



2010

Wisconsin Energy Independent Community Partnership

25x25 Plan for Energy Independence

Green Lake County and School District



Adopted on December 21, 2010 by the Green Lake County Board

Approved on December 22, 2010 by the Green Lake School Board

This document is formatted for double sided printing

Wisconsin Office of Energy Independence

RESOLUTION NUMBER 41-2010

file

Relating to Adopting 25X25 Plan for Energy Independent

The County Board of Supervisors of Green Lake County, Green Lake, Wisconsin, duly assembled at its regular meeting begun on the 21st day of December, 2010, does resolve as follows:

WHEREAS, Green Lake County in conjunction with the Green Lake School District was awarded a grant from the State of Wisconsin Department of Administration Office of Energy Independence (OEI) to develop a plan in conjunction with OEI that will source 25% of its energy consumption and 25% of the Green Lake School energy consumption from renewable energy by 2025, and

WHEREAS, an Energy Independence Committee was appointed by County Board Chairman Dan Priske made up of members from the County and the School District who have met monthly to develop the 25 x25 plan, and

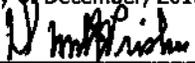
WHEREAS, the Energy Independence Committee has developed a 25X25 Plan for Energy Independence that will contribute conservation, energy-efficiency and renewable energy safeguard to our environment, strengthen our economy, and reduce costs, and meet the 25x25 goal.

NOW THEREFORE BE IT RESOLVED, that Green Lake County Board of Supervisors approves the 25X25 Plan for Energy Independence for Green Lake County and Green Lake School District.

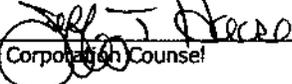
Roll Call on Resolution No. 41-2010

Aye 17, Nay 0, Absent 2, Abstain 0

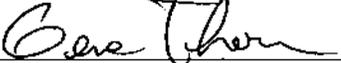
Passed & Adopted/Rejected this 21st day of December, 2010


County Board Chairman


Attest, County Clerk
Approved as to Form:


Corporation Counsel

Submitted by Property & Insurance


Gene Thom, Chairman


Michael Stoddard, Vice Chair


Janne Guden


Rick Perr


Dave Richter

Energy Independent Community Committee

Marge Bostelmann
Jason Kauffeld
Daniel Priske
Sue McConnell
Scott Weir
Ken Bates
Gordy Farrell

County Clerk
UWEX CNRED Agent
County Board Chair
County Board Supervisor
County Maintenance Supervisor
GLS Superintendent
Vice President of School Board
Building and Grounds Chairperson

Green Lake County Property and Insurance Committee

Gene Thom
Michael Stoddard
Joanne Guden
Ricky Perr
David Richter
Jack Meyers
Marge Bostelmann

County Supervisor
County Supervisor
County Supervisor
County Supervisor
County Supervisor
Alternate/ County Supervisor
Secretary

Green Lake County Board of Supervisors

Daniel Priske

Jack Meyers
Donald Peters
Eugene Henke
Ricky Perr
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Margaret Whirry
Maureen Schweder
John Zelenski
David Richter

County Board Chair

Thomas Traxler
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Overview of the 25x25 Process

Wisconsin Energy Independent Community Partnership

In July 2006, Governor Jim Doyle charted a new course for Wisconsin with his *Declaration of Energy Independence*. This declaration was the first step towards moving the State of Wisconsin towards a cleaner, more affordable, energy independent future. In order to ensure Wisconsin's position as a forerunner in our nation's pursuit of renewable energy, Governor Doyle established the Office of Energy Independence (OEI) to further Wisconsin's goal of generating 25% of its electric power and transportation fuels from renewable resources by 2025 and capturing 10% of the emerging bioindustry and renewable energy market by 2030.

Many communities across Wisconsin have stepped forward in support of the Governor's 25x25 Initiative. Currently, more than 125 communities have signed either a statement of partnership or passed a resolution to support the 25x25 goal of the State. In general, all the communities who have set a goal of achieving 25x25 are known as Energy Independent Communities (EIC). The primary objectives of the Wisconsin EIC Partnership are to increase the use of renewable energy and renewable fuels; however, the program also strives to increase and promote public awareness regarding the benefits of increased energy conservation, efficiency, and the use of renewable energy. There are many different benefits, including: cleaner air and water, intelligent land management, rural and urban economic development, as well as a reduction in our State and our nation's dependence upon foreign oil.

In 2009, the State piloted the Energy Independent Community (EIC) Program to assist communities who have made the 25x25 commitment. In its first year, the program assisted 10 pilot applicants¹, comprised of 23 different communities, in the development of a strategic plan detailing how to achieve their 25x25 commitment. In 2010, the 11 different applicants, consisting of 24 different



An Energy Independent Community is willing to set a goal of "25 x 25" to increase our energy independence and promote a sustainable energy policy for the State of Wisconsin.



¹ Eligible applicants include Wisconsin counties, cities, villages or towns that have shown willingness to improve the community's efforts related to energy conservation, efficiency and potential renewable opportunities. Applicants, if they are responsible for their own municipal water, sewer, or electric system, must be in compliance with all appropriate state and federal regulations.

communities, were awarded grants ranging from \$30,000 to \$65,000 to assist in the development of a 25x25 Plan.

Table 1: Green Lake County Population Projection

Green Lake County and Green Lake School District

Green Lake County is located in Central Wisconsin. It is located 90 miles northwest of Milwaukee and 75 miles northeast of Madison. The County is home to the State’s deepest natural lake – Green Lake. The lake’s cool waters reach a maximum depth of 237 feet, and cover an area more than 7 miles long and 2 miles wide; and in addition, the historic Fox River runs through Green Lake County. With the multitude of natural resources, the County offers ample outdoor recreation, including boating, fishing, swimming, hiking and snowmobiling.

With a population² of 19,728, Green Lake County consists of 4 cities, 4 school districts, 2 Villages, 10 Towns, and one independent sanitary district.

Green Lake County Population (Historic and Projected)	
1970	16,878
1980	18,370
1990	18,651
2000	19,105
2010*	19,728
2015**	19,913
2020**	20,064
2025**	20,032

* WI DOA Population Estimate

**WI DOA Population Projection

The population of the County has been steadily increasing since 1970; however, if current projections are accurate, the growth within the County will slow in future years. From 1970 to 2010, the County grew at a rate of approximately 17%; however, from 2010 to 2025 it is only projected to grow less than 2%. As of the 2000 Census, there were 9,831 housing units in the County. The number of housing units is projected to continue to increase, as well. From 2010 to 2025, it is projected that the number of housing units will increase by 7%.

Green Lake County and School District Sustainability

Prior to 2007, Green Lake County implemented an array of energy conservation initiatives including a 5% vehicle fuel reduction resolution, a variety of window and light fixture upgrades, the replacement of incandescent bulbs with compact fluorescents and the replacement of an inefficient boiler. While these measures resulted in positive energy savings, there was no methodology in place to measure success or to prioritize different projects. In 2008, with the confluence of rising energy costs, a new UW-Extension agent, and a proactive maintenance supervisor, the topic of sustainability and how to *strategically* become a more sustainable community began to gather momentum.

Meanwhile, the Green Lake School District had been participating in the Earth Partnership for Schools. The Earth Partnership is a k-12 curriculum guide that helps students, teachers, and community partners focus on ecological restoration as a way of establishing a positive relationship between people and the land.

In 2008, Green Lake County signed a resolution which set the goal of achieving at least 25% renewable, domestically produced energy by 2025. In 2009, the Green Lake School District also signed an expression of support for the 25x25 goals. Both of these resolutions can be found in Appendix A. The County and the School District have been working diligently towards this goal, and in 2010 the County

² 2009 final Population Estimate from the WI Department of Administration. <http://www.doa.state.wi.us/docview.asp?locid=9&docid=7264>

and the School District were awarded a 25x25 Energy Independent Community grant. The 25x25 grant program affords Green Lake County and School District the opportunity to create a thorough energy baseline and devise a well-thought strategic plan that is resulting in this Energy Independent Community 25 x 25 Plan.

Visions for a Sustainable Green Lake County and School District

While the 25x25 process focuses solely on energy use, it is important to take a step back and ground the 25x25 process into the overall goal of increasing the sustainability of Green Lake County and School District. The GLC&S Committee held a visioning session where they explored what *sustainability* means to Green Lake County and School.

MSA and the EIC identified seven separate yet interconnected areas for participants to focus on:

- energy
- land use
- transportation
- water resources
- solid waste
- public education and outreach
- economy

For each of these different areas, participants created vision statements that identify where Green Lake County and School intend to be in the future. The vision statements incorporate a shared understanding of how the community wants to move towards the future. The statements, written in present tense, describe ideal future conditions. Below each vision statement are initial lists of activities to move the County and School District towards their visions.

Energy Vision Statement

Green Lake County values energy efficiency, energy conservation, and renewable energy as a means of reducing energy costs and increasing the use of local, clean energy sources. New development utilizes the most cost-effective energy-efficient methods available. The County is producing enough renewable energy to supply its own needs and sells excess back to the grid. Improvements in efficiency and new energy sources are reducing total carbon dioxide emissions associated with buildings and transportation in the County.



Energy Action Steps

- Offer a residential retrofit program to citizens.
- Promote the use of the Energy Star Rating throughout the County.
- Complete full energy audits on municipal buildings and include recommendations in action plan.

- Adopt an anti-idling policy for municipal vehicles where appropriate.
- Utilize the weeds taken off area lakes for energy.
- Ensure codes and policies allow the use of solar hot water systems throughout the County.
- Reduce building permit fee for installation of renewable energy systems.
- Review zoning and design standards for impediments to installing a renewable energy system.
- Create a map of appropriate places in the County for wind turbines.
- Partner with Green Lake County Habitat for Humanity on home energy education.
- Foster partnerships with other community-based organizations working to increase energy awareness and education.

Land Use Vision Statement

Green Lake County directs development toward the Cities and Villages, rather than on the fringe. The County promotes infill development to maintain the vitality of downtown areas. The County places a high priority on sustaining viable agricultural land and protecting the numerous natural resources located within the County.



Land Use Action Steps

- Maintain a current County comprehensive plan and zoning code that work to identify the character of land, assign a future use, then implement the plan.
- Consider setting a minimum lot size of at least 1:20 acres in rural areas to deter farmland fragmentation.
- Consider adopting a conservation subdivision ordinance to ensure development is clustered.
- Consider a Transfer of Development Rights (TDR) program that directs development towards Villages and Cities while preserving farmland.
- Promote renovation of older buildings to provide inventory for target niches both residential and non-residential uses.
- Support and seek to remove barriers to sustainable agriculture efforts.
- Support community organizations that are furthering the land use goals of the County, including community revitalization organizations and sustainable agriculture organizations.

Transportation Vision Statement

The well-connected, multi-modal transportation system in Green Lake County attracts residents, visitors, and businesses to the County. This safe and effective system allows people to travel locally and regionally via optional modes including car and carpool, walking, biking and mass transit, thereby leading to healthier citizens, creating a ripple effect throughout the County. Public and private vehicles within the County utilize innovative technology and alternative fuel sources, and the County is electric vehicle friendly. This transportation network is affordable, convenient, accessible, and utilized by residents of all ages.



Transportation Action Steps

- Implement free bicycle use programs in Cities and Villages.
- Change County vehicle purchasing standards so that all new vehicles purchased utilize an alternative fuel: fuel cells, electricity, natural gas, propane, ethanol or flex fuel capacity, and biodiesel.
- Adopt a neighborhood electric vehicle (NEV) ordinance and install solar-powered charging stations so they are readily available.
- Map mass transit routes within the County.
- Lobby state leaders to ensure mass transit connections to major metropolitan areas.
- School District will require smaller vehicles that use alternative fuels for bussing.
- Conduct a detailed study and capital improvement plan that will identify and assess the need for additional or expanded bike paths.
- Determine the feasibility of a regional bike route that would connect the Cities throughout the County.
- Encourage carpooling by endorsing and advertising several carpool locations.
- Establish a County ordinance stating that new non-residential facilities will include at least one bike rack.
- Provide showers and lockers in any newly constructed County facilities to enable employees to bike to work.
- Assist with Safe Routes to School Program.
- Support community organizations promoting alternative transportation options.

Water Resources Vision Statement

Ground and surface water resources in Green Lake County are clean and plentiful. The County works to enhance and protect water on both the local and regional level. It is important to the County to ensure the surface waters of Green and Puckaway Lakes are clean and viable for people and wildlife alike, as both are significant to the character and economics of the County. The County values efficiency, safety and quality in the pumping and use of groundwater and in the design and maintenance of storm water management.



Water Resources Action Steps

- Implement a program to ensure water efficient fixtures are in use throughout the County.
- Implement an education program or cost program to increase conservation of water resources.
- Consider passing a phosphorus free fertilizer ordinance.
- Update the County Stormwater Management Plan.
- Continue to promote rain garden and rain barrel education and use.
- Increase enforcement of sediment management/erosion control at construction sites.
- Work with Towns to improve maintenance of Town roads with chronic erosion problems (roadsides, culverts, ditches).
- Establish a county-wide Clean Water Day that rallies citizens of Green Lake County to clean up stream banks and waterways, paint storm-sewer grates, etc.
- Support community-based organizations working on water-quality and watershed issues.

