

# Draft

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## Long Term Energy Efficiency and Conservation Plan



WILL COUNTY, IL  
2012

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## **1.1 Vision and Guiding Principles**

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Energy plays a critical role in the health of Will County’s economy and environment. It generates electricity, heats our homes, supports our businesses, and runs our transportation systems. Without sustainable management, the future of energy poses significant risks to our economy, environment, and quality of life.

Too much reliance on volatile, foreign oil supplies destabilizes our economy and pollutes our environment. Non-renewable fuels are a finite and costly resource. High energy costs, natural resource depletion, air and water pollution threatens the well-being of our community.

A sustainable energy future requires a drastic paradigm shift—transitioning away from primarily fossil fuels and unrestrained energy consumption towards renewable energy and sustainable development. The energy challenge is global in nature but necessitates local action. Will County is responding to the global and local imperative by creating a community vision of sustainable energy management.

As part of Will County’s commitment to a clean energy future, it crafted the Long Term Energy Efficiency and Conservation Plan with a vision to achieve a 10 percent increase in energy efficiency by 2025. The vision forms the foundation of the Plan from which strategic goals and actions were established and will be taken by the County.

The Plan provides an innovative framework for the County to transition towards a more sustainable energy future. It provides a roadmap of actions to reduce the County’s reliance on non-renewable sources of energy.

### **1.1.1 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. An integrated approach that addresses the economic, environmental and social impacts of development is necessary to address the accelerating deterioration of the human environment. Action must begin at the local and regional level.

Will County is committed to the tenants of sustainability, and the TBL approach serves as the foundation of the Long Term Energy Efficiency and Conservation Plan. The Plan will enhance the County’s response in addressing the challenge.

### **1.1.2 Guiding Principles**

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

- Promoting a collaborative process among County departments to implement innovative energy management solutions that enhance the County’s financial efficiency.
- Applying an integrated, strategic approach to managing the County’s facilities, transportation, infrastructure, land use, solid waste and water systems.
- Engaging and educating County employees and the community about the importance of energy efficiency and conservation as it relates to sustainability.
- Demonstrating leadership in responsible energy management through government initiatives.
- Measuring, monitoring and communicating the County’s progress towards energy efficiency and conservation goals.

## 1.2 Energy Efficiency and Conservation Goals

Six strategic focus areas were identified for goal development. The focus areas include Public Facilities, Transportation, Material Management, Water Systems, Land Use, and Education and Communication. Each focus area requires efforts by every major sector of Will County government. The goals provide structure for the Plan and identify opportunities for energy efficiency and conservation. The focus areas and corresponding strategic goals are presented in **Table 1.1**.

**Table 1.1. Energy Efficiency and Conservation Goals**

Public Facilities	<ul style="list-style-type: none"> <li>• Reduce energy consumption from County facilities through demand reduction and building retrofits</li> <li>• Apply sustainable building standards (e.g. LEED certification) for new County buildings</li> <li>• Increase use of renewable energy</li> </ul>
Transportation	<ul style="list-style-type: none"> <li>• Increase use of and improve infrastructure for public transit</li> <li>• Reduce vehicle miles traveled for employee commuting</li> <li>• Implement programs to encourage the community to reduce vehicle miles traveled</li> </ul>
Material Management	<ul style="list-style-type: none"> <li>• Reduce solid waste generated and disposed of in the County landfill</li> <li>• Promote recycling in County government and among County residents and businesses</li> <li>• Continue a landfill gas recovery system at County landfill to reduce pollutants</li> </ul>
Water Systems	<ul style="list-style-type: none"> <li>• Reduce water consumption by County facilities</li> <li>• Work with municipalities to reduce energy use for water production and distribution</li> <li>• Support responsible water use by County residents and businesses</li> </ul>
Land Use	<ul style="list-style-type: none"> <li>• Develop land use policies that support sustainable growth</li> <li>• Support sustainable development projects and “green” construction</li> </ul>
Education and Communication	<ul style="list-style-type: none"> <li>• Incorporate energy efficiency and conservation into outreach efforts</li> <li>• Encourage employees to reduce energy consumption</li> </ul>



### 1.3 Applying a Management System Approach

An integrated management system approach is necessary to define, communicate, and achieve energy efficiency and conservation within County operations and throughout the community. A management system allows continual performance improvement by implementing processes that are synchronized with existing County practices. **Figure 1.1** illustrates the steps that are involved in conducting a systematic energy management system in Will County.

Figure 1.1



**1. Establish Vision and Strategic Goals**

The initial step taken by Will County was to develop the vision and strategic energy efficiency and conservation goals. A stakeholder involvement process (described in Section 1.4.1) initiated this step.

**2. Conduct Assessment**

An evaluation of the County's current energy consumption (e.g. government entity and community use) was conducted to establish a baseline upon which further actions could be taken and measured (Section 2)

**3. Identify and Rank Opportunities**

Energy conservation opportunities were identified and aligned with their strategic goals within specific sectors. The opportunities were analyzed and ranked according to a variety of criteria, such as energy savings, air pollutant emission reduction, implementation cost, job creation, and simple payback.

**4. Select Actions and Set Targets**

Based on the rankings, opportunities were selected for implementation. Performance metrics and targets will be set according to the County's goals.

**5. Develop Action and 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 County Board approval and employee buy-in of initiatives, action plans will be implemented.

**7. Monitor Performance**

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

**8. Communicate Progress**

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

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**1.4 The Long Term Energy Efficiency and Conservation Plan**

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**1.4.1 Plan Development and Stakeholder Involvement**

The Long Term Energy Efficiency and Conservation Plan is a coordinated effort among stakeholders interested in the energy future of County government and the community-at-large.

Will County solicited input from a diverse group of stakeholders to develop a list of goals and objectives and determined selection criteria important to key constituents. Through an interactive process, the stakeholder group established a universe of energy efficiency and conservation projects. A preliminary screening of the list of projects was conducted to

compare the environmental, social, and financial benefits of each project and assign each a “triple bottom line” score. A selection process then identified the energy efficiency and conservation measures that are technically feasible, acceptable to the County, and offer cost savings and financial benefits to the County.

The measures identified during the initial screening underwent a limited quantitative evaluation; including cost/ benefit analysis, air pollutant 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 documented in Section 4.

#### **1.4.2 Structure of the Plan**

The organization of the Plan follows the structure of the management system framework discussed in Section 1.3. In this section, the vision and strategic goals are presented. Section 2 provides the current energy consumption and air pollutant emissions of County operations and the community. Section 3 lists the specific objectives and corresponding actions to be taken to reduce energy consumption in the six focus areas of Public Facilities, Transportation, Material Management, Water Systems, Land Use, and Education and Communication. The objectives and actions were derived from the stakeholder process and align with the County’s established goals. Section 4 details the 12 major actions to be taken in the next ten years by Will County to accomplish the 10 percent energy efficiency goal by 2025. Finally, the implementation schedule and monitoring and verification plan, along with recommendations for continued program development, are presented in Section 5.

## **2.1 The Foundation**

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This section presents the results of an energy assessment of both County government operations and the greater Will County community. This assessment is not a precise accounting of energy consumption. Instead, it provides a broad examination of the County's energy usage and highlights where actions are most needed. The assessment then serves as the foundation for recommendations and actions towards a more energy efficient future for Will County.

### **2.1.1 Energy Consumption and Emissions**

Energy is used to generate electricity, heat and cool buildings, power equipment and fuel motor vehicles. Energy sources are classified as either non-renewable, an energy source that once used cannot be recreated; and renewable, an energy source that can be easily replenished.

Non-renewable energy sources account for 93 percent of all energy used in the United States (EIA 2009). Energy in Will County is predominately derived from non-renewable energy sources, which include non-renewable 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 air pollutants. Energy use is a significant source of air pollutant emissions. The burning of fossil fuels—oil, coal, natural gas, gasoline, and diesel, as well as waste decomposition through landfills, create air pollutant emissions.

This section establishes a baseline for energy usage and air pollutant emissions in Will County's government operations and the community.

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## **2.2 Data Collection Process and Tools**

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### **2.2.1 County Operations**

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

- Electricity
- Natural gas
- Vehicle fuel
- Waste
- Water

The amount of energy used in each of the above categories was gathered with assistance from

Will County employees for the County's baseline energy assessment year of fiscal year 2009 (FY 2009), July 2008 thru June 2009. FY 2009 data was not available for the County's Highway Department vehicle fleet; however a year's worth of data (September 2008 thru August 2009) was provided and serves as an approximation of use in FY 2009. The County does not own or operate a water and/or sewer treatment facility, typically a significant energy user in municipal and county governments.

The FY 2009 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 uses were assumed to be only 33 percent efficient. This is a generally accepted efficiency factor that takes into account non-renewable 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**

County-wide community energy and estimated water use data includes electricity, natural gas, vehicle fuel, and heating oil. Predominant Will County community utility providers include Commonwealth Edison (ComEd) for electricity, and Nicor and Integrys for natural gas. The utility providers provided FY 2009 data that was used to estimate County-wide community electricity and natural gas consumption.

To estimate heating oil consumption, statewide totals, provided by the U.S. Energy Information Administration (EIA), were obtained, and County-wide community usage was extrapolated based on population. Vehicle miles traveled (VMT) data were obtained from the Illinois Department of Transportation and used to determine vehicle fuel consumption for vehicles traveling within Will County. Average vehicle fuel usage in gallons per day was obtained for CY 2005 from the EIA.

### **2.2.3 Emissions**

The FY 2009 data from County government operations and the County-wide community were used to calculate air pollutant emissions. An air pollutant assessment was conducted using the Local Government Operations Protocol (LGOP). The assessment included emissions calculations for County government operations – government facilities and fleet – and community-wide emissions that encompass all private sectors – residential, commercial, and industrial – sources within the County limits.

The energy use data (including electricity, natural gas, and vehicular fuel), as well as solid waste decomposition (from landfill operations) data, were converted to the following emissions; carbon dioxide (CO<sub>2</sub>), methane (CH<sub>4</sub>), and nitrous oxide (N<sub>2</sub>O) through the use of activity and equipment-specific emissions factors as provided in the LGOP. The total CH<sub>4</sub> and N<sub>2</sub>O emissions were converted to carbon dioxide equivalents (CO<sub>2</sub>e) using global warming potentials (GWPs), then added to the total CO<sub>2</sub> emissions.

A more detailed description of the data collection process and assumptions used in calculating energy consumptions and air pollutant emissions can be found in **Appendix A**.

### 2.3 Summary of Results

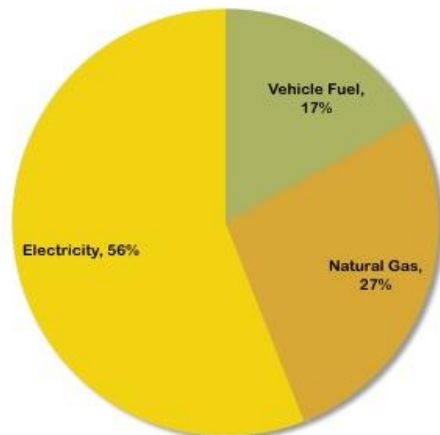
In 2009, energy consumption from County government operations totaled approximately 334 billion Btus. County-wide community energy consumption totaled approximately 137 trillion Btus.

**County Government Energy Use:**  
333.7 billion Btus/yr.  
**County-wide Community Energy Use:**  
136.5 trillion Btus/yr.

As shown in **Table 2.1, Figure 2.1, Table 2.2** and **Figure 2.2** below, electricity is the largest source of energy use, for County government operations and County-wide community, accounting for 56 and 63 percent of total energy use, respectively. Natural gas energy use follows electricity use, for County government operations and County-wide community, accounting for 27 and 32 percent total utility energy use, respectively. Vehicle fuel energy use trails in both cases, and fuel (heating) oil shows up as only one percent of total energy consumption in the County-wide community.

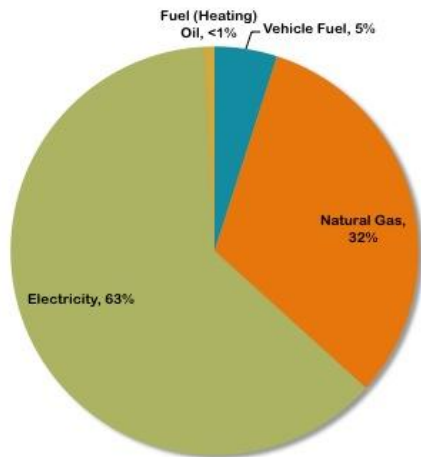
<b>Table 2.1. 2009 County Government Operations Energy Consumption by Source</b>		
<b>Source</b>	<b>Energy (Btus)</b>	<b>Percent of Total Use</b>
Electricity	185,800,000,000	56%
Natural Gas	91,900,000,000	27%
Vehicle Fuel	56,000,000,000	17%
<b>Total</b>	<b>333,700,000,000</b>	<b>100%</b>

**Figure 2.1. 2009 County Government Operations Energy Consumption by Source**



Source	Energy Usage (Btus)	Percent of Total Use
Electricity	85,800,000,000,000	63%
Natural Gas	43,000,000,000,000	32%
Fuel (Heating) Oil	693,000,000,000	<1%
Vehicle Fuel	7,000,000,000,000	5%
<b>Total Btus</b>	<b>36,500,000,000,000</b>	<b>100%</b>

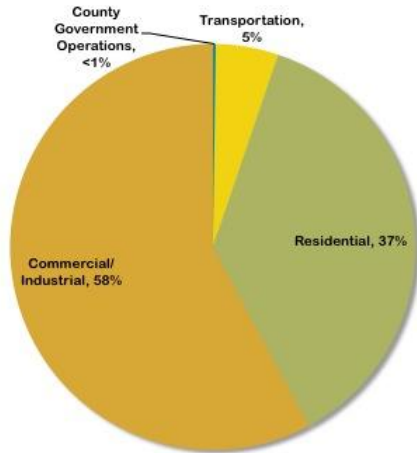
Figure 2.2. County- wide Community Energy Consumption by Source



When considering the larger County-wide community energy use profile, energy consumption for County government operations accounts for less than one percent of the entire energy footprint. Despite representing a small percentage of energy use, local governments have the opportunity to directly control energy consumption and set an example for the private sector. County-wide, the commercial/industrial sector represents the largest energy consumer, representing 58 percent of all energy consumed within Will County as shown in **Table 2.3** and **Figure 2.3**.

