



LOUISIANA WATER TREATMENT FACILITY

LSU INDUSTRIAL TRAINING AND ASSESSMENT CENTER

CASE STUDY NO. 1

Audit Highlights

- The team's report identified five recommendations that estimated annual savings at \$1,138,447.
- The total implementation cost of projects is estimated at \$2,848,420 with an average payback period of 2.5 years.
- The recommended projects incorporate replacing boilers, chillers and using an optimum sized compressor.

Facility Highlights

- The site is part of a larger sustainability initiative for clean water in the state.
- The team of engineering students was able to talk to recent graduates from LSU about their experience transitioning into industry.
- The facility partners with local schools for educational programs around water treatment.

Summary

The LSU Industrial Training and Assessment Center (ITAC), hosted by the LSU College of Engineering, in partnership with the LSU AgCenter, worked with local chemical manufacturers to take the next step into a sustainable future. As part of the U.S. Department of Energy Office of Manufacturing and Energy Supply Chains (MESC) funding, the team of students and faculty provided no-cost sustainability assessments for the manufacturer. The team recommended projects including replacing chillers, boilers and compressors. The assessment took place during the summer 2024 cycle and will hopefully lead to a future successful funding application from the manufacturer.



Outside lighting around clarification tanks can be switched for energy savings. Photo by LSU ITAC students

Application Processes

To take part in an assessment with the LSU team or for more information, visit the DOE-ITAC website or email M.P. Hayes at mhayes@agcenter.lsu.edu with questions. This program is designed for manufacturers with annual utility costs of \$100,000 to \$3,500,000 and annual revenue less than \$250 million. Other programs may be available for facilities that do not meet this requirement. In previous years, there have been funding opportunities associated with recommendations for implementations for eligible manufacturers through various federal agencies.



Replace Existing Chiller With High-Efficiency Model

The LSU team observed that the facility's current chiller is outdated and inefficient. These existing models require a high amount of energy compared to higher standards that utilize variable speed drives. By replacing these units with higher-efficiency models, the facility can achieve a significant reduction in energy consumption. This would not only lower the electrical demand and overall costs but also enhance the lifespan of the system. Furthermore, modern chillers use more environmentally friendly refrigerant, which not only improves heat transfer but also aligns with current sustainability standards.

Energy Savings
13,067,059 kWh/year

Total Cost Savings
\$810,158/year

Implementation Cost
\$2,364,120

Payback Period
2.92 years

Use/Purchase Optimally Sized Compressor

Energy Savings
4,284,573 kWh/year

Total Cost Savings
\$265,645/year

Implementation Cost
\$63,000

Payback Period
0.24 years

During the team's visit, the students observed that the facility's compressed air system is unfit for the demand of the production floor. An oversized compressor spends a significant amount of time short cycling, where it consumes a large percentage of full-load power without delivering any useful air. This leads to excessive energy consumption and unnecessary wear on the motor. By using an optimally sized compressor, the system can maintain a higher ratio of power required to the production of air.

Replace Boiler

During the team's visit, the students observed that the facility's boiler system is outdated and/or inefficient. The team noted that these existing models operate at significantly lower combustion efficiencies compared to current models. A large portion of the energy produced by these units is lost, rather than transferred in the heat exchange. By replacing the older models with high-efficiency boilers, the facility can achieve up to 30% more thermal efficiency than older models. Modern boilers can also be equipped with modulating burners that can precisely adjust their controls to match the facility's heating demand, ultimately reducing the annual fuel consumption and gas emissions. As part of a rural manufacturing network, large capital energy projects can be proposed in U.S. Department of Agriculture rural development energy grants for funding.

Energy Savings
None

Total Cost Savings
\$58,575/year

Implementation Cost
\$420,000

Payback Period
7.17 years

Other Recommendations

The team has additional recommendations for upgrading to higher-efficiency equipment. For the lighting system, it is currently outdated, but upgrading could reduce electricity consumption while maintaining proper illumination throughout the space, saving \$1,889 per year, with a

\$1,050 implementation cost for the installation of occupancy sensors, saving an additional \$2,180. The recommendations outlined are a summary and not a comprehensive economic analysis of projects.

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