

# Economics of Dairy, Beef and Feed and how it Relates to Energy

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## Take Home Messages:

1. From 2006 to 2012 crop prices have increased dramatically driven by both increased demand and droughts that has decreased supply.
2. Crop profit per acre has been higher than historical averages. That has driven up land prices and rental rates which may result in decreased profits in the near future.
3. Retail beef prices are at historic highs due to the lowest number of beef cows since 1962. Because of high feed prices beef farmers profit has been variable over this time.
4. Dairy farm profitability has been very volatile over the past 10 years, including a year when the average dairy producer lost money.
5. Rising family living costs along with margin compression has created stress for many small dairy farms. This has accelerated the exit of small farms and growth of larger farms.
6. Routine maintenance of cooling and ventilation systems are a low cost method optimizing energy use on farms.

## Introduction

Over the last 10 years prices paid for farm commodities and input costs has increased dramatically. This has created periods of extreme swings in profitability. Since 2006 generally cash crop producers have enjoyed very profitable years (compared to history) because of high crop prices. Because feed cost is the highest single factor in the cost of production for livestock, livestock profitability has been very volatile. Dairy farmers had the worst profitability year on history in 2009.

## Feed/Crop Prices

Starting in about 2006 corn prices began increasing dramatically because of several factors. In the fall of 2006 there was an explosion in the production of corn ethanol plants, due in part to the EPA 10% renewable fuel standard for gasoline (Babcock). The phase out of MTBE as a gasoline additive also increased the demand for ethanol. Figure 1 shows that the percent of the US corn crop that went to ethanol production increased from about 10% before 2006 to about 40% currently. There were many other factors that contributed to the increase in corn prices. Weather issues on other parts of the world decreased the world supply of feed grains, increasing the demand for US grain. Asia's growing middle class desired more animal proteins. This increased the demand for US grains. Until 2014 there were major weather issues in some parts of the corn belt every year. To compete with corn, the prices of other crops also increased dramatically.

The increase in crop prices led to an increase in profitability on crop acres. Corn sale prices that averaged \$2.04/bushel in the upper Midwest from 2001-2005 increased to an average of \$4.40/bushel from 2006-2013 (Salfer). During the same time frame the direct and overhead cost per bushel increased from \$2.11/bushel to \$3.51/bushel. Much of the increase being driven by increased land rent and machinery cost per acre. The pattern for soybean prices and costs are similar.

The record crop production in 2014 greatly decreased prices for the second half of 2014. It is expected that corn belt profitability will be much lower because costs (particularly land costs) will remain high with lower crop prices.

### Beef Profitability

The beef industry has different segments and unlike most other major livestock species is very dispersed throughout the US. The two major segments are the beef cow/calf business and beef finishing feedlots. The Eastern corn belt has a large number of beef cow/calf farms, but many are small and supplemented with off farm income.

All segments of the beef industry have been profitable since 2010. However, despite the record retail beef prices profitability has been moderate because of the high feed prices. Profitability of beef cow calf enterprises vary widely between years. The average cow/calf enterprise lost money in 2008 and 2009 because the increase in feeder calf prices did not keep up with the increase in feed costs. From 2010 to 2013 cow/calf farms made an average of \$105/cow annually (Salfer). Beef feedlots followed the same pattern losing money in both 2008 and 2009. Beef finishing made an average of \$52/head from 2010-2013. The higher feed prices caused the feed cost per lb of gain to double from the 2001-2006 average of \$0.34 to \$0.68 from 2007-2013.

Beef cow numbers are the lowest they have been since 1962. There has been drought through much of the main beef cow areas and high corn prices enticing farmers in the upper Midwest to sell cows and plant crops on their land. From 2011 to 2014 the major beef cow states of Texas, Missouri and Oklahoma were in the worst drought in 100 years. This caused the liquidation of large numbers of cattle. Beef cow numbers are expected to begin increasing in 2015.

### Dairy Profitability

Dairy profitability has been affected by high feed prices similar to other livestock species. 2009 was the lowest profitability year in history. Many producers lost in excess of \$100/cow per month for several months. However, whole farm profit in the upper Midwest fared much better than many areas because most producers raise a high percentage of their feed.

Year to year profit volatility has increased tremendously. Net return averaged \$480/cow from 2000 to 2006 with a low of \$268/cow in 2002 to \$678/cow in 2005. From 2007 to 2013 net return averaged \$354/cow with a range from \$-189/cow in 2009 to \$881/cow in 2007 (Salfer). We are likely to have excellent profits for 2014.

Another trend emerging over the past few years in the upper Midwest has been the change in profit/cow by herd size cohort. Not only has the average herd size increased, the net return per cow has increased in the cohort of larger herds compared to smaller herds. From 2000 to 2010 the net return per cow for herds with 51-100 cows averaged \$529 and for herds >500 cows averaged \$352. This compares to a net return of \$361/cow for herd size 50-100 cows and \$536 for herds >500 cows from 2011 to 2013 (Salfer).

