Pathway to a Sustainable Future: Economic and Technical Feasibility of a Hydrothermal Carbonization (HTC) Processing Plant

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In order to combat climate change and achieve global sustainability, recycling waste and reducing our use of fossil fuels is crucial as we continue moving forward. Hydrothermal carbonization (HTC), a fairly new waste-to-energy conversion method, is seen as an efficient solution for both of these problems, having the ability to avoid treating waste by conventional means (e.g landfilling), recovering energy in the form of hydrochar (a renewable energy source similar to coal), and extracting nutrients from waste (phosphorus). However, HTC processes are still yet to be more widely implemented on a commercial scale. Currently, most existing HTC plants are located in Europe, with few elsewhere. The purpose of this study is to create a financial model for commercial-scale HTC plants that process waste and generate economically and environmentally sellable products, as well as study various factors (including location, size, and waste feedstock) that may optimize the environmental impact and profitability of an HTC plant. This research aims to specifically assess the economic and technical feasibility of HTC plants in the United States, due to the lack of existing HTC plants and high waste generation in the U.S. In order to assess the feasibility of such an operation, construction of a financial model in excel, literature-based research, market analysis, risk assessment, investigation of industrial-scale HTC plants, and discussion with industry experts will be used. Overall, discovering the feasibility of HTC plants will aid in its future application on a global scale, which will combat several pressing environmental issues.

Awards Won:
NC State College of Engineering: Award to attend NC State Engineering Summer Camp