ENERGY EFFICIENCY & CONSERVATION PLAN

County of Will
Adopted:

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This Energy Efficiency and Conservation Plan is a product of the Will County Land Use Department and adopted by the Will County Board. To provide advice and commentary for the development of this plan, a Task Force, whose members are listed below, was assembled from interested public and private sector stakeholder organizations. The participation of these stakeholders in the development of the plan should not be considered an endorsement by these individuals nor the institution or corporation they represent.

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WILL COUNTY EXECUTIVE - Lawrence M. Walsh

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Energy Efficiency & Conservation Plan

Section 1 - Introduction

Vision and Guiding Principles

Vision Statement:

The Will County Vision Statement for the long term Energy Efficiency and Conservation Plan:

> Will County, Illinois will be leader of intergovernmental efforts to foster alternative energy development and energy conservation that helps assure the quality of the area's growth and development.

Introduction:

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. Therefore, it is imperative that Will County strives to reduce its energy consumption and encourages others to do the same.

A sustainable energy future requires a drastic paradigm shift—transitioning away from primarily non-renewable 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 its commitment to a clean energy future, Will County adopted this Energy Efficiency and Conservation Plan with a vision to achieve a 20 percent decrease in energy consumption measured per capita by 2025 and an increase in the production/use of renewable energy that will assist the State of Illinois in reaching its Renewable Energy Portfolio Standard of using 25% renewable energy 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 action programs to reduce the County's reliance on non-renewable sources of energy.

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.

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.
- Provide information to residents and businesses on available incentives to encourage less energy consumption and more renewable energy development.

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 with assistance from other local governments, residents and businesses. 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	• Reduce energy consumption by 20% by 2020 from County facilities through demand reduction and building retrofits • Apply sustainable building standards (e.g. LEED® certification) for new County buildings • Increase use of renewable energy whenever feasible
Transportation	• Increase use of and improve infrastructure for public transit • Reduce vehicle miles traveled for employee commuting • Implement programs to encourage the community to reduce vehicle miles traveled
Material Management	• Reduce solid waste generated and disposed of in the County landfill • Divert 60% of waste generated from the County's landfill • Promote recycling in County government and among County residents and businesses • Continue a landfill gas recovery system at County landfill to reduce pollutants • Add additional renewable energy whenever feasible
Water Systems	• Reduce water consumption in County facilities • Work with municipalities to reduce energy use for water production and distribution • Support responsible water use by residents and businesses
Land Use	• Develop land use policies that support sustainable growth • Support sustainable development projects and "green" construction
Education and Communication	• Incorporate energy efficiency and conservation into outreach efforts • Encourage employees to reduce energy consumption
Community Garden Properties	• Encourage creating community gardens on "unbuildable" properties • Provide education to the public on community gardens' benefits and locations • Encourage development of "farmettes" through adaptable zoning and education

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 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 according to a variety of criteria, such as energy savings, air pollutant emission reduction, implementation cost, possible job creation, and simple payback.

4. Select Initiatives and Set Targets
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 programs 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.

The Energy Efficiency and Conservation Plan

Plan Development and Stakeholder Involvement

The 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 worked with its consultant (CDM) to develop a Plan framework and then solicited input from a diverse group of stakeholders (Energy Efficiency & Conservation Task Force) to solidify and develop a list of goals and objectives while determining 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 with the consultant 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.

Many of the measures identified during the initial screening underwent a limited quantitative evaluation; including cost/ benefit analysis, air pollutant emission reduction potential, and kilowatt-hour savings potential.

Structure of the Plan

The organization of the Plan follows the structure of the management system framework discussed previously in **Section 1**. Also in this section, the vision and strategic goals were presented which provide the basis for the Objectives and Initiatives in Section 3.

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 initiatives 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 initiatives were derived from the stakeholder process and align with the County's established goals found in Section1.

Section 4 details the 12 major actions to be taken in the next ten to thirteen years by Will County operations and countywide. To accomplish the 20 percent reduction in energy consumption efficiency goal by 2025, county operations has committed to being more efficient, and specific goals are tied to actions for county wide goals. Goals are based upon baseline 2009 data as depicted in Section 2 of the Plan. Will County is also committed to helping the State of Illinois achieve its Renewable Portfolio Standard goal of using 25% of its energy from renewable sources by 2025.

Finally, the implementation schedule and the monitoring and verification plan, along with recommendations for continued program development, are presented in **Section 5**.

Energy Efficiency & Conservation Plan

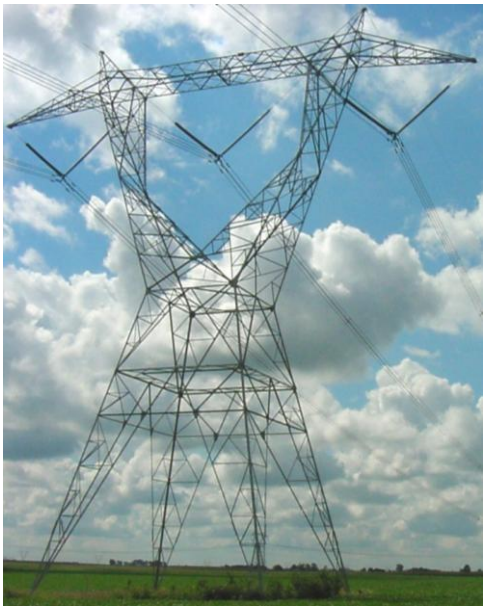
Section 2 - Energy Assessment

The Foundation

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 action programs towards a more energy efficient future for Will County.

Energy Consumption and Emissions

Energy is used to generate electricity, heat and cool buildings, power equipment, fuel motor vehicles, pump water, make products and dispose of them. 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 electricity, nuclear power is the power source for 48%, coal is 47% and natural gas is less than 3%, as of 2009. Renewable Energy was about 3%. 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 non-renewable 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.

Energy data for electricity, natural gas and vehicle use was complied by the consultant, CDM, and Will County personnel by using utility invoices paid from 2009.

Data Collection Process and Tools

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

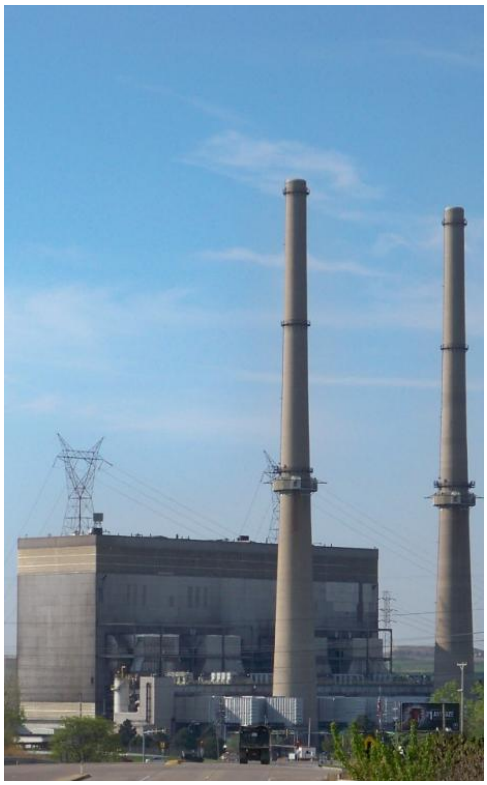
The amount of energy used in each of the above categories was gathered with assistance from Will County employees for the County's baseline energy assessment year of fiscal year 2009 (FY 2009). FY 2009 data was not available for the County's Highway Department vehicle fleet; however, a year's worth of 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.

Communitywide

Countywide 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 countywide 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 countywide 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.



Emissions

The FY 2009 data from County government operations and the Countywide 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_2), methane (CH_4), and nitrous oxide (N_2O) through the use of activity and equipment-specific emissions factors as provided in the LGOP. The total CH_4 and N_2O emissions were converted to carbon dioxide equivalents (CO_2e) using global warming potentials (GWPs), then added to the total CO_2 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**.

Summary of Results

In 2009, energy consumption from County government operations totaled approximately 334 billion BTUs. countywide community energy consumption totaled approximately 137 trillion BTUs.

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 countywide community, accounting for 56 and 63 percent of total energy use, respectively. Natural gas energy use follows electricity use, for County government operations and countywide 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 countywide community.

