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9/29/09

MEMORANDUM

TO: Environmental Concerns Committee

THROUGH: Carl S. Goldsmith, Director of Public Works

FROM: David P. Gorman, Asst. Director of Public Works

SUBJECT: **US Mayors Climate Protection Agreement and Cool Cities Program**

DATE: September 18, 2009

The ECC requested that staff present information concerning the Cool Cities program, which aims to reduce global warming. To join the program, a municipality must commit to take four actions: (1) join the US Mayors Climate Protection Agreement to reduce global warming pollution, (2) incorporate hybrid and other cleaner fleet cars, (3) modernize municipal buildings with energy saving technology and (4) invest in clean and renewable energy. Nearly 1,000 communities have signed the Agreement, including the DuPage County communities of Carol Stream, Elmhurst, Villa Park and Westmont.

Beyond the actions required to join, there are fives milestones to progress through the program:

- Milestone #1: Establish a Cool Cities Campaign. It is recommended that a team of 3-7 active volunteers serve on the team. This has actually already been initiated by the Lombard/Villa Park Chapter of the AAUW and the Lombard Garden Club. The ECC would communicate with those groups to accomplish the goals of the program.
- Milestone #2: Engage the Community. The ECC could accomplish this by recommending to the Village President and Board of Trustees that the Village should participate in the Cool Cities program.
- Milestone #3: Municipality Signs the Commitment Agreement. The Village Board of Trustees would adopt a resolution authorizing the Village President to sign a resolution to adopt the US Mayors Climate Protection Agreement.
- Milestone #4: Implementing Initial Solution Steps. The ECC would be charged to create a local climate action plan. The Energy Audit Report that is being presented to the ECC concurrently with this memo, under separate cover, may serve as the basis for this plan. Also, the Village's actions through the Clean Air Counts program would be recognized in this plan.
- Milestone #5: Implementing Advanced Smart Energy Solutions. This final stage is where most of the ECC's energy would be focused. The steps involved are:
  - undertaking a community-wide "global warming audit" (such an audit has already been conducted as part of the aforementioned Energy Audit Report),
  - completing a climate action plan with specific solutions to meet the target reductions of the Climate Agreement,
  - adopting energy efficiency policies (e.g. energy efficient lights and green building standards),
  - adopting a green vehicles policy (e.g. purchases hybrid vehicles for city fleet),
  - adopting other global warming reduction policies (e.g. no-idling and Energy Star appliances),
  - adopting renewable energy policies (e.g. buying electricity from renewable resources and installing solar panels or wind turbines),
  - adopting transit and land-use improvements (e.g. the planned circulator bus),
  - supporting State action to reduce greenhouse gasses,
  - publishing an annual report tracking progress on the climate protection goals, and
  - supporting initiatives on global warming at state and national levels.

US Mayors Climate Protection Agreement:
As stated in the Agreement, nearly 1,000 mayors have signed the Agreement, which states that (a) scientific consensus is that climate change is a reality and that human activity has been largely responsible, (b) the US Conference of Mayors endorses the terms of the Kyoto Protocol and encourages federal action and (c) the goal is to reduce greenhouse gas emissions to 7% below 1990 levels by 2012. The Agreement requires actions under local control, including:

1. reducing emissions from municipal operations,
2. having land-use policies that preserve open space and smart growth,
3. promoting transportation options such as bicycling,
4. advocating for renewable energy resources,
5. prioritizing energy efficiency in building codes and municipal retrofits,
6. purchasing Energy Star equipment,
7. promoting LEED or similar sustainable building practices,
8. increasing fleet vehicle mileages, reducing idling and using biodiesel,
9. evaluating pumps to increase efficiencies,
10. increasing recycling rates,
11. maintaining the urban forest, and
12. educating the community on greenhouse gas emissions.

The Village has either already accomplished or is taking actions to accomplish all items with exception of items #4, #5 and #12. Regarding renewable energy resources (#4), it is suggested *but not required* that the Village could purchase renewable energy at an increment of between $22,000 and $70,000 annually. Regarding energy efficiency (#5), the Village has already switched to metal halide and fluorescent bulbs, and the Village could explore options for building code incentives. Regarding greenhouse gas emissions (#12), this could be accomplished using the website, the Pride newsletter and ECC presence at community events. Therefore, this list of minimum actions appears to be very feasible for little effort and no cost (unless we choose to purchase renewable energy).

