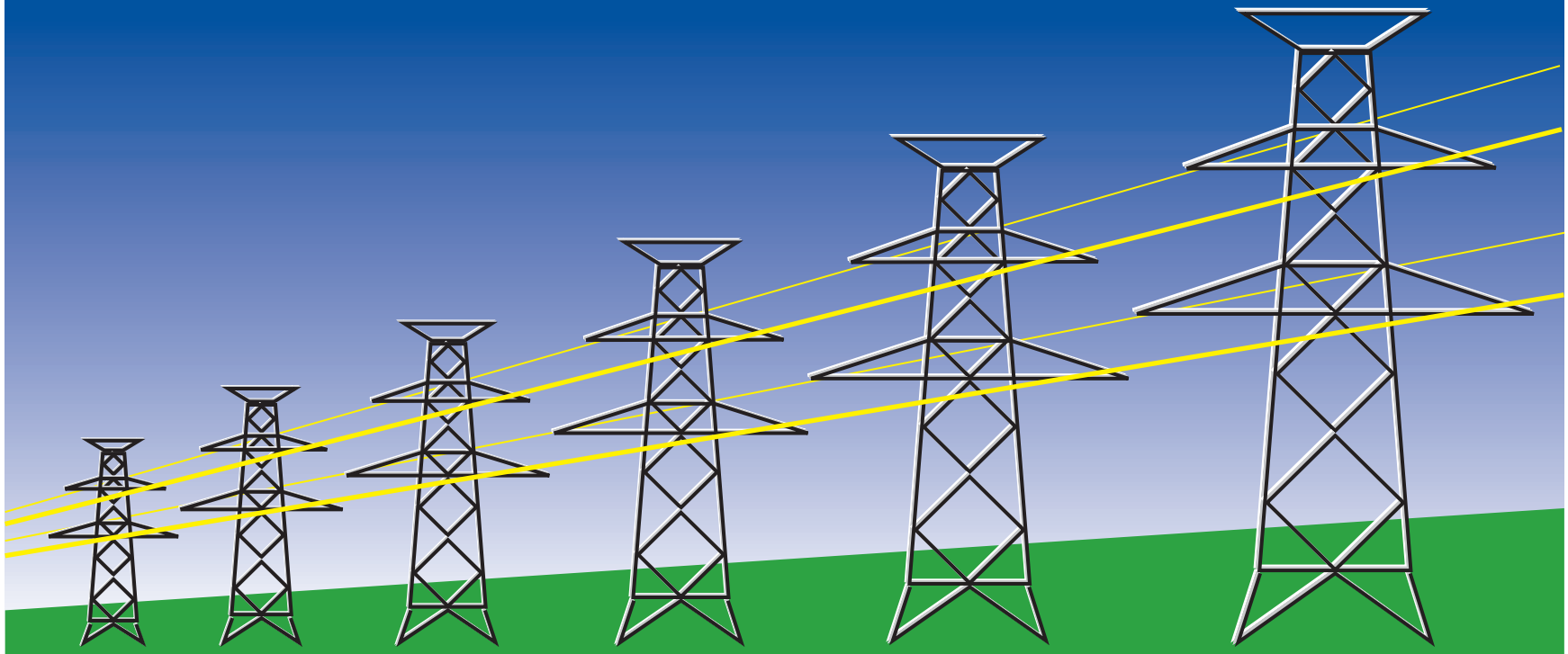
KANE COUNTY ENERGY PLAN

Managing Kane County's Growing Energy Needs



Produced through Kane County Energy Solutions
A Project of the Community Energy Cooperative

Acknowledgements

The Kane County Energy Plan

The Kane County Energy Plan is the product of Kane County Energy Solutions, a project to plan for the region's energy future. This plan recommends strategies for managing the county's increasing electricity needs, and proposes innovative programs for improving energy efficiency and managing electricity demand.

The Community Energy Cooperative coordinated the project and produced the plan along with an advisory committee of local stakeholders and input from utilities, the county and several municipalities. Data analysis was provided by the Center for Neighborhood Technology. The Community Energy Cooperative is a non-profit membership organization helping consumers and communities obtain the information and services they need to control energy costs.

Community Energy Cooperative Staff

Lindy Wordlaw, Kane County Project Coordinator
Kathryn Tholin, General Manager
Anthony Star, Assistant Manager
Marjorie Isaacson, Assistant Manager
Paul Esling, Systems Analyst
Stephanie Folk, Communications and Outreach Coordinator
Ruth Klotz-Chamberlin, Fellow
Larry Kotewa, Staff Engineer
Jose Lara, Administrative Assistant
Lucila Prieto, Data Entry/Office Support
Rachel Scheu, Research Associate

Center for Neighborhood Technology Staff

Albert Benedict, Senior GIS and Planning Analyst
Peter Haas, Director of Geographic, Research and Information Department

Project Funding

Funding for this project was provided by the Illinois Department of Commerce and Economic Opportunity.

Cooperating Organizations

Kane County Development Department
Kane County GIS-Technologies Department
ComEd

Advisory Committee

Gary Blum, Facilities Engineer, Delnor Health and Wellness Center
Sharon Dixon, Planner, Kane County Development Department
Harry Eng, Consultant, Supply Chain Consultants
Mike Ferencak, Planner, Village of Sugar Grove Community Development Department
Carl Hayes, retired energy professional, Batavia
Richard Hirschberg, community activist, Elgin
David Jurina, Architect, Avid Architecture
Robert Olp, CEO, Connor-Winfield Corporation, Aurora
Sue Roscoe, community activist, Aurora
David Segel, community activist, Elgin
William Spaeth, Deputy Director, City of Aurora Community Development Department
Michael Stanch, energy professional, Stanch Lighting and Energy
Jill Warner, community activist, Elgin
Betsy Zinser, community activist, Batavia

Kane County Energy Solutions
Community Energy Cooperative
2125 West North Avenue, Chicago, IL 60647
Phone: (773) 269-4037
www.energycooperative.org

October 2005

Table of Contents

Executive Summary i

Introduction 2
- Reducing Energy Use: An Opportunity for Kane County 2
- Recommendations and Action Plans for a Better Kane County Energy Future 4
- Report Organization 4
- About the Plan Development 5

Section One: Managing Electricity Growth in Kane County 6
- Overview of the County 6
- Modeling Growth in Electricity Use and Demand 17

Section Two: Recommendations and Action Projects 26
- Recommendations 28
- Action Projects 32
- Plan Implementation 40

Appendices 42
- Appendix A: Glossary 42
- Appendix B: A Summary of the Kane County Energy Solutions Roundtable 44
- Appendix C: Builders, Housing Baseline and Building Codes 48
- Appendix D: Potential Energy Saving Tools 50
- Appendix E: The Regulatory Environment 51
- Appendix F: Action Projects References and Resources 54

Executive Summary

Reducing Energy Use: An Opportunity for Kane County

The residents, businesses, utilities and government of Kane County have an extraordinary opportunity to change the county's energy consumption. The Kane County Energy Plan proposes a focused set of strategies to cut the rate of growth of electricity use by 30%. Achieving this vision would have far-reaching impacts. It would lower energy costs for residents, businesses, government and other energy users, reduce the need for expensive, unsightly new infrastructure, and improve the environment. It would also help to lower the cost of both electricity and natural gas for all consumers by reducing the use of expensive peak power.

Kane County is growing fast. Over the next twenty-five years the population is expected to increase by 70 percent, changing land use dramatically as the population expands westward. Energy impacts of growth are already evident, as was illustrated in December 2002, when ComEd proposed constructing a new 138 kV transmission line along Randall Road. Local residents opposed this power line, and a compromise solution was eventually reached after more than a year of discussion and negotiation. However, all parties recognized that growth in demand for electricity will make it necessary to have more such discussions in the future. New infrastructure will be expensive and will be controversial.

County leaders have already taken significant steps to plan and manage the growth of the county on many issues, including development, transportation, and open space preservation. However, energy is an unseen, and often overlooked, public necessity. The incentive to manage it properly is inefficiently split between consumers, utilities and government, often resulting in inaction and controversy. Now is the time to put energy on par with other development issues in Kane County and to manage its growth in a coordinated and effective manner that improves the community's quality of life and business environment.



Kane County Today, Tomorrow and Growing Energy Demand

Kane County is located approximately 30 miles west of Chicago and is one of the fastest growing counties in Illinois. The county contains urban, suburban and agricultural areas, and such, is a microcosm of the state. While growth issues such as housing, transportation and water resources are being addressed, rapidly rising energy consumption is one facet of growth that has not been fully recognized by those planning the future of the county.

To date, all discussions of infrastructure needs have assumed only a supply-side approach to demand growth, with no consideration of the ways in which consumers use electricity or the potential positive impacts of reduced demand and energy use. However, there is significant opportunity to affect the county's overall electricity demand and use. Doing so could reduce and/or delay the need for new infrastructure. A strategy that examines the potentials of a demand-side approach could harness citizens' economic, aesthetic, and health concerns about infrastructure expansion and engage them in a program that promotes economically viable energy efficiency, load management, and renewable energy options.

The Kane County Energy Plan is the culmination of a twelve month project to analyze the current and future energy needs of the county and to develop strategies addressing those needs. Given the growth expected in Kane County, an aggressive focus on energy efficiency and demand reduction could make the county a model not only for the state, but for the nation. As concerns grow about the cost and availability of energy, Kane County leaders can use this plan as a call to action and a framework for envisioning a better energy future for the county.

Research

A profile of Kane County's growing energy use and demand was created by analyzing population and land use data provided by the Kane County Development Department, combined with an unprecedented collection of infrastructure and consumer usage data from ComEd, the utility serving most of the county. The "business-as-usual" scenario shows that without any intervention, the growth of peak electrical demand in the county could increase to from 1,527 MW to 2,054 MW by 2030.

Next, three different models of conservation were developed and applied to the business-as-usual scenario to show the potential cumulative energy savings that could be achieved through varying degrees of demand management strategies:

- **Short term conservation** (A mix of strategies, with no new construction strategies)
- **Moderate impact on new growth plus short-term conservation** (A mix of strategies, with varying penetrations of new construction strategies)
- **Aggressive impact on new growth plus short term conservation** (A mix of strategies, with aggressive penetrations of new construction strategies)

As a result of implementing these strategies, the growth of peak electrical demand in the county (currently at 1,527 MW) could be cut from 527 MW to between 333 MW and 403 MW by 2030. This would result in the reduction in use over those 25 years by Kane County homes and businesses of between 5.9 million and 8.3 million MWH, which are worth between $705 million and $990 million in today's dollars. This reduction in demand could allow the local utility, ComEd, to avoid building one or two large substations, 15 to 25 small substations, or a combination of substations at an avoided cost of hundreds of millions of dollars.

Recommendations

The Kane County Energy Plan includes a series of recommendations that call for adjusting the policy focus of the county to incorporate a commitment to reducing energy use and the growth of energy demand. It also includes a series of action projects that put the recommendations into effect. The twenty-one recommendations in this plan are divided into six key action areas that are defined by the key participants involved in each:

Joint County/Utility

- The County and its utilities should jointly set an energy use reduction goal to reduce peak electrical demand by at least 30% compared to a business as usual scenario, resulting in an energy savings of approximately $2.4 million annually for consumers.

- To implement and monitor strategies that will achieve this goal, a joint county-utility commission should be established by the county board and utilities.

County Government

- Kane County government should lead the coordination of the Kane County Energy Plan with the creation of a quasi-governmental committee.

- Kane County government should play a stronger role in planning for the county's energy future.

- At the next opportunity for updating the 2030 Land Resource Management Plan, the Kane County Board should update the energy chapter to include the goal of establishing a county wide energy code.

- Kane County Board should utilize resources to provide educational, technical and financial assistance to municipalities so they may adopt and implement the International Energy Conservation Code (IECC 2003) and 2004 Supplement.

- Kane County should provide leadership by example and go beyond minimum building codes and ensure that all new buildings that receive public funding are Leadership in Energy and Environmental Design (LEED™) certified.

- Kane County government should provide leadership by example in existing government facilities and set a goal of reducing energy usage by a reasonably attainable 10%.

Utilities

- ComEd and the municipal utilities should further examine opportunities to tie energy efficiency and demand reduction strategies to reductions in future infrastructure development in ways that prudently reduce costs for utilities and consumers.

- ComEd and the municipal utilities should aggressively target current and future demand reduction programs in Kane County, including commercial and industrial curtailment programs, residential air conditioner cycling, and other programs.

- The county's electric utilities should develop builder incentive programs to encourage the development of ENERGY STAR® homes, and potentially homes certified through other programs such as the still-developing LEED™-Home program.

- The electric utilities should consider requiring the installation of advanced metering, air conditioning cycling switches, or two-way communicating thermostats in all new buildings.

- Utilities should target their efficiency programs to existing homes and businesses.

Regulatory

- The Illinois Commerce Commission should adopt regulations that recognize the value of reduced peak demand on the cost of infrastructure. Specifically, utility investments in targeted demand reductions should be treated on an equal basis as the costs of building traditional "iron in the ground" infrastructure such as substations and transmission and distribution lines, and should be allowed to be recovered through distribution rates.

Municipalities

- All municipalities in Kane County should adopt the International Energy Conservation Code 2003 and 2004 Supplement.

- All municipalities in Kane County should set percentage goals for new residential construction to be ENERGY STAR® or LEED™ certified.

- All municipalities in Kane County should provide adequate training for administrators, code officials, and inspectors on implementing the Illinois Energy Conservation Code for Commercial Buildings.

- All municipalities should require builders to conduct Home Energy Ratings Systems (HERS) Tests in new residential construction and supply the results to potential buyers.

Consumers

- Groups already interested in energy should utilize the variety of technical and financial resources available now to reach beyond their regular membership and work within other established civic and social networks in the county to educate residents and business owners about the benefits of energy efficiency, demand reduction, and energy issues in general.

- Building operation staff of commercial buildings should be trained on how to reduce energy use and costs of general building systems through proper operations and maintenance procedures.

- Kane County Energy Solutions should seek funding to offer residents throughout the county training and other resources that focus on the general systems of a home, proper operations and maintenance procedures for these systems, and other related energy issues.

Action Projects

The thirteen corresponding action projects are organized as highest priority for immediate action, and projects for near to mid term action. They fall into two different types of projects:

- **Educational projects,** designed to reach a large consumer base and teach the individual and collective benefits of efficiency and demand reduction, and to discuss general energy issues. Target audiences include residents, businesses, and schools.

- **Application projects,** focused on equipping residents, businesses and municipalities with the means to obtain efficient appliances and systems, building controls and technologies, and to apply better general building practices, while underscoring the supplemental behavioral changes and tools necessary for long-lasting results.

During a time of growing concern about the cost and availability of energy, Kane County leaders can use this plan as a framework to structure a better energy future for the county. Rapid implementation of these recommendations and action plans will have a significant positive impact on the future of the county. Furthermore, this aggressive focus on energy efficiency and demand reduction could make the county a model not only for the state of Illinois, but for the nation.

Conclusion

Energy use is a concern for everyone but it is not the specific responsibility of any one party. Different parties have different interests and until now, there has been no mechanism to align these interests. However, the Kane County Energy Plan highlights the opportunity to do just that. Kane County's energy use is growing faster than the region's as a whole due to rapid population growth and widespread changes in land use. As these changes take shape and a new picture of Kane County emerges, there is a window of opportunity to take coordinated action and affect future energy growth and related costs.

Introduction

Reducing Energy Use: An Opportunity for Kane County

The residents, businesses, utilities and government of Kane County have an extraordinary opportunity to change the consumption of energy in the county. The Kane County Energy Plan proposes a focused set of strategies to cut the rate of growth of electricty use by 30%. Achieving this vision would have far-reaching impacts—lowering energy costs for residents, businesses, government, and other energy users, reducing the need for, and expense of, unsightly new infrastructure, improving the environment, and, through reducing the use of expensive peak power, helping to lower the cost of both electricity and natural gas to all consumers.

Kane County is growing fast. Over the next twenty-five years the population is expected to increase by 70 percent, changing land use dramatically as the population expands westward. Energy impacts of this growth are already evident, as was illustrated in December 2002, when ComEd proposed constructing a new 138 kV transmission line along Randall Road. Local residents opposed this power line, and a compromise solution was eventually reached after more than a year of discussion and negotiation. However all parties recognized that growth in demand for electricity will make it necessary to have more such discussions in the future. New infrastructure will be expensive and will be controversial.

County leaders have already taken significant steps to plan and manage the growth of the county on many issues, including development, transportation, and open space preservation. However, energy is an unseen, and often overlooked, public necessity. The incentive to manage it properly is inefficiently split between consumers, utilities and government, often resulting in inaction and controversy. Now is the time to put energy on par with other development issues as a critical concern for Kane County, and to manage its growth in a coordinated and effective manner that improves the quality of life and the business environment of the community.



