The Economics of Low Cost Parlors

A.S. Leaflet R2786

Larry Tranel, Dairy Field Specialist; Kristen Schulte, Farm Management Field Specialist, ISU Extension and Outreach

Problem Statement:

Many dairy producers (> 40+% in Iowa) are milking in stall barns or antiquated milking parlors which are achieving only 25 cows milked per person per hour. In comparison, other producers are achieving 75 cows milked per person per hour in well-designed milking parlors. This difference represents a person being three times more efficient with use of labor which translates into significant differences in farm profitability between these milking systems.

ISUEO Dairy Team Programmatic Response:

Making milking easier and more labor efficient should be a primary goal for dairy producers who are milking less than 45 cows per person per hour. Most of these milking systems can be modernized in cost effective ways that usually payback in very reasonable timeframes using Low Cost Parlors (LCP).

The ISUEO Dairy team has developed an exceptional array of materials to facilitate these decisions and has worked individually with many producers and agri-industry professionals to implement successful LCP systems. Much of this information can be found at: http://www.extension.iastate.edu/dairyteam/milking-systems .

Producers who have employed LCP have been very satisfied. But, the decision to leave the stall barn seems to be a mindset hurdle that many producers have difficulty assessing the how's and why's of making the switch to a more labor efficient system. Yet, after making the switch, one of the most common comments is "I should have built it a long time ago."

Economics of Low Cost Parlors: Decision Tools

The aim of this work is to assist producers to think through and critically evaluate the financial impact of taking an old stall barn or antiquated parlor and transforming it into a TRANS Iowa low cost parlor or similar model. The partial budget that follows aims at assisting producers in determining their net financial impact of making the change. Many producers make the change around the 80 cow mark so the example uses an 80 cow dairy herd with daily average milk production at 65 pounds per cow.

Table 1. is an annual partial budget analysis. In the top left portion are increased incomes and decreased expenses (positive impacts). In the top right portion are the increased expenses and decreased incomes (negative impacts). The sum is totaled for the Net Annual Financial Impact. In addition, quality of life and other profit opportunities are variables that may have a financial value which producers may or may not want to include in the analysis.

The net annual financial impact is calculated based on many herd and financial assumptions which are listed (input) in the bottom two-thirds of the spreadsheet. Beginning with the sample 80 cow herd size and the target of $18/cwt. milk price, the estimated cost of the milking parlor is input along with estimated costs of changes to cow housing and other changes such as manure storage, etc.

An average cost for a low to medium cost milking parlor is around $60,000 with 12 cows per side or $2,500 per stall. Some have been built for under $600 per stall and others cost close to $5,000 per stall so there is great variation from one parlor to the next.

In addition to the cost of the parlor, some producers may need to add cow housing, manure storage or other facility costs when making the decision so those variables can be input or be a part of a separate investment decision. The years of useful life of the added facilities, 22 in this example, is important to know for capital recovery cost purposes. The value of the investment after its useful life, $63,500 in total with parlor and other facilities summed. The interest rate of 5.5% was used for capital recovery cost purposes. The added insurance value of $217,000 was used with the cost of $0.005 per $1,000 of insurance.

One of the major incentives to employ a LCP is the milking labor savings which is often more than double the previous efficiency of milking in a stall barn or antiquated parlor. In this example on 80 cows, milking labor went down from 7 hours per day to 3 hours per day.

Heat detection hours may increase or decrease and in this example the decrease was negative so it actually increased by .07 hours per day (only five minutes). Feeding labor decreased 0.6 hours per day and manure handling decreased 0.5 hours per day. Labor management decreased .15 hours per day. The sum of labor savings, with milking labor included is estimated at 5.2 hours per day with stationary herd size of 80 cows. (This sample data was extrapolated from LCP survey conducted by ISUEO Dairy team)).

In this transition to a parlor, production per cow is estimated to increase 6.5 pounds or 10% due to higher cow comfort changes, not just due to the milking parlor. For the same reason, somatic cell count is expected to decrease 20% with the changes in cow housing (cow comfort).

Feed costs are not estimated to change much as the herd in this example was fed with a TMR prior to the parlor. Likewise the cull rate is only expected to decrease 1% with less cows getting hurt in the freestall versus stall barn environment.

Table 1. Economics of Low Cost Parlors Partial Budget Spreadsheet Analyzer.

