**M E M O R A N D U M**

TO: David Adams, UVic Energy Manager

FROM: Thom Watkin, Alina Chin

DATE: 26th October 2016

RE: Proposal to investigate and improve Clearihue energy consumption

https://lh5.googleusercontent.com/TobdxntxLwz7lcy7qWdHshwfDBkXG5u4tCyyAOE0GqD-fgWnA0lqOULc2_gyM8ZzoQ2n-BuueVWebfZml3rKhiHwEcyMIFmOP6iTNQDt2OVaP-tRJnjeLtE6IQ6LFe9ex4bYnvr8**Overview**

Our proposed study will look into the cost-effectiveness of retrofitting Clearihue, an older UVic building, with modern electricity-saving measures.

**Problem Identification**

Every year UVic spends $4.0 million on electricity. A large portion of this comes from the approximately 27 million kWh per year used by the top 10 energy consuming buildings on campus. Some of this power use is difficult to mitigate, like that of the high-tech and power-intensive equipment used in the EDC2 and the Bob Wright microscope facilities. A great deal of this, however, comes from a lack of proper electricity saving measures in older buildings: Petch, McPherson, Clearihue, and Cadboro Commons each use approximately 2.5 million kWh per year of electricity. In a building like Clearihue, the majority of this power consumption would come from the continual running of lights, computers, and projectors within the classrooms and hallways.

If UVic is to continue to try and hold its standing as a ‘green’ university, and continue striving towards more eco-friendly initiatives, then we need to explore further options for power-saving measures within the older and more energy wasteful buildings. Our goal is to explore the feasibility of reducing the energy footprint of the UVic campus facilities through improved sensors and automated energy management systems.

Our study will examine the current state of Clearihue’s energy consumption to determine the principal causes of wasted electricity. We will then research which types of sensors (e.g. photocell sensors, motion sensors, CO2 sensors, router surveying) should be installed in Clearihue, as well as energy-saving controls (e.g. automated computer shutoffs, light controls, heating controls, ventilation controls). By installing proper energy management systems, UVic could greatly reduce unnecessary power consumption. Our study would provide preliminary data on retrofitting Clearihue that could be generalized to other buildings on campus that also need upgrades.

**Plan of Action**

The proposed study will investigate the following questions:

* What are the current lighting and temperature control policies in Clearihue?
* For how many hours are the computers in the Clearihue lab powered on?
* Who uses the building and during which hours? (E.g. offices, classrooms, computer labs)

These questions can be answered by interviewing members of Clearihue’s facilities and computing services staff.

* How much energy does the building use yearly?
* How much energy does the lighting, ventilation, and computing systems use?

These questions can be answered by either contacting David Adams or designing an experimental method to obtain estimates.

* What are the costs and benefits of installing a sensor system modelled on an existing system on campus (e.g. in ECS)?
* What are the costs and benefits of installing a sensor system designed from scratch, using state-of-the-art components?
* What restrictions does Clearihue’s structure impose on installing a sensor system?

These questions can be answered by researching sensor systems and automated energy management.

**Timeline**

|  |  |  |  |
| --- | --- | --- | --- |
| Task | Hours | Start Date | Completion Date |
| Measure Building Power Usage | 10 | November 14th, 2016 | November 17h, 2016 |
| Calculate Power Savings | 5 | November 17th, 2016 | November 17th. 2016 |
| Research Retrofitting Costs | 10 | November 21st, 2016 | November 24th, 2016 |
| Write & Edit Study Report | 8 | November 24th 2016 | December 4th, 2016 |

**Budget**

|  |  |  |
| --- | --- | --- |
| Task | Hours at Cost of Labour | Cost |
| Data Gathering | 10 hours at $15/hour | $150 |
| Savings Analysis | 5 hours at $15/hour | $75 |
| Implementation Analysis | 10 hours at $15/hour | $150 |
| Report Writing | 8 hours at $15/hour | $120 |

**Credentials**

Alina is interested in automation and has related experience with embedded systems. Thom has previous experience with sensor based power saving systems and is also deeply interested in automation. As upper level UVic students, both Alina and Thom have extensive experience in research gathering and report writing.

**Conclusion**

While UVic has upgraded many buildings on campus to help reach its energy-reduction goals, older buildings like Clearihue still waste unknown amounts of electricity every day. Our study will research the feasibility of upgrading Clearihue with automated energy-saving controls. As a result, we will have valuable data on the causes of wasted energy on campus, as well as a strategy for upgrading older buildings that can be applied across campus. This will not only contribute to UVic’s goal of 8% less electricity consumption, but also demonstrate that UVic can stay on the leading edge of green campuses across Canada.

**References**

“Integrated Energy Masterplan.” University of Victoria. 2011.

“Sustainability Action Plan.” University of Victoria. 2014.