Solid Waste Vision Statement

The residents, businesses, and government of Green Lake County utilize the most efficient and effective methods available to reduce, reuse, compost and recycle waste.

Solid Waste Action Steps

- Ban or discourage bottled water sales in County.
- Investigate waste compaction as a means of preserving landfill space.
- Purchase laptops for County Supervisors so they are paperless.
- Implement paperless policy at School District.
- Incorporate cradle to cradle concepts into school curriculum.
- Require reuse/recycling of building and demolition materials. Incorporate education as well.
- Utilize the methane from the current landfill.
- Require or incentivize businesses and institutions to compost food waste; recommend composting to individuals.

- The County Highway Department continues to utilize innovative recycling techniques when building transportation systems.
- Continue Clean Sweep program and expand education outreach opportunities with the event.
- Offer free recycling program for appliances and electronics.
- Provide recycling receptacles at all County parks and other facilities.
- Produce an A-Z Guide that tells County residents how to properly dispose of all goods.
- Investigate modification of tipping fees. "Cost to throw".
- Investigate options to convert solid waste to biodiesel.
- Investigate incineration operation feasibility instead of landfilling.

Education and Outreach Vision Statement

Students, elected officials, and all citizens are aware and are concerned about current environmental and social issues and they know how they can benefit from a sustainable community. Sustainability is infused in people's decisions and actions. Information on sustainability is accessible to all citizens young and old through the education system, digital and traditional media sources. Sustainable conversations are expanded and people feel they are part of the solution.



Education and Outreach Action Steps

- Incorporate more education and outreach of energy efficiency and renewable information on County website. Provide a list of action steps for people to implement.
- Coordinate monthly educational forums/focus groups.
- Embed sustainability into school curriculum and daily operations.
- Advertise sustainable messages on billboards, in the schools, etc.
- Promote demonstration sites at County Schools.
- Incorporate outreach at County Fair.
- Promote the establishment of community partners.
- Promote public awareness and acceptance of the benefits of energy efficiency and renewable energy policies and practices through open meetings, networking and support for the outreach efforts of community partners.
- Promote and celebrate the successes of green building development.

Economy Vision Statement

Green Lake County has a growing and diversified economy that has strong foundations in sustainability. The County's local-based economy attracts residents, visitors, and businesses that value sustainability. The County utilizes the most current technological connections which attracts new businesses and provides existing businesses with a competitive advantage. Green Lake County has a stable employment base which provides desirable jobs that pay a living wage.

Economy Action Steps

- Support the creation of jobs with wages and benefits that provide adequately for families and contribute to community.
- Support a process by which the economic value of healthy watersheds is determined.
- Foster increased “green jobs” workforce and entrepreneurial opportunities through the development and promotion of energy efficiency and renewable energy education and training programs.
- Be a recognized resource for collaborations towards the advancement of regional sustainability policy and practice.
- Work with and leverage the resources of existing organizations, agencies and businesses pursuing sustainable tourism.
- Identify and champion existing sustainable activities and businesses.
- Assist in the development of an inventory of existing ecotourism, civic tourism, cultural and historic tourism, and other travel businesses for use in the creation of lists of activities and attractions that could enhance current offerings.
- Provide tools for tourism businesses to use to improve their sustainable development performance.
- Establish Green Lake County as a center of technology-based entrepreneurial activity by attracting “teleworkers” and “teleshops” to the County and by increasing the computer skills of residents.



What was measured? Why?

One of the first steps integral to creating a 25x25 Plan is to establish the baseline of existing energy usage and determine the total anticipated 2025 energy usage. This section and the next outline the electricity, natural gas, and gas/diesel used by Green Lake County and the Green Lake School District (GLC&S) from 2007 to 2009. This includes buildings and fleet information. By analyzing the baseline and projected energy use, it is possible to pinpoint where future projects will have the most impact.

Data Collection

Staff from both Green Lake County and the School District collected the data and entered it into the EPA's Energy Star Portfolio Manager computer software and into the Energy Center of Wisconsin's fleet spreadsheet. Portfolio Manager is an interactive energy management tool that will help all Energy Independent Community grant recipients track their energy use.

The County's baseline originally included energy data from thirteen buildings: the Courthouse, Dodge Park, Dodge Park Boat Landing, the Fairgrounds, the Food Pantry, the Health and Human Services building, the County Highway Shop 1, the County Highway Shop 2, the Radio Tower, the storage shed, the GLC Safety Building, the Sunset Park Boat Landing, and Zobel Park. In the spring of 2010, the County brought the new LEED-certified Justice Center on-line. The Justice Center replaces several of the older buildings that were originally included in the baseline: the Courthouse, the Health and Human Services building, and the GLC Safety building. The Justice Center was on-line before GLC&S completed their baseline; it is most accurate to include it in the baseline. The buildings which were taken off-line were removed from the baseline. Because the Justice Center is much larger and therefore uses more cumulative energy than the buildings it was replacing, this was the most accurate way to incorporate the Justice Center into the energy usage of the County.

The School's baseline included only one building which houses the elementary, middle, and high schools.

The fleet vehicles included in the baseline are from both the County and the School. This includes vehicles from the County departments (land conservation, planning and zoning enforcement, health and human services, maintenance, highway, law enforcement) and from the school (the school buses, the van and truck). There are some personal vehicles which employees use for business use that are not included in the baseline at this time. This information could be collected in the future as GLC&S continue to refine their data and baseline. In addition, complete data for all vehicles was not available. For the most part, cumulative gallons and cumulative mileage were provided. Ideally, data would include per vehicle fuel consumption, fuel cost, and mileage in order to more accurately assess energy savings from future projects.

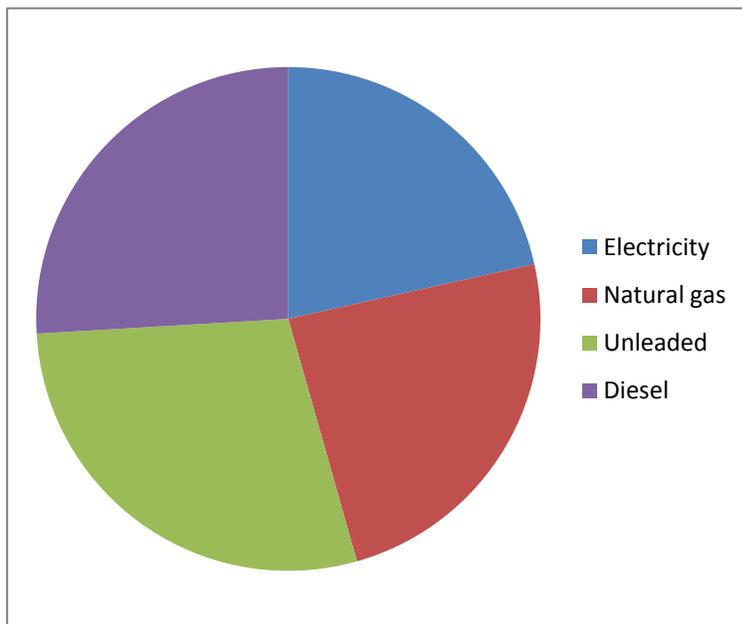
Discoveries/Surprises

2009 Energy Baseline

The Energy Center of Wisconsin used the data that the GLC&S had input into Portfolio Manager and the fleet data to create an energy baseline for GLC&S. The following chart shows the energy usage baseline for GLC&S which is used to calculate the 25% renewable energy goal and to mark progress by GLC&S.

Green Lake County and School Energy Baseline		
Total energy usage baseline:	38,213 million (MM) Btus	
Comprised of:	2,408,532 kWh	(8,218 MMBtus)
	92,103 therms	(9,210 MMBtus)
	87,727 gallons of unleaded fuel	(10,878 MMBtus)
	71,275 gallons of diesel fuel	(9,907 MMBtus)

Table 2: Green Lake County and School Energy Baseline



The pie chart to the left shows the total consumption of energy by energy type. The County and School combined have an almost equal breakdown of energy consumed by energy type:

- Electricity – 22%
- Natural gas – 24%
- Diesel fuel – 26%
- Unleaded fuel – 28%

This generally is not the trend in energy consumption. Typically, electricity and natural gas usage outweigh fuel usage.

Figure 1: Energy Consumption by Energy Type

On average from 2007 to 2009, 54% of the energy consumed was from the fleet and 46% from the buildings. This is also not a typical trend, as usually building consumption is a significantly greater portion of total energy usage than fleet consumption. These anomalies present opportunities for the County and School District when deciding on a project list.

Renewable Energy Production Goal

In December 2008, Green Lake County adopted the Wisconsin Energy Independent Community 25x25 Partnership, by resolution 31-2008. Similarly the Green Lake School District also passed an expression of support in November 2009. These resolutions commit the County and the School District to sourcing 25% of its energy from renewable, domestic sources by 2025. As part of the Energy Center of Wisconsin's data analysis, a specific renewable energy generation goal has been set for Green Lake County & School.

25x25 =
generating
9,785 MMBtus
of renewable energy
by 2025

Green Lake County and School are assuming an annual municipal energy usage growth rate of only 0.15% over the next 15 years. This is fundamentally based upon research by the Energy Center of Wisconsin. The Center calculated that the population growth rate discounted by the percent of energy attributable to buildings is 0.3%. The estimated population growth rate in the County is 0.5%; however generally building energy consumption is essentially flat as municipalities grow -- the energy use of new buildings is mostly offset by energy reductions from modernizing existing stock and building closings. Because the new Justice Center is included in the baseline, the County does not anticipate building any new buildings before 2025. The County and School District chose the modest growth rate of 0.15% to allow for growth in buildings owned by the School and growth in the fleet.

Assuming this growth rate, the energy use baseline for 2025 will be 39,141 MMBtus. The Green Lake County and School District renewable energy generation goal for 2025 is 9,785 MMBtu. This translates into 2,867,892 kWh or 97,852 therms or 78,913 gallons of gas, or 70,397 gallons of diesel, or some combination of reduction and generation in all of these fuel types.

Current Energy Usage Details

Extensive data was collected for the creation of the GLC&S baseline. The data that was collected provides a wide array of detail about energy consumption in Green Lake County and School District, including energy costs, amount of CO₂ emissions, energy consumption by building, and a myriad of other specific pieces of information that may be used to inform decisions on energy reduction projects and energy generation projects.

Energy Costs

From 2005 to 2009, GLC&S spent over \$2.2 million on energy. On average, 49% of the total energy cost was attributed to buildings, and 51% was attributed to fleet. Note that Figure 2 does not include the energy costs associated with the Justice Center that was brought on-line in 2010. When the GLC&S updates this information there will be a spike in energy consumption by buildings, as the cumulative energy consumption of the Justice Center is much higher than the baseline in 2009.

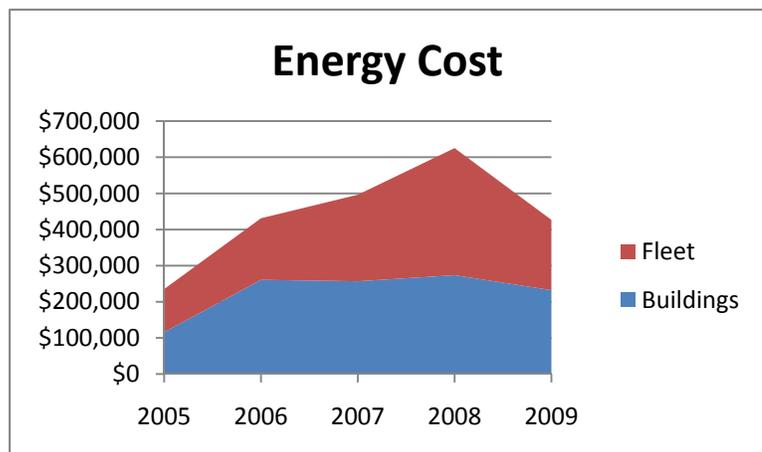


Figure 2: 2009 Energy Costs

While energy usage has been increasing across GLC&S; the trend shown in the chart is due in large part to variable prices in energy, not changes in usage. One of the many benefits of attaining 25x25 is that the County will be less susceptible to fluctuating energy costs.

