



U.S. Department of
Agriculture-NIFA



Project Title: Cloud-based Decision Support System Integrating Biomass Quality, Uncertainty and Risk to Optimize the Production of Second-generation Biofuels

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Project Goal

- (1) Development of a unified computational and theoretical scheme that links novel biomass quality control principles, uncertainty, and risk measures in bioenergy logistics systems optimization.
- (2) Design of robust biofuel SCs that holistically embrace an understanding of the biomass quality variability (which is variable and is defined as moisture, ash, and sugar contents, among others), supply uncertainty and biomass conversion technology risk;
- (3) Development of a cloud-based biofuels decision support system that incorporates the set of mathematical programming models and tractable here and now algorithms.

Objectives

1. Develop novel mathematical models based on stochastic programming to design large-scale bioenergy systems which incorporate the concepts of biomass quality and supply uncertainties, and their impact on biomass conversion technology selection.
2. Integrate computational methods and mathematical programming formulations proposed into a Cloud-based Decision Support System (DSS).
3. Conduct student internships at INL and ORNL and develop seminars/workshops as well as instructional material.

Expected Project Outcomes

- (1) Reduce feedstock quality uncertainty and quantify feedstock quality impact on technology selection and SC design, which overcome feedstock quality barriers faced by bioenergy industry; thus, increasing yields and operational performance
- (2) Encourage investment, which translates into industry growth by providing an expected profit that includes uncertainty and risk in the feedstock.



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