

Predictions of Energy Use - Equations and "Rules of Thumb"

(see Reference section for full citations on sources of information)

Total Farm Electrical Use:

1. between 3.3 and 4.0 kWh/cwt

from Farmer, G.S. et al., 1990. AA Review of Electricity Use and the Impact of Selected Demand-Side Management Technologies on Dairy Farms@ (this data compiled from New York, Texas, and Wisconsin Farms)

2. E_m (kWh/month) = $(C * 0.034 + 3.3) * 1000$

where C = number of cows milked

3. Average Electric Use = 42 kWh per cow per month

4. 2.15 kWh/cwt

from Collar, C.S. et al, California Extension Service

5. E_f (kWh/day) = Annual Farm Electrical Energy Use = $4.38 * M$

where M = average daily milk production (cwt/day)

6. E_f (kWh/day) = $2.21 * C$

where C = average number of cows milked daily

from Boor, P., R.J. Straub, B.J. Holmes, and R. Stowell, "Electrical Energy End-Use on Wisconsin Dairies."

7. Monthly kWh usage: (barn and house combined) = $0.26 * \text{annual milk (cwt)} + 1480$

8. Monthly kWh usage: (barn and house combined) = $50 * \# \text{ cows milked} + 980$

from Wells, G.D. and W.C. Christiansen, "Electric Utilization on Vermont Dairy Farms@"

Milk Cooling Energy Use

1. DX no precooler ~ 0.75-1.1 kWh/cwt (higher number for older refrigeration systems)

DX with precooler ~ 0.5 kWh/cwt

Ice bank cooling ~1.15-1.3 kWh/cwt

from Farmer, G.S., et al. A Review of Electricity Use and the Impact of Selected Demand-Side Management Technologies on Dairy Farms@ and D.J. Reinemann, personal communication

$$2. E_c (\text{kWh/day}) = 0.738 * M$$

where M = average daily milk production over the month

from Boor, P. et al., A Electrical Energy End-Use on Wisconsin Dairies@