KANE COUNTY, ILLINOIS

2040 ENERGY PLAN

ADOPTED JUNE 14, 2011

CNTenergy

Quality Of Kane

Healthy People, Healthy Living, Healthy Communities-
It's about Quality of Life

ACKNOWLEDGMENT

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Adopted by the Kane County Board June 14, 2011

EXECUTIVE SUMMARY

Planning Framework

For over 50 years, the Kane County Board has endorsed long range planning as a means to preserve values commonly shared by its residents and to establish countywide policies to attain those goals. Today, Kane County is not only renewing its commitment to planning by updating its comprehensive plan to the year 2040, but has committed to a unique convergence of three planning processes: transportation, health, and land use, within a comprehensive, countywide planning program supported by the Kane County Board. This combined planning initiative is the Quality of Kane initiative.

The need for a County energy policy was introduced in the 2020 Land Resource Management Plan, adopted in 1996, in order to encourage a conservation ethic by individuals, households and businesses within the county and to recognize land use planning as an effective technique to conserve limited energy resources. More specifically, the 2020 Plan encouraged energy conservation, utility siting and the use of renewable energy in the form of hydropower, solar and wind.

In 2004, the 2030 Land Resource Management Plan expanded the energy discussion to include setting standards for green buildings and reducing dependence on the automobile through effective land use planning and the smart growth principles. The Community Energy Cooperative, a non-profit membership organization created by the Center for Neighborhood Technology was highlighted. The siting of peaker plants in agricultural areas was discouraged.

Since the adoption of the 2030 Land Resource Management Plan, our society and the world has increased its focus on the generation and consumption of energy. Recognition of fossil fuels as a finite, polluting and increasingly costly source of energy has resulted in advancing technology in the areas of conservation and the use of renewable sources of energy.

Increased funding for energy efficiency provided the opportunity for Kane County to develop the Kane County 2040 Energy Plan, an update to the Kane County Energy Plan, a project of the Community Energy Cooperative, completed in 2005. The Kane County 2040 Energy Plan is one of seven energy efficiency activities funded through an Energy Efficiency and Conservation Block Grant as part of the American Recovery and Reinvestment Act.

The Quality of Kane planning initiative reflects the county's continuous mission to maintain and enhance an exceptional Kane County with Healthy People, Healthy Living and Healthy Communities. The Kane County 2040 Energy Plan is an important component of Quality of Kane and the 2040 Plan process as energy planning intersects with all other planning-related issues. The policies within the Kane County 2040 Energy Plan will be carried over to the 2040 Land Resource Management Plan in the Sustainability and Energy chapter. This chapter will emphasize our growing focus on energy related issues. The Kane County 2040 Energy Plan will also be an implementation tool of the 2040 Plan and Quality of Kane initiative.

Energy Planning in Kane County

Kane County is located in the Chicago metropolitan region of northeastern Illinois. The county is a microcosm of the state; characterized by an older urbanized corridor on its eastern edge, large-lot suburban development in the central corridor, and agricultural land in the west. With expectations of significant growth by the year 2040, the Kane County Board continues to address the challenges of water supply, traffic congestion and diverse, affordable housing.

However, growth also affects energy consumption. The Kane County 2040 Land Resource Management Plan, currently in development, is aimed at "ensuring that Kane County's quality of life will be sustained and that there will be a proper balance between natural resource protection and healthy communities and economic development as we progress further into the 21st century[1]" and will include goals regarding sustainability and energy. The zoning and building codes adopted by Kane County regulate land uses and determine building characteristics that impact energy consumption. These connections illustrate why energy is an important planning and growth management issue.

With energy costs rising, the impacts of energy consumption need to be considered. Two-thirds of the Chicago region's greenhouse gas emissions are attributed to energy consumption in buildings[2]. Taking into consideration the projected growth in Kane County, it is possible to reduce energy consumption by implementing strategies that address consumer behavior and utilize existing and future technologies. Economically, consuming less energy means that families, businesses, and local governments save money on energy costs. Environmentally, consuming less energy means reducing the emissions of greenhouse gases and other harmful pollutants.

Kane County 2040 Energy Plan

The Kane County 2040 Energy Plan (KC2040EP) is an update to the Kane County Energy Plan completed in 2005 that focused on how projected growth would impact electricity consumption in the county. This update has been expanded to include natural gas consumption data and municipal electric utilities data from St. Charles, Geneva and Batavia. The KC2040EP presents an analysis of how energy is consumed in the county and how consumption patterns are expected to change as the county grows. In addition, strategies are recommended for managing the county's changing energy needs while incorporating energy planning into the larger planning process. Implementation of the Kane County 2040 Energy Plan will enable the county to meet the goals in Exhibit 1.

Strategies

The Kane County 2040 Energy Plan recommends implementing the following strategies that embrace existing technologies and practices for reducing energy consumption.

Kane County Goals

Goal 1	**Kane County will be a leader and role model in the area of energy efficiency** within the county and throughout the region.
Goal 2	Kane County will **encourage both municipalities and specific sectors** (residential, commercial, industrial, institutional, etc.) to **set goals to reduce energy consumption that will lead to both environmental and economic benefits.**
Goal 3	Kane County will **reduce energy consumption in county-owned buildings by 10 to 25 percent,** based on the specific energy and cost saving opportunities indicated in each building's energy audit reports. Performance monitoring will track progress and identify adjustments to energy efficient improvements needed to achieve optimal savings.

EXHIBIT 1

Residential Strategies

1	Retrofit existing residential buildings
2	Develop green building standards and programs for new residential construction
3	Encourage on-site renewable energy for residential buildings
4	Encourage occupant behavior modification in the residential sector
5	Encourage energy efficient window air conditioner replacement
6	Encourage energy efficient refrigerator replacement

Commercial & Industrial (C&I) Strategies

7	Retrofit existing commercial and industrial buildings
8	Develop green building standards and programs for new C&I construction
9	Encourage on-site renewable energy for commercial and industrial buildings
10	Encourage occupant behavior modification in the commercial and industrial sector

TABLE 1

Impacts

The Kane County 2040 Energy Plan includes projections for energy consumption in the year 2040, assuming "business as usual", without implementation of energy savings measures. Next, the plan presents three scenarios for reducing energy consumption: conservative, moderate and aggressive. These scenarios assume low, moderate and high levels of energy strategy implementation; illustrating that **Kane County could save $1 billion to $3.4 billion and reduce energy consumption by 83.6 billion kBtu[3] to 272 billion kBtu over the next thirty years.**

Actions

The Kane County 2040 Energy Plan encourages Kane County Government to commit to the following action items that will assist municipalities in implementation of the recommended strategies.

Summary

The Kane County 2040 Energy Plan provides the information and resources needed to effectively reduce energy consumption through coordinated efforts of the county, municipalities, and consumers. In addition, unprecedented federal, state, and foundation funds are available for energy efficiency and conservation measures. This funding can maximize energy and cost savings. Taking action now will ensure that the county continues to be economically and environmentally sustainable as the region grows.

Kane County Actions

Action 1	**Provide training and educational opportunities** to municipalities in order to improve energy efficiency.
Action 2	**Identify, and when possible, seek out funding opportunities** to implement energy efficient strategies.
Action 3	**Remain involved in local/regional discussions on energy issues,** including energy efficiency, renewable energy, smart grid, and emerging energy technologies, while coordinating municipal energy and sustainability efforts throughout Kane County.
Action 4	**Create a data warehouse** to collect pertinent data for the ongoing analysis of energy consumption through established partnerships with local utilities.
Action 5	**Promote economic development** through energy efficiency, energy conservation and renewable energy opportunities.

EXHIBIT 2

SECTION 1

ENERGY PLANNING

Why Plan for Energy?

Energy costs are rising and are expected to do so for the foreseeable future. Rising energy costs and changing energy needs raise economic, environmental and even security concerns that impact municipalities, businesses and households. The consumption of electricity and natural gas in buildings is the greatest contributor to greenhouse gas emissions in the nation, and energy use in buildings accounts for nearly two thirds of all emissions in the seven-county Chicago metropolitan region.[4] Sources of energy, infrastructure vulnerabilities, and long-term affordability all impact the region's energy security and economic development. Each of these energy concerns can be addressed in part at the local level through existing planning tools and functions. This involves analysis of energy consumption and development of strategies to reduce consumption and decrease demand.

Planning is a broad discipline that covers many areas including land use, transportation, housing, water resources, health and human safety, and quality of life. Professional planners have recently incorporated the issues of energy and climate change into the comprehensive planning process. Energy is now considered an important factor in planning.

How Land Use and Zoning Impact Energy

Smaller houses ----------> Lower energy use

Compact land use ----------> Less driving (less energy use for transportation)
----------> More economical distribution of energy

Sustainable development codes ---> Opportunities for renewable energy and green buildings

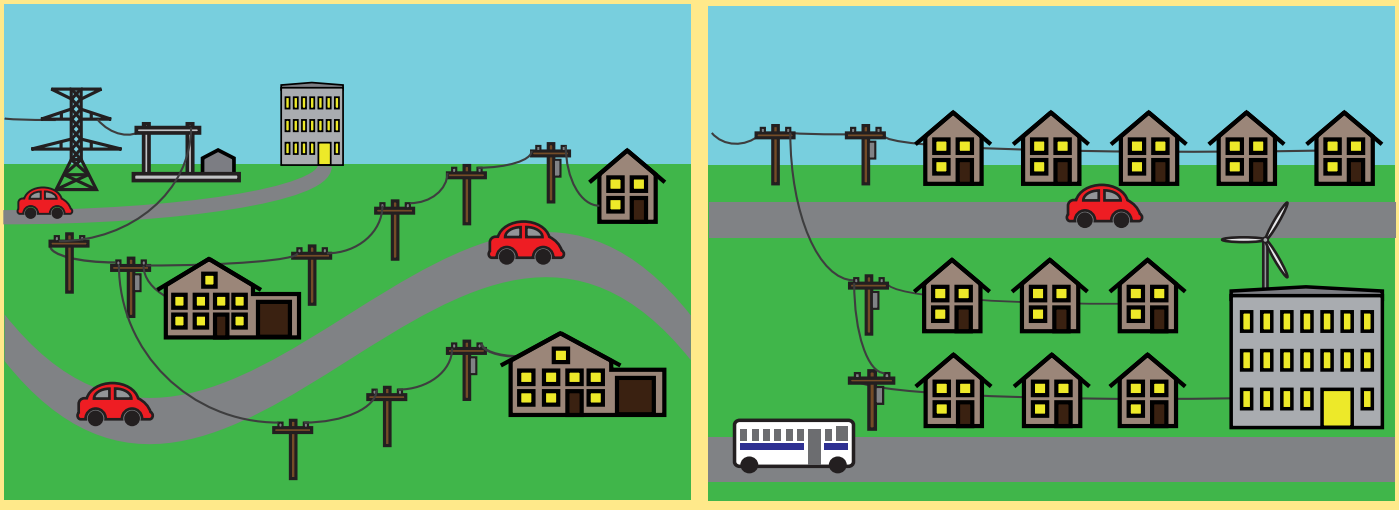


EXHIBIT 3. PLANNING AND ENERGY

Energy issues connect directly to land use, transportation, building codes and infrastructure siting. Energy is also indirectly connected to water and quality of life issues. Addressing energy along with other traditional aspects of planning can reduce long-term energy costs while ensuring energy security. The graphic below illustrates how land use and zoning decisions intersect with energy issues.

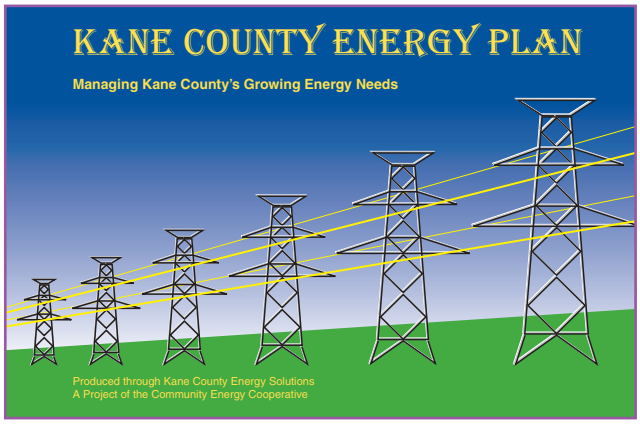
The Kane County Energy Plan: Then and Now

BACKGROUND

In 2005, the Kane County Energy Plan (KCEP) was published after a year-long study of energy use in the county. The initial study started as a response to a community outcry against a plan by ComEd, the local electric utility, to construct a 138kV above-ground transmission line along a 15-mile stretch of Randall Road in central Kane County.

The Illinois Department of Commerce and Economic Opportunity (DCEO) then provided funding for a study that was conducted by the Center for Neighborhood Technology's energy division, CNT Energy (formerly the Community Energy Cooperative).

CNT Energy developed a plan that illustrated the importance of understanding energy consumption in the rapidly growing county. The plan also projected how population and employment growth would impact energy demand by examining current consumption and anticipated population and land use growth patterns through 2030. Kane County is a microcosm of Illinois' varied land use patterns of urban, suburban and rural. Therefore, potential strategies for reducing energy consumption and demand identified in Kane County may be replicable across the state. However, the timing of the 2005 Energy Plan did not coordinate with other county planning priorities and the Energy Plan was not adopted.



KANE COUNTY AND THE REGION

Since 2005, interest in reducing energy consumption has increased across the country. Many local governments have increased their efforts to address energy consumption, going beyond municipal building consumption to address energy consumption in entire communities. Kane County's regional planning agency, the Chicago Metropolitan Agency for Planning (CMAP), analyzed regional energy consumption for the seven-county area that includes Cook, DuPage, Kane, Kendall, Lake, McHenry and Will Counties. The 2009 Regional Energy Analysis was built on individual account-level data that was aggregated at the county level. The analysis provides an in-depth look at how the region consumes energy. It also examines the potential energy and cost savings that could be achieved through the widespread implementation of strategies for improving energy efficiency.[5]

Building on this effort, the Center for Neighborhood Technology, a leading sustainability organization, undertook the task of preparing aggregate community-wide energy consumption profiles for every municipality in the region.[6] At the local level, municipalities in Kane County and across the CMAP region have begun to take action to address energy consumption and related issues. See Appendix 6.

FUNDING OPPORTUNITIES

Over the past several years, funding for energy efficiency has become available at the federal, state and local levels. As part of the American Recovery and Reinvestment Act (ARRA), the Energy Efficiency and Conservation Block Grant (EECBG) funded forty municipalities and six counties in the Chicago region as "direct formula" grantees based on population numbers. Kane County and the municipalities of Aurora, Carpentersville and Elgin were among those receiving awards after outlining specific energy efficiency strategies. In a second EECBG competitive funding round, CMAP was awarded $25 million for a retrofit ramp-up program in the Chicago region, which will create a sustainable energy retrofit market that will last long after the initial three-year funding period.

A host of other federal and state funding opportunities including the Sustainable Communities Program, Weatherization Assistance Program, and Neighborhood Stabilization Program are available to local governments interested in reducing their energy consumption. Adoption of the Kane County 2040 Energy Plan will put the county and its municipalities in a better position to access the valuable technical and financial resources that are available at the regional, state and federal levels. Adopting the Plan will demonstrate the county is committed to planning for energy efficiency and sustainability by establishing well thought-out goals and implementation steps.

KANE COUNTY 2040 ENERGY PLAN

As part of Kane County's Energy Efficiency and Conservation Block Grant funding, the Kane County Board chose to update and broaden the scope of the original Kane County Energy Plan (KCEP). The Kane County 2040 Energy Plan outlines ten strategies for reducing greenhouse gas emissions and total energy use while improving energy efficiency.

Updated electricity and natural gas consumption data was obtained in order to develop four scenarios for future energy consumption. The scenarios include a business-as-usual scenario as well as scenarios for low, moderate and aggressive implementation of energy-saving measures. These scenarios will guide implementation of the strategies.

In addition, the six appendices provide a wealth of information that municipalities can use to initiate or continue steps to reduce energy consumption. For example, the appendices include energy consumption information by municipality, examples of what some municipalities are currently doing to reduce energy consumption, and other valuable resources.

PARTNERS AND ROLES

The data used in the Kane County 2040 Energy Plan was collected and aggregated from account-level electricity and natural gas data. This data was used along with population projections to forecast energy consumption to the year 2040. The 2040 forecast for energy consumption data was used to determine projected cost savings and energy efficiency for each strategy described in the Plan. The success of the Kane County 2040 Energy Plan depends on the extent to which the county, municipalities, utilities and other interested parties are able to work together to increase energy efficiency by implementing the selected strategies.

Kane County

Kane County government has a history of providing leadership in planning for growth as evidenced in the 2030 Land Resource Management Plan and previous county comprehensive plans. During 2011 Kane County

government is poised to expand its leadership in energy-related planning through the development of a 2040 Land Resource Management Plan. This is an excellent time for Kane County, municipalities and the region to take advantage of a variety of funding sources in order to implement the Kane County 2040 Energy Plan. Through implementation of the Kane County 2040 Energy Plan, Kane County has the opportunity to become a regional and national leader in energy and sustainability.

Municipalities

Several municipalities in Kane County are addressing energy and sustainability issues through comprehensive planning, codes and ordinances, and energy efficiency.

Building Owners and Occupants

The strategies outlined in the Kane County 2040 Energy Plan are intended to encourage building owners and occupants to use energy more efficiently. Appendices 3 and 4 outline opportunities for building owners, managers and occupants to reduce energy consumption.

Utilities

Both the electric and natural gas utilities offer energy efficiency programs to their customers. The utilities should consider partnering with interested municipalities to offer enhanced programs. For example, in 2001 and 2002, ComEd partnered with the Community Energy Cooperative and Neighborhood Housing Services in Elgin to develop and conduct a window air conditioner trade-in program. The program allowed hundreds of residents to trade in old, inefficient air conditioners for new EnergyStar®[7] units at no cost. Examples of additional utility programs can be found in Appendix 4. Utilities should also continue to make energy consumption data available through trusted organizations and government agencies. The availability of this data will allow municipalities to monitor progress and ensure results.

Where to Start? Energy Planning in Four Phases

Reducing energy consumption can lead to significant cost savings and reductions in greenhouse gas emissions. However, in order to achieve widespread energy and cost savings it is important to develop an organized, manageable plan that includes goals and actions. Increasing amounts of information and resources are available to assist communities in developing plans and setting achievable energy efficiency goals with coordinated, actionable strategies. The following steps outline key components of the energy planning process.

1) Determine a Baseline. In order to measure progress it is important to first determine the amount of energy currently being consumed. Section 3 of this Plan provides baseline energy consumption data for Kane County. Appendix 2 provides municipal baseline energy consumption data.

2) Select Strategies. There are a variety of strategies available to increase energy efficiency. It is important to select the strategies that are most appropriate for each local government. What works for a municipality with an older and smaller housing stock on quarter-acre lots might not work in a municipality characterized by large estates on acre-size lots.

3) Take Action. There are many resources available to assist in the selection and implementation of strategies. This Plan offers strategies based on energy consumption data in Kane County. The Kane County 2040 Energy Plan can be used as a starting point for each local government. Additional resources can be found in the appendices.

4) Continue Measuring. The most successful strategies are continually refined through performance review and ongoing analysis. Regular comparison of baseline measurements can provide the necessary data.

OTHER REGIONAL PLAYERS

Chicago Metropolitan Agency for Planning (CMAP)

CMAP is the regional planning organization for the northeastern Illinois counties of Cook, DuPage, Kane, Kendall, Lake, McHenry, and Will. By state and federal law, CMAP is responsible for developing a comprehensive plan for the region. The recently released plan, GO TO 2040, aims "to help the seven counties and 284 municipalities plan together for sustainable prosperity through mid-century and beyond."[8] Within GO TO 2040, CMAP closely examines energy issues and recommends retrofits and renewable energy generation as key strategies for reducing energy consumption and greenhouse gas emissions. In addition to comprehensive planning, CMAP conducts important research and shares information on a variety of subjects including land use, transportation, housing, economic development, open space, and other quality of life issues.

State of Illinois

The State of Illinois Department of Commerce and Economic Opportunity (DCEO) provides both funding and informational resources helpful to municipalities, businesses and individuals seeking to reduce energy consumption. These resources include matching funds for public sector agencies and energy efficient appliance rebate programs for the private sector. DCEO also offers a variety of information for municipal governments, businesses, schools, and individuals.

Federal Government

In addition to funding a variety of the energy planning and energy efficiency projects in Kane County, the U.S. Department of Energy offers important energy efficiency information for homes, other building types, vehicles, industry and government. Information tools and resources designed for specific audiences are available online and free webinars and other learning opportunities are made available on a regular basis. and renewable energy programs, some of which are funded by federal energy efficiency grants. In conjunction with Kane County government, these municipalities can help lead the way in promoting energy and sustainability initiatives. They can share information and lessons learned in their communities and provide feedback on the strategies outlined in the Kane County 2040 Energy Plan. This on-the-ground experience from knowledgeable partners can encourage other municipalities to become involved.

SECTION 2

ENERGY 101

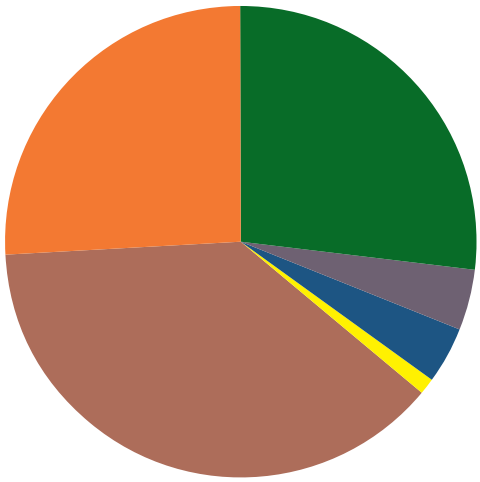
Fueled by rising costs, energy has become a hot topic for discussion in recent years. Concerns about climate change and availability of new technologies continue to increase. This section provides basic information and key concepts that will be helpful for implementing the strategies in this Plan.

Energy Consumption in Buildings

Studies show that in the United States, approximately two thirds of greenhouse gas emissions are from buildings, emphasizing the importance of analyzing energy consumption in buildings.[9] This Plan analyzes energy consumption in residential[10] and commercial and industrial[11] (C&I) buildings using electricity usage data (ComEd electric utility) and natural gas usage data (Nicor gas utility). Other heating fuel sources such as propane, fuel oil, wood, and solar were not analyzed because they currently comprise less than 3 percent of heating fuel used in all occupied housing units in Kane County.[12]

Emissions in the Chicago Region

The Chicago Metropolitan Agency for Planning's GO TO 2040 Plan shows that in the Chicago region, 64% of all emissions are from energy consumption in buildings (electricity/natural gas).



38%	ELECTRICITY
26%	NATURAL GAS
27%	TRANSPORTATION
4%	INDUSTRY & PRODUCT USE
4%	SOLID WASTE
1%	WASTEWATER
0%	PROPANE & FUEL OIL
0%	AGRICULTURE & LIVESTOCK

REGIONAL EMISSIONS PROFILE WITHOUT AVIATION, TOTAL MILLION METRIC TONS CO2E: 127.8
Source: Center for Neighborhood Technology, included in the GO TO 2040 Plan, page 101.

Basic Facts about Electricity Consumption

There are three stages involved in supplying electricity to consumers:

1. Generation or production of electricity
2. Transmission of electricity from the generation source across the electric grid
3. Distribution of electricity to end users

The energy-saving strategies in this Plan focus on electricity generation and consumption by end users.

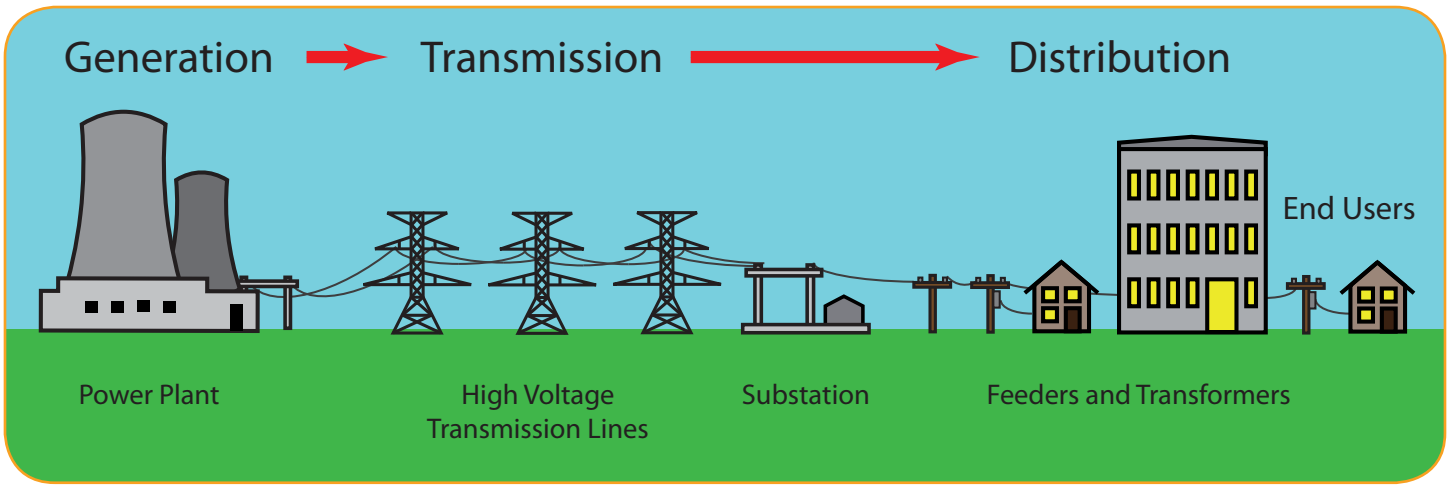


EXHIBIT 4. HOW ELECTRICITY GETS TO OUR HOMES AND BUSINESSES

Current trends show that electricity consumption is on the rise nationwide. In the residential sector, this is attributed to growth in consumer electronics and information technology equipment as well as increases in home size and air conditioning use. In the C&I sector, increasing consumption is driven by telecommunication and network equipment; along with specialized technologies such as medical imaging advancements.[13] In the Chicago metropolitan region in 2005, approximately 31 percent of total electricity consumption occurred in the residential sector, with the C&I sector accounting for the remaining consumption.[14]

PEAK DEMAND

Peak demand or "peak load" is a term that describes a period of time when electricity usage is highest, which can refer to system or individual customer peak demands. System peak demands include total electricity usage across all sectors. Individual peak demands refer to electricity usage by a single utility customer, residential or C&I. Often in Illinois, the highest system peak demands occur on hot summer afternoons when the demand for electricity is high due to air conditioning use. C&I sector individual peak demands typically mirror this system-wide pattern. For the residential sector, individual peak demands are often reached during evening hours when people arrive home from work, turn on lights and appliances, and change temperature settings.

Reducing individual peak demand can influence and potentially reduce system peak demands. This is important because although the highest system peak demands may occur just a few times per year, the electric utility is required by law to be able to meet those demands. Therefore, strategies that reduce system peak demand over time can reduce the utility's need to operate and build additional infrastructure, and decrease the strain on the electrical grid. The U.S. Energy Information Administration (EIA) defines demand-side management as "the planning, implementation, and monitoring of utility activities designed to encourage consumers to modify patterns of electricity usage, including the timing and level of electricity demand."

Although energy efficiency typically focuses on reducing consumption, certain measures also reduce peak demands. For example, replacing an inefficient air conditioner with a more efficient unit, and operating it at the same time as the old air conditioner, reduces electricity demand and overall consumption. The same applies for energy efficient lighting that is on during peak demand times. This relationship between energy consumption and peak demand is important to understand when analyzing the impacts of energy efficiency measures.

Dynamic Electricity Pricing

Residential customers in Illinois have options when it comes to how they pay for electricity. In addition to standard, fixed-price rates, ComEd and Ameren Illinois also offer rate options that let customers pay the hourly market price of electricity. These hourly pricing programs are designed to help households save money by being smart about how and when they use electricity. More than 20,000 Illinois households have signed up for hourly pricing. Participating households have lowered their electricity costs compared with what they would have paid on a standard fixed rate while helping to reduce stress on the electric grid during peak times.

SMART GRID

The electric industry in the United States is undergoing a rapid transformation for the first time in many decades. The industry is incorporating advanced information and communication technologies that will transform the grid into a highly flexible and responsive "smart grid." This digital energy system delivers electricity from suppliers to consumers using two-way digital communications for the control and delivery of information. A smart grid makes it possible to dynamically respond to changes in the grid condition. Modernization of the grid will allow for the efficient integration of innovative technologies such as electric vehicles and renewable energy systems. Proponents claim many potential consumer benefits that could result from the implementation of smart grid technologies. For example, smart meters make it possible to offer "dynamic electricity pricing" options that can benefit consumers and help reduce strain on the electric grid. Advances in metering technology also create opportunities to provide consumers with access to more information about their electricity usage and costs, which can inform their decisions about energy consumption.

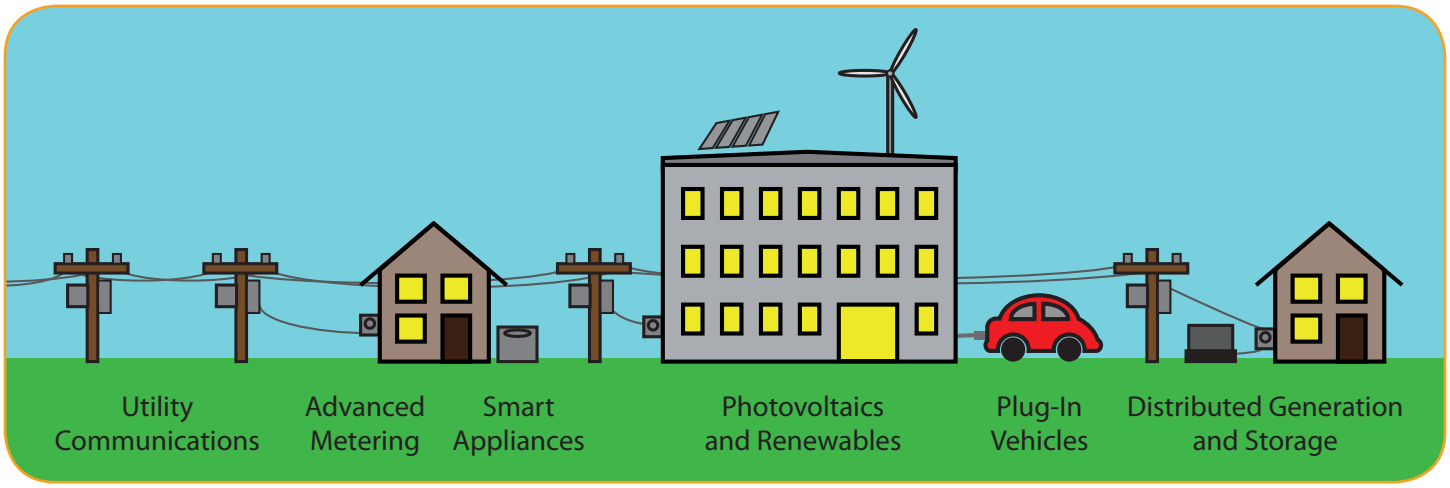


EXHIBIT 5. HOW SMART GRID WORKS

Basic Facts about Natural Gas Consumption

There are three stages in the process of supplying natural gas to consumers:

1. Generation of natural gas[15]
2. Transmission of natural gas from generation source[16]
3. Distribution of natural gas to end users

The natural gas strategies in this Plan focus on consumption by end users.

In northern Illinois, natural gas is the primary fuel used for space heating. In addition, natural gas is commonly used for hot water heaters, clothes dryers, and cooking in the residential sector. However, consumption is slowly decreasing due to increased energy efficiency in both homes and businesses and because of de-industrialization in the C&I sector. In the Chicago metropolitan region in 2005, the residential sector accounted for approximately 57 percent of all natural gas consumption in the region, with the balance in the C&I sector.[17]

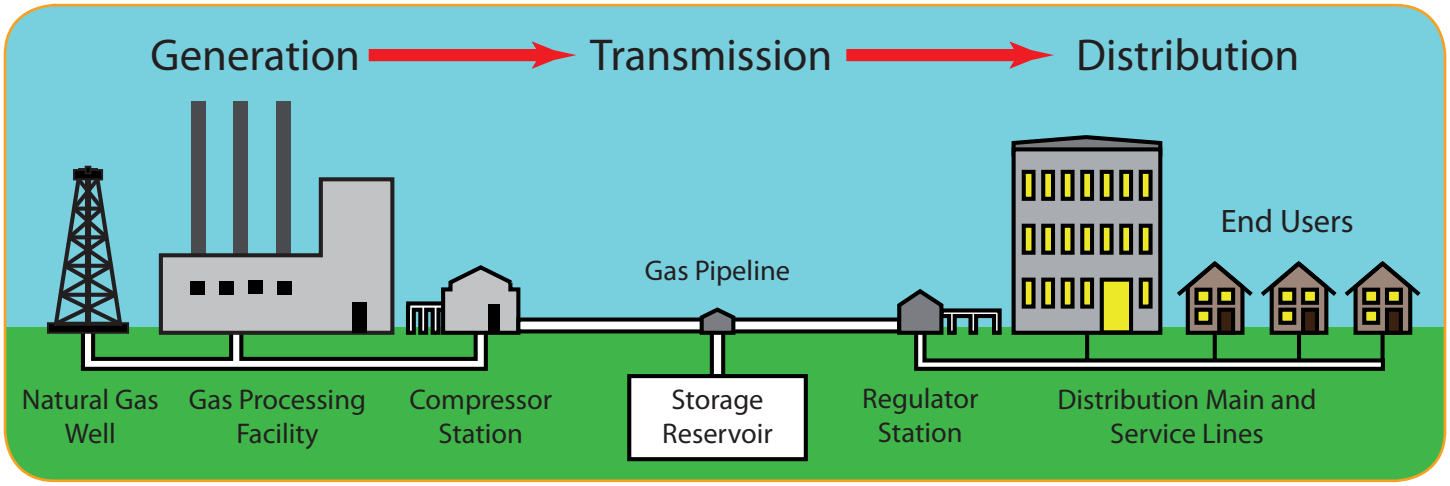


EXHIBIT 6. HOW NATURAL GAS GETS TO OUR HOMES AND BUSINESSES

The Connection between Energy and Emissions

WHAT ARE GREENHOUSE GAS EMISSIONS?

