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Supply chain planning and design for biodiesel production via wastewater sludge

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This study presents mathematical models that capture the impact of different carbon emission-related policies on the design of the biocrude-for-biodiesel supply chain. These are two-stage stochastic programming models which identify locations and production capacities for biocrude production plants by exploring the tradeoffs that exist between location, transportation, inventory costs and emissions in the supply chain. The study analyzes the behavior of the chain under different regulatory policies such as carbon cap, carbon tax, carbon cap and trade, and carbon offset mechanisms. A number of observations are made about the impact of each policy on the supply chain designs and costs. The state of Mississippi is used as the testing grounds for these models. A number of solution algorithms are proposed to solve these problems, and ArcGIS is used to visualize and validate these solutions.

Biography

Sandra D Ekşioğlu is an Associate Professor of Industrial Engineering at Clemson University. She received her PhD in Industrial and Systems Engineering from the University of Florida in 2002. 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 biofuels 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 50 refereed journal papers and conference proceeding. She is the co-author of "Developing Spreadsheet-Based Decision Support Systems Using Excel and VBA for Excel" 2nd Ed. which is the textbook used in one of the classes she teaches. She is an active member of Institute for Operations Research and the Management Sciences (INFORMS), Institute of Industrial Engineers (IIE), and American Society for Engineering Education (ASEE).

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