

**WEST CENTRAL WISCONSIN
STATE OF THE REGION WORKING PAPER**

ENERGY AND SUSTAINABILITY

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**WEST CENTRAL WISCONSIN COMPREHENSIVE PLANNING
APRIL 2009**



Prepared by West Central Wisconsin Regional Planning Commission

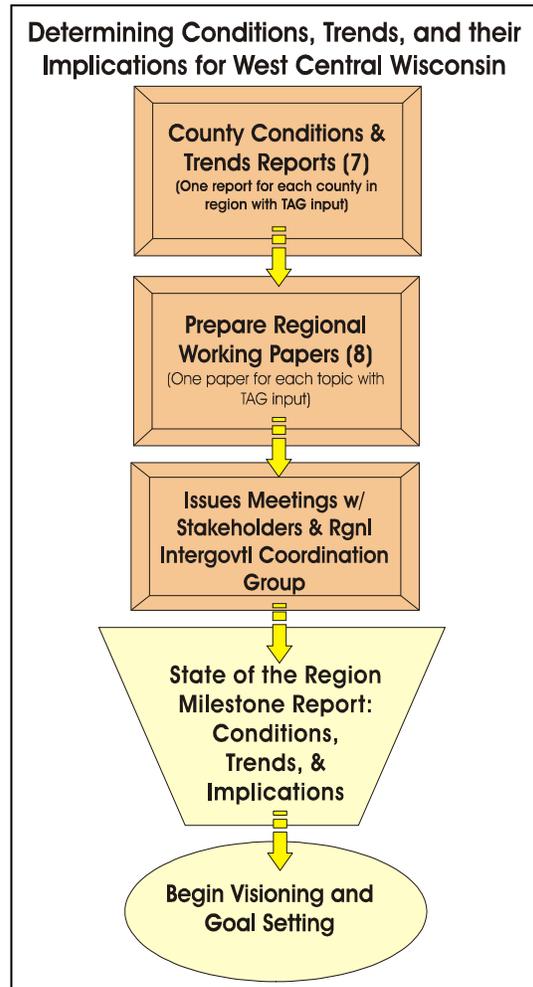
1. INTRODUCTION

This document is one of eight working papers prepared by West Central Wisconsin Regional Planning Commission (WCWRPC) as part of its comprehensive planning effort with input from the project’s Technical Advisory Group (TAG). Even though energy and sustainability is not a required element under State Comprehensive Planning Law, the regional plan will have an Energy and Sustainability Element. Due to the dynamics of energy and sustainability in our society, there will be some overlap between this working paper and the other working papers.

As shown in the diagram to the right, these working papers largely build upon the seven county conditions and trends reports prepared by WCWRPC with TAG input. The working papers place the county data in a regional context, highlighting conditions and trends of regional significance.

As such, the information found within this document is discussed at a regional level. Each county’s conditions and trends report should be referred to for additional details and background information at the county and municipal level.

These working papers provide a foundation upon which regional issues can be identified and discussed. Only by building a consensus on our region’s key conditions and trends, can the issues, their implications, and the remainder of the regional comprehensive planning effort for west central Wisconsin proceed.



Lagom.

Legend says the word *lagom* comes from the Vikings. The word has no exact meaning in the English language, but can be translated roughly to “enough” or “in balance.” There is an adage that translates to, “Enough is as good as a feast.”

2. ENERGY PRODUCTION & USE - LIMITED RESOURCES

“The frog does not drink up the pond in which it lives.” – Native American proverb

CURRENT ENERGY SOURCES

Like the majority of the State of Wisconsin, the west central region of the state is mostly dependent on fossil fuels. With no accurate data that show energy use by type of fuel at the county level, statewide data need to be used. In 2005, coal (29.9 percent) and petroleum (29.2 percent) were they most used fuel types. This was followed by natural gas (23.1 percent). There is a significant drop in percentage after these three, which include electric imports (7.1 percent), nuclear (6.0 percent), and renewable energy (4.5 percent)¹. Among renewable energy, wood led the fuel types with 2.7 percent. Figure 1 shows the 2005 percentages for all of the renewable energy fuels. With all things being equal, one can assume that the amount of wind energy in the region is under the state average while wood is above the state average.