Greenhouse gases are gases that trap heat in the Earth's atmosphere. Common greenhouse gases include carbon dioxide (CO_2), Methane (CH_4) and Nitrous Oxide (N_20). Greenhouse gases come from both natural sources and human activities. Over the past 200 years, greenhouse gas emissions associated with human activities have increased dramatically due to deforestation and the burning of fossil fuels such as coal, oil, and natural gas. (U.S. Environmental Protection Agency, *www.epa.gov/climatechange/basicinfo*).

Today, most of the world's energy originates from the burning of fossil fuels. These fossil fuels consist of hydrogen and carbon, and when burned to create energy, the carbon combines with oxygen to create carbon dioxide, a greenhouse gas. However, the amount of carbon dioxide produced depends on the carbon content of the fuel.[18] For example, coal (used to produce electricity) emits nearly twice as much

EXHIBIT 7. U.S. POWER GRID BY REGION
Source: U.S. Environmental Protection Agency

carbon dioxide per unit of energy as natural gas. While burning any fossil fuel contributes to greenhouse gas emissions, nuclear power and renewable energy sources offer significantly lower emissions during energy production. Understanding this relationship is important when selecting strategies to reduce greenhouse gas emissions. Table 2 below shows types of energy by source, use and associated emissions.

The Chicago metropolitan area draws its electricity from a regional electric grid that covers parts of Illinois and states to the east, as illustrated. The electricity that flows through this regional grid is produced mainly by burning coal (73 percent), and through nuclear power (22 percent).[19] In contrast, the northeastern part of the United States has a significantly higher natural gas base load generation and very little coal, while electricity in the northwestern part of the United States mainly comes from hydro-electric generation. Because fossil fuels, particularly coal, make up such a large percentage of the fuel used to generate electricity in the region, electricity consumption in northern Illinois accounts for a significant portion of greenhouse gas emissions.

Energy Sources, Use and Greenhouse Gas Emissions from Generation

Energy Type	Energy Source	Use	Emissions (from generation)
Fossil Fuel	Coal	Electricity	Highest
	Petroleum	Transportation	High
	Natural Gas	Natural Gas, Electricity	Medium
Nuclear Power	Nuclear	Electricity	Low
Renewable	Wind	Electricity/Heating	None
	Solar	Electricity	None
	Biomass	Electricity	Very Low
	Hydroelectric	Electricity	None
	Geothermal	Heating	Very Low

TABLE 2

EMISSIONS AND CLIMATE CHANGE

According to the U.S. Environmental Protection Agency, "the Earth's climate has changed many times during the planet's history, with events ranging from ice ages to long periods of warmth. Historically, natural factors such as volcanic eruptions, changes in the Earth's orbit, and the amount of energy released by the sun have affected the Earth's climate. Beginning late in the 18th century, human activities associated with the Industrial Revolution have also changed the composition of the atmosphere and therefore very likely are influencing the Earth's climate." (*www.epa.gov/epahome/learn.htm#climate*)

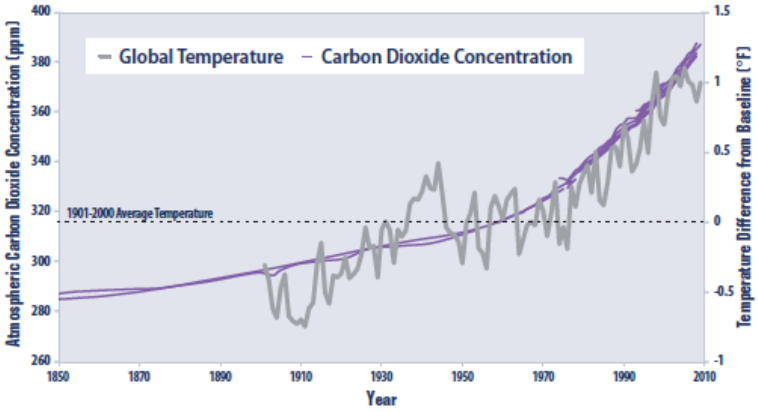
Greenhouse gases trap heat in the atmosphere. This natural warming effect is essential to support life; however, too many greenhouse gas emissions added to the atmosphere can shift Earth's equilibrium, adding significant heat. This creates a change in climate.

Climate change refers to long term, major changes in air and ocean temperatures, rainfall, snow, or wind patterns. Although these changes result from human and natural causes, the considerable impacts seen around the world cannot be explained solely from natural causes. Human activities that add to natural greenhouse gas emissions in the atmosphere include but are not limited to burning fossil fuels for energy, cutting down trees, generating waste, and development of land. A direct link has been made between this increase in atmospheric greenhouse gas emissions and an increase in atmospheric temperature (Exhibit 8).

Worldwide, the last decade has been the warmest on record. But greenhouse gas emissions have impacted the climate not just by increasing average temperatures, but also by increasing the frequency and severity of extreme weather. The following changes[20] have already been observed:

- Changing precipitation patterns
- Melting ice in the Arctic
- Melting glaciers around the world
- Increasing ocean temperatures, which will likely cause more intense hurricanes in the Atlantic, potentially eliminating 10,000 square miles of land in the U.S. by the end of the century

The Link Between Greenhouse Gases and Temperature, 1850–2009



Source: Carbon Dioxide Information Analysis Center. 2010. http://cdiac.ornl.gov/ and National Oceanic and Atmospheric Administration. 2010. www.noaa.gov

EXHIBIT 8. GREENHOUSE GASES AND TEMPERATURE

- Acidification of the oceans due to elevated carbon dioxide in the atmosphere
- Responses by plants and animals, such as shifting ranges. For example, some migratory birds are spending the winter an average of 35 miles further north than they did 40 years ago.[21]

Aurora's Green Power Campaign

US EPA defines green power as "electricity generated from a subset of renewable resources, including solar, wind, geothermal, biogas, biomass, and low-impact hydroelectric sources." (Source: US EPA Guide to Purchasing Green Power.)

The City of Aurora kicked off a "Go Green Aurora" campaign in 2010, encouraging residents and businesses to switch to a renewable energy supplier or choose the option to purchase "renewable energy certificates," that allows customers to access renewable energy resources from a variety of energy sources across an entire region.

Renewable Energy

WHAT IS IT?

Fossil fuels are considered nonrenewable energy sources. This means they draw on finite resources that will eventually dwindle, becoming too expensive or too environmentally damaging to retrieve. In recent years there has been increasing interest in renewable energy, and in particular, wind energy. Renewable energy sources are constantly replenished and will never run out (US EPA). They include wind, solar, and hydrothermal energy. Renewable energy consumption is expected to increase as the cost of oil and natural gas rise and environmental concerns become more widespread. Financial incentives designed to increase renewable energy production will also have an effect on consumption.

RENEWABLE ENERGY IN THE UNITED STATES

Over half of all renewable energy generated in the United States is used to produce electricity. The other major use is the production of heat and steam for industrial processes. Renewable fuels are also used in cars and trucks, as well as homes. Table 3 defines the most common types of renewable energy.

Most Common Types of Renewable Energy

Solar	Solar energy is energy that comes from the sun. Solar energy is used to generate electricity and to heat buildings and water.
Geothermal	Geothermal energy involves capturing heat from within the earth's core via steam or hot water. It is used to heat buildings, provide hot water or generate electricity.
Waste	Waste can be used to generate energy through waste-to-energy combustion or the collection of landfill gases. Waste-to-energy combustion is the most common means of creating energy from waste. It involves burning municipal solid waste at energy facilities. This creates steam and heat, which can be used to generate electricity. Landfill gas is another form of waste energy. This involves collecting the methane gas released when waste decomposes in landfills.
Wind	Wind is air in motion and caused by uneven heating over land and water. Wind energy is used to generate electricity.
Biofuels	Biofuels come from organic materials (plants or animals), or biomass. For example, corn or other plant materials can be used to create ethanol, which is used to fuel vehicles. Biofuels can also be burned to generate electricity or to heat buildings.
Wood	Wood is a biomass (organic material made from plants and animals). When burned, the chemical energy in the wood is released as heat. Wood or wood waste can be burned to provide heat to industries and homes or to generate electricity.
Hydropower	Hydropower is mechanical energy harnessed from flowing water. It is one of the oldest sources of energy and today it is most commonly used to generate electricity.

TABLE 3

Renewable energy accounted for only eight percent of total energy consumption in the United States during 2009. Exhibit 9 illustrates that hydropower was the largest source of renewable energy consumption, followed by wood, biofuels, wind, waste, geothermal, and solar.

In Illinois the most viable renewable options are wind and solar energy production at large and small scales. Small-scale geothermal energy projects can also provide energy saving opportunities.

REGULATING RENEWABLE ENERGY IN ILLINOIS

In August 2007, Illinois enacted legislation (Public Act 095-0481) that created the Illinois Power Agency (IPA). The agency's purpose is to develop electricity procurement plans for investor-owned electric utilities (EUs) that supply more than 100,000 Illinois customers in order to ensure "adequate, reliable, affordable, efficient, and environmentally sustainable electric service at the lowest total cost." The procurement plans must include cost-effective renewable energy resources per the renewable portfolio standard (RPS).

The Illinois Renewable Energy Standard adopted in 2007 set annual incremental percentage goals for electricity production from renewable sources, culminating in 25 percent renewable sources by 2025. The renewable energy will come from wind energy (75 percent), solar energy (6 percent) and other sources. It is worth noting that within this requirement, "the law prohibits renewable energy purchases from increasing electric rates more than one half percent over the previous year."[22] In 2009, the required percentage of electricity production from renewable sources was 5 percent.

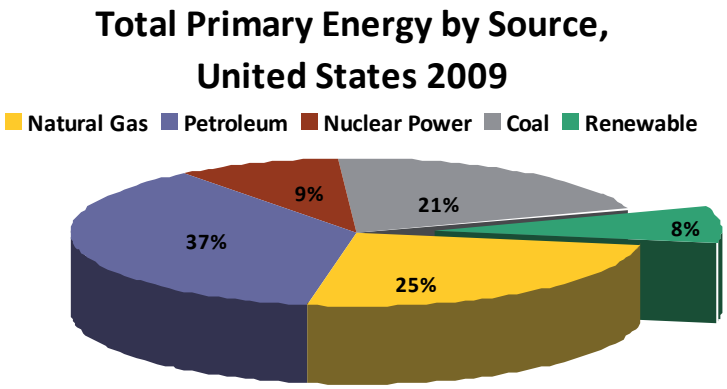
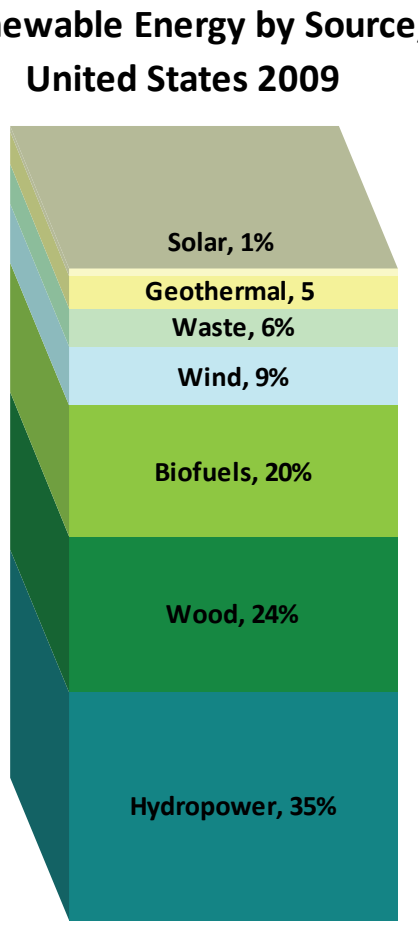


EXHIBIT 9



WIND ENERGY

Within the last few years, Illinois has experienced major expansion in wind energy development for several reasons.

1. **Strong wind resources.** According to the U.S. Department of Energy, Illinois prairie winds have an average speed of 5.0 meters per second (m/s). Some of the highest wind speeds occur in the northern and central areas of the state, as illustrated in Exhibit 10.

2. **Supportive transmission infrastructure.** Wind farms in Illinois can connect to existing statewide high voltage transmission lines. In addition, much of northern Illinois is connected to the PJM electric grid, a regional transmission system serving 13 states and 50 million customers. Of those 13 states, Illinois has the highest wind speeds, presenting viable opportunities for Illinois wind farm projects to partner with utilities and increase economic development. Other states have much less developed electric infrastructure. Connecting wind energy to the grid in those states requires a much larger investment.

3. **State legislation.** As mentioned previously, the Illinois Renewable Energy Standard requires 25 percent of electricity production to come from renewable sources by the year 2025. Wind must account for 75 percent of the renewable energy. To date, Kane County, the City of Batavia, and the neighboring counties of Kendall (south) and DeKalb (west) have adopted wind ordinances that regulate wind energy systems and locations for siting. McHenry County, the Village of Montgomery, and the City of Naperville are currently considering similar ordinances, with others likely to follow.

4. **Funding and incentives.** The U.S. Department of Energy and the U.S. Environmental Protection Agency provide resources through grants that can be used for wind energy production. Kane County recently initiated a Revolving Loan Fund for Energy Efficiency providing funds for a variety of projects including wind energy production. The State of Illinois and a variety of non-profit entities offer incentives to offset the cost of installation. See Appendix 5 for more information.

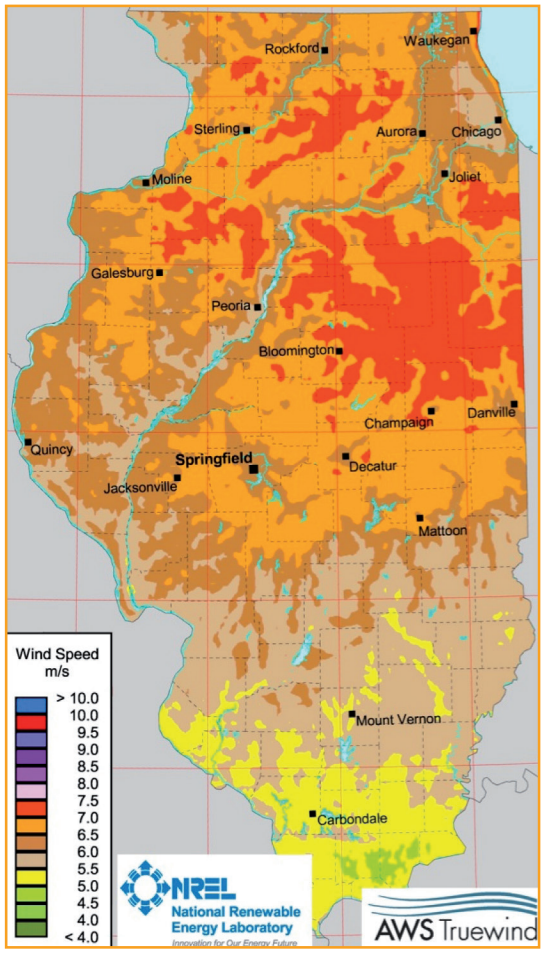


EXHIBIT 10. ILLINOIS WIND MAP
Source: Illinois Wind Energy Association

I.B.E.W. Local Union 461 in Aurora features both solar panels and a wind turbine.

SOLAR ENERGY

In Illinois, the main option for solar power is the use of photovoltaic devices (PV), solar thermal or solar cells, which use sunlight to generate electricity. Solar energy can be captured at the individual household or building level, as well as through larger-scale solar farms. Illinois is expected to experience major solar expansion within the next few years due to a combination of legislation and increased sources of funding, discussed below.

1. **Solar resources.** According to the National Renewable Energy Laboratory,[23] in northern Illinois it is possible to produce nearly 4.5 kilowatt hours of electricity per square meter per day (kWh/m^2/day).

2. **Supportive transmission infrastructure.** Like wind farms, solar farms and PV systems in Illinois can connect to existing statewide high voltage transmission lines.

3. **State and local legislation.** Within the 25 percent Illinois Renewable Energy Standard, 6 percent of renewable electricity production must come from solar power. However, in 2010, the Solar Ramp Up Bill was signed into law shortening the timeframe for the solar energy requirement to 2015 with interim targets between 2010 and 2015. The City of Batavia passed an ordinance regulating solar panel installation. Other communities in the region are considering similar ordinances. In 2010, the Illinois legislature also passed the Homeowners' Solar Rights Act, which "clarifies the rights of homeowners or condominium associations to put solar panels on the property and outlines a process for that to occur."[24]

4. **Funding and Incentives.** The Department of Energy and the Environmental Protection Agency provide grants that can be used for solar energy production. Kane County recently initiated a Revolving Loan Fund for Energy Efficiency providing funds for a variety of projects including solar energy production. The State of Illinois and a variety of nonprofit entities offer incentives to offset the cost of installation. See Appendix 5.

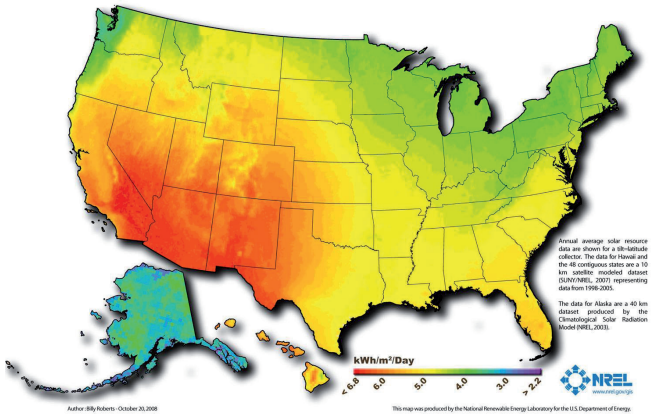


EXHIBIT 11. AVERAGE ANNUAL SOLAR DATA
Source: National Renewable Energy Laboratory

Rockford Solar Plant and Farm

Rockford, situated 40 miles from Kane County's western border, has become the Midwest's unofficial solar headquarters. Wanxiang America Corporation opened its solar panel manufacturing plant in partnership with Chicago-based New Generation Power to develop the nation's 2nd largest solar farm. The 62 megawatt Rockford Solar Project will produce enough electricity to power over 10,000 homes and create over 5,000 green jobs.

SECTION 3

BASELINE ENERGY CONSUMPTION

What is a Baseline Measurement?

The purpose of a baseline measurement is to measure "resulting change that is caused by or linked to some intervention that you have implemented."[25] Without a baseline measurement, the success or limitations of Kane County's energy efficiency strategies would be indeterminable. This is true at any scale, from determining how well a retrofit strategy works at reducing energy consumption at the community-wide level to the household level. Accurate data establishes a concrete starting point from which to measure progress.

Once a baseline measurement is completed, a careful analysis can assist in targeting appropriate strategies. For example, a community with a high level of energy consumption in the commercial and industrial sector may want to examine strategies that target those consumers. Even at the household level, a homeowner may realize his or her annual natural gas consumption is significantly higher than the county's household average and begin to think about ways to reduce consumption

Background Information

The analyses below involved an examination of data[26] from ComEd (electric utility), St. Charles, Geneva and Batavia Municipal Electric Utilities, and Nicor (natural gas utility.) Analyses are presented for two sectors: the residential sector, which includes single family homes, townhomes and apartments; and the commercial and industrial (C&I) sector, which includes a wide range of businesses, industries, government buildings, schools, hospitals and other non-residential buildings. Electricity is measured in kilowatt hours (kWh) and natural gas is measured in therms. Both measurements can be converted to kilo British thermal units (kBtu) for comparison purposes.

Kane Co Electricity Consumption 2008, kWh

Residential	1,617,248,849
C&I	3,253,629,099
Total	4,870,877,948

TABLE 4

ELECTRICITY CONSUMPTION

In 2008, Kane County consumed 4.87 million kilowatt hours (kWh) of electricity. The residential sector accounted for 33 percent of consumption while the C&I sector accounted for 67 percent.

Table 5 illustrates the average annual electricity consumption in 2008 by unit for both the residential and C&I sectors. Residential units represent number of households and C&I units represent the number of accounts. Various factors affect electricity consumption including square footage, the presence and efficiency of air conditioning, efficiency of lighting, appliances and systems, and individual behavior. Electricity cost calculations are based on the average cost per kWh for ComEd as reported in the Illinois Commerce Commission Utility Sales Statistics for 2008. Note that this impacts electricity costs for the municipal electric utilities. Exhibit 13 depicts monthly average residential sector electricity consumption (2008) by census block group in Kane County. Dark green represents the lowest monthly average; red represents the highest.[30]

RESIDENTIAL SECTOR

In general, the southeastern and northern areas of the county experienced lower average electricity consumption per household. The higher averages in the central and western portions of the county may be due to home size or function, such as a farmhouse. Similarly, the higher averages along t northeastern edge may coincide with locations that experienced significant expansion of larger homes in both incorporated and unincorporated areas within the last decade.

Exhibit 14 depicts monthly average commercial and industrial sector[31] (C&I) electricity consumption (2008) by census tract[32] in Kane County. Dark green represents the lowest monthly average; red represents the highest.[33] In general, C&I accounts in the central and western corridors of Kane County experienced lower average electricity consumption, while accounts in the eastern corridor along the Fox River are higher. These higher averages may be due to building size or function, such as large warehouses and industrial uses. Average consumption is also likely effected by population, since the majority of the county's total population resided in the eastern corridor in 2008. As such, schools in these areas serve more students and local municipalities house more personnel in larger buildings.

Exhibit 12. Kane County Electricity Consumption by Sector, 2008

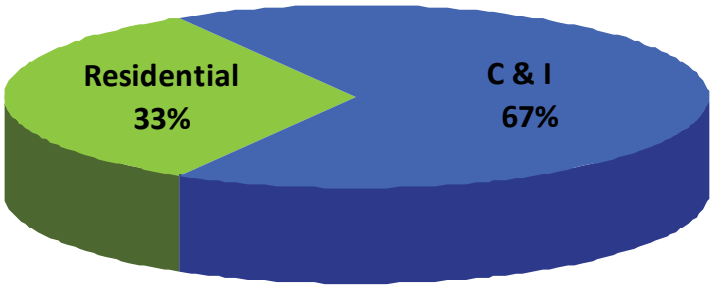


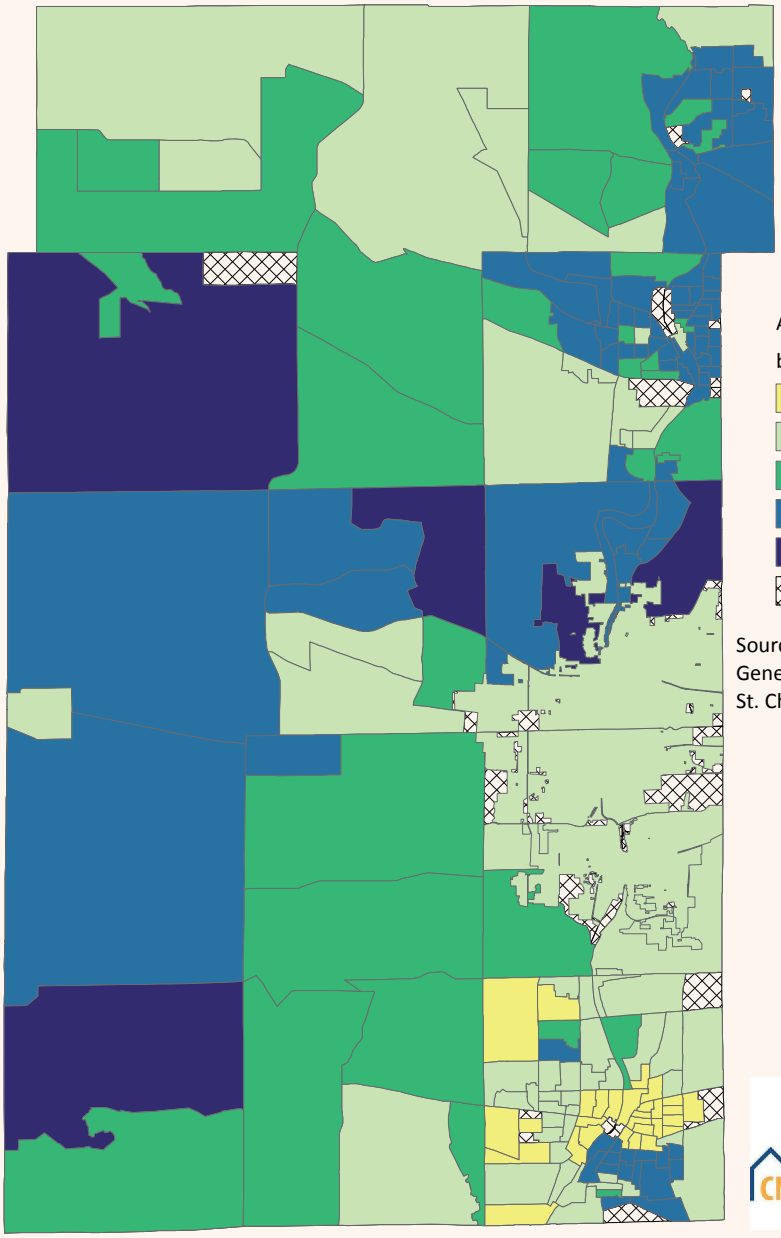
EXHIBIT 12

Average Electricity Consumption and Cost 2008

	Number of Units[27]	kWh per Unit	$ per kWh	Annual $ per Unit
Residential	164,060	9,858	0.116[28]	$1,141
C&I	37,284	87,266	0.095[29]	$8,295

TABLE 5

Kane County Residential Electricity Consumption, Average Monthly kWh per Household, 2008



Average Monthly kWh per HH,
by Census Block Group

- Less than 600 (Less than $70)
- 600 - 899 ($70 - $104)
- 900 - 1,199 ($105 - $139)
- 1,200 - 1,499 ($140 - $174)
- More than 1,500 (More than $175)
- Data unavailable

Sources: ComEd, Batavia Municipal Electric Utility, Geneva Municipal Electric Utility, and St. Charles Municipal Electric Utility

CNTenergy

Kane County Energy Plan

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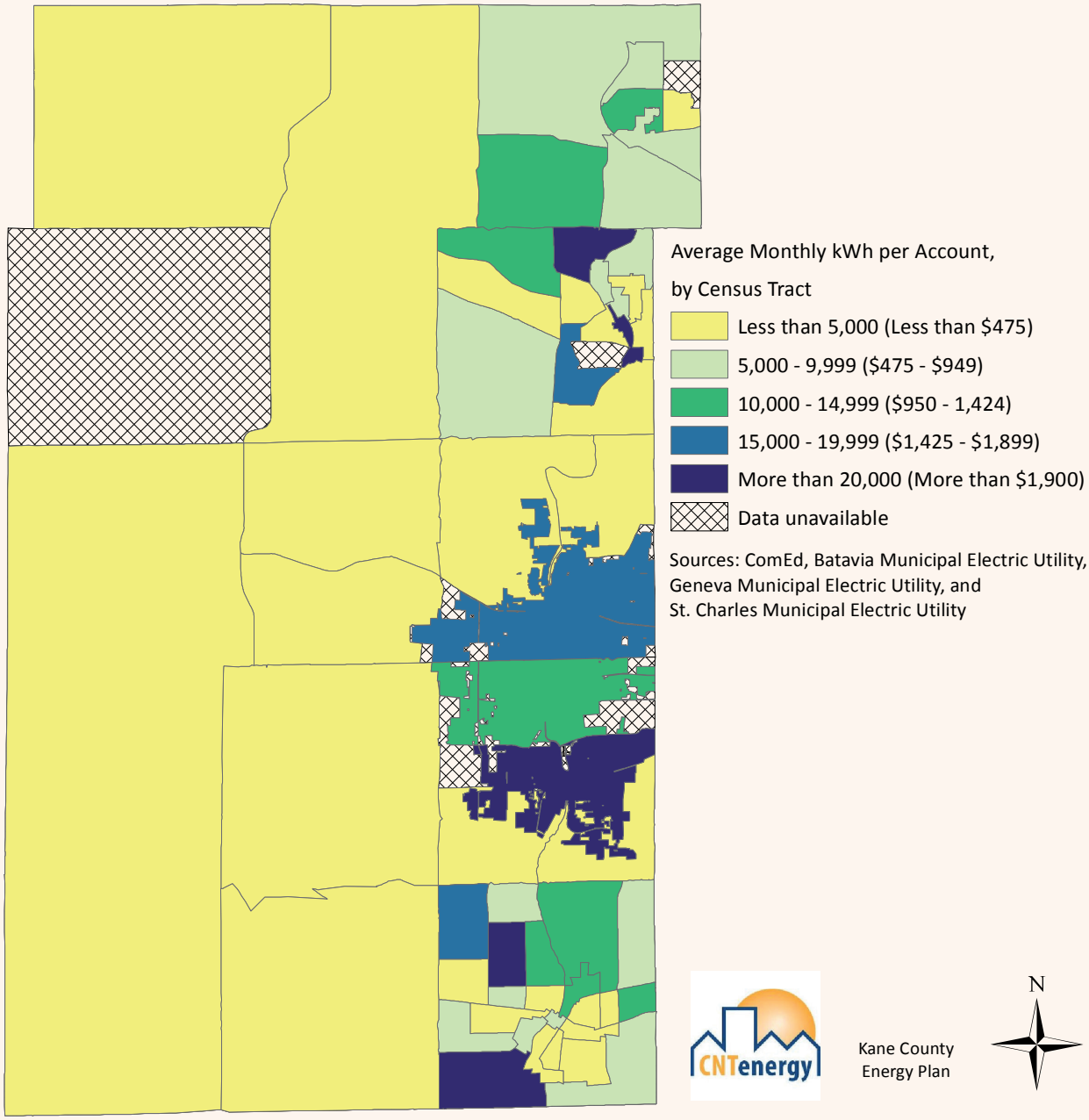
Each area on the map represents average monthly consumption per unit, household or C&I account. It is important to note that these averages can be affected by various factors, including the following:

- Building size and age.
- Building use or function; energy use varies by end use. For example a farm grain dryer; a downtown apartment; a large-lot single family home; a large C&I building, and a storefront convenience store will all have very different energy consumption.
- Occupant behavior, for example the number of occupants, habits, and activities.

Kane County Commercial & Industrial Electricity Consumption, Average Monthly kWh per C&I Account, 2008



Each area on the map represents average monthly consumption per unit, household or C&I account. It is important to note that these averages can be affected by various factors, including the following:

- Building size and age.
- Building use or function; energy use varies by end use. For example a farm grain dryer; a downtown apartment; a large-lot single family home; a large C&I building, and a storefront convenience store will all have very different energy consumption.
- Occupant behavior, for example the number of occupants, habits, and activities.

Natural Gas Consumption

In 2008, Kane County consumed 340 million therms of natural gas. The residential sector accounted for 53 percent of consumption and the commercial and industrial sector accounted for 47 percent.

Table 7 illustrates the average annual natural gas consumption in 2008 by unit for both the residential and the C&I sectors. Residential units represent number of households and C&I units represent the number of accounts. Factors that affect natural gas usage include building size, age of the building, building envelope efficiencies, and the efficiency of the furnace or boiler and water heater.

RESIDENTIAL SECTOR

Exhibit 16 depicts monthly average residential sector natural gas consumption (2008) by census block group in Kane County. Dark green represents the lowest monthly average; red represents the highest.[37] In general, the eastern corridor of the county experienced lower average natural gas consumption per household, while the central and western corridors experienced higher averages. Higher household averages are likely due to home size or age of structure.

COMMERCIAL AND INDUSTRIAL SECTOR

Exhibit 17 depicts monthly average commercial and industrial sector[38] (C&I) natural gas consumption (2008) by census tract[39] in Kane County. Dark green represents the lowest monthly average; red represents the highest.[40] In general, C&I accounts with the highest average consumption are located in the eastern edge of the county, likely due to larger schools and industry and warehousing uses.

