Renewable Energy & Climate Change Newsletter

AgMRC agricultural marketing resource center

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in this issue...

prices, profitability and supply/demand

The following spreadsheets have been updated on the AgMRC Renewable Energy web site, http://www.agmrc.org/renewable_energy/.

prices
- midwest ethanol prices
- ethanol basis
- fuel vs. grain (annual)
- fuel vs. grain (monthly)

profitability
- ethanol profitability
- corn profitability
- biodiesel profitability

supply/demand
- corn/ethanol balance sheet
- soy oil biodiesel balance sheet
- soybean balance sheet
- distillers grains balance sheet

The Ethanol Blenders' Tax Credit, Part II

By Dr. Robert Wisner, biofuels economist

This is the second of two articles discussing the benefits of ethanol blenders' tax credits.

In this article we will examine whether the ethanol blenders' credit is needed when the industry has blending mandates. We will look at what the impact might be from a failure to renew the tax credit as well as import taxes on ethanol.

Ethanol-related tax policies coming to the forefront

Unless Congress renews them, both the 45 cents per gallon ethanol blenders' tax credit and the U.S. tax on imported ethanol will expire at the end of 2010. The blenders' tax credit has been in existence in some form for decades, although it was reduced by $.06 per gallon in 2009. Its purpose has been to encourage growth of the domestic fuel ethanol industry, reducing dependence on foreign oil, and encouraging growth in employment and economic activity in rural areas where most ethanol plants are located. The import taxes have been a companion policy, designed to prevent the subsidy to the domestic ethanol industry from being passed on to foreign ethanol producers. When ethanol is imported into the U.S. for motor fuel, firms that blend it with gasoline receive the blenders' tax credit. Thus, the import taxes were designed to offset the blenders' credit which otherwise would be built into the value of imported ethanol. In reality, the import duty at 54 cents per gallon and the 2.5% ad valorem tariff (tax) together have modestly exceeded the blenders' tax credit, thus creating a U.S. market disadvantage for imported ethanol.(1)

At this writing, the disadvantage for taxable imports is about 13 cents per gallon, approximately 8% of the recent value of ethanol, or – in corn equivalent – about 36.4 cents per bushel. Another way of putting this import disadvantage in perspective is that it is equivalent to 100% of our estimated northern Iowa ethanol producer's individual plant return over variable costs for the month of April, 2010. (2)

Caribbean Basin Initiative import tax exclusion

There is an exception to this import tax disadvantage for a small amount of imported ethanol. The U.S. Caribbean Basin Initiative (CBI) waives the import tax on ethanol processed in Caribbean countries and shipped to the U.S., for imports of up to 7% of the total U.S. ethanol supply.(3) At this marketing year (September 2009-August 2010) rate of production, the exclusion is about 911 million gallons of CBI ethanol. That's equivalent to the ethanol production from about 325 million bushels of corn.

Key questions for policy-makers

A key question for policy-makers is whether failure to renew the blenders' tax credit and the import taxes would materially affect the profitability of the U.S.

ethanol industry. It is generally expected that if one is not renewed, the other one also will not be renewed. The answer to this question is quite important to ethanol investors and producers, corn and milo growers, the livestock industry, the petroleum industry, grain elevators, other users of corn, input suppliers to the corn and soybean industries, and others affected by corn demand. A closely related question is "What would the market impacts be from failure to renew these policies?" In this article, we examine potential effects of eliminating these tax policies on the relative economic position of domestic vs. foreign ethanol producers. We also look at potential effects on expansion of the U.S. ethanol market, especially for E-85, and impact on potential market size vs. mandated market size for all types of ethanol from the 2007 U.S. energy legislation. Some groups argue that the U.S. ethanol industry has matured to the point where the subsidies are no longer needed and that government mandated blend levels make them unnecessary and costly to tax payers. Others indicate that the blenders' credit is still very important in maintaining profitability of the domestic ethanol industry and in encouraging long-term market growth. They point out that failure to renew the biodiesel blenders' tax credit, despite government biodiesel mandates, has resulted in a sharp drop in U.S. biodiesel production and serious financial pressure in that industry.

Considerations related to government blending mandates

Several aspects of U.S. government biofuels policies are important in assessing possible impacts of failing to renew the blenders' tax credit and the import taxes, including the following:

- With the mandates, gasoline refiners, wholesalers, and some retailers have no choice but to blend ethanol with gasoline. However, if the market is saturated, the blending mandates run into a collision course with the actual market. With current allowable blends, the one market that might provide some relief from market saturation is the E-85 market (a blend of 85% ethanol and 15% gasoline).
- Consumers are not forced to buy E-85. To entice them to buy this product, it must be at least as valuable to them as E-10 and/or E-0, and they must have flex fuel vehicles.
- Because of E-85's sharply lower energy content per gallon vs. gasoline and E-10, ethanol sold as E-85 needs to be priced about 28% lower per gallon than gasoline and substantially lower than ethanol sold as E-10. (4)
- Government blending mandates specify only the quantity, not the geographic source of ethanol to be blended in gasoline.
- Ethanol producers' profitability margins have been quite tight for much of the last two years, even to the point of forcing a substantial number of plants into bankruptcy.
- Lowering the ethanol price to keep E-85 competitive while at the same time removing the blenders' tax credit would further worsen profitability margins of domestic ethanol producers – unless corn prices weakened proportionately.

The blenders' tax credit: current effects

Last month we looked at the question of who ultimately receives benefit from the blenders' tax credit. Examples from recent market conditions in Iowa indicated it has been shared largely by blenders, retail fuel suppliers, and consumers, although that has not always been the case.(5) Under recent market conditions, the E-10 ethanol market appears to be approaching a saturation point known as the "blend wall". By passing a large part of the blenders' credit on to consumers, the market has been attempting to expand the demand for ethanol in the E-85 market segment. The E-85 market size is limited by:

1) a small percentage of the total vehicle fleet that is flex-fuel vehicles and
2) a small percentage of retail motor fuel stations that offer E-85 blends.