### Family Cost of Living

The two biggest factors driving the structural change in farm size is family living cost and margin compression. Family living costs have risen dramatically, especially for farms paying their own health insurance premiums. The average family living cost increased from \$38,239 in 2003 to \$65,150 in 2013 (Nordquist). At the same time trendlines (Figure 2) show that the average profit per hundredweight has been decreasing since 1993. These two factors have accelerated the exit of small dairy farms while others have chosen to expand.

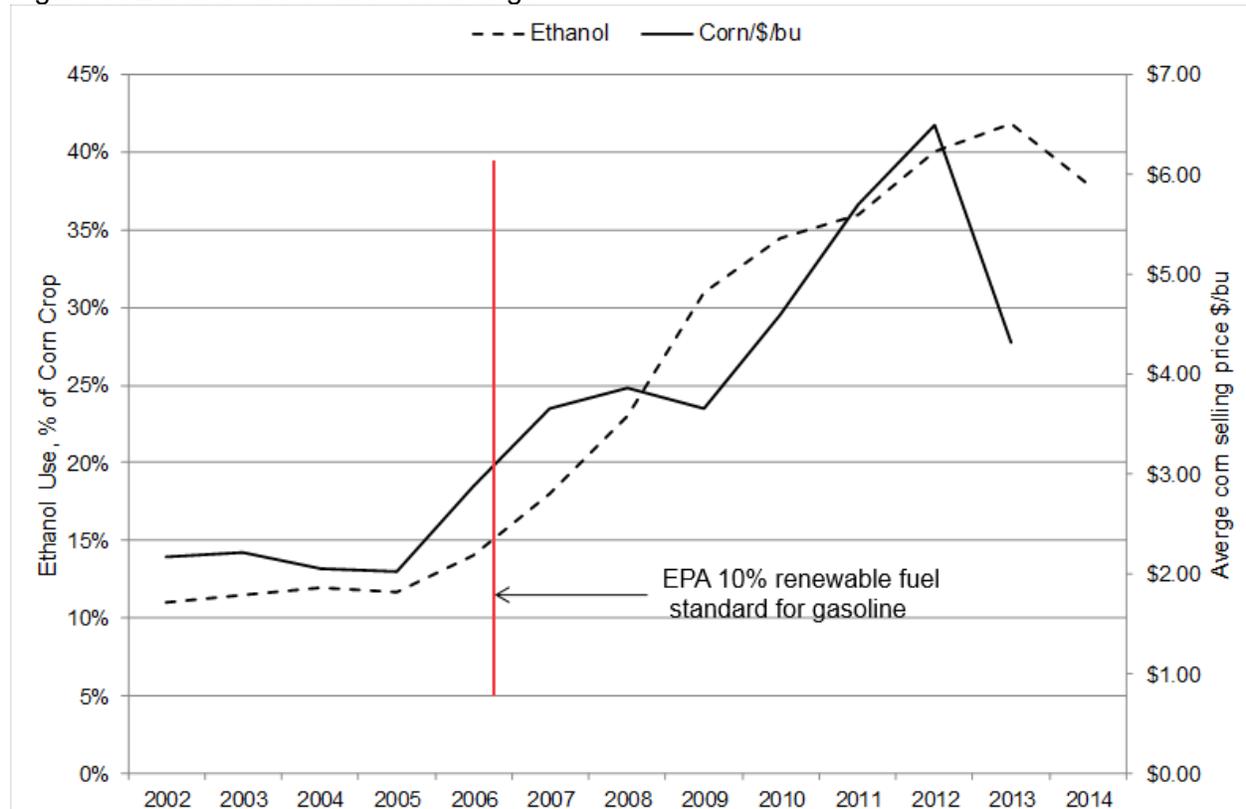
## Energy Costs

The big three costs on dairy farms are feed, labor and replacement cost (the cost of a replacement heifer – the value of a cull cow). These three account for 60-70% of the all expenses. The average annual utility cost per cow in the upper Midwest since 2000 was \$73.94/cow. Most of this would be electricity.

Even though energy is a reasonably low percent of the total cost of production, it is important for producers to optimize electrical use on the farm. Most of the electricity used on farm is associated with the milking process (milking and cooling the milk), ventilation and lighting.