Kane Co Natural Gas Consumption 2008, Therms

Residential	181,639,334
C&I	158,437,043
Total	340,076,377

TABLE 6

Exhibit 15. Kane County Natural Gas Consumption by Sector, 2008

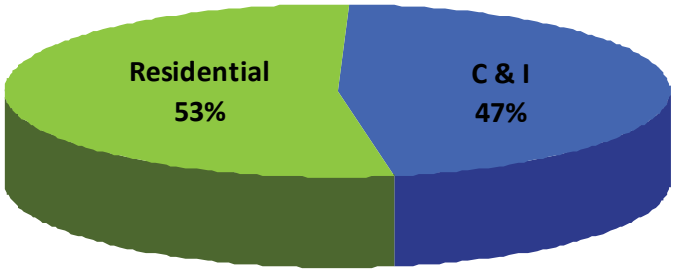


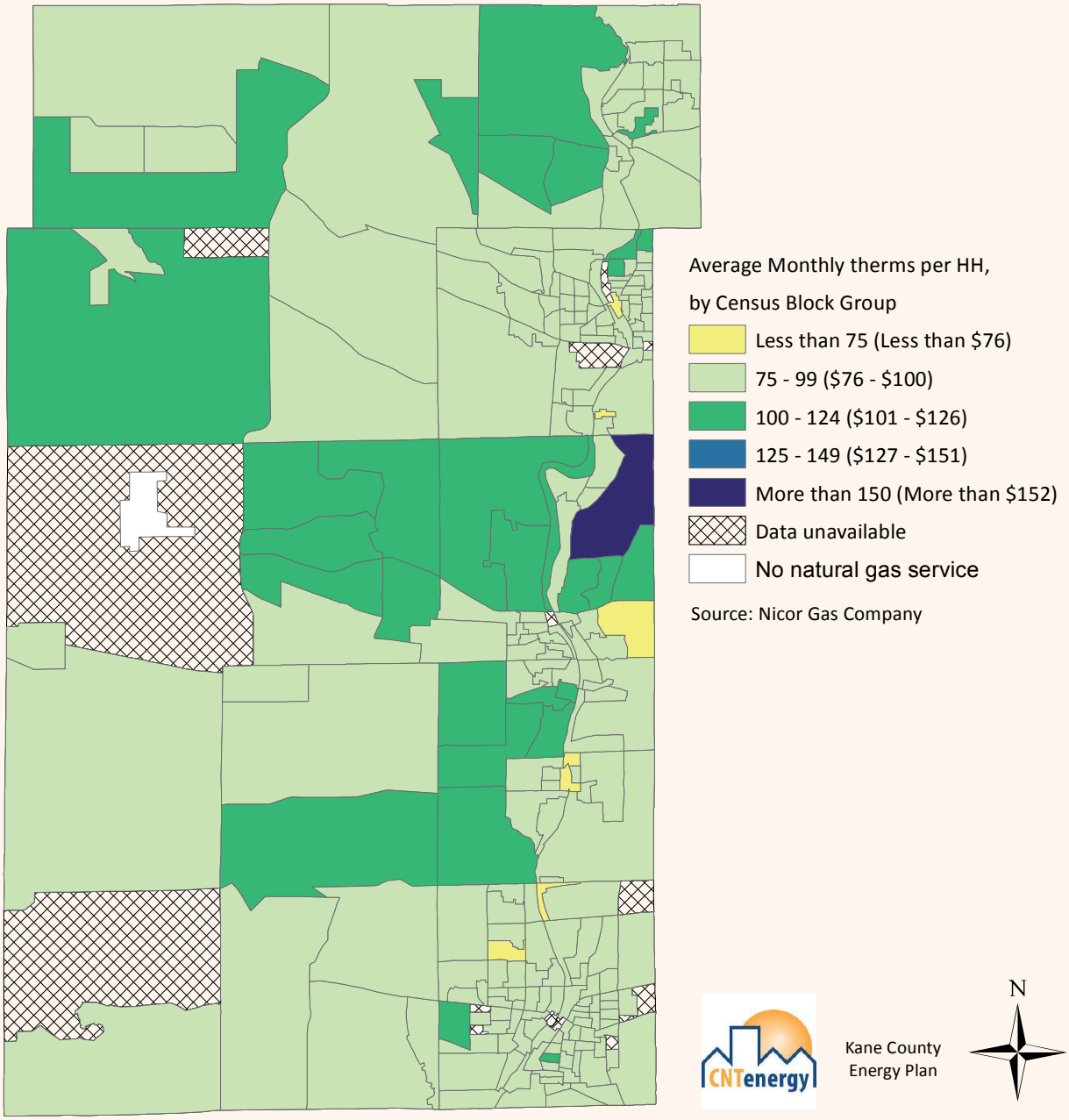
EXHIBIT 15

Average Natural Gas Consumption and Cost 2008

	Number of Units[34]	Therms per Unit	$ per Therms	Annual $ per Unit
Residential	164,060	1,107	1.015[35]	$1,032
C&I	14,481	10,941	0.983[36]	$10,575

TABLE 7

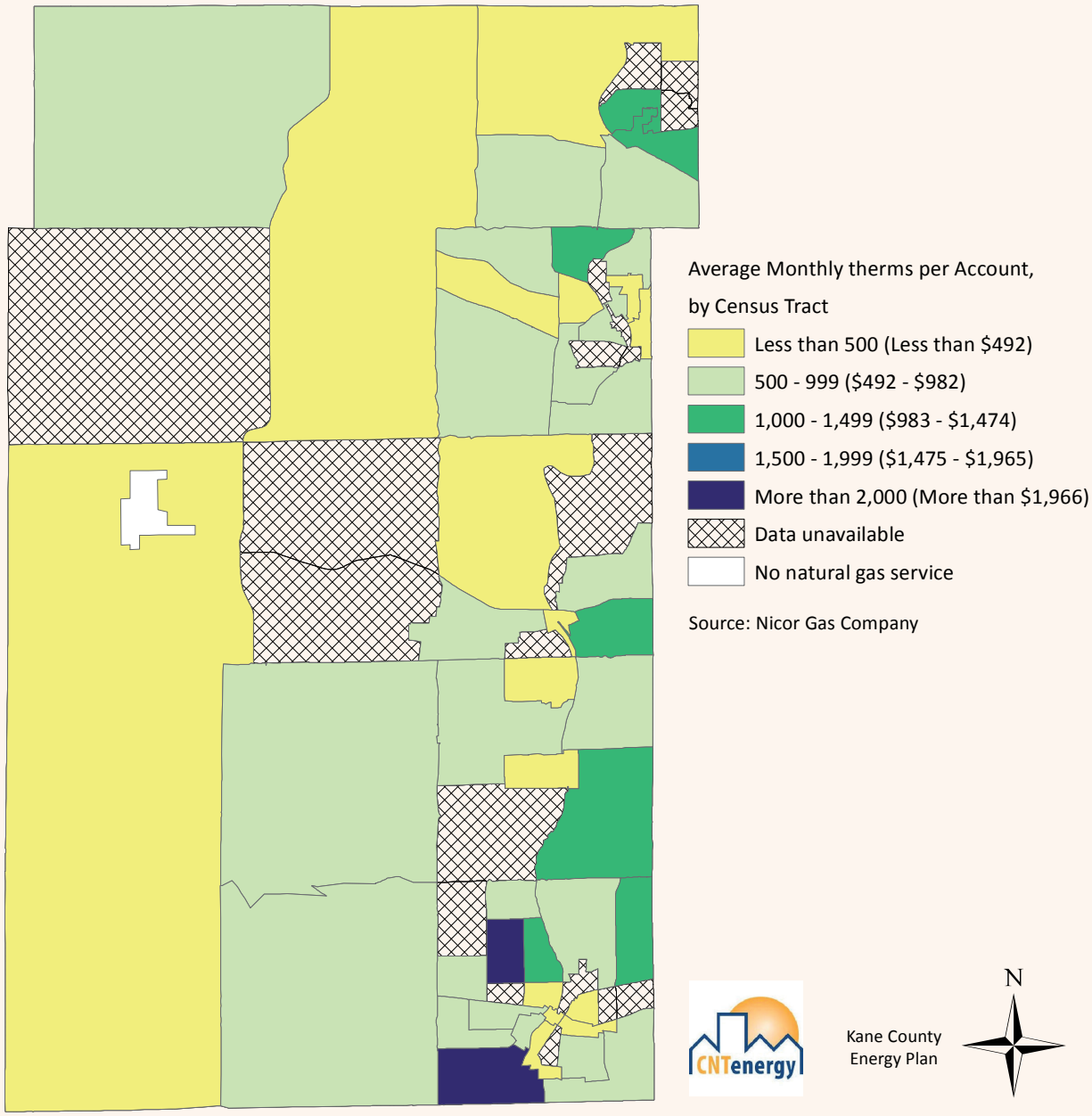
Kane County Residential Natural Gas Consumption, Average Monthly therms per Household, 2008



Each area on the map represents average monthly consumption per unit, household or C&I account. It is important to note that these averages can be affected by various factors, including the following:

- Building size and age.
- Building use or function; energy use varies by end use. For example a farm grain dryer; a downtown apartment; a large-lot single family home; a large C&I building, and a storefront convenience store will all have very different energy consumption.
- Occupant behavior, for example the number of occupants, habits, and activities.

Kane County Commercial & Industrial Natural Gas Consumption, Average Monthly therms per C&I Account, 2008



Each area on the map represents average monthly consumption per unit, household or C&I account. It is important to note that these averages can be affected by various factors, including the following:

- Building size and age.
- Building use or function; energy use varies by end use. For example a farm grain dryer; a downtown apartment; a large-lot single family home; a large C&I building, and a storefront convenience store will all have very different energy consumption.
- Occupant behavior, for example the number of occupants, habits, and activities.

Total Energy Consumption

Table 8 summarizes Kane County's total energy consumption in kBtu (kilo British thermal units). The use of kBtu allows for the blending of multiple energy sources, in this case electricity (kWh) and natural gas (therms) consumption, into a single unit of measure for comparison. Table 9 combines electricity and natural gas consumption, analyzing total energy consumption and costs by residential and C&I sectors. In 2008, Kane County's total energy consumption was 50.6 billion kBtu. At 53 percent, the commercial and industrial sector consumed slightly more energy than the residential sector as shown in Exhibit 18.

Exhibit 18. Kane County Total Energy Consumption by Sector, 2008

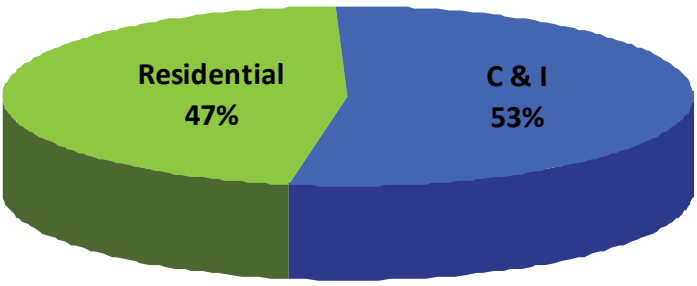


EXHIBIT 18

Electricity and Natural Gas Consumption by Sector in kBtu, 2008

	Electricity	Natural Gas
Residential	5,518,053,073	18,163,933,400
C&I	11,101,382,486	15,843,704,300
Total	16,619,435,559	34,007,637,700

1 kWh = 3.413 kBtu; 1 therm = 100 kBtu

TABLE 8

Total Energy Consumption and Costs, 2008

	Total Energy (kBtu)	Cost
Residential	23,681,986,473	$19,076,486,557
C&I	26,945,086,786	$16,628,992,663
Total	50,627,073,259	$35,705,479,220

TABLE 9

Exhibit 19 illustrates 2008 energy consumption in Kane County by sector, further divided by kBtu consumption related to natural gas and electricity. Total 2008 energy consumption in Kane County is also shown.

Kane County Total Energy Consumption by Sector, 2008

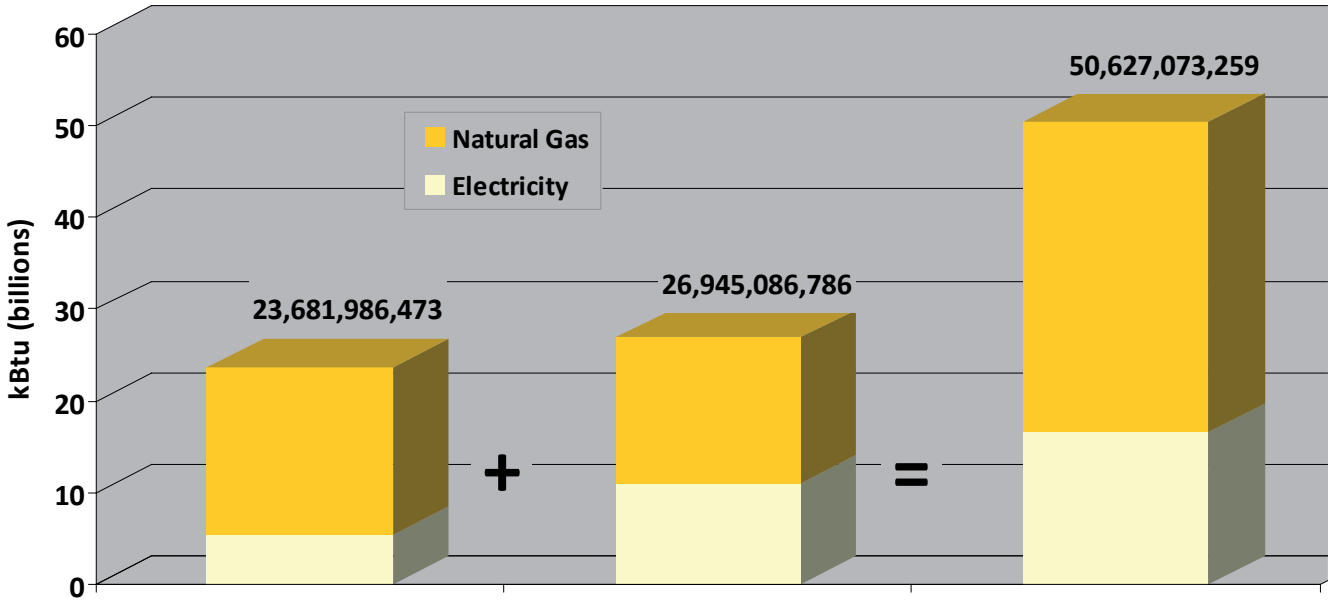


EXHIBIT 19

Total Energy Consumption by Municipality

The following two maps display average annual total energy (kBtu) per unit for each municipality in Kane County. The unincorporated area of the county remains white since there are no boundaries within this area. Calculating average annual kBtu per unit for this entire area is not an accurate representation; therefore, does not add value to this map.

RESIDENTIAL SECTOR

Exhibit 20 illustrates the average annual energy consumption (kBtu) per household for each municipality in Kane County. Dark green represents the lowest average consumption per household; red represents the highest average consumption.[41]

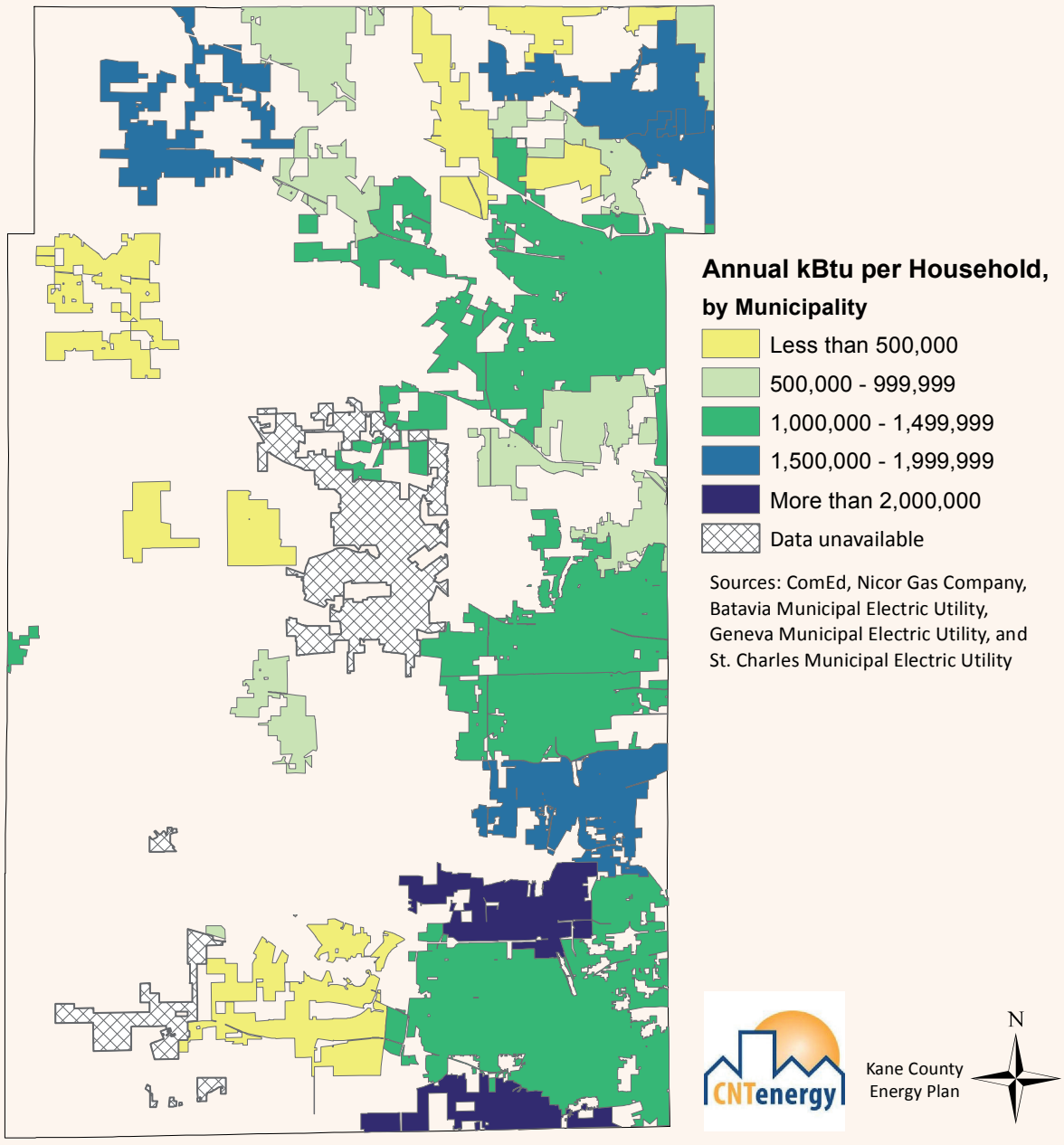
Consumption is depicted in kBtu, which includes both electricity and natural gas consumption. Factors such as building size and age of structure impact average kBtu per household. Specific factors for each municipality are best determined with a careful analysis at the local level.

COMMERCIAL AND INDUSTRIAL SECTOR[42]

Exhibit 21 illustrates the average annual energy consumption per commercial and industrial account (C&I) for each municipality in Kane County. Dark green represents the lowest annual average per account; red represents the highest.[43]

Consumption is depicted in kBtu, which includes both electricity and natural gas consumption. Factors such as function/land use, building size, and age of structure can impact average kBtu per C&I account. Specific factors for each municipality are best determined with a careful analysis at the local level.

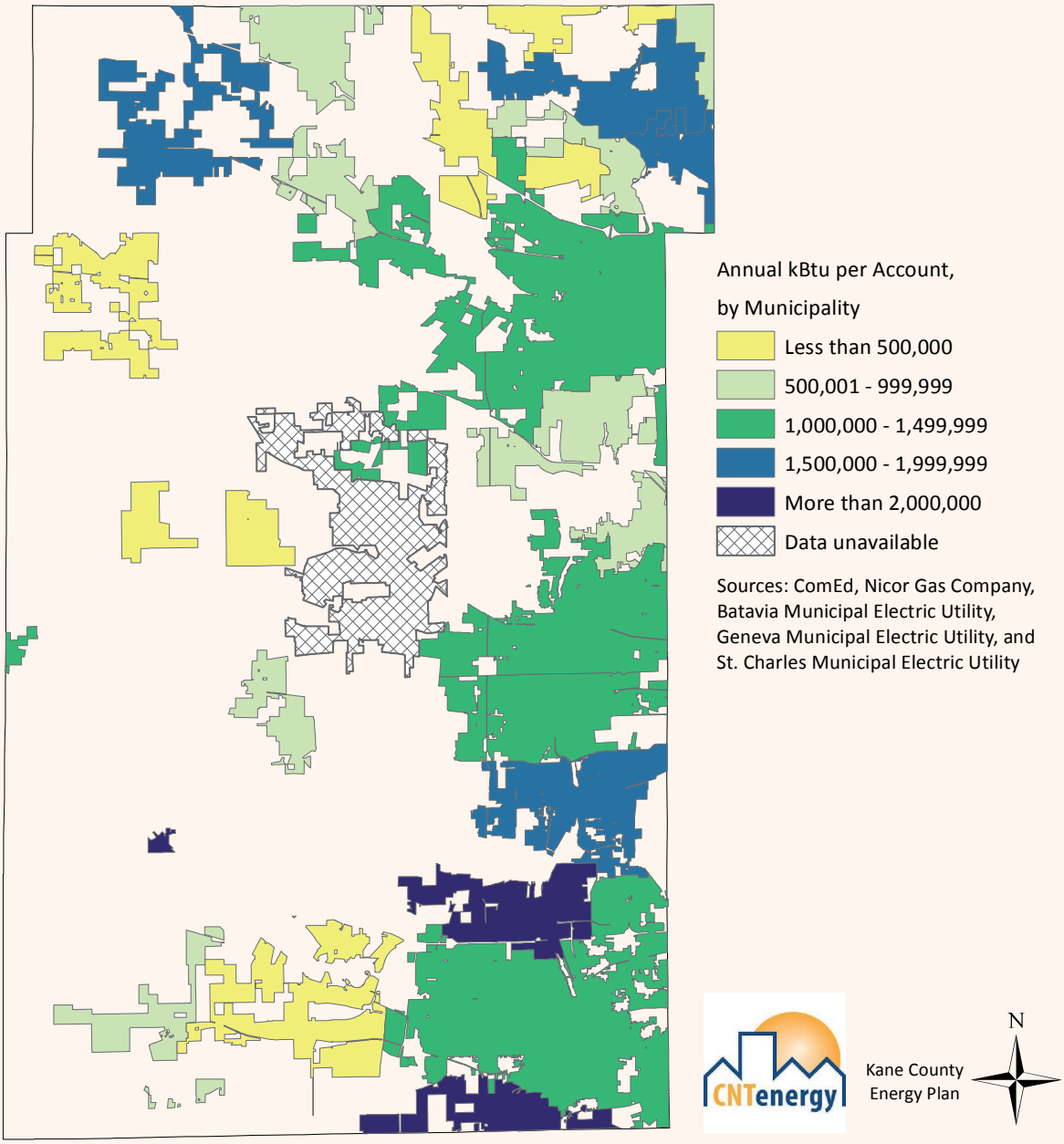
Kane County Residential Energy Consumption, kBtu per Household, 2008



Each area on the map represents average monthly consumption per unit, household or C&I account. It is important to note that these averages can be affected by various factors, including the following:

- Building size and age.
- Building use or function; energy use varies by end use. For example a farm grain dryer; a downtown apartment; a large-lot single family home; a large C&I building, and a storefront convenience store will all have very different energy consumption.
- Occupant behavior, for example the number of occupants, habits, and activities.

Kane County Commercial & Industrial Energy Consumption, kBtu per Account, 2008



Each area on the map represents average monthly consumption per unit, household or C&I account. It is important to note that these averages can be affected by various factors, including the following:

- Building size and age.
- Building use or function; energy use varies by end use. For example a farm grain dryer; a downtown apartment; a large-lot single family home; a large C&I building, and a storefront convenience store will all have very different energy consumption.
- Occupant behavior, for example the number of occupants, habits, and activities.

SECTION 4

STRATEGIES FOR REDUCING ENERGY CONSUMPTION

A Snapshot of Strategy Savings

The ideas represented in the Plan include the most common energy-saving strategies employed by communities across the country for both residential and commercial and industrial (C&I) sectors. The residential sector includes a variety of housing types such as single family homes, attached homes as well as duplexes, and apartments. The C&I sector includes businesses of various sizes and types (storefronts to large industry), all government and public buildings, most nonprofit organizations, and institutions like schools and hospitals.

Each strategy was analyzed for potential energy and cost savings on a per unit basis (by household or commercial account) and county-wide impact. These are estimates and actual savings may differ due to factors such as building size, age of buildings, and individual behavior. Electricity cost calculations are based on the average cost per kWh for ComEd as reported in the Illinois Commerce Commission Utility Sales Statistics for 2008. Note that this impacts electricity costs for the municipal electric utilities.

Strategies for Reducing Energy Consumption

Residential Strategies	
1	Retrofit existing residential buildings
2	Develop green building standards and programs for new residential construction
3	Encourage on-site renewable energy for residential buildings
4	Encourage occupant behavior modification in the residential sector
5	Encourage energy efficient window air conditioner replacement
6	Encourage energy efficient refrigerator replacement
Commercial & Industrial (C&I) Strategies	
7	Retrofit existing commercial and industrial buildings
8	Develop green building standards and programs for new construction
9	Encourage on-site renewable energy for commercial and industrial buildings
10	Encourage occupant behavior modification in the commercial and industrial sector

TABLE 10

Since implementation of a strategy across the entire county depends upon numerous jurisdictions with distinct visions and needs, several potential scenarios have been developed. Actual application of the strategies is expected to fall within the following spectrum.

- **Conservative Scenario:** Strategy implementation at a fairly low rate across the county, with sporadic, committed action by some individuals and/or communities.
- **Moderate Scenario:** Strategy implementation at a modest rate, assuming an increase in commitment and action by individuals and/or communities.
- **Aggressive Scenario:** Strategy implementation at a high rate, requiring broad participation from a large percentage of individuals and/or communities.

Based on the three scenarios it is estimated that Kane County could save $1 billion to $3.4 billion (Exhibit 22) over the next 30 years if collective, planned action is taken now to reduce energy consumption in buildings. It is important to note that the potential energy savings are based on actual energy consumption data in Kane County and not standardized estimates of savings, which don't always take into account regional differences in energy consumption patterns from across the country.[44]

On the following page, Exhibit 23 shows the total projected cumulative energy costs from 2011 through 2040 (in gray) as compared to total projected cumulative cost savings (in green) for each scenario, if each strategy was implemented beginning in 2011. Scenario cost savings range from 5 percent to 16 percent reduction in projected cumulative energy costs through 2040.[45]

Total Strategy Savings

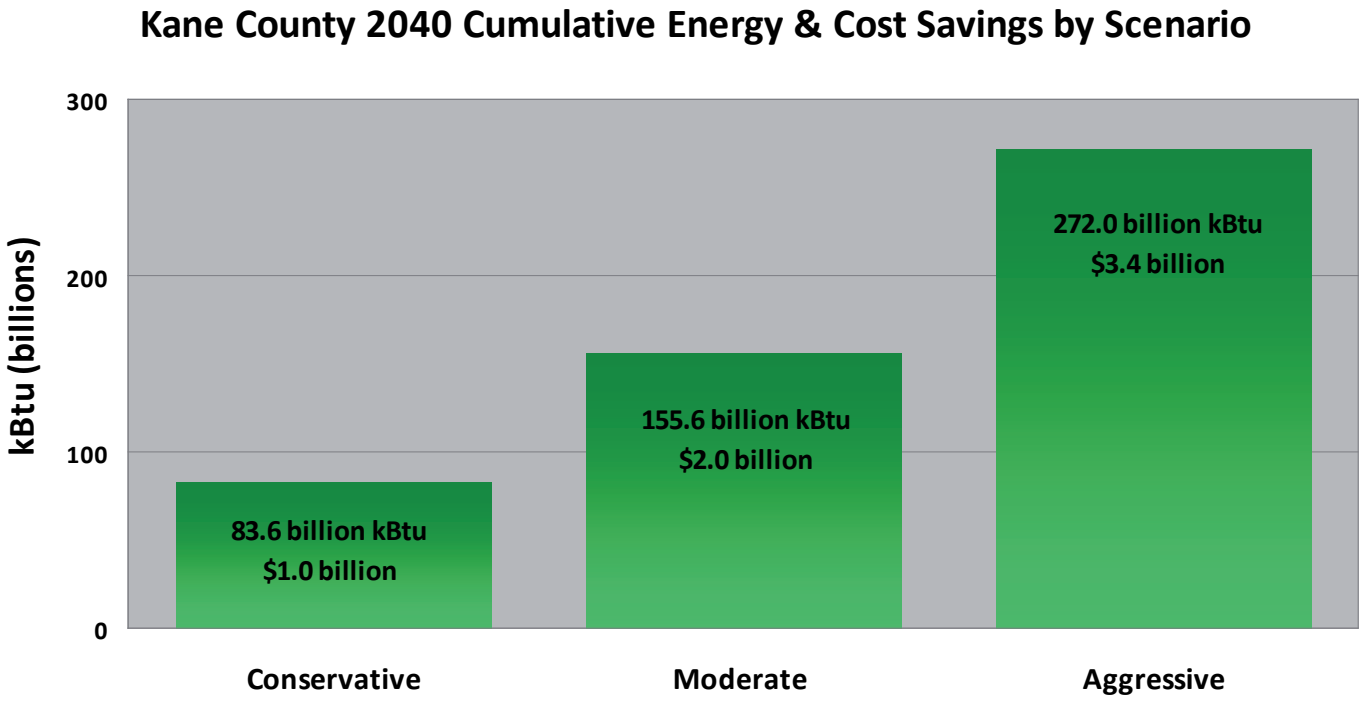


EXHIBIT 22

How to Read the Strategies

The strategies outlined in this section are categorized by sector as residential or commercial and industrial (C&I). Residential sector strategies apply to single family homes, townhomes and condominiums, apartments, and other housing types. C&I sector strategies generally apply to businesses of all sizes, government buildings, nonprofit agencies, and institutions such as churches, schools and hospitals. Each strategy embraces existing technologies and practices that will allow rapid deployment and implementation. The sample strategy that follows outlines the structure of each strategy.

Total Strategy Savings: Kane County 2040 Cumulative Cost Savings by Scenario

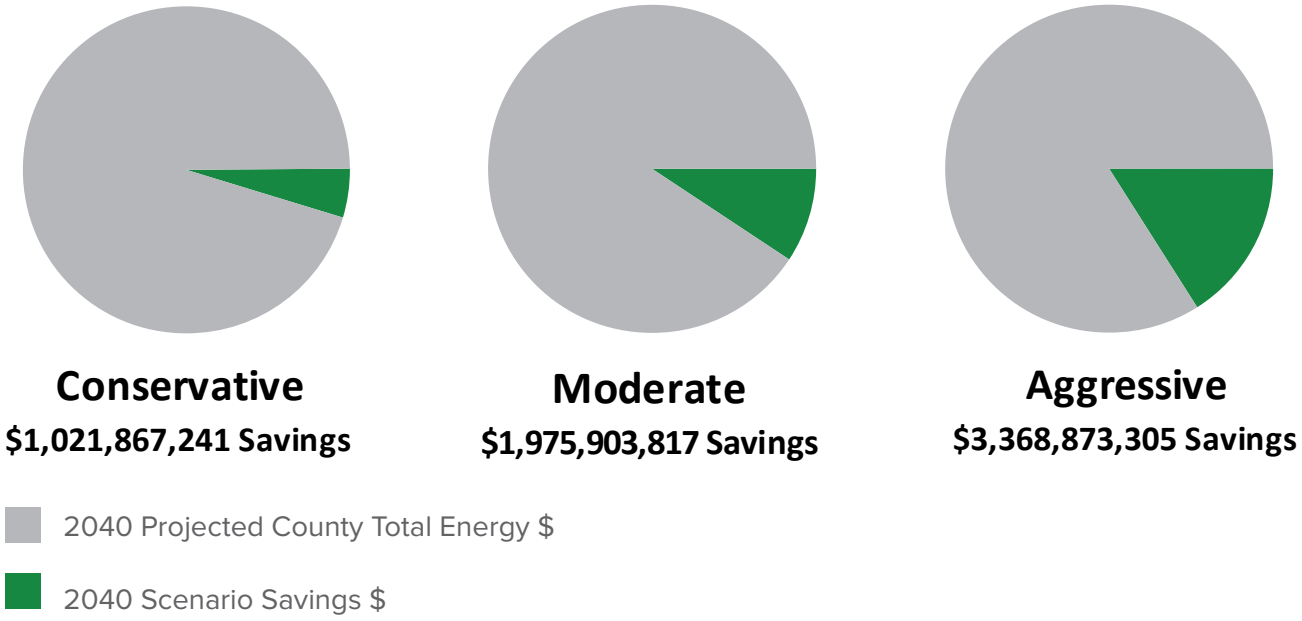


EXHIBIT 23

Sample Strategy

Strategy Description: A brief description of the strategy.

Potential Savings in Kane County: For each strategy, annual energy and cost savings are presented in a table similar to the one below. Savings are based on average energy consumption in Kane County. This is important because national and regional agencies that estimate energy consumption and savings often do not account for local characteristics of energy consumption patterns.

Table 11 illustrates the anticipated energy savings per unit (household or C&I account) for one year. Savings for electricity (kWh) and natural gas (therms) are shown. Both units of energy are combined to show total energy savings in kBtu. Total annual cost savings are also displayed.

Exhibit 24 illustrates the cumulative energy and cost savings for 2011 through 2040 that could result from implementation of the strategy. The exhibit includes estimates for conservative, moderate and aggressive scenarios. Each scenario assumes a specific number of participating units by the year 2040.

Energy savings are calculated for the years 2011 through 2040, with the assumption of linear growth.[46] This timeframe allows for realistic growth in consumer participation.

Potential Annual Savings Per Unit

	Electricity	Natural Gas	Total
Annual Energy Savings	kWh	Therms	kBtu
Annual Cost Savings	$	$	$

TABLE 11

Sample Strategy

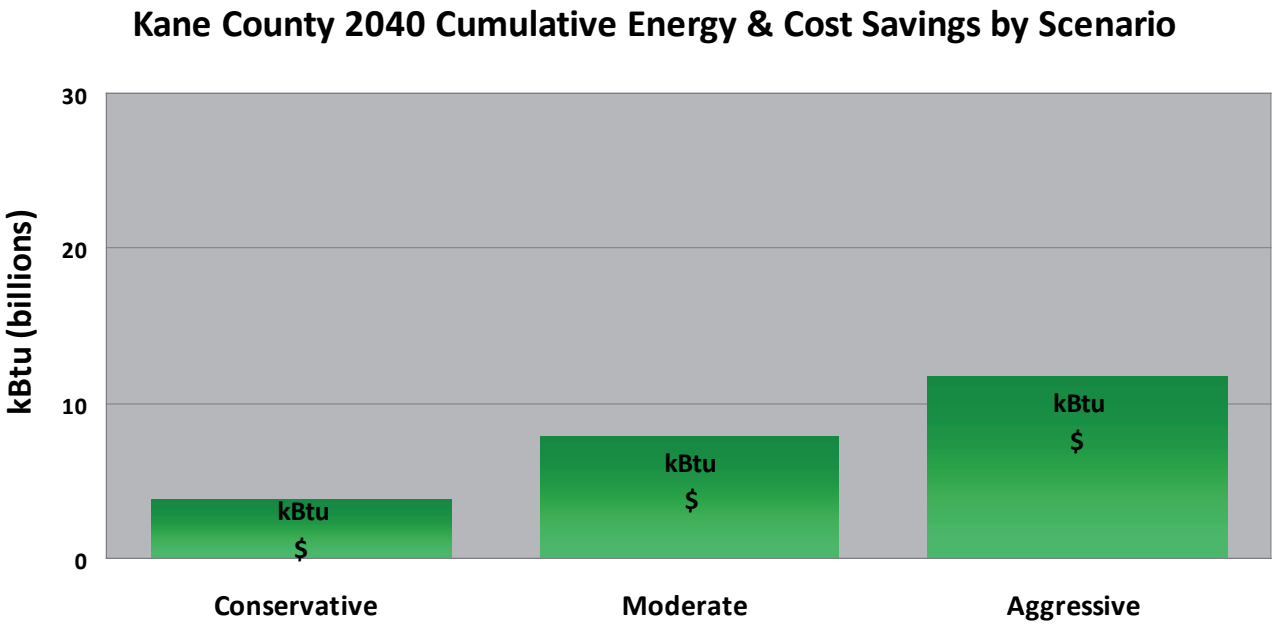


EXHIBIT 24

The cumulative cost savings are those achieved during the entire thirty-year timeframe. For example, as shown in Exhibit 25, a home retrofitted in 2011 saves money in 2011 and each following year.

