2010
Wisconsin Energy Independent Community Partnership

25 x 25 Plan for Energy Independence

City of Whitewater
&
Whitewater Unified School District

Issue Date: **December 31 , 2010**

This page intentionally left blank

Table of Contents

1. 25x25 Project Overview

Introduction

The Wisconsin Office of Energy Independence (OEI) administers energy programs to assist Wisconsin to profitably and sustainably promote energy efficiency and renewable energy resources. The goal of the Wisconsin Energy Independent Community Partnership administered by the OEI is to effectively increase energy independent assessments for Wisconsin communities. Currently, there are many communities across the State of Wisconsin interested in implementing and adopting renewable energy and energy efficient projects. This program will assist 10-15 communities that could be potential pilots or models for completing an energy independence assessment, allowing the community to then move forward with energy efficiency and/or renewable energy projects.

Definition

- Energy Independent Community (EIC) – a community that is willing to set a goal of "25 by 25" to increase our energy independence, and promote a sustainable energy policy for the State of Wisconsin

Objectives

The objectives of the Wisconsin Energy Independent Community Partnership are to:

- Increase the use of renewable energy and renewable fuels by 25% by 2025 across the State of Wisconsin.
- Increase and promote public awareness regarding the benefits of increased energy conservation, energy efficiency, and renewable energy use by counties and municipalities around the state. These benefits include, but are not limited to: clean air and water, intelligent land management, rural and urban economic development, as well as state and national energy independence.

Eligible Participants

Applicant must be a Wisconsin county, city, village or town that has 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 electrical system, must be in compliance with all appropriate state and federal regulations.

The City of Whitewater (City) partnered with the Whitewater Unified School District (District) to submit an application to receive funding support under the 2010 EIC plan grant opportunity. The City and District are required to collect electricity, natural gas, and transportation fuel consumption data from the past three years and develop a plan by December 31, 2010 that would identify an action plan to achieve 25x25 goals. This report (Plan) is the resultant deliverable to the Wisconsin Office of Energy Independence to fulfill grant requirements. They City and District were awarded a $45,000 planning grant to complete this project.

City of Whitewater

The City of Whitewater is a growing city located in southeast Wisconsin, with a 2010 population estimate of 14,454. Population has increased 7.6 percent since 2000, and is estimated to increase to approximately 15,664 residents by 2025. The City of Whitewater occupies the northwest corner of

Walworth County, and also occupies a small portion of Jefferson County. The City is home to the University of Wisconsin – Whitewater, the new Whitewater University Technology Park, and a rejuvenated and vibrant historic downtown.

The City of Whitewater joined the Energy Independent Communities Partnership with City Council passage of a 25 x 25 Resolution on October 23, 2009. A copy of this resolution is included as an attachment to this report.

The City of Whitewater is recognized as a leader in environmental stewardship in the State and region. In December, 2005, the City of Whitewater Council passed a resolution supporting the U.S. Conference of Mayor's Climate Protection Agreement (included as an attachment to this report). Our forward-thinking municipal comprehensive plan, passed in 2010, incorporates and emphasizes elements of sustainability throughout. Each chapter of the plan directly highlights strategies to pursue sustainability goals. Presently, in December 2010, the City is considering becoming one of the first communities in the Wisconsin DNR's Green Tier Legacy Community program, reflecting ongoing commitment to environmental stewardship and resource footprint reduction. This DNR program welcomed the first five charter communities in November 2010.

The City has identified emerging sectors relating to the broader sustainability transition, including energy efficiency and generation component manufacturing, design, and services; water quality and efficiency products; alternative transportation, such as cycling; as well as bio- and information technology, as priority economic growth foci. The City recognizes that supporting and attracting businesses in these sectors, and improving environmental performance of existing businesses, not only will lead to more economic opportunity for our citizens, but also foster innovation and expansion in businesses that share our environmental ethic. Part of undertaking this 25x25 planning exercise is not only to improve municipal operations, but in partnership with the Whitewater Unified School District and other key stakeholders, lead by example and provide education and outreach of best practices throughout the community.

Whitewater Unified School District

The Whitewater Unified School District provides K-12 education to residents of the City of Whitewater and surrounding area. In addition to the City of Whitewater, district territory also includes the Town of Whitewater, most of the Towns of Richmond and La Grange in Walworth County; most of the Town of Lima and the eastern portion of the Town of Johnsontown in Rock County; a small portion of the Koshkonong Township and most of Cold Springs Township in Jefferson County.

Enrollment in the District is 2,033 in 2010, up from 941 in 2001 (WI Department of Administration, 2010). The District operates six buildings: High School, Middle School, Central Office Building, and three elementary schools: Washington, Lincoln, and Lakeview.

The Whitewater Unified School District first adopted an Energy Conservation Statement in 1985, which was subsequently revised in 2000. That Statement is included as an attachment to this plan.

In recent years, the District has worked more closely with the City on cooperative efforts, such as funding the Whitewater Aquatic Center, and undertaking this energy assessment and planning project. This 25x25

planning effort has provided the opportunity and identified future efforts around energy and sustainability for the District to collaborate with the City, University, and other stakeholders.

Process

The Whitewater Energy Team (Team) began meeting in February, 2010, and draws its ten formal members from City and District executives and staff, as well as representatives from the University of Wisconsin – Whitewater, WE Energies, and University of Wisconsin – Extension. A number of additional persons participated throughout the process to add value and content to the process and plan. Whitewater Energy Team roster is included in Chapter 11 of this plan report.

The Team is charged with carrying out the 25x25 planning process by assessing present conditions, investigating energy efficiency and conservation best practices, exploring renewable energy options, building partnerships, and increasing staff awareness and capacity to strategically approach energy as a cost savings, environmental, and economic development issue.

The Whitewater Energy Planning Team took an inclusive, capacity building approach to study energy options for the City and District. The Team sought and continues to seek to build relationships with key stakeholders in the City and region, including the University of Wisconsin – Whitewater, UW Extension, and regional municipalities interested and/or active in energy planning. The Team is aware that relationships and cooperation will be critical to the success of this plan and future efforts.

The first step in the planning process was to collect energy consumption data, including electricity, natural gas, and liquid transportation fuels (more about this in Chapter 2). The Team worked with WE Energies to provide historical data from the City and District facilities, and without their assistance this exercise could not have been completed. The electrical and natural gas data was entered in the U.S. Environmental Protection Agency Portfolio Manager online software platform, which provides a method to track, benchmark, and compare consumption in specific facilities.

The Energy Center of Wisconsin, an independent non-profit research and consulting firm, was contracted by the Office of Energy Independence to build an energy demand modeling platform, to which data from Portfolio Manager was transferred, as a tool provide projections of energy demand conditions in 2025 based upon energy efficiency and renewable energy measures. In a nutshell, the tool was used to estimate a total 2009 energy use baseline to provide an assessment of current consumption. Next, the tool estimates growth in energy demand based upon historical energy use and future population projections, and allows the user to enter projects predicated to be completed in a particular timeframe, calculates how the 2009 energy use baseline will be impacted and how this reflects projected total energy demand and renewable energy used in 2025. This tool provides insight to the Team to inform decisions as to how specific projects, as well as the broader effort, impacts energy consumption and track progress toward the 25x25 goal. This tool was used as the official benchmark to determine progress toward achieving the 25x25 goal, as outlined in this plan grant commitment.

The next step in the assessment process was to determine the present state of facilities, building systems, equipment, and other infrastructure that impacts energy consumption. The City completed this process by relying upon municipal staff knowledge of facilities, and solicited estimates from third-party contractors on specific potential energy savings projects. A representative from Focus on Energy also

walked through most City facilities and provided rough estimates for potential energy savings projects, which informed City staff where estimates should be solicited. The City executed a performance contract with Honeywell in 2005, which provided a facilities baseline and resulted in energy savings, and the 2010 assessment activities built upon those successes. The City also benefited from applying for and receiving an Energy Efficiency and Conservation Block Grant from the American Recovery and Reinvestment Act of 2009, as many building systems were studied for energy savings opportunities at that time.

The District chose to contract with Vesta Technologies Inc. to conduct complete facility energy assessments to determine opportunities for improvement. The Whitewater Aquatic Center, attached to the Whitewater High School and governed by an independent board, also selected Vesta to audit the facility.

The City and District were in the process of studying or undertaking projects independent of this 25x25 energy planning process, which supported activities and added capacity to the effort. These include the Whitewater Innovation Center and Whitewater University Technology Park, improvements at the Wastewater Treatment Plant, and others.

As the energy baseline model was built and facility assessments completed, the Energy Team, as well as other decision making bodies, began to act on information to implement projects and plan to undertake additional projects in future budget years. Those projects that were completed during the planning process are noted as such in Chapters 4 and 6, along with all projects considered for implementation.

The planning processes that lead to the creation of this Plan did not include significant outreach to citizens and private sector businesses. The availability of staff and volunteers prohibited a concerted outreach effort while moving ahead on assessment and planning of City and District efforts. The intent is to turn attention to education and outreach to citizens and businesses while projects outlined in this Plan are implemented in 2011. An outline of the approach and expected education and outreach activities is included in Chapter 10 in this Plan.

This Energy Independent Communities 25x25 Plan for Energy Independence is the contractually obligated report and deliverable outlining the City and District's assessment, baseline, and project plan to achieve the 25x25 goal of achieving 25 percent renewable energy utilization in 2025.

Timeline

The accompanying timeline displays the progression of major activities and events of the Whitewater 25x25 energy planning process leading to completion of this report.

October 23, 2009	City of Whitewater 25x25 Resolution Adopted by Common Council
December 15, 2009	25x25 Plan Grant Applications Submitted
February 4, 2010	25x25 Plan Grant Award Notification
February 23, 2010	First Whitewater Energy Team Meeting
March, 2010 – June, 2010	Collection of City and District Baseline Energy Use
April 7, 2010	Energy Independent Communities Quarterly Meeting, Eau Claire, WI
June, 2010	Focus on Energy Facility Visits
August 4, 2010	Energy Independent Communities Quarterly Meeting, Kaukauna, WI

October – November, 2010	Municipal and District project estimates by private contractors
October, 2010 – January, 2011	Energy Efficiency & Conservation Block Grant Projects Completed
November 11, 2010	Cooperative Outreach Event: City of Jefferson - City of Whitewater Energy Initiative Kickoff, Jefferson, WI
December 15, 2010	Energy Independent Communities Quarterly Meeting, Waukesha, WI; Whitewater 25x25 Plan Presentation
December 31, 2010	Energy Plan due to Office of Energy Independence

This energy plan, or a revised format, is expected to be considered by the City of Whitewater Common Council and by the Whitewater Unified School District Board in 2011 for endorsement as policy documents.

Commitment to Continual Improvement

The City of Whitewater and Whitewater Unified School District have each made a commitment to uphold energy and sustainability as a community and operational priority. The creation and adoption of this plan affirms these values and creates a strategy to make continuous improvement toward energy and cost reduction and utilize renewable sources of energy. To ensure progress is continual and long-term, the City and District are committed to actively implementing this plan, tracking progress, and to revisit the plan regularly as conditions and technology change. Further, this commitment affirms:

- Strengthen existing partnerships, and seek to form new ones, to implement projects and carry the sustainability mission forward.
- Annual public presentations to the Common Council and School Board highlighting successes and progress on environmental benchmarks.
- Proactively seek grant and other funding and financing opportunities to assist with project implementation as they become available.
- Continuous outreach and education activities.

2. What was measured? Why?

The necessary first step in the energy planning process is the collection of historic energy consumption data and the development of a use baseline. This baseline included electricity and natural gas consumption figures for each structure operated by the City and School District, as well as exterior lighting (street, pedestrian), park uses (unconditioned buildings, lighting), water utility, and fleet vehicles. The collection of three years of historical data is required under grant conditions. The City was able provide eight years of data (2002 through January 2009) for most facilities, and the School District three years.

The Energy Center of Wisconsin developed an energy use forecasting model for each of the grant recipient communities in order to estimate energy use and renewables utilization in 2025 based upon project implementation selection and timeline.

The City and District were also required to provide record, or where records are incomplete, estimates of liquid transportation fuel use (unleaded gasoline and diesel). The City operates a range of vehicles, including police cruisers and patrol vehicles, public works pickup and heavy trucks, and sedans for use by municipal staff. The School District contracts with a private transportation services firm to provide busing for students to and from school and to and from activities.

Buildings

The City of Whitewater building inventory includes 49 principle structures with a total of approximately 240,000 square feet of floor space. This inventory includes historic facilities as well as recently constructed (and under construction). The Historic Train Depot, which is owned by the City and occupied by the Whitewater Historic Society, was constructed in 1890. The White Memorial Building was dedicated in 1902 and housed the city library until 1991, when the Irvin Young Memorial Library was constructed. The White Building now houses the Humanities Council, Arts Alliance, Community Cable Television, and public art exhibitions. The Armory was constructed in 1942, Public Safety building in 1967, and Administrative Center added to the Safety Building in 1997. The City operates a Wastewater Treatment Center, which was placed into operation in 1982, and co-operates the Whitewater Aquatic Center with the School District, which is attached to the High School and was built in 2001, and added a fitness center separated in 2004. In 2011, the City will welcome the Whitewater Innovation Center.

City of Whitewater Facilities Energy Use Summary, 2009

Facility	Energy Use		Annual	Floor	Energy Intensity
	kWh	therms	Cost	Space (sf)	(kBTU/sf)
Wastewater Treatment Facility	1,878,259	65,350	$ 190,276		
Municipal Center (Admin, Safety)	640,835	28,392	$ 78,373	41,072	122.4
Water Utility	335,120	2,566	$ 49,862		
Street Lighting and signals	231,599	0	$ 25,782		
Library	172,400	5,876	$ 25,410	16,008	73.5
Cravath Lakefront Community Center*	98,663	1,358	$ 12,746	3,280	145
Armory	71,519	8,436	$ 16,542	19,341	56.2
Streets Department - Garage	51,503	12,096	$ 17,864	39,460	213.8
White Building	34,830	5,917	$ 9,864	5,354	132.7
Train Depot	11,015	998	$ 2,356	2,760	49.8
Starin Park Picnic Shelter	2,024	0	$ 330	120	57.5
Totals	3,527,767	130,989	$ 429,405		

***** Includes significant exterior lighting on this building meter, including 33 pedestrian and 4 street lights in Cravath Park

The Whitewater Unified School District operates nine buildings; High School, Middle School, Central Office Building, and three elementary schools: Washington, Lincoln, and Lakeview. These facilities comprise approximately 495,000 square feet.

The Whitewater High School was completed in 1994, and is a bring structure that is primarily one story, with the exception of a two-story classroom section and the gymnasium. The Middle School was originally constructed in 1959 with additions of the North Wind in 1962, Shop in 1965, Library in 1970, Lockerooms in 1981, and an addition to the Library in 2000. The Middle School served as the high school until the new High School was constructed.

The Lakeview Elementary was built in 1955, with two classrooms added in 1956. The gymnasium was added in 1970, along with the library and additional space. In 1991 three classrooms were added, followed by an additional classroom and art room in 2000. Lincoln Elementary was completed in 1952, with a West Wing added in 1963, North Wing in 1970, and Kindergarten rooms in 2000. Washington Elementary was completed in 1966 with the cafeteria and two story classroom addition in 2000.

The Central Administration building was originally completed in 1974 as a single story metal frame structure. The current office space was added in 1997 and additional storage space in 2000.

Whitewater Unified School District Facilities Energy Use Summary, 2009 (table)

Facility	Energy Use		Annual	Floor	Energy Intensity
	kWh	therms	Cost	Space (sf)	(kBTU/sf)
High School	1,487,880	127,522	$ 169,252	188,832	94.4
Whitewater Aquatic Center	1,321,120	115,180	$ 204,536	39,460	406
Middle School	468,240	50,256	$ 63,124	121,400	55.2
Lincoln Elementary	250,297	25,475	$ 51,751	62,300	54.6
Washington Elementary	263,100	18,173	$ 46,965	61,225	44.3
Lakeview Elementary	192.880	21,177	$ 41,895	49,000	56.6
Central Administration Building	68,680	5,015	$ 12,555	12,040	61.1
Totals	3,859,510	362,798	$ 590,078		

Fleet

In 2009, the only year for which reliable data is available, the City of Whitewater operated 98 vehicles that consumed 2,602 gallons of unleaded gasoline and 16,418 gallons of diesel for fleet operations.

