2010
Wisconsin Energy Independent Community Partnership

25 x 25 Plan for Energy Independence

Report completed by:

Shawano County

Issue Date: **December 31, 2010**

Table of Contents

Overview 2

What was measured? Why? 3

Discoveries/Surprises 5

Total Projects Considered 8

Pathways to 25 x 25 11

Projects Selected – Explanation 12

Narrative – Potential Renewable Feedstocks 15

Existing Unknowns – Necessary Information for Future 16

Action Steps – Immediate & Long - Term 17

Energy Independence Team Members 18

Appendix – Baseline Energy Consumption Data – Spreadsheets 19

Overview

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.
An "*Energy Independent Community (EIC)*"– is 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

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

- Increase the use of renewable energy and renewable fuels by 25% by 2025 in 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 and are not exclusive to: clean air and water, intelligent land management, rural and urban economic development, as well as state and national energy independence.

The Board of Supervisors of Shawano County passed

> "RESOLUTION NO. 89-09 SUPPORTING THE STATE OF WISCONSIN'S "25 X 25" GOALS FOR ENERGY INDEPENDENCE AND SUPPORTING APPLICATION FOR ENERGY INDEPENDENT COMMUNITY PLANNING GRANT.' November 11, 2009. This resolution stated in part:

NOW, THEREFORE, BE IT RESOLVED BY THE SHAWANO COUNTY BOARD OF SUPERVISORS in session this 10th day of November, 2009, that it hereby declares itself a partner with the State of Wisconsin in pursuit of the "25 x 25" goals for energy independence.
BE IT FURTHER RESOLVED that the Shawano County Board of Supervisors assembled hereby supports an application to the State of Wisconsin Office of Energy Independence for an Energy Independence Community Planning Grant.

Shawano County Did apply for said grant for the 2010 year, and was awarded the same.

In early 2010 the county created the Shawano County Energy Independence Committee. The purpose of the committee was to perform activities under OEI grant, and to establish a basis for energy research & planning for the county government. The committee is comprised of county staff, county supervisors and county citizens.

The committee has:

1. Determined a pathway for the county government to increase the use in its operations of renewable energy and renewable fuels by 25% by 2025.
2. Set up a sub-committee to further refine the project scope and data collection methodology for after the end of the grant period.
3. Taken the initial steps towards development of a draft energy policy.

What was measured? Why?

The purpose of measurement was:

1. To develop a baseline.
2. To inventory energy use and type of use.
3. To obtain data for later planning.

Scope

The committee set the following scope. The reasons for setting this scope were to limit it to our primary energy uses for the 2010 project given the time and staff available. Information about post 2010 scope is later in this report.

Period
2007 – 2009

County Facilities
Defined as facilities owned by the government of Shawano County. This included facilities used in operations, by the public, and residential rental properties.
This excluded properties rented by the government of Shawano County.
This included:
3 residential units
Courthouse
Jail & Sheriff's Office
Historical Society buildings
Work Release Center
Community Programs building
Crawford Center (events / shows)
Fair Grounds (multiple buildings)
3 Highway facilities (Main, Angelica and West)
Park facilities that are heated or powered.

418,844 square feet

Fleet
Any vehicle owned by the government of Shawano County that has an odometer or hour meter, and generators, mowers, and other fossil fueled major equipment. This included trucks, road equipment vehicles, construction equipment vehicles, vans, cars, and a variety of ancillary fossil fuel powered equipment.
It did not include the City-County library system vehicles, nor did it include employee vehicles used for commuting or work purposes.
The majority fuel is diesel which constitutes 40% of the county's fossil energy use.

Lighting and Water

The only lighting and water maintained by the county is integral to the facilities and their operation.

Employee Behavior

Employees were survey as to relevant work and commuting behavior and preferences. This information will be used in future activity regarding energy efficiency, beyond the scope of the 2010 project year.

