



**2009**

**Wisconsin Energy Independent  
Community Partnership**

**25 x 25 Plan for Energy  
Independence**

**Report completed by:  
Greater Columbus Energy Task  
Force  
(Columbus Energy  
Independence Team)**

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**The Greater Columbus Energy Task Force reserves and requests the right to amend this report in early 2010.**

Wisconsin Office of Energy Independence

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## 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?**

All City of Columbus government buildings and functions that use/consume energy (electric, natural gas, diesel, gas) were measured to create an energy use baseline going forward. These included the Aquatic Center, Park Pavillion, Fire Station, Public Works Garage, City Hall, Senior Citizens Center, Library, Boy Scout Cabin, Park Garage, Cemetery Garage, Waste Water Treatment Plant, Water and Light Utility, and outdoor/street lights.

At the beginning, we believed all buildings and functions had a potential for energy conservation and efficiency.

### **Discoveries/Surprises**

What immediately surprised the Greater Columbus Energy Task Force was the high and low energy intensity levels of several buildings. It was particularly surprising to learn that the Columbus Library had an energy intensity of 9.5. After some fact finding, we learned this was due in large part to the exhaust fans running due to an ongoing mold problem.

Conversely, we were surprised that the Park Pavilion, a very large historic 100 year old wooden structure had one of the lower energy intensity levels at 2.46. This is due in part because of lower winter usage and less daily use, hour-wise, than other City buildings.

In addition, we discovered outdoor lighting (street lights) were 9% of total energy usage, higher than expected, and that fleet energy consumption was a relatively low 6% of energy consumption, lower than expected.

As the energy team reviewed bio-fuel options, we were surprised also that an anaerobic digester and bio-fuel furnace were not energy conservation and renewable fits for the wastewater treatment plant for size, area and economic reasons. In fact, the anaerobic digester would be a net energy use gain.

Lastly, we were surprised that bio-mass and bio-fuel applications for Columbus City buildings were not applicable because of small size, space limitations, or aesthetics.

### **Total Projects Considered**

After reviewing the current baseline of energy usage in the City of Columbus, the Greater Columbus Energy Task Force considered the following projects to achieve the 25x25 energy independence goals in our community LED Street Light Conversion:

- **Purchase Additional Renewable Electricity.** The City has already embarked on an aggressive pathway of purchasing renewable electric energy blocks. Increasing the current percentage of 16% to 38% in 2010, and 46% in 2011 will go a long way toward achieving the City's energy independence goal. Many advantages accrue to his strategy as outlined in the Pathways to 25x25 Section.
  
- **Solar Thermal/Pool Cover at Aquatic Center.**  
Because of the significant amount of energy used to heat the pool, solar thermal/pool cover would provide considerable energy savings and assist the City achieve its renewable energy goal.
  
- **Solar at New Police Administration Center.**  
The north/south orientation, coupled with its clean roof configuration, would seem to make the new Police Administration Building an ideal location to site a photovoltaic solar electric system.
  
- **Building Efficiency Improvements.**  
Columbus has already embarked on a series of energy conservation and efficiency projects. These include lighting efficiency projects for the existing Library, City Hall, municipal parking lot lighting. Planned lighting efficiency projects include the Public Works building and garages, the new Police Administration building, and the Community Center. All City buildings should be reviewed for future lighting and energy efficiencies to achieve maximum energy conservation before 2025.
  
- **Renewable/Energy Efficiencies in New Library Expansion (Solar).**  
The Columbus Public Library has very recently unveiled plans for a library expansion. Although no definitive timetable or plans have been developed, this project could offer a future opportunity to incorporate renewable and energy conservation features into the design.
  
- **Wastewater Treatment Plant Bio-fuel Energy Generation and Anaerobic Digester.**  
The City of Columbus is looking at upgrading its waste water treatment plant, including consolidation with the neighboring Village of Fall River, in the next several years. Included in the upgrades is consideration of a possible anaerobic digester and a bio-fuel powered furnace. Yard and leaf

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refuse from Columbus and neighboring communities would be the most likely source of bio-fuel.



Pathways to 25 x 25

The City of Columbus 25x25 Energy Independence Plan reaches the goal of a 25% reduction in non-renewable energy use by 2025 through a combination of energy conservation and efficiency projects and utilizing new sources of renewable energy, including renewable energy purchases. Taken together, this pathway reduces CO2 emissions by 3,629,086 pounds, or 38 percent, by 2025.

**Purchase Renewable Energy: 996,000 kWh saved**

Currently, the City of Columbus purchases 16% of its electricity in the form of renewable power blocks. This percentage is scheduled to increase to 38% in 2010. By increasing this renewable energy block purchase percentage to 46% (3320 blocks) by 2011, Columbus will reach its energy independence goal.

This approach offers several advantages. First, it leverages Columbus' relationship with its municipal electric wholesaler, WPPI Energy. Second, this will provide a powerful example and message to residential and business consumers that purchasing renewable power is advantageous. WPPI Energy has the technology, ability and resources to invest and develop future renewable energy generation facilities. The City of Columbus is not in the energy or renewable energy business.

