

Request for Decision

LED Streetlight Conversions

Presented To: Operations Committee

Presented: Tuesday, Feb 03, 2015

Report Date Wednesday, Jan 28, 2015

Type: Presentations

Recommendation

That authority be provided to the General Manager of Infrastructure Services to complete retrofits of all C.G.S. streetlights, subject to a positive business case, as outlined in the report from the General Manager of Infrastructure Services dated January 28, 2015 and that;

It is a multi-year program with locations determined by the General Manager of Infrastructure Services and that;

Preliminary estimates to Finance this project in the amounts of \$4 million in 2015, \$2 million in 2016, and \$2 million in 2017 be provided from the Capital Financing Reserve Fund- Roads and that;

Savings from the project be credited back to the Capital Financing Reserve Fund – Roads until the capital investment has been reached and that;

The General Manager of Infrastructure Services be provided the authority to maximize the available per fixture grant in 2015 and that;

Procurement of the contract is to include design, supply and installation of LED fixtures in accordance with the City's Roadway Lighting Policy and Pedestrian Lighting Standards and that;

Staff report back to Operations Committee annually on the progress of the LED Streetlight conversion program.

Finance Implications

If approved, funding for this project is provided for in the 2015 Capital Budget and 2016-2017 outlook. Annual funding allotments will drawn from the Capital Financing Reserve Fund - Roads. The balance in this reserve fund as of December 31, 2014 is \$10 million. Approval of this initiative commits \$8 million from this reserve fund. Savings generated will be used to pay back the reserve fund until the entire amount is repaid.

Signed By

Report Prepared By

Shawn Turner
Manager of Financial & Support
Services

Digitally Signed Jan 28, 15

Division Review

David Shelsted
Director of Roads & Transportation
Services

Digitally Signed Jan 28, 15

Recommended by the Department

Tony Cecutti
General Manager of Infrastructure
Services

Digitally Signed Jan 28, 15

Recommended by the C.A.O.

Doug Nadorozny
Chief Administrative Officer

Digitally Signed Jan 28, 15

Background

The City of Greater Sudbury (CGS) owns all streetlights within the City and electricity is provided through Greater Sudbury Utilities (GSU) or Hydro One Networks Inc. (HONI), depending on the area serviced. GSU also provides technical support, advice, and is contracted to maintain the system including the streetlight inventory database, and the repairs and maintenance of the streetlights.

There are currently 14,627 streetlights within CGS with 60% serviced by GSU and the remaining 40% serviced by HONI. Of the current inventory, approximately 3,000 are LED.

In 2012, CGS Council approved a streetlight retrofit project that resulted in the conversion of 1,315 streetlights from high pressure sodium (HPS) to light emitting diode (LED). Advantages of the project were a reduction in green house gas emission, reduced light pollution and energy savings.

Streetlight Energy

The Ontario Energy Board (OEB) regulates the province's electricity and natural gas sectors. One of its key regulatory functions is approving delivery rates for electricity distribution and transmission, including those for GSU and HONI.

The annual streetlight energy costs have grown significantly over the last 10 years largely due to the cost of electricity. Additionally, a portion of the increase can be attributed to growth in the streetlight network.

The cost of streetlight energy can be broken into two types of charges. There are fixed costs that do not vary based on the amount of electricity consumed. There are also variable charges that are based on the amount of electricity used. The intent of converting streetlights to LED is to reduce the variable portion of the electricity bill.

In 2013, GSU applied for a rate structure that increased the fixed cost per streetlight fixture in order to offset the declining revenues from the 2012 LED conversions.

Use of LED Street Lights

The following are some Ontario municipalities that have started converting their streetlight network from HPS fixtures to LED:

Kingston	10,000 street lights at an estimated cost of \$4 million
Markham	12,300 cobra-style street lights in 2012
Mississauga	49,000 street lights started in 2012 at a cost of \$26 million.
North Bay	5,600 at a cost of \$2.8M
Windsor	23,000 street lights starting in mid-2014 at an estimate cost of \$14.3 million

Other large municipalities in the United States have also undertaken large scale LED conversions. However, climate and energy rates vary dramatically which renders comparisons to these projects difficult.

American National Standard Practice for Roadway Lighting (RP-8)

CGS has adopted Pedestrian Lighting Standards for pedestrian road right-of-ways based on the American National Standard Practice for Roadway Lighting (RP-8). The standard provides for a standard of illumination that is considered appropriate and provides a safe level of lighting. Some current lighting levels do not meet the RP-8 standard. Further, straight conversion of some existing HPS to LED may provide less adequate lighting due to the limited dispersion of light with LEDs. The saveONenergy Retrofit Program Ontario incentive is only allowable for the conversion of existing streetlights to their equivalent LED and would not be granted for any improvements.

