



GREEN DEAL PROJECTS SUCCESS STORIES



CLEAN ENERGY WORKING GROUP

HIGH EFFICIENCY CONVERSION OF BIOMASS WASTE TO ENERGY

May 2024



Bio-FlexGen project

BioFlexGen is revolutionising biomass energy conversion, focusing on efficient and adaptable CHP technology to transform biomass residues into electricity, heat, hydrogen, and CO₂.

This process is supported by additional digital tools to further enhance its performance and improve its flexibility.

#EUGreenDeal



ABOUT THE BIO-FLEXGEN PROJECT

The Bio-FlexGen project is driving a transformative approach in the renewable energy sector, deploying an advanced Combined Heat and Power (CHP) technology powered by digital tools to convert biomass residues (waste) into multiple energy outputs. This systemic solution is being developed and tested across various European regions, with a network of partners committed to advancing sustainable energy solutions.

The project's core innovation includes a digital platform for optimising real-time energy production, thereby enabling renewable energy systems to be more efficient and adaptable. It aims to accelerate our transition to a sustainable energy economy by:

- transforming low-cost unwanted biomass residues into renewable energy with a high efficiency of 55% and 25MWe capacity;
- introducing a flexible CHP technology that adapts to produce electricity, heat, hydrogen, and CO₂;
- improving the flexibility of the energy system through the use of on-demand digital optimisation tools;
- providing a way for renewable CHP solutions to be more scalable and economically viable.



DESCRIPTION OF SUCCESS

The Bio-FlexGen project marks a significant milestone: the successful development and implementation of a new Hybrid Fluidised Bed gasifier technology. This achievement is a breakthrough in biomass energy conversion, enabling syngas to be produced very efficiently from biomass residues.

The project has overcome challenges such as integrating many different types of biomass feedstock and optimising gasification under a variety of pressures, demonstrating the potential for scalable, flexible renewable energy systems. This success paves the way for broader adoption and further innovation in sustainable energy technologies.



HIGHLIGHTS

- The introduction of the Hybrid Fluidised Bed gasifier combines the benefits of two existing fluidised bed technologies, enhancing the efficiency of biomass converted to syngas.
- The use of advanced digital tools for real-time optimisation of the energy production process ensures maximum efficiency and adaptability.
- The digitalisation enables the gasifier to produce four different products (electricity, heat, hydrogen and/or CO₂) for the broader energy system or industrial applications.
- Converting biomass residues into valuable energy significantly contributes to reducing our reliance on fossil fuels and advancing the transition to a sustainable energy economy.



IMPACT

The Bio-FlexGen project revolutionises the renewable energy landscape, transforming biomass into valuable energy resources with unprecedented efficiency. Its impact extends beyond energy production, developing a sustainable ecosystem by using biomass residues, thus promoting environmental conservation and reducing carbon footprints. The project's innovative approach and technological advancements set new benchmarks for renewable energy solutions, contributing to the global effort towards a more sustainable and energy-secure future.

Read more about this success story online

[High efficiency conversion of biomass waste to energy](#)

Visit the project website

[Bio-FlexGen](#)



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