Biochar production and heat generation through slow pyrolysis

The Carbofex de-carbonizer is a continuously operating intermediate pyrolysis unit. The technology is based on an indirectly heated (allothermal) screw reactor. The pyrolysis unit converts biomass into biochar, pyrolysis oil and pyrolysis gas. The carbon recovery is over 50%. The gases are used to energize the pyrolysis reactor. The gas can also be utilized in other applications such as in biomass dryers and in hot water boilers. The facility produces more energy than it consumes. The excess renewable energy can be used e.g., in cooling and desalination.

The continuous pyrolysis unit utilizes biomass efficiently. Temperature and residence time can be accurately adjusted so the resulting biochar is of uniform quality. The unique and controlled pyrolysis technique allows the usage of variety of raw materials as a feedstock.

The produced biochar can be used in multiple applications such as in soil improvement and to filtrate harmful chemicals. The Carbofex biochar is pure and of high quality. The biochar fulfils all limit values designated to biochar and is approved for organic food production. The feedstock is of PEFC certified source. Carbofex is the biggest EBC certified biochar producer in Europe.

The de-carbonizer enables to produce high quality biochar with low PAH levels. In addition, flue gas emissions are very low, and a considerable amount of CO_2 is bound into biochar. This removed CO_2 equivalent can be traded internationally through compensation services.

The Carbofex demo plant is located in Hiedanranta, Tampere and it has been in operation since 2017. This specific unit carbonizes up to 500 kg of wood chips per hour, turning it into 140 kg of biochar. The plant can produce 700 tons of biochar and 600 tons of pyrolysis oil per year.

Photo: Carbofex Ltd.

KEY WORDS

Biochar, bioenergy, biomass, slow pyrolysis

COUNTRY

Finland

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ADDITIONAL INFORMATION

The demo plant uses wood chips from small diameter stem wood as a feedstock, but the feedstock could also include other biomass such as olive pits, olive cake, pecans, walnuts, hazels, pistachios, straw, hulls, waste wood, date pits, palm kernels and coconut shells. Wood is bought from private forest owners, through a local forest management association. Wood is chipped and dried at Hiedanranta premises.

A 1 MW district heating plant is operated in the Hiedanranta region as part of a district heating network. Excess heat, not needed for drying biomass or the pyrolysis process, is thus sold to the local district heating company.

Carbofex is also a technology provider. A fully operating facility can be purchased at 1.25 M€.

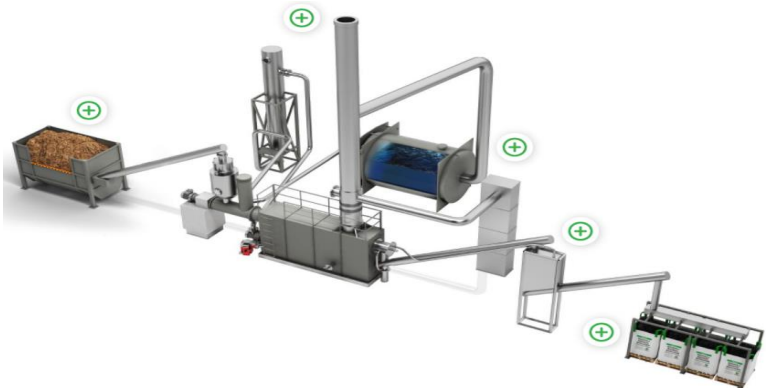

Photo: Carbofex Ltd.

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ABOUT BRANCHES

BRANCHES is a H2020 "Coordination Support Action" project, that brings together 12 partners from 5 different countries. The overall objective of **BRANCHES** is to foster knowledge transfer and innovation in rural areas (agriculture and forestry), enhancing the viability and competitiveness of biomass supply chains and promoting innovative technologies, rural bioeconomy solutions and sustainable agricultural and forest management.

This project has received funding from the European Union's Horizon 2020 research and innovation programme under grant agreement No. 101000375

THE PARTNERSHIP

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