

Key to using local resources for biomass may include waste

The Northwest can have a sizeable biofuels industry based primarily on local resources -- if non-traditional feedstocks, such as municipal waste, and new conversion technologies are used, according to a report issued today by the Department of Energy's Pacific Northwest National Laboratory.

It will be difficult for the Northwest to create a significant biofuels industry based on today's land use practices with currently available agricultural and forestry resources alone. However, if municipal solid waste is used in conjunction with these existing resources, the region can produce 10 to 15 percent of its transportation fuel from indigenous resources. An even larger industry can be created with new land use practices and the identification of new energy crops. These findings are from the PNNL report, *Biofuels in Oregon and Washington: A Business Case Analysis of Opportunities and Challenges*.

The region's rapidly emerging ethanol and biodiesel industry is currently dependant on imported feedstocks.

"With a growing demand for transportation fuels and constrained petroleum supplies, there is a growing need for a significant biofuels industry in the Northwest and across the country," said Mike Davis, who leads PNNL's Energy and Environment Directorate. "If we want to develop an industry that makes sense for the local economy and environment and is big enough to make a difference, we need to be willing to look beyond the Midwest model.

"We need to develop unconventional approaches that are consistent with regional resources and economics."

It is critical that the Northwest look beyond the traditional biomass model, the report finds, because the region has a highly diversified agricultural system, with the most productive acreage used to grow high-value food, seed and ornamental crops. The value of these crops for traditional uses currently exceeds their potential value as a resource for biofuels. The report also finds many of the residues from agriculture and forestry products have higher value uses as feed and fiber than as feedstock for biofuels. Additionally, these resources are difficult to collect and transport to processing facilities.

"Like many parts of the country, the Northwest has a limited ability to supply the quantity of low-cost feedstocks required for traditional biofuel conversions," said Dennis Stiles, lead author of the report. "We will need to use multiple resources and new technologies. A sustainable biofuels industry in the Northwest is possible, but it won't be easy."

One resource that is readily available is municipal solid waste. In 2004, Oregon and Washington residents generated 8.2 lbs and 7.5 lbs per person per day respectively. According to the report, the organic fraction of MSW constitutes 70 percent of the region's currently available biomass.

MSW can be an important part of a larger biofuels industry that utilizes multiple biomass resources, including agriculture and timber, according to the report. It has fewer traditional hurdles than other biomass resources: the infrastructure to collect it already exists; it is concentrated in a small number of locations; and current disposal options are limited and becoming increasingly expensive. In contrast, resources such as wheat straw and timber harvesting residues are not currently collected at a significant scale and are dispersed throughout the region. Over time, MSW can help provide a market to develop new energy crops within the region, note the report's authors.

“If we can find a way to ensure waste reaches its potential as a viable fuel source and in a cost-effective manner, it’s a win-win scenario for the economy and the environment.” said Stiles.

The use of indigenous resources also heightens the need for investment in conversion technologies that aren’t yet commercially available. The need is significant because nearly all of the Northwest’s available biomass resources, including MSW, are comprised of lignocellulosic materials. These materials are more difficult to convert to traditional biofuels than grain crops. A concerted research and development effort is necessary for these complex feedstocks to become cost-competitive with petroleum fuels.

The report also identifies an important opportunity for development of new chemical processes that convert the lignocellulosic biomass to bio-crude. Biocrude, with appropriate upgrading, can be directly substituted for petroleum at regional refineries. The report also describes approaches that use chemical processes to convert biomass to gasoline and to diesel fuels that are compatible with existing vehicles and the current fuel distribution systems. These approaches better leverage the existing fuels infrastructure.

“A new look at conversion technologies can give the region a chance to leapfrog from the existing suite of biofuels technologies to the next generation of biofuels that work with today’s vehicles and gas stations,” said Stiles. The technologies developed here can also be successfully used in other regions of the country to provide biofuels for our nation.”

Biofuels will be part of the solution to reducing America’s dependence on imported oil while transitioning to a renewable energy base -- but they aren’t the only solution, according to Davis.

“We must substantially advance all potential solutions -- from energy efficiency and conservation to demand-side management and carbon capture -- if we’re going to get to the rate and scale needed to reduce dependence on imported oil while reducing carbon emissions.”

Source: Pacific Northwest National Laboratory

This document is subject to copyright. Apart from any fair dealing for the purpose of private study, research, no part may be reproduced without the written permission. The content is provided for information purposes only.