**LED Street Light Conversion 2010/2012: 221,908 kWh saved**

The City of Columbus will convert 65% of its street lights to led in 2010, contingent on receiving a \$225,000 energy efficiency and conservation block grant. Once this first phase is completed, the City will convert the remaining 35% of the street lights to LED.

Wisconsin Renewable Energy Standard: 648 kWh saved

The current Wisconsin renewable energy standard of 10 percent, contained in current City of Columbus electric energy purchases will assist in our goal.

**Replace with 3 Solar Generation 2010-2011 and beyond: 36,800 kWh/1513 therms saved**

By installing a solar thermal system of 32 collectors, including a pool cover at the Columbus Aquatic Center, 1,513 therms are expected to be saved.

Installing an 8.4 kW solar generation system at the new Police Administration Building will generate an estimated 12,264 kWh per year.

Installing two more 8.4 kW solar generation systems at two separate buildings would generate an estimated 24,528 kWh per year. Possible locations for these could include the Library expansion, the Community Center, and a future Fire Station.

**Energy Efficiency and Conservation 2009-2010 and beyond: 48,000 kWh saved**

Columbus has embarked on a series of energy conservation and efficiency projects. These include lighting efficiency projects for the existing Library, City Hall, Columbus Water & Light building, and municipal parking lots lighting. Planned lighting efficiency projects include the Public Works building and garages, the new Police Administration building, and the Community Center. All City buildings should be reviewed for future lighting and energy efficiencies to achieve maximum energy conservation before 2025.

**NEV/Hybrid Conversion 2009: 422 gallons of unleaded gasoline saved**

The City of Columbus has purchased one flex-fuel police vehicle, one NEV truck for public works functions, and two general fleet electric-converted Prius's to replace gasoline powered vehicles. As technology advances, the City will consider purchasing additional hybrid, flex-fuel and NEV vehicles, as needed, to replace gasoline powered vehicles.

### Projects Selected – Explanation

The Greater Columbus Energy Task Force (GCETF) considered a number of energy sustainability projects. Our priorities are projects that will show strong energy sustainability leadership and provide a good return on investment. We are very conscious of spending energy money wisely.

#### **LED Street Light Conversion**

Our number one priority is a 100% LED street light conversion project in Columbus. We determined that there is an excellent return on investment for LED streetlights. The project shows leadership and is a project that is highly visible in our community and will encourage others to follow suit. The LED streetlight project will pay significant dividends in electricity saving and staffing costs. LED streetlights have substantially longer life expectancy and the cost of replacing light bulbs will be an ongoing cost saving. We are dependent on the EECB grant to fund 65% of the LED conversion.

The City budgets the remaining cost over the next few years and so the project is on track for initial conversion in 2010 with completion by 2012-13.

#### **Increasing Renewable Energy Block Purchases**

Our electricity comes from a municipally owned utility that is a member of WPPI. We identified WPPI renewable energy blocks as an ideal vehicle for a small city to purchase renewable electricity. WPPI invests in a diverse range of renewable resources. They manage the renewable energy sources and have technical and staff knowledge on these new technologies. Renewable electricity is available to Columbus citizens and industries.

The City of Columbus anticipates purchasing about 16% of municipal government electricity from renewable resources to meet our 25 by 2025 goal. Each year the City has increased its renewable commitment. Our first promotional campaign to Columbus residents resulted in a 49% increase in renewable energy blocks. We will continue to expand and encourage residential and industrial participation in renewable energy programs.

#### **Renewable Energy Generation and Building Efficiencies**

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The energy audit identified significant savings through the use of a solar blanket at the aquatic centers. We are working with our insurance carrier to understand the risk of covering a public pool, and will move forward on this project.

The City of Columbus is renovating an existing property for the police department; solar options are being investigated for this renovation project.

The energy audit showed many potential projects for improving efficiency of our city buildings. We are working to implement changes recommended to save energy.

Columbus has committed to taking a leadership role in energy initiatives. We passed a neighborhood electric vehicle ordinance, purchased an electric pick up truck for the Department of Public Works and have committed to providing electric plug ins in city parking lots.

Further investigation will be conducted to identify the viability of biomass or geothermal for the City Hall campus buildings. These are older buildings that have unique needs for heating and cooling and additional work.

As the Columbus Library is planning its expansion project, we will be considering a solar installation, and other energy saving measures in this project.

### **NEV/Hybrid Vehicle Conversion**

The City, in conjunction with Columbus Water & Light, has been progressively beginning to convert its fleet to renewable technology vehicles. This has included the purchase of a an NEV truck made by Columbia ParCar for public works functions, a flex-fuel (E-85) Police Car, and two PHEV-converted Prius's. The City expects to continue this trend of replacing gasoline vehicles with hybrid, flex-fuel, and NEV vehicles as technology advances to meet the City's future needs.

