City of Lexington and Fayette County

Empower Lexington

A Plan For a Resilient Community

www.lexingtonky.gov/energy

2012

livegreenlexington

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Letter to the Lexington Community---

Lexington, renowned as the "Horse Capital of the World," is one of the most beautiful places in the United States, if not the world. The unique blend of sharply defined urban boundaries, tree lined rural roads, horse farms, other crop and livestock farms, palisades, stone fences, and countless other physical and social elements combine to make our community setting unlike any other.

Our community has a long history of taking steps to preserve our unique environment. We were one of the first communities in the country to establish an urban service area which directs growth to a well-defined inner core. And Lexington was the first community in Kentucky to establish a local Purchase of Development Rights program to purchase conservation easements on area farms and to earn the Tree City USA designation. These are just a few examples.

In keeping with this tradition of preserving (our) Lexington, we are now encouraging our community to embark on what may very well become one of our signature accomplishments- becoming a more sustainable and resilient community by becoming more energy efficient. In short we are asking individuals, organizations and businesses to voluntarily reduce their annual energy use by 1% or more per year. These efforts, which we are calling *Empower Lexington*, will save the community money, create jobs by keeping more money in the local economy, position us to be more competitive economically, conserve natural resources, increase our energy independence, create a more livable community, improve public health and make our air and water cleaner.

We recognize that sustainability can mean different things to different people. We believe the best way to define sustainability for Lexington is to use the definition created by the Sustainable Cities Research Institute which states in part—

> *Sustainable communities are defined as towns and cities that have taken steps to remain healthy over the long term. Sustainable communities have a strong sense of place. They have a vision that is embraced and actively promoted by all of the key sectors of society, including businesses, disadvantaged groups, environmentalists, civic associations, government agencies, and religious*

organizations. They are places that build on their assets and dare to be innovative. These communities value healthy ecosystems, use resources efficiently, and actively seek to retain and enhance a locally-based economy.

This definition captures the type of community Lexington aspires to be and is taking steps to become.

"It's extremely difficult to get people to live sustainably. Often they are just concerned with trying to live" - Callum Rankine, WWF

In developing the *Empower Lexington* plan, stakeholders reviewed information for five sectors that they identified as critical if we are to use less energy as a community. These sectors include Residential; Industrial/Commercial/Institutional; Land Use/Food/Agriculture; Transportation; and Waste. They then identified one paramount goal for each of these five critical sectors and provided recommendations and strategies to help our community reach that goal.

As you read this plan, you will note that it is a document of opportunities and possibilities. There are some recommendations and strategies that are bold, some that are more conservative, and some that are either/or choices. There are also some that can be implemented quickly, others that may take some time, and some may not be implemented at all due to unforeseen difficulties. However we believe all are worthy of consideration and each recommendation, if implemented, will reduce our energy use and make us a more sustainable community.

Empower Lexington is a common sense plan for Lexington that relies largely on voluntary measures and public-private partnerships to reduce our energy use. Many of these measures focus on improving energy conservation and energy efficiency. According to Intelligent Energy Choices for Kentucky's Future (November 2008), in 2005 total energy usage in Kentucky was the sixth highest per capita in the United States. In the same year, the average expenditure per Kentuckian on energy was $4,084, ranking the state ninth nationwide even though we ranked 45th nationwide in energy prices (dollars per million Btu). This discrepancy underscores the fact that Kentucky is an energy-intensive state on a per capita basis. We believe these

numbers demonstrate that there is ample opportunity for energy conservation and energy efficiency initiatives to reduce energy use and save money in Kentucky. Our idea is not unrealistic as the United States has met 77 percent of its new energy demands with energy efficiency since 1970 (Laitner, 2007).

The *Empower Lexington* plan is designed to be flexible. We have included mechanisms for checking progress and updating the plan periodically as it becomes apparent that specific recommendations are no longer valid, as new opportunities arise, and as conditions and technologies change. We view the *Empower Lexington* plan as the first steps in our efforts to become a more energy aware, energy efficient, and sustainable community.

Finally the *Empower Lexington* plan is meant to have an immediate impact and be achievable as evidenced by the reduction target proposed in the plan— a minimum of 1% per year. While meeting this target will be challenging, it is definitely within our community's grasp. And meeting this target and implementing the *Empower Lexington* plan will have big benefits. We'll have a more efficient transportation system, residents and organizations will have the tools and resources they need to help them save money, our community will be managing our waste as a resource and move us closer to realizing our zero waste vision, and our agricultural land and greenspace will be preserved.

The *Empower Lexington* plan will help fulfill Lexington's February 2008 commitment via Council resolution 49-2008 to participate in the International Council of Local Environmental Initiatives Cities for Climate Protection Program as well as the US Mayor's Climate Protection Agreement which Lexington signed in 2005.

The community stakeholders involved in creating this plan acknowledge their support of the recommendations contained within. This plan, the culmination of several years of hard work by these individuals, represents the consensus of the stakeholders groups involved and we hope the community will embrace the plan. We acknowledge the fact that this plan may not be perfect - none are - but it represents an important first step forward for the community in raising our energy awareness. Energy touches all our lives and for the first time we are having a community-wide dialogue about the

amount of energy Lexington uses, the sources and forms of that energy, and how we can become more energy efficient. The *Empower Lexington* plan is opening lines of communication and bringing diverse interests together to work on ways we can improve our community.

In Lexington many individuals, companies and organizations have been working to become more energy efficient for some time now. As an example, the LFUCG recently hired our first ever Energy Manager, purchased robust energy management software for our buildings, and established an internal Energy Improvement Fund to allow us to reinvest energy savings into future energy improvements. We also have replaced all 10,000+ incandescent traffic signals with energy efficient LED signals

(which saves taxpayers $120,000 annually in electricity costs), have the largest fleet of gasoline-electric hybrid vehicles in the state, and are purchasing biodiesel (B5) for our Division of Waste Management trucks. UK is in the midst of a multimillion dollar building upgrade (performance contract) to make their facilities more energy efficient and is implementing their own campus Empowered initiative. And Fayette County Public Schools is working to reduce energy use at their facilities and to build more energy efficient schools to include the “net zero energy” Locust Trace AgriScience Farm. LexTran now has several diesel electric hybrid buses. Our community is building more energy efficient homes and buildings and creating more bike trails, and many of our residents are taking individual actions to reduce their energy use at home and work. Businesses are becoming more energy efficient “because it pays” by making them more competitive and saving money. Lexington now has a Community Energy Advisor to help residents, businesses, churches and other organizations save energy and money thanks to a DOE block grant- and the list goes on.

We believe that implementation of the *Empower Lexington* recommendations will allow us to build on these efforts and will result in a more sustainable community. We are confident that this is a worthwhile effort and hope that the community will join

us in this endeavor. As individual members of this work group, we highly encourage the community to embrace the *Empower Lexington* plan and we pledge to actively engage our respective organizations and constituencies in helping implement this plan.

--- Sincerely *Empower Lexington* Members

EXECUTIVE SUMMARY

Across the country, a growing number of communities are developing and implementing plans such as *Empower Lexington* to help provide a competitive economic advantage, to preserve jobs, to help improve the environment, to help their communities flourish, to improve energy security, and to improve the quality of life for their citizens.

Lexington has never before had a collective plan to become more energy efficient. This is why *Empower Lexington* is so important- particularly in light of rising energy costs, which businesses and residents alike must pay. Plus Kentucky's energy use is projected to grow by slightly more than 40 percent between now and 2025 under a Business-As-Usual scenario (*Intelligent Energy Sources for Kentucky's Future,* November 2008). For example, between now and 2025, according to estimates from the Kentucky Public Service Commission, Kentucky will need an additional 7,000 megawatts of electricity generation. This energy growth encompasses all sectors, including electricity generation, natural gas use, and transportation fuels. Increasing demand for energy and the increasing cost of energy production will increase the price that each of us, business, government, and individuals alike, must pay. This is one reason why energy efficiency makes good economic sense.

Developing *Empower Lexington* was a multiyear effort that began in earnest in July 2009. During the process almost 75 stakeholders representing a large cross section of our community were invited to serve on a steering committee and one of five subteams, with the goal being to draft a plan *(Empower Lexington)* to reduce Lexington's energy use and associated greenhouse gas emissions that could be presented to the community for consideration.

We feel that it is important to note that this plan was developed at minimal cost to the city largely through the generosity of local stakeholders providing their time and talent. This is a testament to the importance of this issue and the commitment of the individuals and organizations involved.

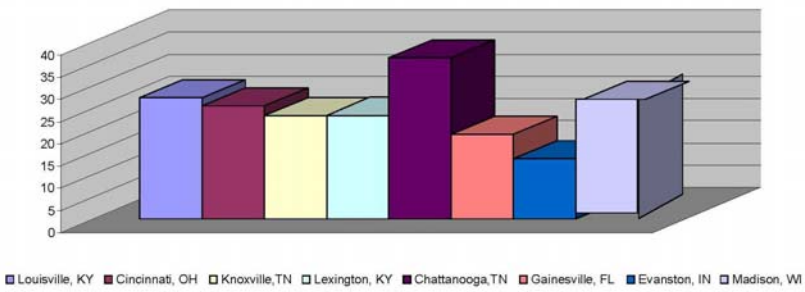
There are recommendations in this plan in five distinct areas: Residential; Industrial/ Commercial/Institutional; Land Use/Food/Agriculture; Transportation; and Waste. Where practical, the emissions reductions expected to be realized should the recommendations be successfully implemented have been calculated and are presented herein.

As part of this effort, we also completed a Lexington-Fayette County "baseline" inventory for

our community for calendar year 2007 (our baseline year) to get an idea of how much energy our community uses and the quantity of resulting greenhouse gas emissions we generate. The inventory was conducted using the most commonly used software protocol for calculating community fossil fuel emissions in the U.S. Our baseline inventory was a complete inventory in that it included all sectors (commercial, residential, industrial, transportation, and waste).

The results of our baseline inventory were enlightening. We discovered Lexington's carbon footprint is much lower comparatively than the May 2008 Brookings Institute *Report Shrinking the Carbon Footprint of Metropolitan America* suggested. The community likely recalls that the Brookings report concluded that the Lexington Metropolitan Statistical Area (MSA) had the highest carbon footprint per capita of the 100 municipal areas studied based on data from 2000 and 2005 calendar years. It is important to note that the Brookings report was a partial study that considered residential building emissions, emissions from personal transportation and emissions from freight transportation on highways. Carbon emissions from commercials buildings, industry and other modes of transportation were not considered in the Brookings report, although these sources account for roughly half of national emissions.

What we have found through our emissions inventory is that at 23.4 metric tons of carbon dioxide equivalent per person per year our carbon footprint compares favorably to many cities both here in Kentucky and in the United States. But we can do better.



Per Capita GHG in metric tons

City	Year inventoried	Per capita result
Chattanooga, TN	(2006)	36.3
Louisville, KY	(2006)	27.34
Cincinnati, OH	(2006)	25.5
Madison, WI	(1996)	24.9
Lexington, KY	***(2007)***	***23.4***
Knoxville, TN	(2005)	23.3
Gainesville, FL	(2007)	19.1
Austin, TX	pending	unavailable
Fayetteville, AK	pending	unavailable

To challenge and inspire the community to become more energy efficient and to help measure our progress, we developed an energy reduction goal (target) for the community of at least 1% per year, with calendar year 2011 chosen as our reference point (beginning point).

