

Energy Requirements - Lactation

Lactating cows require energy to support maintenance, milk production, gestation and weight gain. Absolute requirements (Mcal of Net Energy for lactation (NE_l)/day) for these functions can be calculated as follows:

Maintenance:

$$\text{Lactation 1: } NE_{l\text{-maint}}(\text{Mcal/day}) = 1.2 \times 0.080 \times \text{Liveweight}^{0.75}$$

$$\text{Lactation 2: } NE_{l\text{-maint}}(\text{Mcal/day}) = 1.1 \times 0.080 \times \text{Liveweight}^{0.75}$$

$$\text{Lactations 3+: } NE_{l\text{-maint}}(\text{Mcal/day}) = 1.0 \times 0.080 \times \text{Liveweight}^{0.75}$$

Milk Production:

$$NE_{l\text{-lact}}(\text{Mcal/day}) = \text{Milk (kg/day)} \times [0.3512 + 0.0962 \times \text{Fat (\%)}]$$

Gestation (if days pregnant greater than 210):

$$NE_{l\text{-gest}}(\text{Mcal/day}) = 0.024 \times \text{Liveweight}^{0.75}$$

Weight Gain:

$$NE_{l\text{-gain}}(\text{Mcal/day}) = 5.12 \times \text{Weight Gain (kg/day)}$$

Weight loss during lactation will contribute energy to these requirements. This contribution can be calculated as follows:

$$NE_{l\text{-loss}}(\text{Mcal/day}) = 4.92 \times \text{Weight Loss (kg/day)}$$

Total absolute (Mcal of NE_l /day) energy requirements for lactation are:

$$NE_{l\text{-total}} = NE_{l\text{-maint}} + NE_{l\text{-lact}} + NE_{l\text{-gest}} + NE_{l\text{-gain}} - NE_{l\text{-loss}}$$

Required energy concentration in dietary dry matter (DM) can be calculated as follows:

$$NEI(\text{Mcal/kg DM}) = NE_{l\text{-total}} \div \text{DM intake (kg/day)}$$

for more information:

[Every Extra Pound is Profit](#), Alberta Dairy Management

[Energy and Protein Status Affect Fertility](#), University of Alberta Dairy Research Highlights

Nutrient Requirements of Dairy Cattle, NRC 1989