Implementation of the Kane County Energy Plan could cut the growth of peak electricity demand in the county (currently at 1,527 MW) from a projected growth of 527 MW to growth between 333 MW and 403 MW by 2030. Over those 25 years, Kane County residents and businesses could reduce their electricity use by between 5.8 million and 8.3 million MWH. This would provide a savings of between $705 million and $990 million in today's dollars. Reduction in demand of this magnitude could allow ComEd (as the utility serving the growing areas of the county), to avoid building two large substations, 15 to 25 small substations, or some combination. This could save the utility and its customers hundreds of millions of dollars. All of this can be done using existing technologies and implementation methods, and without changing the development and land use plans currently in place.

While this plan projects electricity use reductions over the next 25 years, achieving this level of reductions requires action now. Strategies to reduce electricity use include all customers and buildings, existing and new. New construction, however, is the major driver of the level of increase in electricity demand. It is easier and cheaper to address energy use at the time of new construction than going back to change it later. The recommendations in this plan focus on how this can be done and on steps that can be taken right away.

The Kane County Energy Plan is written for county residents, the business community, municipal and county policy and decision makers and local utilities. Success in achieving the potential of this plan depends on action and coordination of all parties. This will require new ways of acting and thinking about energy use, new tools to incent changes in investments in energy using equipment and changes in the patterns of energy use. Finally, there are great opportunities for new kinds of leadership by residents and government.

What About Natural Gas?

The Kane County Energy Plan was designed to focus on efforts that can reduce the consumption of electricity in Kane County over the next twenty-five years. The plan focuses on electricity use because the infrastructure needed to serve electrical load can have an impact on other development issues in the county, and because reducing peak use of electricity has a significant impact on both the need for new infrastructure and the price of electricity.

A comprehensive analysis of natural gas efficiency was beyond the scope of this study. Many of the proposals in this plan, however, will also have the benefit of significantly reducing the consumption of natural gas for home heating—an issue of even greater concern during this time of exceptionally high prices. In addition, much of the increased price of natural gas results from dramatic increases in the use of natural gas to generate electricity during the summer cooling season. Reducing electricity use during the summer periods will help to dampen increases in gas prices during the winter.



Recommendations and Action Projects for a Better Kane County Energy Future

The Kane County Energy Plan details a series of recommendations that adjust the policy focus of the county to incorporate a commitment to reducing energy use and the growth of energy demand. It also includes a series of initial action projects that provide concrete ways to put the recommendations into effect. The twenty one recommendations in this plan are divided into six key areas that are defined by the key participants involved in each. The six categories are:

- Joint County Government/Utilities
- County Government
- Utilities
- Regulatory
- Municipalities
- Consumer

The thirteen corresponding action projects are organized as **highest priority for immediate action** and **projects for near to mid term action.** They fall into two different types of projects:

- **Educational projects,** designed to reach a large consumer base and teach the individual and collective benefits of efficiency and demand reduction, and to discuss general energy issues. Target audiences include residents, businesses, and schools.

- **Application projects,** focused on equipping residents, businesses and municipalities with the means to obtain efficient appliances and systems, building controls and technologies, and to apply better general building practices, while underscoring the supplemental behavioral changes and tools necessary for long-lasting results.

During a time of growing concern about the cost and availability of energy, Kane County leaders can use this plan as a framework to structure a better energy future for the county. Rapid implementation of these recommendations and action plans will have a significant positive impact. Furthermore, this aggressive focus on energy efficiency and demand reduction could make the county a model not only for the state of Illinois, but for the nation.

Report Organization

This report is divided into two sections. Section One describes the methodology used to model the county's current and future energy use. It also describes the potential tools and strategies for reducing energy use that were used in the model and in developing the recommendations. Section Two is the plan itself. It outlines the recommendations and action projects developed through the Kane County Energy Solutions project and proposes implementation strategies to put them into action.

About the Plan Development

The Community Energy Cooperative coordinated the Kane County Energy Solutions project with funding from the Illinois Department of Commerce and Economic Opportunity's Regional Energy Program, which aims to help communities improve their local economies through increased energy efficiency. This project began in August 2004. The Cooperative is a non-profit membership organization with more than 8,000 members in the Chicago metropolitan area. It was established in 2000 by the Center for Neighborhood Technology. The Cooperative brings extensive experience in research and analysis, program design, and implementation of community-based demand reduction programs. A key element of the Cooperative's success to date has been its ability to tailor such programs to the communities in which they operate.

Data for the analytical portions of the plan were provided by ComEd, the Kane County GIS-Technologies Department and the Kane County Development Department. These agencies were instrumental in providing access to data (and in some instances, unprecedented amounts of data) for this project. Without assistance and regular feedback from these agencies, this project would not have been possible.

On April 22, 2005, the Cooperative released its analysis of the county's current and future energy use and introduced potential tools and strategies for managing growth at a roundtable discussion entitled "Planning for Growth: Managing Our Increasing Energy Needs." Those in attendance included: urban planners; municipal and county government officials; state officials (including a state legislator and representative of the lieutenant governor's office); representatives of municipal utilities (Batavia, Geneva, and St. Charles); representatives of institutions such as Delnor Hospital, West Aurora School District 129, and Elgin Community College; building operators; professionals in the energy business; members of interest groups such as Sierra Club, Batavia Citizens for Clean Energy, and People United for Responsible Energy; and concerned residents from across the county.

The Kane County Energy Solutions Advisory Committee formed shortly after the roundtable discussion and met seven times during the summer and fall of 2005. The committee reviewed the final data analysis, assessed successful efficiency and demand reduction programs in other communities across the nation, discussed plan goals and recommendations, and identified the most promising projects and actions that should be considered in Kane County. This process culminated with the release of this plan at a public event called Kane County Energy Futures on October 21, 2005 in Elgin.



Participants discuss maps at the April 22, 2005 roundtable entitled Planning for Growth: Managing Our Increasing Energy Needs.

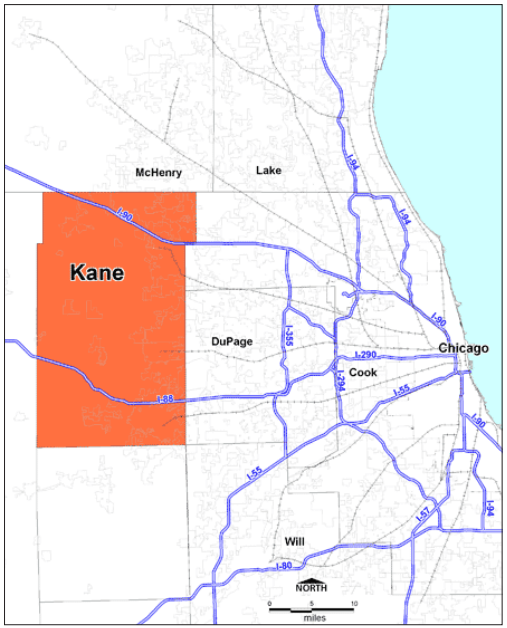
Section One:
Managing Electricity Growth in Kane County

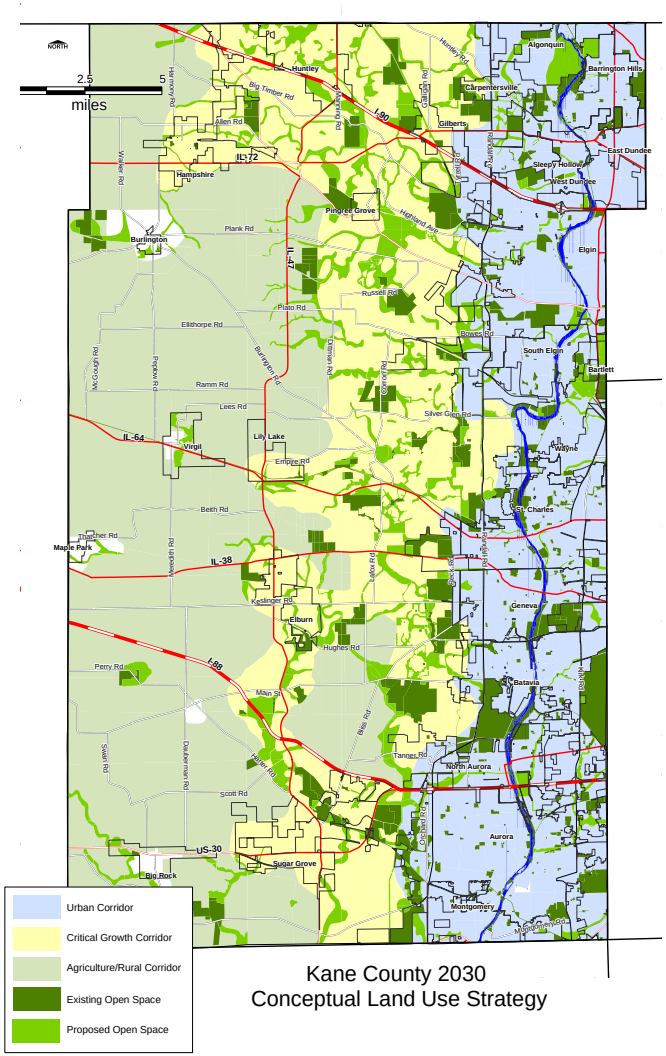
Overview of the County

Kane County, Illinois, with a population of more than 400,000, is one of the fastest growing counties in the state. Urban, suburban and rural areas make up the county's 523 square miles located on the western edge of the Chicago metropolitan area.

There are 28 municipalities within Kane County. The Census 2000 municipal populations ranged from 124 in the small Village of Pingree Grove to 142,150 in the City of Aurora. Since 2000, some places have already experienced growth in the thousands.

In 2004, the Kane County Board adopted the 2030 Land Resource Management Plan, a land use strategy that evaluated population growth projections and future development land use patterns. The strategy designated three distinct areas of the county: the **Urban Corridor** on the eastern edge of the county along the Fox River; **Critical Growth Corridor** in the center of the county; and **Agricultural Corridor** on the western edge.





Kane County 2030
Conceptual Land Use Strategy

Land Use

The **Urban Corridor** grew during the 19th century as workers settled near mills and factories on the Fox River in the older population centers of Elgin, St. Charles, Geneva, Batavia and Aurora. Railroads have run through the county since 1853 and today three Metra commuter rail lines run to and from Chicago. At the present, the urban corridor contains a mix of residential, commercial and industrial land uses. The urban corridor is home to 85% of Kane County residents and to the highest concentrations of commercial and industrial facilities, which are located primarily along the Fox River.

An urban neighborhood in Kane County



The **Critical Growth Corridor** is characterized by more suburban-style development. Land uses are increasingly residential with some commercial uses located primarily along Randall Road, a major arterial roadway which runs north-south through the county. Randall Road is the site of the controversial power tower proposal of 2002. The Metra Union Pacific West commuter rail line is expanding 8.5 miles west from Geneva to Elburn into the critical growth corridor. This area accounts for 11.5% of the county's population, but is expected to capture 50% of future growth. The housing stock in this portion of the county is generally newer and larger than its counterparts built earlier along the Fox River.

New housing in the critical growth corridor



The **Agricultural Corridor** is characterized by farmland and preserved green space. Only 2.5% of Kane's population currently lives in this corridor and the population is not projected to grow significantly because farmland and green space preservation are key components of the land use strategy. Land use goals include water resource management, open space protection and greenways implementation.

A road in Kane County's agricultural corridor

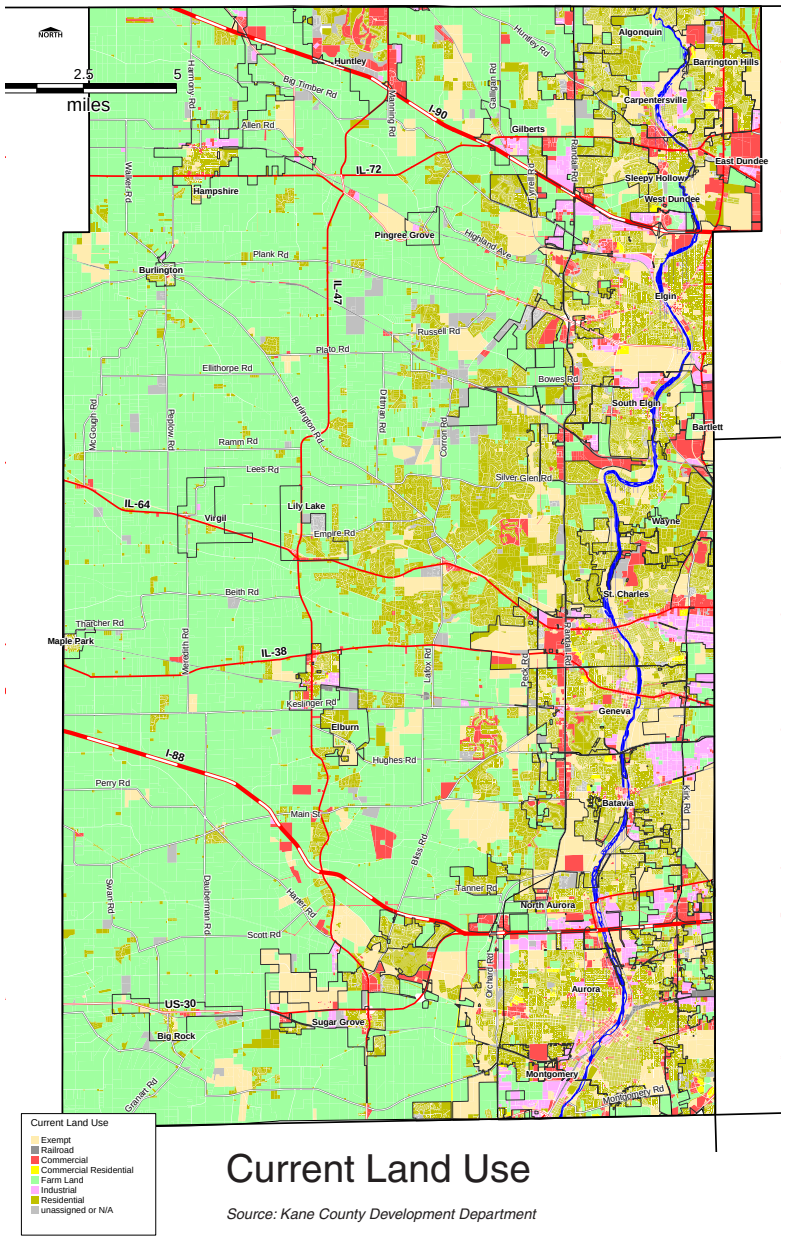


Land Use Today and Tomorrow

The 2030 Land Resource Management Plan categorizes the following land uses:

- Resource Management Area
- Municipality
- Country Estate
- Urban Residential
- Rural Residential
- Commercial
- Industrial
- Office Research
- Institutional

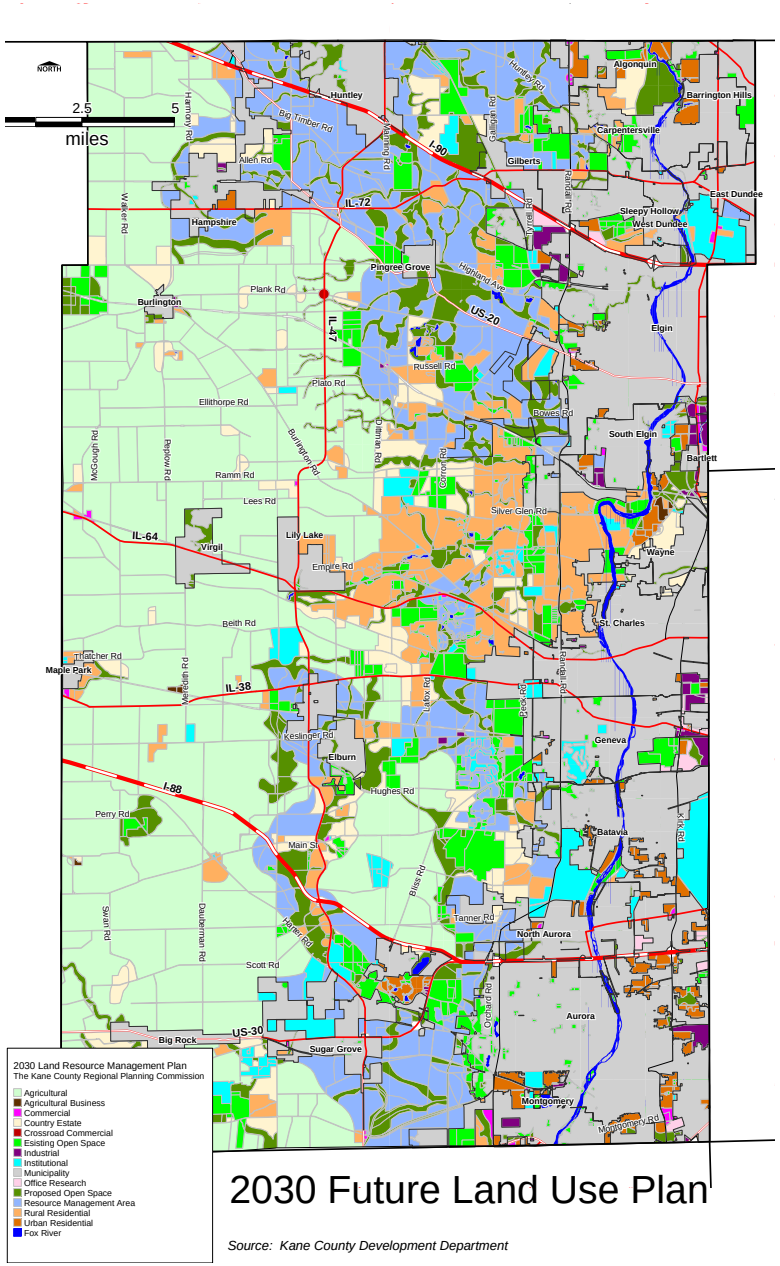
As Kane County grows over the coming years, many of the land uses will change too. The county's 2030 Plan identified current agricultural or residential vacant parcels that could be developed for new land uses. (See current and future land use maps.)