Economics of Low Cost Parlors — Annual Partial Budget Analysis

Kristen Schulte, Farm Management Specialist and Larry Tranel, Dairy Specialist, Iowa State University Extension

Positive Impacts			Negative Impacts	
Increased Incomes			**Increased Expenses**	
Increased Milk Production	$30,888	ISU	Capital Recovery Cost of Parlor (Dep & Int)	$5,567
Increased Milk Premiums	$3,454	Extension	Capital Recovery Cost of Housing/Other	$15,857
Increased Cull Cow Sales	-$680	D	Increased Feed Costs	$16,786
Total Increased Incomes	$33,662	A	Increased Cow Replacement Costs	-$1,280
Decreased Expenses		I	Increased Utilities and Supplies	-$602
Reduced Heat Detection Labor	-$256	R		
Reduced Milking Labor	$14,600	Y	**Total Increased Expenses**	$36,328
Other Reduced Labor	$4,941	TEAM	**Decreased Incomes Expected**	
Total Decreased Expenses	$19,286		**Total Decreased Incomes**	$0
Total Positive Impacts	**$52,948**		**Total Negative Impacts**	**$36,328**
Annual Value: 1) to Quality of Life	**$23,818**		**NET ANNUAL FINANCIAL IMPACT =**	**$16,620**
2) Other Profit Opportunities :	**$5,000**		**with Quality of Life & Other Opportunities =**	**$45,438**

Herd and Financial Assumptions		Units	Instructions or Reference Values
Herd Size	80	no. cows	Enter herd size, lactating and dry
Milk Price	$18.00	$ per cwt milk	Typical range $15.00 to $21.00 / cwt
Estimated Cost of Milking Parlor	$57,000	$ for parlor	Include shell, framework & equipment
Estimated Cost of Cow Housing Changes	$160,000	$ per farm	Typical range of $0 to $2,500/cow
Estimated Cost of Other Changes (manure, etc.)	$25,000	$ per farm	Typical range of $0 to $1,500/cow
Years of Useful Life	22	years	Typical rage is 15 to 30 years
Value of Parlor after Useful Life	$3,500	$ per farm	Typical range of 10 to 20% of purchase price
Value of Housing & Other Changes after Useful Lif	$60,000	$ per farm	Typical range of 10 to 30% of purchase price
Interest Rate of Money	5.50	% interest rate	Value of own or borrowed money
Insurance Rate per $1,000 Value	0.50	%	Typical rate is 0.5% per 1,000 investment
Increased Insurance Value of Changes vs. Current	$217,000	$ per farm	Added investment value over current system
Labor Changes			
Current Hours of Milking Labor	7	hours per day	Include set-up and cleanup
Anticipated Hours of Milking Labor	3	hours per day	Include fetching cows and cleanup
Reduced Hours for Heat Detection Labor	-0.07	hours per day	Typical is -0.75 to +.75 hours
Decreased Hours for Feeding Labor	0.6	hours per day	Typical is 0 to 0.5 hours
Decreased Hours for Manure Handling	0.5	hours per day	Typical is 0 to 1.2 hours
Labor Rate for General Labor Activities	$10.00	$ per hour	Typical rate is $8 to $18 with benefits
Reduced Hours for Labor Management	0.15	hours per day	Include hiring, training, overseeing, etc.
Labor Rate for Labor Management	$16.92	$ per hour	Typical rate of $12 to $25
Milk Production and Quality Changes			
Lbs of Milk per Cow per Day, Past Year	65	lbs/cow/day	Typcial range of 50 to 90 lbs
Projected Change in Milk Production	6.5	lbs/cow/day	Typical 0 to 10% more 2x
SCC Premium per 1,000 SCC Change	$0.003	$ per cwt	Typically $0.002 - $0.004/cwt
Current Annual Bulk Tank Average SCC	305,000	SCC per ml	Typical range of 100,000 - 400,000 SCC
Estimated Percent Change in SCC	-20.0	%	Typical range of -25 to +25%
Feed Costs and Intake Changes			
Lbs of TMR Dry Matter (DM) per lb of Milk	0.73	lb DM/lb Milk	Typical range of 0.55 to 0.8
Cost per lb of TMR Dry Matter	$0.145	$ per lb DM	Typical range of $0.09 to $0.145 in 2013
Estimated Change in cost/lb Dry Matter	-$0.001	$ per lb DM	Typical range of -$0.003 to +$0.003
Culling and Herd Replacement Changes			
Cost of Replacement Heifer	$1,600	$ per heifer	Typical range of $1,300 to $2,200
Cull Price per Cow (or sold for milking purposes)	$850	$ per cow	Typcial range of $450 to $1,200
Expected Change in Annual Turnover Rate	-1	%	Typical range of -3% to +8%
Utilities and Supply Changes for Milking			
Anticipated Change in Electricity cost	-$7.52	$/cow/year	Typical decrease of 0 to 150 kWh
Anticipated Change in Water cost	$0.00	$/cow/year	Typical range of -$5 to +$5
Anticipated Change in Chemicals Cost	$0.00	$/cow/year	Typical range of -$2 to +$2

