

Village of Mount Prospect



ENERGY STRATEGY PLAN

April 2010

Village of Mount Prospect, Illinois
50 South Emerson Street
Mount Prospect, IL 60056

ENERGY STRATEGY PLAN

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1.1 Background

Energy plays a vital role in the health and well being of any community. It generates electricity, heats buildings, and runs transportation systems. It is important to be efficient with such a resource to sustain operation and quality of life. Within any community lie opportunities for energy efficiency—to reduce costs, protect available resources and reduce the impact on the environment. In order to evaluate and implement alternatives for energy efficiency, funding, assistance from energy professionals, and a commitment from the community are needed to become more energy efficient.

The American Recovery and Reinvestment Act of 2009 (ARRA) appropriated funding for the Department of Energy (DOE) to issue formula-based energy efficiency and conservation grants to states, territories, units of local government and Indian tribes under the Energy Efficiency and Conservation Block Grant (EECBG) Program. This Program, authorized in Title V, Subtitle E of the Energy Independence and Security Act of 2007 (EISA) and signed into Public Law (PL 110-140) on December 19, 2007, provides funds to governmental entities to develop and implement projects to improve energy efficiency and reduce energy use and fossil fuel emissions in their communities. The U.S. Department of Energy (DOE)'s Office of Energy Efficiency and Renewable Energy (EERE) administers the Program.

Under the EECBG Program, the Village of Mount Prospect (Village) was awarded a \$489,600 grant to fund energy efficiency and conservation projects. In order to receive the full EECBG funds, the Village was required to develop and submit an energy strategy to the DOE. In December 2009, the Village submitted its strategy, which outlined its energy efficiency and conservation goals, and provided information on the projects funded by the EECBG Program.

In order to develop this strategy and create a more formal energy efficiency and conservation plan, the Village retained the services of Camp Dresser & McKee Inc (CDM). CDM helped the Village identify its short and long-term energy efficiency goals and activities, and established general implementation guidance. EECBG funding was used to pay for these services.

1.2 Guiding Principles

A sustainable energy future requires a paradigm shift—transitioning away from fossil fuels and unrestrained energy consumption towards renewable energy and sustainable development. Under this Energy Strategy Plan, “renewable energy” is defined as energy produced from the Earth’s natural resources that regenerates, including sunlight, wind, water (hydro, wave, tidal), and geothermal heat. “Sustainable development” and the term “sustainability” is generally defined as meeting the community’s present needs, without compromising the ability of future generations to meet their own needs.

The energy challenge is global in nature but necessitates local action. The Village is responding to the global and local imperative by creating a community vision of sustainable energy management.

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As part of the Village’s vision of a clean energy future, this Plan is created to serve as a foundation from which strategic energy efficiency and conservation goals and actions can be identified and implemented.

1.2.1 The “Triple Bottom Line” Approach

The “Triple Bottom Line” (TBL) is a widely accepted concept for sustainable development. The TBL states that success is measured not only by financial performance (the traditional bottom line) but also by environmental stewardship and social responsibility. The TBL approach addresses the economic, environmental, and social impacts of development.

The Village is committed to the tenets of sustainability, and the TBL approach serves as the foundation of the Energy Strategy Plan. The Plan enhances the Village’s response in addressing the challenge.

1.2.2 Principles

The Village is committed to implementing energy efficiency and conservation measures in its business strategy, policies, and operations. In an effort to lead by example, the Village will adhere to the following principles:

- **LEADERSHIP:** Demonstrate leadership in responsible energy management through government initiatives.
- **STRATEGIC VISION:** Apply an integrated, strategic approach to managing the Village’s facilities, transportation, infrastructure, land use, solid waste and water systems.
- **COLLABORATION:** Promote a collaborative process among Village departments to implement innovative energy management solutions that enhance the Village’s financial efficiency.
- **EDUCATION:** Engage and educate Village employees and the community about the importance of energy efficiency and conservation as it relates to sustainability and the implications of climate change.
- **EVALUATION:** Measure, monitor and communicate the Village’s progress towards energy efficiency and conservation goals.

1.3 Plan Development and Implementation Process

A systematic approach is necessary to define, communicate, and achieve energy efficiency and conservation within Village government operations and throughout the community. **Figure 1.1** illustrates the steps that are involved in conducting a systematic energy management system in the Village.

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Figure 1.1. Steps for Effective Energy Management



CDM worked with the Village to execute the first five (5) steps of the Energy Strategy Plan (described in greater detail in Section 3). The final three (3) steps will be implemented by the Village to carry out the actions set in this Plan.

1. Establish Strategic Goals

First, the Village and CDM conducted a stakeholder meeting to develop the strategic energy efficiency and conservation goals. Subsequent meetings were held by the Village's steering committee to fine tune the goals.

2. Conduct Assessment

Next, CDM conducted an evaluation of the Village's current energy consumption (i.e. government entity and community use) in order to establish a baseline upon which further actions could be taken and measured.

3. Identify & Rank Opportunities

CDM identified energy conservation opportunities and aligned them with the strategic goals within specific sectors. The opportunities were analyzed and ranked according to a variety of criteria, such as energy and cost savings, greenhouse gas emission reduction, implementation cost, and simple payback.

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4. Select Actions & Set Targets

The Village selected opportunities for implementation. Performance metrics and targets will be set according to the Village's goals.

5. Develop Action & Monitoring Plans

In order to document progress, action and monitoring plans were developed to identify resources, assign roles and responsibilities, and establish accountability.

6. Implement Initiatives

Upon Village Board approval and employee buy-in of initiatives, action plans will be implemented.

7. Monitor Performance

The Village will measure its performance against the baseline (established during Step 2) using identified metrics and targets.

8. Communicate Progress

The Village will publicize its achievements and opportunities for improvement through regular communication to Village staff and the community.

1.4 Structure of the Plan

The organization of the Plan follows the aforementioned process. In this section, the guiding principles and plan development process are presented. Section 2 provides the current energy consumption and greenhouse gas emissions of Village government operations and the community. Section 3 describes the stakeholder involvement process that identified the strategic goals, energy conservation opportunities, and selection criteria that were used to rank each opportunity. Sections 4 and 5 describe the six (6) short-term and four (4) long-term goals, respectively that the Village intends to implement based on their high ranking. Finally, the implementation process, monitoring and verification plan, and recommendations for continued program development are presented in Section 6.

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2.1 The Foundation

This section presents the results of the Village government operations and community-wide energy consumption assessment. This assessment is not a precise accounting of energy consumption. Instead, it provides a broad examination of the Village's energy usage and highlights where actions can potentially lead to higher energy and cost savings. Furthermore, it serves as the foundation for recommendations and actions towards a more energy efficient future for the Village.

2.1.1 Energy Consumption and Greenhouse Gas Emissions

Energy is used to generate electricity, heat and cool buildings, power equipment and fuel motor vehicles. Energy sources are classified as either nonrenewable, an energy source that once used cannot be recreated; and renewable, an energy source that can be easily replenished. Nonrenewable energy sources account for ninety-three percent (93%) of all energy used in the United States (EIA 2009). Energy in the Village is predominately derived from nonrenewable energy sources, which include fossil fuels—oil, natural gas, and coal. For the purpose of this plan, consumed energy sources include electricity, natural gas, fuel oil, and vehicular fuel.

A major goal of all sustainable energy management programs includes the reduction of greenhouse gas (GHG) emissions. Energy use is a significant source of GHG emissions. The burning of fossil fuels—oil, coal, natural gas, gasoline, and diesel, as well as waste decomposition through landfills, create GHG emissions.

This section establishes a baseline for energy usage and GHG emissions in Village's government operations and the community.

2.2 Data Collection Process and Tools

2.2.1 Village Operations

The baseline energy assessment for Village government operations includes the following categories of energy use:

- Electricity;
- Natural gas; and
- Vehicle fuel.

With assistance from Village staff, the energy usage in each of the above categories was gathered to create the Village's baseline energy assessment over a one year period (September 2008 thru August 2009).