This target is a *voluntary* target. We will measure progress toward this target on a *per capita* basis, meaning that the basis for the target is the total

energy used by our community divided by our population. This per capita approach is the best measure of whether we are actually becoming a more energy efficient community. Since this is a common form of measurement among communities, it will also allow us to benchmark ourselves against other cities on a regular basis. We will also measure our progress toward this target on an absolute basis, to determine whether the total amount of energy our community uses is decreasing.

The approach outlined in this document encourages us to be more energy efficient, which should lower our energy demand, provide cost savings to our residents and allow our businesses to be more competitive.

Responsibilities for implementing particular recommendations depend in large part on the specific recommendation– sometimes the local government will be the lead agency, other times there will be public/private partnerships or nonprofits assuming this responsibility, and in still other instances the community may take the lead.

We have included a glossary of commonly used energy terms for the reader's convenience at the end of the document, and also have posted this plan on the LFUCG website at www.lexingtonky.gov/energy.

RECOMMENDATIONS

OVERVIEW

Each subteam developed one overarching recommendation for their respective sector- the "one thing" that is critical to reducing energy use for their sector. This key "recommendation" is presented as the goal for each subteam, with the remaining recommendations/implementation strategies put forth to support this goal. When developing recommendations the subteams and the steering committee endeavored to consider potential monetary costs or savings, energy savings, emission reductions, time frame needed to implement a particular recommendation, and likelihood of success when considering whether to include a recommendation in the plan.

Details and context for these recommendations can be found in the specific sector discussions which follow. Additional details on many of the individual recommendations are available but were excluded in this written document for brevity- this info can be found on the LFUCG website noted above and on the cover of this document.

RESIDENTIAL SECTOR RECOMMENDATIONS

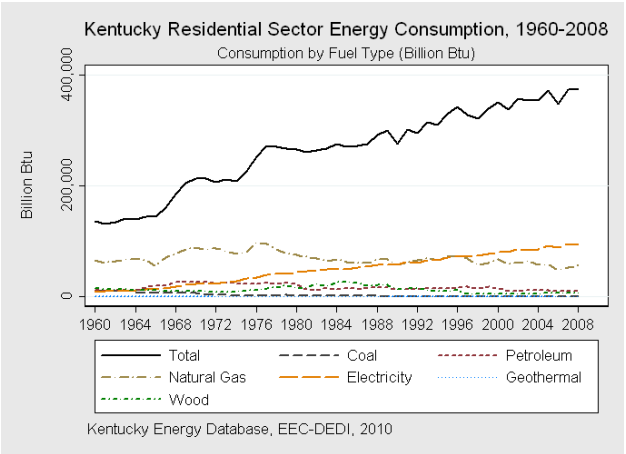
Goal– To provide residents with the resources and knowledge needed so they can live more sustainably, save energy and save money.

According to the Kentucky Department for Energy Development and Independence (DEDI) *Kentucky Energy Profile for 2010*, the residential sector uses 19% of the total energy consumed statewide and this sector consumes nearly 30% of all electricity and 24% of all natural gas used annually in Kentucky. Locally, our 2007 emissions inventory showed the residential sector used 40.2% of the electricity used in the county and generated 28.4 % (1,850,553 metric tons) of all greenhouse gas emissions in Fayette County,

As a state, the Commonwealth has the fourth lowest average electricity rates in the nation, an economic advantage. However these low rates likely contribute to the fact that Kentucky ranks high nationally in terms of per capita (per person) electricity consumption.

Within Fayette County, the average residential electric bill for 2009 was in the range of $90 to $100 dollars per month and the average residential rate ranged from 7 to 8 cents per kWh (electricity rates in Kentucky are billed in terms of cents per kilowatt hour of electricity consumed).

In regards to natural gas, consumption for all purposes —residential, commercial and industrial— in Kentucky places the state 27th among all 50 states, or about average. Consumption of natural gas for Kentucky residential customers alone ranks 25th among all states, again about average. In 2008 the average cost of natural gas in Kentucky was $10.14 per mcf (1,000 cubic feet). In contrast to 2008 costs, the average cost of natural gas for residential customers in Fayette County in 2011 was $5.51 per mcf. With Fayette county residential customers using an average of 6 mcf per month, the average natural gas commodity cost per month in Fayette County in 2011 was approximately $34.00.



In developing *Empower Lexington* recommendations, the residential sector subteam spent a significant amount of time identifying ways to provide residents with the tools and resources they need to become more energy efficient. In addition, this group concluded energy efficiency is a variable that is often overlooked in determining a home's worth and that key entities such as home builders and remodelers, real estate agents and

financial institutions should be educated on the value of energy efficiency. The strategies emphasized below are designed to enable Fayette County residents to implement and benefit from best practices which have been proven to work in other areas of the country.

In 2006, Kentucky's electrical use per (residential) customer was 24 percent above the national average, ranking sixth highest.

RECOMMENDATION #1: Increase public awareness of and demand for energy efficiency services and improvements

Investing in your home's energy efficiency takes money. Fortunately, there are a number of programs and incentives in place at the national, state and local level to help residents reduce the amount of energy they use (to include programs sponsored by utility providers). However it is generally recognized that these programs are not used as often as one would expect, which may be attributable in part to a lack of awareness. This recommendation seeks to increase local awareness of and participation in these programs and to encourage homeowners to reduce energy use.

Specific strategies being advocated in support of this recommendation include: (1) developing an overall promotional strategy in support of residential sector recommendations (i.e. continuing the current Community Energy Advisor Program sponsored by the LFUCG); (2) promoting availability of existing federal and state tax incentives, utility rebates, energy efficient mortgage programs, and the KY Home Performance program to homeowners and educating home energy raters, bankers and realtors on these mechanisms to make it easier for homeowners to use these; (3) providing realtor and appraiser education and training on the increase in worth energy efficiency improvements can add to a home's value; (4) promoting energy efficiency competitions between neighborhood associations; (5) encouraging neighborhoods and property management organizations (i.e. landlords) to identify energy improvement opportunities and promote group contracting options as a way to reduce costs; (6) publicizing the value of water conservation in reducing residential water use and cost and reducing both water treatment and waste water treatment energy use; (7) promoting green power generation through participation in green power programs provided by utilities and; (8) discerning and advocating for best practice utility rate structures that incent energy conservation, efficiency and long term cost effectiveness (at the whole system level – in energy production, transmission and use).

RECOMMENDATION #2: Develop and promote systematic and professional "whole house" retrofit awareness and infrastructure.

"Whole house" retrofits are being seen as increasingly critical to reducing a home's total energy use. When performing whole house retrofits, the entire structure is looked at to determine the optimal (most cost effective) energy improvements. Whole house retrofits are often combinations of improvements such as installing insulation, high efficiency HVAC equipment, sealing ductwork, replacing major appliances, upgrading hot water systems, etc. Professional auditors have the skills needed to identify problems and the ability to recommend whole house retrofits.

Strategies our community will employ to support whole house retrofits are to: (1) encourage greater use of professional, independent residential energy audits for homes and multifamily housing; (2) create a green certificate program to encourage local homeowners to achieve recommended standards for air infiltration and insulation levels; (3) promote utility service energy efficiency retrofits that can be implemented professionally across the rate base, regardless of ownership or credit qualifications; (4) involve the real estate and finance industry so that energy retrofits become more commonplace when residential property changes hands or is financed; (5) identify and promote energy efficiency best practices resources (online and in person trainings) to the remodeling and contractor community.

RECOMMENDATION #3: Develop and promote diverse retrofit finance approaches – applicable to the full range of housing types and ownership structures across Lexington.

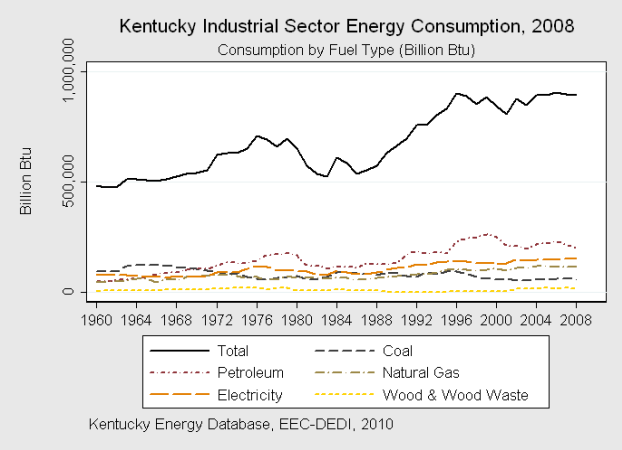
Finding upfront dollars to make energy improvements can be problematic for some residents. Although tax incentives and utility rebates can help offset costs, additional financial help is sometimes needed. This recommendation is meant to promote innovative ways that homeowners may be able to use to finance energy improvements.

To accomplish this recommendation our community should (1) promote establishment and use of innovative retrofit financing mechanisms such as on-bill utility service retrofits funded over time with realized cost savings and PACE (property assessed clean energy) for single and multifamily housing and; (2) promote programs whose aim is to perform whole house retrofits such as the KY Home Performance program.

INDUSTRIAL/COMMERCIAL/INSTITUTIONAL SECTOR RECOMMENDATIONS

Goal– To promote energy efficiency and provide businesses and organizations with the knowledge and tools needed to save energy and money.

The Industrial/Commercial/Institutional subteam focused on the need for the private sector to partner with the public sector and other non-governmental agencies to promote, market and educate members of the community about the benefits and cost-savings associated with energy conservation and energy efficiency programs. The Industrial/Commercial/Institutional sub-team recognizes the importance of energy efficiency as both the demand for and cost of energy are expected to significantly increase over the next ten years. The recommendations offered by the sub-team reflect the opportunities that exist within Lexington's business community to use their resources and provide the necessary promotional and marketing tools needed to see the *Empower Lexington* plan succeed.



Energy efficiency is the easiest, cleanest and cheapest resource available to reduce energy consumption. A sustained energy efficiency program offers balance to energy supply markets by reducing demand, avoiding the need for costly new grid investments (new power plants, transmission lines, etc.), and serves to modernize existing operations, which increases business competiveness in the global free market.

Addressing energy efficiency is not a new concept to the industrial or commercial sectors. From 1970-2007 energy use per sq. ft. has decreased by approximately 28% in commercial buildings and 11% among residential dwellings. The industrial sector has seen substantial gains in efficiency measured as the amount of energy used per dollar of production. It now takes 60% less energy to produce a dollar of output than it did in 1970. Improvements in energy efficiency are a result of improvements in technology; higher energy prices; and areas of public policy (appliance efficiency, building codes, tax credits, etc.)

In 2006, Kentucky's electrical use per industrial customer was 427 percent above the national average, ranking third highest.

RECOMMENDATION #1: Develop Aggressive Marketing Effort

The educational component of the *Empower Lexington* plan cannot be overstated. The more that people familiarize themselves with energy efficiency and conservation programs the more likely they will implement the recommendations contained in the plan. Without the education component for the *Empower Lexington* plan there will be little hope of community-wide success. An aggressive marketing effort can highlight the benefits of energy efficiency, which translates not only to reduced energy consumption, but real cost savings to business owners and consumers. This marketing campaign should utilize print, television, and social media to communicate the benefits of the *Empower Lexington* plan. Marketing efforts should focus on commercial building owners/occupants; small/medium sized manufacturers; churches, and nonprofits. As organizations continue to develop their own energy efficiency programs, the successes of specific programs should be highlighted.