Although this market is small, some further expansion in it is possible if the product is priced cheaply enough relative to gasoline to offset lower fuel mileage accompanying it. Competitive pricing requires that E-85 be priced about 28% below E-0 to offset the 34% lower energy content of ethanol (vs. E-0) and a sharp reduction in fuel mileage that stems from ethanol's lower energy content. In the years ahead, policy-makers hope the E-85 market will expand sharply to accommodate government mandates for both increased corn-starch ethanol and large production of cellulosic ethanol. Without a large E-85 market, potential opportunities for cellulosic ethanol are likely to be quite limited. Production of flex-fuel vehicles is almost certain to increase sharply in the next several years, but that alone is not enough to ensure a large E-85 market. At current wholesale prices of ethanol, a 28% reduction in price to ensure competitiveness in E-85 markets amounts to around 45 cents per gallon. That is about equivalent to the 45 cents blenders' tax credit. If the blenders' tax credit is allowed to expire, wholesale ethanol prices will have to be low enough to compensate for the loss in value of 45 cents per gallon, thus reducing the profitability of both corn-starch and future production of cellulosic ethanol. Production costs for cellulosic ethanol are generally expected to be significantly higher than those for corn-starch ethanol. Thus, expiration of the blenders' tax credit would be expected to hurt cellulosic ethanol relatively more than corn-starch ethanol.

Higher ethanol blends are a key variable

The ethanol blending wall is due partly, from a short-term standpoint, to infrastructure limitations. These limitations have been steadily reduced for several years and will continue to be reduced. However, for the longer term, the market size is limited by the maximum ethanol-gasoline percentage that the Environmental Protection Agency (EPA) allows for conventional vehicles. If ethanol blends of E-12 to E-15 are allowed for all gasoline-powered vehicles, the blending wall and ethanol market saturation could be avoided for several years. Enforcement of blending mandates could then remove or reduce the need for lower ethanol prices by forcing the wholesale and retail fuel

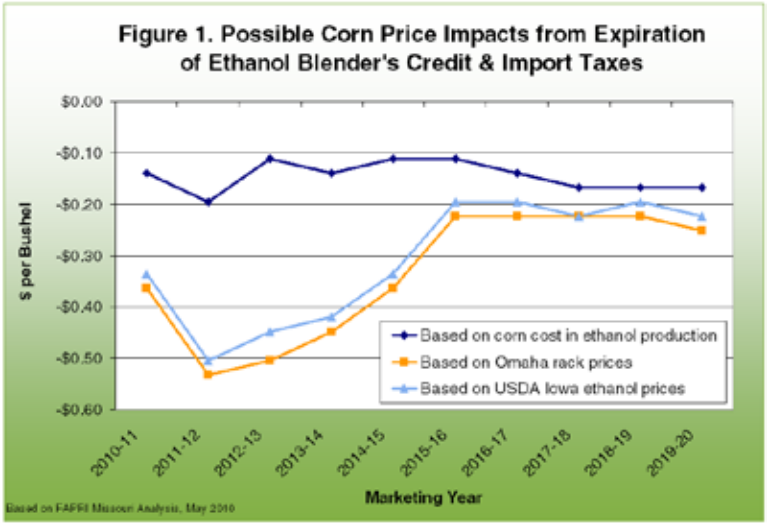
markets to pay whatever price is needed to acquire the mandated volumes of ethanol. The higher ethanol prices could then be passed on to consumers, possibly without lowering corn prices even if the blenders' tax credit is eliminated.

EPA currently is studying the feasibility of increasing the allowable ethanol blend to E-15 (15% ethanol and 85% gasoline) and is expected to make a decision in late summer or fall of this year. Indications so far are that if E-15 is approved, it will only be for 2001 and newer vehicles and flex-fuel models. If so, additional infrastructure limitations that are likely to result that will hinder the expansion in the ethanol market. At this writing, Archer Daniels Midland, a major ethanol producing company, has just asked EPA to consider allowing E-11 or E-12 blends for use in all gasoline vehicles. If approved, this would likely push the blending wall forward one to three years, thus setting the stage for the mandates to continue determining the minimum amount of ethanol used in U.S. motor fuel nationally. If E-11 or E-12 is approved, it would thus assist the ethanol industry in coping with possible loss of the blenders' credit. However, there are other important dimensions to this situation.

Failure to renew the blenders' credit: corn price impact

Economists at the Farm and Agricultural Policy Research Institute (FAPRI) at the University of Missouri, Columbia recently used its large long-term projections model to analyze impacts related to failure to renew the blenders' tax credit. Its analysis indicated the corn portion of the ethanol production cost would drop moderately from its baseline analysis, with the amount of change varying from year to year. The actual amount of change would depend on a number of dynamic variables that are difficult to predict including the crude petroleum price, whether allowable intermediate ethanol-gasoline blends will be approved for conventional vehicles, and technological changes in ethanol production. The FAPRI analysis acknowledges that a "blend wall" likely exists, but does not analyze short-term market reactions that may occur before the market and/or government policies can adjust to it. If the current tax policies are allowed to expire, the indicated lower corn costs per gallon of ethanol production from FAPRI's analysis would translate into a reduction in U.S. farm prices for corn prices of approximately 11 to 20 cents per bushel. That is the conversion from cost per gallon to a per bushel impact, based on current average ethanol yields of 2.8 gallons per bushel.(6) The estimated impact varied somewhat from year to year, as shown in Figure 1.

With lower corn prices, one would expect ethanol prices over time to also decline, thus creating some benefit for consumers. FAPRI's analysis indicated ethanol prices would decline substantially. The equivalent decline in the value of corn if all of the reduced ethanol value was reflected in corn prices is also shown in Figure 1, for FAPRI's assessment of the Omaha rack (wholesale) prices and Iowa at-plant ethanol prices reported by USDA. The declines are similar for these two markets. Lower ethanol values in corn equivalent are in cents per bushel, again assuming the ethanol yield is 2.8 gallons per bushel. It is clear from Figure 1 that the analysis indicates not all of the drop in ethanol value would go to corn growers. The large difference between the models indicated a drop in corn cost and the decline in wholesale ethanol prices suggests that ethanol plants would face a severe reduction in margins and sharply reduced values of their biorefineries. The industry would find it necessary to downsize production to the point where ethanol prices at least cover costs.