The Whitewater Unified School District owns and operates 8 fleet vehicles. School bus services are contracted to a local busing company.

3. Discoveries/Surprises

In March, 2010, the Facilities Director for the Whitewater Unified School District retired, leaving a large gap in capacity and institutional knowledge of the District facilities. The District remained without a Facilities Director for the duration of the planning effort, placing responsibility on this position to the District Administrator and Director of Business Services.

The District will welcome new individuals in the Director of Facilities and Director of Business Services positions in January, 2011.

Zero-Net-Energy Magnet
Midway through this planning process, the School District Administrator, Dr. Suzanne Zentner, came forward with a bold proposal. Dr. Zentner had developed the idea to seek funds from a Federal grant, of which a portion the State held unawarded, for the purpose of creating a zero-net-energy sustainability "magnet" school.

Lakeview Elementary School was identified to be the site for this project, due to being the smallest school in the district in terms of enrollment, and its rural location that may facilitate the integration of additional renewable energy options and outdoor learning opportunities.

This opportunity is presented in greater detail in the Total Projects Considered chapter of this report.

Efficiency Opportunities
Despite comprising nearly 34 percent of the facilities energy use in 2009, the City discovered fewer opportunities for efficiency upgrades as compared to the School District. The School District, comprising almost 45 percent of facility energy use, found opportunities to reduce consumption by over 15,000 MMBtu (45 percent reduction), as compared to 1800 MMBtu in the City facilities (7 percent). Figures do not include upgrades at the Wastewater Treatment Facility, the largest overall energy user, nor the Whitewater Aquatic Center.

Whitewater Aquatic Center

The Whitewater Aquatic Center has been operating under a financial deficit for the past few years. Efforts have been ongoing to improve income and reduce costs to achieve financial stability and progress has been made. It was discovered during this energy planning process that implementing efficiency improvements, outlined on pages 27 and 28 of this report, would result in nearly eliminating the operational deficit of the facility based upon energy cost savings. This has resulted in immediate positive press and renewed support for the facility. Savings from efficiency projects are estimated to be over $92,000 per year, and additional savings may be realized in future projects.

4. Total Projects Considered

The City of Whitewater and Whitewater Unified School District considered a broad array of efficiency, conservation, and renewable energy options in the completion of this plan. This section of the report includes energy projects that have been completed by the City and District in 2010, those included in capital budgets, as well as those considered in determining potential planned pathways to 25x25.

Projects Completed and In Progress

Following the creation of the 2009 Energy Baseline for the City and District, a number of projects impacting energy consumption were initiated, many as a direct result of this 25x25 planning process. Those projects are detailed below, followed by descriptions of further projects that were considered or will be implemented after the adoption of this plan.

Energy Efficiency & Conservation Block Grant

The U.S. Federal Government created a new funding opportunity through the American Recovery & Reinvestment Act of 2009 to reduce energy consumption in municipal government operations, known as the Energy Efficiency & Conservation Block Grant (EECBG). A portion of this funding was awarded directly to the ten most populous counties and municipalities in the State, and a portion of funding was made available through the Wisconsin Office of Energy Independence on a competitive grant process to all other municipalities.

The City of Whitewater applied and was awarded $175,600 to complete thirteen projects. Wisconsin Focus on Energy provided additional financial incentives, totaling $20,592.80. A number of additional projects were included for consideration in the block grant application. Final selection of projects was based upon estimated financial payback, as calculated by our Focus on Energy representative Chuck Zinda. The City of Whitewater is estimated to save approximately $34,000 in energy costs (in 2009 energy prices) annually based upon Focus on Energy estimates.

Each of the EECBG funded projects were completed between October and December, 2010. As such, the reduced energy consumption as a result of these improvements was not part of the Energy Center of Wisconsin baseline. The EECBG projects were added as measures completed in 2010. Lighting will be completed April 1, 2011.

City of Whitewater – Energy Efficiency & Conservation Block Grant – Savings from Funded Projects

Project	Estimate Annual Savings			Greenhouse Gas Savings		
	kWh	Therms	$	CO2	NOx	SOx
White Memorial – Boiler Replacement	0	3000	$ 3,000	35,124	30	0
White Memorial – Hot Water Heater Replacement	0	57	$ 57	667	1	0
Safety Building – Boiler Replacement	0	6000	$ 6,000	70,248	60	0
Safety Building – Roof Insulation Upgrade R15 to R25	5,658	2123	$ 2,802	34,429	32	21
Safety Building – Hot Water Heater Replacement	0	114	$ 114	1,335	1	0
Safety Building – Variable Frequency Drives on Hot Water	25,248	0	$ 3,030	42,720	48	93
Starin Park – Hot Water Heater Replacement	0	32	$ 32	370	0	0

Library – VAV System	18,854	340	$ 1,467	35,882	39	70
Library – Variable Frequency Drives for blowers & pumps	33,902	0	$ 3,593	57,362	64	125
Armory – Hot Water Heater Replacement	0	160	$ 160	1,873	2	0
Cravath Park Parking Lot – 150W HPS upgrade to 66W LED	12,702	0	$ 821	21,492	24	47
Cravath Park Bollards – 70W HPS upgrade to 12W LED	10,600	0	$ 1,166	17,935	20	41
Streetlighting – 400W HPS upgrade to 206W Beta LED	29,127	0	$ 3,204	49,283	55	113
Totals	136,091	11,826	$ 25,446	368,720	376	510

City of Whitewater Upgrades

The City made a number of small improvements to facilities during 2010. Some of these projects were a result of Focus on Energy facility walk-throughs with City staff, others were upgrades completed as a normal maintenance and attrition of equipment.

Measure:	Estimated Savings:
Refrigerator replacement at the Library	1,562 kWh
Administration Building VAV system	6,200 kWh
Vending Miser on Amory Vending Machines	900 kWh
Replacing two hot water heaters in Admin Center with one high-efficiency unit	800 therms
Total:	8,662 kWh 800 therms 112.3 MMBtu

At the Administrative Center, two existing 75 gallon 55-60 percent efficient (500,000 Btu input) units will be replaced with one 100 gallon 95% efficient unit. Ventilation system is also being modified to achieve further efficiency gains. This project was initiated due to planned expansion of the Public Safety building and necessary changes to the present venting arrangement to allow the development.

Administration Center Lighting Reduction

In October 2010, the City of Whitewater conducted a lighting reduction project that eliminated a total of 55 lighting units from office spaces throughout the Administration Center. A walk-through found that many spaces exceeded lighting requirements and that units could be removed or relocated to reduce consumption as well as achieve increased effectiveness of remaining units.

The removal of 55 lighting units will result in an estimated 159 kWh per year energy savings per unit, as well an estimated $50 per unit per year avoided labor costs of replacing expired bulbs. The cost of the project was approximately 28 hours of labor, with a near immediate payback. This measure saves about 8,745 kWh, and $3,850 per year ($1,100 from energy).

Wastewater Treatment Facility Efficiency Upgrades

The City of Whitewater received a $5.7 million award from the American Recovery and Reinvestment Act of 2009 to complete upgrades to the Wastewater Treatment Facility. The purpose of the award was updating treatment technologies and did not focus on energy efficiency. However, improvements are expected to reduce energy use in the facility through updating equipment. Upgrades will also improve the quality of water discharge from the system, placing a smaller burden on natural water systems.

Improvements impacting energy use include: adding variable frequency drives on six small pumps; replacing old pumps; and installing new motors. The facility is also switching to an ultraviolet system of treatment, replacing the chlorination/dechlorination system. This will add energy consumption, but will significantly reduce chemical use and the cost and environmental impact associated with it.

A detailed analysis of energy savings as a result of efficiency upgrades to the Wastewater Treatment Facility was not completed. For the purposes of this Report and the associated energy modeling, an energy savings figure is not included, although savings is expected.

Wastewater Treatment Facility Biogas Digester – Phase I

The City of Whitewater retained Strand Associates to conduct a biogas digester feasibility study at the Whitewater Wastewater Treatment Facility. This study was completed in May, 2010. As of December, 2010, the City is going forward with the design and engineering phase of project implementation. This project will utilize biogas produced in a rehabilitated existing digester to offset a portion of the natural gas used to heat the facility. A new heating unit was installed at the facility which allows fuel blending between natural gas and biogas, ensuring heat is delivered when needed and biogas is utilized as available.

The facility was placed into service in 1982 and received its last major renovation in 1996. An equipment and rehabilitation project was implemented in 2010. The facility current treats about half the design capacity. The facility has two anaerobic digestion tanks, only one of which is currently utilized, and biogas produced is presently flared. This digester was rehabilitated as part of the 2010 improvements.

The City is studying the potential to receive industrial waste at the Treatment Facility, which would increase total production of biogas from the facility (this will depend upon quantity of waste accepted and energy content). Initially this level of waste is expected to be 10,000 gallons per day. In addition to the production of biogas, accepting industrial waste represents an income stream to the facility.

Presently, 9.6 MMBtu of biogas is generated daily at the facility. During the improvements to the facility conducted in 2010, mixers and other measures were added that are expected to increase the production of biogas from the existing level of waste, by an unknown amount. The collection of 10,000 gallons of industrial waste per day will increase biogas production by an estimated 6.5 MMBtu per day, bringing the total to 16.1 MMBtu per day.

The City intends to rent a 20,000 gallon steel frak tank at the site for storage, to maintain and control the flow of industrial waste into the digester system. A heating blanket will be added to the tank, at an expense of approximately $18,000, to ensure the tank does not freeze and extend use to approximately 10 months per year. Repurposing of the existing gas sphere, or adding new smaller tanks, for storage of biogas may also be investigated. Over time, the intent is to increase industrial waste to 20,000 gallons per day once facility staff learns how the facility performs with various types of waste and relationships are built with the private sector, bringing total facility production to 29 MMBtu per day. The anaerobic digester has the capacity to handle a maximum of approximately 30,000 gallons of industrial waste with current infrastructure.

Eventually, an industrial waste receiving system and underground tank may be added to the facility to ease delivery and further increase capacity.

The first phase of improvements to the anaerobic digester will allow the collection of biogas that will be utilized to offset natural gas for heating the facility. Given expected population growth through 2030, and accepting 10,000 gallons of industrial waste at the facility, the biogas is expected to offset 69.3% of natural gas use at the facility, or 48,040 therms, and assumes there is sufficient biogas storage to utilize biogas to offset natural gas consumption (extra production would need to be stored until high demand periods). Biogas storage is required due to higher demand of natural gas during the heating season, and surplus biogas production during non-heating periods.

Whitewater University Technology Park - Innovation Center

The City of Whitewater has partnered with the University of Wisconsin – Whitewater to develop the Whitewater University Technology Park, a 125 acre business/industrial park located on the City's east side. Included in the park is the Whitewater Innovation Center, a 38,000 square foot business incubator facility that will be owned by the Whitewater Community Development Authority (CDA).

Construction of the Innovation Center began shortly after the April 25, 2010 groundbreaking ceremony. The total construction budget for the facility is $5.4 million, and is expected to be complete in January, 2011. A grant from the U.S. Economic Development Administration in the amount of $4.7 million supports the construction of the Innovation Center and improvements to the Technology Park. The Wisconsin Department of Commerce provided technical assistance in facilitating the grant development.

Total costs for developing the 125 acre Whitewater University Technology Park is approximately $11 million. The portion not funded by the EDA grant will come from the Whitewater Community Development Authority revenue bonding and other sources.

The Innovation Center is expected to achieve the U.S. Green Building Council's LEED™ Gold certification level. Technologies and sustainable measures include: solar photovoltaic panels; high energy efficiency design and fixtures; geothermal HVAC; low-flow plumbing fixtures; collection and use of graywater in shared toilet facilities; construction waste recycling; recycled content materials; regionally sourced materials; low emitting materials and finishes; native and low water landscaping; and shared parking (with an adjacent public park).

Most relevant to the 25x25 Energy Plan, the Innovation Center will have a 20 kW solar photovoltaic roof-mounted system, as well as a geothermal heating and cooling system with a capacity of 1098 MBH heating and 100 tons cooling. The solar system is expected to produce approximately 28,062 kWh per year, and the geothermal system will deliver approximately 18,896 therms (renewable)(9,591 therms cooling, 9,315 therms heating) while consuming 132,000 kWh per year.

The facility is designed to have an estimated annual energy demand of approximately 498,100 kWh, 47.9% of ASHRAE 90.1 baseline (52.1% more efficient than code). Between this estimated level of electrical and HVAC demand, the estimated annual building energy load is 3,588 MMBtu. The 20kW solar and geothermal system will provide approximately 55% of the facility's expected annual energy demand. Renewable energy utilization level may be increased through future installations.

The Whitewater Innovation Center is a business incubator facility as well as a green technology and sustainability commitment showcase. The Technology Park is intended to foster the growth of ideas from researchers into job-created businesses that boost economic development in the city and region. The Innovation Center reflects the community's identification of green and sustainable technologies and businesses as priority growth areas to drive future economic, social, and environmental prosperity.

CESA 2, the largest Cooperative Educational Service Agency in Wisconsin, has signed a 10-year lease to expand and move from Milton, WI to become the first Innovation Center tenant, occupying approximately 10,000 sf. The lease begins in February, 2011.

The covenants of the Technology Park require, or encourage, a variety of features once highly uncommon in business and industrial parks, such as encouraging pursuit of LEED certification and high-efficiency design; encourage on-site solar and wind energy generation; encourage use of geothermal HVAC; require low-impact sites and landscaping; require minimum bike parking, pedestrian amenities and connectivity; commitment to an urban streetscape; and require higher quality exterior materials. These covenants are legally enforceable tools to ensure development proceeds in a manner with increased awareness of environmental impact, and so that firms are aware of Whitewater's expectations in higher quality facilities and built environment.

Steetlighting

The addition of the Innovation Center and creation of the Whitewater University Technology Park will bring an extension of Starin Road, which runs through UW – Whitewater campus, and connect it with an existing road segment adjacent to the Tech Park. All of the new lighting along Starin Road will be LED.

As in many communities, most of the streetlights in the City of Whitewater are owned by the utility, WE Energies, and rented through an agreement where the City pays the energy use charge plus a fee, and the utility maintains the infrastructure. This takes the decision to complete infrastructure upgrades out of the City's control, but the City will work with WE Energies to complete improvements in the future.

Whitewater Unified School District - 2010 Lighting Retrofit

In May 2010, the School District completed a lighting retrofit of all District facilities, for a total of 2,430 lighting units replaced or retrofitted. The last major lighting project was completed in 2003, and many units have failed recently. Also added were 217 motion sensors to turn off lighting when rooms are unoccupied. Estimates do not include kWh savings from motion sensors, or cost savings from peak load reduction.

Total Project Cost:	$ 271,599
Focus on Energy Incentive:	$ 38,587
Expected kWh Saved:	386,036 (annual)
Expected energy savings:	44.3%
Expected cost savings:	$54,728.61 (annual – 2009 dollars and rates)
Peak demand savings (est.):	117.81 kW
Post-incentive payback:	51.09 months

To put the energy savings from this project in perspective, the expected annual savings, 386,036 kWh, is more electricity than used in 2009 by any of the three Whitewater Elementary Schools: Washington (263,100), Lincoln (250,297), Lakeview (192,880); or a significant portion of the Middle School (468,240).

This project is expected to prevent the emissions of: 579,055 pounds CO2; 965,091 grams sulfur dioxide; and 2,239,012 grams of nitrogen oxides.

Projects Considered

Projects considered fall into various levels of consideration and feasibility. All projects considered plausible and moderately feasible are included under consideration. Not all projects considered included in this report will plan to be implemented in the short term, but have been included for longer term consideration.

Unless otherwise noted, renewable energy systems cost and production are based upon Focus on Energy baseline estimates. All such projects would be subject to site assessments and technology selection that will result in greater precision of cost and generation. All incentive figures are based upon 2010 program levels from Focus on Energy and WE Energies.

Baseline assumptions for renewable energy generation are (unless otherwise noted):

Energy Cost (2010):	$0.12611 / kWh
	$0.95 / therm
Energy Cost Inflation Rate:	5.0%

City of Whitewater

Wastewater Treatment Facility Biogas Digester – Phase I Ramp-up

The initial conditions for producing biogas at the Wastewater Treatment Plant plans for receiving 10,000 gallons of industrial waste per day (200 days per year) to test the introduction of various materials and performance of the digester. Phase I Ramp-up entails the intent to increase receiving industrial waste to 20,000 gallons per day, 200 days per year. This would add an estimated additional 13,000 therms annually of biogas production. This assumes there is adequate storage to utilize the biogas to offset natural gas use at the facility. This would increase total biogas production at the facility to approximately 61,000 terms per year.