Table 2.1 - 2009 County Government Operations Energy Consumption by Source

Source	Energy (BTUs)	Percent of Total Use
Electricity	186,110,000,000	56%
Natural Gas	91,900,000,000	27%
Vehicle Fuel	56,000,000,000	17%
Total	**334,010,000,000**	**100%**

Figure 2.1 - 2009 County Government Operations Energy Consumption by Source

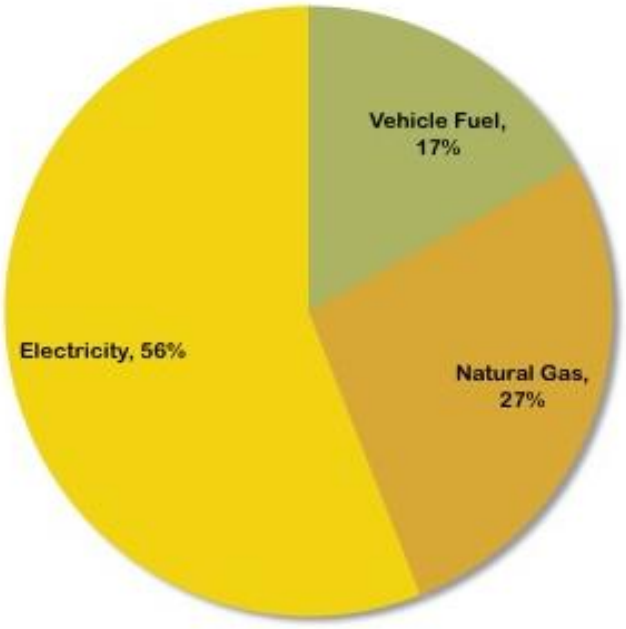
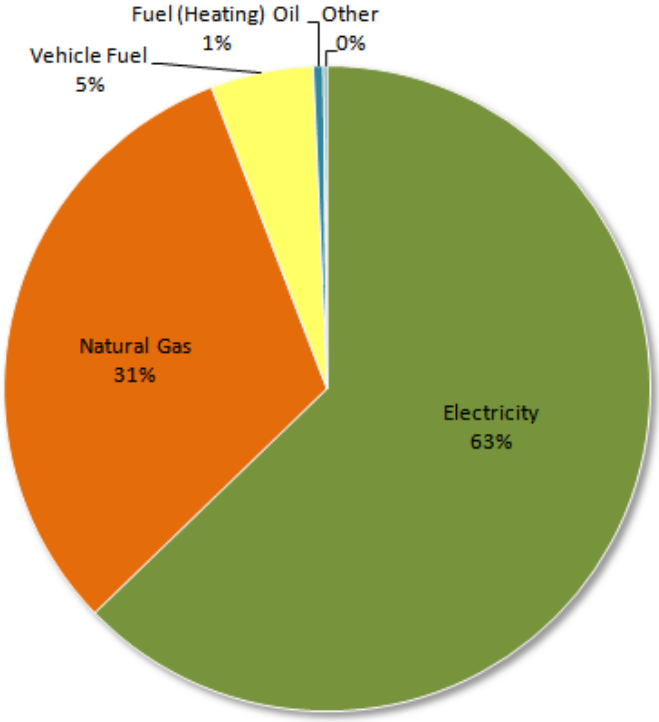


Table 2.2 - 2009 Countywide Community Energy Consumption by Source		
Source	**Energy Usage (BTUs)**	**Percent of Total Use**
Electricity	85,800,000,000,000	63%
Natural Gas	43,000,000,000,000	32%
Vehicle Fuel	7,000,000,000,000	5%
Fuel (Heating) Oil	693,000,000,000	<1%
Other	241,010,000,000	<1%
Total BTUs	**136,734,010,000,000**	**100%**

Figure 2.2 - Countywide Community Energy Consumption by Source

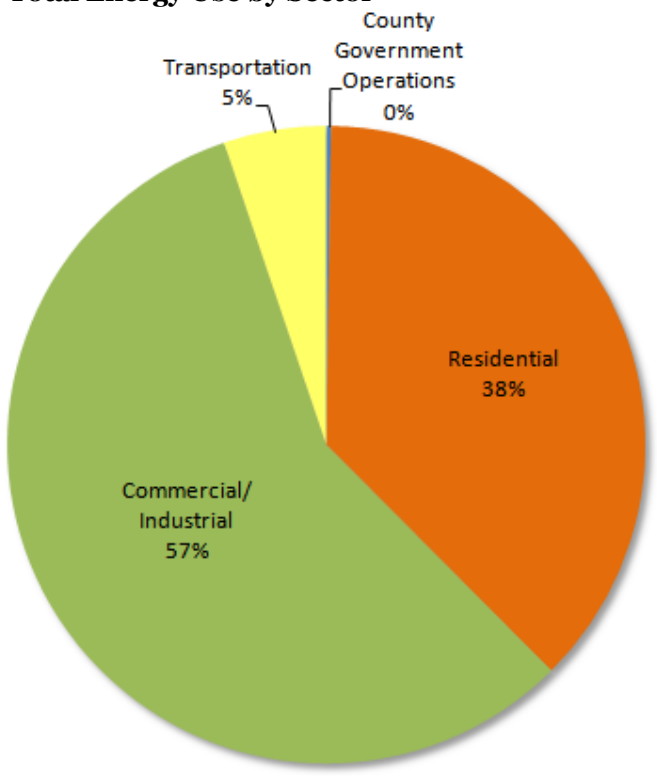


When considering the larger countywide community energy use profile, energy consumption for County government operations accounts for less than one percent of the entire energy footprint. Despite representing a small percentage of energy use, local governments have the opportunity to directly control energy consumption and set an example for the private sector. countywide, 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.**

Table 2.3 - 2009 Total Energy Usage by Sector

Sector	Energy Usage (BTUs)	Percent of Total Use
County Government Operations	334,010,000,000	<1%
Residential	51,000,000,000,000	37%
Commercial/Industrial[1]	78,300,000,000,000	58%
Transportation	7,100,000,000,000	5%
Total BTUs	**136,734,010,000,000**	**100%**

Figure 2.3 - Total Energy Use by Sector



[1] Commercial and industrial zone data are combined since the electrical usage data received from Commonwealth Edison was not delineated between those zones.

County Government Operations Energy Consumption Energy Costs

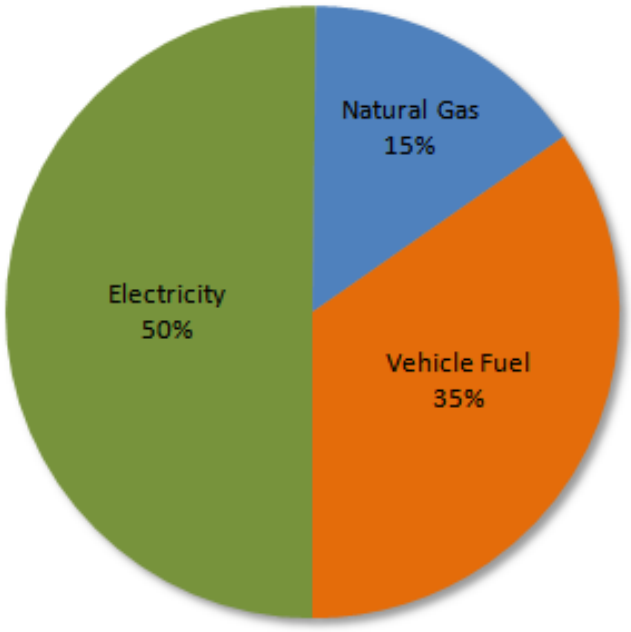
Tracking energy costs is a critical step to improving energy efficiency in County government operations. By identifying the largest energy sources, the County can identify departments and individual buildings that are energy inefficient and prioritize energy efficient investments.

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.