ECC and Board of Trustees History:
The ECC had discussed the US Mayors Climate Protection Agreement for four months in 2006 with Wes Anderson. The ECC forwarded the Agreement to the Board of Trustees on 9/26-06 without a recommendation. The Board of Trustees tabled the matter indefinitely on 10/19/06 by a vote of 4 to 2. Questions of costs and national policy regarding the Kyoto Protocol were part of the Board's discussion. The four trustees that had voted to table the matter are no longer on the Board so it is possible that the current Board may have a different consensus.

Recommendation:
The Village is already accomplishing most of the actions promoted by both the US Mayors Climate Protection Agreement and the Cool Cities program and the remaining action can be accomplished with little effort and no cost. The only tangible benefit to the Village would likely be to demonstrate a commitment to sustainable practices in our federal and state grant applications. Therefore, the decision to sign the Agreement and/or participate in Cool Cities would be more a philosophical statement and policy directive to staff for planning and operational objectives.

The U.S. Mayors Climate Protection Agreement

(As endorsed by the 73rd Annual U.S. Conference of Mayors meeting, Chicago, 2005)

A. We urge the federal government and state governments to enact policies and programs to meet or beat the target of reducing global warming pollution levels to 7 percent below 1990 levels by 2012, including efforts to: reduce the United States' dependence on fossil fuels and accelerate the development of clean, economical energy resources and fuel-efficient technologies such as conservation, methane recovery for energy generation, waste to energy, wind and solar energy, fuel cells, efficient motor vehicles, and biofuels;

B. We urge the U.S. Congress to pass bipartisan greenhouse gas reduction legislation that 1) includes clear timetables and emissions limits and 2) a flexible, market-based system of tradable allowances among emitting industries; and

C. We will strive to meet or exceed Kyoto Protocol targets for reducing global warming pollution by taking actions in our own operations and communities such as:

1. Inventory global warming emissions in City operations and in the community, set reduction targets and create an action plan.
2. Adopt and enforce land-use policies that reduce sprawl, preserve open space, and create compact, walkable urban communities;
3. Promote transportation options such as bicycle trails, commute trip reduction programs, incentives for car pooling and public transit;
4. Increase the use of clean, alternative energy by, for example, investing in "green tags", advocating for the development of renewable energy resources, recovering landfill methane for energy production, and supporting the use of waste to energy technology;
5. Make energy efficiency a priority through building code improvements, retrofitting city facilities with energy efficient lighting and urging employees to conserve energy and save money;
6. Purchase only Energy Star equipment and appliances for City use;
7. Practice and promote sustainable building practices using the U.S. Green Building Council's LEED program or a similar system;
8. Increase the average fuel efficiency of municipal fleet vehicles; reduce the number of vehicles; launch an employee education program including anti-idling messages; convert diesel vehicles to bio-diesel;
9. Evaluate opportunities to increase pump efficiency in water and wastewater systems; recover wastewater treatment methane for energy production;
10. Increase recycling rates in City operations and in the community;
11. Maintain healthy urban forests; promote tree planting to increase shading and to absorb CO2; and
12. Help educate the public, schools, other jurisdictions, professional associations, business and industry about reducing global warming pollution.

The U.S. Conference of Mayors Climate Protection Agreement – Signature Page

You have my support for the Mayors Climate Protection Agreement.

