THREE RIVERS

Project Component #1 Lighting: City Hall, Library, Commission On Aging (COA)

Most of the lighting in these buildings are T12 fluorescent, the balance is incandescent. A few fixtures have been retrofitted to T8 technology but this appears to have been done on an as needed basis. Retrofits and replacements in these buildings will be performed as described below.

Retrofit types:

- Retrofit 4ft linear T12 fluorescent fixtures with 28W T8 lamps, and a premium low wattage electronic ballast.
- Retrofit 8ft linear w/2 F96 T12 HO fluorescent fixtures with 2L HO Electronic ballast and 2 F96 T8 HO
- Retrofit non-dimming incandescent fixtures with screw-in compact fluorescent lamps of a size and type suited to the task.
- Replace cracked, broken, or missing lenses in recessed ceiling troffers and surface fixtures with flat lenses.
- Replace fixtures specified in the Room By Room Report with new fixtures of a type and size suited to the task.
- Replace all incandescent EXIT signs with LED signs.

Disposal: Proper disposal of lamps and ballasts in compliance with EPA regulations is included.

Photo of Ceiling Lighting/City Hall

Benefits

- Reduced energy use
- Improved lighting levels
- Improved lighting quality
- Eliminates current mix of magnetic and electronic ballasts

Project Component #2 Building Envelope: Library and Commission On Aging (COA)

Air leakage is defined as the "uncontrolled migration of conditioned air through the building envelope". Caused by pressure differences due to wind, chimney (or stack) effect, and mechanical systems it has been shown to represent one of the largest sources of heat loss or gain through the building envelopes for nearly all types of buildings. Beyond representing potential for energy savings uncontrolled air leakage can affect thermal comfort of occupants, air quality through ingress of contaminants from outside and the imbalance of mechanical systems, and the structural integrity of the building envelope - through moisture migration. Control of air leakage involves the sealing of gaps, cracks and holes, using appropriate materials and systems, to create, if possible, a continuous plane of "air-tightness" to completely encompass the Building Envelope. Part of this process also incorporates the need to "decouple" floor - to - floor, and to "compartmentalize" components of the building in order to equalize pressure differences.

The buildings were inspected visually and using a smoke puffer to identify location and severity of air leakage paths. Air leakage paths are detailed in the scope of work below.

City of Three Rivers, MI

TABLE 1 – ENERGY SAVINGS, GHG REDUCTION, COST SAVINGS				
Project Component	**Project Description**	**Annual Energy Savings**	**Annual Carbon Dioxide Emissions Reduction**	**Annual Cost Savings**
#1	Municipal Bldg Lighting	57,731 kWh	91,404 pounds	$ 4,062
#1	Library Lighting	4,563 kWh	7,225 pounds	$ 346
#1	COA Lighting	13,010 kWh	20,598 pounds	$ 1,008
#2	Library/COA Bldg Envelope	2,650 CCF	31,600 pounds	$ 2,645
TOTALS		**376,520 kWh/ 2,650 CCF**	**150,827 pounds**	**$ 8,061**

Emissions Reduction Data obtained through the US Environmental Protection Agency, Clean Energy, Greenhouse Gas Equivalencies Calculator (http://www.epa.gov/RDEE/energy-resources/calculator.html)

STURGIS

Table 1 below depicts a summary of the scope of work to be performed.

TABLE 1 The City of Sturgis Honeywell Performance Contract Base Project Scope of Work	City Hall/Library	Civic Center/Auditorium	Diesel Plant	Doyle Community Center	Police/Fire	Waste Water Treatment Plant	West Street/Admin Offices	City-wide Improvements
Install New Heating Boiler System/Humidification	X							
Install New Chilled Water System/Chiller	X							
Replace/Retrofit AHU	X							
Add more VAV Boxes to Current System	X							
Existing HVAC Systems Tune-Up & Rebalance (Air & Water)	X							
Install high Efficiency Motors	X							
Building Envelope Tune Up	X	X	X	X	X	X	X	X
Domestic Water Heater Replacement	X							
Water Conservation Measures	X	X		X	X	X	X	
Lighting Upgrades	X	X		X	X	X	X	X
Temperature Controls Upgrade	X							

By implementing this program, the City of Sturgis will reduce its overall energy expenditure by $57,721 annually. The City will reduce its kWh consumption by 640,621. Due to the fuel switch at the City Hall/Library, there will be a net negative gas savings of 7,040 CCF. The cost to implement these energy conservation measures is approximately $1.2 million. The implementation of these energy conservation measures will reduce the City's greenhouse gas emissions by 636 tons annually. The City of Sturgis is requesting funding from the State in the amount of $67,892. So for every grant dollar invested, the City of Sturgis is leveraging 17.5 times that amount in energy and operational savings and capital contribution. This project will help stimulate the local economy and create jobs in the City of Sturgis. Based on the $92,000 per job published by the DOE, by implementing this project, the City will help create approximately thirteen (13) jobs. These jobs will include electricians, plumbers, pipe fitters, control technicians, project managers, and engineers.

KILOWATTS FOR COPS – COUNTY JAIL

3. Energy Savings & Cost Effectiveness/Reduction of Greenhouse Gases

TABLE 1 – ENERGY SAVINGS, GHG REDUCTION, COST SAVINGS

Project Activity	Project Description	Annual Energy Savings	Annual Carbon Dioxide Emissions Reduction	Annual Cost Savings
#1	Solar Electric	30,021 kWh	47,532 pounds	$ 2,702
#2	Solar Hot Water	29,815 therms	328,654 pounds	18,520
#3	New Washers & Dryers			
#4	Energy Audits, Building Upgrades, Solar Showers			
TOTALS		**30,021 kWh/ 29,815 therms**	**376,186 pounds**	**$ 21,222**

Emissions Reduction Data obtained through the US Environmental Protection Agency, Clean Energy, Greenhouse Gas Equivalencies Calculator (http://www.epa.gov/RDEE/energy-resources/calculator.html) The two major activities have calculations related to energy savings, cost savings and greenhouse gas emission reductions. Additional savings should be realized by any buidling upgrades at Kings Mill and an electric savings at Cade Lake Campground after installation of the passive solar hot water system for the showers. The solar hot water system for the jail has a potential payback time of 4.75 years. The overall project payback is 12.63 years; potentially less with buidling upgrades and the passive solar system at the campground.

Savings for the washer/dryer upgrades will be realized in the reduction of gas usage as a result of the improved efficiencies and the addition of the solar hot water system. A separate savings line has not been calculated.

TABLE 2
PRESENT AND EXPECTED OPERATIONAL COSTS & ENVIRONMENTAL EFFECTS

Month	Cost of Present Energy	Expected Savings	Present Gas Usage (therm/CCF)	Portion Replaced by Solar	Savings in Gas Usage (therm/CCF)	Savings in CO_2 Creation (tons)
January	$ 10,663	$ 1,919	9,866	18 %	8,090	14
February	7,484	2,320	7,028	31 %	4,849	38
March	6,493	2,792	6,173	43 %	3,519	44
April	4,090	2,413	5,246	59 %	2,151	26
May	2,235	1,609	3,412	72 %	955	19
June	1,496	1,287	1,924	86 %	269	12
July	1,350	1,269	1,631	94 %	98	5
August	1,484	1,410	1,816	95 %	91	1
September	1,516	1,273	1,860	84 %	298	.5
October	2,309	1,478	1,889	64 %	680	.5
November	4,141	1,201	3,622	29 %	2,572	1
December	8,563	1,028	7,868	12 %	6,924	3
Total	**$ 49,513**	**$ 18,520**	**50,446**		**29,815**	**164**