Memorandum

**To:** David Adams

**From:** Gillian Bryson and Devroop Banerjee

**Date:** 28th October 2016

**Re:** Proposal to investigate the improvement of UVic’s Outdoor lighting systems

**Purpose**

This proposal outlines a study that will look at the social impact, and feasibility of implementing changes to the University of Victoria’s (UVic) outdoor lighting systems which could decrease UVic’s overall power usage and help contribute towards completing Uvic’s sustainability plan.

**Project Description**

The University of Victoria is a large campus that uses many resources every day. As part of its efforts to decrease excessive use of resources, Uvic has created a sustainability plan with a goal of completion by 2019.

What Uvic is lacking is a system that regulates power usage of the outdoor lighting system to decrease power output when they are not in use. Therefore we propose to look into is a two-part change to the outdoor lighting system, that lights the paths and walkways around and through the UVic Campus.

The first change is based on the fact that the lamp posts around UVic waste an excessive amount of energy when they are lit in the evenings with no students around; their light is not needed. The lighting system should be calibrated to know when they are needed and to adjust their power consumption accordingly. The system should be calibrated such that the lampposts can detect people from a distance, ensuring that they light up only when residents are passing by, while making sure that they are never in complete darkness between two lampposts. The calibration should also be able to detect one’s presence for an extended period of time and hence not dim or turn off when they are standing there.

The second change would be to look at how the outdoor lights consume power. Uvic’s outdoor lighting system should have the capability to work off of green energy collected throughout the day for use in the evenings. Each light should have the ability to gather and store power for later use, but should still be connected to the main grid to ensure performance when needed.

These two changes would potentially allow UVic to reduce its overall power consumption, by reducing the amount of energy the system uses, and by having it run on green sources. This would contribute towards completing a part of the sustainability plan regarding the 8% reduction in electricity usage.

**Plan of Action**

Keeping the feasibility and social impacts of implementing our ideas in mind, the proposed study is meant to answer the following questions:

1. Would you turn off the lights completely or dim them?
   1. Would this be viewed negatively by the residents?
   2. If dimming, how far would they be turned down?
      1. What would be the minimum dimming level that would significantly impact the lamp post’s energy usage?
2. Would turning them off or dimming them cause a safety hazard?
3. How would this be perceived by the public?
4. What concerns would this cause for residents?
5. Would a socially acceptable solution be to increase campus security patrols at night?
6. How would the lampposts know when they are needed?
   1. If motion sensors are used, what should be the optimum detection range?
   2. Could a smart system be used, that predicts students’ movements, lighting the areas accordingly?
   3. Should the lights be able to detect the daylight intensity and adjust themselves accordingly?
7. What would be the most effective method of energy collection?
   1. Wind
   2. Solar
   3. Hydro
8. How will the harnessed energy be stored?
   1. Should each lamppost have its own power reserve?
   2. How would it be beneficial if the lampposts shared their collected power?
      1. Maintenance
      2. Would it decrease required system upkeep resources?
9. Would installing such a system, in its entirety, save any energy?
   1. Would the technology, used to regulate power usage, use equal or more power than what it would save?
   2. Would such a system save money in the long term?

To do this we plan on completing the following tasks by doing background research on:

1. Green energy collection systems and sensor technologies.
2. Other projects undertaken with similar goals, to investigate their feasibility and acquire an idea regarding ours, ie:- what should be considered when designing such a system?

**Timeline**

Our initial timeline is to begin November 7th 2016 and run as late as December 5th 2016

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
|  | **Week 1** | **Week 2** | **Week 3** | **Week 4** | **Week 5** |
| **Background Research** |  |  |  |  |  |
| **Prepare Surveys** |  |  |  |  |  |
| **Conduct Surveys** |  |  |  |  |  |
| **Analyze Surveys** |  |  |  |  |  |
| **Draft Report** |  |  |  |  |  |
| **Edit and Proofread Report** |  |  |  |  |  |
| **Complete Report** |  |  |  |  |  |

**Credentials**

As a graduate of Camosun’s criminal justice program Gillian Bryson has hours of experience in report writing, and has had many classes and projects that require the design and execution of studies and surveys. Bryson has a good understanding of how to evaluate data from such studies and knows how to conduct such a study with ethical limitations in mind.

As a second year computer science student, Devroop Banerjee has had sufficient experience with problem analysis and brainstorming to come up with feasible, implementable solutions to resolve issues. Banerjee has also taken up Environmental Studies and Geography in high school which definitely gives him a more well rounded idea when it comes to a topic such as energy conservation. A majority of his past jobs have been both desk and sales jobs. Hence, he is capable of handling and managing large volumes of data as well as interacting with a wide variety of people. He believes these skills would be necessary when it comes to this study.

**Budget**

|  |  |  |  |
| --- | --- | --- | --- |
| **Items** | **Charges/hour ($)** | **Hours** | **Total ($)** |
| **Background Research** | **12.00** | **30** | **360.00** |
| **Prepare Surveys** | **12.00** | **10** | **120.00** |
| **Printing charges (100 sheets @ $0.12/pc)** |  |  | **12.00** |
| **Conduct Surveys** | **12.00** | **15** | **180.00** |
| **Analyze Surveys** | **12.00** | **5** | **60.00** |
| **Draft Report** | **12.00** | **5** | **60.00** |
| **Edit and Proofread Report** | **12.00** | **14** | **168.00** |
| **Complete Report** | **12.00** | **4** | **48.00** |
| **Contingency fund** |  |  | **183.00** |
| **Total** |  |  | **1,191.00** |

**Conclusion**

Uvic’s current outdoor lighting system unnecessarily wastes energy. Considering UVic’s efforts to decrease its energy consumption by 8% by 2019, the ideas introduced in this proposal are meant to do just that. A study through background research and surveys regarding the shortcomings of the old system, and the new system’s feasibility, this proposal introduces fresh, innovative solutions on how to conserve energy which is otherwise being used when nobody is in need of it. The costs are minimal and the long term savings are beneficial, with the added advantage of keeping UVic green. This study is a must if UVic wants to make subtle yet smart changes, keeping its students, staff and the environment happy!