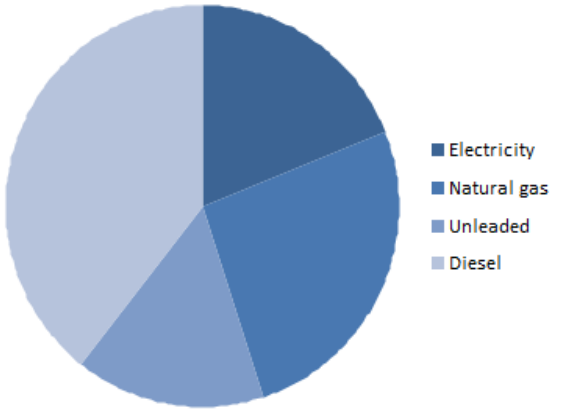
Discoveries/Surprises

1. We had assumed at the beginning of the project that the largest fossil fuel use category and impact would be the heating and cooling of facilities. This turned out not to be correct. It was actually our fleet operations. Shawano County does both road maintenance and some construction.

The fleet accounts for 55% of the counties fossil energy use, and 40% of the fossil energy was in diesel alone.

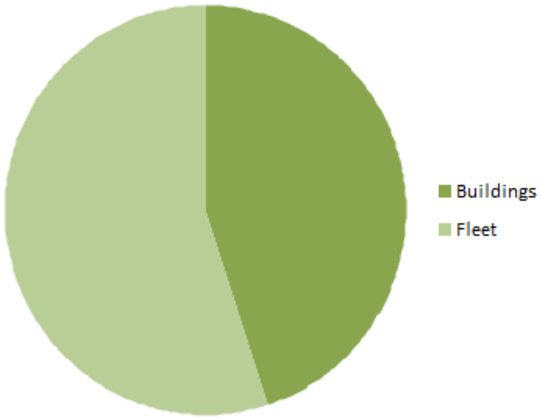
Total Consumption by Energy Type

Energy type	*Percent of total Btus*
Electricity	19%
Natural gas	26%
Unleaded	15%
Diesel	40%



Total Consumption by End Use

Energy end use	*Percent of total Btus*
Buildings	45%
Fleet	55%



This meant that significant strides could be made towards 25x25 goals by renewable content substitution in fuels for the fleet. Further that some of that will probably assisted by development in the vehicle technology market over the next 15 years.

2. That for purposes of future planning, an internal and utility reporting framework would have to be set up. This would be to increase efficiency and uniformity of data collection. Also, the committee felt that the actual scope should be increased.
3. The implementation of renewable energy technologies, primarily those for the heating, cooling and powering of facilities would represent a huge financial outlay for a rural county. It is not an expense that could, given current economic conditions combined with the current "cheap" (in a non-systems thinking view) price of fossil energy be accepted by the county's tax payers alone. To be practice, most of the cost of transition would have to be covered by funds from outside county and local governments revenue from taxation.

4. It is difficult to see how transition to significantly less fossil energy use in heating, cooling and power especially, by rural local governments can proceed in the future. Returns on investment that may be acceptable in the private sector are often not politically acceptable in the local government context. The committee feels that significant progress in this area will require a serious commitment to be made by state and national governments. "Serious" in this context, means funding.
5. From presentations and meeting with our colleagues in Green Lake county; the committee did discover the potential of both renewable energy options and the use of geothermal HVAC and green building techniques, especially for new construction

.

Total Projects Considered

The total projects considered by the committee fall into a few groups.

The first group are those supported by 2010 grant project data and analysis, and other research.

The second category are projects that did not contribute the creation of the pathway to 25x25 developed in 2010. But the committee believes these projects should be put into county planning and implemented.

The third group is projects that should be studied and evaluated.

Projects supported by 2010 grant project data and analysis, and other research.

Landfill methane use.

The county owns and co-operates with the City of Shawano a landfill site. A feasibility study examining use of methane produced for fuel or power generation was recently completed. From that study, it appears that due to the nature of the contents of the landfill, and other factors, proceeding in this direction is not recommended.

Purchase of Green Energy

Since currently this option would raise the government's operating costs this was rejected. The committee wanted to use capital cost budgeting so as to have a return on investment, and eventually save on operating costs.

Renewable Energy Projects.

Diesel vehicles transition to Bio-diesel (for warm months)

Conversion of gasoline powered fleet to flex fuel vehicles.