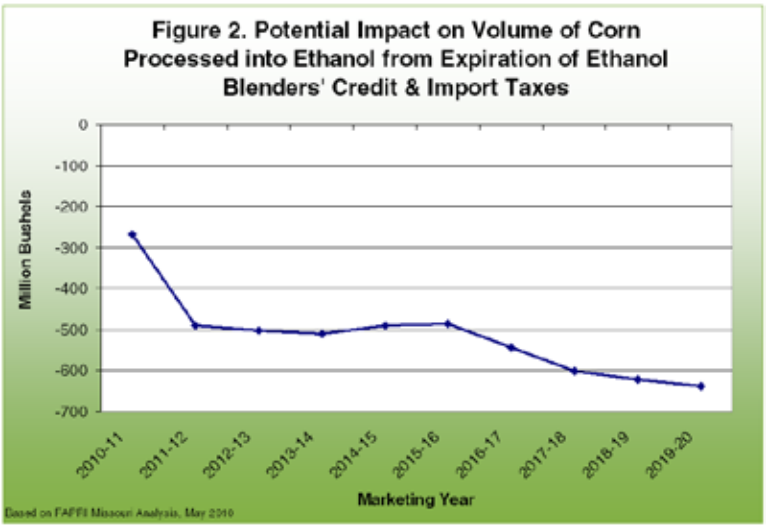


The large differential between ethanol price reductions and the reduced cost of corn is especially pronounced in the early part of the period, but is much less starting in 2016-17, when the mandated blending of corn-starch ethanol levels off after several years of rapid increases.

Impact on corn volume processed into ethanol

The FAPRI analysis indicates that the volume of ethanol produced from corn would decline considerably from the baseline analysis if the blenders' tax credit and the import taxes are allowed to expire. Government mandated quantities of ethanol blending prevented a larger negative impact on corn volume as well as prices, but did not completely eliminate the negative effects. Figure 2 shows the indicated reduction in the volume of corn processed into ethanol if these policies are allowed to expire. We calculated the volume of corn affected by dividing FAPRI's estimated reductions in ethanol production by 2.8 gallons per bushel of corn. Indicated reductions in the volume of corn to be processed for ethanol after 2010-11 ranged from 485 to about 640 million bushels per year, with the impact increasing as time goes on.

These are not insignificant volumes from the standpoint of corn growers and the



industries that support the corn industry. They are equivalent to production from 3 to 4 million acres with a normal U.S. average yield. The net effects on corn volume and prices would be positive for non-ethanol users of corn including the domestic livestock and poultry industries and their foreign counter-parts who rely heavily on U.S. corn.

Imports could supply a portion of EISA ethanol mandates (7)

The Energy Independence and Security Act of December 2007 mandates the annual volumes of various types of renewable fuels to be blended with U.S. gasoline through 2022. However, it does not specify that the renewable fuels must be produced in the U.S. The most logical foreign substitute for U.S. corn-starch ethanol is ethanol produced from sugar cane in Brazil. Brazil exported sizeable quantities of ethanol to the U.S. directly as well as indirectly through Caribbean Initiative countries until the current marketing year. Our Brazilian contacts indicate production costs there historically have been substantially less than for corn-starch ethanol in the U.S. However, the cost situation changed substantially in the current 2009-10 ethanol marketing year, due to a sharp rise in world sugar prices. Because of higher sugar prices, Brazilian firms processed a higher percentage of their sugar cane into sugar, with less going into ethanol production. At this writing, there are reasons to believe the increased cost of Brazilian ethanol was due in large part to weather problems in important foreign sugar-producing countries. If so, we would expect its exports to increase in the future. Recent trade reports indicate international sugar prices have fallen by about 50% in the last several months. The Brazil ethanol industry has developed extensive infrastructure for exporting ethanol including a pipeline to supply exporting facilities, and has substantial additional land that could be used for sugar production.

Another possible source of foreign-based ethanol is through U.S. domestic processing of Mexican sugar into ethanol. The U.S. sugar program supports sugar prices above world levels through domestic marketing allotments and Tariff-rate Import Quotas (TRQ's). Excess domestic production beyond marketing quotas can be used for ethanol production. Agricultural legislation in 2008 specified that with the North American Free Trade Agreement (NAFTA) requiring the U.S. to allow duty-free imports of Mexican sugar, excess sugar imported from Mexico can also be used for production of ethanol in the U.S.(8) Over time, this could be an additional source of ethanol production for EISA mandates, with or without renewal of ethanol import taxes. Industry sources believe ethanol production from sugar will be lower cost than that from corn starch. Expiration of the ethanol import taxes would not change the competitive position of this source of ethanol relative to corn-starch ethanol, if both receive the same blenders' tax credit. However, ethanol production from Mexican sugar could be a source of advanced biofuel for the EISA mandates. If the blenders' credits are continued in their present form, the larger tax credit for advanced biofuels would make sugar-based ethanol more competitive with corn-starch ethanol than if all blenders' tax credits were allowed to expire.

Mexican sugar cane production is about 50% larger than in the U.S. and has been increasing for the last five decades. Its domestic prices often are above those of the U.S., due a restrictive import system that has some similarities to U.S. policies.(9) Mexico's sugar exports have fluctuated from year to year. In 2009, U.S. imports of Mexican sugar on a raw sugar basis totaled 1.272 million metric tons, approximately double the volume of the previous year.(10) Future import volumes of Mexican sugar are uncertain but could provide some increased competition in U.S. ethanol markets.

Concluding comments

Blenders' tax credits and ethanol import taxes have been an integral part of U.S. biofuels policy for a number of years. They are generally viewed as companion policies since the import tax prevents foreign ethanol producers from receiving the subsidy that is intended to stimulate domestic ethanol production and use. More recently, federally mandated biofuels production levels that increase annually to 2022 were initiated with the late 2007 energy legislation. Some groups argue that because of the mandates, there is no need for ethanol blending subsidies. Their reasoning is that the fuel industry is required to blend prescribed amounts of ethanol with gasoline and that, if necessary, it can bid up ethanol prices to whatever level is needed to obtain the necessary supply. That process might work better if the ethanol "blend wall" can be eliminated. At this time, the main way of eliminating the blend wall is to expand the E-85 market, but that requires ethanol to be priced at about 34% less (with E-85 priced about 28% less) than gasoline to offset its lower fuel mileage. The E-85 market is limited in size because of the small number of

flex-fuel vehicles that can use it. Blenders' tax credits help to permit lower ethanol prices while moderating the influence the lower prices would otherwise have on profitability of ethanol producers and/or corn growers. The blenders' tax credit may have an increasingly important role as the industry seeks to expand the E-85 market.

If EPA allows intermediate blends higher than E-10 for conventional vehicles, such as E-12 to E-15, the mechanism for federally mandated forcing of ethanol blending levels into the nation's fuel supply might work more successfully without blenders' tax credits and import taxes than if the only fuel ethanol markets are E-10 and E-85. The reason for this is that the E-85 market is restricted to flex-fuel vehicles, which are in very limited supply, and is purchased voluntarily by consumers. Without the blenders' credit, its required low price to offset sharply lower fuel mileage would severely depress profit margins of ethanol producers unless offset by sharply lower feedstock (corn) costs. The 45 cents per gallon tax credit, if absorbed entirely through lower corn prices, would amount to about $1.26 per bushel. That in turn would put downward pressure on cropland prices.