### **Energy Efficient Home Project**

In an effort to educate Columbus residents on the advantages of renewable energy and how they can incorporate energy conservation and renewable power in their homes, Columbus started the energy efficient home project. The goal to build 5-10 energy efficient homes in the city that save 25 percent in energy and have a renewable energy component would be a powerful public education and demonstration project.

### **Greater Columbus Energy Fair**

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~~Again, in an effort to educate Columbus citizens of the options available to save energy and generate renewable energy, an energy fair will serve as an excellent public education event.~~

### **Renewable Electric Public Education and Challenge**

To encourage the purchase and use of renewable power among Columbus citizens, the Columbus energy independence team is issuing a challenge to city residents. This ongoing challenge will begin with an open letter signed by each member of the energy independence team sent to Columbus Water & Light customers, urging them to consider purchasing renewable energy blocks.

Narrative – Potential Renewable Feedstocks

We believe that purchasing renewable energy blocks is an excellent way for a small municipality to support expansion of renewable energy alternatives.

Wind is not an option within the city at this time. We do not have a viable site for a windmill at this time. As the city grows this could become a more realistic option.

We are considering solar projects at the pool, the new police building, the Library expansion projects.

Biogas was discussed, but we determined that it is not a feasible option at this time. We have a local dairy farm, but the number of cows is much less than the size of herd needed to be a viable alternative (over 1,000 cows). We are looking into food waste from the schools, harvesting weeds from a nearby lake, and yard waste.

Hydro is not an option. Although we have a small river that runs through Columbus, numerous studies have shown that it is not a viable water flow for generating electricity.

Existing Unknowns – Necessary Information for Future

EECB Grant Monies that will be used to fund the LED street light conversion

Addressing energy conservation and efficiencies in historic buildings tha have individual unique needs.

Library expansion project timing, police building, other city building projects.

The fuure cost of renewable energy

The future advances in NEV technology.

Action Steps – Immediate & Long - Term

In order to implement the projects and pathway to achieve the 25x25 energy independence goal, the City of Columbus will need to take the following action steps:

Short Term

- Forward Columbus 25x25 Energy Independence Report to the Columbus Water & Light Commission and Columbus City Council for approval.
- Greater Columbus Energy Task Force
- Forward Aquatic Center recommendations, including solar thermal heating and pool cover, to the Columbus Aquatic Center Board for approval.
- Recommendation by the Greater Columbus Energy Task Force to the Columbus Water & Light Commission
- Develop and implement a LED street light action plan and schedule by Columbus Water & Light to begin LED street light conversion in 2010, contingent on receiving an energy efficiency and conservation block grant.
- File Public Service Commission letter for LED street light conversion
- Columbus Water & Light approval of 2012 Capital Budget project to borrow \$110,000 from WPP1 municipal borrowing fund to install remaining 35% of led street light fixtures.
- Selection of a solar generation project by the Greater Columbus Energy Task Force with preference given to siting it at the new Police Administration building.
- Meet with Library Board and River Architects to incorporate energy and renewable efficiencies in new library expansion.
- Budget and schedule completion of energy efficiency and lighting projects in Public Works Garage and Columbus Community Center.



~~Long Term~~

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- Annual review of 25x25 energy independence plan by the Greater Columbus Energy Task Force to implement recommendations, 2010-2025. Amend as needed.
- Approval by City Council to increase renewable energy block purchases to 46 percent.
- Meet with Columbus Historic Landmarks & Preservation Committee to address energy efficiencies in historic City buildings, including City Hall.
- Study and recommendation of installing second solar generation project
- Study and review of feasibility of a geo-thermal system to heat and cool City Hall campus

Energy Independence Team Members

Nancy Osterhaus – former Mayor, Chair. Nancy is a small business owner, president of the Columbus Main Street organization and has extensive business background.

Bob Link – Mayor. Bob is also a small business owner and life long resident of Columbus.

Eric Anthon – Assistant Superintendent Columbus Water & Light. Eric brings project management and leadership experience to the team.

Martin Day – community member and electric utility employee. Martin's work with in a private utility company brings another important perspective to our discussions.

Rob Goebel – Plant Manager, American Packaging Corporation. Rob takes a leadership energy savings role at our largest manufacturer. He has implemented many energy savings projects.

Curt Hanson – President Mid State Equipment. Mid State Equipment is the largest agricultural equipment dealership in the Midwest. Curt is interested and involved in saving and producing electricity.

Ed Harding – CEO, Columbus Community Hospital. Our local hospital is a major user of electricity within the city. Ed helps us remain focused on the ROI and viable projects.

Mark Jansen – Superintendent, Columbus School District. The schools provide a vehicle for education and awareness of energy savings initiatives.

Al Stroschein, Chair, Columbus Water & Light Commission. Al has a private law firm in Columbus and brings expertise in energy matters as a member of the WPPI Energy Board of Directors.

Advisors – Steve Sobiek, Economic Development and Energy Sustainability Director, Jim Schieble – Energy Services Representative.

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

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Please direct any questions electronically to:

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