GRINNELL COLLEGE

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COMPANY BACKGROUND

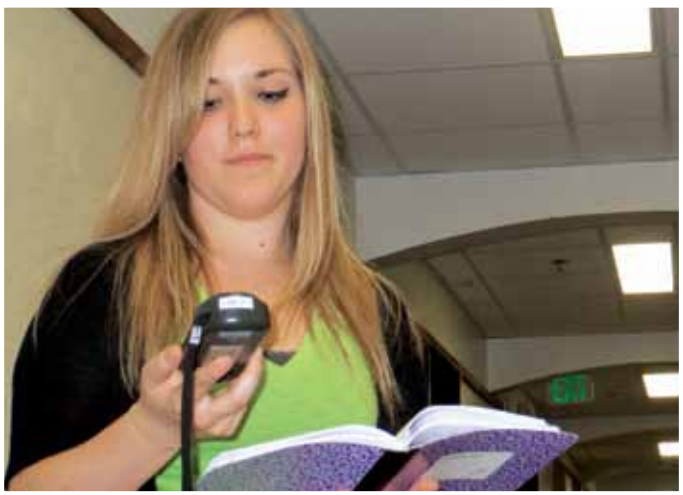
Grinnell College is a private college founded in 1846 and is located in Grinnell, Iowa. The college has 64 buildings on 120 acres, along with 365 acres for environmental research. The mission of Grinnell College is to provide students with a broad, deep, and life-enhancing education. This liberal arts college offers 26 majors and 10 interdisciplinary concentrations to approximately 1,600 students through the help of 600 faculty and staff.

PROJECT BACKGROUND

Grinnell College had a campus wide lighting audit performed recently which identified 20,552 lighting fixtures. By conducting a detailed energy survey of various buildings on campus, suggestions were made in order to reduce emissions, upgrade fixtures or bulbs, and estimate how much electricity is being used on campus.

INCENTIVES TO CHANGE

The Grinnell College campus operates year-round, although campus use decreases during the summer months. Due to the large amount of building space relative to the size of the student body, the college has a high energy use per capita. Conversely, the energy usage per square foot is relatively low. The ultimate goal is to further their commitment and success towards becoming carbon neutral, following the values of students, faculty and staff, along with meeting The American College & University Presidents' Climate Commitment.



RESULTS

The goal of this lighting project was to decrease the energy used throughout the campus by the lighting systems. The intern was tasked with developing a usable method to document the lamp use, type, location and wattage, along with potential savings options. The data was compiled into a spreadsheet that will help manage and control inventory of the various lamps. The intern calculated upgrade and replacement costs with standard-practice control methods, energy usage and maintenance savings.

Lighting Upgrades: Eight types of lights were found to be in use throughout the 18 dormitories. Fluorescent lamps were common in all the buildings. An option for upgrading fluorescent lamps to improve efficiency is to retrofit the fixture with a light-emitting diode (LED) lamp. Incandescent lamps throughout the dorms could save energy by changing to an equivalent compact-fluorescent lamp or LED bulb. Fixtures with t12 linear fluorescent lamps could be retrofit to t8 fluorescent lamps or t8 LED lamps.

HID Metal Halide Lights: Four of the buildings are using High Intensity Discharge (HID) metal-halide lamps. The HID metal halide lamps could be replaced with a six-lamp linear t8 fixture, with either fluorescents or LED lamps. The current HID lamps are not preferable partly due to operational issues with that type of lighting. Installing a more efficient light will provide energy and maintenance savings and will also increase the comfort level of the areas.

Occupancy Sensors: Occupancy-controlled sensors are recommended throughout the campus for most of the corridors, lounges, restrooms and other areas with intermittent area use. The sensors would ensure lights are turned off when the area lighting is not required. This would provide additional energy savings for the college.

CONVENTIONAL AIR POLLUTANTS AND GREENHOUSE GASES DIVERTED IN METRIC TONS

TOTAL FOR ALL SECTORS							
CO_2	SO_2	CH_4	N_2O	CFC	NO_X	VOC	PM_{10}
6125.62	33.04	229.63	3.05	75.12	15.70	0.49	0.82

PROJECT	ANNUAL COST SAVINGS	ENVIRONMENTAL RESULTS	STATUS
LIGHTING UPGRADES WITH OCCUPANCY SENSORS	$610,730	9,542,661 KWH	RECOMMENDED