The data was provided in specific units of energy (e.g., kilowatt hours of electricity, therms of natural gas, gallons of gasoline and diesel) and converted to a standard energy unit, British thermal units (Btus), for comparison purposes. One Btu is the quantity of energy required to raise the temperature of 1 pound of water by 1 degree Fahrenheit. In order to account for efficiency losses in electricity generation, transformation, and conveyance systems, all electricity

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uses were assumed to be only thirty-three percent (33%) efficient. This is a generally accepted efficiency factor that takes into account fossil fuel combustion, steam generation, turbine/generator and voltage, transformation losses at the electricity generation station and subsequent voltage transformation and power line conveyance losses between the electricity generation station and the point of actual electricity use.

2.2.2 Community-wide

Village-wide community energy use data includes electricity, natural gas, and vehicle miles travelled. The utility providers for the Village include Commonwealth Edison (electricity) and Nicor (natural gas). Community-wide energy consumption data was provided by the Center for Neighborhood Technology (CNT). The CNT report shows energy and greenhouse gas emissions of the entire Village. The data from their 2005 energy consumption report was the best available data at the time of the Plan. It is provided in **Appendix A**.

2.3 Village Government Operations Energy Assessment

The average energy consumption from Village government operations totaled approximately 102,636,000,000 Btus. As shown in **Table 2.1** below, electricity is the largest source of energy use for Village government operations, accounting for sixty-five percent (65%) of total energy use. Vehicle fuel energy use follows electricity use, accounting for twenty-two percent (22%) total utility energy use. Natural gas energy use is only thirteen percent (13%) of total energy consumption.

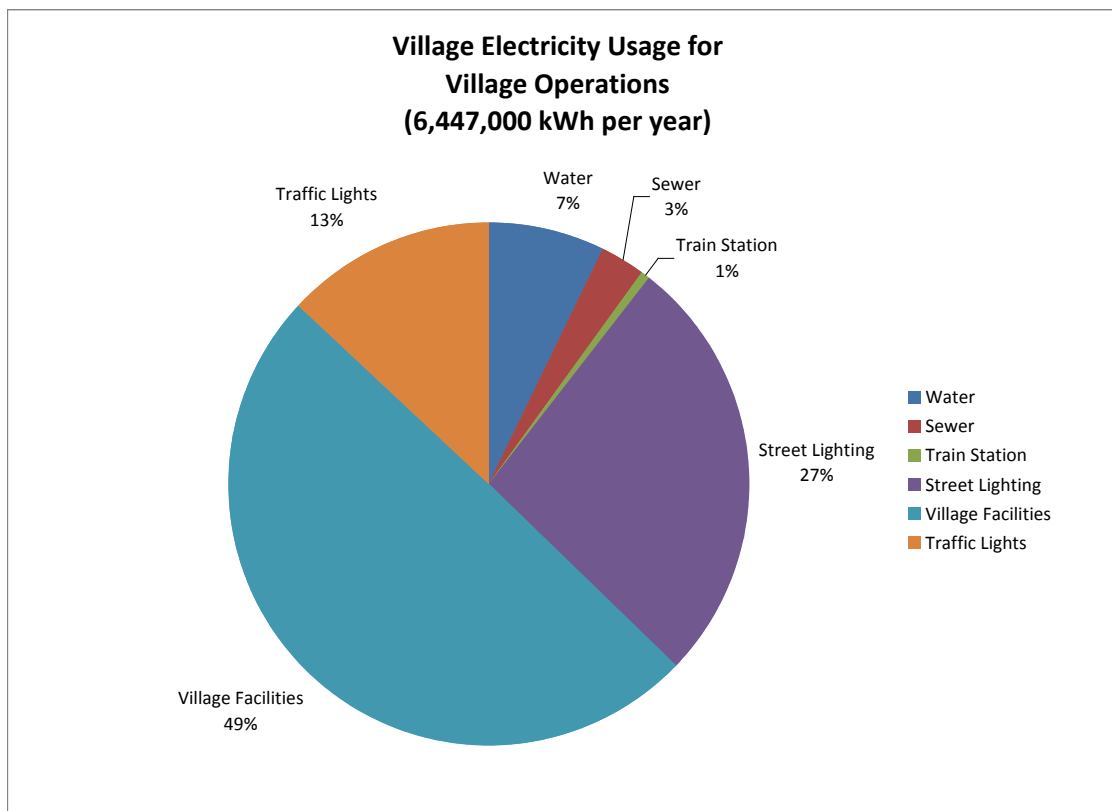
Table 2.1. Village Government Operations Energy Consumption by Source		
Source	Energy (Btus)	Percent of Total Use
Electricity	66,658,000,000	65%
Natural Gas	12,968,000,000	13%
Vehicle Fuel	23,010,000,000	22%
Total	102,636,000,00	100%

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2.3.1 Electricity Consumption

The predominant energy use in Village government operations is electricity, accounting for sixty-five percent (65%) of the total energy consumption. **Figure 2.1** shows the distribution of electricity use in Village operations. As shown below, “Village Facilities” accounts for the largest electricity use. It includes the Village Hall, the Public Safety building, the Public Works building, and the outlying fire stations. Street and traffic lighting account for a combined forty percent (40%) of the electricity use. Water and sewer electricity consumption is primarily due to pumping.

Figure 2.1. Village Government Operations Electricity Use by Facility/Department

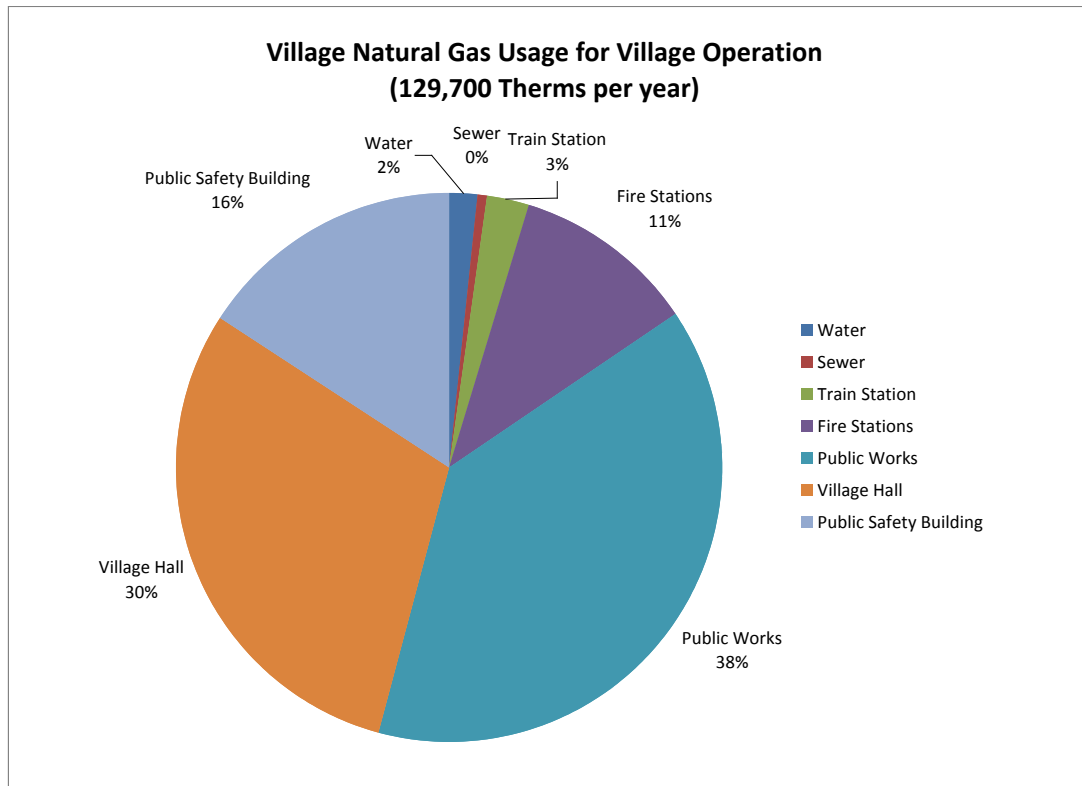


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2.3.2 Natural Gas Consumption

Natural gas accounts for thirteen percent (13%) of total energy consumption for Village government operations. **Figure 2.2** shows the distribution of natural gas use in Village operations. As shown below, Village Hall accounts for the largest natural gas usage in Village operations. Notably, as part of its franchise agreement with Nicor, the Village receives a specific amount of free therms each year.