A recent FAPRI-University of Missouri analysis indicates that even without a blend wall market constraint, expiration of the blenders' tax credit and ethanol import taxes would have negative impacts on ethanol prices and production. We have translated these impacts into cents per bushel and millions of bushels of impact. Magnitudes involved would almost certainly have negative effects either on corn prices or starch and cellulosic ethanol profitability or both.

If the blenders' tax credit is allowed to expire, many would take the view that it would remove the main justification for ethanol import taxes. Import taxes more than offset the blenders' tax credit that is received when imported ethanol is blended with gasoline in the U.S. Thus, the import taxes create a penalty for importing ethanol into the U.S. The penalty is substantial when compared with recent returns over variable cost for domestic ethanol plants. If it is removed, we would expect domestic ethanol producers to face increased competition from imported ethanol and negative pressure on profit margins, both as a competitor of corn-starch ethanol and as a source of advanced biofuel mandated by U.S. energy legislation. The most likely source of increased ethanol imports is Brazil, although recent policy changes may cause imports of Mexican sugar to be processed into ethanol in the U.S. Both of these import sources might help meet mandated blending levels for advanced biofuels, in competition with the anticipated development of a domestic cellulosic ethanol industry.

References

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2 Monthly returns over variable costs are from Ag Marketing Resource Center web site, "Corn-Ethanol Profitability", and Don Hofstrand, "Iowa ethanol corn supply chain profitability" AgMRC Renewable Energy and Climate Change Newsletter, April 2010.

3 ERS, USDA, "Next-Generation Biofuels: Near-Term Challenges and Implications for Agriculture", Amber Waves, June 2010, and Paul Wescott, "U.S. Ethanol Expansion Driving Changes Throughout the Agricultural Sector", Amber Waves, November 2007.

4 Robert Wisner, "The Ethanol Blenders' Tax Credit, Part I: Who gets the benefits?", AgMRC Renewable Energy and Climate Change Newsletter, June 2010.

5 Robert Wisner, "The Ethanol Blenders' Tax Credit, Part I: Who gets the benefits?", AgMRC Renewable Energy and Climate Change Newsletter, June 2010.

6 FAPRI, University of Missouri-Columbia, US Biofuel Baseline, Briefing Book Projections for agricultural and biofuel markets, FAPRI-MU Report #04-10, May 2010, Columbia, Missouri.

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10 Economic Research Service, USDA, "Sugar and Sweeteners Yearbook Tables: World Production, Supply, and Distribution", June 19, 2010.

U.S. Distillers Grains Supply-Use Under E-10, E-12 and E-15

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This article examines how U.S. corn supply-demand balances are likely to be effected by expanding the proportion of ethanol allowed to be mixed in U.S. fuels from 10% (i.e., E-10), to 12% (E-11) and 15% (E-15) over the next decade. June 2010 USDA World Agricultural Supply-Demand Estimates (WASDE) and 2010 USDA Agricultural Projections of grain and livestock supply, use and agricultural commodity prices for the 2010 through 2019 period are used as a basis for this analysis. United States corn and livestock supply-use projections were taken "as is" from this source with only minor adjustments. Information on 2010 USDA Agricultural Baseline Projections are available online.

Expansion in allowable ethanol fuel blends from E-10 to either E-12 or E-15 is projected to have a marked impact on total supplies and uses of both corn and distillers grains. This analysis combines U.S. corn and distillers dried grain with solubles (DDGS) (in corn equivalents) into one inclusive supply-use balance sheet, showing the projected impact and tradeoffs of expanded grain ethanol production and DDGS.

A key assumption in this analysis is that DDGS substitutes for corn in livestock feed rations on a pound- for-pound or 1-for-1 basis. It is also assumed that domestic uses of total U.S. corn plus DDGS (in corn equivalents) will be maintained over time at the expense of foreign uses (i.e., exports). Another key assumption is that alternative uses of corn and DDGS will be rationed by market forces in such a manner so that ending stocks of U.S. corn will not be drawn down below the 900 million to 1 billion bushel level over the next decade under normal corn production scenarios (i.e., no unforeseen crop production shortfalls). Finally, is also assumed that all DDGS produced in a particular marketing year are used in that same period, i.e, that ending stocks of DDGS effectively equal zero at the end of each U.S. corn marketing year during the MY 2010-11 through MY 2019-20 period. The assumptions regarding the priority of domestic uses as opposed to export use and of maintaining minimal U.S. corn ending stocks levels are critical determinants of the results of the following analysis.

See the June 2010 AgMRC Renewable Energy and Climate Change newsletter article on "Measuring Supply-Use of Distillers Grains in the United States" for a related article on the issue of combining corn and DDGS together in a single supply-demand balance sheet and for an explanation of how the USDA Agricultural Projections for 2010-19 were adopted for use in this analysis.

USDA agricultural projections for 2010-2019

As stated by the USDA Economic Research Service, the USDA Agricultural Projections for 2010-19, released in February 2010, provide long run projections for the United States farm sector for the next decade. The following analysis incorporated updated USDA WASDE U.S. corn supply demand report estimates with the original baseline assumptions to examine changes in U.S. bioenergy policy as pertains to U.S. ethanol production and use.

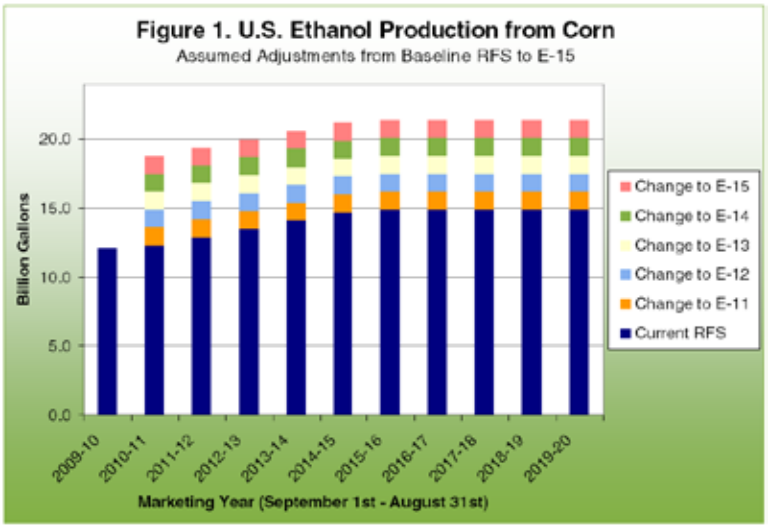
U.S. ethanol & ddgs production under differing ethanol use policy scenarios

