

Energy Needs in Beef Cow-Calf Operations: The Engine To Keep Things Running

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One of my mentors, Dr. Darrell Rankins, a Professor Emeritus and Retired Beef Extension Specialist in our department, used to highlight the importance of energy in cow-calf operations. This mantra still stands true today, with energy most often being the first most limiting nutrient in beef cattle diets in Southeast operations. Warm-season perennial forages have declined in quality and quantity this time of year while entering a period of winter dormancy. Cool-season perennial grasses, like tall fescue, slow their growth during this time period, then pick back up again in the late winter and early spring. This leaves a gap in forage production and quality when energy demands of the cow herd are increasing.

Cow energy requirements change throughout the year. The nutritional needs of the cow herd is a dynamic situation that operates as a yearly production cycle. Energy needs of beef cattle are commonly expressed as 1) total digestible nutrients (TDN) or 2) net energy for maintenance (NEm). In the Southeast, most forage and feed analysis reports express energy values for these sources as TDN. Total digestible nutrients are the sum of digestible starch, fiber, protein and fat in forage and feedstuffs. Cows do not have a static or “fixed” energy requirement throughout the year. Depending on where a cow is in the production cycle will determine how much of her daily energy need is allotted towards maintenance, lactation, gestation, and/or growth.

The energy needs of cows can be classified as follows:

- **Maintenance** – Cows require nutrients to digest food, move, maintain body temperature and weight, expel waste, and repair tissues on a daily basis. The energy maintenance requirement of a mature cow differs during the dry vs. lactation period. Lactation increases metabolic activity, and maintenance requirements are increased during this time period. Maintenance requirement can be impacted by the environment. For example, increased activity (distance walking to water, forage, etc.) and climatic conditions (hot/humid; cold/wet) influence daily energy needs.
- **Lactation** – The energy requirement of lactation is

largely a function of milk yield, fat and protein %. Energy needs for lactation are the greatest during the first 60 days after calving. During the 60 days prior to calving, cow lactation energy requirements begin to increase in preparation for the arrival of the calf. There are also differences between and within breeds that affect milk yield and composition and energy needs for lactation. The greater milk production potential, the greater energy demand on the cow.

- **Gestation and Reproduction** – Realistically, the energy requirement for gestation is almost always part of the daily energy demand for a mature cow. The gestation length of a cow is 283 days – which equates to almost 10 months out of the year! During early pregnancy, the daily energy requirement is a very small percentage of a cow’s daily needs (estimated 0.1% of the energy requirement during the third month postpartum). However, by one month prior to calving, energy demand for gestation increases to 56% of her daily energy requirement. This is because rapid growth of the fetus is occurring prior to calving. After calving, the cow supports lactation needs for the calf and her own maintenance requirement. Shortly after calving, we enter back into the breeding cycle for the cow herd, requiring adequate body condition and maintenance of the cow for successful rebreeding. This is where energy is the “engine” of the operation – helping us ensure we meet the list of growing needs for the cow for her own maintenance, lactation and reproduction needs.

- **Growth** – For a mature cow, we often don’t think about growth as being key factor influencing energy demands. After all, she is fully grown. Instead, the term “growth” refers to the energy needed for a mature cow to recover body tissue energy during different times of the year. For example, after weaning and during the first 6 months of pregnancy represents a time period where body weight gain can be most economically and effectively added to cattle. This coincides with a time period where gestation and lactation demands are low to minimal, meaning that the cow can use her daily energy allotment better for maintenance and body weight gain.

Energy Facts for the Herd

- Lactating cows consume more forage compared to gestating cows due to the increased energy demand (see Figure 1). As cows get closer to calving, dry matter intake begins to increase to help provide additional nutrition during this time period. As an example, a 1,400-pound cow consuming 2.5% of her mature body weight per day in dry matter during the first 90-days post-calving will eat around 35 pounds of dry matter.
- Energy needs of first-calf heifers are greater than for mature cows because energy is needed for growth in addition to maintenance and lactation.
- Inadequate energy during the last third of gestation and from calving to rebreeding can negatively impact reproductive performance in the herd.

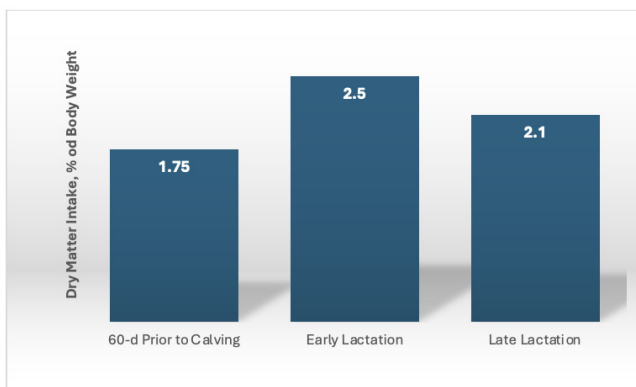


Figure 1. Daily dry matter intake of a mature beef cow, expressed as a percent of animal body weight, across three stages of production.

Energy Indicators for the Farm

- **Body Condition Scoring** – A periodic visual appraisal of the cow herd and relative body fat composition can provide a body condition score for cows. Body condition scoring provides an estimate of cow energy reserves. Cows should

be maintained in body condition score 5 or greater to have healthy calves and breed back quickly. If cows fall below this level, conception rates and calving interval can be impacted. Key times to body condition score beef cattle are at weaning, 60 to 90 days prior to calving, at calving, and the beginning of the breeding season.

- **Historical Records** – Specifically, looking at your calving season distribution and reproductive performance in your herd may be an indicator that can provide insight into your nutrition program. The period from calving to rebreeding is a critical time for energy demands in the cow herd and tends to be the time period where cattle may begin to “fall off” in terms of body condition. Management to ensure consistent intake and availability of high quality forage and feed during this time can help maintain cattle during this critical time period.
- **Forage and Feed Testing** – Conducting a forage and feed analysis on supplemental resources used with the herd is critical to ensure energy needs of the cow herd are met on a daily basis. Especially during the winter months, energy can be a limiting factor in cattle diets. This coincides with the time period where we are typically using some hay and/or feed supplement for the herd. Results from these analyses can help us provide targeted supplementation for the herd to better meet their energy demands during a challenging time of the year.

Alabama Extension has a comprehensive publication on nutrient requirements of beef cattle. This publication contains tables that highlight dry matter intake, total digestible nutrients, crude protein, and macromineral needs of beef cattle at various stages of production. Information on this topic and other nutritional management strategies can be found by visiting www.alabamabeefsystems.com.



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