Sector	Energy Usage (Btus)	Percent of Total Use
County Government Operations	332,800,000,000	<1%
Residential	51,000,000,000,000	37%
Commercial/Industrial <sup>1</sup>	78,300,000,000,000	58%
Transportation	7,100,000,000,000	5%
<b>Total Btus</b>	<b>136,700,000,000,000</b>	<b>100%</b>

**Figure 2.3. Total Energy Use by Sector**



<sup>1</sup> Commercial and industrial zone data are combined since the electrical usage data received from Commonwealth Edison was not delineated between those zones.

### 2.3.1 County Government Operations Energy Consumption

#### 2.3.1.1 Energy Costs

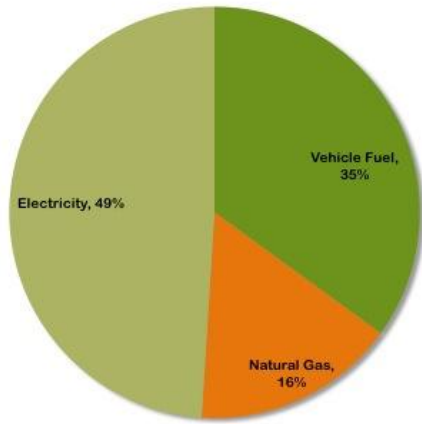
Tracking energy costs is a critical step to improving energy efficiency in County government operations. By identifying the largest energy sources, the County can identify departments and individual buildings that are energy inefficient and prioritize energy efficient investments.

The total energy cost for County government operations in FY 2009 was approximately \$3.6 million. As **Table 2.4** and **Figure 2.4** demonstrate, nearly half of Will County’s energy costs were attributable to electricity purchases. Vehicle fuel accounts for 35 percent of the County’s total energy cost at approximately \$1.3 million.

Category	Cost	Percent
Electricity	\$1,760,000	49%
Natural Gas	\$ 560,000	16%
Vehicle Fuel	\$1,255,000	35%
<b>Total</b>	<b>\$3,575,000</b>	<b>100%</b>



**Figure 2.4. 2009 County Government Operations Energy Purchases by Source**



### 2.3.1.2 Electricity Consumption

The predominant energy use in County government operations is electricity, accounting for 56 percent of the total energy consumption as referenced in Figure 2.1, and 49 percent of the total energy cost as referenced in Figure 2.4. Approximately 18 million kilowatt hours of electricity were used for County government operations in FY 2009. As indicated in **Table 2.5** and **Figure 2.5**, the Adult Detention Facility is the largest electricity user at 30 percent of the total. The Courthouse accounts for 13 percent, the Sunny Hill Nursing Home accounts for 10 percent, and the River Valley Juvenile Detention Facility accounts for 9 percent of the total electricity consumed by County facilities. Table 2.5 also summarizes the annual electricity usage and cost for major County facilities and utilizing departments.

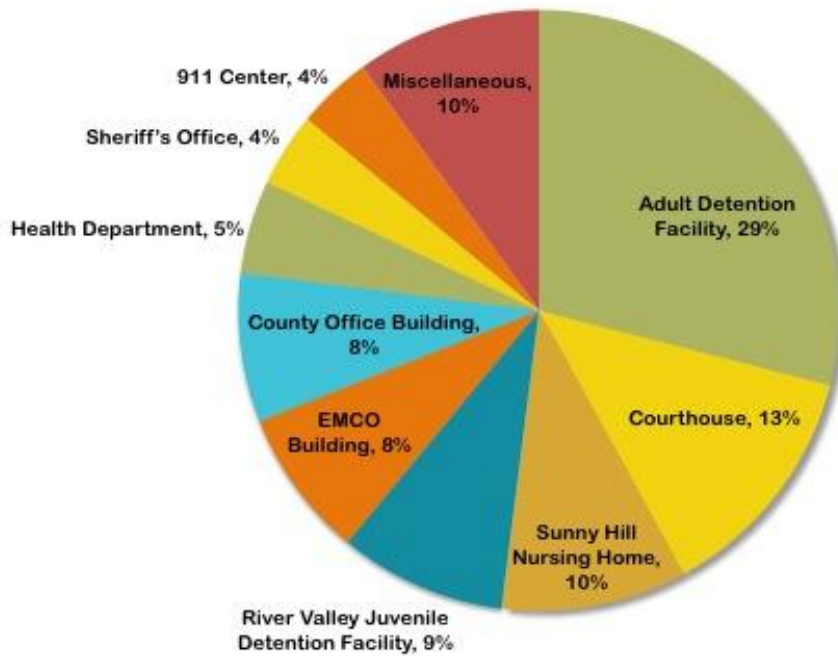
<b>Department</b>	<b>Electricity Usage (kWh)</b>	<b>Cost</b>	<b>Percent</b>
Adult Detention Facility	5,300,000	\$391,000	30%
Courthouse	2,300,000	\$240,000	13%
Sunny Hill Nursing Home	1,900,000	\$199,000	10%
River Valley Juvenile Detention Facility	1,600,000	\$181,000	9%
EMCO Building	1,400,000	\$154,000	8%
County Office Building	1,400,000	\$143,000	8%
Health Department	970,000	\$100,000	5%
Sheriff's Office	730,000	\$75,000	4%
911 Center	700,000	\$74,000	4%
*Government **	360,000	\$43,000	2%
*Street Lights	350,000	\$56,000	2%
*Highway Department	350,000	\$36,000	2%
*Land Use Department	270,000	\$29,000	1.5%
*Recorder of Deeds Department	150,000	\$17,000	1%
*Emergency Management Agency	60,000	\$7,000	0.4%
*Maintenance Department	40,000	\$5,000	0.4%
*Radio System	28,000	\$3,000	0.2%
*Commuter Parking Lot	23,000	\$2,700	0.1%
*Veteran's Assistance	19,000	\$2,400	0.1%
<b>Total</b>	<b>18,000,000</b>	<b>\$1,758,000</b>	<b>100%</b>

\* All items with asterisk have been combined into one section on the pie chart called "Miscellaneous"

\*\* Government locations are as follows:

308 Prairie Ave - 1 Lockport TWP  
 13809 High Rd - Lockport TWP  
 14537 Edison Drive Unit 4 New Lenox  
 802 Nicholson St. Joliet  
 806 Nicholson St. Joliet  
 22365 S Owens Rd Unit R Frankfort  
 19418 97th Ave Ste 3 - Mokena

Figure 2.5. 2009 County Government Operations Electricity Use by Facility/Department



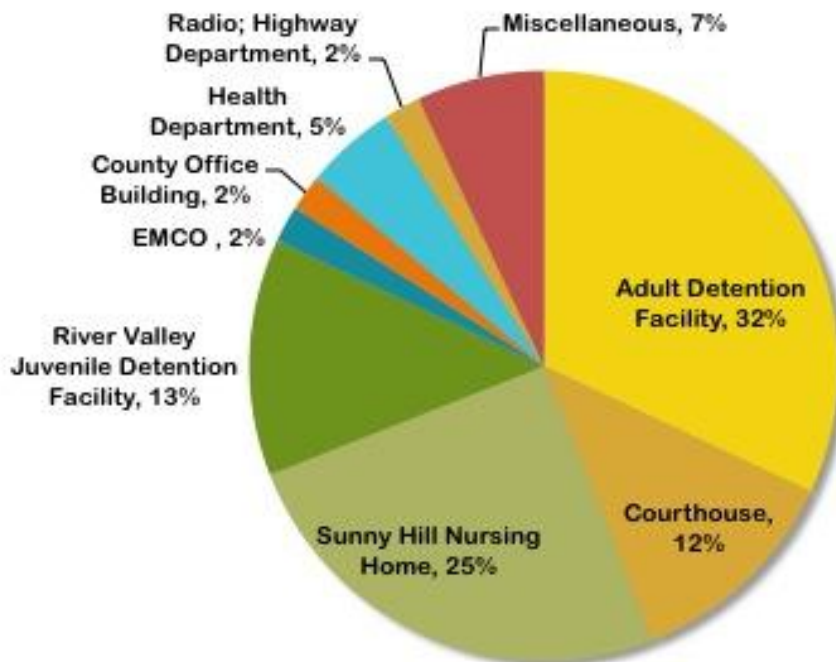
### 2.3.1.3 Natural Gas Consumption

As shown previously in Figures 2.1 and 2.4, natural gas accounts for 27 percent of total energy consumption and 16 percent of the total energy cost in County Government operations. In FY

2009, Will County government used a total of approximately 920,000 therms of natural gas. As **Table 2.6** and **Figure 2.6** demonstrate, the top four natural gas consumers include the Adult Detention Facility, Sunny Hill Nursing Home, River Valley Juvenile Detention Facility, and Courthouse. Together, these four facilities represent over 82 percent of the FY 2009 County government operations natural gas usage. The Adult Detention Facility is the largest natural gas user of all County facilities at 32 percent. Table 2.6 also summarizes the annual natural gas usage and cost for each County facility.

<b>Table 2.6. 2009 County Government Operations Natural Gas Use and Cost by Facility/Department</b>			
<b>Department</b>	<b>Natural Gas Usage (Therms)</b>	<b>Cost</b>	<b>Percent of Total Use</b>
Adult Detention Facility	297,000	\$173,000	32%
Sunny Hill Nursing Home	228,000	\$89,000	25%
River Valley Juvenile Detention Facility	119,000	\$89,000	13%
Courthouse	115,000	\$77,000	12%
Miscellaneous	60,000	\$60,000	7%
Health Department	45,000	\$31,000	5%
County Office Building	19,000	\$14,000	2%
Radio; Highway Department	19,000	\$13,000	2%
<b>EMCO</b>	18,000	\$13,000	2%
<b>Total</b>	<b>920,000</b>	<b>\$559,000</b>	<b>100%</b>

Figure 2.6. 2009 County Government Operations Natural Gas Use by Facility/Department



#### 2.3.1.4 Vehicle Fuel Consumption

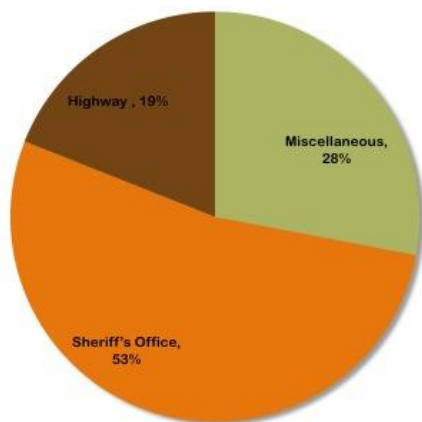
Vehicle fuel accounts for 17 percent of total energy consumption in County government operations and 35 percent of the total energy cost as referenced in Figures 2.1 and 2.4. Will County purchased approximately 365 thousand gallons of gasoline and 83 thousand gallons of diesel, at a total cost of approximately \$1.3 million, in FY 2009. As demonstrated in **Table 2.7** and **Figure 2.7**, the Sheriff's Office is the largest user of vehicle fuel, purchasing 239 thousand gallons of gasoline at a cost of \$678,000. This accounts for over half of the County's vehicle fuel spending. The Highway Department accounts for 19

percent of the total fuel purchased<sup>1</sup>. Other County departments, combined, spent approximately \$358,000 for vehicle fuel, accounting for 28 percent of the total vehicle fuel consumption. Table 2.7 summarizes vehicle fuel consumption for County government operations in FY 2009.

<b>Department</b>	<b>Gallon</b>	<b>Cost</b>	<b>Percent</b>
Sheriff's Office	239,000	\$678,000	53%
Highway	83,000	\$219,000	19%
Miscellaneous	126,000	\$358,000	28%
<b>Total</b>	<b>448,000</b>	<b>\$1,255,000</b>	<b>100%</b>

<sup>1</sup> The Highway Department provided a year's worth of data from September 2008 thru August 2009 and represents an approximation of vehicle fuel use and cost for FY 2009.