Solar power (PV) installation on roofs of selected county facilities.

Siting and implementation of small to medium wind turbines on county properties.

Projects that did not contribute the creation of the pathway to 25x25 developed in 2010. But the committee believes these projects should be put into county planning and implemented.

Geothermal for new construction

While there is a difference of opinion within the committee on the utility of the use geothermal year around for both heating and cooling (in commercial/public facilities), geothermal does appear to be a "low hanging fruit". Performance of the new public school in Shawano (year around geothermal with backup) and the county facilities in Green Lake County (year around, no backup) should be monitored.

New construction by the county government, standards.

- "Green building" to a LEED standards
- Clustering future services/facilities
- Green IT

Operations

Development of a local purchasing policy
Study & implementation of energy efficiency measures.

Projects that should be studied and evaluated

Virtual service delivery.

Use of communication technologies, including high speed video to have "virtual" office hours in the West & East parts of the county, and to facilitate meeting attendance when appropriate in 3 locations in the county simultaneously. To reduce county operations costs, fuel use, and reduce the same for citizens.
Employee travel

Employee travel

Study employee use of none county vehicles; scope, conservation steps.
Study employee commuting; scope, conservation steps.

Solar hot water

New construction and park facilities

Remodeling standards

"Green building/remodeling" to a LEED standard should be considered and evaluated for any facilities remodeling.

Fleet

Diesel vehicles transition to Bio-diesel (all year implementation)
Community electronic vehicles
Vehicle monitoring
Hybrids/Plug-ins

Other operations

Virtual service delivery

Use of communication technologies, including high speed video to have "virtual" office hours in the West & East parts of the county, and to facilitate meeting attendance when appropriate in 3 locations in the county simultaneously. To reduce county operations costs, fuel use, and reduce the same for citizens.

CAD/CAM and other software-green plug-ins

Dematerialization purchasing policy

Feasibility of micro-hydro power cogeneration at selected county parks

New ventures/partnerships

Waste water and solid waste treatment systems incorporating digesters for methane production for electric power. This could be coupled with the idea of county wide recycling.

Use of electricity produced by private sector /agricultural methane to electricity facilities.

Pathways to 25 x 25

The committee decided that its pathway would have the following boundary conditions.

1. It would have to involve the least cost to county tax payers possible.

2. That transitional costs, and especially the costs associated with implementation of the generation of renewable energy on county property by 80% subsidized by funds from outside the county's tax revenue.

3.That any transition of fleet energy sourcing, and new technologies regarding the same, not in anyway reduce the functioning, operability, or service levels or service quality, of any element of that fleet.

4. That transitional costs associated with transitioning to non-fossil energy and other sustainability aspects of facility building and operations, be handled in capital improvement programming so as to not raise operating costs, realize a savings in operating cost, and produce a long term return on investment for the county.

Within that framework, the committee recommends the following pathways:

- That the committee continue, after 2010 to develop a complete scope, a system for data gathering, measurement and energy related planning.

- That the committee work with county departments and other partners to develop a county government energy plan.

- The committee recommends that that capital improvement plan include a phased transition of fuels/energy sources for the fleet to renewable fuels, consistent with the projects chosen by the committee and illustrated in grant project spreadsheets.

- That there be provision of continuing education for county personal, local government leaders and the public on transition to using non-fossil energy sources, including renewables.

Projects Selected – Explanation

Fleet

Projects:
B20 diesel replacement/ fossil diesel reduction.
E85 substitution / unleaded gasoline reduction.

Change in purchasing policy:
New gasoline powered vehicles be high efficiency and flex-fuel.
New diesel vehicles/equipment be high efficiency and bio-diesel capable.