Figure 1: 2005 WI Biomass

Fuel Type	Percent
Wood	2.7
Ethanol	0.6
Hydro	0.4
Biogas	0.3
Solar	0.2
Waste	0.2
Wind	0.1

Source: UW-Extension – Center for Land Use Education

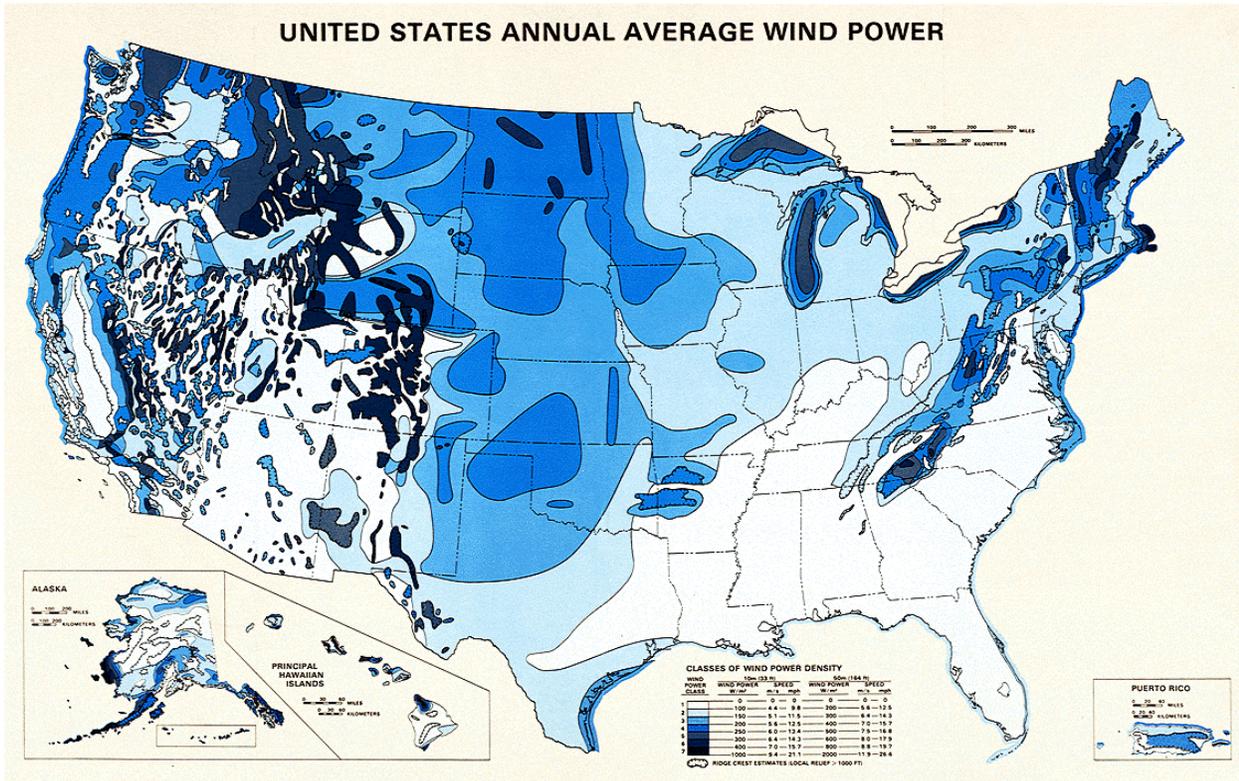
Energy consumption has steadily increased over the past 35 years. In fact, consumption has increased 55 percent, which is over double the state’s population growth. Roughly two-thirds of the money that is spent on energy in Wisconsin leaves the state’s economy. This equates to almost \$15 billion annually, or on average \$6,600 per household². The reduction of consumption is a vital component of any goal to increase the percentage of renewable fuels used in the state and region. Without significant reduction, much of the state’s agricultural and natural resources would be needed for energy and would not be available for other industries (agricultural, paper, etc.)

