**Funding Criteria**

**A. General Rules**

1. Students, faculty, and staff are encouraged to submit requests for funding. Student-led projects require a faculty or staff sponsor in order to have funds awarded.
2. Funding can only go to university-affiliated projects from students, faculty, staff, and departments.
3. All SSC projects must make a substantial impact on students. This may be a direct impact or an impact through education and engagement. All SSC funding is 100% from student green fees, so the projects funded by the students must benefit them.
4. SSC encourages innovation and new technologies – creative projects are encouraged to apply.
5. Unless a type of expense is specifically listed below as having restrictions, SSC can generally fund it. The items referenced below should not be taken as comprehensive list.

**B. Things SSC Can Fund, On A Case-By-Case Basis**

1. SSC can fund feasibility studies and design work; however, it must work toward ultimately addressing a sustainability need on campus.
2. SSC can fund staff positions that are related to improving campus sustainability. Strong preference will be given to proposals receiving matching funding from departments and/or plans for maintaining continuity of the position after the end of the initial grant.
3. SSC can fund outreach events with a central theme of sustainability, provided their primary audience is the general campus community.
4. SSC discourages funding requests for food and prizes but will consider proposals on a case by case basis that prove significant reasoning.
5. SSC can fund repairs and improvements to existing building systems as long as it works toward the goal of improving campus sustainability; however, a preference is shown to projects utilizing new or innovative ideas.
6. SSC can provide departments with loans for projects with a distinct payback on a case by case base. Loans will require a separate memorandum of understanding between SSC and departmental leadership pledging to repay the award in full and detailing the payback plan.

**C. Things SSC Will Not Fund:**

1. SSC will not fund projects with a primary end goal of generating revenue for non-University entities.
2. SSC will not fund personal lodging, food, beverage, and other travel expenses.
3. SSC will not fund any travel expenses.
4. SSC will not fund tuition or other forms of personal financial assistance for students beyond standard student employee wages.

**Your Step 2 funding application should include this application, the supplemental budget form, and any letters of support.**

*Please submit this completed application and any relevant supporting documentation to* *Sustainability-Committee@Illinois.edu**. The Working Group Chairs will be in contact with you regarding any questions about the application. If you have any questions about the application process, please contact the Student Sustainability Committee at* *sustainability-committee@illinois.edu.*

**General & Contact Information**

**Project Name:** A Living-lab Platform Based on the Campus Instructional Facility Geothermal Project

**Total Amount Requested from SSC:** $10,000 (can be deducted to $9318.16 if necessary)

**Project Topic Areas:** [ ]  Land & Water [x]  Education [x]  Energy

[ ]  Transportation [ ]  Food & Waste

**Applicant Name:** John Zhao

**Campus Affiliation (Unit/Department or RSO/Organization):** Department of Agricultural & Biological Engineering

**Email Address:** zilongz2@illinois.edu

**Check one:**

 [x]  This project is solely my own ***OR***

 [ ]  This project is proposed on behalf of (name of student org., campus dept., etc.):

**Project Team Members**

|  |  |  |
| --- | --- | --- |
| **Name** | **Department** | **Email** |
| John Zhao | Department of Agricultural & Biological Engineering | zilongz2@illinois.edu |
| Xinlei Wang | Department of Agricultural & Biological Engineering | xwang2@illinois.edu |
| Yu-Feng Lin | Illinois Water Resources Center | yflin@illinois.edu |
| Andrew J. Stumpf | Illinois Water Resources Center | astumpf@illinois.edu |

**Student-Led Projects (Mandatory):**

Name of Faculty or Staff Project Advisor: Xinlei Wang
Advisor’s Email Address: xwang2@illinois.edu

**Financial Contact *(Must be a full-time University of Illinois staff member)***

Contact Name: Samantha Hurt

Unit/Department: Department of Agricultural & Biological Engineering

Email Address: sjhurt@illinois.edu

**Project Information**

*Please review the proposal materials and online content carefully. It is highly recommended you visit a working group meeting sometime during the proposal submission process.*

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

*You may copy and paste your Step 1 application answer if nothing has changed.*

The goals of this project consist of:

1. Thorough investigation on the CIF buildings’ envelopes’ thermal properties, indoor and outdoor environments, weather conditions’ variation over a year, and the geothermal parameters.

2. Construct two models for designing the traditional HVAC system and the renewable geothermal HVAC system, based on input building information, ground loop heat exchanger geometries and climate conditions.

3. Develop an open-source, hands-on-easy tool software to quantitively show the real-time energy transfer and energy savings of the CIF project. Convert the CIF geothermal project to a living-lab for educational purpose. Bring more visible information to the sight of public and students to arise their awareness of importance of renewable energy on campus.

The desired outcomes include:

1. A software open to public and students to show the real-time savings on energy consumptions by using CIF geothermal heat exchanger.