"In the long term, the economy and the environment are the same thing. If it's unenvironmental it is uneconomical. That is the rule of nature" - Mollie Beatty

RECOMMENDATION #2: Develop Educational Energy Conservation Programs

After developing a marketing campaign to explain the benefits of energy efficiency and the cost saving measures associated with it, the sub-team recommends that an energy education and conservation program be developed to assist and inform members of Lexington's business community and other institutional organizations about starting and implementing conservation programs. These educational programs should provide web-based information and updates for easy accessibility to the public. The programs could include: how to perform preliminary energy assessments, places to find help, information on energy incentives, etc.

Additionally we recommend an *Annual Mayor's Energy Efficiency Best Practices Awards* program be created that would serve as a high level demonstration of leadership for energy conservation and sustainability. The program would recognize organizations and designers who completed significant energy conservation projects during the year. Such recognition would serve to help drive the marketing efforts of the *Empower Lexington* plan.

The sub-team also recognized the need to promote and expand energy competitions throughout the Lexington-Fayette County community as part of this recommendation. These competitions would serve to foster innovation and creativity between similar institutions. Interested organizations could track their energy use and compete against similar size or type of buildings and

organizations. Again, this recommendation serves to promote, market, and educate the public and members of the business community about energy efficiency and conservation programs as well as the cost-savings associated with such energy programs.

The final education program under this recommendation is to establish and promote an annual energy fair & green exposition to provide an opportunity for all industry sectors and segments of the Lexington-Fayette County community as well as the Bluegrass Region to meet and exchange ideas and information regarding energy efficiency and conservation programs. Bluegrass GreenWorks has provided leadership in this area in the past, and the subteam recommends that an annual energy fair and green exposition be held to promote innovation and an exchange of ideas for energy programs that offer real energy solutions and cost savings to energy consumers. This annual energy fair and exposition could include educational seminars, vendors demonstrating their programs and products, energy forums, public policy forums, etc.

RECOMMENDATION #3: Distribute Tools to Benchmark Energy Usage

Many mid-size and small entities such as business owners, churches, nonprofit organizations, etc do not have the tools or resources available to benchmark their facility's energy use, nor do they have the capabilities to understand what their energy use means when compared to facilities of similar size. Therefore, the sub-team recognized the need to provide owners and facility managers the tools to benchmark their energy use. Many large manufacturers have already taken this step and now smaller industrial/commercial/institutional businesses and organizations should be equipped with similar tools. These tools will allow other sectors of industry, churches, educational buildings, etc the ability to compare buildings of similar size and function, while affording them the opportunity to see the importance of developing an energy program.

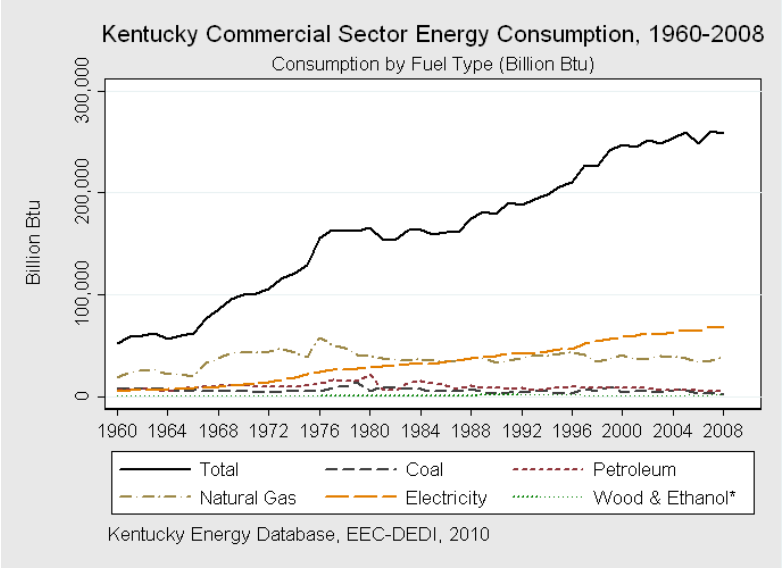
RECOMMENDATION #4: Promote Energy Efficient & Sustainable Building Designs

The Commonwealth of Kentucky's strategic energy action plan, *Intelligent Energy Choices for Kentucky's Future*, states that Kentucky's energy use is projected to grow by slightly more than 40 percent between now and 2025. Recognizing the need to balance pro-growth strategies, while reducing our energy consumption to meet future energy demands,

the sub-team recommends promoting energy efficient and sustainable building designs as a means to meet these goals. By encouraging architects, engineers and building owners to adopt sustainable building designs for new buildings and renovations, Lexington would see a benefit in having more ENERGY STAR facilities within the community. Currently, very few ENERGY STAR buildings exist outside of education and government buildings in the county. There is a real need to educate and encourage implementation of energy efficient and sustainable building designs locally.

RECOMMENDATION #5: Incentivize Energy Improvement for Local Business

While the current economic climate is difficult for local, state and the federal government in terms of revenue, it is also important to recognize that it remains difficult for small and mid-size business owners to operate their businesses given the current economic environment we find ourselves in as a nation. Environmental stewardship and economic sustainability should be complimentary goals for our community. Therefore, the subteam would like to encourage our local government to review, where possible, opportunities to incentivize energy efficiency programs for our local businesses. Providing a financial incentive means local businesses can save money, become more productive and improve competitiveness. As an example, LFUCG could review and provide tax incentives where possible (such as 5 year property tax moratoriums' for property improvements), provide grants, allow taller buildings, waive or reduce permit fees, etc.



Incentivizing energy improvements for business would be beneficial for all levels of government. Our community can encourage Congress to finalize issuance of standards for appliances and equipment, and encourage them to incent states for implementation. We should explore innovative regulatory models that reward efficiency, allow rapid depreciation of capital equipment through federal/state tax codes, and encourage Congress to focus additional resources on DOE's Building Technologies Program. Our community should also encourage Congress to expand the tax deductions created in EPAct 2005 for commercial buildings.

RECOMMENDATION #6: Expedited Local Approval Processes

The industrial/commercial/institutional subteam recognizes the time-sensitive nature of many economic development projects within our community. To encourage and incentivize various industrial sectors and organizations to pursue energy efficiency, the subteam felt that a reasonable recommendation would be to offer an expedited local approval process for businesses or organizations wishing to build or expand their facilities, if the building or expansion meets Energy Star or LEED certification standards. This would be one way no cost way to incentivize energy efficiency.

As an example, if a proposed building or renovation is designed to meet Energy Star or LEED certification standards then the application for building permits and other local approvals could be one-half the normal time frame. This recommendation offers a tangible cost-savings benefit to business owners, while encouraging the expansion and construction of high-performance buildings within our community.

RECOMMENDATION #7: Review Zoning Requirements

The periodic review of our laws and regulations is a practice of good government. The sub-team recommends that any impediments to energy efficiency that are included in current local zoning requirements should be identified, reviewed, and changed where practical.

LAND USE, FOOD, AND AGRICULTURE SECTOR RECOMMENDATIONS

Goal– To preserve and enhance land and Bluegrass soils.

The Land Use, Food, and Agriculture subteam believes that preservation and enhancement of the land and the Bluegrass soils are the primary objectives of this portion of the Plan. Every recommendation in this plan should be considered within the framework of the understanding that our land is our most valuable resource. In reaching this conclusion the subteam considered a variety of information, including the backgrounds and experience of the team members; research reports from governmental, scientific, and advocacy sources; and local surveys and related information. From those sources and discussions the subteam developed the following pillars of understanding.

The Bluegrass Region of Kentucky, which includes Lexington/Fayette County, is unique to any other city/region in the nation that is developing a similar action plan in that most residents agree that our precious bluegrass soils (the land) is our most important resource and that our equine and agriculture industry is irreplaceable and unique to anywhere in the world. In fact, we are a world monument at risk, according to the 2008 World Monument Fund Watch List.

Conservation interests have promoted coordinated growth planning for the central Bluegrass Region of Kentucky on the premise that planning for growth is the key to building and sustaining our community. Countless governmental, private, and non-profit groups, as well as individual citizens, advocate and promote best land use and management practices to minimize adverse impacts on the environment.

To preserve this resource, we must ensure our agricultural and associated industries remain economically viable so rural areas remain capable of agricultural production. If these agricultural interests were to become no longer economically viable, then the likely result would be urbanization

of our farmland. The loss of these agricultural lands would cause a large net increase in the carbon footprint of the Bluegrass region.

> Agriculture is perhaps the most inherently sustainable of all human activities, using natural fertility of the land, sunlight, water and human labor to produce the basic necessities for survival
> - Mark Overton (1999)

It is important to manage land wisely, whether the land is rural or urban. Best management practices that encourage native vegetation and that maintain riparian (stream) buffers enhance environmental quality and promote carbon sequestration whether in the city or in rural areas. Fayette County on the average has less than 20% tree canopy cover. Although many neighborhoods have upwards of 40% canopy cover, there are many that do not. Establishing and maintaining a healthy tree canopy of 40% in residential areas, and 20% in commercial developments would provide a myriad of benefits to all residents.

Like our relationship with the land, citizens of Fayette County also have an important relationship with the foods they eat. By making informed food choices, residents of Fayette County can reduce energy use and the impact of food choices on climate change and carbon emissions, improve personal and community health, build greater food security in the region, promote local agriculture, and enhance environmental and economic health. By becoming more informed about the sources of their foods, the techniques used to produce those foods, and the energy necessary to bring those foods to the table, consumers can make choices that reflect their values.

As stated above land preservation is paramount. With this primary goal in mind, the subteam developed recommendations and supporting strategies that would provide our community with the tools needed to accomplish this. These strategies, if implemented, will increase energy efficiency, improve environmental quality, and promote public health.

RECOMMENDATION #1: Preserve land with vegetative cover, in rural and urban areas, and promote the preservation and expansion of greenspace within Fayette County.

Accomplishing this primary recommendation is a necessary requirement for all other recommendations related to land use. Maintaining forest land as forest land may result in net sequestration of 1.3 tons/acre of CO_2 equivalent, and cropland remaining cropland may result in net sequestration of 0.05 tons/acre of CO_2 equivalent. In addition to sequestering CO_2, preserving

greenspace and vegetated lands is imperative to the agricultural industry, enhances quality of life, improves environmental quality, and provides recreational and alternative transportation opportunities.

Land really is the best art - Andy Warhol

RECOMMENDATION #2: Continue to expand farmland protection programs and explore innovative land preservation and conservation concepts with focus on protection of the unique and precious bluegrass soils.

Protecting farmland from commercial development will enhance environmental quality and will reduce anthropogenic causes of climate change. Fayette County can implement this strategy in several ways. We should focus on protecting our bluegrass soils in planning and zoning, comprehensive planning, and in discussions relative to the expansion of the Urban Service Boundary. Exploring mechanisms to implement the Greenspace Plan would allow our community to preserve and protect areas that have already been recognized for their importance. We can also consider a program to retain rural lands in production by planning for succession in ownership, matching investor groups with agricultural professionals for management. We can increase the demand for infill development within the current Urban Services Area and provide incentives for developers to build well-designed, mixed-use and energy efficient projects inside the city, while preserving our finite Bluegrass landscape on its perimeter.

