



**2009**

**Wisconsin Energy Independent  
Community Partnership**

**25 x 25 Plan for Energy  
Independence**

**Report completed by:**

**The City of Platteville and the City of Lancaster**

Issue Date:

December 31, 2009

## Wisconsin Office of Energy Independence

*This page intentionally left blank*

**Table of Contents**

Overview ..... 2

What was measured? Why? .....3

Discoveries/Surprises .....4

Total Projects Considered .....5

Pathways to 25 x 25 .....6

Projects Selected – Explanation .....8

Narrative – Potential Renewable Feedstocks .....9

Existing Unknowns – Necessary Information for Future .....10

Action Steps – Immediate & Long - Term ..... 11

Energy Independence Team Members ..... 12

Appendix – Baseline Energy Consumption Data – Spreadsheets

## **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 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.

### **Eligible Participants**

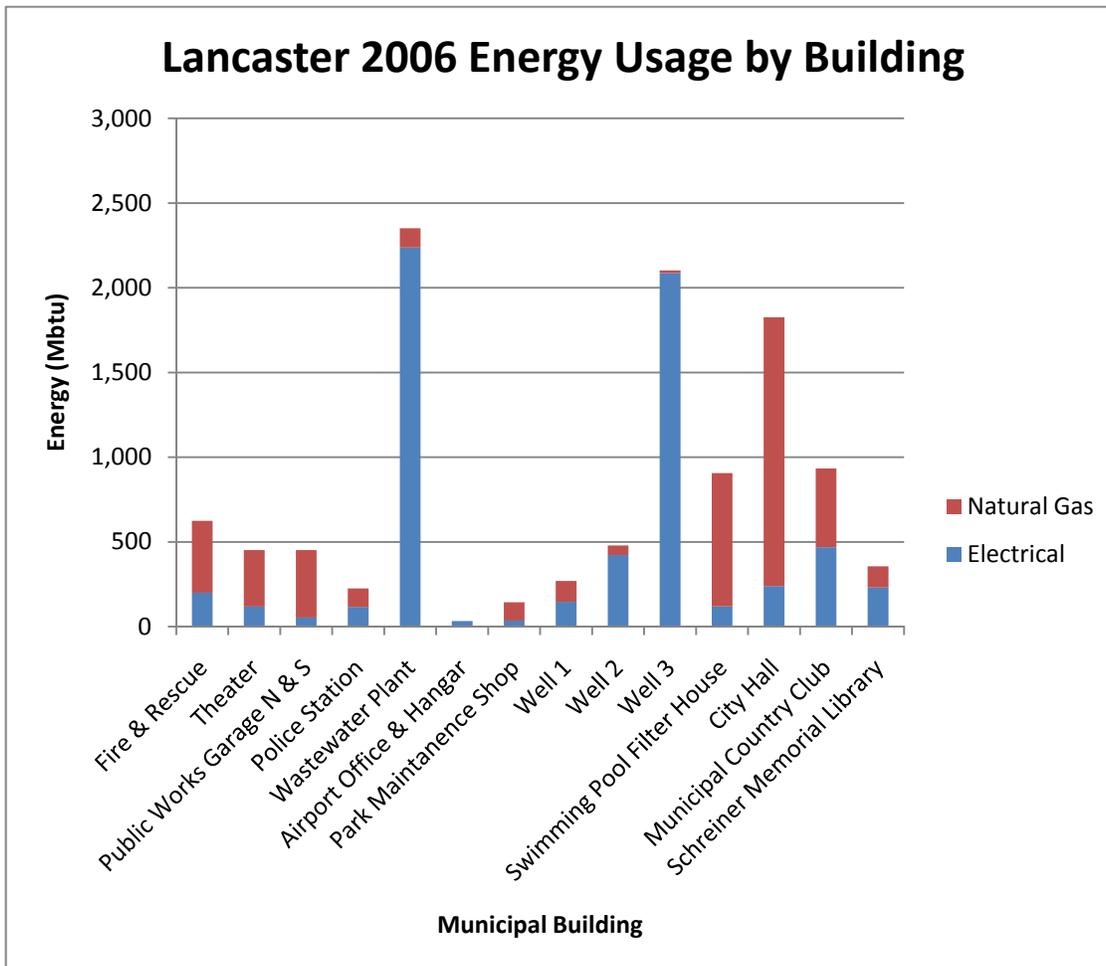
Applicant must be a Wisconsin county, city, village or town that has shown willingness to improve the community’s efforts related to energy conservation, efficiency and potential renewable opportunities. Applicants, if they are responsible for their own municipal water, sewer, or electrical system, must be in compliance with all appropriate state and federal regulations.