Current Land Use

Source: Kane County Development Department

Kane County is changing; as the population increases, land use will change. The electric infrastructure that once supported a county characterized by an urban edge and large agricultural areas will not be adequate as energy use and demand grow.



2030 Future Land Use Plan

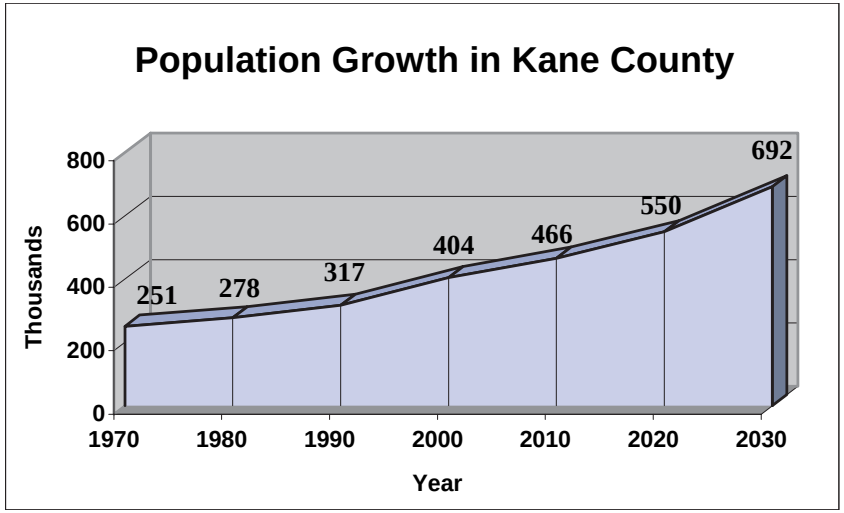
Source: Kane County Development Department

Population

At the time of the 2000 Census, Kane County's population was 404,119. Growing by more than 70%, it is projected to reach 692,346 by 2030. This population growth is nearly double that of the previous 30-year time span from 1970 to 2000, as illustrated in the chart on the right.

- The **Urban Corridor,** which houses most of today's population, is projected to experience an approximate 40% growth rate and will still house the majority of the county's population.
- The **Critical Growth Corridor** will see major growth and quadruple its current population. This area will face the greatest challenges to sensible growth.
- The **Agricultural Corridor** is the rural area of the county where no major population growth is expected.

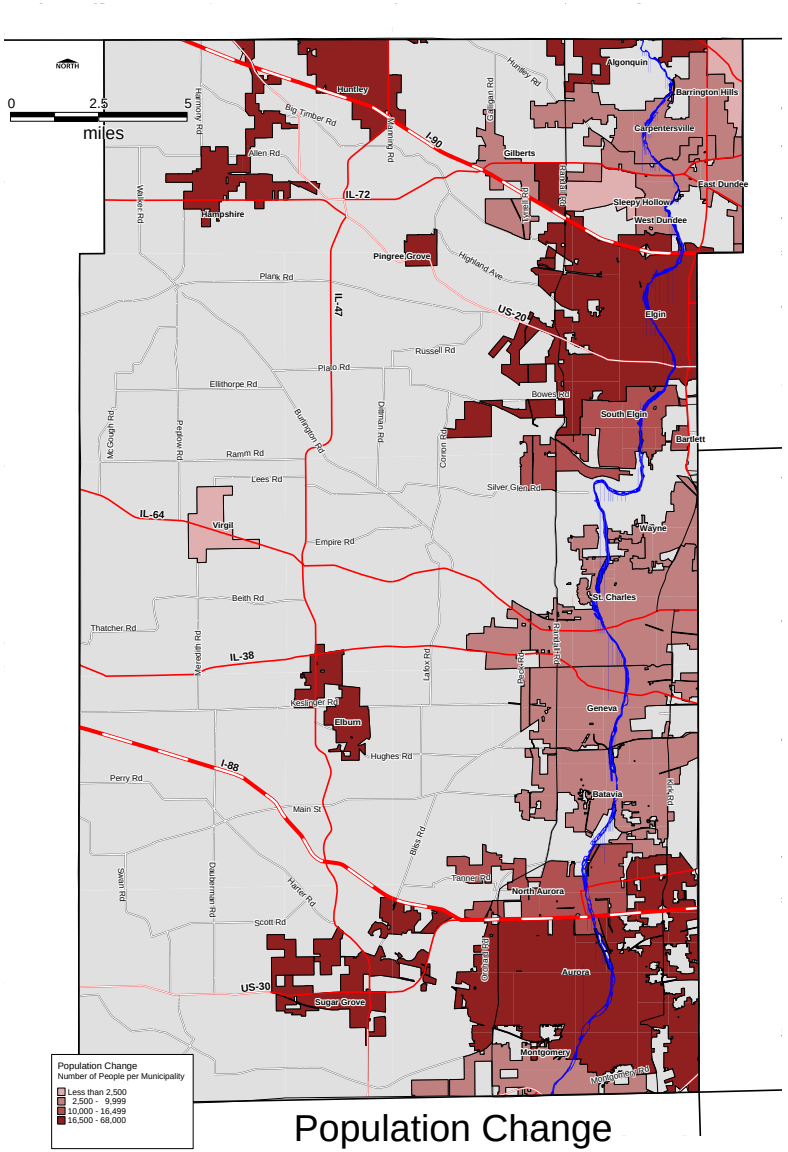
All 28 municipalities in Kane County are expected to grow over the next 25 years. However, most of the county's growth will be in eight municipalities. Most of these communities lie at least partially within the critical growth corridor.



Source: 2030 Land Resource Management Plan, Kane County Regional Planning Commission

Top 8 Growth Municipalities

Municipality	2000 population	Added population by 2030 (projected)	Percent growth by 2030 (projected)
Elgin	94,487	+67,929	72%
Sugar Grove	3,909	+58,833	1,505%
Aurora	142,990	+48,017	34%
Huntley	5,730	+38,705	675%
Elburn	2,756	+18,370	667%
Algonquin	23,276	+18,057	78%
Hampshire	2,900	+17,493	603%
Pingree Grove	124	+16,784	13,535%



Population Change
Kane County 2000 - 2030 (projected)

Electricity Use & Infrastructure

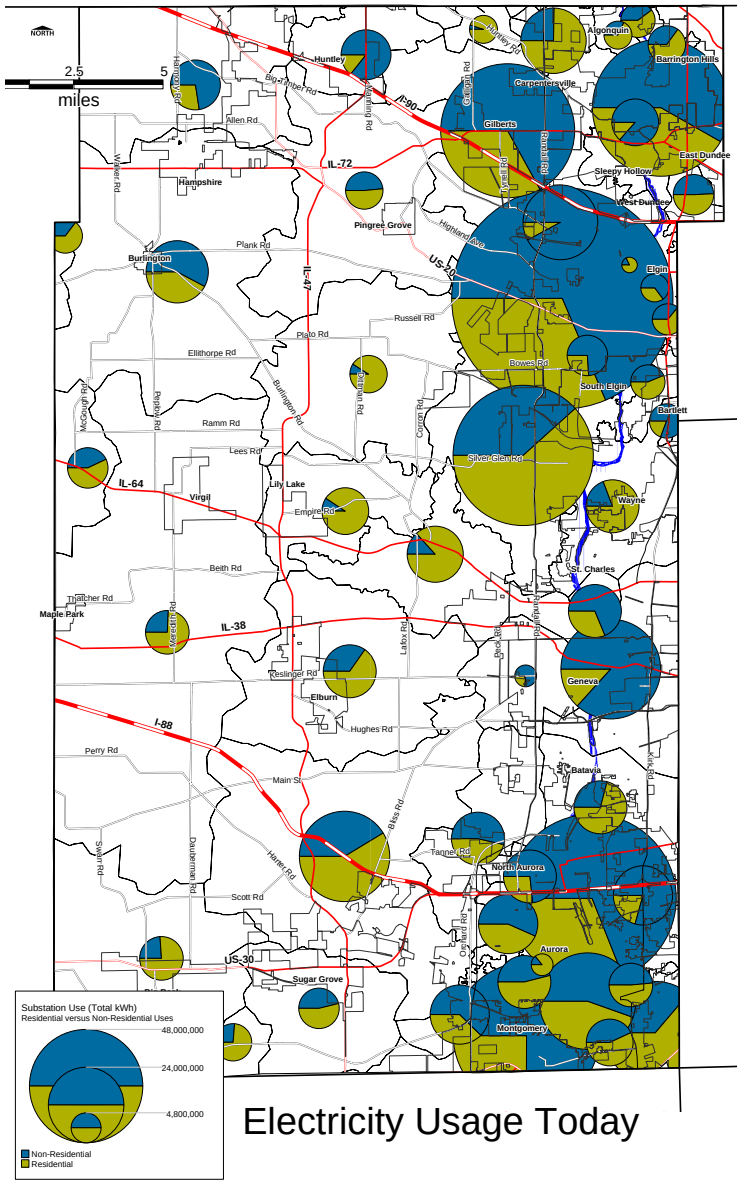
Electrical infrastructure is built by utilities to meet current and projected future use, typically on a five year planning horizon. While the current electrical infrastructure of Kane County supports current use by consumers, the rapid growth of the county's population and changing land use means that inherently the future infrastructure needs of the county will have to be different. The following description and maps illustrate current electrical use and infrastructure in portions of the county served by ComEd, and provide a basis for modeling what the future energy use and infrastructure needs of the county will be over the next 25 years.

ComEd is the investor owned electric utility that serves the majority of Kane County. Three cities have municipal owned and operated utilities: Batavia, Geneva and St. Charles. These cities are, for the most part, fairly built out; and while they face a number of energy related issues, the critical population growth and subsequent electrical demand growth and infrastructure needs are elsewhere in the county.

Kane County's electrical consumers cumulatively use approximately 471,000 MWH/month, (1,527 MW of peak demand). That consumption breaks down as follows:

25 % = Residential consumption
75 % = Non-residential consumption

The highest energy use is concentrated along the Fox River in the Urban Corridor. The map shows that these areas also tend to be the most diverse in terms of types of energy users.



Electricity Usage Today

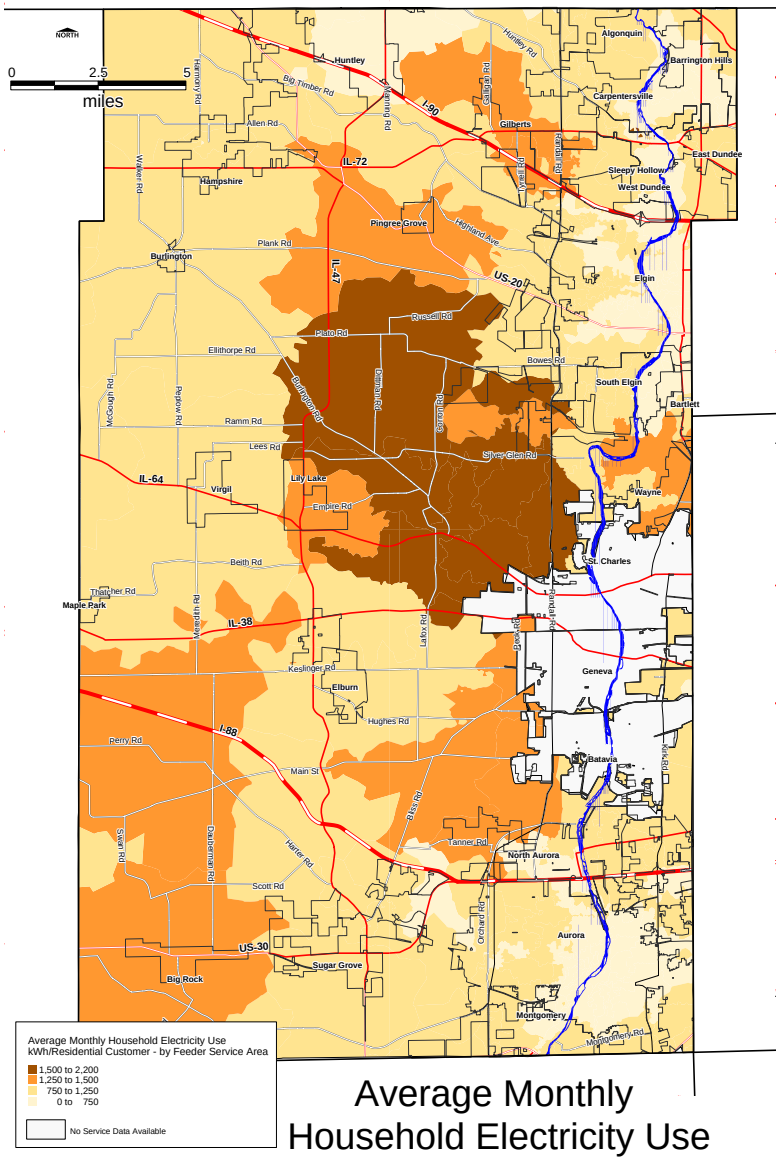
Residential Electricity Use

The map on the right shows the average household monthly electricity use in Kane County, with the darker shades representing higher monthly energy use.

As development expands westward in Kane County away from the Urban Corridor and moves to a more suburban style development in the Critical Growth Corridor, the average household electrical demand also increases. This is in addition to the collective burden that these new housing units place on the existing electrical infrastructure.

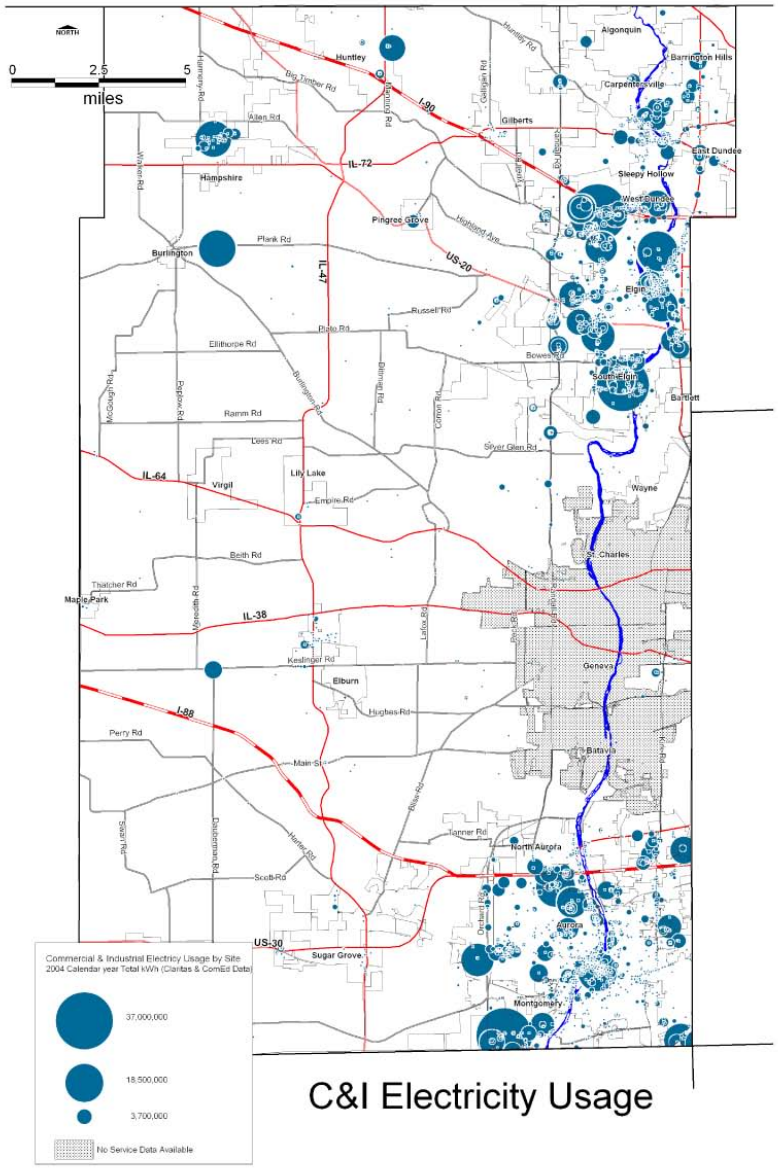
The housing in the Critical Growth Corridor of Kane County is generally newer and larger than housing on the eastern edge. Building larger homes has a significant impact on energy consumption, particularly electricity. Although homes built today may be more energy efficient, more electrical appliances and more conditioned spaces increase overall household consumption.

National home trends are consistent with those in Kane County. The average home size increased from 1,660 square feet in 1973 to 2,320 square feet in 2003. More than 85% of new construction homes now have central air conditioning, a large driver of peak demand energy use.



