Energy fundamentals for farm lighting

Lighting plays an important role on the farm. In addition to enhancing security around the farm property, lighting also provides an acceptable production environment for livestock, a safe work environment for farm employees, and the ability to perform work effectively after dark. This publication gives basic information about a variety of farm lighting options. Refer to additional publications in the Farm Energy series for more information regarding indoor and outdoor lighting applications.

Terminology

The table included on page 2 of this publication provides a brief overview of energy efficiency, rated life, relative cost and other features for different types of lighting. To compare lighting options, it is also important to understand basic lighting terminology:

- **Lumens:** Quantity of light produced by a lamp is measured in "lumens" (lm). A 60 watt (W) incandescent bulb produces about 780 lumens.
- **Foot-candles:** The level of lighting at a working surface. Light meters commonly measure light levels in foot-candles. One foot-candle (fc) is defined as the amount of illumination from a candle falling on a surface at a distance of one foot. A bright sunny day might have a light level outdoors of 8000 fc while a brightly lit desktop may be about 100 fc.
- **Average Rated Life:** The average number of hours that it takes for half of a given bulb type to burn out. This is determined under ideal conditions in a laboratory and actual life may be shorter. Factors impacting actual bulb life include: ambient temperature, humidity, dust, power surges and the number of on/off cycles.
- **Efficiency:** Lighting efficiency is measured in light production per unit of energy used. Units are Lumens/W (lm/W).

In addition to light fixtures, many farm buildings have windows or skylights that utilize daylight to supplement interior lighting needs. Keeping these surfaces clean and free of debris is helpful to allow as much sunlight as possible to enter the building.

Incandescent phase-out

Currently, incandescent bulbs are utilized for a variety farm lighting applications but they are scheduled to be phased out in the near future. Incandescent bulbs utilize electrical resistance to produce light and most of their energy is actually given off in the form of heat rather than light, therefore they are the least efficient type of lighting. This inefficiency and short bulb life make them a costly source of lighting in spite of their low retail price. Now may be a good time to consider alternative lighting options before incandescent bulbs are no longer available to purchase. The scheduled phase-out among U.S. retailers is:

- **100W incandescent** – January 1, 2012
- **75W incandescent** – January 1, 2013
- **60W and 40W incandescent** – January 1, 2014

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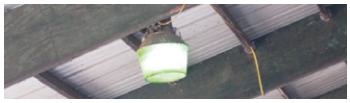
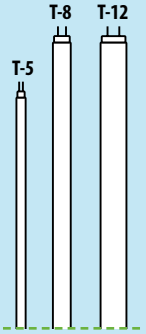
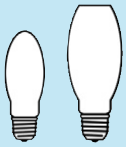
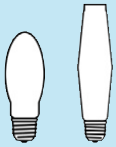
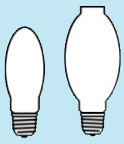



Lamp	Example	Typical Lamp Size (W)	Efficiency Lumens/W	Average Rated Life (hrs)	Minimum Start Temp (F)	Ballast?	Relative Cost	Typical Application
Incandescent		25-200	10-35	1,000-4,000	Below 0	No	$	Indoor/outdoor
Compact Fluorescent		5-57	50-80	6,000-12,000	0	Yes	$$	Indoor/outdoor
Cold Cathode Compact Fluorescent		5-18	41-49	18,000-25,000	-10	Internal	$$$	Indoor/outdoor
LED		6-20	4-150	35,000-50,000	Below 0	N/A	$$$$$	Indoor/outdoor
T-5 Fluorescent		13-28	54-104	5,000-20,000	0	Yes	$$	Indoor/outdoor
T-8 Fluorescent		15-36	58-98	5,000-20,000	0	Yes	$$	Indoor
T-12 Fluorescent		14-60	42-98	7,500-30,000	50	Yes	$	Indoor
Metal Halide		35-1,000	60-80	7,500-10,000	Below 0	Yes	$$$$	Indoor high bays, outdoors
High Pressure Sodium		35-400	50-140	15,000-24,000	Below 0	Yes	$$$	Indoor/outdoor
Mercury Vapor		40-1,000	10-63	16,000-24,000	Below 0	Yes	$$$	Indoor high bays, outdoors

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