Date: _____

Mayor: _____

Signature: _____

Address: _____

City: _____ State: _____ Zip: _____

Mayor's e-mail: _____

Staff Contact Name: _____

Staff Contact Title: _____

Staff Phone: _____

Staff e-mail: _____

Please add my comments in support of the Mayors Climate Protection Agreement. We will add these to the Website *(optional)*:

_____

_____

_____

_____

Please return completed form at your earliest convenience to:
The U.S. Conference of Mayors
Climate Protection Center

By Mail:
1620 I Street, NW
Washington, DC 20006

By Fax: (202) 293-2352

For additional information, contact
Kevin McCarty
kmccarty@usmayors.org

(202) 861-6728

ENDORSING THE U.S. MAYORS CLIMATE PROTECTION AGREEMENT

WHEREAS, the U.S. Conference of Mayors has previously adopted strong policy resolutions calling for cities, communities and the federal government to take actions to reduce global warming pollution; and

WHEREAS, the Inter-Governmental Panel on Climate Change (IPCC), the international community's most respected assemblage of scientists, has found that climate disruption is a reality and that human activities are largely responsible for increasing concentrations of global warming pollution; and

WHEREAS, recent, well-documented impacts of climate disruption include average global sea level increases of four to eight inches during the 20th century; a 40 percent decline in Arctic sea-ice thickness; and nine of the ten hottest years on record occurring in the past decade; and

WHEREAS, climate disruption of the magnitude now predicted by the scientific community will cause extremely costly disruption of human and natural systems throughout the world including: increased risk of floods or droughts; sea-level rises that interact with coastal storms to erode beaches, inundate land, and damage structures; more frequent and extreme heat waves; more frequent and greater concentrations of smog; and

WHEREAS, on February 16, 2005, the Kyoto Protocol, an international agreement to address climate disruption, went into effect in the 141 countries that have ratified it to date; 38 of those countries are now legally required to reduce greenhouse gas emissions on average 5.2 percent below 1990 levels by 2012; and

WHEREAS, the United States of America, with less than five percent of the world's population, is responsible for producing approximately 25 percent of the world's global warming pollutants; and

WHEREAS, the Kyoto Protocol emissions reduction target for the U.S. would have been 7 percent below 1990 levels by 2012; and

WHEREAS, many leading US companies that have adopted greenhouse gas reduction programs to demonstrate corporate social responsibility have also publicly expressed preference for the US to adopt precise and mandatory emissions targets and timetables as a means by which to remain competitive in the international marketplace, to mitigate financial risk and to promote sound investment decisions; and

WHEREAS, state and local governments throughout the United States are adopting emission reduction targets and programs and that this leadership is bipartisan, coming from Republican and Democratic governors and mayors alike; and

WHEREAS, many cities throughout the nation, both large and small, are reducing global warming pollutants through programs that provide economic and quality of life benefits such as reduced energy bills, green space preservation, air quality improvements, reduced traffic congestion, improved transportation choices, and economic development and job creation through energy conservation and new energy technologies; and

WHEREAS, mayors from around the nation have signed the U.S. Mayors Climate Protection Agreement which, as amended at the 73rd Annual U.S. Conference of Mayors meeting, reads:

The U.S. Mayors Climate Protection Agreement

A. We urge the federal government and state governments to enact policies and programs to meet or beat the target of reducing global warming pollution levels to 7 percent below 1990 levels by 2012, including efforts to: reduce the United States' dependence on fossil fuels and accelerate the development of clean, economical energy resources and fuel-efficient technologies such as conservation, methane recovery for energy generation, waste to energy, wind and solar energy, fuel cells, efficient motor vehicles, and biofuels;
B. We urge the U.S. Congress to pass bipartisan greenhouse gas reduction legislation that includes 1) clear timetables and emissions limits and 2) a

flexible, market-based system of tradable allowances among emitting industries; and

C. We will strive to meet or exceed Kyoto Protocol targets for reducing global warming pollution by taking actions in our own operations and communities such as:
   1. Inventory global warming emissions in City operations and in the community, set reduction targets and create an action plan.
   2. Adopt and enforce land-use policies that reduce sprawl, preserve open space, and create compact, walkable urban communities;
   3. Promote transportation options such as bicycle trails, commute trip reduction programs, incentives for car pooling and public transit;
   4. Increase the use of clean, alternative energy by, for example, investing in "green tags", advocating for the development of renewable energy resources, recovering landfill methane for energy production, and supporting the use of waste to energy technology;
   5. Make energy efficiency a priority through building code improvements, retrofitting city facilities with energy efficient lighting and urging employees to conserve energy and save money;
   6. Purchase only Energy Star equipment and appliances for City use;
   7. Practice and promote sustainable building practices using the U.S. Green Building Council's LEED program or a similar system;
   8. Increase the average fuel efficiency of municipal fleet vehicles; reduce the number of vehicles; launch an employee education program including anti-idling messages; convert diesel vehicles to bio-diesel;
   9. Evaluate opportunities to increase pump efficiency in water and wastewater systems; recover wastewater treatment methane for energy production;
   10. Increase recycling rates in City operations and in the community;
   11. Maintain healthy urban forests; promote tree planting to increase shading and to absorb CO2; and

