LOUISIANA FISH FARM

LSU AGCENTER WATER AND ENERGY CONSERVATION PROGRAM

Audit Highlights

- The team's report identified five recommendations that estimated annual savings at $24,497.
- The total implementation cost of projects is estimated at $270,419 with an average payback period of 6.6 years.
- The recommended projects incorporate small-scale solar installation for fishponds.

Facility Highlights

- This site is part of the LSU AgCenter's network of rural farming.
- The facility operates on a continuous basis providing ample opportunities to cut energy and water costs for more sustainable practices.
- Students were able to see life cycles for fish being grown at the facility and have been invited back for volunteering opportunities during the harvesting season.

A student team visits a fish farm and learns about holding tanks. Photo by M.P. Hayes

Summary

The LSU AgCenter Water and Energy Conservation Program in partnership with Louisiana Sea Grant and LSU College of Engineering worked with a local fish farm to take the next step into a sustainable future. As part of the U.S. Department of Agriculture Renewable Energy for America Program (REAP) funding, the team of students and faculty provided no-cost sustainability assessments for the farm. The team recommended projects including LED light upgrades, improved air circulation for water cooling, pump replacements, small-scale solar for ponds and a large solar installation.

Summary (cont.)

The assessment took place during the winter 2023 cycle and will hopefully lead to a successful USDA REAP application from the farm as well as additional opportunities to work with students affiliated with the Water Quality Extension Lab for research.

Application Processes

The USDA REAP has funding opportunities for stakeholders interested in energy efficiency and renewable energy projects. The program is designated for agricultural producers and small businesses. For more information, visit the USDA Rural Development website or email M.P. Hayes at mhayes@agcenter.lsu.edu with questions.

Small-Scale Solar for Aeration

During the site visit, the host informed the team that the fishponds used pumps for water level management during certain times of the year. Two submeters are located in proximity for the small pumps to be plugged or hardwired into the energy grid. The team recommends using small-scale solar power to generate electricity for pump systems. An off-the-grid solar unit can generate enough power to run the isolated systems. Since these systems are not required to be on at specific times and can be used when convenient, the off-the-grid solar power provides independent electrical options for use. Solar kits come with all the necessary parts for easy installation and integration for small power consumption applications.

Energy Savings
6,042 kWh/year

Total Cost Savings
$1,187/year

Implementation Cost
$1,500

Payback Period
1.26 years

Air Circulation for Water Cooling

Energy Savings
1,555 kWh/year

Total Cost Savings
$205/year

Implementation Cost
$1,265

Payback Period
6.17 years

The host mentioned that during the spring through the fall season, the facility must keep fans blowing all day for air circulation to keep the water cool. There are six small 18-inch portable floor fans mounted to the walls across the room that blow constantly during the warmer months and are considered undersized for the space. The host said this circulation is inadequate at some points during the summer and additional fans must be plugged in for air circulation. The team suggests using air handling units with duct socks for easy, direct air cooling for the fish tanks in the breeding house. This has been seen in facilities as an ergonomic solution for workforce labor by directing air movement to a desired location.

Motor Upgrades

The team observed that some motors at the facility were standard efficiency, small horsepower motors. However, there are still opportunities for further improvement by replacing certain motors with more efficient and premium options. The team recommends replacing standard efficiency motors in the two fish holding rooms (approximately 16 motors) each with a 1-horsepower water pump, which is utilized for the recirculation of water into the tanks. Despite the longer payback window, the final implementation cost can be adjusted based on successful application for the USDA REAP.

Energy Savings
4,752 kWh/year

Total Cost Savings
$627/year

Implementation Cost
$6,400

Payback Period
10.17 years

Other Recommendations

The team had additional recommendations for upgrading LED lights and utilizing rooftop solar as renewable energy. For the lighting recommendation, the facility runs mostly non-LEDs but could utilize an LED retrofit for cost savings. This recommendation would cost $475 and have a savings potential of 910 kWh/year or $120. Additionally, due to the available space, the facility could potentially invest in larger solar platforms. Though the implementation cost would be high, the energy that is generated could offset the facility's footprint and provide an environmentally sustainable energy solution. It was estimated a single rooftop on site could generate 169,337 kWh/year from National Renewable Energy Laboratory PVWatts. The outlined recommendations are a summary and not a comprehensive economic analysis of projects.

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