



Federal Policies Influencing the Development of the Cellulosic Biofuels Industry in the United States

**Forest Landowners Association –2008 National
Forest Landowners Conference
Chicago, Illinois
April 8-11, 2008**

**Curt Rich
Van Ness Feldman
1050 Thomas Jefferson Street, NW
Washington, D.C. 20007
202-298-1886
jcr@vnf.com**

The Energy Independence and Security Act of 2007 calls for U.S. biofuels production to reach 36 billion gallons – one quarter of current U.S. petroleum consumption – by 2022.

In 2006, biofuels production totaled just under 5 billion gallons.

USDA/DOE "Billion Ton Study"

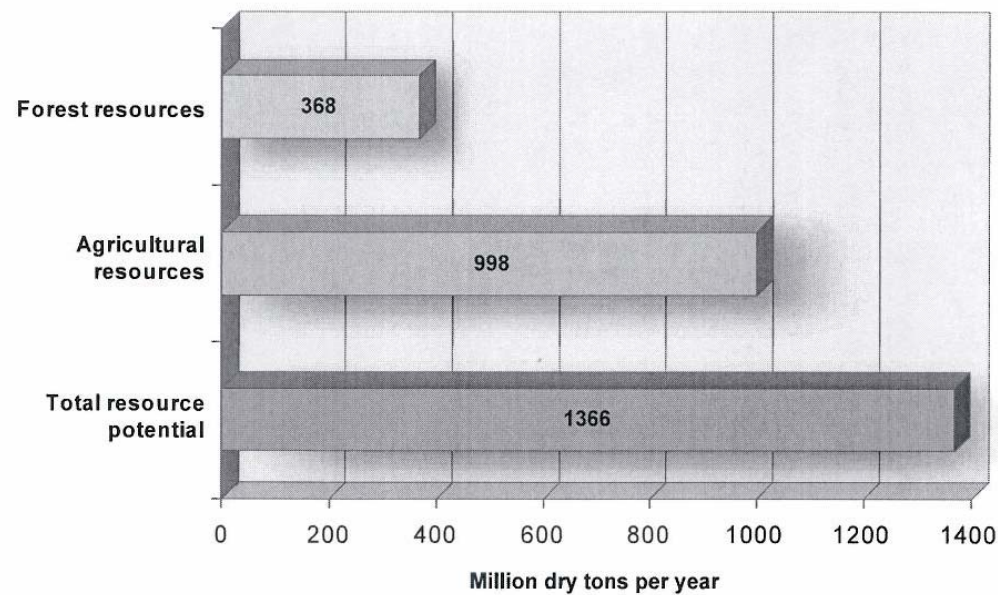
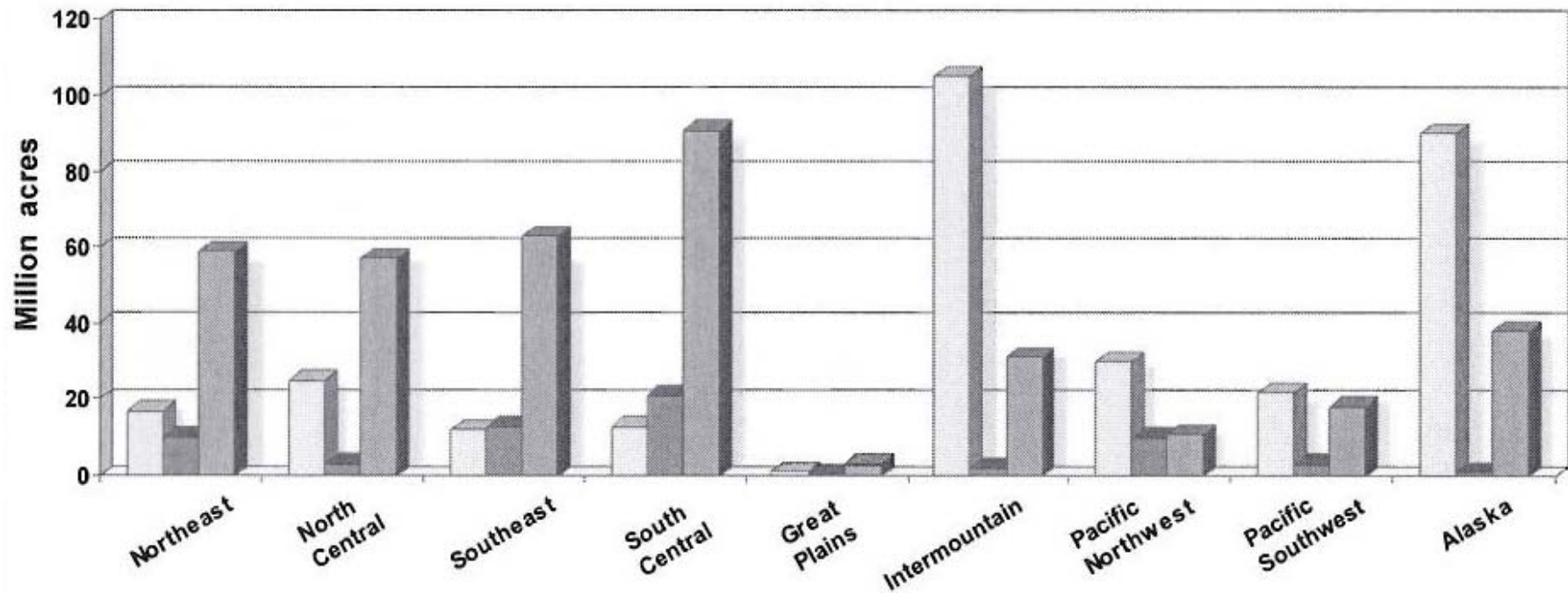