12. Help educate the public, schools, other jurisdictions, professional associations, business and industry about reducing global warming pollution.

NOW, THEREFORE, BE IT RESOLVED that The U.S. Conference of Mayors endorses the U.S. Mayors Climate Protection Agreement as amended by the 73rd annual U.S. Conference of Mayors meeting and urges mayors from around the nation to join this effort.

BE IT FURTHER RESOLVED, The U.S. Conference of Mayors will work in conjunction with ICLEI Local Governments for Sustainability and other appropriate organizations to track progress and implementation of the U.S. Mayors Climate Protection Agreement as amended by the 73rd annual U.S. Conference of Mayors meeting.

MEMORANDUM

TO: Environmental Concerns Committee

THROUGH: Carl S. Goldsmith, Director of Public Works CJ

FROM: David P. Gorman, Asst. Director of Public Works DPG

SUBJECT: **Energy Audit Report**

DATE: September 18, 2009

The Village has received the attached Energy Audit Report, which was provided at no cost to the Village by Utilivate Technologies, LLC through a cooperative agreement between ComEd and the Illinois Department of Commerce and Economic Opportunity. The report is provided for the ECC's review. A comprehensive "Sustainable Energy Plan" that incorporates the report will be presented to the ECC at a future meeting.

Per discussion with Lonnie Morris, Chair of the Cool Cities program, this report fulfils the responsibility for a "global warming audit" and provides the ability to craft a climate action plan. (See the concurrent memo on the US Mayors Climate Protection Agreement and the Cool Cities program.) The report will provide a baseline in order to measure future actions.

No formal action is required by the ECC at this time. However, staff asks that the ECC provide comments on the report. Staff will then develop a point by point review of the report's recommendations and the ECC's comments. That review will be provided to the ECC at a forthcoming meeting.

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Village of Lombard – Village Hall
Energy Audit Report
Lombard, IL

I. Executive Summary

The Executive Summary highlights the main conclusions of the energy assessment. Recommendations, summary tables of energy conservation measures, initial cost, annual savings, and payback are included based on an energy audit conducted by Utilivate Technologies, LLC. The energy audit targeted the Village of Lombard Village Hall facility.

Village of Lombard – Village Hall
2008 Electric Usage and Cost

Village Hall			
Period	**Usage (kWh)**	**Usage (mbtu)**	**Cost ($)**
Jan08	57,081	194,817	n/a
Feb08	51,868	177,025	n/a
Mar08	51,685	176,401	n/a
Apr08	59,278	202,316	n/a
May08	66,468	226,855	n/a
Jun08	77,769	265,426	n/a
Jul08	78,477	267,842	n/a
Aug08	75,703	258,374	n/a
Sep08	63,032	215,128	n/a
Oct08	55,670	190,002	n/a
Nov08	59,070	201,606	n/a
Dec08	57,152	195,060	n/a
Total	**753,253**	**2,570,852**	**$0.00**

Village Hall Heat			
Period	**Usage (kWh)**	**Usage (mbtu)**	**Cost ($)**
Jan08	141,239	482,049	n/a
Feb08	121,951	416,219	n/a
Mar08	97,465	332,648	n/a
Apr08	87,889	299,965	n/a
May08	85,584	292,098	n/a
Jun08	94,624	322,952	n/a
Jul08	87,841	299,801	n/a
Aug08	88,416	301,764	n/a
Sep08	77,915	265,924	n/a
Oct08	78,515	267,972	n/a
Nov08	125,103	426,977	n/a
Dec08	143,200	488,742	n/a
Total	**1,229,742**	**4,197,109**	**$0.00**