POTENTIAL ALTERNATIVE ENERGY SOURCES

The State of Wisconsin Office of Energy Independence created a goal of having 25 percent of the state’s electrical energy and transportation fuels from renewable sources by 2025. The west central region can be a significant stakeholder in this goal. The variety of land cover allows for diversity in availability for renewable energy resources. According to the Center for Land Use Education’s *Wisconsin Land Use Megatrends: Energy*, the region has potential to provide renewable energy from wood, ethanol, switchgrass, and waste. In addition, there are specific areas in the region that would be moderately conducive to wind energy and on-site solar operations. There are also many opportunities in the dairy industry to create and profit from renewable energy.

The diversity of the region’s elevations, land cover, and land use play a significant and determining role in potential renewable energy that can be created in the region. There are currently several wind power exploration projects occurring in the region. As a whole, the region is rated as moderate for wind energy potential (Figure 2). According to Focus on Energy, the mean annual power density at 40 meters in the region is diverse, ranging from less than 100 W/m² to 200-300 W/m². The mean annual wind speed at 30 meters ranges from under 10.1 mph to 13.4 mph. This range is in the lower third of potential statewide speeds. At 100 meters, the speeds range between 12.3 mph and 17.9 mph. The majority of the region has mean annual wind speeds that are in the lower third of the potential statewide speeds. At the same time, parts of the

Figure 2: Wind Power Potential

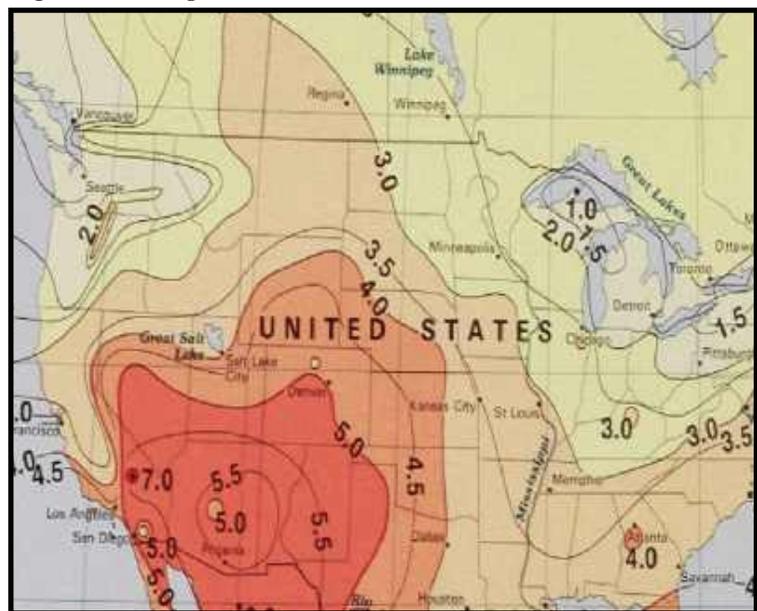


Source: National Renewable Energy Laboratory

region are ranked in the middle half of potential statewide speeds. Much of this is due to the diversity of elevations and land cover in the region. There are numerous areas in the region that are not conducive to wind energy. The ongoing wind exploration projects will go a long way in determining the amount of energy that can be produced in the region from wind. In addition, the State of Wisconsin is currently in the process of looking into wind farm siting guidelines.

Solar energy potential is fairly constant throughout the region and is not as strong as other parts of the nation (Figure 3 and 4). Due to the terrain in most areas of the region and the economic importance and vitality of agricultural land in the region, a large scale solar energy farm seems to be difficult to imagine in the region. It is commonly thought that most solar potential in the region would be site specific. Solar panels in the region would create most of their energy during the summer months, which are the months that experience the highest energy demands. There are numerous options to locate smaller solar farms in

