

## UBC SUSTAINABILITY SCHOLARS PROGRAM

Summer 2018

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### Research Project Title

LED Street Lighting Business Case

### Goal or Operations Plan objective

The Township of Langley plans to develop a business case to convert existing street lights over to LED. The Township is interested in analyzing their current inventory to produce a financial business case that supports a conversion from the current lighting infrastructure over to LED technology. The business case would support the following:

- Energy and maintenance savings of converting over to LED lamps
- Research on different LED adaptive technologies that could be integrated into Township street lights, including: dimming, maintenance alerts, etc.
- Research on LED technologies and specifications that the Township should move forward with. Including: colour, wattage, and model type.
- Benefits of LED lighting, including: reduced light pollution and light trespass, increased visibility and safety, energy savings, cost savings, and environmental benefits.
- Available funding opportunities for LED street light conversion (GMF, BC Hydro, other provincial grants).
- Estimated rate structures for conversion, this would be completed in partnership with BC Hydro and Township staff.

### Outline scope of project and why it is of value to your organization. Describe how and when the scholar's work will be actionable.

The Township's energy consumption for roads is related to street lighting and traffic lighting. The Township has an online inventory of the quantity, locations, models, and the wattage of street lights currently installed.

Majority of the street lights are high-pressure sodium (HPS) lamps with some LED lamps. Street lights are not on a metered system for utility billing, instead electricity is billed by number and type of fixtures installed. Based on 2016 utility billing, 18,500 GJ of electricity is used for street lighting. Street lights currently consume just over 18% of the Township's electricity use.

The Township of Langley plans to develop a business case to convert existing street lights over to LED. The Township is interested in analyzing their current inventory to inform a detailed business case for Council's consideration. The financial business model will need to be developed to include energy and maintenance savings, total capital and operations costs to convert over to LED lamps, payback timeline, and return on investment (ROI) calculations.

The financial business model will be accompanied by a report that outlines recommended adaptive LED technologies, LED specifications, associated benefits, possible incentive/grant possibilities, and a high-level summary of LED street lighting infrastructure implemented in other municipalities.

This project would provide both short and long term value to the Township. The scholar's work would have immediate practical value and would help the Township achieve the following:

- Learn from researched best practices and strategies;
- Develop a financial business case to take to Council for adoption of LED infrastructure for the 2019 budget cycle.

The scope of the scholar's work is broken down as follows:

1. Analysis & Research : *Conduct research on current street lighting infrastructure in other local municipalities, analyze the Township's lighting inventory, look into various LED lamp and adaptive technologies, work with BC Hydro to understand new rate structures when converting over to LED*

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- Summarize street lighting infrastructure across local municipalities; for municipalities who have converted over to LED, summarize their approach.
  - Work with Township staff to analyze current inventory: lamp types and quantities, and associated operating and maintenance costs
  - Work with BC Hydro to determine new rate structures when converting over to LED
2. *Business Case: Assist Sustainability Specialist in creating a financial business case to convert Township street lighting to LED in a phased approach.*
- Detail recommended LED technologies
  - Capital costs for new infrastructure
  - Detailed energy and maintenance savings
  - Detailed analysis of payback period, return on investment compared to business as usual model, and integrated new rate structures

### **Deliverables**

- Assistance with a report to Council that outlines recommended LED technologies, environmental benefits, incentive/grant possibilities, and a high-level summary of LED street lighting infrastructure implemented in other municipalities.
- A financial business model will need to be included in the report and should detail the energy and maintenance savings, total capital and operations costs to convert over to LED lamps, payback timeline, and return on investment (ROI) calculations.
- Executive summary for the UBC Sustainability Scholars program online project library

### **Time Commitment**

Completing the 250 hours of work will require approximately 2 days of work per week from May 1 to August 10, 2018. The Township may be able to accommodate a flexible work schedule; however, it is preferred that the scholar spend at least one consistently scheduled day per week at the Township's Operations Centre where a work space will be provided for the scholar throughout the term.

### **Skill set/background required/preferred**

- Experience with financial modelling and analysis;
- Excellent research and writing skills;
- Strong communication skills - experience conducting interviews is considered an asset;
- Ability to work and excel with minimal supervision;
- Demonstrated interest in sustainability and energy through education and/or practical experience;
- Access to a personal vehicle is considered as asset;
- Familiarity with quantitative research methodologies and implementation.

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