Increasing the industrial waste use at the facility would also further expand the income potential from accepting waste.

Wastewater Treatment Facility Biogas Digester – Phase I Ramp-up II

There is existing capacity and interest to eventually increase the receiving of industrial waste to around present infrastructure capacity, 30,000 gallons per day, 200 days per year. This would add an estimated additional 13,000 therms annually of biogas production.

The present facility uses approximately 65,350 therms per year of natural gas per year, so the maximum use of biogas at the facility, to meet present demand, and with adequate biogas storage, would be met with approximately 25,000 gallons of industrial waste per day (with 2009 levels of municipal waste). This phase would increase total facility biogas production to approximately 74,000 terms per year, far exceeding natural gas use at the present facility.

To achieve full utilization of biogas under this scenario, sufficient storage of biogas would need to be added to collect gas during the summer months for use during the heating season; or another productive use of the biogas would need to be determined. It is likely not economically feasible to have sufficient storage of biogas on site to meet full heating demand of the facility throughout the heating season. Thus, it is assumed that microturbine(s) are added to create electricity from the biogas rather than flare it. The addition of a microturbine would likely only make economic sense if Phase II (below) is completed, or if significant biogas storage facilities are not added, as biogas production would need to significantly exceed demand such that sufficient electricity is produced to offset the infrastructure cost of the microturbine(s).

In the energy baseline for this planning exercise, it is projected that exceeding 20,000 gallons of industrial waste accepted at the facility per day would correspond with completing Phase II (below), or other measure to make feasible the use of a microturbine at the site to produce electricity at reasonable cost. Assuming a microturbine with a 42 percent mechanical efficiency, 13,000 therms of biogas would product approximately 165,400 kWh per year. Since 13,000 therms could only be produced operating at full digester capacity, 80 percent of this figure, 132,320 kWh is used the baseline as a more reasonable estimate.

Wastewater Treatment Facility Biogas Digester – Phase II

The second existing anaerobic digester at the Treatment Facility currently is not used. The 2010 engineering study (Strand) investigated the potential to utilize this digester to collect manure from farms in the immediate region to produce biogas and reduce water quality concerns that result from runoff of field spread manure. This measure was previously investigated in 2005, and further refined by the 2010 study by Strand. If this measure is implemented, an additional waste stream may need to be added in the treatment facility to meet the regulatory requirements of animal waste handling. Additional infrastructure will also be necessary to filter the solids, such as sand, from the waste stream prior to use in the digester.

Digester #2 has the estimated capacity to receive waste from 840 animal units (AU) and produce approximately 49.56 MMBTU/day given typical diary cow manure biogas energy content (59,000 Btu per AU). The retention time of manure in the digester would be approximately 28 days, accepting manure waste for 200 days per year should be sufficient to keep the digester operating year-round. Assuming a microturbine with 42 percent mechanical efficiency, running at 90 percent capacity with a capacity factor of 80 percent, this measure would produce approximately 5,490 kWh/day, 2,003,850 kWh/year. It is assumed that all of the biogas produced in this phase would be used to produce electricity through one or more microturbines, rather than offset natural gas use. Level of biogas storage, system arrangement, and levels of heating demand would dictate how the biogas is utilized.

According to the engineering report, the capital cost of adding this option would be approximately $1,933,000, with a 20-year amortized present value of $504,000 (4.375 discount rate).

City of Whitewater Fire Station

In 2009, the City of Whitewater conducted a needs assessment to determine if the City should explore adding on to the current Administration Center to add capacity at the public safety department necessary for a full-time fire station staff.

The result of the needs assessment suggested three additions to the present Public Safety and Administration Center. The first portion would be the addition of fire station office and support spaces, added to the southwest portion of the building along Whitewater Street, adjoining existing public safety garage. The second portion would add living quarters and associated space for full time fire staff on the north side of the existing building. The third portion would add to the existing garage space. Funding to implement this project is currently being sought.

The addition of this new facility space will necessitate altering the venting system for the existing hot water boilers in the Administration Building. As a result, upgrades to the existing boiler system become necessary, and efficiency improvements can be achieved. This project is included in *City of Whitewater Upgrades* on page 13.

The new facility will be designed to the highest energy and resource efficiency practicable, as well as use of recycled, renewable, and regionally produced materials. Pursuit of LEED™ certification will be strongly considered.

Additional design considerations may include: solar photovoltaic; high efficiency water fixtures; high efficiency appliances and lighting; optimum daylighting; low emission finishes; use of renewable and recycled materials; low or zero water native landscaping; and integrate cycling facilities; and others.

The impact of this project on energy consumption in the City is unknown, and thus is not included in the 25x25 estimates in the 2010 Energy Plan.

City of Whitewater Library Lighting Upgrade

The City of Whitewater solicited a bid to upgrade interior and exterior lighting units at the Library. The estimate included upgrades to four lighting units in the parking lot and four walkway lighting units, seven exterior flood lights, four interior wall mounted lights, twelve ceiling mounted and two ceiling vault units. Each of the new units will utilize LED technology to reduce energy use.

The estimate included replacing two exterior flood lighting units in front of the historical White Building, upgrading to LED units.

The current estimated use of the lighting units to be replaced is 6,107 kWh per year. The energy use of the new units with same use duration is estimated to be 3,138 kWh per year. Completing this project would save approximately 2,968 kWh per year, a savings of 48.6 percent. The cost, as quoted, to

complete these upgrades is $32,041. The payback, at present, to complete this project is likely prohibitive.

Innovation Center – Solar & Wind

The Innovation Center is a highly visible facility that has already begun to serve as a magnet of high-tech, "clean-tech", and business that seek to identify with renewable energy. The facility is designed with roof-mounted solar photovoltaics, geothermal HVAC and water heating, and high efficiency lighting. Adding high visibility renewable energy systems, such as pole-mounted dual-axis tracking solar photovoltaics and wind turbines will only increase awareness, interest, and use as a clean economic development marketing and lead by example tool.

Install a highly visible 10 kW solar photovoltaic tracking system at the Innovation Center.

Approximate cost (2010 figures):	$ 90,000
FoE incentive:	$ 36,500
WE Energies Incentives:	$ 29,250
Municipal Cost:	$ 29,525
Approximate production:	16,000 kWh/year (1,600 kWh/year)
Approximate payback:	10.2 years

Install four 20 kW wind turbines at the Innovation Center*.

Approximate cost (2010 figures):	$ 310,000
FoE incentive:	$ 100,000 (35%)
WE Energies Incentive**:	$ 100,000
Municipal Cost:	$ 110,000
Approximate production:	128,000 kWh/year
Approximate payback:	6.6 – 8.9 years (+/- 0.5m/s wind speed variation)
Return on Investment (10 yr)	12.3%
Net present value (10 yr)	$ 33,396
Return on Investment (20 yr)	19.2%
Net present value (20 yr)	$ 153,778

* Figures based upon investment and production calculator provided by Renewegy, an Oshkosh, WI-based turbine manufacturer. Assumptions include: 4.0% annual energy cost increase, 6.0 m/s average wind speed, $0.12611 kWh 2010 utility rate, 5% annual discount rate

** WE Energies presently offers up to $100,000 on solar pv and wind energy projects, providing up to 50% of the post- Focus on Energy incentive project cost.

There may be sufficient space at the Innovation Center to add additional installations of wind turbines and/or solar tracking systems in addition to those outlined above.

Presently, the Innovation Center is designed such that, between existing solar and geothermal system, 55 percent of the energy use in the facility will come from renewable sources. The addition of the above 10 kW solar tracking system and four 20 kW wind turbines could provide 13.7 percent of the energy used at the facility, increasing building source from renewables to 68.7 percent. An additional 307,170 kWh of annual production would be necessary, absent further efficiency measures, the achieve

net-zero energy at the Innovation Center based upon projected annual energy demand. This could further elevate the stature of the facility and ability to serve as a magnet for business.

Whitewater Administrative Center – Solar PV

The Whitewater Administrative Center and Public Safety Building do not have optimal solar orientation. However, they do have areas of flat roof with excellent unobstructed solar access. There are some roof mechanical and structural elements that limit the total available space, but there are at least three areas were solar photovoltaic panels could be placed. One or more pole mounted solar tracking systems could be installed behind the facility in parking islands.

3 rows of 8 185W panels above the public safety building garage doors – 4.44 kW

1 row of 17 185W panels on the center portion of the building roof – 3.15 kW

1 row of 8 185W panels on the center portion of the building roof – 1.48 kW

1 row of 17 185W panels on the Administrative Center addition – 3.15 kW

1 row of 8 185W panels on the Administrative Center addition – 1.48 kW

2 8-185W panel tracking units on a parking island behind the building – 2.96 kW

	13.7 kW	2.96 kW (tracking)
Estimated cost:	$ 95,900	$ 20,720
Focus on Energy Incentive:	$ 33,565 (35%)	$ 7,252
WE Energies Incentive:	$ 31,167	$ 6,734
Municipal Cost:	$ 31,162	$ 6,734
Approximate Production:	16,440 kWh/year	4,736 kWh/year
Approximate Payback:	12.5 years	10.2 years

Public Works Garage

The structures at the Public Works Garage have roofs that pitch east-west, which does not easily facilitate productive solar infrastructure. Given the size of this site, however, there may be sufficient space for a ground-mounted solar system, provided that it does not obstruct vehicle use. There may also be space sufficient for a wind turbine, but a site assessment would need to be conducted.

Armory

The Armory does not have significant roof space suitable for a solar photovoltaic system. It is located in an urbanized area, making it also unsuitable for traditional wind development.

Whitewater Wastewater Treatment Facility – Solar & Wind

The Whitewater Wastewater Treatment Facility has significant flat roof space oriented south, as well as a large site without obstructions that is presently managed lawn. The facility is also located north of the City proper, and thus citing concerns (especially for wind turbines) may be decreased. Necessary utility tie-in for renewables projects is located nearby, decreasing connection cost.

The potential project(s) would be phased in over a number of years. This could be done, in part, to take advantage of the Focus on Energy and WE Energies incentives, as they are presently structured (WE Energies: up to $100,000 per facility per year).

Solar

Significant solar potential exists. The Wastewater Treatment Facility has a large site with few obstructions, which could facilitate a relatively large installation of either fixed or tracking solar photovoltaic system(s) not mounted on existing buildings. The option of fixed versus tracking systems would be determined by future study and priority, with generally higher energy production and lower payback for tracking systems but lower maintenance costs for fixed panels. A combination of tracking and fixed systems would maximize system output.

Phase 1

Utilize open spaces to install solar tracking system(s), comprised of 20 units of 8 185W panels. This capacity was selected to maximize presently (2010) available Focus on Energy incentive. This would total 29.6 kW of capacity, expected to produce approximately 47,360 kWh/year.

The second portion of phase one could be to add 30 kW of ground mounted fixed panels. Space would likely be available for additional ground mounted systems, should the investment be available. This capacity was selected to maximize presently (2010) available Focus on Energy incentive. This 30 kW of capacity would be expected to produce approximately 36,000 kWh/year.

Phase 2

The facility features three long (north-south) structures (Rotating Biological Contractors) on the west side of the site. Each building has two flat areas, with a gap between, potentially suitable to receive solar infrastructure. Each area is approximately 100 feet long and 24 feet wide with perfect solar orientation. Each is sufficient space for approximately 4 rows of 7 185W panels, for a total of 56 panels (10.36 kW) per building. This phase would total 31.08 kW of capacity among three buildings.

Phase 3

Install solar photovoltaic systems at the main building at the Wastewater facility. This facility houses the administrative functions, as well as receiving for septage, and influent pumping function. The top of structure is approximately 50 feet wide, and could receive an installation of 18 185W panels. The southeast portion of the station is approximately 30 feet wide, and one level below the adjacent higher central structure, which could cause some shading in the late afternoon. The southwest portion protrudes further south from the building than the east, and may be able to receive two rows of panels without significant shading. There may also be sufficient space toward the north and west portions of the building, to the rear, to receive additional solar capacity.

1 row of 18 panels, top of center structure – 3.33 kW

1 row of 8 185W panels, east garage – 1.48 kW

1 row of 8 185W panels, west garage – 1.48 kW

1 row of 6 185W panels, west garage – 1.11 kW

	Phase 1	Phase 1	Phase 2	Phase 3
Capacity:	29.6 kW (track)	30 kW (fixed)	31.08 kW	7.4 kW
Estimated cost:	$ 207,200	$ 210,000	$ 217,560	$ 51,800
Focus on Energy Incentive:	$ 72,520	$ 73,500	$ 75,000*	$ 18,130
WE Energies Incentive:	$ 67,340	$ 68,250	$ 71,280	$ 16,835
Municipal Cost:	$ 63,740	$ 68,250	$ 71,280	$ 16,835
Approximate Production:	47,360 kWh/yr	36,000 kWh/yr	37,296 kWh/yr	8,880 kWh/yr
Approximate Payback:	10.2 years	12.5 years	12.5 years	12.5 years

* $ 75,000 is the largest Focus on Energy incentive available, in 2010.

Additional (or different) solar capacity may exist at this site. A certified assessment will be completed prior to any proposed system installation.

Wind

Phase 1

Add 4 20 kW wind turbines. See Innovation Center – Solar & Wind, wind turbine system specifications. This system would produce approximately 128,000 kWh per year. Figures will be substantially similar; in 2010 financial figures and incentives.

Additional (or different) wind capacity may exist at this site. A certified assessment will be completed prior to any proposed system installation.

City of Whitewater Renewable Energy Projects Underway and Considered

Facility	Year (est.)	Generation kWh	Generation therms	Capital Cost	Potential Incentives FoE	Potential Incentives WE	Potential Incentives Total	City Cost
Innovation Center	2011	28,062	18,896					
Biogas Digester, Phase I	2011		48,040					
Biogas Digester, Phase I 20k	2015		13,000					
Biogas Digester, Phase I 30k	2020	132,320						
Biogas Digester, Phase II	2018	2,003,850						
Innovation Center – Solar Tracking		16,000		$ 90,000	$ 36,500	$ 29,250	$ 65,750	$ 29,250
Innovation Center – Wind		128,000		$ 310,000	$ 100,000	$ 100,000	$ 200,000	$ 110,000
Admin Center – Solar PV (fixed)		16,440		$ 90,900	$ 33,565	$ 31,167	$ 64,732	$ 31,162
Admin Center – Solar PV (tracking)		4,736		$ 20,720	$ 7,252	$ 6,734	$ 13,986	$ 6,734
Wastewater Wind		128,000		$ 310,000	$ 100,000	$ 100,000	$ 200,000	$ 110,000
Wastewater Solar, Phase I, Year 1		47,360		$ 207,200	$ 72,520	$ 67,340	$ 136,860	$ 63,740
Wastewater Solar, Phase I, Year 2		36,000		$ 210,000	$ 73,500	$ 68,250	$ 141,750	$ 68,250
Wastewater Solar, Phase II		37,296		$ 217,560	$ 75,000	$ 71,280	$ 146,280	$ 71,280
Wastewater Solar, Phase III		8,880		$ 51,800	$ 18,130	$ 16,835	$ 34,965	$ 16,835
Totals		2,586,944	79,936	$ 1,508,180	$ 516,467	$ 490,856	$ 1,004,323	$ 507,251

* Generation figures are based upon Focus on Energy estimates, with 2010 capital cost estimates and incentive levels.

Whitewater Unified School District

During 2010, the Whitewater Unified School District contracted Vesta Technologies, Inc., to complete an Energy Study of each of the district facilities (Aquatic Center contracted separately). The efficiency projects listed in the below tables are the result of that study.

Implementing all projects investigated by Vesta that individually have less than a 20 year simple payback would yield approximately the following:

Cost	$ 2,305,471
Annual Energy Savings	$ 258,408
Peak Load Savings	389.8 kW
Electrical Savings	694,835 kWh
Natural Gas	113,449 therms
Lifecycle Savings	$ 3,459,243

These figures do not include HVAC projects that may be implemented if the option of installing a geothermal HVAC system at Lakeview Elementary is not pursued. Full project details contained in the December 1, 2010 Energy Study by Vesta Technologies, Inc., available through the Whitewater Unified School District central office.