**What was measured? Why?**

The first step on the path to achieving the 25 by 25 goal and to becoming Energy Independent Communities is to understand current energy use. To that end, the Cities of Lancaster and Platteville engaged in a partnership with professors and students from the UW-Platteville to study municipal buildings, vehicle fleets, and other infrastructure to measure energy consumption. The team presented their findings in a comprehensive report that identifies consumption, details recommended action for each facility, and provides basic economic analyses.

The report also includes a detailed engineering analysis of the theoretical heating, cooling, ventilation, and lighting loads that were used, in part, to make the recommendations. An analysis of the past three years of historical data for the actual energy usage by the two cities is presented. Further, the long-term benefits resulting from actions to reduce dependence on non-renewable energy sources are discussed. Finally, suggested means for additional reduction, and eventual elimination, in the use of non-renewable energies are presented.

An example of the user-friendly data reporting featured in the report is shown below.



## **Discoveries/Surprises**

During the course of the study, both Platteville and Lancaster were surprised to discover the municipal facilities that consumed the most energy. While larger, older buildings like the City Halls were expected to have high usage, the wastewater treatment plants and wells were among the highest consumers of energy. The wells that had been upgraded with variable frequency drive (VFD) motors were much lower than wells without the VFDs, clearly showing the benefits of that equipment. A VFD has since been installed in Lancaster's Well #3. The blowers used at the wastewater treatment plant in Platteville also used a surprising amount of electricity. Likewise, the swimming pools were larger-than-expected consumers of energy.

There were also surprises in the recommendations related to the feasibility of certain initiatives that could improve energy efficiency. For example, the report identified a number of behavioral changes to reduce energy consumption. While amount of energy savings was not quantified in the report, the changes could be made at no cost to either City. Another surprise was the viability of a geothermal heating system at the Lancaster Golf Course. The conversion of the HVAC system to geothermal does not appear to be cost-prohibitive.

## **Total Projects Considered**

Both the City of Lancaster and the City of Platteville are acutely interested in implementing the recommendations of the team from UW-Platteville. Both municipalities are in the process of evaluating a variety of projects to achieve the 25 by 25 goal. The list below includes many of the projects that have been discussed by Lancaster and Platteville:

- Electric vehicle purchase
- Daylighting
- High efficiency boilers
- More efficient lighting
- Motion sensors
- Building insulation
- VFD for water and wastewater
- Behavioral changes
- Turn off lights
- Study existing HVAC systems for deficiencies and upgrade opportunities
- Building orientation for Platteville PD
- Lighter interior paint colors
- Interior lighting configuration
- Safe routes to schools

## **Pathways to 25 x 25**

For Lancaster, the plan over the next 3 years is to lead by example and implement two projects yearly that will increase both energy efficiency and the use of renewable energy sources. In 2010, efficiency will be greatly increased through the replacement of the boilers in City Hall (see below). The use of renewable energy will be increased through installing daylighting equipment in the Public Works garage (see below) and through the purchase of an electric utility vehicle to replace an inefficient pickup truck in the City fleet. In 2011, greater energy efficiency will be achieved through the installation of motion sensors to control lights in City Hall, upgrading light fixtures in all City buildings, and implementing behavioral changes to promote energy efficiency. In the furtherance of the 25% renewable goal, the City will work with its electric utility, Alliant Energy, on a cost-effective plan for purchasing “green” electricity. The 2012 efficiency plan is to reduce the carbon footprint of our golf course by converting the facility to a geothermal system. The City will also purchase an additional electric utility vehicle to replace another pickup truck in the Public Works fleet.