**Figure 2.2. Village Government Operations
Natural Gas Use by Facility/Department**

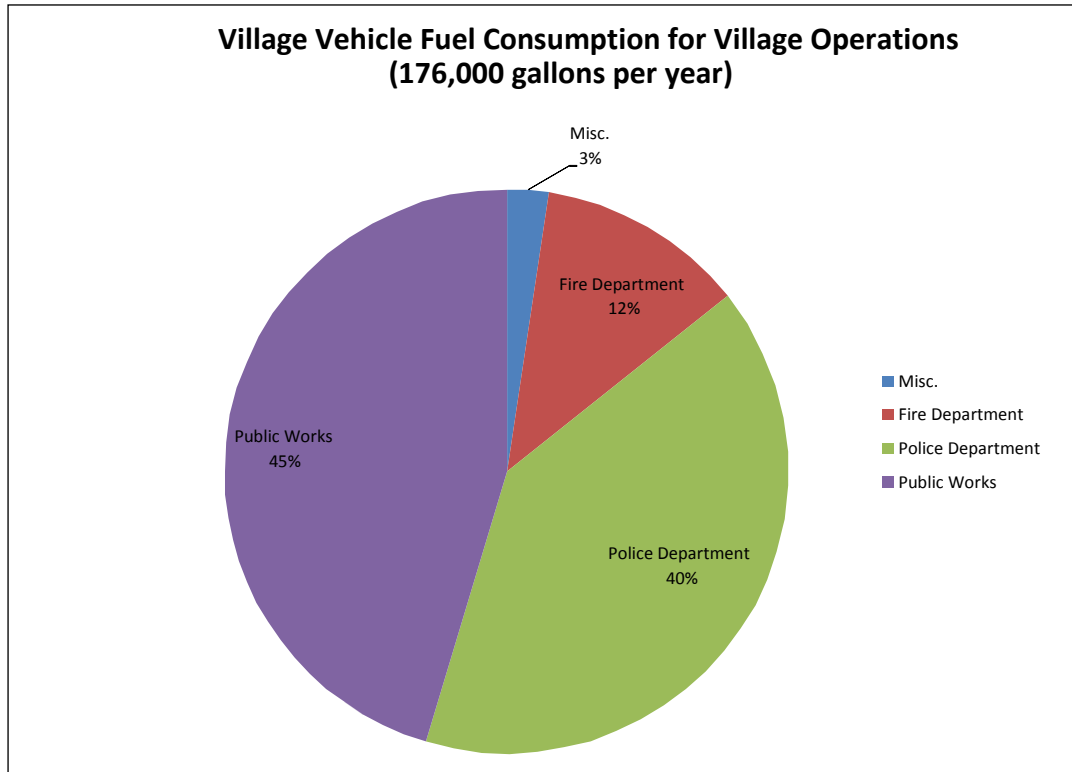


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2.3.3 Vehicle Fuel Consumption

Vehicle fuel accounts for twenty-two percent (22%) of total energy consumption in Village government operations. **Figure 2.3** shows the distribution of fuel use in Village operations. The “Misc” category includes Community Development, Human Services, and other Village “pool” or shared vehicles in the fleet.

**Figure 2.3. Village Government Operations
Vehicle Fuel Consumption by Department**



2.3.4 Greenhouse Gas Emissions

Since GHG emissions are, in part, the result of fossil fuel combustion, the link between energy consumption and GHG emissions is apparent. Building heating and electricity consumption, vehicle operation, street lighting, and waste decomposition via landfill disposal all generate GHG emissions. In FY 2009, GHG emissions from Village government operations totaled approximately 6,844 metric tons of carbon dioxide equivalents (CO₂e). According to the Environmental Protection Agency’s (EPA) GHG Equivalencies Calculator, this is equivalent to the annual GHG emissions of approximately 1,310 passenger vehicles.

GHG emissions were calculated with emission factors obtained from the U.S. Emissions & Generation Resource Integrated Database (eGRID). The eGRID is comprehensive source of data on the environmental characteristics of almost all electric power generated in the United States. By using eGRID data for Illinois, GHG emissions can be estimated to best reflect the make-up of electricity in the region: fossil fuels, nuclear, renewable energy, etc. This is the best available

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data to estimate the characteristics of the Village’s electric power supply. The eGrid accounts for the fact that Illinois is the national leader in nuclear capacity and generation. This is important since carbon emissions from nuclear energy are zero.

2.4 Community-wide Energy Assessment

Community-wide energy consumption totaled approximately 10.2 trillion Btus. As shown in **Table 2.2** below, electricity is the largest source of energy use in the community, accounting for forty-five percent (45%) of total energy use. Natural gas and vehicle fuel energy use account for twenty-eight percent (28%) and twenty-six percent (26%) respectively. In order to calculate vehicle fuel energy use, vehicle miles traveled data from the CNT report was used and an average twenty miles per gallons was assumed based on Illinois travel data.

Source	Energy (Btus)	Percent of Total Use
Electricity	4,630,000,000,000	45%
Natural Gas	2,905,000,000,000	28%
Vehicle Fuel	2,662,500,000,000	26%
Total	10,197,500,000,000	100%

2.4.1 Electricity and Natural Gas Consumption

As previously indicated, community-wide energy consumption data was provided by CNT. **Figure 2.4** and **Figure 2.5** show electricity and natural gas use for the entire Village.

The commercial/industrial sector is the largest consumer of electricity, whereas the residential sector is the largest consumer of natural gas in the Village.

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Figure 2.4. Village-wide Electricity Consumption by Sector