2. A smart screen to display the animation and real values related with energy savings.

3. A report which lists the parameters and explain the models.

**Where will the project be located? Are special permissions required for this project site?**

*If special permission is required for this location, please explain and submit any relevant letters of support with the application.*

**This project will be located at the Campus Instructional Facility Building (Specific Location to be determined) on campus. We had meetings with Mr. Qu Kim and Mr. Clarence Odom, who both are representatives from CIF project committee, to eplain our project. Right now we have all the signature from Mr. Odom, Mr. Kim and Ms. Kristin McMurray.**

**Other than the project team, who will have a stake in the project? Please list other individuals, groups, or departments affiliated directly or indirectly by the project. This includes any entity providing funding (immediate, future, ongoing, matching, in-kind, etc.) and any entities that benefit from this project.**

*Please attach letters of commitment or support at the end of the application.*

No

**How will this project involve and/or benefit students?**

*This includes both direct and indirect impact.*

**• The proposed project can be incorporated as part of the curriculum so that students can play a role in the project. Professor Xinlei Wang teaches two courses TSM 438 – Renewable Energy Applications and ABE 436 – Renewable Energy Systems which are both closely related with the utilizations of geothermal energy. This provides a great opportunity to involve students into geothermal space heating/cooling design.**

**• Undergraduate/graduate students will also be hired in the experimental measurements, which involves gathering data regarding the indoor and outdoor temperature variation. The CIF building can serve as a living lab for further educational purposes.**

**• The results of this project will be presented in the seminar and other events on our campus to increase students’ awareness on energy savings.**

**• The project will enable students to deeply understand the characteristics and utilization of geothermal energy in sustainable ways of space heating and cooling. By accessing to the open-source software toolbox, students can more clearly understand the energy-savings and emission reductions from the geothermal applications. This will enhance the students’ awareness on the importance of geothermal energy and stimulate further interests in this area.**

**How will you bring awareness and publicize the project on campus? In addition to SSC, where will information about this project be reported?**

• An intelligent display screen will be built on campus to show the specific numbers in terms of energy savings, reduction of carbon dioxide and decreased maintaince cost using the model developed in this project.

• The results of this project will be presented in the seminar in our campus to increase people’s awareness on the importance of renewable energy applications. Annual events such as Engineering Open House, Explore ACES, and Environmental Horizons will also be utilized give presentations to educate the students and citizens of Illinois.

# Financial Information

*In addition to the below questions, please submit the supplemental budget spreadsheet available on the Student Sustainability Committee* [*website*](http://ssc.sustainability.illinois.edu/?page_id=2087)*. Submission of both documents by the submission deadline is required for consideration of your project.*

**Have you applied for funding from SSC before? If so, for what project?**

No.

**If this project is implemented, will you require any ongoing funding required? What is the strategy for supporting the project in order to cover replacement, operation, or renewal costs?***Please note that SSC provides funding on a case by case basis annually and should not be considered as an ongoing source of funding.*

No.

**Please include any other obtained sources of funding. Have you applied for funding elsewhere?**

*Please attach any relevant letters of support as needed in a separate document.*

No, We did not apply for funding elsewhere

# Environmental, Economic, and Awareness Impacts

**How will the project improve environmental sustainability at the Urbana-Champaign campus? If applicable, how does this project fit within any of the** [**Illinois Climate Action Plan**](https://icap.sustainability.illinois.edu/) **(iCAP) goals?**

• Geothermal energy has a large potential in alternating the fossil fuels and electricity in traditional space heating, due to its clean, quietness, high efficiency and long-term economics. The implementation of geothermal heating systems can largely reduce the university’s energy consumption. This project will arise public’s awareness of the importance of utilizing renewable energy applications by specifically quantitively showing the values of energy savings and emission reductions from the CIF geothermal project.

• Based on the product of this project, students can have a chance to design their own geothermal project according to their preferred conditions. This will greatly improve students’ interests in geothermal and renewable energy applications.

• This project is closely related with the strategic framework of iCAP, because the utilization of shallow geothermal energy will reduce the emissions and carbon footprint, thus having a large positive impact on preventing the rapid climate change. It will help strengthen the leadership of UIUC in renewable energy applications and the iCAP commitment. Given the analysis based on this project, the shallow geothermal energy can be utilized much more efficiently on campus. This will enormously aid in the leadership of UIUC in the aspect of geothermal applications over the country.

**How will you monitor and evaluate the project’s progress and environmental outcomes? What short-term and long-term environmental impacts do you expect?**

*Some examples include carbon emissions, water conservation, green behavior, and reduced landfill waste.*

**This project consists of 3 phases, a quarterly report will be delivered to present the progress of the project.**

**Both short-term environemtnal impacts will be the energy-savings and the reduction in fosil fuels' emissions. The long-term impact will be the education of students on UI campus with information from this project.**

**What are your specific outreach goals? How will this project inspire change at UIUC?**

**The outreach goals of this project:**

**• Develop an open-source, hands-on-easy tool software to quantitively show the real-time energy transfer and energy savings of the CIF project. Convert the CIF geothermal project to a living-lab for educational purpose. Bring more visible information to the sight of public and students to arise their awareness of importance of renewable energy on campus.**

**• Inspire changes: This project will arise public's awareness on the significance of geothermal energy. Students and citizens will be more interested in related topics.**

**If applicable, how does this project impact environmental injustice or social injustice?**

**The development of shallow geothermal energy has long fallen behind the step of solar and wind energy due to its high initial cost. This project will directly reflect the potential competiveness of shallow geothermal energy for space heating/cooling, which will largely aid in the development of geothermal energy in the future.**