These specific projects will be augmented by other energy efficiency measures that will be adopted as part of larger projects. For example, as the City seeks to upgrade the Wastewater Treatment Plant, the use of Variable Frequency Drive (VFD) motors and other energy-saving improvements will be incorporated into the project design. These projects will help reduce current energy usage. In addition to the 25x25 action plan, the City will begin to create a culture of energy conservation consciousness to encourage sustainable behaviors and educate the community on environmentally friendly practices that will aid in the of achieving the City’s goals.

The cost savings associated with these initiatives will be reinvested into future renewable energy efforts, creating a revolving appropriation dedicated to achieving the 25X25 goal.

For Platteville a management team that will be a permanent part of city government will be established to identify and evaluate projects identified in the UWP report as well as new projects. Additionally, the City of Platteville has forged a pathway to 25x25 with initiatives that include:

- Use of LED lights on new traffic signals since 2005
- Working with UW-P professors to collaborate on design of a digester for animal waste to produce methane for co-generation of electricity.
- Installed Variable Frequency Drive (VFD) and new blowers in the WWTP to reduce energy usage, estimated at 40%.
- Worked with UW-P Senior Design team in mechanical engineering to develop tank heater to heat Caustic Soda tank and wrap of insulation thus allowing energy efficiencies, a 1 year pay back. Will be implemented in 2010.

- Put a new roof and additional insulation on Well #4 in December 2008 that has yielded a 43.4% reduction in therms used.
- Split the Well house into a mechanical room and a chemical room to control temperatures on each side.
- Partnered with students to install heaters and insulation directly on one of the chemical tanks to reduce the temperature in the chemical room even further.

## **Projects Selected – Explanation**

The boiler replacement project will be conducted in City Hall, located at 206 South Madison Street, Lancaster, WI, 53813. Currently there are two Constant Volume Roof Top Units (RTUs), a 10 ton and a 15 ton, which will be replaced with AAON Variable Volume RTUs with Gas heating and DX cooling section. The Wastewater Treatment Plant, located at 1027 S Madison Street, Lancaster, WI, 53813, is where the electric utility pickup trucks will be based and the charging station installed.

The City will also install 16 light pipes on the roof of the Public Works garage South building and new T-8 fluorescent fixtures with attached light sensors that will turn lights on or off depending on the amount of daylight yield by the pipes. New T-8 fluorescent fixtures and motion sensors will be installed in the Public Works garage North building to replace the inefficient high-pressure sodium fixtures that remain on when the building is not in use.

The AAON VAV RTUs will eliminate the need for a by-pass damper in the Duct System which lowers the efficiency of the entire system; add Variable Frequency Drives (VFD) to the blowers which increase operating efficiency; Increase cooling operating efficiency by a minimum of 3 EER points; provide a more reliable and user friendly control of the building.

The replacement of the inefficient boilers at City Hall with new, high efficiency boilers and new controls will considerably reduce the cost of heating building. Energy costs are carried in the annual general fund operating budget, therefore the savings achieved will enable the City to retain at least one new permanent job. Additionally, four temporary jobs will be created during the installation process.

The daylighting of the Public Works garage will use natural light, the ultimate renewable source, as the primary source for lighting. This project, combined with the motion sensors in the North building, will advance the City's twin goals of efficiency and sustainability. The purchase of the electric vehicle will also dramatically reduce the consumption of nonrenewable energy through the phasing out of the pickup truck that it replaces. Three temporary jobs will be created through this effort.