Benefits and Barriers: This section provides a brief review of the benefits associated with this strategy and the real or perceived barriers to implementation.

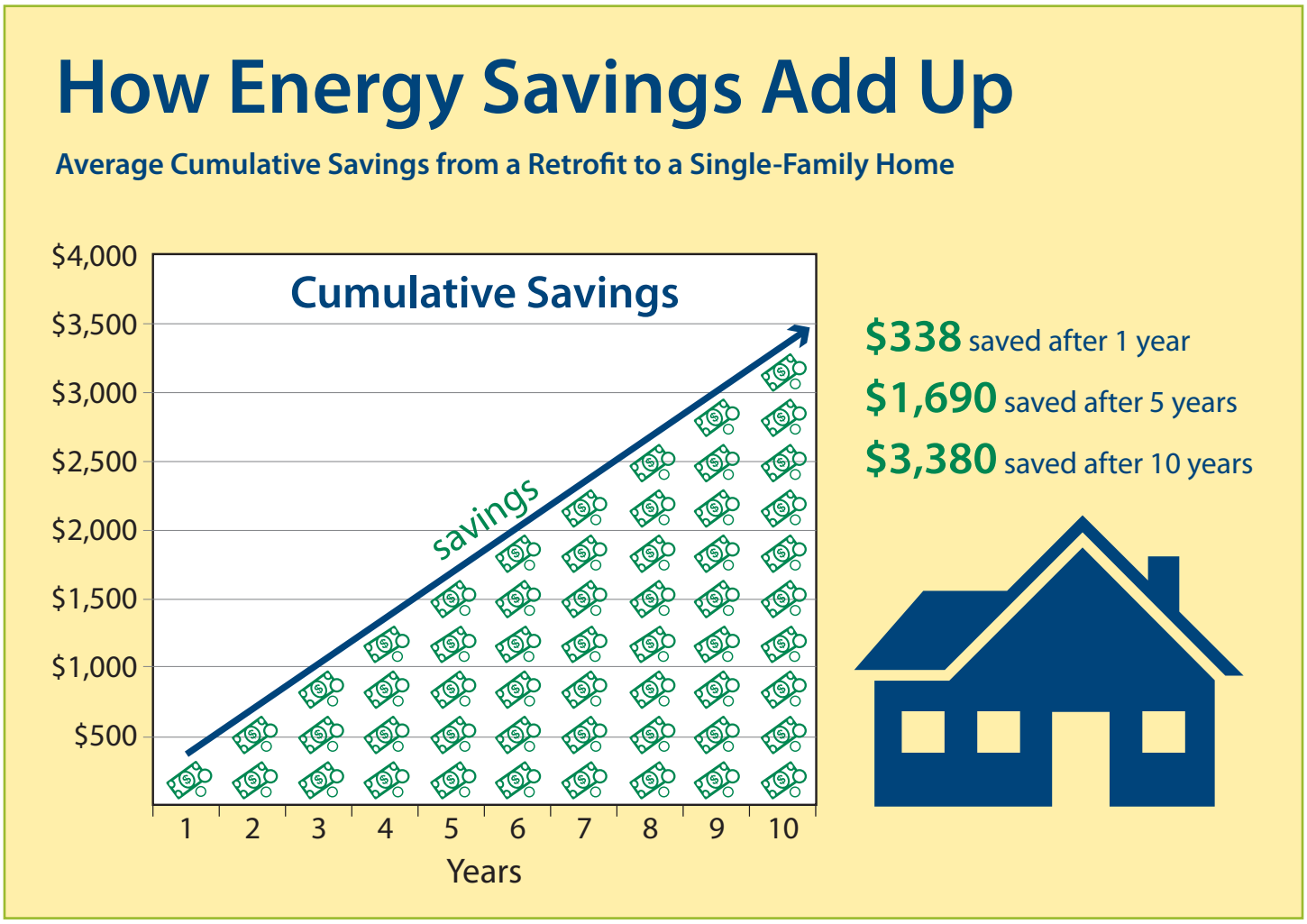


EXHIBIT 25. CUMULATIVE ENERGY SAVINGS FROM HOME RETROFIT

Kane County Action Steps, Sample Strategy

This section provides a brief to-do list for Kane County that is specific to the strategy. In instances where Kane County does not have the ability to directly implement a strategy, action steps that may assist or encourage others to do so are included.

Residential Strategies

There are six strategies for the residential sector that could result in $290 million to $1 billion in savings for consumers who live and do business in Kane County. Implementing these strategies would also reduce projected cumulative residential energy consumption from 3 percent to 10 percent. The range of cost and energy savings reflects different participation rates for each strategy within the conservative, moderate or aggressive scenarios as compared to the business-as-usual scenario.

Municipalities will need to determine the participation rates for each strategy that are reasonable goals for their communities. Rates may depend on several factors, and could result in a mix of conservative, moderate and aggressive goals. For the purposes of this plan, examining countywide implementation of the moderate scenario strategies will provide a total cumulative savings of $614 million to the consumers of Kane County by 2040.

Nearly half of those savings can be achieved if 50 percent of all households in Kane County begin to implement simple changes around the home as described in the residential occupant behavior modification strategy.

Total Residential Strategy Savings

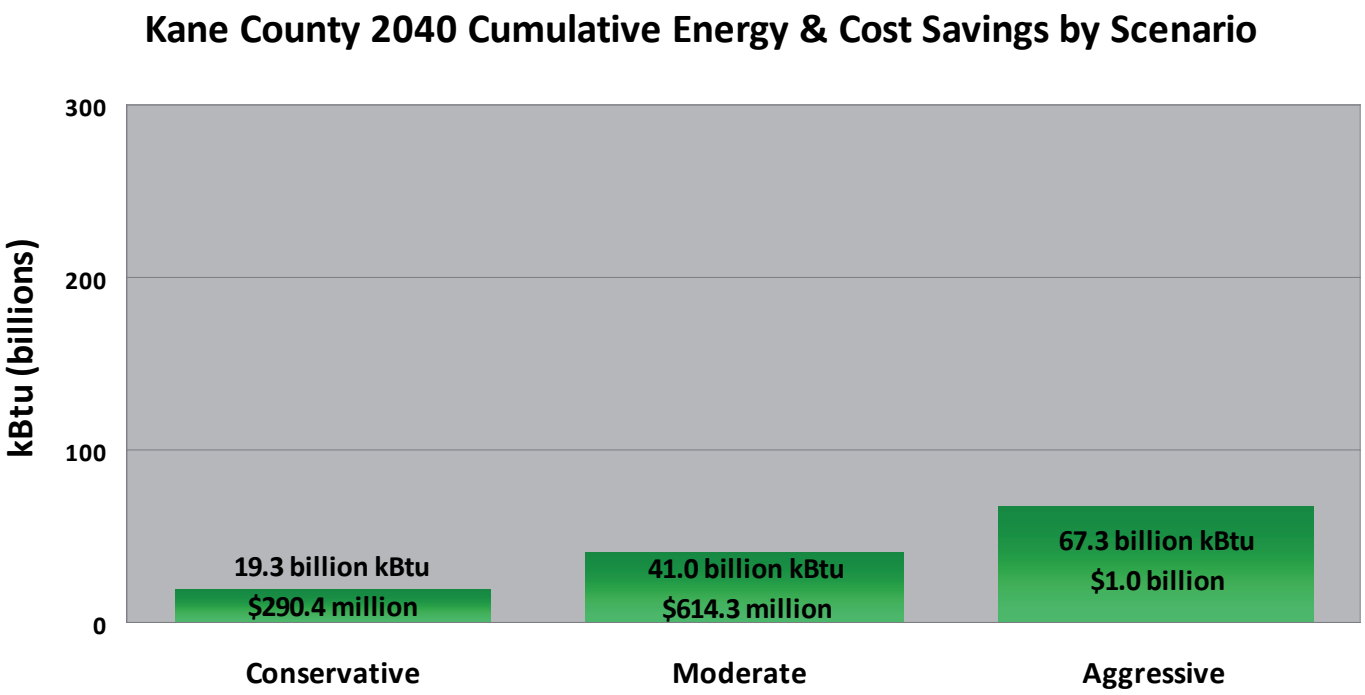


EXHIBIT 26

The strategies highlighted in the table below and described in this section can create significant energy and cost savings for the county. The assumed participation rates reflect current policy and funding trends, existing technologies and available information and resources.

Moderate Scenario Strategies, Rates and Savings

Strategy	Participation Rate (through 2040)	$ Saved in Millions
Behavior Modification	50% all HH	$277.6
Green Building (new construction)	25% all new residential construction	$167.7
Renewable Energy	2% all HH	$76.7
Retrofit Existing Buildings	10% all HH	$69.7
Efficient Refrigerators	10% all HH	$15.2
Efficient A/C	20% HH built before 1980	$7.4

HH=households

TABLE 12

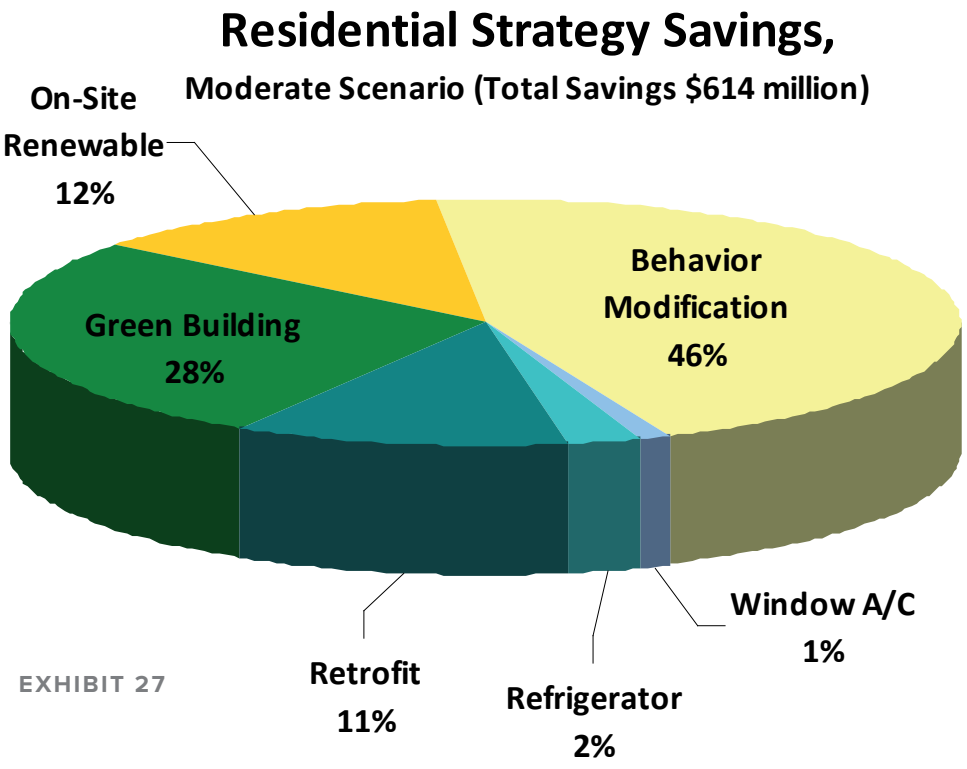


EXHIBIT 27

Strategy 1: Retrofit Existing Residential Buildings

Strategy Description: A retrofit is a whole-building approach to reducing energy consumption. It involves examining all systems within a building and making strategic improvements. Energy retrofits in existing residential buildings are critical to any energy usage reduction strategy because buildings last for many decades. Retrofitting older buildings to improve energy efficiency has proven to significantly reduce electricity and natural gas consumption. A national evaluation of weatherization programs indicates that total energy consumption can be reduced by an average 30 percent[47] per building by implementing comprehensive energy retrofits that use existing technologies and properly maintaining equipment.[48]

Most retrofit programs apply a mix of energy conservation measures (ECMs) and energy efficient technology. Typical ECMs address building envelope, heating, cooling, hot water, lighting and appliances. The most common technologies include insulation, energy efficient windows, high efficiency boilers and furnaces, programmable thermostats or energy management systems, solar or tankless hot water systems, and compact fluorescent bulbs. The most effective retrofit programs combine technical and financial assistance. This comprehensive approach helps property owners identify the most cost-effective energy saving solutions and provides them with access to the capital needed to implement the recommended improvements.

Potential Savings in Kane County: In general, most homes built before 1980 were not built to current energy efficiency standards.[49] These homes can often realize significant cost savings from retrofits. This means that municipalities with older housing stock should make this strategy a high priority. Based on average household consumption in Kane County it is possible to reduce annual household energy consumption by 29,361 kBtu resulting in an estimated cost savings of $338 each year (Table 13).

If retrofits were implemented in 10 percent of households (moderate scenario), cumulative energy savings would reach 7.9 billion kBtu in 2040, for a total savings of $69.7 million. This significant reduction in energy consumption could help reduce individual customer peak demand; and therefore, influence and potentially reduce system peak demands. Exhibit 28 illustrates the potential energy and cost savings for the moderate scenario as well as the conservative (5 percent) and aggressive (15 percent) scenarios. See Appendix 1 for more details.

Residential Retrofit: Potential Annual Savings Per Unit

	Electricity	Natural Gas	Total
Energy Savings	493 kWh	277 Therms	29,361 kBtu
Cost Savings	$57	$281	$338

TABLE 13

Benefits and Barriers: Retrofits of existing buildings offer the potential for significant energy savings with a relatively short pay-back time, ranging from just a few years to approximately 10 years. Another benefit of this strategy is the increasing availability of rebates, tax credits and other incentives from the utilities and local and federal governments. The main barrier may be access to capital to finance retrofits. A retrofit ramp-up program in the Chicago region is expected to provide funding opportunities for retrofits throughout the region Illinois. See Appendix 5 for more details.

Residential Retrofit Strategy

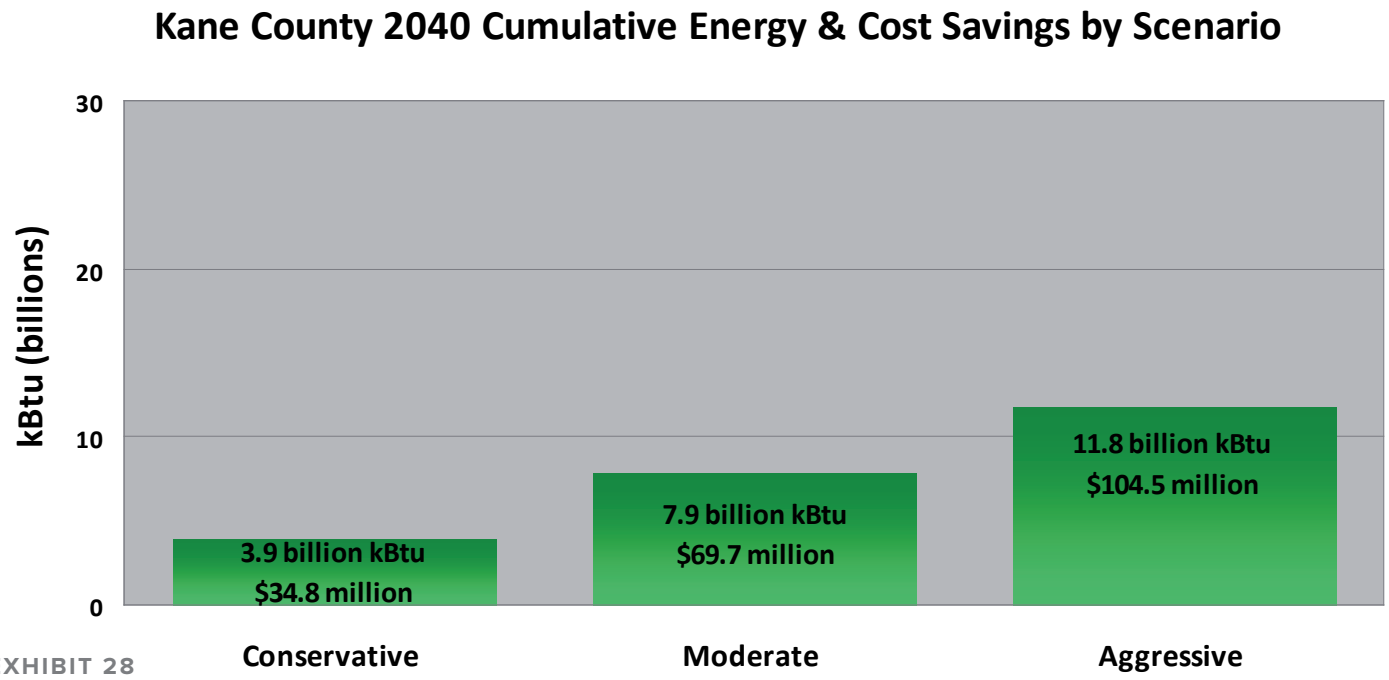


EXHIBIT 28

Kane County Action Steps, Residential Retrofit Strategy

- Support and participate in existing retrofit activities in Kane County and the region.
- Provide technical assistance and information on retrofit programs and loan pools to municipalities.

Strategy 2: Develop Green Building Standards and Programs for New Residential Construction

Strategy Description: The U.S. Green Building Council (USGBC) defines green building as a way to "significantly reduce or eliminate the negative impact of buildings on the environment and on the building occupants" through "sustainable site planning, safeguarding water and water efficiency, energy efficiency, conservation of materials and resources, and indoor environmental quality."[50] Energy consumption can be reduced by 30 percent[51] by constructing new buildings to meet typical green building standards. Green buildings also feature additional benefits such as reduced water consumption, healthier indoor air, durable materials, and reduced construction waste.[52] Another important benefit to building green is that the upfront costs at time of construction are small.[53]

Green building programs typically feature a rating system that measures the degree of efficiency achieved through the implementation of a set of prescriptive standards. Some municipalities set green building standards through building codes and ordinances, while others have voluntary programs that offer appropriate incentives such as expedited plan reviews or reduced permit fees,[54] such as the Chicago Green Permit Program.[55] Recently, there has been a trend toward mandating green building standards in the commercial sector and this trend has begun to spread to the residential sector as well.

Green buildings address more than just energy efficiency. Other features may include water conservation strategies, stormwater management, use of recycled materials and resources, and indoor air quality standards.

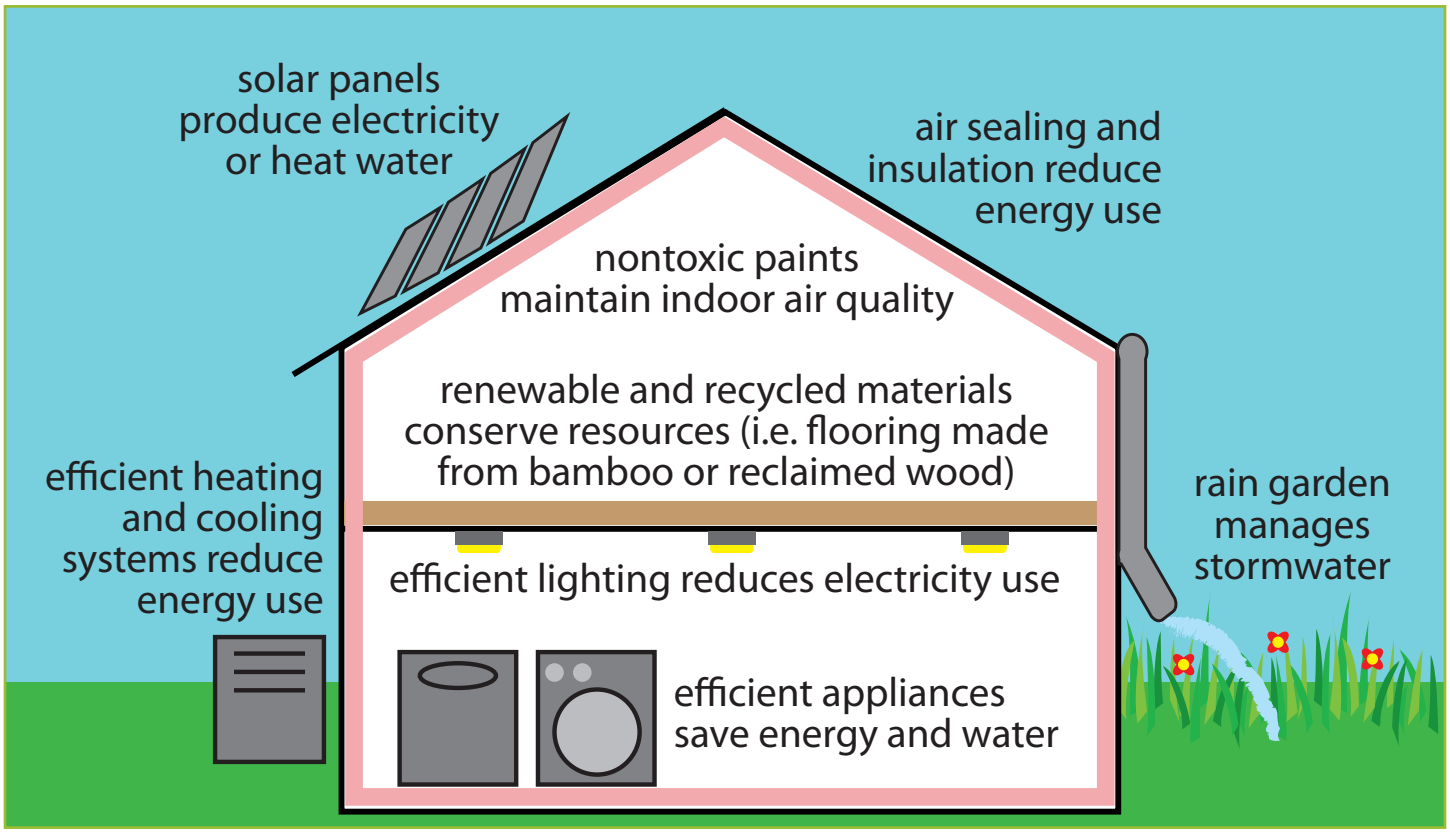


EXHIBIT 29. ELEMENTS OF A GREEN BUILDING: ENERGY, WATER, STOMWATER, AIR QUALITY

Potential Savings in Kane County: Municipalities and unincorporated areas of Kane County located in the Critical Growth Area are expected to experience the most new residential construction in the future. The Urban Corridor[56] and Sustainable Urban Area[57] are expected to experience the most infill. Therefore, both areas should make this strategy a high priority. Based on average household consumption it is possible to reduce annual energy consumption by 43,305 kBtu per household, resulting in an estimated cost savings of $575 per year (Table 14).

If 25 percent of new residential construction (moderate scenario) was built to meet green building standards, cumulative savings could be 11.6 billion kBtu and $167.7 million in 2040. This significant reduction in energy consumption could help reduce individual customer peak demand; and therefore, influence and potentially reduce system peak demand. Exhibit 30 illustrates the potential energy and cost savings for the moderate scenario as well as the conservative (10 percent) and aggressive (50 percent) scenarios. See Appendix 1 for more details.

Residential Green Building for New Construction Strategy

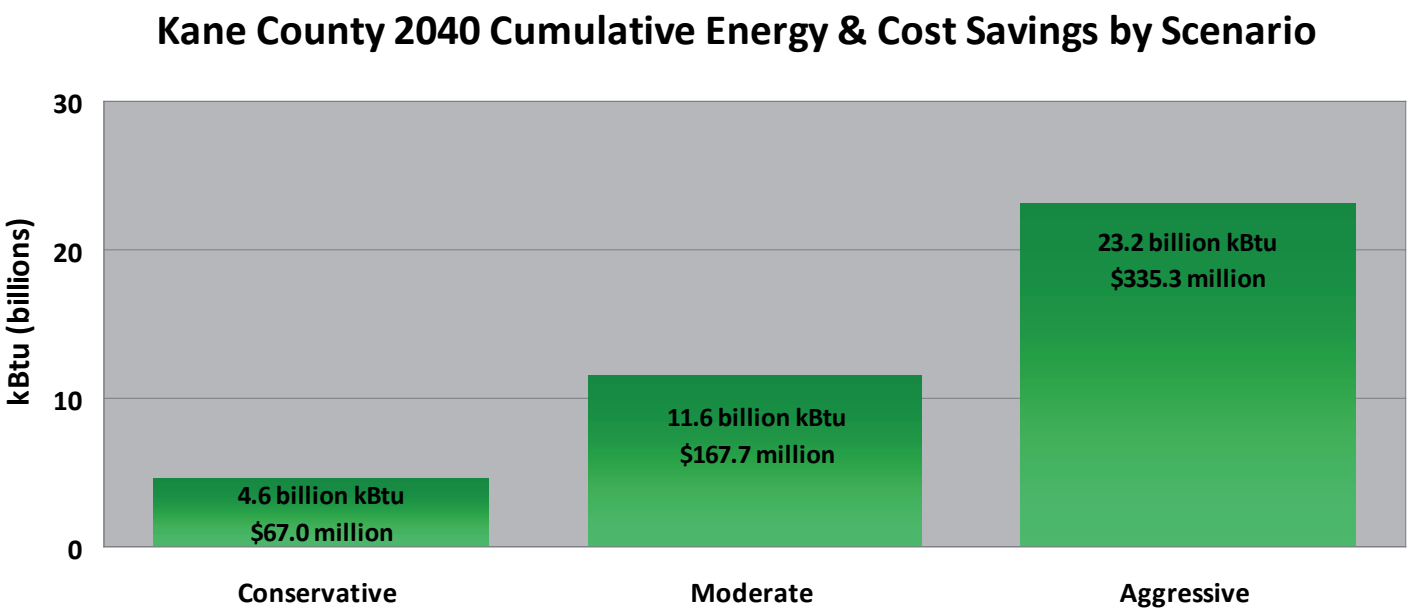


EXHIBIT 30

Residential Green Building Potential Annual Savings Per Unit

	Electricity	Natural Gas	Total
Energy Savings	2,957 kWh	332 Therms	43,305 kBtu
Cost Savings	$346	$229	$575

TABLE 14

Benefits and Barriers: Green building programs are gaining popularity in the region because of potential energy, resource and cost savings, other environmental benefits, and the minimal additional upfront costs.[58]

Barriers for instituting green building programs in Kane County may include the misperception in the construction industry that it is too costly to build to green standards or that there is not a market for selling "green homes." In addition, some municipalities may be concerned that in today's lagging economy additional standards may deter local investment.

LEED

Leadership in Energy and Environmental Design

LEED, an internally recognized green building certification system, was developed by the U.S. Green Building Council (USGBC). LEED certification applies to residential and C&I buildings; intended to improve performances such as:

- Energy savings
- Water efficiency
- CO_2 emissions
- Indoor environmental quality
- Stewardship of resources

Among the various LEED rating systems, LEED–ND (Neighborhood Development) have been developed for neighborhood designs. LEED–ND is a collaboration between USGBC, the Congress for the New Urbanism and the Natural Resource Defense Council. This system integrates the principles of smart growth, urbanism and green building.

www.usgbc.org

Kane County Action Steps, Residential Green Building

- Increase Kane County's knowledge-base by identifying best practices. Provide technical assistance to municipalities and encourage all municipalities to consider developing green building standards and programs.
- Create a network of builders, realtors and municipalities to discuss the benefits and barriers to establishing green building standards and programs.

Strategy 3: Encourage On-Site Renewable Energy for Residential Buildings

Strategy Description: For more than 100 years, centralized power stations have provided the most efficient method for the creation and distribution of electricity. In recent years, however, distributed generation (DG) of renewable energy at a household level has become a viable option as more fuel options and improved technologies have come to market. Appropriate household DG systems include photovoltaic (PV) panels or wind turbines that can be installed on roofs or in yards, and gas-fired micro-turbines located in basements. Participating households most likely would connect systems to the electric grid to sell excess power, or if necessary, to purchase power when home systems do not provide sufficient capacity.

Potential Savings in Kane County: While feasible with any building, it should be noted that the cost of a renewable energy system is generally lower when integrated at the time of construction. This strategy can be prioritized throughout Kane County.

Based on average household consumption it is possible to reduce total annual electricity consumption by 33,634 kBtu resulting in an estimated cost savings of $1,154 per year. (Table 15).

Wind Turbines: Small and Large

Wind turbines can rotate about a horizontal or a vertical axis. Large turbines typically are commercial scale with a capacity close to one megawatt (1,000 kilowatts.) Small turbines typically have a capacity of less than 100 kilowatts. According to AWEA (American Wind Energy Association), small wind turbines in the U.S. generated a total of 17.3 MW in 2008.

Lee-DeKalb Counties Wind Farm

Highland Park home

Willis Tower, proposed solar panels & wind

If 2 percent of all households (moderate scenario) produced their own electricity through household renewable energy systems, projected 2040 cumulative savings could be 2.2 billion kBtu and $76.7 million.

Exhibit 31 illustrates the potential energy and cost savings for the moderate scenario as well as the conservative (1 percent) and aggressive (3 percent) scenarios. See Appendix 1 for more details.

Residential On-Site Renewable Energy Strategy

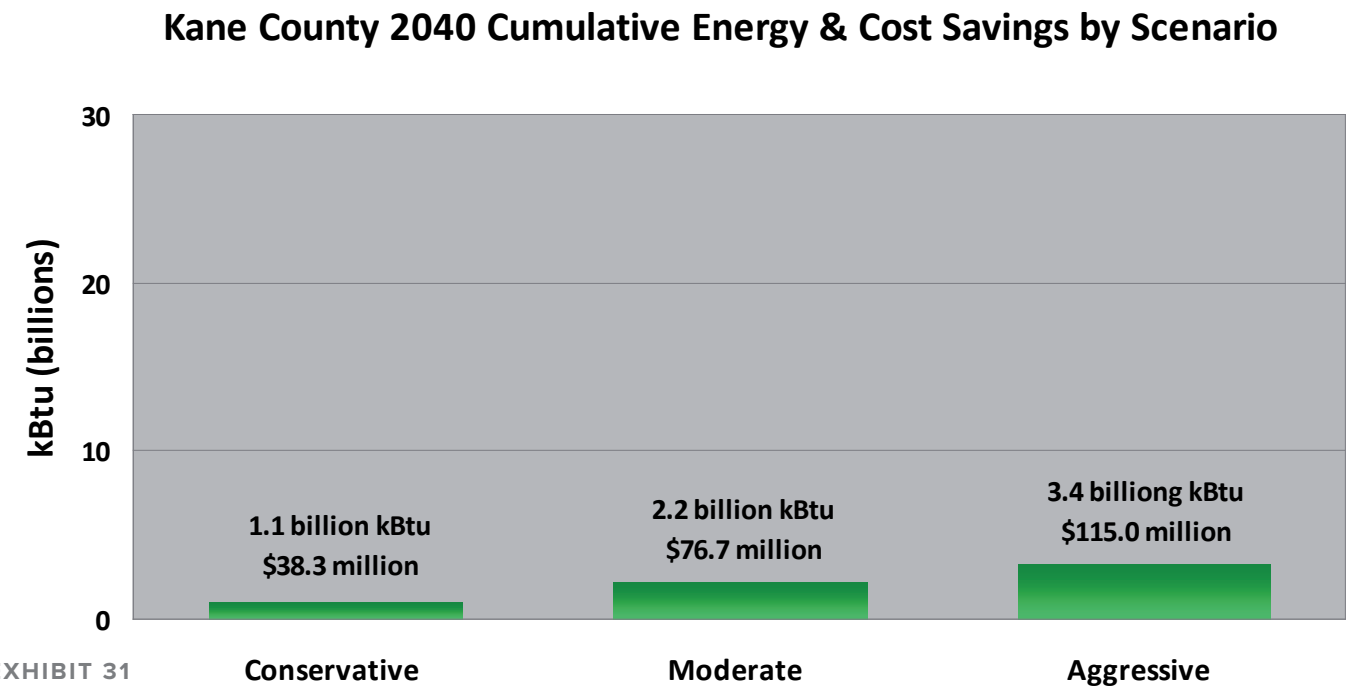


EXHIBIT 31

Residential On-Site Renewable Energy Potential Annual Savings Per Unit

	Electricity	Natural Gas	Total
Energy Savings	9,858 kWh	0 Therms	33,634 kBtu
Cost Savings	$1,154	$0	$1,154

TABLE 15

Benefits and Barriers: On-site renewable energy is challenging because the initial cost to equip a home with a renewable energy system can be high. Without subsidies, tax credits or incentives such as those currently offered in Illinois,[59] the pay-back time is long. However, the potential for energy savings is high. Most homes in Kane County likely could be equipped to meet almost all of their electricity needs through on-site production and sell excess power back to the grid. Further, renewable energy production reduces reliance on fossil fuels and addresses potential supply problems such as power quality and availability. Lastly, wind and solar projects may help fulfill Illinois' Renewable Energy Standard requirements.

Kane County Action Steps, Residential On-Site Renewable Energy

- Market small wind ordinances and encourage municipalities to consider adopting their own. Continue to investigate large scale wind ordinances.
- Continue to research renewable energy ordinances such as solar.
- Highlight and publicize best practices for on-site renewable energy production as well as existing and new solar and wind projects in and near Kane County

Strategy 4: Encourage Occupant Behavior Modification in the Residential Sector

Strategy Description: The "go green" mantra and similar headlines are splashed across newspapers, television and billboards. A 2007 nationwide poll found that 52 percent of adults said that climate change was either extremely or very important to them personally, with another 30 percent ranking it somewhat important.[60] Despite increasing concerns, our actions do not reflect the scale of change needed to address this issue. The ability to translate our concerns into simple changes in behavior at home could substantially reduce energy consumption.

This strategy calculates the savings potential for simple tasks that can be completed in the home: 1) turning off unused lights; 2) performing simple air conditioning maintenance; 3) reducing heating and increasing cooling temperatures by three degrees; and 4) unplugging electronic devices that continue to draw energy when not in use. Implementation of this strategy will be most successful when programs are tailored to individual municipalities.