MAINTENACE/HIGH PRIORITY RECOMMENDATIONS

Ref - No.	Description	Annual Savings (Based on Energy Audit)	Cost Estimate (Based on Energy Audit)	Average Simple Payback (SPB) – (Based on Energy Audit)
ECM-1	Motion Sensors	$ 3,438	$ 10,350	3.0
ECM-2	Replace MH – Install M Sensors	$ 2,675	$ 5,700	1.3
ECM-3	Replace Halogen Lighting	$ 7,667	$ 21,250	2.8
ECM-4	Remove 2 lamps – Hallway	$ 481	$ 290	0.6
ECM-5	Remove wall wash lighting	$ 51	$ 25	0.5
ECM-6	Replace Building Automation S.	$ 83,141	$ 57,200	0.7
Total	----------	**$ 97,454**	**$ 94, 815**	**1.0**

Note: ECM = Energy Conservation Measures

Note: All calculations are based on energy audit

Findings:

The Village of Lombard Village Hall facility consumed 1,982,995 kWh of electricity in calendar year 2008 at an annual (estimated) cost of $175,899. When the above recommendations are implemented, it is projected that electricity usage will be reduced to 884,416 kWh; a 55.40% reduction. Electricity cost will be reduced to $78,451; a 55.40% reduction.

II. Table of Contents

a. Facility Description

The Village of Lombard Village Hall is a three-level building. The entrance level occupies about half the floor plan area and houses the Board Room and Community Room in a split level fashion. An open stairway leads to the lower and upper floors of the building.

The lower level houses offices and the mechanical room. The upper floor houses offices along in the perimeter of the building, copy room, and a large open office space.

i. Exterior walls

The exterior walls are in very good condition.

ii. Windows

About 40% to 50% of the exterior wall area is glass windows. The windows are double pane and have a fresh air (outdoor air) intake louver. The louvers are manually controlled and sometimes jam in an open position, allowing cold outdoor air to enter the building during winter months and hot outdoor air during summer months.

iii. Exterior doors

Exterior doors are in good condition.

iv. Roof

The roof in this facility is in good condition.

v. Building occupancy levels

The facility is occupied 8.5 hours per day, Monday through Friday.

	Op. Hrs per day	**Op. days per week**	**Occ Hrs**	**Non Occ Hrs**
Building	8.5	5	42.5	125.5
Hrs per Wk	8.5	5	42.5	125.5

Lighting

The Board room and the community room have 250 watt halogen lamps; the entrance area has 1000 watt metal halide lamps. Lighting in the lower level is T8 fluorescent lamps. Most of the fixtures have four lamps; few have two lamps. The upper floor uses high bay 400 watt metal halide for general lighting. Desks have individual lighting that is sometimes used by the occupants.

Air Handling Units (AHU)

The building has four air handling units; three are located in the mechanical room of the lower level and one (the lobby unit) is located on the roof of the building. The air handling units have a fresh air intake, circulating air, mixed air chamber and electric coils for heating. Discharge temperature is controlled by electric duct heaters.

Chillers

The building has four larger DX cooling systems for each AHU; and two smaller three-ton (3 ton units); one for the computer room and one for the TV6 studio.

Hot Water

Hot water is provided by a 9 KW electric water heater. Water is pumped to a storage tank, where water is stored and circulated at 120 ºF.

Observations

1. Offices and restrooms lights are left "ON" while unoccupied.
2. There are sixteen – 400 watt metal halide lamps in the upper floor open area that are "ON" 24 hours per day, seven days per week.
3. The Board room and the community room have halogen lamps.
4. Hallways have four lamp fixtures.
5. There are fifteen CFL wall wash (decorative lights) around the office walls in the upper floor.
6. Air handling units (AHU) operate 24 hours per day seven days a week.
7. Base board heating runs independently controlled from the AHU system

Recommendation

1. Install motion sensors to control lighting. See ECM-1
2. Replace metal halide lights with fluorescent lamps and install motion sensors. See ECM-2
3. Replace halogen lights with fluorescent lights. See ECM-3.
4. Remove two of four lamps of hallway lighting. See ECM-4.
5. Remove wall wash lighting. See ECM-4.
6. Replace existing building automation system with a new and up to date system, Develop plan, procedures and implement them to reduce operating hours of AHU system. See ECM-6.
7. Develop plan and procedures and implement them to control base board heating run time. See ECM-7.