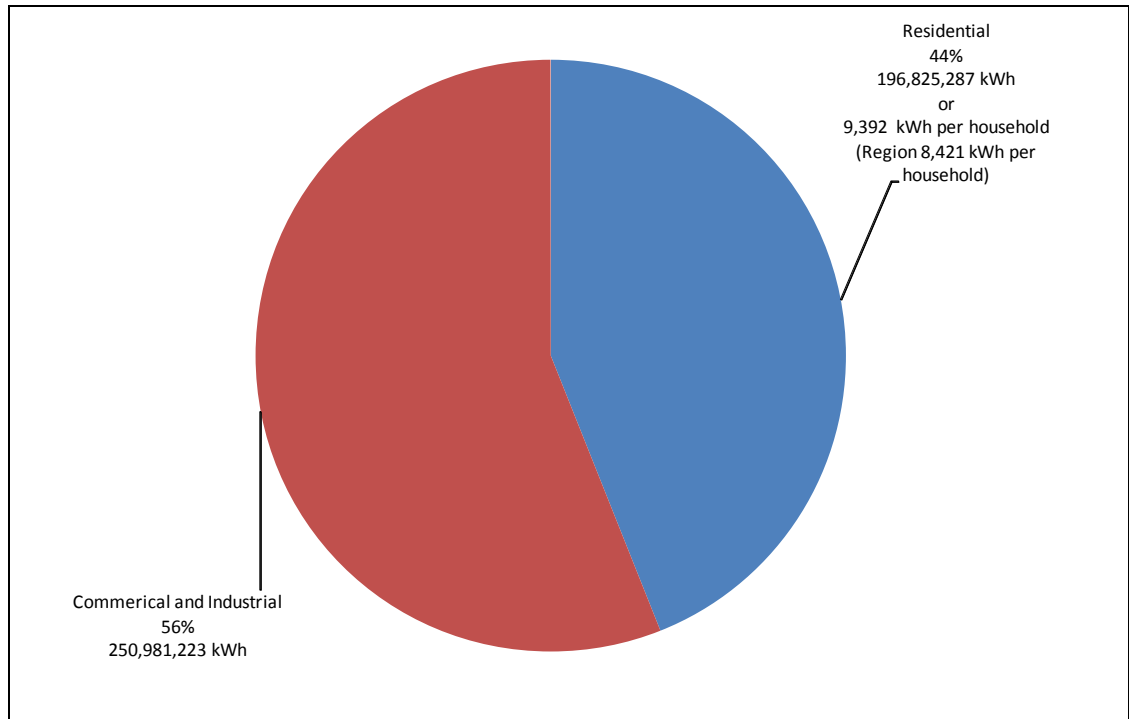
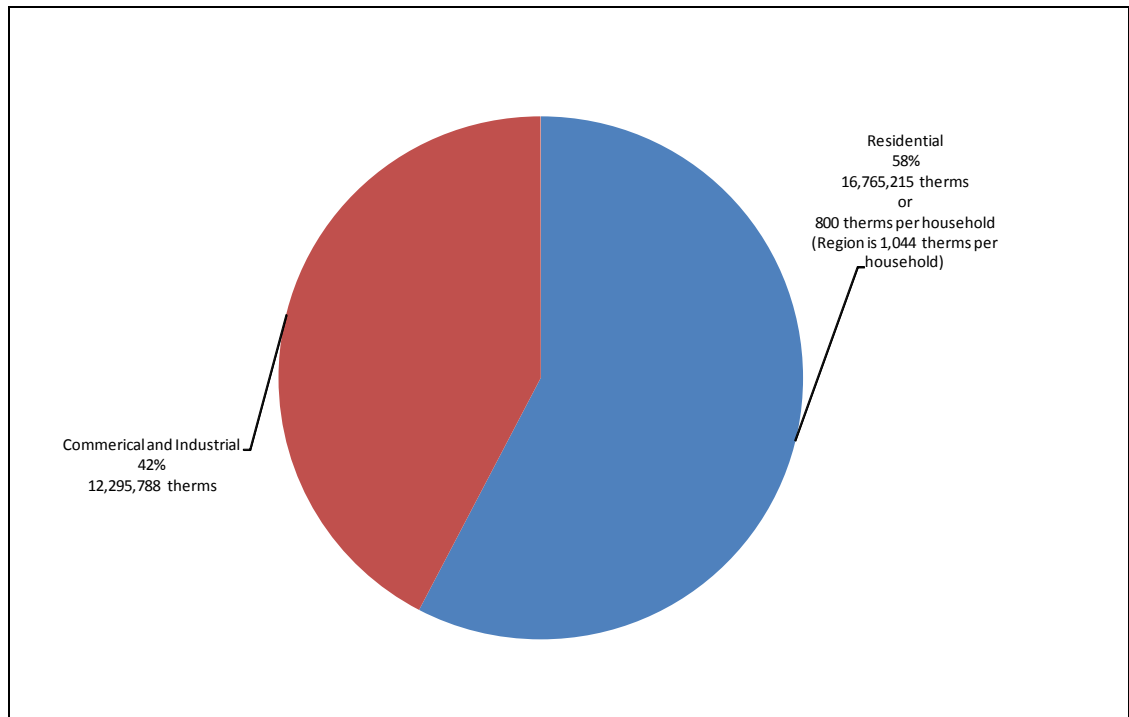


Figure 2.5. Village-wide Natural Gas Consumption by Sector



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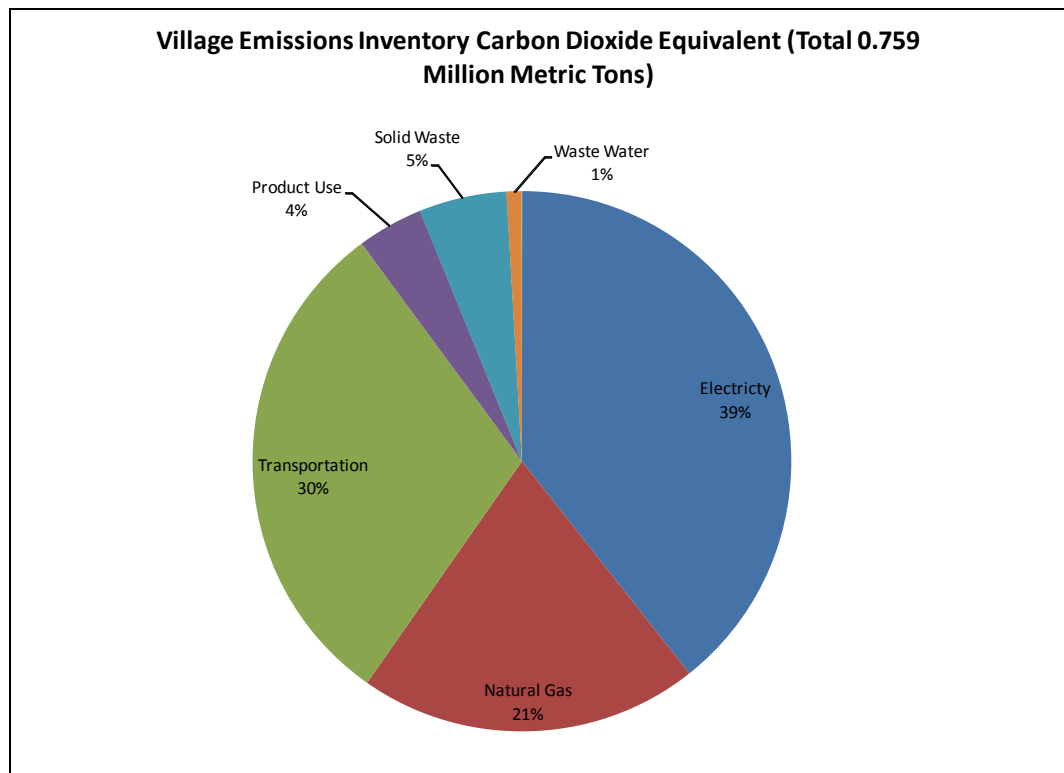
2.4.2 Vehicle Miles Traveled (Transportation)

After electricity, transportation accounts for the third largest energy use in the community-wide assessment. According to the CNT report, the Village's number of vehicle miles travelled (VMT) in 2005 was 426 million miles, with 313 million miles attributed to household VMT. The Village has an average of 14,950 VMT per household compared to the Chicago Region of 14,713 VMT per household.

2.4.3 Greenhouse Gas Emissions

According to the CNT report, Village-wide GHG emissions totaled approximately 759,000 metric tons of carbon dioxide equivalents (CO₂e). According to the Environmental Protection Agency's (EPA) GHG Equivalencies Calculator, this is equivalent to the annual GHG emissions of approximately 140,000 passenger vehicles. As indicated in **Figure 2.6**, electricity accounts for thirty-nine percent (39%) of Village emissions and transportation accounts for thirty percent (30%) of emissions. In addition to transportation and energy use, the CNT report includes GHG emissions resulting from waste, waste water, product use, and industrial processes. The Village per capita GHG emissions is 13.7 metric tons of CO₂e compared to the Chicago Region which is at 15.40 metric tons of CO₂e.

Figure 2.6. Village Greenhouse Gas Emissions by Source



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2.5 “Make a Difference” Usages

2.5.1 Village Government Operations

As noted earlier, electricity is the predominant energy source used in Village government operations, followed by vehicle fuel and then natural gas. In both electricity and natural gas, Village facilities have the largest electricity and natural gas usage. In addition, street and traffic lighting accounts for forty percent (40%) of electricity use and thus there are opportunities for more efficient traffic and street lighting. Therefore, energy efficiency activities that reduce electricity and natural gas use should be evaluated.

2.5.2 Community-wide

Electricity is, by far, the predominant source of energy used within the Village-wide community. The commercial/industrial sector is the largest user of electricity, and the residential sector is the largest user of natural gas Village-wide. Village residents and businesses are an essential part of the solution.

As part of the Village’s commitment to sustainable energy management, energy efficiency and conservation measures need to be focused towards community efforts that reduce the energy consumption of local municipalities, businesses and residents.

Based on this energy assessment, energy efficiency and conservation goals and activities were developed, ranked and evaluated. The following sections discuss the energy efficiency opportunities and activities recommended for implementation.

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3.1 Overview

Based on the energy consumption data provided in Section 2, the Village and CDM developed an overall screening process to brainstorm different energy efficiency goals and activities that provide sustainable benefits to the Village and its residents. This Section provides an overview of the screening process implemented by the Village to develop the energy efficiency goals and activities over the short-term (3-year) and long-term (10-year) period.

