

CASE STUDY: High-efficiency lighting systems

Energy-efficient lighting systems pay off quickly for Maryland processing plant.

BEST PRACTICE

Replace old lighting systems with linear fluorescent and LED lighting.

The Maryland & Virginia Milk Producers Cooperative (Maryland & Virginia) is owned by 1,500 dairy farming families throughout the region. The co-op's fluid milk processing plant in Landover, Md., Marva Maid of Landover, has been in operation since 1969 and currently processes 175 million pounds of milk annually. To lower costs and increase sustainability, in 2009 the plant replaced old metal halide, high-pressure sodium and incandescent light fixtures with new energy-efficient lighting systems, including T-8 and T-5 linear fluorescent lights, as well as upgraded to light-emitting diode (LED) exit signs. The old lights throughout the plant were less efficient in two ways: They used more electricity in their own right, and they generated excess heat, which in turn raised the cost of cooling the plant. Additionally, the incandescent lamps used in the old exit signs required five times the electricity of the new LED signs. Not only are the new lights saving the Maryland & Virginia processing plant an estimated 400,000 kWh and \$50,000 per year – they also improved light quality throughout the plant.

The project is expected to deliver a remarkably fast return on investment. The plant invested \$96,182 in improving the lighting efficiency throughout the plant, including a \$24,000 incentive from the Maryland Farm Energy Audit Program operated by EnSave, Inc. Based on the 2009 energy savings, the payback period is expected to be less than a year and half. Ongoing savings from the new system will help the plant and the co-op members to be more sustainable and more cost-effective for years to come.

Key benefits.

Annual Energy Reduction: 400,014 kWh per year

Payback: The plant will realize a return on its investment in approximately 1.4 years. Investment figures include the Maryland Farm Energy Audit Program incentive.*

Greenhouse Gas (GHG) Reduction: The current savings in electricity use represent the equivalent of 287 metric tons of CO₂ per year, equivalent to the annual greenhouse gas emissions realized by taking 55 passenger vehicles off the road.

Source: EPA Greenhouse Gas Equivalencies Calculator (www.epa.gov/cleanenergy/energy-resources/calculator.html).

Reduced Cooling Needs: The lower wattage lamps in the new system produce less heat, so less chilling is necessary to maintain proper plant temperatures.

Lowered Maintenance: Because T-5 fluorescent lamps and LEDs tend to last longer than the old lamps, less maintenance is required to replace lamps.

Other Benefits: The new lighting systems improved light color and illumination throughout the plant. The new T-5 fluorescents produce more light than the old metal halide lights and have better color rendition than the yellow-tinted high-pressure sodium lights.

Maryland co-op lighting project is shining example of cost-effective sustainability.

CHALLENGE AREA

Old, inefficient lighting system.

Old metal halide, high-pressure sodium and incandescent lights burned more energy, provided less light and required more maintenance to replace lamps. The old lights also generated more heat, which in some areas of the plant required additional energy for cooling. Conversely, the new lights may require some areas of the plant to need additional heating, but this added cost is expected to be more than offset by the cooling savings.

PLANT PROFILE

Marva Maid of Landover, Landover, Md., Processing Plant.

Maryland & Virginia's fluid milk processing plant in Landover, Md., processes 175 million pounds of milk per year and 31.5 million pounds of water and dairy-based drinks.

FINANCIAL INFORMATION

Investment	\$96,182
System includes	New lights, including small tube T-5 fluorescent bulbs for the plant floor, T-8 fluorescent bulbs for workstation and office areas, and LED lights to replace incandescent bulbs in the plant's exit signs.
System life expectancy	T-5 and T-8 bulbs typically last 5 to 10 years. LEDs have a 50,000-hour capacity.
Offsetting incentives	\$24,000 from the Maryland Farm Energy Audit Program.**
Payback period	1.4 years, based on a 400,000 kWh annual savings.*

*Energy cost savings were calculated at the time of project completion, based upon the regional cost of energy for the plant's location. Energy costs may fluctuate over time and by geographic region. **State and federal incentives will vary by plant.

QUICK FACTS

- T-5 and T-8 light fixtures deliver less noise, more light per watt and better color rendering than traditional T-12 linear fluorescent lamps.
- T-5 and T-8 fixtures use a more efficient electronic ballast system than the traditional and less efficient magnetic ballasts.
- T-5 and T-8 lamps are a smaller diameter lamp, making them easier for store.
- LED exit signs have a much longer life than traditional signs.

TOOLS AND RESOURCES

EnSave can help farms and food processors identify ways to save energy. Contact EnSave at 800-732-1399 for more information, or visit www.EnSave.com.

THE DAIRY PLANT SMART project is designed to increase U.S. milk processor awareness of and confidence in the economic feasibility of energy management practices. Dairy Plant Smart is one of 10 projects endorsed by the Innovation Center for U.S. Dairy™ to help reduce greenhouse gas emissions and increase business value across the dairy industry.

This is one in a series of validated case studies that have been proven to be economically viable in fluid milk processing plants. Together, these case studies help identify critical control points for energy management best practices for improving efficiency and profit opportunities.

For more information about Dairy Plant Smart, or to join our mailing list, e-mail innovationcenter@usdairy.com.

The Innovation Center aligns the collective resources of the dairy industry to offer consumers nutritious dairy products and ingredients, and promote the health of people, communities, the planet and the industry.