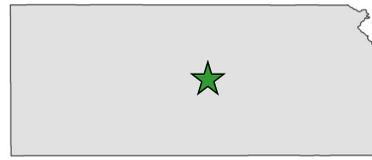


2016 Case Study

Compass Minerals

Intern: Emily Brown
Major: Renewable Energy Technologies
School: Wichita State University



Company background

Compass Minerals is the largest producer of salt in North America and the United Kingdom. The Lyons plant has a rich history of producing salt through mechanical evaporation since 1911. The plant operates 24 hours per day, 365 days per year and produces food-grade salt, water-care products, animal nutrition products, and other salt and mineral products. The plant includes an administrative office, storeroom, electrical and maintenance shops, several warehouses, nine-story mill, and an evaporator building, in addition to pump houses and wells.

Project background

The intern worked on a lighting survey at the Compass Minerals Lyons plant to consider energy efficiency, labor savings related to lighting maintenance, safety/security, compliance with company policies, sanitation/quality, and lighting material waste management. By creating a current lighting map of the facility, an inventory of light bulbs exists for evaluation of alternative materials and controls, purchasing needs and improved lighting waste management. The intern recorded illumination data and light on/off patterns for each location surveyed across the Lyons plant. She then measured the amount of illumination for each area during two surveys to compare with Compass Minerals' requirements and industry standards.

Incentives to change

Compass Minerals enlisted a student from the Kansas State University Pollution Prevention Institute (PPI) Intern Program last year to begin identifying waste streams at the Lyons plant. Results of that effort indicated there was room for improvement regarding lighting material waste management. Additionally, Compass Minerals wished to evaluate lighting with respect to potential cost reductions (energy efficiency

and labor savings), safety/security, compliance with company policies, and sanitation/quality. To that end, Compass Minerals applied for a 2016 PPI intern to conduct a comprehensive lighting survey.

In addition to addressing the above issues, Compass Minerals expects the lighting survey will have a positive impact on sustainability metrics. The National Electrical Manufacturers Association (NEMA), with its enLIGHTen America Initiative, estimates use of lighting controls can reduce energy costs by 15 to 80 percent depending on the facility (NEMA). This in turn would reduce the amount of carbon dioxide equivalent released into the atmosphere by electricity companies. Compass Minerals is committed to sustainability and applying innovation to "maximize the efficient use of resources and minimize emissions, waste, and other impacts" (Compass Minerals 2014 Sustainability Report).

Lighting survey at the Lyons plant

Compass Minerals has upgraded much of its lighting system to high-efficiency fluorescent bulbs, but still has an assortment of incandescent, metal-halide, and high-pressure sodium bulbs.

The intern created an inventory of light bulbs when surveying the plant and found a collection of F32T8 4' 32W bulbs, F54T5HO 4' 54W bulbs, T5 27W LED 4' bulbs, F75T12 75W 8' bulbs, 100W metal halides, 400W high-pressure sodium, and 100W incandescent bulbs. The intern used an Extech Model, HD450 data-logging light meter to measure illumination during two surveys of the plant, one performed during the day and one during the night. The intern also used three HOBO Occupancy/Light Data Loggers, UX90-005/6 to log light on/off and occupancy patterns in areas around the plant that have the potential to generate energy savings with the addition of an occupancy sensor.

Following data collection and analysis, the intern's recommendations included an LED retrofit of the fluorescent tubes, metal halides and high-pressure sodium bulbs; the addition of occupancy sensors in appropriate areas; and the process of de-lamping fixtures in appropriate areas.

For the LED retrofit, the intern recommended replacing the T8 fluorescents (32W) with T8 LEDs (15W) and removing the ballast from the T8 fixtures. For the T12 fluorescents (75W), the intern recommended replacing the bulbs with T8 LEDs (15W) and replacing the current ballast (134W) with a more energy-efficient ballast (111W). For the T5HO fluorescents (54W), a combination of T5 LEDs (27W) and RKT LED kits (16.7W) were used in the calculations to produce the most amount of energy saved per year. For the metal-halide and high-pressure sodium lights, the intern chose LED-equivalent fixtures as the retrofit option. This recommendation is estimated to save 1,193,630 kWh and \$78,174 per year.

Next, the intern recommended the use of occupancy sensors in various areas. The intern recommended using a high bay occupancy sensor, which covers 5,500 sq. ft. in the can line area. Other recommended sensors include the Watt-Stopper Passive Infrared Ceiling Sensor, which covers 300 sq. ft. in the main office breakroom, conference room, and, bathroom; south warehouse ingredient room; mill breakroom; and the 7th and 8th floors in the new mill. A Watt-

Stopper Passive Infrared Wall Sensor, which covers 150 sq. ft., can be used in the locker rooms and on the 9th floor of the new mill. This option is estimated to save 129,504 kWh and \$8,482 per year.

Finally, the intern recommended de-lamping fixtures. After performing her surveys and gathering illumination data, she assigned each area surveyed a category based on Guth's *Footcandle Recommendations*, and analyzed whether the area was under, within, or over the allocated Lux range for both surveys. The intern then identified the areas that were producing more lumens per square meter than needed for the work type. In these recognized areas, three- and four-bulb fixtures were minimized to two bulbs, while still maintaining sufficient illumination. This recommendation is estimated to save 25,631 kWh and \$1,679 per year.

Benefits of implementing these projects are electricity and labor cost reductions, reduction of greenhouse gas emissions, improved lighting waste management, improved lighting policies and assessments, and a safer working environment.

The proposed improvements could save Compass Minerals a total of 1,378,765 kWh/year, with savings of \$88,335 per year, and a maximum total payback period of 1.21 years. The improvements are estimated to reduce a total of 1,319 metric tons of CO₂ equivalent per year.

Summary of 2016 P2 intern recommendations for Compass Minerals

Project description	Annual estimated environmental impact	Annual estimated cost savings	Status
LED retrofit	1,193,630 kWh	\$78,217	Recommended
Occupancy sensors	129,504 kWh	\$8,482	Recommended
De-lamping	25,631 kWh	\$1,679	Recommended
Total savings *	1,378,765 kWh	\$88,335	
GHG reductions *	1,319 metric tons CO₂e		

* Does not include projects that are "not recommended" or "further research is needed."