

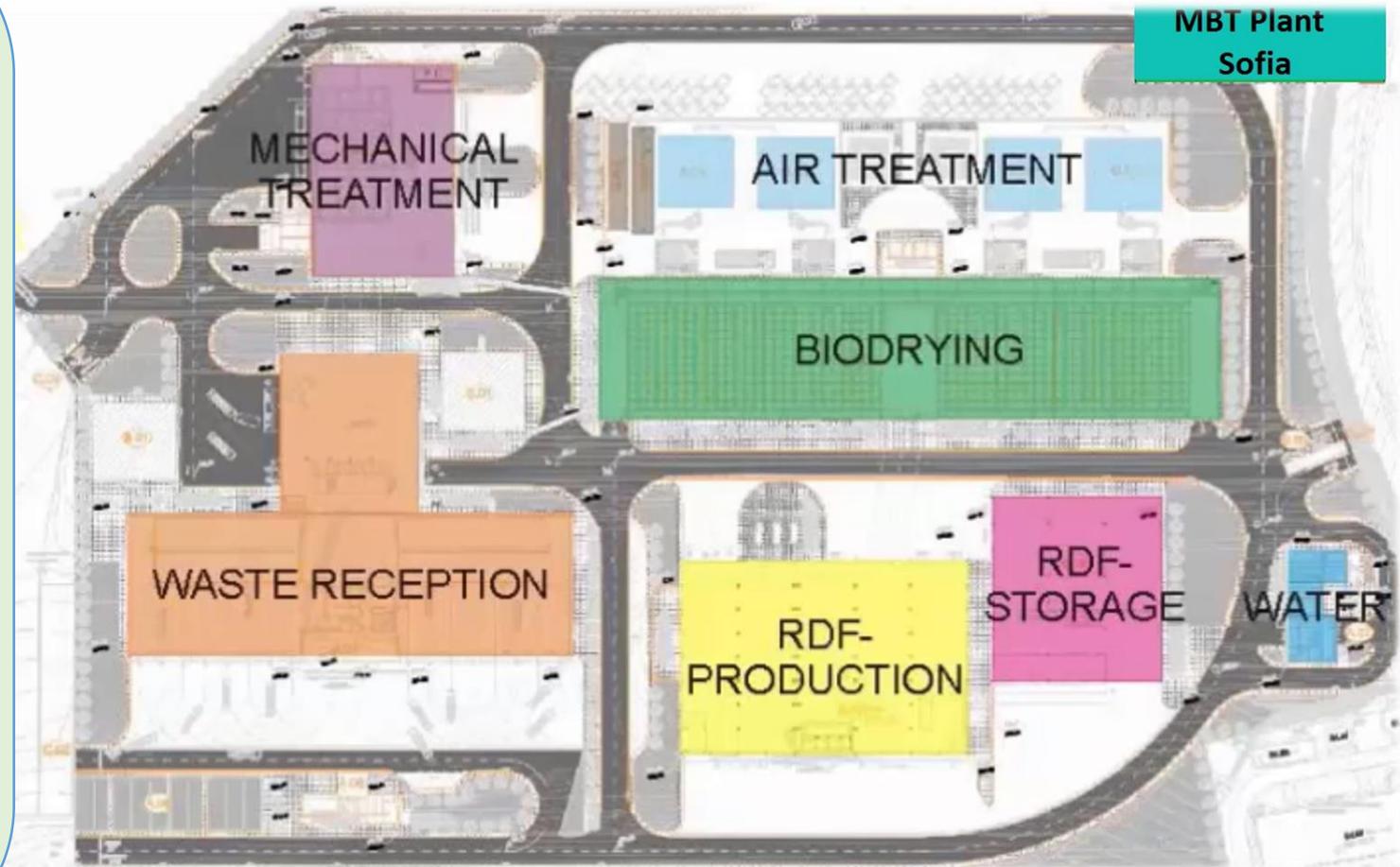


BIODRYING OF MUNICIPAL SOLID WASTE - SUSTAINABLE TECHNOLOGY FOR TREATMENT AND WASTE MANAGEMENT

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Biodrying is a new method of biomass waste treatment, which is developed in recent years as an effort to solve problems of waste management. Biodrying is a pre-treatment technology that uses natural and forced aeration along with the heat generated by natural aerobic biotransformation of organic matter to reduce the water content of the waste. The technology has attracted extensive attention and undergone rapid development, especially for its potential to reduce the amount of waste for landfilling and to provide a substitute for the conventional fossil fuels – refuse derived fuel (RDF). It is considered, that