Table 2.4 - 2009 County Government Operations Energy Costs by Source

Category	Cost	Percent
Electricity	$ 1,813,730	50%
Natural Gas	$ 546,000	15%
Vehicle Fuel	$1,255,000	35%
Total	**$3,614,730**	**100%**

Figure 2.4 - 2009 County Government Operations Energy Purchases by Source



Electricity Consumption

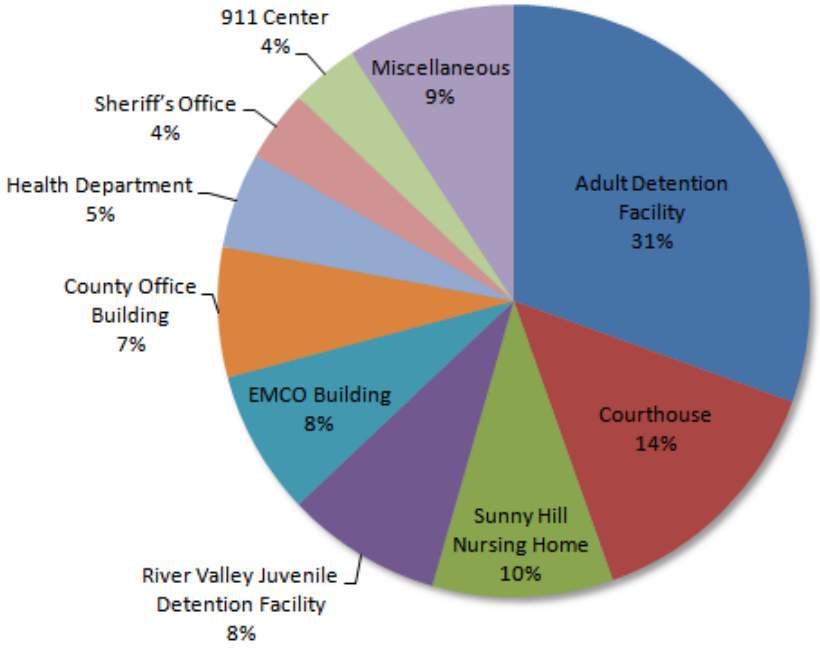
The predominant energy use in County government operations is electricity, accounting for 56 percent of the total energy consumption, as referenced in **Figure 2.1**, and 50 percent of the total energy cost, as referenced in **Figure 2.4**. Approximately 18 million kilowatt hours of electricity were 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 30.5 percent of the total. The Courthouse accounts for 14 percent, the Sunny Hill Nursing Home accounts for 10 percent, and the River Valley Juvenile Detention Facility accounts for 8.5 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.

Table 2.5 - 2009 County Government Operations Electricity Use and Cost by Facility/Department

Department	Area (sq. ft.)	Electricity Usage (kWh)	Cost	Percent
Adult Detention Facility†	410,500	5,743,232	$419,256	30.5%
Courthouse	141,700	2,641,159	$274,680	15.0%
Sunny Hill Nursing Home†	94,000	1,856,635	$194,389	10.0%
River Valley Juvenile Detention Facility†	125,100	1,600,000	$181,000	8.5%
EMCO Building	76,600	1,483,831	$146,840	8.0%
County Office Building	92,400	1,334,912	$136,161	7.1%
Health Department	65,000	985,673	$101,243	5.2%
Sheriff's Office†	31,600	730,000	$75,000	3.9%
911 Center†		700,000	$74,000	3.7%
*Government **	43,000	444,399	$53,061	1.9%
*Street Lights	N/A	350,000	$56,000	1.9%
*Highway Department	85,000	350,000	$36,000	1.9%
*Land Use Department	16,000	270,000	$29,000	1.4%
*Recorder of Deeds Department		150,000	$17,000	0.7%
*Emergency Management Agency	3,600	60,000	$7,000	0.3%
*Maintenance Department		40,000	$5,000	0.2%
*Radio System†	N/A	28,000	$3,000	0.1%
*Commuter Parking Lot	N/A	23,000	$2,700	0.1%
*Veterans' Assistance		19,000	$2,400	0.1%
Total		**18,809,841**	**$1,813,730**	**100%**

† Denotes a facility in operation at all hours
* Combined into "Miscellaneous" section in Figure 2.5
** Government locations are as follows:
308 Prairie Ave - 1 Lockport TWP
13809 High Rd - Lockport TWP
14537 Edison Drive Unit 4 New Lenox
22365 S Owens Rd Unit R Frankfort
806 Nicholson St. Joliet
802 Nicholson St. Joliet
19418 97th Ave Ste 3 - Mokena

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



Natural Gas Consumption

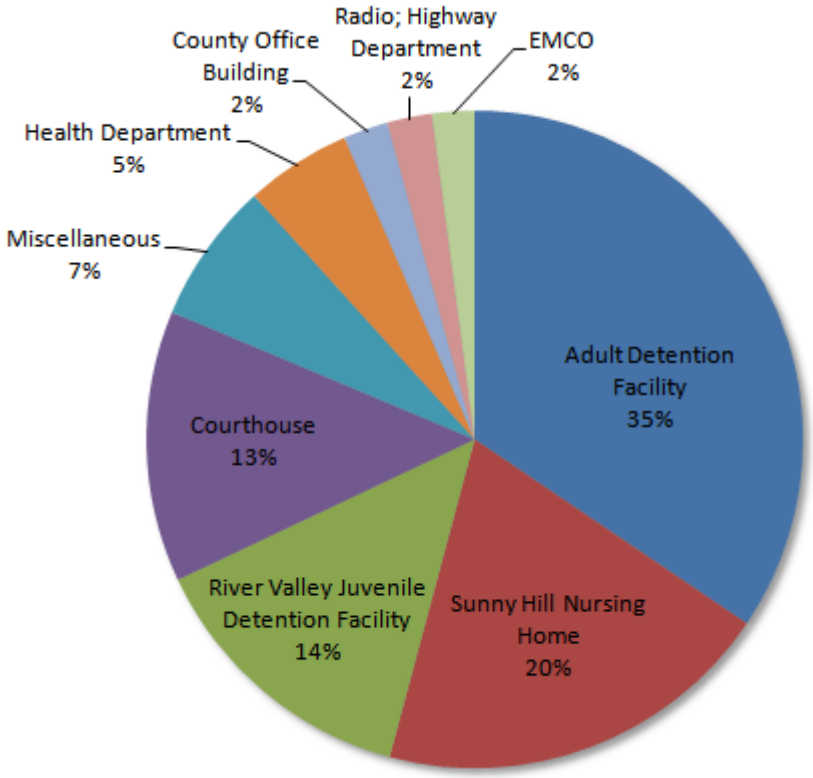
As shown previously in **Figures 2.1** and **2.4**, natural gas accounts for 27 percent of total energy consumption and 16 percent of the total energy cost in County Government operations. In FY 2009, Will County government used a total of approximately 920,000 therms of natural gas. As **Table 2.6** 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 34.5 percent. **Table 2.6** also summarizes the annual natural gas usage and cost for each County facility.

Table 2.6 - 2009 County Government Operations Natural Gas Use and Cost by Facility/Department

Department	Area (sq. ft.)	Natural Gas Usage (Therms)	Cost	Percent of Total Use
Adult Detention Facility†	410,500	297,000	$173,000	32%
Sunny Hill Nursing Home†	94,000	170,000	$76,000	25%
River Valley Juvenile Detention Facility†	125,100	119,000	$89,000	13%
Courthouse	141,700	115,000	$77,000	12%
Miscellaneous		60,000	$60,000	7%
Health Department	65,000	45,000	$31,000	5%
County Office Building	92,400	19,000	$14,000	2%
Radio; Highway Department†	65,000	19,000	$13,000	2%
EMCO	76,600	18,000	$13,000	2%
Total		**862,000**	**$546,000**	**100%**

† Denotes a facility in operation at all hours

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



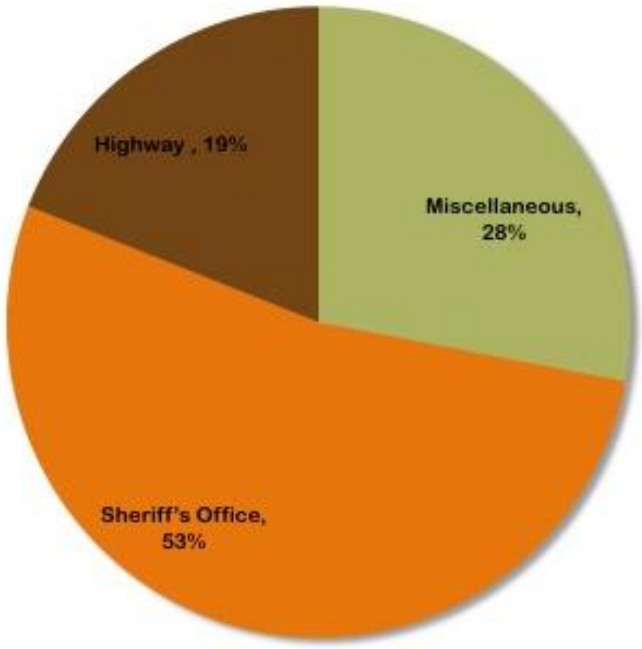
Vehicle Fuel Consumption

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. 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.

Table 2.7 - 2009 County Government Operations Vehicle Fuel Use and Cost by Department

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

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



[1] 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.