Commercial and Industrial Electrical Use

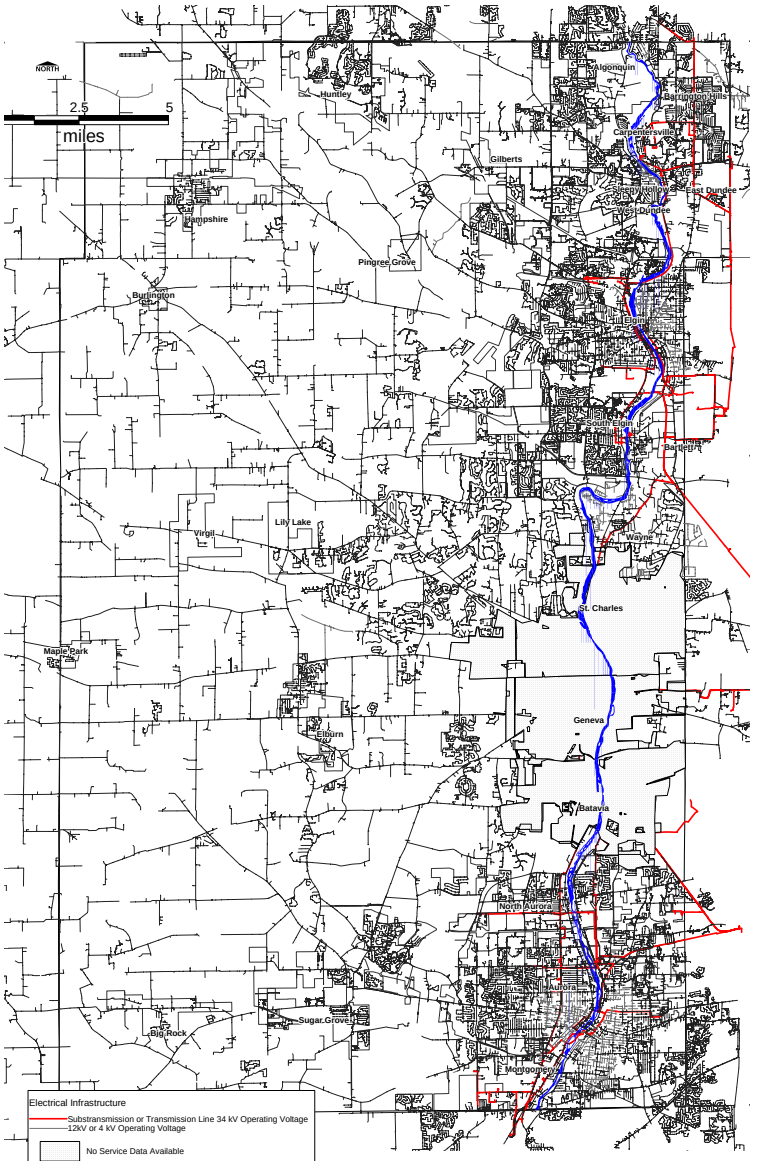
The large commercial and industrial (C&I) users in Kane County are concentrated along the Fox River in the Urban Corridor. The largest users are in Aurora and Elgin. The map to the right illustrates the current energy use by this sector.



Infrastructure

Not surprisingly, much of Kane County's electrical infrastructure is concentrated along the Fox River in the Urban Corridor, where the county's population, land use density and electricity use are greatest. The map to the right shows the current infrastructure of the county. The red high voltage lines are the backbone of the electrical grid.

ComEd serves the electrical load through a network of more than 50 substations and 200 feeders. A substation receives high-voltage electricity from the long distance transmission system and lowers the voltages to the appropriate levels for local distribution. Feeders are components of the local distribution infrastructure that run from substations to the transformers located at individual homes and businesses.



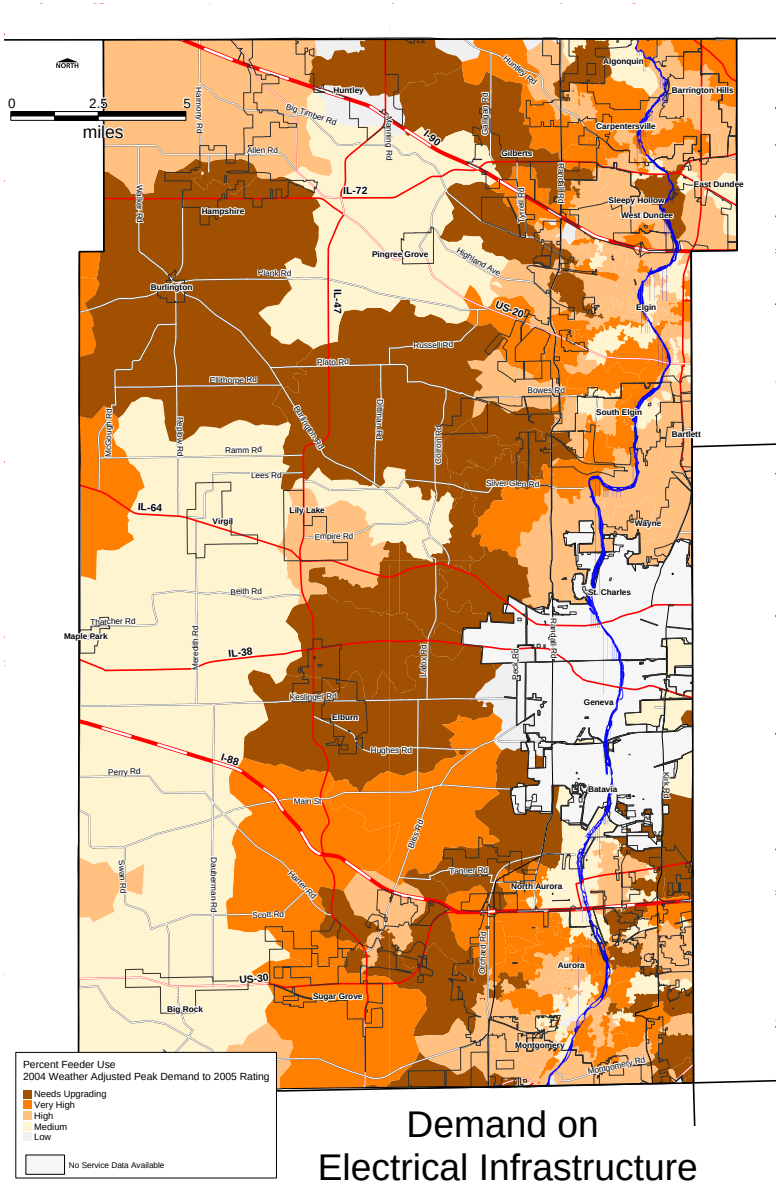
Electrical Infrastructure

ComEd, like most utilities, plans its future electrical infrastructure development on a five year planning horizon. Additional infrastructure, in the form of new substations and feeders, will be necessary to serve increasing and/or shifting load as the county develops. The map to the right illustrates energy use at the substation level. Comparing this map to the previous electrical use maps (residential use and commercial/industrial use), one can see where demand is high geographically and which areas of the system are nearest their capacity.

The darker shading indicates higher stress on the feeders (given the actual usage compared to the feeder's capacity). Most of the stress is occurring west of the Urban Corridor, where less electrical infrastructure is in place. As development moves westward into former agricultural and rural areas, new supportive infrastructure will have to be built or upgraded in all areas, particularly in both the Critical Growth and Agricultural Corridors.

The picture of energy use today in Kane County is one of change. While in the short term existing infrastructure is adequate to keep the lights on, it cannot continue to support the changing population and land use patterns. Immediate utility infrastructure projects to keep up with growth are already on the drawing board, or under construction. However the projects for managing load ten to twenty five years from now are not yet planned, so there is time to proactively address energy policy countywide. The Kane County Energy Plan describes a variety of strategies to reduce energy use in both existing and future homes and businesses, using existing technologies and implementation methods, without altering projected development patterns.

Kane County Energy Solutions developed a model using population, energy use and land use patterns to project future electricity consumption. The next section describes the methodology and data sources used to calculate both current and future growth projections. These data and the model results informed the Kane County Energy Plan's conservation efforts and energy saving strategies.



Demand on Electrical Infrastructure

Modeling Growth in Electricity Use & Demand

In order to project future energy use it was necessary to match current energy use patterns with current and projected land use patterns. For uniformity, the analysis utilized the same land use designations as the 2030 Land Resource Management Plan.

With additional data supplied by ComEd, it was possible to calculate the current number of residential and non-residential units and their energy usage for each land use designation. By then modeling how land use patterns will change (typically from agricultural to some form of residential or commercial), and by applying a growth factor for energy usage in existing buildings, a model of future energy use was developed.

This analysis found that current total energy consumption in the county is more than 471,000 MWH during a typical summer month, with a peak demand of 1,527 MW. Without any changes to how energy is used in the county, energy consumption is predicted to rise 527 MW to a peak demand of 2,054 MW by 2030.

Current Energy Use: Residential, Commercial and Industrial

Residential

Analysis of the current and proposed housing stock in Kane County revealed that there were three distinct types of housing units that could be grouped for analysis purposes:

- Urban Residential
- Large House
- Farm House

These housing types were identified based on the size of the parcel (as illustrated in the table to the right).

As the lot sizes indicate, the different types of residential land uses are relative to Kane County. "Urban Residential," for example, does not represent the Loop in Chicago. Rather, it indicates housing types and densities found more often in communities along the eastern edge of the county, such as Elgin or Aurora. Likewise, "large house" is more indicative of newer style single family suburban developments, and "farm house" refers to an active farm with a residence located on the lot.

Commercial and Industrial

Current commercial and industrial (C&I) energy usage was calculated by using detailed data on the actual energy use for specific classes of businesses.

A regression analysis was performed to calculate the average kWh per residential housing type and business type at a parcel level. The regression analysis yielded the following values.

Development Type and Modeled Energy kWh

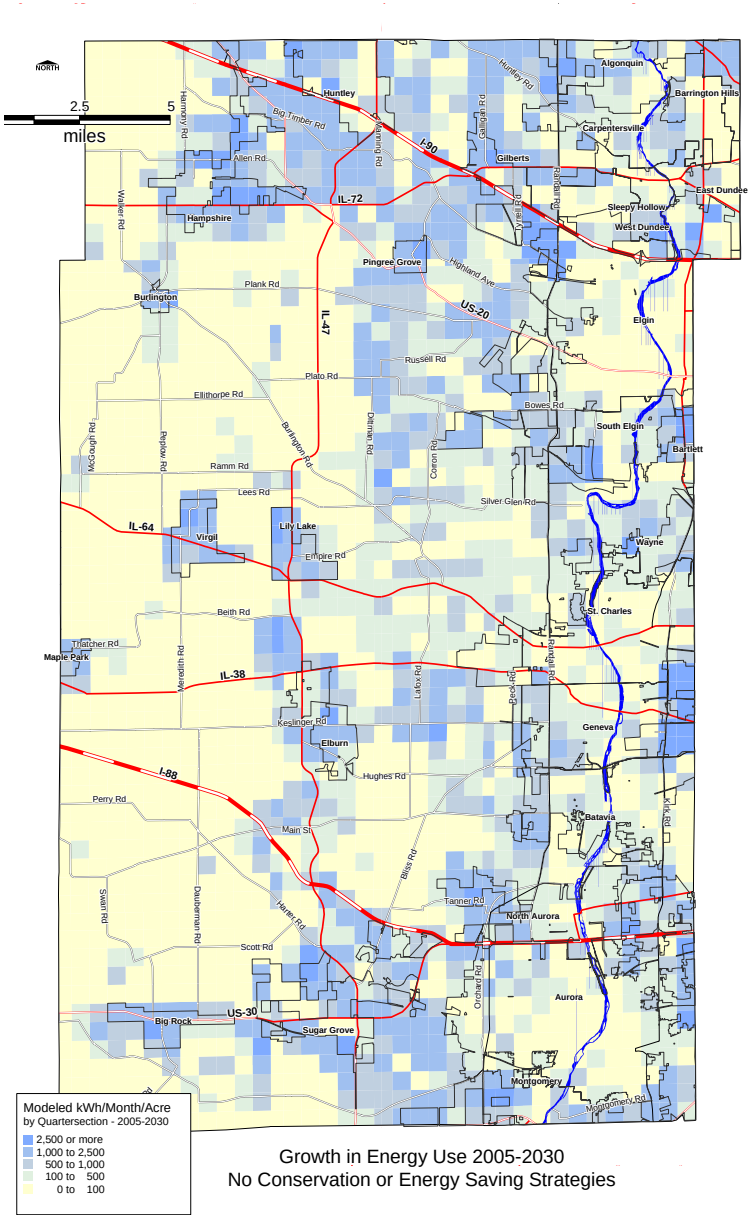
Development Type	Average Lot Size by Acre	Average Summer Month kWh	Current Acres by Land Use	Proposed Additional Acres in 2030 Plan
Residential				
Urban Residential	.22	751	22,031	15,977
Large House	1.4	1,792	25,237	28,215
Farm House	29.8	894	63,823	N/A
C&I				
Commercial	2	11,129	12,210	2,917
Industrial	2.9	57,486	6,748	1,456
Office Research	1.3	11,129	448	1,619
Institutional	5.3	23,993	32,669	3,352

Future Energy Demand

The 2030 Land Resource Management Plan outlines suggested development patterns (land use) for Kane County. In creating average summer month kWh consumption levels for each land use type, it was then possible to apply these figures to the projected changes in use of agricultural and rural land in order to estimate the future energy demand. Based on the descriptions of those land uses, the numbers of new C&I and housing units (both urban and large) were projected for areas that are currently agricultural or rural but were planned for future development.

The model of current residential and C&I electrical usage was applied to projected land use changes to estimate the growth in energy demand (including adjusting for ongoing growth of usage in existing homes and businesses). The map on the right indicates the 2030 projected energy growth.

As this map indicates, much of the growth in electricity demand is located in areas that are currently overstressed due to recent development trends. Assuming that development will follow current trends and coincide with the 2030 Plan, identifying these areas and providing a framework to reduce demand will lengthen the life of the existing system and reduce the need for new infrastructure. These strategies directly impact utility costs, which in turn impact consumers.



Growth in Energy Use 2005-2030
No Conservation or Energy Saving Strategies

Conservation Efforts & Energy Efficiency Strategies

Developing Strategies

Kane County's energy use does not need to continue to grow at its projected rate, even as projected population growth is reached in the coming years. A wide variety of technologies and practices exist today that could **substantially** reduce the growth of energy use by significant amounts. To demonstrate the impact of reducing electrical demand in Kane County, three types of conservation efforts and energy saving strategies were studied:

- Appliances and systems
- Building practices
- Behavior and controls

The energy use model described in the previous section allowed for the flexibility to adjust the strategies within each of these categories and assume either a low, medium or high degree of savings. The model also allowed for the adjustment of penetration rates and acceptance of the different strategies for each land use type. All of the strategies described below are based upon existing technologies and standards and have been used elsewhere in the United States. As new, better technologies develop, the models contained here could be adjusted accordingly.

The **appliances and systems** strategies included:

- High efficiency (ENERGY STAR® or better) air conditioning, both window and central.
- ENERGY STAR® household appliances such as refrigerators and freezers.
- Lighting including compact fluorescents (CFLs), T-8 tubes with electronic ballasts and Light Emitting Diodes (LEDs).
- Mechanical equipment such as high efficiency motors and compressed air systems.

Building practices strategies centered on mandated standards and voluntary guidelines. These included:

- International Energy Conservation Code (IECC), Model Energy Code (MEC).
- ENERGY STAR® qualified homes.
- The American Society of Heating, Refrigeration and Air Conditioning Engineers (ASHRAE) Standard 90.1.
- Leadership in Energy and Environmental Design (LEED)™ rated buildings.

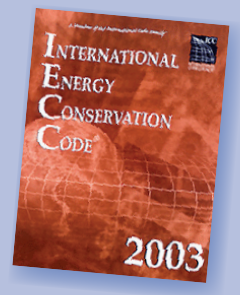
Why an energy code?

The purpose of an energy code is to regulate the design of buildings and structures to enable efficient energy use. Most energy codes address thermal performance ratings for windows, ceiling, wall and basement insulation, as well as HVAC systems and more recently for commercial buildings only, lighting.

Typically, energy codes are a supplement to the building code, along with plumbing, electrical, mechanical and fire codes. In municipalities, building codes are often within the set of code ordinances that regulate town governance, zoning and other regulatory items.

Which standard is standard?

The most current code standard is the 2003 International Energy Conservation Code (IECC) and 2004 Supplement, and it is considered the model for energy standard codes, where adopted, throughout the United States.



Behavior and controls strategies cover a wide range of tools that change how and when energy is used within a home or business. Examples of these include:

- Programmable thermostats and building automation systems.
- Real-time pricing of electricity and demand reduction programs applied along with electric rates and education.

The **appliances and systems, building practices** and **behavior and controls** strategies were then applied in various ways to existing homes and businesses, and to the construction of new buildings. The strategies applied to existing buildings were generally categorized as conservation efforts.