because of the presence of biogenic fraction in RDF, greenhouse emissions of the burned fuel are partially carbon neutral, which can reduce the global CO₂ emissions. The technology of biodrying is used in the Mechanical and biological treatment plant (MBT) in Sofia, which is one of the biggest in Europe.



PROCESS OF BIODRYING – ANALYSES OF CRITICAL FACTORS

In biodrying, the main drying mechanism is convective evaporation, using heat from the *aerobic biodegradation* of biomass in municipal solid waste components and facilitated by the mechanically supported airflow.

Critical operational matrix-related parameters

- Initial moisture content
- Substrate composition
- Pressure resistance to airflow

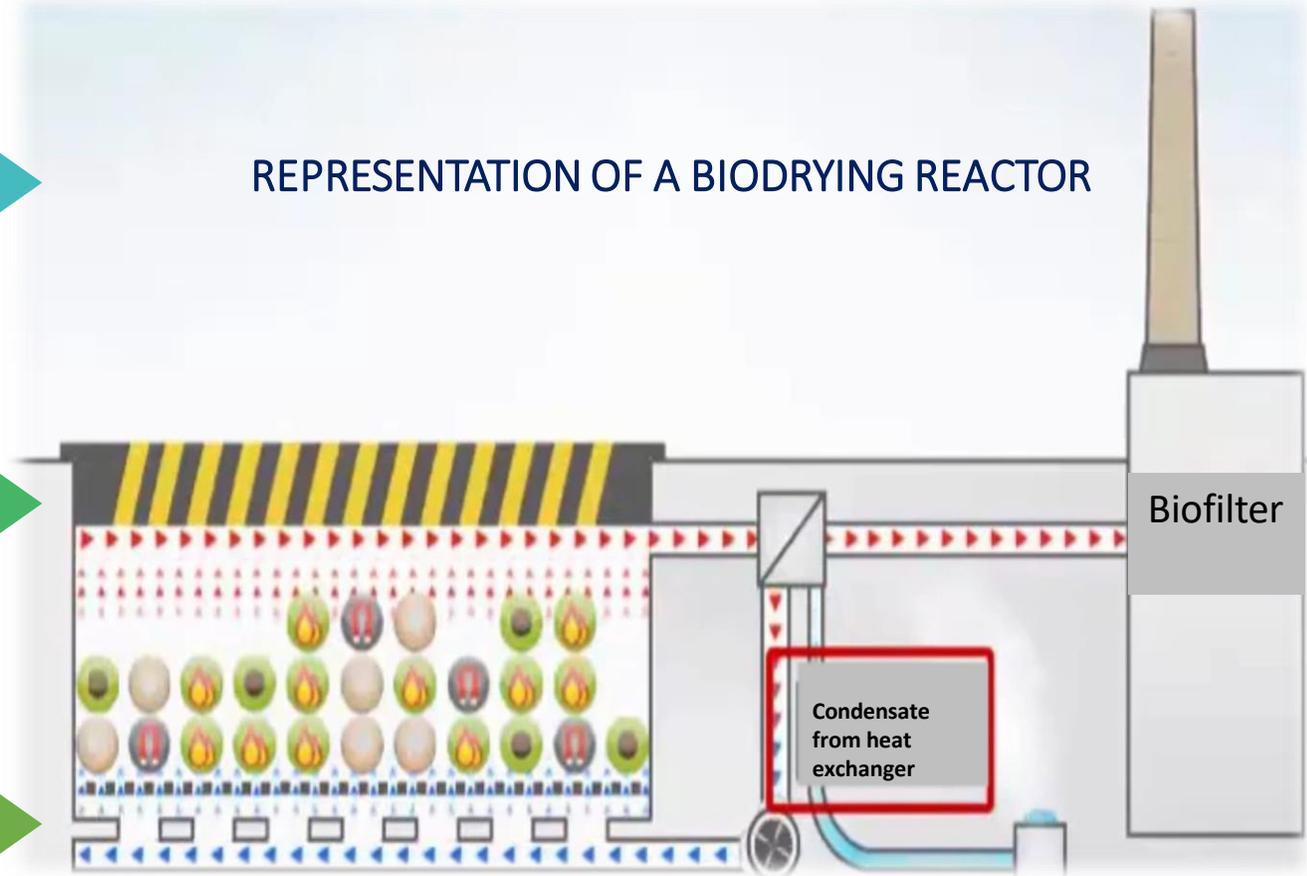
Critical operational air-related parameters