**Figure 2.7. 2009 County (Government) Operations Vehicle Fuel Consumption by Department**

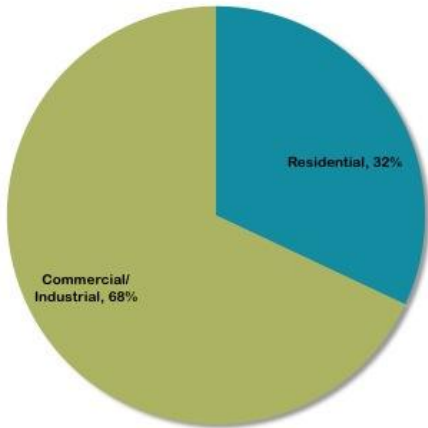


### 2.3.2 County-wide Community Energy Consumption

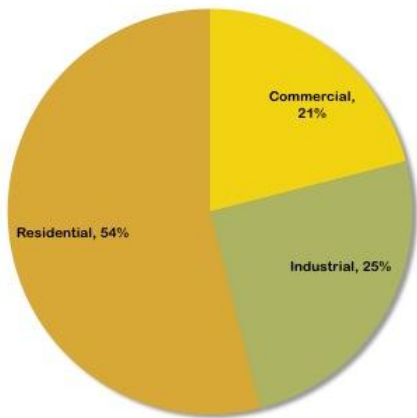
#### 2.3.2.1 Electricity, Natural Gas, Fuel Oil, and Vehicle Fuel Consumption

As demonstrated in **Figure 2.8**, the commercial/industrial sector is the largest consumer of electricity, accounting for 68 percent of total electricity consumption. **Figure 2.9** shows that the residential sector is the largest consumer of natural gas in Will County, accounting for 54 percent of total natural gas consumption. While the industrial sector accounts for only 25 percent of the community's natural gas, it is the most significant user of fuel oil, accounting for 63 percent of total consumption as shown in **Figure 2.10**. Vehicle fuel usage is overwhelmingly dominated by gasoline as indicated in **Figure 2.11**.

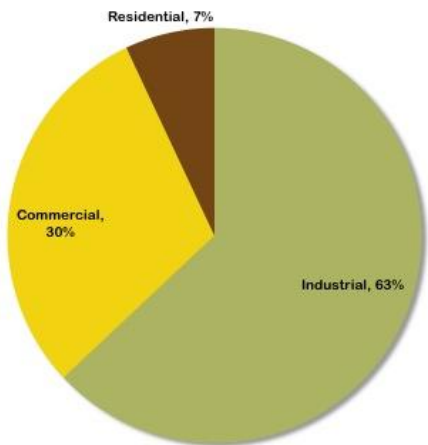
**Figure 2.8 2009 Countywide Community Electricity Consumption by Sector**



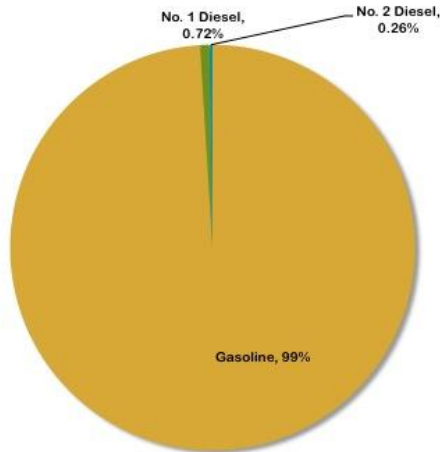
**Figure 2.9 2009 Countywide Community Natural Gas Consumption by Sector**



**Figure 2.10 2009 Countywide Community Fuel Oil Consumption by Sector**



**Figure 2.11 2009 Countywide Community Fuel Oil Consumption by Type**



### 2.3.3 Emissions

Since air pollutant emissions are, in part, the result of non-renewable fuel combustion, the link between energy consumption and air pollutant emissions is apparent. Building heating and electricity consumption, vehicle operation, street lighting, and waste decomposition via landfill disposal all generate air pollutant emissions.

<b>County Government Emissions:</b> 21,400 metric tons of CO <sub>2</sub> e
<b>County-wide Community Emissions:</b> 10,900,000 metric tons of CO <sub>2</sub> e

In 2009, air pollutant emissions from County government operations totaled 21,400 metric tons of carbon dioxide equivalents (MTCO<sub>2</sub>e). **Table 2.8** represents the 2009 County Government Operations air pollutant emissions results. County-wide community air pollutant emission totaled approximately 10.9 million metric tons or approximately 16.3 tons per capita based on 2009 population estimates, as presented in **Table 2.9**. Comparatively, this is a higher level of emission than the City of Chicago’s 2000 emissions per capita rate of 12 tons, but lower than other major metropolitan areas such as Denver which calculated an emissions rate of 19 tons per capita.

Source	Metric tons CO <sub>2</sub> e per year	Metric tons CO <sub>2</sub> e per County Government Employee
Electricity Production	12,600	5.0
Natural Gas Combustion	5,000	2.0
Mobile Sources	3,800	1.5
<b>County Government Operations Total</b>	<b>21,400</b>	<b>8.5</b>

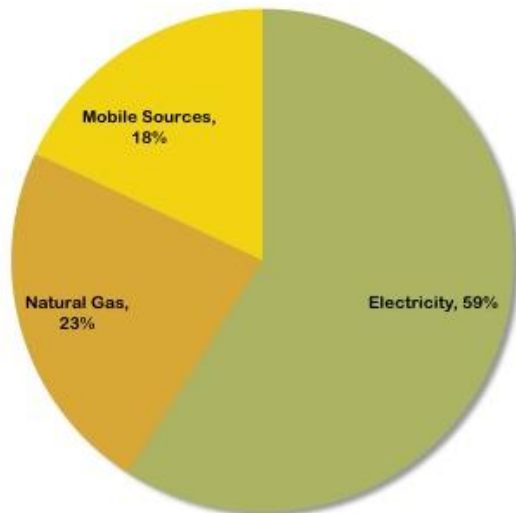
<b>Table 2.9. 2009 County- Wide Community Emissions</b>		
<b>Source</b>	<b>Metric tons CO2e per year</b>	<b>Metric tons CO2e per capita</b>
Electricity Production	5,800,000	8.71
Natural Gas	2,300,000	3.46
Fuel Oil Combustion	51,000	0.08
Mobile Sources	2,700,000	4.02
Solid Waste Disposal	25,000	0.04
<b>County- Wide Community Total</b>	<b>10,900,000</b>	<b>16.30</b>

For both the County Government operations and County-wide community air pollutant assessments, electricity is by far the largest source of air pollutant emissions, accounting for 59% of the County Government operations emissions and 53% of the County-wide community emissions, as shown in **Figure 2.12** and **Figure 2.13**.

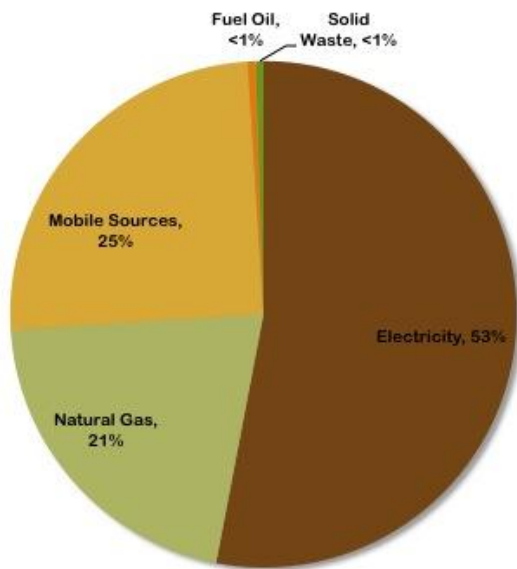
Natural gas accounts for 23 percent of County Government operations emissions. Electricity accounts for 53 percent of the County-wide community air pollutant emissions, as shown in Figure 2.13.

Natural gas accounts for 21 percent and mobile sources account for 25 percent of the countywide community air pollutant emissions.

**Figure 2.12. 2009 County Government Operations Emissions by Source**





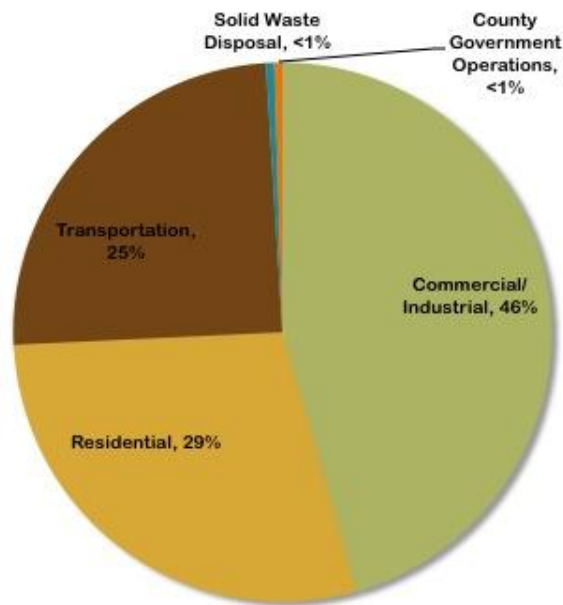
**Figure 2.13. 2009 County- Wide Community Emissions by Source**

Less than one percent of the County-wide community air pollutant emissions are from fuel oil combustion and solid waste decomposition via landfill operations. This is typical of a local government's air pollutant emissions profile. To avoid double counting emission from other sectors, the LGOP does not explicitly capture the emissions associated from the full life cycle of a product, including manufacturing, distribution and disposal. Therefore, this assessment does not account for emissions arising from the production of goods consumed in Will County, but manufactured elsewhere. Energy consumption in residential, commercial and industrial buildings (electricity and natural gas) accounts for the majority of air pollutant emissions in Will County.

In the County-wide community, the commercial/industrial sector represents the largest air pollutant emissions sources, contributing 46 percent of the total air pollutant emissions within Will County. The residential sector accounts for 29 percent of the total air pollutant emissions, and transportation accounts for the remaining 25 percent. When considered a sector within the larger County-wide community inventory, air pollutant emissions from County Government operations account for less than one percent of the total air pollutant emissions. **Table 2.10** and **Figure 2.14** below depict the percentage of air pollutant emissions from each sector.

<b>Table 2.10. 2009 Total Emissions by Sector</b>	
<b>Emissions by Sector</b>	<b>Metric tons CO2e per year</b>
County Government Operations	21,000
Residential	3,100,000
Commercial/ Industrial	3,100,000
Transportation	2,700,000
Solid Waste Disposal	25,000
<b>Total</b>	<b>10,900,000</b>

Figure 2.14. 2009 Total Emissions by Sector



## 2.4 “Make a Difference” Usages

### 2.4.1 County Government Operations

Electricity is the predominant energy source used in County Government operations, followed by vehicle fuel and then natural gas. In both electricity and natural gas, the Adult Detention Facility is by far the largest electricity and natural gas user. The Adult Detention Facility has more than twice the square feet area than the next highest user of natural gas, Sunny Hill Nursing Home, and more than twice the size of the next highest electricity user, the Courthouse. Both the Adult Detention Facility and the Sunny Hill Nursing Home operate 24 hours, 7 days a week. The amount of energy used by the Adult Detention Facility appears to be proportional to its size and use when compared to Sunny Hill Nursing Home and the Courthouse. The Adult Detention Facility recently completed an addition and renovation in May of 2009, which should have resulted in bringing the building into compliance with current energy codes. When taking this factor into account, along with the size of the facility and the amount of energy used, the Adult Detention Facility appears to be relatively energy efficient.

The Sheriff's Office, vehicle fuel usage appears to represent the greatest opportunity for energy savings within the County Government Sector. It comprises more than half of the total vehicle fuel use in County operations. Section 4 describes a recommendation for decreasing fuel use by converting the sheriff officer's fleet to hybrid vehicles.

#### **2.4.2 County-wide Community**

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

As part of Will County's commitment to sustainable energy management, energy efficiency and conservation measures need to be focused towards community efforts that reduce the energy footprints of local municipalities, businesses, and residents. Herein lays a tremendous opportunity to reduce energy consumption and emissions.

### **3.1 Energy Efficiency and Conservation Opportunities**

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Will County set a goal to achieve a 10 percent increase in energy use efficiency by the year 2025? To achieve that goal, the Long Term Energy Efficiency and Conservation Plan developed objectives and actions for the six focus areas: Public Facilities, Transportation, Material Management, Water Systems, Land Use, and Education and Communication. In all, this plan outlines **12 specific objectives** and related actions to achieve the 2025 goal. The actions serve as specific means to be taken over the next ten years.

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### **3.2 Buildings and Public Facilities**

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#### **3.2.1 Role of Facilities in Energy Consumption and Emissions**

Green buildings quickly evolved from a trend into the accepted standard - not only in new design and construction, but also in retrofits of existing structures. It is reasonable to believe that more than half of the buildings that exist today will still exist in 2050. For that reason, energy efficiency improvements for existing facilities make more sense than ever. Will County is committed to sustainability and aims to incorporate energy efficient building components into existing facilities and new construction.

A building retrofit is an improvement to building infrastructure, and often to operating and management practices, that reduces utility (energy and water) and maintenance costs. A retrofit starts with an audit to establish current costs and opportunities for savings. Improvements to infrastructure may include solar, wind, LED lighting, as well as more precise temperature control and monitoring systems. Staff training and new monitoring strategies ensure continued optimal operation and savings. Some of the benefits of retrofitting existing buildings are as follows:

- Lower utility costs, resulting in operational cost savings
- Measurable return on investment, typically recouping the cost of the program within a few years
- Reductions in air pollutant emissions
- Lower system repair and maintenance costs
- Improved occupant comfort and overall building health, thereby reducing occupant complaints
- Improved energy efficiency
- Reduced risk of costly repairs
- Increased productivity
- Enhanced safety

As the world comes to grips with the economic, environmental and political ramifications of conventional energy use, Will County is fortunate to have a major, largely untapped domestic energy resource opportunity—"increased efficiency." Along with direct income gains, building retrofits provide new opportunities for area residents, raise property values, and improve public health by reducing emissions.

The following three objectives describe Will County's commitment to energy efficiency.

