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The South Dakota Fuel Ethanol Industry

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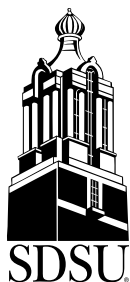
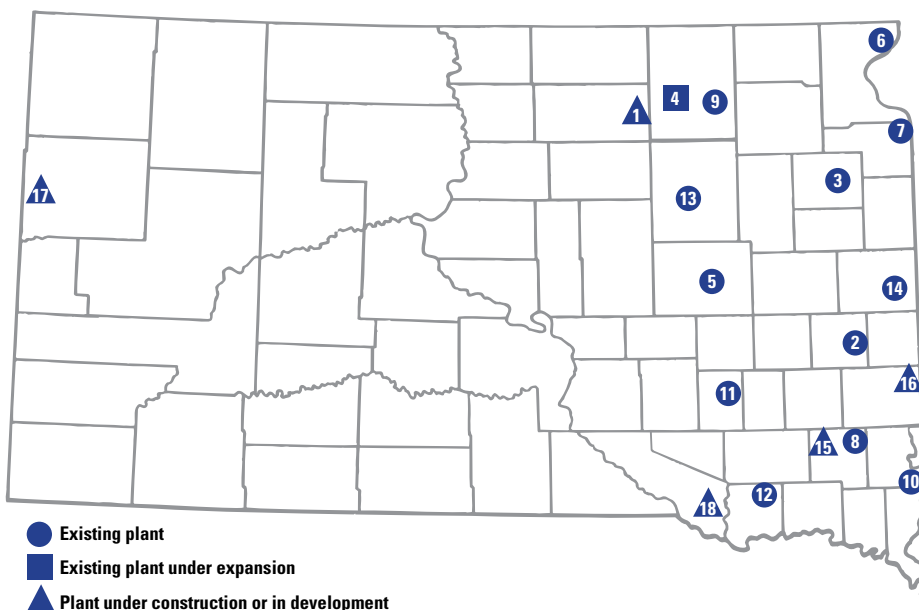
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As the push for biorenewable fuels continues to increase, the U.S. fuel ethanol industry is growing. South Dakota has been a leader in ethanol production, and will likely continue to be for years to come. Because the fuel ethanol industry’s effects are going to increasingly impact our state, it is important to be aware of the important facets of the industry here in South Dakota. This article will summarize the current status of the ethanol industry and briefly discuss historic production data.

The ethanol industry is having a substantial impact on the state’s economy. According to the South Dakota Corn Utilization Council (SDCUC, 2008), the South Dakota ethanol industry generates approximately 10 cents of new local income for every dollar of ethanol produced, which translated into over \$340 million of total added wealth to South Dakota citizens during the year 2004. Overall, South Dakota’s fuel ethanol industry annually generates over \$1.1 billion in economic activity in the state.

There are currently 13 ethanol plants operating in the state, and they produce approximately 726 mgy (million gallons per year) in total, which is 8.5% of the nation’s ethanol supply. Two additional plants are currently under construction, and one is undergoing expansion. Once these three projects are completed, they will yield an additional 240 mgy of ethanol, bringing the total production capacity of the state to approximately 966 mgy. Information about South Dakota’s ethanol plants can be found in figure 1 and table 1.

Figure 1. Locations of ethanol plants in South Dakota (based on RFA, 2008; SDCUC, 2008). More information about each plant is provided in table 1.



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Table 1. Ethanol plants in South Dakota (based on RFA, 2008; SDCUC, 2008).

	Company	Location	Year Online	Current Ethanol Capacity (mgj)¹	Estimated Corn Used (million bu/year)²	Estimated Coproducts Produced (thousand tons/year)²	Under Construction/Expansion (mgj)¹
1	Aberdeen Energy	Mina	2008 ³	0	0	0	100
2	Dakota Ethanol, LLC	Wentworth	2001	52	19.3	173.3	0
3	Glacial Lakes Energy, LLC	Watertown	2002	100	37.0	333.3	0
4	Heartland Grain Fuels, LP	Aberdeen	1993	9	3.3	30.0	40
5		Huron	1999	30	11.1	100.0	0
6	North Country Ethanol, LLC	Rosholt	2000	28	10.4	93.3	0
7	POET	Big Stone City	2002	75	27.8	250.0	0
8		Chancellor	2003	50	18.5	166.7	0
9		Groton	2003	52	19.3	173.3	0
10		Hudson	2004	55	20.4	183.3	0
11		Mitchell	2006	60	22.2	200.0	
12		Scotland	1988	15	5.6	50.0	0
13	Redfield Energy, LLC	Redfield	2007	50	18.5	166.7	0
14	VeraSun	Aurora	2004	150	55.6	500.0	0
15		Marion	2008 ³	0	0	0	100
16	Buffalo Ridge Energy ⁴	Sherman					50
17	Pro-Eco Energy ⁴	Belle Fourche					100
18	Wagner Native Ethanol ⁴	Wagner					50
South Dakota Summary Statistics							
South Dakota Capacity				726	268.9	2,420.0	240
Percent of National Total (%)				8.5			4.7
National Summary Statistics							
Total Current Capacity with 147 Ethanol Plants				8,522.4	3156.4	28,408.0	
Total Under Construction (55 Plants) / Expansion (6 Plants)							5,083.5
Potential National Capacity				13,605.9			

