

Biochar plant feasibility study

Institute of Ceramic and Building Materials Opole, PP 8

ABSTRACT

The study generally covers the issue of producing and introducing the biochar products in Poland, particularly in Opole province.

At the beginning the study focuses on the description and analysis of the status of the legal framework in Poland and the EU as well as main problems connected with fertilizer regulations in force and biochar registration as fertilizer, soil amendment, growing media in Poland.

In the analysis of feedstock for the production of biochar in the Opole province we were focused primarily on biomass waste. This type of biomass is the cheapest and most available. The greatest potential constitutes straw, livestock and food industry waste and municipal sewage sludge.

There are two main areas to use biochar - as a soil additive and as an animal feed additive. Among many other applications, due to the profile of our Institute, we plan to explore and develop the use of biochar in the building sector. Main applications of biochar, which were selected for the Opole province are the improvement of poor soil quality (Class V), and the rehabilitation of forest areas. Comparing the potential needs (1 million tonnes) to production capacities (6 thou tons/year) activity of BC plants is assured for several decades. Capacity of industrial installation to meet local needs in our region should be of the order of 500 - 700 ton of dry biomass / year. For assumed target quantity of 15 installations, production potential of BC would be max. 6 thou tons per year.

Technology and Technological Process was discussed. In the current state of the art selection of BC installations is limited. For presented feasibility study WSK Anlage GmbH technology was chosen. It has been tested by us in pilot scale with positive pyrolysis tests of chicken dang, rye straw and sewage sludge were performed. Location of BC plant is the area of the former brickworks. This parcel is leased by company WSK Olesno, which will be the main investor of biochar production plant.

Financial analysis of BC installations for chicken dang, based on WSK technology with annual capacity of 420 tons of BC/ year and invest cost approx. 400 tho Euro, shows favorable indicators IRR, NPV and payback time for scenarios with heat recovery and power generation. For options with a 30% subsidy results are promising, payback time amounts about 4 years. Biochar project without subsidies seems to be questionable.

Environmental aspects section describes the characteristics of environmental correspondence of the technology with current polish and EU requirements as well as the positive benefits of biochar on the environment.

The Technical Documentation provides a basic breakdown of the technology. Study includes Assembly and detail drawings of basic units BC pilot plant: Reactor chambers, Inner baskets, Filter with active carbon, Sedimentation unit, Gas scrubbing unit and Condensation unit.