2011 BETTER GOVERNMENT COMPETITION

City of Boston

1. Program Name:

LED Streetlight Replacement

2. Administering Agency(if applicable):

Office of Environmental and Energy Services and the Department of Public Works

3. Contact Person (Name & Title):

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7. Please provide a brief overview of the issue at hand, the problem that the proposal addresses, including relevant background information on its nature and scope. **Suggested length**: up to up to ¾ page.

The City of Boston (City) has 64,000 electric streetlights, with an annual energy usage of 65 million kWh and a cost of around $7 million. The Public Works Department (PWD) includes a Streetlighting Division, which maintains and replaces streetlights throughout Boston.

As of Fall 2010, Boston's streetlight fixture stock included 42,000 mercury vapor (MV) streetlights and 22,000 high pressure sodium (HPS) fixtures, which are 25% more efficient. A large number of MV fixtures were acquired from NStar in 2000. The City has been looking for options to replace all MV fixtures with the more efficient HPS fixtures.

In 2009, the Office of Environmental and Energy Services (EES) and DPW began looking into the potential of new lamp technology—light-emitting diodes (LED)—to make further efficiency improvements—and began planning a pilot in the Boston Common, using fixtures loaned by manufacturers. In spring 2010, NStar approached the City to replace all of the MV fixtures with HPS as part of meeting the new energy efficiency goals. The City proposed bypassing HPS and going straight to LED fixtures. NStar was hesitant to agree because of the high cost and the uncertainty of wide-scale adoption of a new technology.

At this point, EES and PWD decided to conduct a more in-depth analysis and some LED pilot projects before re-engaging with the utility's offer.

8. An explanation of the proposed/effective solutions and how it would, or has, changed current practice. Detail the way the problem was, or is, proposed to be addressed. If applicable, cite examples of similar approaches in place elsewhere around the United States. **Suggested length**: ¾ page.

In 2009, EES and DPW began investigating the possibility of LED fixture installations in Boston separate from the NStar offer. The first pilot project, in October 2009, featured the temporary installation of "acorn" style streetlamps, 3 prototypes from 6 different companies, along the "Mayor's Walk" in the Boston Common. The second pilot program installed 20 "cobrahead" streetlights in a municipal parking lot in Jamaica Plain. The lot had its own meter to track energy use. Almost all of the City's MV fixtures are cobraheads,

The pilot projects tested the performance and reliability of LEDs in Boston's weather. Signs posted at pilot locations solicited community input via an online survey and a Twitter feed.

Because of NStar's concerns about LEDs, it was important to present a clear financial argument. Initial figures from NStar cited costs of $600 per LED fixture and a life expectancy of 50,000 hours. EES and PWD analyzed life cycle costs with input from manufacturers and technical assistance from good-government organizations. Casting a broader net and with the new technologies coming on the market, prices had dropped to $300 a fixture and life expectancy risen to at least 70,000 hours.

Persuaded by the new data, NStar agreed to fund LED fixtures instead of HPS fixtures. In October 2010, the City and NStar signed an agreement which provided an incentive to the City to purchase and install MV fixtures by the end of the calendar year. The City's RFP process brought in the first LED fixtures under the expected price. Delivery started around Dec 1, 2010, and, by the end of 2010, over 2,600 LED fixtures had been installed. Based on the success of this initial installation the City has negotiated a renewed incentive arrangement and aims to install at least 15,000 lights in 2011.

Longer life expectancy of LED fixtures, about 4 to 5 times longer than MV, reduces the labor cost by around $250 per fixture over its life.

Benefits for LEDs compared to MVs

- Up to a 60% reduction in wattage demand, with no decrease in luminosity
- Longer life expectancy (70,000 hours compared to 20,000 hours)
- Decreased maintenance costs

9. What were the start-up costs associated with the program or policy? Or, if the submission is an "idea," describe the projected start-up costs. **Suggested length**: ¾ page.

EES and DPW Streetlight Division dedicated significant staff time to research and analyze LED technology and the life cycle costs, plan the pilot projects, and carry out procurement of fixtures and installation services.