3.2 Process

3.2.1 Stakeholder Involvement

The Energy Strategy Plan was initially developed through a coordinated effort among stakeholders interested in the energy future of Village government and the community-at-large. The Village solicited input from a diverse group of stakeholders to develop a list of energy efficiency and conservation activities, define short and long term energy efficiency goals, and determine selection criteria important to key constituents. The stakeholders also considered pros and cons to implementation.

During the stakeholder meeting, the group used the Metropolitan Mayors Caucus' *Greenest Region Compact (Compact)* to help frame the goal setting process and establish energy efficiency and conservation activities for this plan. The *Compact* recommends the Village adopt environmental strategies that minimize the Village's impact on natural resources. An internal memorandum on recommended Village actions for the *Compact* is provided in **Appendix C**.

3.2.2 Selection Criteria & Ranking

After the stakeholder process was complete, the energy efficiency and conservation goals and activities were analyzed according to a variety of criteria, including the following:

1. Energy savings (kWh and/or therms per unit time period)
2. GHG emission reductions
3. Visible/education potential
4. Cost-effective
5. Supports other Village initiatives
6. Proven/successful
7. Measurable
8. Social benefits
9. Low level of effort/simple
10. Innovative
11. Replicable
12. Quick return on investment

The group of stakeholders ranked the selection criteria by level of importance as indicated by their numbered order (e.g. 1—highest rank, 13—lowest rank). A preliminary screening was conducted that rated and assigned a score to each activity by summing the individual scores of each criterion. This selection process identified the energy efficiency and conservation goals

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and activities that are technically feasible, acceptable to the Village, and offer cost savings and financial benefits to the Village.

3.2.3 Steering Committee

Using the proposed goals and activities identified in the stakeholder process and the results from the preliminary screening, a Village Steering Committee selected energy efficiency and conservation goals and activities to further evaluate.

3.3 Energy Efficiency & Conservation Goals

While all energy efficiency and conservation goals are of high importance, eleven major goals were identified as providing the greatest economic, social, and environmental benefits. The goals identified during the initial screening underwent a quantitative evaluation; including cost/benefit analysis, greenhouse gas emission reduction potential, job creation potential, kilowatt-hour savings potential, grant eligibility potential, renewable energy potential, capital costs, and operation and maintenance costs. The results of this screening effort are listed below as short and long term energy efficiency and conservation goals.

3.3.1 Short-Term Goals

Below are the Village's short term energy efficiency and conservation goals.

- **EDUCATION:** Develop and implement a Village Sustainability Education & Public Outreach Program to encourage Village staff and the community to invest time and resources in energy efficiency and sustainability.
- **ENERGY AUDITS & RETROFITS:** Conduct building energy audits & retrofits on major Village facilities to identify and evaluate energy efficiency opportunities.
- **SUSTAINABILITY COMMITTEE:** Establish a Village Sustainability Committee to advise the Village Board on all energy efficiency and conservation activities, educate the public, and demonstrate leadership in sustainability.
- **STREET LIGHTING:** Convert Village street lights to LED or other energy efficient street lighting.
- **PUBLIC TRANSPORTATION, BICYCLING AND OTHER FORMS OF TRAVEL:** Encourage the use of public transportation, bicycling, walking, and other forms of travel to reduce the amount of vehicle miles traveled.
- **WEATHERIZATION PROGRAM:** Support the Village's existing Home Weatherization Program to improve energy efficiency in homes and reduce energy costs for Village residents.

With the exception of the Energy Audits and Retrofits, the Village will begin implementation of all of these short-term goals in 2010 by leveraging EECSBG funding. Detailed descriptions of the goals and associated activities are provided in Section 4.

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3.3.2 Long-Term Goals

Below are the Village's long term energy efficiency and conservation goals.

- ALTERNATIVE FUEL VEHICLES: Encourage the use of alternative forms of transportation, such as hybrids and electric vehicles that use less energy and emit fewer emissions throughout the community.
- BUILDING MANAGEMENT SYSTEMS: Install Energy Management Systems at major Village facilities to proactively manage and optimize energy usage.
- SUSTAINABLE MUNICIPAL CODES: Adopt sustainable zoning and building codes, such as Leadership in Energy and Environmental Design (LEED) concepts, to reflect the recent changes in energy efficiency and sustainable design, and encourage residential and commercial sustainable building practices.
- RENEWABLE ENERGY: Identify, evaluate and implement renewable energy opportunities that show a good return on investment.

These goals will be implemented as funding becomes available. More detailed descriptions of the goals and associated activities are provided in Section 5.

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4.1 Introduction

This section presents an analysis of each of the six short term energy efficiency and conservation goals. A description of each goal is provided along with a list of benefits, challenges, and recommendations for implementation. The results of each goal's quantitative analysis are summarized in **Table 4.1**.

4.2 Sustainability Education & Public Outreach Program

4.2.1 Description & Intent

The Village will develop and implement a comprehensive sustainability program that would be designed to educate residents and businesses on energy efficiency, recycling, and water conservation. The campaign would include press releases, mass email notifications, dedicated space in existing mass mailings (i.e. Village quarterly newsletters), Village website or other existing outreach materials. It is estimated it would cost approximately \$20,000 annually to implement a successful education and public outreach program that would create measurable benefits.

Specifically, the Village website would incorporate information to educate individuals on general sustainability concepts, provide specific actions to be done at the resident/business level, and identify Village programs and services. The Village would leverage content from other existing sustainability education websites.

The Village will also sponsor and host energy exhibits that would provide information to local business, residents, and students. This activity will meet a priority goal listed in the *Greenest Region Compact*.

4.2.2 Benefits

- Energy users and waste generators not already investing time and resources into sustainable efforts may start initiating programming to reduce energy use
- Sustainability campaign would reach, and benefit, all areas of conservation and sustainability
- Showcases the Village's commitment to sustainability

4.2.3 Challenges

- Real benefits resulting from initiatives are difficult to quantify
- Website requires periodic updating to maintain usefulness
- Ongoing administrative costs if staff designated to lead substantial components of program

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4.2.4 Recommendations

- Assign staff/department to lead effort
- Consider hiring a consultant to handle marketing and program management
- Determine effective types of education materials for mailings and website

4.2.5 Village Actions to Date

- Provides educational opportunities to learn about water conservation during the annual Public Works Open House event
- Water conservation practices and education are priority strategies of the Greenest Region Compact
- Outlined water conservation techniques and recycling information in past Village newsletters and websites
- Conducts an annual electronic recycling program (co-sponsored with Motorola) as funding is available

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4.3 Village Sustainability Committee

4.3.1 Description & Intent

The Village Sustainability Committee will represent and serve the community on environmental sustainability initiatives. Membership may include representative stakeholders from Village departments, the Village Board and Commissions, local businesses, nonprofit organizations, and schools. The purpose of the Committee is to advise and educate governing bodies on sustainability initiatives. The Sustainability Committee may assist with the development of the sustainability education program, conduct and sponsor sustainability education programs for the public, and advise and assist governing bodies to work in a manner consistent with environmental sustainability.

4.3.2 Benefits

- Showcases the Village's commitment to sustainability
- Serves as voice for sustainability issues in Village government

4.3.3 Challenges

- Real benefits resulting from initiatives are difficult to quantify
- Requires community volunteers

4.3.4 Recommendations

- Establish a committee of concerned stakeholders to serve on the Committee and offer sound advice on environmental practices

ENERGY STRATEGY PLAN

4.4 Street Lighting

4.4.1 Description & Intent

The replacement of existing street lighting in the Village with LED (lighting emitting diode) technology would reduce energy consumption and conserve fossil fuels. It is a priority strategy of the *Greenest Region Compact*. LED retrofits would not only reduce energy consumption but would also reduce maintenance and replacement costs.

