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

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Overview

Our proposed study will look into the cost-effectiveness of retrofitting Clearihue, an older 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 simply from older buildings lacking proper electricity saving measures. Petch, McPherson, Clearihue, and the Cadboro Commons all 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.

Our goal is to explore the feasibility of reducing the energy footprint of the UVic campus facilities through improved sensors (eg. Photocell sensors, motion sensors, co2 sensors, router surveying) and improved automated energy management systems (eg. automated computer shutoffs, light controls, heating controls, ventilation controls).

With the introduction of proper energy management systems, there could be a great potential for reduction of unnecessary power consumption. By ensuring that power consumption in these buildings is used with purpose, and not otherwise, the University can help to ensure that the tuition paid by its students is allocated to the many places where it is needed.

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

Tasks:

1. Obtain an approximate power allocation document for the building, detailing what percentage of the power is used by what sources (eg. 30% from computers, 40% from lights, 10% from outlets, etc) from either
   a. A pre-measured power usage allocation document
      i. May not exist. Time estimate not given
   b. Measuring classroom and hallway light usage, comparing against the known yearly power consumption for the building, and extrapolating from there.
      i. 10 hours – October 31st, 2016
2. Calculate, based off estimates, what the approximate power consumption savings would be if the systems we have described were implemented
      i. 5 hours – November 1st, 2016
3. Research the cost of retrofitting these systems to the building, both in time and money, and determine the viability of the project from the results of the comparison
      i. 10 hours – November 3rd, 2016
4. Write an official report, detailing the results of the study
      i. 8 hours – November 8th, 2016

Budget

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
Total		$495

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

[1 sentence summarizing Needs, 1 sentence Goal, 1 sentence Benefits]

While energy waste has been an issue to plague the modern world since the introduction of electric energy, the world is truly progressing to a point where more conservative, ecologically sound, and fiscally responsible energy use is within our grasp. By researching the methods we propose, we hope to potentially demonstrate another way that UVic can stay on the leading edge of green campuses across Canada, while saving money and increasing its already respectable standing.

References

"Integrated Energy Masterplan." University of Victoria. 2011.

"Sustainability Action Plan." University of Victoria. 2014.