Facilities/county property

Retrofits:
Courthouse windows replacement/upgrade (underway)

Wind energy projects:

County Farm property
Huber facility property
West highway shop property

Photovoltaic electricity generation:

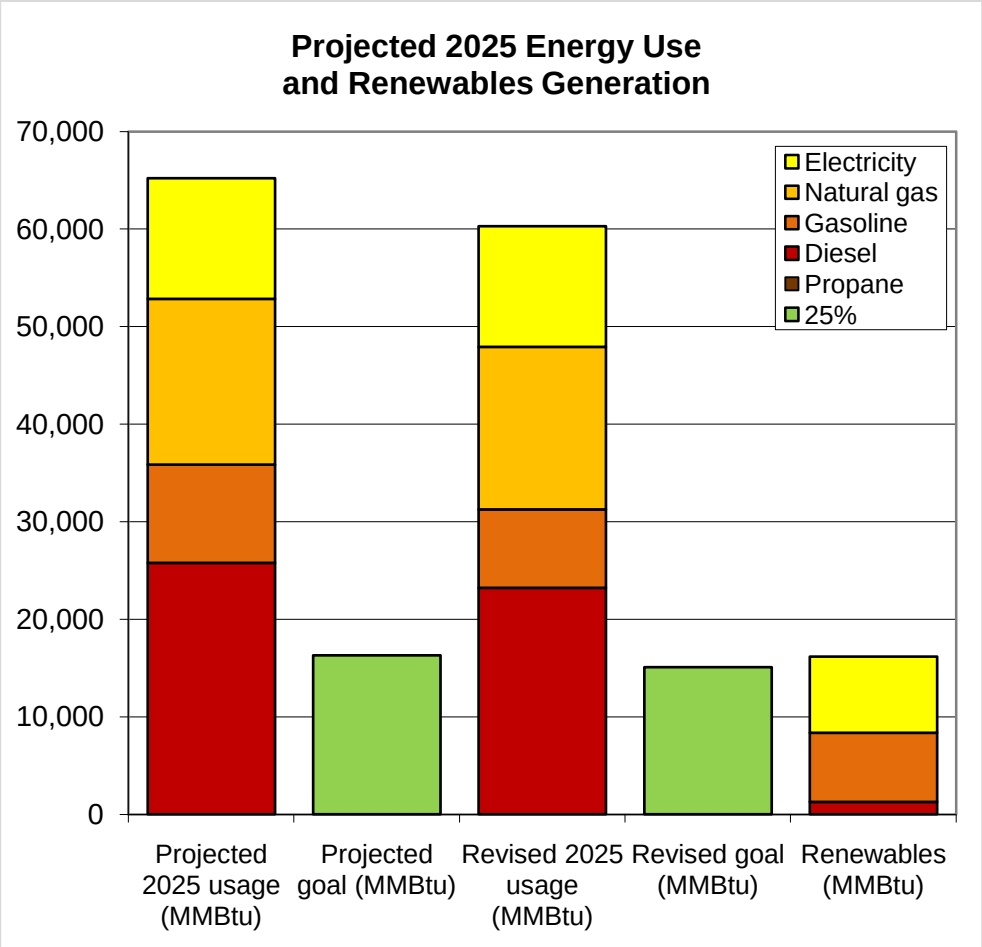
Park facilities at Wilson Lake Park, Hayman Falls and Pulcifer Park
Mielke Theatre
West Highway Shop
East Highway Shop
Crawford Center
Huber
Highway
Department of Community Services building
Courthouse
Fairgrounds

Other

Further work by the Energy Independence Committee.

For data on projects selected please consult the appendix.

PORTFOLIO SUMMARY				
Installed cost before incentives	Incentive amounts	Present value cost with incentives	lbs CO_2 avoided from fossil emissions	Percent of goal achieved (see below)
$ 3,722,745.00	############	$ 819,493.74	564,803	108%



Projected 2025 usage (MMBtu)	65,206
Revised 2025 usage (w/ efficiency) (MMBtu)	60,274
Revised 25% 2025 renewables goal (MMBtu)	15,069
Sum of renewable measures (MMBtu)	16,207
Percent of goal achieved	108%

Baseline lbs CO_2:	13,770,047
New lbs CO_2:	13,205,244
CO2 Reduction:	0

Rationale

The fleet related changes would over 15 years reduce fossil fuel/ increase renewables use significantly. Given the potential technical advances due to international market forces, this could eventually eliminate fossil fuel use in the county's fleet.
This process would administratively fit in with existing CIP operations.