¹ mgj denotes million gallons per year of ethanol produced.

² Estimates are based on 1 bu of corn yielding approximately 2.7 gal of ethanol and 18 lb of DDGS.

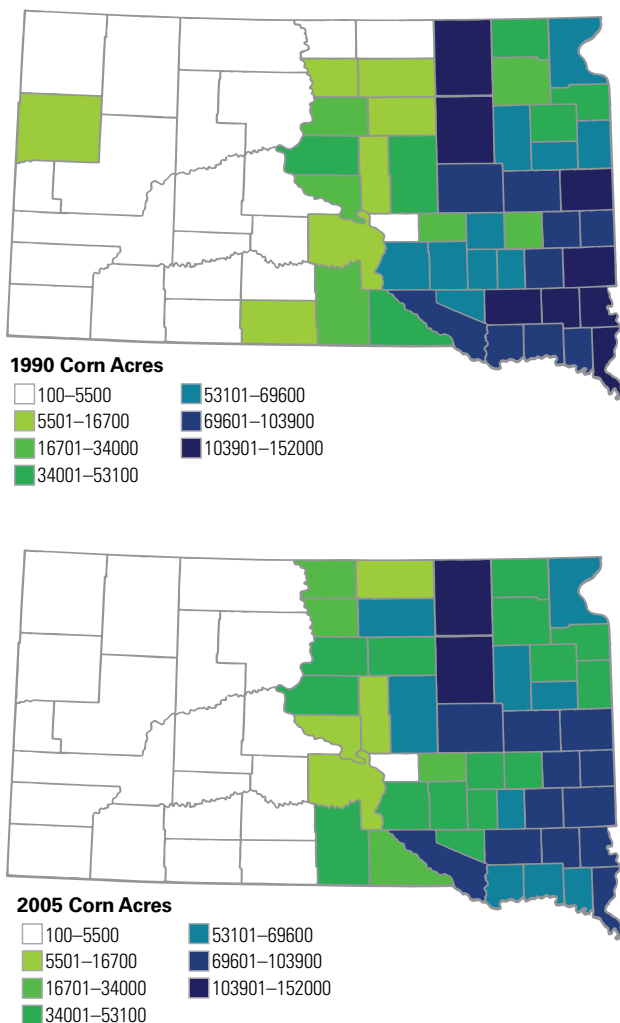
³ Anticipated to be operational.

⁴ These three plants are currently in the exploratory phase only and are thus not included in the summary statistics.

All plants in the state currently use corn as a feedstock, although this may change as the industry evolves over time. Lignocellulosic materials such as corn stover, switchgrass, or other perennial grasses might become attractive feedstocks for ethanol production once the processing and fermentation technology becomes economically competitive and commercially available.

The quantity of corn grown in South Dakota has been expanding since the late 1970s. This has been due, in part, to the growth of the ethanol industry itself, though there are other factors, such as new hybrids and improved yields. All of these factors have led to more corn being grown in South Dakota, especially east of the Missouri River (fig. 2). The first ethanol plant in

Figure 2. South Dakota corn acreage has been shifting over time. (Adapted from NASS, 2008.)



South Dakota was built in Scotland, in 1988, but the expansion of the state’s ethanol industry didn’t really begin until the late 1990s. From then on there was rapid growth, not just in South Dakota, but throughout the Midwest’s corn-producing states. For the last several years South Dakota has led the nation in the percentage of the state’s corn crop destined to produce ethanol (fig. 3). In 2007, for example, nearly 50% of the state’s corn supply was converted into ethanol (based on NASS, 2008; RFA, 2008; SDCUC, 2008); this fraction may grow in the next few years as additional plant capacities expand and new plants come online.