The authors have used their best judgement and shall not be liable for any use of this software decision-making aid.

Electrical costs are expected to decrease about $8 per cow per year due to the parlor versus stall barn milking. Water and chemical costs are not expected to change from one system to the other.

With all these variable input, the net financial impact of the low cost parlor relative to the current system is $16,620. If a value for quality of life (easier milking, more free time, etc.) is added at $23,818 and a value for other profit opportunities (ability to milk more cows, do better job, etc.) is added at $5,000 annually, the total value of modernizing to a milking parlor is $44,438. In essence, even with building cow housing and manure storage, low cost parlors can create great financial impact and rid farms of a huge labor bottleneck.

Cash Flow Implications of the Low Cost Parlor

In addition to the net financial impact, producers need to understand the cash flow implications of the transition to a low cost parlor. First, capital recovery cost used in the net financial impact is different than the principal and interest payment on the loan used in the cash flow. Second, the labor savings were given a financial value. But, if portions of the labor savings were not previously paid, then an adjustment needs to be made if that savings of labor is not turned into cash. It could be turned into cash if a better job managing the other aspects of the operation happens that creates profit equal or above the labor savings. If not, the difference needs to be adjusted from cash flow implications relative to the net financial impact where unpaid labor savings was given a value.

Below is a loan amortization for a 20 year loan of $250,000 at 5.5% interest. Total annual payment is $20,637 which is slightly more than the $21,424 capital recovery cost on the parlor. Therefore, $787 is added to the $16,620 of net financial impact from our previous example. In addition, even though $14,345 of labor was saved from milking and heat detection, only $5,000 was hired meaning $9,345 needs to be subtracted from the net financial impact. Other labor savings was $4,941 with none of that previously hired meaning that amount also needs to be subtracted from the net financial impact. So, although the net financial impact was $16,620 the cash flow change was only $3,121.

Summary

In summary, the TRANS Iowa Low Cost Parlors have been a great financial and personal investment for dairy producers. The decision to employ a LCP is difficult as producers need a mindset change relative to stall barn milking while understanding many variables that go into making the change. The Economics of Low Cost Parlors spreadsheet can assist producers. Producers may be able to make the change with little or no changes to cow housing or manure storage. Others may have sizeable costs to one or both. Either way, the variables can be analyzed to determine whether or not the LCP is a good decision for a particular dairy farm as depicted by net financial impact.

Loan Amortization for Low Cost Parlor

20	Years of Loan	Annual Interest	Principal Amount
12	Annual Payment(s)	Rate 5.50%	$250,000
240	Total Payments		

First Month	Interest	Prinicpal	Total Payment
Payment	$1,146	$574	$1,720

First Year	Interest	Prinicpal	Total Payment
Payment	$13,750	$6,887	$20,637

Net Cash Flow Analysis of Low Cost Parlor

			Totals
Net Annual Financial Impact from Partial Budget Analysis			$16,620
	Capital Recovery Cost of Parlor and Other	$21,424	
	Annual Payment on Parlor Investment	$20,637	
Cash Flow Difference of Capital Recovery vs Annual Payment			$787
Cash Flow Adjustment for Unpaid Labor and Management			
	Heat Detection & Milking Labor Saved	$14,345	
	Amount Hired	$5,000	-$9,345
	Other Labor Saved (feed, manure, labor mgt	$4,941	
	Amount Hired	$0	-$4,941
	Total Change in Farm Cash Flow		$3,121