

CITY OF BLOOMFIELD



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COMPANY PROFILE

The City of Bloomfield is located in the heart of Davis County and is home to about 2,600 residents. The Davis County Community School District, located entirely in Bloomfield, educates all K-12 students within Davis County. It is the second largest school district in terms of geographical area, covering 486 square miles. Both the city and school district work together to create the best possible environment for the 1,200 K-12 students. This is exhibited in their motto: *One School, One Community, One Goal... The Best That We Can Be!*

PROJECT BACKGROUND

This P2 intern project resulted from Bloomfield's partnership in Iowa's E3 project. E3, or Economy, Energy, Environment, is an EPA sponsored framework that brings together assistance providers from six federal agencies and collaboratively supports communities, manufacturers, and manufacturing supply chains. The city of Bloomfield requested P2 internship assistance in maximizing the energy efficiency of their county school district's buildings and operations. The project focused on opportunities in the elementary/middle school, the old high school building, and the new high school building. Strategies were determined that would reduce the overall energy consumption at the three locations.

INCENTIVES TO CHANGE

The school district desires to provide the best possible educational environment for its students. Funds that are spent on energy cannot be used to obtain resources for students, so maximizing energy saving opportunities is critical. In addition to that, the city of Bloomfield is preparing to become a net-zero electric community by the year 2030. This means that any efforts to reduce energy consumption will directly impact this goal in a positive way.

RESULTS

Reduce Kitchen Equipment Operating Times: The elementary/middle school kitchen prepares meals for all K-8 students in the school district. Various types of kitchen equipment are used to prepare and store food before, during, and after it has been cooked. The

kitchen equipment is fairly new and operates efficiently. There are some opportunities to further reduce energy usage by reducing operating times of the equipment. Equipment used in preparation of the food, such as the ovens, could be turned on a couple of hours later each morning. Other equipment such as refrigerators or milk coolers could be turned off during longer periods when not in use.

Gas Condensing Boiler: The existing gas steam boiler system is responsible for heating the old high school building, which is made up of the original 3-story high school, a 2-story addition, and the gymnasium. With plans in the near future to tear down the 3-story portion of the building, a new heating system would be beneficial. The existing system is past its



PROJECT	ANNUAL COST SAVINGS	ENVIRONMENTAL RESULTS	STATUS
REDUCE KITCHEN EQUIPMENT OPERATING TIMES	\$200	3,204 kWh	RECOMMENDED
GAS CONDENSING BOILER	\$8,966	13,086 Therms	RECOMMENDED
INSTALL EFFICIENT A.C. UNITS	\$2,121	34,210 kWh	RECOMMENDED
REDUCE DAILY A.C. USAGE HOURS	\$5,615	90,570 kWh	RECOMMENDED
INSTALL CENTRAL AIR	\$4,060	49,355 kWh	RECOMMENDED
SOLAR ARRAY (PRELIMINARY ESTIMATE)	\$167,947	1,971,000 kWh	RECOMMENDED

useful life and is not optimally sized for the smaller square footage. Both a gas steam boiler and gas condensing boiler were considered. A gas condensing boiler is the most energy-efficient option and would significantly reduce annual heating costs.

Install Efficient A.C. Units: The Davis County Elementary School building currently uses 29 individual window unit air conditioners to cool the classrooms located on the outside of the building. The model, age, and power of these units vary greatly from classroom to classroom. It was discovered that replacing some of the models with newer, more efficient window unit air conditioners could provide cost savings as well as a reasonable payback period.

Reduce Daily A.C. Usage Hours: The Davis County Elementary School building uses its 29 window unit air conditioners 24 hours a day for around 8 months of the year in order to keep the building cool and free from too much moisture. The installation of ceiling fans would improve air circulation and allow for the reduction of the air conditioners' usage. This would cut the electricity usage and costs of the window air conditioning units by more than 52 percent.

Install Central Air: Most of the rooms located on the inner part of the Davis County Elementary School are currently cooled by central air conditioning. Most of the other rooms with windows are equipped with 29 individual window unit air conditioners. It estimated that there could be a potential savings of \$4,060 per year by installing central air conditioning for those exterior rooms.

Solar Array: Net metering is a billing process that allows energy customers who generate their own power, such as wind or solar, to put excess power back onto the grid with the option to draw back from it later if needed. In the case of solar

panels that generate energy during the brightest part of the day, energy that is not used at that time could be put on the grid and offset the cost for power drawn overnight. The intern compiled a preliminary solar array study that indicated cost savings potential for the city and the school system. A more thorough feasibility study is recommended to evaluate the optimum sizing, return-on-investment, and cost savings that could be achieved. Considerations of the study should include current policies that govern sizing of alternative energy sources, net metering practices, limitations of virtual net metering, and power purchase agreements in Iowa.

