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Biofuels development in Maine: Using trees to oil the wheels of sustainability

By Caroline L. Noblet, Mario F. Teisl, Katherine H. Farrow and Jonathan Rubin
Posted March 12, 2013, at 3:15 p.m.

As national standards require increased use of renewable transportation fuels by 2022, Maine is positioned to be a leader in wood-based cellulosic ethanol production and use.

The Energy Independence and Security Act of 2007 mandates the sale of renewable energy and advanced biofuels through the Renewable Fuel Standard. This standard requires 36 billion gallons of renewable transportation fuel by 2022, with 21 billion provided by advanced biofuels. It is estimated that three-quarters of the requirement will be from cellulosic ethanol, a form of ethanol produced from plant fiber, sources of which may include trees, switchgrass and scrap wood.

Cellulosic ethanol has a better carbon footprint than either traditional fuel or corn-based ethanol, and its production does not lead to higher food prices like other sources of ethanol, such as corn and sugarcane. In addition to the environmental benefits of ethanol production and use, there may be substantial economic and energy security benefits.

Maine residents may welcome a new output opportunity for the forest industry; alternatively, Mainers may react negatively to wood-based fuel production if it leads to deterioration in forest management, congestion, pollution from the building and running of biorefineries, or transportation fuels with inferior characteristics.

We surveyed New Englanders' willingness to accept and use biofuels, with a focus on Mainers. In total, 382 Maine residents and 958 other New Englanders answered the survey for a response rate of 52 and 38 percent, respectively, yielding an overall response rate of 40 percent.

We found almost all Mainers and New Englanders were aware of ethanol as a fuel additive and, of those who were aware, almost all had heard that ethanol could be made from corn. Knowledge of other potential sources of ethanol, however, such as switchgrass, trees and garbage, was relatively low and varied across the region, especially with respect to the knowledge that ethanol can be made from trees.

To capture whether consumers realized the fuel they use now is a blend of 90 percent gasoline and 10 percent ethanol, a survey question specifically targeted this knowledge: "What type of fuel do you typically put in your vehicle?" Remarkably, half of all Mainers believed they were using only gasoline, despite the fact that nearly all gasoline distributed in Maine was blended with 10 percent ethanol by November 2008.



Courtesy of the University of Maine
Paige Case, a chemical engineering undergraduate student at the University of Maine, holds a container filled with biofuel oil made from cellulose in waste wood. The new process of creating biofuel was developed by UMaine professor Clayton Wheeler and his students.


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BDN MAINE On the whole, Mainers and other New England respondents are uncertain about the attributes of ethanol as a fuel additive, which suggests that many consumers have not made up their minds about ethanol. [Learn more](#)

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One of the key environmental attributes that has been touted for ethanol is the production of less greenhouse gas pollution. Only 25 percent of Mainers thought that ethanol produces less pollution, while 37 percent expressed uncertainty. In reality, compared with gasoline, corn-based ethanol may produce up to 19 percent less greenhouse gases, and cellulosic ethanol is estimated to produce an 86 percent reduction

Perceptions about ethanol appear relatively negative or uncertain. However, many people seemingly have not formed a strong opinion, so attitudes still appear to be malleable. Hence, biofuel promoters and detractors have the opportunity to influence individuals' opinions through information and marketing programs.

We also presented 10 potential impacts of cellulosic ethanol production and asked Mainers to rate the importance of each; the levels of importance seemed to fall into three tiers. The highest tier of importance included increasing local employment and decreasing fuel imports. Mainers also placed changes to forest health in this highest tier of importance.

In the middle tier, Mainers were concerned about how biofuel harvests may affect the prices of other wood fuels — primarily firewood and wood pellets — and harvest intensity.


Cellulosic ethanol is touted as producing lower global-warming gases relative to other transportation fuels. However, Mainers found this to be a relatively unimportant benefit. In fact, interest in global-warming issues was consistently low throughout the survey, indicating that messages about cellulosic ethanol's ability to decrease global warming may be of interest to a limited audience.

Potential impacts on the forest environment are important. Given the importance of forest impacts to Mainers, promoters of cellulosic ethanol should make sure harvesting practices are environmentally sound and sustainable and that this is well communicated to the public.

This work provides empirical evidence that consumers do not hold identical — or even similar — knowledge and preferences when it comes to a new energy technology, such as wood-based biofuel. We have found that consumers judge the value of biofuels by using their prior knowledge of ethanol sources, their perceptions of the attributes of different fuels and their interest in the ways that cellulosic ethanol might mitigate the impacts of fossil fuels. Interestingly, consumers in the Northeast focus more on the economic, environmental and national security attributes of this type of fuel than on global warming and other environmental concerns.

Caroline L. Noblet is a lecturer in the School of Economics at the University of Maine. Mario F. Teisl is a professor in the School of Economics there, while Katherine H. Farrow is a recent graduate of the Master of Science program in natural resource economics. Jonathan Rubin is a professor at the university with a joint appointment in the School of Economics and the Margaret Chase Smith Policy Center. A longer version of this article appeared in Maine Policy Review, published by the University of Maine's Margaret Chase Smith Policy Center, and can be found at digitalcommons.library.umaine.edu/mpr.

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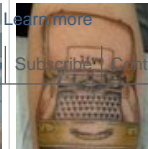
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MEProudLIBERAL • 20 days ago
 "I'd put my money on the sun and solar energy. What a source of power! I hope we don't have to wait to run out of coal and oil before we tackle that." -Thomas Edison 1931
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softerthanfluffy # MEProudLIBERAL • 19 days ago
 Magnets!!! If the government allows it.
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Stephen Lee Blythe • 19 days ago
 It is undoubtedly less efficient to turn trees into ethanol than to turn them into pellets for heat and/or electricity production. However - one only need survey Eastern Maine on Google Earth to see the vast areas that have been stripped of trees, leaving thin strips of small fir trees only. Turning a healthy mixed forest into whatever you want to call these barren areas is NOT sustainable harvesting of a biofuel!
 5 ^ | 1 v • Share

softerthanfluffy # Stephen Lee Blythe • 19 days ago
 There are no barren lands. We have more trees in Maine today then there was before Maine was Settled. Spruce and fir etc have a life span of maybe 50 years tops. Pine a little longer. Maine is not the redwood forest. We have useable



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