### 3.2.2 Objectives and Actions

#### **Objective 1: Reduce energy consumption and air pollutant emissions from County Government facilities through demand reduction and building retrofits by 10 percent**

##### 3.2.2.1 Actions for County Government Operations

- Migrate existing County buildings towards more energy efficient operations by incorporating energy efficient retrofits – lighting and building system control retrofits provide the shortest payback periods where practical.
- Issue capital improvement bonds or identify other funding sources to finance energy efficiency upgrades in County government facilities.
- Modify building codes to drive energy efficiency improvements for County government facilities
- Implement a County Energy Challenge to inspire employees to reduce building energy use and cost by 15 percent.
- Convert street lighting to more efficient technologies, including LED types.
- Adopt and implement green building policies that include third-party certification of energy, water and waste conservation strategies.
- Create a policy, administered through the Building Division of the Will County Land Use Department that requires certified energy managers, or trained building management personnel, to control room temperatures which prevent misuse and unnecessary energy consumption.
- Use Low VOC paints in County buildings.
- Use green cleaning products only.

##### 3.2.2.2 Actions for County- wide Community

- Partner with municipalities within the community to improve street lighting, water pumping, water treatment and other energy intensive operations.
- Develop a home “use wisely” energy program to educate homeowners on effective energy saving retrofits and initiatives.
- Offer technical and possibly financial assistance to homeowners for the purposes of installing home retrofits.
- Offer free energy audits whenever practical and affordable.
- Provide a list and description of weatherization techniques to the community that will prevent energy loss. Consider offering these workshops during the fall/winter months in tandem with other County education programs such as those for waste reduction.

#### **Objective 2: Apply sustainable building standards (i.e. LEED® certification) for new County Government buildings**

There are several advantages to incorporating sustainable building standards, such as LEED® certified designs, into County government facilities. By using fewer resources, the County will significantly reduce operating costs. Several studies suggest that employees are more productive and generally more satisfied working in a building that uses more natural light. Another study indicates that reducing indoor air pollutants through green building

design could save U.S. businesses \$58 billion in avoided sick time and another \$200 billion in increased worker productivity. Incorporating green building standards for new County government buildings contributes to the protection of ecosystems and biodiversity, improves air and water quality, reduces waste at the County landfill, and conserves natural resources. Green construction is also a significant tool for public relations that attracts the best and brightest workers to the County's offices. Additional benefits include lower overhead costs, greater employee productivity, less absenteeism, and stronger employee attraction and retention. Studies suggest that cost premiums for efficiency improvements can range between one and four percent for LEED® Silver, and up to ten percent for LEED® Platinum certification. Over the course of a LEED® certified building's life, the savings in total costs can be as much as ten times greater than the extra cost for the more sustainable design. An investment of \$100,000 in sustainable design features can produce a return of \$1 million in saved costs over the building's life.

#### **3.2.2.3 Actions for County Government Operations**

- Update the Will County Building Ordinance to incorporate energy efficient building standards for all new construction of County government facilities.

#### **3.2.2.4 Actions for Community**

- Apply energy efficient designs, interior recycling systems, and energy efficient technologies through development of ordinances and codes.
- Encourage municipalities and private business to incorporate energy efficient building standards for all new construction.
- Provide information educating the greater community about the benefits of energy efficient building certification.
- Develop fact sheets and marketing materials on affordable green design and construction practices to educate the community.

### **Objective 3: Produce as much 10 percent of Will County's total energy use through on site renewable energy sources**

#### **3.2.2.5 Actions for County Government Operations**

- Investigate increasing the use of renewable energy by 5 megawatts using renewable energy sources like solar, landfill gas-to-energy, and wind.
- Establish at least one district heating and cooling system. The most obvious to investigate would be to combine the EMCO building, the Adult Detention Facility and the Courthouse into one district heating and cooling system because of their proximity to each other.
- Investigate sources of land that could be used for renewable energy resources such as wind.
- Identify financial incentives to encourage businesses and community institutions to improve their energy efficiency and/or seek renewable energy opportunities.
- Partner with utilities such as Nicor and ComEd to assess community-wide energy savings techniques.

#### **3.2.2.6 Actions for County- Wide Community**

- Develop a "Civic Green Building Policy" that embodies a commitment by local municipal governments to construct all new civic facilities to a certain level of

performance or standard (LEED® Silver, Gold, and Platinum). It may also include criteria for undertaking retrofits of existing civic buildings.

- Work with local municipal government to implement an on-site renewable energy policy requiring new and retrofitted civic buildings to include the micro-renewable classes described below:
  - Renewable space conditioning (heating and cooling) and hot water systems including cost-effective solar thermal and geothermal exchange systems.

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### **3.3 Transportation**

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#### **3.3.1 Role of Transportation in Energy Consumption and Emissions**

There is a clear link between transportation and energy use— cars burn fuel that emits emissions. In fact, it is the fastest growing source of air pollutant emissions in the United States. In Will County, transportation accounts for approximately 17 percent of the total energy footprint in County Government operations, and roughly 7 percent of total County-wide community consumption. More significant, is the fact that transportation accounts for 35 percent of the total County Government operations energy costs. Without a doubt, a reduction in energy use from transportation will lower operating costs and emissions.

To further transportation related energy use, the County should establish transportation policies and programs to minimize non-renewable fuel use in the community. It is essential that the community shift from the single-occupancy vehicle standard towards alternative modes of transportation. Specific actions should be implemented to reduce per capita vehicle miles traveled (VMT), expand alternative transportation infrastructure, and encourage use of low-carbon fuels.

Objectives 4 and 5 demonstrate Will County’s commitment to achieve significant reductions in energy use and emissions from the transportation sector.

#### **3.2.2 Objectives and Actions**

<b>Objective 4: Reduce per capita vehicle miles traveled (VMT) by 30 percent and expand alternative transportation infrastructure and programs</b>
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##### **3.3.2.1 Actions for County Government Operations**

- Sponsor a web-based, ride-share program for County employees to carpool with other staff with similar routes and schedules.
- Implement an alternative transportation education program for County employees.
- Provide incentives for alternative modes of transportation, the use of employer parking facilities, and ride-sharing programs.

##### **3.3.2.2 Actions for County- wide Community**

- Promote expansion of public transportation infrastructure such as Pace bus lines and Metra rail service.
- Coordinate with Metra during the planning stages of the proposed expansions to the Heritage Corridor (HC), Southwest Service (SWS), Rock Island District Line (RID), and the Metra Electric District (MED) to ensure that the improvements will best

accommodate Will County's commitment to expanding access to alternative transportation.

- Whenever possible, expand roadways to include bicycle provisions and develop off-street bicycle and walking infrastructure such as greenways and bikeways. Will County forest preserves and other public lands could serve as a venue for expanded off-street bicycle and walking infrastructure.
- Encourage future development and public spaces to be mixed-use and transit-oriented such that future users are not limited to personal vehicle usage. Coordinate with CMAP to consider transit-oriented development near proposed stations for the future commuter line (HC, SWS, RID, and MED) extensions.
- Establish a comprehensive parking plan in tandem with expansion of public transportation infrastructure to create and expand park-and-ride transit stations within the interstate system for long distance commuters.
- Coordinate with the Pace Express Bus System during planning of new park-and-ride facilities to ensure the commuter transit needs of Will County can be integrated into the regional transit system expansions.
- Sponsor a web-based, ride-share program for the community to carpool with neighbors with similar routes and schedules.
- Partner with CMAP and municipalities to offer alternative transportation (e.g. biking, carpooling, public transit, and walking) education programs and encourage commuters to utilize the PACE ride-share program.  
Offer incentives to businesses that adopt the alternative transportation employee incentive program at their workplaces.

**Objective 5: Reduce net air pollutant emissions and increase alternative vehicle and fuel use**

**3.3.2.3 Actions for County Government Operations**

- Invest in more energy efficient County government vehicles such as gas/electric hybrids and plug-in vehicles, as they become available.
- Retrofit County government vehicles to run on higher percentage biodiesel such as B20 (20 percent biodiesel) and B100 (100 percent biodiesel).
- Investigate the feasibility of a no-idling campaign in tandem monitor a fuel economy standard for all County fleet; require these vehicles to maintain fuel economy records and phase out vehicles that do not conform to standards.
- Investigate and, if feasible, implement a County biodiesel production program in tandem with a waste vegetable oil recycling program. This would serve the purpose of reducing waste and encouraging alternative fuels. For instance, waste vegetable oil from the Sunny Hill Nursing Home's and the County Jail's cafeterias could be converted to biodiesel at a County biodiesel production facility. This biodiesel could be used to supplement fuel needs for County operated diesel vehicles.

**3.3.2.4 Actions for County- wide Community**

- Offer incentives for residents to invest in more energy efficient vehicles such as hybrids or retrofit their vehicles to run on a higher percentage of biodiesel.
- Encourage the installation of electric car charging and alternative fueling (i.e. higher percentage biodiesel, ethanol) stations to increase accessibility for these types of fuels.



Long Term Energy Efficiency and Conservation Plan

- Enact a low-carbon fuel standard that requires all diesel fuel sold in the County to contain at least 5 percent biodiesel and all gasoline to contain at least 10 percent ethanol.
- Coordinate with municipalities and CMAP to assess how alternative transportation infrastructure such as roundabouts would alleviate traffic in addition to providing emission reductions by minimizing idling.
- If implemented, encourage businesses that generate waste vegetable oil such as restaurants to participate in a waste vegetable oil recycling program. Offer incentives to those who participate.
- Assess current transit routes and future demand projects to identify areas of need and/or future potential and determine effective routes that serve not just commuter passengers (i.e. Will County to Chicago), but provide adequate service to intra-Will County commuters.
- Write and adopt a County policy for inclusion of pedestrian and bicycle ways in new design and construction based on CMAP's existing Bicycle and Pedestrian Program.
- Reach out to municipal transportation and public works departments to discuss feasibility of bike lane and sidewalk improvements. Cooperation with municipalities with higher population densities, such as Joliet and Naperville, is especially important.

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### **3.4 Material Management**

#### **3.4.1 Role of Material Management in Energy Consumption and Emissions**

Material management plays a critical role in reducing energy consumption air pollutant emissions and material conservation. At multiple stages of a product's lifecycle—extraction and processing of raw materials, manufacturing, distribution, storage, transport and disposal—energy is used and pollution is generated.

In a worst-case scenario, material goods use energy intensive processes, contain excessive packaging, and transport over long distances before they are used once and discarded. In addition, the transportation of waste to disposal sites produces air pollutant emissions. The decomposition of the organic fraction of solid waste at the landfill results in the release of carbon dioxide and methane.

The practice of easy disposal, a growing population, and a material consumer culture require conventional standards for material management to shift towards sustainability. Innovations in material management including source reduction, recycling, composting, energy recovery from combustion, and energy recovery from gasification are necessary to reduce energy use and air pollutant emissions. Specifically, energy recovery and recycling reduce the need for new energy production from and harvesting raw, virgin materials. Recycling reduces the amount of energy needed to produce new items and reduces the amount of raw materials needed.

Will County is committed to sustainable material management and is taking the lead in energy recovery and recycling. Will County has an active and robust recycling program both within its government facilities and offered to its public (e.g., HHW and electronic

recycling events, etc.). In addition, municipalities within Will County offer curbside collection of recyclables, and other various programs. Will County has opportunities to do more, for example, gas engines can produce power from landfill gas by converting generated methane gas to energy. This process reduces air pollutant emissions (EPA 2009) and generates electricity that can be used to power homes and businesses in the community. Will County should continue its efforts to reduce solid waste generation and promote recycling within the community.

The following three objectives describe Will County's commitment to sustainable consumption and material management.

### **3.4.1 Objectives and Actions**

#### **Objective 6: Reduce solid waste generation**

##### **3.4.2.1 Actions for County Government Operations**

- Implement an Environmentally Preferable Procurement Policy that requires energy efficient standards and regulation of types and quantities in government purchasing.
- Reduce the overall number of office machines by purchasing multi-functional and centrally located printers, scanners, and copiers.
- Invest in an efficient potable water filtration system to reduce the purchasing of expensive and energy-intensive bottled-water.
- Educate the users about water quality and bottled water waste.

##### **3.4.2.2 Actions for County- wide Community**

- Create a system to measure waste reduction then re-instate a 5 percent waste volume reduction goal outlined in the 2008 Will County Solid Waste Management Plan (SWMP) with the intention of scaling waste volume reduction up to 10 percent.
- Continue to expand the existing web-based information clearinghouse discussed in the 2008 SWMP into a highly interactive web-based sustainability education program with information on County material management policies, facilities, and activities.
- Integrate the current source reduction campaigns, such as the School Waste Reduction Program, with current and proposed recycling education campaigns.
- Through the expanded public recycling education program and the interactive web based sustainability education program, encourage businesses and residents to purchase goods from recycled materials, produced locally, with minimal packaging, and that are durable, repairable and reusable.

#### **Objective 7: Divert 50-60 percent of all waste away from landfill disposal**

##### **3.4.2.3 Actions for County Government Operations**

- Expand the County's in-house recycling program, which requires all County employees to recycle with the intention of recovering 70 percent of waste generated in most County office buildings.
- Continue the requirement of double-sided printing as listed in the 2008 SWMP. Expand this policy to encourage County employees to reduce material consumption by also eliminating unnecessary printing and reusing materials.
- Implement a composting program to divert food, yard waste, and other organic waste generated in County government.

- Continue County assistance and encouragement to municipalities and communities to partake in recycling and waste reduction.

