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What Cost, Biomass for Fuel?

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CORNHUSKER ECONOMICS

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Market Report	Yr Ago	4 Wks Ago	1/13/12
Livestock and Products, Weekly Average			
Nebraska Slaughter Steers, 35-65% Choice, Live Weight	$106.98	$119.20	$123.56
Nebraska Feeder Steers, Med. & Large Frame, 550-600 lb.	150.85	166.00	181.06
Nebraska Feeder Steers, Med. & Large Frame 750-800 lb.	127.59	145.35	154.13
Choice Boxed Beef, 600-750 lb. Carcass	168.24	189.14	187.92
Western Corn Belt Base Hog Price Carcass, Negotiated	73.09	78.98	83.01
Pork Carcass Cutout, 185 lb. Carcass, 51-52% Lean	83.44	90.13	83.82
Slaughter Lambs, Ch. & Pr., Heavy, Wooled, South Dakota, Direct	165.25	153.50	148.75
National Carcass Lamb Cutout, FOB	348.52	405.48	394.24
Crops, Daily Spot Prices			
Wheat, No. 1, H.W. Imperial, bu.	7.01	5.90	5.97
Corn, No. 2, Yellow Omaha, bu.	6.22	5.99	*
Soybeans, No. 1, Yellow Omaha, bu.	13.69	11.31	*
Grain Sorghum, No. 2, Yellow Dorchester, cwt.	10.36	10.14	10.09
Oats, No. 2, Heavy Minneapolis, MN , bu.	4.02	3.31	3.05
Feed			
Alfalfa, Large Square Bales, Good to Premium, RFV 160-185 Northeast Nebraska, ton.	140.00	155.00	155.00
Alfalfa, Large Rounds, Good Platte Valley, ton.	72.50	132.50	137.50
Grass Hay, Large Rounds, Good Nebraska, ton.	*	95.00	100.00
Dried Distillers Grains, 10% Moisture, Nebraska Average.	196.00	220.00	208.00
Wet Distillers Grains, 65-70% Moisture, Nebraska Average.	64.50	69.50	70.25

*No Market

Biomass has a prominent role in discussions of future United States energy supplies. Why? Because it could reduce our dependence on foreign petroleum supplies, and reduce greenhouse gas emissions compared to using petroleum or other fossil fuels.

What is meant by biomass for fuel? Generally, the term is used to designate either crop residues such as corn stover or dedicated energy crops such as switchgrass and poplar trees. Technically of course, grains themselves are biomass and they can be used for fuel as well.

Biomass can be burned directly as fuel or converted to a liquid fuel such as ethanol, using cellulose bio-refinery technologies that are still under development. In either case, biomass must be collected and delivered to a use point, a process that can be quite expensive because of the low density of energy in biomass and the dispersed pattern of availability.

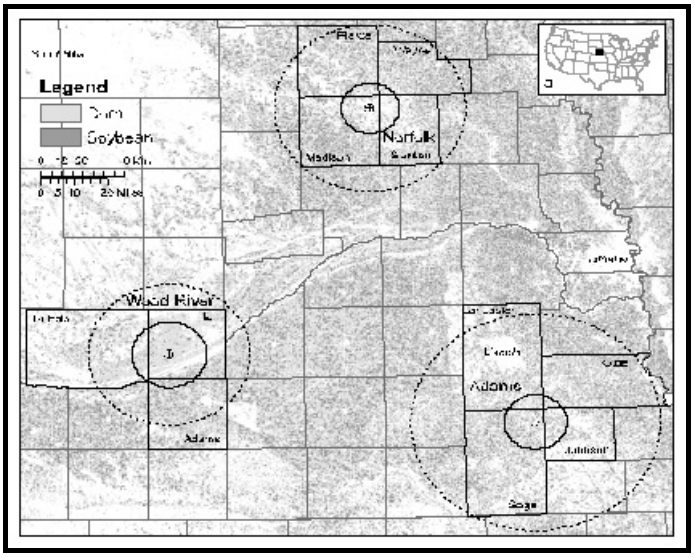
In a recent study we examined the potential cost of delivering commercial quantities of biomass to three Nebraska towns, Adams, Norfolk and Wood River. We chose these locations because they represent areas with different land use patterns, and each town has a corn ethanol plant that could potentially use biomass to fuel the plant or could be modified to produce cellulosic ethanol.

Our approach to this issue was to examine the land resources in each vicinity and budget out the cost of producing, collecting and transporting both corn stover and switchgrass. We identified current technology for various operations needed and used current custom rates

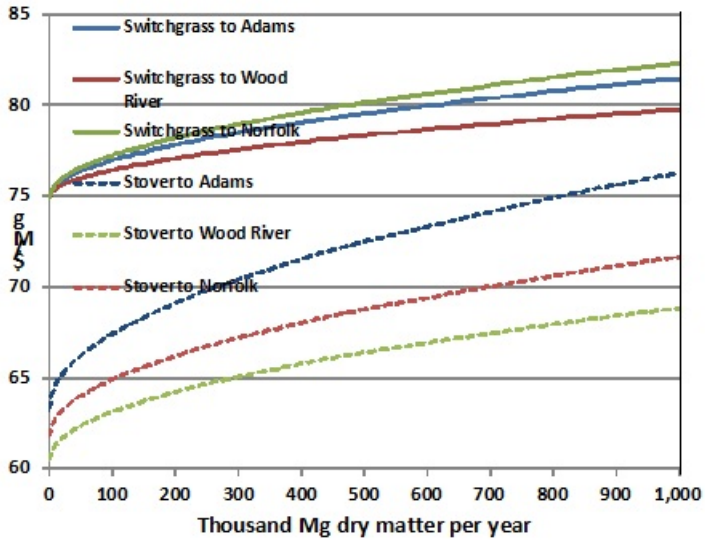
for those operations where possible, engineering cost estimates for a few operations for which custom rates are not reported.

We estimated stover yields from historical grain yield data in each area, and estimated switchgrass yields from previous on-farm trials we have conducted. We assumed that half of the stover would be harvested from half of the corn fields each year.

The amount of biomass required at a point can vary widely, depending on the nature of the use facility. For example, we calculated that the current grain ethanol plants would require from 67 to 185 thousand tons per year, while a 40 million gallon per year (mgy) cellulosic ethanol plant would require about 450 thousand tons per year. As the amount required increases, the cost per ton increases because it must be transported from more distant fields. On the map below, the solid lines indicate the supply areas required to supply fuel for current corn ethanol plants, while the dotted lines represent the supply areas needed to supply a 40 mgy cellulosic plant.



The chart below shows the prices necessary to supply each of the delivery points with either corn stover or switchgrass. The intercept of the curves ($75 per dry metric ton of switchgrass, about $62 per dry metric ton of stover) shows our estimates of the on-farm costs of the two products. Switchgrass costs are much higher because land rent and establishment costs must be included, whereas stover is treated as a residue with only collection costs.



At the present time, coal and natural gas provide much cheaper combustion energy than these biomass prices. The price that can be paid by cellulosic ethanol plants is as yet unknown.

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