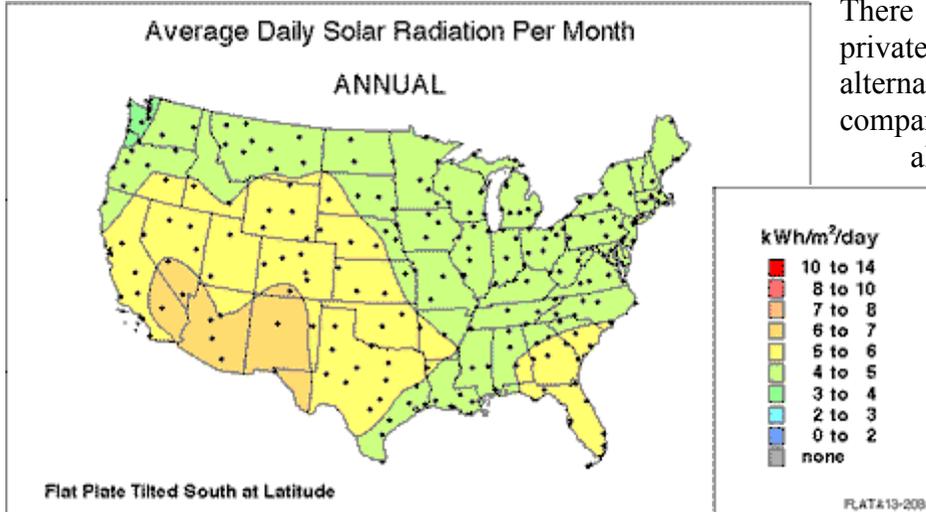
Figure 3: Solar potential



Source: www.solar4power.com

brownfield and industrial areas of the region. Even though the region ranks relatively weak in solar potential when compared to other areas in the U.S., the region has higher solar potential than all areas in Germany, the majority of France, and is only slightly behind Spain. Germany is largest solar thermal market in Europe and is second in the world, only behind Japan.

Figure 4: Solar Potential



Source: www.bergey.com courtesy of US-DOE and NREL

There has been an increase in the private sector's investment in alternative energy. Numerous companies that are working in the alternative energy industry are being created and many businesses are expanding. These businesses are spread throughout the region. The diverse geography, land cover, and types of agricultural and natural resource industries create an environment where there are numerous

alternative energy opportunities. Some examples of this include, the recent opening of High Quality Shavings, which is a new pellet company located in Polk County; anaerobic digesters on dairy farms; bio-energy opportunities from the by-products of processing plants and the making of cheese; and algae from lakes.

3. AGRICULTURE AND THE IMPACTS

“In every deliberation, we must consider the impact of our decision on the next seven generations.” – Great Law of the Hau de no sau nee (Iroquois Nation).

The seven county region has a storied agricultural and natural resource history. Agricultural and natural resources have played an important role throughout the history of Wisconsin. The region is diverse in opportunities for profiting from bio-energy. In fact, the land cover diversity is seldom equaled among other regions in the state. The region consists of areas that are conducive for large acres of row crops, forest land, lakes, and areas that are conducive to smaller farms and/or dairy farms. Recently, many of these resources are beginning to be used as bio-energy. This can be witnessed by the increasing number of bio-energy stakeholders that are operating in the region. These facilities consist of private companies, individual farmers, and individuals.

Growing Participation in Sustainable Farming Practices

There has been an increase in organic farms and direct market food production in the region. These farms have a reduced impact on global climate change due to limited, if any, use of pesticides and fertilizers and reduced transportation costs to transport their products. In 2007, there were 206 certified organic farms and \$11,099,000 in sales of organically produced commodities. Due to different questions on the USDA census form, data from 2002 are not perfectly compatible with the 2007 data. However, according to the 2002 Census, the region had 63 organic farms and \$2,131,000 (\$2,450,650 - 2007 dollars) of sales.

Figure 5: Agricultural Products Sold To Individuals For Consumption

	2002 Farms	2007 Farms	Percent Change	2002 Value (in \$1,000)	2007 Value (in \$1,000)	Value Percent Change
Barron County	87	102	17%	423	858	103%
Chippewa County	85	112	32%	703	654	-7%
Clark County	150	194	29%	233	369	58%
Dunn County	99	136	37%	440	883	101%
Eau Claire County	57	108	90%	219	1046	378%
Polk County	120	194	62%	215	712	231%
St. Croix County	112	136	21%	292	797	173%
West Central Wisconsin	710	982	38%	2,525	5,319	111%
State of Wisconsin	4,918	6,243	27%	29,072	43,491	50%
U.S.A.	116,733	136,817	17%	812,204	1,211,270	49%

Source: USDA Census of Agriculture

Figure 5 shows that the value of agricultural products sold directly to individuals for consumption significantly increased 111 percent in the region between 2002 and 2007. This consists of farmers markets, community supported agriculture, local purchasing programs, etc. The value sold increased from \$2,525,000 in 2002 to \$5,319,000 in 2007. This is an increase of \$2,794,000 (\$2,415,000 - 2007 dollars). In addition, there are now no less than 20 farmers markets in the region, many of which operate more than one day a week.