LED manufactures loaned 18 fixtures for the installation in the Mayor's Walk on Boston Common. For the pilot in Jamaica Plain, the City was donated 20 cobrahead streetlights.

10. How is the program or policy funded, or how will it be funded? **Suggested length**: up to ½ page.

Purchase of the LED fixtures is funded almost entirely by the state-mandated energy-efficiency program administered by NStar. Program funds come from the energy efficiency system benefits charge and the state's participation in the Regional Greenhouse Gas Initiative. The MOU sign by the City and NStar increases the per-fixture funding as the number of installed fixtures increases.

The City is paying installation costs out of its capital budget. Through good government practices, the City has been able to keep installation costs down. For the December 2010 installations, PWD used private contractors and City workers to maximize installations and meet an NStar funding deadline. This also allowed PWD to compare costs and effectiveness for actual work completed: installation and oversight costs for installations performed by the private contractor cost in at $45.21/fixture. PWD workers at $37.92/fixture. For 2011, DPW renegotiated its contract costs; due to operational efficiencies by City workers, signed an MOU for $36.44/fixture.

With this support from NStar, the City's cost share for labor and materials has an expected payback of less than 1 year.

11. Describe the positive outcomes generated by the program or policy, or the projected outcomes from the idea submitted. **Suggested length**: up to ¾ page.

The City of Boston and NStar's groundbreaking agreement on funding LED streetlights replacement will lead to municipalities across the state receiving funding for similar projects.

LED streetlights offer many advantages over standard mercury vapor streetlights, including:

- Up to a 60% reduction in wattage demand, with no decrease in luminosity
- Operating savings of more than $400k annually for conversions already complete (3,800 fixtures); and more than $2M annual savings for planned scope of work (19,000 fixtures)
- Friendlier, more integrated light for residential areas thanks to the directional lighting potential and absence of "hot spots"
- Brighter, star-filled skies for Bostonians thanks to a drastic reduction in light pollution and light trespass.
- Longer life expectancy (70,000 hours vs. 20,000 hours) leading to decreased maintenance costs

The efficiency of LEDs will reduce the City's annual electricity consumption by more than 15 million kWh in savings and its annual emission of greenhouse gases by more than 7,000 metric tons.

12. Will/Did the program or policy require the passage of legislation, executive order or regulations? If yes, please cite:

No, but it did require altering "business as usual" for the largest utility in Massachusetts,

13. If applicable, how has the program or policy expanded or changed since its inception? **Suggested length**: up to ¾ page.

Since installation, the City has been contacted by a number of Massachusetts municipalities to learn about how we implemented the agreement with NStar and how our departments worked together to run the pilots and do the analysis.

The City is now looking into the feasibility of replacing the HSP with the next generation of LED fixtures.

14. Does Massachusetts face the same problem addressed in this proposal? If you entry describes a program or policy already in place in Massachusetts, please provide additional relevant detail about current practices.(Pioneer Institute staff will assist if necessary) **Suggested length**: up to ¾ page.

The City of Boston and NStar have reached an agreement on funding LEDs for municipal streetlight replacement. This is a groundbreaking shift in utility practice. The program's

success will result in more of the Commonwealth's municipalities' receiving funding for LED projects.

15. What are your future goals? **Suggested length**: up to ½ page.

The goal of Boston's streetlight program is to replace all 64,000 streetlights with LEDs over the next 8-10 years.

Streetlights account for 17% of the GHG emissions from Boston municipal operations. Mayor Menino has committed to reducing the City's emissions 25% by 2020. The installation of LEDs in all of Boston's electric streetlights would reduce their emissions by 50%.

Add space to this form, as appropriate.

When complete, return to:
Better Government Competition 2011
Pioneer Institute for Public Policy Research
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For further information regarding the Better Government Competition and Pioneer Institute, please visit our website @ www.pioneerinstitute.org.

All questions regarding the competition should be directed to Shawni Littlehale @ 617-723-2277 x 207 or to slittlehale@pioneerinstitute.org.

DEADLINE: All applications must be postmarked or e-mailed by Monday, April 4th @ 4:30 PM EST, to be considered for a 2011 Better Government Competition award.