Countywide Community Energy Consumption

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

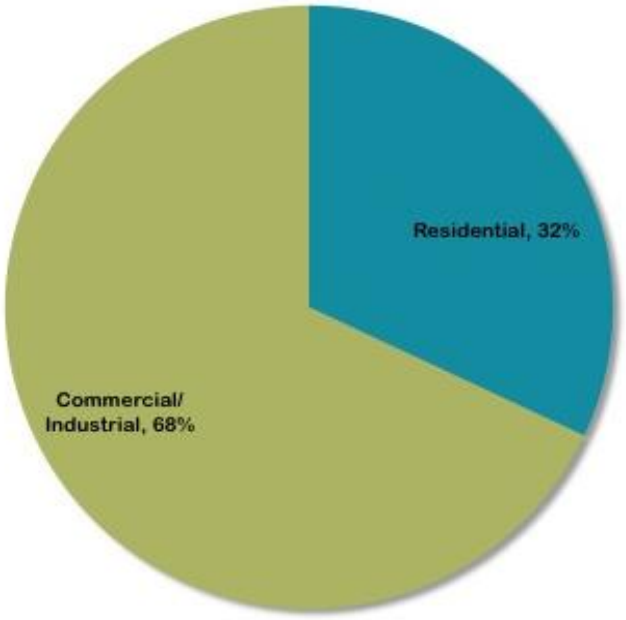


Figure 2.9 - 2009 Countywide Community Natural Gas Consumption by Sector

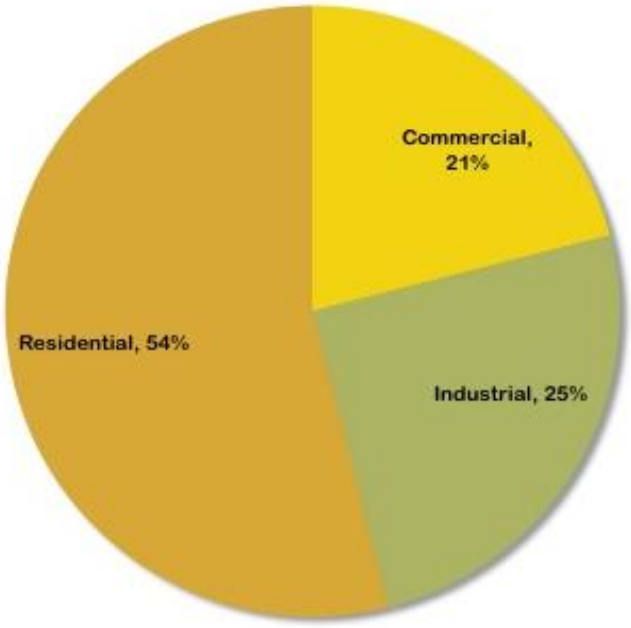


Figure 2.10 - 2009 Countywide Community Fuel Oil Consumption by Sector

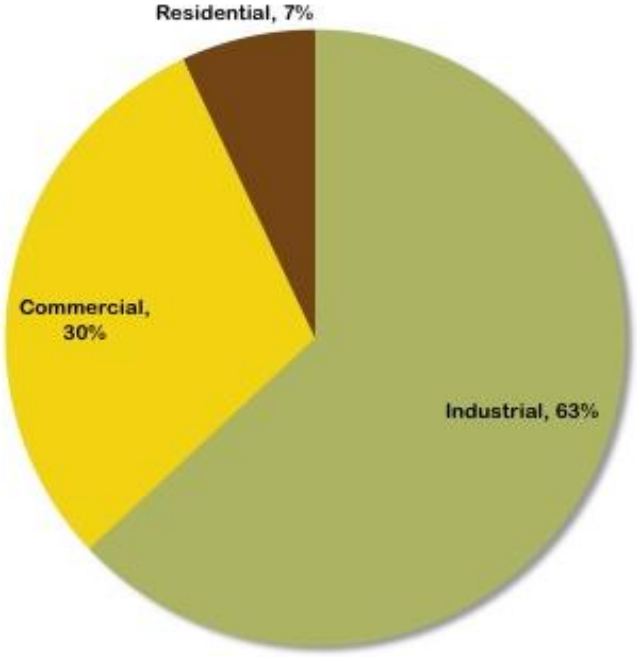
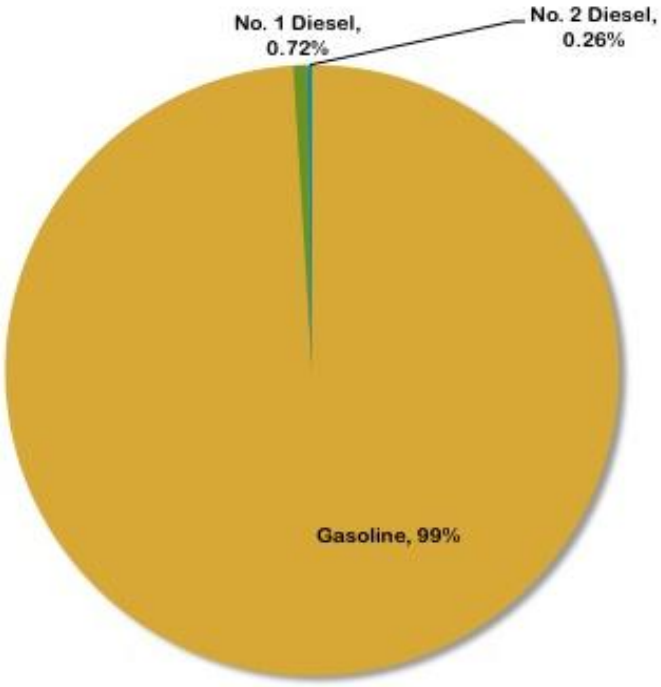


Figure 2.11 2009 Countywide Community Fuel Oil Consumption by Type



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.

In 2009, air pollutant emissions from County government operations totaled 21,400 metric tons of carbon dioxide equivalents (MTCO2e). **Table 2.8** represents the 2009 County Government Operations air pollutant emissions results. countywide 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.

Table 2.8 - 2009 County Government Operations Emissions

Source	Metric tons CO2e per year	Metric tons CO2e per County Government Employee
Electricity Production	12,600	5.0
Natural Gas Combustion	5,000	2.0
Mobile Sources	3,800	1.5
County Government Operations Total	**21,400**	**8.5**

Table 2.9 - 2009 Countywide Community Emissions

Source	Metric tons CO2e per year	Metric tons CO2e per capita
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
County-Wide Community Total	**10,900,000**	**16.30**

For both the County Government operations and countywide 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 countywide 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 countywide 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

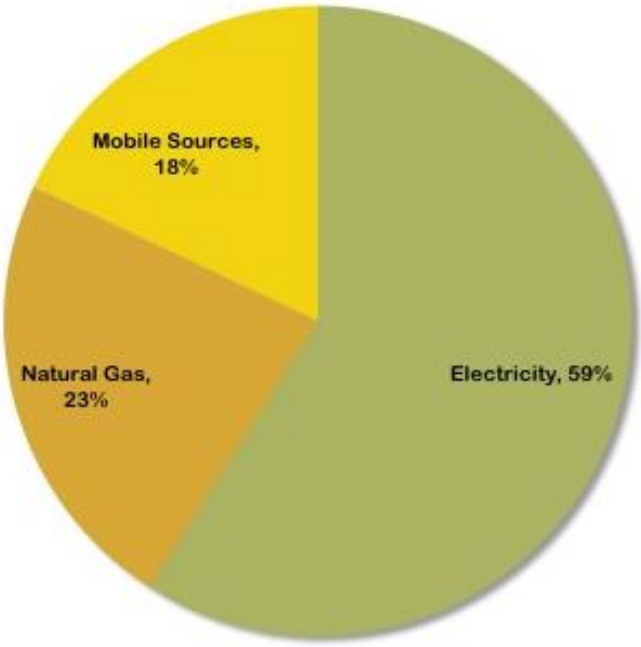
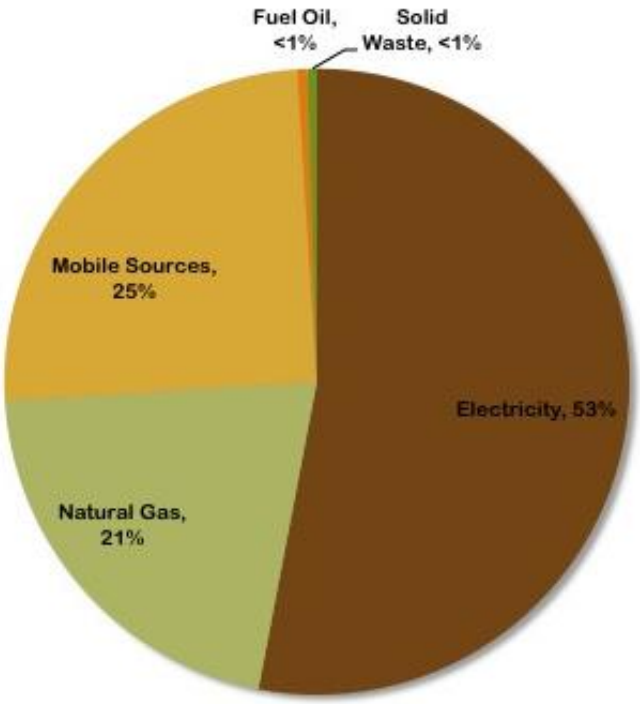