In regards to the direct market farm industry, the region has no fewer than nine Community Supported Agricultural (CSA) farms. Many of these farms serve communities in the seven county region and/or the Twin Cities Metropolitan Area. The population of the Twin Cities metropolitan area significantly adds to the large supply of consumers of direct market farm products in the region.

Pesticides and Fertilizers On the Rise

As the region has a large percentage of agricultural land, the region consequently has fertilizers and pesticides that are used. The Wisconsin Department of Agriculture, Trade, and Consumer Protection (DATCP) reported in 2006 that nitrate-nitrogen is the most widespread groundwater contaminant in Wisconsin and that the problem is increasing in extent and severity. Specifically in Wisconsin’s groundwater, 80 percent of nitrate inputs come from agricultural fertilizers, manure spreading, and legume cropping systems. An analysis of 35,000 Wisconsin drinking water samples found that private wells in agricultural areas were three times more likely to be unsafe than in forested areas. Fertilizer and pesticides have the chance to travel downstream into surface water, and at the same time they have the chance to seep into groundwater. Nitrous oxide is a major contributor of green house gases produced from modern agriculture, which produces over 80 percent of global nitrous oxide emissions. The impact that nitrous oxide has on global warming is roughly 300 times more than carbon dioxide. In addition, a significant amount of energy is used to make and transport fertilizer and pesticides.

Regionally, between 1997 and 2007, the amount of commercial fertilizer, lime, and soil conditioners used increased from 961,419 acres to 1,004,211 acres. In relation to total assessed agricultural land, the percent of acres that had commercial fertilizer, lime, and soil conditioners increased from 39.1 percent to 43.6 percent (Figure 6).

Figure 6: Commercial fertilizer, Lime and Soil Conditioners

	Total Acres 1997	Total Acres 2002	Total Acres 2007	Percent of AG Land 1997	Percent of AG Land 2002	Percent of AG Land 2007
Barron County	146,425	140,384	150,959	40.7	39.9	46.6
Chippewa County	146,233	140,562	149,249	39.2	37.6	42.2
Clark County	184,448	169,803	202,466	40.2	36.8	46.0
Dunn County	160,955	137,126	170,003	39.5	34.4	44.4
Eau Claire County	71,900	68,795	81,175	33.6	33.7	39.5
Polk County	109,184	106,633	111,064	36.2	36.4	38.4
St. Croix County	142,274	119,927	139,295	41.5	38.7	45.2
West Central Wisconsin	961,419	883,230	1,004,211	39.1	36.9	43.6

Source: USDA Census of Agriculture

The amount of chemicals for insects and weeds also increased between 1997 and 2007. Figure 7 shows that chemicals for insects increased from 111,663 acres to 242,775 acres. Chemicals for weeds increased from 565,986 acres to 721,342 acres. Acres of both chemicals categories increased in comparison to total assessed agricultural land in the region. Chemicals for insects increased from 4.8 percent to 10.5 percent and chemicals for weeds increased from 23 percent to 31.3 percent.

According to 2001 data, Barron, Chippewa, and Polk counties are located in a region of Wisconsin where 25 percent of the private wells had a detectable amount of herbicides or herbicide metabolites. Dunn, Eau Claire, and St. Croix counties were located in a region of Wisconsin where 52 percent of the private wells had a detectable amount. Clark County was in a region where 12 percent of the private wells had a detectable amount.

