

MEMORANDUM

To: Jarred MacLean, Recycling Manager, Facilities Management

From: Deepinder Dhillon and Kshitiz Rawat

CC: Monika Smith

Date: October 9th, 2024

Re: Proposal to investigate the feasibility of introducing Reverse Vending Machines

This proposal aims to explore the feasibility of introducing Reverse Vending Machines (RVMs) at the University of Victoria (UVic), to reduce plastic waste, enhance recycling efforts and contribute to the university's sustainability efforts. RVMs are vending machines that collect and recycle plastic bottles and metal cans.

Background

The University of Victoria is a recognized leader in sustainability, consistently demonstrating its commitment to environmental responsibility. Since 2009, UVic's waste reduction practices have improved significantly, with the campus's landfill diversion rate increasing from 58% to 74% in 2018 [1]. The University's Latest Strategic Plan (2023) sets a goal to achieve a diversion rate of 81% [1]. However, plastic waste, which makes up over 18% [1] of the campus's landfill waste remains a significant challenge, highlighting the need for improved waste management strategies.

1. Problem Definition

This section outlines the challenges faced by UVic in managing plastic waste and how reverse vending machines could provide effective solutions.

1.1 Need Statement: Plastic waste remains a significant problem at UVic, accounting for over 18% of the campus's landfill waste, half of which is recyclable [1]. The improper disposal of plastics adds to the problem. There is a clear need to enhance current waste management practices. Innovative solutions, such as installing RVMs, would be crucial in addressing this issue and the university's commitment to sustainability.

1.2 Goal Statement: Our goal is to reduce plastic waste on campus and improve recycling rates with the help of RVMs.

- 1.3 Objectives:** The use of RVMs will encourage students and staff to recycle more effectively by providing an efficient and rewarding method to dispose of plastic bottles and cans. This system would increase the campus recycling rate and reduce improper disposal of plastics, directly contributing to UVic's goal of achieving an 81% landfill diversion rate and supporting the university's broader sustainability efforts.
- 1.4 Constraints:** The proposed solution cost must not exceed a budget of \$100,000. Additionally, the system should aim to achieve a return on investment within 5 years.
- 1.5 Benefits:** The installation of RVMs offers several key benefits. First and foremost, they will significantly reduce plastic waste on campus by increasing the recycling rate and minimizing improper plastic disposal. This will directly help in achieving the university's goal of reaching an 81% landfill diversion rate. Moreover, the system will promote a culture of responsibility among students and staff by incentivizing proper recycling practices. Additionally, this model can serve as a pilot program within the university and if successful, could be scaled up to include a wider community or even an entire city, helping reduce the impact of plastic waste on the environment.

2. Plan of Action

2.1 Technical Plan

This section outlines our plan to investigate the feasibility of installing Reverse Vending Machines (RVMs) for recycling plastic bottles and metal cans.

1. Assess Current Waste Generation and Potential Benefits

- How much plastic waste is being generated on campus?
- How many of those are plastic bottles and metal cans?
- What percent of this potential waste can be diverted through RVMs?
- How much plastic has been recycled through RVMs across universities that have installed them?
- Can we achieve similar results at UVic?
- What cost-saving benefits can RVMs bring to UVic?

These questions will be answered by contacting and gathering data from the Facilities Management – Waste Reduction Unit. Additionally, we will conduct research and review case studies from other universities or places that have implemented RVMs to analyze their waste diversion rates. This combined research will help us estimate the potential waste reduction and financial benefits for UVic.

2. Evaluating RVM Models and Site Assessment

- What types of RVM models are available in the market?
- How much would they cost including installation?
- What is the maximum storage capacity of these RVMs for plastic bottles and cans?
- How reliable are these models in terms of maintenance?
- What are the optimal locations on campus for installing RVMs to maximize usage?
- Will there be any additional requirement for the installation such power or other infrastructure?

We will research and compare different RVM models, focusing on storage capacity, reliability, and material compatibility (plastic bottles and cans). Additionally, we will evaluate potential site locations on campus by analyzing high-traffic areas to determine where RVMs can have the most impact.

3. Investigate RVM Usage and Management

- What types of RVM models are available in the market?
- How willing are students and staff to use RVMs?
- What types of incentives do they prefer?
- Will they prefer One Card?
- Who will be responsible for maintaining the RVMs?
- How will recycled items be managed and processed?





We will survey students and staff to determine their interest in using RVMs and their preferred incentive methods. If the UVic One Card is selected, we will collaborate with the IT department to integrate it with the RVM system. Additionally, we collaborate with Facilities Management and the Office of Planning and Sustainability to assign responsibility for RVM maintenance, routine collection and other services, ensuring the recycling process runs smoothly.

2.2 Management Plan

2.2.1 Timeline

The table below summarizes the key tasks and their related durations for completing the feasibility study.

Table 1: Feasibility Study Timeline

	Oct 28 – Nov 3	Nov 4 – Nov 10	Nov 11 – Nov 17	Nov 18 – Nov 24	Nov 25 – Dec 1
Assess Current Waste Generation and Potential Benefits					
Evaluating RVM Models and Site Assessment					
Investigate RVM Usage and Management					
Write Feasibility Report					

2.2.2 Budget

Table 2 below lists the cost breakdown for the study, amounting to a total cost of \$1,180.

Table 2: Proposed Budget for the study

Task	Hours	Rate	Total Cost
Assess Current Waste Generation and Potential Benefits	10 hours	\$20.00/hr	\$200
Evaluating RVM Models and Site Assessment	8 hours	\$20.00/hr	\$160
Investigate RVM Usage and Management	16 hours	\$20.00/hr	\$320
Write Feasibility Report	25 hours	\$20.00/hr	\$500
Total	\$1,180		

2.3 Qualifications

We both are second-year computer science students at the University of Victoria and through our academic experience, we have gained the necessary skills to conduct surveys and research for this project. As a part of UVic's community, we have valuable insights into sustainability and students' perspectives on environmental initiatives. This knowledge will be essential in evaluating the feasibility of our proposed RVM solution.

3. Conclusion

Introducing RVMs at UVic offers a promising solution to tackle plastic waste and improper disposal while supporting the university's long-term sustainability goals. By making recycling more rewarding RVMs can encourage students and staff to participate more in waste reduction efforts. The feasibility report will evaluate the current waste situation, explore potential RVM models, and gather data from the campus community to ensure the project is both practical and effective. Moreover, a successful implementation at UVic could serve as a pilot program and ultimately benefit the whole community.

4. References

- [1] J. Maclean. "Request for Proposals FM/WR 0520," University of Victoria, Sept 2024.