Figure 2.13 - 2009 Countywide Community Emissions by Source



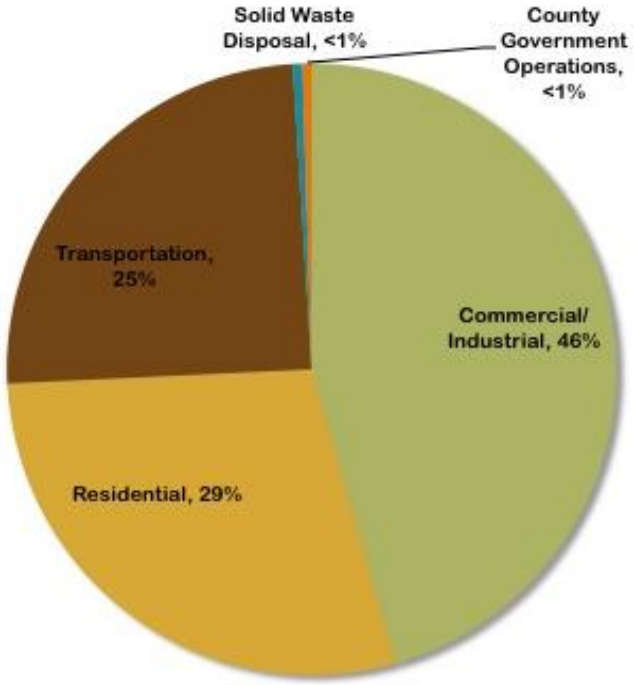
Less than one percent of the countywide community air pollutant emissions are from fuel oil combustion and solid waste decomposition via landfill operations. This is typical of a local government's air pollutant emissions profile. To avoid double counting emission from other sectors, the LGOP does not 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 countywide 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 countywide 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.

Table 2.10 - 2009 Total Emissions by Sector

Emissions by Sector	Metric tons CO2e per year
County Government Operations	21,000
Residential	3,100,000
Commercial/ Industrial	3,100,000
Transportation	2,700,000
Solid Waste Disposal	25,000
Total	**10,900,000**

Figure 2.14 - 2009 Total Emissions by Sector



"Make a Difference" Usages

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 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 office's fleet to hybrid vehicles.

Countywide Community

Electricity is, by far, the predominant source of energy used within the Countywide 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 Countywide. 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.

Energy Reduction Goal Calculations

As provided earlier in **Tables 2.2** and **2.3**, the total energy consumption, expressed in British Thermal Units, for the entire County in 2009 was 136,734,010,000,000 BTUs. Using the official Census Count of 2010 as a baseline, the total population for Will County was 677,560 people. On a per-capita basis, energy consumption for Will County is 201,788,786 BTUs per person.

If projecting Will County's population from 2010 by using the established 2030 estimate provided by CMAP of 1,076,446 in a straight-line fashion, the 2025 estimated population for Will County would be 976,725 people. By using the previously calculated per-capita energy usage of 201,788,786 BTUs per person, the projected total countywide energy usage in 2025 would be 197,092,051,000,000 BTUs.

To attain the goal of 20 percent energy reduction by the year 2025 established in Section 1, the total energy usage in 2025 should not exceed 157,839,000,000,000 BTUs (which is derived from 197,092,051,000,000 BTUs – 20%).

Energy Efficiency & Conservation Plan

Section 3 - Energy Efficiency & Conservation Opportunities

Energy Efficiency and Conservation Opportunities

Will County operations have set a goal to achieve a 20 percent decrease in energy consumption by the year 2020. A goal of 20% energy reduction per capita countywide has also been established, along with an increase in the production/use of Renewable Energy to assist the State of Illinois in reaching its Renewable Portfolio Standard of using 25% renewable energy by 2025. To achieve energy efficiency and renewable energy goals, 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 13 specific objectives and related actions to achieve specific goals. The initiatives serve as specific means to be taken over the next thirteen years. Action programs have been outlined in Section 4 to provide a means of achieving many of the initiatives in Section 3.

Buildings and Public Facilities

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.

Objectives and Initiatives

Objective 1: Reduce energy consumption and air pollutant emissions from County Government facilities through demand reduction and building retrofits by 20 percent by 2020 and apply sustainable building standards to new County Government buildings.

Initiatives for County Government Operations

- Migrate existing County buildings towards more energy efficient operations by incorporating energy efficient retrofits. Installing lighting and building system control retrofits to provide the shortest payback periods where practical.
- Perform energy audits to prioritize retrofits. Consider issuing Request for Qualifications [RFQ] and Requests for Proposals [RFP] to contract with Energy Service Companies for consulting on identifying and prioritizing retrofits.
- Identify funding sources to finance energy efficiency upgrades in County government facilities, such as the revenue generated from the County's Gas to Energy Facility.

- Exceed building codes whenever possible to drive energy efficiency improvements for County government facilities.
- Implement a Better Buildings Challenge to inspire employees to reduce building energy use and related cost by 20 percent by 2020.
- Convert street lighting to more efficient technologies, including LED types.
- Adopt and implement green building policies that may include third-party certification of energy, water, and waste conservation strategies.
- Create a policy, administered through Facilities Management which 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 whenever possible.
- Use green cleaning products as available.

Initiatives for Countywide Community

- Work with the Will County Governmental League, municipalities, and townships within the county to improve energy efficiency in street lighting, water pumping, water treatment and other energy intensive operations.
- Develop a home "use wisely" energy program, perhaps in the form of public workshops, to educate homeowners on effective energy saving retrofits and initiatives.
- Encourage home energy audits with payback analysis.
- 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: Provide energy efficiency assistance to government agencies, residents and businesses.

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.

Initiatives for County Government Operations

- Will County should update the Will County Building Ordinance and the Will County Zoning Ordinance to incorporate energy efficient development and building standards for all new construction of County government facilities.

Initiatives 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 and purchase renewable energy for use.

Initiatives for County Government Operations

- Investigate increasing the use of renewable energy on-site by 5 megawatts using renewable energy sources like solar, landfill gas-to-energy, and wind.
- Investigate sources of land that could be used for renewable energy resources such as solar and wind.
- The County should consider purchasing energy from providers that have renewable energy as part of their portfolio.

Initiatives for Countywide 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. If financial assistance is available, provide to those municipalities that meet at least the LEED® Silver

standard. The financial assistance would be based on the square footage of the building.

- 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.

- Identify financial incentives to encourage businesses and community institutions to improve their energy efficiency and/or seek renewable energy opportunities through usage of available land or structures. To assist in this, the County may make use of annual surveys of municipalities to determine availability of land and infrastructure to locate renewable energy.
- Partner with utilities such as Nicor and ComEd to assess communitywide energy savings techniques.

Transportation

Role of Transportation in Energy Consumption and Emissions

There is a clear link between transportation and energy use— cars burn fuel that emit 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 countywide 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 initiatives 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.

Objectives and Initiatives

Objective 4: Reduce per capita vehicle miles traveled (VMT) by 30 percent and expand alternative transportation infrastructure and programs.

Initiatives 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.

Initiatives for Countywide 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.
- Promote web-based, ride-share programs 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.
- Educate businesses about the various transportation alternatives.
- Offer incentives to businesses that adopt the alternative transportation employee incentive program at their workplaces.

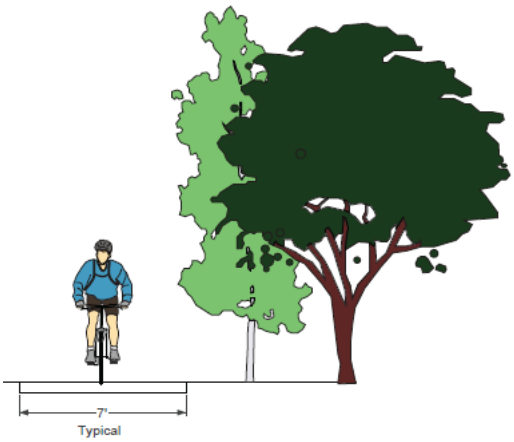
Objective 5: Reduce net air pollutant emissions and increase alternative vehicle and fuel use.

