

E2 (ENERGY EFFICIENT) STREET LIGHTING PROGRAM UPDATE

EXECUTIVE SUMMARY

A city-wide conversion of approximately 80,000 street lights to LED technology is recommended to proceed. Administration is now well informed on the feasibility of LED technologies, and greater technical detail on the requirements specification and the Request for Proposal (RFP) approach can be found in the Technical Report (Attachment 1).

A business case has been developed in support of a proposal for a city-wide implementation of LED street lights during the 2015-2018 Action Plan (Attachment 2).

An estimated capital cost of \$32 million is required for the planned four year implementation period. Average annual electricity cost savings and preventative maintenance savings are conservatively estimated at over \$5 million per year. A payback period of six and a half years is expected. Energy and operating savings would be retained by the department for street light infrastructure upgrades, lifecycle maintenance and growth related costs.

ADMINISTRATION RECOMMENDATION(S)

That the SPC on Transportation and Transit recommend that Council:

1. Direct Administration to bring forward a capital funding request of \$32 million in the 2015-2018 Action Plan for city-wide LED conversion;
2. Direct Administration to continue to investigate all funding options, including the possibility of grants, to provide funding for the project; and
3. Direct Administration to report back to the SPC on Transportation and Transit by 2018 with a program update.

RECOMMENDATION OF THE SPC ON TRANSPORTATION AND TRANSIT, DATED 2014 JULY 18:

That the Administration Recommendations contained in Report TT2014-0473 be approved.

Excerpt from the Regular Meeting Minutes of the SPC on Transportation and Transit, dated 2014 July 18.

“CLERICAL CORRECTION

A clerical correction was noted to Report TT2014-0473 on Page 2 of 4, under the Heading “Extended Trials of LED Street Lights”, second paragraph, by deleting the amount “\$30 million” following the words “reduced to an estimated”, and by substituting with the amount “\$32 million”.

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 2013 December; and

Approval: Logan, Malcolm concurs with this report. Author: Hirji, Arsheel (IIS) & Hewitt, Chris (Roads)
City Clerks (C. Smillie)

E2 (ENERGY EFFICIENT) STREET LIGHTING PROGRAM UPDATE

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

On 2013 December 13, Council approved the recommendations provided by Administration in TT2013-0798. The approved recommendations include that 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.

BACKGROUND

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

The Roads Traffic Engineering Division continuously investigates new technologies to ensure that Calgary's street light system is efficient, effective, and sustainable. There are almost 90,000 fixtures which make up Calgary's street light inventory. In 2013, City street lights consumed over 90 million kilowatt hours of electricity at a cost of \$12.5 million. The total electricity costs to operate Calgary's street lighting system are forecast to increase to over \$16 million by 2020.

INVESTIGATION: ALTERNATIVES AND ANALYSIS

LED Street Light Requirements Specification for Calgary

In early 2014, Administration completed an LED street light requirements specification to guide the procurement of LED and lighting control technologies. This document includes best practice guidelines (TAC and IESNA) and experiences from other Canadian jurisdictions, including the City of Edmonton. Specific requirements include:

1. Street light optical performance, measured in terms of the amount of energy consumed to deliver a unit of light (Watts/lumen);
2. Minimum light levels, uniformity requirements for roads and sidewalks for local, collector, and major roadways, including consideration of pedestrian activity;
3. Restrictions on glare, up light and the colour of light to help ensure citizens experience quality and comfortable lighting on Calgary's roads, while reducing light pollution and light trespass;
4. Measures to address product longevity and quality to help ensure products will continue to perform for up to 20 years including minimum testing requirements; and
5. Warranty terms to support up to 10 years of coverage.

This work will be continued into the future, with an objective to update The City's street lighting design guidelines with a requirement for the use of LED technologies on new roads. This work will require consultation with the development industry and is anticipated to be part of Roads 2015 business plan.

E2 (ENERGY EFFICIENT) STREET LIGHTING PROGRAM UPDATE

Extended Trials of LED Street Lights

Trials of LED street light conversions are currently underway. In addition to the proof of concept completed in the community of Brentwood in 2012, up to 2,500 additional high pressure sodium (HPS) street lights are being converted to LED technologies in five communities: Altadore, Brentwood, Douglasdale, Tuxedo Park, and Marlborough.

