

2009

**Wisconsin Energy Independent
Community Partnership**

**25 x 25 Plan for Energy
Independence**

Report completed by:

**Chequamegon Bay Region Energy
Independence Team**

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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 independence for Wisconsin communities. Currently, there are many communities across the State of Wisconsin interested in implementing renewable energy and energy efficient projects. This program provided resources and support to ten pilot communities for the completion of energy independence assessments, allowing the participating communities to move forward with energy efficiency and/or renewable energy projects.

In 2009, several communities in the Chequamegon Bay partnered with the Alliance for Sustainability, University of Wisconsin-Extension and Focus on Energy to pursue the goals of energy independence as one of these ten pilot projects. The Chequamegon Bay Regional partnership includes:

- City of Ashland
- City of Bayfield
- City of Washburn
- Town of Bayfield
- Town of La Pointe
- Red Cliff Band of Lake Superior Chippewas
- Ashland County
- Bayfield County
- Bay Area Rural Transit (BART)

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
- Energy Independence Team (EI Team) – a group of representatives from partner communities that assist in collecting data and background information, identifying priorities and potential projects, and facilitating 25x25 planning efforts within their organizations

Objectives

- Increase the use of renewable energy and renewable fuels by 25% by 2025 in the State of Wisconsin.
- 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.

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.

What was measured? Why?

Each participating entity collected three years of data on energy use in its buildings, including electricity, natural gas, and propane consumption. Other building information was also gathered to help determine the energy intensity of individual facilities, including building description, use, location and area (ft.²). Data from street lighting, water infrastructure, existing renewable energy installations (solar thermal panels) and liquid-fuel powered generators was also collected.

The EI Team enlisted the help of our area Focus on Energy consultant to conduct building audits of all government buildings with heat and power. The audits and walkthroughs provided targets for efficiency and conservation projects and were very helpful in prioritizing efforts and developing 25x25 plans.

Energy Independence Team partners also collected information on fuel use in fleet vehicles and equipment. The EI Team compiled a comprehensive inventory of fleet vehicles and fuel-consuming maintenance equipment, and compiled data related to types of fuel consumed, cost, and volume. The available information varied by community, utility provider, individual departments and how data was already being tracked.

The data collected was used to develop a baseline of energy use for the region that provides the first evidence-based look at overall energy consumption, specific end uses, and the related annual costs to local governments. The baseline helps identify areas and specific facilities and equipment for prioritization and will enable the partners to measure the results of energy efficiency efforts in the future. It further provides an overall picture of energy use that aids in assessing potential renewable energy opportunities.

Discoveries/Surprises

In the process of collecting data and developing energy efficiency and renewable energy projects, those involved in the effort made a few discoveries. For example, it is a fairly common practice for governments to delegate the responsibility of paying utility bills to a staff person who has little to do with tracking energy consumption. Because the information was not being routinely scrutinized, some anomalies, including significant overcharges, went unnoticed until the data was reviewed as a part of this project. As a result, partner communities now have a better idea of their total expenditures for energy per year, and many have changed operating practices to track energy information more effectively.

This was also an opportunity to update utility records with accurate addresses and descriptions. It was discovered that the utility company workers would often label premise IDs with their best guesses at addresses and descriptions, making it very difficult to match up premise IDs with actual physical locations. The EI Team also discovered a number of facilities with multiple premise IDs (as many as five separate meters on a single building). In one case, it was discovered that a building previously audited in a feasibility study for a geothermal installation has its air conditioning unit on a completely separate premise ID from the rest of the building, meaning energy consumed by the existing unit was not taken into account.

Another discovery was the difficulty in collecting energy data, especially that related to the vehicle fleet. No central department in any of the communities (BART excluded) had the whole picture. Fleet insurance inventories provided the best overall summary of the fleets, but many were not entirely up to date, and most did not differentiate between diesel, gasoline or flex-fuel vehicles. Most had no records that related estimated fuel economy to particular vehicles, making it difficult to identify the especially inefficient vehicles or equipment. Some departments that purchased fuel in bulk could quantify gallons purchased or total costs (not always both), but not necessarily miles driven, in total or per vehicle. Some communities and departments purchase fuels retail and others have a combination of retail and bulk

purchases. Fuel used in light equipment (such as chainsaws and lawn mowers) and seldom-used motorized vehicles (such as snowmobiles and boats) was often not tracked at all.

The available consumption data was compiled, but additional information and adjustments to fuel tracking methods would make planning for energy efficiency much easier. Purchasing for vehicles and, in some cases, fuel is conducted by departments rather than centrally. There is great potential for better record keeping and for efficiency upgrades as fleets turn over.

A mild surprise was how many really significant, sometimes expensive steps are needed to meet the 25x25 goals. Early on in the project, communities anticipated significantly more “low-hanging fruit” that would make the goals easier to achieve. It has become clear that more significant energy conservation measures and behavioral changes will be necessary to make installation of renewable energy systems more effective.