Right now the increasing use of corn is an opportunity for South Dakota’s corn producers; it is not only an avenue for boosting corn use and sales, it also has potential benefits to the investors in the industry. However, there are issues we need to be aware of as the industry grows. On the corn-production side, the supply of corn to the ethanol plants will need to be reliably consistent in both quality and quantity. From the livestock standpoint, it is important to note that corn may be diverted away from livestock feed and used for ethanol production. However, coproducts resulting from ethanol production can replace some of the need for corn in livestock diets. These coproducts, known as distillers grains, can be successfully incorporated into many livestock diets, although it is often not a one-

Figure 3. Historic South Dakota corn production data. (Adapted from NASS, 2008; RFA, 2008; SDCUC, 2008.)

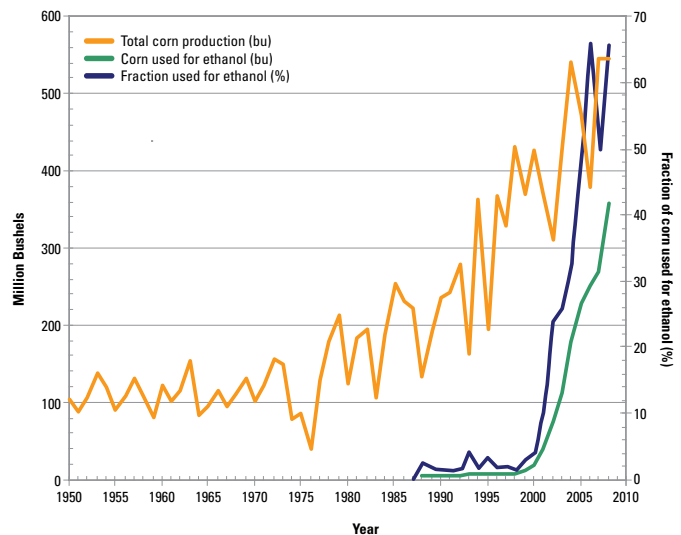


Table 2. SDSU Extension publications discussing use of ethanol coproducts in livestock diets.

SDSU publication	Title	Online address
Beef		
ExEx2036	Feeding Corn Distiller's Co-Products to Beef Cattle	http://agbiopubs.sdstate.edu/articles/ExEx2036.pdf
Dairy		
ExEx4022	Distillers Grains for Dairy Cattle	http://agbiopubs.sdstate.edu/articles/ExEx4022.pdf
ExEx4025	Economics of Feeding Distillers Grains to Dairy Cows	http://agbiopubs.sdstate.edu/articles/ExEx4025.pdf
ExEx4030	Use of By-products in Growing Heifer Diets	http://agbiopubs.sdstate.edu/articles/ExEx4030.pdf
Sheep		
ExEx2052	Feeding Soy Hulls and Dried Distillers Grain with Solubles to Sheep	http://agbiopubs.sdstate.edu/articles/ExEx2052.pdf
ExEx2053	Using DDGS in Mixed Lamb Diets	http://agbiopubs.sdstate.edu/articles/ExEx2053.pdf
Swine		
ExEx2035	Use of Distillers Dried Grains with Solubles (DDGS) in Swine Diets	http://agbiopubs.sdstate.edu/articles/ExEx2035.pdf
Storage		
ExEx4029	Ensiling Wet Distillers Grains with Other Feeds	http://agbiopubs.sdstate.edu/articles/ExEx4029.pdf
Mycotoxins		
ExEx4038	Mycotoxins in Corn Distillers Grains: a Concern in Ruminants?	http://agbiopubs.sdstate.edu/articles/ExEx4038.pdf

to-one replacement. The nutrient profiles of distillers grains often complement that of other currently underutilized and less nutrient-dense feedstuffs, such as corn stover. Optimal use and inclusion rates will vary by species and age; more information is available in the SDSU Extension publications mentioned in table 2.

The continued growth of the ethanol industry in South Dakota will go hand in hand with the price of fossil fuels. This growth will likely spur the development of new ethanol plants and the expansion of existing plants. More research will need to be devoted to increasing the efficiency of energy production from corn. Similarly, coproducts of ethanol processing will

undergo changes in their nutrient composition, which will thus require the generation of additional knowledge to help guide appropriate uses for these new materials. South Dakota is in a position to continue to be among the leaders in biofuels.

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