Existing Buildings

Conservation strategies were applied to existing residential housing and C&I buildings. They included appliances and systems as well as behavior and controls strategies.

Conservation strategies for residential housing included:

- Incandescent lighting replaced with compact florescent light bulbs.
- Household appliances replaced with ENERGY STAR® models at the time of replacement.
- Older inefficient window air conditioners replaced with ENERGY STAR rated models on an accelerated basis.
- Higher seasonal energy efficiency rating (SEER) central air conditioners installed to replace older models when they break down.
- Increased use of programmable thermostats.
- Real-time electric rates used to encourage reductions in peak energy use.

For businesses, lighting upgrades and air conditioner replacements were applied.

- Lighting included using CFLs and T-8 tubes and electronic ballasts for upgrade work.
- Air conditioning replaced with high SEER models at the time of replacement.
- Programmable thermostats and limited building controls were applied, along with demand reduction programs.

New Construction

Because so many of the county's buildings in 2030 will be new, energy saving strategies for new construction are essential to reducing energy usage. The key strategy for new construction is building practices, and it takes the form of standards and guidelines related to building energy efficiency. Those standards also include some of the tools listed above as part of the conservation strategies.

For residential construction, the IECC 2003 energy code was considered a baseline. Through a survey of builders, it was discovered that while not generally mandated in municipalities, builders in Kane County were in fact following many of the code requirements. (See Appendix C for Builders Survey.) Bringing all construction up to code will further increase energy savings. Complying with either the 2003 IECC and the 2004 supplement is not very difficult for most builders.

The next higher level of efficiency is the ENERGY STAR qualified home program followed by the energy requirements portion of the Leadership in Energy and Environmental Design (LEED)™ credit designations.

For C&I construction, ASHRAE Standard 90.1 provided the first step above minimum construction. The next higher levels of efficiency were the LEED™ energy requirements.

Appendix D quantifies the appliances and systems, building practices and behavior and controls strategies in both new and existing buildings in the residential, commercial and industrial sectors that were used for this analysis..

Three Models of Changed Energy Use in 2030

Based on the various conservation and energy saving strategies, three scenarios were developed for modeling changes in energy use and demand that differed from the "business as usual" scenario. These were:

- Short term conservation
- Moderate impact on new growth and short term conservation
- Aggressive impact on new growth and short term conservation

The business as usual approach with no conservation or energy saving strategies implemented would result in an increase in electricity demand of 1,527 MW to 2,054 MW by the year 2030

The **short term conservation** scenario assumed a mix of conservation efforts over a 5 year period but included no energy savings strategies applied to the new residential and commercial construction.

The two short term conservation plus impact on new growth scenarios also incorporated those same conservation strategies but added varying penetrations of the energy saving strategies for new construction.

The **moderate impact scenario** is based on a set of moderate energy saving strategies. For residential construction this results in a 9.3% reduction in energy use and in C&I construction, this results in a 6.5% reduction. The moderate impact scenario proposes new construction with the following make-up:

- 40% built business as usual (no reductions)
- 50% built as ENERGY STAR qualified (a 15% reduction in energy use for residential and 10% reduction for C&I)
- 10% built with LEED energy requirements (an 18% reduction in energy use for residential and 15% reduction for C&I)

The **aggressive impact scenario** takes a more aggressive approach with an assumption of the LEED™ energy requirements being met for all new construction. These two scenarios show the impacts that aggressive, or even modest, energy saving strategies can have on energy demand as the demand no longer increases at the same rate as in business as usual or short term conservation scenarios.

The demand reductions (shown in Chart 1) of 40 MW with conservation only, 124 MW with conservation and a moderate energy savings approach, and 194 MW with conservation and an aggressive energy savings approach, are on the levels of substation capacities. A small substation may have a capacity of 8 MW while large substations may have capacities of 30 MW to 120 MW and greater. This means there is a real possibility to reduce the number of new substations or transformers needed by the year 2030.

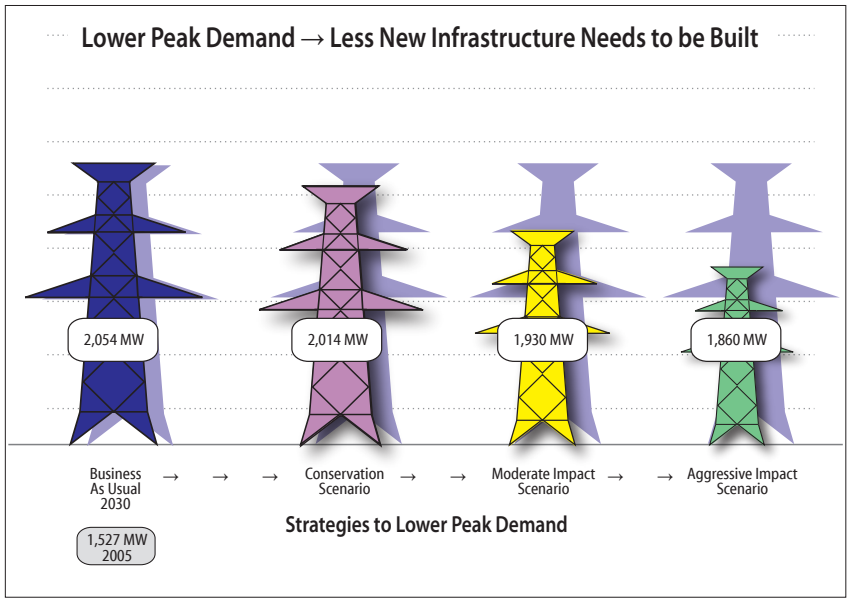


Chart 1: Reduced Peak Demand by 2030

The reduced demand by the year 2030 translates into reductions in the amount of new electrical infrastructure required. This does not mean fewer poles, wire, cables and transformers, which are used to distribute the electricity in the neighborhoods. Everyone still needs to be reached and connected to receive their electricity. What it does mean is that substation capacity for Kane County as a whole is reduced. This could lead to a smaller number of new substations required, or fewer or smaller transformers at new and/or existing substations, along with reduced transmission and sub-transmission requirements at those substations. This will result in savings for the electric distribution utility, which will help keep electric distribution rates as low as possible.

The effect of this permanent demand reduction can also be seen in the timing of the construction of the electrical infrastructure. If the overall load does not grow at as rapid a pace, the need to build the infrastructure also slows down. This can allow for more gains to be made in the design of the equipment and infrastructure before it needs to be installed, thus allowing the electric distribution utility to make use of the advances that equipment can provide.

Another way to look at the impact of conservation and energy saving strategies is to measure the cumulative savings (Chart 2). This indicates the MWH savings possible between now and the year 2030. These savings translate into lower energy usage for consumers and therefore lower energy costs. However, this is only using today's technologies and strategies. In the next 25 years, there will be more advances made and technologies discovered that can be utilized to provide additional energy-saving strategies and tools. These will lead to greater conservation and efficiency opportunities. The savings will offer the consumer more resources with which to implement the ever growing array of energy conservation and efficiency tools.

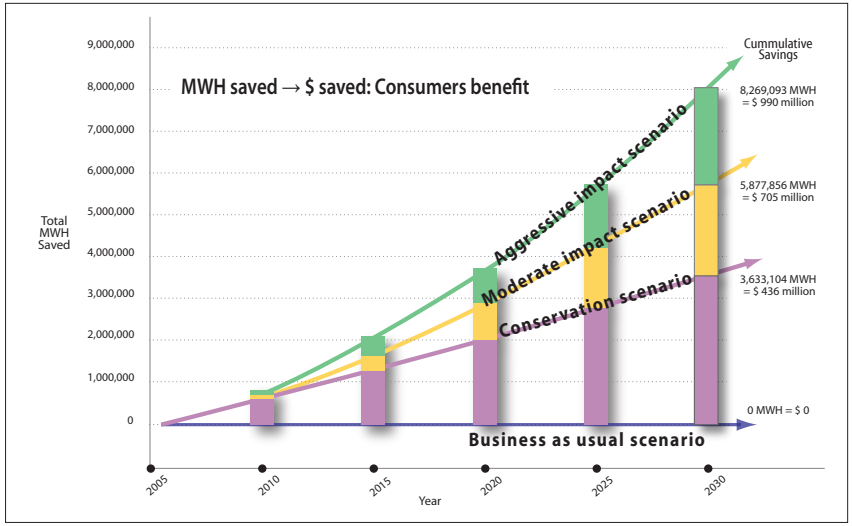
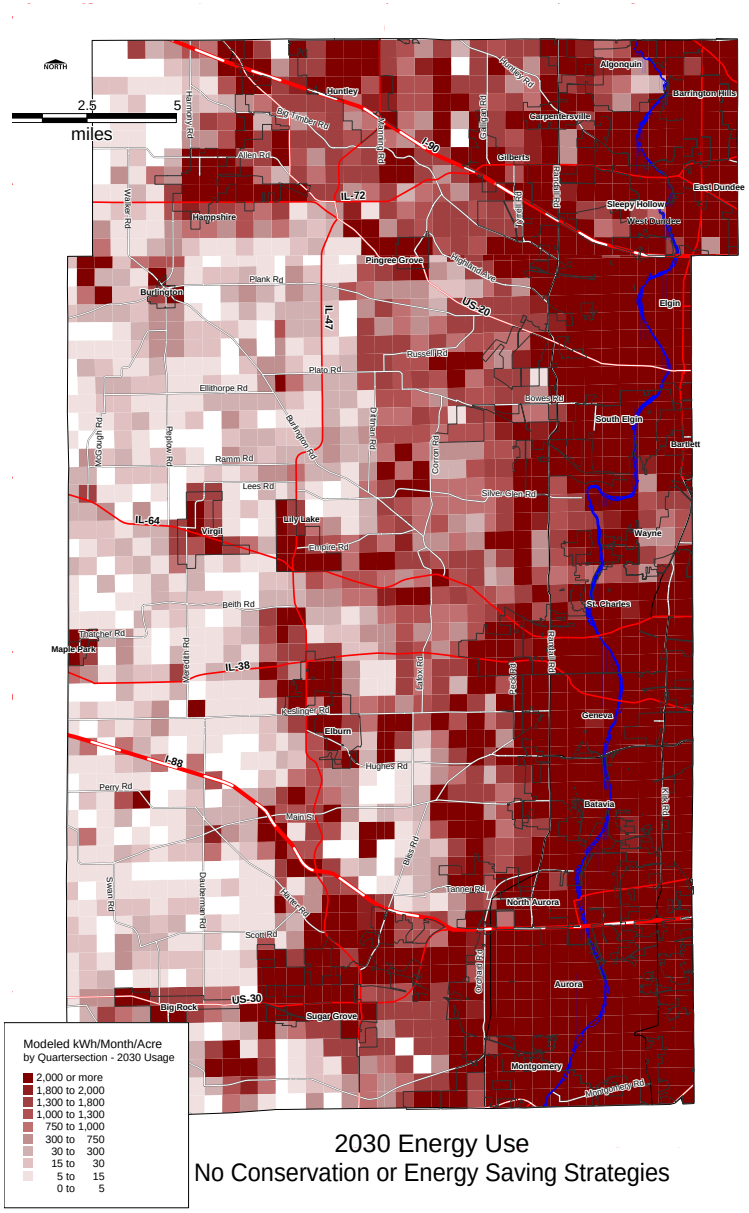
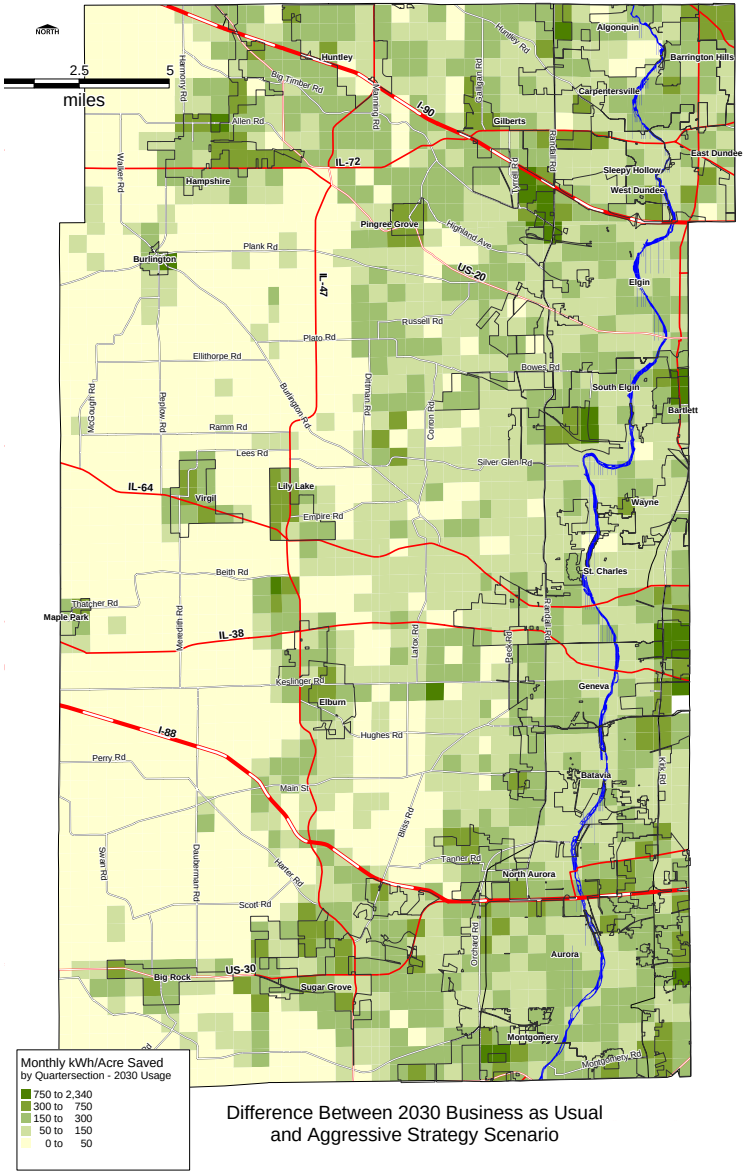


Chart 2: Cumulative Energy Savings

While the charts summarize the countywide results of modeled future energy demand scenarios, the maps on the following page depict these scenarios in terms of how they relate to changing the energy landscape of the county. While energy use will grow under any set of circumstances, adopting a strategy to reduce future electrical usage can have an impact in the critical growth areas of the county.



2030 Energy Use
No Conservation or Energy Saving Strategies



Difference Between 2030 Business as Usual
and Aggressive Strategy Scenario

County Growth and Responsible Energy Planning

The county's population is growing rapidly and corresponding changes in land use patterns are obvious. Accompanied with that growth is the increase of energy use and demand, and the need for more electrical infrastructure. Growth in energy use and demand is inevitable, but how fast this growth rises is up to consumers—individually and collectively.

The three different models of conservation show the cumulative energy savings that could be achieved through demand management strategies and demonstrate the importance of this study. Slowing the growth in energy demand will benefit individual consumers, utilities and, collectively, Kane County as a whole, as energy savings increase and the need for new capital investments in infrastructure is reduced. Slowing the growth in energy use and demand has an added benefit to the environment because electricity generation is a major source of air pollution.

The suggested strategies of the Kane County Energy Plan have widespread applicability as growth continues in similar patterns elsewhere in the state and nationwide. The methods used in this analysis make it possible to apply the model in other locations, and the types of data sources used are common enough to be available in other regions. Similar studies could be conducted to examine growth trends and the effect on the supporting electrical infrastructure, and to identify potential solutions for accommodating growth in a more responsible, efficient manner.

Section Two:
Recommendations and Action Projects

As has been described earlier in this plan, it is in everyone's interest to reduce electricity use and change electricity use patterns. However the decisions and actions that make this possible however are not the specific responsibility of any one party. Different parties have different interests, and until now there has been no mechanism to align these interests. Given the electricity environment in Kane County today, along with the broader context within the state of Illinois, there is a clear and compelling opportunity to do just that. Kane County's energy use is growing faster than the region's as a whole because of the county's rapid population growth and widespread changes in land use. Decisions and actions in the next few years will have major impacts on the county, its consumers, and its utilities for many years to come. This opens a window of opportunity to take coordinated action and affect the county's energy future. At the same time, inaction will squander that opportunity.

Electricity use in Kane County is influenced directly and indirectly by a wide range of players. The electric utilities serving the county (ComEd and the cities of Batavia, Geneva, and St. Charles) have the responsibility to supply and distribute the electricity that the community needs. Consumers, including residents, businesses, public and private institutions, and others, make a range of decisions that determine how electricity is used. These decisions range from immediate behaviors like turning lights and air conditioners on and off to investment decisions such as selecting new air conditioning or refrigeration equipment. Government at all levels—federal, state, county and muncipal—influences this system of supply and demand in many ways. Its roles include providing oversight of infrastructure siting, creating building and energy codes, developing information and incentives to influence market decisions, regulating utility regulation, and more.

The recommendations of the Kane County Energy Plan represent a broad framework for how Kane County can plan for a better energy future by encouraging key players to take proactive measures. These key players include the county government, utilities, municipalities, consumers, and regulators. However, given that the recommendations are for a countywide energy plan, the involvement of county government and utilities is absolutely crucial.