Total Projects Considered

Chequamegon Bay partners have used this project as a platform to investigate opportunities for regional collaboration in developing renewable energy infrastructure, in addition to developing their own community-specific projects. Several communities, including the Town of La Pointe and Bayfield County, are currently assessing the potential for wind energy in several locations. The same group has been working with a local fuel provider, Midland Energy, and others to promote the availability and use of biodiesel in municipal and private fleets, with the possibility of introducing B20 to the region in a significant way by summer 2010. Midland already provides E-85 fuel locally, and some communities are now taking this option into consideration as fleet vehicles are replaced.

In addition to EI Team efforts, the local Xcel Energy Bayfront Power Plant has already converted 2 of its 3 boilers to run on biomass, rather than coal. Xcel Energy has a goal of converting the third boiler to make the plant the largest biomass power plant in the Midwest by 2012. There are ongoing research efforts at the former UW-Ag Research Station by UW-Extension agents and the Agriculture and Energy Resource Center (in partnership with Xcel, the Department of Natural Resources, and the Office of Energy Independence) to develop sustainable, local sources of biomass that will help supply the plant in the future.

The EI Team will continue to build regional partnerships to expand the reach of these efforts and build on momentum gained during the course of the project. This will allow for collaboration with additional communities in a wider geographic range, educational institutions, utility providers, and economic interests, while providing opportunities for joint purchasing and cost sharing in infrastructure development and future projects. This will also simplify efforts to provide employee and community education about energy conservation and related issues.

Each of the participating partners in the region identified projects that will help them reduce their overall energy consumption and begin the transition to renewable energy sources. This is a dynamic list of potential projects that will change as community needs, opportunities, funding, and technology develop in coming years. At this time, over 70 individual community projects are being considered, many of which are intended for immediate implementation. These projects have varying degrees of likelihood for future implementation. This list is in no way finite or all-inclusive.

Potential projects (by EIC partner) include:

Ashland County:

1. Courthouse boiler replacement with digital controls
2. Courthouse lighting replacement
3. Courthouse window replacement

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4. Courthouse attic insulation
5. Courthouse air conditioning upgrades
6. Courthouse solar electric panels
7. Jail/Public Safety lighting controls, occupancy & daylight sensors
8. Jail/Public Safety solar hot water
9. Jail/Public Safety solar electric panels
10. HHS lighting controls and modifications
11. HHS solar electric panels
12. Highway department lighting upgrades
13. Vehicle fleet sheriff's department improved efficiency
14. Vehicle fleet - E-10 blend of fuel
15. Vehicle fleet - B-20 use (warm weather)
16. Vehicle fleet - E-85 use
17. Vehicle fleet - Use of B-20 (cold weather) & B-50 (warm weather)

Bayfield County:

1. County Annex Building window replacement
2. County Annex Building HVAC controls upgrade
3. Courthouse boiler replacement with digital thermostat controls
4. Courthouse occupancy sensors
5. Courthouse variable speed drives for water system pumps
6. Courthouse low-wattage radiant heaters for employees with special heating needs
7. Exterior lighting efficiency upgrade
8. Highway Department lighting upgrade in all garages
9. Ag Station R-55 roof insulation
10. Ag Station solar hot water system
11. Fleet will include three compressed natural gas (CNG) vehicles
12. Installation of CNG fueling station

City of Ashland:

1. City Hall HVAC system retooling
2. City Hall occupancy sensors
3. City streetlight audit with Xcel Energy
4. Vaughn Library LED exit lights
5. Recreation Center lighting upgrade
6. Ellis Fire Station lighting upgrade
7. Additional insulation in multiple city buildings

City of Bayfield:

1. Old Courthouse insulating window quilts
2. Old Courthouse occupancy & daylight sensors
3. City Hall weatherization, including door sweeps
4. City Hall programmable thermostats
5. City Hall occupancy sensors
6. Insulate hot water lines in all city buildings
7. Annually inspect and repair all door and window seals
8. Waste Water Treatment Plant energy audit
9. City streetlight upgrade to LED or other comparable alternative.