4.4.2 Benefits

- Reduces electricity
- Reduces maintenance: LED signal lamps have a 7-year service life
- Lowers energy costs
- Reduces GHG emissions by eliminating unnecessary electricity and fuel use
- When properly applied, LED street lighting has better uniformity and color rendition than HID sources

4.4.3 Challenges

- Incurs cost and time for project management and administration
- Traffic will be impacted during replacement
- Pole placement for traditional street lighting may not be suitable for LED equipment
- Businesses impacted by LED street lighting may be concerned about brightness

4.4.4 Recommendations

- Continue to evaluate LED lighting vendors
- Identify LED street lighting locations for replacement
- Develop procurement and design documents for bidding
- Implement project
- Phase in LED lamps for street lighting at re-lamping time

4.4.5 Village Actions to Date

- The Village has initiated LED traffic lighting projects in the past and has budgeted for such improvements in 2010
- The Village is currently evaluating different vendors for these type of products

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4.5 Weatherization Program

4.5.1 Description & Intent

A weatherization program is a program that enables residents to reduce their energy usage and costs by making their homes more energy efficient. Typical weatherization projects include energy audits, installation/repair of electrical appliances, water heaters, heating and cooling systems, windows, insulation, air leaks, and duct work.

The national average of annual utility costs savings at weatherized households is approximately 32 percent (DOE 2009). Weatherized households in Mount Prospect could save approximately \$850 annually.

Example projects include:

- Wall, floor and attic insulation
- Storm windows and doors
- Energy efficient windows
- Roofing
- Caulking
- Weather-stripping
- Energy-efficient furnaces and water heaters
- Plumbing
- Insulation for water heaters and piping
- Insulated siding
- Home storm water improvements

Currently the Village administers a Home Weatherization Grant Program and Rehabilitation Loan Program established through funding by the Community Development Block Grant (CDBG) program. These programs provide funding for weatherization improvements but have established household income parameters which limit participation. The allocation of funding would expand the current Weatherization program and allow additional households to participate. Through the program, the Village could provide a matching 50 percent grant up to the maximum \$1,500 expenditure limit per household.

In addition, the Village could establish a revolving loan fund to provide a long-term mechanism for extending the funding source of the program. A revolving loan fund is a program where additional loans can be made for energy efficient initiatives pursued by residents. Loans are typically made at a low interest rate over a longer period of time. Additional loans are made from principle and interest payments of current loans.

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4.5.2 Benefits

- Reduces home utility and repair costs
- Reduces energy consumption by low-income clients reduces the need for combustion of fossil fuels and the resulting emissions into the atmosphere
- Reduces costs for bill collection and service shut-offs
- Decreases U.S. energy use the equivalent of 17.9 million barrels of oil every year
- Provides an economic boost to Village community and increases property values
- With a revolving loan fund, lending can continue into perpetuity

4.5.3 Challenges

- Requires prudent risk management
- Incurs cost and time for administration to manage program and report results
- Lengthy development time to determine parameters and criteria for grant distribution
- A bad economic environment may result in little interest of homeowners to allocate their share of monies towards program

4.5.4 Recommendations

- Leverage the Village's existing Home Weatherization program to implement this activity
- Consider raising income requirements from low to low-moderate
- Partner with the Illinois DOE's Weatherization Assistance Program to obtain further financial support and technical guidance
- Design marketing towards residents and their specific needs in Mount Prospect
- Develop an effective package of energy saving measures that address heating, cooling, insulation, water use, and lighting. Data has shown that an effective package can save 20 to 30 percent on utility bills which could be up to \$1000 for an average homeowner
- Require the applicant to have owned and occupied the home for a minimum of one year
- Determine a minimum and maximum grant size, e.g. minimum \$500 and maximum \$1,500
- Establish reporting requirements for participants, e.g. utility bills are the most obvious form for showing energy savings

4.5.5 Village Actions to Date

- Established the Mount Prospect Home Weatherization Program
- The Village Rehabilitation Loan program provides 0 percent interest loans, in an amount not to exceed \$25,000, to residents for home energy efficiency improvement projects

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- Participated in the Metropolitan Mayors Caucus' compact fluorescent lamp (CFL) bulb distribution
- Serves community as a CFL bulb recycling/disposal site

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4.6 Public Transportation, Bicycling, & Other Forms of Transportation

4.6.1 Description & Intent

The Village of Mount Prospect established a Public Transportation System Plan to increase transit usage and multimodal connectivity, improve access and circulation in and around transit facilities, promote pedestrian and transit friendly environments and develop local transit options. The Village should implement the highest priority goals as listed in the plan to reduce energy consumption attributed to the transportation sector. Specifically, the Village should promote alternative forms of transportation that reduce per capita vehicles miles traveled (VMT), expand public transportation infrastructure, and encourage use of low-carbon fuel.

- Sponsor a web-based, ride-share program for the community to carpool with neighbors with similar routes and schedules
- Improve connections to key destinations in town as well as outside Village
- Eliminate gaps in off peak service and expand north-south Pace bus service
- Establish transit hubs at key locations (recommendation include Randhurst Mall, Mount Prospect Metra station and at the proposed STAR line Station)

A key component of the plan is to develop a community bikeway system plan. The Master Bike Plan will enhance bikeway infrastructure to improve mobility for pedestrians and bicyclists and expand bikeway connections to provide multi-modal access to bus and train services. EECBG funding in the amount of \$40,000 could be utilized to develop a bike plan with recommendations on routes, improvements, and other infrastructure and education materials to encourage biking within the community.

4.6.2 Benefits

- Potentially reduces mobile sources of GHG emissions from the burning of fossil fuels (gasoline, diesel)
- Improved air quality resulting from reduced vehicular emissions
- Reduced traffic congestion
- Biking is an affordable form of transportation
- Improves personal and environmental health (i.e. biking, improved air quality)

4.6.3 Challenges

- Real benefits resulting from initiatives are difficult to quantify
- Capital improvement projects are cost-intensive

4.6.4 Recommendations

- Community Development Department to manage effort

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- Identify additional funding sources to invest in biking infrastructure improvements and programs
- Ensure safe and inviting transportation corridors
- Tie to sustainability education program
- Develop an outreach and marketing plan to provide information to the public about available transportation services

4.6.5 Village Actions to Date

- Public Transportation System Plan finalized in November 2009
- Installed bus shelters and bike racks at various sites throughout the Village

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4.7 Energy Audits and Retrofits

4.7.1 Description & Intent

Village-operated buildings should be surveyed to identify energy conservation opportunities. The intent is to retrofit those buildings where opportunities were identified to save energy and reduce energy costs. The buildings with the most energy saving opportunities should undergo further analysis via computer modeling to calculate energy savings.

Building energy saving opportunities include window replacement, building envelope modifications, new roofs, and improved air handling units. Depending on the type of modifications and number of buildings, costs of retrofits range significantly.

4.7.2 Benefits

- Save significant energy costs annually
- Showcases the Village's leadership in energy conservation
- Replaces antiquated equipment that may need replacement for other reasons besides efficiency

4.7.3 Challenges

- Construction may be considered an inconvenience in some buildings
- Significant number of buildings are affected
- Several buildings may require State Historical Preservation Office (SHPO) notification before work

4.7.4 Recommendations

- Apply for funding opportunities with the Smart Energy Design Assistance Center (SEDAC)
- Hire consultant to conduct building energy audits
- Prioritize buildings to be retrofitted
- Select components within each building to retrofit
- Determine schedule for completion
- Contract with Architecture/Engineer firm to prepare construction documents for retrofits

4.7.5 Village Actions to Date

- In 2009, the Village leveraged SEDAC funding to have an energy audit conducted at the Public Safety facility
- Conducts a water leak audit of the entire system twice a year using specialized electronic leak detection equipment
- Conducts aggressive water main leak repair program throughout the year

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4.8 Summary

Table 4.1 provides a summary of the short term energy efficiency goals listing cost, benefits, energy savings, GHG emissions reduction, and an evaluation of non-cost factor.