Figure 1: Annual biomass resource potential from forest and agricultural resources

USDA/DOE “Billion Ton Study”

- 1 billion dry tons of biomass required to displace 30 percent of the country's current petroleum consumption
- 749 million acres of forestland in the United States – approximately one-third of the country's land area.



What are the policy considerations behind this push to develop a biofuels industry?

Energy Independence

The U.S. imports approximately 60% of the crude oil it consumes, with the majority of the imported oil used to produce gasoline and diesel.

Global Climate Change

The transportation sector directly accounts for ~30% of total U.S. GHG emissions. Transportation is the fastest-growing source of U.S. GHGs and the largest end-use source of CO₂.

Economic Development

Between 2000 and 2004, the average price of corn was \$2.37 per bushel. In 2007, corn averaged ~\$4.00 per bushel and has reached ~\$5.70 per bushel in the 2008 future markets.

Price

Merrill Lynch estimated that without biofuels, the current price of oil and gasoline would be about 15 percent higher.

Not all Biofuels Are Created Equal

	Petroleum	Corn Ethanol	Biodiesel	Cellulosic Ethanol
Production	140 billion gallons (gasoline) 60 billion gallons (diesel)	7 billion gallons [14-15 billion gallon limit]	300 million gallons	n/a
Energy Content		E-85 contains 85 percent of the energy of a gallon of gas.	Same as diesel	Same as corn ethanol
Carbon footprint		Reduces emissions by 18-29 percent	Reduces emissions by 78.5 percent	Reduces emissions by 86 percent
Energy balance		Produces one and a half times more energy than it consumes	Produces 3.25 times more energy than it consumes	Produces four to six times more energy than it consumes
Water Usage	.5 gallons of water per gallon of crude oil production	Four gallons of water to produce one gallon of ethanol	One gallon of water to produce one gallon of biodiesel	Two to six gallons of water to produce one gallon of cellulosic ethanol.
Food v. Fuel		Whole grain corn is diverted from other uses like feed and food and enters the fuel market	Soybean meal and oil and separated in a crush facility, with the oil used for biodiesel production and the meal entering the fiber and feed market.	Cellulosic feedstocks include wood and woodwaste, grasses and agricultural byproducts that do not compete with food markets.
Transportation	Transportable through existing pipeline infrastructure	Incompatible with existing pipeline infrastructure. Must be transported by train/ truck.	Transportable through existing pipeline infrastructure	Incompatible with existing pipeline infrastructure. Must be transported by train/ truck
Retail Price	\$3.00 per gallon gasoline \$3.40 per gallon diesel	\$2.30 per gallon	\$3.75 per gallon	\$3.00-5.00 per gallon (pre-commercial estimates)

Who are the industry leaders?

Verenium (Cambridge, MA). Recently completed construction of a 1.4 million gallon/year demonstration plant in Jennings, Louisiana. Verenium uses an enzyme-based technology to convert sugar cane bagasse, energy cane, sorghum and hard wood into ethanol.

Range Fuels (Broomfield, CO). Recently broke ground on a 20 million gallon/year commercial-scale cellulosic ethanol plant near Soperton, Georgia. This plant will be the first in the United States to produce commercial quantities of ethanol from wood, grasses, and corn stover.

Mascoma (Boston, MA). Broke ground this month on a 500,000 gallon per year facility in Rome, New York that will produce ethanol from wood chips and switchgrass.

KL Process Design Group (Rapid City, SD). Operating a cellulosic ethanol plant using waste wood near Upton, Wyoming. The demonstration-scale facility (Western Biomass Energy LLC) is expected to produce 1.5 million gallons of ethanol annually from wood waste.

BlueFire Ethanol Fuels Inc. (Irvine, CA). Ready to break ground on a waste-to-ethanol biorefinery in Lancaster, CA. The proposed plant will convert a variety of biomass materials, including wood waste, agricultural residues and urban trash, into 3.1 million gallons/year of cellulosic ethanol.

Who are the industry leaders? (continued)

Pacific Ethanol Inc. (Sacramento, CA). Proposed cellulosic ethanol plant in Boardman, Oregon. Using Danish company BioGasol's proprietary conversion process, the plant will convert agriculture and forest product residues into ethanol.

Lignol Innovations Inc. (Berwyn, PA). Proposed cellulosic ethanol plant in Commerce City, Colorado. Using a biochem-organosolve process, Lignol will convert hard and soft wood residues into ethanol and commercial products.