Potential Savings in Kane County: Because the changes in behavior suggested in this strategy are simple, they can be easy to achieve. This strategy should be a priority in each municipality. Based on average household consumption, annual energy consumption can be reduced by 13,117 kBtu resulting in an estimated cost savings of $177 each year (Table 16).

If 50 percent of all households (moderate scenario) implemented these simple behavior changes, projected 2040 cumulative savings could be 18.6 billion kBtu valued at $277.6 million. Collectively, there is clear potential to translate simple, yet coordinated actions into real savings. Exhibit 32 illustrates the potential energy and cost savings for the moderate scenario as well as the conservative (25 percent) and aggressive (75 percent) scenarios. See Appendix 1 for more details.

Elgin's multimedia "green" campaign includes an annual expo, mailings, emails and other activities for residents to become involved.

Residential Behavior Modification Potential Annual Savings Per Unit

	Electricity	Natural Gas	Total
Energy Savings	924 kWh	100 Therms	13,117 kBtu
Cost Savings	$108	$69	$177

TABLE 16

Benefits and Barriers: Changes in energy consumption behavior can be relatively easy and straight forward and can involve both available and inexpensive technologies. Taking small steps to achieve energy efficiency can also develop awareness of energy issues and willingness to embrace bigger changes in the future. Another benefit is the availability of educational tools and materials that can be adapted to the needs of each municipality. Lastly, in most municipalities there is potential to establish partnerships with schools, churches, local hardware stores, environmental interest groups, and others. These partnerships can increase success over time. The main barrier to implementing a municipal campaign is the time and money required to design, market and implement the program.

Residential Occupant Behavior Modification Strategy

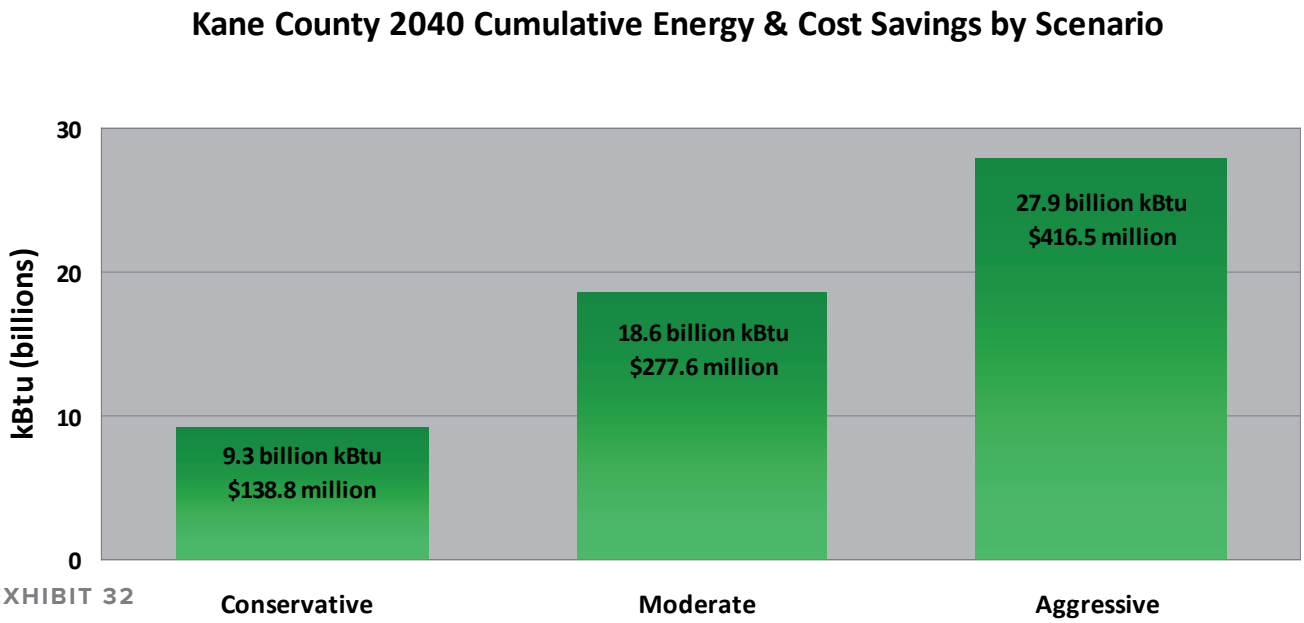


EXHIBIT 32

Kane County Action Steps, Residential Occupant Behavior Modification

- Research and identify best practices for municipal energy efficiency programs.
- Provide technical assistance to interested municipalities.

Strategy 5: Encourage Energy Efficient Window Air Conditioner Replacement

Strategy Description: Air conditioning and refrigeration are the two largest contributors to electricity consumption in the home. Combined, they make up approximately 30 percent of all residential electricity usage.[61] Both appliances almost exclusively use electricity and typically have relatively short lifecycles. These appliances are usually replaced when repairs become too costly, or occasionally for new product upgrades. Window air conditioner replacement offers an opportunity to improve energy efficiency. This strategy encourages the following actions:

1. Increase the pace of replacement by aggressively targeting trade-in and rebate programs for more efficient units, particularly in low-income communities where the cost of replacement may be a barrier.
2. Educate consumers to be better informed and equipped to make better decisions when purchasing new window air conditioner units.

Properly implemented trade-in programs are highly effective tools to reduce electricity consumption; and therefore, creating an opportunity to potentially reduce individual customer peak demand as well. The best programs keep less efficient units from remaining in use by requiring a complete trade—the consumer receives a brand new, efficient unit, while the sponsor hauls away the older, inefficient one. Rebate programs are an excellent tool to encourage the purchase of an energy efficient unit at the time of replacement. While any new unit will achieve energy savings due to increasing federal minimum energy standards,[62] requiring energy efficient products (i.e. Energy Star) will result in additional energy and cost savings.

Potential Savings in Kane County: Window air conditioners are more common in older structures, since new buildings almost exclusively use central air conditioning. While the number of window air conditioning units is expected to decrease over time as older housing stock is replaced, significant opportunity remains to reduce electricity consumption through the replacement of inefficient units.

This strategy should be a priority in municipalities with a significant amount of older housing stock. Based on typical air conditioner consumption data, the average household could reduce its annual electricity consumption by 754 kBtu and reduce costs by $26.

If 20 percent of all households built before 1980[63] (moderate scenario) replaced their window air conditioners with more energy efficient units, projected 2040 cumulative savings would be 214.5 million kBtu valued at $7.4 million. Exhibit 33 illustrates the potential energy and cost savings for the moderate scenario as well as the conservative (10 percent) and aggressive (30 percent) scenarios. See Appendix 1 for more details.

Benefits and Barriers: Energy and cost savings are realized immediately upon replacement of window air

Reducing Energy Consumption with Ceiling Fans

Ceiling fans cool the air by increasing air movement and creating a breeze. Using ceiling fans during warmer months can make a room feel about 4° cooler, allowing the consumer to raise the air conditioner thermostat settings by that same amount. Raising a thermostat by that amount can save about 6% from your cooling costs.

conditioning units. In order to encourage replacement, municipalities can partner with local utilities, hardware stores and other retailers to develop incentive programs. One barrier to implementation of this strategy is the time needed to set up and run a replacement program.

Window Air Conditioner Replacement Potential Annual Savings Per Unit

	Electricity	Natural Gas	Total
Energy Savings	221 kWh	0 Therms	754 kBtu
Cost Savings	$26	$0	$26

TABLE 17

Residential Energy Efficient Window Air Conditioner Strategy

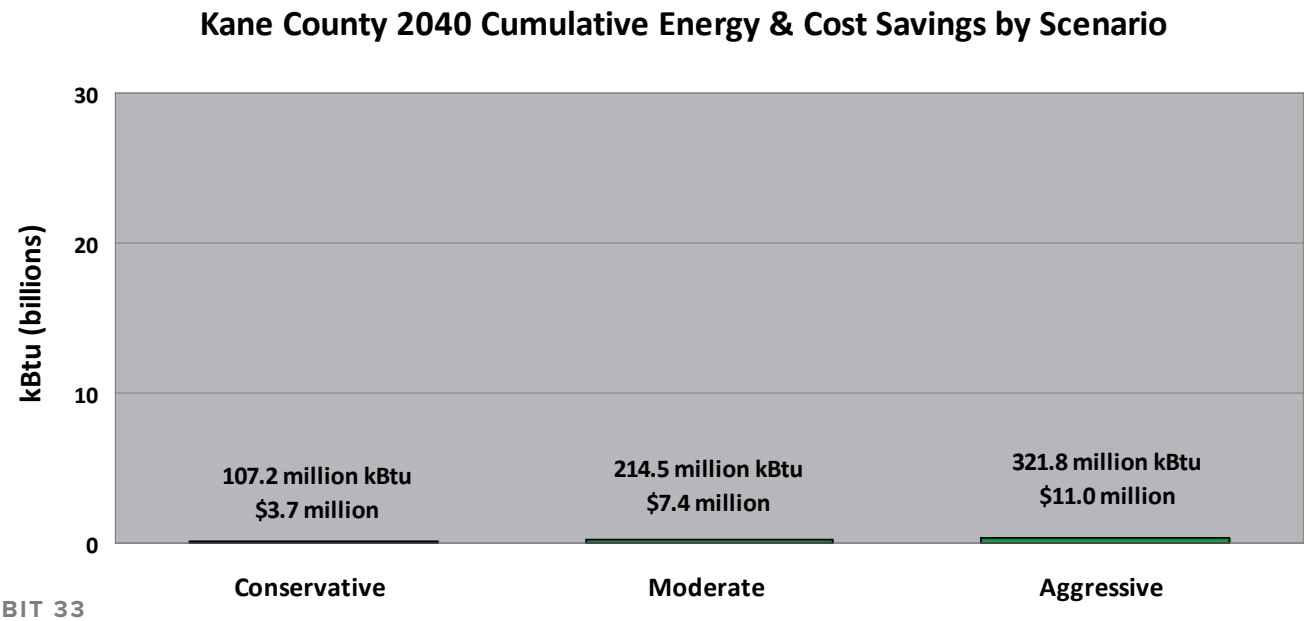


EXHIBIT 33

Kane County Action Steps, Window Air Conditioner Replacement

- Identify model replacement programs and encourage municipalities to offer their own programs.
- Identify and engage partners interested in developing a countywide rebate or trade-in program.
- Educate residents about ComEd's window air conditioner recycling rebate program.

Strategy 6: Encourage Energy Efficient Refrigerater Replacement

Strategy Description: As mentioned in Strategy 5, refrigeration is a major source of residential electricity consumption. Because refrigerators are among the most expensive household items to replace, residents often wait until their units become obsolete or repairs become too costly. This strategy identifies refrigerator replacement as an opportunity to improve energy efficiency and encourages the following actions:

1. Increase the pace of replacement by aggressively targeting trade-in and rebate programs for energy efficient refrigerators, particularly in low-income communities where the cost of replacement may be a barrier.
2. Educate consumers to be better informed and equipped to make better decisions when purchasing new refrigerators.

Like window air conditioner trade-in programs, the best programs keep less efficient units from remaining in use by requiring a complete trade of appliances. Old refrigerators are commonly re-used in basements and garages, which results in an increase in energy consumption. Effective trade-in programs solve this problem. Since federal minimum energy standards for appliances have increased in recent years and are expected to continue to improve,[64] any new refrigerator is likely to be more efficient than an older unit, but a program that requires a more efficient refrigerator (i.e. Energy Star) will result in additional energy and cost savings.

Potential Savings in Kane County: Because all households have refrigerators, this strategy could be addressed by any municipality. Based on typical refrigerator consumption data, the average household could reduce its annual electricity consumption by 1,044 kBtu and achieve cost savings of $36 each year.

ComEd Appliance Recycling

ComEd will pay residential customers $25 to haul away old but still working air conditioners, refrigerators and freezers as an added incentive to take inefficient appliances out of use and recycle them properly.

The table below reports the number of appliances recycled within Kane County for 2009 and 2010, not including municipal electric utilities (Batavia, Geneva & St. Charles).

Year	Fridge	Freezer	A/C	Total
2009	1,120	449	31	1,600
2010	1,793	406	42	2,241
Total	2,913	855	73	3,841

Refrigerator Replacement Potential Annual Savings Per Unit

	Electricity	Natural Gas	Total
Energy Savings	306 kWh	0 Therms	1,044 kBtu
Cost Savings	$36	$0	$36

TABLE 18

If 10 percent of all households (moderate scenario) in Kane County replaced an old refrigerator[65] with a more efficient unit, projected 2040 cumulative savings would be 443.6 million kBtu valued at $15.2 million. This reduction in energy consumption could help reduce individual customer peak demand; and therefore, influence and potentially reduce system peak demands. Exhibit 34 illustrates potential energy and cost savings in the conservative (5 percent) and aggressive (15 percent) scenarios. See Appendix 1 for more details.

Benefits and Barriers: Energy and cost savings are realized immediately upon replacement of refrigerator units. Most new refrigerators are more efficient than older units. In order to encourage replacement, municipalities can partner with local utilities, hardware stores and other retailers to develop incentive programs. One barrier to implementation of this strategy is the time needed to set up and run a replacement program. Another barrier is that refrigerators may be considered a major expense and replacement often occurs out of necessity.

Residential Energy Efficient Refrigerator Replacement Strategy

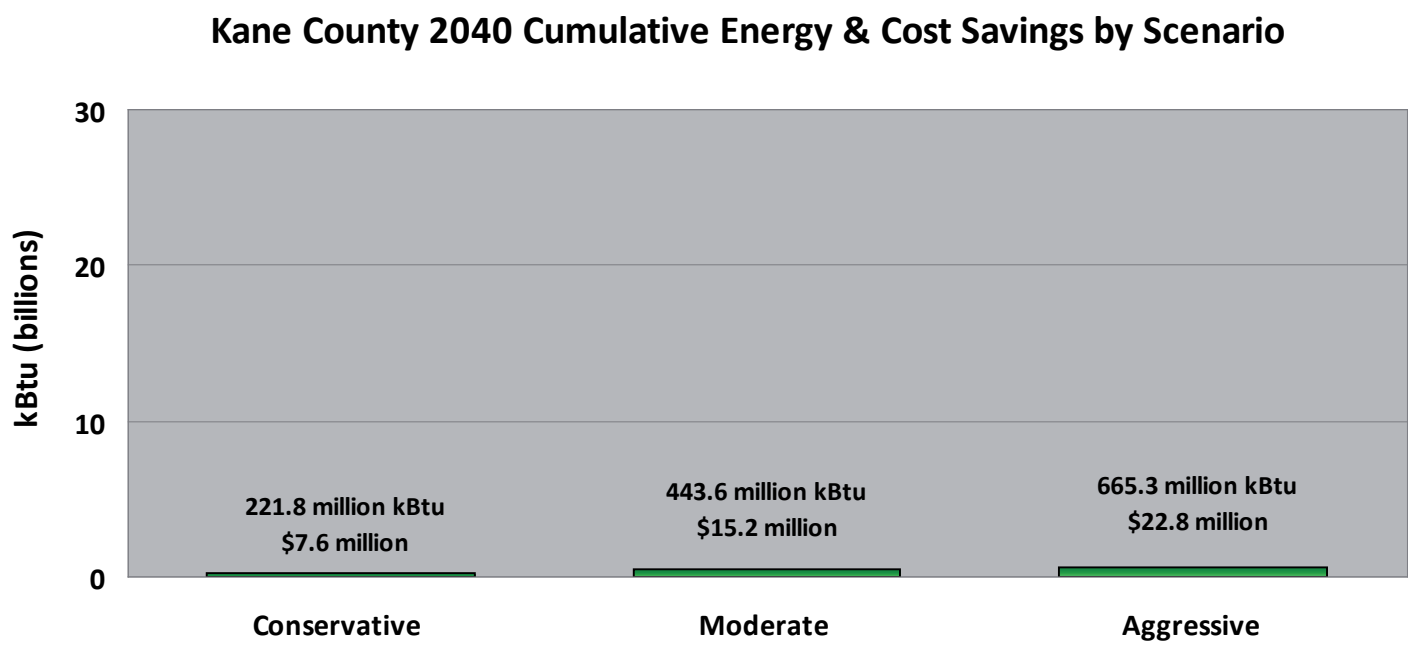


EXHIBIT 34

Kane County Action Steps, Refrigerator Replacement Strategy

- Educate residents about ComEd's refrigerator recycling rebate program.
- Identify model replacement programs and encourage municipalities to offer their own program.
- Identify and engage partners interested in developing a countywide rebate or trade-in program.

Commercial and Industrial Strategies

There are four strategies for the commercial and industrial (C&I) sector that could result in $731 million to $2.4 billion in savings for businesses, government buildings, schools, hospitals and other non-residential buildings in Kane County. Implementing these strategies would also reduce projected cumulative C&I energy consumption from 8 percent to 24 percent.

Total Projected Cumulative Commercial and Industrial Energy Consumption through 2040

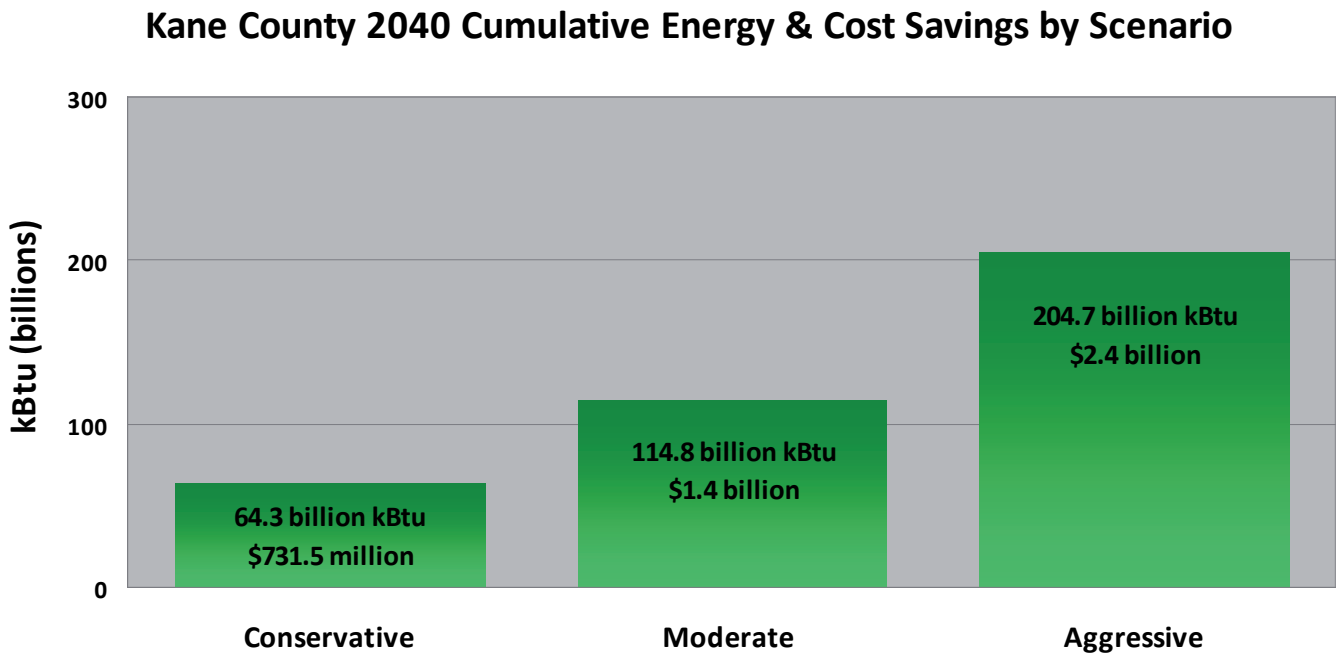


EXHIBIT 35

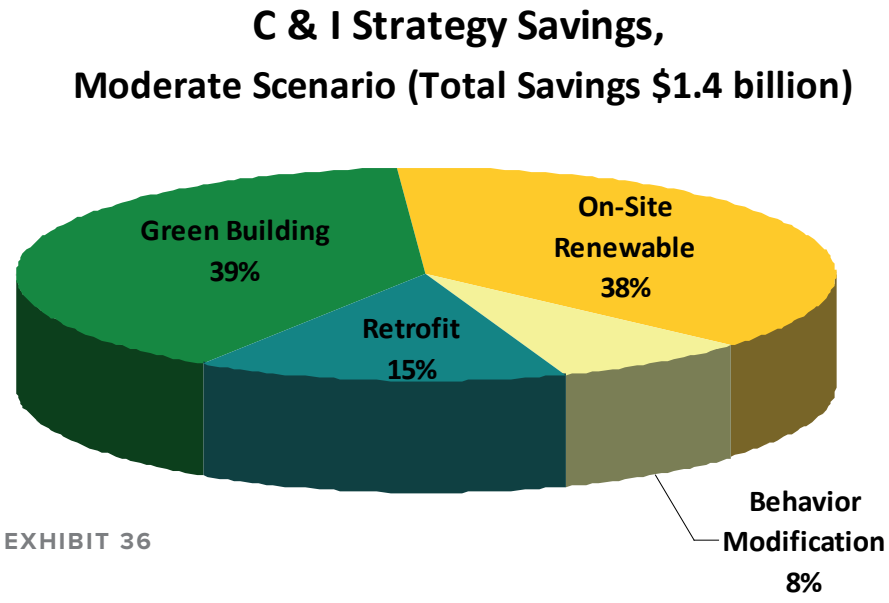


EXHIBIT 36

Municipalities will need to determine participation rates for each strategy that are reasonable goals for their communities. The rates may depend on several factors, and could result in a mix of conservative, moderate and aggressive goals. For the purposes of this Plan, examining countywide implementation of the moderate scenario strategies would provide cumulative savings of $1.4 billion in Kane County by 2040 (Exhibit 36, page 54). Nearly three quarters of the savings can be achieved by ramping up on-site renewable energy technologies that coincide with utility renewable energy requirements and by implementing green building standards in half of all new C&I buildings.

The strategies highlighted in the table below and described in this section can create significant energy and cost savings for the county. The assumed participation rates reflect current policy and funding trends, existing technologies and available information and resources.

Moderate Scenario Strategies, Rates and Savings

Strategy	Participation Rate (through 2040)	$ Saved (Millions)
Green Building (new construction)	50% of all new accounts	$541
Renewable Energy	20% of all accounts	$516.5
Retrofit Existing Buildings	15% of all accounts	$199.2
Behavior Modification	15% of all accounts	$104.9

Accounts=proxy for number of buildings

TABLE 19

Strategy 7: Retrofit Existing Commercial and Industrial Buildings

Strategy Description: Like their residential counterpart, energy retrofits in existing commercial and industrial (C&I) buildings are critical in any energy reduction strategy. Retrofit programs use appropriate energy efficiency tools and technologies to significantly reduce electricity and natural gas consumption in existing buildings. As discussed previously, retrofit programs can be expected to achieve an average of 30 percent[66] energy savings per building.

Retrofits in the C&I sector typically address building envelope, heating and cooling systems, hot water production, lighting systems, and plug load.[67] Technologies and strategies may include lighting retrofits, passive day-lighting,[68] recommissioning of buildings,[69] improved insulation, energy efficient windows, high efficiency boilers and furnaces, heat recovery systems,[70] energy management systems, solar or tankless hot water systems,[71] and high efficiency equipment to reduce plug load. Large commercial and industrial customers may employ energy managers to focus on and manage energy consumption, as well as electricity and gas purchase contracts. Like residential retrofit programs, the most effective C&I sector retrofit programs combine technical and financial assistance to achieve the highest possible savings and largest return on investments.

Potential Savings in Kane County: In general, most buildings constructed before 1980 were not built to current energy efficiency standards.[72] These buildings are likely to realize significant energy and cost savings as a result of retrofits. Therefore, municipalities with older commercial and industrial buildings should make this strategy a high priority. Based on average C&I account consumption, it is possible to reduce annual consumption per account by 288,420 kBtu for an estimated cost savings of $2,089 each year (Table 20).[73]

If retrofits were implemented in 15 percent of C&I accounts (moderate scenario), projected 2040 cumulative energy savings would be 26.8 billion kBtu valued at $199.2 million. This significant reduction in energy consumption could help reduce individual customer peak demand. Futhermore, due to the relationship between system peak demand and C&I sector peak demand that was discussed in Section 2, this energy use reduction, particularly if implemented at large scale, could heavily influence and reduce system peak demand. Exhibit 37 illustrates the potential energy and cost savings for the moderate scenario as well as the conservative (10 percent) and aggressive (25 percent) scenarios. See Appendix 1 for more details.

C&I Retrofit Potential Annual Savings Per Unit

	Electricity	Natural Gas	Total
Energy Savings	4,363 kWh	2,735 Therms	288,420 kBtu
Cost Savings	$346	$1,744	$2,089

TABLE 20

Benefits and Barriers: Retrofits offer the potential for significant energy savings with a relatively short return on investment. Another benefit that could aid in the implementation of this strategy is the availability of funding from local and federal government sources. These opportunities are expected to continue. The main barrier is securing the cash or financing to complete the retrofits.

Locally, the Kane County Revolving Loan Fund assists nonprofit and public entities. The City of Elgin also had a retrofit grant program for specific downtown businesses during 2010. The Chicago Region Retrofit Ramp Up Program is expected to provide funding opportunities for retrofits in all building sectors. See Appendix 5 for more details.

Commercial & Industrial Retrofit Strategy

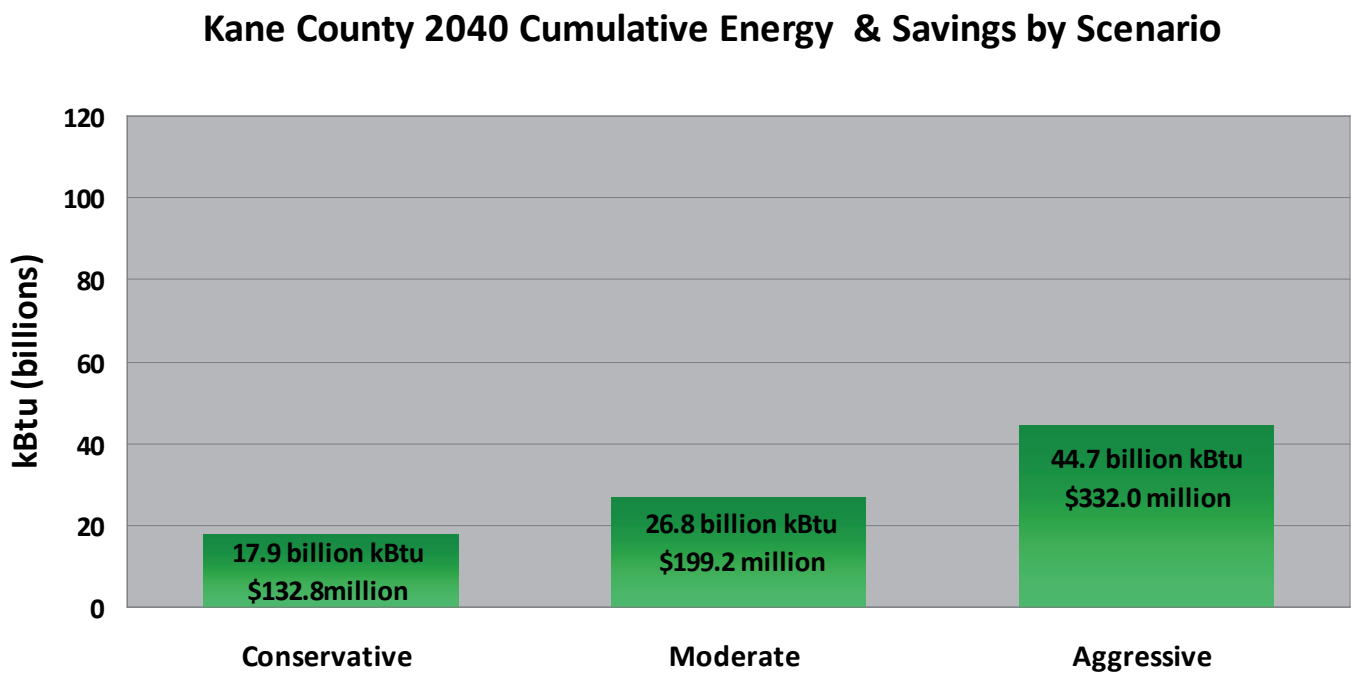


EXHIBIT 37

Kane County Action Steps, C&I Retrofit Strategy

- Support the Kane County Revolving Loan Fund in assisting nonprofit and public entities.
- Support and participate in existing retrofit activity in Kane County and the region.
- Provide technical assistance and information on retrofit programs and loan pools to municipalities.

Strategy 8: Develop Green Building Standards and Programs for New C&I Construction

Strategy Description: The U.S. Green Building Council (USGBC) defines green building as a way to "significantly reduce or eliminate the negative impact of buildings on the environment and on the building occupants" through "sustainable site planning, safeguarding water and water efficiency, energy efficiency, conservation of materials and resources, and indoor environmental quality."[74] Energy consumption can be 30 percent lower in newly constructed buildings that are built to meet typical green building standards. Green buildings also feature additional benefits such as reduced water consumption, healthier indoor air, durable materials, and reduced construction waste.[75] Another important benefit is that the additional costs at time of construction are small.[76]

Green building programs typically feature a rating system that measures the degree of efficiency achieved by implementing a set of prescriptive standards. Some municipalities require green buildings through building codes and ordinances, while others have voluntary programs that offer appropriate incentives, such as expedited plan reviews or reduced permit fees.[77]

Potential Savings in Kane County: Municipalities and unincorporated areas of Kane County located in the Critical Growth Area are expected to experience the most new construction in the future, while the Urban Corridor[78] and the Sustainable Urban Area[79] are expected to experience the most infill. Therefore, both areas should make this strategy a high priority. Based on average C&I account consumption, it is possible to reduce annual consumption per account by 417,564 kBtu resulting in cost savings of $4,166 each year (Table 21).[80]

Aurora Police Department

Features of this 154,000 square foot LEED Gold-certified building include photovoltaic panels, daylighting, permeable pavers, and recycled products used in materials of the

Rakow Branch Library, Elgin

This 10,000 square foot LEED Gold-certified building integrates daylighting, geothermal heating and cooling, and on-site stormwater management.

C&I Green Building Potential Annual Savings Per Unit

	Electricity	Natural Gas	Total
Energy Savings	26,180 kWh	3,282 Therms	417,564 kBtu
Cost Savings	$2,073	$2,093	$4,166

TABLE 21

If 50 percent of new C&I construction (moderate scenario) was built to meet green building standards, projected 2040 cumulative energy savings would be 51.2 billion kBtu valued at $541 million. This significant reduction in energy consumption could help reduce individual customer peak demand. Futhermore, due to the relationship between system peak demand and C&I sector peak demand that was discussed in Section 2, this energy use reduction, particularly if implemented at large scale, could heavily influence and reduce system peak demand. Exhibit 38 illustrates the potential energy and cost savings for the moderate scenario as well as the conservative (25 percent) and aggressive (100 percent) scenarios. See Appendix 1 for more details.

Benefits and Barriers: Benefits of a green building program include significant energy savings, reduced water consumption, healthier indoor air, durable materials, and reduced construction waste.[81] Another important benefit to building green is that the upfront costs at time of construction are small.[82] In this sector, green building is becoming an effective economic development tool to attract tenants interested in projecting an image of sustainability for their businesses. One potential barrier is the perception that green building construction costs significantly more than conventional construction.

Commercial & Industrial Green Building Standard for New Construction Strategy

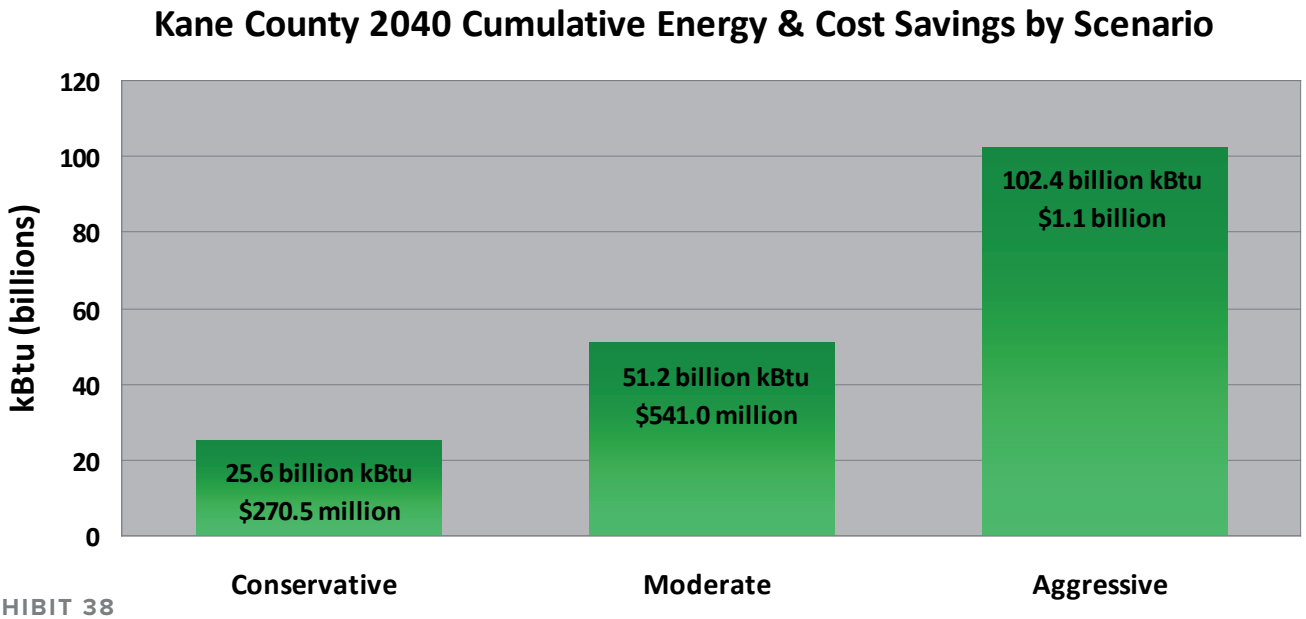


EXHIBIT 38

Kane County Action Steps, C&I Green Building Strategy

- Increase Kane County's knowledge-base by identifying best practices. Provide technical assistance to interested municipalities and encourage all municipalities to consider developing green building standards and programs.
- Create a network of builders, realtors and municipalities to discuss the benefits of and barriers to establishing green building standards and programs.