Energy Planning by County Government and Utilities

County government can play a critical coordinating role in energy planning, much as it is doing with other growth issues such as housing, transportation and water resources. This role is increasingly important for small municipalities with very limited resources. While this function does not currently have dedicated resources or staff, much can be done now in the context of other growth related issues. Simply put, getting started does not require a lot of resources. Finally, the county is the logical, best positioned entity to take on this crucial leadership role.

The electric utilities serving Kane County have an unusual opportunity to influence the county's future energy patterns and consumption levels. While all the existing utilities (ComEd and the municipal utilities of Batavia, Geneva, and St. Charles) have a role to play, ComEd is the largest utility and the company serving almost all of the growth areas in the county. This means ComEd has the greatest potential to enable significant energy efficiency and demand reduction.

The opportunity to reduce the need for new infrastructure adds value to energy efficiency and demand reduction strategies that are being pursued or could be pursued in northern Illinois. The extent of projected growth and the extent of possible efficiencies and changes in load shape provide prime opportunities to link what are generally independent strategies and to target efficiency and demand reduction strategies in the area where they will have the greatest impact on future growth.

Along with these opportunities, the county and the utilities have an additional opportunity to take full advantage of new investments in energy efficiency and demand reductions. The development of a Sustainable Energy Plan for the State of Illinois will allow utilities to devote unprecedented effort to reducing consumer energy use and costs.

Recommendations

Joint County Government and Utilities Recommendations

CU 1: Setting and achieving a goal for energy demand reduction will reduce the cost of living and doing business, and the cost of utility operations in Kane County. The County and its utilities should jointly set an energy use reduction goal to reduce peak electrical demand by at least 30% compared to a business as usual scenario, resulting in an energy savings of approximately $2.4 million annually for consumers.

CU 2: To implement and monitor strategies that will achieve this goal, the County Board and the electrical utilities should establish a joint county-utility commission, with local officials and community leaders appointed by the County Board Chairperson, and Kane County utilities selecting appropriate representatives. This commission could meet on a periodic basis to plan the implementation of targeted efforts, monitor progress towards the goal, and ensure the coordination of county development plans, utility infrastructure, and efficiency and demand reduction planning.

County Government Recommendations

CG 1: A widespread, multi-faceted energy campaign needs an experienced leader to coordinate participants and activities. Kane County government should lead the coordination of the Kane County Energy Plan with the creation of a quasi-governmental committee. Resources to fund administrative requirements will be solicited by an outside agency as opportunities on the near horizon take shape, such as the Federal Energy Policy Act of 2005 and the Illinois Sustainable Energy Plan.

CG 2: Kane County government should play a stronger role in planning for the county's energy future by sponsoring multi-disciplinary educational seminars, strategizing/planning sessions, and projects that relate to both the recommendations stipulated in the 2030 Land Resource Management Plan and the research and analysis described in this plan.

CG 3: At the next opportunity for updating the 2030 Land Resource Management Plan, the Kane County Board should update the energy chapter to include the goal of establishing countywide energy code. It should encourage the adoption of the International Energy Conservation Code (IECC 2003) and the IECC 2004 Supplement as the code standards for all municipalities.

CG 4: New codes, especially for smaller municipalities, require administrative costs and technical assistance that are available from a variety of national, regional and state resources. The Kane County Board should utilize these resources to provide educational, technical and financial assistance to municipalities so they may adopt and implement the IECC 2003 code and the IECC 2004 Supplement. Resources that should be considered include the International Code Council, Building Codes Assistance Project, the Midwest Energy Efficiency Alliance, the Illinois Clean Energy Community Foundation, and other national state and regional resources.

CG 5: Kane County should provide leadership by example in new building practices. The county should go beyond minimum building codes and ensure that all new buildings that receive public funding are Leadership in Energy and Environmental Design (LEED™) certified.

CG 6: Kane County government should provide leadership by example in existing government facilities. The county, with the assistance and cooperation of maintenance staff and qualified energy professionals, should set a goal of reducing energy usage by a reasonably attainable 10%.

Utilities Recommendations

UT 1: ComEd and the municipal utilities should further examine opportunities to tie energy efficiency and demand reduction strategies to reductions in future infrastructure development in ways that prudently reduce costs for the utilities and consumers. A long planning horizon for energy reduction (longer than that necessary for the planning of new substations) provides the opportunity to promote effective strategies and to monitor the impact of those strategies in relation to future infrastructure needs.

UT 2: ComEd and the municipal utilities should aggressively target current and future demand reduction programs in Kane County, including commercial and industrial curtailment programs, residential air conditioner cycling, and other programs. With increased penetration of these programs, especially in ComEd service areas, the programs can be managed to curtail growth of peak demand and prolong the life of existing infrastructure in targeted areas of the county. Given the projected growth in many areas, this measure would have a significant impact in reducing energy costs. The adoption and aggressive marketing of these strategies within the municipal utility areas would also reduce the need for purchase of expensive peak power, and could result in reduced electricity costs for all customers, as well as reduced need for transmission capacity into the distribution system.

UT 3: Building new homes with efficient technologies and construction will have lasting impacts on the county's electricity use. The county's electric utilities should develop builder incentive programs to encourage the development of ENERGY STAR® homes, and potentially homes certified through other programs such as the still-developing LEED™-Home program. These kinds of incentives have been cost-effective and extremely successful in areas including Wisconsin and Minnesota. Given municipal growth in many areas, this measure would have a significant impact in reducing the growth in residential energy use.

UT 4: Advanced metering and control technologies enable the development of new mechanisms to control usage and demand response pricing options. Installing such technology at the time of new construction or new service dramatically reduces its cost. The electric utilities should consider requiring the installation of advanced metering, air conditioning cycling switches, or two-way communicating thermostats in all new buildings.

UT 5: Utilities should target their efficiency programs to existing homes and businesses. This will encourage replacement of the worst existing equipment, including inefficient air conditioning, refrigeration and lighting.

Regulatory Recommendation

As the regulatory agency for investor-owned utilities in Illinois, the Illinois Commerce Commission has the opportunity to set up regulatory frameworks that recognize and value the impact of reduced energy use. Without such frameworks, utilities do not have sufficient incentive to make investments in demand reduction as an alternative to new infrastructure.

ICC 1: The Illinois Commerce Commission should adopt regulations that recognize the value of reduced peak demand on the cost of infrastructure. Specifically, utility investments in targeted demand reductions should be treated on an equal basis as the costs of building traditional "iron in the ground" infrastructure such as substations and transmission and distribution lines, and should be allowed to be recovered through distribution rates.

Municipalities Recommendations

MU 1: Adoption of a standardized energy code will provide a big impact at a low cost for residential new construction. All municipalities in Kane County should adopt the International Energy Conservation Code 2003 and 2004 Supplement. Adoption in just the eight municipalities with growth projections of more than 16,500 would guarantee minimum efficiency standards for nearly 110,000 new homes.

MU 2: While some builders in Kane County are building energy efficient homes, these homes should penetrate a larger portion of the market. All municipalities in Kane County should set percentage goals for new residential construction to be ENERGY STAR® or LEED™ certified. Percentage goals could mirror similar incentive programs utilized by municipalities that are designed to achieve other growth-related goals such as open space or affordable housing requirements. Negotiation bonuses, especially during the annexation agreement process, are often returned to the developer in this win-win scenario. Given municipal growth in many areas, this measure would have a significant impact in reducing residential energy use.

MU 3: New codes require administrative and technical implementation techniques. All municipalities in Kane County should provide adequate training for administrators, code officials, and inspectors on implementing the Illinois Energy Conservation Code for Commercial Buildings. Resources that should be considered include the Illinois Department of Commerce and Economic Opportunity, the Building Code Assistance Project and others.

MU 4: Better educated residents make better housing choices, which collectively can benefit the entire municipality, not just the individual. All municipalities should require builders to conduct Home Energy Ratings Systems (HERS) Tests in new residential construction and supply the results to potential buyers. These affordable tests provide a numerical rating of the energy efficiency of the structure and energy using devices within the home. Coupled with this, builders should be encouraged to market appliance efficiency upgrades as options for homebuyers. New homebuyers will learn about the benefits of energy efficiency, in turn resulting in reduced energy use and increased energy savings. Given the projected population growth of the county, the large scale results would greatly impact future energy growth.

Consumers Recommendations

CO 1: There is an opportunity to reach a broader range of people interested in reducing their energy use and cost than is currently reached by existing environmental organizations. Effective action on energy efficiency and demand reduction will require an educated population. Existing community and business organizations should be a conduit for energy education as part of their ongoing communications. Groups already interested in energy should utilize the variety of technical and financial resources available now to reach beyond their regular membership. They should work within other established civic and social networks in the county to educate residents and business owners about the benefits of energy efficiency, demand reduction, and energy issues in general. Groups that are already interested in local energy issues include Kane County Energy Solutions and local interest groups such as the Sierra Club Valley of the Fox Group, Batavia Citizens for Clean Energy, and People United for Responsible Energy.

CO 2: Existing businesses can reduce their current energy use and costs, benefiting their bottom line and maximizing available system capacity resources for new development. Commercial building operation staff should be trained on how to reduce energy use and costs of general building systems through proper operations and maintenance procedures. Tapping into regional and state resources, including the Midwest Energy Efficiency Alliance Building Operator Certification Program, the Manufacturing Energy Efficiency Program, Small Business Smart Energy Program, and the Smart Energy Design Assistance Center should be considered.

CO 3: There are many low-cost and no-cost energy savings opportunities in existing homes. Kane County Energy Solutions should seek funding to offer residents throughout the county training and other resources that focus on the general systems of a home, proper operations and maintenance procedures for these systems, and other related energy issues.

Action Projects

As the preceding recommendations indicate, developing strategies to address and plan for the county's energy future involves those who supply electricity and react to consumer usage, those who govern both utilities and consumers, and of course, those who live and do business in Kane County. The action projects present specific things that can be done now or in the near future with existing or developing relationships, while continuing to identifying partners that share an interest in the vision and recommendations.

These proposed action projects are listed in order of priority. They are categorized as: 1) highest priority projects for immediate action; and 2) priority projects for near to mid-term action. Each individual project is outlined in the following manner:

- Project Description
- Impact
- Potential Project Coordination
- Potential Project Partners
- Potential Funding

Highest Priority Projects for Immediate Action

1. Lighting Retrofit Program	
Project Description	This program raises consumer awareness of the energy saving benefits of efficient lighting systems through a campaign offering information and rebate incentives for replacing T-12 with T-8 fluorescent bulbs and incandescent bulbs with CFLs. The focus would also include efficient lighting fixtures.
Impact	Direct impact, covering the span of the county. Participation rate of 5% of 7,500 C&I and 25% of 130,000 residential with average savings possible of 5 kW C&I and 0.25 kW residential yields approximately a 10 MW savings. Lighting accounts for ≈ 9% of household electricity.
Potential Project Coordination	The Community Energy Cooperative or similar organizations with proven knowledge and experience
Potential Project Partners	Local citizen infrastructure in targeted communities; local government in targeted communities
Potential Funding	Foundation support; private/public partnerships; Illinois Sustainable Energy Plan; 2005 Federal Energy Bill

2. Target Cities Energy Education Program	
Project Description	An educational campaign that targets specific municipalities and uses a community-based marketing approach to educate citizens about energy efficiency, demand reduction and general energy issues. Phase 1 of this project targets the cities of Aurora, Batavia and Elgin, three receptive cities already focusing on environmental issues. This project could expand with additional phases to include more cities.
Impact	Indirect impact that depends on scale and depth of project. Ongoing evaluation would seek to quantify direct impact in each phase.
Potential Project Coordination	The Community Energy Cooperative or similar organizations with proven knowledge and experience
Potential Project Partners	Local citizen infrastructure in targeted communities; local government of targeted communities
Potential Funding	Phase 1: Foundation support; private/public partnerships Other phases: Illinois Department of Commerce and Economic Opportunity; Illinois Sustainable Energy Plan; 2005 Federal Energy Bill

3. Energy Efficiency Educational Campaign	
Project Description	This educational campaign uses creative, interesting and proven methods to provide education on energy efficiency, demand reduction and general energy issues for the residential and commercial sectors. The residential program utilizes existing networks and features the creation of a localized school partnership/program that incorporates energy efficiency into everyday life and a variety of subjects taught in school. The business program works with business associations, chambers of commerce and local leadership to provide periodic educational opportunities for different types of businesses. Phases of this project could be incorporated into the Target Cities Energy Education Program, and could later include larger sections of the county as funding and partnerships develop.
Impact	Indirect impact that depends on scale and depth of project. Ongoing evaluation would seek to quantify direct impact in each phase.
Potential Project Coordination	The Community Energy Cooperative or similar organizations with proven knowledge and experience
Potential Project Partners	Local governments; local citizen infrastructure; schools; business organizations and chambers of commerce; local leadership; state energy education program; energy education resource organizations
Potential Funding	Foundation support; private/public partnerships; Illinois Sustainable Energy Plan; 2005 Federal Energy Bill

4. Energy Audit Program	
Project Description	The program encourages energy consumers, including housholds, businesses and government, to obtain energy audits performed by a network of energy professionals. Audit results will serve as educational resources to the consumer, as well as provide a set of energy action steps.
Impact	Direct impact. Audit rate of 3% of 7,500 C&I and 130,000 residential with average savings possible of 5 kW C&I and 0.5 kW residential with a 50% participation rate yields a 1.5 MW savings achieved. This program could be paired with "Target Cities" for an even greater initial impact.
Potential Project Coordination	A trained energy professional with documented, proven experience
Potential Project Partners	Energy professionals in and near Kane County
Potential Funding	Foundation support; private/public partnerships; Illinois Sustainable Energy Plan

5. New Construction Residential Energy Checklist	
Project Description	This program, to be adopted by municipalities, requires builders to document systems and appliances in the home in a one-page energy checklist. Documentation includes efficiency ratings of the HVAC system, insulation, glazing, appliances and lighting. Another version of this program could be adopted on a builder-by-builder basis.
Impact	Indirect impact that depends on scale and depth of project. Ongoing evaluation would seek to quantify direct impact in each phase conducted.
Potential Project Coordination	Municipality
Potential Project Partners	Municipalities; homebuilder associations; individual builders; possibly one of many green building programs for precedent
Potential Funding	Public/private partnership

6. School District Energy Report Card	
Project Description	This project is an educational tool that analyzes utility data from each district in the county, ranks schools according to usage and intensity, and educates administration and staff about energy efficiency and its budgetary impacts. This project could be phased in and start with one or several cooperating schools. Follow-up phases could include documenting changes and improvements in energy use, etc.
Impact	Indirect impact that depends on scale and depth of project. Ongoing evaluation would seek to quantify direct impact in each phase conducted.
Potential Project Coordination	One or several energy related classes present in local high schools and community colleges
Potential Project Partners	Kane County Regional Office of Education; Fox River Valley School Business Officials; ComEd; Batavia Municipal Utility; Geneva Municipal Utility; St. Charles Municipal Utility
Potential Funding	Foundation support; private/public partnerships

7. Building Code Report Card	
Project Description	This is an educational program designed to consolidate information about the building codes currently in place in all 28 municipalities in the county. It would also involve developing and publicizing a report card summarizing this information. Though this is public information, county-wide information is not currently available in one place.
Impact	Indirect impact that depends on scale and depth of project. Evaluation would seek to quantify direct impact
Potential Project Coordination	Community Energy Cooperative
Potential Project Partners	Kane County Energy Solutions Advisory Committee
Potential Funding	Community Energy Cooperative

8. Municipal Code Training	
Project Description	This educational training program is geared toward working with municipalities to better understand, adopt, and implement residential and commercial energy codes. The residential portion involves both adoption and enforcement of the IECC 2003 energy code and 2004 supplement. The commercial portion focuses on implementation of the new Illinois Energy Conservation Code for Commercial Buildings, which includes work done as renovations, alterations, repairs or additions.
Impact	Direct impact. Residential code training: Taking the eight communities with growth projections of over 16,500 residents by 2030, uniform code adoption of the IECC 2003 energy code could guarantee minimum efficiency standards for nearly 110,000 new homes. Commercial code training: The Illinois Environmental Protection Agency estimates annual energy savings resulting from adopting the statewide code would range from 6% to 16%, depending on building type/size; which could produce demand reductions from 1% to 3% or 15 MW to 50 MW.
Potential Project Coordination	Community Energy Cooperative
Potential Project Partners	Illinois Department of Commerce and Economic Opportunity; Building Code Assistance Program; Municipalities; homebuilder associations
Potential Funding	Illinois Department of Commerce and Economic Opportunity; Building Codes Assistance Program; Illinois Sustainable Energy Plan; foundations; public/private partnerships

Priority Projects for Near to Mid Term Action

9. Efficient Air Conditioner Program	
Project Description	This program encourages replacing older air conditioners with more efficient units and maximizing the operating efficiency of existing units. For window air conditioners, the program focuses on simply trading out old units for new efficient models. For central air conditioners, the program focuses on operation and maintenance, and provides rebates when replacement becomes the most viable option.
Impact	Direct impact, covering the span of the county. Participation rate of 3% of 130,000 residential with average savings possible of 1 kW yields approximately a 4 MW savings.
Potential Project Coordination	The Community Energy Cooperative or similar organizations with proven knowledge and experience
Potential Project Partners	Local citizen infrastructure in targeted communities; local government of targeted communities
Potential Funding	Foundation support; private/public partnerships; Illinois Sustainable Energy Plan; 2005 Federal Energy Bill

