Sandra D Eksioglu, J Fundam Renewable Energy Appl 2016, 6:3(Suppl)
http://dx.doi.org/10.4172/2090-4541.C1.008

Bioenergy supply chains optimization: Models and applications

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In the recent years, we have seen an increasing interest in many areas of research related to bioenergy. This interest has been motivated by the potential that exist to make bioenergy a future power sources in the USA and world. Despite the increasing interest, the economic viability of bioenergy and its future has been challenged for a number of reasons. For example, all the types of bioenergy will continue to face biomass feedstock transportation and other logistics challenges which have imposed limitations on the production capacities of biofuel plants. This presentation summarizes mathematical models which support large-scale biomass transportation and consequently large-scale production of bioenergy. These models are extensions of the multi-facility supply chain design problem. One of the extensions that will be discussed in this talk is a two-stage stochastic programming model which is used to capture uncertainties of biomass supply and biomass conversion. On-going concerns about bioenergy are focused not only on its economic viability, but also, on its carbon footprint. This is because the steps involved in production and transportation of biomass are energy intensive. Thus, some of the models which will be presented do focus on minimizing costs and carbon footprint due to transportation activities in the supply chain. These models are tested via a number of case studies developed using data from the Southeast region of USA. Numerical results will be presented.

Biography

Sandra D Eksioglu is an Associate Professor of Industrial Engineering at Clemson University. Her research focus has been on the theory and application of operations research tools to problems that arise in the areas of transportation, logistics, and supply chain. She works on developing mathematical models and solution algorithms that help design and manage large scale and complex supply-chains. In particular, she is interested in the application of these tools to the bioenergy supply chain. She received the Faculty Early Career Development (CAREER) Award from the National Science Foundation in 2011 for her work on biofuels supply chain. She has co-authored over 70 refereed publications.

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