Whitewater High School – Efficiency Measures

Measure	Cost	Savings	Simple Payback	kW Saved	kWh Saved	Therms Saved	Expected Life	Lifecycle Savings
Add High Efficiency Shoulder Boiler	$ 60,000	$ 11,886	5.05			10,708	25	$ 159,889
Boiler Plant Resets	$ 8,000	$ 2,408	3.32			2,169	25	$ 36,540
Variable Frequency Drives	$ 38,250	$ 3,975	9.62		38,596		25	$ 35,288
Thermal Energy Storage	$ 150,000	$ 11,350	13.22	250			40	$ 145,100
Demand Limited Strategies	$ 2,500	$ 5,175	0.48	38			25	$ 93,238
Power Factor Correction	$ 30,500	$ 16,546	1.84				25	$ 275,601
DCC Controls – Option A	$ 12,500	$ 20,503	0.30		80,230	10,159	20	$ 313,597
DCC Controls – Option B	$ 102,200	$ 41,006	1.50		171,157	19,210	20	$ 578,374
DCC Controls – Option C	$ 179,711	$ 16,403	4.93		59,905	8,571	20	$ 175,017
Totals	$ 583,661	$ 129,252		288	349,888	50,817		$ 1,812,644
100 kW Wind Turbine*	$ 380,000	$ 9,870	38.5		150,000			-$ 197,405
100 kW Solar PV*	$ 500,000	$ 14,086	35.5	30	100,000			-$ 133,764

* Assumes $ 100,000 incentive each from each Focus on Energy and WE Energies

Whitewater Middle School – Efficiency Measures

Measure	Cost	Savings	Simple Payback	kW Saved	kWh Saved	Therms Saved	Expected Life	Lifecycle Savings
Caulk Seal 2nd Floor Roof Intersection	$ 1,000	$ 843	1.19			760	40	$20,918
Seal Soffit area of Gym Roof	$ 200	$ 186	1.08			168	40	$ 4,636
Add High Efficiency Shoulder Boulder	$ 58,500	$ 7,590	7.71			6,837	25	$ 81,915
Eliminate Pump Cavitation	$ 2,500	$ 4,613	0.54	9.4	34,595		20	$ 69,463
VFD on Pumps	$ 7,875	$ 1,910	2.95		16,187		20	$ 24,171
Classroom Occupancy Sensors – Lighting & HVAC	$ 23,100	$ 3,849	6.00		21,168	1,218	20	$ 36,944
Demand Ventilation for Large Rooms	$ 4,500	$ 3,113	1.45			2,804	20	$ 44,063
Replace 8 HV units with 6	$ 308,000	$ 3,500	11.14			3,155	25	$ 25,750
Modify IMC Air Handling to utilize chilled water	$ 1,250	$ 150	8.33		1,260		20	$ 1,090
DHW Timer and Auto secondary Heater Isolation	$ 2,000	$ 768	2.60		4,174	316	20	$ 9,981
Hall Lighting Timers	$ 3,000	$ 1,172	2.56		10,656		20	$ 15,283
Watt Saver for Vending	$ 385	$ 121	3.18		1,104		15	$ 1,103
Install LED Exit Bulbs	$ 550	$ 116	4.74		975		15	$ 877
Combine Old IMC Electric Meter with Main Meter	$ 13,500	$ 1,605	8.41				20	$ 11,538
Demand Limited Strategies	$ 8,000	$ 3,500	2.29	67.7			20	$ 46,600
Power Factor Correction	$ 9,892	$ 5,435	1.82				25	$ 90,656
DDC Controls – Option A	$ 10,120	$ 8,374	0.60		31,936	4,149	20	$ 125,574
DDC Controls – Option B	$ 121,880	$ 13,399	5.46		54,504	6,277	20	$ 135,896
DCC Controls – Option C	$ 97,900	$ 6,699	6.37		23,845	3,501	20	$ 61,799
Total	$ 674,152	$ 66,943		77.1	200,404	29,185		$ 808,257

Lakeview Elementary School – Efficiency Measures

Measure	Cost	Savings	Simple Payback	kW Saved	kWh Saved	Therms Saved	Expected Life	Lifecycle Savings
Isolate Off Boiler when not needed as backup	$ 4,500	$ 1,082	4.16			975	20	$ 12,379
Improve Boiler Reset Schedule	$ 450	$ 284	1.58			256	20	$ 3,980
Install High Efficiency Condensing Boilders	$ 90,000	$ 7,343	6.13			6,615	20	$ 69,551
Domestic Water Improvements	$ 14,800	$ 2,686	5.51	12.0	9,988	744	20	$ 27,102
Totals– HVAC & Water (1-4)	$ 109,750	$ 11,395		12.0	9,988	8,590		$ 113,012
Classroom Occupancy Sensors- Lighting & HVAC	$ 10,500	$ 1,749	6.00		9,093	609	20	$ 16,784
Demand Ventilation for Large Rooms	$ 3,000	$ 686	4.37		1,410	468	20	$ 7,702
Replace Gym HV Units	$ 59,000	$ 694	15.85			624	25	$ 1,839
LED Exit Lights	$ 220	$ 47	4.73		390		15	$ 352
Watt Saver for Vending	$ 385	$ 121	3.18		1,104		15	$ 1,103
Demand Limiting Strategies	$ 200	$ 463	0.43	6.8				$ 7,023
DDC Controls – Option A	$ 10,450	$ 3,010	1.74		11,480	1,492	20	$ 41,731
DDC Controls – Option B	$ 55,250	$ 4,014	8.26		16,327	1,880	20	$ 29,468
DCC Controls – Option C	$ 50,238	$ 2,408	9.35		8,572	1,258	20	$ 15,047
Totals– Other	$ 189,243	$ 13,192		6.8	48,376	6,331		$ 121,049
Geothermal HVAC- Full *	$ 364,000	$ 5,587	65.15	-97.0	- 94,932	18,900	25	-$ 260,641
Geothermal HVAC- Partial*	$ 100,750	$ 2,514	40.08	-24.0	- 23,700	4,725	25	-$ 54,241
50kW Solar PV **	$ 200,000	$ 6,022	33.21	15	50,000		40	-$ 43,428

* Assumes 35% Focus on Energy Incentive

** Assumes $100,000 incentive each from Focus on Energy and WE Energies. Assumes $0.10 / kWh cost; $ 8 per watt installed cost.

Lincoln Elementary – Efficiency Measures

Measure	Cost	Savings	Simple Payback	kW Saved	kWh Saved	Therms Saved	Expected Life	Lifecycle Savings
Window Replacement Infill with KalWall	$ 360,000	$ 6,847	17.53	6.7	8,442	5,100	100	$ 256,585
OA Resets and optimize Boiler Plant w/new Modular Boiler	$ 43,500	$ 4,202	10.35			3,786	25	$ 34,237
Classroom Occupancy Sensors for Lighting & HVAC	$ 14,300	$ 2,104	6.80		10,738	754	25	$ 24,624
Demand Ventilation for Large Rooms	$ 3,000	$ 686	4.37		1,410	468	25	$ 9,691
Replace HV Units	$ 166,000	N/A	N/A					
Demand Limiting Strategies	$ 200	$613	0.33	9.0			20	$ 9,363
DDC Controls – Option A	$ 10,450	$ 3,746	1.39		14,287	1,856	20	$ 53,213
DDC Controls – Option B	$ 37,950	$ 4,995	4.56		20,319	2,340	20	$ 55,152
DCC Controls – Option C	$ 52,300	$ 2,997	7.85		10,688	1,566	20	$ 23,218
Total	$ 687,700	$ 26,190		15.7	65,884	15,870		$ 466,086

Washington Elementary – Efficiency Measures

Measure	Cost	Savings	Simple Payback	kW Saved	kWh Saved	Therms Saved	Expected Life	Lifecycle Savings
Window Replacement Infill with KalWall	$ 118,700	$ 2,624	15.08			2,364	100	$ 65,393
Upgrade Boiler Plant and add OA Resets	$ 43,500	$ 1965	22.14			1,770	40	$ 7,590
Demand Control Ventilation	$ 2,900	$ 444	6.53			400	20	$ 4,026
Replace HV Units	$ 120,000							
Classroom Occupancy Sensors	$ 14,300	$ 2,415	5.92		12,557	841	25	$ 30,378
Demand Limiting Strategies	$ 200	$ 613	0.33	9.0			20	$ 9,363
DDC Controls – Option A	$ 10,450	$ 3,082	1.70		11,753	1,527	20	$ 42,854
DDC Controls – Option B	$ 81,450	$ 4,109	11.89		16,715	1,925	20	$ 15,230
DCC Controls – Option C	$ 58,040	$ 2,465	10.60		8,776	1,288	20	$ 12,336
Total	$ 449,540	$ 17,717		9.0	49,801	10,115		$ 187,170

Central Administration – Efficiency Measures

Measure	Cost	Savings	Simple Payback	kW Saved	kWh Saved	Therms Saved	Expected Life	Lifecycle Savings
New Door Sweeps	$ 50	$ 75	0.67		182	36	3	$ 164
Convert RTU to VAV System	$ 16,750	$ 1,886	4.97		9,456	519	15	$ 13,818
Occupancy Sensors for Restrooms	$ 2,000	$ 639	3.13		2,236	241	15	$ 5,860
Insulate Hot Water Piping	$ 40	$ 23	1.74		207		25	$ 386
Tie Domestic Hot Water to High Eff. Boiler	$ 3,000	$63	47.62			39	15	-$ 2,225
Solar Hot Water	$ 20,000	$ 554	36.10			340	25	-$9,751
Vendmiser	$ 385	$ 121	3.18		1,104		10	$ 668
DDC Controls – Option A	$ 7,150	$ 1,505	2.38		5,375	746	20	$ 19,903
DDC Controls – Option B	$ 13,200	$ 2,007	3.95		7,644	940	20	$ 23,389
DCC Controls – Option C	$ 11,300	$ 803	6.33		2,675	419	20	$ 7,442
Total	$ 73,875	$ 7,676			28,879	3,280		$ 59,654

Whitewater Aquatic Center – Efficiency Measures

The City of Whitewater and Whitewater Unified School District partnered to develop the 36,000 square foot Whitewater Aquatic Center in 2001, which is attached to the High School. The facility is operated by an independent board that is supervised by both the City and District.

The facility includes:

- Lap Pool: 8-lane, 75 pool (5,000 sf pool area)
- Leisure Pool that includes a lazy river, slide, and whirlpool (4,450 sf pool area)
- Fitness Center: 2,270 sf
- Office/Conference/Concessions area: 4,818 sf
- Locker Rooms: 4,308 sf
- Mechanical Rooms: 6,175 sf
- Programming: 117.5 hours/week; 7,514 weekly visits; 90,18 annual visits

A study was conducted by Vesta Technologies, a building automation and energy management firm. Their studies focused on the mechanical and HVAC systems.

Potential projects identified by Vesta:

- Replace weather stripping around exterior doors
- Add weather stripping around pool doors
- HVAC ventilation optimization & DDC temperature controls
- Indirect Direct Evaporative Cooling System (IDEC)
- Pool cover
- HVAC VAV (variable air volume) drives
- VFD (variable frequency drives) on pool pumps
- CO2 monitors in locker room, fitness center
- Vending miser units on drink coolers
- UV Water Treatment
- Power Factor Correction

Projects included in the Whitewater Aquatic Center 2011-2012 capital budget are included in the table below, with expected project cost and savings estimates, as provided by Vesta. Further project details are included in Appendix IV: Detailed Potential Project Descriptions.

The expected savings from these efficiency projects are significant. The 4,447 MMBtu of savings represents 4.9 percent reduction in total 2009 energy use baseline.

Whitewater Aquatic Center Potential Project Savings and Costs

Project	Year	Savings			Est. Cost.	ROI
		kWh	Therms	$$		(years)
Program existing DCC	2011	10,864		$ 4,019	$ 200	0.04
Balance existing air handling units	2011		6,975	$ 6,250	$ 5,700	0.92
Install vending miser	2011	3,125		$ 250	$ 400	1.6
Weather stripping pool and exterior doors	2011	40,975	3,339	$ 6,417	$ 9,600 – 16,000	1.5 to 3.0
Variable Frequency Drives on pool pumps	2011	744,480		$ 67,003	$ 39,688	0.59
Ultra Violet Water Treatment	2011			$ 8,760	$ 97,500	11.3
Heat Recovery System	2012		6,313**			
	Total	799,444	16,627	$ 92,699		

Estimates in this table were provided by Vesta Technologies. All values utilize 2010 energy costs ($0.80 / kWh ; $0.95 / therm)

*Calculation based upon natural gas boiler, estimating 35% electrical and 40% gas savings.

** Heat recovery system expected to save approximately 25% of facility HVAC natural gas use; calculated after 2011 project energy savings.

Whitewater High School – Wind & Solar

The Whitewater High School site is located on the southern edge of the City of Whitewater, bordered to the south by Highway 12. Residential neighborhoods are located to the north and north east. Areas to the west, south, and southeast are rural and predominately agricultural use.

The large site occupied by the High School as well as its proximity to undeveloped open space makes it an attractive site for potential wind turbine(s). Its location along Highway 12 is highly visible, and any installation would be impossible to overlook for those traveling along that route (thousands of trips per day). The site may support considerable solar and wind energy installation(s), the extent to which site assessments would better determine.

Solar – Phase I

Install a highly visible 20 kW solar photovoltaic tracking system at the High School.

Approximate cost (2010 figures):	$ 180,000
FoE incentive:	$ 63,000
WE Energies Incentives:	$ 58,500
Municipal Cost:	$ 58,500
Approximate production:	32,000 kWh/year
Approximate payback:	10.2 years

Solar – Phase II

The second phase entails installing less visible solar photovoltaic panel system(s) occupying roof space of the High School. Roof space is considerable; there may be four or more distinct locations for sizable installations. A site analysis will need to be completed to best determine precise project options.

Capacity:	30 kW (fixed)
Estimated cost:	$ 210,000
Focus on Energy Incentive:	$ 73,500
WE Energies Incentive:	$ 68,250
Municipal Cost:	$ 68,250
Approximate Production:	36,000 kWh/yr
Approximate Payback:	12.5 years

Wind – Phase I

Add 4 20 kW wind turbines. There are likely sites for more than four turbines, but with existing incentive structure, purchasing and installing equipment that totals $300,000 in cost maximizes utilization of those incentives.

Approximate cost (2010 figures):	$ 310,000
FoE incentive:	$ 100,000 (35%)
WE Energies Incentive**:	$ 100,000
Municipal Cost:	$ 110,000
Approximate production:	128,000 kWh/year
Approximate payback:	6.6 – 8.9 years (+/- 0.5m/s wind speed variation)
Return on Investment (10 yr)	12.3%
Net present value (10 yr)	$ 33,396
Return on Investment (20 yr)	19.2%
Net present value (20 yr)	$ 153,778

* Figures based upon investment and production calculator provided by Renewegy, an Oshkosh, WI-based turbine manufacturer. Assumptions include: 4.0% annual energy cost increase, 6.0 m/s average wind speed, $0.12611 kWh 2010 utility rate, 5% annual discount rate

** WE Energies presently offers up to $100,000 on solar pv and wind energy projects, providing up to 50% of the post- Focus on Energy incentive project cost.

Whitewater Middle School – Solar

The Whitewater Middle School is located within a residential neighborhood on the southwest side of Whitewater, 0.2 miles north of the High School.

The Middle School has areas of flat roof that may be good candidates for the installation of solar photovoltaic systems. The building has few mechanicals located on the roof, providing large areas without obstruction. As with all renewable energy projects in this Plan, a detailed site assessment will need to be completed.

Phase I:

7 rows of 21 185W panels along southern classroom hall. – 27.18kW

Phase II

2 rows of 22 185W panels on the north building – 8.1 kW

1 row of 32 185W panels above turn-in entry way – 5.9 kW

1 row of 24 184W panels on the east building – 4.4 kW

Capacity	27.18 kW	18.4 kW
Estimated cost: (30 kW x $7,000/kW)	$ 190,260	$ 128,800
Focus on Energy Incentive:	$ 66,591 (35%)	$ 45,080
WE Energies Incentive:	$ 61,835	$ 41,860
Municipal Cost:	$ 61,834	$ 41,860
Approximate Production:	32,616 kWh/year	22,080 kWh/year
Approximate Payback:	12.5 years	12.5 years

There is likely additional roof space that could support solar infrastructure beyond these concept projects. The installation of a wind turbine would prove more difficult to site, if desirable or possible, given the building's proximity to adjacent neighborhoods. However, locating a turbine(s) near the building along the playing fields may provide sufficient set-back from neighbors. For the purpose of this Energy Planning exercise, a wind turbine system is not included.