#### **3.4.2.4 Actions for County- wide Community**

- Continue to expand traditional and electronics recycling drop-offs for Will County as outlined in the 2008 SWMP. These facilities should serve the community at large.
- Scale-up the current 40 percent waste diversion goal over the remaining 5 years of the 2008 SWMP to 50 percent.
- Continue to offer recycling events such as the Book and Electronics Recycling Programs.
- Expand recycling drop-off centers to accommodate all townships and municipalities and include glass recycling. Implement residential and commercial food waste collection in Will County.
- As proposed in the 2008 SWMP, continue the waste audit assistance offered to all businesses in Will County. In tandem with this initiative, establish a requirement for businesses and apartment complexes to recycle paper, and metal.
- Encourage the expansion of the existing resale shops to include trade-ins and recycling for other inefficient household appliances such as light-bulbs, toilets, and faucets.
- Create a County curbside recycling program to service collection in unincorporated areas as proposed in the 2008 SWMP. Work with residents in unincorporated areas to create incentive for larger recycling volumes, “Pay by the Bag” approach.
- Continue the current Construction and Demolition (C&D) Debris Management program outlined in the 2008 SWMP. Establish a requirement for contractors and construction firms to recycle construction and demolition debris (e.g., 50% to 75%). In addition, reinstate market development assistance activities for recycling of C&D debris as proposed in the 2008 SWMP.

<b>Objective 8: Generate energy and reduce emissions from the solid waste management system</b>
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#### **3.4.2.5 Actions for County Government Operations**

- Partner with Waste Management, Inc., operator of the County’s landfill, to design and construct a landfill gas-to-energy facility at the County-owned Prairie View Landfill that will collect methane and use it to fuel onsite engines (or turbines), generating electricity to power surrounding businesses and homes.

#### **3.4.2.6 Actions for County- wide Community**

- Encourage haulers to transition to a fleet with 20 percent energy efficient renewable fuel sources.
- Encourage municipalities to require haulers to provide separate collection of organics (food and yard waste) and encourage residents to compost food and yard waste.

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## 3.5 Water Systems

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### 3.5.1 Role of Water Systems in Energy Consumption and Emissions

The connection between water systems and energy is evident. Energy is used throughout the entire water cycle. The collection, treatment, and distribution of water, and the collection and treatment of wastewater all require energy.

Water is an integral part of our community. Water serves our residents, businesses, schools, parks, and public buildings. Water and wastewater systems require energy to power pumps and treatment processes. While these tasks inherently require the consumption of natural resources, several innovative measures can be effective in mitigating the environmental impact of water system operations.

While Will County does not own major water infrastructure, it recognizes the vitality of water to its community and should take measures to protect this, increasingly, scarce resource. It should adapt its current operations to minimize water consumption and promote water conservation throughout the community. Will County's commitment to reduce water use lessens demand on energy intensive water systems and reduces air pollutant emissions. The following objective describes Will County's commitment to sustainable water management.

### 3.5.2 Objectives and Actions

<b>Objective 9: Reduce water consumption by 20 percent</b>
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#### 3.5.2.1 Actions for County Government Operations

- Replace existing conventional toilets with a toilet that has a flush volume of 3.5 gallons or less in all County government facilities. Ultra low flush toilets and high efficiency toilets can reduce flush volume to as low as 1.28 gallons per flush (gpf).
- Install high efficiency urinals that have a flush volume of 0.5 gallons in all County government facilities.
- Replace conventional lavatory faucets with a flow rate of 5.0 gpm or more with low-flow faucets (1.5 gpm).
- Utilize faucet aerators and flow restricting orifices.
- Employ the use of brooms to clean sidewalks as opposed to hosing down concrete areas outside of public buildings.
- Employ water conservation measures in landscape management that include:
  - Reducing irrigation cycles by 1-3 minutes or eliminating one irrigation cycle per week
  - Adjusting sprinklers to prevent overspray and run-off
  - Repairing leaks and broken sprinkler heads and hoses
  - Adding two inches of mulch around trees and plants to reduce evaporation
  - Investigating the use of gutters and downspouts to collect rainwater for irrigation of County facilities for new County building construction
  - Utilizing "Smart" irrigation controllers that automatically adjust watering schedules based upon weather conditions or completely shut down irrigation when rain or freezing conditions are sensed

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- Considering water conservation schedules in the dry months during which nonessential high water uses (lawn watering, car washing) are not permitted. Programs could be modeled from those implemented in several municipalities in neighboring Cook County
- Collect rainwater for landscaping and sidewalk/street cleaning purposes in new County buildings.
- Utilize reclaimed water for irrigation of County Golf Courses and to clean vehicles at the Sheriff's Office and Highway Department.
- Implement a potable water filtration system to reduce the purchasing of energy intensive bottled water where feasible.

**3.5.2.2 Actions for County- wide Community**

- Continue Will County's active participation and representation in the CMAP's Regional Water Supply Planning Group to ensure that Will County stays abreast of regional water supply planning measures
- Provide water audits to the community-at-large to promote large-scale water conservation and efficiency
- Encourage municipalities to install variable frequency drives on pumps to reduce energy consumption at municipal water and waste water pumping and treatment facilities
- Work with municipalities and businesses to use reclaimed water where possible in the operation of boiler and chiller systems
- Encourage and provide incentives for industrial water audits
- Consider implementing the following water reclamation opportunities:
  - Utilize rain barrels or cisterns to capture runoff and use the captured water for landscape irrigation where feasible
  - Install water reclamation systems for car washes
  - Install water reclamation systems for laundry usage

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**3.6 Land Use**

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**3.6.1 Role of Land Use in Energy Consumption and Emissions**

Land use and development patterns play a significant role in energy consumption and air pollutant emissions. The built environment is a fundamental component of sustainability. Land use planning is currently dominated by low-density growth and zoning ordinances that isolate service centers, businesses and residents from each other. This type of sprawl is energy intensive. Spread-out development patterns exploit natural resources at an unsustainable rate and encourage the use of motor vehicles that result in traffic congestion, long commute times, and air pollution.

Will County should promote land use patterns that positively affect energy use and the environment. Community sustainability requires efficient infrastructure, open space, the preservation of natural resources, and green design. County policies, plans and regulations should move beyond green buildings to green neighborhoods that serve the economy, the community and the environment.

The following two objectives describe Will County’s commitment to sustainable land use and development.

### 3.6.1 Objectives and Actions

#### **Objective 10: Develop land use policies that support sustainable growth**

##### **3.6.2.1 Actions for County Government Operations**

- Implement a policy through the Building Division of the Will County Land Use Department for sustainable construction that considers a building's total economic and environmental impact and performance, from raw material extraction and product manufacture to building design, construction, operations and maintenance, and reuse or disposal.
- Conserve open space, natural resources and agricultural land in accordance with the Will County Land Resource Management Plan and enforced by the Will County Zoning, Subdivision Control and Water Resources ordinances.

##### **3.6.2.2 Actions for County- wide Community**

- Provide for the recommendations within the Will County Land Resource Management Plan, which advocates mixed-use, dense development patterns that minimize the environmental impacts from development.
- Update the Building Ordinances and Land Use Management Plan to develop mixed-use, dense development patterns that minimize the environmental impacts from development.
- Utilize data collected from Will County’s Long Range Planning Section to impose zoning requirements and provide development incentives for sustainable land-use patterns that promote multi-use, public transportation, and green space development.
- Identify the infrastructure investments and public-private partnerships that are needed to achieve a sustainable community.
- Continue to implement an outreach campaign to inform community of land use polices and plans and provide educational resources to residents about the benefits of dense development patterns and the preservation of open space.
- Institute a policy that stresses the ecological significance of the land designated for open space.
- Conduct regional visioning sessions among regional (such as the CMAP) and municipal planning and economic development agencies to create a shared goal and foster buy-in, to discuss current land use controls and initiatives, and to develop mechanisms for coordinated growth management.
- Extend sustainability planning beyond the regional level to neighborhoods and construction.
- Continue to review zoning ordinances and clarify language regarding the allowed use of photovoltaic panels and wind turbines and how such technology is treated under such regulations.
- Prioritize land use policies that could be encouraged by incentives rather than regulation.

- Continually update the County’s land use policies and decision making as outlined in the Land Resource Management Plan to include new technologies and practices and align such with sustainability principles.

**Objective 11: Characterize current land use patterns and support sustainable development projects**

**3.6.2.3 Actions for County Government Operations**

- Design and build greenescapes, cost-efficient and environmentally friendly solutions for landscaping, which preserve natural resources and prevent waste and pollution at County properties.
- Incorporate sustainability and life-cycle costing decision-making processes into all County construction projects.
- Encourage green roofs, renewable energy, and energy efficient system controls and equipment in all new construction and renovations of County government facilities where feasible
- Invest in parking infrastructure at County facilities to cap or reduce the number of parking spots, encourage public transit, and promote walking or cycling.

**3.6.2.4 Actions for County- wide Community**

- Incorporate alternative transportation systems into development plans.
- Create private-public partnerships to redevelop underutilized properties in a sustainable manner that includes wide sidewalks, permeable pavement, rooftop gardens, and green alleys.
- Create infrastructure that enables more residents to walk or bicycle to meet basic daily, non-work needs.
- Accommodate all population and business growth within the existing County boundary.
- Include potential impacts to infrastructure, including water supply, demand and quality, storm water and transportation systems and develop resiliency strategies to manage risk and minimize financial burdens.
- Collect and evaluate population projections, transportation usage, zoning restrictions, and other data that are required to project future land use. Assess current land use modeling and forecasting to determine if future needs and pressures are being accurately accounted for.

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**3.7 Education and Outreach**

**3.7.1 Role of Education and Outreach in Energy Consumption and Emissions**

The energy challenge of today requires global, regional, local and individual action. Will County is leading the community towards a clean energy future. However, government action alone is not enough. As indicated in Section 2, energy use from County government operations accounts for less than one percent of the county-wide community total. Household and personal vehicle energy use account for 42 percent, and Will County businesses account for a 58 percent, of the total county-wide community energy consumption. Unmistakably, Will County residents and businesses are an essential part of the solution.

Education and public outreach campaigns play a significant role in impacting individual actions. As part of Will County's commitment to sustainable energy management, it should employ sustainability education into its County government operations and support a community-wide public engagement campaign.

Education and communication apply to all focus areas: Public Facilities, Transportation, Material Management, Water Systems, and Land Use. Specific education and communication actions are identified within each focus area. This section, therefore, serves as an overview for communication and education of this plan.

The following objective describes Will County's commitment to the importance of education and communication in achieving community-wide energy efficiency and conservation.

### **3.7.2 Objectives and Actions**

<b>Objective 12: Encourage County employees, residents, and local businesses to reduce energy consumption at home and in the work place</b>
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#### **3.7.2.1 Actions for County Government Operations**

- Establish a cross-departmental "Green Team" to act as a steering committee for County government energy initiatives.
- Establish a Sustainability Awards Ceremony to recognize superior performance by employees who demonstrate sustainability.
- Establish an employee of the month program to award County staff who promotes energy efficiency or conservation in the workplace.
- Provide continuing education and training programs in the form of courses, seminars, and degrees on a wide array of sustainability issues for employees to pursue.
- Offer an employee incentive program to encourage energy saving tips and initiatives to be adopted in County practices.
- Sponsor an annual "Energy Challenge" among County staff to encourage employees to reduce energy consumption and implement energy efficiency projects to lower energy costs.
- Identify a lead office manager in all County departments to monitor employee energy use and behavior.

#### **3.7.2.2 Actions for County- wide Community**

- Develop a Home Energy Program to educate homeowners on cost-effective, healthy and easy solutions (e.g. Energy Star appliances) for energy efficiency in their homes and businesses.
- Implement a weatherization program that conducts energy audits and assists residents in applying for utility and state cash rebates and tax credits to weatherize their homes and businesses.
- Partner with municipal governments, neighborhoods, schools, local community action agencies, non-profit organizations, faith communities, businesses, civic organizations and individual community members to launch a community-wide public engagement campaign to promote energy efficiency and conservation.



- Establish a business leadership committee to encourage local businesses to create a clean energy economy and generate green jobs.
- Establish a Will County Energy Task Force composed of citizen volunteers from academia, business and government to guide future energy use and emissions reduction planning efforts.
- Identify major community issues and goals concerning land use, transportation, energy, and the environment and link these goals through an energy efficiency program.

**Objective 13: Incorporate energy efficiency and conservation into education and outreach efforts**

**3.7.2.3 Actions for County Government Operations**

- Implement and distribute a monthly email newsletter to County employees that highlights innovative energy practices in County government and suggests energy saving tips.
- Centralize communication and outreach in a single County department and incorporate energy efficiency and conservation messages into communication and outreach materials.
- Create a Sustainability and Energy Department and hire an Energy Coordinator for County facilities to manage implementation of the County Energy Policy, manage energy procurement, and identify opportunities for energy efficiency improvements and funding sources.