CO2 Emissions

GLC&S produce over 7 million lbs of CO2 annually. In spite of the fact that electricity only accounts for 22% of the total energy consumption, it accounts for 48% of the CO2 emissions. The other three energy types are responsible for the following contributions to the County and School District’s total CO2 emissions:

- Natural gas = 13%
- Unleaded gas = 20%
- Diesel fuel = 19%

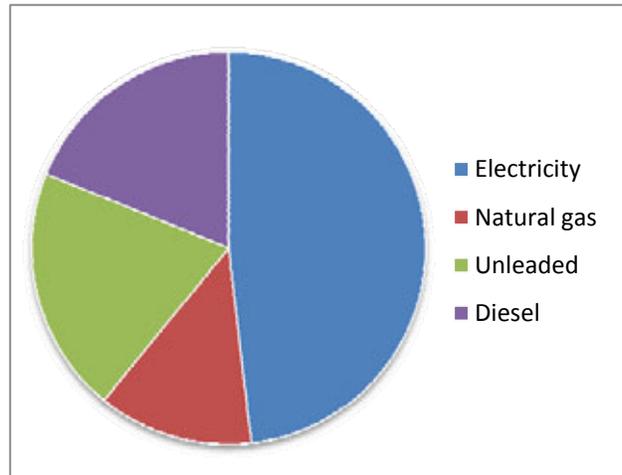


Figure 3: CO2 Emissions by Energy Type

Energy Intensity of Selected Buildings

Of the buildings that were included in the energy baseline for GLC&S, many do not have substantive energy costs or are not physical buildings, including: Dodge Park, the Dodge Park Boat Landing, the Fairgrounds, the Sunset Park Boat Landing, and Zobel Park.

This table shows the energy intensity of selected buildings. It includes the kWh/ft², the therm/ft², and the combined energy intensity.

As you can see, there is a wide range of energy intensity for the different buildings included on the baseline. The table to the right shows whether a building uses a lot of electricity or a lot of natural gas compared to other buildings. It is not feasible to compare kWh to therms across the table; these metrics are used to compare the energy intensity of one building to another. This

	TOTAL		
	kBtu/sq. ft	kWh/sq. ft	therm/sq. ft
GL Radio Tower	504.5	147.9	0.00
Food Pantry	100.2	9.9	0.66
Highway Shop #2	97.3	1.5	0.91
GL Safety Building	91.8	11.7	0.52
GL School	81.2	5.7	0.62
GL Courthouse	69.8	7.6	0.44
Health and Human Service	68.5	12.6	0.26
Highway Shop #1	58.9	3.0	0.49
Justice Center	50.6	12.8	0.07
Storage shed	0.9	0.3	0.00

Table 3: Energy Intensity by Building

examination of the energy intensity should help inform decisions for different projects. A building with very high energy intensity is more likely to have obvious “low hanging fruit” than a building with very low energy intensity. That being said, there are also some energy expenditures which are unavoidable.

It would be beneficial to measure the energy intensity of the different fleet vehicles, as well; however, due to irregularities in the data, it’s not possible. As GLC&S move forward in the 25x25 process, calculating the energy intensity of the different fleet vehicles would also help direct funding so it has the biggest impact.

Renewable Feedstocks

Choosing renewable sources of energy will greatly reduce the demand for fossil fuels, resulting in a cleaner environment and an energy independent future. There are many different potential sources of renewable energy: solar, wind, geothermal, biofuels, and more. Whereas fossil fuels are generally extracted a long distance away from where they are ultimately used, renewable resources are primarily used near their source. When choosing which combination of renewable resources are the most appropriate, there are two very important, inter-connected factors to consider: location and price. Simply having an abundance of a resource is not enough; one must also be able to harness and transport its energy at an acceptable cost.

The following section explores Green Lake County's general aptitude for pursuing various renewable energy sources, including: solar, wind, geothermal, biogas, biomass, and other emerging renewable energy technologies. It is important to note that while the following section provides general information on opportunities and constraints at a regional level, renewable energy sources are extremely site-specific. This section is not meant to replace intensive information gathered during the site assessment phase of a renewable energy project.

Solar Energy

Solar energy is one of the most abundant sources of renewable energy in the world. There are several regional factors which contribute to determining the feasibility of solar energy: insolation, rebate availability, and electricity prices. Insolation is the amount of sunshine in a given location, shown in Figure 4. Insolation is measured in "full sun hours" per day. As the map to the right depicts, overall Wisconsin may not have the *most* optimal solar resources; however, the many people who think there is not enough sun in WI for solar energy systems are wrong. During the summer, WI receives about 75% of the annual solar energy received by the deserts of Arizona and Southern California³. In November and December, there is much less sun: there is an average of only 2.5 hours of sun per day available to provide solar energy; however, on clear days with snow, there is up to a 60% output increase from light reflected off of snow. In addition, the efficiency of crystalline PV cells is improved in the cold. Thus on cold, sunny, winter Wisconsin days, crystalline PV systems will still have close to their highest output. Indeed, on an optimal WI winter day, the output of a crystalline PV system will be higher than similar systems in the desert of Arizona⁴.

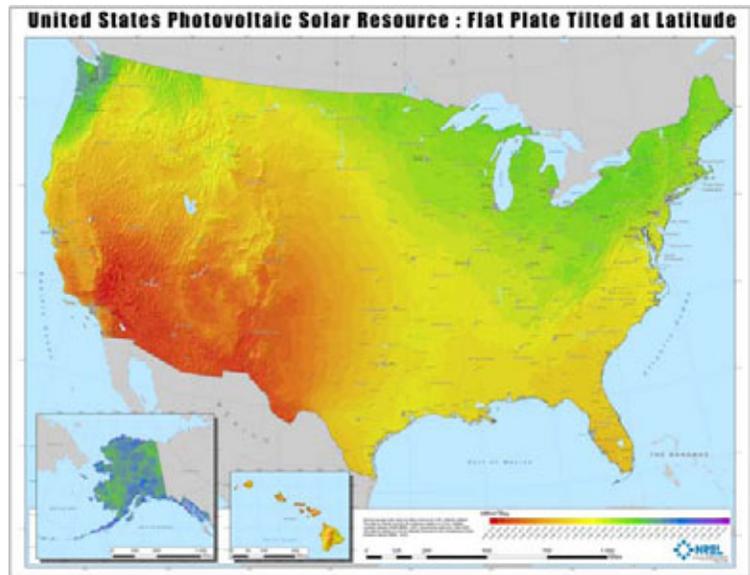


Figure 4: United States Photovoltaic Solar Resources.
National Renewable Energy Laboratory (NREL) homepage www.nrel.gov

³ Energy Center of Wisconsin

⁴ Ibid

The other two main regional factors which contribute to the feasibility of employing solar energy are rebates and electrical prices. Rebates may range from 10% to more than 60% depending on the project location. Local electric prices have a large impact on system payback times.

In reality, the specific conditions of a given site are more important when determining whether solar energy is the best renewable option for an area. In general, for a site to be appropriate for a solar energy system there must be a south-facing mounting area that is free of shading and obstructions. The power infrastructure may require updating or expansion and if installing a roof-mounted system, the roof must be capable of supporting the system.

Figure 5 shows a map of solar electric installations completed from 2002 through 2009, as recorded by Focus on Energy. There was only one residential solar electric system installed in Green Lake County during this time period.

In addition to solar electric systems, Wisconsin is well suited for solar hot water systems. These systems work in tandem with one's existing gas or electric water-heating system and produce hot water heated with the sun. Because solar hot water systems are more forgiving in terms of site requirements, they are often a better choice for a site which is partially shaded or lacks optimal southern exposure. There were at least 5 solar thermal projects in Green Lake County, installed between 2002 and 2009.

Wind Energy

Wind energy is one of the fastest growing sectors of renewable energy production in the United States. Like solar, wind energy is abundant across the United States. Wind

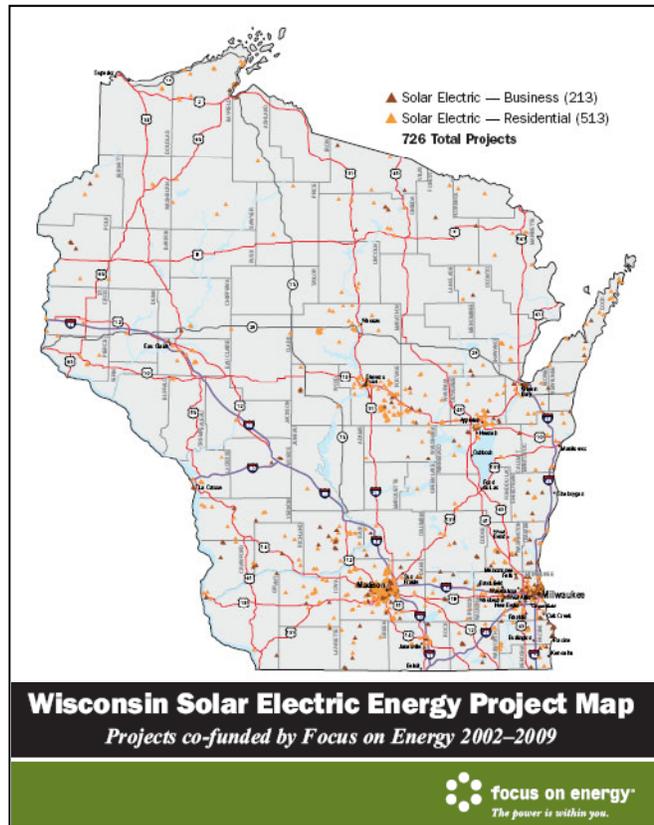


Figure 5: Solar Electric projects in Wisconsin
Focus on Energy www.focusonenergy.com

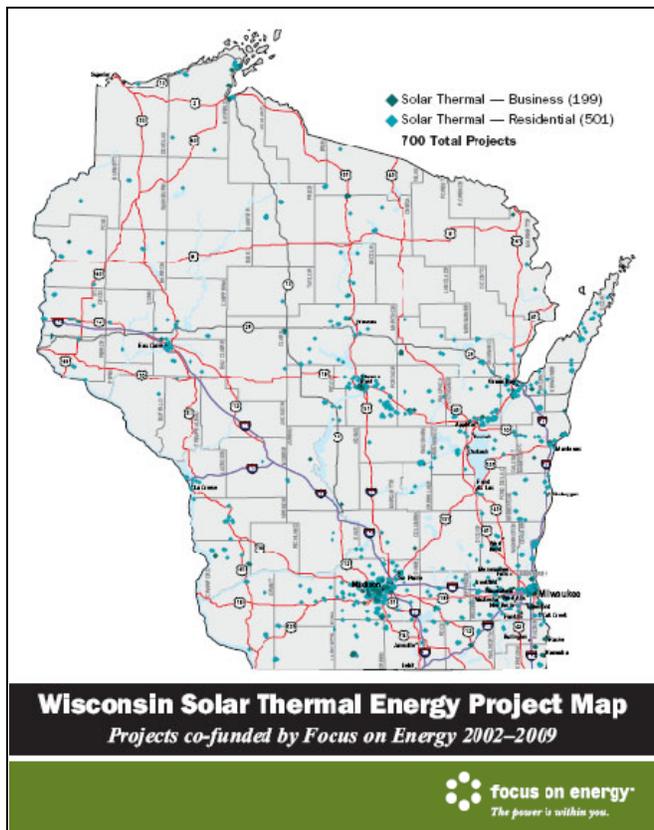


Figure 6: Solar Thermal Energy Projects in Wisconsin
Focus on Energy www.focusonenergy.com

resources are characterized by wind-power density classes, ranging from class 1 (the lowest) to class 7 (the highest). Good resources (usually class 3 and above) are located in many locations across the USA⁵. In general, areas with annual average wind speeds around 6.5m/s and greater at 80 meter height are considered to have suitable resources for wind development.

Across Wisconsin, both large utility scale wind farms and smaller wind turbines are increasing in number. In general, the areas of Wisconsin that are most appropriate for wind are located along the Great Lakes; however, there are other isolated sites across the State that also demonstrate immense wind potential. Figure 7 shows a close-up of the mean annual wind speed at 100 meters for Green Lake County. The areas in dark purple have the greatest potential for wind power. The dark purple areas have an annual average wind speed of 7.5 – 8.0 m/s at 100



Figure 7: Mean Annual Wind Speed at 100 Meters
AWS Truewind www.focusonenergy.com

meters. The lighter purple areas have an annual average wind speed of 7.0 – 7.5 m/s at 100 meters. The yellow and orange lines are transmission lines. As the figure shows, there are parts of eastern and southern Green Lake County that have a winning combination of excellent wind resources and proximal transmission lines. Currently, there are no any wind installations in Green Lake County; however, there are distinct possibilities.

The potential energy to be generated from wind resources is quite site specific; however, given the appropriate specific location, Green County could support small wind (facility specific), community wind (5-20 large turbines), or large wind (>50 large turbines).

