

Poultry production is an energy intensive enterprise, with a typical four to six house poultry farm using approximately 2,000 gallons of propane and 30,000 to 50,000 kWh of electricity per house per year. The heating, ventilation and lighting requirements of the birds' living environment represent the three key areas of opportunity for energy efficiency improvements. Since poultry integrators¹ determine the number of birds and price per pound, producers find the most effective way to increase profits is to decrease energy costs. With support from the 2015 Kathleen A.P. Mathias Agriculture Energy Efficiency Program, five Maryland poultry farmers did just that.

In addition to sidewall insulation and lighting, the 2015 Mathias Program poultry grantees successfully implemented the following energy efficiency measures.

Radiant Heaters



It's quite costly to heat the air in a poultry house with forced hot air heaters and then remove that warm air with tunnel ventilation fans. Rather than heating the air, radiant heaters heat objects in a space. They also provide concentric zones of temperature, with the hottest area in the center. These zones enable the birds to find comfort areas. Birds are healthier, and the producer saves energy with less waste heat.

Ventilation Fans



Ventilation fans, which typically use 50 to 60% of the electricity on a poultry farm, expel ammonia produced by the birds and cool the houses using tunnel ventilation. An effective fan upgrade has an equal or higher airflow at a more efficient rate.

Tunnel Doors



Loose fitting, damaged or poorly insulated tunnel curtains are a source of heat loss in a poultry house. Insulated tunnel curtains and doors reduce air leaking and provide a greater thermal boundary which in turn reduces the amount of energy required to heat the house. The tunnel doors help maintain warmer air temperatures in the cooler months, and direct the cool moist air from the cool pads upwards during the warmer months.

“Tube heating produces such a warm even heating, it saves on energy bills and the chicks are much more comfortable.”

Marcia DiGregorio, Camlau Farms

Note: ¹ – The integrator owns the birds and hires the producer to grow the birds to a specified weight.

Ceiling Insulation



To minimize heat loss through the ceiling of a poultry house, an insulation barrier can be installed to restrict air flow from the heated space to an unheated attic space. Adding insulation in the ceiling saves energy by preventing heated air from exiting the poultry house through the ceiling.

End Wall Door Covers



Installing sealed end wall door covers provides energy savings by sealing air leaks and restricting air flow from the heated house to the outside. They are installed over the existing door to add a sealed thermal barrier. Replacing the entire end wall door often has a payback longer than the expected useful life of the door. End wall door covers offer comparable savings at a much lower cost and better payback.

The following table summarizes the costs and energy savings associated with the implemented measures on the five farms. Other operation benefits, such as healthier birds, lower mortality rates and increased growth rate, are not captured here.

Recommended Poultry Measure	Annual Electricity Savings (kWh)	Annual Estimated Cost Savings (\$)	Annual Propane Savings (gal)	Annual Estimated Cost Savings (\$)	Overall Energy Savings (MMBtu)	Total Labor (Hrs)	Installed Cost (\$)	Estimated Payback Period (Yrs)
Radiant Heaters	0	0	210	\$368	19	90.0	\$8,000	21.8
Ventilation Fans	17,937	\$2,447	0	0	61	399.5	\$73,600	30.1
Insulated Tunnel Curtains and Doors	0	0	1,935	\$3,425	177	282.5	\$77,707	22.7
End Wall Doors and Door Covers	0	0	2,364	\$3,718	217	258.75	\$50,040	13.5
Ceiling Insulation	0	0	2,145	\$3,753	196	83.75	\$45,398	12.1
Sidewall Insulation	0	0	2,218	\$4,197	203	90.0	\$46,000	11.0
LED Lighting	1,485	\$172	0	0	5	1.0	\$500	2.9
Totals	19,422	\$2,619	8,872	\$15,461	878	1,205.5	\$301,245	19.5