

# CITY OF DUBUQUE

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## COMPANY BACKGROUND



DUBUQUE

Dubuque, Iowa is a city led by environmentally aware leaders that strive to create a sustainable community by managing resources and increasing energy efficiency. Sustainable Dubuque is a program that focuses efforts on three main aspects of community development: environmental and ecological integrity, economic prosperity, and social and cultural vibrancy.

Located on the Mississippi River in northeast Iowa, the city of Dubuque employs more than 900 people throughout the year. Citizens of Dubuque take pride in the city's slogan: Masterpiece on the Mississippi.

## PROJECT BACKGROUND

The Historic Federal Building, City Hall, and City Hall-Annex were all constructed more than a half-century ago. Through the years, renovations have been made that increase energy efficiency and reduce the carbon footprint of the buildings. The project identified new opportunities that could produce environmental and utility cost savings.

## INCENTIVES TO CHANGE

The model for Sustainable Dubuque consists of 11 principles that identify and address community values that citizens want to preserve for future generations. The intern project addressed two of these key values, community design and smart energy use, by identifying opportunities to improve the efficiency of municipal buildings, while preserving the historic integrity of the older structures. Increasing the efficiency of municipal buildings and minimizing the use of energy and resources will position the city as a model of sustainability.

## RESULTS

**Electricity Savings:** Reducing the daily electricity use in the Historic Federal Building will produce noticeable annual savings. Opportunities to reduce energy consumption include reducing the number of lights used in unoccupied and naturally lit areas, powering down computers and monitors when not in use, reducing the quantity of multi-function office equipment in common areas, eliminating space heaters, and installing variable frequency drives (VFD) on the chiller system pumps. Implementing these recommendations would save 120,730 kWh and reduce energy costs by \$10,130 a year.

**Window Upgrades:** The Historic Federal Building loses significant energy to the surrounding environment through its exterior windows. The windows are manufactured from steel with a single glazing that provides poor thermal resistance between the indoor and outdoor air temperatures. Further, infiltration through the steel frames result in wasted energy and increased costs.

The intern offered three options to increase the thermal efficiency of the windows and reduce infiltration around the frames with technologies that would retain the historic integrity of the building. Depending on the option selected, energy use could be reduced by up to 7,000 therms, saving \$6,700 a year.



**Cooling Tower:** City Hall uses more than 1,000,000 gallons of water a month to cool its air handling units and heat pumps. Installing a cooling tower to convert the open loop system to a closed loop system would save millions of gallons of water and chemicals. The cooling tower would cool the water to an adequate temperature, allowing the water to be reused. While the city is not directly billed for water consumption, a commercial consumer would be charged approximately \$70,200 for supply and disposal of this amount of water.

### CONVENTIONAL AIR POLLUTANTS AND GREEN HOUSE GASES DIVERTED IN STANDARD TONS

Total for all sectors					
CO <sub>2</sub>	SO <sub>2</sub>	CH <sub>4</sub>	N <sub>2</sub> O	CFC	PM-10
141.20	0.54	350.26	177.14	1.55	0.02

PROJECT	ANNUAL COST SAVINGS	ENVIRONMENTAL RESULTS	STATUS
ELECTRICITY SAVING PRACTICES - HISTORIC FEDERAL BUILDING	\$7,153	84,244 KWH	RECOMMENDED
WINDOW UPGRADES - HISTORIC FEDERAL BUILDING	\$6,700	9,550 THERMS	RECOMMENDED
CITY HALL COOLING TOWER	\$8,740*	12 MILLION GALLONS OF WATER	RECOMMENDED

\*Based on current city water rates, the 12 million gallons of potable water would be, if billed to a commercial user, \$24,000 for water with sewer charges of \$42,000 + tax. Currently these fixed and variable costs are subsidized by community rate payers.

