

# MILKING SYSTEM ENERGY ASSESSMENT



The **Iowa's Dairy Center** was constructed by the Northeast Iowa Dairy Foundation, a nonprofit, grassroots organization of dairy farm families and related businesses who identified a need to retain young people in rural areas while bolstering the economic impact of dairy farms in northeast Iowa through education, demonstration, and research. In 2000, the foundation opened the Dairy Center which includes an educational facility and an operating dairy farm including a milking parlor for 250 cows. In 2013, a new robotic milking center was added to the facility.

During a 2014 energy audit, Iowa's Dairy Center evaluated energy consumption of the dairy operations to compare the traditional parlor milking system and the robotic milking system.

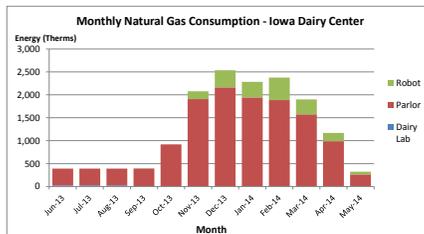
## The robotic milking system has lower electric demand.

This is due to round-the-clock operation of smaller milk harvesting equipment loads. Energy utilization at Iowa's Dairy Center is higher on a per-cow and per-hundredweight basis than "typical" Midwestern dairy operations. The use of two separate milking centers instead of one results in some of the equipment being oversized and underutilized in the milking parlor.

ELECTRICITY UTILIZATION	Milking Parlor	Robotic System	Dairy Center
Annual kWh	198,963	179,335	378,298
kWh per cow	1,592	1,470	1,532
kWh per hundredweight	5.52	5.26	5.40

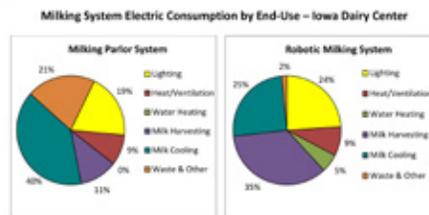
## Per-cow and per-hundredweight energy utilization and annual costs are lower.

Electric and natural gas energy utilization and annual energy costs are lower on a per-cow and per-hundredweight basis for the robotic milking system than for the milking parlor system. Monthly natural gas consumption varies based on the time of year, but consumption is highest in the winter months when space heating equipment is in use.



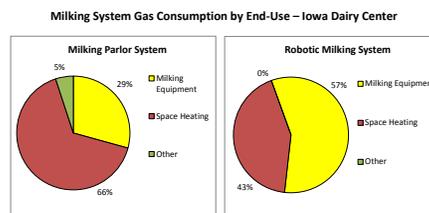
## Electric energy consumption is slightly higher for the milking parlor than for the robotic milking system.

The difference in consumption could be the result of using older and somewhat less efficient equipment in the milking parlor. Hot water use for washing the Clean-in-place (C-I-P) milking equipment in the milking parlor is estimated at about 3 gallons per cow per day. Hot water use for washing the C-I-P milking equipment in the robotic milking center is estimated at about 1.4 gallons per cow per day. Water heating uses natural gas and electric water heaters/boilers.

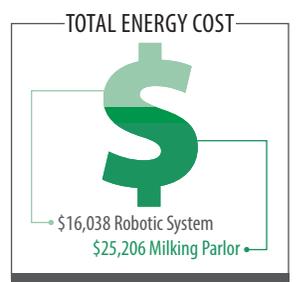
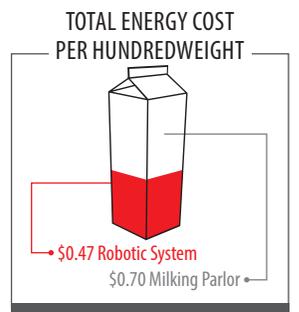
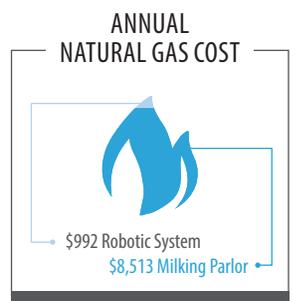
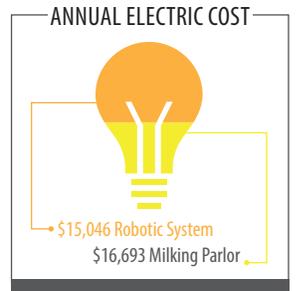


## Natural gas consumption is considerably higher for the milking parlor than for the robotic milking system.

The milking parlor's floor heating system accounts for most of the difference.



NATURAL GAS UTILIZATION	Milking Parlor	Robotic System	Dairy Center
Annual Therms	10,899	1,269	12,158
Therms per cow	87	10	49
Therms per hundredweight	.30	.04	.17



**\$9,168\***  
robotic milking system energy savings

\* Year to year energy consumption may vary depending upon variable conditions. Any projected savings are estimates only.



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