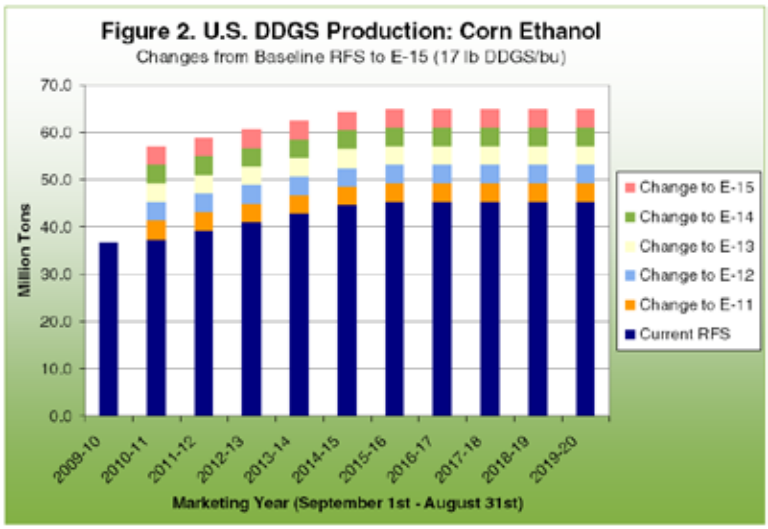
For each 1% increase of ethanol allowed in U.S. gasoline blends, it is assumed that 1.3 billion gallons more ethanol will be produced each year with requisite increases made in the U.S. Renewable Fuels Standard (RFS). Figure 1 illustrates how increases of 1% in allowable U.S. ethanol use in blended fuels (i.e., from E-10 to E-11, etc.) would affect U.S. ethanol production in each U.S. corn marketing year through MY 2019-20. Figure 1 likely overstates the ability of the U.S. ethanol industry to quickly increase production capacity to supply the amount of ethanol required to fully supply higher ethanol blends (say, E-14 or E-15) during the early years of adjustment. Total U.S. ethanol production would be projected to increase to as much as 21.36 billion gallons by U.S. corn MY 2015-16 under an E-15 ethanol inclusion policy regime.

Increases in U.S. ethanol production associated with increasing gasoline blend proportions would also bring about increases in DDGS production (Figure 2). For each 1.3 billion gallons of addition ethanol produced (i.e., plus 1% of allowable ethanol in gasoline fuel blends), an additional 464.3 million bushels (mb) of corn is used (1.3 bln. gal ÷ 2.8 gallons of ethanol per bushel). If for each bushel of corn used in ethanol production, 17 pounds of DDGS are produced, then a 1% increase in allowable ethanol mixture in gasoline blends will produce 7,893.9 million pounds of DDGS (3.95 million short tons). Whereas with current U.S. ethanol policy (i.e., E-10), 44.5 million tons of DDGS production from U.S. corn are projected for MY 2015-16, for E-15 an additional 19.7 million tons (i.e., 64.2 million tons) of DDGS would be produced during the same marketing year.

Baseline E-10 scenario for U.S. corn plus ddgs supply-demand

The expanded, combined U.S. corn and DDGS supply-demand balance sheet in Table 1 is patterned after the U.S. corn supply-demand tables provided in monthly USDA WASDE reports. Along with standard WASDE report estimates of corn usage for ethanol production, non-ethanol food, seed and industrial use, exports, and feed and residual use, this table also provides estimates of DDGS production, feed use and exports. A 1 pound of DDGS to 1 pound of corn weight relationship is assumed in this combined table, allowing for DDGS to be represented on the basis of 56 pound or "bushel" equivalent units (i.e., $DDGS_{cn\ equiv}$). Combined U.S. corn





and distillers grains supply-use projections for MY 2010-11 through MY 2019-20 are presented.

Table 1 shows that under the current E-10 ethanol fuel inclusion regulations, U.S. corn ethanol production use, DDGS cn equiv production, feed use of corn and $DDGS_{cn\ equiv}$, and exports of corn and $DDGS_{cn\ equiv}$ are projected to increase until MY 2015-16, but then remain steady through MY 2019-20. Exports of DDGS are assumed to be 21% of annual DDGS production throughout the MY 2010-11 through MY 2019-20 period (see Wisner 2010). This analysis assumes that all $DDGS_{cn\ equiv}$ produced are used in the same marketing year. There is no accumulation of ending stocks of $DDGS_{cn\ equiv}$ because of their bio-degradable properties. Accordingly, only corn ending stocks are assumed to be non-zero in this corn + $DDGS_{cn\ equiv}$ supply-demand table.

Although appreciable ending stocks of U.S. $DDGS_{cn\ equiv}$ are assumed to not exist (equal to zero), $DDGS_{cn\ equiv}$ feed use and exports are accounted for in figuring total use of corn and $DDGS_{cn\ equiv}$. The % ending stocks-to-use of corn plus $DDGS_{cn\ equiv}$ is marginally smaller than for corn alone (i.e., because total use of corn plus $DDGS_{cn\ equiv}$ is greater than total use of corn alone).

If as assumed in this analysis DDGS are a 1-to-1 substitute for corn in livestock feed rations, then standard U.S. corn supply-demand balance sheets at least marginally misrepresent livestock feed supply-demand balances in the U.S., implying a larger U.S. ending stocks-to-use ratio situation than actual exists when corn plus $DDGS_{cn\ equiv}$ are accounted for.