Figure 7: Chemicals For Insects

	1997 Acres	2002 Acres	2007 Acres	1997 Percent	2002 Percent	2007 Percent
Barron County	79,176	91,406	108,425	22.0	26.0	33.4
Chippewa County	74,172	83,616	106,936	19.9	22.4	30.3
Clark County	94,609	93,463	128,881	20.6	20.3	29.3
Dunn County	99,793	92,744	123,655	24.5	23.3	32.3
Eau Claire County	49,033	49,865	57,074	22.9	24.4	27.8
Polk County	67,996	58,903	78,749	22.5	20.1	27.2
St. Croix County	101,207	84,607	117,622	29.6	27.3	38.2
West Central Wisconsin	565,986	554,604	721,342	23.0	23.2	31.3

Source: USDA Census of Agriculture

4. TRANSPORTATION OPTIONS

“If you are seeking creative ideas, go out walking. Angels whisper to a man when he goes for a walk.” – Raymond Inmon.

The spatial pattern in the region is extremely rural. The region has a variety of Federal, State, County, and Local highways and roads that transport goods, services, and people. The region’s road system is a strength of the region, however, mass transit options lack in the region due to lack of community size, distance from destinations, and cost. As a whole, in 2000, 78.4 percent of workers in the region drove alone to work. There is more detailed discussion regarding the existing transportation situation in the Transportation Working Paper.

Healthy Options: Walking and Biking

There is a scattering of small cities and villages which in most instances are not conducive to intra-city mass transit. However, these communities are conducive to walking, if safe and accessible walking facilities exist, which in many cases is the situation. Several communities in the region have incorporated Safe Routes To School programs, which promote walking and biking to school and home. Many communities in the region have taken strides to promote and build accessible non-motorized transportation facilities.

Limited Bus Service

The size of the City of Eau Claire allows for the opportunity to operate a transit bus system, which it does. In addition, the communities of Chippewa Falls, Menomonie, Rice Lake and River Falls have the ability to have some form of small transit program that could include a shared-ride taxi system and/or a fixed route for buses or passenger vans. Rice Lake and Chippewa Falls have shared-ride taxi service.

Greyhound and Jefferson Lines offer limited inter-city bus service in the region and from within the region to outside the region. The location of the region allows for opportunities to have inter-city bus service, as Interstate Highway 94, U.S. Highways 8 and 53, and State Highways 29 and 64 travel through the region. These corridors are major transportation routes on which many communities in the region are located along. Even though these services exist, their operation schedules are extremely limited.

Passenger Rail Opportunity

There is ongoing discussion regarding passenger rail in west central Wisconsin. This service, if operated through the region, would have a station in Eau Claire and in other communities between Eau Claire and the Twin Cities. Current discussion involves the likelihood that people would use the passenger rail and how much money the system would cost. If a passenger rail system is created along the I-94 corridor there would be many significant changes to the region. One of these changes would be the demand for residential and commercial space in proximity to the stops along the route. Data show that passenger rail stops increase density, which then would create a condition where walking and bus transit is more feasible.

5. PLANNING, LAND USE, & COMMUNITY DESIGN

“Planning of the automobile city focuses on saving time. Planning for the accessible city, on the other hand, focuses on time well spent.” – Robert Cervero

The way a community grows and how it is designed plays a significant role on how much negative impact that community has on the environment. Reduced density creates an environment where a private automobile is required. Walking for purpose, as opposed for recreation, is not an option in many new developments throughout the region.

Residential Land Use = Population x 4

The region has experienced a significant increase in the rate of developed land per inhabitant. This has been most evident in Clark County. As a whole, the region experience a 98.3 percent increase in residential land, while only experiencing a 24.5 percent increase in population between 1987 and 2007. Much of this new development is single use where different land uses are separated. This separation often makes it challenging for pedestrians and bicyclists to travel from one use to another. Figure 8 depicts the percent change in residential land use and population for each of the seven counties in the region. As can be seen, the percent of increase in residential land use is roughly four times larger than the percent change in population over the same period of time.

