# *From time to time unforeseen challenges or opportunities can affect the planned budget, timeline, or overall goals of a project funded by the Student Sustainability Committee. Past examples of these situations include projects coming in under budget but having additional opportunities available, or inclement weather delaying the planting of agriculture projects.*

# *Below please include a brief project summary and your requested changes. Attach additional documents as needed. If you have any questions, please contact the Student Sustainability Committee at sustainability-committee@illinois.edu.*

# General Information

**Project Name:** Pilot-Scale Implementation of Environment-Enhancing Energy (E2E) Paradigm for Food Waste to Biofuel and Biomaterial

**Total Amount Requested from SSC:** $150,000

**Date of Scope Change Submission: 10/7/2021**

# Contact Information

Project Lead Name: Yuanhui Zhang

Scope Change Applicant Name (if different than Project Lead):

Unit/Department: Agricultural and Biological Engineering

Email Address: yzhang1@illinois.edu

# Project Information

Please provide a brief background of the project, the goals, and the desired outcomes:

Please address all of the above items including concrete examples of the desired outcomes

Our research team proposes to augment management of food waste produced through the dining halls on UIUC campus, via hydrothermal liquefaction (HTL) for biofuel production. This is an expansion of our Environment-Enhancing Energy (E2E) research program focusing on Waste-to Energy. More than 34 million tons of food waste were generated in the US in 2010 (EPA, 2010). According to Kelly Boeger, the Menu Management Dietician at the University of Illinois, 344,559 pounds (dry mass) per year of food goes unused by the cafeterias on campus, which was worth $425,735 or 2.46 % of the overall budget as of 2015 (Hettinger, 2015). This unnecessary spoilage costs at least the same amount for waste disposal and treatment, in addition to environmental burdens. On the other hand, this spoilage presents an opportunity for UIUC to implement new resource recovery technologies to alleviate waste and increase student activities directly related to sustainability. Hydrothermal liquefaction (HTL) is a technology that utilizes elevated temperatures and pressure to convert wet biomass to oil that can be used in motors or asphalts. This process potentiates greater sustainability by simultaneously remediating the food waste and producing renewable energy.

Please provide a brief summary of how students will be involved in the project’s changes:

Any relevant opportunities for student involvement in your project

Currently, our team is comprised of two PhD students and two undergraduate students who will continue on with Stage-II under the supervision of Professor Yuanhui Zhang, a leading expert in the area of HTL of wet biowaste. Several undergraduate students that worked on Stage-I have graduated, and we will recruit more if this proposal is approved. The graduate students will lead the efforts during the project, while educating and instructing undergraduate students who will be involved in the various research and community outreach aspects of the ongoing work. Specifically, this project involves some chemical laboratory tests organized by two graduate students, which will be a good opportunity for undergraduate student to learn and improve their experimental and analysis skills. Undergraduate students will involve in different tasks such as food waste collection, conversion to biocrude oil, product upgrading, campus presentations, and other key responsibilities. These opportunities and presentations can include conferences, events such as Engineering Open House (EOH), and visitor tours. Overall, students will gain valuable practical experience on the sustainability of the campus and beyond.

Mark the components for which you are applying to change. (Mark all that apply.)

[ ] Overall goals: No change

[ ] Budget: No change

[ ] Timeline

* Original Timeline: December 21, 2021
* New Timeline: June 30,2022

[ ] Other

Please provide a brief summary of your requested scope change. How is your request different from your original plan? Please explain the reason for the proposed changes.

A brief summary of total project timeline and key milestones

Due to pandemic, the project was first extended to Dec 31, 2021.  However, the persisted COVID situation further delayed some important tasks. Two major pieces of equipment for the pilot HTL reactor were delayed for delivery (Reactor coil and heat exchanger).  We requested the manufacturer for the parts in July 2021.  Initially the supplier said it would take four weeks, but now it said take four months (short of material supply on their side) -- The delivery date is anticipated on Nov 1 2021.  Without the reactor coil and heat exchanger which requires special design with high-grade stainless steel, the reactor is on a hold mode.  We plan to have the reactor fully assembled before the Christmas after receive the parts in November, and it will take another three months to complete the testing and data collection.  Considering the holiday season in December, I’d respectfully requested your approval of the extension.

Additional comments (Optional)

Any additional comments/relevant information for the project proposal