



Simulating your Biomass Supply Chain to find Opportunities to Reduce Cost and Risk

a.k.a “A simulation model for the design and analysis of wood pellet supply chains.”

Ecostrat, Inc.
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Rating

9

- 9 Ability to Reduce Feedstock Cost
- 9 Ability to Decrease Supply Chain Risk
- 8 Ease of Implementation

Recommendation

Woody biomass supply chains are complex and the interactions between their different components are often hard to understand. Changes to the actual supply chain can be risky, as they may affect quality of feedstock and final bio-products, consistency of supply, and involve expensive capital investments... Computer simulation, on the other hand, allows for testing different supply chain scenarios at very little cost.

Computer simulation methods are already used across other industries, from sawmilling to aerospace to military operations. More powerful computing power allows for more realistic representations of real world problems, at a much lower cost. It is a perfect technology for a growing bio-energy sector which is still trying to develop full understanding of its supply chains.

This is a technical paper, however, it will be useful to project developers, investors and facility operators who are looking for low-risk alternatives to reduce costs and risks in their supply chains.

In this summary, you will learn

- A new advanced computer simulation method to test various configurations in a biomass supply chain and the potential cost reduction that can result.
- An understanding of the degree to which testing a new operational configuration in a computer environment, rather than in real life, lowers the risk of making costly errors.

Summary

Procurement, transportation and storage of raw material, pellet production, and distribution are the major activities in a wood pellet supply chain. To understand how these components interact, one has to estimate the time, cost, emissions, and energy consumption associated with each of these activities. All of these components and variables compose one complex system which is difficult to understand using traditional (spreadsheet) methods.

In this paper, a simulation model is developed, which models an entire actual wood pellet supply chain in British Columbia, Canada. The objective of this simulation is to enhance a wood pellet supply chain by lowering pellet production costs. The model simulates raw material supply, processing, and distribution to markets, and includes uncertainties, interdependencies between stages of the supply chain, and resource constraints. The simulation time is set to one year.

Because the various simulation scenarios are run rapidly in a virtual computer environment, it is very easy to make changes and clearly see the impact on the supply chain. In this example, the results of scenario-based analysis showed that by changing the drying fuel from sawdust to bark, about 1.5% cost reduction was achievable. Additionally, blending 10% bark in the pellet to produce lower quality pellets for the international market would provide 4.75% of raw material savings.

“Improvements in computing power allows for more realistic representations of real world biomass supply chain problems, at a much lower cost.”

“It is very easy to make changes to a simulation and understand the impact of those changes on the supply chain.”

To discuss how you can use the concepts in this paper or to receive a copy of the paper, please contact us:

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