The renewable energy projects were picked because they would take advantage of the particular space available and/or architectures of different county buildings and properties.
The "County Farm", in particular is a large multi-use space (recreation, forestry, agricultural rental and other uses) could support significant wind technology development. The county, especially the Eastern ½ is a good area for wind energy production.
The reasons for the selection of projects include the intent to have the path taken be one in which expense is in the capital budgeting, so as to produce return on investment and reduction over time in operations costs.

The committee believes that the county should develop an energy policy and an operational framework supportive of that policy. This process, begun with this grant funded project would oversee the above recommendations. As part of that, the committee would continue to work on the matters mentioned earlier in this report

Please refer to the Total Projects Considered section, specifically the two subsections:
Projects that did not contribute the creation of the pathway to 25x25 developed in 2010. But the committee believes these projects should be put into county planning and implemented.
And
Projects that should be studied and evaluated.

Narrative – Potential Renewable Feedstocks

For information on renewable feed stocks in the county and all of Wisconsin, please refer to the Wisconsin Bioenergy Atlas at http://wiscbioenergy.org/index.php .

The county has significant wind power potential, especially in its Eastern half. Although the county's current wind turbine siting ordinance is not viewed as favorable to wind energy development recent steps at the state level will probably alter that.

Photovoltaic arrays are in use at number of locations around the county on some residences, churches, businesses and a nature center. So far, the reported monetary savings during spring through early fall from these sites is very good.

Landfill methane resources have not to our knowledge been evaluated county wide. The Shawano Landfill has been studied and found to be not appropriate for energy or fuel production.

Wood waste and other wood product as feedstock, and pellet production does have potential. The western and south-central areas of the county have significant timber.

Agricultural production in the county centers on dairy and corn. The potential renewable feedstock from cropped lands in a variety of forms is high. A promising opportunity in county is farm based power generation.
A county farm (Green Valley Dairy) currently uses anaerobic digesters/generators to cogenerate approximately 1.4 MW of electricity. Other large farms are considering implementations. As the cost of entry decreases, this could be a major local energy production opportunity.
Another production route of course is biogas, depending on market factors and infrastructure.

Passive solar water heating also is a potential area, that is currently little used beyond a few residences.

Hydro power is represented in county by three small dams that produce electricity. Not explored yet is the area of micro-hydro generation. The county does contain a number of stretches of fast flowing river water, often in public land areas.

While not technically considered a "renewable" energy feedstock, we do need to mention geothermal HVAC. As is the case nearly everywhere, this has high potential across sectors. The committee is aware of two entities in county have installed geothermal systems. One is a nature center, the other a public school.

Existing Unknowns – Necessary Information for Future

The committee believes the following to be crucial questions that will profoundly affect future progress towards energy planning.

Future federal and state funding levels, the level of importance given to this matter by the federal and state governments.

- The future stability of local government revenues.
- The cost of relevant technologies.
- Increases in efficiency in both manufacturer of relevant devices and their productive output.
- Future capabilities, both technical and practical in a market environment of new technologies, (such as cellulosic-bioenergy-bioplastics, pyrolysis, micro-nuclear).
- Fossil energy feedstock prices.

On our local level, the results of examination and evaluation referred to elsewhere in this report.

Action Steps – Immediate & Long - Term

Near – Term

Delivery of report and recommendations to the CIP Committee

- Completion of final scope document
- Finishing the data gathering system and methodology to address the final scope.
- Implementation of the data gathering and analysis framework.
- The committee create an outline for a county government energy policy.

<u>Near and Long Term</u>

- Continuing relevant education for staff and public.
- Pursuing partnerships to address county's energy goals.
- Identification and pursuit of grants and other funding supportive of county's energy goals.

<u>Long Term</u>

- The committee, county departments, home committees, board and citizens collaboratively develop and implement a Shawano County Government Energy Plan.
- Completion of projects in this report to reach the 25x25 goals, and to further transition to energy independence from fossil fuel feedstocks.