Impact of E-12 ethanol fuel blends on U.S. corn + ddgs supply-demand

If the allowable inclusion rate for ethanol in blended fuels in the U.S. were to be raised from 10% (i.e., E-10) to 12% (i.e., E-12), increases are projected in ethanol-related use of corn and DDGS production, feed use and exports (Table 2). Under the assumptions used in this analysis, reductions of approximately 26% in U.S. corn exports and of nearly 14% in U.S. corn ending stocks would occur if E-12 ethanol fuel blending rules were adopted. Key findings in regard to E-12 adoption are as follows:

- Under the assumptions used in this study, decreases in U.S. corn exports of 550-600 million bushels per marketing year would be needed to limit sizable reductions in U.S. corn ending stocks resulting from increased U.S. ethanol production (i.e., to E-12). Decreases of 100-150 million bushels in U.S. corn ending stocks per marketing year would still be projected to occur under the E-12 scenario relative to current E-10 baseline projections.
- For E-12 ethanol fuel blends, annual marketing year increases are projected in corn use for ethanol production of nearly 929 million bushels in comparison to currently allowable E-10 blends. Over the same period, the production and total use of DDGS (measured pound-for-pound as a substitute for corn in terms of "$DDGS_{cn\ equiv}$") is projected to increase by 198 million $DDGS_{cn\ equiv}$ "bushels" annually.
- The net result of E-12 adoption in fuel blends is tighter corn supplies than with E-10. Increased $DDGS_{cn\ equiv}$ bushels from E-12 adoption don't fully offset reduced corn feeding. Part (i.e., 21%) of the increased amount of DDGS that are produced under E-12 adoption are projected to compensate for reduced U.S. corn exports in this analysis.

Impact of E-15 ethanol fuel blends on U.S. corn + ddgs supply-demand

If the allowable inclusion rate for ethanol in blended fuels in the U.S. were to be increased from 10% (i.e., E-10) to 15% (i.e., E-15), major changes are projected to occur in ethanol-related use of corn and DDGS production, feed use and exports (Table 3). Under the assumptions used here, reductions of nearly 69% in U.S. corn exports would occur. Key findings in regard to E-15 adoption are as follows:

- Decreases in U.S. corn exports of approximately 1,550 million bushels per marketing year would be needed to limit extreme reductions in U.S. corn ending stocks over the 10 year period. Decreases of 100-150 million bushels in U.S. corn ending stocks per marketing year would still be projected to occur under this scenario relative to current E-10 baseline projections.
- For E-15 ethanol fuel blends, annual marketing year increases in corn use for ethanol production of nearly 2,321 million bushels are projected in comparison to currently allowable E-10 blends. Over the same period, production and total use of DDGS are projected to increase by 621 million $DDGS_{cn\ equiv}$ "bushels" annually.
- The net result of E-15 adoption in fuel blends would be tighter corn supplies than with E-10. Increased $DDGS_{cn\ equiv}$ bushels don't fully offset reduced corn feeding. Part of the increased amount of DDGS that would be produced under E-15 adoption are projected to compensate for reduced U.S. corn exports in this analysis.

Conclusions

Expansion in allowable ethanol fuel blends from E-10 to either E-12 or E-15 is projected to have a marked impact on total supply, use and ending stocks of both corn and distillers grains. In this analysis it is assumed that the total cumulative domestic use of corn and $DDGS_{cn\ equiv}$ for ethanol production, non-ethanol FSI use and livestock feeding would take precedence over the use of U.S. corn for exports (i.e., should domestic uses compete with corn exports). Consequently, U.S. corn exports are projected to be reduced to limit extreme declines in U.S. corn ending stocks. Even under these assumptions, reductions occur in U.S. corn ending stocks and tightening of projected ending stocks-to-use occurs for both U.S. corn alone and cumulative U.S. corn plus $DDGS_{cn\ equiv}$ for E-12 and E-15 ethanol production scenarios.

The projected tightening of U.S. corn plus $DDGS_{cn\ equiv}$ ending stocks-to-use would likely result in more volatile U.S. corn prices over time. Potential weather or disease threats to U.S. feedgrain production during the coming decade could cause an extreme tightening of U.S. corn ending stocks and spark sizable corn price volatility events during any particular marketing year – especially during the preharvest summer growing season for U.S. corn.

Declines in U.S. corn exports of the degree projected in this analysis under the E-12 and E-15 scenarios would have marked consequences on the World corn and broader coarse grain export market. In the June 10th USDA WASDE report the U.S. was projected to supply 56.5% of World corn exports in MY 2010-11 (i.e., 50.80 mmt of the World total of 89.93 mmt of corn exports). For the broader measure of world coarse grains (including grain sorghum, barley, oats, rye, millet and mixed grains), the U.S. is projected to supply 47.8% of World exports (i.e., 54.63 mmt of total World exports of 114.23 mmt). Reductions in corn exports as projected above for E-15 fuel blends would likely cause sizable and dramatic shifts in the structure World corn and coarse grain export markets and World usage.

More analysis needs to be carried on this topic. Under alternative sets of assumptions different outcomes are certainly possible and likely. The determination of whether domestic or foreign uses of U.S. corn and DDGS are more affected by U.S. energy policy changes in regards to ethanol could have critically important impacts on competitive uses of U.S. corn and on the profitability and sustainability of their associated domestic and/or foreign industries.

Table 1. E-10 Ethanol Production Scenario – Combined U.S. Corn & Distillers Grains Supply-Demand Projections

Based on USDA Agricultural Projections for 2010-2019 Marketing Years & the June 10, 2010 USDA WASDE Report