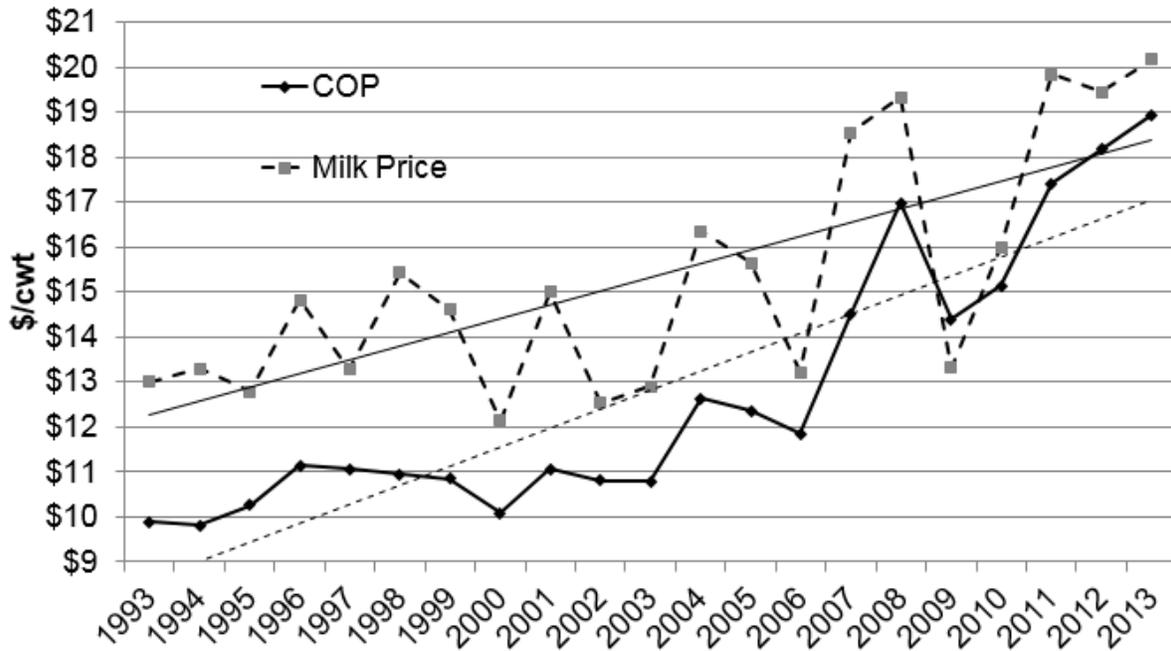
A low cost way to optimize electricity cost is to have a regular maintenance schedule for their ventilation and cooling systems. We recently summarize data from a farm that focused on maintenance (cleaning) of the ventilation system in his barn during the summer of 2013. Kilowatts of energy used per lb of milk produced was lower during the summer of 2013 than the two previous years without a regular maintenance schedule (Figure 3).

Figure 1. Ethanol and Corn Price change<sup>1</sup>



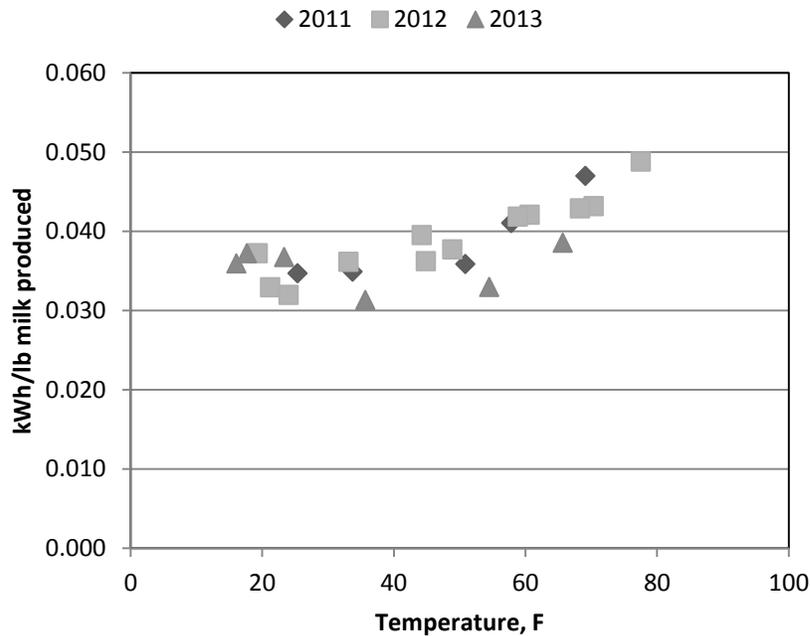
<sup>1</sup>USDA, 2015

Figure 2. Milk price and cost of production with trendlines<sup>1</sup>



<sup>1</sup>Salfer, University of Minnesota Center for Farm Financial Management, 2015

Figure 3. Energy efficiency pr lb of milk from 2011 to 2013



References:

Babcock, B.A., J. F. Fabiosa, 2011. The impact of ethanol and ethanol subsidies on corn prices: revisiting history. CARD Policy Brief 11-PB5.

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