District Central Office – Solar

Located adjacent to the Middle School, the Central Office houses the administrative, business, and support offices as well as meeting space for the district. The east end of the building is garage space. Its east-west orientation provides two potential sites for solar photovoltaic installations, one on each end of the building. The area at the west end of the building is approximately 40 feet wide and 60 feet deep, the east end 50 feet wide and 40 feet deep. Portions of the east end of the building may be partially shaded from trees from the adjacent residential site for portions of the day and year.

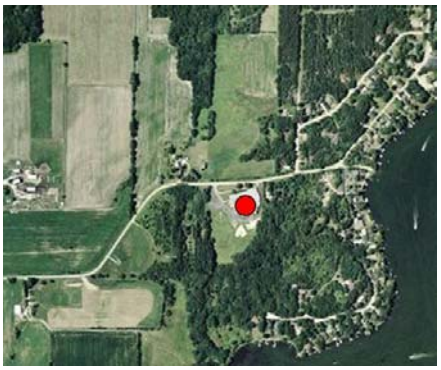
There may be sufficient space for three rows of panels on the west half of the building, with one shorter row in the center and a potentially longer row to the north. This could allow for approximately 20 kW in total capacity.

Estimated cost: (20 kW x $7,000/kW)	$ 140,000
Focus on Energy Incentive:	$ 49,000 (35%)
WE Energies Incentive:	$ 45,500
Municipal Cost:	$ 45,500
Approximate Production:	24,000 kWh/year
Approximate Payback:	12.5 years

Lakeview Elementary School – Net-Zero Energy & Sustainability Magnet

At the time of 25x25 Plan writing, the District is in the process of seeking funds from the State of Wisconsin charter school funding pool to convert the Lakeview Elementary School to a charter model and become a Net-Zero Energy & Sustainability Magnet. The funds would be utilized to make facility upgrades and improvements to utilize aggressive energy efficiency measures, green building materials, water conservation and reuse, natural landscaping, renewable energy, and implement an interactive environmental education throughout the school and grounds.

In 2009, the 49,000 sf Lakeview Elementary School consumed 192,880 kWh and 21,177 therms, costing nearly $42,000. The goal result of facility improvements would be a net-zero energy facility, meaning that the facility will produce sufficient renewable energy at the school site to meet its annual demand. Efficiency and conservation measures will reduce the amount of renewable energy necessary to achieve the net-zero goals. If this project is funded and net-zero goals achieved, it will represent approximately **12.3 percent** (2,775.8 MMBtu) of the renewable energy necessary to achieve the system-wide City and District 25x25 goal.



The energy efficiency options explored by Vesta (above) could reduce energy consumption in Lakeview by 48,376 kWh, and additional measures may be possible in the future. The geothermal HVAC system calculations provided by Vesta suggest that a system producing 18,900 therms would require approximately 94,932 kWh to operate, bringing the net energy use of the facility to approximately 239,436 kWh per year. Achieving this level of on-site generation would be a challenge, and require efficiency and renewables projects of several types likely implemented over a number of years, yet it would serve as a priceless educational showcase.

Renewable energy measures may include: solar photovoltaic, multiple small wind turbines, and geothermal heating and cooling. The geothermal system will be designed to meet 100% of the heating and cooling requirements for the facility, and may also be used to provide domestic water. Efficiency measures will be utilized to reduce heating and cooling demand to the greatest degree possible. The remaining energy use will be offset through a combination of solar and wind energy systems installed on-site.

A complete facility renovation may accompany upgrades to the energy systems in the school. As such, LEED™ for Schools or LEED™ for Existing Buildings, and/or other third-party certification program, may be pursued. The project would seek to maximize sustainability measures to create a showcase facility with exceptional educational value in all areas, not exclusive to energy.

The school facility is located at the edge between wooded areas to the east and south, and agricultural areas to the north and west. Lakeview School is located near Whitewater Lake, which is part of a larger natural area corridor that includes the southern portion of the Kettle Moraine State Forest, Bluff Creek State Natural Area, and Clover Valley Fen State Natural Area. Homes located near the school will play a role in potential turbine siting.

Example Generation Profile*:

Energy System	Capacity	Approx.Production	Approx. Cost
Solar Photovoltaic	40 kW (fixed)	48,000 kWh	$280,000
Solar Photovoltaic	11.85 kW (tracking)	18,900 kWh	$83,000
Wind	100 kW (one turbine)	140,000 kWh	$550,000
Geothermal		21,177 therms**	

* Illustrative example purposes only. Purposed systems not yet determined. Costs and production are Focus on Energy baseline estimates.

** Estimate. System may be designed to handle 100% heating and cooling load, offsetting all current natural gas use, but increase electrical use. This increase in electrical use is, for purposes of this report, expected to be offset by efficiency measures to the facility. Does not assume major improvements in facility heating loss.

Lincoln Elementary - Solar

Lincoln Elementary is located in west-central Whitewater, and is boarded by residential neighborhood to the north, south, and east, and playing fields to the west (Middle School beyond field).

Lincoln features several potential solar photovoltaic sites, include the two classroom corridors that protrude south (which are partially shaded by trees in the courtyard), the portion of the building that branches to the west, as well as the core portion of the facility to the north. Most spaces are unobstructed from solar radiation, and feature few rooftop mechanicals.

The west wing of the building, although not oriented optimally for solar, may provide the best location for an installation due to its lack of obstructions to solar radiation. Each of the two classroom corridors is partially shaded at various times of the day due to adjacent trees. The west wing has a skylight in the center, but is otherwise free of rooftop obstructions. The skylight is approximately 25 feet from each the northern and southern edge of the building, providing area for potentially one row of panels on either side of the skylight, extending approximately 50 feet in length. This may be sufficient space, with two total rows 21 185W panels, for a 7.77 kW system.

Estimated cost: (7.77 kW x $7,000/kW)	$ 54,390
Focus on Energy Incentive:	$ 19,036.50 (35%)
WE Energies Incentive:	$ 17,676.75
District Cost:	$ 17,676.75
Approximate Production:	9,324 kWh/year
Approximate Payback:	12.5 years

There is likely sufficient space for additional system(s), but a shading analysis would need to be completed.

Washington Elementary – Solar

Washington Elementary is located in the east-central portion of the City, and along with its playing fields, occupies an oversized city block. It is boarded immediately by a cemetery to the west (and residential neighborhood beyond), residential neighborhood to the north and east, rail corridor and industrial park to the south.

The northwest section of the building may be the most attractive for a first solar installation, given the relatively large space with few existing rooftop items. This portion is approximately 50 feet wide and 65 feet long, and may support approximately 4 rows of 18 135W panels of approximately 13.3 kW total capacity. Two additional rows may be possible on the southern portion of the building, totaling 24 panels for 4.4 kW capacity.

	13.3 kW	4.4 kW
Estimated cost: (30 kW x $7,000/kW)	$ 93,100	$ 30,800
Focus on Energy Incentive:	$ 32,585 (35%)	$ 10,780
WE Energies Incentive:	$ 30,257	$ 10,010
Municipal Cost:	$ 30,258	$ 10,010
Approximate Production:	15,960 kWh/year	5,280 kWh/year
Approximate Payback:	11.5 years	11.5 years

Whitewater Aquatic Center – Solar Thermal Pool Heating

This system would significantly displace demand on the existing natural gas boiler that heats the 8-lane lap pool as well as the leisure pool and whirlpool. This system will also replace the domestic hot water system that is used for showers and sinks.

The Whitewater Aquatic Center Board has included completing a solar thermal pool heating system in its 5-year capital budget for implementation in 2012.

A full system site analysis has not yet been completed. After investigating other similar systems, such as Fort Atkinson High School and Osceola High School, the assumption is that this system would be designed to offset 70 percent of the pool heating and 70 percent of the domestic water heating loads. Precisely how much demand will be met by a solar thermal system will depend in part on potential

savings from optimizing the pressure and ventilation of the building, which reduces evaporative losses, efficiency projects proposed to be conducted in 2011, as well as other constraints.

Based upon the assumption of meeting 70 percent of both pool and domestic water heating in the facility, approximately 45,903 therms of natural gas would be offset by this solar thermal system for pool heating, and 7,002 therms from domestic hot water. Together, this saves 52,905 therms of natural gas, or 5,470 MMBtu. These figures are based upon 2009 building demand.

Calculation: 65,576 therms x .70 = 45,903 therms
10,003 therms x .70 = 7,002 therms
= 52,905 therms

The addition of a solar thermal system will also need to consider the impact of upgrading the present pool boilers and domestic water system, as the solar unit would significantly reduce demand on these, and thus reduce savings and paybacks from upgrading them. Upgrading the existing boiler to a high-efficiency unit, and potentially a smaller unit, may be options.

2009 WAC Natural Gas Use Breakdown

Domestic Hot Water	9%	10,003 therms
Pool Heating	22%	24,452 therms
Evaporation	37%	41,123 therms
HVAC	32%	35,566 therms

Summary of Renewable Energy Measures Considered by the Whitewater Unified School District

Facility	Year	Generation		Capital	Potential Incentives			District
		kWh	therms	Cost	FoE	WE	Total	Cost
Aquatic Center – Solar thermal	2011		52,903					
Lakeview Net-Zero - Solar	2012	66,900		$ 363,000				
Lakeview Net-Zero - Wind	2012	140,000		$ 550,000				
High School Solar – Phase I		32,000		$ 180,000	$ 63,000	$ 58,500	$ 121,500	$ 58,500
High School Solar – Phase II		36,000		$ 210,000	$ 73,500	$ 68,250	$ 141,750	$ 68,250
High School Wind – Phase I		128,000		$ 310,000	$ 100,000	$ 100,000	$ 200,000	$ 110,000
Middle School Solar – Phase I		32,616		$ 190,260	$ 66,591	$ 61,835	$ 128,426	$ 61,835
Middle School Solar – Phase II		22,080		$ 128,800	$ 45,080	$ 41,860	$ 86,940	$ 45,860
District Office – Solar		24,000		$ 140,000	$ 49,000	$ 45,500	$ 94,500	$ 45,000
Lincoln Elementary – Solar		9,324		$ 54,390	$ 19,036	$ 17,676	$ 36,712	$ 17,678
Washington Elementary – Solar		21,240		$ 123,900	$ 43,365	$ 40,267	$ 83,632	$ 40,268
Totals		512,160	52,903	$ 2,250,350	$ 459,572	$ 433,888	$ 893,460	$ 447,391

All figures are in 2010 dollars, based upon 2010 incentive structures by Focus on Energy (FoE) and WE Energies, and 2010 system cost and production figures provided by Focus on Energy.

Transportation Measures

The Whitewater Unified School District contracts with a private transportation services firm to provide busing for students to and from school and to and from activities. During the time frame of this planning process, the District determined that it did not have the staff time and capacity to address transportation fuels in a meaningful way. However, the District has renewed interest in revisiting transportation fuels in the near future, with the goals of reducing fuel consumption, reducing emission of air pollutants, and utilizing alternative fuels.

The City of Whitewater will consider replacing existing vehicles with high-mileage, alternative fuel, or electric options during the normal vehicle replacement cycle.

There are many types of alternative fuel and high-mileage vehicle options on the market today. This is an area that has experienced rapid growth, and likely will continue in the future. Each option has specific advantages and disadvantages ranging from lower emissions and reduced dependency on fossil fuel, in addition to variable vehicle ranges, use capacities, and other performance. The Energy Team did not have capacity during this planning exercise to explore specific vehicle options given the diversity of options and the lack of a clear superior measure. Additional research will be required before specific vehicles are replaced and upgraded in the future.

The University of Wisconsin – Whitewater currently operates several electric vehicles for use on campus, and serves to share knowledge and test options. The City is learning from the University's experience with these vehicles, and will solicit additional input to inform future purchasing decisions.

For the purposes of this planning exercise, the City estimates that it will replace three vehicles with electric vehicles by 2015. The vehicles to be replaced will be determined at a future date as existing vehicles are retired from the fleet. Liquid fuel savings as a result of this measure is not included in the Energy Model calculations, as future vehicle use and fuel savings are difficult to predict.

In 2005, the City of Whitewater became among the first municipalities in Wisconsin to adopt an ordinance permitting the use of neighborhood electric vehicle (NEVs) on municipal roadways. This is important leadership position, as many NEVs are not crashed test rated, and as such is not permitted on State roadways and only on municipal roadways were specifically permitted by that municipality. This removes a local regulatory barrier and allows citizens and businesses to begin adopting these vehicles for local use as they come to market.

Medium- and Large-scale Renewables

The City of Whitewater seeks to develop strategies to facilitate and promote the development of renewable energy infrastructure by the private sector in the City of Whitewater. This includes, but is not limited to, geothermal heating and cooling, solar thermal and photovoltaics at homes and businesses, medium- and utility scale "solar farms", cultivation and collection of biomass feedstock for energy production, and siting wind turbines in appropriate locations.

The encouragement of the siting of renewable energy infrastructure fits directly into the City's overall economic development strategy. The City recognizes the significant potential economic and environmental benefit of locating renewable energy facilities in and near the City. The City recognizes that by taking a proactive stance to facilitate siting and development of clean energy facilities these facilities are more likely to develop in our community.

Noted examples of these types of developments in the private sector include:

- Jefferson Sun One - 20 MW solar energy farm proposed to be located in the City of Jefferson, approximately 14 miles to the north of Whitewater. If completed, it would triple the estimated installed solar capacity in the State of Wisconsin.
- Sun Prairie Copps West Supermarket – Utilizing its flat roof, this supermarket features an impressive 47.4 kW solar photovoltaic installation.
- Jefferson Area Business Center – This business incubator facility in the City of Jefferson features as 21.38 kW fixed array of roof mounted solar photovoltaic panels.
- Menasha Corporation – The Neenah, WI based company will add five 20 kW Renewegy wind turbines at their headquarters along highway 41.
- SCA Tissue - This global paper company added four 20 kW Renewegy wind turbines to its Service Excellence Facility in the Town of Menasha, WI, in 2010.
- Orion Lighting – This Manitowoc, WI lighting company added a 20 kW Renewegy turbine to the parking lot of their headquarters.
- Kohl's Department Stores – The Menominee Falls, WI -based retailer has installed solar photovoltaic panels on 100 of its stores in the U.S., reaching this milestone in September, 2010. A published estimate of the typical Kohl's 88,000 sq.ft. facility includes more than 2,300 panels. In addition, over 500 Kohl's locations have achieved U.S. DOE Energy Star certification.
- Home Harbor Assisted Living – This Racine, WI facility installed a 135 kW solar photovoltaic system in 2009.
- Gunderson Lutheran Hospital in La Crosse, WI added a 58 kW solar photovoltaic system in 2009.
- Mulroy's Auto Body Shop – This Minneapolis, MN business added a 40 kW solar photovoltaic system in 2010, the largest in the Twin Cities region.
- Osborne Farm - The barn on this family farm in the Town of Sugar Creek in Walworth County hosts 12.4 kW of solar photovoltaic panels. The superinsulated farm house is heated using only passive solar and a wood boiler, and all fuel used in farm vehicles is biodiesel made on the farm. Convergence Energy of Lake Geneva rents 14 acres of this farm to host 10 large pole-mounted solar photovoltaic tracking systems.

- Green Leaf Inn – This small hotel under construction near Delavan, WI, installed a 50 kW wind turbine in 2009. This green-designed and built business intends to be zero-net-energy once completed in 2011.