VI. Energy usage

a. Current energy consumption

i. Overview

The facility consumed 1,982,995 kWh of electricity during calendar year 2008 at an annual (estimated) cost of $175,899.

ii. Electric energy

1. Consumption profile

Forty seven percent of the electricity is consumed by the heating and air conditioning system; 24% is consumed by the lighting system, 13% is consumed by the AHU supply and return fan motors, and 7% is used by miscellaneous equipment such as the water heater and hot water circulating pump, computers, copy machines, televisions, and others.

2. Demand profile

The utility bill shows that the maximum demand for 2008 was 199 kW set in the month of May (2008) and the minimum was 116 kW set in the month of January (2008).

iii. Natural gas energy

The facility is an all electric facility.

iv. Total energy

1. Total energy

The total (estimated) cost is $175,899 per year.

VII. Recommendations

a. Sustainable Energy Planning

Utilivate Technologies recommends that it's Performance-Grade Energy Audit serve as the basis for a comprehensive Sustainable Energy Plan (SEP). SEP should consist of the following elements (some of which were initiated or completed as part of Utilivate's energy audit):

- ❑ Baseline energy use (preliminary report completed)
  Summarize current energy usage by source; describe usage and cost evaluations.

- ❑ Planned action and projects (preliminary report completed)
  Summarize the actions needed to move the organization to the next higher performance level (preliminary report completed)

- ❑ Savings opportunities assessment (preliminary report completed)
  Summarize the results of savings estimation associated with process improvements, program implementation, and projects.

- ❑ Financial assessment (preliminary assessment initiated)
  Evaluate the financial impact of proposed and planned actions: Payback, life cycle costs, and rate of return. Prioritize actions based on financial assessment results considering financial performance measures.

- ❑ Goals and measures
  State the key goals to be achieved; include quantitative performance targets. Include goals associated with the implementation of processes, programs, and projects.

- ❑ Budget (preliminary assessment performed)
  Establish the operating budget needed to fund new and ongoing initiatives.

- ❑ Create an Energy Mandate
  Earn management approval and formal support of the Sustainable Energy Plan.

b. Process, Programs, and Projects

None

i. Overview

Evaluation of each energy conservation measure (ECM) is shown in each table numbered by the ECM number.

An explanation sheet precedes each calculation table describing the present conditions, the recommended changes and the savings.

ii. Operation and Maintenance Opportunities

Evaluation of each operation and maintenance recommendation is shown in each table numbered by an O&M number.

An explanation sheet precedes each calculation table describing the present conditions, the recommended changes and the savings.

iii. Low Cost/No Cost Opportunities

These recommendations require little or no capital investment. In most case, maintenance personnel may be able to implement them.

iv. Energy Conservation Measures (ECM)

These recommendations require capital expenditures and new equipment. Specifications may need to be developed and contractors hired to install these new systems.

Evaluation of each energy conservation measure (ECM) is shown in each table numbered by the ECM number.

An explanation sheet precedes each calculation table describing the present conditions, the recommended changes and the savings.

ECM-1 – Motion Sensors

Present Conditions

Lights in several areas are left "ON" unnecessary.

Recommendation

Install motion sensor to control operating hours of the lighting system.

Savings

Savings will result from fewer hours of operation.

Estimated Savings	$ 3,438.28
Estimated cost of pr	$ 10,350.00
Simple payback	3.0 Yrs

ECM-2 – Lighting Retrofit from MH to Fluorescent and Motion Sensors

Present Conditions

General office lighting in the upper level is metal halide and stays "ON" many more hours than needed.

Recommendation

Replace these fixtures with the latest fluorescent technology and install motion sensors to control and reduce operating hours of these lights.

Savings

Saving will result from fewer hours of operation.

