LOUISIANA LUMBER MILL

LSU AGCENTER WATER AND ENERGY CONSERVATION PROGRAM

Audit Highlights

- The team's report identified six recommendations that estimated annual savings at $70,692.
- The total implementation cost of projects is estimated at $156,753 with an average payback period of 2.22 years.
- The team saw potential in recommending color roofing to reduce solar loads.

Facility Highlights

- This site is part of the LSU AgCenter's network of rural farming.
- The facility has a large agricultural footprint and has ties to the forestry industry across the state and nation. This facility specializes in pine lumber.
- The students were able to see industrial lumber processing which incorporates both agricultural systems and advanced engineering automation.

An LSU team observed the operations of a lumber 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 yellow pine lumber mill to reduce their energy footprint. 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 sensor controls, HVAC systems, motor controls, building envelope enhancements and motor operation scheduling. The assessment took place during the summer 2024 cycle. This partner was interested in workforce development opportunities for LSU students as they transitioned from their academic pathways into their future careers.

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.

Colored Roof for Solar Loading

The LSU team observed that the facility's roof was not coated with reflective paint or any cool roof mechanism during the assessment. Our team noticed that the color of the existing rooftop is dark, which absorbs a lot more heat than a light coat because it absorbs more radiation energy. Conventional roofs can reach temperatures of 150 F or more on a sunny summer afternoon. Under the same conditions, a reflective roof could stay more than 50 F cooler. Furthermore, the ability of the reflective coatings to reduce the effect of radiation energy will consequently decrease the cooling load on the HVAC in the space resulting in energy savings.

Energy Savings
440,035 kWh/year

Total Cost Savings
$24,642/year

Implementation Cost
$68,828

Payback Period
2.79 years

Motor Optimization for Irrigation

Energy Savings
166,193 kWh/year

Total Cost Savings
$9,307/year

Implementation Cost
$21,000

Payback Period
2.26 years

During the team's visit, the students observed that some of the motors at the facility were not only old but oversized for the operation. The identified motors are the sprinkler pumps which are rated 300 horsepower to keep wood healthy. The team recommended downsizing to 100-HP premium efficient motors to apply water efficiently to wood. Since the motors are used 10 hours a day and for most of the year, the team estimates there will be a significant amount of electrical savings from downsizing the electric motors for peak operating efficiency. Additionally, there are opportunities to recirculate water from the retention pond to reduce water consumption at the facility.

Variable Frequency Drives

The host informed the team that the facility uses soft-starters in some applications where variable frequency drive (VFD) may deliver more electrical energy savings. The facility utilizes soft-starters as they frequently experience issues with the power source and load, such as surges and electrical noise affecting the operation. The team recommended providing isolation to prevent and reduce the risk of electric disturbance and ensure a more stable and reliable system. By implementing VFDs and isolation measures, the facility can enhance energy efficiency, reduce downtime and increase productivity, prolong equipment lifespan and create a more sustainable and resilient system.

Energy Savings
212,095 kWh/year

Total Cost Savings
$11,877/year

Implementation Cost
$51,800

Payback Period
4.36 years

Other Recommendations

Additional recommendations included installing control systems for existing equipment, programmable thermostats and air compressor controls. If the production environment can be continuously monitored, the data that is gathered could be tracked and analyzed to enhance the productivity of the process and decrease downtime around the facility. Similarly, controls on the HVAC system and air compressors can optimize use during work hours. The HVAC controls had an estimated savings of 18,302 kWh/year or $1,025, while the air compressor controls would save 212,095 kWh/year or $11,877. These three recommendations total implementation cost was $15,125 for control systems. The outlined recommendations are a summary and not a comprehensive economic analysis of projects.

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