Infill and redevelopment is a particularly effective method to implement this recommendation. According to the 2009 LFUCG Housing Market Study, over 14,000 residential units could be added if the vacant and highly underutilized land inside the Urban Services Area were committed to increased housing. The 2009 study also estimated that by 2030 there may be demand for over 30,000 new residential units of a variety of types. Estimates of housing demand and potential supply depend in part on new information available from the US Census and on the refinement of planning and other governmental policies. The basic truth remains however that the combination of increased density and development of underutilized land inside the Urban Services Area are key strategies in satisfying our long term growth demands while preserving rural lands. The Brookings Institute, the Urban Land Institute, American Planning Association, and others promote this approach as a tool to effectively accommodate growth while curbing excessive greenhouse gas emissions through the use of mass transportation, mixed-use and energy efficient development, increased density, and preservation of greenspace.

RECOMMENDATION #3: Promote best management practices for agricultural, residential, and commercial areas that maintain vegetation that sequesters carbon dioxide, preserves soil, and reduces surface water runoff.

Best management practices in agricultural areas should include proven techniques such as rotational grazing, no-till planting, no-mow zones in riparian areas, and participation in conservation reserve programs. Planting trees in rural and urban areas is a particularly important best management practice and one that should be heavily utilized by our community. For example, a forested stream-side (riparian) buffer that extends 35 feet on each side of the stream reduces water pollution and, for each 100 feet of stream buffer, could provide from 0.45 to 2.5 tons of CO_2 sequestration each year. Strategic planting of trees, including replacement of street trees, can provide improved temperature moderation, water management, and carbon sequestration. Increasing tree canopy cover by 10%, or 1,400 acres, may yield 97,000 tons of CO_2 sequestered once trees are mature.

RECOMMENDATION #4: Support activities that continue the economic viability of agricultural uses of land in the Bluegrass region.

The Bluegrass and Fayette County are proof that urban growth and agriculture are compatible and more profitable than in many cities/regions in the world. In a recent study Fayette County ranked first in average agricultural sales per farm of 23 similar regions around the country, and the average agricultural sales per farm in Fayette County ranged from 5-11 times greater than all other regions. Additionally, agricultural value per farm in the Bluegrass grew at a rate of 42% from 1997-2002 while similar values in 14 of 23 regions with significant farming operations were stagnant or declining. Fayette County has a diverse base of agricultural crops that includes tobacco, corn, soybeans, hay, and a variety of smaller vegetables and fruits. With regards to production of farm animals, while the equine industry is often the focus of discussion, Kentucky also is the largest cattle-producing state east of the Mississippi River. Recognizing and promoting the value of land used for agriculture will help protect agricultural land from urbanization.

One way to implement this strategy is to develop and promote a regional Buy Bluegrass Campaign that increases awareness of, and demand for, local agricultural food and fiber products, and that advances the systems for the processing and warehousing of local agricultural products. Another is to promote agritourism in Fayette and surrounding counties by supporting agricultural projects that attract, instruct, and entertain visitors and by developing driving, hiking, biking, walking tours and programs, and multi-modal trail systems to (water, hiking/biking, equine) to connect the

public to those projects. An Agritourism Summit could help to develop a plan and promote agritourism with the intent of developing the Bluegrass as the "Napa Valley" for signature Kentucky products such as horses, bourbon, wine, and other Kentucky-grown products.

To increase the use of local agricultural products we should develop a local and regional infrastructure for producing, processing, preserving, and storing locally produced food and fiber while taking advantage of, and promoting, both new and traditional technologies for production of animal and plant-based food and fiber in ways that save energy, reduce greenhouse gas emissions and promote land conservation. Finally, we can promote research, development, and implementation of agricultural-based alternative energy sources, including ethanol, biodiesel, and other biomass resources. These fuel sources may provide double benefit for the Bluegrass because they are not only valuable crops but also may be more energy efficient than fossil fuels.

RECOMMENDATION #5: Promote programs in the schools and in the community to raise awareness of the importance of food choices and how the production of foods can have far-reaching impacts on human health, the environment, and the communities where the foods are produced.

Agricultural operations contribute to greenhouse gas emissions in the United States. For example energy use on farms and in transport releases CO_2. while digestion of food by some livestock and management of manure produce methane, which is a potent greenhouse gas. Just as all foods are not equal with regard to their nutritional value, all foods are not equal with regard to their greenhouse gas production. Even the same type of food may have different impacts depending on the means and location of production. An awareness of the environmental and energy impacts of food production and distribution will allow citizens to make informed choices about the foods they eat.

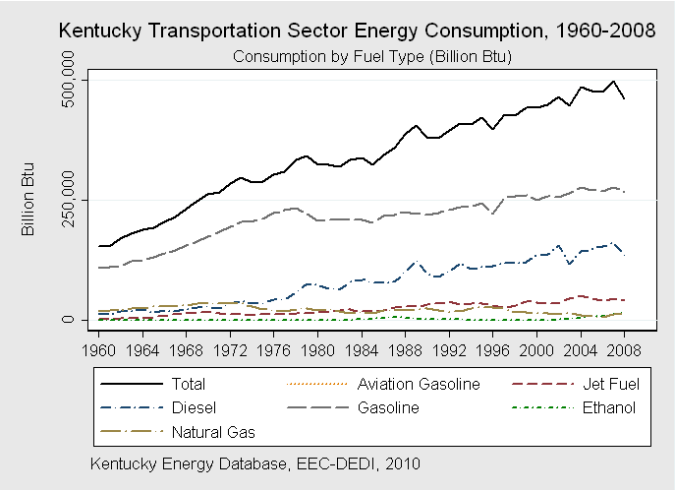
One way to build awareness of food production and the importance of food choice is to promote a community-based, local food system. Such a system could reshape the community's relationship to food and provide substantial environmental, economic, social and health benefits. Public-private initiatives can increase the amount of home-grown and locally-grown food, result in more money remaining in the local economy, and reduce the carbon intensity of the food chain. A newly-formed Bluegrass Regional Food Policy Council could provide a forum for stakeholders from diverse consumer and producer sectors to examine the region's food system and to provide recommendations on how to improve it with regard to human health and nutrition, energy efficiency, and land conservation.

TRANSPORTATION SECTOR RECOMMENDATIONS

Goal– To provide an efficient, interconnected transportation system that improves quality of life, saves Fayette County citizens time and money, and moves people and goods with less energy.

Nationally the transportation sector has been estimated to account for 28% to 33% of total carbon emissions in the U.S. These estimates are "tailpipe" emissions and do not include emissions generated through lifecycle processes such as manufacture of vehicles, the extraction and refining of fuels, and the construction and maintenance of transportation infrastructure. Within the transportation sector, passenger vehicles and light duty trucks are the main source of GHG emissions accounting for roughly 57% of the total. Freight trucks account for an additional 20% nationally.

The transportation sector is also the fastest growing source of carbon emissions accounting for almost half of the growth in US GHG emissions but the recent slowdown in GDP growth and government mandates on fuel economy standards should adjust growth rates downward. (The Transportation Energy and Carbon Footprints of the 100 Largest U.S. Metropolitan Areas, May, 2008, Frank Southworth).



Within Fayette County, we found the transportation sector accounted for 23.3% of our greenhouse gas emissions annually in our 2007 inventory (1,521,039 metric tons).

Transportation GHG reductions have been described as a 4-legged stool and it is prudent to look at each of the four legs if we want to save energy and reduce emissions: (1) raising vehicle energy efficiency; (2) reducing carbon content of fuels; (3) reducing vehicle miles travelled (VMT) and; (4) improving vehicle and systems operations.

National standards have been developed recently which will increase vehicle fuel efficiency to 35.5 mpg for model year 2012-2016 for automobiles and light duty trucks. Additionally, agreements have been reached to almost double fuel economy by the 2025 to an average of nearly

55 mpg. Heavy duty vehicles will also see improved emissions due to new standards- by 2018 GHG emissions will be reduced 17% for diesel heavy duty vehicles and 12% for heavy duty gasoline vehicles.

Use of alternative fuels can reduce carbon emissions. Ethanol blends of 10% added to gasoline (E10) can cut carbon by 2% and by 60% for E85 blends (based on renewable sources). Compressed natural gas can reduce carbon emissions by 25% and electric vehicles can get 65% reductions.

Historical trends have shown that as the national GDP grows so does vehicle miles of travel. VMT increased from approximately 2.1 trillion to nearly 3 trillion between 1990 and 2005. However, VMT growth has occurred at a much slower rate in more recent years. This may be due to a moderation of driver's travel needs, a response to recent fuel costs increases, and/or a reaction to the economic recession. But any growth makes emission reductions difficult. Reducing VMT may require fundamental changes.

Improving vehicle and systems operations means reducing congestion and delay on our existing infrastructure. Techniques such as traffic signal coordination, incident management, intersection design improvements (roundabouts, double crossover diamond, etc.), and variable lane use control can be implemented to reduce delays and congestion and to reduce the amount of fuel our residents use.

Lexington is already employing many strategies to reduce transportation carbon emissions. LFUCG has a fleet of 71 gasoline-electric hybrid vehicles and has 184 vehicles using B5 biodiesel. Lexington continues to expand the bicycle network and operate a carpool and vanpool program. Traffic signal coordination is an ongoing effort and roundabouts have been constructed in 2 locations to improve travel. LexTran ridership has increased over 50% since 2004 and LexTran recently obtained several hybrid buses. The innovative double crossover diamond interchange at New Circle Road and Harrodsburg Road is expected to reduce congestion at this location.

The transportation subteam focused primarily on developing recommendations that reduce GHG emissions by improving infrastructure, reducing congestion, increasing alternative transportation opportunities, increasing the use of alternative fuels such as biodiesel, and promoting more efficient vehicles.

RECOMMENDATION #1: Develop Bike/Pedestrian Programs and Infrastructure Based on the Bicycle and Pedestrian Master Plan

Many daily vehicle trips are short distances that could be accomplished by walking or biking rather than driving. This recommendation emphasizes completing sidewalk and bikeway systems including signed bike routes, bike lanes and trails. It includes planning for walkabilty focusing on density, mixed use, and pedestrian oriented site/street design. Public education and promotion of bicycling/walking is also needed. Improved safety for all modes of transportation through education, enforcement and traffic calming is required.

The Victoria Transport Policy Institute has estimated that if 20% of the shorter trips were done by biking/walking, then the area would have 10-30% less vehicle miles of travel (VMT) and a potential to reduce total carbon emissions by 2-6%. Locally our goal is to double walking trips by 2020 and then nearly double them again by 2030 and to increase bicycle trips at a more rapid rate.

Construction of bicycle and pedestrian facilities can have a significant (financial) cost. To dedicate resources to these types of facilities requires sustained public & political support and a willingness to impact vehicular travel in some cases.

RECOMMENDATION #2: Increase Transit Service and Coverage

In the February 2011 State of Green Community Survey, respondents were asked to identify the one thing to make Lexington more attractive for retirees. Public transportation was ranked 5th by respondents. Additionally, public transportation connecting Lexington to surrounding cities and towns was ranked as the second best “great idea” to move our community forward.

Other cities of similar area and population often have higher transit ridership than Lexington but this is likely due to the fact that these communities have invested more resources in their transit system.

This recommendation would reduce vehicle miles of travel from single occupant vehicles by increasing local transit service levels and coverage. Examples of increased service levels include expanding the number of areas with access to buses as well as providing more frequent service such as 15 or 30 minute “headways” rather than 30-60 minute headways. A headway is a

measurement of the time between vehicles in a transit system and reducing headways can significantly increase ridership levels. Offering incentives for using mass transit can also increase ridership. Discount passes or reduced fare options can attract more participation. The Center for Clean Air Policy uses a rule of thumb that a 1% increase in service levels increases ridership by 0.5%. LexTran expects 1-2% annual growth in ridership and its 2030 Transit Plan recommends a 62% increase in service.

