LOUISIANA RICE MILL

LSU AGCENTER WATER AND ENERGY CONSERVATION PROGRAM

Audit Highlights

- The team's report identified six recommendations that estimated annual savings at $227,527.
- The total implementation cost of projects is estimated at $997,180 with an average payback period of 4.38 years.
- The team forecasted one recommendation to save on propane at the facility.

Facility Highlights

- This site is part of the LSU AgCenter's network of rural farming.
- The facility has many ties to Louisiana agriculture and is in the process of upgrading its facility for more sustainable practices.
- Students had the opportunity to see how a quintessential Louisiana crop is processed and turned into the marketable produce seen on many store shelves.

An LSU team observed the operations of a rice mill to assess its energy usage. LSU AgCenter photos

Summary

The LSU AgCenter Water and Energy Conservation Program in partnership with Louisiana Sea Grant and LSU College of Engineering worked with a rice mill to help identify operational changes for more sustainable manufacturing. 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 mill. The team recommended projects including air compressor controls, belts for motors, HVAC controls, forklift conversion and large solar installations. The assessment took place during the summer 2024 cycle and the facility was interested in pursuing a USDA REAP grant for renewable energy.

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.

Energy Efficient Belts

The team noticed that the facility utilized standard V-belts on four 75-horsepower drag machines in the industrial facility. These belts have been known to cause energy loss because standard V-belts can easily slip, causing the motor to work harder to produce the necessary amount of energy lost. Changing the standard V-belts to the cogged V-belts will decrease the loss of power transfer and lead to a reduction in electricity usage. Studies have shown that the efficiency of a cogged V belt is around 1.5% better than a standard V-belt. The cogged V-belts will also have a longer life than the standard V-belt.

Energy Savings
24,464 kWh/year

Total Cost Savings
$2,302/year

Implementation Cost
$200

Payback Period
0.09 years

Air Compressor Leaks

Energy Savings
17,970 kWh/year

Total Cost Savings
$1,563/year

Implementation Cost
$135

Payback Period
0.09 years

In the facility, the LSU team observed an air leak in the compressed air distribution system. This leak was found in the grain storage area. It was audibly heard near the leak location, and upon closer inspection with a handheld ultrasonic detector, the intensity of the leak was measured at 59 dB, 62 dB and 70 dB. The use of handheld instrumentation is a skill that students learn on-site for accurate analysis of project recommendations. Once implemented, the maintenance program will reduce costs by supplying compressed air to the facility more efficiently in the form of reduced electrical consumption. The related implementation cost per year is associated with the parts and labor required to repair the leaks.

Rooftop Solar Project

During the assessment, the team was informed that the facility is interested in installing solar panels to generate electricity on-site. The facility has a parking area with almost no shade from the surroundings. The electrical energy generated by a 300-kW photovoltaic (PV) array was simulated using the National Renewable Energy Lab (NREL) solar calculator. The NREL solar calculator determines annual electrical energy output from a PV system by calculating solar radiation using the local meteorological data, factoring in the system specifics and summing electrical output over all the 8,760 hours in a year.

Energy Savings
441,004 kWh/year

Total Cost Savings
$38,367/year

Implementation Cost
$514,800

Payback Period
13.42 years

Other Recommendations

The team had additional recommendations for HVAC and air compressor controls and forklift conversion. The control systems, implementing thermostats and pressure reduction sensors on air compressors have the potential to save 31,513 kWh/year or $2,741. A unique recommendation is the conversion of propane forklifts to electric. Though this recommendation would increase the facility's energy usage, it was projected to reduce the facility's CO2 footprint by 147 tons/year. This estimate helps with carbon emissions during a life cycle analysis of their produce. The outlined recommendations are a summary and not a comprehensive economic analysis of projects.

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P3987-E (online) 7/25