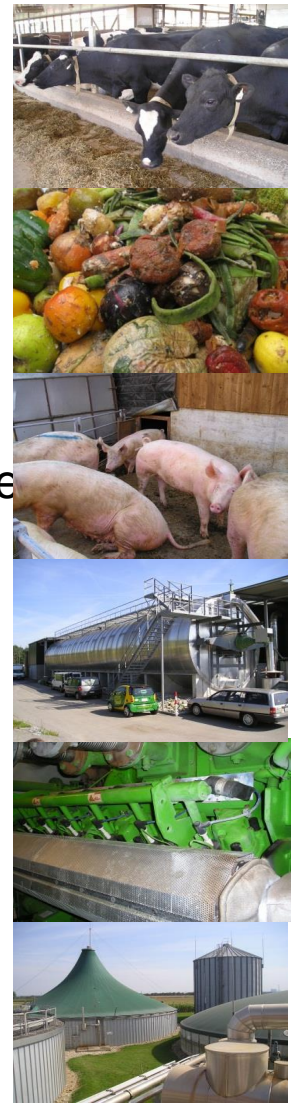
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Aim

To highlight the diversity of benefits from anaerobic digestion and biogas systems.

- The multifunctionality is its clearest strength.
- Sustainable biogas systems include processes for:
 - treatment of waste,
 - protection of the environment,
 - conversion of low-value material to higher-value material,
 - the production of electricity, heat and of advanced gaseous biofuel.
- Biogas and anaerobic digestion systems are dispatchable and as such can facilitate intermittent renewable electricity.
- The target group for the report:
 - Biogas stakeholders in general,
 - Decision makers,
 - Biogas business actors.

Scope

Create a narrative of how AD and biogas fit into the concept of the circular economy.

- The biogas plant and its basic functions are described, as are the concept of biorefineries and how they interlink to biogas production.
- The multiple functions of BG in CE are discussed under the following headings:
 - Biogas as an energy carrier;
 - Reduction of GHG emissions;
 - Energy security;
 - Biogas as raw material – further use of carbon dioxide and methane;
 - Biogas from AD as a scavenger for organic waste streams;
 - Biogas treatment for better water quality;
 - Awareness tool on circular thinking;
 - Biogas in agriculture;
 - Balancing income for rural areas;
 - Challenges in using waste as raw-material.
- The intimate relation between AD and CE is exemplified through four case-studies.
 - To show how simple it can be to take a significant step towards circular economy concepts with the aid of biogas and anaerobic digestion.

Linear economy

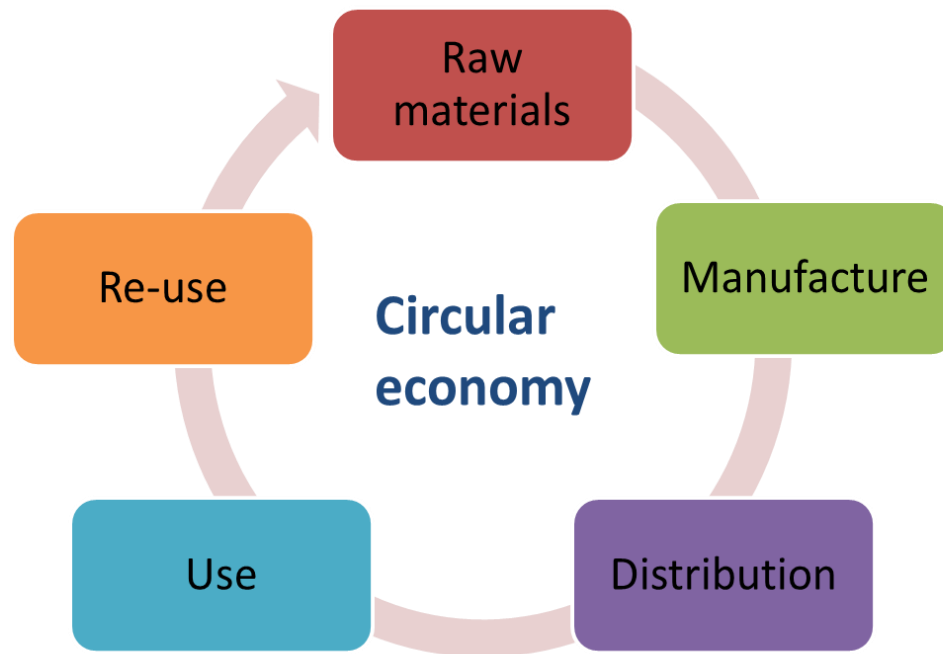


Figure 1. Differences between the linear and the circular economy.

