



Animal Heat Mats

For Livestock Farms



Farms can use less energy, save money, and be more resilient through equipment upgrades that pay for themselves

There are several measures and technologies available to help livestock farms reduce energy use and save money while maintaining or enhancing production. These recommendations were developed for cattle and swine operations and can benefit other types of livestock farms, both very small farms with few animals and much larger operation with more than 1,000 animals.

Heat Mats Recommended During Farrowing

Raising piglets calls for heat lamps or heat mats to prevent chilling. Heat mats offer significant energy-efficiency, cost, and animal welfare benefits, and it is recommended that heat lamps be replaced with heat mats in most cases.

One benefit of heat mats is that heat is transferred to animals by touch rather than by radiating toward them from lamps, and that heat is distributed and captured more effectively. Heat rises, so heating from under animals tends to be more effective and economical. Because heat mats are installed at the base of animal pens, energy is better utilized as it is transferred to the litter or directly to the animals.

When heat lamps are used, heat travels to the sow, and this can create a hazard by encouraging piglets to get too close to the sow, increasing the chances of laid-on or crush losses. Heating mats provide a safe warm zone and also avoid the chance of a bulb going out, which happens with heat lamps and results in periods of time where the animals could be without heat.

Another major benefit of a heat mat is its shape, because heat mats can distribute heat to a targeted area such as piglet creep areas. For litters over twelve pigs, a five-foot mat is used to provide the recommended 0.33 square feet per piglet. For wean-to-finish operations, Dr. Hongwei Xin of Iowa State University recommends 0.5 square feet per pig. Centering heating pads in the creep area keeps the piglets near the teat they are nursing from, thus encouraging increased lactation. By also keeping the sow cooler, she is encouraged to eat more and be more comfortable. Frequently, sows that are too warm move around to find a cooler place to lie, which increases crush-losses.



Animal Heat Mats	
Description	Replace heat lamps with a heat mat.
General Operational Requirements	Requires a means to safely enclose wiring, for example in PVC pipe.
Potential Energy Savings ¹	40–80%
Typical Simple Payback ²	1–7 years
Possible Barriers	Farmers wary that animals may chew the mat. High-quality mats are made of durable, water-resistant, and fire-retardant materials that can handle scratching, chewing, and impacts.
Non-Energy Benefits	Better distributed heat source can keep sows cooler and reduce crush losses; mat serves as a draft barrier on slatted floors.
Industry Information and References	MFEP 2012, Wisconsin Focus On Energy 2020 and 2015, Xin 2014.

Table Notes:

1. The row for **Potential Energy Savings** represents the potential savings as a percentage of the total energy use for each technology category. For example, if heating was 10% of a farmer’s electricity usage, and the table showed a Potential Energy Savings of 50%, the net effect would be a 5% overall electricity energy savings. A farmer can then predict **Annual Cost Savings** by estimating 3% off their annual bill. For example, if that farmer’s annual electricity bill is \$10,000 then the potential cost savings for implementing this measure would be \$500 per year.

2. Simple Payback is the installation costs divided by the potential energy cost savings, showing how long it takes for annual cost-savings from an upgrade to pay for the initial costs. A farmer can use this information to predict the **Expected Implementation Cost** by taking the annual cost savings from note #1 and multiplying it by the Simple Payback for the technology being investigated. If the heat mat example had an annual cost savings of \$500 and had a Typical Simple Payback of 3.0 years, then the estimated implementation cost for that upgrade would be \$1,500.

Resources

Energy efficiency resources are being developed for farmers by Cornell Cooperative Extension and the New York State Energy Research and Development Authority, in collaboration with topic-experts in NYS. Visit AgEnergyNY.org to find cost-saving resources for farms:

- Recommendations for energy-efficient technologies
- Conservation practices to optimize energy use
- Easy access to funding resources



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Ready to get started?

Visit AgEnergyNY.org to learn more and to get advice on energy efficiency and farm operations, learn about available grants and incentives, or obtain a free energy audit of your farm operations.