Initiatives 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 and 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.
- Offer incentives to employees who participate in carpooling.

Initiatives for Countywide 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 and assist wherever possible the installation of electric car charging and alternative fueling (i.e. higher percentage biodiesel, ethanol) stations to increase accessibility for these types of fuels.
- 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.
- Coordinates with municipalities and CMAP to assess how to modernize the transportation infrastructure to increase traffic flow and reduce vehicle idling times at intersections and through corridors. This may include implementation of modern intersection design elements, roundabouts, Intelligent Transportation System and signal interconnects.
- 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.
- The County should provide high-quality maps that identify bike routes. Maps should show connectivity to other routes and transportation modes. The county should arrange an event that highlights trail linkages.
- 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.
- Encourage use of Zip cars and other vehicle sharing programs that reduce the overall number of cars in use.

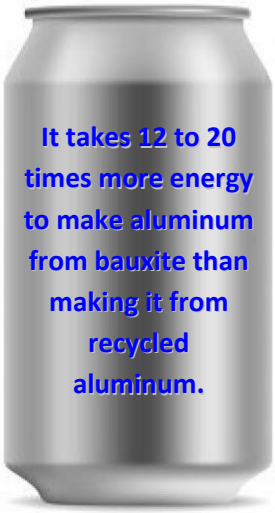


Material Management

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, are transported over long distances, then 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 the harvesting of raw, virgin materials. Recycling reduces the amount of energy needed to produce new items and reduces the amount of raw materials needed to make products.

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., Household Hazardous Waste, electronic recycling events, etc.). In addition, municipalities within Will County offer curbside collection of recyclables, and other various programs.

In 2011, Will County partnered with its landfill operator, Waste Management, to build a landfill gas-to-energy facility. This facility produces power from landfill gas by converting generated methane gas to electricity. This process reduces air pollutant emissions (EPA 2009) and generates energy fed to the electrical grid to power homes and businesses throughout the community.

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

Objectives and Initiatives

Objective 6: Reduce solid waste generation.

Initiatives 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.
- Encourage employees to utilize electronic media without printing items.
- Implement a No Print policy for email.
- Implement an electronic submittal system for bids and invoices.
- Implement vermicomposting programs in cafeterias where possible.
- Educate employees on waste-free lunch practices.
- Encourage employees and officials to use reusable cups and utensils.

Initiatives for countywide Community

- Continue to expand the existing 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, the interactive web based sustainability education program, and social media outreach Will County shall encourage businesses and residents to purchase goods made from recycled materials, and/or produced locally, all with minimal packaging.
- Education efforts will encourage the purchase of items that are durable, repairable and reusable. Create a listing of local repair shops (for shoes, electronics, vacuums, etc.) and place it on the internet.

Objective 7: Divert 60 percent of all waste away from landfill disposal by 2020.

Initiatives 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.

Initiatives for Countywide 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 and 60 percent by 2020.
- 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.
- Promote existing resale shops and encourage the expansion of services 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%).
- Reinstate market development assistance activities as needed for recycling of C&D debris as proposed in the 2008 SWMP.

Objective 8: Generate energy and reduce emissions from the solid waste management system and County-owned sites.

Initiatives for County Government Operations

- Continue to partner with Waste Management, Inc., operator of the County's landfill, to operate a landfill gas-to-energy facility at the County-owned Prairie View Landfill utilizing methane to fuel onsite engines (or turbines), generating electricity to power surrounding businesses and homes. Currently there are three turbines with more being added to reach a goal of full capacity of eight turbines generating enough power for 8,000 homes.
- Consider solar panel installation on the south face of the landfill and/or renewable energy for unused portions of the landfill property.
- Evaluate other County-owned sites for possible alternative energy installations.

Initiatives for countywide Community

- Encourage haulers to transition to a fleet predominantly using compressed natural gas instead of diesel for garbage and recycling collection.
- Encourage municipalities to require haulers to provide separate collection of organics (food and yard waste) and encourage residents to compost food and yard waste.
- Encourage Anaerobic Digestion Plants that generate renewable energy whenever economically feasible. This may entail establishing anaerobic digesters at wastewater treatment plants, food collection sites, and livestock farms.

Water Systems

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.

Objectives and Initiatives

Objective 9: Reduce water consumption by 20 percent for County Operations and Encourage Reduction of Water Use Countywide.

Initiatives 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.
- Consider using water meters to identify any losses or excessive water use.
- Consider replacing water pumps to save on water consumption dues to less vibration.
- Consider the "Buy American" concept when purchasing products.
- 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.
    - 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 whenever feasible 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.

Initiatives for Countywide 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.
- Will County should ensure compliance with Section 202.9 of the Water Resource Ordinance for Unincorporated Will County, which prohibits the transfer (diversion) of water between watersheds.
- 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.
    - Install permeable pavers in parking lots and walkways.
    - Encourage bioswales along roads and parking lots.

Land Use

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.

Objectives and Initiatives

Objective 10: Develop land use policies that support sustainable growth.

Initiatives 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.

Initiatives for Countywide 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. Encourage communities to incentivize high-density development.
- Update the Building Ordinances and Land Use Management Plan to develop mixed-use, dense development patterns that minimize the environmental impacts from development. The County should develop a model ordinance to share with communities. Incentives that encourage private open space should be considered.
- 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.

Initiatives for County Government Operations

- Encourage infill development. New development should be near urban areas. Incentives should be offered to encourage infill development.
- The County should discourage development in prime agricultural areas.
- Design and build greenscapes, 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 in all new construction and renovations of County-owned facilities where feasible.
- Increase the use of permeable pavers, bioswales and native landscaping that retains water while slowing it to prevent erosion and flooding.
- Invest in parking infrastructure at County facilities to cap or reduce the number of parking spots, encourage public transit, and promote walking or cycling.

Initiatives for countywide 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.

Education and Outreach

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 initiatives 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.

Objectives and Initiatives

Objective 12: Encourage County employees, residents, and local businesses to reduce energy consumption at home and in the work place.

Initiatives for County Government Operations

- Work with a cross-departmental "Green Team" to act as a steering committee for County government energy initiatives.
- Establish an employee of the year program to award County staff members who promote 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.

- Create an employee incentive program to encourage energy saving tips and initiatives to be adopted in County practices.
- Sponsor an annual "Energy Challenge" among County departments or buildings 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.

Initiatives for Countywide 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. Work with CMAP on adapting their program to this effort.
- 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 standing Countywide 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.

Initiatives for County Government Operations

- Implement and distribute an internal bi-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.
- Utilize maintenance personnel and the RRE division staff to manage implementation of the County Energy Policy, manage energy procurement, and identify opportunities for energy efficiency improvements and funding sources.

Initiatives for Countywide Community

- Use various methods such as presentations, printed newsletters, e-mail newsletters, and collection events to extend the message of sustainability throughout the County at schools, businesses, community organizations, and general public outreach events.

- Continue 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 the 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.
    - School programs, exhibits, and education materials.
    - Radio, television, and newspaper messages.
    - Billboards and bus 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 in the Plan's progress.
- Educate residents, schools, and businesses on the short and long term financial savings related to energy conservation.
- 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 resources.

Energy Efficiency & Conservation Plan

Section 4 - Energy Efficiency & Conservation Measures

Introduction

The objectives and initiatives identified in the preceding section are intended to guide Will County's decision making over the next thirteen years. They represent key opportunities for the County to pursue in order to meet its established goals. As described in Section 1, 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 time and/or cost
- Social benefits

Twelve major action programs 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. 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. If not indicated, the Department of Energy's (DOE) Energy Efficiency and Conservation Benefits (EECBG) Calculator was used to determine energy savings, and air pollutant emission reductions.

Countywide Long Term Energy Plan

Description and Intent

A comprehensive, multi-year energy management plan for County government will be developed as an extension of the thirteen-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 thirteen-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 serve as informed stewards of this initiative.

Demonstrates the County's leadership in sustainable energy practices

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.

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.

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.

Key Action Programs and Roles

Key action programs 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.

Web-Based Sustainability Education Program

Description and Intent

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

Large impact created from small actions

A specialized website was developed in 2010 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 provide entertaining education games, virtual tours and other means to increase retention of content. A significant education campaign has been initiated simultaneously to roll out of the web-based program to notify the public of the program. This campaign includes press releases, mass email notifications, dedicated space in existing mass mailings, or other existing outreach materials.

Benefits are estimated based on anticipated material diversion from landfills (79,000 metric tons of CO2e 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.