10. Energy Savings Purchase Program	
Project Description	The basis of the program is the financing of energy efficient appliances and equipment (motors, refrigeration and compressed air systems) through the electric utility. Financing is calculated by one's future energy savings. This program has two components that address the up-front cost issues of buying big ticket items and making energy improvements. One component is for homes and small business and the other is for larger commercial and industrial energy users.
Impact	Direct impact. Tier one: Participation rate of 1% of 3,750 small businesses and 130,000 residential with average savings possible of 1 kW small business and 0.25 kW residential yields approximately a 0.4 MW savings. Tier two: Currently, there are approximately 3,750 larger C&I customers in Kane County. This program would set a penetration target of 1% of the businesses per year with a demand reduction of 15 kW per business for a total of 0.6 MW savings.
Potential Project Coordination	Utilities
Potential Project Partners	ComEd; Batavia Municipal Utility; Geneva Municipal Utility; St. Charles Municipal Utility
Potential Funding	ComEd; Batavia Municipal Utility; Geneva Municipal Utility; St. Charles Municipal Utility; other public/private partnerships

11. Efficient Appliance Trade-in/Rebate Program	
Project Description	While air conditioning is the largest driver of peak demand, other appliances--particularly refrigerators--can have a significant impact on energy consumption. This program uses rebates and discounts to encourage the accelerated replacement of older appliances and with efficient units. The trade-in of old units is an essential component of the program and is necessary to ensure net energy reductions.
Impact	Direct impact, covering the span of the county. Participation rate of 3% of 130,000 residential with average savings possible of 0.75 kW yields approximately a 3 MW savings.
Potential Project Coordination	The Community Energy Cooperative or similar organizations with proven knowledge and experience
Potential Project Partners	Midwest Energy Efficiency Alliance; ComEd; Municipal Utilities
Potential Funding	Illinois Sustainable Energy Plan

12. Real Time Pricing Marketing and Education	
Project Description	This project would involve 1) educating Kane County residents about real-time electricity pricing, and 2) marketing a real-time pricing program to eligible residential customers. (The Community Energy Cooperative could partner with ComEd and interested municipal utilities to offer a real-time pricing program to residential electricity customers. The utilities would offer the rate and the Cooperative's role would be to market the plan.) Marketing efforts would include targeted mailings, strategic advertising, and other proven methods that have been successful in the pilot version of the program.
Impact	Direct impact. The program could impact all ComEd service areas (and other participating utilities). Average savings estimated at 0.75kW per participant with a 5% penetration rate of approximately 130,000 eligible, yields approximately a 5MW savings.
Potential Project Coordination	Community Energy Cooperative
Potential Project Partners	ComEd; municipal utilities; The Community Energy Cooperative; local community organizations
Potential Funding	ComEd; the Batavia Municipal Utility, Geneva Municipal Utility, and St. Charles Municipal Utility (if the municipal utilities offer a similar rate)

13. Smart Metering	
Project Description	Builders arrange to have the electric utility-approved smart meter installed on all new residential construction. The smart meter provides more detailed and timely energy usage information to both the consumer and the utility.
Impact	This program is aimed at new residential construction through 2030 with an annualized growth of 4,000 units per year, producing demand reductions from 1% to 3% or 15MW to 50MW.
Potential Project Coordination	ComEd; Batavia Municipal Utility; Geneva Municipal Utility, St. Charles Municipal Utility
Potential Project Partners	ComEd; Batavia Municipal Utility; Geneva Municipal Utility, St. Charles Municipal Utility
Potential Funding	Federal; State; Public/private partnerships; ComEd; Batavia Municipal Utility; Geneva Municipal Utility, St. Charles Municipal Utility

Plan Implementation

The complexity of the proposed recommendations and action projects implies that the Kane County Energy Solutions project should continue after the publication of this plan. Carrying out the recommendations and projects in this plan will necessitate the involvement of key local stakeholders, including county government, utilities, municipalities and consumers. This chapter outlines important elements of the ongoing implementation of the plan.

Implementation Committee

An organizing committee should oversee this implementation process, such as the one recommended of the county government (CG 1), which recommends that "the county should lead the coordination of the plan with the creation of a quasi-governmental committee." The Kane County Energy Solutions Committee should be comprised of relevant county and municipal officials, including planners, code enforcement officials, and policy and decision makers; representatives from all four utilities; representatives from each level of the business community (industrial, institutional, commercial and small business); representatives from local interest groups; and community leaders and residents.

The committee should meet on a regular basis for the purpose of monitoring and evaluating the progress of ongoing action projects and the advancement and maturation of recommendations
.

Monitoring

In order for the recommendations and action projects to take root and flourish, the implementation committee will have two roles. The committee will work to generate more interest in the concepts and ideas expressed in this plan, recruit additional stakeholders to participate, and keep stakeholders informed and involved. In addition, it will monitor the status of all recommendations and action items by documenting progress, identifying and working with lead coordinating organizations and partnering agencies, and helping to secure potential funding sources.

During the crucial first year of plan implementation, suggested activities of the committee could include, but are not limited to the following:

- Spearhead high priority action items.
- Continue to generate interest through a communications strategy directed at individuals and local interest groups.
- Solicit and coordinate involvement of municipalities.
- Establish a method for tracking recommendations and projects.
- Identify and work with implementation partners.
- Identify (and possibly help secure) potential funding sources.

In the coming years as other organizations, agencies and individuals begin to take more interest and responsibility for recommendations and projects, the committee can reassess its role.

Evaluation

The implementation committee should conduct a self-assessment and report back to local stakeholders on the progress of the Kane County Energy Plan each year. During this evaluation process, certain questions should be addressed, such as:

- How can we measure our overall progress?
- Are the original population projections and related growth assumptions fairly accurate? If not, does this effect any recommendations or projects?
- Do we still support each recommendation and project? If not, why?
- Have the improvements made or goals achieved had the results we hoped for? If not, why?
- Have we adequately involved municipalities and local interest groups? If not, why?
- Are we working with the right implementation partners, funders, and local stakeholders? Do we need to identify more participants?
- If applicable, are the desired results of our efforts capable of withstanding the test of time and becoming financially self-sustaining? If not, why?
- How have the efforts of the plan impacted the development of new electrical infrastructure in Kane County?

Once a detailed evaluation takes place, the answers to these questions and others should be communicated to the local leadership and stakeholders in Kane County. A Kane County Energy Solutions annual update meeting should be held, and should involve all original groups in addition to new participants. The goals of this meeting should also include celebrating the accomplishments to date, large and small. A meeting summary document should be prepared and disseminated to all participants.

Plan Update

Every two to three years, the implementation committee should prepare an update to the original Kane County Energy Plan so that it remains a relevant working document. The update process could take place in one or several meetings, and should address the following topics:

- Describe the accomplishments of the Kane County Energy Plan.
- What elements of the plan have not been addressed or accomplished, and why?
- Are there any changes in the county that require a redirection of recommendations and projects? If yes, explain.
- Through the evaluation process, have new recommendations or projects been proposed and initiated? If yes, explain.

Once the plan update process has been conducted, an update report to the original Kane County Energy Plan should be prepared and disseminated to all participants.

Appendices

Appendix A: Glossary

2030 Land Resource Management Plan: Commonly referred to as the "2030 Plan." This document is a long-range comprehensive land use strategy that evaluated population projections and future development land use patterns, adopted by the Kane County Board in October 2004.

ASHRAE: Abbreviation for American Society of Heating, Refrigeration and Air Conditioning Engineers.

CAC: Abbreviation for central air conditioner.

CFL: Abbreviation for compact fluorescent light bulb. CFLs are approximately four times as energy-efficient and 8-12 times as long lasting as incandescent light bulbs.

C&I or Commercial/Industrial: The commercial/industrial sector is generally defined as businesses. The C&I sector includes, but is not limited to, manufacturing, health and education institutions, hotels, restaurants, and retail stores. C&I electrical service is a separate classification from residential electrical service.

Demand (Electric): The rate at which electric energy is delivered over a designated period of time.

Demand Reduction: Strategies to reduce electric demand.

Demand-Side Management (DSM): Utility-administered measures designed to encourage consumers to modify electricity use patterns.

Electrical Infrastructure: Includes transmission lines, substations and feeders.

Energy Efficiency: Measures that provide more efficient energy use, i.e., replacing traditional light bulbs with CFLs.

ENERGY STAR®: An appliance and home certification program with strict energy performance standards. ENERGY STAR is run by the US Environmental Protection Agency.

Feeder: Any of the medium-voltage lines used to distribute electric power from a substation to consumers or to smaller substations.

Grid: The layout of an electrical distribution system.

HERS: Abbreviation for Home Energy Rating System. HERS tests provide ratings of the energy efficiency for residential structures and energy using devices within the home.

IECC: Abbreviation for International Energy Conservation Code. The code is written by the International Code Council and is considered the model for energy standard codes. The code encourages energy conservation through efficiency in envelope design, mechanical systems, lighting systems, and the use of new materials and techniques.

ICC: Abbreviation for International Code Council. The ICC formed in 1994 with the joining of three separate code agencies into one non profit organization with a mission to develop a single, coordinated national model construction code. In addition to model codes, the ICC provides technical and educational assistance to builders, municipalities and others.

ICC: Abbreviation for Illinois Commerce Commission. Under state mandate, this purpose of this commission is to ensure safe, efficient, reliable and uninterrupted utility service at reasonable prices; to regulate the financial organization of utility companies so that they provide such services; and provide utility companies with the opportunity to earn a reasonable profit.

kW: Abbreviation for kilowatt. 1 Kilowatt (kW) = one thousand watts. Some electrical rates charge for peak demand in kilowatts.

kWh: Abbreviation for kilowatt hour. 1 Kilowatthour (kWh) = one thousand watt hours. Most electricity consumption is charged in cents per kilowatt hour.

LED lighting: Abbreviation for light-emitting diode lighting. LEDs are a highly efficient lighting technology and are employed in traffic signals and exit signs.

LEED™ Green Building Rating standard: LEED™ (Leadership in Energy and Environmental Design) is a credits-based rating system for green building. Certified, Silver, Gold, and Platinum levels of green building certification are awarded based on total credits earned.

Load (Electric): The amount of electric power delivered or required at any specific point or points on a system.

Megawatt (MW): One million watts or 1,000 kilowatts.

MEC: Abbreviation for Model Energy Code, one of the precursors to the IECC standard. (ENERGY STAR® standards reference the 1993 Model Energy Code)

Peak Demand: The maximum load during a specified period of time.

Peaker Plant: An electricity plant used during the peak-load periods. Peaker plants typically run on natural gas.

Real-Time Pricing (RTP): An electricity pricing strategy using variable, hourly prices that reflect actual market prices. Consumers' bills reflect *how much* electricity is consumed, and also *when* it is consumed. Consumers get information about price levels and are able to change their consumption behavior in response to changing prices.

Residential: The residential sector is defined as private households, Including apartments.

SEER: An abbreviation for seasonal energy efficiency ratio, it is the ratio of total cooling output (in British thermal units or BTUs) provided by an air conditioner unit divided by its total energy input (in watt-hours). The higher the SEER, the more efficient the air conditioner.

Substation: A facility where transformers lower electricity's voltage for distribution.

Transformer: A device used to transfer electric energy from one circuit to another, especially a pair of multiply wound, inductively coupled wire coils that affect such a transfer with a change in voltage, current, phase, or other electric characteristic.

Transmission System (Electric): An interconnected group of electric transmission lines and associated equipment for moving or transferring electric energy in bulk between points of supply and points at which it is transformed for delivery over the distribution system lines to consumers, or is delivered to other electric systems.

WAC: An abbreviation for window air conditioner.

Watt: The electrical unit of power. The rate of energy transfer equivalent to 1 ampere flowing under a pressure of 1 volt at unity power factor.

Watt Hour (Wh): The electrical energy unit of measure equal to 1 watt of power supplied to, or taken from, an electric circuit steadily for 1 hour.

Appendix B: Summary of the Kane County Energy Solutions Roundtable

Planning for Growth: Managing Our Increasing Energy Needs

On the morning of Friday, April 22, 2005 more than 50 people attended the Community Energy Cooperative's roundtable discussion entitled "Planning for Growth: Managing Our Increasing Energy Needs." Held at the Batavia Public Library, this event was the first public meeting of the Cooperative's Kane County Energy Solutions project. The purpose of the meeting was to present our preliminary analysis of how Kane County's energy needs are expected to change in the coming years. We also introduced potential strategies for meeting the county's growing energy needs while minimizing the costs and disruptions associated with constructing new electrical infrastructure. Possible strategies include energy efficiency and demand reduction programs. The focus of work in the coming months will be to fully develop these strategies along with a plan for implementation.

The April 22 event drew a wide range of participants including: urban planners; municipal and county government officials; representatives of municipal utilities (Batavia, Geneva, and St. Charles); representatives of institutions such as Delnor Hospital, West Aurora School District 129, and Elgin Community College; building operators; professionals in the energy business; members of interest groups such as Sierra Club and Batavia Citizens for Clean Energy; Energy-Smart Pricing Plan participants; and concerned citizens from across the county. Others present included Illinois Representative Linda Chapa LaVia (83rd District), and Dan Persky, senior policy advisor from the Office of Lieutenant Governor Pat Quinn.

After a continental breakfast and spirited welcome by General Manager Kathryn Tholin, Cooperative staff presented a brief project summary and a quick lesson on the basics of electricity, followed by a detailed review of the data that staff has analyzed for several months. Data from Kane County, the Northeastern Illinois Planning Commission, the United States Census Bureau and ComEd were examined. We found that with the projected population growth in Kane County, electricity usage will continue to rise, put stress on existing infrastructure and require costly new infrastructure. The final portion of the presentation described some of the energy efficiency and demand reduction strategies that could reduce the county's projected growth in electricity use and future infrastructure needs.

For details, see the full presentation online: www.energycooperative.org/kane-county-energy-solutions.php.



Roundtable participants review maps and provide feedback about their levels of concern.

Participant Feedback Exercises

Participants completed two feedback exercises at the April 22 roundtable event. We used a map exercise to measure participants' views on the county's projected growth and how growth will affect electricity demand and the electrical infrastructure. The second exercise was a survey that will guide the Cooperative as we begin developing a countywide plan to address projected growth and its impacts on the electricity infrastructure.

Mapping Our Concerns

Participants reviewed maps illustrating Kane County today and projections for Kane County in the year 2030. We wanted to know how concerned participants were about the issues illustrated. The responses are summarized below. To view the maps, go to www.energycooperative.org/kane-county-energy-solutions.php. Participants voted using the following scale.

- **Not concerned:** this is being addressed, will be addressed, or will fix itself.
- **Somewhat concerned:** this is a minor problem when looking at the big picture.
- **Concerned:** this is something that should be addressed in the near future.
- **Very concerned:** this should be addressed immediately! We should urge proper decision-makers to take action!

Map A: Anticipated development of agricultural and vacant residential land. Participants indicated that anticipated patterns of development are a source of concern. More than 80% indicated their concern in varying degrees.

Map B: Today's electrical infrastructure in Kane County. We asked participants to consider existing electrical infrastructure in the context of the county's projected growth of 71% by 2030. In general, the current infrastructure is a source of concern.

Map C: Average electricity used per household in a month. This issue is a source of great concern with 22 of the 36 respondents (over 60%) indicating they are very concerned about the average electricity used per household.

Map D: Demand or stress on current infrastructure. Participants expressed their concern about current demands on the county's electrical infrastructure. Nearly 70% agreed that we should address this immediately and urge proper decision makers to take action.

Map E: Today's electricity use in Kane County. This map illustrated total current residential, commercial and industrial electricity usage. Participants expressed concern about this total overall usage. Nearly 80% were either concerned or very concerned.

Map F: Growth in total electricity use. This map illustrated how total electricity use (residential, commercial, and industrial) is expected to grow from 2005 through 2030. While only 14% are not concerned about this, the majority of respondents (nearly 64%) are very concerned about the county's growth in total electricity use.

Map G: Total projected electricity use. This map combined today's total electricity use with the projected growth in total electricity use to illustrate the total projected use of electricity for 2030. Nearly 85% reported that they are concerned or very concerned with the projected electricity use.

Vote Totals for Mapping Our Concerns

	Map A	Map B	Map C	Map D	Map E	Map F	Map G
Not Concerned	6	6	5	1	4	5	4
Somewhat Concerned	5	6	3	2	4	2	2
Concerned	9	12	6	9	17	6	9
Very Concerned	16	12	22	26	12	23	23

Prioritizing Tools and Strategies

In the second feedback exercise, participants completed a survey asking them how they would prioritize specific tools and whether the strategy for implementation should be of a voluntary or standard-based (regulatory) nature. The 38 survey respondents told us the following.

Building Practices

Kane County Energy Solutions (KCES) should place a high priority on energy building codes as tools for addressing electricity issues in the county. Nearly all respondents agreed that these codes should be standard-based as opposed to voluntary.