Noted public sector developments include:

- MATC Fort Atkinson – Madison Area Technical College Campus in Fort Atkinson, an urban site, added a 100 kW wind turbine in 2009. The College utilizes an online monitoring dashboard that allows the public to monitor the turbine's performance. The highly visible site is adjacent to Fort Atkinson High School, which features a solar thermal pool heating system.
- Evansville Wastewater Treatment Plant – In 2010, this Wisconsin Energy Independent Community added a 100 kW Northwind wind turbine at their wastewater treatment plant.
- Wausau East High School – This Wausau, WI high school installed a 100 kW Northwind wind turbine in 2009 and added a second 10 kW Bergey Excel-S turbine in 2010. Near the foot of the 100 kW turbine is a 2.88 kW solar photovoltaic tracking system. The Wausau Outdoor Renewable Energy Learning Center has real-time data available through an online dashboard from each system.
- Kaukauna High School – This school not only features a 4.9 kW solar photovoltaic system, but also will add two 20 kW wind turbines in 2011.
- Westby Bekkum Memorial Library – This Westby, WI library features a 6.97 kW solar photovoltaic system.
- Upper Sandusky, Ohio – Wyandot County worked with a private sector partner, PSEG, to develop a 80-acre, 12 MW solar photovoltaic installation on public (County) land straddling the runway of Wyandot County airport in 2009. With 159,200 panels, this system produces enough electricity to support 9,000 residences. Ohio State Extension agent provided the impetus and support in facilitating the development, and the contractor utilized the project to train 50 new certified solar installers.
- Swanton, Ohio - 180th Fighter Wing Air National Guard Base at the Toledo Express Airport hosts a 1.2 MW solar photovoltaic system, installed in four phases, which provides 37 percent of the base's energy use.
- Xcel Energy – In September, 2010, Xcel Energy announced that it is seeking a community partner in developing a 600 kW solar photovoltaic installation on a 3.5 acre parcel and through October 2010 was soliciting interest from state or local governments or higher education institutions on whose site the solar PV system can be installed.

Included above are but a small sample of example projects potentially replicable in and around the City of Whitewater.

5. Pathways to 25 x 25

The Pathways to achieving the 25x25 goal for the City and District involves short-, medium-, and long term strategies to reduce energy consumption and achieve greater utilization of renewable energy.

Energy Efficiency

The City and District have already implemented a wide array of energy efficiency improvements during 2010, in part due to information and capacity provided by the planning process. Many additional projects have been included in capital budgets in 2011, and further measures will be undertaken in the short- to medium- term. Most of these measures are considered "low hanging fruit" – those that have expected payback periods of less than five years. However, some projects are considered longer-term investments, those paying off in greater than ten years.

Efficiency measures undertaken by the City, included in this report, are expected to reduce annual baseline consumption by 153,451 kWh and 12,626 therms. Combined, this decrease of 1,786.2 MMBtu represents 7.1 percent of the 2009 City building energy use (2.5 percent of total baseline) and savings of approximately $ 21,148 (2010 energy cost figures).

Efficiency measures undertaken by the District, included in this report, are expected to reduce annual baseline consumption by 1,080,871 kWh and 113,449 therms. Combined, this decrease of 15,032.8 MMBtu represents 44.9 percent of the 2009 District building energy use (21.1 percent of total baseline) and savings of approximately $ 151,290 (2010 energy cost figures).

Efficiency measures undertaken by the Whitewater Aquatic Center (WAC), included in this report, are expected to reduce annual baseline consumption by 799,444 kWh and 16,627 therms. Combined, this decrease of 4,390.4 MMBtu represents 27.4 percent of the 2009 WAC building energy use (xx percent of total baseline) and savings of approximately $ 105,507 (2010 energy cost figures).

Combined, these efficiency measures, already completed, underway, or expected to be implemented during 2011 and 2012, will reduce energy consumption approximately 2,033,766 kWh and 142,702 therms per year. This 21,209.4 MMBtu annual savings represents **28.4** percent of the 2009 building energy use and 29.8 percent of the total energy baseline.

Energy baseline and 2009 building energy use figures are different, because the energy baseline, as calculated by the Energy Center of Wisconsin tool, utilizes three-year average energy consumption data, while 2009 building energy use is a point-in-time figure. These figures are each reported separately because some facilities do not have three years of available energy use data, and the energy planning exercise utilizes the ECW tool baseline for future energy use calculations.

Renewable Energy

There are a great variety of renewable energy options available to the City and District that were identified and investigated in this planning process.

The City and District plan to undertake the following renewable energy projects, detailed outlined in Chapter 4:

- Innovation Center – Solar PV and Geothermal (existing)
- Wastewater Facility – Biogas Phase I & Ramp-up
- Wastewater Facility – Biogas Phase II
- Whitewater Aquatic Center – Solar Thermal

These projects combine to produce an estimated 13,831 MMBtu of renewable energy, comprising **75.4 percent** of the City and District 25x25 goal.

Future Renewables

The City and District also include the following projects toward achieving the 25x25 goal, making a commitment to investigate implementation during the time horizon of this plan (2025).

- Lakeview Elementary School – Net-zero School
- Wastewater Treatment Facility – Manure Digester
- Innovation Center – Wind and Solar PV
- Administration Center Solar PV
- Wastewater Treatment Facility – Wind and Solar PV
- Whitewater High School – Wind and Solar PV
- WUSD Central Office – Solar PV
- WUSD Lincoln Elementary – Solar PV
- WUSD Washington Elementary – Solar PV

These projects combine to produce an estimated 11,917 MMBtu of renewable energy, comprising **64.9 percent** of the City and District 25x25 goal.

Renewable Portfolio Standard

The present Wisconsin Renewable Portfolio Standard requires regulated utilities to achieve 10 percent utilization of renewable energy in their service mix. This level may change during the 15 year planning horizon of this report, but it is assumed and modeled for the present 10 percent level. This would result in 437,000 kWh of renewable power from the utility, representing 1,462 MMBtu or 8 percent of expected 25 x 25 Goal.

After factoring completed and planned energy efficiency and conservation measures expected to be undertaken between 2010 and 2012, the renewable energy project selection combine to reach an anticipated **154 percent achievement** of the 25x25 goal, with an overall renewable energy utilization rate of **38.5 percent**. We anticipate future improvements in energy efficiency and additional renewable energy projects not included in this report may further increase our 2025 renewable energy utilization above this figure. Revising this energy plan periodically will allow us to do this.

Even though solar photovoltaic systems presently, in 2010, have up to a 67.5 percent cash incentive from the options available through Focus on Energy and WE Energies, the payback of such systems are expected to be between 11 and 12.5 years, assuming a 5 percent annual increase in energy prices and no economies of scale. However, they are the lowest maintenance of any renewable energy system, and may be placed in highly visible locations to raise awareness and serve as educational opportunities,

increasing their social value. These systems are also expected to last a long time, 25 years or longer, making the economic benefit over the long term significant.

Wind energy systems presently have a similar incentive structure as solar, but with generally more attractive payback rates. The greatest concern with these systems, generally, is siting in positions with favoriable wind resource yet meeting setback requirements and minimizing issues with neighboring parcels. Payback varies greatly depending upon unit selected and wind resource available, maintenance is also an ongoing requirement, making payback periods less predictable than solar. Yet, estimates provided show attractive payback ranges of 6 to 8 years for some technologies, creating a net positive cash flow over a 10 year bond period.

Vehicles

In 2011, the City of Whitewater will upgrade all private water meters from analog to digital. This will allow remote monitoring and meter reading, eliminating the present situation of having a municipal staff person drive around the City and physically read the analog meters. It is expected that this measure will not only lead to decrease water use as system losses will be easier to identify, but also consumer use may decline due to better information. This would lead to lower energy use in the Water Utility for water pumping, and at the Treatment Facility. The fuel savings from eliminating analog meter reading is expected to be significant, although this figure is not yet known.

The Energy Team recognizes that our knowledge and capacity to address transportation issues were limited during the period of this grant. Our limited time was focused on exploring facility efficiency improvements and renewable energy options, as facilities represented most of our energy baseline. The Energy Team will continue to investigate energy options in transportation.

Summary

Planned energy efficiency measures implemented between 2010 and 2012 are expected to decrease energy consumption by approximately 25.7 percent from the 2009 baseline. Renewable energy projects currently under development will provide approximately 73.9 percent of the City and District 25x25 Goal (using revised energy use baseline), and future renewables under investigation could provide an additional 63.6 percent of this goal. **These measures combine to achieve 154 percent of the 25 x 25 Goal, achieving a 38.5 percent renewable energy utilization rate.** These figures are calculated utilizing the Energy Center of Wisconsin model using 2007 to 2009 energy consumption data.

Summary of Whitewater Pathway to 25 x 25 Goal

Project	2009 Baseline	Savings (MMBTU)	Renewables (MMBTU)	Percent Savings	Percent Renewables	Schedule (est.)
City kWh	12,037					
District kWh	8,661					
WAC kWh	4,507.7					
City therms	13,098.9			2025 Projected use:		90,377
District therms	24,761.8			25 x 25 Goal:		22,594
WAC therms	11,518			Revised 2025 projection:		73,378
City liquid fuels	2,605			Revised 25 x 25 Goal:		18,344
Total	76,307					
Efficiency Projects (2010-12)						
City		5,23.5748		7.1 %		2010 - 11
District		3,687.932		45.0 %		2010 - 12
WAC		2,727.703		27.4 %		2011
Total		6,939.21		28.4 %		
Renewables						
Underway			13,831.1		75.4 %	2010-18
Future			11,916.9		64.9%	2012-25
10 % RPS			1,462.7		8.0 %	
Total			27,239			

6. Projects Selected – Explanation

The City and District have begun to implement, or have already completed, most of the efficiency measures included in this report. Those projects already completed, or in-progress status, are included in project descriptions in the preceding chapter of this report. The efficiency projects that may result of from the Vesta Technologies assessment of District facilities have not yet been selected and included in future capital budgets.

The lighting retrofit to the Library and White Memorial Building will not be implemented at this time. The energy cost savings did not yield a realistic return on investment, based upon the contractor's estimate.

The City has completed upgrades to the Wastewater Treatment Facility to utilize biogas, and will begin to accept industrial waste in the coming months. The City is committed to utilizing the existing capacity of the digester, and making minor improvements, to accept increasing amounts of industrial waste and offset most natural gas use at the site. The City will continue to investigate the potential of adding capacity to host a manure digester at the Wastewater facility, with implementation predicated in the 5 to 7 year time horizon.

The Innovation Center is completed and will open in January, 2011. The City is intrigued by the idea of increasing the on-site capacity from renewable energy sources, and will actively seek opportunities to do so.

The Whitewater Aquatic Center has included all of the efficiency measures in their 2011 and 2012 capital budgets that are outlined in this report. Also included is the pursuit of a solar thermal system for pool and domestic water heating. Future projects may also exist, but have not been explored or included in this report.

The District is aggressively pursuing funding options for completing the Lakeview School Net-Zero Energy concept. This status of the project at the time of report completion is that obtaining funding from the State is realistic. The District will continue to pursue this opportunity as well as seek additional funding options to move this project forward.

The City and District chose to include the future renewable energy options in this plan, as each are committed to increasing their utilization of renewable energy. Analysis completed in this report was completed by UW Extension and additional detailed study will need to be conducted before any additional projects are implemented. Funding will likely be the highest hurdle for each of these measures, and the City and District, with their partners, will continue to actively seek external funding opportunities.

Significant transportation fuel measures were not included in this report, and no options were included in the energy model. However, the City will investigate measures as fleet vehicles are retired.

7. Potential Renewable Feedstocks

Biogas

The City of Whitewater is pursuing a project to collect the biogas produced from the anaerobic digestion of municipal waste at the Wastewater Treatment Center. This biogas will be used to offset natural gas use at the facility. Current biogas production from municipal waste is 96 therms (9.6 MMBtu) per day, 35,040 therms per year, and is expected to increase with population growth and efficiency upgrades to the digester. All gas presently produced is flared.

The City is also preparing to accept industrial waste at the facility, appropriate for use in the existing anaerobic digester, to increase biogas production. Initially, 10,000 gallons per day for 200 days per year is the target. This would produce an estimated 13,000 therms of biogas per year. There is potential to increase to 20,000 gallons received per day, representing an additional 13,000 therms of biogas per year. The total existing capacity to accept industrial waste at the facility is 30,000 gallons per day. Either biogas storage capacity or a microturbine will need to be utilized to take advantage of this additional production.

There is also potential to accept animal waste from dairy production in the immediate region and add a second waste stream to the Treatment facility to produce additional biogas. This biogas could be used to offset natural gas use, produce electricity, or both. In the engineering report exploring this option, a survey was conducted to identify potential sources of manure and gauge interest in dairy operators. With existing capacity to accept 840 animal units, four dairies expressed interest that would meet the system capacity. This system could produce approximately 49.56 MMBtu of biogas per day.

The study conducted by Strand included surveying a number of the larger dairy farmers in the Whitewater region, and yielded interest from several farmers. At this time, there is sufficient interest to provide several times the current projected capacity (840 A.U.) of the digester. This figure may change over time, as it will be several years before this phase of the project may be implemented, but indication of supply is positive.

Wood

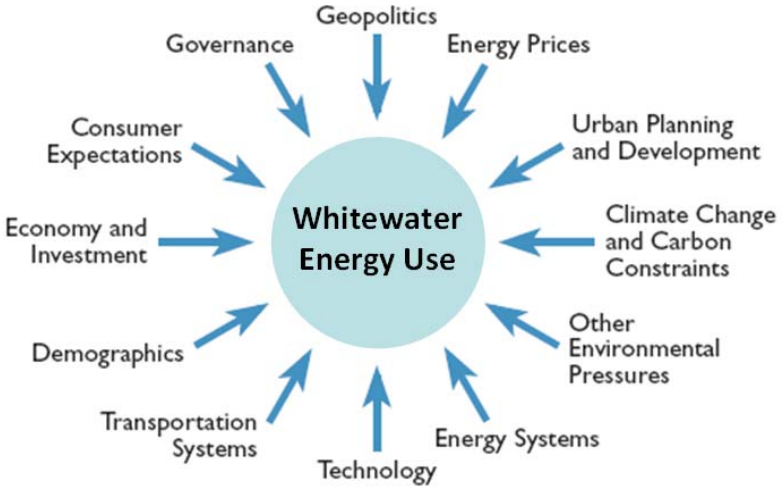
A thorough analysis of wood and wood waste for use as fuel was not conducted during this planning exercise. The Whitewater region is predominately agricultural, and the use of wood for energy is not foreseen in City in District facilities.

Biomass

A thorough analysis of potentially available biomass, such as waste from food processors or agricultural operators, was not conducted during this planning exercise. Given that the immediate region surrounding Whitewater features excellent agricultural soils, there is likely potential for collection of agricultural residues to produce liquid fuel or for direct combustion. However, these options were not explored by the Energy Team.

8. Existing Unknowns – Necessary Information for Future

While this plan outlines future projects for the City to reach its 25x25 goal, there are in depth details and information that was not included in the scope of this plan. This section outlines those details that will need to be addressed in the future.



Adapted from: Quality Urban Energy Systems of Tomorrow (QUEST), 2010

Whitewater Innovation Center

As mentioned in this report, the City of Whitewater has partnered with the University of Wisconsin – Whitewater to build and operate a technology business incubator known as the Innovation Center. The City of Whitewater will be responsible for all energy costs associated with the space occupied by tenants of the Innovation Center, creating a large unknown in terms of energy consumption. The expected energy consumption is based upon engineering estimates during project design, and actual consumption will vary depending upon occupancy rates, nature of occupants, plug loads, weather, etc.

Wastewater Facility Biogas Production

There will be variation in the future biogas production at the Treatment Facility, due to the nature of population and business growth in the management district. Also variable may be the availability of industrial waste and energy content, which will impact biogas production. Presently, the City expects to charge industrial facilities to receive the waste, and this rate may also impact the quantity of waste that is ultimately available.

Technology

Technology continues to evolve at a rapid pace; often resulting in cost reductions causing projects impacting energy use to become more financially attractive. Just in the past few years, the availability of high mileage vehicles has been vastly improved with the introduction and improvement of hybrid technology, and the next few years will likely increase these options as well as introduce electric vehicles. Similar rapid improvements in LED and other lighting technologies have occurred.

All projects included in this plan are based upon technologies available in 2010, and their estimated costs. The purpose of this plan is to develop a strategy to reduce energy consumption and achieve 25 percent utilization of renewable energy by 2025. Over the next 14 years, technological conditions will change dramatically, with the positive expectation that it will become increasingly cost effective to achieve and exceed our 2025 goal. It is thus necessary to revisit this plan regularly to make continual improvement throughout and beyond this period.

The City and District, while revisiting this energy plan and making capital and equipment improvements, will consider the technologies available and weigh decisions based upon energy savings, fiscal return, environmental benefits, and other factors. However, the City and District will not "wait" for the next around-the-corner technological solution, knowing that these developments are notoriously difficult to predict and "magic" solution will likely ever exist.

Technology is a dual-edge issue. The increased adoption of electronic devices may very well increase overall energy use by the City and District, as well as the private sector, even as efficiencies will likely continue to advance for appliances, lighting, and other equipment.