Strategy 9: Encourage On-Site Renewable Energy for Commercial and Industrial Buildings

Strategy Description: For more than 100 years, centralized power stations have provided the most efficient method of generating and distributing electricity. In recent years, however, distributed generation (DG) of renewable energy has become a viable option as more fuel options and improved technologies have come to market. Appropriate DG systems include photovoltaic (PV) panels or wind turbines and gas-fired micro-turbines.

On-site renewable energy could provide some of the energy needed for the commercial and industrial sector but may need to be supplemented by energy from the electrical grid. Additional types of renewable energy systems include large-scale, multiple site distributed generation and combined heat and power. The energy and cost savings for these systems are assessed on a case-by-case basis and are not included in this strategy.

Potential Savings in Kane County: This strategy can be prioritized throughout Kane County. While feasible with any building, it should be noted that the cost of a renewable energy system is generally lower when integrated at the time of construction. Based on average C&I account consumption in Kane County, it is possible to reduce annual electricity consumption per account by 148,875 kBtu resulting in cost savings of $3,456 each year (Table 22).[83]

If on-site renewable energy systems were implemented in 20 percent of all C&I accounts (moderate scenario), projected 2040 cumulative savings would be 22.3 billion kBtu valued at $516.5 million. Exhibit 39 illustrates the potential energy and cost savings for the moderate scenario as well as the conservative (10 percent) and aggressive (30 percent) scenarios. See Appendix 1 for more details.

Combined Heat and Power (CHP)

Combined heat and power (also referred to as cogeneration) is the use of an engine or a power station to simultaneously generate both electricity and useful heat that meets all or part of the load needed for a facility. It is one of the most common forms of energy recycling. Potential energy savings can vary greatly by facility size.

Benefits and Barriers: On-site renewable energy in the commercial and industrial sector is challenging because the initial cost to retrofit an existing building or integrate a renewable energy system at the time of construction is high. Without subsidies, tax credits or incentives, the pay-back time is long. Even with government subsidies such as those currently provided by the State of Illinois[84] the cost may be prohibitive. However, the potential for energy savings is high. Depending on the size and needs of the building, a large percentage of electricity may be obtained from on-site production. Use of on-site renewable energy reduces reliance on fossil fuels and addresses potential supply problems related to power quality and availability. Finally, new wind and solar projects may contribute to meeting utility requirements set forth in the Renewable Energy Portfolio.

C&I On-Site Renewable Energy Potential Annual Savings Per Unit

	Electricity	Natural Gas	Total
Energy Savings	43,633 kWh	0 Therms	148,875 kBtu
Cost Savings	$3,456	$0	$3,456

TABLE 22

Commercial & Industrial On-Site Renewable Energy Strategy

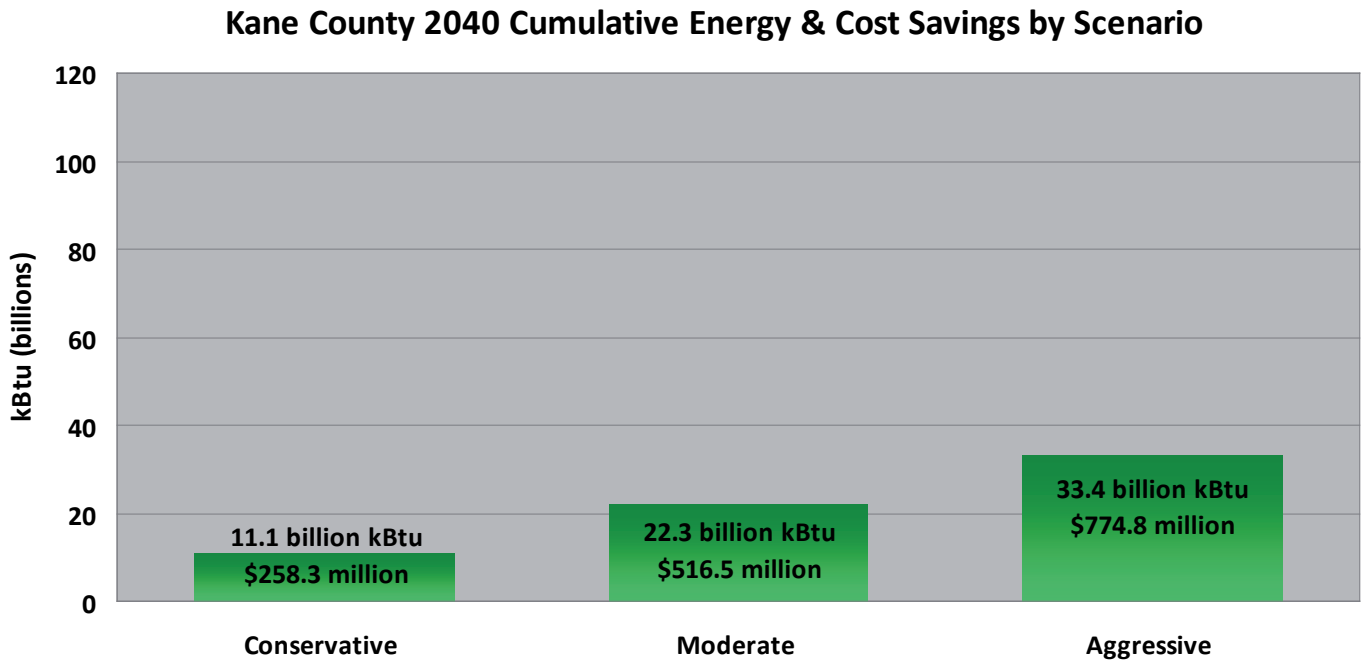


EXHIBIT 39

Kane County Action Steps, C&I Green Building Strategy

- Market small wind ordinances and encourage municipalities to consider adopting their own. Continue to investigate large scale wind ordinances.
- Continue to research renewable energy ordinances such as solar.
- Highlight and publicize best practices for on-site renewable energy as well as existing and new solar and wind projects as well as combined heat and power and distributed generation projects.
- Encourage discussions about renewable energy and identify potential site-specific locations for pilot projects. Potential partners include utilities, renewable energy manufacturers and businesses.

Strategy 10: Encourage Occupant Behavior Modification in the Commercial and Industrial Sector

Strategy Description: An increasing number of businesses are recognizing the value of energy efficiency as a means of attracting customers and employees. Municipalities that encourage energy efficiency tend to attract like-minded businesses.

Many business owners are aware of the benefits of simple changes in behavior (i.e. replacing traditional light bulbs with compact fluorescent light bulbs) through utility bill inserts and various forms of media. Yet despite increasing understanding about the benefits derived from simple changes in behavior, our actions do not reflect the scale of change needed to address this issue. The ability to translate our environmental concerns into simple changes in behavior can result in a substantial energy savings.

The following actions were calculated for their energy savings potential: 1) reducing heating temperatures by 3°; 2) increasing cooling temperatures by 3°; and 3) further reducing/increasing temperatures during non-work hours by using programmable thermostats. Modifications to lighting were not analyzed for this strategy for two reasons:

1. Savings opportunities vary greatly based on the different types of lights that are present in different C&I sector buildings.[85]
2. Many businesses are prevented from making changes to lighting or electric devices in their buildings due to ownership issues or directives from corporate headquarters. See Appendix 3 for efficient lighting information for municipal buildings.

Potential Savings in Kane County: Because the changes in behavior suggested in this strategy are simple, they can be easy to achieve. This strategy should be a high priority in each municipality. Based on average C&I account consumption data, it is possible to reduce annual consumption per account by 156,422 kBtu resulting in an estimated cost savings of $1,107 each year (Table 23).[86]

If occupants modified and improved their energy habits in 15 percent of all C&I accounts (moderate scenario), projected 2040 cumulative savings could be 14.5 billion kBtu valued at $104.9 million. Exhibit 40 illustrates the potential energy and cost savings in the conservative (10 percent) and aggressive (25 percent) scenarios. See Appendix 1 for more details.

Benefits and Barriers: Changes in energy consumption behavior can be relatively easy and straight forward and can involve both available and inexpensive technologies. Taking small steps to achieve energy efficiency can also help develop a sense of awareness of energy issues and willingness to embrace bigger changes in the future. Another benefit is the availability of educational tools and materials that can be adapted for each municipality. Lastly, in most municipalities there is potential to establish partnerships with schools, churches, local hardware stores, environmental interest groups and others that can increase participation and success. The main barrier to implementing a community-wide campaign is the time and money required to design, market and implement the program.

PepsiCo's Chicago Plaza

An increasing number of businesses are acknowledging the important role that building occupants play in "going green." Support and participation from employees can increase a building's energy efficiency performance in order to meet environmental and economic goals.

PepsiCo's Chicago Plaza earned a LEED Silver rating for an existing building with the help of their employee "Green Team." Activities included an employee-driven education campaign culminating in an energy efficiency competition between building floors.

Source: *www.greenbiz.com/news/2008/12/07/pepsicos-chicago-hq-lands-leed-silver-thanks-workers-efforts*

C&I Behavior Modification Potential Annual Savings Per Unit

	Electricity	Natural Gas	Total
Energy Savings	1,913 kWh	1,499 Therms	156,422 kBtu
Cost Savings	$151	$956	$1,107

TABLE 23

Commercial & Indsutrial Occupant Behavior Modification Strategy

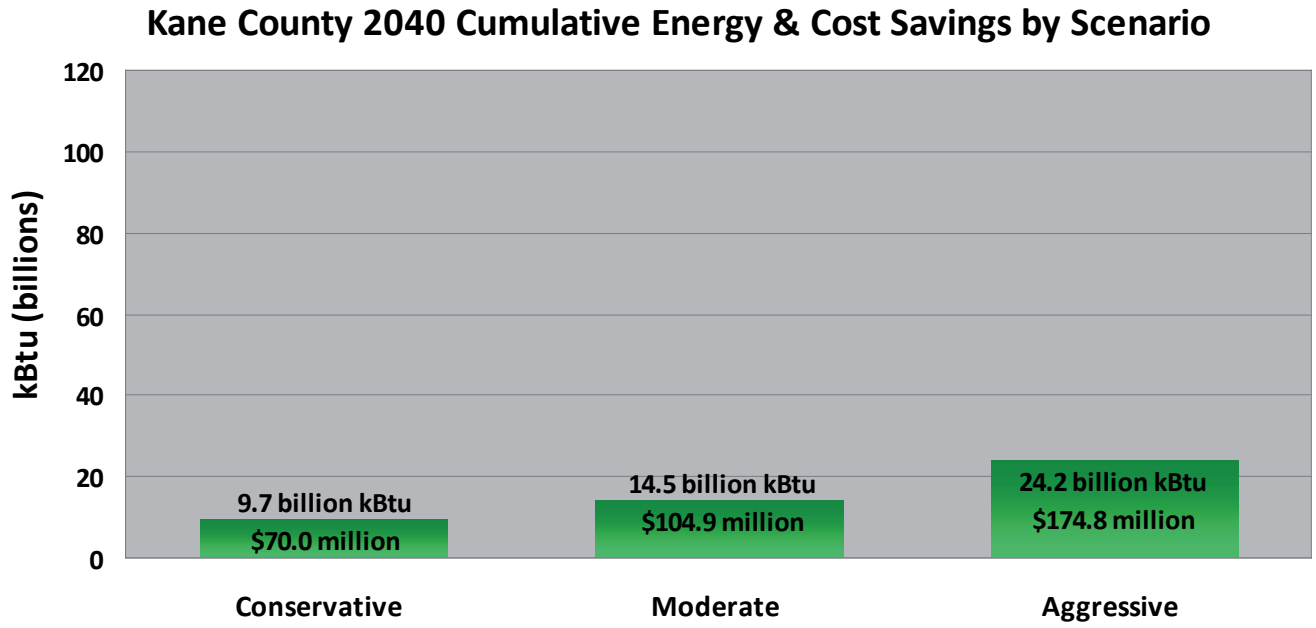


EXHIBIT 40

Kane County Action Steps, C&I Occupant Behavior Modification Strategy

- Research and identify best practices for energy efficiency that target the C&I sector, and possibly specific consumers.
- Implement a county "green team" with members from each department to identify and establish energy efficiency operating procedures and sustainable procurement practices. Publicize results and encourage municipalities to do the same.
- Consider initiating programs in schools and hospitals. Identify funding sources (local foundations, local, state and federal government) to implement programs.

SECTION 5

IMPLEMENTATION

The table below outlines the timeframe, potential partners, and recommended measurements for implementation of each strategy discussed in Section 4. A near timeframe refers to activities taking one to two years. Mid refers to three to 4 years, and long refers to five or more years.

Implementation of Strategies in Kane County

	Strategy	Timeframe	Potential Partners	Measurement(s)
1	Retrofit existing residential buildings	Near	Kane County, municipalities, Chicago Region Retrofit Ramp-Up, other retrofit experts	Number of retrofits completed (and documented energy savings)
2	Develop green building standards and programs for new residential construction	Mid	Kane County, municipalities, U.S. Green Building Council - Illinois Chapter	Number of municipalities that adopt some level of green building standards
3	Encourage on-site renewable energy for residential buildings	Long	Kane County, municipalities, Illinois Wind Energy Association, Illinois Solar Energy Association	Number of new on-site renewable energy systems
4	Encourage occupant behavior modification in the residential sector	Near	Kane County, municipalities, interest groups; community-based organizations; schools	Number of: municipalities with campaigns, participating agencies and organizations, participating households
5	Encourage energy efficient window air conditioner replacement	Near to Mid	Kane County, municipalities, utilities, local hardware stores and appliance retailers	Number of window air conditioners replaced
6	Encourage energy efficient refrigerator replacement	Near to Mid	Kane County, municipalities, utilities, local hardware stores and appliance retailers	Number of refrigerators replaced
7	Retrofit existing commercial and industrial buildings	Near to Mid	Kane County, municipalities, Chicago Region Retrofit Ramp-Up, other retrofit experts	Number of retrofits completed (and documented energy savings)
8	Develop green building standards and programs for new construction	Near	Kane County, municipalities, U.S. Green Building Council - Illinois Chapter	Number of municipalities that adopt some level of green building standards
9	Encourage on-site renewable energy for commercial and industrial buildings	Long	Kane County, municipalities, Illinois Wind Energy Association, Illinois Solar Energy Association	Number of new on-site renewable energy systems
10	Encourage occupant behavior modification in the commercial and industrial sector	Mid	Kane County, municipalities, interest groups, chambers of commerce	Number of: municipalities and chambers of commerce with campaigns, C&I sector participants

TABLE 24

REFERENCES AND NOTES

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2. "The Chicago Region Greenhouse Gas Baseline Inventory and Forecast." 2009 December. Prepared for the Chicago Metropolitan Agency for Planning.
3. kilo British thermal unit (kBtu): allows natural gas (therms) and electricity (kWh) consumption to be compared.
4. "The Chicago Region Greenhouse Gas Baseline Inventory and Forecast." 2009 December. Prepared for the Chicago Metropolitan Agency for Planning.
5. "Chicago Regional Energy Snapshot." 2009 September. Prepared for the Chicago Metropolitan Agency for Planning. 5 April 2011. *http://www.cmap.illinois.gov/strategy-papers/regional-energy.*
6. The Municipal Energy Profile Project by Center for Neighborhood Technology is a two-year project that will be completed in early 2011.
7. EnergyStar is an energy performance rating system for products. EnergyStar labeled products have met government standards and are considered energy efficient. EnergyStar is administered by the U.S. Departments of Energy and Environmental Protection Agency.
8. GO TO 2040. October 2011. Chicago Metropolitan Agency for Planning. 5 April 2011. *http://www.cmap.illinois.gov/2040/main.*
9. Regional studies also reflect this, including the regional component of the Chicago Climate Action Plan (2007) and the Chicago Region Baseline Emissions Inventory and Forecast (2009)
10. Single family attached and detached homes, condominiums and townhomes, and apartments
11. Businesses, industry, government buildings, schools, hospitals and other similar end users.
12. American Community Survey. Kane County, 2006-2008. United States Census Bureau. 5 April 2011. *http://factfinder.census.gov/home/saff/main.html?_lang=en.*
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14. "Chicago Regional Energy Snapshot." 2009 September. Prepared for the Chicago Metropolitan Agency for Planning. 5 April 2011. *http://www.cmap.illinois.gov/strategy-papers/regional-energy.*
15. Natural gas is extracted from wells, transported to processing facilities and onto compressor stations.
16. Transmission of natural gas utilizes storage reservoirs, pipelines and regulator stations.
17. "Chicago Regional Energy Snapshot." 2009 September. Prepared for the Chicago Metropolitan Agency for Planning. 5 April 2011. *http://www.cmap.illinois.gov/strategy-papers/regional-energy.*
18. The United Nations Intergovernmental Panel on Climate Change (IPCC) provides greenhouse gas accounting for six major categories of greenhouse gases. Emissions were typically converted into CO2e using global warming potentials from the IPCC Fourth Annual Assessment Report.
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26. Premise (account) level data, aggregated by residential and commercial/industrial sectors at the County level.

27. Units = Households for Residential (ACS 2008); Accounts for Commercial & Industrial.

28. "Illinois Electric Utilities: Comparison of Comparison of Electric Sales Statistics For Calendar Years 2008 and 2007." 31 December 2009. Illinois Commerce Commission. 6 April 2011. *http://www.icc.illinois.gov/.*

29. ICC, Average calculated for Small and Large Commercial & Industrial Electricity Sales Statistics, 2008.

30. Data Unavailable signifies that the minimum number of aggregated accounts was not available, as stipulated in a data-sharing agreement between CNT Energy and the utility, and thus, CNT Energy was unable to report data.

31. C&I sector includes businesses of all size, government, nonprofit, and institutions like schools, hospitals and churches.

32. For C & I, average monthly kWh was analyzed by census tract, not census block group as for the residential sector, because the minimum number of aggregated accounts was not available, as stipulated in a data-sharing agreement between CNT Energy and the utility. Therefore, CNT Energy was unable to report this data at a more detailed level.

33. Data Unavailable signifies that the minimum number of aggregated accounts was not available, as stipulated in a data-sharing agreement between CNT Energy and the utility, and thus, CNT Energy was unable to report data.

34. Units = Households for residential and Accounts for Commercial & Industrial.

35. "Illinois Gas Utilities: Comparison of Comparison of Gas Sales Statistics For Calendar Years 2008 and 2007." 1 October 2009. Illinois Commerce Commission. 6 April 2011. *http://www.icc.illinois.gov/.*

36. ICC Average calculated for Small and Large Commercial & Industrial Natural Gas Sales Statistics, 2008.

37. Data Unavailable signifies that the minimum numbers of aggregated accounts was not available, as stipulated in a data-sharing agreement between CNT Energy and the utility, and thus, CNT Energy was unable to report data.

38. C & I sector includes businesses of all size, government, nonprofit, and institutions like schools, hospitals and churches.

39. For C & I, average monthly kWh was analyzed by census tract, not census block group as for the residential sector, because the minimum number of aggregated accounts was not available, as stipulated in a data-sharing agreement between CNT Energy and the utility. Therefore, CNT Energy was unable to report this data at a more detailed level.

40. Data Unavailable signifies that the minimum number of aggregate accounts was not available, as stipulated in a data-sharing agreement between CNT Energy and the utility, and thus, CNT Energy was unable to report data.

41. Data Unavailable signifies that the minimum number of aggregate accounts was not available, as stipulated in a data-sharing agreement between CNT Energy and the utility, and thus, CNT Energy was unable to report data.

42. C & I sector includes businesses of all size, government, nonprofit, and institutions like schools, hospitals and churches.

43. Data Unavailable signifies that the minimum number of aggregate accounts was not available, as stipulated in a data-sharing agreement between CNT Energy and the utility, and thus, CNT Energy was unable to report data.

44. Differences in energy consumption are noted within different regions of Illinois. A community in Kane County uses more energy for heating than a community at the southern tip of the state, whose weather and climate differences are noted by its climate region assignment.

45. Savings are based on 2009 utility rates which were the most recent rates available at publication. Actual savings will vary based upon changing utility rates.

46. Calculations assume linear growth. Real life implementation may occur differently depending on planning priorities, funding and other factors.

47. Most of the savings are achieved in natural gas, approximately 25%, with the remaining 5% attributed to efficiencies in electricity consumption.

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    In a 2003 report to the California Sustainable Building Task Force, Greg Kats noted that while upfront costs to support green design are 2% higher than for typical buildings, on average, they result in a life cycle savings of 20% of total construction costs. Overall savings are more than ten times the initial investment.

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57. "2030 Land Resource Management Plan." Kane County Development Department. 6 April 2011. *http://www.co.kane.il.us/Development/2030/index.asp.*

58. In a 2003 report to the California Sustainable Building Task Force, Greg Kats noted that while upfront costs to support green design are 2% higher than for typical buildings, on average, they result in a life cycle savings.

59. The State of Illinois offers building owners 30% rebates for installation of renewable energy systems, but funds are depleted quickly. The rebate for government and nonprofit agencies is 50%. Demand for the rebates outweighs the funding supply for both programs.

60. ABC News/Washington Post/Stanford University Poll. April 5-10, 2007. N=1,002 adults nationwide. MoE ± 3. Fieldwork by TNS.

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62. "Appliance Industry Joins Energy, Water Efficiency Organizations to Announce Agreement for New Minimum Efficiency Standards, Updated ENERGY STAR Levels, and Energy-Efficiency Tax Credits." 1 May 2007. Alliance to Save Energy. 6 April 2011. *http://ase.org/news/appliance-industry-joins-energy-water-efficiency-organizationsto-announce-agreement-new-minimum.*

63. 1980 is an approximated threshold used to identify when builders began to include central air conditioning as a standard feature in new home construction.

64. "Appliance Industry Joins Energy, Water Efficiency Organizations to Announce Agreement for New Minimum Efficiency Standards, Updated ENERGY STAR Levels, and Energy-Efficiency Tax Credits." 1 May 2007. Alliance to Save Energy. 6 April 2011. *http://ase.org/news/appliance-industry-joins-energy-water-efficiency-organizationsto-announce-agreement-new-minimum.*

65. For the purposes of this strategy, old is defined as having been purchased before 2001, when the most recent federal efficiency standards were established for refrigerators.

66. Most of the savings are achieved in natural gas, approximately 25%, with the remaining 5% attributed to efficiencies in electricity consumption.

67. Plug load is electricity consumed from an electrical device when turned off or in standby mode but still plugged in.

68. Collecting and reflecting sunlight.

69. Systematic approach to identify low cost operational and maintenance improvements in existing buildings.

70. Captures waste heat from one system to use for other heating purposed that would otherwise come from a primary energy source.

71. 71 Monitors, controls, and optimizes performance of HVAC operations.

72. National Association of Homebuilders (NAHB) Research Center. Energy Efficiency in Remodeling.

73. This is an average based on a wide range of different size C&I accounts. Savings will differ based on factors that include building size, age of building, and systems, technologies and uses of the building.

74. Green Building, Basic Information. 22 December 2010. U.S. Environmental Protection Agency. 28 March 2011. *http://www.epa.gov/greenbuilding/pubs/about.htm.*

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80. This is an average based on a wide range of different size C&I accounts. Savings will differ based on factors that include building size, age of building, and systems, technologies and uses of the building.

81. "Chicago Green Homes Program Guide." April 2009. Chicago Green Homes. 6 April 2011. *http://www.cityofchicago.org/content/dam/city/depts/doe/general/GreenHomesRoofsBldgs_pdfs/ChicagoGreenHomesGuidev20.pdf.*

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83. This is an average based on a wide range of different size C&I accounts. Savings will differ based on factors that include building size, age of building, and systems, technologies and uses of the building. For example, a small storefront may generate enough electricity to fulfill all of its energy needs, while a large warehouse may not.

84. The State of Illinois offers 30% rebates on installation of renewable energy systems, but funds are depleted quickly. Demand for the rebates outweighs the funding supply.

85. C&I sector buildings in this plan include businesses of all sizes from small storefronts to large industries, and include schools, hospitals, churches, government and public buildings, all which may have very different lighting standards and needs, thus the range in potential savings varies greatly. Building owners should take advantage of resources in Illinois like the Smart Energy Design Assistance Center (known as SEDAC) to site-specific opportunities for lighting efficiency upgrades.

86. This is an average based on a wide range of different size C&I accounts. Savings will differ based on factors that include building size, age of building, and systems, technologies and uses of the building.

APPENDIX 1

METHODOLOGY

Appendix 1 provides the methodologies used in the Kane County Energy Plan, which includes aggregating data, analyzing data, and calculating energy and cost savings. This documentation is important to the validity and understanding of the information and data presented.

Converting to kBtu

kBtu (kilo British thermal units) allows the comparison of natural gas (therms) and electricity (kWh) consumption. The conversion factors are to the right:

1 kWh = 3.412 kBtu
1 therm = 100 kBtu

Electricity, 2008 data

TOTAL CONSUMPTION

ComEd electricity 2008 premise -level data was provided to CNT Energy for all of ComEd's service territory, including the seven-county Chicago region. The dataset is split between the residential and commercial & industrial (C & I) sectors. CNT Energy conducted a 4-step analysis to further identify and spatially map the data through analysis of zip codes, latitudinal and longitudinal coordinates, townships, and municipal boundaries[1].

HOUSEHOLD UNIT OF MEASUREMENT IN RESIDENTIAL CONSUMPTION

Households were used for the unit of measurement in the residential sector energy consumption analysis. This is the standard for organizations and tools developed across the country, including the U.S. Energy Information Administration's (EIA) Residential Energy Consumption Survey (RECS). Household units provide a tangible measurement that all residents of a community can understand and directly relate to, whereas analysis based on accounts does not always provide a clear understanding of the unit of measurement. This is due to the fact that there may be little consistency in what an account may represent, for example a multifamily building may have one account for all units or each unit may have an account. For single family units, typically one account represents one unit, but in agricultural areas, a farm may have several utility accounts. Additionally, the number of accounts differs between utilities; there are typically more electric accounts than natural gas accounts, whereas the number of households remains consistent. Households are the most consistent and comprehensible unit of measurement when analyzing energy consumption in the residential sector.

MUNICIPAL ELECTRIC UTILITIES

I addition, Kane County has three electric municipal utilities, St. Charles, Geneva, and Batavia. Through data sharing agreements, CNT Energy received 2008 electricity consumption data from each municipal utility. This data was properly aggregated with the 2008 Kane County electricity data received from ComEd.

AVERAGE ANNUAL KWH HOUSEHOLD CONSUMPTION

1. Identified the total kWh consumed by the residential sector in Kane County.
2. This value was divided by the total number of households as provided by the Census Bureau's American Community Survey, 2006 - 2008.
3. The result is the average annual household consumption of electricity.

ANNUAL COST PER HOUSEHOLD

4. Identified the average cost per kWh for ComEd as reported in the Illinois Commerce Commission Utility Sales Statistics for 2008.
5. This value was multiplied by the average annual kWh consumed per household.
6. The result is the average annual cost of electricity consumption per household.

Natural Gas, 2008 data

TOTAL CONSUMPTION

Nicor natural gas 2008 premise-level data was provided to CNT Energy for Nicor's service territory within the seven-county Chicago region. The dataset is split between the residential and commercial & industrial (C&I) sectors. CNT Energy conducted a 4-step analysis to further identify and spatially map the data through analysis of zip codes, latitudinal and longitudinal coordinates, townships, and municipal boundaries[2].

HOUSEHOLD UNIT OF MEASUREMENT IN RESIDENTIAL CONSUMPTION

Households were used for the unit of measurement in the residential sector energy consumption analysis. This is the standard for organizations and tools developed across the country, including the U.S. Energy Information Administration's (EIA) Residential Energy Consumption Survey (RECS). Household units provide a tangible measurement that all residents of a community can understand and directly relate to, whereas analysis based on accounts does not always provide a clear understanding of the unit of measurement. This is due to the fact that there may be little consistency in what an account may represent, for example a multifamily building may have one account for all units or each unit may have an account. For single family units, typically one account represents one unit, but in agricultural areas, a farm may have several utility accounts. Additionally, the number of accounts differs between utilities; there are typically more electric accounts than natural gas accounts, whereas the number of households remains consistent. Households are the most consistent and comprehensible unit of measurement when analyzing energy consumption in the residential sector.

AVERAGE ANNUAL HOUSEHOLD CONSUMPTION

1. Identified the total therms consumed by the residential sector.
2. This value was divided by the total number of households as provided by the Census Bureau's American Community Survey, 2006 - 2008.
3. The result is the average annual household consumption of natural gas.

ANNUAL COST PER HOUSEHOLD

4. Identified the average cost per therm for Nicor, People's Gas and North Shore Gas as reported in the Illinois Commerce Commission Utility Sales Statistics for 2008.
5. This value was multiplied by the average annual kWh consumed per household.
6. The result is the average annual cost of natural gas consumption per household.

Energy Consumption Forecasts

To calculate energy consumption forecasts for Kane County in 2040, EIA (Energy Information Administration) growth factors specific to the East North Central region were used. These growth factors project growth rates of energy consumption by sector and source. EIA growth factors are updated annually, so it is recommended that Kane County adjust the 2040 forecast accordingly.

The following tables illustrate the projected 2040 forecast including number of units, energy consumption and energy costs if Kane County were to proceed with "business as usual," implementing no energy efficiency strategies. These projections were used in calculating the energy and cost savings for each energy efficiency strategy presented in the Kane County 2040 Energy Plan.

Given population projections and expected land use trends, the table below provides the expected electricity and natural gas consumption growth by 2040.

The projected growth in consumption translates into $731 million of energy cost using 2009 Kane County utility rates. Likely utility rate increases were not considered.

Consumption per household and C&I account, however, is projected to decrease over time. This is likely due to increased efficiencies, in general, that is expected to occur over time and is included in the growth factors supplied by the Energy Information Administration used to calculate energy forecasts. The projections do not include the implementation of strategies suggested in this Plan.

Table 4 below shows the projected total cumulative energy consumption and costs for Kane County between 2011 and 2040. This data was used in the analysis of the impacts of strategy implementation.

2040 Projected Number of Units

Residential Units	274,085
Electric C & I Units	62,288
Natural Gas C & I Units	34,596

TABLE 1

Business as Usual: 2040 Projected Electricity and Natural Gas Consumption

	Electricity (kWh)	Natural Gas (Therm)
Residential Units	1,889,025,035	151,285,016
Electric C&I Units	3,747,267,064	170,904,954
Natural Gas C&I Units	5,636,292,099	322,189,970

TABLE 2

Business as Usual: 2040 Projected Total Energy Consumption and Costs

	Total Energy (kBtu)	Cost ($)
Residential	21,573,855,019	$325,530,979
C&I	29,876,170,622	$405,744,005
Total	51,450,025,642	$731,274,984

TABLE 3

Projected Cumulative Total Energy Consumption and Costs (2011 to 2040)

	Electricity (kWh)	Natural Gas (therms)	Total (kBtu)
Energy Consumption	158,390,656,727	9,891,842,774	1,529,613,198,178
Energy Cost	$14,548,150,208	$6,563,744,969	$21,111,895,177

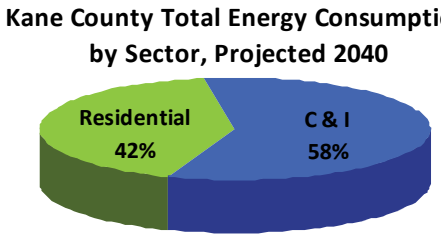
TABLE 4

Collection of Data in the future

Access to data is often a barrier in developing a community-wide energy consumption baseline. A local government can track utility bills for analysis of energy consumption in government owned buildings; however, analysis of energy consumption across all sectors of a community can be difficult with no cohesive source of data. A consumption based model, using actual utility energy use data, provides a more accurate analysis of energy consumption. Collection of this data is not only important for baseline metrics, but also for developing strategies to reduce energy consumption and monitoring and measuring the progress of strategy implementation. Therefore, it is important for Kane County to determine a process for collecting future energy data from ComEd, the municipal electric utilities, and Nicor in order to ensure successful implementation of the KC2040EP.

ComEd County-Level Energy Data

Fortunately, in March 2011, utility officials at ComEd released county electricity consumption data for each county in its service area for the first time. The information is presented by customer class: residential, small commercial and industrial and large commercial and industrial. The utility intends to share this information with county economic development partners twice a year. Access to this data will be helpful for Kane County as it moves forward with the implementation of the KC2040EP and determines methods to measure the success of the strategies chosen to reduce electric energy consumption over time.



Strategies

GENERAL STRATEGY METHODOLOGY NOTES

Savings Calculations for all strategies

If implemented, each strategy can provide annual and cumulative consumption savings over a period of time as described below:

Annual Consumption Savings

Annual consumption savings are the energy savings expected to be achieved for one year, based on average residential and C & I consumption in 2008. Consumption savings are expressed in kWh (electricity), therms (natural gas), and then combined for comparison in kBtu.

The following steps were used to calculate annual consumption savings:

1. Identified amount of energy saved (annually) in kWh and therms.
2. Identified the ComEd revenue per kWh for residential sales and commercial sales (using the average between small and large customers) as reported in the Illinois Commerce Commission Utility Sales Statistics for 2009.
3. Multiplied Step 2 by energy saved in kWh (electricity) for total electricity cost savings.
4. Identified the Nicor revenue per therm for residential sales and commercial sales (using the average between small and large customers) as reported in the Illinois Commerce Commission Utility Sales Statistics for 2009. Multiplied this value by energy saved in therms (natural gas) for total natural gas cost savings.
5. Calculated total cost savings by adding total electricity cost savings and total natural gas cost savings.

Cumulative Consumption Savings Cumulative consumption savings are the energy savings expected over time based on long term action, as multiple consumers begin to participate. Calculating cumulative savings captures the true energy savings achieved over time.[3] For the purposes of this plan, a 30 year planning timeframe from 2011 through 2040 was chosen because it coincides with the regional planning timeframe of the Chicago Metropolitan Agency for Planninzg (CMAP), our regional planning agency, and Kane County's 2040 planning process.[4] Consumption savings are expressed in kWh (electricity), therms (natural gas), and then combined for comparison in kBtu.

