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June 30, 2009

Mayor Matthew Ryan  
Members of the City Council  
City of Binghamton  
38 Hawley Street, 4<sup>th</sup> Floor  
Binghamton, NY 13901

Report Number: P4-9-27

Dear Mayor Ryan and Members of City Council:

A top priority of the Office of the State Comptroller is to help local government officials manage government their resources efficiently and effectively and, by so doing, provide accountability for tax dollars spent to support government operations. The Comptroller oversees the fiscal affairs of local governments statewide, as well as compliance with relevant statutes and observance of good business practices. This fiscal oversight is accomplished, in part, through our audits, which identify opportunities for improving operations and Board governance. Audits also can identify strategies to reduce costs and to strengthen controls intended to safeguard local government assets.

In accordance with these goals, we are conducting an audit of four municipalities in the Binghamton region to determine if local municipalities can have a positive impact on the environment and public safety, and realize cost savings by using light emitting diodes<sup>1</sup> (LED) for traffic signals. We included the City of Binghamton in this audit. Within the scope of this audit, we conducted interviews with employees to gain an understanding of traffic signal use and maintenance. Our audit period was January 1, 2006 to July 31, 2008, and we also examined the City's electricity bills and other documentation related to replacing the City's incandescent traffic signals with LEDs from 1997 through 2007.

This report of examination letter contains our findings specific to the City. We discussed the findings with City officials and considered their comments in preparing this report. The City's response is attached to this report in Appendix A. At the completion of our

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<sup>1</sup> Light emitting diode, or LED, traffic signals are an energy-efficient alternative to commonly used incandescent bulbs. Where incandescent bulbs use one large bulb, LED traffic signal lights are composed of hundreds of LEDs that from a distance appear as a single continuous light source.

audit of the four municipalities, we prepared a global report that summarizes the significant issues we identified at all of the municipalities audited.

## **Summary of Findings**

City officials replaced all of their incandescent traffic signal bulbs with LEDs in 2002, which saved the City a significant amount of resources. Electrical expenditures for traffic signals were over \$85,000 in 2001, the year prior to replacing incandescent signals with LEDs. The City reported 2007 traffic lighting electrical cost of \$42,600. This represents a savings of approximately 50 percent since City officials replaced the incandescent lights with LEDs.

## **Background and Methodology**

Incandescent bulbs have long been used to illuminate traffic signals. Traffic signals act as an integral part of smooth day-to-day operations within all municipalities. Signals operate 24 hours a day, 7 days a week and amount to an annual operating cycle of 8,760 hours. Opportunity exists for substantial cost savings if these devices could operate more efficiently. Recently, municipalities started to move from the traditional incandescent bulbs to LEDs.

Recent technological advances have catapulted LEDs into the forefront of efficient traffic signal devices. LED technology gained popularity in many municipalities' traffic signals because of their energy efficiency. This type of bulb has quickly become an area for reduced electric use and cost savings. Approximately 52 percent of the traffic signal market has already moved to LEDs, with red and green signals having the deepest market penetration at 65 and 59 percent, respectively.<sup>2</sup> Yellow traffic signals have yet to experience the same adoption because they remain illuminated for only a fraction of the time.

In 2008, the U.S. Department of Energy commissioned a study<sup>3</sup> to determine the effects of using energy saving LEDs in traffic signal applications. This study disclosed that municipalities who replaced their incandescent traffic signals with LED bulbs produced immense cost savings. Another study conducted by the New York State Energy and Research Development Authority (NYSERDA) concluded that replacing incandescent bulbs with LEDs could result in estimated energy savings of 90 percent on average for traffic signals.<sup>4</sup>

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<sup>2</sup> U.S. Department of Energy savings estimates

<sup>3</sup> Navigant Consulting, Inc. prepared a report for the U. S. Department of Energy.

<sup>4</sup> NYSERDA Energy Smart Pamphlet available at:

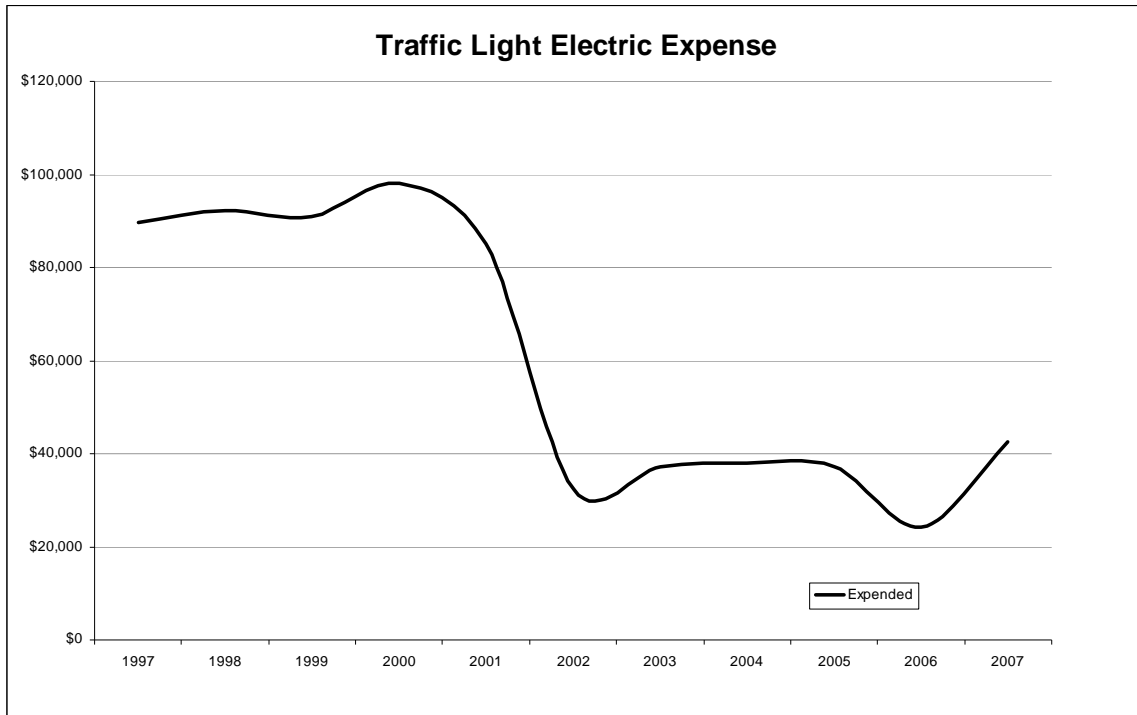
<http://www.lrc.rpi.edu/programs/transportation/LED/pdf/NYSLEDBrochure.pdf>

We interviewed appropriate City officials and compiled information on the replacement of the traffic lighting. We reviewed 10 years of traffic signal expenditures and documented the costs before and after the replacement with LEDs.

We conducted our audit in accordance with generally accepted government auditing standards (GAGAS). Such standards require that we plan and conduct our audit to adequately assess those City operations within our audit scope. Further, those standards require that we understand the City's management controls and those laws, rules and regulations that are relevant to the City's operations included in our scope. An audit includes examining, on a test basis, evidence supporting transactions recorded in the accounting and operating records and applying such other auditing procedures, as we consider necessary in the circumstances. We believe that our audit provides a reasonable basis for our findings, conclusions and recommendations contained in this report.

### **Audit Results**

We applaud City officials for their forward thinking. In an effort to better control the rising costs of traffic lighting, your City replaced the incandescent bulbs typically used in traffic lighting to the more energy efficient LEDs. The replacement became a tremendous cost savings for City taxpayers. Since then, your traffic lighting expenditures have fallen approximately 50 percent as of the fiscal year ended 2007. Expenditures for traffic signals were over \$85,000 in 2001, the year prior to purchase. The City reported 2007 traffic lighting cost of \$42,600. The City's traffic light electrical expenditures for the last ten years are presented below:



In addition to the cost savings from reduced electric consumption, the City is also realizing a reduction in labor costs incurred to maintain the traffic signals. Typically, an incandescent light bulb lasts for less than one year,<sup>5</sup> therefore each bulb needs to be replaced annually. In contrast, an LED bulb's useful life is more than five times longer than an incandescent bulb, which means that the City saved approximately four years of labor cost, since they replaced their incandescent bulbs with LEDs. The City's average maintenance cost savings totaled over \$3,000 annually, or over \$15,000 over five years.

Our office is available to assist you upon request. If you have any further questions, please contact Patrick Carbone at (607) 721-8306.

Sincerely,

Steven J. Hancox  
Deputy Comptroller  
Office of the State Comptroller  
Division of Local Government  
and School Accountability

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<sup>5</sup> Typically, an incandescent bulb can last for 8,000 hours while an LED bulb lasts for 50,000 hours.

**APPENDIX A**  
**RESPONSE FROM CITY OFFICIALS**

The City officials' response to this audit can be found on the following page.



## DEPARTMENT OF PUBLIC WORKS

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Matthew T. Ryan, Mayor

Thomas F. Costello  
Deputy Commissioner  
38 Hawley Street  
Binghamton, NY 13901  
March 30, 2009

Patrick Carbone, Chief Examiner  
Office of the State Comptroller  
State Office Building, Room 1702  
44 Hawley Street  
Binghamton, New York 13901-4417

Dear Mr. Carbone:

Thank you for including the City of Binghamton in your recent audit, which helped identify opportunities for improving operations and identifying strategies to reduce costs by replacing the City's incandescent traffic signals bulbs with LED's.

From the information you provided, the City of Binghamton is pleased to note, the cost savings and other positive effects the LED replacement has had on our environment.

Again, thank you for including the City of Binghamton in your recent audit and providing us with your findings. We look forward to working with you in the future and have no further information to add.

Sincerely,

Thomas F. Costello  
Deputy Commissioner of Public Works