The initial estimated cost to convert to LED lights city-wide was approximately \$50-70 million. Based on Administrations experience with the LED trials and the RFP for fixtures and installation, this cost has been greatly reduced to an estimated **\$32 million**.

City-Wide Implementation of LED Technologies in Calgary

Three implementation options are analyzed in the business case.

1. Conversion aligned with Action Plan 2015-2018 (Recommended): The city-wide implementation would include up to 80,000 street lights. Conversion would be funded and take place over a four year period.
2. Conversion of street lights using existing budget: Approximately 2,000 street lights could be converted annually with no additional increase to the capital budget.
3. Do nothing: Suspension of any further LED conversions.

Stakeholder Engagement, Research and Communication

No objections to the trial of LED technologies were raised during initial consultations with community associations. These trials and feedback received from citizens will be incorporated into any larger scale conversions. The communications plan for the extended trial period does include collection of feedback from affected communities after installations are completed in 2014 September.

The Urban Development Institute (UDI) is a stakeholder that has not yet been engaged in this process, as the current project scope relates to existing street lights. Going forward, it will be important that LED lighting is clearly specified and readily available for new development areas.

Strategic Alignment

The recommended scope of the LED street lighting program will contribute towards achieving several of the objectives of Transportation's Action Plan 2015-2018, in addition to the Calgary Transportation Plan (CTP), Municipal Development Plan (MDP), 2020 Sustainability Direction (SD), and imagineCalgary (iC) goals. The strategic alignment of the recommendation is summarized in the business case.

Social, Environmental, Economic (External)

LED street lights provide a better quality light to pedestrians and drivers by emitting light that can improve colour perception, improving the ability for drivers to see and for others to be seen.

A transition to LED technologies on Calgary roads would minimize light trespass into private properties, reducing the negative impacts of street lighting on Citizens in their homes.

The recommended city-wide LED implementation would reduce operating and maintenance costs for Roads as LEDs have a longer life and the proposal for a ten year warranty period.

E2 (ENERGY EFFICIENT) STREET LIGHTING PROGRAM UPDATE

Financial Capacity

Current and Future Operating Budget:

There is an impact to the 2015 to 2018 operating budget for Roads. Savings from decreasing energy expenses and reduced labour costs will be retained by Roads to offset unfunded growth in the street light operating budget. Projected energy savings are listed in the business case and are based on manufacturer response to the trial request for proposal, the pilot project and the experience of other cities that have moved to LED lighting.

Street light system growth of approximately 2,500 units each year causes an estimated \$360 thousand energy cost increase and is not included in the current Action Plan 2015-2018.

Current and Future Capital Budget:

An estimated \$32 million is requested to complete a city-wide conversion of street lights to LED technologies over the 2015 to 2018 business cycle.

The capital request will form part of the Roads capital budget in Action Plan 2015-18. Funding options will be finalized at that time. Options to be considered include a combination of; (1) available grants (2) internal bridge financing – to be repaid from the expected energy & labour savings (3) Remove funding from a project or program with less benefit.

Administration will continue to look for available grants which could offset some of the cost for the city-wide LED retrofit.

Risk Assessment

1. There is a risk that reduced night-time power usage could create an increase in the commodity price for the Corporation.
2. Cost escalation of fixtures; is not considered a high risk for this project as the product technology is now considered mature.
3. Calculations for construction cost escalations have been included in the cost evaluations in the business case.
4. There is a ten year warranty on materials which also extends to labour on a catastrophic failure.
5. Minor retrofitting of existing infrastructure is required for the LED conversion included in the business case based on The City of Edmonton's experience.
6. When the approximately 2,500 LED fixtures are installed for the trial communities, there may be complaints that arise. Projected operating costs in the business case may increase to address these concerns, should they arise.

REASON(S) FOR RECOMMENDATION(S):

Administration is now better informed on the feasibility of LED technologies. Based on this knowledge, a business case has been developed in support of a recommended city-wide implementation of LED technologies over the 2015-2018 Action Plan.

ATTACHMENT(S)

1. LED Street Lighting Update – Technical Report
2. Business Case for City-wide LED Street Lighting Conversion Program