In addition to transit service within Fayette County, residents of the area have recognized the need for public transportation connecting surrounding counties to Lexington. Census data has shown large numbers of people commuting daily between Fayette County and adjacent counties. Capturing those trips with a reasonably priced public transit system would remove many single occupant vehicles from area highways, reducing congestion. This recommendation supports efforts to provide robust intercity bus/rail service in central Kentucky including connections to surrounding counties, Frankfort, Louisville and Cincinnati.

Some of the daily cross-county commute trips are being accommodated through the LexVan program and other public transit authorities such as Kentucky River Foothills. However, this recommendation encourages a broader, more comprehensive program involving additional parties (KYTC, LexTran, private other public transit authorities such as BUS, and FTSB).

RECOMMENDATION #3: Promote Ridesharing- Regional Carpool/Vanpool/School Pool and commute Trip Reduction Marketing.

This recommendation would increase vehicle occupancy through ridesharing and reduce total number of trips through commuter trip reduction strategies.

As more people share rides, the fewer single occupant vehicles will be traveling on our roads which will also result in less vehicle miles of travel. A rideshare program can include the traditional ride matching services along with a website or message board for coordinated rides. Incentives such as designated rideshare parking, preferential parking, and guaranteed ride home programs improve participation. Marketing efforts include new employee orientation, event promotions, and publications.

Drive by any Fayette County school in the morning and it is obvious congestion occurs as parents drop students off. It has been estimated that 7% to 15% of school VMT can be reduced through a school carpool program. A school pool program would match parents at private schools

or students that don't meet busing requirements with others in the area to share rides.

The LFUCG vanpool program currently has a waiting list of people wanting vans to commute to/from Lexington. The goal of this recommendation would be to expand the Vanpool program and double participation by 2030. Similarly, the Ride-matching program goal would increase participation by 50% by 2030. A School pool program goal would be to reduce school vehicle traffic by 50% by 2030.

This recommendation will also encourage flexible work schedules such as telecommuting (working at home) and 4-day work weeks. Other strategies could include job sharing and a live-where-you-work program to promote short commutes. By reducing the number of daily commuters or shifting commute trips to shorter distances or off-peak times, roadway congestion is reduced making for a more efficient transportation system. A program administered by LFUCG or other regional agencies would reach the public through marketing and incentives.

RECOMMENDATION #4: Develop an Eco-driving Program

An amazing amount of vehicle operating efficiency can be realized in the way we drive and maintain our cars. Eco-driving basically means getting the best mileage out of your vehicle and includes simple steps such as minimizing idling, avoiding rapid starts and stops, and properly maintaining your vehicle. This education and outreach initiative is designed to encourage our community to decrease the amount of fuel we use by voluntarily improving driving habits. Drivers who practice moderate levels of eco-driving typically see an increase of 15% in mileage per gallon of fuel used.

LFUCG and other area agencies such as Bluegrass Partnership, Bluegrass PRIDE, and area businesses would develop a program of education and outreach that can be done primarily through existing staff/avenues. This effort would include such marketing actions as PSAs, website and social media development, and competitions. EcoDriving USA™ is an existing nationwide program/initiative that we can join at no cost.

RECOMMENDATION #5: Pursue Energy Efficient Highway Infrastructure and Congestion Relief Strategies

Providing the most efficient transportation system possible is another tool to use to save energy and cut pollution. By constructing roundabouts and other congestion relief solutions at suitable high delay intersections and by using Intelligent Transportation System (ITS) methods

(coordinated traffic signal systems, cameras, and communication) we can maximize system efficiency. Lexington should consider innovative designs (roundabouts, double crossover diamond, etc.) for all intersections under review for traditional treatments (signals, stop signs, etc). The Division of Traffic Engineering is currently exploring adaptive signal control technology which adjusts the timing of lights to accommodate changing traffic patterns and is developing policies regarding placing signals on flash during off-peak travel times and decommissioning traffic signals where warranted. Other techniques to be employed through highway infrastructure program include requiring the use of alternative fuel in highway construction contracts and increasing the use of warm mix asphalt (WMA) which results in lower emissions. These should be considered with each highway construction contract. Although some of these methods have higher initial costs, the community gains in the long run with reduced delays, reduced fuel consumption, and cleaner air.

RECOMMENDATION #6: Encourage Low Carbon/Alternative Fuels and Infrastructure

The type of fuel used by vehicles impacts the amount of pollution generated. Currently, gasoline and diesel are the overwhelming fuel source in the U.S. and in Lexington. However, several types of alternative fuels are being used and developed. This recommendation encourages the use of alternative fuels to power vehicles and equipment. Alternative fuels include: biodiesel, propane, compressed natural gas (CNG), electric and hybrids. Large fleets are often the first to initiate alternative fuel use but the public may adopt it as infrastructure and availability expands.

LFUCG is currently using a (B5) biodiesel blend for 184 vehicles and has a large fleet of hybrids. Local government is also looking at other alternative fuel sources such as propane, CNG and electric. Other large fleets such as LexTran, UK, Fayette County Schools and the Bluegrass Airport have explored use of alternative fuels and should be encouraged to continue. However, fuel cost, availability, and infrastructure are issues that may need to be addressed.

In the long term, electric or fuel cell technologies are seen as the most promising technologies for reducing our reliance on imported petroleum and for reducing carbon emissions.

RECOMMENDATION #7: Promote Energy Efficient Vehicles by Replacing, Retrofitting, Repowering, and/or Right-sizing

This recommendation seeks to improve the efficiency of (fleet) vehicles by: replacing conventional vehicles with alternative fuel technology (LexTran hybrid buses/support vehicles, LFUCG/Police hybrid vehicles); retrofitting current vehicles with cleaner technologies (diesel

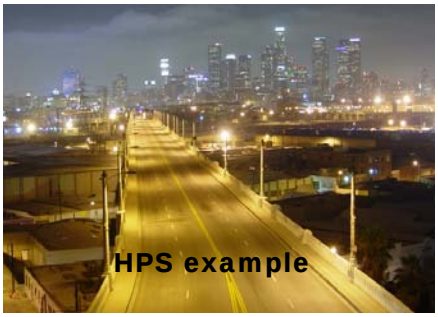
particulate filters/diesel oxidation catalysts, aerodynamic retrofits, low-rolling tires, etc.); repowering vehicles by replacing older diesel engines with cleaner burning equipment; and/or right-sizing vehicles by matching duty requirements with appropriate vehicle class and size.

Retrofitting and repowering existing vehicles can be expensive so many fleets are pursuing this strategy through normal operations and fleet turnover. In addition, new federal fuel economy standards will reduce carbon pollution by 21% by 2030.

RECOMMENDATION #8: Pursue Smart Streetlights; Remove Streetlights; Reduce Hours of Operation

This recommendation proposes to save money and reduce energy consumption and associated carbon dioxide emissions generated by streetlights in our community by ensuring lighting levels are appropriate and by employing advanced (solid state) lighting technologies to include LED technology.

It is recommended that all high pressure sodium (HPS) streetlights be replaced with solid state lighting technologies (LED) as conditions and resources allow. LED lights use less energy and last longer but are more expensive to purchase. However, costs continue to decrease as more municipalities switch. Currently, Lexington has approximately 30,000 streetlights which are owned by utility companies. LFUCG pays a monthly fee for use of the pole, fixture, and energy. Installing LED streetlights could double current costs (compared to HPS) if the utilities retain ownership.



LFUCG should investigate whether transferring ownership of streetlights from the utility companies to the LFUCG would be beneficial at some future point in time- this option would have to be approved by all parties involved and the Public Service Commission. Our community (in coordination with the utility companies as necessary) should also take steps to ensure lighting levels are appropriate so that light pollution, light trespass, and wasted lighting are reduced. Turning streetlights off from midnight to 5 am would save almost as much energy as converting to LED lights so this option deserves consideration. Also, the possibility of turning off midblock lights in select areas should be investigated. These lighting reductions need public acceptance since perceived safety concerns may need to be addressed.

WASTE SECTOR RECOMMENDATIONS

Goal- "Lexington should pursue a zero waste vision."

This subteam reviewed available information on the composition of our community's waste stream to try to determine where we should focus our efforts. The bulk of this information was obtained from Lexington Annual Solid Waste Reports and the waste audit completed as part of the *Master Plan for the LFUCG Recycling Center* prepared by Gershman, Brickner and Bratton (GBB) in 2009. These reports provide a good snapshot of the waste our community currently generates and how this municipal solid waste (or MSW) is currently being managed.

Our community disposed of over 324,000 tons of waste in 2010. Based on the GBB Waste Audit, trash from single family residences accounts for the largest percentage (31%) followed closely by commercial (28%), industrial (23%), multifamily residences (10%), and construction and demolition debris (6%). In regards to the materials themselves, four materials comprised the majority of the waste stream- paper (24%), organic material (23%), construction and demolition debris (21%), and plastic (11%). The GBB report estimated that the vast majority, almost 80%, of the aggregated municipal solid waste stream could be diverted from the landfill and recycled, composted or otherwise reused.

When developing recommendations the Waste subteam developed common pillars of understanding that all members could agree on to help guide the subteam. One of the key pillars was the belief that our community needs to view the waste we generate as a resource and find ways to manage this resource so that future generations are not deprived of an equitable share in this resource. In short, throwing away unwanted materials which then end up in landfills is no longer good enough.

This is particularly true for Lexington. There are currently no operating municipal solid waste landfills in Fayette County- all of the community's municipal solid waste (trash) that is not recycled, composted, or disposed of in Fayette County construction, demolition and debris (CD&D) landfills is transported out of the county for disposal. Additionally the CD&D portion of LFUCG's Haley Pike landfill closed at the end of 2011 due to reaching capacity, further limiting disposal options.

> Don't throw anything away. There is no 'away' - Royal Dutch Shell advert (2007)

This subteam also recognized that reducing the amount of waste disposed of in landfills can significantly reduce the amount of energy used by our community and the amount of greenhouse

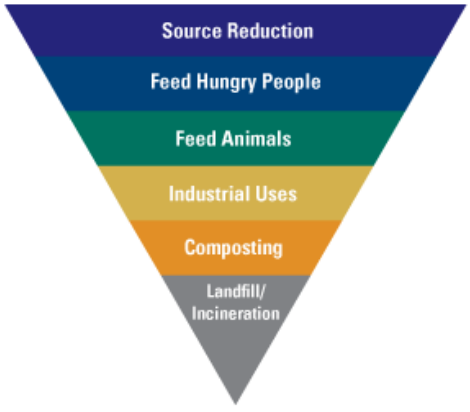
gases generated. Doing so reduces the amount of energy used in transporting trash, the generation of methane (a potent greenhouse gas) at landfills, and in many cases the amount of energy needed to manufacture new products.

Plus it can have a big impact on our local economy. In Fiscal Year 2011 (July 2010 – June 2011) Lexington recycled 25,000 tons of material, generating about $2.4 million in revenue. Recycling also saved the city about $700,000 in landfill fees during this period.