While both NextEra, a division of Florida Power & Light, and Alliant Energy have laid some of the ground work necessary to pursue a large wind installation in eastern Green Lake County, pursuing the construction of a large wind farm in the County is a very intensive process that is

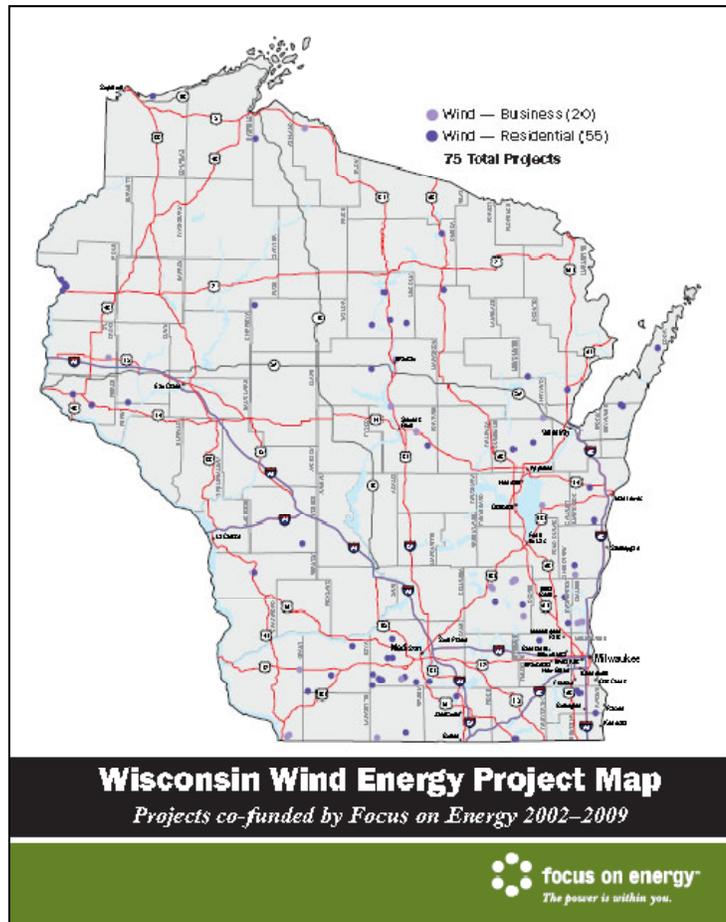


Figure 8: Wind Energy Projects in Wisconsin
Focus on Energy www.focusonenergy.com

⁵ U.S. Department of Energy www.windpoweringamerica.gov

largely dependent upon private investment. In the past two years, the wind industry has been generally less aggressive in pursuing new large wind farms. This is due in large part to the economic downturn and the relaxation of certain renewable energy requirements. Due to the financial and administrative burdens of pursuing a large wind farm, community-based wind and small wind are currently the more viable options for Green Lake County.

There are a wide range of elements to be considered when siting a wind project. The placement of turbines to take advantage of the available wind resources must be balanced with minimizing their impact on their surroundings and the environment. Ecologic and geologic features, the type of soil and underlying rock, permitting requirements, environmental studies, and constructions costs are all factors which must be considered. If the County decides to pursue wind resources, it would be wise to first try a small wind installation. A single small turbine will be subject to fewer environmental and neighbor concerns, zoning requirements, and required permitting, thus resulting in a smaller financial and administrative commitment from the County. The first step to pursuing a small wind installation is to conduct a specific site assessment. If the County decides to pursue community wind, the first step is the preparation of a feasibility study. A feasibility study will generate information on the specific wind potential of a site, as well as information on electrical connections and transmission potential.

As with solar energy, there are certain general sites specifications which make wind energy (either a small, community, or large wind installation) more feasible: open fields are better suited than forested areas; higher elevations tend to have higher average wind speeds; a site needs exposure to prevailing winds (the direction of prevailing winds varies in Green Lake County); and a site needs to abide by all turbine siting guidelines⁶.

Currently, the State of Wisconsin has a September 1, 2010 deadline to propose wind turbine placement rules. At the time of this report, the Public Service Commission (PSC) is holding public hearings on wind turbine placement draft rules. These rules, once adopted, will regulate turbine placement on wind farms that generate less than 100 megawatts of electricity. Wind farms that generate more than 100 megawatts will still be subject to PSC approval⁷. Currently, at minimum, local zoning ordinances usually stipulate the required minimum setbacks for wind turbines; however, as the wind siting guidelines are fully developed and adopted, they may add additional restrictions or limitations that will need to be taken into account when considering the development of wind resources.

⁶ Focus on Energy www.focusonenergy.com

⁷ The Daily Reporter via *Better Plan*, *Wisconsin Badgers for a Better Renewable Energy Plan*
www.betterplan.squarespace.com

Biogas

Biogas digesters, also called anaerobic digestion systems, are systems which convert organic waste⁸ from farms, food processing facilities, and waste-water treatment plants into energy. Residues which may be used for anaerobic digestion include cattle and pig manure and slurry; poultry manure; vegetable processing residues; silage effluent; dairy processing residues; brewery residues; milk processing residues; and fish processing residues. Different feed stocks will require different loading systems, depending on the consistency of the feedstock. Different feedstocks will also yield different energy results.

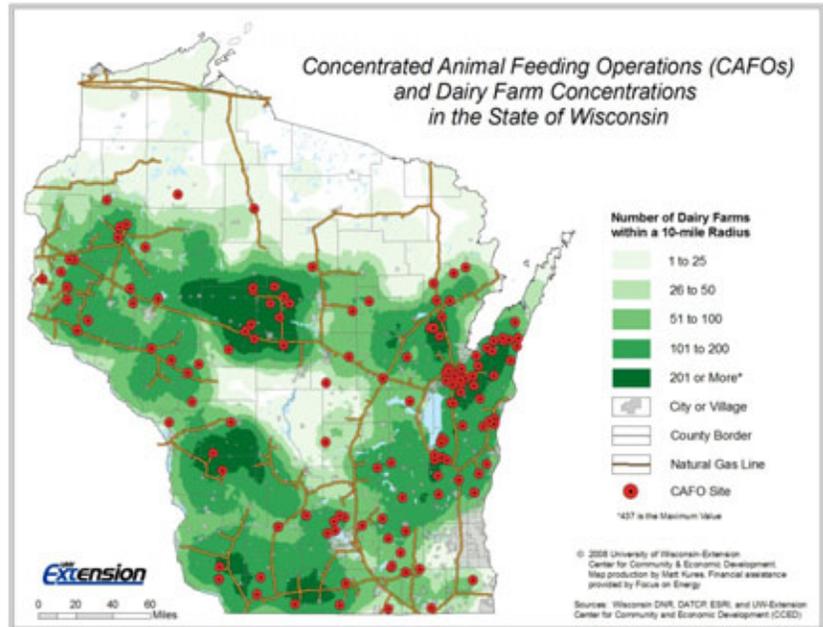


Figure 9: Potential sources of biogas in Wisconsin
UWEX www.uwex.edu/ces/cced/bioeconomy/crops.cfm

Energy from anaerobic digesters offers great potential as a renewable source of electricity, heat, and combined heat and power generation. It is carbon neutral, and can therefore reduce overall quantities of carbon dioxide in the environment. In addition to producing energy and reducing greenhouse gases, biogas systems also help improve water quality and provide odor control.

Traditionally, anaerobic digesters are part of an on-site integrated farm waste management system; however, large scale centralized anaerobic digesters (CADs) are now being developed, using feedstock imported for a number of sources.

Anaerobic digesters encourage the natural breakdown of organic matter by bacteria in the absence of air. It is an effective method for turning livestock and food processing residues into biogas, as well as a nutrient-rich soil conditions and a liquid fertilizer. The biogas or methane which is a byproduct of the anaerobic process can be used in internal combustion engines to power a generator, power a modified hot water heater, or make electricity. Using biogas for natural gas is still evolving but possible scenarios include bottling it and then selling it to an industrial customer or direct pipeline injections. As a fuel, biogas composed of 65% methane yields about 650 Btu per cubic foot⁹. This energy estimate is often used when designing systems for the anaerobic digestion of manure. General estimates predict that one kilowatt of electricity production requires 5-8 dairy cows¹⁰.

⁸ . Because the term “waste” implies that the materials is unwanted rubbish, the term “residue” is often used to reinforce the importance of these materials as renewable resources.

⁹ Midwest Renewable Energy Council www.mrec.org

¹⁰ Ibid

Currently, Wisconsin leads the United States in the most dairy farm anaerobic digestion systems. As of 2008, there was one biogas digester in Green Lake County. The Double S Dairy, located in Markesan, Wisconsin, has 1,100 milking Holsteins. The biogas produced is dehumidified and run through a 200 kW Caterpillar engine generator set to produce both electricity and heat. The electricity produced from the biogas digester is sold to Alliant Energy.

When determining the feasibility of additional biogas systems in Green Lake County, important factors to consider include the following: type and quantity of available feedstocks; security of supply of feedstocks; outlet for by-products, including but not limited to the biogas; size and location of the plant; and transportation costs and logistics.

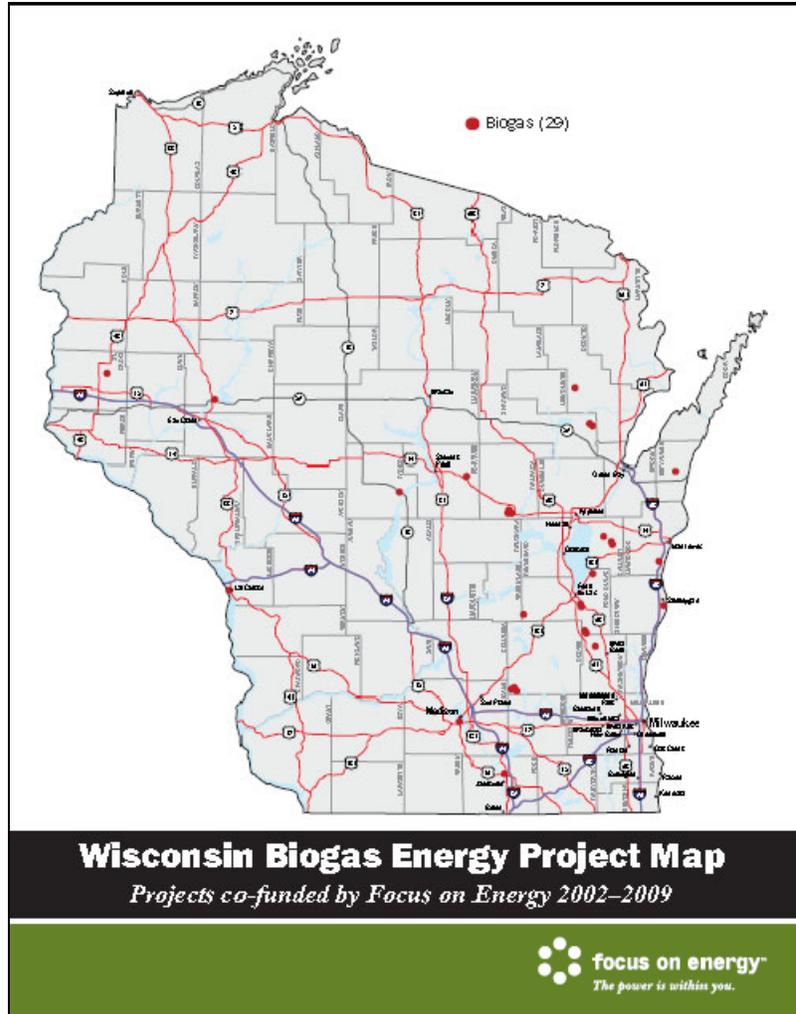
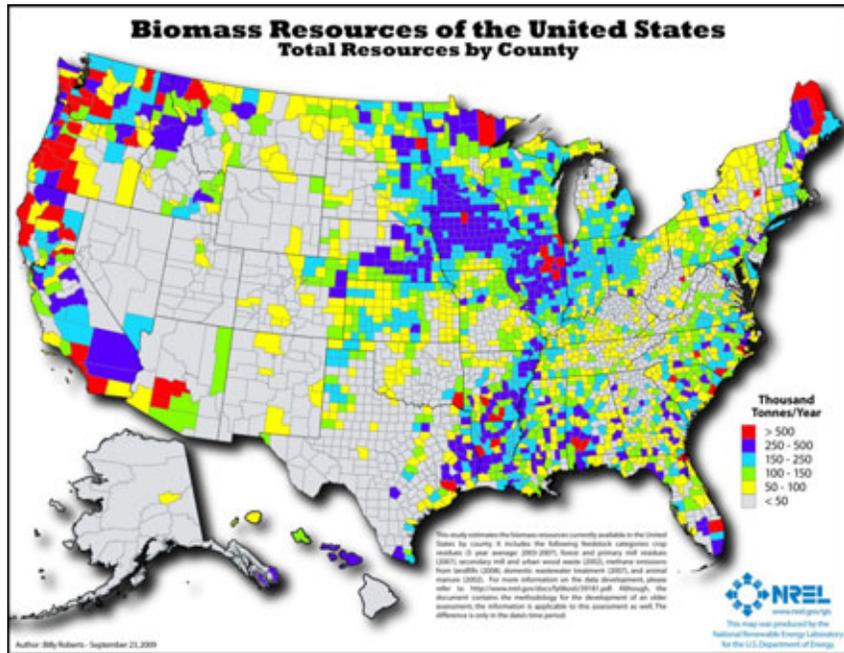


Figure 10: Biogas Energy Projects in Wisconsin
Focus on Energy www.focusonenergy.com

Biomass

The use of biomass energy is not a new concept – it began when people started burning wood to cook food and keep warm. Indeed, wood is still the largest biomass energy resource today; however, other sources of biomass can also be used. Wisconsin is home to a wealth of different biomass resources. These resources, such as prairie grasses, forest waste, and agricultural by-products, can be used as a renewable source of both heat and fuel across Wisconsin. According to the map shown in Figure 11, the National Renewable Energy Laboratory

Figure 11: Biomass Resources in the United States
National Renewable Energy Laboratory www.nrel.gov



Laboratory estimates that Green Lake County produces 50-100 thousand tons of mixed biomass per year. There are several potential sources of biomass in Green Lake County, primarily agricultural by-products. As Figure 12 shows, in Green Lake County there are corn, grains, and other croplands. There are also several food manufacturing facilities.