ZeaChem Inc. (Menlo Park, CA). Proposed 1.5 million gallon/year cellulosic ethanol production plant near Boardman, Oregon. ZeaChem has signed a feedstock agreement with GreenWood Resources, Inc. to supply poplars from its managed tree farm to be converted into ethanol.

What market challenges currently exist for the U.S. Biofuel Industry?

- Cellulosic Biofuel technology is pre-commercial
 - Technology challenges
 - Capital Challenges
- Incumbent industries feel threatened by competition for feedstocks
- Environmental Concerns

2007 Farm Bill

Title IX – Energy

- **Biomass Research and Development Program.** For biobased fuel research. (\$75 - \$420 million in proposed mandatory funding over five years)
- **Bioenergy Program.** Provides payments to producers to encourage purchases of eligible feedstocks for expanding production of bioenergy. (\$245 million - \$1.4 billion in proposed mandatory funding over five years)
- **Regional Biomass Crop Research.** New program to conduct biomass crop research at 10 geographically dispersed and competitively selected land-grant universities. (\$40 million in proposed mandatory funding over five years)
- **Biomass Energy Reserve.** New program to help landowners produce, harvest, store and transport energy crops. (Up to \$130 million in proposed mandatory funding over five years)

Tax Credit for the Production of Cellulosic Biofuels: A Comparison of Pending Senate and House Legislation

	Present Law	Senate Bill (Farm Bill)	House Bill
Eligible Property	Methanol and ethanol, but not alcohol produced from petroleum, natural gas or coal, or alcohol with a proof of less than 150.	Alcohol with a proof greater than 150 percent produced from lignocellulosic or hemicellulosic matter that is available on a renewable or recurring basis. Examples include dedicated energy crops and trees, wood and wood residues, plants, grasses, agricultural residues, fibers, animal wastes and municipal solid waste.	Alcohol with a proof greater than 150 percent produced from lignocellulosic or hemicellulosic matter that is available on a renewable or recurring basis. Examples include dedicated energy crops and trees, wood and wood residues, plants, grasses, agricultural residues, fibers, animal wastes and municipal solid waste.
Credit Rate	51 cents per gallon tax refund to blenders on each gallon of ethanol blended with gasoline. 10 cent per gallon credit for up to 15 million gallons per year from small producers of ethanol.	A tax credit of \$1.25 per gallon, less any amounts received under the existing ethanol or small ethanol producer tax credits (IRC Section 40).	•A tax credit of 50 cents per gallon for qualified cellulosic alcohol fuel producers (in addition to the current credits provided for ethanol fuel production for a maximum credit of \$1.01 per gallon).
Duration	•Expires December 31, 2010	•Expires April 1, 2015.	Expires December 31, 2013
Estimated Budget Impact		\$1.07 billion over 10 years	\$482 million over 10 years

Energy Independence and Security Act of 2007 (EISA)

Section 202: Federal Renewable Fuel Standard

- ESIA requires an increase in renewable fuel production by requiring that 36 billion gallons of biofuels be blended with conventional fuel by 2022.
- Of this amount, 21 billion gallons must be advanced biofuels, such as biobased diesel.
- The renewable fuels standard features a specific carve-out applicable to biodiesel.
 - 2009 – 500 million gallons
 - 2010 – 650 million gallons
 - 2011 – 800 million gallons
 - 2012 – 1 billion gallons
- After 2012, the EPA Administrator, in coordination with the DOE and USDA, shall determine the volume of fuel, which “shall not be less than the applicable volume ... for calendar year 2012,” meaning that 1 billion gallons per year is a floor following 2012.

Energy Independence and Security Act of 2007

Section 201(I): Definitions

The term `renewable biomass' means each of the following:

- (i) Planted crops and crop residue harvested from agricultural land cleared or cultivated at any time prior to the enactment of this sentence that is either actively managed or fallow, and nonforested.
- (ii) Planted trees and tree residue from actively managed tree plantations on non-federal land cleared at any time prior to enactment of this sentence, including land belonging to an Indian tribe or an Indian individual, that is held in trust by the United States or subject to a restriction against alienation imposed by the United States.
- (iii) Animal waste material and animal byproducts.
- (iv) Slash and pre-commercial thinnings that are from non-federal forestlands, including forestlands belonging to an Indian tribe or an Indian individual, that are held in trust by the United States or subject to a restriction against alienation imposed by the United States, but not forests or forestlands that are ecological communities with a global or State ranking of critically imperiled, imperiled, or rare pursuant to a State Natural Heritage Program, old growth forest, or late successional forest.
- (v) Biomass obtained from the immediate vicinity of buildings and other areas regularly occupied by people, or of public infrastructure, at risk from wildfire.
- (vi) Algae.
- (vii) Separated yard waste or food waste, including recycled cooking and trap grease.

Looking Forward: Policy Challenges

- Access to Capital
- Potential restrictions on feedstocks
- Transportation
- Market demand

What to Ask Congress

Questions?