**3.7.2.4 Actions for County- wide Community**

- Purchase an energy efficient mobile education unit for the purposes of extending the message of sustainability throughout the County to use as a recycling and energy efficiency educational center at schools and public outreach events.
- Develop a highly interactive web-based sustainability education program to educate residents, students and businesses on energy efficiency, conservation, and responsible water and material management.
- Develop an online community mapping tool and make available to provide alternative transit information to the community, including walking/biking directions, accessibility, and quality of infrastructure such as sidewalks and roads.
- Develop a public transportation and bicycling/walking education program to encourage use of public transit, car-pooling, and non-vehicle transportation.
- Sponsor a community-wide recognition program to award sustainable energy practices of businesses and residents and to promote continued achievements and educate public on responsible energy management.
- Build grassroots community support through task forces, meetings with citizens, informal networking, and meetings with business leaders, utilities, and interest groups.
- Publicize the benefits of this Plan through effective social marketing campaigns, public relations, and media events. Marketing materials should identify target populations and forums for dissemination of information. Tools should include:
  - Pamphlets, bill inserts and newsletters
  - Public speakers program

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- School programs, exhibits, and education materials
  - Radio, television, and newspaper messages
  - Billboards, bus, and subway messages
  - Property, residential, and trade association energy workshops
- Disperse this plan to the public as it serves to communicate Will County's commitment to energy efficiency and conservation and keep all interested stakeholders involved of the Plan's progress.
- Devote resources to educate the public on the link between its sustainability goals and energy decisions and educate the community about the County's energy resource

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## 4.1 Introduction

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The objectives and actions identified in the preceding section are intended to guide Will County’s decision making over the next ten years. They represent key opportunities for the County to pursue in order to meet its established goals. As described in Section 1, many (some are still under evaluation) of the opportunities were analyzed according to a variety of criteria, including the following:

- Energy savings (kWh and/or therms per unit time period)
- Air pollutant emission reductions
- Implementation cost
- Simple payback
- Job creation/retention
- Feasibility of implementation in the time frame allowed
- Measurability
- Sustainability
- Social benefits

The opportunities were rated and assigned a “triple bottom line” score by summing the individual scores of each criterion. While all opportunities are of the highest priority, twelve major actions were identified as providing the greatest economic, social, and environmental benefits. For that reason, Will County should prioritize these actions and implement them as soon as possible, preferably within the next five years.

This section presents a detailed analysis of each of the 12 energy efficiency and conservation measures that received the highest “triple bottom line” score. A description of the activity is provided along with a list of benefits, challenges, and key tasks and roles required for implementation. The results of each measure’s quantitative analysis are summarized in an “Energy Snapshot.” If not indicated, the Department of Energy’s (DOE) Energy Efficiency and Conservation Benefits (EECBG) Calculator was used to determine energy savings, air pollutant emission reductions, and jobs creation.

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## 4.2 County-wide Long Term Energy Plan

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### 4.2.1 Description and Intent

A comprehensive, multi-year energy management plan for County government will be developed as an extension of the ten-year plan. This is necessary to achieve energy efficiency and conservation in both County government operations and the community as a whole. The plan will set specific energy performance goals for all sectors including buildings, transportation, land use and material management. The plan will build off the ten-year plan and continue to assess energy consumption and define metrics to measure progress over time. The plan should be made highly visible to County departments and employees such that they may

**ENERGY SNAPSHOT**

**Energy Saved:** 166,000,000 kWh per year  
and

12,400,000 therms per year

**Implementation Cost:** \$200,000 for plan  
development

**Total Air Pollutant Savings:** 183,000  
metric tons of CO<sub>2</sub>e

**Jobs Created/Retained:** 2

**Financial Savings per year:** \$24,000,000  
(\$16,600,000 @ \$.1/kWh and \$7,600,000  
@\$.61/therm

**Simple Payback:** Immediate

serve as informed stewards of this initiative.

Benefits are estimated based on an anticipated 3 percent reduction in community-wide energy use obtained as a result of changes in public actions. This value of 3 percent reduction is based on typical goals for similar community energy reduction programs.

#### 4.2.2 Benefits

The benefits of the Energy Plan are as follows:

- Serves as a guide to realistically reduce energy consumption over time
- Demonstrates the County’s leadership in sustainable energy practices
- Enables conservation measures to continue for the life of the plan’s enforcement

#### 4.2.3 Challenges

The challenges of the Energy Plan include:

- Difficult to measure results and attribute energy and cost savings to specific programs and initiatives
- Lengthy development time

#### 4.2.4 Key Actions and Roles

Key actions and roles necessary to ensure the validity and utilization of the Energy Plan include:

- Create a committee to oversee energy efficiency and conservation measures within Will County
- Review long term energy plan to determine whether more in-depth study is required to necessitate a specific 20-year plan
- Identify areas of concentration, establish baseline, and develop metrics to measure progress

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### 4.3 Web-Based Sustainability Education Program

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#### 4.3.1 Description and Intent

Will County will continue further development a highly interactive web-based sustainability education program. The program is to educate residents and businesses on recycling, energy efficiency and water conservation.

A specialized website will be developed to provide information on general sustainability concepts, list specific actions to be performed at the resident/business level, identify Will County programs and services, and test/certify community members on learned content. Certifications will be available at up to 10 levels (e.g., corresponding to school grade levels, typical resident, etc.). A

significant education campaign has been initiated simultaneous to roll out of the web-based program to notify the public of the program (assumed \$25,000 costs for development/printing). Campaign includes press releases, mass email notifications, dedicated space in existing mass mailings, or other existing outreach materials.

**ENERGY SNAPSHOT**

**Energy Saved:** 13,800,000 kWh/yr and 1,040,000 therms/yr

**Implementation Cost:** \$150,000 to \$175,000 estimated

**Annual Cost:** \$15,000 per year

**Total Air Pollutant Savings:** 79,000 metric tons of CO<sub>2</sub>e

**Jobs Created/Retained:** 2

**Financial Savings per year:** \$2,000,000 (\$1,380,000

@ \$.1/kWh and \$633,000 @\$.61/therm)

**Simple Payback:** Immediate

Benefits are estimated based on anticipated material diversion from landfills (79,000 metric tons of CO<sub>2</sub>e per year) and a 0.25 percent reduction in energy usage (13,800,000 kWh and 1,040,000 therms) obtained as a result of changes in public actions.

#### **4.3.2 Benefits**

The benefits of a web-based sustainability education program include:

- Large impact created from small actions of a large number of energy users and waste generators
- Sustainability campaign will reach, and benefit, all areas of conservation and sustainability
- Level of public involvement will be assessed with web-based counter (e.g., # hits, # certifications, etc.)
- Considered a showcase of sustainability practices to the community and will be unique among Illinois County websites

#### **4.3.3 Challenges**

The challenges of a web-based sustainability education program include:

- Real benefit resulting from initiative is difficult to quantify
- Requires periodic updating to maintain usefulness

#### **4.3.4 Key Actions and Roles**

Key actions and roles necessary to ensure the success of a web-based sustainability education program include:

- Establish leadership within the County to lead effort (e.g. Land Use Department)
- Hire outside consultant(s) to assist in the development of web-based interface

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### **4.4 County Government Energy Policy Development**

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#### **4.4.1 Description and Intent**

A County government energy policy developed to encourage and incentivize energy conservation will achieve energy efficiency throughout County government operations. Sustainable energy policies may include a requirement that building renovations and all new construction projects meet energy efficient standards, a prohibition of space heaters and other personal appliances in the County office environment, and an investment in hybrid vehicles for the County fleet. A significant employee awareness program will be implemented to educate staff about the energy policy.

Benefits are estimated based on an anticipated 3 percent reduction in County government energy use obtained as a result of changes in County government operations. Simple payback is calculated based on the higher cost proposal of \$100,000.

#### **4.4.2 Benefits**

The benefits of a County Government Energy Policy include:

- Provides guidance and lays out a process to realistically reduce energy consumption over time
- Reduces pollution from reduced energy use
- Demonstrates the County's leadership in energy efficiency and sustainable energy practices

- Showcases sustainability practices to the community

#### 4.4.3 Challenges

The challenges of a County Government Energy Policy include:

- Difficult to measure results since numerous factors (e.g., weather, building modifications, etc.) make determining source of reductions complex
- Lengthy development time
- Ongoing administration costs

#### 4.4.4 Key Actions and Roles

Key actions and roles of a County Government Energy Policy include:

- Establish leadership within the County to lead effort
- Establish County stakeholders' group to assist in policy development
- Hire outside consultant to assist in the development of energy policy

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### 4.5 Electronic "IT" Power Management System

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#### 4.5.1 Description and Intent

An electronic "IT" power management system is a policy and technology based system that minimizes energy consumption from office electronics, namely computers, monitors and printers. The key component of the technology is power management. Computers and monitors account for 40 to 60 percent of the energy used by all office equipment. An automatic power management system will deactivate the computer screen after 15 minutes of inactivity, enter into standby mode after 20 minutes, and put the computer into hibernation after 25 minutes. Studies shows that power managed computers consume almost half of the energy of an active computer. According to the EPA, the average annual unit computer energy usage is 103 kWh for a power-managed computer and 172 kWh for an active computer (Source: ENERGY STAR, LBNL Home Office Spreadsheet, 2008). The calculations above assume the County operates 2,000 computers. Simple payback is calculated based on an implementation cost of \$100,000, which includes technology upgrade and purchasing energy efficient computers.

**ENERGY SNAPSHOT**

**Energy Saved:** 138,000 kWh/year

**Implementation Cost:** \$20,000 to \$100,000

**Total Air Pollutant Savings:** 100 metric tons of CO<sub>2</sub>e

**Jobs Created/Retained:** 1

**Financial Savings per year:** \$13,800 @ \$0.1/kWh

**Simple Payback:** 7 years, 3 months

In addition to an "IT" power management system, the electronic "IT" power management system policy may also include the following:

- A requirement that computers be turned off after hours and over the weekend
- A purchasing policy to replace CRT monitors with more energy efficient LCD monitor and to replace old desktop-style computers with laptop versions that consume less energy
- A technology setting to prohibit screen savers and set printer defaults to double-sided printing

#### 4.5.2 Benefits

The benefits of an electronic "IT" power management system include:

- Reduces overall energy consumption

- Reduces air pollutant emissions by reducing electricity
- Lowers energy costs
- Serves as an example to employees who may employ these energy saving measures in their personal lives

#### 4.5.3 Challenges

The challenges of an electronic “IT” power management system include:

- Difficult to measure power savings
- Requires technology upgrades and purchasing of energy efficient electronics
- Incurs administrative time and cost

#### 4.5.4 Key Actions and Roles

Key actions and roles necessary for an electronic “IT” power management system include:

- Establish a leader within the County to manage implementation
- Establish stakeholder group within the County to draft policy

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### 4.6 Green Building Permit Program

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#### 4.6.1 Description and Intent

A permitting process for building projects that are “green,” or environmentally sustainable, standards will provide a way to incentivize developers to improve energy efficiency in new construction and renovation within Will County. Developments and renovations must meet minimum criteria to be eligible. If eligible, the County’s “permit review team” will review the application. The County’s review team will review the application for eligibility within 15 business days. Initial reviews will be completed within 15 business days of submittal. The permit review team will be trained in acceptable sustainable construction procedures and some the divisional staff will serve as the inspection team. The Department of Energy’s EECBG Benefits Calculator estimates a savings of 2,361,000 kWh per year based on an implementation cost of \$90,000, the assumed salary of staff is required to oversee the program.

**ENERGY SNAPSHOT**

**Energy Saved:** 2,361,000 kWh/yr  
**Implementation Cost:** \$90,000  
**Total GHG Savings:** 2,300 metric tons of CO<sub>2</sub>e  
**Jobs Created/Retained:** 1  
**Financial Savings per year:** \$236,000  
@\$0.1/kWh

#### 4.6.2 Benefits

The benefits of the Green Building Permit Program include the following:

- Increases developer satisfaction by reducing the permit cost
- Reduce electricity and natural gas usage due to more energy efficient development and design
- Lowers energy costs
- Reduces air pollutant emissions from reduced energy consumption
- Incentivizes green development
- Showcases the County’s commitment to sustainability and encourages “green” development
- Saves our natural resources

#### 4.6.3 Challenges

The challenges of the Green Building Permit Program include the following:

- Requires policy development
- Requires input and investigation, which may prove to be a lengthy development process
- Difficult to audit ongoing energy savings as a direct result of permitting process
- Still keep structural sustainability while gaining energy efficiency
- Applicant demonstrating compliance once approved and what will happen if requirements are not met
- Making requirements easy to understand and follow

#### 4.6.4 Key Actions and Roles

Key actions and roles required for the Green Building Permit Program include:

- Hire one staff member to oversee the program (could be filled by multiple part-time positions)
- Establish criteria that meets “green” building standards
- Establish “Green Permit Review Parameters” to assist in permit application review
- Establish a baseline in terms of designed energy efficiency over conventional building practices to determine energy savings of “green” development

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### 4.7 Green Building Code Modifications

#### 4.7.1 Description and Intent

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 hour setbacks, wattage requirements, and other standards to raise building energy efficiency beyond minimum requirements. The DOE’s EECBG Benefits Calculator estimates a savings in 656,000 kWh per year based on a one-time cost of \$25,000. Simple payback is calculated based on the higher cost proposal of \$50,000.

**ENERGY SNAPSHOT**

**Energy Saved:** 656,000 kWh/yr  
**Implementation Cost:** \$25,000 to \$50,000  
**Total air pollutant Savings:** 44,000 metric tons of CO<sub>2</sub>e  
**Jobs Created/Retained:** 1  
**Financial Savings per year:** \$66,000 @ \$0.1/kWh  
**Simple Payback:** 9 months

#### 4.7.2 Benefits

The benefits of green building code modifications include the following:

- Reduces electricity and natural gas usage
- Lowers energy costs
- Reduces air pollutant emissions by eliminating unnecessary electricity and fuel use
- Incentivize energy efficient new construction and renovation
- Since energy codes strive to be cost effective, generally, there is a short payback period in energy savings.

#### 4.7.3 Challenges

The challenges of green building code modifications include the following:

- Requires policy development
- Requires a lengthy development process



- Difficult to audit ongoing energy savings as a direct result of code changes

#### **4.7.4 Key Actions and Roles**

Key actions and roles required for green building code modifications include:

- Establish a panel to develop building energy requirements and oversee program
- Establish a baseline in terms of energy efficient design
- Obtain a consultant to analyze building codes and offer suggestions for modification

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## **4.8 Green Zoning Modifications**

### **4.8.1 Description & Intent**

There is a need to comprehensively revise the zoning ordinance and make appropriate revisions to the building ordinance, particularly with regard to energy efficiency and sustainable development practices as may be referenced in the Conservation Plan, the Will County Land Resource Management Plan, and the Chicago Metropolitan Agency for Planning's (CMAP) Go To 2040 Regional Comprehensive Plan.

