

## On Campus Demonstration Biogas Digester

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Expected Graduation 2021

### Abstract:

How can Humboldt State manage food waste resources while simultaneously providing and promoting energy independence? The purpose of this paper is to present an idea on how to move forward with these challenges, by showcasing an on-campus biogas digester at HSU. Biogas digestion is a process of anaerobic decomposition, in which natural gases that occur during the decomposition process, are contained with intention for a fuel source. This project will provide an opportunity for the campus to showcase and pioneer how our waste streams can be managed in a holistic approach providing additional resources. A potential site for the digester could be the school's Campus Center for Appropriate Technology (CCAT). The digester would serve as a demonstration for how food and other organic waste can be effectively managed and turned into a source of energy independence. Biogas digestors can range from consumer ready, commercially manufactured packages, to one-of-a-kind, do it yourself masterpieces. Further development for this project may include determining feasible packages for demonstration, determining the appropriate size of the digester, and designing the final system.

**1. Project Description:**

This project will explore the feasibility, and appropriate application of an on-campus biogas digester at Humboldt State University. This project was inspired by a similar project at UC Davis, where 50 tons of organic waste are converted to 12,000 kWh of renewable electricity each day (Davis 2014). The digester could be used to convert on campus food waste, green waste from facilities, animal waste from on campus facilities, all into energy that could be used by the school. The main step to completing this project would be, identifying the appropriate size and location of the digester, based on the campus's needs

**2. Need Statement:**

*This project addresses HEIF's mission of creating a more sustainable campus by promoting energy independence by providing a way for student to directly engage with sustainable alternative energy production. The project addresses each of HEIF's goals. First, this is a student-initiated project, and has the potential to be developed by and maintained by student employees. Second, the project provides the opportunity for discussion of both qualitative and quantitative results. Student researchers will have the opportunity to analyze and develop the system. Beyond that, students and the community will be able to learn from the model HSU will be demonstrating. Third, this project provides the opportunity for interdisciplinary collaboration between different majors and areas of focus. Fourth, embodying responsible food waste management will promote new conversation regarding food waste, and practical alternatives. Finally, successfully installing this project, will provide an opportunity to showcase another successful project. The project could have accompanying interpretive signage and could be used as an ongoing learning experience by students and the larger community.*

**3. Outcome:**

Students will determine the feasibility, and appropriate application of an on-campus Biogas Digester. Successful installation of an on-campus biogas digester will minimize emissions related to traditional decomposition. Additionally, waste is not being transported, so there are external factors like transport to consider. Finally, the digestion is providing a fuel source that can be used in place of standard electricity.

**4. Partners:**

Although official collaboration has not been yet solicited, there may be interests in collaborating from the Campus Center for Appropriate Technology, the Waste Reduction Resource Awareness Program, Green Campus, the Society for Women Engineers, the Schatz Energy Research Center, Engineers Without Borders, and various Engineering classes and professors.

**Appendix:**

"UC Davis Biodigester Turns Campus Waste into Campus Energy." College of Engineering UC Davis, 2 Feb. 2015, [engineering.ucdavis.edu/blog/uc-davis-biodigester-turns-campus-waste-campus-energy/](http://engineering.ucdavis.edu/blog/uc-davis-biodigester-turns-campus-waste-campus-energy/)