- Airflow rate
- Parameters referring to the thermodynamic and physical relationship between air and water vapor

Critical operational bio-related parameters

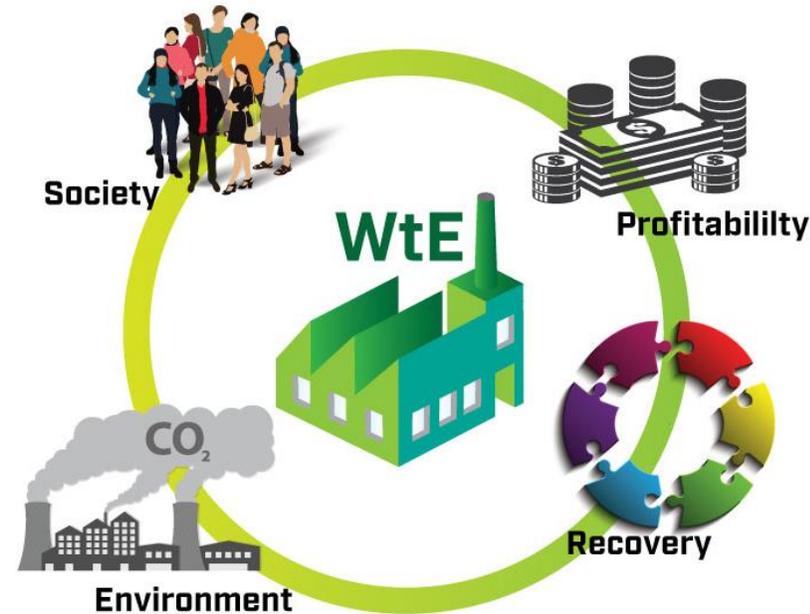
- Carbon-nitrogen ratio
- Structure and stability of microbial community

REPRESENTATION OF A BIODRYING REACTOR



WHY THE BIODRYING IS A SUSTAINABLE TECHNOLOGY?

Municipal solid waste with high moisture content is the major hindrance in the field of waste to energy conversion technologies and here comes the importance of biodrying process. Biodrying is a convective evaporation process, which utilizes the biological heat developed from the aerobic reactions of organic components. The numerous end use possibilities of the output are making the biodrying process versatile, which is possible by achieving the required moisture reduction, volume reduction and bulk density enhancement through the effective utilization of biological heat.



This is attractive for MBT plants established to produce solid recovered fuel (SRF) as their main output, because removing the excessive moisture of the input waste facilitates mechanical processing and improves its potential for thermal recovery. A major benefit of SRF production in MBT with biodrying is the opportunity to incorporate the biogenic content of the input waste, a carbon dioxide (CO₂)-neutral, alternative energy source, into a fuel product. This produces an SRF low in CO₂ specific emission loading, mitigating the waste management contribution to climate change. As result, there is high interest in biodrying MBT plants: 20 commercial references are currently operational in Europe, with overall capacity of ca. 2,000,000 t/a.



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This work was supported by Project BG05M2OP001-1.002-0019: 'Clean Technologies for Sustainable Environment - Waters, Waste, Energy for a Circular Economy', financed by Operational Program 'Science and education for smart growth', co-financed by the European Union through the European structural and investment funds.