Future Legislation

The 25x25 baseline was created with the assumption that Wisconsin Utilities will meet ten percent of the electrical production from renewable sources, per present (2010) Wisconsin statues. This level of renewables may be increased, and such a proposal appeared in 2010 Wisconsin legislative session. Creating a renewable energy portfolio standard was also discussed at the Federal level in 2010. Future legislation at the State or Federal level may impact the rate of renewables use by utilities, therefore impacting the baseline use of renewables for the City and District, impact energy costs, and availability of technology and/or outside funding.

For the purposes of this planning exercise, the assumption was made that utilities will not exceed ten percent of their portfolio met from renewable sources by 2025.

Future legislation may also impact the City and District's utilization of renewable energy beyond impacting the portfolio of the utilities.

- Impact the utility rates for electrical or natural gas, making efficiency and renewables more financially attractive.
- Change current cash incentives for utilization of renewable technologies for municipalities and/or school districts (increase or decrease incentives).

Funding

The City and District face difficult budget constraints, creating a challenging environment that places top priority on sound financial decisions. Limited budget dollars are under greater strain and competition from a variety of alternative uses. Energy saving projects that represent a reduction in operational cost, especially over the short- to medium- term, may gain favor in this cost-saving environment, although the fiscal return will need to be emphasized. Projects with longer period of return will face intense scrutiny.

Municipal bond rates are at or near historic lows, partial result of a federal response to present economic conditions to prevent further deterioration in financial markets. These rates create a more attractive lending environment for the City and District to finance projects through bonding. These rates are likely to change in the future, which may impact project implementation and return on investment.

Availability and success of application for Focus on Energy and WE Energies incentives may determine which projects are completed and timeline. Relatively generous incentives exist in 2010, however the limited nature of funds at the State level will, in part, determine what is available. These incentive levels and availability will likely change in the future, creating uncertainty in plan cost and implementation.

The City of Whitewater has been very successful in receiving federal aid to support energy and environmental projects (25x25 Plan Grant: $45,000; EEGBC: $175,600; Innovation Center: $4,700,00; Wastewater Treatment Plant: $5,700,000). Availability of State and/or Federal funding for projects may create additional opportunities to implement projects and strategies outlined in this plan, and/or new opportunities to reduce energy consumption and renewables production. The City and District have chosen to be aggressive in seeking funding opportunities.

Political and Public Support

Political and public support of energy and environmental pursuits is high, as is reducing operational budgets and economic development. Showing the financial benefit of reducing utility costs may garner political and/or public support for projects within this Energy Plan, as well as future projects.

Partnerships

The City and District have been successful in building partnerships with organizations within our City and Region, including UW-Extension, UW-Whitewater, WE Energies, and others. The success of this planning effort depended upon expertise and increased capacity gained through these relationships.

The potential for success in implementing project and achieving medium- and long-term goals will be based, in part, on the ability to maintain and further develop cooperative partnerships.

Private-public partnerships are an area that has been investigated only to a limited extent in this planning process, and future success may also be furthered by exploring and nurturing this type of relationship. Examples include relationships with industrial facilities and area dairies that may provide feedstock for the biogas digester at the Wastewater facility. Additional examples are working with tenants of the Innovation Center and Whitewater University Technology Park to develop long-term relationships and potentially collaborations on future projects

Participation by community groups and businesses in developing this plan was minimal. By including a broader coalition of groups, the Energy Team may increase community capacity to address energy challenges, as well as foster innovative ideas.

Energy Prices

The price of fossil energy is a significant determinate of the economic payback of efficiency and renewables projects. Energy prices increased rapidly leading up to the present economic slow down, and are likely to continue to rise at an unknown and variable rate. The spike in energy prices in 2008 caused a sharp increase the demand for hybrid and high mileage vehicles, yet when energy prices declined slightly this demand cooled somewhat. These acute changes in energy prices, as well as national or regional events, can drive public support and governmental emphasis on energy policy.

Detailed Feasibility Studies

Many of the projects included in this plan received only broad-brush engineering visits, providing general cost and payback estimates. Project implementation will require detailed engineering analysis to determine greater precision on cost and payback. These studies will determine final feasibility of going forward with a project.

9. Action Steps – Immediate & Long - Term

Immediate

The City and District began to implement energy efficiency improvements during this planning process and potential projects were investigated. Those projects are outlined in Chapter 4 of this report. Other efficiency projects not yet completed or underway will be completed during 2011 and 2012.

In early 2011, the Energy Team will work with the City Common Council and School Board to develop adoptive (or endorsable) policy documents to be considered by their respective governing bodies. The Energy Team will make any necessary modifications to this report to a format agreeable for consideration and adoption.

The Energy Team will continue to meet at a frequency to be determined to continue to implement this Energy Plan, study additional measures, conduct education and outreach activities, and develop partnerships.

The City and District will begin to develop and implement education and outreach activities, in cooperation with our partners, to build upon our successes. Our education and outreach strategy is included in Chapter 10 of this report. The development of these programs will begin in 2011 and extend into the future.

The City will continue to investigate opportunities to reduce fossil energy consumption from liquid transportation fuels. The Energy Team did not place significant focus on addressing transportation fuels during this planning process, as they represented a small portion of overall energy baseline and lacked the staff time and capacity to develop a thorough fleet plan. Measures to reduce fuel consumption are included in this plan, and the City will investigate this issue further to make additional progress toward reducing cost and achieving the 25x25 goal.

They City and District are considering having renewable energy site assessments completed by an independent, third-party specialist to determine more precisely what energy resources are available given present infrastructure conditions and estimate system costs. These studies will provide greater clarity to the potential renewable energy projects outlined in this Report, and inform the City and District how to move forward on these elements of their Energy Plan.

Long-Term

The City and District education and outreach plan focuses on building programming for the immediate- to medium- term, and the Energy Team will work to develop energy programming for long-term success. Partnering with UW-Extension, UW-Whitewater, Technical Colleges, and other organizations and businesses will enable programming to be developed and carried forward.

The City and District include a Commitment to Continual Improvement in the Overview chapter of this plan report. The City and District are committed to maintaining and building relationships with the University and other stakeholders to address energy and other concerns. To this end, the City and District will continue to facilitate and seek input from present Energy Team members, as well as others. The City and District, through the success of this planning process, expect to revisit this plan regularly to reassess energy use, and continue to investigate measures to reduce energy consumption and utilize renewable sources of energy. This long-term strategy will aid in ensuring the City and District maintains awareness of the energy issues, actively seeking opportunities as they arise.

10. Education and Outreach

The City of Whitewater and Whitewater Unified School District will make great progress toward reducing energy consumption and utilization of renewable energy through implementation of this plan. The City and District is also making great strides in other areas, such as water quality and efficiency, natural areas, purchasing, and more. However, the Team realizes that education and outreach is critical to communicate success, lead by example, and facilitate energy improvements in the private sector.

The City of Whitewater has an excellent and growing relationship with the University of Wisconsin – Whitewater faculty and staff. The City is also working to develop relationships with the Technical Colleges in the region, including Gateway, Madison Area, and Blackhawk. The City and District will continue to develop relationships to develop and deliver education and outreach programming.

Partnerships and collaborations with private sector firms and non-profit groups will also be cultivated to aid in the delivery of education and outreach.

EcoFair360

The inaugural EcoFair360 was held at the Walworth County Fairgrounds on July 16-18, 2010, and was attended by over 1,100 individuals. The Fair featured 75 booths from local businesses and non-profits, and 140 speaker sessions on a broad diversity of topics. The City and District energy planning efforts were highlighted on lectures delivered on the 17th and 18th by UW Extension.

Jefferson Energy Independence Kickoff

On November 11, 2010, the City of Whitewater participated in a City of Jefferson's Energy Independent Communities Educational Kick-off event, held at the Jefferson Area Business Center. The event was well attended, with over 100 reported in attendance. Whitewater City Manager and Energy Team member Kevin Brunner spoke on behalf of the City and District, highlighting the many projects underway and in planning. The keynote was delivered by Judy Ziewacz, Director of the Office of Energy Independence, speaking broadly about the history of the initiative and touching on projects across the State. Also speaking was State Representative Andy Joregensen, Lisa Fox of Focus on Energy, Andy Kellen and Greg Hoffman from WPPI Energy, and City of Jefferson Mayor Dale Oppermann.

Planned Education and Outreach Measures

Real-time Building Monitoring

The Whitewater Innovation Center will have real-time building energy monitoring, which will display current and historical rates of electricity and water consumption, energy production from the 20 kW solar photovoltaic array (and any future installations), activity of the geothermal system, and other building characteristics. This platform will display data on a scrolling LCD screen in the facility common space, and also make the data available to the public through an online dashboard.

In the future, the City and District will explore the potential of adding this building monitoring capacity to other facilities, further building capacity to utilize this tool in education programs in the District, at UW-Whitewater, and in other education and outreach activities.

Community Networking

The City and District will work to network with other communities in the State and Region that are active in addressing energy and sustainability concerns. This will be through existing channels, such as the Energy Independent Communities Partnership, Southeast Wisconsin Sustainable Communities Network, Local Government Institute, and DNR Green Tier Legacy Communities, and also direct community-to-community interactions to jointly work toward achieving environmental benchmarks. This may include cooperative education and outreach events, sharing knowledge and best practices, and other activities.

Media Outreach

Members of the Energy Team will periodically prepare press releases to highlight successes in the City and District on energy and other environmental initiatives. These press releases will also highlight ways that citizens and business can make improvements and direct individuals to additional resources.

Email List

The City and District may collect email addresses and other information voluntarily from individuals that attend education and outreach events. This information may be utilized to create an email list to be used to increase the outreach capacity to raise energy awareness, distribute energy-related materials, and announcements of upcoming events.

Facility Tours

The Energy Team may coordinate tours of City and District facilities, such as the Whitewater Innovation Center, to highlight advanced building technologies in action. These tours may often be associated with other educational activities, such as workshops, lectures, and outreach events.

Online Presence

The City and District will create areas of their respective websites to be central locations to access and disseminate information electronically on sustainability initiatives. Included will be policy documents, such as this report, success stories, press releases, and linked resources to Focus on Energy, U.S. DOE and EPA, UW-Whitewater and UW-Extension, and others.

K-12 Curriculum

The Energy Team may work with the District and partners to promote the integration of energy and other sustainability concepts into K-12 educational programming. UW-Whitewater, UW-Extension, area technical colleges and other partners may contribute to supporting the District in this effort.

The K-12 Energy Education Program (KEEP) is an award-winning teacher education program operated out of Stevens Point, WI. Their teach-the-teacher programs may assist in raising the capacity of local teachers to provide education on energy to students. KEEP also has a wealth of information on both school and home efficiency strategies available to improve the outreach activities of the Energy Team. The District will explore implementing programs and strategies available through KEEP.

Student Projects

The City, District, and University will collaborate to develop places for both K-12 and University students to contribute directly toward energy and sustainability projects. Examples may include a group project of University studies to investigate options for the City's fleet vehicles, marketing and outreach material creation, local food projects, and study other topics of student design. These projects will be highlighted and publically recognized, while giving students practical project experience.

Economic Development

Clean energy and water efficiency have been identified both by the City and regional economic development entities (Milwaukee 7) as priority growth sectors. The City, Whitewater Community Development Authority, and partners will collaboratively work to develop the capacity for high road economic development. Components may include:

- Business-focused workshops
- Resource dissemination publicizing Focus on Energy and other programs
- Continue to lead by example and publicize success
- Collaboration with the University and technical colleges

Energy Challenge

The City will work with the District and WE Energies to challenge homeowners and businesses to reduce their energy consumption. This public challenge may be set up to challenge homeowners and businesses to reduce consumption based upon past years energy use, verified through their WE Energies bill. Multiple channels will be utilized to publicize the challenge, including local media, District take-home fliers for kids, employers, and other existing groups.

Educational resources will be provided, with supportive outreach activities. Homeowners and businesses will be encouraged to provide their stories, and along with monthly and/or annual winners, publicize energy conservation efforts with good press and public recognition. Energy Kits may be developed (more below) and distributed at outreach events. Public recognition, and potentially awards (from participation certificates up to small sustainability-related materials) may be given. An annual public recognition event may be organized to highlight successes, distribute awards and participation certificates, and thank sponsors and partners.

This effort will serve not only to highlight the successes the City, District, and University have made toward energy, but raise awareness and make quantitative progress throughout the community.

UW-Whitewater has held energy challenges on campus between dorms in the past, and the City will coordinate with the University on this effort.

Energy Kits

The Energy Team will develop Energy Kits consisting of educational materials, CFL and/or LED light bulbs, reusable shopping bag, and other materials, distributed at outreach events to raise awareness of energy. Materials will be solicited in-kind or at low cost from local businesses to assist in this effort, and will be recognized for their contribution.

Rain Barrel Program

Although not directly tied to energy use, the City and District may incorporate additional environmental education and outreach programs. The Walworth County Land Use and Resource Management Department, in conjunction with UW-Extension, operate a rain barrel program through which residents can purchase a rain barrel and kit to reduce potable water use in outdoor applications. This existing program may be highlighted and marketed with proposed energy programming.

Planned Events

Whitewater Energy Independence Kickoff

The City and District will hold an Energy Independence Kickoff event at the newly completed Whitewater Innovation Center in January, 2011. Details of the event remain to be planned. The event will serve as the first public event held at the Innovation Center following its completion and will highlight the energy efficiency and renewable energy efforts underway in the City and District. The event program will be planned to be similar to the November 11, 2010 event in the City of Jefferson.

Whitewater Innovation Center Ribbon-Cutting

The ribbon cutting ceremony at the Whitewater Innovation Center will be held in spring 2011, following completion of interior spaces, furnishing, the occupancy. The event will focus primarily on the Innovation Center and Whitewater's commitment to clean and high tech energy development.

University of Wisconsin – Whitewater Earth Day

Each year, UW-Whitewater hosts a week-long Earth Day celebration that includes public education and outreach events throughout the week. This is punctuated by a day-long program on April 22, which includes speakers, demonstrations, local food, advocacy, and service learning activities. The City and District will work with the University to extend this celebration beyond campus, to further the environmental activities and goals of the entire community.

EcoFair360

The 2nd Annual EcoFair360 will be held at the Walworth County Fairgrounds July 8 – 10, 2011. The City and District will again highlight the process and success to-date of the energy planning effort, as well as other environmental initiatives.

Many future educational, outreach, and advocacy events will be planned.

11. Energy Independence Team Members

Kevin Brunner – City Manager, City of Whitewater

Dr. Suzanne M. Zentner – Administrator, Whitewater Unified School District

Mary Nimm – Community Development Authority Manager – City of Whitewater

Bruce Parker – Director of Neighborhood Services, City of Whitewater

Tim Reel – Wastewater Division Superintendent, City of Whitewater

Jim Strasburg – Director of Business Services, Whitewater Unified School District

Dr. Eric Compass – Assistant Professor of Geography, University of Wisconsin – Whitewater

Greg Swanson – Director of Facilities Planning and Management, UW - Whitewater

Vivian Kuss – WE Energies

Joshua Clements – Walworth County University of Wisconsin - Extension Educator

Special Thanks to the individuals who were not formally part of the Whitewater Energy Team that contributed to the completion of this report. We would specifically like to extend our gratitude to:

Cameron Clapper – Assistant to the City Manager, City of Whitewater

Thayer Coburn – President, Whitewater Aquatic Center Board of Directors

Nathan Jaeger – 2nd Grade Teacher, Whitewater School District; incoming Director of Business Services (January, 2011)

Connie Lindholm – WE Energies

Paula Malone – Director, Whitewater Aquatic Center

Chuck Zinda – Energy Advisor, Focus on Energy

Special Thanks to the University of Wisconsin – Extension Sustainability Team members, who provided assistance in the sharing of best practices, process, and experience from the other communities undertaking energy planning throughout Wisconsin.

This 25x25 energy plan report compiled and edited by Joshua Clements, Walworth County University of Wisconsin Extension, on behalf of and extensive support from the Whitewater Energy Team and contributing individuals.