Shawano County Energy Independence Committee

Tim Reed, Director of Planning & Development (Chair)

Dennis Knaak, County Board Supervisor

Sandy Steinke, County Board Supervisor

Randy Wright, County Sheriff

Frank Pascarella, County Administrative Coordinator

Melinda Barlow, Planning & Solid Waste Management

Grant Bystol, Highway Commissioner

Steve Dreher, Supervisor, Building Maintenance Department

Mary Hagen, Finance Department Staff Accountant

Steve Hansen, Manager, Technology Services

Joel Kroenke, Citizen Member

Keith Marquardt, Parks Manager

Jay Moynihan, University of Wisconsin Cooperative Extension

David Poffinbarger, GIS Coordinator

Diane Rusch, Finance Director

William Van Lopik, Citizen Member

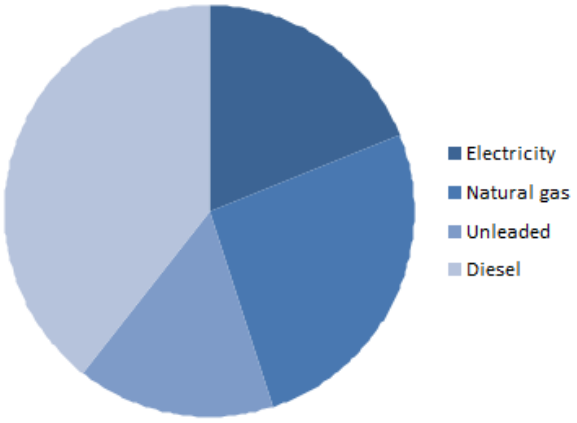
Appendix: Baseline Energy Consumption Data – Spreadsheets

Your energy usage baseline is	64,790	million (MM) Btus.*
That baseline is comprised of	3,602,960	kWh,
	169,002	therms,
	80,562	gallons of unleaded,
and	184,219	gallons of diesel.
By assuming an annual growth rate of	0.04%	,
in 2025 your energy use baseline will be	65,206	MMBtu.
Your 25% renewable energy goal		
for 2025 is therefore	16,301	MMBtu,
or	25%	of your baseline consumption.
This translates into	4,777,662	kWh or
	163,014	therms or
	131,463	gallons gas or
	117,276	gallons diesel, or
		some combination
		of those fuels.

* This baseline is an average of 3 years of energy use data.

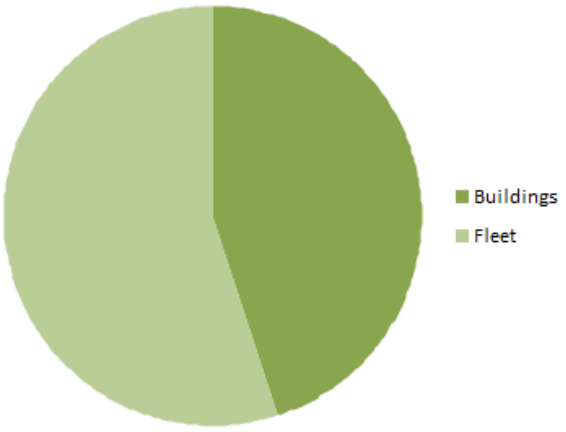
Total Consumption by Energy Type

Energy type	*Percent of total Btus*
Electricity	19%
Natural gas	26%
Unleaded	15%
Diesel	40%



