General Operations

For Poultry and Egg 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 poultry and egg farms reduce energy use and save money while maintaining or enhancing production.

General Operations Best Practices

Technical assistance and rebates are available to help poultry and egg farmers implement energy saving measures. Below are some areas of general operations where poultry and egg farms tend to get the most benefit from energy efficiency measures.

1. Tunnel Doors

The typical poultry house tunnel inlet curtain has limited insulation value, and many curtains are loose fitting which results in significant infiltration. This is a major heat loss during winter months.

A low-cost solution could be to install temporary interior curtains or insulation panels which are then removed during warmer weather. The issue is these temporary curtains are time consuming to install and remove. This can cause ventilation issues during power failures because of the time required to remove them to allow natural entry of fresh air. Another assistive solution is to install seals (e.g. curtain pockets) to reduce infiltration, but this does not resolve the low insulation issue.

A more costly but more effective solution is to install hinged insulated doors mounted to the interior of the poultry house (aka Tunnel Doors). Even during warm weather, the tunnel doors can help improve airflow by directing air up and towards the center of the house which can alleviate the dead air spots. Options include doors made of plastic or wood and filled with insulating foam employing different types of cabling and winching for ease of use.

Issues to be aware of include properly installing the doors so they seal tightly and stay sealed over time. This requires careful framing and carpentry since poultry houses are not often built perfectly square and true. Another issue with the doors is difficulty in keeping the doors pulled up tight when in the closed position. The doors are subject to the static pressure of the fans pulling against them, as well as wind working against the closing mechanism.

Tunnel doors without proper sealing allow more infiltration than a well-installed tunnel inlet curtain. The infiltration losses of a poor seal far outweigh the insulation gains of the new tunnel doors. Therefore, it is imperative to achieve and maintain a good seal. Poultry houses move and shift over time which will require ongoing maintenance to prevent infiltration. Lastly, it is recommended not to remove the poultry house knee braces to accommodate the installation of tunnel doors. Some tunnel door designs do not allow a convenient place for knee brace installation so confirm the tunnel door design accommodates knee braces.

2. Brooder Plates

Farms typically use 250 W heat lamps to provide heat for the chicks. Radiant brooders are available that use far less energy to provide heat for the chicks and are also less of a fire risk.

The birds' bodies are heated directly by the radiant brooder and heat loss to the surrounding area is minimized making it more efficient than the existing heat lamp system. A heating plate, part of the brooder, simulates a hen keeping chicks warm beneath a heat source. The heat plate provides warmth for chicks, ducklings, goslings and other young poultry in the brooder. Sizes can be Extra Small (15 chicks, 15 W, 10" x 10" x 3.5"); Small (20 chicks. 22 W, 12" x 12" x 5"), Medium (30 chicks, 42 W, 16" x 16" x 7"), and Large (50 chicks, 66 W, 16" x 24" x 7"). Height of all sizes adjusts from 1.5" to 6" by adjusting the legs.

As the chicks grow, the legs of the brooder are adjusted to increase the height of the plate above the bedding and chicks. A temperature controller allows control of power output between 20% - 100%. Chicks stay warm by near contact with the underside of the plate. The bottom-side surface of the heating plate is warm at 125°F, offering less risk of fire. An optional rugged plate cover prevents older chicks from perching on top and fouling the unit with droppings. The plate can be hand-washed to remove dust and debris. As a rough gage of savings, each 250W heat lamp can conservatively be equated to a 40W brooder.

	Tunnel Doors	Brooder Plates
Description	Tunnel doors improve insultation value during winter months and improve cooling efficiency	Replace heat lamps with brooder plates
General Operational Requirements	Applies to poultry houses with general space heating	For farms that heat chicks for more than one week annually
Potential Energy Savings[1]	20–30%	40–75%
Typical Simple Payback[2]	4–15 years	3–9 years
Possible Barriers	Cost	Farmers wary that animals may not properly use the brooder plates
Non-Energy Benefits	Improved animal comfort	Reduced fire and burn hazard; improved heat distribution and animal comfort
Industry Information and References	Auburn 2005	NDSU 2022

Poultry Farms	
End Use	**% of Annual Electric Use (Range)**
Lighting	10–30%
Ventilation	5–25%
Well Pumps	1–6%
Heating for Animals	10–35%
Refrigeration	10–20%
Compressed Air	1–3%

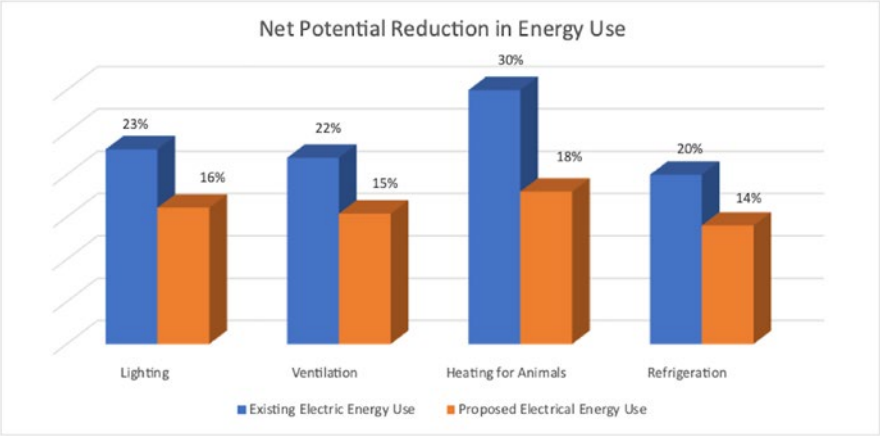

Table Notes:

*1. The **Potential Energy Savings** row represents the potential savings as a percentage of the total energy use for each technology category. For example, if heating as an end use was 20% of a farmer's electricity usage, and the table showed a Potential Energy Savings of 25%, the net effect would be a 5% overall electricity energy savings. An individual farmer can then predict the **Economic Benefit** through annual cost savings by taking 5% of their annual bill. So, if a farmer's annual electricity bill is $10,000 then the potential cost savings for implementing HE Refrigeration would be $500.*

*2. Simple Payback is defined as the installation costs divided by the potential energy cost savings. An individual farmer can then predict the **Expected Implementation Cost** by taking the cost savings from note #1 above and multiplying it by the Simple Payback for the technology being investigated. If the HE Refrigeration had a Typical Simple Payback of 3.0 years, then the estimated implementation cost would be $1,500.*

References:

• Donald, Jim and Simpson, Gene. 2005. Tunnel Inlet Doors – A Progress Report. Poultry Engineering, Economics and Management Newsletter, Issue No. 38, November 2005. Auburn University, AL. Available at https://ssl.acesag.auburn.edu/poultryventilation/documents/Nwsltr-38%20Tunnel%20Doors.pdf

• Penny, Nester et al. 2022. Beginners Guide to Raising Chickens. AS2045. North Dakota State University Extension, Fargo, ND. Available at https://www.ndsu.edu/agriculture/extension/publications/beginners-guide-raising-chickens

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.

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