The biogas plant – the hub in the bio-economy

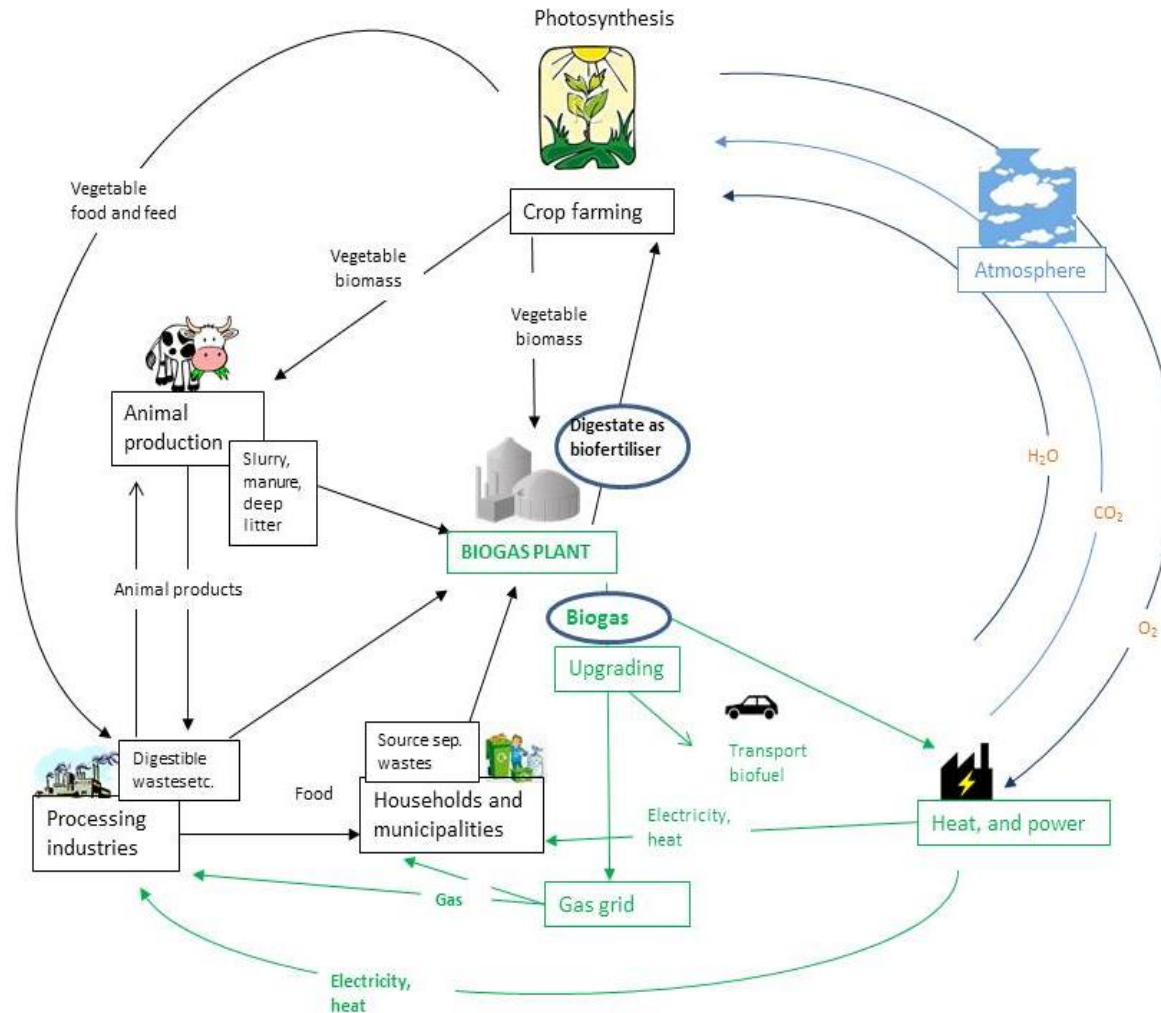


Figure 2. An example of how a modern co-digestion biogas plant fits into the circular economy (Source: Al Seadi et al, 2018)

The multiple functions of biogas in circular economy and its challenges

The report contains discussions in the areas of:

- Biogas as an energy carrier
 - Biogas - a part of the modern society's energy supply system
 - Biogas used for heat and electricity production
 - Upgraded biogas (biomethane) used as vehicle fuel
 - Upgraded biogas (biomethane) injection into the gas grid
- Reduction of GHG emissions
 - Improved nutrient up-take efficiency in agriculture
- Energy security
- Biogas as raw material – further use of carbon dioxide and methane
- Biogas from AD as a scavenger for organic waste streams
 - Biogas from food waste
- Biogas treatment for better water quality
- Awareness tool on circular thinking
- Biogas in agriculture
 - Centralised manure co-digestion is circular economy in practice
 - Using digestate as fertilizer
 - AD of animal slurries improves air quality
- Balancing income for rural areas
- Challenges in using waste as raw-material

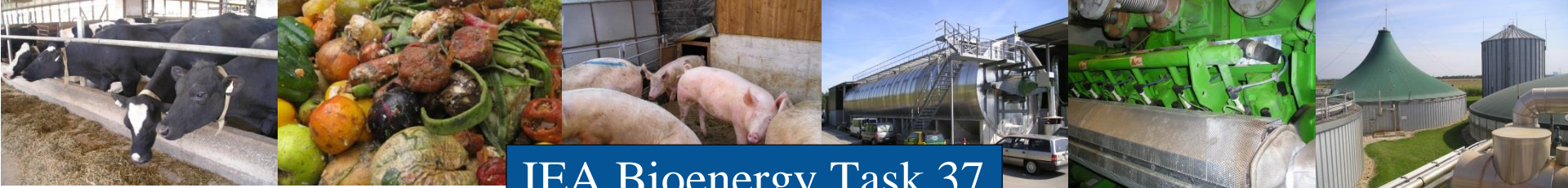
The report is available at: <http://task37.ieabioenergy.com/>



Conclusions from the report

- Circular economy is still in the early stages.
- Production from bio-based resources will grow.
- Wastes will be transformed to high-value products.
- Biogas facilities has a vital role.
- Sustainability and potential for financial gain.





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Thank you!



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