The County's zoning ordinance was adopted July 20, 1978, has been amended over 80 times since its adoption, and is the subject of numerous interpretations. The zoning ordinance has conflicting, unclear, outdated, and/or confusing use categories, provisions, and definitions. The current zoning ordinance is often difficult for the public and planning professionals to use and interpret, and is not organized in a user-friendly format. Additionally, the County's zoning and building ordinances are not entirely consistent with the Land Resource Management Plan's recommendations, particularly with regard to sustainable development practices and energy conservation.

Therefore, in January 2011, the County began the process of comprehensively revising the zoning ordinance. In addition, a green building incentives report was prepared as a tool to be utilized in future building ordinance amendments and associated fee schedule changes. The zoning ordinance revision is due for completion in the summer of 2012.

### **4.8.2 Benefits**

The benefits of revising Will County's zoning ordinance and future building ordinance-related changes, include, but are not limited to the following:

- Demonstrates Will County's commitment to being a leader in the implementation of sustainable development practices
- Provide incentives to businesses and general public to promote sustainability
- Engine for job creation, every one million dollars spent on clean energy creates approximately 16.7 jobs
- Provide savings for residents and businesses through possible reduced application and fees expenses in the short-term, and reduced energy expenses in the long-term

### **4.8.3 Challenges**

- Requires policy development
- Updating an outdated zoning ordinance requires a lengthy development process
- Difficult to measure energy savings as a direct result of code changes

### **4.8.4 Key Actions & Roles**

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- Continue to utilize an advisory committee to develop the goals and objectives of a zoning ordinance modification
- Continue to utilize a consultant to analyze the zoning ordinance and recommend areas for modification

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## 4.9 County Building Retrofits

### 4.9.1 Description and Intent

Eight County operated buildings were surveyed to identify energy conservation opportunities including: Sunny Hill Nursing Home, Health Department, Highway Admin – Joliet, River Valley Juvenile Detention Facility, County Office Building, Courthouse, EMCO, and the Archives Building. The intent is to retrofit those buildings where opportunities were identified to save energy and reduce energy costs. Six of the buildings were computer modeled to calculate energy savings; the Juvenile Detention Facility and Archives Building were not modeled since they had very few energy saving opportunities.

**ENERGY SNAPSHOT**

**Energy Saved:** 1,165,000 KWh/yr and 76,000 therms/yr

**Implementation Cost:** \$1,700,000

**Total Air Pollutant Savings:** 1,200 metric tons of CO<sub>2</sub>e

**Jobs Created/Retained:** 19

**Financial Savings per year:** \$114,000

The building envelope components did not generally yield a payback when measured against the threshold of a five to ten year payback period. Several opportunities generate significant savings per year, but have a greater than ten year payback. Additionally, there are several buildings with old roofs and old air handling units that yield payback in more than ten years, but still generate energy savings. Several facility managers expressed interest in having windows replaced that are currently single pane with double pane low emission types. These did not meet the County’s payback criteria, but would still generate savings if pursued.

If all potential items listed for retrofit in each building were pursued, the total cost would be approximately \$2.8 million. If all of the items that yield payback in ten years or less are pursued, the total cost is only approximately \$150,000. Will County will obtain significant benefits if all of the items that yield payback in ten years or less, the items with old and antiquated building components, and those with significant savings per year, are pursued. The total implementation cost for retrofit improvements falling into these categories is approximately \$1,700,000.

### 4.9.2 Benefits

The benefits of County building retrofits include the following:

Showcases the Will County government as a leader in energy conservation

- Replaces antiquated equipment that may need replacement for other reasons besides lack of efficiency
- Saves significant annual energy costs

### 4.9.3 Challenges

The challenges of County building retrofits include the following:

- Construction may be considered an inconvenience in some buildings
- Most buildings retrofits shall require a sizeable investment
- Significant number of buildings are affected
- Several buildings may require notification to the Illinois Historical Preservation Agency, the State Historical Preservation Office, before work begins

#### **4.9.4 Key Actions and Roles**

Key actions and roles related to County building retrofits include:

- Prioritize buildings to be retrofitted
- Select components within each building to retrofit
- Determine schedule for completion
- Contract with Architecture/Engineer firm(s) to prepare construction documents for retrofits

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### **4.10 Landfill Gas-to-Energy Facility**

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#### **4.10.1 Description and Intent**

A landfill gas-to-energy facility is operating at the existing County owned and privately operated Prairie

View Landfill. It is anticipated that the facility is designed to manage all landfill gas generated (e.g., currently destructs approximately 1,800 standard cubic feet per minute (scfm) of landfill gas) with a gross capacity of 4.8 megawatts (MW) using 3 Caterpillar 3520 engines (net capacity of 4.56 MW). The facility operates continuously year round (24 hours per day and 7 days per week), except for maintenance shutdowns. Estimated revenue in 2012 is \$441,000. The landfill gas (methane) is being used to generate electricity that offsets grid derived, non-renewable-fuel generated electricity). Once fully built, the facility will provide 12.8 MW of electricity and approximately \$1.2 million in gas revenue, plus revenue sharing payments.

#### **4.10.2 Benefits**

The benefits of the landfill gas-to-energy facility include the following:

- Reduces air pollutant emissions resulting from destruction of landfill gas, which is comprised primarily of the gases methane (CH<sub>4</sub>) and carbon dioxide (CO<sub>2</sub>)
- Generation of electricity using the heating value of methane in landfill gas is considered a renewable energy technology, which has the added benefit of offsetting the use of non-renewable fuels such as coal and natural gas
- Project is sustainable as the investment will be realized for the period of significant gas generation and the life of the building (i.e., 20 years)
- Project can help reduce local air pollution (as landfill gas typically contains low concentrations of numerous hazardous air pollutants)
- Eligible for additional funding via federal tax credits (Section 45 Tax Credits) and state incentives (investment tax credits, property tax and sales tax exemptions, grants, loans)
- Eligible for Renewable Energy Credits (value varies). Revenue could be considerably higher with RECs if used as a direct grid-derived offset

#### **4.10.3 Challenges**

The challenges related to a landfill gas-to-energy facility include:

- LFG electricity generation equipment, generate some emissions (CO, NO<sub>x</sub>, SO<sub>x</sub>, etc.) which can contribute to local ozone and smog formation

#### **4.10.4 Key Actions and Roles**

Key actions and roles related to the landfill gas-to-energy facility include:

- Oversee operations agreement with Waste Management, Inc., negotiate after the engines are in place
- Facility Design and local permitting – 4 months
- Illinois EPA Air Permit Renewals
- Use as a funding source for energy efficiency and renewable energy projects identified by the County

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### **4.11 Brownfield Renewable Energy Sites**

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#### **4.11.1 Description and Intent**

Will County will consider applying for grant funding and possibly using either Solid Waste Funds for revenue from the Prairie View Gas to Energy Facility (as seed funding) to develop renewable energy (primarily wind and solar power, but hydroelectricity may be considered too in mines) on Brownfield sites, which would include existing or closed landfills. Many landfill sites in Will County already have Gas to Energy Facilities, and therefore are already sending power to the grid or at least have the infrastructure (power lines and substations) to send electricity to the grid. Other Brownfield sites are typically located near local infrastructure and may also be relatively easy to connect to the grid. Many such sites have already been developed throughout the United States, and the USEPA and the US Department of Energy have programs (technical assistance, feasibility study & grants) to assist Will County establish these sites. Other partners may be (but not limited to) landfill owners/operators, brownfield site owners, Will County Center for Economic Development, local municipalities and their Economic Development Departments.

#### **4.11.2 Benefits**

- As with the County's Prairie View Gas to Energy Plant, additional renewable energy would be sent to the grid, providing a non-fossil fuel power source, reducing carbon emissions and helping Illinois meet its Renewable Portfolio Standard of 25% by 2025.
- Revenue could be obtained from the sale of electricity, where none is currently being generated. Tax revenue may also be generated, helping the County and municipalities with their budgetary needs.
- Revenue from the renewable energy source may be used to develop/remediate the property, and create new businesses and jobs.
- Jobs may be created through the building of the renewable energy source.

#### **4.11.3 Challenges**

- Will County, Center for Economic Development & municipalities may need to devote time and initial seed funding to research sites, conduct feasibility and suitability studies.
- If developed, sites may need to be monitored, and grant requirements met.
- Possible liability issues due to potential contamination

- IEPA permitting or permit modifications may be needed
- Interconnection to grid can be time consuming

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## 4.12 Alternative Fuel Vehicle Fleet

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### 4.12.1 Description and Intent

Vehicle fuel consumption accounts for 17 percent of Will County government’s energy usage and 35 percent of its energy cost. The largest user is the Sheriff’s Office that operates 378 vehicles (Ford Crown Victorias) on conventional and E85 gasoline. The Sheriff’s Office purchases 30 new vehicles a year. The transition to a hybrid or alternative fuel vehicle fleet will reduce fuel use, lower costs, and reduce air pollutant emissions. A police fleet offers a unique opportunity since police vehicles accumulate high mileage and running time.

**ENERGY SNAPSHOT**

**Energy Saved:** 1,677,000,000 Btus  
**Fuel Saved:** 13,427 gallons of gasoline  
**Implementation Cost:** \$900,000 for 30 vehicles  
**Cost Differential between Hybrid and Conventional Police Vehicle:** \$90,000 for 30 vehicles  
**Total air pollutant Savings:** 118 metric tons of CO<sub>2</sub>e  
**Jobs Created/Retained:** 10  
**Financial Savings per year:** \$37,000 to \$47,000  
**Simple Payback:** 20 years

If the Sheriff’s Office purchased 30 hybrid or alternative fuel vehicles annually, the County will save up to 13,427 gallons of gasoline annually. This calculation assumes the current vehicle fleet gets 14 miles per gallon on city roads versus up to 48 miles per gallon using a hybrid or alternative fuel vehicle.

According to vehicle pricing data, the total cost of purchasing 30 hybrids at retail price is \$900,000.

However, the cost difference between purchasing the slightly more expensive hybrids than purchasing conventional police vehicles at retail price is \$90,000. The cost differential, and not the full implementation cost, has been the only eligible portion to receive some types of grant funding. Assuming a gasoline cost range of \$2.80 to \$3.50 per gallon, the County could save \$37,000 to \$47,000 annually yielding a payback period of 2 years. The payback period decreases with increased fuel costs. Simple payback was calculated based on the cost differential.

### 4.12.2 Benefits

The benefits of an alternative fuel vehicle fleet include:

- Improved fuel economy reduces fuel costs
- Reduces air pollutants by decreasing fuel consumption from the County government vehicle fleet
- Reduces air pollutants that cause smog
- Reduces U.S. dependence on foreign oil
- High visibility to promote alternative transportation to the community
- May qualify County for purchase incentives (e.g. hybrid rebates)

### 4.12.3 Challenges

The challenges related to an alternative fuel vehicle fleet include:

- Hybrid vehicles are more expensive than conventional vehicles
- Hybrids require battery replacement after seven years and other maintenance costs

#### **4.12.4 Key Actions and Roles**

Key actions and roles required for an alternative fuel vehicle fleet include:

- Identify additional funding to help offset upfront costs
- Identify the best type of hybrid vehicles for fleet conversion
- Consider hiring a consultant with knowledge of alternative fuel vehicles

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### **4.13 Community Gardens (this section under development)**

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Community gardens have been around for many years and are a growing trend throughout the U.S. A community garden is a parcel or tract of land set apart for gardeners where flowers, vegetables and fruits may be grown. Usually, a group of people or organization decides they want a community garden and take responsibility for paying water bills, taking applications and keeping written rules up-to-date.

The reason a community garden is part of an energy plan is because of the environmental benefits it brings. Rather than local residents driving to stores to get some of their food that is transported from distant farms, they can often walk to the garden and gather fresh items.

The garden also allows rain to return to aquifers rather than run off into storm sewers. This reduces flooding during severe storms and improves recharge.

People that work in the garden not only eat healthy, fresh produce and develop a sense of community, but they also connect to the soil, becoming more aware of pollution issues.

Community gardens may also help during periods of unusual weather, increasing local agricultural output.

Beyond the environmental benefits, there are health, safety and social benefits to the entire community. Will County should encourage community gardens.

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### **4.14 Summary**

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The “Energy Snapshots” were then combined into a graphic summary representing each measure’s quantitative analysis and rating. (The summary is still to be completed).

## 5.1 Implementation

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This plan was developed to assess the current energy consumption of Will County and identify opportunities for reducing the County’s energy footprint. Long term planning is essential. This document identifies realistic goals and the actions that have the greatest impact on reducing energy consumption and air pollutant emissions.

A facilitated stakeholder process, together with strategic planning sessions and an assessment of current energy use, identified the objectives and opportunities presented in Section 3. The opportunities were then rated and ranked by their “triple bottom line” score to determine the twelve major actions (or measures to be taken) with the greatest economic, social, and environmental impact. The screening process was a necessary first step to determine short term and long-term actions.

Carrying out implementation of the selected actions will require continued collaboration, commitment, and evaluation of actions. Will County will prioritize the recommended actions and identify a management structure for identifying responsible actors. Several factors must be considered including financial, technical, political, and logistic feasibility. The County’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.