The following steps were used to calculate cumulative consumption savings:

6. Identified amount of cumulative energy saved in kWh and therms.
7. Same as above (Annual Cost Savings)
8. Same as above (Annual Cost Savings)
9. Same as above (Annual Cost Savings)

BASE NUMBERS FOR ALL CALCULATIONS UNLESS OTHERWISE NOTED

Number of Households, 2008: American Community Survey of the U.S. Census Bureau
Number of C & I Accounts, 2008: ComEd[5]
Number of Households, 2040: Chicago Metropolitan Agency for Planning 2040 projections
Number of Accounts, 2040: CNT Projections[6]

RESIDENTIAL STRATEGIES

Table 5. below shows the projected cumulative energy consumption and costs for the residential sector in Kane County between 2011 and 2040. This data was used in the analysis of the impacts of strategy implementation.

STRATEGY 1: Retrofit existing buildings.

Assumptions:

- The number of existing households in 2008 is the base number.
- 30% energy savings (25% natural gas and 5% electricity) per household based on nationwide studies and retrofits in our region.

Projected Cumulative Residential Sector Energy Consumption and Costs (2011 to 2040)

	Electricity (kWh)	Natural Gas (therms)	Total (kBtu)
Energy Consumption	52,865,704,352	4,936,654,156	674,043,198,831
Energy Cost	$6,190,573,980	$3,404,316,705	$9,594,890,685

TABLE 5

Conservative Cumulative Savings Countywide by 2040

5%	Electricity (kWh)	Natural Gas (therms)	Total (kBtu)
Energy Savings	81,823,989	36,627,073	3,941,890,745
Cost Savings	$9,581,589	$25,258,029	$34,839,619

Moderate Cumulative Savings Countywide by 2040

10%	Electricity (kWh)	Natural Gas (therms)	Total (kBtu)
Energy Savings	163,647,979	73,254,146	7,883,781,490
Cost Savings	$19,163,178	$50,516,059	$69,679,237

Aggressive Cumulative Savings Countywide by 2040

15%	Electricity (kWh)	Natural Gas (therms)	Total (kBtu)
Energy Savings	245,471,968	109,881,219	11,825,672,235
Cost Savings	$28,744,767	$75,774,088	$104,518,856

Assumptions:

- The number of new households in 2040 is the base number, which was calculated by subtracting the number of existing households from the projected number of households in 2040.
- 30% energy savings (natural gas and electricity) per household based on nationwide research.

Conservative Cumulative Savings Countywide by 2040

10%	Electricity (kWh)	Natural Gas (therms)	Total (kBtu)
Energy Savings	374,998,552	33,572,304	4,636,725,485
Cost Savings	$43,912,330	$23,151,461	$67,063,791

Moderate Cumulative Savings Countywide by 2040

25%	Electricity (kWh)	Natural Gas (therms)	Total (kBtu)
Energy Savings	937,496,381	83,930,761	11,591,813,712
Cost Savings	$109,780,826	$57,878,653	$167,659,479

Aggressive Cumulative Savings Countywide by 2040

50%	Electricity (kWh)	Natural Gas (therms)	Total (kBtu)
Energy Savings	1,874,992,762	167,861,521	23,183,627,423
Cost Savings	$219,561,652	$115,757,305	$335,318,957

Assumptions:

- The total number of 2040 households is the base number, because renewable energy generation can occur in any home.
- 100% electricity savings due to the small size of residential buildings and the potential for generating enough electricity to sustain household consumption.

There were no assumptions made for natural gas savings, because natural gas savings depend on many different factors and should be determined on a case-by-case basis.

Conservative Cumulative Savings Countywide by 2040

1%	Electricity (kWh)	Natural Gas (therms)	Total (kBtu)
Energy Savings	327,295,958	0	1,116,733,807
Cost Savings	$38,326,357	$0	$38,326,357

Moderate Cumulative Savings Countywide by 2040

2%	Electricity (kWh)	Natural Gas (therms)	Total (kBtu)
Energy Savings	654,591,915	0	2,233,467,614
Cost Savings	$76,652,713	$0	$76,652,713

Aggressive Cumulative Savings Countywide by 2040

3%	Electricity (kWh)	Natural Gas (therms)	Total (kBtu)
Energy Savings	981,887,873	0	3,350,201,421
Cost Savings	$114,979,070	$0	$114,979,070

Assumptions:

- The total number of 2040 households is the base number, because behavior modification can occur in any home.
- Assumes the following energy savings:
  - Reduce thermostat by 3°: 9% of total therms
  - Increase thermostat by 3°: 9% of a/c kWh[7]
  - Reduce 6 light bulb hours per day (3 60-watt bulbs/2 hours): (131.4 kWh)
  - Replace air conditioner filter: 10% a/c kWh
  - Reduce phantom load: 5% of total kWh

Conservative Cumulative Savings Countywide by 2040

25%	Electricity (kWh)	Natural Gas (therms)	Total (kBtu)
Energy Savings	797,421,122	65,928,645	9,313,665,331
Cost Savings	$93,378,013	$45,464,393	$138,842,407

Moderate Cumulative Savings Countywide by 2040

50%	Electricity (kWh)	Natural Gas (therms)	Total (kBtu)
Energy Savings	1,594,842,244	131,857,289	18,627,330,663
Cost Savings	$186,756,027	$90,928,787	$277,684,813

Aggressive Cumulative Savings Countywide by 2040

75%	Electricity (kWh)	Natural Gas (therms)	Total (kBtu)
Energy Savings	2,392,263,366	197,785,934	27,940,995,994
Cost Savings	$280,134,040	$136,393,180	$416,527,220

Assumptions:

- The total number of housing units built before 1980 is the base number, because of the likelihood of window air conditioner units.
- Assumes average savings of 221 kWh, based on typical program savings documented nationwide.

Conservative Cumulative Savings Countywide by 2040

10%	Electricity (kWh)	Natural Gas (therms)	Total (kBtu)
Energy Savings	31,439,582	0	107,271,852
Cost Savings	$3,681,575	$0	$3,681,575

Moderate Cumulative Savings Countywide by 2040

20%	Electricity (kWh)	Natural Gas (therms)	Total (kBtu)
Energy Savings	62,879,163	0	214,543,704
Cost Savings	$7,363,150	$0	$7,363,150

Aggressive Cumulative Savings Countywide by 2040

30%	Electricity (kWh)	Natural Gas (therms)	Total (kBtu)
Energy Savings	94,318,745	0	321,815,557
Cost Savings	$11,044,725	$0	$11,044,725

Assumptions:

- The total number of households in 2040 is the base number, because replacing a refrigerator can occur in any home.
- Assumes average savings of 306 kWh, which was calculated based on the difference between federal efficiency standards in 1993 and 2001, with an added 20% savings that is required when appliances meet Energy Star standards.

Conservative Cumulative Savings Countywide by 2040

5%	Electricity (kWh)	Natural Gas (therms)	Total (kBtu)
Energy Savings	64,999,258	0	221,777,467
Cost Savings	$7,611,413	$0	$7,611,413

Moderate Cumulative Savings Countywide by 2040

10%	Electricity (kWh)	Natural Gas (therms)	Total (kBtu)
Energy Savings	129,998,516	0	443,554,935
Cost Savings	$15,222,826	$0	$15,222,826

Aggressive Cumulative Savings Countywide by 2040

15%	Electricity (kWh)	Natural Gas (therms)	Total (kBtu)
Energy Savings	194,997,773	0	665,332,402
Cost Savings	$22,834,239	$0	$22,834,239

Projected Cumulative Residential Sector Energy Consumption and Costs (2011 to 2040)

	Electricity (kWh)	Natural Gas (therms)	Total (kBtu)
Energy Consumption	105,524,952,376	4,955,188,618	855,569,999,347
Energy Cost	$8,357,576,228	$3,159,428,263	$11,517,004,491

TABLE 6

Commercial and Industrial Strategies

Table 6. shows the projected cumulative energy consumption and costs for the C & I sector in Kane County between 2011 and 2040. This data was used in the analysis of the impacts of strategy implementation.

STRATEGY 7: Retrofit existing commercial and industrial buildings.

Assumptions:

- The total number of existing accounts in 2008 is the base number.
- 30% energy savings (25% natural gas and 5% electricity) per account based on nationwide studies and retrofits in our region.

Conservative Cumulative Savings Countywide by 2040

10%	Electricity (kWh)	Natural Gas (therms)	Total (kBtu)
Energy Savings	326,098,987	167,768,680	17,889,517,776
Cost Savings	$25,827,040	$106,960,922	$132,787,962

Moderate Cumulative Savings Countywide by 2040

15%	Electricity (kWh)	Natural Gas (therms)	Total (kBtu)
Energy Savings	489,148,481	251,653,020	26,834,276,664
Cost Savings	$38,740,560	$160,441,383	$199,181,943

Aggressive Cumulative Savings Countywide by 2040

25%	Electricity (kWh)	Natural Gas (therms)	Total (kBtu)
Energy Savings	815,247,468	419,421,701	44,723,794,441
Cost Savings	$64,567,599	$267,402,305	$331,969,905

Assumptions:

- The projected number of new C & I accounts in 2040 is the base number, which was calculated by subtracting the number of existing accounts from the projected number of accounts in 2040.
- 30% energy savings (natural gas and electricity) based on nationwide research.

Conservative Cumulative Savings Countywide by 2040

25%	Electricity (kWh)	Natural Gas (therms)	Total (kBtu)
Energy Savings	1,868,135,632	192,220,560	25,596,134,781
Cost Savings	$147,956,342	$122,550,218	$270,506,560

Moderate Cumulative Savings Countywide by 2040

50%	Electricity (kWh)	Natural Gas (therms)	Total (kBtu)
Energy Savings	3,736,271,264	384,441,120	51,192,269,562
Cost Savings	$295,912,684	$245,100,436	$541,013,120

Aggressive Cumulative Savings Countywide by 2040

75%	Electricity (kWh)	Natural Gas (therms)	Total (kBtu)
Energy Savings	7,472,542,527	768,882,240	102,384,539,124
Cost Savings	$591,825,368	$490,200,872	$1,082,026,240

Assumptions:

- The total number of 2040 C & I accounts is the base number, because renewable energy generation can occur in any business.
- 50% electricity savings (not 100% as assumed in residential buildings) due to the larger size of commercial/industrial buildings and the potential for generating enough electricity to sustain a percentage of consumption. The percentage of consumption will vary on a case by case basis, however, because smaller units may be able to generate 100% of their consumption, while very large buildings may experience a smaller percentage. No assumptions were made for natural gas savings.

Conservative Cumulative Savings Countywide by 2040

10%	Electricity (kWh)	Natural Gas (therms)	Total (kBtu)
Energy Savings	3,260,989,870	0	11,126,497,438
Cost Savings	$258,270,398	$0	$258,270,398

Moderate Cumulative Savings Countywide by 2040

20%	Electricity (kWh)	Natural Gas (therms)	Total (kBtu)
Energy Savings	6,521,979,741	0	22,252,994,875
Cost Savings	$516,540,795	$0	$516,540,795

Aggressive Cumulative Savings Countywide by 2040

30%	Electricity (kWh)	Natural Gas (therms)	Total (kBtu)
Energy Savings	9,782,969,611	0	33,379,492,313
Cost Savings	$774,811,193	$0	$774,811,193

Assumptions:

- The total number of 2040 C & I accounts is the base number, because behavior modification can occur in any business.
- Assumes the following energy savings:
  - Reduce thermostat by 3°: 9% of therms
  - Increase thermostat by 3°: 9% of a/c kWh[8]
  - Adjust thermostat during non-working hours
    - Total hours in a week 7 days x 24 hours = 168 hours
    - Working hours estimated at 5 days x 16 hours = 80 hours
    - Average of 88 non-working hours (52%/week) available for temperature setbacks
    - If a 3° at 100% of the time setback is 9% savings, then a 52% of the time setback would be 52% x 9% to equal to an additional 4.7% a/c kWh saved and an additional 4.7% therms saved.

Conservative Cumulative Savings Countywide by 2040

10%	Electricity (kWh)	Natural Gas (therms)	Total (kBtu)
Energy Savings	142,961,796	91,937,237	9,681,509,330
Cost Savings	$11,322,574	$58,614,585	$69,937,160

Moderate Cumulative Savings Countywide by 2040

15%	Electricity (kWh)	Natural Gas (therms)	Total (kBtu)
Energy Savings	214,442,694	137,905,855	14,522,263,994
Cost Savings	$16,983,861	$87,921,878	$104,905,739

Aggressive Cumulative Savings Countywide by 2040

25%	Electricity (kWh)	Natural Gas (therms)	Total (kBtu)
Energy Savings	357,404,490	229,843,092	24,203,773,324
Cost Savings	$28,306,436	$146,536,463	$174,842,899

Tables 7 and 8 depict projected average electricity and natural gas consumption and cost per unit in 2040. These projections were calculated using 2040 electricity and natural gas consumption projections along with projected number of households and commercial accounts.

2040 Projected Average Electricity Consumption and Cost

	Number of Units	kWh per Unit	$ per Therms	Annual $ per Unit
Residential	274,085	6,892	0.117	$807
C & I	62,288	60,160	0.079	$4,765

TABLE 7

2040 Projected Average Natural Gas Consumption and Cost

	Number of Units	Therms per Unit	$ per Therms	Annual $ per Unit
Residential	274,085	552	0.690	$381
C & I	34,596	4,940	0.638	$3,150

TABLE 8

KANE COUNTY MUNICIPAL ELECTRICITY CONSUMPTION, 2008

Municipality	Electricity Consumption, 2008							
	Residential				Commercial & Industrial			
	kWh	Number of Units[9]	Average annual kWh per Unit	Average annual $ per Unit	kWh	Number of Units	Average annual kWh per Unit	Average annual $ per Unit
Aurora	490,117,481	58,187*	8,423	$975	854,115,127	12,879	66,318	$6,303
Batavia	94,917,598	9,457*	10,037	$1,161	321,715,432	1,292	248,942	$23,661
Big Rock	7,251,238	No HH Census Data; Incorporated in 2001			3,155,384	113	27,924	$2,654
Burlington	2,248,593	182	12,331	$1,427	3,167,415	107	29,602	$2,813
Campton Hills	No electricity data; Incorporated in 2007				No electricity data; Incorporated in 2007			
Carpentersville	84,222,881	11,418*	7,376	$853	122,766,781	1,922	63,874	$6,071
East Dundee	11,073,071	1,297	8,538	$988	35,354,296	637	55,501	$5,275
Elburn	19,617,949	1,987	9,873	$1,142	21,949,929	728	30,151	$2,865
Elgin	278,367,738	35,000*	7,953	$920	752,619,814	8,910	84,469	$8,028
Geneva	81,730,867	7,811*	10,464	$1,211	306,395,277	2,038	150,310	$14,287
Gilberts	21,696,404	1,847	11,746	$1,359	11,770,932	377	31,223	$2,967
Hampshire	16,433,081	1,949	8,431	$975	40,153,166	635	63,233	$6,010
Kaneville	1,541,214	No HH Census Data; Incorporated in 2006			644,139	34	18,945	$1,800
Lily Lake	3,737,141	283	13,227	$1,530	535,157	34	15,740	$1,496
Maple Park	4,785,474	472	10,135	$1,173	1,199,728	190	6,314	$600
Montgomery	50,567,371	5,797	8,724	$939	115,383,326	1,551	74,393	$7,071
North Aurora	55,003,164	6,004	9,162	$1,060	95,891,666	1,595	60,120	$5,714
Pingree Grove	12,152,643	1,643	7,396	$856	7,751,364	347	22,338	$2,123
Sleepy Hollow	15,029,435	1,230	12,222	$1,414	1,640,695	133	12,336	$1,172
South Elgin	70,938,436	7,296*	9,723	$1,125	135,843,507	1,824	74,476	$7,078
St. Charles	128,380,116	12,770*	10,053	$1,163	388,401,809	2,086	186,202	$17,698
Sugar Grove	34,874,243	3,139	11,112	$1,286	19,575,487	815	24,019	$2,283
Virgil	901,745	100	9,056	$1,048	970,178	9	107,798	$10,246
Wayne	18,404,969	813	22,630	$2,618	2,851,318	107	26,648	$2,532
West Dundee	25,780,871	3,025	8,522	$986	46,783,117	861	54,336	$5,164

APPENDIX 2

KANE COUNTY MUNICIPAL NATURAL GAS CONSUMPTION, 2008

Municipality	Natural Gas Consumption, 2008							
	Residential				Commercial & Industrial			
	Therms	Number of Units[10]	Average annual Therms per Unit	Average annual $ per Unit	Therms	Number of Units	Average annual Therms per Unit	Average annual $ per Unit
Aurora	59,002,737	58,187*	1,014	$1,029	39,226,757	4,180	9,384	$9,226
Batavia	11,882,046	9,457*	1,256	$1,275	9,660,851	1,091	8,855	$8,706
Big Rock	601,549	No HH Census Data; Incorporated in 2001			224,313	42	5,341	$5,251
Burlington	495,330	182	2,716	$2,757	139,835	37	3,779	$3,715
Campton Hills	No natural gas data; Incorporated in 2007				No natural gas data; Incorporated in 2007			
Carpentersville	11,165,868	11,418*	978	$993	7,473,616	561	13,322	$13,098
East Dundee	1,612,112	1,297	1,243	$1,262	7,624,017	477	15,983	$15,714
Elburn	3,937,018	1,987	1,981	$2,011	2,061,515	291	7,084	$6,965
Elgin	37,961,281	35,000*	1,085	$1,101	32,471,484	3,432	9,461	$9,302
Geneva	13,025,969	7,811*	1,668	$1,693	11,152,213	1,217	9,164	$9,009
Gilberts	2,931,797	1,847	1,587	$1,611	930,653	247	3,768	$3,704
Hampshire	2,994,760	1,949	1,536	$1,559	3,111,595	199	15,636	$15,373
Kaneville	325,251	No HH Census Data; Incorporated in 2006			912,358	36	25,343	$24,917
Lily Lake	480,799	283	1,702	$1,727	111,832	36	3,106	$3,054
Maple Park	775,529	472	1,643	$1,667	502,534	50	10,051	$9,881
Montgomery	5,561,504	5,797	959	$851	31,608,131	405	78,045	$76,734
North Aurora	6,535,640	6,004	1,089	$1,105	8,893,717	450	19,764	$19,431
Pingree Grove	1,786,804	1,643	1,087	$1,104	129,862	19	6,835	$6,720
Sleepy Hollow	1,864,876	1,230	1,517	$1,539	151,793	35	4,337	$4,264
South Elgin	8,005,411	7,296*	1,097	$1,114	4,269,197	653	6,538	$6,427
St. Charles	18,526,052	12,770*	1,451	$1,473	15,398,469	1,873	8,221	$8,083
Sugar Grove	4,485,303	3,139	1,429	$1,451	1,988,998	479	4,152	$4,082
Virgil	No natural gas service				No natural gas service			
Wayne	2,354,076	813	2,894	$2,938	140,077	27	5,188	$5,100
West Dundee	4,240,291	3,025	1,402	$1,423	1,561,955	378	4,132	$4,062

APPENDIX 3

MUNICIPALINFORMATION & RESOURCES

The information presented in this appendix provides information and resources for local governments on the topics of energy efficiency, climate action and sustainability planning. Actions pursued by municipalities are presented to encourage conversation and participation.

Examples of strategies:

Framework Policies and Statements

Municipalities across the country (and world) are collaborating regarding their intent to reduce energy consumption and emissions. This section examines three efforts, the U.S. Conference of Mayors Climate Protection Agreement, Sierra Club's Cool Cities Campaign and the U.S. EPA's Green Power Partnership.

Capturing Energy Efficiency through Municipal Operations

Reducing energy consumption through municipal operations is usually the first step a municipality takes in order to implement energy policy. This section examines three areas where energy savings can be achieved by local government: municipal franchise agreements, lighting, and municipal water operations.

Framework Policies and Statements

U.S. CONFERENCE OF MAYORS CLIMATE PROTECTION AGREEMENT

In 2005, the U.S. Conference of Mayors unanimously endorsed the U.S. Conference of Mayors Climate Protection Agreement, an initiative launched by Seattle Mayor Greg Nickels in which mayors commit to reduce emissions in their cities to seven percent below 1990 levels by 2012. Since its inception, the Conference has actively encouraged mayors to sign on to the agreement. Currently, over 500 mayors have committed to this goal.

Commitments of the Climate Protection Agreement[11] include:

- Strive to meet or beat the Kyoto Protocol targets in their own communities through actions ranging from anti-sprawl land-use policies to urban forest restoration projects to public information campaigns
- Urge state and federal governments to enact policies and programs to meet or beat the greenhouse gas emission reduction target suggested for the United States in the Kyoto Protocol (7 percent reduction from 1990 levels by 2012.)
- Urge Congress to pass bipartisan greenhouse gas reduction legislation, that would establish a national emission trading system

We signed the U.S. Conference of Mayors Climate Protection Agreement!

Q: How do we get data from 1990 to gauge 7% reduction from 1990-level emissions?
A: Local utilities aren't required to keep data for more than 2 years. A "linear backcast" or "regression analysis" utilizes existing consumption numbers to estimate consumption in 1990. It's not a perfect method (and presents challenges for high-growth communities) but it is an accepted measurement that provides a starting point from which to move forward

Kane County Participating Cities (2): Aurora and Elgin.

Regional Participating Cities (32): Algonquin; Berwyn; Blue Island; Bolingbrook; Carol Stream; Chicago; Des Plaines; Elmhurst; Evanston; Hazel Crest; Highland Park; Hoffman Estates; Homewood; Joliet; Lake Forest; Lake in the Hills; Lombard; Northbrook; Oak Lawn; Oak Park; Orland Park; Oswego; Palatine; Park Forest; Park Ridge; Plainfield; Rolling Meadows; Schaumburg; Villa Park; Waukegan; Westmont; and Wilmette.

In 2007 The U.S. Conference of Mayors Climate Protection Center was launched in response to an increasingly urgent need to provide mayors with the guidance and assistance needed to lead their cities' efforts to reduce the greenhouse gas emissions that are linked to climate change. Moving beyond advocacy, the Conference established a goal to increase the number of cities involved, and to equip all cities with the knowledge and tools that ultimately will have the greatest impacts on reducing greenhouse gas emissions. Tools, resources, and best practices that help municipalities move forward in addressing issues related to energy and emissions are highlighted on the Center's website.[12]

COOL CITIES CAMPAIGN (SIERRA CLUB)

Sierra Club's Cool Cities Campaign is a collaboration between community members, organizations, businesses, and local leaders to implement clean energy solutions that save money, create jobs, and help curb global warming. Since 2005, over 1000 city and county leaders have made a commitment to reduce their community's carbon footprint. With these commitments comes a challenge and opportunity — and this volunteer-led program can help turn your community into a "cool" community.[13]

Cool Cities outlines five milestones for participating communities and provides resources to assist in reaching them, including materials, guides and best practices:

1. Establish a Cool Cities Campaign—An established group of local citizens committed to reducing global warming emissions.
2. Engage the Community—The local Cool Cities campaign builds support for local action by working with other community groups, generating letters to mayors, raising the issue with the media, and talking to neighbors.
3. Sign Commitment Agreement—Mayor/Village President signs either the US Mayors' Climate Protection Agreement, Cool Counties Agreement or Canadian Partners for Climate Protection
4. Implement Initial Solution Steps—Turn commitment into initial action, starting with steps to improve operations.
5. Implement Advanced Smart Energy Solutions—Take the initial commitment further, creating policies that significantly reduce global warming emissions, lower energy bills, and make the city a cleaner place to live. May include consideration of concepts like green buildings, fuel efficient city fleets, and powering homes with renewable energy.

Kane County Participating Cities (2): Aurora and Elgin

Regional Participating Cities (36): Algonquin; Arlington Heights; Barrington; Brookfield; Carol Stream; Chicago; Crystal Lake; Elmhurst; Evanston; Forest Park; Glen Ellyn; Glenview; Hazel Crest; Highland Park; Hoffman Estates; Homewood; Joliet; LaGrange Park; Lake Forest; Lake in the Hills; Lombard; Naperville; Northbrook; Oak Lawn; Oak Park; Oswego; Palatine; Park Forest; Park Ridge; Plainfield; Rolling Meadows; Villa Park; Warrenville; Westmont; Wheaton; and Wilmette.

U.S. EPA Green Power Partnership

The Green Power Partnership is a voluntary program led by the U.S. Environmental Protection Agency (EPA) that brings together like-minded communities and businesses who have committed to buying green power at EPA minimum purchase requirements. Participating members are provided with helpful tools and resources, while receiving publicity and recognition. Learn more about the Green Power Partnership in Appendix 4 and at *http://www.epa.gov/greenpower/documents/gpc_brochure.pdf*

Increasing Energy Efficiency through Municipal Operations

MUNICIPAL FRANCHISE AGREEMENTS

The majority of municipal governments have franchise agreements with the utility companies that provide electricity or natural gas. The agreements give the utility the right to operate in the municipality, but also allow the utility to use public land for distribution infrastructure. The EPA Region 5 funded a study examining municipal franchise agreements across the Region. The results state that franchise agreements "represent a largely unused opportunity for municipalities to promote energy efficiency and renewable energy, and that some franchise agreements even create disincentives for energy efficiency."

It may be helpful for municipalities to review the study before renewing agreements that may be in place for decades. The study can be found at: *http://www.epa.gov/r5climatechange/franchise-agreement-report.pdf*

MUNICIPAL ENERGY EFFICIENCY OPPORTUNITIES

An increasing number of municipalities are capturing significant energy and cost savings through lighting and water operation improvements.

Street Lights

1. Benefits of replacing standard streetlights[14] with induction lighting include:
2. Potential energy savings from 30-60%
3. Less maintenance with an expected bulb lifetime of 20 years (as opposed to 5 to 7 years)
4. Lower maintenance costs
5. Excellent return on investment period, payback period of 3 to 7 years.

Sample Streetlight Replacement: 155 watt light with 55 watt induction light

	Annual Savings		Savings over 20-year Liftetime	
	Energy (kWh)	Cost	Energy (kWh)	Cost
One (1) Streetlight	438	$39.64	876	$792.78
100 Streetlights	43,800	$3,964	876,000	$79,278

TABLE 9A

Local Example:
There is also potential for harnessing electricity through renewable technologies for street lights. In nearby Downers Grove (DuPage County), the Village installed a hybrid solar and wind powered street lighting system—the first of its kind in the nation. The 25 lights in the Prentiss Creek subdivision boast an expected lifetime 10 times beyond standard lighting, or 100,000 hours and are expected to save more than 500,000 kWh of electricity, as the wind/solar mix is expected to produce nearly all electricity consumption.[15] 45% of the $283,000 project was funded through Community Development Block Grant dollars.[16]

Traffic Lights

Similar to streetlights, traffic lights have great cost and energy savings potential for municipalities, especially because they are essentially "on" 24 hours a day. LEDs (light emitting diode) already in place in our region use anywhere from 80-90% less energy and require considerably less maintenance.

Local Example:
In Kane County, the City of Elgin recently converted traffic signals at 69 intersections over a period of two years. The cost per LED fixture and pole installed was approximately $10,000 and basic fixture replacement about $5,000. The city expects to save an estimated 85-90% in energy cost savings, which does not include savings attributed to reduced maintenance, including manpower and vehicle usage.[17]

Building Lighting

Municipalities are also saving energy by retrofitting lighting in buildings. Types of lighting retrofits can vary greatly depending on existing lights and lighting needs. Municipalities can take advantage of the Illinois Smart Energy Design Assistance Center (SEDAC) free energy audit services and technical assistance. A comprehensive energy audit will analyze energy consumption and offer recommendations or ECMs (Energy Conservation Measures) that may include options for more efficient lighting. Each type of lighting offers a particular energy savings potential and corresponding return on investment (or payback period.) Lighting retrofits and upgrades may include:

- Replace fluorescent T12 lamps/magnetic ballasts with T8 or T5 lamps/electronic ballasts
- Replace incandescent light bulbs with compact fluorescent light bulbs (CFLs)
- Use LED lighting for signage
- Use occupancy sensors for lighting in break rooms, bathrooms, conference rooms, etc...
- Replace metal halides with high-bay fluorescent fixtures
- Daylighting (harvesting natural daylight) through the use of skylights when feasible (use with automatic/manual daylighting controls for more savings)

SampleTraffic Light Replacement: 150 watt light with 25 watt light

	Annual Consumption		Consumption over 5 years	
	Energy (kWh)	Cost	Energy (kWh)	Cost
Standard 8-Light Intersection	10,512	$951	52,560	$4,757
LED 8-light Intersection	1,752	$159	8,760	$793

TABLE 9B

Local Example:
The City of Elgin retrofitted lighting in The Centre, a city-owned recreational facility and conference center, with incentives offered by the Department of Commerce and Economic Opportunity (DCEO) combined with planned budget expenditures. The project replaced all 400-watt Metal Halide fixtures in the main gym, auxiliary gym and racquetball courts with T5 highbay fixtures. The new lighting allows for lights to be turned on and off with no warm up period, and thus burn for fewer hours each day. New lighting is estimated to save more than 119,000 kWh per year. According to The Centre Operations Manager, these lighting projects saved the city $63,273.58 in electricity costs in 2008.[18]

Another opportunity to increase building lighting efficiencies is to replace exit sign lights that are required to be on continuously, with LED lights. Before replacement, Elgin's exit signs consumed approximately 42,048 kWh of electricity each year. After replacement with LED lights, consumption was reduced to 3,810 kWh of electricity annually.

Municipal Water Operations

Treatment of wastewater and the provision of drinking water typically cost more than one-third of a municipality's total energy bill, according to recent estimates by the U.S. EPA., as energy is consumed in all stages of the water use and treatment cycle.

Most opportunities to improve efficiency or conserve energy in water operations involve upgrading of equipment. An energy audit can identify areas to improve efficiency in maintenance and operations, as well as provide recommendations for energy efficient equipment. However, because of the cost to replace equipment, the payback period can be long. Therefore, replacements are usually only recommended when current equipment needs to be replaced.

However, in addition to equipment replacement, behavioral changes such as operations and maintenance modifications require little or no cost and have the capacity to significantly impact energy and cost savings. Maintenance of equipment is also important in ensuring efficient operation and longevity.

Consumers can contribute to reducing energy consumption in municipal water operations.. Development and implementation of a water conservation awareness program for residents has many benefits for operations. Reducing water consumption will result in shorter pump run times, less maintenance, and savings in chlorine to treat drinking water. Through conservation programs communities can reduce water consumption by 10%.

APPENDIX

4

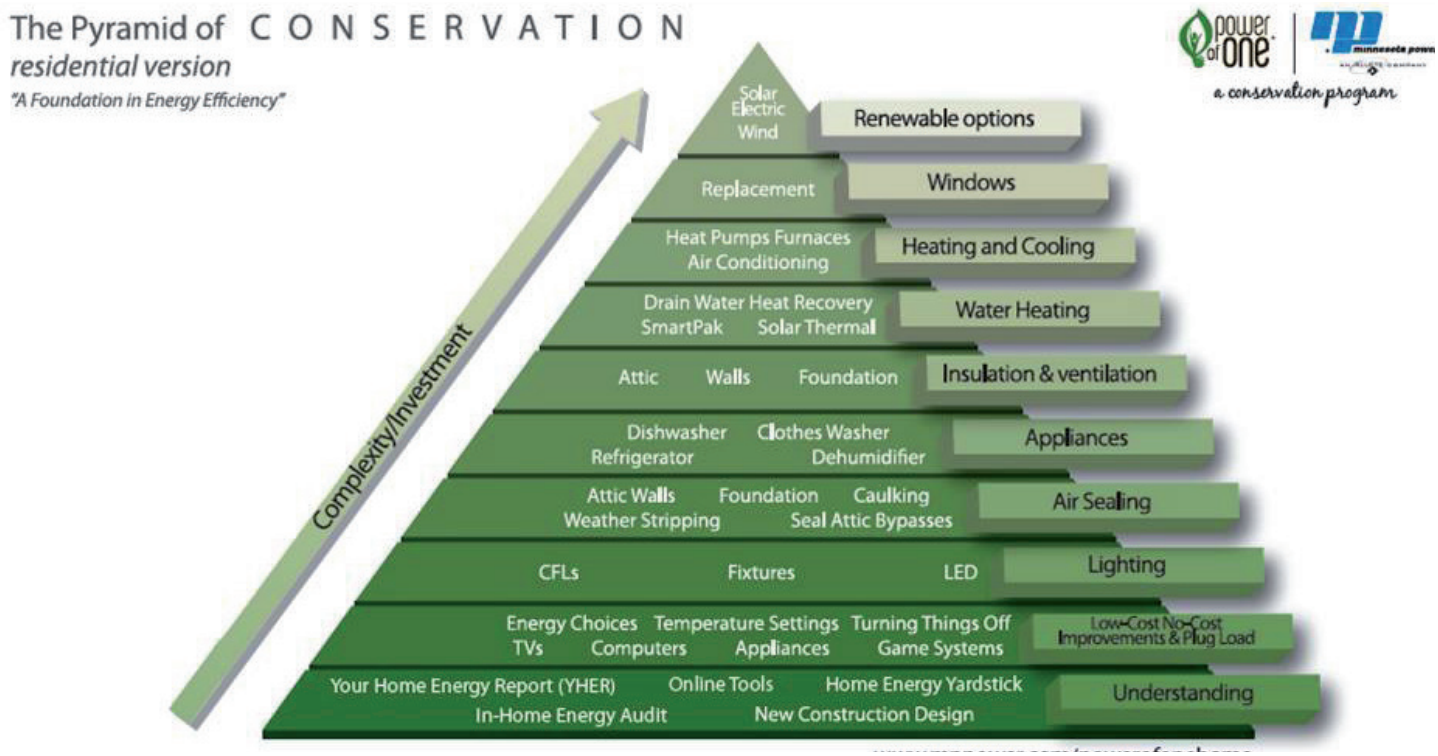
HOUSEHOLD AND BUSINESS INFORMATION & RESOURCES

The purpose of Appendix 4 is to provide tools for residents and business owners who seek to understand their energy consumption and identify ways to reduce consumption and costs.

