

e2 (Energy Efficient) Street Lighting Program Update

EXECUTIVE SUMMARY

A feasibility assessment evaluating three technology options: light emitting diode (LED), induction, and light emitting plasma (LEP) was completed in August 2013. The feasibility assessment has identified LED as the best-fit technology for a wide-scale conversion program due to a number of reasons including: efficiency, durability, maturity, applicability to Calgary's climate and road types, and the ability of the technology to focus light.

Administration is working on a number of items related to an extended trial of LED street lights. This extended trial is intended as a next step towards a well informed implementation plan and budget for a potential larger scale LED street lighting program across Calgary. These items include:

1. An LED street light requirements specification to act as a guide for procurement activities. This document will also act as a guide to Calgary's development industry in the potential incorporation of LED technologies in new developments;
2. Conversion of up to 2,100 street lights in five communities;
3. A detailed communications and public engagement plan to accompany the trial;
4. The continuation of a technology exchange between Edmonton and The City of Calgary;
5. Investigations into innovative funding mechanisms which allow municipalities to use operational efficiencies from utility and maintenance savings to fund energy efficiency projects; and
6. Departmental energy management planning to assist with identifying and evaluating energy management technologies and strategies across the Transportation department.

Greater detail on each of the above noted items is provided in the Technical Report attached (Attachment 1).

ADMINISTRATION RECOMMENDATION(S)

That the SPC on Transportation and Transit recommend that Council:

1. Receive this report for information; and
2. Direct Administration to report back to SPC on Transportation and Transit with a business case and project plan for a City wide LED conversion no later than 2014 July.

RECOMMENDATION OF THE SPC ON TRANSPORTATION AND TRANSIT, DATED 2013 DECEMBER 13:

That the Administration Recommendations contained in Report TT2013-0798 be approved.

PREVIOUS COUNCIL DIRECTION / POLICY

On 2012 December 03, Council approved the recommendations provided by Administration in TT2012-0343. The approved recommendations include that Council:

1. Direct Administration to provide an update on street light trials, technologies, and proposal for a business case and implementation plan to the 2015 to 2017 business plan cycle, and report back through SPC on Transportation and Transit no later than December 2013; and

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2. Direct Administration to continue to proceed with street light trials and implementation of various technologies, within existing budgetary allocations.

BACKGROUND

Roadway lighting is part of a safe and efficient road network. It provides night-time visibility of potential hazards for pedestrians and motorists. Lighting level standards are prescribed by the Transportation Association of Canada (TAC), the Illuminating Engineering Society of North America (IESNA) and are followed by The City of Calgary.

The Roads Traffic Division continuously investigates new technologies to ensure that Calgary's street light system is efficient, effective, and sustainable from a triple-bottom-line perspective. There are almost 90,000 fixtures which make up Calgary's street light inventory and with recent advancements in technology, the Traffic Engineering Division has completed an investigation into ways to reduce operating costs related to electricity and maintenance, while potentially improving light quality and reducing The City's impact to the environment.

INVESTIGATION: ALTERNATIVES AND ANALYSIS

Energy Efficient Technology Feasibility Assessment:

A feasibility assessment evaluating LED, induction and LEP as alternatives to high pressure sodium (HPS) street lights has been completed by Administration, with the assistance of DMD & Associates Electrical Consultants (DMD). This consultant was selected through a Request for Proposals for their extensive experience in evaluating and incorporating energy efficient street light technologies in addition to developing guidelines for IESNA and TAC. Evaluation criteria included:

1. Fixture efficiency (lumens per watt)
2. Durability/longevity
3. Product availability in the marketplace
4. Applicability to Calgary's large varieties of road types
5. Ability to focus light

Based on the results of the study, Administration has concluded that LED is the best-fit technology to aid The City in achieving long-term financial, social, and environmental benefits from a street light technology change.