Biomass resources may be converted directly into liquid fuels, called biofuels. The two most common types of biofuels in use today in the United States are ethanol and biodiesel. Biodiesel is made by combining alcohol (usually methanol) and a catalyst such as sodium hydroxide with vegetable oil, animal fat, or recycled cooking grease. Ethanol is made from starches and sugars through a fermentation process very similar to beer brewing.

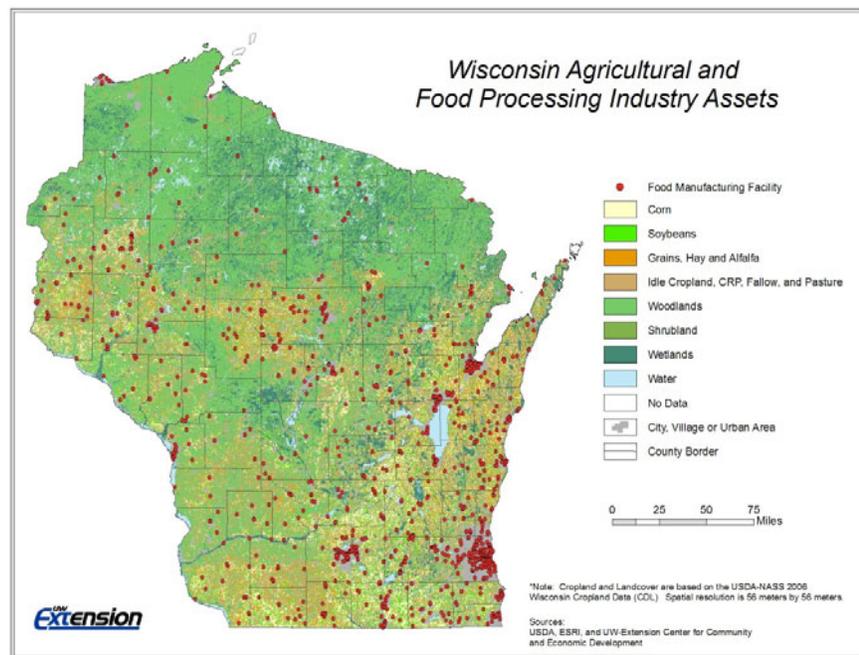


Figure 12: Agricultural Assets in Wisconsin
UWEX www.uwex.edu/ces/cced/bioeconomy/

Biomass resources may also be used to generate electricity, often called biopower or biomass power. Most biopower plants use a direct-combustion system: it burns biomass feedstocks directly to produce steam. The steam then drives a turbine, which powers a generator that converts the power into electricity.

Like other renewable resources, biomass conversion may be implemented at a wide variety of scales, ranging from a residential woodstove to a large industrial facility. When contemplating a biomass system, the source of feedstock is the most important factor. Other important factors include available transportation systems, environmental and aesthetic considerations, site availability and neighboring land uses, and community support.

The University of Wisconsin-Extension has compiled extensive research on the spatial dimensions of available feedstocks. These become particularly relevant when considering a large scale operation. While there are certainly sources of biomass within the County, currently biomass may not be the most appropriate renewable resource for the County to pursue on a large-scale. In general, the County ranks in the lower half of Wisconsin counties in terms of amount of harvested agricultural products (Figure 14). Specifically, Green Lake County harvested 5-10 million bushels of corn in 2007. In comparison, Dodge

Figure 13: Biodiesel Production and Acres of Harvested Soybeans
 UWEX www.uwex.edu/ces/cced/bioeconomy/

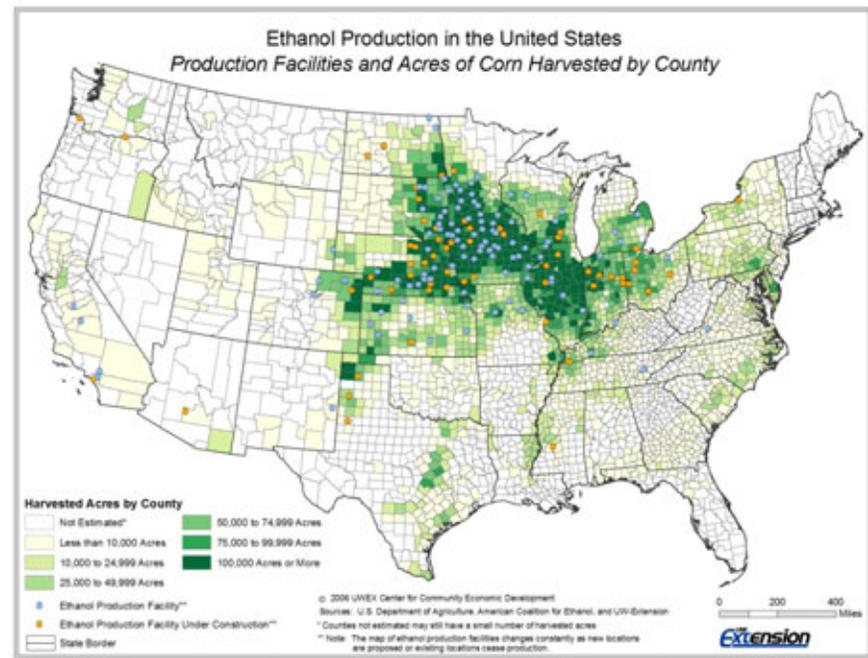
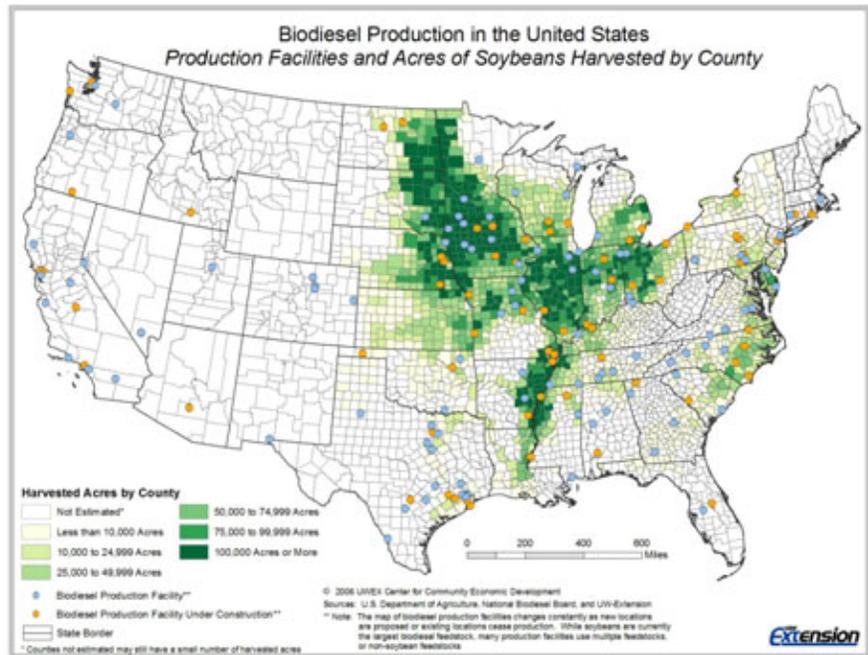


Figure 14: Ethanol Production and Acres of Harvested Corn
 UWEX www.uwex.edu/ces/cced/bioeconomy/

County harvested more than 20 million bushels, ranking number 5 overall, and Marquette County harvested less than 1 million bushels.

The County also ranks in the lower half of Wisconsin counties in terms of volume of growing stock on timberland (Figure 15). There are fewer than 40,000 acres of forest land in Green Lake County, compared to Marquette County with 80,000 to 160,000 acres of forest land, and Waushara County with 160,000 to 320,000 acres.

Because different biomass products are refined differently, the consistent production of a vast quantity of a feedstock is imperative for successful large-scale biomass conversion. In addition to growing enough of a feedstock, other important elements in biomass conversion include the following:

- Harvest and collection
- Preprocessing
- Storage and queuing
- Handling and transportation

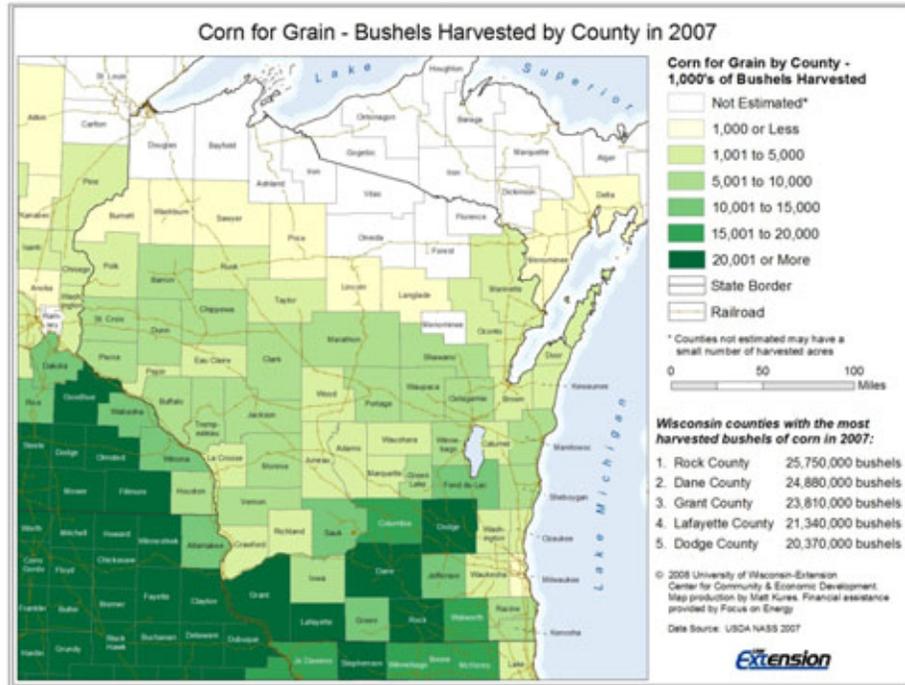


Figure 15: Amount of Corn Harvested for Grain by County UWEX www.uwex.edu/ced/cced/bioeconomy

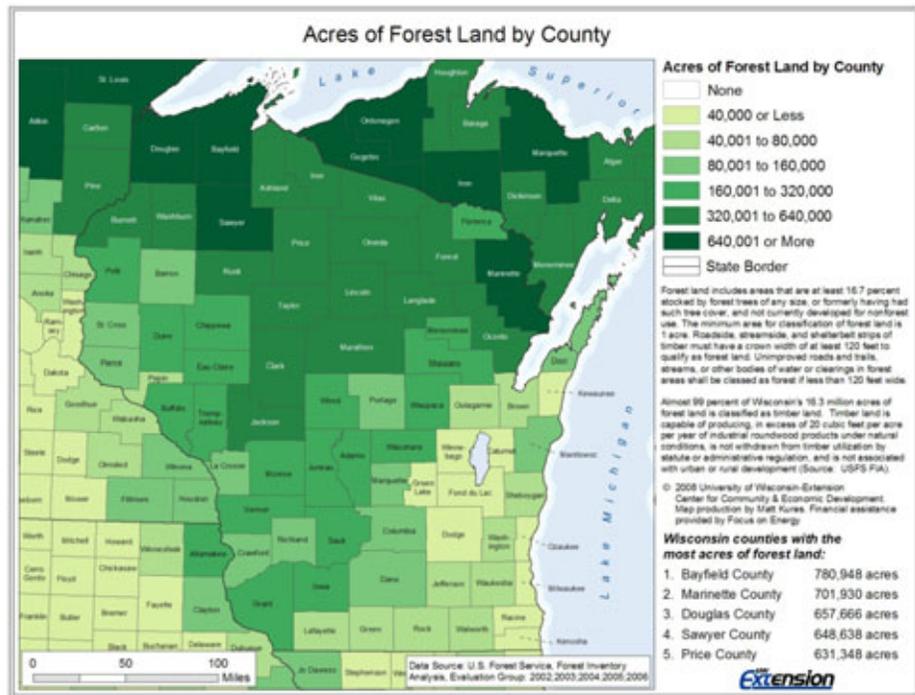


Figure 16: Acres of Forest Land by County UWEX www.uwex.edu/ced/cced/bioeconomy

Hydro-Power

Water is the most common renewable resource used in the United States today. This statistic commonly refers to large hydro-electric dams. Because dam sites are severely constrained by available rivers and the competing uses for those rivers, it is not appropriate for Green Lake County to consider a large hydro-electric project; however, hydroelectric power can also be generated from just a small amount of water. Often called micro-hydroelectric, these systems range in size from producing enough electricity for a home, business, farm, or ranch to

