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# Ethanol and Low Carbon Fuel Standards

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# CORNHUSKER ECONOMICS

## Ethanol and Low Carbon Fuel Standards

Market Report	Yr Ago	4 Wks Ago	10/10/08
<b><u>Livestock and Products,</u></b>			
<b><u>Weekly Average</u></b>			
Nebraska Slaughter Steers, 35-65% Choice, Live Weight.....	\$91.19	\$97.59	\$91.57
Nebraska Feeder Steers, Med. & Large Frame, 550-600 lb.....	121.17	117.24	108.11
Nebraska Feeder Steers, Med. & Large Frame 750-800 lb.....	118.85	111.66	103.48
Choice Boxed Beef, 600-750 lb. Carcass.....	145.08	159.90	152.27
Western Corn Belt Base Hog Price Carcass, Negotiated.....	58.08	67.82	61.98
Feeder Pigs, National Direct 50 lbs, FOB.....	45.64	47.29	44.76
Pork Carcass Cutout, 185 lb. Carcass, 51-52% Lean.....	61.21	75.46	69.60
Slaughter Lambs, Ch. & Pr., Heavy, Wooled, South Dakota, Direct.....	93.25	97.50	94.50
National Carcass Lamb Cutout, FOB.....	266.64	273.41	271.37
<b><u>Crops,</u></b>			
<b><u>Daily Spot Prices</u></b>			
Wheat, No. 1, H.W. Imperial, bu.....	7.49	6.43	5.27
Corn, No. 2, Yellow Omaha, bu.....	3.20	5.40	4.01
Soybeans, No. 1, Yellow Omaha, bu.....	9.05	12.09	8.78
Grain Sorghum, No. 2, Yellow Dorchester, cwt.....	6.21	8.27	5.48
Oats, No. 2, Heavy Minneapolis, MN, bu.....	*	*	*
<b><u>Feed</u></b>			
Alfalfa, Large Square Bales, Good to Premium, RFV 160-185 Northeast Nebraska, ton.....	135.00	190.00	190.00
Alfalfa, Large Rounds, Good Platte Valley, ton.....	87.50	77.50	77.50
Grass Hay, Large Rounds, Premium Nebraska, ton.....	*	85.00	85.00
Dried Distillers Grains, 10% Moisture, Nebraska Average.....	*	162.50	147.50
Wet Distillers Grains, 65-70% Moisture, Nebraska Average.....	37.50	59.25	57.00
*No Market			

There have been two primary reasons why the public has had an interest in more ethanol, rather than leaving the issue to the private market. First, it has been thought to be beneficial in slowing climate change. Second, it would increase energy independence by reducing the amount of petroleum we import. We will discuss the first of these issues in this article, with the second issue to be addressed in a later article.

### The Low-Carbon Concept

The connection between ethanol and climate change is carbon. To produce energy, the world's economies have been pumping carbon dioxide (CO<sub>2</sub>) from fossil sources into the atmosphere. The resulting dramatic rise in atmospheric CO<sub>2</sub> has trapped more solar heat, leading to global warming. Low-carbon standards and policies are efforts to reduce *fossil* carbon use, or *fossil* carbon footprint. These policies generally include other greenhouse gases (GHGs) grouped together with carbon dioxide as CO<sub>2</sub> equivalent, or CO<sub>2</sub>e.

Any fuel that reduces fossil carbon emissions for the benefit of the public, while at the same time propelling a vehicle for private benefit, merits some public encouragement such as a subsidy or mandate. The difficulty arises in determining what the carbon footprint really is, as well as how much and what kind of public encouragement is warranted.

### Biofuels' Carbon Footprint

Biofuels such as ethanol and biodiesel contain carbon that was extracted directly from the atmosphere in the photosynthesis process. So their tail-pipe CO<sub>2</sub>

emissions consist of just atmospheric carbon being re-circulated, and thus do not directly increase atmospheric CO<sub>2</sub>.

But fossil fuels are used in processing biomass to extract biofuels, and in the production of the feedstock, such as corn. Accounting for this fossil carbon has come to be called "life cycle analysis" or LCA. Further, "indirect land use change" due to biomass production may have additional carbon balance implications. It has turned out to be a baffling task to identify and measure the carbon footprint of a particular fuel.

### **Low-Carbon Fuel Standards**

State and federal standards are being defined in terms of the carbon intensity of the fuel, measured in grams of CO<sub>2</sub>e per megajoule of energy in the fuel, gCO<sub>2</sub>e/MJ. The Federal Energy Independence and Security Act of 2007 establishes a low carbon fuel standard for corn ethanol (production from future plants must account for 20 percent less than gasoline's 92 gCO<sub>2</sub>e/MJ); for biodiesel and "advanced biofuels" (50 percent less than the fuel they replace); and for cellulosic biofuels (60 percent less). The standards require minimum quantities of each of these fuels to be used, starting in 2009 and 2010.

California is implementing a different standard. The tentative plan is that all motor fuels sold must meet a specific carbon intensity, 96.7 gCO<sub>2</sub>e/MJ in 2010, declining thereafter. Governors of five mid-western states (not including Nebraska) and Manitoba, Canada are jointly studying similar standards for their areas.

These low carbon fuel standards will ultimately create a price premium for fuels that qualify. Thus, it is important for biofuel producers to know whether the carbon content of their product will qualify for the premiums and/or carbon credits.

### **Nebraska Corn Ethanol for California?**

Depending on how California determines ethanol's carbon intensity, Nebraska corn ethanol might be worth a premium in California because of its low carbon intensity, or it might be of very little value because of its high carbon intensity.

Proposed regulations<sup>1</sup> specify that generic corn ethanol will be assigned a value of 75.6 gCO<sub>2</sub>e/MJ, as determined by Argonne National Laboratory and the

University of California. But the University of Nebraska's BESS model<sup>2</sup>, which is based on more current data, finds that ethanol from a Nebraska dry mill plant producing wet byproducts should be assigned half that much, about 38 gCO<sub>2</sub>e/MJ, making it much more valuable in the future California market.

However, a study released last winter<sup>3</sup> estimates that higher corn prices due to corn ethanol demand could result in worldwide land use changes that imply an *additional* 104 gCO<sub>2</sub>e/MJ should be allocated to corn ethanol's carbon emissions. If true, that would mean that corn ethanol is far worse than gasoline for global warming.

Unfortunately, assumptions and calculations for determining carbon intensity are still hotly disputed by scientists, the biofuel industry and others. This dialog could have a significant impact on Nebraska's ethanol industry, and regulations cannot be very stable until these issues are closer to resolution.

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<sup>1</sup> <http://www.arb.ca.gov/fuels/lcfs/lcfs.htm>

<sup>2</sup> <http://bess.unl.edu>

<sup>3</sup> *Science*, 29 Feb 2008, p1238-1240.