Figure 8: Residential Land Use and Population Growth

	1987 - 2007 % Change in Residential Land Use	1987 - 2007 % Change in Population	New Residential Acres/New Population
Barron County	54.4	16.8	3.2
Chippewa County	87.6	13.8	6.3
Clark County	71.3	6.4	11.1
Dunn County	n/a	21.5	n/a
Eau Claire County	61.0	17.4	3.5
Polk County	139.9	31.4	4.5
St. Croix County	138.1	64.9	2.1
West Central Wisconsin	98.3	24.5	4.0

Source: WI Department of Revenue and WI Department of Administration

Transit Oriented Development

As was discussed earlier, most of the communities in the region are small and in rural locations.

Therefore, very few communities have the ability to operate a mass transit bus service. In most instances, a mass transit bus service that operates every 30 minutes needs a consistent density of at least 7-8 housing units per acre. In instances where this does not exist, this reduces the ability for conventional Transit Oriented Development (TOD). However, many TOD strategies are beneficial and desirable design, even if there is not a transit system operating in the community. These strategies could be implemented in neighborhoods and areas in small rural communities in the region. These include mixed-use development, pedestrian friendly design, reinvesting in established downtown areas, and only allowing development in areas that have public water and sewer. Another approach includes making sure that needed resources are within a 20 minute walk from most residences. For the City of Eau Claire, there are endless opportunities to implement more sustainable land use patterns through TOD.

Leading The Way With LEED and WI Green Tier

The Leadership in Energy and Environmental Design (LEED) program is a voluntary certification system that sets standards for individual structures and neighborhood design operated by the U.S. Green Building Council. There has been a significant increase in the interest

and construction of LEED certified buildings in the region. Currently, there are two LEED certified structures in the region: Flynn Elementary School in Eau Claire, Eau Claire County and Luck K-12 School in Luck, Polk County. There are eight registered structures in the region that are waiting to be certified. These are located in Chippewa (one), Dunn (three), and St. Croix (four) counties.

The Wisconsin Green Tier Program is based on a collaborative system of contracts and charters crafted jointly by participating businesses and the Wisconsin Department of Natural Resources. These contracts and charters streamline environmental requirements in many cases and encourage new environmental technologies. The region has five companies that have successfully gone through the Green Tier Program.

6. SUSTAINABILITY EFFORTS – RECENT CHANGES

“We must become the change we want to see.” – Mahatma Gandhi

There are many definitions of sustainability. Most agree that there are three attributes of sustainability. These three attributes are: the economy, the environment, and society. For the purpose of this working paper, environmental sustainability will be discussed.

Wisconsin Communities Leading Change Charge

There has been increased local and multi-jurisdictional interest within the region to create plans and projects to reduce impact on climate change. Several communities in the region are in the process of analyzing or implementing a process to become an eco-community. The most common process in this endeavor is *The Natural Step*. These communities adopt resolutions that state that they will adhere to specific guidelines that will reduce their impact on global climate change. As a whole, Wisconsin is a global leader in eco-communities with 24 such communities. The following municipalities in the region have adopted resolutions supporting the State’s 25 x 25 energy independence goal: Polk County, Village of Osceola, City of Amery, City of New Richmond, City of River Falls, and City of Thorp.

Units of government in the region are creating committees of elected and ad-hoc officials to address activity within their respective unit of government that can lessen their impact on climate change. Through these committees, the communities are also analyzing how they can reduce their costs and increase their energy independence through renewable and/or local energy sources. Examples include Barron County’s Energy Policy Work Group, Chippewa County’s Committee on Energy Consumption, Cost, and Conservation, and Polk County’s Ad Hoc Renewable Energy Committee.

Universities

Efforts also include work in the university sector. This includes the Earth, Wind, and Fire project team, which consists of several county based UW-Extension agents primarily in western and northwestern Wisconsin. The project team is working with local bio-energy stakeholders to raise the dialogue on bio-energy development in the region. Another program in the region is the UW – River Falls St. Croix Institute for Sustainable Community Development (SCISCD). The SCISCD has a mission to support and facilitate the UW – River Falls in becoming one of the premier venues for deliberation and demonstration of sustainable community development principles. The SCISCD has also incorporated a graduate level program which focuses on sustainability.

1. UW – Extension. Center for Land Use Education. Wisconsin Land Use Megatrends: Energy. 2008.
2. Wisconsin Office of Energy Independence. Wisconsin Energy Statistics 2007. www.power.wisconsin.gov.