Sustainable Diagram on Food Waste Reduction Programs in Mitigating Carbon Footprint—a Loyola Marymount University Case Study

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Abstract

• Food waste is an economic, social, and environmental problem with broad implication. The direct impacts from fossil fuel use, food waste rotting in landfills, water use, and transferring food waste create environmental stressors associated with climate change. Increasing methods to reduce food waste are becoming common practice across private sector as a tool to reduce economic cost and carbon footprint. This study aims to evaluate the food waste diversion efforts at Loyola Marymount University's dining hall. The research approach examining Loyola Marymount dining halls' sustainability efforts will be broken down into two separate stages: analyzing food waste data pre- and post-implementation of mitigation efforts, and diagramming the mitigation efforts including the composting, liquefying, and dehydrator processes. This study hopes to demonstrate how a university's efforts to reduce food waste can contribute to the overall goal of sustainability. Using diagrams to relay findings, this study can serve as encouragement to LMU to continue and increase sustainability efforts, and as a model for other universities.

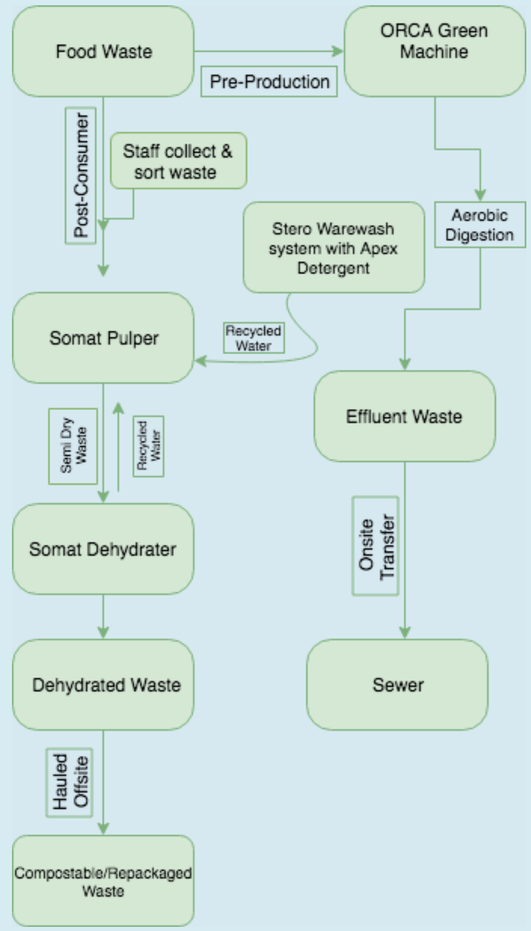
Introduction

• Loyola Marymount and Sodexo invest in a range of waste diversion programs including Lean Path Software, Pre/Post Consumer, Somat Pulper/Somat Dehydrators, Trayless Dining, Water efficient dishwashers, and Signage throughout food dining areas. Food waste diversion programs have been proven to lower carbon footprint. This research evaluates these process in step by step diagram and analyzes waste hauls and total tonnage. We asked how have sustainability efforts at Loyola Marymount University's dining hall reduce energy, water, and solid waste? And furthermore, how have the Somat systems, pulper, and dehydrator, reduced food waste on campus?

Processes

• The Lair Marketplace uses an Orca Green Machine (ORCA) for all pre-consumer food waste. ORCA green machine is a food liquefier that converts food waste into water effluent, which is sent to the sewer. For all post-consumer, Lair uses a Somat pulper and dehydrator. Food waste enters the pulper, processed, and mixed with water from dishwashing machines, becoming 95% water and 5% solid. The mixture is then dehydrated, create a semi-dry waste pulp waste, reduces waste volume by 9 to 1 (93%). Water used during this step is recycled back to the pulper.

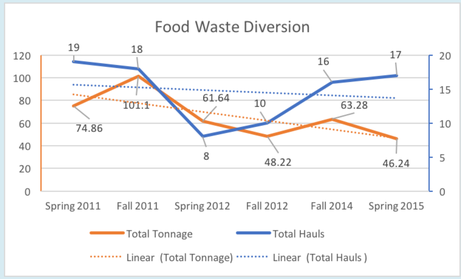
Diagram



Step By Step Diagram: Food Waste has two different paths. Pre-Production waste is sent to the ORCA machine that uses aerobic digestion, adding oxygen to speed up the process, the Liquified Waste is sent directly to the sewer on LMU Campus. Dining hall staff collect Post-Consumer waste and sort compostable waste for the Somat Pulper. Waste enters the Somat Pulper is mixed with water, processed and made into a slurry. The water used by the Pulper is recycled water from the Dishwashing services. The Semi-Dry waste is sent to the Somat Dehydrator where paddles macerate the waste killing bacteria and reduces the waste matter by up to 93%, producing dry material. The end product is available for composting onsite or repackaged and sent to food recovery services.

Caption: Somat Dehydrator showing dehydrated waste

Results



Caption: Waste diversion machines added after Fall 2011.

Discussion

- The impact of waste on a University's carbon footprint is significant yet manageable through new technologies. The direct effect on climate change from fossil fuels, food waste rotting in landfills that produce methane, along with water use and economic cost of transferring food waste, the environmental stressors are significant. Loyola Marymount's waste diversion technologies reduce food waste limiting the number of hauls and total weight transferred. As represented in the graph above, total hauls during a semester dipped after installation but sharply rose back to similar numbers in the 2014 and 2015 semester. More research is needed to understand these changes, but influences may include student increase and operations. The waste transferred now is dehydrated, repackaged, and transferred to food recovery company in Los Angeles that then produces animal feed.
- While Loyola Marymount's and Sodexo's processes help lower the overall carbon footprint, there remains an opportunity for growth. The overall sustainable goal would see food waste produced in dining halls composted around campus and water used in the process recycled. Previous research at LMU has analyzed the possibility of composting the dehydrated waste. Preliminary results showed that unprocessed dehydrated food waste is not suitable as a soil amendment. The water effluent produced was analyzed, and high levels of fecal indicator bacteria were detected. Addressing and finding solutions to these issues can provide further suitability across campus.

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