What are Adult Equivalents?

Adult Equivalents (AE) are a way of standardising grazing livestock of different classes and species, so they can be expressed using a common term. The most common animal units are:

- Animal Equivalent and
- Cattle Units (CU) for cattle, and
- Dry Sheep Equivalent for sheep (DSE)

The AE system is widely used in northern Australia to better estimate the energy needs of cattle. This modified method has improved predictions of forage dry matter and energy intake, leading to more accurate livestock management practices.

Animals gain energy from the plant material they consume; not all energy is available for growth as energy is lost to waste products such as faeces, urine and gas. The remaining energy is metabolizable energy (ME). The energy density of food is described as megajoules of metabolizable energy per kilogram of dry matter (MJ ME/kg DM). ME will differ between plant species but also between various parts of the one plant, for example leaf versus stem.

Energy requirements of sheep and cattle vary depending on factors including:

- age
- sex
- seasonal conditions such as heat.
- stage of growth, and
- level of activity e.g. walking to watering points or distance for grazing.

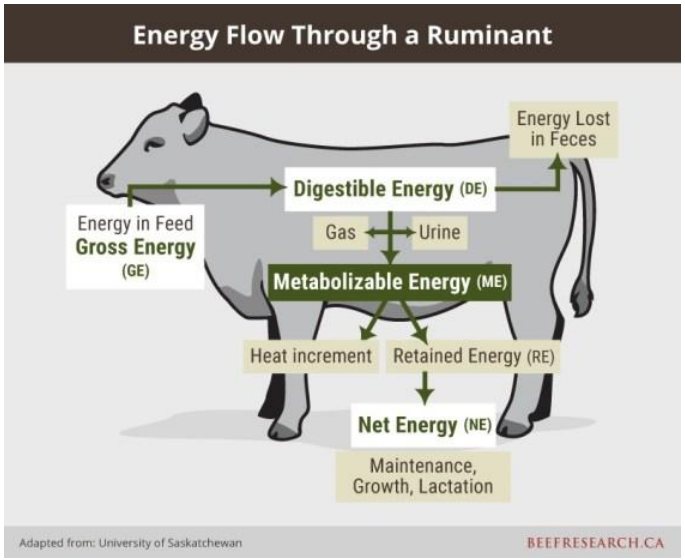

Figure 1 Energy flow through a ruminant (https://www.beefresearch.ca/topics/nutrition-in-beef-cattle/).

The use of AE allows for a consistently calculated appropriate stocking rates and feed requirements for livestock management. AE are the ME requirements of different classes of stock relative to the ME requirements of a standard animal.

A standard animal is:

- A 2.25-year-old 450kg *Bos taurus* steer with zero weight gain.
- Walking 7km per day – this is important as activity accounts for 20% of the energy demand of grazing livestock.
- Using the Australian feeding standards (NRDR 2007), the standard animal requires 73MJ ME per day.

$$\textbf{AE Rating} = \frac{\text{ME requirement of animal in question}}{\text{ME requirement of standard animal}}$$

The DSE is a 45 kg merino wether with zero weight gain. The energy demand of the defined AE is 8.4 times that of the DSE. Hence, there are 8.4 DSE to one AE. This allows you to compare properties, enterprises or mobs. Therefore, sheep and cattle can be expressed as either AE or DSE.

- The AE system is used for:
    - Describing the grazing pressure imposed on pastures by foraging animals.
    - Forage budgeting and paddock carrying capacity assessments.
    - Economic comparisons across enterprises properties, and businesses.
    - Property valuation.

The consequences of underestimating feed consumption for different classes of animals are:

- Overgrazed paddocks.
- Poor reproduction rates.
- Animals not meeting performance targets.
- Poor business performance.
- Higher carrying capacity expectations than the land can sustain.

A thorough outline and tables for various breeds and more in-depth information for comparing your livestock can be found in the links below. They incorporate tables to compare different types of stock https://bushagri.com.au/animal-units/ae-tables in different productivity regions.

Table 1 shows that *Bos taurus* steers or dry females who are gaining 0.6 kg/hd/day with an average LW of 150 kg are equivalent to 0.8 AE.

Growing Animals (any period)
Steers and Dry Empty Females

Average Liveweight	Average Daily Gain (kg/hd/day)					
	0	0.2	0.4	0.6	0.8	1.0
150	0.46	0.57	0.68	0.80	0.92	1.04
200	0.52	0.65	0.79	0.92	1.06	1.21
250	0.62	0.78	0.93	1.09	1.25	1.42
300	0.72	0.90	1.07	1.25	1.43	1.61
350	0.82	1.01	1.20	1.40	1.59	1.79
400	0.91	1.11	1.32	1.52	1.73	1.94
450	1.00	1.21	1.43	1.64	1.85	2.07
500	1.08	1.30	1.52	1.74	1.96	2.18
550	1.17	1.39	1.61	1.83	2.05	2.28
600	1.25	1.47	1.69	1.92	2.14	2.36
650	1.33	1.55	1.77	2.00	2.22	2.44
for bulls add	11%	7%	5%	3%	1%	0%

Table 1 AE of growing steers and empty female Bos indicus cattle of varied weights and growth rates during any season.

Further notes

Animal Units | Bush Agribusiness

A tool for standardising Adult Equivalent calculations | Meat & Livestock Australia

"Recommendations for the revision of animal units and their application" by Ian McLean and Sally Finch