Appendix I - Baseline Energy Consumption Data – Spreadsheets

Growth Factor

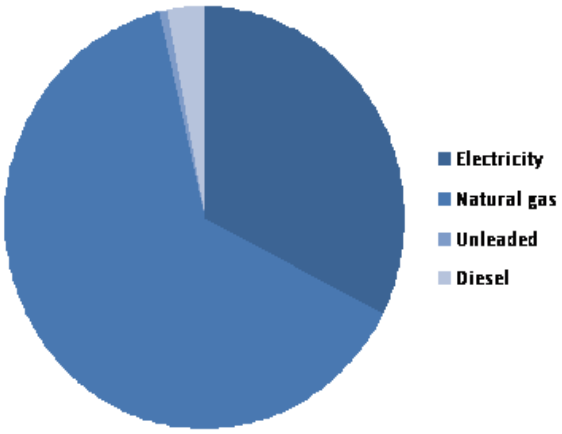
Building energy data, electricity and natural gas, for the period 2007 to 2009 for the City and District reflect a 1.5 percent annual growth in total energy consumption. Given the expected increase in population in the City of Whitewater over the next 15 years, the Energy Team made the assumption that energy demand would continue to increase at a similar annual rate as recent years. Thus, our annual *growth factor* of energy consumption for our energy modeling is **1.5 percent**. This figure may be high or low, depending upon a variety of factors, but the Team assumed this to be a reasonable figure.

The following table was created by the Energy Center of Wisconsin energy model to reflect anticipated energy consumption in 2025 based upon 2007 to 2009 baseline averages. As shown, the energy use baseline is 71,220 MMBtu, which is anticipated to increase to 90,377 MMBtu, if no efficiency, conservation, or renewable energy measures are implemented. This would require a total of 22,594 MMBtu of renewable energy use to achieve the 2025 goal of 25 percent renewable energy utilization.

Your energy usage baseline is	**71,220**	million (MM) Btus.*
That baseline is comprised of	6,959,346	kWh,
	466,068	therms,
	2,602	gallons of unleaded,
and	16,418	gallons of diesel.
By assuming an annual growth rate of	**1.50%**	,
in 2025 your energy use baseline will be	**90,377**	MMBtu.
Your 25% renewable energy goal		
for 2025 is therefore	**22,594**	MMBtu,
or	32%	of your baseline consumption.
This translates into	6,622,032	kWh or
	225,944	therms or
	182,213	gallons gas or
	162,549	gallons diesel, or
		some combination
		of those fuels.

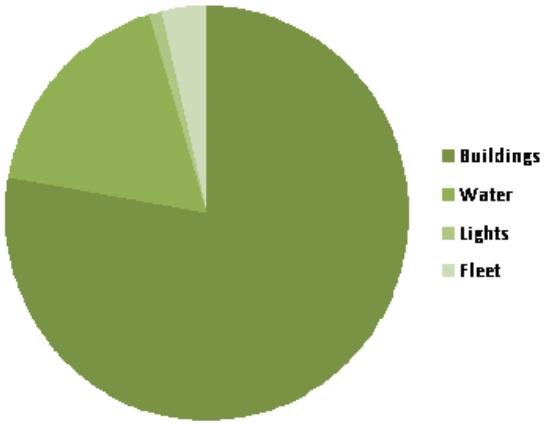
Total Consumption by Energy Type

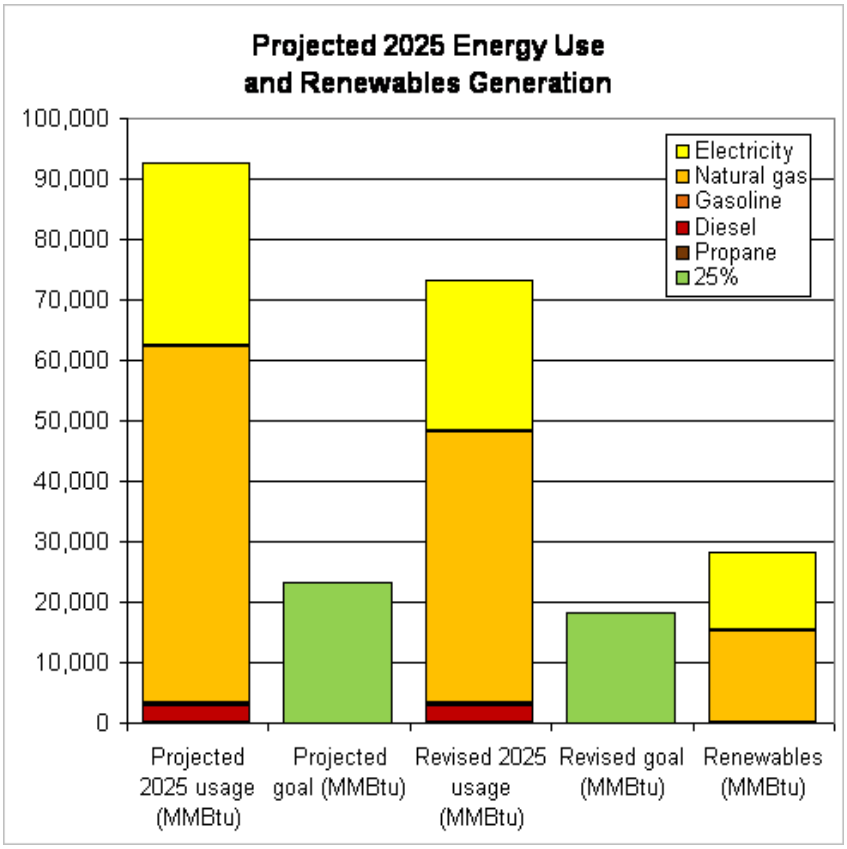
Energy type	*Percent of total Btus*
Electricity	33%
Natural gas	65%
Unleaded	0%
Diesel	3%



Total Consumption by End Use

Energy end use	*Percent of total Btus*
Buildings	80%
Water	18%
Lights	1%
Fleet	4%





Projected 2025 usage (MMBtu)	92,581
Revised 2025 usage (w/ efficiency) (MMBtu)	73,378
Revised 25% 2025 renewables goal (MMBtu)	18,344
Sum of renewable measures (MMBtu)	28,268
Percent of goal achieved	**154%**

Appendix II – Energy Strategy

As part of the 25x25 Energy Independence Planning process, the Energy Team developed a general approach to achieving the 25x25 goal. This strategy was used as

1. Improve Energy Efficiency
   Through improvements in energy efficiency, the City and District can reduce costs and reduce overall consumption, thus decreasing the necessary renewable energy generation capacity or purchase to achieve the 25x25 goals. Implement projects that have an expected payback of less than ten years, producing positive cash flow. Be conscious of emerging opportunities and advancement in technology and best practices.

2. Seek Opportunities for Conservation
   Improving infrastructure is one way to reduce consumption, but conservation through behavioral change, sometimes made easier through application of appropriate technology, reduces unnecessary expenditure of energy. Examples include turning off lights when rooms are unoccupied and utilizing energy management software in computer systems.

3. Utilize Renewable Energy
   The 25x25 goal dictates that the City and District invest in some combination of renewable energy generation capacity and purchase of renewable energy credits. In 2010, attractive incentives exist for renewable energy infrastructure from Focus on Energy and WE Energies. These incentives can combine to provide up to 67.5 percent of project cost, with variable incentive ceilings. Paybacks will, in part, determine which strategy is pursued, but the City and District will aggressively seek to implement projects that provide attractive payback and/or utilize heavy incentive support.

4. Investigate fuel-efficient and alternative fuel vehicles.

5. Sustainable Economic Development

6. Education and Outreach

Please direct any questions concerning the
Wisconsin Energy Independent Communities Partnership
electronically to:

Brian Driscoll
Community Relations Director
State of Wisconsin
Office of Energy Independence
17 West Main St. Room #429
Madison, WI 53702
brian.driscoll@wisconsin.gov

RESOLUTION ADOPTING "25 X 25" STATE GOALS FOR ENERGY INDEPENDENCE AND BECOMING AN ENERGY INDEPENDENT COMMUNITY.

WHEREAS, Wisconsin Governor James Doyle has created the Office of Energy Independence and established the following goals:

1) Generating 25% of electricity and transportation fuels from renewable sources by 2025 ("25 x 25")
2) Capturing 10% of the emerging bio-industry and renewal energy market by 2030
3) Becoming a national leader in groundbreaking energy research; and

WHEREAS, the Whitewater Common Council has taken numerous actions in recent years to have its facilities become more energy efficient and has indicated its support for renewable energy and the investigation of alternative fuels when it adopted the U.S. Conference of Mayors Resolution on Global Climate Change in 2006; and

WHEREAS, the Office of Energy Independence is seeking partnerships with local governments in furtherance of the State of Wisconsin's efforts to achieve the "25 x 25" goals;

WHEREAS, the City of Whitewater will benefit from such a partnership with the State of Wisconsin;

NOW THEREFORE BE IT RESOLVED by the Common Council of the City of Whitewater, Walworth and Jefferson Counties, Wisconsin that the City of Whitewater hereby declares itself a partner with the State of Wisconsin in pursuit of the "25 x 25" goals for energy independence; and

BE IT FURTHER RESOLVED, that upon adoption, the City Manager is hereby directed to send a copy of this Resolution to the Governor's Office of Energy Independence along with a listing of the City's actions to date to improve its energy efficiency and independence.

Resolution introduced by Councilmember Olsen, who moved its adoption. Seconded by Councilmember Binnie. AYES: Olsen, Taylor, Winship, Binnie, Singer, Kienbaum, Stewart. NOES: None. ABSENT: None. ADOPTED: October 6, 2009.

Kevin M. Brunner
Kevin M. Brunner, City Manager

Michele Smith
Michele R. Smith, City Clerk

CITY OF WHITEWATER, WALWORTH & JEFFERSON COUNTIES, WISCONSIN) Ss.

I hereby certify this to be a true and correct copy of the record on file in my office. Dated at Whitewater, WI this 23rd day of October, 20 09

Michele Smith
City Clerk

December 20, 2005

ENDORSING THE U.S. MAYORS CLIMATE PROTECTION AGREEMENT

WHEREAS, the U.S. Conference of Mayors has previously adopted strong policy resolutions calling for cities, communities and the federal government to take actions to reduce global warming pollution; and

WHEREAS, the Inter-Governmental Panel on Climate Change (IPCC), the international community's most respected assemblage of scientists, has found that climate disruption is a reality and that human activities are largely responsible for increasing concentrations of global warming pollution; and

WHEREAS, recent, well-documented impacts of climate disruption include average global sea level increases of four to eight inches during the 20th century; a 40 percent decline in Arctic sea-ice thickness; and nine of the ten hottest years on record occurring in the past decade; and

WHEREAS, climate disruption of the magnitude now predicted by the scientific community will cause extremely costly disruption of human and natural systems throughout the world including: increased risk of floods or droughts; sea-level rises that interact with coastal storms to erode beaches, inundate land, and damage structures; more frequent and extreme heat waves; more frequent and greater concentrations of smog; and

WHEREAS, on February 16, 2005, the Kyoto Protocol, an international agreement to address climate disruption, went into effect in the 141 countries that have ratified it to date; 38 of those countries are now legally required to reduce greenhouse gas emissions on average 5.2 percent below 1990 levels by 2012; and

WHEREAS, the United States of America, with less than five percent of the world's population, is responsible for producing approximately 25 percent of the world's global warming pollutants; and

WHEREAS, the Kyoto Protocol emissions reduction target for the U.S. would have been 7 percent below 1990 levels by 2012; and

WHEREAS, many leading U.S. companies that have adopted greenhouse gas reduction programs to demonstrate corporate social responsibility have also publicly expressed preference for the U.S. to adopt precise and mandatory emissions targets and timetables as a means by which to remain competitive in the international marketplace, to mitigate financial risk and to promote sound investment decisions; and

WHEREAS, state and local governments through the United States are adopting emission reduction targets and programs and that this leadership is bipartisan, coming from Republican and Democratic governors and mayors alike; and

WHEREAS, many cities throughout the nation, both large and small, are reducing global warming pollutants through programs that provide economic and quality of life benefits such as reduced energy bills, green space preservation, air quality improvements, reduced traffic congestion, improved transportation choices, and economic development and job creation through energy conservation and new energy technologies; and

WHEREAS, mayors from around the nation have signed the U.S. Mayors Climate Protection Agreement which, as amended at the 73rd Annual U.S. Conference of Mayors meeting, reads:

The U.S. Mayors Climate Protection Agreement

A. We urge the federal government and state governments to enact policies and programs to meet or beat the target of reducing global warming pollution levels to 7 percent below 1990 levels by 2012, including efforts to: reduce the United States' dependence on fossil fuels and accelerate the development of clean, economical energy resources and fuel-efficient technologies and such as conservation, methane recovery for energy generation, waste to energy, wind and solar energy, fuel cells, efficient motor vehicles, and biofuels;
B. We urge the U.S. Congress to pass bipartisan greenhouse gas reduction legislation that includes 1) clear timetables and emissions limits and 2) a flexible, market-based system of tradable allowances among emitting industries; and
C. We will strive to meet or exceed Kyoto Protocol targets for reducing global warming pollution by taking actions in our own operations and communities such as:
   1. Adopt and enforce land-use policies that reduce sprawl, preserve open space, and create compact, walkable urban communities;
   2. Promote transportation options such as bicycle trails, commute trip reduction programs, incentives for car pooling and public transit;
   3. Increase the use of clean, alternative energy by, for example, investing in "green tags", advocating for the development of renewable energy resources, recovering landfill methane for energy production, and supporting the use of waste to energy technology;
   4. Make energy efficiency a priority through building code improvements, retrofitting city facilities with energy efficient lighting and urging employees to conserve energy and save money;
   5. Purchase only Energy Star equipment and appliances for City use;
   6. Increase the average fuel efficiency of municipal fleet vehicles; reduce the number of vehicles; launch an employee education program including anti-idling messages; convert diesel vehicles to bio-diesel;
   7. Evaluate opportunities to increase pump efficiency in water and wastewater systems; recover wastewater treatment methane for energy production;
   8. Increase recycling rates in City operations and in the community;
   9. Maintain healthy urban forests; promote tree planting to increase shading and to absorb CO2; and
   10. Help educate the public, schools, other jurisdictions, professional associations, business and industry about reducing global warming pollution.

NOW, THEREFORE, BE IT RESOLVED that The U.S. Conference of Mayors endorses the U.S. Mayors Climate Protection Agreement as amended by the 73rd annual U.S. Conference of Mayors meeting and urges mayors from around the nation to join in this effort.

BE IT FURTHER RESOLVED, The U.S. Conference of Mayors will work in conjunction with ICLEI Local Governments for Sustainability and other appropriate organizations to track progress and implementation of the U.S. Mayors Climate Protection Agreement as amended by the 73rd annual U.S. Conference of Mayors meeting.

Resolution introduced by Councilmember Stewart, who moved its adoption. Seconded by Councilmember Bilgen. AYES: Uselman, Bilgen, Hixson, Stewart. NOES: Torres, Kienbaum. ABSTAIN: Stauffer.

Kevin M. Brunner, City Manager Michele R. Smith, City Clerk

Whitewater Unified School District

www.wwusd.org

Summary of adopted district energy policies

December 14, 2009

700 Support Services

733 Energy Conservation

The School Board shall encourage and support an energy conservation and education program in the Whitewater Unified School District to substantially lower consumption of electricity, natural gas, oil and water. Each District employee and student shall be responsible for actively participating in conservation efforts in order to reduce consumption to acceptable levels. Any applicable energy conservation guidelines prescribed by state or federal agencies shall be followed in the District.

The District shall participate in energy conservation programs approved by the Board. The District Administrator or designee shall implement, direct, monitor, evaluate and report District energy conservation efforts to the Board.

LEGAL REF.: Sections 120.12(1), Wisconsin Statutes 120.44

Adopted by School Board: May 30, 1985
Revision Adopted by School Board: March 20, 2000

900 Facilities Development

990 Facilities Renovations

The School Board will plan for the renovation or expansion of District facilities as safety, instructional, structural or other requirements make such plans necessary or desirable, within the realities of budgetary limitations. In order to avoid excessive future expenditures, renovations or expansion plans presented to the Board shall incorporate energy conservation measures.

Projected enrollments, instructional and community needs shall all be considered by the Board in determining the necessity for renovation and structural changes or additions to be made. When engaged in such facilities planning, the Board may engage the services of an architectural firm, a construction management firm, a financial advisor or such other consultants as the Board determines to be necessary for the completion of the project.

LEGAL REF.: Sections 120.12(5), Wisconsin Statutes 120.13(9) 120.44

Adopted by School Board: August 5, 1985
Revisions Adopted by School Board: February 10, 1992
August 28, 2000

Compiled by Joshua Clements, Walworth County UW Extension