Savings	$ 2,675
Estimated cost of project	$ 5,700
Simple payback	2.1 Yrs

ECM-3 – Lighting Retrofit - Replace halogen lights with fluorescent lighting

Present Conditions

The Board room and the community room have halogen bulbs as the source for lighting.

Recommendation

Replace the halogen lamps and fixtures with latest technology fluorescent lamps, fixtures and motion sensors.

Savings

Saving will result from operating a more efficient lighting system, reducing operating hours of the lighting system and maintenance from longer life of the fluorescent lamps.

Savings	$	7,667
Estimated cost of project	$	21,250
Simple payback		2.8 Yrs

ECM-4 – Remove 2 of 4 lamps – Hallway lighting

Present Conditions

The lighting fixtures of the hallways have four – T8 fluorescent lamps.

Recommendation

Remove two of the four lamps and one ballast of each fixture.

Savings

Saving will result from reducing load levels of the affected lighting fixtures.

Savings	$	481
Estimated cost of project	$	290
Simple payback		0.6 Yrs

ECM-5 – Remove wall wash lighting – hallway lighting (Upper floor)

Present Conditions

There is perimeter lighting over the cabinets of the upper floor. This lighting system is solely for decorative purposes.

Recommendation

Remove the lamps, lock the switches, and disconnect wiring to ensure these lamps are not replaced at a later date.

Savings

Saving will result from not having to operate these lights and from not having to replace these bulbs.

Savings	$	51
Estimated cost of project	$	25
Simple payback		0.5 Yrs

ECM-6 – Replace building automation system

Present Conditions

The three air handling units located in the mechanical floor of the lower level are controlled by the original Allerton building automation system.

Recommendation

Replace the building automation system with an up to date system.

Savings

Saving will result from a more a drastic reduction of operating hours of the AHUs and from not having the heating and cooling system run simultaneously.

Estimated Savings	$	83,141.42
Estimated cost of project	$	57,200.00
Simple payback		0.7 Yrs

vi. Facility Improvement Measures (FIM)

No facility improvement measures are recommended.

VIII. Conclusions

The Village of Lombard Main Village Hall facility is properly maintained. There are a number of improvements that can be made to make the building more energy efficient. However the return on investment of these projects based on energy savings exceed five years (e.g. replace windows, install a geothermal system).

IX. Supporting Documentation

a. Utility rates

b. Equipment list for facility

Village of Lombard

Attachment 4 Reducing CO_2 Emissions

The "carbon footprint" has gained currency in the media as a measure of the impact of energy usage on the atmosphere and climate change. A recent review of various definitions has shown that although the term has not been given a rigorous academic definition, several practical definitions have been offered.

In 2006, the UK Parliamentary Office of Science and Technology (POST 2006) submitted the definition that "A 'carbon footprint' is the total amount of CO^2 and other greenhouse gases, emitted over the full life cycle of a process or product. It is expressed as grams of CO^2 equivalent per kilowatt hour of generation (gCO2eq/kWh), which accounts for the different global warming effects of other greenhouse gases."

Havens (2007) was one of the first to propose a "life cycle" approach by looking at the overall impact of manufacturing or using specific products on greenhouse gas generation. Following this approach, the UK Carbon Trust and Defra developed a "Life Cycle Assessment" method for quantifying the greenhouse gases accountable in the production and use of selected products.

Calculation of Carbon-Footprint: Following is a calculation of carbon footprint for an energy reduction target of 20% from the baseline energy use:

Village of Lombard			
	2008 Baseline	55.40% Reduction	New Usage Total
Electric kWh	1,982,995	1,098,579	884,416
NG Therms	0	0	0
Total metric tons CO_2	**1,226**	**679**	**547**

55.40% Emissions Reductions are Equivalent to:		
Barrels of Oil Not Consumed	1,580	**Barrels per year**
Cars off the Road	147	**Cars per year**
Gallons of Gas not Consumed	77,379	**Gallons per year**
Acres of pine trees reducing carbon	566	**Acres per year**

Carbon footprint reduction goals can be readily achieved by implementing identified energy conservation opportunities.