LED Street Light Requirements Specification for Calgary's Development Industry

Administration has received inquiries from Calgary's development industry seeking guidance regarding criteria for an energy efficient street light technology to be used in new communities. In response to interest in greener communities, Administration is developing a detailed requirements specification for LED street lights. This document will provide guidance to developers in selecting the technology which meets The City's requirements. This specification document will also help guide future procurement activities, should a full-scale LED conversion program be implemented. This document will be completed by the end of 2013.

Extended Trial of LED Street Lights

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As recommended by Administration in TT2012-0343 and approved by Council in December 2012, a second round of trials of LED street light conversions are planned to start in early 2014. These conversions will be funded by existing capital budgets under the 2012 to 2014 budget cycle. In addition to the proof of concept completed in the community of Brentwood in 2012, up to 2,100 additional HPS street lights ranging from 100 to 400 Watts will be converted to LED technologies in five communities including: Altadore, Marda Loop, Douglasdale, Tuxedo Park, and Marlborough. These communities were selected to ensure an adequate cross section of population demographics, road types, pole spacing, neighbourhood age, and fixture watt classes.

This trial LED conversion program will provide Administration with the information necessary to develop a well informed business case and project plan for future work. It is anticipated that these trial conversions will be completed by April 2014.

These conversions present the opportunity to gain an understanding of the public perception related to LED street lighting. A detailed communications and public engagement plan to complement the trial has been drafted and pre-conversion community consultations will start in December 2013.

City of Edmonton Technology Exchange

A technology exchange was formalized between The City of Edmonton and The City of Calgary in 2013. Edmonton has completed LED installations in 34 communities and has gained experience in using this technology. Calgary Roads is working with Edmonton to transfer this knowledge and experience in preparation of increased LED street lighting use in Calgary.

Energy Management Planning & BPBC4

Transportation, in collaboration with Infrastructure & Information Services and Environmental & Safety Management is currently undertaking a detailed energy management planning exercise. As part of this project, a variety of efficiency, conservation and greenhouse gas mitigation projects are being assessed. This will include LED street lighting. Based on a set of management-approved criteria, potential projects across the department will be benchmarked and prioritized. The results of this planning exercise will complement business planning for the 2015 to 2018 cycle.

The combination of all the initiatives noted above will assist Roads in preparing a business case and project plan for the proposed e2 Street Light Conversion Program.

STRATEGIC ALIGNMENT

Social, Environmental, Economic (External)

The proposed LED trial conversions will realize triple-bottom-line benefits including:

1. Provision of better quality light to pedestrians and drivers;
2. Reduction in light wastage and trespass;
3. Contribution to imagineCALGARY's target of a 30% reduction in energy use from 1999 levels to 2036; and
4. Reductions in operating costs for Roads related to electricity and street light maintenance.

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Financial Capacity

Current and Future Operating Budget:

There are no operating budget implications associated with the report recommendations. The energy savings from the trial installations are too small in scale to significantly adjust the 2014 operating budget.

Current and Future Capital Budget:

There are no capital budget implications associated with the report recommendations. The trial installations are funded within approved budgets.

Risk Assessment

There are no significant risks associated with the recommendation provided in this report. All project related risks have been identified and are being managed. Specifically:

1. Ensuring that Calgary receives the best-fit technology for our current and future needs through the development of a living requirements specification document with the assistance of Canada's foremost experts in the area, in addition to partnering with The City of Edmonton and subject matter experts across The Corporation.
2. Working with the citizens of Calgary to ensure their questions are addressed through comprehensive engagement.
3. Taking a strategic approach to planning for energy management across Transportation to ensure the most beneficial energy management projects are prioritized.

REASON(S) FOR RECOMMENDATION(S):

Administration has initiated conversion of 2,100 existing street lights to a more energy efficient alternative (LED). The business case and project plan for City wide implementation will be prepared following completion these trial conversions and community consultation.

ATTACHMENT

E2 Energy Efficient Street Lighting Program Update Technical Report