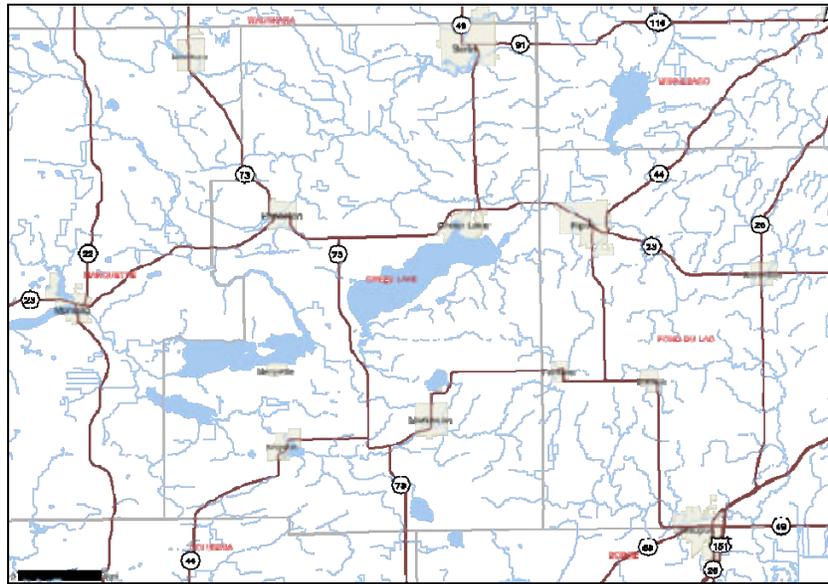


Figure 17: Water Resources in Green Lake County
WDNR www.dnrmaps.wisconsin.gov

producing enough electricity for a small neighborhood. In general, the term micro-hydro refers to installations that produce less than 100kW of power.

Hydro-power is based on simple concepts very similar to other renewable resources: moving water turns a turbine or waterwheel, the turbine spins a generator and electricity is produced. Water power is comprised of a combination of head (the vertical drop) and flow (quantity of water). Combined these create the pressure needed to drive the turbine. A site's head and flow will dictate everything about the hydro-system including how much electricity you will generate. The following equation estimates the output of a system in watts (W), assuming 53% efficiency which is representative of most micro-hydropower systems¹¹: $[\text{net head (feet)} \times \text{flow (gpm)}] \div 10 = W$

When examining the feasibility of a micro-hydro system, there are several factors to consider: the amount and regularity of the water source; the water rights; the type of system (grid-tied or stand-alone); and any applicable permits. For the most part, micro-hydro systems do not have an extreme effect on the environment; however, environmental effects ought to be considered, as well.

Similar to other renewable resources, micro-hydro is very site specific; however, in general, with its abundance of water resources, Green Lake County is well suited to use micro-hydro systems.

¹¹ US Department of Energy www.energysavers.gov

Innovative New Technologies

Algae

Recently, scientists have developed both biodiesel and ethanol from a very unlikely source: algae. Algae are mostly photosynthetic, microscopic organisms that live in both the world's salt and freshwaters. The science behind the use of algae as a renewable feedstock is relatively simple: algae needs water, sunlight, and carbon dioxide in order to grow. Algae may be cultivated outdoors or in enclosed systems, and then harvested and useful materials extracted from them. Algae produce oil and carbohydrates that can be harvested and converted into both ethanol and biodiesel. Both the ethanol and biodiesel produced from algal lipids are much cleaner-burning than petroleum-based diesel or gas. While the science may be simple, the reality is that this technology has not proven to be economically viable. The main focus of this emerging science is to figure out how to grow algae fast enough and cheap enough to make it competitive with petroleum-based products. Currently, there is a Wisconsin state-funded project to develop a commercial-scale cultivation system, as well as a University of Wisconsin-Madison project to determine how and at what cost algal cultivation can be integrated into existing wastewater treatment processes¹². These projects are spearheaded by AlgaXperts, LLC, based in Madison, WI. This company is a professional algal consulting and analysis company that provides biological, economic, and engineering services related to water quality and green technology innovations.

With more than 20 lakes, numerous streams, and the Fox River, Green Lake County could be a good candidate to utilize algae as a source of renewable energy if and when the technology becomes financially feasible.

¹² www.algaxperts.com

Total Projects Considered

As the Plan was developed, Green Lake County and School District focused on six different types of projects:

- Public Education Projects
- Administrative and Policy Change Projects
- Energy Efficiency Projects
- Building Projects
- Fleet Projects
- Large-scale Renewable Energy Generation Projects

Public Education Projects

The GLC&S 25x25 Committee explored several programs for educating the Green Lake County community as a whole. These programs focus on energy efficiency, sustainable practices, and renewable energy. In addition to informing the Green Lake County citizens about Green Lake County and School District's commitment to reaching 25x25, these educational projects empower the citizens of Green Lake County to make sustainable choices in their own lives, thus extending the reach of the 25x25 process beyond just municipal operations. The Committee discussed extending the Natural Step for Communities Study Circle which were conducted for Committee members and department heads to residents of Green Lake County. Specific projects are detailed in the Project Selection section of this Plan.

Administrative and Policy Changes

There are many policy tools available to communities to help encourage, incentivize, or require renewable energy and energy efficiency projects. There are two broad categories of tools: those which inform municipal operations and those which govern all Green Lake County citizens. The policy tools that the Committee discussed were:

1. Implement an idling policy for all County vehicles
2. Adopt a renewable fuel vehicle purchasing policy
3. Adopt a standardized green purchasing policy
4. Implement a paper reduction strategy
5. Shift to life-cycle cost accounting
6. Create a performance target system to evaluate and monitor internal sustainability goals
7. Implement a PACE program to make energy efficiency and renewable energy projects more affordable to the citizens of Green Lake County. PACE (Property Assessed Clean Energy) is a financing method which whereby a municipality gives property-owners an energy project loan. The loan is paid back as a loan on the property tax bill of a property. A PACE program helps eliminate the up-front costs associated with renewable energy and it solves the problem of "what happens when I sell my home?"

Energy Efficiency Projects

Often times the “low hanging fruit,” or projects that have extremely high savings to investment ratios, are energy efficiency projects. Indeed increasing the efficient use of existing energy supplies is widely acknowledged to be the fastest, cleanest, and cheapest means to meet future energy needs. In addition to helping to reduce electricity and heating bills, energy efficiency projects give the County and the School District a head-start on meeting the 25x25 commitment by reducing their total energy usage.

Focus on Energy analyzed the two highway shops and the Green Lake School for possible energy efficiency projects. Focus on Energy works with eligible Wisconsin resident, businesses, and governments to install cost-effective energy efficiency and renewable energy projects. Focus on Energy identified the following possible projects:

Highway Shop 1

- Replace lights with compact fluorescents
- Install LED exit lighting
- Insulate the domestic hot water pipes
- Replace T-8 lamps with low wattage fluorescents
- Replace refrigerator with high-efficiency Energy Star refrigerator

Highway Shop 2

- Install LED exit lighting
- Replace the overhead door seals
- Replace the electric hot water heater with high-efficiency natural gas hot water heater
- Replace refrigerator with high-efficiency Energy Star refrigerator

Green Lake School

- Replace lights with compact fluorescents
- Tune-up Air Conditioning
- Install LED exit lighting
- Insulate the domestic hot water pipes
- Install on-demand water heater
- Ensure that optimal computer/monitor sleep modes are being utilized
- Install occupancy sensors for lighting
- Install high-performance linear fluorescent lights
- Install high-efficiency combination oven in cafeteria
- Replace air compressor with high-efficiency unit
- Replace the boiler with a high-efficiency 100% condensing boiler system
- Replace refrigerator with high-efficiency Energy Star refrigerator

In addition to these three buildings, Green Lake County and School will consider energy efficiency projects for other buildings, as well. A full evaluation would be necessary before the County and the School District undertake any large retrofit projects.

Building Projects

Currently, the Green Lake County and School District building inventory included 12 buildings with a total of more than a quarter of a million square feet of floor space. These buildings range from the brand new LEED-certified Justice Center to structures such as the park shelters that hardly qualify as buildings. These buildings consumed over 2.4 million kWh and more than 92,000 therms in 2009. Of the total building profile, 77% of the kWh consumption and 34% of the therms are attributed to County buildings.



The first projects considered for the buildings that comprise the Green Lake County and School District profile were solar electric and solar hot water projects. Specifically, the Committee considered solar electric on the Highway Shop 1, Highway Shop 2, the Justice Center, and the School. The Committee also considered solar hot water systems at the school, the jail, and the maintenance shed.

Fleet Projects

Currently, the Green Lake County and School District fleet inventory includes 81 County vehicles, a school passenger bus, and two other school vehicles. In 2009, the County and School consumed over 71,200 gallons of diesel fuel and over 87,700 gallons of unleaded fuel. Of the total fuel profile, the School consumes shy of 9% of the diesel fuel and 3% of the total unleaded fuel consumed.

The first projects that were considered for the fleet were a conversion to biodiesel and flex fuel vehicles. Replacing the school truck with a Neighborhood Electric Vehicle (NEV) was also discussed. While the Committee immediately gravitated towards replacing current conventional fuel sources with alternative fuel sources, increasing the overall efficiency of the fleet was also discussed.

Large-Scale Renewable Energy Projects

The majority of the renewable energy generation projects that were discussed are small- to medium-scale site specific projects; however, the Committee did discuss two different large-scale renewable energy projects: a utility-scale wind farm and a methane digester at the landfill. As detailed in the *Renewable Feedstocks* section of this Plan, the wind farm was spawned by the interest that both Alliant Energy and NextEra have shown in Green Lake County.

Pathways to 25x25

Green Lake County and School District’s pathway to 25x25 involves short and long-term action steps which encompass the six different categories of projects detailed in the previous section of this Plan.

1. The County and the School District will continue to educate County citizens and employees in sustainable practices.
2. The County and the School District will implement administrative and policy changes to ensure that they are providing services in at an efficient and optimal level.
3. The County and the School District will embrace energy efficiency first and foremost.
4. The County and the School District will implement small to medium-scale renewable energy generation projects at both the School and County buildings.
5. The County and the School District will convert their vehicle fleet from conventional fuels to alternative fuels.
6. The County and the School District will coordinate with interested stakeholders to implement a large-scale wind farm.

There potentially are many different alternatives for the County and the School to embrace these six different categories of projects and reach their 25x25 goals; however based on the projects considered, the Energy Center of Wisconsin’s data analysis, and the perceived feasibility of the projects that were proposed, the following pathway was selected. Please refer to Appendix B for data sheets on the following pathway. The following sections of this Plan provide details and specific information on the projects selected.

Energy Baseline 2009 (MMBtus)	38,213
Projected 2025 Total (MMBtus)	39,141
Energy Efficiency Projects (MMBtus saved)	1,699
25% Renewable Energy Generation Goal - after subtracting Energy Efficiency Projects (MMBtus)	9,360
PV Projects (MMBtus)	1,042
Wind Projects (MMBtus)	1,098
Alternative Fuel Projects (MMBtus)	7,298
Total MMBtus Renewable Energy Generated by 2025	9,438
Goal Achieved	101%

Projects Selected

Public Education Projects

Throughout the 25x25 planning process, the Committee has placed a high importance on community education and outreach. This is an effective way to leverage the 25x25 grant dollars. In keeping with this, the following list outlines some of the educational events that were implemented as part of the 25x25 process:

- Green Lake County EIC members and Green Lake County Department Heads attended Natural Step for Communities study circles facilitated by Lynn Markham, from UWEX.
- Jason Kauffeld, Green Lake County UWEX educator and secretary of the EIC, taught 60 educators at the July 25-30, 2010 Midwest Regional Conference for Sustainability Education about community outreach and planning related to sustainability.
- Jason Kauffeld led an Energy Tour in Fond du Lac County on July 31, 2010. He taught the 25 attendees about Wisconsin and Green Lake County's commitment to achieving 25x25.
- The GLC&S EIC hosted an educational booth at the Green Lake County Fair on August 5-8, 2010. The EIC mobilized over 240 volunteer hours to keep the booth staffed. The EIC developed a banner and poster/placard detailing the mission of the GLC&S EIC.
- The EIC brought John Ikerd to Green Lake's Thrasher Theater on August 27th. The renowned author and expert in the field of sustainable agriculture and economic development gave a presentation on community sustainability and renewable energy.
- The EIC attended the 4th Annual Tri-County Economic Development Summit. This is a day-long event for Tri-County leaders from the private and public sector to network and learn about the green and sustainable efforts in the tri-county areas. Presentation included an overview of the Green Lake County and School District 25x25 planning process.
- The EIC hosted the first informational and renewable energy demonstration section at the annual Harvest Festival celebration in Green Lake County.
- The EIC is coordinating the Energy Education Week which will be held in early 2011, and will be comprised of the following events:
 - Community Job Fair – This will be an evening event for adults to learn what green jobs are available in Green Lake County and the surrounding areas and also to learn about green education programs from colleges across Wisconsin. Event planning will be in conjunction with the Workforce Development Board.
 - Career Day – An event for students across the County to learn about career opportunities in the energy field. Age-appropriate activities for all grade levels will be included in this event.
 - Renewsal Play – An interactive stage performance that turns conservation into entertainment. The Green Lake School District would like to host this event for students throughout the County.
 - Teacher Workshop – This is a teacher training workshop on the KEEP curriculum for all teachers in the four school districts within the County. There is potential to invite

teachers from surrounding districts as well. Providing training on this unique curriculum will allow energy education to spread far and wide throughout the County.