	U.S. Corn Marketing Year (September 1st – August 31st)									
	2010-11	**2011-12**	**2012-13**	**2013-14**	**2014-15**	**2015-16**	**2016-17**	**2017-18**	**2018-19**	**2019-20**
Planted Acres (million acres)	88.0	90.0	89.5	89.5	89.5	89.5	89.5	89.5	89.5	89.0
Harvested Acres (million acres)	81.8	82.8	82.3	82.3	82.3	82.3	82.3	82.3	82.3	81.8
Yields (bushels per acre)	163.5	162.4	164.4	166.4	168.4	170.4	172.4	174.4	176.4	178.4
Supply (million bushels)										
Beginning Stocks: Corn	1,603	1,573	1,570	1,550	1,510	1,479	1,428	1,406	1,414	1,457
Production: Corn	13,370	13,447	13,350	13,695	13,859	14,024	14,189	14,353	14,518	14,593
Production: $DDGS_{cn\ equiv}$	1,484	1,484	1,515	1,576	1,637	1,657	1,657	1,657	1,657	1,657
Imports: Corn	10	15	15	15	15	15	15	15	15	15
Total Supply: Corn + $DDGS_{cn\ equiv}$	**16,467**	**16,519**	**16,629**	**16,835**	**17,021**	**17,175**	**17,289**	**17,432**	**17,604**	**17,723**
Use (million bushels)										
Ethanol Use: Corn	4,700	4,700	4,808	5,022	5,236	5,307	5,307	5,307	5,307	5,307
Non-ethanol FSI: Corn	1,360	1,350	1,350	1,350	1,350	1,350	1,350	1,360	1,365	1,375
Exports: Corn	2,000	2,200	2,250	2,275	2,300	2,325	2,350	2,375	2,400	2,425
Exports: $DDGS_{cn\ equiv}$	300	300	307	320	334	338	338	338	338	338
Feed & Residual: Corn	5,350	5,275	5,300	5,325	5,400	5,500	5,575	5,650	5,725	5,800
Feed & Residual: $DDGS_{cn\ equiv}$	1,127	1,127	1,153	1,204	1,256	1,273	1,273	1,273	1,273	1,273
Total Use: Corn	**13,410**	**13,525**	**13,708**	**13,972**	**14,286**	**14,482**	**14,582**	**14,692**	**14,797**	**14,907**
Total Use: Corn + $DDGS_{cn\ equiv}$	**14,537**	**14,562**	**14,861**	**15,176**	**15,542**	**15,755**	**15,855**	**15,965**	**16,070**	**16,180**
Ending Stocks: Corn	1,573	1,510	1,407	1,288	1,098	1,036	1,049	1,082	1,150	1,158
Ending Stocks: $DDGS_{cn\ equiv}$	0	0	0	0	0	0	0	0	0	0
Total Ending Stocks Corn + $DDGS_{cn\ equiv}$	**1,573**	**1,510**	**1,407**	**1,288**	**1,098**	**1,036**	**1,049**	**1,082**	**1,150**	**1,158**
%Ending Stocks-to-Use: Corn	11.7%	11.2%	10.3%	9.2%	7.7%	7.2%	7.2%	7.4%	7.8%	7.8%
%Ending Stocks-to-Use: Corn + $DDGS_{cn\ equiv}$	10.8%	10.3%	9.5%	8.5%	7.1%	6.6%	6.6%	6.8%	7.2%	7.2%

Table 2. E-12 Ethanol Production Scenario – Combined U.S. Corn & Distillers Grains Supply-Demand Projections

Based on USDA Agricultural Projections for 2010-2019 Marketing Years & the June 10, 2010 USDA WASDE Report

	U.S. Corn Marketing Year (September 1st – August 31st)									
	2010-11	**2011-12**	**2012-13**	**2013-14**	**2014-15**	**2015-16**	**2016-17**	**2017-18**	**2018-19**	**2019-20**
Planted Acres (million acres)	88.0	90.0	89.5	89.5	89.5	89.5	89.5	89.5	89.5	89.0
Harvested Acres (million acres)	81.8	82.8	82.3	82.3	82.3	82.3	82.3	82.3	82.3	81.8
Yields (bushels per acre)	163.5	162.4	164.4	166.4	168.4	170.4	172.4	174.4	176.4	178.4
Supply (million bushels)										
Beginning Stocks: Corn	1,603	1,573	1,570	1,550	1,510	1,479	1,428	1,406	1,414	1,457
Production: Corn	13,370	13,447	13,350	13,695	13,859	14,024	14,189	14,353	14,518	14,593
Production: $DDGS_{cn\ equiv}$	1,625	1,625	1,656	1,717	1,778	1,798	1,798	1,798	1,798	1,798
Imports: Corn	10	15	15	15	15	15	15	15	15	15
Total Supply: Corn + $DDGS_{cn\ equiv}$	**16,608**	**16,659**	**16,770**	**16,976**	**17,162**	**17,316**	**17,429**	**17,573**	**17,745**	**17,863**
Use (million bushels)										
Ethanol Use: Corn	5,629	5,629	5,737	5,951	6,165	6,236	6,236	6,236	6,236	6,236
Non-ethanol FSI: Corn	1,360	1,350	1,350	1,350	1,350	1,350	1,350	1,360	1,365	1,375
Exports: Corn	1,375	1,575	1,626	1,652	1,677	1,703	1,728	1,753	1,778	1,803
Exports: $DDGS_{cn\ equiv}$	341	341	348	361	373	378	378	378	378	378
Feed & Residual: Corn	5,194	5,119	5,145	5,173	5,251	5,352	5,427	5,502	5,577	5,652
Feed & Residual: $DDGS_{cn\ equiv}$	1,284	1,284	1,308	1,356	1,405	1,421	1,421	1,421	1,421	1,421
Total Use: Corn	**13,558**	**13,673**	**13,858**	**14,125**	**14,443**	**14,640**	**14,740**	**14,850**	**14,955**	**15,065**
Total Use: Corn + $DDGS_{cn\ equiv}$	**14,841**	**14,956**	**15,165**	**15,482**	**15,848**	**16,061**	**16,161**	**16,271**	**16,376**	**16,486**
Ending Stocks: Corn	1,425	1,362	1,257	1,134	941	877	891	924	992	1,000
Ending Stocks: $DDGS_{cn\ equiv}$	0	0	0	0	0	0	0	0	0	0
Total Ending Stocks Corn + $DDGS_{cn\ equiv}$	**1,425**	**1,362**	**1,257**	**1,134**	**941**	**877**	**891**	**924**	**992**	**1,000**
%Ending Stocks-to-Use: Corn	10.5%	10.0%	9.1%	8.0%	6.5%	6.0%	6.0%	6.2%	6.6%	6.6%
%Ending Stocks-to-Use: Corn + $DDGS_{cn\ equiv}$	9.6%	9.1%	8.3%	7.3%	5.9%	5.5%	5.5%	5.7%	6.1%	6.1%

Table 3. E-15 Ethanol Production Scenario – Combined U.S. Corn & Distillers Grains Supply-Demand Projections

Based on USDA Agricultural Projections for 2010-2019 Marketing Years & the June 10, 2010 USDA WASDE Report