One of the best examples of this is probably found in the recycling of aluminum beverage cans. Recycling of aluminum is a huge economic engine in Kentucky. Aluminum related industries employ over 17,000 workers in Kentucky and they add over 740 million dollars to the state's economy each year. Secondary (recycled) aluminum is the primary source of aluminum for these industries. Indeed a third of all aluminum beverage cans produced in America are produced right here in Kentucky. And it takes 90% less energy to produce a can from recycled cans than from virgin material. Yet nationally nearly half of all aluminum cans produced are still being thrown away in landfills each year. At our own recycling center, recycling aluminum beverage cans results in almost a half million dollars in revenue for the LFUCG annually.

Another pillar was the conclusion that the community should strive to use the EPA "waste hierarchy" and "food hierarchy" pyramids to ensure "wastes" are used in the most beneficial way possible by and for our community.

Waste Management Hierarchy



EPA Food Management Hierarchy

In regards to actual recommendations, *the paramount recommendation this subteam arrived at was that Lexington should pursue a zero waste vision*. This "umbrella" recommendation is already a stated goal of the LFUCG Division of Waste Management.

Our community as a whole paid over 11 million dollars in landfill disposal (tipping) fees in 2010. Lexington, like any community, could benefit from having this money to reinvest in our local economy.

We realize that achieving a true zero waste future will be difficult and some may argue will not be feasible at all. However pursuing this vision will definitely allow us to reduce the amount of waste we generate, to increase reuse of materials, to increase recycling and composting, and to find beneficial uses for materials that we are currently landfilling. And as technologies improve and/or the value of recovered materials increases, a zero waste future may actually be within reach. Pursuing this vision will require that Lexington evaluate how wastes are being managed, develop infrastructure where needed, articulate this vision to the public and educate the public on ways they can help our community achieve this vision.

All the remaining recommendations support this zero waste vision- mainly through source reduction, reuse, recycling, obtaining energy from waste, and diverting materials from the landfill.

RECOMMENDATION #1 Develop a comprehensive program to promote beneficial use of organic waste material.

Organic waste is basically anything that comes from animals and plants that is biodegradable (such as food waste). Organic materials—comprised of yard trimmings, food scraps, wood waste, and paper and paperboard products—are the largest component of our trash and make up more than two-thirds of the solid waste stream nationally according to the EPA. Communities across the country are working hard to minimize the amount of organic waste being landfilled. Lexington has several ongoing programs (to include several pilot programs) designed to keep some of this material from being landfilled.

Under this recommendation, these efforts would be expanded/enhanced to increase the amount of organic material being beneficially reused. These steps include increasing organic

composting at the home, business and municipal level, increasing restaurant participation in composting programs, reducing kitchen waste, and distributing excess food. Benefits include reduced landfilling of waste, possible reduction in transport costs, promotion of community gardens, minimizing of fats oils and grease issues, etc.

RECOMMENDATION #2 Increase diversion of materials from landfills

This recommendation proposes that our community pursue opportunities to reduce the amount of material being landfilled. Potential opportunities described below include finding beneficial uses for construction and demolition debris (CD&D), establishing a mattress recycling program, establishing yard waste convenience centers to increase composting, increasing recycling of scrap metal, beneficially using biosolids from LFUCG wastewater treatment plants, and increasing the amount of bedding material (horse muck) being beneficially used.

Approx 20,787 tons of CD&D materials were disposed of in Haley Pike CD&D landfill in 2009 with materials such as roofing shingles, brick/concrete/rock, dirt/sand/gravel, and lumber accounting for 82% of this total. This recommendation would develop programs to minimize the amount of construction and demolition waste being landfilled in Fayette County through such steps as working with private/nonprofit entities to beneficially reuse CD&D material, educating generators on steps they can take to minimize waste; and by establishing less expensive ways to manage this material. This will become increasingly important locally as the LFUCG Haley Pike Landfill closed at the end of 2011 as scheduled, leaving only one (private) CD&D landfill open in the county.

This recommendation also advocates the community establish a centralized mattress recycling point run by the LFUCG and/or partners. Nonprofit entities could be partners as could for profit entities. Roughly 90% of a mattress is recyclable. LEXCALL received 2136 calls for mattress pickup in 2010 and approximately 1.5% of the total waste going to the CD&D landfill from Fayette County consisted of mattresses according to the 2008 GBB waste study. Equipment costs for such a program are estimated at $200,000.

Establishing yard waste convenience centers would reduce transport, preserve landfill space, and increase composting. The GBB waste study showed that 5% of Fayette County's yard waste is still being landfilled. This is probably a matter of convenience, since it is cheaper to "dispose" of this material at Haley Pike Landfill compost pad than to pay $52/ton at transfer station. Establishing yard waste convenience centers that allow this material to be managed more easily should reduce the amount of yard waste being landfilled and result in lower "disposal" costs to

businesses.

The GBB Waste Audit indicates 4.6% of City's aggregate waste stream was metal (equivalent to approximately 21,000 tons). To increase recycling of scrap metal, we propose an effective outreach program be developed specifically targeted to increase metal recycling in our community. Recycling metal reduces greenhouse gas emission and uses less energy than the production of metal from virgin ore. The amount of energy saved differs by the metal being recycled, but can be up to – 92% for Aluminum – 90% for Copper – 56% for Steel. This outreach program would endeavor to create an awareness of not only the impact recycling metal has on the environment, but the profit that can be generated from taking metals to a recycling center and the wide array of items that are commonly accepted. Increased recycling will result in profits for businesses and the LFUCG recycling center, provide aluminum for Kentucky's secondary aluminum industry (which employs over 17,000 employees), reduce landfilling of waste, and possibly reduce landfill and transport costs.

This recommendation also advocates that our community identify and support optimal ways of managing biosolids that reduce transportation and disposal costs and associated emissions and find ways to beneficially reuse this material if possible. Approximately 43,000 tons of biosolids generated during the sewage treatment process are transported to a landfill and disposed of annually at a cost to the community of approximately one million dollars per year. Currently the LFUCG Division of Water Quality strives to reduce the water content of biosolids, which reduces hauling and disposal costs as a best management practice. However if a beneficial use could be found (such as creating a soil amendment like the Metropolitan Sewer District or MSD has done), this could ultimately reduce these annual disposal costs significantly. It is recognized that this could require a significant monetary investment and that this option would also be highly dependent upon KPDES permit conditions that drive selection of technology at the treatment plants as well as solid waste regulations.

The final component of this recommendation is to increase amount of bedding material (horse muck) being beneficially used. In 2009 10,723 tons of horse bedding were composted in Fayette County. This recommendation seeks to increase the amount of “horse muck” being used beneficially and provide farms with an effective way to manage these types of wastes. Land application to help prevent erosion, composting, and energy production are the three primary usage options. If successful this will reduce landfilling of waste, reduce disposal and transport costs, and generate useful products such as soil amendments.

RECOMMENDATION #3 Energy from Waste- Use waste materials to generate energy

This recommendation proposes that our community investigate and pursue (when warranted) energy from waste opportunities. Energy from waste options may require bundling of different materials and/or regional partnerships to provide sufficient volumes. There are several possible opportunities worthy of investigation to include using grease to produce energy, using biogas from the sewage treatment plant(s) to create energy, using nonrecyclable materials found in our municipal waste stream to create energy, and using yard waste to produce energy. These are discussed in more detail below.

Using grease to create energy would increase the amount of grease being beneficially reused in Fayette County by taking steps such as establishing community-wide grease collection programs, entering into agreements with vendors, and looking for additional ways to use the grease collected at the treatment plants. Yellow grease consists mainly of cooking/frying oils, and although it can contain food particles it is generally free of impurities and can readily be converted into biodiesel fuel. Brown grease is a mixture of water, oils, grease and other wastes. LFUCG Div of Water Quality indicates the Town Branch Treatment Plant accepted 1,583,315 gallons of grease last year. LFUCG Water Quality has mixed brown grease with sludge in digesters to aid in increased biogas production. Some communities such as San Francisco use fats, oils & grease from wastewater to create fuel for their diesel vehicles. These types of initiatives could be used to power LFUCG diesel fleet, generate money, reduce dependence on foreign oil, and reduce fats oils and grease problems.

Biogas has approximately 60% of the energy value of natural gas. The sewage treatment process at the Town Branch Treatment Plant generates approximately 99 million cubic feet of biogas (predominantly methane) annually which has the potential to be used to generate green (renewable) power. In fact, the Division of Water Quality already uses approximately 37% of this biogas to heat the sludge digesters used in the treatment process at the plant and the remainder is flared. LFUCG is investigating the possibility of using the biogas being flared, a renewable fuel, to create energy. Preliminary analysis looks promising. Other communities are successfully doing this now. If successful this would reduce CO2 emissions by approximately 1,565 metric tons/year according to Climate and Air Pollution Planning Assistant software. Uncertainty about Kentucky Division of Water permit conditions may be biggest obstacle (treatment process changes could preclude this alternative).

In regards to using municipal waste (garbage) to energy opportunities for nonrecyclable

materials, approximately 324,000 tons of waste generated in Fayette County is being landfilled annually. If we combusted all the materials currently being landfilled by Lexington each year for energy recovery, this would reduce CO2 emissions by approx 693,000 metric tons tons/year according to the EPA WARM model. Los Angeles, CA, Palm Beach Co, FL, and San Diego, CA are pursuing this option. LFUCG Department of Environmental Quality and Public Works (DEQPW) is reviewing available technologies and looking at environmental benefits and financial feasibility now through a request for proposals (RFP) process. Energy from waste options may require bundling of different materials to provide sufficient volumes and/or regional partnerships. This type of technology is becoming more common in Europe where heat generated in the process is often used to heat homes via district heating. Potential benefits include generating money and/or saving money, reducing dependence on foreign oil, and helping us reach zero waste goal. Depending on the process selected, the process may be able to produce ethanol which could be used to help power LFUCG gasoline fleet.

Finally, the potential exists to pursue using yard waste to produce energy. This could be an attractive option since we are already collecting yard wastes. Our community collected approximately 57,000 tons of yard waste in 2009 in Fayette County. If a facility that could utilize this material was located close to downtown it could eliminate need to transport material to Haley Pike compost pad. Biomass to energy projects are receiving financial incentives which means we could possibly partner with private firms or entities with large boilers on this type project. If successful this would result in reduced transportation emissions and creation of energy. If this option is pursued the goal would be to use all yard waste generated in the county to produce energy.

RECOMMENDATION #4 Periodically investigate (and pursue if warranted) landfill mining.

This recommendation recognizes that waste is a resource and makes it a goal to recover this material when practical. Landfill mining can be expensive and may not make sense economically at this time, but more and more entities (including private waste disposal companies) are beginning to view waste as a resource and companies are taking a harder look at recovering materials from landfills now with an eye to reusing the recovered material or creating energy from the recovered material. As an example the community of Nantucket is successfully mining their landfill to recover materials and free up landfill space. Ancillary benefits include minimizing LFUCG environmental responsibilities associated with landfills, “freeing up” space in existing landfill cells, supporting our zero waste vision, and possibly creating energy.

EMISSIONS INVENTORY AND FORECAST

As mentioned earlier in the report, Lexington used Clean Air and Climate Protection (CACP) software to calculate emissions for Lexington-Fayette County for calendar year 2007 (the baseline year). This is probably the most commonly used software protocol for calculating community fossil fuel emissions in the US. CACP software calculates both Scope 1 (direct) emissions and Scope 2 (indirect) emissions. Examples of Scope 1 emissions include vehicle emissions and burning of fuel onsite to generate power. Scope 2 emissions examples include purchase of electricity from an off site provider. When making emissions calculations for electricity used by our community, we used emissions based on 2005 EPA Emissions and Generation Resource Integrated Database (eGRID) information for KY which assumes 91% of our electricity is generated by coal. This conservative approach is most representative of our actual fuel mix and provides a more accurate emissions estimate than other alternatives.