- The EIC will purchase 18 monitors to measure kWh use. These monitors will be distributed to public and school libraries throughout the County. Students and public alike may checkout the monitors for use at home to gauge specific appliance energy usage.
- Computer kiosks will be set up in the lobby of the Justice Center and will be used to educate the public on the energy-saving components and energy usage of the center.

Administration and Policy Changes

The County shall adopt anti-idling and alternative fuel vehicle purchasing policies in order to increase the energy efficiency and sustainability of County operations. While it isn't the most glamorous project, making a commitment to purchasing alternative fuel vehicles is the most important measure selected. There is more information in the following section on fleet projects.

Energy Efficiency Projects

Based upon the recommendations of Focus on Energy, the Committee selected three energy efficiency projects to implement.

Energy Efficient Lighting Retrofit at Green Lake School

Convert existing T12 systems to T8 fluorescents. The measure includes replacing 44 fixtures in the cafeteria with 22 25w T8 fluorescents and occupancy sensors and replacing 13 fixtures in the kitchen with 13 25w T8 fixtures and occupancy sensors, and replacing 13 fixtures with 13 25 w T8 fluorescents and added manual switching. It is estimated that this project will save 8,788 kWh of electricity annually.

Replace the boilers at Green Lake School

Replace an old boiler at the School that is currently only 65% efficient with a 100% Condensing Boiler System. It is estimated that this project will save 15,206 kWh of electricity annually, and will cost approximately \$62,000. Currently, it is eligible for \$9,914 of incentives from Focus on Energy.

NEV at School

Replace the existing truck at the School with a Neighborhood Electrical Vehicle (NEV). This will save approximately 1,200 gallons of unleaded fuel per year, and will cost approximately \$16,500.

Renewable Energy Generation Projects for Buildings

After contemplating many different small- to medium-sized renewable energy generation projects for buildings in the County and School inventory, three photovoltaic projects and two medium-scale wind projects were selected. It is important to note that the costs and energy generation numbers are estimates, the County and the School shall obtain specific site-estimates before pursuing any of these projects.

Photovoltaic Project at the School

This project will be implemented in two phases. During the first phase, the School will install two rows of twenty-two 235-watt panels. This array will measure approximately 75 ft x 10 ft and will be located on the roof of the school. In the second, the school will install another two rows of twenty-two 235-watt panels. The total space used in phase one and two will be approximately 75 ft x 20 ft. It is estimated that this project will generate approximate 24,530 kWh annually. The estimated cost for both phases is \$125,000. If this project were completed in one phase, the cost would be less. This

project does qualify for incentives from Focus on Energy. Currently, if the project were completed in two phases, it would be eligible for approximately \$38,000 in incentives.

Photovoltaic Project at the Highway Shop 2

Install two rows of twenty-two 235watt panels. This array will measure approximately 75ft x 10ft. This project is estimated to generate approximately 12,265 kWh annually. The estimated cost is \$65,000. Currently, it would qualify for approximately \$18,400 in FOE incentives.

Photovoltaic Project at the Justice Center

Install a 13.76 kW solar system consisting of 4 dual-axis solar trackers at the Justice Center. It is estimated that this project will generate approximately 21,877 kWh of electricity annually. It is estimated to cost approximately \$142,500, and is currently eligible for approximately \$38,000 in FOE incentives.

Wind Turbine for School

Install one medium scale wind tower for the School. For the energy calculations, a Renewegy medium-sized wind turbine was used; however, the County and School may wish to pursue other options which may increase or decrease the estimated energy generation and/or cost. If the School were to install one wind turbine, it is estimated that it would generate approximately 25,053 kWh annually, and will cost approximately \$90,500 to install. Currently, there would be approximately \$18,100 in incentives available. There are additional tax credits available; however, because neither the School nor County are tax-paying entities, they are not eligible. The County and School could pursue the creation of a Blocker C Corp or a flip-model of financing if they wished to capitalize upon the available tax credits.

Wind Turbine at the Justice Center

Install two medium scale wind towers at the Justice Center. The same as the wind turbine at the School, Renewegy medium-sized turbines were used for these calculations. It is estimated that this measure will generate approximately 50,106 kWh of electricity annually. It is estimated to cost approximately \$177,530 and be eligible for \$35,506 in incentives.

Renewable Energy Generation Projects for the Fleet

Because the fleet makes up such a large amount of the baseline energy consumption for the County and School, it also comprises an imperative part of the projects needed to attain 25x25. Because only cumulative fuel consumption was available, these projects are based upon estimated total consumption levels.

Flex-Fuel Van at School

Replace existing van at the School with a flex-fuel van. The van would run off of E-85. There is currently an E-85 filling station in Green Lake County. This measure would generate an estimated 944 gallons per year. The cost of a flex-fuel vehicle is comparable to a new unleaded fuel vehicle, and it is anticipated that the School will complete this measure in accordance with the normal replacement schedule.

County Vehicle Conversion to Flex Fuel

In accordance with the normal replacement schedule, replace County unleaded fuel vehicles with flex-fuel vehicles. There are currently some existing flex fuel vehicles. It is assumed that they will continue to be updated with flex fuel vehicles. It is estimated that 80% of the fleet will be converted from unleaded to flex fuel by 2025, resulting in a renewable generation of more than 53,500 gallons of fuel.

As more County vehicles are converted to flex fuel, there will be a need to install another E85 fueling station. While there is currently one station in Green Lake County, it is anticipated that this large-scale conversion of County vehicles will necessitate another station. As this time approaches, the County and the School will investigate partnerships or other means of encouraging and/or facilitating more flex fuel filling stations.

County Vehicle Replacement Schedule				
<i>(As vehicles are normally replaced, they shall be replaced with alternative fuel vehicles)</i>				
Year	Make	Model	Year of Replacement(s)	Alternative Fuel Type
Sheriff's Office				
2005	Ford	Crown Vic	2011	flex fuel
2006	Ford	Crown Vic	2011	flex fuel
2006	Ford	Crown Vic	2011	flex fuel
2008	Ford	Crown Vic	2012	flex fuel
2008	Ford	Crown Vic	2012	flex fuel
2008	Ford	Crown Vic	2012	flex fuel
2005	Ford	Crown Vic	2013	flex fuel
2007	Ford	Crown Vic	2013	flex fuel
2007	Ford	Crown Vic	2013	flex fuel
2004	Dodge	Durango	2013	flex fuel
2009	Dodge	Charger	2014	flex fuel
2009	Dodge	Charger	2014	flex fuel
2009	Dodge	Charger	2015	flex fuel
Land Conservation				
2008	GMC	Canyon Truck	2014	flex fuel
2004	Chevy	Silverado Ext Gab	2010-2011	flex fuel
2007	Ford	Escape XLT	2012-2013	flex fuel

County Vehicle Replacement Schedule					
<i>(As vehicles are normally replaced, they shall be replaced with alternative fuel vehicles)</i>					
Planning and Zoning					
2008	Chevy	Uplander Van		2018	flex fuel
Maintenance					
2003	Chevy	Pick-up w/ plow		2011	flex fuel (Dodge 3/4 ton Ext. Cab)
2001	GMC	Sonana 4WD		2012	flex fuel (mid-size Dodge Dakota)
2009	Dodge	Ram Truck		2017	flex fuel (3/4 ton, Ext. Cab)
Highway Vehicles					
1996	Ford	Truck		2011	flex fuel
1998	Chevy	Truck		2012	flex fuel
2001	Ford	Supercab		2013	flex fuel
2002	Ford	Truck		2014	flex fuel
2003	Ford	Crewcab Pick-up		2015	flex fuel
2005	Ford	F-250		2017	flex fuel
2007	Ford	Superduty F-250		2018	flex fuel

Biodiesel County/School Partnership

Install a fuel tank so that the County and School can mix their own biodiesel during the four months of the summer. At this time, it is anticipated that they will use a B50 blend for four summer months. The cost also includes purchasing a blender pump. If all the current County and School vehicles that use diesel are to convert to B50 for June, July, August, and September, an estimated 9,890 gallons of diesel would be generated from renewable sources. The estimated cost is \$100,000.



Existing Unknowns – Necessary Information for the Future

While this Plan details specific projects that will move the County and School District towards their commitment of attaining 25x25, there are several existing unknowns.

Detailed Site Analysis and Engineering Studies

Much of the specific energy generation information was estimated from readily available sources. Because renewable energy generation is extremely site specific, further detailed site analysis will be necessary to ensure that the proposed measures achieve their anticipated energy generation goals. In addition, specific engineering studies will be necessary to provide detailed costs and specific product information.

Vehicle Fleet Data

Because the fleet is such a large portion of the County and School's energy baseline, the projects related to converting the fleet from conventional fuel sources to alternative fuel sources are imperative to the success of achieving 25x25. Data for the fleet is based upon cumulative fuel usage, thus the proposed alternative fuel projects assume that each vehicle in the fleet is responsible for an equivalent amount of fuel. In reality, this is not the case. As the County and School move forward on the 25x25 initiative, more detailed data on per vehicle fuel consumption and miles driven must be collected. Converting the vehicles which are used the most to an alternative fuel will amount in greater renewable energy generation.

Renewable Energy Technology

Renewable energy is a rapidly changing field. Estimates that were made today, in 2010, on potential projects that may occur in 2015 do not account for the rapid advancements that are currently being made in the renewable energy generation field. As Green Lake County and School move towards their 25x25 goal, they may embrace technologies that don't even exist currently.

Funding

Especially in these tough economic times, funding these projects is always a challenge for communities. It is anticipated that the timeline of these projects may shift as specific funding sources are found.

Non-renewable Energy Prices

If non-renewable energy prices continue to rise, the cost-effectiveness of renewable energy projects will increase. The reverse is also true. Because decisions are often driven by the bottom line, future energy prices will affect the County and School's path to 25x25.

Future Political Climate

The past political climate in Green Lake County and Wisconsin as a whole has been very supportive of the sustainability movement. Indeed, Green Lake County made the commitment to build the LEED-certified Justice Center independent of this 25x25 planning process; however, future political support and therefore public funding, is always unknown.

Future Mandates and Legislation

With carbon trading and renewable portfolio standards, it is highly likely that there will be future legislation that will affect Green Lake County and School's path to 25x25.

Action Steps – Immediate and Long-Term

The following table includes the immediate and long-term action steps for Green Lake County to move along their pathway to 25x25. The table includes the responsible party and the estimated cost.

Project	Responsible Party	Cost with incentives	Year
Continue to track energy usage through Portfolio Manager	County Clerk/ School District Accounts Mgr	No cost	2010-2025
Make a commitment to continual improvement, and review this plan annually	Property and Insurance Committee	No cost	2010-2025
Continue to implement energy and sustainability educational events	Energy Independent Community Committee	Varying cost	2010-2025
Develop and adopt administrative and policy changes	County Board	Varying cost	2010-2025
Complete Energy-Efficient Lighting Retrofit at Green Lake School	School Board	\$5,000	2011
Replace boilers at the Green Lake School	School Board	\$51,917	2012
Install Photovoltaic System - Green Lake School Phase One	School Board	\$43,537	2013
Install Photovoltaic System - School Phase Two	School Board	\$42,000	2015
Install Photovoltaic System – Highway Shop 2	County Board	\$46,603	2012
Install Photovoltaic System - Justice Center	County Board	\$104,215	2020
Install Wind turbine - School	School Board	\$72,400	2013
Install Wind turbine - Justice Center	County Board	\$142,024	2015
Purchase NEV for school	School Board	\$16,500	2015
Flex fuel van - school	School Board	\$26,000	2011
County vehicles conversion to flex fuel (80% of fleet converted by 2025)	County Board	cost to replace vehicles	2011-2025
Biodiesel County/School Partnership	County Board/School Board	\$95,000	2012

Commitment to Continual Improvement

By adopting this Plan, Green Lake County and School District are making a commitment to themselves to consider and value the long term sustainability and energy independence of the County and School District. An important aspect of this commitment is continued, annual efforts to track progress towards the visions and goals established in their Plan. In order to obtain the 25x25 goal, the County and the School District shall recommit to a set of actions each year.