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 campaigns reach and benefit all areas of conservation and sustainability.
- Level of public involvement is assessed with web-based counter (e.g., number of hits, number of members e-mail subscribers, facebook fans, twitter followers, etc.).
- Considered a showcase of sustainability practices to the community and will be unique among Illinois County websites.

Challenges

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

- Measurable benefit resulting from initiative is difficult to quantify.
- Social media and web interaction requires daily maintenance for reliability, usefulness, and to meet customer expectations.

Key Action Programs and Roles

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

- Establishing leadership within the County to lead effort (e.g. Land Use Department).
- Hiring of services for maintenance, module development and problem solving.

County Government Energy Policy Development

Description and Intent

A County government energy policy (i.e. Energy Management Procedures) 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.

Showcases sustainability practices to the community

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.

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.

Key Action Programs and Roles

Key action programs and roles of a County Government Energy Policy include:

- Establish leadership within the County to lead effort.
- Utilize County stakeholders' group to assist in policy development (i.e. Green Committee).
- Implement Energy Management Procedures, Green Action Plans and the U.S. Department of Energy's Better Buildings Challenge, that has a goal of 20% energy reduction in certain buildings by 2020 using a baseline of 2009.

Electronic Information Technology "IT" Power Management System

Description and Intent

An electronic Information Technology "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 show 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.

Serves as an example to employees who may employ these energy saving measures in their personal lives

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 (i.e. Department Green Action Plans).
- 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.

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.

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.

Key Action Programs and Roles

Key action programs 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.

Green Building Permit Program

Description and Intent

A green building permitting program for building projects that are "green," or environmentally sustainable, provides standards which 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. Qualifying applications will be identified as "High Priority" and the review should be completed within thirty (30) business days. The permit review team will be trained in acceptable sustainable construction procedures and some 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 time to oversee the program.

Increases developer satisfaction

Benefits

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

- Increases developer satisfaction by reducing the permit cost and time taken to issue a permit for Green Building Permits.
- Reduces 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.

Challenges

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

- Developing a policy.
- Developing a method for auditing ongoing energy savings as a direct result of permitting process.
- Keeping structural sustainability while gaining energy efficiency.
- Monitoring applicant demonstrating compliance once approved, and determining what will happen if requirements are not met.
- Making requirements easy to understand and follow.
- Dedicate staff time to implement the program.

Key Action Programs and Roles

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

- Dedicate staff to oversee the program
- Establish criteria that meet "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.

Green Building Code Modifications

Description and Intent

Building energy codes and incentives 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 incentives and staff time implementation of $25,000. Simple payback is calculated based on the higher cost proposal of $50,000.

Incentivize energy efficient new construction and renovation

Benefits

The benefits of green building code modifications include the following:

- Reduces consumption of electricity and natural gas.
- Lowers energy costs.
- Reduces air pollutant emissions by reducing electricity and fuel consumption.
- 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.

Challenges

The challenges of green building code modifications include the following:

- Developing a policy.
- Implementing new codes.
- Requires a lengthy development process to adopt significant building code changes: 2012 Codes from the International Code Council (ICC) and beyond.
- Difficult to audit ongoing energy savings as a direct result of code changes.

Key Action Programs and Roles

Key action programs 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.

- Have an ICC representative provide assistance to teach the new codes to contractors and the Will County Building Division.

Green Zoning Modifications

Description and Intent

Engine for job creation

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.

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.

Challenges

- Developing a policy.
- Updating an outdated zoning ordinance requires a lengthy development process.
- Measuring energy savings as a direct result of code changes.

Key Action Programs and Roles

- 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
- Adopt the new Zoning Ordinance with Building Incentives by Summer 2012 and begin implementation.

County Building Retrofits

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 fewer energy saving opportunities.

Saves significant annual energy costs resulting in reduction of burden to taxpayer

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 identified windows which needed replacing which are/were single pane with double pane low emission types. Some buildings have already received window replacements using funds from the U.S. Department of Energy.

If all potential items listed for retrofit in each building were pursued, the total cost would be approximately $2.8 million. 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. The County has utilized approximately $1.2 million of U.S. Department of Energy grant funds to install retrofits in County buildings since 2009.

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 resulting in reduction of burden to taxpayers.

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.

Key Action Programs and Roles

Key action programs 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.

Landfill Gas-to-Energy Facility

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 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 off-sets grid derived, non-renewable-fuel generated electricity. Once fully built, the facility will provide 12.8 MW of electricity and approximately $1.2 million annual in gas revenue, plus revenue sharing payments.

Reduces air pollutant emissions resulting from destruction of landfill gas

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 (CH4) and carbon dioxide (CO2).
- 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) for developer 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.

Challenges

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

- LFG electricity generation equipment, generate some emissions (CO, NOx, SOx, etc.) which can contribute to local ozone and smog formation, which is offset by the significant generation of renewable energy.

Key Action Programs and Roles

Key action programs 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 state/local permitting – 4-6 months
- Illinois EPA Air Permit Renewals.
- Use as a funding source for energy efficiency and renewable energy projects identified by the County.
- Establish a specific fund from Gas-to-Energy Plant revenues to be used for energy related projects.

Brownfield Renewable Energy Sites

Description and Intent

Will County will consider applying for grant funding and possibly using either Solid Waste Funds or 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 such areas as 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, and 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. The County's Prairie View Landfill Facility may be the ideal candidate, since the site is owned by the County, operator by Waste Management through an existing agreement, which allows for additional renewable energy to be added, and the infrastructure is already in place.

Revenue could be obtained from the sale of electricity and gas

Benefits

- As with the County's Prairie View Gas-to-Energy Plant, additional renewable energy would be sent to the grid, providing another 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 or gas, 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, create new businesses and opportunities for redevelopment, including jobs.
- Jobs may be created through the building of the renewable energy source.
- Will County may also be able to share in the revenue, if possible.

Challenges

- Will County Center for Economic Development and 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 and costly.

Alternative Fuel Vehicle Fleet

Description and Intent

Reduces air pollutants by decreasing fuel consumption

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.

If the Sheriff's Office purchased 30 hybrid, or significantly higher fuel efficient or alternative fuel vehicles annually, the County could 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, high fuel efficiency or alternative fuel vehicle.

According to vehicle pricing data, the total cost of purchasing 30 hybrids at retail price is $900,000. Cost of a high fuel efficient vehicle or alternative fuel vehicle may be less expensive, and may be more practical since many hybrids do not have enough horsepower to adequately perform police functions.

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 energy 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. The payback for a high fuel efficient vehicle or alternative fuel vehicle may vary, however it should still offer a relatively quick payback, since fuel prices in 2012 were $4.00 - $4.25/gallon.

Benefits

The benefits of an alternative/high fuel efficient 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. rebates).

Challenges

The challenges related to an alternative fuel vehicle fleet include:

- Hybrid and other alternative/high fuel efficient vehicles are typically more expensive than conventional vehicles.
- Hybrids require battery replacement after seven years and other maintenance costs may be difficult to find an alternative or high fuel efficient vehicle that has high enough horsepower for police operations.

Key Action Programs and Roles

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

- Identify additional funding to help offset upfront costs.
- Identify the best type of hybrid/alternative fuel/high fuel efficient vehicles for fleet conversion.
- Research hybrid/high fuel efficient/alternative fuel vehicles.

Community Gardens & Urban Agriculture

Community gardens and urban agriculture 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 an organization decides they want a community garden and takes responsibility for paying water bills, taking applications, and keeping written rules up-to-date. Community gardens can potentially be located on property that was previously classified as unbuildable.

Beyond the environmental benefits, there are health, safety, and social benefits to the entire community

Urban agriculture works under the same premise as community gardens by using unbuildable property in a primarily well-developed, urban environment. Urban agriculture can differ from community gardens in that the property may be used by one individual or entity as opposed to being available to the community at-large.

The reason community gardens and urban agriculture are a part of an energy plan is because of the environmental benefits they bring. 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 local field and gather fresh items. This results in a reduction of per capita vehicles miles traveled [VMT], thereby reducing energy consumption.

Benefits

The benefits of community gardens and urban agriculture include:

- The fields allow rain to return to aquifers rather than run off into storm sewers. This reduces flooding during severe storms and improves recharge.
- People who work in the gardens and fields 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.

Challenges

The challenges related to community gardens include:

- Developing a policy.
- Acquiring the land for crop production.

Key Action Programs and Roles

Key action programs and roles required for community gardens include:

- Updating local zoning codes to allow the use as a permitted or special use.
- Identify appropriate locations for crop production.

