

Report to Council



Date: 10/12/2016
File: 1850-18
To: City Manager
From: Brydan Tollefson, Energy Programs Manager
Subject: LED Street Lighting Retrofit - Business Case

Recommendation:

THAT Council receives, for information, the report from the Energy Program Manager dated September 12, 2016 with respect to the LED Street Lighting Retrofit - Business Case.

AND THAT Council considers this retrofit project as part of the 2017 capital budget review process.

Purpose:

To update Council on the status of a fully developed, construction ready, project to convert all compatible High Pressure Sodium lighting to LED technology. Work on the business case to support this project has been completed and verifies a simple payback of 3.7 years complete with a return on Investment, over the 15-year life of the project, of \$13 million.

Background:

Project Description:

Street lighting is an important community service, but can consume as much as 40 percent of a city's energy budget. The existing Cobra Style High Pressure Sodium (HPS) lights are failure prone and costly to manage, which add to lighting costs. Consequently, LED street lighting has emerged as a leading opportunity as an energy conservation measure.

Background and Problem Statement:

High-pressure sodium street lamps are not energy efficient and typically operate 12 hours a day; so their energy cost is high. These lamps also have a short life span (+/- 5 years), resulting in unpredictable and expensive operations. The City must replace roughly 20 percent of these lamps each year.

Currently, operators detect light outages either when a community member calls to report it or when mobile crews detect outages during periodic checks. Consequently, the time to replace a lamp can vary considerably, potentially impacting public safety and an operator's liability. The City is also charged a flat rate on street lighting that we pay whether the light is burned out or not.

The benefits of deploying LED-based street lamps fall into two categories: energy savings and operational savings.

- Typically, the largest benefit of LED street lights is lower energy costs, which result from delivering the same or enhanced quality light at lower wattages.
- The operational savings from LEDs are based on the fact LED lamps have a life span of up to 20 years (3 to 4 times longer the HPS lamps), which will reduce callouts and result in replacement less often, which reduces hardware and installation costs.

Business Case Development

A comprehensive pilot project and evaluation process was completed from September 1, 2015 to May 30, 2016, to assess the viability of existing LED technologies currently on the market. As a result of the technical review, it was determined that the current state of LED technology exceeds the current HPS standards and the LED street light marketplace has matured to the point that it is appropriate to support a business case for a major upgrade project. Appendix A has more detail regarding the pilot project and review process.

Costs and Benefits:

An inventory count puts the total number of compatible fixtures to be replaced at 9,913. The total project cost for a conversion of 9,913 High Pressure Sodium lights to LED is estimated to be \$3,952,975, resulting in annual maintenance and electrical utility cost savings of \$918,437 and a simple payback of 4.3 years. The life cycle analysis estimates a 15 year return on investment of \$13,113,932. A breakdown of project costs can be found in Appendix B.

The City of Kelowna is currently working with the electrical utility provider, FortisBC, under their Custom Business Efficiency Program, to receive an incentive rebate for this project. Preliminary estimates indicate that the City could receive an incentive of \$536,769. An agreement is expected to be in place by early September 2016. This reduces the total project cost to \$3,416,206, with a project payback of 3.7 years, and increases the return on investment to approximately \$13.7 Million. This grant is payable upon project completion.

Some of the benefits of converting our existing high pressure sodium to LED include:

1. Reduced annual maintenance costs of \$177,152
2. Reduced annual electricity costs of \$741,285
3. Improved light levels, safer roads resulting from decreased outages, and improved reliability and longevity of City asset

Sensitivity and Risk:

The overall level and probability of risk on this project is considered to be low.

Technology

- The technology has been tested by City staff and industry with great success. The reliability of LED technology is considered to be higher than HPS, with an operating life of 3-4 times longer. LED technology provides flexibility in design, allowing improved shielding and optics, dimming capabilities that are not possible with HPS, as well as a wider range of wattages and color options.

Costs

- The "LED Street Lights Across B.C." agreement that is in place contractually obligates the manufacturers to keep the same pricing for the duration of the contract, so fixture pricing should remain constant.
- The installation costs cannot be verified but have been estimated at \$90 per fixture. This is considered a conservative estimate as a result of discussions with multiple municipalities across the country who have paid installation costs ranging from \$75-\$90 per fixture. An increased installation cost of \$10 per fixture to \$100 per fixture results in a total project cost increase of \$99,130 (an impact of 3% on the total project cost), which is considered to have a minimal impact on the business case, increasing the payback by 0.1 years.

Implementation Strategy:

This project will be managed by Infrastructure Delivery, with support from the Energy Program Manager. A street light design consultant will be engaged to design the appropriate light levels across the street light network. Light levels must meet the "Illuminance Uniformity Levels" as defined by the Illumination Engineering Society (IES), listed in section 5.3.1 of Schedule 4 - Design Standards in the City of Kelowna Subdivision, Development and Servicing Bylaw No. 7900. The lighting network will also be designed to meet recommendations from the U.S. Department of Energy (DOE), the National Electrical Manufacturers Association (NEMA), the American Medical Association (AMA), and the International Dark-Sky Association (IDA), in order to minimize glare, light trespass, skyglow, and the use of blue light.

Once the design is complete, the LED fixtures can be acquired, at which time a public process will be initiated to select an electrical contractor to perform the replacement of HPS with LED.

The length of time to complete the upgrade is estimated to be 12 months, but may vary depending on the timing of the RFP process with seasonal weather conditions and availability of contractors to complete the work.

Financial Considerations:

The Business Case has been reviewed by Finance.

Internal Circulation:

Divisional Director, Communications & Information Services
Divisional Director, Infrastructure
Director, Financial Services
Manager, Building Services
Manager, Financial Planning
Manager, Infrastructure Planning Department
Manager, Public Works

Considerations not applicable to this report:

Legal/Statutory Authority:
Legal/Statutory Procedural Requirements:
Existing Policy:
Personnel Implications:
External Agency/Public Comments:
Communications Comments:
Alternate Recommendation:

Submitted by:

B. Tollefson, Manager, Energy Programs

Approved for inclusion:



J. Creron, Divisional Director, Civic Operations

cc: Divisional Director, Civic Operations
Director, Financial Services