Information Tools

ENERGY AUDITS/ENERGY ASSESSMENTS

Understanding energy consumption is the first step to increasing one's energy efficiency. The image below depicts Minnesota Power's "Pyramid of Conservation," which suggests measuring consumption is the basis from which all other energy investments are made. An energy audit (or energy assessment) is an analysis of energy consumption of a building including a review of past energy consumption as found on utility bills. The building analysis involves a visual and diagnostic inspection of living space, all mechanical systems (HVAC, lighting, hot water), and the building envelope. Paired with a review of past energy consumption, an energy audit report summarizes key issues and recommendations for improvements that range from low/no cost strategies to larger investments. Each ECM (Energy Conservation Measure) includes anticipated energy savings and return on investment, or the length of time required to recover the cost of the initial investment.



There are several ways to obtain an energy audit:

1. Pay a trained energy professional to conduct an audit.
2. Obtain a free energy audit. Certain businesses in Illinois qualify for free energy audits through the Illinois Smart Energy Design Assistance Center (SEDAC.)[19]
3. Conduct a self-audit employing one or more of the following tools:

- ComEd: Energy Star at Home Tool *https://www.comed.com/sites/HomeSavings/Pages/energyanalyzer.aspx*

- ComEd: Energy Analyzer (for businesses) offers two free services for business consumers:

  - **Energy Insights** Online offers comprehensive energy consumption analysis tools *https://www.comed.com/sites/BusinessSavings/Pages/energyinsights.aspx*

  - **Whole Building Energy Usage** offers energy management tools for owners/managers of multiple buildings *https://www.comed.com/sites/BusinessSavings/Pages/wholebuilding.aspx*

- Citizen's Utility Board (CUB): CUB Energy Saver is a free online energy advisory service that tailors recommendations based on self-inputted energy data, and provides personalized energy savings suggestions. *https://www.cubenergysaver.com/*

- Nicor:
  - **Energy Depot for Homes** serves as a self-audit tool that features an energy profile to document past consumption; an energy calculator that calculates annual energy costs for all systems in the home; and a library to address energy concerns. *http://www.energydepot.com/NicorRes/index.asp*

  - **Residential Overview** features user-friendly tips and tools to help residential consumers better understand their bills, manage natural gas costs, gather energy efficiency tips, and more. *http://www.nicor.com/en_us/residential/*

  - **How to Conduct Your Own Energy Audit** is directed towards commercial and industrial users, but provides useful information for any consumer. The site includes downloadable forms for conducting an audit. *http://www.nicor.com/en_us/commercial/planning_needs/build_strategy/energy_audit.htm*

  - **Commercial and Industrial Overview** features user-friendly tips and tools for businesses. *http://www.nicor.com/en_us/commercial/*

ENERGY STAR®

ENERGY STAR[20] is a joint program between the U.S. Environmental Protection Agency (EPA) and the U.S. Department of Energy (DOE) that provides leadership in identifying energy efficient products and practices. It began as a voluntary labeling program to help consumers identify energy efficient products, typically computers, monitors and other office equipment. The ENERGY STAR® label has expanded over the years to over 60 product categories, including major appliances, lighting, and home electronics. In addition to product labeling, ENERGY STAR® provides building assessment tools to assist building owners and occupants in achieving greater energy savings. Lastly, entire buildings can earn the ENERGY STAR® label. Upon meeting strict guidelines, an ENERGY STAR® home[21] can expect energy savings of 20% to 30%. Commercial buildings[22] meet similar energy performance guidelines.

Utility-Based Programs

Utilities have a variety of energy efficiency programs that can help customers reduce their overall energy consumption and demand. Over time, the collective result may avoid the need to build additional power plants and expensive infrastructure. All utilities should to continue to provide programs that assist customers in reducing their energy consumption.

COMED PROGRAMS AND INCENTIVES, RESIDENTIAL[23]

- Energy Star® Lighting. Instant on-shelf discounts at participating retailers.
- Appliance Recycling. Recycle old, working refrigerators, freezers and air conditioners and receive a $35 rebate.
- Central Air Conditioner Cycling. Receive credits on your bill for allowing utility to cycle a/c units during high demand periods.
- Central Air Conditioning Efficiency Services. Obtain tune-up information or assistance in identifying qualified HVAC services when replacing a central air conditioning system.
- Residential Real-Time Pricing. Tap into cost savings by being billed for the electricity used based on wholesale hourly market prices.
- All-Electric Home Performance Tune Up. Get a free evaluation on energy consumption.
- Multi-Family Direct Install Program. Free installation of efficient showerhead, faucet aerators and up to six compact fluorescent light bulbs for multifamily buildings.
- ComEd Programs and Incentives, Business[24]
- Retro-commissioning. Employ an expert to analyze building energy consumption and identify low/no-cost energy saving strategies to achieve optimal energy system performance.
- Lighting. Receive incentives for lighting replacement. Amounts vary based on type of lighting.
- Refrigeration Upgrades. Various incentives may be available, but require contacting ComEd directly through the account manager.
- HVAC Upgrades. Various incentives may be available, but require contacting ComEd directly through the account manager.
- Electric Motors. Incentives up to $7 per horsepower are available for energy efficient motors. Contact the utility directly through the ComEd account manager.
- Sensors and Controls. Various incentives for different types of sensors and controls are available.
- Central Air Conditioning Efficiency Services. Obtain tune-up information or assistance in identifying qualified HVAC services when replacing a central air conditioning system.
- Residential Real-Time Pricing. Tap into cost savings by being billed for the electricity used based on wholesale hourly market prices.
- All-Electric Home Performance Tune Up. Get a free evaluation of energy consumption.
- Multi-Family Direct Install Program. Free installation of efficient showerhead, faucet aerators and up to six compact fluorescent light bulbs for multifamily buildings.

NICOR RESIDENTIAL PROGRAMS[25]

- Energy Star® Equipment Replacement Rebate. Rebates for Energy Star-rated boilers, furnaces and water heaters. Instant on-shelf discounts at participating retailers.
- Low-to-Moderate Income Program Home weatherization and furnace upgrades are available to customers with household at 200-300% percent federal poverty level as identified by Community Action Agencies.
- Existing Home Retrofit Program Assists homeowners by analyzing energy use, recommending weatherization measures, and facilitating installation. Rebates are received based on the installation of recommended measures.
- Residential Multi-Family Direct Install Program In conjunction with the ComEd Multi-Family Direct Install Program, this program assists owners and residents of multifamily buildings in reducing energy costs through direct installation of energy-saving measurements.

NICOR BUSINESS REBATE PROGRAMS[26]

Efficiency Rebates. Rebates for high efficiency boilers, furnaces and water heaters, and efficiency maintenance including boiler tune-ups, boiler re-set controls and steam traps. Business Custom Incentive Program Efficiency upgrades not covered in the standard efficiency rebate program may be eligible for financial assistance after installation. Application process required. *http://www.nicorgasrebates.com/bus-customer/business-custom-incentive-program#Info1*

GREEN POWER

The U.S. Environmental Protection Agency (EPA) defines green power as "subset of renewable energy… (with) the highest environmental benefit." Green power includes "electricity produced from solar, wind, geothermal, biogas, biomass, and low-impact small hydroelectric sources."[27] The benefits of green power include reduced emissions and air pollution. The on-site renewable energy strategies outlined in Section 4 are one way a consumer can access green power; however, there are other options available in Kane County.

Renewable energy certificates[28] (RECs) represent "the property rights to the environmental, social, and other nonpower qualities of renewable energy generation. A REC, and its associated attributes and benefits, can be sold separately from the underlying physical electricity associated with a renewable-based generation source."[29] A home or business owner purchasing RECs may not necessarily use green power, but supports its technology and production elsewhere through purchase of the certificate. RECs offer consumers a way to participate when green power products are unavailable in the local market.

Some utilities may offer "green pricing," which allows consumers to purchase green power at a small premium that covers the costs incurred by the utility to include green power in its generation mix. In Kane County, the St. Charles Municipal Electric Utility offers a green power option, as does nearby Naperville. Because Illinois is a competitive electricity market state, consumers can also access green power through Blue Star Energy, by completely switching their service provider or through the purchase of renewable energy certificates. As mentioned in Section 2 of the KC2040EP, the City of Aurora recently partnered with Blue Star Energy to increase green power purchases among city residents and business owners. The EPA's Green Power Locator allows consumers to locate green power purchasing options, which is important because the market is growing fast. *http://www.epa.gov/greenpower/pubs/gplocator.htm*

COOL ROOFS

"Cool roofs" address heat absorption that occurs with traditional dark-colored roofing materials. Dark roofs absorb sunlight and heat the building—especially during the summer—that exacerbates the need for cooling and air conditioning. By implementing "cool roof" techniques, less heat is absorbed which in turn reduces the need for cooling energy. Cool roofs are shown to reduce annual air conditioning use by up to 15%, providing significant energy and cost savings that also help reduce harmful greenhouse gas emissions. Cool roofs make the most economic sense when installing a new roof or re-roofing. For more information on the types of materials, visit *http://www1.eere.energy.gov/buildings/pdfs/cool_roof_fact_sheet.pdf* to get started.

APPENDIX 5

FUNDING ENERGY EFFICIENCY PROJECTS AND STRATEGIES

Appendix 5 provides information about energy efficiency funding opportunities for local governments in the Chicago metropolitan region. Please note that funding opportunities continually change.

Energy Efficiency Conservation Block Grants (EECBG)

In 2009, the federal government provided funding for the EECBG program through the American Recovery and Reinvestment Act. The EECBG was originally introduced as part of the Energy Independence and Security Act of 2007. The purpose of EECBG is to assist eligible entities in implementing energy efficiency and conservation 9

1. Reduce fossil fuel emissions;
2. Reduce total energy use; and
3. Improve energy efficiency in buildings, transportation, and other appropriate sectors.[30]

EECBG funding was allocated through the following:

DIRECT FORMULA

Direct formula grant amounts are based on the population of the county or municipality offered funding. Receipt of funding is contingent upon the development of an Energy Efficiency and Conservation Strategy (EECS) that includes proposed activities and projected energy savings and job creation.

Direct Formula EECBG Counties and Municipalities in the Chicago Region

County*	Municipality
Kane	Aurora, Carpentersville, Elgin
Cook	Arlington Heights, Bartlett, Berwyn, Buffalo Grove, Calumet City, Chicago, Cicero, Des Plaines, Evanston, Glenview, Hoffman Estates, Mount Prospect, Oak Lawn, Oak Park, Orland Park, Palatine, Park Ridge, Schaumburg, Skokie, Streamwood, Tinley Park, Wheeling
DuPage	Addison, Bartlett, Carol Stream, Downers Grove, Elmhurst, Hanover Park, Lombard, Naperville, Wheaton
Lake	Waukegan
McHenry	Crystal Lake
Will	Bolingbrook, Joliet, Plainfield, Romeoville

TABLE 10.
*Counties are listed that received funding. No funding was awarded in Kendall County, at the county or municipal level.

Kane County EECBG-funded Activities

The following seven activities are funded by Kane County's EECBG formula grant:

1. Update the Kane County Energy Plan and the Energy Efficiency Chapter of the KC 2030 Land Resource Management Plan;
2. Retrofit county owned facilities with updated and energy efficient systems;
3. Develop and implement a revolving loan fund for public sector and nonprofit energy efficiency improvement projects;
4. Train building auditors, inspectors and code developers/enforcers, as well as contractors and/or tradespeople, in advanced energy efficiency and conservation building techniques;
5. Implement improvements to Kane County's Intelligent Transportation System (ITS), including: 1. Expansion of the Fiber Optic Interconnect Network for County Highway and road segments and the installation of field devices such as roadway weather systems and dynamic message signs; and 2. Installation of real time management systems for traffic and maintenance operations;
6. Determine the extent to which bus rapid transit, improved transit and corridor land use densification will reduce vehicle miles traveled per capita;
7. Develop a Sustainability Plan for Kane County.

Kane County Revolving Loan Fund for Energy Efficiency (RLF)

In particular, the RLF (#3) offers low-interest loans to eligible local government, public and non-profit organizations to implement energy efficiency building upgrades. Repayment structure is based on projected energy savings. *http://www.countyofkane.org/Pages/kcci/rlf4ee.aspx*

City of Aurora EECBG-funded Activities

The following activities, categorized by three groups, were funded by Aurora's EECBG formula grant:

For Residents and Business

1. Water Saving Toilet Program: implement a residential toilet water savings rebate program to encourage water conservation; offered rebates to residential property owners for replacement of older toilets with new WaterSense labeled, High Efficiency Toilets.
2. Residential Energy Savers Program: provided eligible residents with a free energy evaluation to determine how they can make their home more energy efficient; offered a matching grant to complete eligible improvements, covering 50% of eligible project costs up to $3,500.
3. Business Energy Savers Program: offered Aurora businesses an opportunity to achieve efficiencies through a matching grant of 80% of project costs up to $9,600; supported improvements associated with Section 503, 504 and 505 of the International Energy Conservation Code 2009.
4. Aurora GreenWorks Program: an economic development initiative to support the City's Sustainability Plan and its five-year Housing and Community Development Block Grant Consolidated Plan.

Municipal Energy Usage

1. Lighting Retrofits: various City of Aurora administrative and service buildings were identified as a measure to cut annual energy usage on lighting.
2. Heating/Cooling Retrofits: install new water cooled and heated roof mounted heat pump units that utilize raw well water in the facility routed through a plate heat exchanger.
3. Traffic Signals: LED upgrades on all signals, as well as interconnection of the signals to each other and the centralized system.

Renewable Energy Technology

1. Traffic Signal Wind Turbines: installed at two intersections to power the signals; additional power produced will go into the grid to offset other transportation infrastructure energy needs.
2. Wind System, Aurora Police Headquarters: system assessment, identification, design, and construction management of up to 10 kW wind renewable energy system.
3. Energy Efficiency and Sustainability Strategy/Policy: Planning Division is in the process of engaging a consultant to assist in the development of these policies and regulatory text.

City of Aurora Residential Energy Savers Program

Related to #1, the Energy Savers Program offers free energy audits and 50% reimbursements up to $3500 for implementing energy efficiency recommendations. Applications were due by 1/14/2011. More information can be found at *http://www.aurora-il.org/documents/neighborhoodredevelopment/app_residential_energy_grant_program.pdf*

Carpentersville EECBG-funded Activities

The Village of Carpentersville is funding the upgrade of nine traffic signals and 14 streetlights to energy efficient LED lighting with their EECBG formula grant.

Elgin EECBG-funded Activities

The City of Elgin is funding the Center City Commercial Retrofit Grant program with their EECBG formula grant. The Center City Commercial Retrofit Grant Program will provide matching funds (up to 50% of cost) to assist commercial property owners with retrofitting their existing buildings for energy efficiency.

City of Elgin Energy Efficiency Revolving Loan Program

This revolving loan fund (RLF) offers no-interest loans to single family homeowners in Elgin seeking to improve the energy efficiency of their home in terms of lighting, building envelope, building systems (mechanical, electrical, plumbing), appliances, and basement/crawl spaces. Repayment structure is based on projected energy savings and payments are administered through the homeowner's water bill. Applications were available on 2/1/2011 and were due by 2/25/2011. *http://www.cityofelgin.org/index.aspx?nid=1067*

Competitive

Additional EECBG funding was available through a competitive grant program called the Better Buildings Initiative.[31] Thousands of applications were submitted, and twenty-five were selected based on their ability to develop an energy retrofit program for all building sectors that transforms the market for long term retrofit activity while addressing key barriers.

Chicago Region Retro Ramp-Up Program (CR3)

The Chicago Metropolitan Agency for Planning (CMAP) was awarded $25 million from the competitive funding round of the EECBG. CMAP's CR3 will develop, test and implement a set of financial products for different building types in both the residential and commercial sectors. The program will include a "one stop shop" information center where building owners can identify resources and programs to implement retrofit work, including information to find qualified contractors to perform the work.

Other EECBG competitive funding awards

Another $427 million was awarded to twenty-four other states, regions and cities. Learn more about these projects at *http://www.energy.gov/news/documents/Retrofit_Ramp-Up_Project_List.pdf* and *http://www.eere.energy.gov/pdfs/retrofit_ramp-up_map.pdf.*

STATE FUNDING

The remaining EECBG dollars were set aside for states, with the stipulation that 60% of those funds go to non-direct formula funded local governments. In Illinois, the state opted to disseminate those funds through each of the regional planning organizations. However, because the Chicago Metropolitan Agency for Planning (CMAP) was awarded competitive round funding, our region's funds are being disseminated through the Metropolitan Mayors Caucus.

Illinois Department of Commerce and Economic Opportunity (DCEO)

The Illinois Department of Commerce and Economic Opportunity (DCEO) is the lead state agency responsible for improving Illinois' competitiveness in the global economy. Under the umbrella of DCEO the State of Illinois offers a variety of funding opportunities in the form of grants and rebate programs. The following is a list of links to opportunities offered by DECO:

Energy Efficiency

http://www.commerce.state.il.us/dceo/Bureaus/Energy_Recycling/Energy/Energy+Efficiency/

Renewable Energy

http://www.commerce.state.il.us/dceo/Bureaus/Energy_Recycling/Energy/Clean+Energy/

Biofuels

http://www.commerce.state.il.us/dceo/Bureaus/Energy_Recycling/Energy/Renewable+Fuels/

Smart Energy Design Assistance Center (SEDAC)

The Smart Energy Design Assistance Center (SEDAC) provides advice and analyses enabling private and public facilities in the State of Illinois to increase their economic viability through the efficient use of energy resources. SEDAC is sponsored by the Illinois Department of Commerce and Economic Opportunity in partnership with ComEd and Ameren Illinois Utilities and provides valuable services at no cost to for-profit businesses and public facilities. SEDAC's Smart Energy Design Assistance Program is administered through the University of Illinois' School of Architecture and provides free technical design assistance services (e.g. energy audit) for public facilities to identify energy saving opportunities. Once potential strategies are identified, SEDAC can provide additional information on incentives, grants, rebates, tax incentives and other opportunities. http://smartenergy.arch.uiuc.edu/

Illinois Clean Energy Community Foundation (ICECF)

The Clean Energy Community Foundation (ICECF) exists to improve energy efficiency, advance the development of renewable energy resources and protect natural areas for people in communities all across Illinois. The ICECF was established through a $225 million endowment provided by Commonwealth Edison. Projects are funded under three core program areas: energy efficiency, renewable energy resources, and preservation of wildlife/natural areas. Funding recipients are local government agencies or nonprofit organizations that serve Illinois residents. Visit *http://www.illinoiscleanenergy.org* for other requirements, deadlines and success stories.

ICECF Targeted Program: Lighting Upgrades

Over the past few years, ICECF has funded lighting efficiency upgrades in schools, libraries, child care centers and other targeted building types that serve the public sector. 2010 targets included historic county courthouses and public safety buildings, but submission deadlines have since passed. Visit *http://www.illinoiscleanenergy.org/lighting_body.asp* periodically for updated 2011 lighting programs.

FUNDING FROM KANE COUNTY GOVERNMENT

The programs below provide financial assistance aimed at specific needs in Kane County, all of which can fund energy efficiency improvements.

Riverboat Fund Program

This Kane County fund provides financial assistance to programs that strengthen Kane County communities and government "through efforts in education, environment, and economic development and with emphasis on addressing Kane County problems and provide long-term solutions."[32] Guidelines and application materials can be found here: *http://www.countyofkane.org/Pages/RiverboatFundProgram.aspx.*

Community Development Fund

Kane County receives annual funding from the U.S. Department of Housing and Urban Development (HUD) through the Community Development Block Grant program (CDBG). CDBG activities are required to meet at least one of the two national objectives: 1) benefit low/moderate income residents; and 2) prevent or eliminate blighted conditions. Other high priority needs dictated by Kane County include affordable housing, public facility improvements, neighborhood infrastructure, emergency shelter services and planning/capacity building. Guidelines and application materials can be found here: *http://www.countyofkane.org/Pages/commDevFund.aspx*

Rental Housing Development Program

Under the U.S. Department of Housing and Urban Development (HUD)'s HOME Investment Partnerships Program, the Rental Housing Development Program provides gap financing to developers of rental housing for projects that would otherwise be financially infeasible. Both non-profit and for-profit developers within the service area are eligible. Guidelines, application materials and information on the service area can be found here: *http://www.countyofkane.org/Pages/rhdp.aspx*

Small Cities Grant Program

The Kane County Small Cities Grant Program provides urban and rural communities with a population of 50,000 or less. This Program provides an opportunity to fund a variety of economic development initiatives "from bricks and mortar, physical improvements to planning studies and analytical reports intended to create a better understanding of and ultimately suggest means to enhance a community or regional economic development climate." Guidelines and application materials can be found here: *http://www.countyofkane.org/Pages/SmallCitiesGrantProgram.aspx*

APPENDIX 6

ENERGY AND SUSTAINABILITY PLANNING

Appendix 6 provides information about energy and sustainability efforts in the Chicago region. In order to be effective and efficient in moving towards a more sustainable region, it is important to connect to and understand existing efforts.

Regional Planning

CHICAGO METROPOLITAN AGENCY FOR PLANNING (CMAP)

GO TO 2040 Plan

GO TO 2040 is a comprehensive regional plan "to help the seven counties and 284 municipalities plan together for sustainable prosperity through mid-century and beyond."[33] The four themes of livable communities, human capital, efficient governance, and regional mobility cover eleven different sections of recommendations for action. Among the energy and sustainability recommendations includes promoting retrofit programs and renewable energy generation.

Regional Energy Snapshot

As part of its GO TO 2040 regional planning process, the Chicago Metropolitan Agency for Planning (CMAP) commissioned the Center for Neighborhood Technology (CNT) to conduct an energy analysis of the seven-county region, including Cook, Lake, DuPage, Will, Kane, McHenry, and Kendall Counties. CNT analyzed regional energy consumption and the potential for energy and cost savings through a variety of strategies that include energy efficiency measures, encouraging and adopting widespread behavior change, and efficient growth and development. Link to report: *http://www.cmap.illinois.gov/strategy-papers/regional-energy*

Chicago Region Emissions Baseline Study

Also as part of the GO TO 2040 regional planning process, CMAP commissioned CNT to conduct an inventory of current greenhouse gas emissions in the seven-county region. CNT calculated a regional GHG emissions inventory for the year 2005, included 2000 emissions data to provide context and trend data, and estimated future emissions if no mitigation actions were taken. To conduct this research, CNT used Intergovernmental Panel on Climate Change methods and local data sources, in combination with modeling of national data to local demographics, in order to document all direct sources of greenhouse gas (GHG) emissions in the seven county metropolitan region, as well as indirect emissions from electricity consumption and waste.

LOCAL PLANNING

Climate Action Plans

Climate Action Plans are designed with the main goal to reduce greenhouse gas emissions by reducing fossil fuel consumption. "The process of developing a climate action plan can identify cost-effective opportunities to reduce GHG emissions that are relevant to the (location). Individual characteristics of

"economy, resource base, and political structure provide different opportunities for dealing with climate change. However, without targets for emissions reductions, incentives for cleaner technologies, or other clear policies, climate action plans will not achieve real reductions in GHG emissions."[34] The Cities of Chicago[35] and Evanston[36] both have adopted and begun implementing Climate Action Plans, with others soon to follow.

Sustainability Plans

The most common definition of sustainability and sustainable development was presented by the United Nations' Brundtland Commission in 1987: "Sustainable development is development that meets the needs of the present without compromising the ability of future generations to meet their own needs."[37] Often following the format of a community's comprehensive plan, sustainability planning efforts typically address aspects that affect a community's sustainability, including land use, transportation, energy, and other issues.

In Kane County, the City of Aurora completed the "City of Aurora Sustainability Plan" and the Village of Algonquin completed their "Environmental Action Plan" in 2009. The City of Elgin expects to complete their "Sustainability Action Plan" in the spring of 2011.

ComEd Community Energy Challenge

In 2009 nine communities, including two in Kane County, participated in Com Ed's challenge to demonstrate their commitment to sustainability through the development of an energy plan that outlined energy-saving strategies. Each community benefited from the targeting of existing programs within their communities by ComEd and the Illinois Department of Commerce and Economic Opportunity. Participating communities (by invitation) were Aurora, Carol Stream, Elgin, Evanston, Hoffman Estates, Oak Park, Orland Park, Schaumburg and Wilmette.

CODES/ORDINANCES

Renewable Energy Ordinances

Renewable energy generation in Illinois is becoming a more viable option. In order to address this trend, a number of local governments have adopted ordinances regarding renewable energy. In 2010 Kane County adopted a small wind ordinance and is considering an ordinance for large scale wind energy projects. The City of Batavia has adopted a wind ordinance, and the Village of Montgomery is in the process of developing a wind ordinance. Municipalities outside of Kane County have adopted ordinances for other sources of renewable energy generation.

Energy Codes

The Illinois Energy Conservation Code[38] signed into law in 2006 set energy efficiency standards for commercial buildings. The Code was amended in 2010 to include residential buildings. The code applies to new commercial and residential construction, renovations, alterations, additions and other repairs that require a building permit. The law also requires that the most recent edition of the International Energy Conservation Code (currently 2009 IECC) and the American Society of Heating, Refrigeration and Air-conditioning Engineers (ASHRAE) Standard 90.1 (currently 2007) must be followed.

Buildings that are not subject to this law include officially designated historic buildings, buildings exempt from a local building code, and buildings that do not use either electricity or fossil fuel for comfort conditioning.[39]

The following resources are available to assist local governments in implementation of the Illinois Energy Conservation Code:

1. For a limited time the 2009 International Energy Conservation Code can be downloaded free of charge at: *http://www.iccsafe.org/store/pages/doeregistration.aspx?r=FreeIECC.*
2. Call 1-888-ICC-SAFE (422-7233) or email (*dmeyers@iccsafe.org*) for technical interpretations of the 2009 IECC as it applies to the State of Illinois.
3. To assist municipalities the Illinois Department of Commerce and Economic Opportunity (DECO) has partnered with the International Code Council to provide 33 seminars in early 2011. Visit *http://www.iccsafe.org/Education/Courses/Pages/IL-DCEO-List.aspx?r=DCEO* to find out more.
4. The Department of Energy developed compliance software tools for code officials to assist in examining plans for compliance with the International Energy Conservation Code. Residential buildings utilize REScheck and commercial buildings, COMcheck. They can be found here: *http://www.energycodes.gov/rescheck/download.stm* and *http://www.energycodes.gov/comcheck/download.stm*

COMMISSIONS/COMMITTEES

Local Government Commissions/Committees

An increasing number of local governments in the region have formed commissions and/or committees designed to address issues related to energy, the environment and sustainability. Kane County, Batavia, Aurora, Algonquin and Elgin are a few examples.

INDIVIDUAL PROJECTS

Will County Forest Preserve District

Sugar Creek Administrative Building, the main office for the Forest Preserve District of Will County, includes green technologies in design and construction. One of these is 46 photovoltaic cells (solar panels) the facility with 14,000 - 16,500 kilowatt hours of electricity per year, which is 20 percent of the power needed. Other green technologies include recycled materials, movable interior walls, extensive use of glass, raised floor construction, indoor air quality, absence of gutters, landscaping, and detention pond design.*http://www.reconnectwithnature.org/visitor-centers/scac*

DuPage County Forest Preserve

The Forest Preserve District of DuPage County installed five solar-thermal hot-water systems. Sun-heated water is in use at public restrooms at three forest preserves, Springbrook Prairie in Naperville, Hidden Lake in Downers Grove and Spring Creek Reservoir in Bloomingdale. Solar-thermal systems are working at the headquarters building at Danada Forest Preserve in Wheaton and the structural maintenance facility at Blackwell Forest Preserve in West Chicago. Through reduced energy costs, the District's return on investment is estimated at about eight to ten years.

A grant from the Illinois Clean Energy Community Foundation paid for 25 percent of the costs, and a rebate from the Illinois Department of Commerce and Economic Opportunity's Solar and Wind Energy Rebate Program funded 30 percent.
http://www.dupageforest.com/blog/default.aspx?id=4294968474&blogid=427&terms=solar+panels
www.dupageforest.com

Elgin High School

Elgin High School plans to install solar panels on the roof sometime in the summer of 2011. The cost of the panels are estimated at a little over $1 million, but with a federally-funded state grant and a match from RRE Solar Farm, the solar panels will be at no cost to the school district. Cost savings are projected at $25,000 a year, with a lifespan of 20 years.

Carpentersville Community School District

Keeneyville School District 20, Carpentersville's Community Unit School District 300 and Prospect Heights School District 23 plan to develop a 13-turbine wind farm in rural Stark County 140 miles southwest of Chicago. The School Wind Consortium, formed by the three district school boards, hopes to have the wind farm operating by fall 2011. The wind farm will generate more than the energy they need; producing potential revenue of $3 million a year selling the extra energy. The Consortium is issuing bonds, seeking investors and applying for federal grants to raise $50 million to fund the wind farm.

Serosun Farms

Serosun Farms is a planned development located near the Villages of Hampshire and Burlington in Kane County whose key selling points focus on being a sustainable community. Core components of the community will include a working farm, residential housing, equestrian center, and preservation and restoration of natural open areas. All of these elements support the economical, environmental, and social goals of Seroson Farms that focus on a sustainable approach to living.

Community goals to reduce energy consumption and greenhouse gas emissions include:

- Provide 70-80% of energy through clean, renewable, onsite sources, including wind, solar, and geothermal energy
- Reduce energy requirements by 80-90% over traditional developments
- Reduce home water requirements up to 50%
- Create healthy homes by improving indoor air quality and ventilation
- Reduce the community's carbon footprint and foster a sustainable way of life

REFERENCES AND NOTES

1. A detailed description of these four steps is available at the Kane County Development Department.
2. A detailed description of these four steps is available at the Kane County Development Department.
3. For illustrative purposes, these cumulative savings assume linear growth, however "real-time" growth might be different, for example a retrofit program might grow quickly at first, and slow at the end of 30 years as more homes are retrofitted.
4. For uniformity of this plan, each strategy assumes linear growth over the 30-year planning timeframe. "Real life" implementation rates may vary for different strategies, thus resulting in higher or lower cumulative savings.
5. While not all businesses have natural gas accounts, most, if not all, have electric accounts. The number of ComEd accounts is a reliable proxy for the number of businesses within Kane County, since there are no other sources with available data.
6. Annual growth rate for households applied to number of accounts to serve as proxy for number of businesses in 2040..
7. a/c kWh is electricity consumption attributed to air conditioning. According to the 2001 Residential Energy Consumption Survey (RECS) published by the Energy Information Administration, the a/c kWh for our region is 16% of total electricity consumption.
8. a/c kWh is electricity consumption attributed to air conditioning. According the 2001 Residential Energy Consumption Survey (RECS) published by the Energy Information Administration, the a/c kWh for our region is 16% of total electricity consumption.
9. Units = Households (HH) residential and Accounts for C&I. Municipalities with an *; HH numbers are from ACS 2006 – 2008; those without an * did not have an ACS 2006 – 2008 household number. In these cases, the rate of growth between the 2000 Census and 2008 ACS in Kane County was applied to the municipal level.
10. Units = Households (HH) residential and Accounts for C&I. Municipalities with an *; HH numbers are from ACS 2006 – 2008; those without an * did not have an ACS 2006 – 2008 household number.. In these cases, the rate of growth between the 2000 Census and 2008 ACS in Kane County was applied to the municipal level.
11. *http://www.usmayors.org/climateprotection/agreement.htm.*
12. *http://www.usmayors.org/climateprotection/revised/*
13. Sierra Club Cool Cities Campaign website: *http://www.coolcities.us/about.php?sid=9dca49100bd742830918fcd602b10b84*
14. Standard lights include high pressure sodium lights, low pressure sodium lights and metal halide.
15. Each light is equipped with a set of batteries for storage.
16. International City/County Management Association "Downers Grove Installs Solar and Wind Powered Street Light System." March 29, 2010 *http://icma.org/en/Article/100226/Downers_Grove_IL_Installs_Solar_and_Wind_Powered_Street_Light_System*
17. David Lawry, Public Services Director, City of Elgin.
18. ComEd Community Energy Challenge, City of Elgin Energy Plan. 2009.

19. http://smartenergy.arch.uiuc.edu/index.html
20. http://www.energystar.gov/index.cfm?c=home.index
21. http://www.energystar.gov/index.cfm?c=new_homes.hm_index
22. http://www.energystar.gov/index.cfm?c=business.bus_index
23. https://www.comed.com/sites/HomeSavings/Pages/programsandincentives.aspx
24. https://www.comed.com/sites/BusinessSavings/Pages/programsincentives.aspx
25. http://www.nicorgasrebates.com/res-customer/res-cust-rebate-information
26. http://www.nicorgasrebates.com/bus-customer/bus-cust-rebate-information
27. http://www.epa.gov/greenpower/gpmarket/
28. Renewable energy certificates are sometimes called green tags, green energy certificates, or tradable renewable certificates.
29. http://www.epa.gov/greenpower/gpmarket/rec.htm
30. EECBG information sheet. United States Conference of Mayors.
31. The Better Buildings Initiative was initially called the Retrofit Ramp-Up Program.
32. Kane County Riverboat Fund Program website: http://www.countyofkane.org/Pages/RiverboatFund-Program.aspx
33. CMAP GO TO 2040 website. January 2011. http://www.cmap.illinois.gov/2040/main
34. Pew Center on Global Climate Change.
35. http://www.chicagoclimateaction.org/
36. http://www.cityofevanston.org/pdf/ECAP.pdf and http://www.cityofevanston.org/assets/Evanston%20Climate%20Action%20Plan%20Annual%20Report.pdf
37. United Nations General Assembly (1987) Report of the World Commission on Environment and Development: Our Common Future.
38. The Illinois Energy Conservation Code is the name of the law that outlines energy building codes in Illinois. It is based on the International Energy Conservation Code (IECC), which is updated every three years by the International Code Council. Every time revisions are made to the IECC, they automatically become a part of the Illinois Energy Conservation Code.
39. Illinois Conservation Code for Commercial and Residential Buildings. Illinois Department of Commerce and Economic Opportunity website: http://www.commerce.state.il.us/dceo/Bureaus/Energy_Recycling/IECC.htm

KANE COUNTY, ILLINOIS

2040 ENERGY PLAN