Mapping biomass markets in Iowa

Randy Boekenstedt
Iowa State University

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Abstract
Three different models for marketing and supplying alternative food and fuel products were prepared and shared with the public.

Keywords
Center for Transportation Research and Education, Bioeconomy and energy, Climate change greenhouse gas emissions, Life Cycle Assessment, Market research and feasibility studies, Models and assessment tools

Disciplines
Biotechnology | Climate | Marketing | Power and Energy | Statistical Models

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Mapping biomass markets in Iowa

How can Iowa farmers find viable markets closer to home?

This project focused on developing the ability to assess food and fuel needs and capabilities locally. It helped farmers and affiliated agencies identify and target local market and capacity goals that were less dependent on long-distance transportation.

Background

Energy and environmental concerns are sparking interest in lessening the distance food products are transported to reach consumers. At the same time, increasing market demand for more local and regional food products is allowing agricultural production to shift from specialization and export marketing toward more localized markets and supply lines. Instead of “locking in” specific markets and supply lines, emerging technologies can more broadly adapt the lowest cost feedstocks into the highest valued products needed in a particular area. This ability to adapt reduces the distance that products need to travel to achieve full market value.

The prospect of converting farmland to energy crops also highlights a growing need to develop alternative methods of delivering food to urban areas. As energy for transportation becomes less available, there will decreased ability to access food in areas where traditional production cannot occur.

The central objective of this project was to focus data and attention on localizing the supply lines that service food and fuel markets. The project goals were to: 1. Develop a spreadsheet-based model that compares and communicates fuel demands and potential biomass capabilities at the county level in Iowa, and 2. Develop a web site that can be accessed by local food advocacy groups throughout the country to assess food needs and move toward systems that are less dependent on long-distance transportation.

Approach and methods

To meet the first goal, the investigator prepared two versions of a fuel model. The detailed fuel model included a relatively comprehensive list of fuel products and potential sources of biomass available in Iowa, and provided the user with numerous opportunities to adjust (for evaluation) the assumptions used. The summary fuel model is a simplified version of the detailed model that narrows the evaluation options exclusively to crop-based feedstocks and three key fuel products.

For the food market web site, the investigator provided a preliminary indication of market size for more than 200 products at the county level for all 3,000 counties in Iowa.
It offered easy-to-use access to rates of product demand for a wide variety of audiences. CTRE and the Leopold Center staff worked together to develop an attractive, user-friendly web site for the food market tool. Referred to as the U.S. Food Market Estimator, the tool has a downloadable user’s guide as well as a demonstration that can be viewed by prospective users.
Conclusions

The two fuel models developed for this project estimate that it would take about 40 percent of Iowa’s current crop mix to offset demand for coal used in Iowa and an additional 50 percent to replace demand for gasoline and diesel fuel (all uses). Developing high-tonnage (10 tons of dry matter/acre) perennial crops could reduce the land needed to less than 30 percent, disregarding changes in demand needed to collect and process the extra tonnage. While the first scenario is an unlikely objective, the second is closer to reality.

From a different perspective, the food market web site indicates that Iowa consumers buy about 2 million tons of food products annually (about 2.6 million tons of production weight); some is imported and some is produced in-state. By comparison, however, the fuel model estimates that Iowans consume more than 16 times this tonnage in coal, gasoline, and diesel fuel each year, or 25, 4, and 3 million tons, respectively, (all uses) All of it is imported; all of it depends on petroleum to get where it is needed in Iowa. Localizing the production of energy is a sensible goal for Iowa, not only in regard to peak oil, climate change and related factors, but also to reduce the energy currently used to move fuel mass to where it is needed in the state.

Each of the three models developed from this project provide quick access to a variety of perspectives that can be used to set goals in this area. Communicating and interpreting these perspectives, however, proved more challenging. The detailed fuel model in particular attempted to account for all products and sources of biomass (that could be identified), which meant it had to interrelate several factors each for a variety of materials such as manure, coal, gasoline, diesel fuel, natural gas, a number of individual crops, municipal sewage, landfill waste and others.

This is in turn required the user to individually monitor and adjust a large number of variables, ranging from how many crop acres were available in a particular area, to the amount of manure produced by an individual hog. While these variables integrated into the model reasonably well, they still required a lot of attention, and the likelihood of errors and misinterpretations was high. The summary model addressed this by narrowing the options to the most likely candidates on both the supply and demand sides and was significantly easier to follow.

Impact of results

The goal for the project was to receive at least five unsolicited contacts per model. The food market model and web site were successful at meeting this goal, the fuel models were not. The detailed fuel model proved too complicated with too many variables and options to appeal to the reviewers. The summary fuel model, while simpler, also failed to generate significant responses. The models are available on request from the co-investigator.
The food market estimator model was revised to make it more user-friendly and is now hosted by CTRE, but available on the Leopold Center web site at www.ctre.iastate.edu/marketsize/. Because of this revision and promotion by the Leopold Center, the tool proved to be much more successful at generating interest. Web use statistics for the first 138 days indicated 4,100 visits, or an average of 29 visitors/day. There were 19,600 “hits” during this initial period (which translated to about 52,000 page views annually). Leopold Center staff receives an estimated three calls or e-mails per week with questions about this tool.

**Education and outreach**

No publications were generated by this project. A presentation on the project was made at the March 2009 Leopold Center Marketing and Food Systems Initiative Workshop.

**Leveraged funds**

No additional funds were leveraged for this project.

For more information, contact:
Randy Boeckenstedt,
CTRE, Iowa State University, 2711 South Loop Drive, Suite 4700, Ames, Iowa 50010-8664; (515) 294-7164, e-mail rboecken@iastate.edu