

COMMITTEE OF THE WHOLE - JUNE 14, 2011

NATIONAL DEMONSTRATION PROJECT UPDATE STREET LIGHT DIMMING – PILOT PROJECT WARD 1

Recommendation

The Commissioner of Engineering and Public Works recommends that this report be received for information.

Contribution to Sustainability

Savings in electricity usage would not only result in decreased operating costs to the city, but it would also have a broader impact on electrical demand in general.

Economic Impact

There are no economic impacts associated with the recommendations of this report.

Communications Plan

As part of the National Demonstration Project, an on-line survey was created on the City's web site for residents to provide feed back on the project. The results are included in the report.

The final technical report has been forwarded to Natural Resources Canada and Streetlight Intelligence Inc. of Victoria, British Columbia, for their review and comments.

Purpose

To update Council on the National Demonstration Project undertaken by Public Works, in partnership with Natural Resources Canada and Streetlight Intelligence Inc., to review the impacts of remotely dimming street light levels to reduce energy consumption.

Background - Analysis and Options

In the fall of 2010, the City of Vaughan teamed with Natural Resources Canada, and Streetlight Intelligence Inc. of Victoria, British Columbia, to take part in a National Demonstration Project for adaptive roadway lighting. The pilot project was to determine the energy saving from reducing the lighting levels remotely via the internet on a portion of the City's street light system.

A total of 10 specially modified streetlights were installed on McNaughton Road (west), and the necessary software was installed on staff's computers. As part of the project arrangements, the 10 light fixtures, the controller, and the computer software, were all supplied to the City at no cost.

Public Works staff reduced the lighting levels incrementally from October 4, 2010 to November 30, 2010, and recorded the energy savings. The lighting levels were reduced, starting at approximately 7:30 p.m., and remained at a reduced level throughout the evening. In addition to determining the energy savings, this technology also remotely informed staff if any of the lights were malfunctioning.

Each of the test lights was monitored for energy use and controlled via the internet. Staff could remotely increase or decrease the amount of power to the lights at any time. As part of this project, the City was interested in evaluating any difference in lighting levels on the road while applying the different dimming levels.

The Lumen IQ Software was used for applying different on/off and dimming schedules for the 10 new lights.

The server, which operated the software and the ten street lights, was based in British Columbia. In order to set up the project, the relevant GIS coordinates of the 10 lights had to be determined and forwarded to Streetlight Intelligence Inc. to plot the locations on the software. Each set of 10 street lights is controlled by a Lumen IQ Station Box. The controller requires a 120V power feed and must be mounted high enough on the street light pole to eliminate the interference of signal transmission to the lights.

Findings:

During the observation period, staff indicated that there was no noticeable visual impact up to 70% dimming light on the road. Starting from 60% dimming level, the difference on the street was noticeable when comparing the dimmed section to normal streetlight lighting levels.

As part of the project, an on-line survey was set up on the City's web site to capture residents' comments about the project. The comments ranged from seeing no difference, to the road being too dark. Concerns about public and pedestrian safety were raised, with people not being in favour of reduced lighting levels for those reasons. Others saw this as a good way to save energy

The Lumen IQ software allows the user to generate the energy usage report such that the City can reveal how much energy has been saved and/or used by dimming the street lights. Using the values generated by the software, and using the electricity prices provide by PowerStream, the following table shows the electricity savings per light based on the different lighting levels:

Period	Lighting Level	Amount of Energy Savings per Street Light
Oct. 4 - 25	100 %	N/A
Oct. 27 – Nov. 2	90%	\$ 0.03519/week
Nov. 3 - 9	80%	\$ 0.07734/week
Nov. 10 - 16	70%	\$ 0.1131/week
Nov. 17 - 23	60%	\$ 0.1547/week
Nov. 24 - 30	50%	\$ 0.1547/week

The City has variety of lighting types, including, coach style, shoe box, cobra head, and others. The technology tested currently only applies to cobra head style lights. There are approximately 6,135 cobra head lights currently in place across the City. The following shows the capital costs necessary to convert those lights.

	Price	Quantity	Total
Lumen IQ Controllers	\$ 250.00	6,135	\$ 1,533,750.00
Lumen IQ Stations	\$ 2,500.00	*38	\$ 95,000.00
Lumen IQ Commander	\$ 5,000.00	1	\$ 5,000
Lumen IQ Software	\$ 2,500 (annually)	1	\$ 2,500.00
Lumen IQ	\$ 15.00 (monthly)	12	\$ 180.00

Station Wan			
		Subtotal =	\$ 1,636,430.00
Labour Cost to retrofit each light	\$ 231.00	6,135	\$ 1,417,185.00
		Total =	\$ 3,053,615.00

* Estimated Lumen IQ stations for each block

Taking the energy savings into account, and comparing them to the capital costs to implement the system across the City, it was determined that at 50% lighting levels, the payback period would be 48.2 years. Although this calculation assumes the lighting levels could be dimmed to 50% on an ongoing basis, this would not be a reasonable lighting level for City streets due to liability and safety concerns. As such, the actual payback period would be longer.

In looking for a more reasonable payback period of 10 years, it was calculated that electricity costs would need to increase 17% annually to meet the 10 year time frame. Again, this calculation was at the lighting levels being at 50% of the current level, which is not something that would be recommended.

Although the main focus of the project was to determine energy/cost savings, the technology does have other benefits that are hard to quantify their value. For example, the system will automatically report back non-functioning street lights. This feature would reduce residents' complaints, and improve repair times. The manufacturer also indicated that the system could be integrated with a 911 emergency dispatch system so that the nearest street light could be made to flash on and off to better identify where police, fire and ambulance need to respond to. Even taking these added benefits into consideration, it is hard to justify the implementation of this type of system at this time due to the capital costs and payback period.

Staff have had conversations with Streetlight Intelligence Inc. about the capital costs and payback periods, and Streetlight Intelligence Inc. have indicated that they are working on reducing their costs to make the system more economical. Staff will keep in touch with the Streetlight Intelligence Inc. representative, and should changes be brought forward that would make this type of system more economically feasible, updated reports will be presented to Council.

Relationship to Vaughan Vision 2020/Strategic Plan

This report is consistent with the priorities previously set by Council and ties into the following Vaughan Vision 20/20 Goals and Objectives:

- Goal: Service Excellence
- Objective: Lead and Promote Environmental Sustainability

- Goal: Management Excellence
- Objective: Enhance Productivity, Cost Effectiveness and Innovation

Regional Implications

N/A

Conclusion

The technology does exist that would allow staff to remotely reduce street lighting levels to achieve energy savings on a large scale basis. Unfortunately, at this time, the capital costs to implement this type of system are considerable, and the payback period is too great to move ahead with implementing this technology in the City.

Staff will continue to follow up with the supplier, and should changes be brought forward that would make this type of system more economically feasible, updated reports will be presented to Council.

Attachments

N/A

Report prepared by:

Brian T. Anthony, Director of Public Works
Shawn McKenzie, Senior Engineering Assistant
Tak Yin Chan, Environmental & Technical Assistant

Respectfully submitted,

Bill Robinson, P. Eng
Commissioner of Engineering and Public Works

Brian T. Anthony, CRS-S, C. Tech
Director of Public Works