	U.S. Corn Marketing Year (September 1st – August 31st)									
	2010-11	**2011-12**	**2012-13**	**2013-14**	**2014-15**	**2015-16**	**2016-17**	**2017-18**	**2018-19**	**2019-20**
Planted Acres (million acres)	88.0	90.0	89.5	89.5	89.5	89.5	89.5	89.5	89.5	89.0
Harvested Acres (million acres)	81.8	82.8	82.3	82.3	82.3	82.3	82.3	82.3	82.3	81.8
Yields (bushels per acre)	163.5	162.4	164.4	166.4	168.4	170.4	172.4	174.4	176.4	178.4
Supply (million bushels)										
Beginning Stocks: Corn	1,603	1,573	1,570	1,550	1,510	1,479	1,428	1,406	1,414	1,457
Production: Corn	13,370	13,447	13,350	13,695	13,859	14,024	14,189	14,353	14,518	14,593
Production: $DDGS_{cn\ equiv}$	2,048	2,048	2,078	2,140	2,201	2,221	2,221	2,221	2,221	2,221
Imports: Corn	10	15	15	15	15	15	15	15	15	15
Total Supply: Corn + $DDGS_{cn\ equiv}$	**17,031**	**17,082**	**17,193**	**17,399**	**17,585**	**17,739**	**17,852**	**17,995**	**18,168**	**18,286**
Use (million bushels)										
Ethanol Use: Corn	7,021	7,021	7,129	7,343	7,557	7,628	7,628	7,628	7,628	7,628
Non-ethanol FSI: Corn	1,360	1,350	1,350	1,350	1,350	1,350	1,350	1,360	1,365	1,375
Exports: Corn	317	517	567	593	619	644	669	694	719	744
Exports: $DDGS_{cn\ equiv}$	430	430	436	449	462	466	466	466	466	466
Feed & Residual: Corn	4,860	4,785	4,811	4,839	4,917	5,018	5,093	5,168	5,243	5,318
Feed & Residual: $DDGS_{cn\ equiv}$	1,618	1,618	1,642	1,690	1,739	1,755	1,755	1,755	1,755	1,755
Total Use: Corn	**13,558**	**13,673**	**13,858**	**14,125**	**14,443**	**14,640**	**14,740**	**14,850**	**14,955**	**15,065**
Total Use: Corn + $DDGS_{cn\ equiv}$	**15,175**	**15,290**	**15,500**	**15,816**	**16,182**	**16,395**	**16,495**	**16,605**	**16,710**	**16,820**
Ending Stocks: Corn	1,425	1,362	1,257	1,134	941	877	891	924	992	1,000
Ending Stocks: $DDGS_{cn\ equiv}$	0	0	0	0	0	0	0	0	0	0
Total Ending Stocks Corn + $DDGS_{cn\ equiv}$	**1,425**	**1,362**	**1,257**	**1,134**	**941**	**877**	**891**	**924**	**992**	**1,000**
%Ending Stocks-to-Use: Corn	10.5%	10.0%	9.1%	8.0%	6.5%	6.0%	6.0%	6.2%	6.6%	6.6%
%Ending Stocks-to-Use: Corn + $DDGS_{cn\ equiv}$	9.4%	8.9%	8.1%	7.2%	5.8%	5.4%	5.4%	5.6%	5.9%	5.9%

Value-added business success factors -- the role of management and operations

July 2010

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(Fifth in a series of six)

There has been a surge of interest in farmer-owned business ventures that seek to capture additional value from commodities past the farm gate. Some of these ventures have been very successful, some marginally successful, and some have failed. Supported by funding from the Ag Marketing Resource Center at Iowa State University, we conducted in-depth interviews with farmer-owned businesses to determine the key factors that influenced the relative success or failure of these ventures. A better understanding of why some ventures succeeded while others failed provides valuable insight for the success of future farmer-owned businesses. This article focuses on the role of management and operations for business success.

Research method

To identify factors having the greatest impact on the success or failure of farmer-owned business ventures, a cross-section of seven farmer-owned commodity processing businesses formed since 1990 in North Dakota, South Dakota, and Minnesota were selected. Extensive interviews were conducted with individuals who played, or continue to play, an important role in the formation and operation of the business. This included leaders in the formation of the business, key members of the management team, selected board members, lenders, local leaders and others.

Research results

Competent professional management is essential to a business venture's success. The right Chief Executive Officer (CEO) and management team can mean the difference between success and failure. Management needs to be involved very early in the business project. One successful venture we interviewed hired its CEO prior to the equity drive. The CEO was then able to lead the equity drive and provide input on plant design and oversee construction. The plant was up and running on schedule.

While this example is more often the exception than the rule (the CEO often comes on board after a successful equity drive), all of the businesses we interviewed agreed the sooner the CEO is hired, the better the start-up process unfolds. Although board members are usually successful producers and community leaders, there is no substitute for good professional management.

It was also particularly helpful when the CEO had been involved in similar start-up operations.

Management recruitment -- The board should plan for a significant investment in the recruitment and retention of a CEO. Recruitment strategies varied among the business's we interviewed, with several using executive placement (a.k.a. headhunter) firms. One CEO responded to an ad in a trade magazine. Another CEO of a successful venture was recruited because he was personally acquainted with one of the founding directors. While there appears to be no patented formula for successful recruitment, the board should make an appropriate investment in time, money, and networking to find, recruit, and hire an industry savvy CEO.

The CEO is the only member of the management team that the board hires. So, once the CEO is hired, the board should leave the remaining hiring decisions to the CEO. The CEO is responsible for building the management team.

As was articulated in a previous article, the board of directors and the CEO must have a shared vision of the organization including its future growth and operations. This shared vision will enable the CEO to manage and build an appropriate management team and will help alleviate micro-managing by the board, which can be very detrimental to board/CEO relations. One CEO we interviewed reported that the board of directors must be committed to reinvestment and growth in order to attract top quality management.

CEO compensation -- Providing adequate compensation and incentives is absolutely necessary for attracting top management professionals. While often challenging for a fledgling organization, an appropriate compensation package will insure that the CEO has as much incentive for business success as the board and the owners. Two successful organizations we interviewed reported offering performance-based incentives described as 'phantom stock' to top management.

Industry knowledge -- The entire management team needs to develop and maintain market and industry savvy and awareness. Market and industry awareness is often a prime selection criterion for key positions. For the venture to succeed, it must remain competitive in its industry in terms of operating efficiency and cost of operations. It is the management team's responsibility to be aware of industry standards and recommend investments and upgrades over time to insure that the venture remains competitive.

Operating margins and investor returns must also be competitive with industry standards and the management and the board must be aware of the margins and returns of other industry participants. This too will likely require ongoing reinvestment of some of the earnings to expand or upgrade facilities. In the absence of such industry awareness, the board and farmer-members may develop unrealistic expectations regarding the returns from their venture. Many farmer-owned processing activities are fundamentally commodity businesses characterized by thin margins.

Employee training -- Finally, the new organization should plan and prepare for significant investments in employee training. This is particularly relevant if

the facility is located in a rural area where manufacturing and processing industries are rare. New employees will likely need substantial training in areas such as safety, sanitation, and quality control.

Another measure to enhance competitiveness is to maintain a lean management team.

(next article - the role of local infrastructure and support)

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The Ag Marketing Resource Center Renewable Energy & Climate Change Newsletter is available on-line at: http://www.agmrc.org/renewable_energy/