### 5.1.1 Implementation Schedule

Will County should consider the following implementation schedule, **Table 5.1**, when executing the 12 major measures described in Section 4. This schedule intends to serve as a general guideline; it should be treated as an adaptable tool to reflect the political, economic, social and environmental factors at the time of proposed implementation. To prevent the over-inflation of annual savings activities with a percent goal reduction, the DOE’s EECBG Benefits Calculator was used in this schedule to determine the annual savings. While the calculations presented in Section 4 are reflective of the County achieving the actual reduction goal, it seems more prudent to show the result obtained by the DOE’s Benefits Calculator.

In addition, the simple payback method was used for calculating annual savings. This payback method does not account for inflation. Annual savings would likely be higher if calculations were performed using life cycle costing methods.

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NOTE: An implementation Schedule will be inserted once the Stakeholders Group reviews the Energy Efficiency & Conservation Plan.

## 5.2 Monitoring and Verification Plan

An effective energy plan requires ongoing monitoring to gauge progress and make sure the County 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 air pollutant emissions reduction, the following metrics can be used:

- Jobs created and/or retained
- Energy (kWh/therms/gallons/BTUs/etc.) saved
- Renewable energy generated
- Air pollutant emissions reduced (in CO<sub>2</sub> equivalents)
- Cost savings

The County will track these metrics for each of the 12 energy efficiency and conservation measures described in Section 4. Other opportunities that Will County pursues should also follow this metric system.

All the opportunities proposed in Section 3, that Will County chooses to pursue, will eventually result in energy savings and air pollutant emissions reductions. Although these types of activities may not have an immediate return on investment, they can still help the County reach their goals. **Table 5.2** provides a detailed list of metrics that can be used to monitor progress for a variety of activities.

<b>Type of Activity</b>	<b>Reporting Metric</b>
Building Codes and Standards	<ul style="list-style-type: none"> <li>• Name of new code adopted</li> <li>• Name of old code replaced</li> <li>• Number of new and existing buildings covered by new code</li> </ul>
Building Retrofits	<ul style="list-style-type: none"> <li>• Number of buildings retrofitted, by sector</li> <li>• Square footage of buildings retrofitted, by sector</li> </ul>
Clean Energy Policy	<ul style="list-style-type: none"> <li>• Number of alternative energy plans developed or improved</li> <li>• Number of renewable portfolio standards established or improved</li> <li>• Number of interconnection standards established or improved</li> </ul>
Building Energy Audits	<ul style="list-style-type: none"> <li>• Number of audits performed, by sector</li> <li>• Floor space audited, by sector</li> <li>• Auditor's projection of energy savings, by sector</li> </ul>
Energy Efficiency Rating and Labeling	<ul style="list-style-type: none"> <li>• Types of energy-consuming devices for which energy efficiency rating and labeling systems were endorsed by the grantee</li> </ul>
Government, School, Institutional Procurement	<ul style="list-style-type: none"> <li>• Number of units purchased, by type (e.g., vehicles, office equipment, HVAC equipment, streetlights, exit signs)</li> <li>• Number of building retrofitted, by Industry sector</li> <li>• Square footage of building retrofitted, by Industry sector</li> </ul>
Industrial Retrofit Support	<ul style="list-style-type: none"> <li>• Number of building retrofitted, by Industry sector</li> <li>• Square footage of building retrofitted, by Industry sector</li> </ul>
Loans, Grants, and Incentives	<ul style="list-style-type: none"> <li>• Number and monetary value of loans given</li> </ul>



	<ul style="list-style-type: none"> <li>• Number of monetary value of grants given</li> <li>• Number and monetary value of incentives provided</li> </ul>
Incremental Cost for Efficiency and Design Elements in New Buildings	<ul style="list-style-type: none"> <li>• Number and square footage of new buildings designed, by sector</li> <li>• Number and square footage of new buildings constructed, by sector</li> </ul>
Renewable Energy Market Development	<ul style="list-style-type: none"> <li>• Number and size of solar energy systems installed</li> <li>• Number and size of wind energy systems installed</li> <li>• Number and size of other renewable energy systems installed</li> </ul>
Financial Incentives for Energy Efficiency	<ul style="list-style-type: none"> <li>• Monetary value of financial incentive provided, by sector</li> <li>• Total value of investments incentivized, by sector</li> <li>• Estimated impact of incentives on total investment made</li> </ul>
Technical Assistance	<ul style="list-style-type: none"> <li>• 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</li> </ul>
Transportation	<ul style="list-style-type: none"> <li>• Number of alternative fuel vehicles purchased</li> <li>• Number of conventional vehicles converted to alternative fuel use</li> <li>• Number of new alternative refueling stations created</li> <li>• Number of new carpools and vanpools formed</li> <li>• Number of energy-efficient traffic signals installed</li> <li>• Number of street lane-miles for which synchronized traffic signals were installed</li> </ul>
Workshops, Training, Education	<ul style="list-style-type: none"> <li>• Number and type of workshops, training, and education sessions held</li> <li>• Number of people attending workshops, training, and education sessions</li> </ul>

### 5.2.1 Monitoring Expenditures

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

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## 5.3 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 County’s objectives. Every year, Will County should conduct an energy assessment to track performance in non-renewable fuel use and progress towards its 2025 goal of improving energy efficiency by 10 percent.

Objectives and actions must be analyzed in light of new economic and environmental conditions. As new technologies and opportunities come-up, the County should continue to reevaluate best available technologies for energy efficiency and conservation. Every three

## Section 5 | Implementation

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### Long Term Energy Efficiency and Conservation Plan

years, Will County should revise the actions in the Plan. Periodic review is required to determine if actions that have not been implemented remain effective. A County Energy Task Force should meet on a regular basis to gauge progress and monitor performance. The Task Force should continuously assess the implementation of the energy strategy plan to make sure the County is 'on track.'

In future energy planning, Will County 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 Will County.

## **Methodology**

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### **County Government Operations**

The baseline energy assessment for County government operations totals the amount of energy used from the following sources: electricity, natural gas and vehicular fuel. Energy use data was gathered with extensive assistance from Will County employees during fiscal year 2009 (FY

2009), July 2008 to June 2009. Monthly invoice data was provided for each County department.

FY 2009 data was not available for the County's Highway Department vehicle fleet; however a year's worth of data (September 2008 thru August 2009) was provided and serves as an approximation of use in FY 2009.

The FY 2009 data was provided in specific units of energy (e.g. kilowatt hours, therms, gallons of gasoline, and diesel) and converted to a standard energy unit, British thermal units (Btu), for comparison<sup>1, 2</sup> the conversion of natural gas, fuel oil, gasoline, and diesel required a simple unit conversion. However, in the case of electricity, it was necessary to account for efficiency losses. The end use of all other energy sources is based on the volume of the raw material input into the system (e.g., gasoline into a vehicle). The data for electricity, on the converse, is based on the use of electricity at the end use and does not account for the energy in the raw material input into the system (e.g., coal into the power plant). The energy required to produce electricity at the end use is calculated in Btus by dividing the energy usage by an efficiency factor of 0.33.<sup>2</sup>

### **Countywide Community**

This efficiency factor is generally considered a rule of thumb figure when accounting for losses in electricity generation, transformation, and conveyance. Countywide community energy activity data includes electricity, natural gas, vehicle fuel, and fuel oil. Data on the number of kilowatt-hours was received from Commonwealth Edison (ComEd) and the number of therms used from Nicor and Integrys.

To estimate heating fuel oil consumption, statewide totals provided by the U.S. Energy Information Administration (EIA) was obtained for CY 2005. Community-wide use in Will County was extrapolated based on population. Total annual distillate heating fuel oil volume (gallons) was obtained for residential, commercial, and industrial sectors<sup>3</sup>.

Residual heating fuel oil volume was obtained for commercial and industrial zones, as this fuel type is not used for residential purposes<sup>4</sup>.

The ratio of the populations was used to calculate the energy usage from fuel oil (residual and distillate) as follows:

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<sup>1</sup> <http://www.eia.doe.gov/neic/infosheets/apples.html>

<sup>2</sup> Masters, Gilbert "Introduction to Environmental Engineering and Science", 2nd Ed, 1998, Prentice Hall, Upper Saddle River, NJ

<sup>3</sup> Distillate fuel oil data: [http://tonto.eia.doe.gov/dnav/pet/pet\\_cons\\_821dst\\_dcu\\_SIL\\_a.htm](http://tonto.eia.doe.gov/dnav/pet/pet_cons_821dst_dcu_SIL_a.htm)

<sup>4</sup> Residual fuel oil data: [http://tonto.eia.doe.gov/dnav/pet/pet\\_cons\\_821rsd\\_dcu\\_SIL\\_a.htm](http://tonto.eia.doe.gov/dnav/pet/pet_cons_821rsd_dcu_SIL_a.htm)

To determine fuel consumption from vehicles traveling within Will County, annual vehicle miles traveled (AVMT) data was obtained from the Illinois Department of Transportation's 2005 Illinois Travel Statistics Report<sup>5</sup>. Extrapolation was performed based on AVMT alone. Average vehicle fuel use in gallons per day was obtained for CY 2005 from the EIA<sup>6</sup>. Data for automotive gasoline, No. 1 diesel, and No.2 diesel were used to directly represent average vehicle fuel usage.

The ratio of the total AVMT values obtained for Will County and the State of Illinois was used to extrapolate fuel use. For each fuel type, the annual energy usage in British thermal units (Btus) was calculated using the following equation:

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The conversion factors for each energy source are listed below:

- 1 kWh of electricity = 3,412 Btu
- 1 therm of natural gas = 99,976 Btu
- 1 gallon of heating fuel oil = 138,500 Btus
- 1 gallon of diesel = 138,700 Btus
- 1 gallon of gasoline fuel = 125,000 Btus

### **Assumptions**

In order to calculate the energy usage in accordance with the equations presented in the previous sections several assumptions were made.

#### **Countywide Community Vehicle Fuel Usage**

- The total AVMT for Will County and Illinois is the same for all vehicle types.
- Each vehicle type uses only one type of fuel (e.g., passenger vehicles only use gasoline fuel).
- The volume of fuel delivered to retail stations is equal to the amount consumed in vehicles.
- The amount of fuel delivered to Will County, and thus the amount of fuel consumed in vehicles in Will County, is directly proportional to the vehicle miles traveled in Will County.

#### **Countywide Community Fuel Oil Usage**

- The distribution of residential, commercial, and industrial sectors within Will County and the State of Illinois was assumed to be the same.
- The amount of heating fuel oil delivered to Will County, and thus the amount of heating fuel oil consumed in Will County, is directly proportional to the population of Will County.

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<sup>5</sup> <http://www.dot.il.gov/adtravelstats.html>

<sup>6</sup> [http://tonto.eia.doe.gov/dnav/pet/pet\\_cons\\_refmg\\_d\\_SIL\\_VTR\\_mgalpd\\_a.htm](http://tonto.eia.doe.gov/dnav/pet/pet_cons_refmg_d_SIL_VTR_mgalpd_a.htm)

## Emissions

The FY 2009 data from County government operations and the CY 2005 data from the countywide community were used to calculate air pollutant emissions. The air pollutant assessment was conducted using the Local Government Operations Protocol (LGOP) developed by some of leading air pollutant quantification organizations in the United States, including: the California Air Resources Board, the California Climate Action Registry, and ICLEI-Local Governments for Sustainability, and The Climate Registry. The LGOP is based on methods used in the World Resources Institute and World Business Council for Sustainable Development Greenhouse Gas Protocol. It is widely used by state and local governments throughout the United States.

The assessment includes emissions calculations for County operations – government facilities and fleet – and community-wide emissions that encompass all private sectors – residential, commercial, and industrial – sources within the County limits.

The energy activity data that includes electricity, natural gas, vehicle fuel and solid waste decomposition in landfills were converted to emissions from the three major air pollutants; carbon dioxide (CO<sub>2</sub>), methane (CH<sub>4</sub>), and nitrous oxide (N<sub>2</sub>O); through the use of activity and equipment-specific emissions factors as provided in the LGOP. The total CH<sub>4</sub> and N<sub>2</sub>O were converted to carbon dioxide equivalents (CO<sub>2</sub>e) using global warming potentials (GWP), then added to the total CO<sub>2</sub>

A GWP represents the ability of each air pollutant to trap heat in the atmosphere and is the ratio of the heat trapping ability normalized to that for CO emissions<sub>2</sub> (i.e., CO<sub>2</sub> has a GWP of 1). The GWP values from the Intergovernmental Panel on Climate Change (IPCC) Second Assessment report were used. While these are not the most up to date GWP values available, they are the ones currently recommended for use by LGOP and other accounting protocols.

Gas	GWP Values
CO <sub>2</sub>	1
CH <sub>4</sub>	21
N <sub>2</sub> O	310

### Methane and Nitrous Oxide Emissions from Vehicles

The most prevalent air pollutant from the combustion of non-renewable fuels – including gasoline and diesel fuels is CO<sub>2</sub>. As such, CH<sub>4</sub> and N<sub>2</sub>O emissions from vehicles were omitted from this inventory. CH<sub>4</sub> and N<sub>2</sub>O are emitted in extremely small quantities when a fossil fuel is burned and their emissions are dependent on the engine type and age. In order to calculate CH<sub>4</sub> and N<sub>2</sub>O emissions from vehicles, according to the LGOP, data needs include the number of miles traveled, the vehicle model year, and vehicle type. This information, particularly for countywide community vehicle emissions is unavailable or extremely difficult to gather. When CO<sub>2</sub> emission factors for gasoline are compared to those of CH<sub>4</sub> and N<sub>2</sub>O in terms of CO<sub>2</sub>e, they represent 0.02% and 0.17% of the total respectively, demonstrating that the impact of these emissions is insignificant.