

**2009 Innovations Awards Program**  
**APPLICATION**

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ID # (assigned by CSG): 09-MW-05MI

**Please provide the following information, adding space as necessary:**

State: Michigan

Assign Program Category (applicant): Natural Resources – Energy (Use list at end of application)

**1. Program Name**

State of Michigan-Bay Region Office Light Emitting Diodes (LEDs) Conversion Program

**2. Administering Agency**

Michigan Department of Transportation

**3. Contact Person (Name and Title)**

Tony Kratofil, Bay Region Engineer

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**8. Web site Address**

None

**9. Please provide a two-sentence description of the program.**

This project is an organized approach to rapidly installing LED retro-fit kits at traffic signal locations in the MDOT Bay Region (Arenac, Bay, Clare, Huron, Isabella, Genesee, Gladwin, Gratiot, Midland, Sanilac, and Tuscola Counties). The program also re-invented the process by which MDOT Bay Region pays utility bills, thereby ensuring we capture the cost savings from reduced energy use.

**10. How long has this program been operational (month and year)? Note: the program must be between 9 months and 5 years old on March 2, 2009 to be considered.**

The project planning began in March 2007, and the first LED retro-fit was installed in October 2007.

**11. Why was the program created? What problem[s] or issue[s] was it designed to address?**

Like many government agencies, the Michigan Department of Transportation (MDOT) is faced with stagnant budgets and increasing costs. The quality of MDOT's highway maintenance program is impacted by reduced budgets. As staff explored alternatives to reducing costs, and LED technology improved in recent years, it became evident that conversion of traffic signal lamps to LED's was a good opportunity to save both energy and money. This program was envisioned as an operations strategy to reduce costs, and to put additional maintenance dollars on the road. An implementation plan was developed for all Bay Region traffic signals not otherwise scheduled to be modernized in the five year capital investment plan. A funding strategy was developed for both purchasing and installing LED retrofit kits. The funding strategy was largely based on return on investment and safety.

Currently, in most instances, MDOT does not pay the bills for signal energy costs directly. MDOT has contracts and cost agreements with counties and cities for them to perform maintenance and manage the operations of the state trunkline system within their jurisdiction. We reimburse the local units of government for our portion of the signal energy on the state trunkline system. Consequently, there is a variety of arrangements throughout the region on how signal energy use is recorded and paid for, and for this plan to be successful, coordination with all the local units of government and a streamlining of the billing process would be necessary.

The LED conversion plan was presented to the local agencies, and MDOT asked for their support in auditing utility bills and installation partnerships. Communication with the utility companies ensured that the wattage amounts were updated, and MDOT was billed properly.

In additional, it was difficult, if not impossible, to match utility bills with MDOT's traffic signal inventory. There is not a clear linkage with the inventory of signals and the billings, since most signals are not metered like a house. Typically there is an agreed upon rate of usage with the utility company, which often times is many years old. This would make it virtually impossible to verify if the utility companies have updated the wattage amounts after the LED retro-fit had been installed.

**12. Describe the specific activities and operations of the program in chronological order.**

MDOT approached this problem considering the many internal and external customers which would need to be approached to make this project a success. First, MDOT Bay Region approached internal customers, and held meetings with MDOT statewide partners to review our proposals and seek advice on the feasibility of our program.

After the scope of the project was approved, a budget needed to be developed. The budget was developed using a cost benefit analysis. The cost benefit analysis was presented to Bay Region MDOT management, and an annual budget was requested. Through careful analysis

of the region total annual operating budget, portions of the budget that were currently underutilized were identified to fund this program,

Upon approval of an annual budget, MDOT sought support from local agency partners who participate in the cost of MDOT owned traffic signals. MDOT requested that local agency partners, who currently pay the traffic signal energy costs locate the paper bills for each of the traffic signals on MDOT's inventory list. A majority of the traffic signals are unmetered, and verification of costs is very important to realize the budget savings of this program.

The Bay Region traffic signal energy unit developed an implementation process which involved installing the LED retro fit kits county by county. The unit ordered the LED retro fit kits, used existing electrician staff and equipment to complete the installations. This proactive approach to installing LED retro fit kits also resulted in a reduction in trouble calls.

MDOT then developed a new billing process in which MDOT now was the agency responsible for paying the utility bills. Previously, there were several different billing procedures. Originally, there was no link between MDOT's signal inventory and the utility company's billing process. MDOT contacted the utility companies, and requested that one account number be established for each county, and all MDOT owned traffic signals located in that county be placed under the one account number. MDOT then verified the wattages for each of those signals, and updated those which LED retro-fits were installed.

Following the installation of the LED retro fit kits and the verification of wattage and billing amounts, the accounts were established using an electronic invoice. The traffic signals are unmetered and the monthly wattage does not fluctuate, therefore, the monthly costs of those meters should not vary. The electronic invoice process allows for automatic payment of traffic signal energy costs, and if the established cost varies, the electronic payment will be rejected and MDOT can review the discrepancy. MDOT would then bill local agencies its share of the signal energy costs using the electronic invoice information.

### **13. Why is the program a new and creative approach or method?**

With reduced sources of revenue, increasing costs, and the impacts of climate change, government agencies need to immediately embrace technologies which will reduce costs and improve the environment. This program developed a new and creative operational and financial approach to installing LED Retro-fits.

This project is innovative in that it required intense cooperation and coordination with MDOT staff, local government agency staff and utility companies. This project has been successful, and that success can be measured in dollars which can be used to improve the conditions of our roadways, and the quality of life of our citizens. This project provided improvements at no additional costs by developing a funding strategy which incorporates return on investment. This will improve customer satisfaction by providing better roads with no additions to the budget, and employee satisfaction by being part of a successful project. Furthermore, this project improves customer satisfaction, because it provides not only a measurable economic benefit, but an environmental benefit.