City of Washburn:

1. New Public Works Garage energy efficient construction
2. New Public Works Garage solar electric panels
3. City Hall insulation
4. City Hall window replacement

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5. City Hall HVAC retooling
6. Fuel tank retrofit to accommodate biofuels to be used in city fleet
7. Higher standards for vehicle efficiency in new fleet vehicles
8. Explore electric and alternative fuel options for fleet vehicles

Town of Bayfield:

1. Upgrade heating systems in all town facilities (3)
2. Town Garage insulation and new outer shell
3. Installation of solar PV units at town facilities

Town of La Pointe:

1. Continue wind energy assessments and pursue funding for implementation
2. Energy efficiency upgrade for outdoor lighting
3. Town Hall weatherization & efficiency upgrade
4. Town Library weatherization & efficiency upgrade
5. Installation of outdoor wood boilers to heat town facilities
6. Promote use of biodiesel at local marinas

Red Cliff Band of Lake Superior Chippewas:

1. Tribal Administration Building weatherization and efficiency upgrade
2. Weatherization, lighting, and efficiency upgrades in multiple tribal facilities
3. Increased use of E-85 and biodiesel in fleet vehicles

Bay Area Rural Transit:

1. Energy efficiency measures and renewable energy technologies to be employed in new transfer station and office/garage facilities (to be completed 2011-2012)
2. Existing office on-demand hot water system
3. Existing office heating system efficiency upgrade
4. Increased use of biodiesel in fleet
5. Purchase of hybrid electric buses
6. Investigation of CNG vehicle feasibility

Pathways to 25 x 25

In order to achieve the 25x25 goals, partner communities will first focus on energy conservation and efficiency to reduce overall consumption and make renewable energy installations more cost effective. This will be followed by implementation of renewable energy projects that are currently plausible and cost effective. As efficiency increases and consumption is reduced, more dramatic options for renewable energy will be investigated and implemented as technology develops and project ideas become more practical. Plans for achieving 25x25 goals will develop as conditions change, and implementation of projects will depend on funding, technology, incentives and a variety of other factors that may come into play before 2025.

Projects Selected – Explanation

At this time, all of the previously listed projects are under consideration and will be implemented as conditions allow and as funding becomes available. Several of the low-cost projects listed have already been implemented and many projects have funding allocated in 2010 budgets. Others are dependent on grant funds and incentives or future plans for infrastructure and fleet upgrades (for example, street lights may be upgraded as roads are scheduled for repairs and more efficient vehicles will be purchased in the normal course of vehicle turnover).

Potential Renewable Feedstocks

It has become obvious that a diverse combination of efficiency projects and renewable energy options will be necessary for the region to achieve 25x25 goals. At this point, biomass may be the most abundant renewable energy feedstock in the area. Biomass is already the main feedstock being utilized at the Bayfront Power Plant. Opportunities for biomass heating and electric energy production are currently underutilized. The region has vast biomass resources with thousands of acres of national and county forest land and several forestry products manufacturers in the area. The development of cellulosic ethanol from woody biomass may be crucial to developing renewable fuels from local resources.

Advances in solar photo voltaic technology is needed to increase efficiency and reduce equipment and installation costs. Even with these advances, solar availability from November through January is modest at best. Some solar hot water systems have been established in the area and are already making significant contributions to hot water needs and reducing operating costs.

The wind resources in the area are not currently considered adequate for commercial production with today's equipment, but many of the areas being assessed have the potential to supplement the energy grid at a minimum. Advances in wind energy technology that may make better use of lower wind speeds could make wind a better possibility in the future.

There is growing support in the region for installation of geothermal systems as costs decrease and technology and local expertise becomes more available. Geothermal is becoming more attractive and cost effective as existing buildings are being upgraded or replaced.

The feasibility of utilizing landfill gases or anaerobic digesters has not yet been investigated.

Existing Unknowns – Necessary Information for Future

Future costs of non-renewable fuels may ultimately be the biggest determining factor in implementing this plan. Price spikes in recent years for natural gas and other petroleum products raised alarms and prompted some changes, but currently national companies are running numerous television advertisements trying to convince Americans that "all the natural gas we'll need for generations is available right here in America". Current energy prices do not seem to contribute to the sense of urgency for immediate change, but as fuel prices are expected to increase, alternative options may become more attractive.

Technological advances that would have a huge impact on the region's energy independence are needed to improve overall energy efficiency, and to increase the benefits and feasibility of renewable energy options like cellulosic ethanol, solar PV, wind energy, and biodiesel production.

An existing unknown that contributes significantly to the success of this effort is the availability of funding in both the long and short terms. This is an extremely difficult time for small communities to make major investments when they are surrounded by so much economic uncertainty, even if these investments will save them money in the long run. This also factors in to the political climate and support for such endeavors.

Action Steps – Immediate & Long - Term

Immediate:

- Promote energy conservation efforts with employees and community members
- Complete data entry in Energy Star Portfolio Manager and continually update information
- Establish more effective tracking methods for facility and fleet energy information
- Develop standards/targets for energy efficiency in buildings and fleets
- Review the proposed energy efficiency projects
- Solicit bids/estimates for implementation and determine payback
- Prioritize projects based on feasibility, impact, cost, and potential incentives
- Budget funds necessary to complete projects
- Seek grant funding and incentives
- Implement projects

Long-term:

- Continue regional efforts to develop or increase biomass and biodiesel production and infrastructure
- Follow technological advances in energy efficiency and renewable energy options
- Continue partnership with other EI Communities and learn from their efforts

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