Platteville has also selected several projects to pursue. One of the priority projects is to make several exterior repairs to City buildings including replacing roofs and adding R-37 insulation (Currently the roofs have no insulation); convert fluorescent fixtures to energy efficient bulbs and install compact fluorescent bulbs in incandescent lights; and install heat recovery system in the new Police Department building that will add to the 30% gain in overall efficiency of the building. Additionally, the City will conduct a feasibility study of the HVAC system in City Hall in 2010 using the Focus on Energy guidelines with a targeted implementation of 2011. The study will be a model for all other municipal buildings in the next five year Capital Improvements Plan (CIP). Finally, fleet efficiencies will be further analyzed in 2010.

## **Narrative – Potential Renewable Feedstocks**

As the efforts to achieve the 25x25 goal continues, the Cities of Lancaster and Platteville will explore the many potential renewable feedstocks for the generation of energy. With a significant amount of agricultural industries in the region, biomass should be plentiful and a reliable source of renewable energy in the future, so long as local power plants are allowed to convert. Similarly, as the availability and reliability of biodiesel improves, both Cities will seek ways to incorporate it into vehicle fleets. Additionally, as the economic viability, or as grants become available, the use of solar panels and wind turbines to generate electricity will be explored.

Finally, both the Cities of Lancaster and Platteville support the efforts of Alliant Energy to establish a biomass plant in Cassville. Most, if not all, of the electricity both cities use is generated at the existing Cassville coal-fired plant. The Public Service Commission of Wisconsin should allow the biomass plant to be constructed so renewable energy can be used throughout the region.

## **Existing Unknowns – Necessary Information for Future**

The primary unknown force that will likely affect the future implementation of the 25x25 program is the state of the economy. In most instances, there are higher costs associated with implementing energy efficient strategies and, therefore, supplemental funding must be available to offset those higher costs. Will economic conditions over the next fifteen years provide enough resources to fund applicable grant programs at the state, federal, and private levels? Will local tax revenues be sufficient to maintain core services and implement energy independence strategies?

## **Action Steps – Immediate & Long - Term**

The Lancaster action steps to proceed on the Pathway to 25X25 include:

- Immediate
  - Receive EECBG award from the Office of Energy Independence
  - Implement grant-funded improvements
  - Purchase electric vehicle
- Long-term
  - Track energy use in 2010 and compare with 2009
  - Quantify savings based on use, price, weather conditions, etc.
  - Allocate money saved for energy efficiency improvements in 2011 budget

The Platteville action steps to proceed on the Pathway to 25X25 include;

- Immediate
  - Implement 2010 initiatives (caustic tank wrap, Municipal Building exterior improvements and lighting retrofits, HVAC/Fleet studies)
  - Track energy use in 2010 and compare to three year baseline
  - Evaluate payback scenarios
  - Pursue funding for further improvements
- Long-term
  - Develop energy guidelines and municipal building model for future CIP

## Energy Independence Team Members

### City of Platteville

- City Manager Dave Berner
- Howard Crowfoot, DPW Director
- Joe Carroll, City Planner

### City of Lancaster

- Mayor Jerry Wehrle
- City Administrator Stephen Crane
- Jerry Carroll, DPW Director
- ICMA Fellow

### UW-Platteville

- Kurt C. Rolle, Ph.D., P.E.
- Jeff Hoerning, Ph.D.
- Lynn Schlager, Ph.D., P.E.
- Justin Reeder, U.W.P. Intern
- The team members were selected to bring direct knowledge about the municipal buildings as well as the most current technical information about alternative energy.
- Members of the project team have been meeting on an individual basis for several months to prepare the final report. The full project team has also met regularly.

**Appendix: Baseline Energy Consumption Data – Spreadsheet**

Please direct any questions 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](mailto:brian.driscoll@wisconsin.gov)