The measurable benefits of the program; include significantly reduced energy consumption and costs, and the elimination county overhead charges for being the billing agent for MDOT.

Additional benefits of the program include an improved environment through reduced energy consumption, the ability to track utility costs to a MDOT traffic signal, reduced trouble calls for electricians, and improved safety for motorist and MDOT personnel.

**14. What were the program's start-up costs? (Provide details about specific purchases for this program, staffing needs and other financial expenditures, as well as existing materials, technology and staff already in place.)**

The only initial costs were the staff time needed to get this project off and running. Initially, it had to be determined which signals would benefit most from being retrofit and then an installation schedule was put together. Quantities were then determined, bid requests were submitted for non-contract items, and the materials were ordered.

The work for this entire project is being completed with current staff.

MDOT maintains a database for traffic signals, and it was updated to add a column to contain utility company information to link the bill and the signal.

**15. What are the program's annual operational costs?**

This project does not have annual operational costs. The one time initial cost is estimated to be \$952,682 to install LED retro fit kits in the Bay Region (Arenac, Bay, Clare, Huron, Isabella, Genesee, Gladwin, Gratiot, Midland, Sanilac, and Tuscola Counties). MDOT and its local partners pay approximately \$483,000 for traffic signal energy. This project expects to reduce that amount by nearly 90%, and therefore would save approximately \$385,000 a year. This project has a three year return on investment schedule.

The State wide estimate for materials to retrofit nearly 1000 traffic signals and over 200 flashers statewide is \$5 million. The annual energy savings from retrofitting these devices would be approximately \$1.5 million. Therefore, in approximately 3.33 years the material costs have been recovered. This program also saves money in maintenance, because LEDs have a longer life span than incandescent bulbs. There is a significant environmental savings by reducing the State's traffic signal energy consumption by up to 90%.

**16. How is the program funded?**

The installation for the LED retro-fits is performed during MDOT electricians regular work hours and during mandatory annual inspections. Therefore, there are minimal additional costs to installing LED retro-fit kits. No additional equipment, besides the LED retro-fits, was purchased for this program.

The LED retro-fit kits are funded from State Restricted Dollars allocated for Traffic and Safety Overhead. The LED retro-fit kits are not funded from Routine Maintenance Budgets, however the cost savings associated with the energy savings will benefit the Routine Maintenance Budget.

**17. Did this program require the passage of legislation, executive order or regulations? If YES, please indicate the citation number.**

No legislation was required.

**18. What equipment, technology and software are used to operate and administer this program?**

While improvements in software may further streamline the billing and tracking process, none were necessary for implementation of this project. Current databases were used to manually link the Utility Companies billings to MDOT's traffic signal inventory database. This allowed MDOT to track the costs of each signal, and determine the savings from installing LED technology.

**19. To the best of your knowledge, did this program originate in your state? If YES, please indicate the innovator's name, present address, telephone number and e-mail address.**

LEDs are gaining momentum on a nation wide basis, however, a strategic approach to implementing the program and tracking the dollars which will be saved is what makes this program unique.

**20. Are you aware of similar programs in other states? If YES, which ones and how does this program differ?**

No.

**21. Has the program been fully implemented? If NO, what actions remain to be taken?**

LEDs have been installed in several Michigan Counties. Based on the success of this program in one region of the state, MDOT intends to implement this program throughout the rest of the state.

**22. Briefly evaluate (pro and con) the program's effectiveness in addressing the defined problem[s] or issue[s]. Provide tangible examples.**

This project saves money, and is expected to make a full return on investment within two years, at which time it will begin saving MDOT money. The Bay Region expects to save approximately \$200,000 a year by implementing the LED program just in Bay Region, and an additional \$185,000 for MDOT's local partners who share in traffic signal energy costs.. The major advantage to this program is that the return on investment can be calculated. This project helps solve the problem of shrinking maintenance dollars for three reasons. First, no maintenance dollars were used to purchase the LED retrofits, and maintenance receives the benefit of reduced utility costs. Second, LEDs do not require the maintenance of incandescent bulbs, and less salary and equipment costs will be expended on traffic signals. This also reduces time and materials expended on trouble calls related to traffic signals. Third, electricians will not be required to replace the bulbs as frequently which reduced maintenance costs and improves safety.

**23. How has the program grown and/or changed since its inception?**

This project's scope was originally defined as 11 Counties in the Saginaw Bay Area. The project has grown to a Statewide Initiative. The installation has progressed faster than originally expected.

**24. What limitations or obstacles might other states expect to encounter if they attempt to adopt this program?**

Developing funding strategies can be a limitation to implementing this project.

## **2009 Innovations Awards Program Program Categories and Subcategories**

Use these as guidelines to determine the appropriate *Program Category* for your state's submission and list that program category on page one of this application. Choose only one.

### *Infrastructure and Economic Development*

- Business/Commerce
- Economic Development
- Transportation

### *Government Operations*

- Administration
- Elections
- Public Information
- Revenue

### *Health & Human Services*

- Aging
- Children & Families
- Health Services
- Housing
- Human Services

### *Human Resources/Education*

- Education
- Labor
- Management
- Personnel
- Training and Development
- Workforce Development

### *Natural Resources*

- Agriculture
- Energy
- Environment
- Environmental Protection
- Natural Resources
- Parks & Recreation
- Water Resources

### *Public Safety/Corrections*

- Corrections
- Courts
- Criminal Justice
- Drugs
- Emergency Management
- Public Safety