The GHGs accounted for in this inventory include carbon dioxide (CO2), methane (CH4), nitrous oxide (N2O), hydrofluorocarbons (HFCs), perfluorocarbons (PFCs) and sulfur hexafluoride (SF6). Reported emissions for all GHG emissions are expressed in metric tons of carbon equivalents (MTCE). MTCE weights each gas by global warming potential (GWP). The Intergovernmental Panel on Climate Change's 2001 Report defines GWP as an index that approximates the warming effect of a given greenhouse gas in today's atmosphere, relative to that of carbon dioxide. The GWP provides a common measure for comparing the potency of all six greenhouse gases. The greenhouse gases included in the City's inventory are described below:

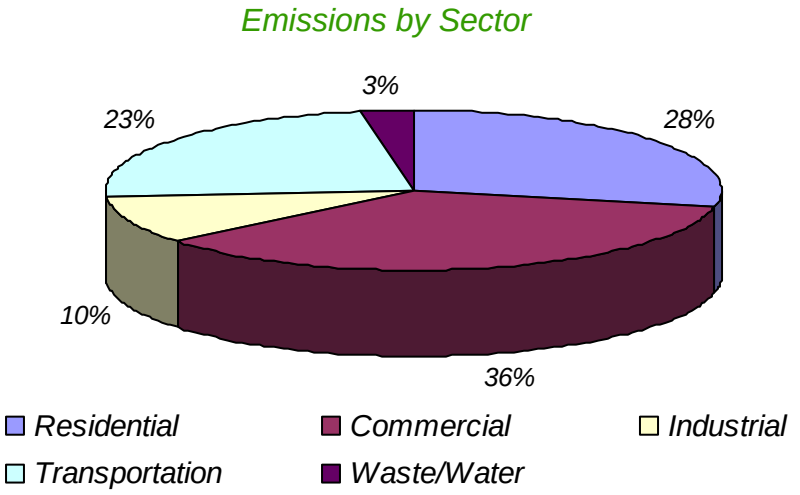
Carbon dioxide (CO_2) is released to the atmosphere when fossil fuels (distillate and residual oil, natural gas, and coal), wood, and wood products are burned. It is the most prevalent of all GHGs, accounting for 82% of total emissions in the U.S. (GWP = 1). Methane (CH4) is emitted during the production and transport of coal, natural gas, and oil; the process of decomposition of organic wastes in municipal solid waste landfills, and the raising of livestock. Methane accounts for 10% of GHG emissions in the U.S. (GWP = 21). Hydrofluorocarbons (HFCs) are gases used as a replacement for CFCs and HCFCs in refrigerant systems. (GWP=140 to 6,300). Perfluorocarbons (PFCs) are produced mainly as a byproduct of aluminum smelting and for some CFC replacements as well as semiconductor manufacturing (GWP = 6,500 to 9,200). Sulfur hexafluoride (SF6) emissions are a result of electricity transformers (GWP = 23,900). Nitrous oxide (N2O) is emitted during on-road transportation, agricultural combustion of solid waste, application of fertilizer and livestock manure management (GWP = 310).

The information on Lexington's energy use needed to run this software program was obtained from various sources. Aggregate information on our community's total electricity usage came from Kentucky Utilities and Bluegrass Energy. Information on natural gas usage was provided by Columbia Gas. Information on vehicular transportation (vehicle miles travelled or VMT) was provided by the Kentucky Transportation Cabinet and then translated into gallons of fuel used. Info on the amount of aviation fuel used came from Bluegrass Airport and information on the amount of waste our community generates came from the Lexington-Fayette Annual Solid Waste Report. Please note that limitations in the data we obtained required assumptions be made in a few areas. Natural gas is not tracked by sector within the county, meaning that we had to "apportion" the percentage of natural gas used by each sector- we accomplished this by assuming Fayette County's use mirrored statewide use. Also the commercial sector includes energy use by 'public' institutional buildings such as LFUCG, UK and the federal government- not just businesses.

We found that in 2007 our community (including businesses, industry, residences, large institutions, waste and transportation) generated approximately 6,523,469 metric tons of CO_2 equivalent emissions. Based on Lexington's population of 278,287 this equated to roughly 23.4 metric tons of CO_2 equivalent per Lexington resident per year. This compares to Kentucky's statewide average of 37.32 tons per capita (for calendar year 2000 as noted in the November 2008 report *Intelligent Energy Choices for Kentucky's Future*). LFUCG emissions were found to be 2% of the community total, which pointedly illustrates why *Empower Lexington* needs to be a community-wide plan if we are to achieve significant reductions. The LFUCG cannot do this alone.

By sector, the commercial sector accounted for 35.3% of total community emissions, the residential sector for 28.4%, the transportation sector for 23.3%, the industrial sector for 10%, and the waste and wastewater sector for 2.9%.

By major fuel, we used 4,612,819,373 kWh (kilowatt hours) of electricity which accounted for 66.4% of community emissions, approximately 92 million gallons of petroleum (including that used in interstate travel within Fayette County) which accounted for 23.3% of our emissions, and 7,570,979 mcf (thousand cubic feet) of natural gas which accounted for 7.8% of community emissions.



In forecasting future energy use and emissions, US Census projections are the main tool we have to project (forecast) likely increases. By using projected population growth and the per capita CO_2 emissions as determined by our 2007 baseline inventory as well as the percentage of emissions that each sector generated in 2007, we were able to estimate future emissions under a "business as usual" scenario. We chose to forecast emissions for years 2015 and 2025 using Lexington's anticipated population for these years as forecasted by the US Census Bureau. For 2015 our emissions are projected to be almost 7 million metric tons (based on 7.5% population growth) and for 2025 our emissions are projected to be approximately 7,600,000 metric tons (based on 17.5% population growth). Lexington's Inventory and Forecast can be viewed in detail at www.lexingtonky.gov/energy

Lexington was recognized for successfully completing Milestone 1 of the Cities for Climate Protection Program in 2011.

THE PROCESS

Lexington signed the US Conference of Mayors' Climate Protection Agreement in 2005, which is a voluntary agreement that encourages communities to act locally to reduce their energy use and related carbon emissions. To date, Mayors of 1051 communities in all 50 states representing over 88 million citizens have signed this agreement. While this agreement was a good start in that it provided suggestions for employing proven Best Management Practices to reduce communities' use of fossil fuels, it did not contain the technical tools necessary for communities to calculate their greenhouse gas emissions and develop a plan to reduce energy use and related emissions.

So to help us reduce Lexington's emissions, the LFUCG also joined the International Council for Local Environmental Initiatives Cities for Climate Protection Program in February 2008 through Urban County Council resolution 49-2008. Over 230 communities in the US have agreed to participate in this voluntary program so we are in good company. Under this Program, participating communities voluntarily agree to take steps such as improving energy efficiency, promoting alternative transportation, adopting land use policies that reduce urban sprawl, improving the fuel efficiency of municipal vehicle fleets, increasing recycling rates, etc

THE FIVE MILESTONES

Cities that participate in this community-wide Program have five milestones to meet: (1) conducting a baseline emissions inventory and forecast; (2) adopting an emissions reduction target; (3) developing a local action plan; (4) implementing the selected policies and measures (the plan) and; (5) monitoring and verifying the implementation of policies and measures (the plan). This approach of establishing a baseline, setting a goal, creating a plan for improvement, implementing the plan, and measuring success is very similar to business improvement plans you see used across the country.

After Lexington joined the Cities for Climate Protection Program, the Department of Environmental Quality (now the Department of Environmental Quality and Public Works) was given responsibility for spearheading this effort. The first step was to reach out to the community to form a broad-based Team of community stakeholders (a "task force" of sorts) to begin working on the CCP milestones (to include developing a draft local action plan that would ultimately be presented to the community and Urban County Council for consideration). This Team included representatives from

LFUCG, UK, Fayette County Public Schools, environmental groups, environmental consultants, climate action experts, LexTran, utility companies, environmental educators, Bluegrass Tomorrow, Commerce Lexington, US Green Building Council, and others. The Team met for the first time in July 2009 and has been meeting monthly ever since. Decisions made by this Team were reached through consensus whenever possible; in matters where we did not have total agreement, decisions were reached by voting with the majority vote deciding the issue.

One of the first tasks undertaken by this Team was to review the local action plans of comparable communities to get a feel for the way their plans were structured, learn from their experiences, and look for ideas and inspiration for our plan. We selected Austin (Texas), Madison (Wisconsin), Gainesville (Florida), Fayetteville (Arkansas), Louisville (Kentucky), Cincinnati (Ohio), Ann Arbor (Michigan), and Chattanooga (Tennessee).

After the Team completed this review, the Team decided in December of 2009 to form five subteams of stakeholders knowledgeable in specific areas to help develop potential recommendations in these areas. These areas include (1) Transportation, (2) Waste, (3) Residential, (4) Land Use/Food/Agriculture and (5) Industrial/Commercial/Institutional (the sector includes large universities, churches, nonprofits, and government entities). Each subteam, working under the direction of a chairperson (facilitator) that was also a member of the main steering committee team for continuity, developed potential recommendations that were subsequently reviewed for inclusion in the *Empower Lexington* plan by the full team. When deciding whether to include a potential recommendation in the *Empower Lexington* plan, the Team considered potential savings or cost, energy reductions, carbon reductions, obstacles, likelihood of success, and ancillary benefits to the community where information was available.

Additionally while the subteams worked, Department of Environmental Quality and Public Works staff completed a Lexington-Fayette County “baseline” greenhouse gas inventory for our community as mentioned earlier. Staff also developed a forecast of Lexington’s energy use and related emissions for future years based on US Census data, which is helpful in visualizing our community’s energy use and emissions if we do not take action now to reduce emissions. We elected to use calendar year 2007 for our baseline year, as this was the earliest year for which we could obtain reliable utility information. This inventory was conducted using Clean Air and Climate Protection software using available data obtained from utility companies and other sources.

Milestone 2, adopting an emission reduction target for the community, generated a lot of discussion. The Team reviewed reduction targets adopted by other communities, and discussed

many approaches to creating targets which would inspire Lexington to become more energy efficient and reduce emissions. In the end, it was decided that *voluntary* reduction targets made the most sense for our community. As mentioned earlier, energy used per capita (per person) will likely be the best measure of whether we are actually becoming more energy efficient and, since this is a common measurement used by communities, will also allow us to compare ourselves to other communities. We will also track our progress in relation to our community's absolute energy use (i.e. not based on population), which will give us a second way to measure whether we are becoming more energy efficient.

The reduction target chosen by the Team is an annual 1% reduction in our community's energy use or more when compared to the amount of energy our community currently uses. The Team believes this target is ambitious yet achievable. Plus it is easy to communicate.

To help us measure our progress, a greenhouse gas inventory for Lexington-Fayette County will be completed for calendar year 2011 using Clean Air and Climate Protection software (as was done for the 2007 emissions inventory). In effect calendar year 2011 will become our "new" baseline year and the standard for measuring our success.

By adopting the plan and the proposed reduction targets contained in this plan, the Urban County Council will be satisfying both milestone 2 and milestone 3.

Milestone 4, implementing the plan, will be satisfied upon substantive implementation of the recommendations in the plan. This will require the support of not only the stakeholders that worked on this plan but also the entire community.