Annual updates to the action plan will be completed prior to the County and School District's budgeting process each year. Annual updates and new actions ought to be approved by resolution by the County Board.

Green Lake County and School District Energy Independence Committee

Marge Bostelmann
Jason Kauffeld
Daniel Priske
Sue McConnell
Scott Weir
Ken Bates
Gordy Farrell

County Clerk
UWEX CNRED agent
County Board Chair
County Board Supervisor
County Maintenance Supervisor
GLS Superintendent
Vice President of School Board
Buildings and Grounds Chairperson

Appendix A: 25x25 Commitment

RESOLUTION NUMBER 31-2008

Relating to setting a goal of achieving at least 25% renewable, domestically produced energy by 2025.

The County Board of Supervisors of Green Lake County, Green Lake, Wisconsin, duly assembled at its regular meeting begun on the 16th day of December, 2008, does resolve as follows:

WHEREAS, the Green Lake County Board is committed to protecting the environment and growing the economy; and

WHEREAS, the Green Lake County Board recognizes that conservation, energy-efficiency, and renewable energy safeguard our environment, strengthen our economy, and reduce costs; and

WHEREAS, the Green Lake County Board recognizes that the public sector must be a leader in implementing energy efficiency and renewable energy in public facilities and infrastructure; and

WHEREAS, the Green Lake County Board has in the past undertaken energy-efficiency measures intermittently; and

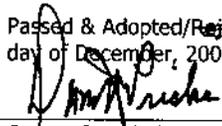
WHEREAS, the Green Lake County Board now wishes to develop a comprehensive approach:

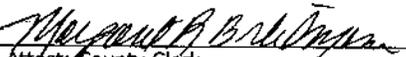
- To implement energy conservation and efficiency in all public facilities in the County,
- To generate renewable energy on public property and in publicly-supported projects,
- To use alternative fuels and increase overall fuel efficiency of the County's vehicle fleet, and

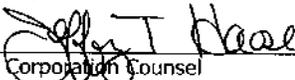
Roll Call on Resolution No. 31-2008

Aye 17, Nay 0, Absent 2, Abstain 0

Passed & Adopted/Rejected this 16th day of December, 2008

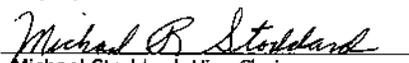

County Board Chairman


Attest: County Clerk
Approved as to Form:


Corporation Counsel

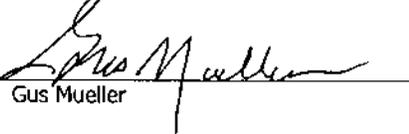
Submitted by Property & Insurance


Eugene Schroeder


Michael Stoddard, Vice Chair

Orrin W. Helmer


Gene Thom


Gus Mueller

Resolution No. 31-2008 Relating to 25% x 2025 Continued:

WHEREAS, the Wisconsin Office of Energy Independence is seeking partnerships with local units of government in furtherance of the State of Wisconsin's efforts to achieve the goal of achieving at least 25% renewable, domestically produced energy by 2025;

NOW, THEREFORE BE IT RESOLVED, that Green Lake County Board hereby declares itself a partner with the State of Wisconsin in pursuit of the "25 x 25" goals for energy independence, and directs staff to prepare and submit an application to the Wisconsin Office of Energy Independence for a grant for an Energy Independent Community 25 x 25 plan; and

BE IT FURTHER RESOLVED, that upon adoption the County Clerk is hereby directed to send a copy of this resolution to Governor Doyle and the Wisconsin Office of Energy Independence.

Appendix B: Energy Spreadsheets

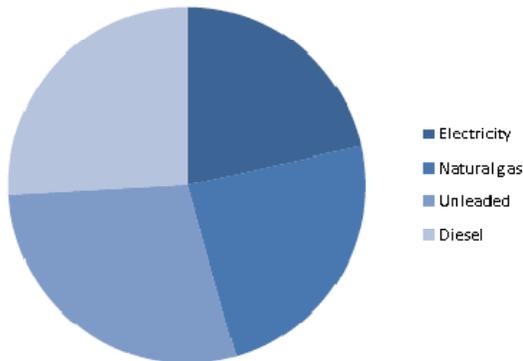
Your energy usage baseline is	38,213 million (MM) Btus.*
That baseline is comprised of	2,408,532 kWh,
	92,103 therms,
	87,727 gallons of unleaded,
and	71,275 gallons of diesel.
By assuming an annual growth rate of	0.15% ,
in 2025 your energy use baseline will be	39,141 MMBtu.
Your 25% renewable energy goal	9,785 MMBtu,
for 2025 is therefore	25% of your baseline consumption.
or	
This translates into	2,867,892 kWh or
	97,852 therms or
	78,913 gallons gas or
	70,397 gallons diesel, or
	some combination
	of those fuels.

* This baseline is an average of 1 years of energy use data. Because of the limitations of Portfolio Manager, for 1 of the 14 buildings and water facilities in your portfolio, the 2009 year used to create this average runs from Dec08-Nov09. In other words, for these facilities Dec08 was counted twice (the 2008 year and the 2009 year) and Dec09 was not counted.

Green Lake Energy Baseline: Additional Info

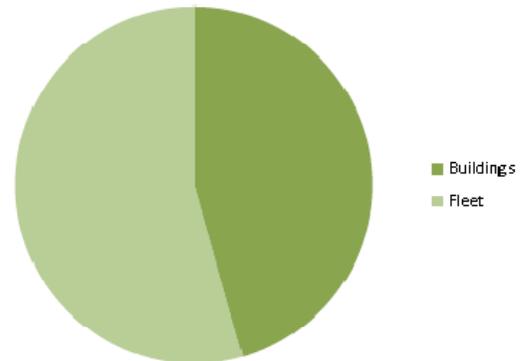
Total Consumption by Energy Type

Energy type	Percent of total Btus
Electricity	22%
Natural gas	24%
Unleaded	28%
Diesel	26%



Total Consumption by End Use

Energy end use	Percent of total Btus
Buildings	45.60738%
Fleet	54.39262%

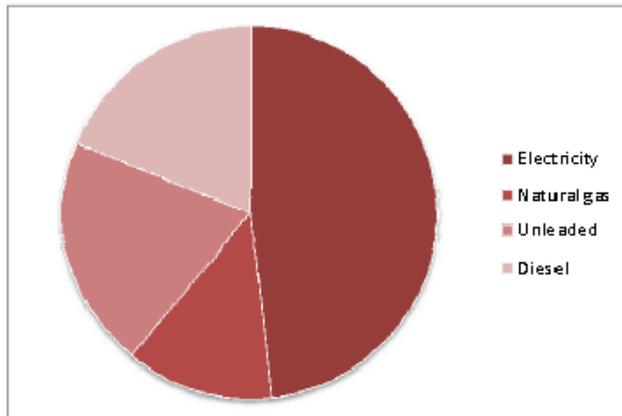


Green Lake Energy Baseline: Additional Info

Total CO2 Emissions by Energy Type

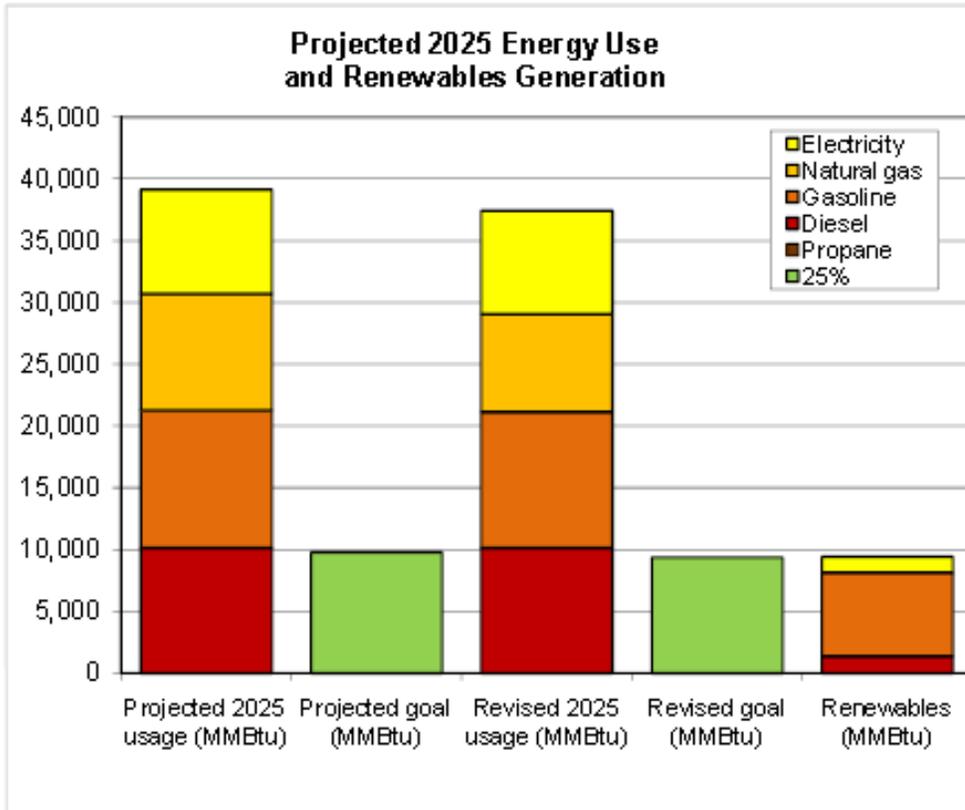
Energy type	Percent of total CO2
Electricity	48%
Natural gas	13%
Unleaded	20%
Diesel	19%

Total: 8 million lbs CO2



		MEASURES						
	Name	Savings-to-investment ratio	Savings/generation	Installed cost before incentives	Incentive amounts	Present value cost with incentives	lbs CO ₂ avoided from fossil emissions	
10%	Wisconsin RPS	--	232437 kWh	--	--	--	393,284	
R	Purchased renewable electricity	#DIV/0!	0 kWh	-	-	-	-	
On	Energy-Efficient Lighting Retrofit at Green Lake County School	0.51	8788 kWh	\$ 5,000	\$ -	\$ 12,690	51	
On	Replace boilers at the Green Lake County School	3.17	15206 therms	\$ 61,831	\$ 9,914	\$ 50,411	17,803	
On	Photovoltaic System - Green Lake County SchoolPhase One	0.18	12265 kWh	\$ 65,000	\$ 21,463	\$ 41,055	71	
On	Photovoltaic System - SchoolPhase Two	0.16	12265 kWh	\$ 60,000	\$ 18,000	\$ 37,296	71	
On	Photovoltaic System - HS2	0.18	12265 kWh	\$ 65,000	\$ 18,397	\$ 45,252	71	
On	Photovoltaic System - Justice Center	0.05	21877 kWh	\$ 142,500	\$ -	\$ 109,155	126	
Off	Solar Hot Water - School	0.09	1400 kWh	\$ 12,000	\$ -	\$ 12,000	8	
Off	Solar Hot Water - Jail	0.07	2100 kWh	\$ 18,000	\$ -	\$ 16,470	12	
Off	Solar Hot Water - Maintenance	0.14	500 kWh	\$ 2,500	\$ -	\$ 2,428	3	
On	Wind turbine - School	0.22	25053 kWh	\$ 90,500	\$ 18,100	\$ 68,273	145	
On	Wind turbine - Justice Center	0.20	50106 kWh	\$ 177,530	\$ 35,506	\$ 126,117	289	
Off	Wind turbines - County	0.02	260000 kWh	\$ 12,000,000	\$ 3,000,000	\$ 6,129,000	15,010	
On	NEV at school	0.89	1200 gallons unleaded	\$ 16,500	\$ -	\$ 31,959	2,908	
On	Flex fuel van - school	0.71	944 gallons unleaded	\$ 26,000	\$ -	\$ 44,226	2,287	
On	County vehicles conversion to flex fuel (80% of fleet converted by 201	#DIV/0!	53598 gallons unleaded	\$ 1	\$ 1	\$ -	129,866	
On	Biodiesel generators - Justice Center	1196.35	34 gallons diesel	\$ 1	\$ -	\$ 1	106	
On	Biodiesel County/School Partnership	3.52	9890 gallons diesel	\$ 100,000	\$ 5,000	\$ 92,245	30,752	

PORTFOLIO SUMMARY				
Installed cost before incentives	Incentive amounts	Present value cost with incentives	lbs CO ₂ avoided from fossil emissions	Percent of goal achieved (see below)
\$ 809,863.00	\$ 126,381	\$ 658,680.82	577,829	101%



Projected 2025 usage (MMBtu)	39,141
Revised 2025 usage (w/ efficiency) (MMBtu)	37,442
Revised 25% 2025 renewables goal (MMBtu)	9,360
Sum of renewable measures (MMBtu)	9,438
Percent of goal achieved	101%

Baseline lbs CO ₂	8,462,170
New lbs CO ₂	7,884,341
CO ₂ Reduction:	0