Section 4 | Short Term Energy Efficiency and Conservation Goals

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**Table 4.1. Energy Strategy Plan
Short-Term Activity Evaluation Summary**

Activity	Annual Energy Savings (kWh and/or therms per year)	Greenhouse Gas Reduction (metric tons CO ₂ e)	GHG Equivalent: # of Vehicles Taken Off Road in a Year ⁷	Estimated Project Implementation Cost to Achieve Energy Savings	EECBG Funds Leveraged for Project Implementation (\$)	Visible	Cost-Effective	Measurable	Social Benefits
1 Sustainability Education ¹	4.5 million kWh and 290,600 therms	4,700	900	\$60,000	\$60,000	✓	✓		✓
2 Sustainability Committee ²	Savings/benefits included in Sustainability Education Plan	4,700	900	\$5,000	\$5,000	✓	✓		✓
3 Street Lighting ³	109,500 kWh	75	14	\$257,565	\$257,565	✓		✓	✓
4 Weatherization Program ⁴	60,000 kWh & 5,100 therms	40	8	\$90,000	\$90,000	✓		✓	✓
5 Public Transportation, Bicycling, & other Forms of Transportation ⁵	4.3 million vehicle miles travelled	2,300	440	\$40,000	\$40,000	✓			✓
6 Energy Audits & Retrofits ⁶	1,009,000 kWh	970	185	\$20,000/yr	\$0	✓	✓	✓	✓

¹ CDM estimated benefits based on a one percent (1%) reduction of community-wide energy use obtained as a result of changes in public actions resulting from education programs (Guide to Energy Management 2008).
² CDM assumes energy savings to be combined with Sustainability Education and Public Outreach goal's one percent (1%) reduction of community-wide energy use obtained as a result of changes in public energy consumption due to policies and standards adopted/implemented by the Village Sustainability Committee.
³ Energy savings were calculated based on the estimated kWh savings for new LED street lighting.
⁴ CDM estimated energy savings assume a participation rate of 20 households per year. At an expenditure limit of \$1,500 per home, the total implementation cost would be approximately \$30,000 per year.
⁵ CDM estimated energy benefits based on a one percent (1%) reduction of community-wide vehicle miles traveled obtained as a result of increased public use of public transportation. Calculations assume energy savings will only result when the plan is implemented.
⁶ CDM used the DOE's EECBG Calculator to determine the energy and greenhouse gas (GHG) savings.
⁷ CDM used the Environmental Protection Agency's (EPA) GHG Equivalencies Calculator to determine the equivalent of GHG emissions in number of vehicles taken off the road in a year.

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5.1 Introduction

This section presents an analysis of each of the four long term energy efficiency and conservation goals. The long term goals will not be funded by the EECBG Program. A description of each goal is provided along with a list of benefits, challenges, and recommendations for implementation. The results of each activity's quantitative analysis are summarized in **Table 5.1**.

5.2 Building Management Systems

5.2.1 Description & Intent

The Village should implement a building management system (BMS) in Village-owned facilities. A BMS is a computer-based control system installed in buildings to control mechanical and electrical equipment such as ventilation, lighting, power systems, fire systems, and security systems. With a BMS, the Village could better manage the buildings' heating and cooling units and minimize overall energy use.

A typical building management system controls 40 percent (40%) of a building's energy use and controls up to 70 percent (70%) if lighting is included in the BMS. Clearly, a BMS is a key component to achieving energy efficiency in government operations. On average, a building management system results in a 10 percent (10%) annual energy savings (Guide to Energy Management 2008). In FY 2008, the Village purchased approximately 82,000 therms and 1 million kWh for building operations at a total cost of \$150,000.

5.2.2 Benefits

- Central or remote control and monitoring of buildings allows for effective monitoring and targeting of energy consumption
- Lower energy costs
- Increased staff productivity and level of comfort from effective temperature monitoring
- Includes alarm indication and fault diagnosis for inefficient or problematic systems
- Low operating costs

5.2.3 Challenges

- Integrating multiple buildings into a BMS is complex due to various mechanical and electrical systems
- Difficult to find a vendor that specializes in all building components (i.e. ventilation, lighting, power systems, fire systems, and security systems)
- In-house management is critical; staff must be trained to handle daily management, maintenance, and default issues

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5.2.4 Recommendations

- Hire a consultant that specializes in building energy management to implement BMS and recommend system upgrades
- Train staff in system controls and energy management to conduct daily operations
- Continually update BMS as new technology becomes available

5.2.5 Village Actions to Date

- A computerized management system controls the heating, ventilating, and air-conditioning (HVAC) unit in Village Hall
- Building management systems will be installed in the new Emergency Operations Center and Fire Station #14 buildings

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5.3 Sustainable Municipal Codes

5.3.1 Description & Intent

Sustainable zoning and building ordinances are an effective way to reduce energy consumption throughout communities. Sustainable zoning would promote mixed-use, transit-oriented, and dense development throughout the Village and minimize environmental impacts in development. Zoning ordinances should clarify language regarding the use of renewable energy (i.e. photovoltaic panels and wind turbines) and include new technologies and practices that align with sustainability principles.

Building energy codes provide minimum building energy requirements to increase energy efficiency and provide cost savings in utilities. Energy codes may include insulation requirements for U-values, R-values and materials, window requirements, mechanical controls for off-hours, wattage requirements, and other standards to raise building energy efficiency beyond minimum requirements.

5.3.2 Benefits

- Reduces electricity and natural gas use by requiring energy efficient building operations
- Energy efficiency lowers building energy costs
- Reduces greenhouse gas emissions by eliminating unnecessary electricity and fuel use
- Promotes energy efficient new construction and renovation
- Short payback period in energy savings since energy codes strive for cost-effectiveness

5.3.3 Challenges

- Requires policy development
- Lengthy development process to establish sustainable zoning requirements and code modifications
- Concerns from community with costs, real and perceived, of increased density and energy efficiency
- Concerns from developers on additional costs of sustainable construction requirements

5.3.4 Recommendations

- Sustainable Committee to serve as an advisory committee to help design sustainable zoning ordinances and building energy efficiency requirements
- Establish a baseline in terms of energy consumption
- Obtain a consultant to analyze building codes and offer suggestions for modifications

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5.3.5 Village Actions to Date

- Village recently adopted the 2006 International Building Code and 2006 Illinois Energy Code which regulate building construction projects. The new codes include requirements for more energy efficient construction techniques
- Updates to the Zoning Code performed in 2009 provide provisions for permitting both wind energy and solar energy conversion systems within the Village
- Updates to the lighting ordinances to limit the amount of light pollution (dark sky ordinance) in order to require more efficient use of property lighting

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5.4 Alternative Fuel Vehicles

5.4.1 Description & Intent

Fossil fuel combustion from mobile vehicles is the fastest growing source of GHG emissions in the United States (EPA 2009). In conjunction with the Village's Public Transportation System Plan that identified several opportunities for expanding public transportation, the Village should encourage the community to shift towards alternative fuels and hybrid vehicles that use less energy and emit fewer emissions.

Program goals may include the following:

- Develop public outreach and marketing plan to provide information about alternative fuel vehicles and low-carbon fuels
- Invest in battery stations for hybrid vehicles
- Designate parking spots for alternative fuel vehicles
- Consider purchasing alternative fuel vehicles for the Villages' vehicle fleet

5.4.2 Benefits

- Improved fuel economy reduces fuel costs
- Reduced traffic congestion
- Reduces GHG emissions and air pollutants that cause smog
- High visibility to promote alternative transportation to the community
- May qualify community residents for purchase incentives (e.g. hybrid rebates)
- Longer operational life of alternative vehicles
- Demonstrates the Village's leadership in energy efficiency and sustainable energy practices

5.4.3 Challenges

- Real benefits resulting from initiatives are difficult to quantify
- Alternative vehicles are more expensive than conventional vehicles
- Alternative vehicles require battery replacement and other maintenance costs
- Ongoing administration costs

5.4.4 Recommendations

- Tie to community-wide education campaign
- Establish leadership within the Village to lead effort
- Expand Sustainability Committee's role in order to assist in program development
- Identify additional funding and incentive programs to help offset costs

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5.4.5 Village Actions to Date

- Purchased limited number of hybrid vehicles for Village operations.
- Currently evaluating the strengths and weaknesses of incorporating alternative fuel vehicles into the Village's fleet.

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5.5 Renewable Energy

5.5.1 Description & Intent

The Village will evaluate renewable energy opportunities and may potentially implement technologies if they show a good return on investment and funding is available. The evaluation will encompass solar, wind and hydroelectric renewable energy alternatives. Based on the evaluation of the alternatives, the Village may fund a renewable energy project at one of more Village facilities. CDM estimates the capital costs of a solar panel or wind turbine to range from \$250,000 to \$300,000. Renewable technology will not save, but rather produce energy.