Milestone 5, monitoring and verifying the implementation of the plan, will be satisfied by periodic reviews of this plan by the stakeholder teams as well as other interested parties. The stakeholder teams will review the Plan every two years (at a minimum) and the results of this review communicated to the public and the Urban County Council. Plus we will quantify our community-wide emissions a minimum of every 5 years using Clean Air and Climate Protection software..

OUTREACH AND COMMUNITY INVOLVEMENT

Once a draft plan was created, the plan was posted on the LFUCG website as well as various stakeholder websites in November 2011 and the Team began soliciting feedback from the community at large. A community outreach campaign also was implemented, which consisted of media releases, radio and GTV3 interviews, opinion pieces in local papers, as well as targeted outreach conducted by stakeholder groups involved in creating the plan. Public meetings were held at the Lyric Theatre and the Agriculture Extension Office in November 2011 and the public was encouraged to submit comments in writing at the public meetings or via the LFUCG website throughout the month of November.

Nearly all of the comments received were supportive of the plan, although some commenters suggested potential improvements in specific areas as would be expected. In December the Team reviewed all the comments closely, and the draft plan was revised to include the suggestions for improvement where possible. It should be noted that based on the comments received the Team felt it was not necessary to make extensive revisions to the plan, an affirmation of the quality and quantity of work that stakeholders put into the original plan.

A compilation/overview of all the significant comments received and the associated responses can be viewed on the LFUCG website noted on the front cover of this plan.

NOW WHAT?

The Urban County Council passed a resolution supporting implementation of the *Empower Lexington* Plan on May 10, 2012 (resolution 0439-12).

Now that the first ever *Empower Lexington* plan is complete, we look forward to working with the community to turn the *Empower Lexington* recommendations and strategies into action.

Responsibilities for implementation depend in large part on the specific recommendation being pursued– sometimes the local government will be the lead agency, other times there will be public/private partnerships or nonprofits assuming this responsibility, and in still other instances businesses or the community may take the lead.

The Empower Lexington stakeholders and LFUCG staff will track the implementation of the goals and related strategies to ensure that the plan is reducing Lexington's energy use and related GHG emissions as intended. We will periodically revisit the *Empower Lexington* plan to ensure that our strategies remain productive and will revise this plan as needed. The LFUCG Department of Environmental Quality and Public Works will report each year to the Urban County Council on progress toward obtaining the plan goals and on actual reductions in energy use, to include actions taken by the Urban County Government to reduce energy consumption.

If we are able to reach the goals laid out in the *Empower Lexington* plan, we will be a richer community in many ways. Financially we will be able to keep more money in the local economy, we will receive more efficient services, we will preserve the quality of life we now enjoy, and we will realize an enhanced reputation.

We invite you—the citizens of Lexington—to join us. Become involved, track Lexington's progress, and take steps to become more energy efficient at work and at home so that our community can truly be empowered.

MEMBERS & CONTRIBUTORS

Steering Committee

Members

Kelly Breeding	Fayette County Public Schools
Brandi Berryman	Downtown Development
Sandy Camargo	Lexington-Fayette Environmental Commission/CDP Engineers
Kara Cecil	Community Action
David Christiansen	Community Action
Subdoh Das	PHINIX
Jason Delambre	Interdependent Energies
Blaine Early	Stites and Harbison/Bluegrass Tomorrow
Jane Eller	KY Environmental Commission
Jim Embry	Sustain Lex– Sustainable Communities Network
Jared Forte	LexTran
David Freibert	LG&E and KU Energy PPL Companies
Kathryn Gibson	Bluegrass Energy
Roy Honican	Bluegrass Energy
Henry Jackson	LexCoolCity
Steve Kay	Urban County Council
Nina McCormack	LexCoolCity
Toni Nelson	ACUPCC
Ben Perry	Bluegrass GreenWorks
Rob Rumpke	Bluegrass Tomorrow
Sarah Sheetz	LG&E and KU Energy PPL Companies
Dick Shore	LexCoolCity
Scott Smith	Smith Management Group/Commerce Lexington
Amy Sohner	Bluegrass PRIDE
Scott Southall	CDP Engineers
Harold Tate	(formerly) Downtown Development
Shane Tedder	University of Kentucky
Britney Thompson	Fayette County Public Schools
Chris Tyler	US Green Building Council (USGBC)/Thermal Equipment Sales
Allison Webster	(formerly) LFUCG Council Aide to Doug Martin
Bob Wiseman	University of Kentucky

Subteams

Residential Sector

Members

Lauren Bennett	Bluegrass PRIDE
David Christiansen	Community Action
Roy Honican (Co-facilitator)	Bluegrass Energy
Henry Jackson	LexCoolCity
Nina McCormack	LexCoolCity
Amy Sohner (Co-facilitator)	Bluegrass PRIDE

Industrial/Commercial/Institutional Sector (includes large academic institutions)

Members

Paul Ackerman	LexMark
Kelly Breeding	Fayette County Public Schools
Tyler Campbell	Commerce Lex
Darcy Everett	Bluegrass PRIDE
Joe Jeffries	Trane
Ken Johnson	Link Belt
Doug Landers	Schneider Electric
Jon Myers	Schneider Electric
Tandy Patrick	Greenebaum Doll & McDonald-Commercial Real Estate
Sarah Scheetz	LG&E and KU Energy LLC
Scott Smith	Smith Management Group/Chamber of Commerce (facilitator)
Scott Southall	CDP Engineers
Shane Tedder	University of Kentucky
Chris Tyler	USGBC/Thermal Equipment Sales
Bob Wiseman	University of Kentucky

Land Use Food and Agriculture Sector

Members

Karen Angelucci	Tree Board
Peter Barber	EEC
Larry Davis	Bluegrass Community Garden
Blaine Early	Stites & Harbison/Bluegrass Tomorrow (facilitator)
Jim Embry	SustainLex– Sustainable Communities Network
Charlie Farmer	Natural Resource Conservation Service (NRCS)
Carrie Johnson	Fayette County Farm Bureau
Dave Maples	KCA
Rob Rumpke	Bluegrass Tomorrow

George Wagner	UK Plant/Soil Sciences

Transportation Sector

Members

DeeDee Bowman	RJ Corman Co
Jessica Cobb	Fayette Count Health Department
Mark Day	Bluegrass Airport
Leslie Eggen	KY Division for Air Quality
Jared Forte	LexTran
Steve Kay	Urban County Council
Stuart Kearns	University of Kentucky
John Kiser	FCPS Transportation
Steve Lane	FCPS Transportation
Don Pasley	Commissioner of Rural and Municipal Aid
Dick Shore	LexCoolCity

Reduce Reuse and Recycle (Waste) Sector

Members

Carol Bradford	Bluegrass PRIDE
Subodh Das	PHINIX
Justin Ervin	Wise Recycling
Darcy Everett	Bluegrass PRIDE
Erin Gold	Goodwill
Garry Hoover	Fayette County Public Schools
Ryan Koch	Seedleaf
Barry Prater	Central KY Fiber
Maxine Rudder	Bluegrass PRIDE
Rebecca Self	Seedleaf
Bill Wood	Habitat for Humanity Restore

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Tracey Thurman	Department of General Services
Tom Webb	Division of Environmental Policy (facilitator)
Mark York	Division of Environmental Policy

Notes: [1] This list may not be all inclusive as additional stakeholders not listed may have participated in the process by offering input, etc. Also, as is usually the case with a project of this magnitude/duration, the level and length of involvement varied due to individual time constraints and responsibilities.

[2] Some stakeholders served on more than one team.

GLOSSARY OF TERMS

Alternative fuels: Fuels or energy sources that can replace petroleum-based liquid fuels, particularly for transportation purposes. Examples include biodiesel, alcohol (methanol, ethanol, butanol), chemically stored electricity (batteries and fuel cells), hydrogen, non-fossil methane, non-fossil natural gas, vegetable oil, and other biomass sources.

Biomass: A renewable energy source, is biological material from living, or recently living organisms. As an energy source, biomass can either be used directly, or converted into other energy products such as biofuel.

BTU: BTU or British Thermal Unit is a traditional unit of energy equivalent to approximately the amount of energy needed to heat 1 pound of water from 39 to 40 degrees F. A BTU can be approximated as the heat produced by burning a single wooden match.

Carbon dioxide: A naturally occurring gas, and also a byproduct of burning fossil fuels and biomass, as well as land use changes and other industrial processes. It is the principal anthropogenic greenhouse gas that affects the earth's radiative balance. It is the reference gas against which other greenhouse gases are measured and therefore has a Global Warming Potential (GWP) of 1.

Carbon sequestration: The uptake and storage of carbon.

Climate: The long-term average of conditions in the atmosphere, ocean, and ice sheets and sea ice described by statistics, such as means and extremes.

Climate change: A significant and persistent change in the mean state of the climate or its variability. Climate change occurs in response to changes in some aspect of Earth's environment: these include regular changes in Earth's orbit about the sun, re-arrangement of continents through plate tectonic motions, or anthropogenic modification of the atmosphere.

Climate forecast: A prediction about average or extreme climate conditions for a region in the long-term future (seasons to decades).

Energy: The ability a physical system has to do work on other physical systems. Electric energy is measured in watt hours**.** It is also expressed in kilowatt hours (kWh) = a thousand watt hours, megawatt hours (mWh) = a million watt hours, gigawatt hours (gWh) = a billion watt hours, and terrawatt hours (tWh) = a trillion watt hours. Energy used in transportation is often expressed in BTUs (British Thermal Units) or barrels of petroleum.

Energy conservation: To reduce or avoid the consumption of a resource or commodity (such as electricity).

Energy efficiency: Energy efficiency refers to products or systems using less energy to do the same or better job than conventional products or systems.

EIA: The Energy Information Administration. An independent agency within the U.S. Department of Energy that develops surveys, collects energy data, and analyzes and models energy issues.

ENERGY STAR: A joint program of the U.S. Environmental Protection Agency and the U.S. Department of Energy helping businesses and individuals save money and protect the environment through energy efficient products and practices.

Fossil fuels: Energy sources such as petroleum, coal, or natural gas, which are derived from living matter that existed during a previous geologic time period.

Global warming: The observed increase in average temperature near the Earth's surface and in the lowest layer of the atmosphere.

Kilowatt hour: (kWh) A measure of energy equivalent to the expenditure of one kilowatt for one hour. For example, 1 kWh will light a 100-watt light bulb for 10 hours. 1 kWh = 3,413 Btu.

Mcf: One thousand cubic feet. One mcf equals the heating value of 1,000,000 Btu (mmbtu).

Megawatt: (MW) The electrical unit of power that equals one million Watts (1,000 kW).

Megawatt Hour (MWh): One-thousand kilowatt-hours.

Renewable fuels: Fuels produced from renewable resources, such as biofuels (e.g. vegetable oil used as fuel, ethanol, or biodiesel). This is in contrast to non-renewable fuels such as natural gas, LPG (propane) and other fossil fuels.

Vehicle Miles of Travel: The number of vehicle miles of travel (VMT) is an indicator of the travel levels on the roadway system by motor vehicles.

Watt: The common base unit of power in the metric system. One watt equals 3.413 Btu/hr.

Weather: The specific conditions of the atmosphere at a particular place and time, measured in terms of variables that include temperature, precipitation, cloudiness, humidity, air pressure, and wind.

Weather forecast: A prediction about the specific atmospheric conditions expected for a location in the short-term future (hours to days).