

HUNTING CREEK FISHERIES

An Aquaculture Case Study

Mathias Ag Program

Matt Klinger operates a fish farm and hatchery on Little Hunting Creek in Thurmont, Maryland. A family-owned business, Hunting Creek Fisheries has been raising pond and aquarium fish since 1924. Although the business used to produce 12 million ornamental fish a year, rapidly increasing fuel costs made the facility's equipment so costly to run that Matt was forced to shut down part of the operation several years ago.

Hunting Creek Fisheries spends about \$30,000 each year on energy costs, including electricity and propane. To learn how to reduce these costs to return the business to earlier production levels, Matt requested an energy audit on his facility in 2010. The audit uncovered opportunities to save on energy costs through equipment replacement. When Matt learned of a new grant opportunity through the Kathleen A.P. Mathias Agriculture Energy Efficiency Program, he made the following energy efficiency upgrades to his facility:

Lighting upgrades, including energy-efficient fluorescent lamps, LED bulbs, and dimming controls have the potential to not only reduce energy consumption but also improve the indoor environment by providing optimal color rendering characteristics (optimal lighting aids staff in examining the colors and patterns of the fish for sorting). In outdoor applications, LED lighting offers operational and maintenance savings over HID metal halide fixtures due to its efficiency and long bulb life.



An outdoor wood gasification furnace provides a much more direct way to heat water in fish tanks. Unlike Hunting Creek Fisheries' old suspended, propane-fired unit heater, which heated water only by first heating the air in the building, a central boiler wood gasification furnace delivers heat directly to the fish tanks. The furnace will use plentiful locally available firewood.



Pumps and filtration upgrades can contribute substantially to energy savings in an aquaculture operation. Modifying an existing multi-stage filtration and water purification system with energy efficient motors can reduce the number of motors required for the filtration process. New filter media, ultraviolet lights and a new pumping system further increase the system's energy efficiency.



Taken together, the lighting, heating and pumps and filtration measures will return a 50% savings on the related energy costs. As shown in Table 1, Hunting Creek Fisheries is estimated to save \$13,326 annually on its electric and propane bills.

Table 1: Implemented Efficiency Measures and Associated Savings

| Recommended Measure | Electric Savings (kWh) | Propane Savings (gal) | Estimated Annual Energy Cost Savings | Installed Cost | Estimated Payback in Years |
|---|------------------------|-----------------------|--------------------------------------|-----------------|----------------------------|
| Lighting Replace fluorescent T12 fixtures with HID metal halide fixtures and dimming controls. Replace HID and compact fluorescent exterior wall packs with LED fixtures. | 35,998 | | \$2,912 | \$4,852 | 1.7 |
| Heating System Replace propane-fired heater with an energy-efficient central boiler wood-gasification furnace. | | 2,338 | \$5,804 | \$22,483 | 3.9 |
| Pumps and Filtration Consolidate and install new high efficiency pump motors, filtration media, ultraviolet lights and pump controls. | 56,990 | | \$4,610 | \$29,323 | 6.4 |
| Totals | 92,988 | 2,338 | \$13,326 | \$56,658 | 4.3 |

The equipment was installed in April 2013 and will pay for itself in an estimated 4.3 years. While Matt has already begun to see savings from the lighting and pumps and filtration upgrades, the performance of the furnace awaits next heating season. “We’re very excited about the savings that we’re going to have through this system,” said Matt. Hurricane Sandy left him with an abundant supply of downed trees to fuel his new wood-fired furnace, which will further speed his payback.

Matt is pleased to be able to bring his unused production building back online and expand his business to levels he has not seen since the price of propane jumped several years ago. “My great-grandfather, who started the farm back in the 20s, always said that despite hard times, people always seem to have a couple of pennies to buy a goldfish,” he said. “Obviously today, goldfish cost a little bit more than a couple of pennies, but we believe that efficiency measures like these can really help us stay competitive.”