Around 70% of respondents felt that rating programs (e.g. LEED, ENERGY STAR) should be high priority, with another 24% suggesting that these tools are a mid-level priority. Two thirds of respondents felt that strategies focusing on rating programs should be voluntary in nature.

Appliances/Systems

KCES should place a high priority on appliances/systems, especially air conditioning systems. Slightly more than half of respondents favor standard-based strategies. More than 70% of respondents place a high priority on lighting and business energy audits, and well over half agreed that these strategies should be voluntary programs.

Behavior and Controls

KCES should place a high priority on building controls and on education. Well over half of participants agreed that both strategies should be voluntary. It was suggested that we investigate opportunities to provide educational programs for children or provide materials to new residents and home buyers.

A majority (56%) of survey respondents agreed that KCES should consider real-time (hourly) pricing as a high priority, while another 27% rated this as a mid-level priority. Two thirds of all respondents felt that such a strategy should be voluntary in nature.

Targeted Places

Strategies that focus on targeted places provide unique, site-specific opportunities to address electricity demand and usage. One such strategy is distributed generation. For example, a large electricity consumer such as an industrial park could produce its own power rather than drawing power from the standard electrical grid. Between 50% and 60% of all respondents favored placing a high priority on strategies focused on distributed generation and combined heat and power. More than 70% felt these strategies should be voluntary.

When asked about geothermal tools and strategies, the majority of respondents suggested a mid-level priority rating. About one quarter of respondents either did not reply or suggested a low priority rating. More than 85% felt that any such strategy should be voluntary. Nearly identical results were noted in reference to developing strategies for microgrids. In general, survey respondents agreed that they would need more information before assessing the potential value of tools that focus on targeted places.

Moving Forward

Following April 22, the Kane County Advisory Committee formed. The committee worked with Cooperative staff to develop strategies and devise an implementation plan that is tailored specifically for Kane County.

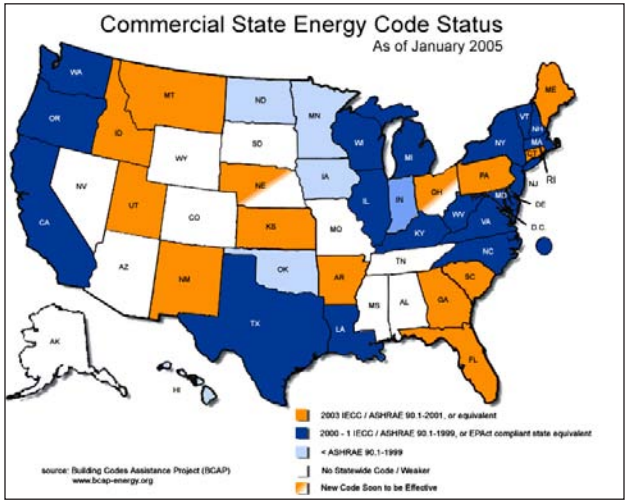


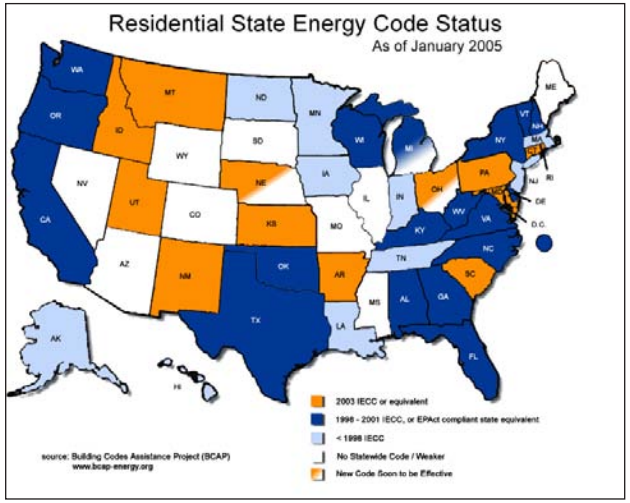


Roundtable participants consider Kane County's energy future at the April 22 roundtable in Batavia.

Appendix C: Builders, Housing Baseline and Building Codes

For reference, state code adoption status is shown on the maps from the Building Codes Assistance Project below.





Data from ten residential builders in Kane County informed building code recommendations in the Kane County Energy Plan. Collectively, they are currently building 12,385 residential units in Kane County. The survey template is shown below.

Developer Info		Company
Communities		Contact Person
Housing Characteristics Types (sf, mf,th, condo)		Address
		Phone
Sizes of units		email
		web
Custom vs std		size of builder (L,M,S)

ENVELOPE	standard what %- all, most, some	upgrade
insulation		
ceiling/attic		
walls		
floor (above unheated basements)		
ducts (supply & return)		
foundation		
HVAC		
heating furn. - AFUE		
cooling AC - SEER		
zoned?		
Windows		
U-factor		
low E?		
quantity		
INTERIOR		
programmable thermostats?		
SMART house?		
lighting		
CFLs?		
daylighting (skylights, light tubes, siting)		
Energy Star appliances (washer, dryer, fridge, freezer, dw)		
Radiant floors?		
Materials - recycled carpet, tiles? low VOC paint?		
EXTERIOR		
landscaping - conservation		
outdoor lighting		
ENERGY EFFICIENT HOMES		
Energy bill guarantees? If so, how long? $ or therms/kWh		
Certification of energy rating/ HERS?		

Where do you see the market for energy efficient homes?
Where is the industry heading?

The survey data was used to compare the energy efficiency of homes built today in Kane County to the IECC 2003 code standards and to the Energy Star® and LEED voluntary guidelines. Results are shown in the following table.

Energy Efficiency Measures Assumed for Current Practice, IECC, Energy Star and LEED Homes Compliance

			Voluntary Standards	
	Current Practice Kane County Climate Zone 14b	**IECC** 2003	**ENERGY STAR® DRAFT 2/8/05**	**LEED™-H DRAFT 12/02/04**
Ceiling	R-30	R-38	R-38	Energy Star Certified Required
Wall	R-13	R-13	R-15	
Window U-factor	U-0.48 (no low-E)	U-0.35 (low-E) (based on fenestration percentage tables)	Energy Star qualified windows U-0.4	additional points for: exceeds Energy Star Home ≥ HERS 88 ≥ HERS 90 ≥ HERS 92 ≥ HERS 94
Floors Above Unheated Basements	R-13	R-30	R-19	
Duct Insulation	None	R-8 supply, R-2 return	R-8 supply	additional points for: Windows exceeds Energy Star ≥ 10% exceeds Energy Star ≥ 20%
Duct Sealing	No	Yes	Yes	
Heating System	Gas furnace, 80% AFUE	Gas furnace, 80% AFUE	Gas furnace, 90% AFUE	additional points for: HVAC exceeds Energy Star ≥ 10% exceeds Energy Star ≥ 20%
Cooling System	Air conditioner, 10 SEER	Air conditioner, 10 SEER	Air conditioner, 13 SEER	
Lighting and Appliances	-	-	5 or more Energy Star qualified light fixtures, ceiling fans and/or appliances	4 or more Energy Star qualified light fixtures Energy Star refrigerator
Thermostat	-	-	Yes -Energy Star qualified	no
HERS test	no	no	yes	yes

Appendix D: Potential Energy Savings Tools

Sector	Tool	Demand Savings (kW)	Unit	Yearly Energy Savings (kWh)
Existing Residential	Exchange Window Air Conditioner for Energy Star model	0.35	each	180
	Replace Central Air Conditioner with 14 SEER Model	1.57	each	807
New Residential Construction	Energy Star qualified home (20% more efficient than base model)	1.25	each	643
	IECC code built home (7% more efficient than base model)	0.50	each	257
	Install 14 SEER Central Air Conditioner instead of a standard model	1.00	each	514
	Purchase Energy Star Window Air Conditioner instead of a standard model	0.18	each	93
Any Residential	Replace the 5 most used lights with CFL models	0.25	per 5 lights	274
Commercial	Upgrade existing lighting to T-8s	5.00	per 10,000 sq ft	23,660
	Temporarily raise Air Conditioner setpoint 6 degrees on 10 days. Savings = 15%	2.50	per 10,000 sq ft	200
	Install high efficiency Air Conditioner system (new). Savings = 15%	2.50	per 10,000 sq ft	1,285
	Build using current ASHRAE Standard 90.1 (4% more efficient than base model)	1.50	per 10,000 sq ft	5,625

Appendix E:
The Regulatory Environment

Changing the growth of energy demand and consumption in Kane County is a multifaceted challenge. This Plan outlines a vision for how it could be done, but such work will not exist in a vacuum. Federal, state and local regulatory and legislative actions will be critical in providing a framework for energy planning and funding opportunities for project and plan implementation.

Kane County is served by two types of utility and regulatory structures. While most of Kane County is served by the investor-owned utility ComEd, the three cities of Batavia, Geneva and St. Charles, have their own municipal utilities. ComEd is regulated by the Illinois Commerce Commission. Municipal utilities are not; instead they are overseen by their city councils, and ultimately the voters. Municipal utilities can more easily set rates, policies, and programs that align utility, city, and consumer interests. On the other hand, regional or statewide initiatives and funding (such as the proposed Sustainable Energy Plan) may not be available to these three cities. The highest growth areas of the County are in areas where ComEd is the utility; therefore the greatest opportunities to manage the growth of electrical consumption come from aligning utility and regulatory interests and making use of state programs to encourage demand reduction and energy efficiency.

Federal Energy Policy

After many years of little federal role in energy policy, The Energy Policy Act of 2005 passed in Congress and was signed by President Bush in the summer of 2005. This wide ranging bill is a collection of many provisions, rather than a truly clear vision of energy policy for the United States. Several of its provisions could have an impact on the issues that have been addressed in this report. At the time of the release of this plan the implementation details for these have not been developed, but they include:

1. Smart metering and demand response. The Energy Policy Act of 2005 recognizes that the actions of some energy users to reduce peak demand benefits all users, and that the value of demand reductions by some households and businesses should be recognized in the development of programs. The act requires all state utility commissions to explore the value of pricing programs that charge by time of use (such as real time pricing), and the benefits of installing smart metering systems that provide more information and feedback responses to customers.

2. Increased appliance efficiency standards. A number of new appliance minimum energy efficiency standards will be created, and some existing ones will be increased. As new homes and businesses are built in Kane County these standards will help reduce the energy use of those new buildings. Likewise as existing homes and businesses replace existing appliances, their energy use will be reduced.

3. Tax credits. This is a short term incentive to reward homeowners to improve air conditioners, water heaters, windows etc. Tax credits of up to $500 are available for measures installed by the end of 2007. There are also tax credits for builders of homes and commercial buildings with energy use 50% below standard.

4. Building codes. Technical assistance is available for states in order to implement energy components to building codes.

State Energy Issues

Deregulation and the restructuring of the electric power industry

The electricity landscape of Illinois is evolving. In 1997 Illinois started a process of deregulation (or more accurately, restructuring) of the electric industry. This has changed the structure of the state's investor-owned utilities. While ComEd was originally a vertically integrated utility that owned power plants, transmission lines, and the local distribution grid, today they only distribute electricity. ComEd's coal-fired generation has been sold to another company, and its nuclear plants are owned by an affiliate of its parent company. Natural gas fired peaker plants are owned by independent power producers. The transmission system, while still owned by ComEd, is now run by a regional transmission organization which runs the electric transmission system for much of the east coast and parts of the Midwest.

The final piece of the restructuring of the Illinois electricity industry is coming in 2007 with the expiration of the current rate freeze and set of electricity rates. ComEd currently has rate cases pending before the Illinois Commerce Commission (ICC) that will reformulate rates and set up a process by which ComEd buys power for its customers who have not switched to alternative suppliers. Since the responsibilities for distributing electricity and generating electricity are now split, the benefits of reducing electric use are likewise split between the local infrastructure costs, and the costs of the actual power itself. This may mean that finding benefits for local residents and businesses will require combining pricing programs for power with locally based incentives from the distribution system.

The Sustainable Energy Plan

In February of 2005 Governor Blagojevich announced the Sustainable Energy Plan Initiative. This initiative proposed to cut the rate of growth of electrical consumption in Illinois and to create a renewable portfolio standard to encourage the use of renewable resources to generate electricity, such as wind and solar. Over the spring and summer the ICC held workshops to discuss the plan and in the fall of 2005, the two largest utilities in Illinois, ComEd and Ameren, were developing plans for implementing programs to address these goals. Cutting the rate of growth of electrical consumption is exactly what the Kane County Energy Solutions Plan envisions for Kane County. Reducing growth at a more aggressive rate than the Illinois Sustainable Energy Plan (as proposed in this plan) will have a positive impact on future infrastructure investments. While these plans are still in development, funding from ComEd's implementation of the Sustainable Energy Plan could be available starting in 2007 for projects in Kane County that cut energy demand. It is unclear at this time if that funding could be used in areas served by municipal utilities.

Local Issues

Municipal Utilities

The three cities with municipal electrical utilities are fairly built out, and have distribution systems that can handle local demand. The challenge facing these three cities is not how to maintain and expand their local infrastructure, but rather the acquisition of power to serve their customers. All three cities will have new power contracts starting in 2007 and it is likely that managing peak demand will be one way to reduce the costs under those new contracts. Therefore there will be some alignment between the needs of the municipal utilities and the need of the rest of the county to reduce the growth of peak demand.

Building Codes

Building codes are the key municipal tool to shape energy use in new development. As described elsewhere in this plan, many of the municipalities in Kane County do not have an energy component in their building code. Adopting and updating building codes may be a challenge for some of the smaller communities where large growth is expected but resources needed for code development are not available. Funding support from various state level programs may be needed to assist in this local issue.

Community Involvement

While this plan focuses on the county level, there have been several recent local initiatives that tie into this plan's goals. The Cities of Batavia, Geneva and Elgin have all formed various types of groups to look at local energy issues. With rising energy costs making energy a more and more visible issue, these local efforts provide an opportunity to engage the residents of Kane County on the broader issues affiliated with this plan.

Appendix F: Action Projects References and Resources

Alliant Energy
4902 N. Biltmore Lane
P.O. Box 77007
Madison, WI 53707
(800) 255-4268
www.alliantenergy.com

Building Codes Assistance Project
Central Office
241 Angell Street
Providence, RI 02906
www.bcap-energy.org/home.php

Community Energy Association
#85 - 10551 Shellbridge Way
Richmond, British Columbia V6X 2W9
CANADA
(250) 598-4034
www.energyaware.bc.ca/welcome.htm

Community Energy Workbook
by the Rocky Mountain Institute
1739 Snowmass Creek Road
Snowmass, CO 81654
(970) 927-3851
www.rmi.org

Energy Trust of Oregon
851 SW Sixth Avenue, Suite 1200
Portland, OR 97204
(866) 368-7878

Humboldt County Energy Report
by the Redwood Coast Energy Authority
427 "F" Street, Suite 236
Eureka, CA 95501
(707) 269-1700
www.redwoodenergy.org

Illinois Department of Commerce and Economic Opportunity
Bureau of Energy and Recycling
620 East Adams Street
Springfield, IL 62701
(217) 785-3416
www.commerce.state.il.us/dceo/Bureaus/Energy_Recycling/

Illinois Sustainable Education Project
620 East Adams Street
Springfield, IL 62701
(217) 785-7440
www.commerce.state.il.us/dceo/Bureaus/Energy_Recycling/Education/ISTEP_program.htm

Iowa Association of Municipal Utilities
1735 NE 70th Ave.
Ankeny, IA 50021
(515) 289-1999
www.iamu.org

Midwest Energy Efficiency Alliance
One East Erie, Suite 200
Chicago, Illinois 60611
(312) 587-8390
www.mwalliance.org

National Association of Home Builders Research Center
400 Prince George's Boulevard
Upper Marlboro, MD 20774
(800) 638-8556
www.nahbrc.org

Nevada Energy Efficiency Strategy
by the Southwest Energy Efficiency Project
2260 Baseline Road, Suite 212
Boulder, CO 80302
(303) 447-0078
www.swenergy.org

Osage, Iowa Municipal Utilities
720 Chestnut Street
Osage, IA 50461
(641) 832-3731
www.osage.net

Portland Community Energy Efficiency Program
City of Portland, Oregon, Office of Sustainable Development
1120 SW 5th Ave., Room 706
Portland, OR 97204
(503) 823-7222
www.ci.portland.or.us

Seattle City Light
P.O. Box 34023
Seattle, WA 98124
(206) 684-3000
www.pan.ci.seattle.wa.us/light/conserve/

State of Texas Energy Conservation Office
111 East 17th Street, #1114
Austin, TX 78701
(512) 463-1931
www.seco.cpa.state.tx.us/

United States Department of Energy
1000 Independence Ave., SW
Washington, DC 20585
(800) dial-DOE
www.energy.gov

Wisconsin Energy Conservation Corporation
211 S. Paterson Street, 3rd Floor
Madison, WI 53703
(800) 969-9322
www.weccusa.org/

Xcel Energy
414 Nicollet Mall
Minneapolis, MN 55401
(800) 328-8226
www.xcelenergy.com