Current Opportunity

CGS, through GSU, has been pre-approved for an incentive in the combined amount of \$1.85 million in order to fund the conversion of existing HPS and low pressure sodium (LPS) streetlights to LED. The incentive is a per fixture rebate defined by the wattage of the bulb being replaced. LEDs are more energy efficient and have a longer useful life than traditional HPS and LPS lights. The saveONenergy Retrofit Program Ontario is offered by the Ontario Power Authority and is only available for streetlights converted by December 31, 2015. The incentive covers a portion of the costs for converting each of the 11,288 HPS and LPS streetlights. Based on the anticipated scope to be completed in 2015, the estimated rebate that can be achieved is in the range of \$0.5M to \$1.0M.

Objective and Scope

The objective for converting existing HPS and LPS streetlights to LED would be to realize operational savings that exceed the initial capital investment within the useful life of the lights (20 years). In order to benefit from the incentive, lights would need to be installed and verified prior to December 31, 2015. A preliminary business case was developed using estimated capital costs and energy savings. This work indicated that an LED streetlight retrofit has the potential to provide operating savings (energy and maintenance) in excess of the capital cost. At a capital cost of \$8M and only considering energy savings, it is expected that the payback period would be approximately 9 years. This does not include maintenance savings and does not take into account lost interest revenue. Upon receipt of competitively procured costs, a final business case will be prepared in order to justify the economics of the project and to ultimately make the decision to proceed.

Converting 11,288 streetlights to LED requires a significant investment of resources in a short amount of time. It is the opinion of GSU and City staff that a project of this size requires a complete turnkey solution including a project manager/consultant responsible for all aspects of the project. This would include assessment, design, supply/storage, installation and removal/disposal of old units.

Lighting design and modeling will be required to assess the lighting levels in advance of carrying out the conversion from HPS/LPS to LED, thus requiring more time and resources. Without this study, some sidewalks & roadways may have reduced lighting levels as HPS disperses light differently than the more directional LED lighting. Where it is practical and reasonable to do so, lighting levels will be brought to RP-8 standards. However, some rural areas are serviced by spot streetlights that illuminate hills, corners, and intersections. These areas will be not brought to RP-8 standards but will undergo LED conversions.

In 2012, the City converted approximately 1,300 streetlights to LED. It is unlikely that the remaining 11,288 streetlights will be able to be replaced by the end of 2015. However, it would be advantageous to complete as many installs as possible in 2015, in order to qualify for the per fixture grant as described above. As a result, the implementation would need to take place over several years with a heavy emphasis on installing as many as possible in 2015.

Risks/ Rewards

As with any large capital project there are risks and rewards. Some of the more significant risks and rewards of converting streetlights to LED are:

Risks

The most significant risk to this project is the possibility of energy savings not being realized. Electricity providers are able to adjust electricity prices and the composition of billing structures twice annually. If the City completes the conversion on the remaining streetlights, there is a risk that GSU and HONI may revise the billing structure to include a higher portion of fixed charges. This would result in the City not achieving the expected financial savings in spite of reduced electricity usage.

Secondly, the useful life of LEDs is estimated by the manufacturer to be 20 years. There is a possibility that LEDs may not last 20 years and/or the "brightness" of LEDs may not be sufficient for the City's lighting needs for the full 20 years. As the analysis of the project will rely on 20 years to justify the economics of the project, a useful life of less than 20 years would jeopardize the case for the project.

Lastly, as with all projects, management of the contract is critical to ensure timelines and budgets are met as expected.

Rewards

Initial review of other LED conversion projects indicate that converting streetlights to LED would result in annual estimated electricity reductions of approximately 37% - 60%. As a result, the City would receive a considerable financial benefit from the conversion. It should be noted that this would not translate into a one for one reduction in financial savings, as there are fixed electricity costs that would not change.

Secondly, there is a positive environmental outcome to the LED conversions such as a reduction in green house gases.

Thirdly, annual maintenance costs are likely to decrease. The average life expectancy of the current HPS streetlights in use is approximately 5 years. The life expectancy of LEDs provided by the manufacture is approximately 20 years. As a result, the LED fixtures would not need to be replaced and serviced as often as the current HPS bulbs.

Lastly, the project supports the CGS Mission Statement of managing the resources efficiently, responsibly and effectively as well as acting today in the interests of tomorrow.

Financing

The Roads division has included draws from reserve in the 2015 Capital Budget and 2016-2017 outlook. As the project is new and estimates are drawn from limited experience in this subject matter, Roads has allocated the following amounts:

2015 - \$4 Million,
2016 - \$2 Million,
2017 - \$2 Million,

These amounts are preliminary estimates and will likely be adjusted as the results from the RFP process are received. There are also largely dependent on the amount of work that the successful bidder is able to do in a given year.

Conclusion

LED streetlight technology has improved significantly in the last few years and LED streetlights are now standard equipment for new City streetlight projects or major road reconstructions.

In order to take advantage of the saveONenergy Retrofit Program Ontario and subject to a positive business case, staff are seeking approval to procure a contract that is to include the design, supply and installation of LED fixtures in accordance with the City's Roadway Lighting Policy and Pedestrian Lighting Standards.

Preliminary estimates to Finance this project in the amounts of \$4 million in 2015, \$2 million in 2016, and \$2 million in 2017 are to be provided from the Capital Financing Reserve Fund- Roads.

Once the business case is finalized and a vendor selected, annually updates will be presented to Council on the progress of the project.