Total Consumption by End Use

Energy end use	*Percent of total Btus*
Buildings	45%
Fleet	55%

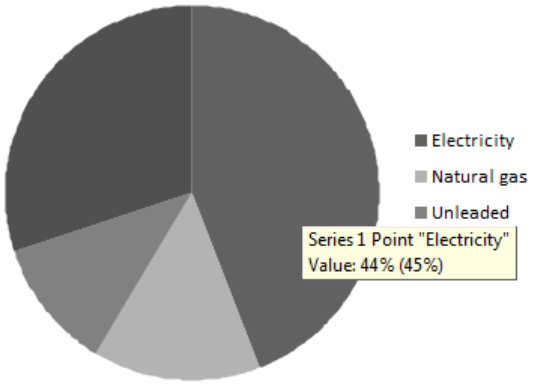


Shawano County Energy Baseline: Additional Info

Total CO2 Emissions by Energy Type

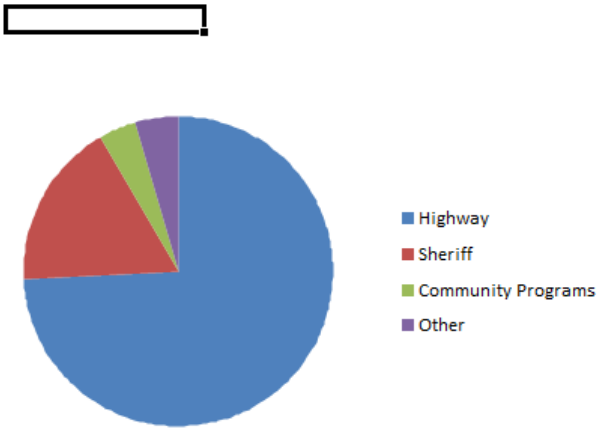
Energy type	*Percent of total CO2*
Electricity	44%
Natural gas	14%
Unleaded	11%
Diesel	30%

Total: 14 million lbs CO2



Fleet breakdown by department

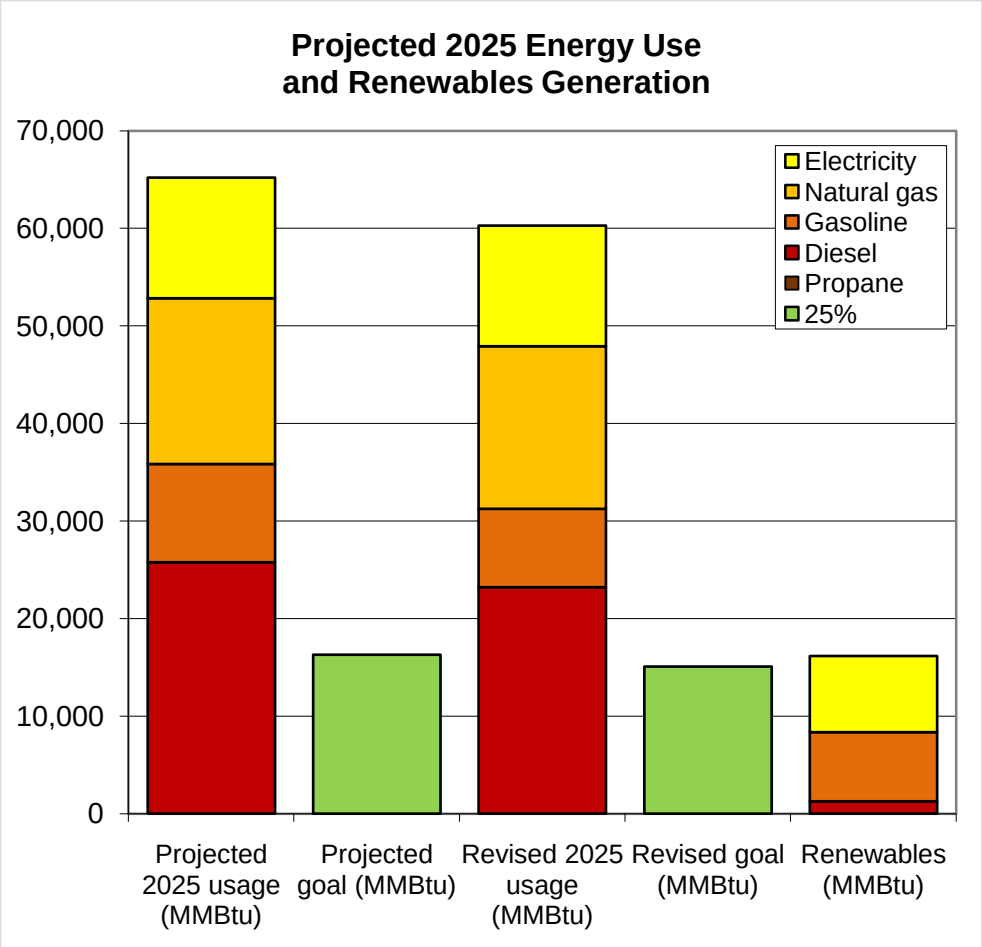
Department	*Percent of total Btus*
Highway	74%
Sheriff	17%
Community Programs	4%
Other	5%