5.5.2 Benefits

- Creates renewable energy
- Reduces greenhouse gases
- Creates jobs for renewable energy products
- Visible to the public
- Reduces annual energy cost

5.5.3 Challenges

- Funding the capital cost of renewable energy equipment
- This is new equipment that will have to be operated and maintained by the Village

5.5.4 Recommendations

- Complete a renewable energy evaluation/feasibility study to assess the cost versus benefit of different renewable energy options, such as wind, solar and hydroelectric
- Identify facilities/locations where renewable energy equipment can be located
- Investigate sources of land that could be used for renewable energy resources such as wind

5.6 Summary

Table 5.1 provides a summary of the long term energy efficiency goals listing cost, benefits, energy savings, GHG emissions reduction, and an evaluation of non-cost factors.

Section 5 | Long Term Energy Efficiency and Conservation Goals

ENERGY STRATEGY PLAN

**Table 5.1. Energy Strategy Plan
Short-Term Activity Evaluation Summary**

Activity	Annual Energy Savings (kWh and/or therms per year)	Greenhouse Gas Reduction (metric tons CO ₂ e)	GHG Equivalent: # of Passenger Vehicles Taken Off Road per year ¹	Estimated Project Implementation Cost to Achieve Energy Savings	EECBG Funds Leveraged for Project Implementation (\$)	Visible	Cost-Effective	Measurable	Social Benefits
1 Building Management Systems ²	100,000 kWh and 8,150 therms	115	22	\$100,000	\$0		✓	✓	✓
2 Sustainable Municipal Codes ³	4.8 million kWh	4,600	880	\$35,000	\$0	✓	✓		✓
3 Alternative Fuel Vehicles ⁴	8.5 million vehicle miles travelled	4,600	880	\$30,000/yr	\$0	✓		✓	✓
4 Renewable Energy ⁵	0	0	0	\$300,000	\$0	✓		✓	✓

¹ CDM used the Environmental Protection Agency's (EPA) GHG Equivalencies Calculator to determine the equivalent of GHG emissions in number of vehicles taken off the road in a year.

² CDM estimated benefits based on a ten percent (10%) reduction of Village-operations building energy use (Guide to Energy Management 2008).

³ CDM used the DOE's EECBG Calculator to determine energy and greenhouse gas (GHG) savings.

⁴ CDM estimated benefits based on a two percent (2%) reduction of community-wide vehicle miles traveled obtained as a result of increased public use of public transportation.

⁵ Additional information is needed to estimate energy production potential.

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6.1 Implementation

Carrying out implementation of the selected goals will require continued collaboration, commitment, and evaluation. Several factors must be considered including financial, technical, political, and logistic feasibility. The Village’s budget, funding sources, stakeholder input, and the “triple bottom line” score of each action should be considered during the implementation process. Collaboration with many partners, including local governments, businesses, homeowners, academia, and religious and non-profit community groups is essential to obtain community buy-in and, consequently, successful implementation.

6.2 Monitoring and Verification Plan

An effective energy plan requires ongoing monitoring to gauge progress and make sure the Village is on the right path to meeting its energy efficiency and conservation goals. In order to gauge progress relative to goals established for energy efficiency and GHG emissions reduction, the following metrics can be used:

- Jobs created and/or retained
- Energy (kWh/therms/gallons/BTUs/etc.) saved
- Renewable energy generated
- GHG emissions reduced (in CO2 equivalents)
- Cost savings

These metrics are also required as part of the EECBG Program reporting process. These metrics can be tracked by the Village for each project activity. **Table 6.1** shows the process or method by which to calculate each parameter. The assessment provided in Section 2 serves as a baseline by which to measure/track future performance.

Table 6.1. Process/Methods for Monitoring Metrics	
Parameter	Process/Method/Calculation for Monitoring/Tracking
Energy (kWh, therms, gallons, etc.)	The Village can track this data from monthly billing provided by ComEd and Nicor. In addition, the Village can track gallons of fuel spent over each reporting period.
Renewable Energy Generated	This can be estimated from the capacity of the renewable energy unit and its duration of operation.
GHG Emissions in metric tons of CO₂e	Please refer to EPA’s GHG Equivalencies Calculator for GHG calculations related to energy savings. Web site is available at http://www.epa.gov/cleanenergy/energy-resources/calculator.html .
Cost Savings	Actual capital cost spent by the Village for energy efficiency and actual operating cost related to energy consumption.

There are a number of programmatic goals or initiatives not a part of the Energy Strategy Plan that will eventually result in energy savings and greenhouse gas reductions. Although these types of goals may not have an immediate return on investment, they can still help the Village

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reach their goals. These types of goals will have a different set of metrics to monitor progress, such as number and/or percent completion of programs implemented.

Table 6.2 provides a list of metrics that can be used for monitoring progress for different project goals.

Table 6.2. Energy Plan Metrics	
Type of Activity	Reporting Metric
Building Codes and Standards	Name of new code adopted
	Name of old code replaced
	Number of new and existing buildings covered by new code
Building Retrofits	Number of buildings retrofitted, by sector
	Square footage of buildings retrofitted, by sector
Building Energy Audits	Number of audits performed, by sector
	Floor space audited, by sector
	Auditor’s projection of energy savings, by sector
Energy Efficiency Rating and Labeling	Types of energy-consuming devices for which energy-efficiency rating and labeling systems were endorsed by the grantee
Government, School, Institutional Procurement	Number of units purchased, by type (e.g., vehicles, office equipment, HVAC equipment, streetlights, exit signs)
Industrial Retrofit Support	Number of building retrofitted, by Industry sector
	Square footage of building retrofitted, by Industry sector
Loans, Grants, and Incentives	Number and monetary value of loans given
	Number and monetary value of grants given
	Number and monetary value of incentives provided
Incremental Cost for Efficiency and Design Elements in New Buildings	Number and square footage of new buildings designed, by sector
	Number and square footage of new buildings constructed, by sector
Renewable Energy Market Development	Number and size of solar energy systems installed
	Number and size of wind energy systems installed
	Number and size of other renewable energy systems installed
Financial Incentives for Energy Efficiency	Monetary value of financial incentive provided, by sector
	Total value of investments incentivized, by sector
	Estimated impact of incentives on total investment made
Technical Assistance	Number of information transaction contacts (for example, webinar, site visit, media, fact sheet) in which an energy efficiency or renewable energy measure were recommended, by sector
Transportation	Number of alternative fuel vehicles purchased
	Number of conventional vehicles converted to alternative fuel use
	Number of new alternative refueling stations created
	Number of new carpools and vanpools formed
	Number of energy-efficient traffic signals installed
	Number of street lane-miles for which synchronized traffic signals were installed

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Table 6.2. Energy Plan Metrics	
Type of Activity	Reporting Metric
Workshops, Training, Education	Number and type of workshops, training, and education sessions held
	Number of people attending workshops, training, and education sessions

6.2.1 Monitoring Expenditures

In addition to monitoring progress using the above metrics, it is important for the Village to track expenditures relative to the implementation of the Plan. The Village should track expenditures for project goals, administration cost, evaluation cost, and outside funds leveraged.

6.3 Funding

The EECBG Program allocated \$489,600 directly to the Village for energy programs and planning. Although the EECBG Program provides funding for several goals identified in the plan, it will only address a portion of the capital and annual costs. Accordingly, there are several other state and federal sources the Village may be able to leverage for funding their needs. A summary of additional funding opportunities is provided in **Appendix E**.

6.4 Continued Program Development

This plan is a ‘living’ document that should be visited and updated on a regular basis. Monitoring progress is necessary to compare outcomes with the Village’s objectives. Every year, the Village should conduct an energy assessment to track performance and progress towards its goals.

Goals and activities must be analyzed in light of new economic and environmental conditions. As new technologies and opportunities come-up, the Village should continue to re-evaluate best available technologies for energy efficiency and conservation. Periodic review is required to determine if goals that have not been implemented remain effective. The Village Sustainability Committee should meet on a regular basis to gauge progress and monitor performance. The Sustainability Committee should continuously assess the implementation of the energy strategy plan to make sure the Village is “on track.”

In future energy planning, the Village should consider lessons learned from the successes and challenges of implementing the Plan. In effect, this plan will serve as a mechanism for continual innovation in energy management and inspire a sustainable Mount Prospect.

DEPARTMENT OF ENERGY

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