Summary

Will County can implement a wide variety of energy efficiency and conservation measures ranging from internal plans and policies to capital improvements and even to its building infrastructure and vehicle fleet to providing programs available to the general public. When implemented together in a timely and orderly fashion, these measures can be more impactful than each one individually.

Energy Efficiency & Conservation Plan

Section 5 - Implementation

Implementation

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. Many of the opportunities were then considered by the "triple bottom line" to determine the twelve major action programs (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 action programs will require continued collaboration, commitment, and evaluation. Will County will prioritize the recommended action programs 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" of each action program 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.

Implementation Schedule

Will County's intent is to begin implementation of all identified programs by the end 2013. The metrics in **Table 5.1** will be considered when executing the 12 major action programs 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.

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_2 equivalents)
- Cost savings

The County will track these metrics whenever measurable 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 its goals. **Table 5.1** is listed below for reference and provides a detailed list of metrics that can be used to monitor progress for a variety of activities.

Table 5.1 - Energy Plan Metrics

Type of Activity	Reporting Metric
Building Codes and Standards	• Name of new code adopted • Name of old code replaced • # of new and existing buildings covered by new code
Building Retrofits	• # of buildings retrofitted, by sector • Square footage of buildings retrofitted, by sector
Clean Energy Policy	• # of alternative energy plans developed or improved • # of renewable portfolio standards established or improved • Number of interconnection standards established or improved
Building Energy Audits	• # of audits performed, by sector • Floor space audited, by sector • Auditor's projection of energy savings, by sector
Energy Efficiency Rating and Labeling	• Types of energy-consuming devices for which energy efficiency rating and labeling systems were endorsed by the grantee

Table 5.1 - Energy Plan Metrics (con't.)	
Type of Activity	**Reporting Metric**
Government, School, Institutional Procurement	• # of units purchased, by type (e.g., vehicles, office equipment, HVAC equipment, streetlights, exit signs, etc.) • Number of building retrofitted, by industry sector • Square footage of building retrofitted, by industry sector
Industrial Retrofit Support	• # of buildings retrofitted, by Industry sector • Square footage of building retrofitted, by industry sector
Loans, Grants, and Incentives	• # of loans given and their monetary value • # of monetary value of grants given • # of incentives provided and their monetary value
Incremental Cost for Efficiency and Design Elements in New Buildings	• # and square footage of new buildings designed, by sector • # and square footage of new buildings constructed, by sector
Renewable Energy Market Development	• # and size of solar energy systems installed • # and size of wind energy systems installed • # and size of other renewable energy systems installed
Financial Incentives for Energy Efficiency	• Monetary value of financial incentive provided, by sector • Total value of investments incentivized, by sector • Estimated impact of incentives on total investment made
Technical Assistance	• # of information transaction contacts (for example, webinar, site visit, media, fact sheet) in which an energy efficiency or renewable energy measure were recommended, by sector
Transportation	• # of alternative fuel vehicles purchased • # of conventional vehicles converted to alternative fuel use • # of new alternative refueling stations • # of new carpools and vanpools formed • # of energy-efficient traffic signals installed • # of street lane-miles for which synchronized traffic signals were installed
Workshops, Training, Education	• # and type of workshops, training, and education sessions held • # of people attending workshops, training, and education sessions

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.

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 reducing energy per-capita by 20 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 years, or more, 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 an annual or semi-annual 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.

Energy Efficiency & Conservation Plan

Appendices:
A: Methodology
B: Definitions
C: Resolutions

Appendix A – Methodology & Data Collection

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[1, 2] 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.[2]

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. Communitywide 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[3]. Residual heating fuel oil volume was obtained for commercial and industrial zones, as this fuel type is not used for residential purposes[4].

[1] http://www.eia.doe.gov/neic/infosheets/apples.html
[2] Masters, Gilbert "Introduction to Environmental Engineering and Science", 2nd Ed, 1998, Prentice Hall, Upper Saddle River, NJ
[3] Distillate fuel oil data:
http://tonto.eia.doe.gov/dnav/pet/pet_cons_821dst_dcu_SIL_a.htm
[4] Residual fuel oil data:
http://tonto.eia.doe.gov/dnav/pet/pet_cons_821rsd_dcu_SIL_a.htm

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

$$\begin{pmatrix} Heating\ Oil\ Energy\ Use\ for \\ heating\ Will\ County \end{pmatrix} = \begin{pmatrix} Illinois\ Annual\ Fuel\ Oil \\ Usage(\ Distillate\ for \\ Residual)\ Per\ Sector\ (gallons) \end{pmatrix} \left(\frac{138{,}874\ Btus}{gallon\ heating\ fuel\ oil}\right) \left(\frac{Population\ WillCounty}{Population\ Illinois}\right)$$

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[5]. Extrapolation was performed based on AVMT alone. Average vehicle fuel use in gallons per day was obtained for CY 2005 from the EIA[6]. 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:

$$\begin{pmatrix} Vehicle\ Fuel\ Energy \\ Use\ per\ Fuel\ Type\ (Btu) \end{pmatrix} = \begin{pmatrix} Illinois\ Vehicle\ Fuel \\ Volume\ Delivered\ per \\ Fuel\ Type(gallons\ per\ day) \end{pmatrix} \left(\frac{365\ days}{year}\right) \left(\frac{Btu}{gallon\ of\ fuel\ type}\right) \left(\frac{AVMT\ Will\ County}{AVMT\ Illinois}\right)$$

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.

[5] http://www.dot.il.gov/adttravelstats.html
[6] 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 communitywide 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_2), methane (CH4), and nitrous oxide (N_2O); through the use of activity and equipment-specific emissions factors as provided in the LGOP. The total CH_4 and N_2O were converted to carbon dioxide equivalents (CO_2e) using global warming potentials (GWP), then added to the total CO_2

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$_2$ (i.e., CO_2 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_2	1
H_4	21
N_2O	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_2. As such, CH_4 and N_2O emissions from vehicles were omitted from this inventory. CH_4 and N_2O are emitted in extremely small quantities when a non-renewable fuel is burned and their emissions are dependent on the engine type and age. In order to calculate CH_4 and N_2O 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_2 emission factors for gasoline are compared to those of CH_4 and N_2O in terms of CO_2e, they represent 0.02% and 0.17% of the total respectively, demonstrating that the impact of these emissions is insignificant.

Appendix B –Definitions

Community Gardening - outdoor public or private spaces for food or pleasure cared for by a group of individuals

Energy Consumption per capita - This data set shall portray energy consumption estimates for Will County on a per person basis. The estimates are given in British Thermal Units (BTU). Included are estimates for four energy-consuming sectors, which include residential, commercial, industrial, and transportation.

Energy Efficiency –doing more with less energy. The goal is to accomplish the same tasks and functions as before while using less energy.

LEED® certification - Leadership In Energy and Environmental Design (LEED) Green Building Rating System is an independent certification program that provides voluntary guidelines for developing high-performance, sustainable buildings. Created by the U.S. Green Building Council (USGBC), the program awards varying levels of certification. There are 100 possible base points distributed across five major credit categories: Sustainable Sites, Water Efficiency, Energy and Atmosphere, Materials and Resources, Indoor Environmental Quality, plus an additional 6 points for Innovation in Design and an additional 4 points for Regional Priority. Buildings can qualify for four levels of certification:

- Certified: 40–49 points
- Silver: 50–59 points
- Gold: 60–79 points
- Platinum: 80 points and above

Renewable Energy Resources - includes energy and its associated renewable energy credit or renewable energy credits from wind, solar thermal energy, photovoltaic cells and panels, biodiesel, anaerobic digestion, crops, and untreated and unadulterated organic waste biomass, tree waste, hydropower that does not involve new construction or significant expansion of hydropower dams, and other alternative sources of environmentally preferable energy. Landfill gas produced in the State of Illinois is considered a renewable energy resource. "Renewable energy resources" does not include the incineration or burning of tires, garbage, general household, institutional, and commercial waste, industrial lunchroom or office waste, landscape waste other than

tree waste, railroad crossties, utility poles, or construction or demolition debris, other than untreated and unadulterated waste wood. (State of Illinois definition)

Triple Bottom Line (TBL) - 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.

Urban Agriculture - the process of growing plants of all types and varieties in an urban environment. This includes:

- Community Gardening – *defined previously*.
- Container Gardening – common for people with small patios, yards, or balconies.
- Indoor Gardening – utilizes a greenhouse or solariums
- Guerilla Gardening - a way of adding plants to public spaces which do not technically belong to the gardener such as a vacant lot, median, beside a highway, or in little strips of dirt.
- Rooftop Gardening – private or public roofs designed to include a growing medium that can support food or plants.