Renewable energy projects selected

		MEASURES						
		Name	Savings-to-investment ratio	Savings/ generation	Installed cost before incentives	Incentive amounts	Present value cost with incentives	lbs CO_2 avoided from fossil emissions
10%	R	Wisconsin RPS	--	170745 kWh	--	--	--	288,901
	R	Purchased renewable electricity	#DIV/0!	0 kWh	$ -	--	$ -	-
On	R	PV - Courthouse	0.00	223380 kWh	$ 360,000	$ 288,000	$ 46,224	1,290
On	R	5 Unleaded reduction/ replacem	-1.26	639217108 gallons u	$ 21,866	$ -	$ 84,228	138,832
On	R	20 Diesel reduction/ replaceme	-0.08	9029 gallons diesel	$ 71,879	$ -	$ 276,878	28,075
On	E	gher effeciency unleaded vehicl	#DIV/0!	6216 gallons unleade	$ -	$ -	$ -	39,291
On	E	-igher effeciency diesel vehicles	#DIV/0!	18540 gallons diesel	$ -	$ -	$ -	57,649
On	R	PV - Crawford Center	0.00	223380 kWh	$ 360,000	$ 288,000	$ 46,224	1,290
On	R	PV - Fairgrounds	0.00	223380 kWh	$ 360,000	$ 288,000	$ 46,224	1,290
On	R	PV - Highway	0.00	223380 kWh	$ 360,000	$ 288,000	$ 46,224	1,290
On	R	PV - Huber	0.00	111690 kWh	$ 180,000	$ 144,000	$ 23,112	645
On	R	PV - DCP	0.00	111690 kWh	$ 180,000	$ 144,000	$ 23,112	645
On	R	Wind - Huber	0.00	58333 kWh	$ 150,000	$ 120,000	$ 19,260	337
On	R	Wind - County Farm	0.00	350000 kWh	$ 900,000	$ 720,000	$ 115,560	2,021
On	R	Wind - West Highway shop	0.00	58333 kWh	$ 150,000	$ 120,000	$ 19,260	337
On	E	Courthouse Windows	#DIV/0!	3434 therms	$ 59,000	$ 59,000	$ -	4,021
On	R	PV - West Highway Shop	0.00	223380 kWh	$ 360,000	$ 288,000	$ 46,224	1,290
On	R	PV - East Highway Shop	0.00	55845 kWh	$ 90,000	$ 72,000	$ 11,556	322
On	R	PV - Wilson Lake	0.00	18615 kWh	$ 30,000	$ 24,000	$ 3,852	107
On	R	PV - Hayman Falls	0.00	18615 kWh	$ 30,000	$ 24,000	$ 3,852	107
On	R	PV - Pulcifer Park	0.00	18615 kWh	$ 30,000	$ 24,000	$ 3,852	107
Off	R	PV - Mielke Theatre	0.00	18615 kWh	$ 30,000	$ 24,000	$ 3,852	107

PORTFOLIO SUMMARY				
Installed cost before incentives	Incentive amounts	Present value cost with incentives	lbs CO_2 avoided from fossil emissions	Percent of goal achieved (see below)
$ 3,722,745.00	############	$ 819,493.74	564,803	108%



Projected 2025 usage (MMBtu)	65,206
Revised 2025 usage (w/ efficiency) (MMBtu)	60,274
Revised 25% 2025 renewables goal (MMBtu)	15,069
Sum of renewable measures (MMBtu)	16,207
Percent of goal achieved	108%

Baseline lbs CO_2:	13,770,047
New lbs CO_2:	13,205,244
CO2 Reduction:	0

An copy in the form of a MS-Excel™ file of the complete set of spreadsheets is available from the Office of Energy Independence, or Shawano County.

Please direct any questions electronically to:

Tim Reed
Director, Shawano County Planning & development Department
Shawano County Courthouse
311 North Main Street
Shawano, WI 54166

(715) 526 – 6766

Tim.reed@co.shawano.wi.us