STUDENT SUSTAINABILITY COMMITTEE

Funding Application – Step II

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: Illini Formula Electric SiCVerter & Powertrain
Total Amount Requested from SSC: $100,000

Project Topic Areas: ☐ Land & Water ☐ **Education** ☐ **Energy**
☐ **Transportation** ☐ Food & Waste

Applicant Name: Akash Chandra & Alexander Stevens
Campus Affiliation (Unit/Department or RSO/Organization): Illini Formula Electric - RSO
Email Address: akashc3@illinois.edu & ams22@illinois.edu

Check one:
☐ This project is solely my own ***OR***
☐ This project is proposed on behalf of (name of student org., campus dept., etc.): Illini Formula Electric - RSO

Project Team Members

Name	Department	Email
Akash Chandra	Illini Formula Electric	akashc3@illinois.edu
Alexander Stevens	Illini Formula Electric	ams22@illinois.edu
Eddie Kwon	Illini Formula Electric	bk7@illinois.edu
Michael Stoens	Illini Formula Electric	mstoens2@illinois.edu
Michael Philpott	Mechse	mphilpot@illinois.edu
Mark Pinson	ESDC	mpinson@illinois.edu

Student-Led Projects (Mandatory):
Name of Faculty or Staff Project Advisor: Michael Philpott
Advisor's Email Address: mphilpot@illinois.edu

Financial Contact *(Must be a full-time University of Illinois staff member)*
Contact Name: Sarah Power
Unit/Department: Mechanical Science and Engineering
The Grainger College of Engineering | University of Illinois

Email Address: sfpower2@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.

Industry leaders like GM, Ford, John Deere, and Tesla are adopting more environmentally friendly technologies. These leaders and other employers are actively recruiting students with relevant experiences designing, building, and working on electric vehicle systems. Using the SSC grant, IFE would give students experience in electric vehicle systems, helping build skills sought after in industry.

We will be building a new powertrain for the car. This involves a student designed and built inverter (motor controller) along with gearboxes and brakes. We will be building five units, with four being used on the car and one for testing and backup. We will increase the efficiency of our current inverter while matching the current power output. Our current inverter wastes 3kW as heat, our custom inverter will only produce 1 kW of waste heat. Our custom inverter will also use regenerative braking, which will increase the energy efficiency of our car.

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.

The project will be in the ESDC lab (formerly ESPL). This is where the team's workshop is located.

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.

- FSAE
- University of Illinois
- Illinois Electrical and Computer Engineering
- Illinois Mechanical Science & Engineering
- SORF
- John Deere
- Rivian
- Telsa
- Caterpillar
- EControls
- Brunswick

How will this project involve and/or benefit students?
This includes both direct and indirect impact.

- Students will get hands on experience with motors and electric powertrains, which can be used to apply for internships.

- While designing the inverter, students will be able to work and gain experience in Power Electronics, Control Systems, and Cooling Power systems.
- Students will be able to learn how to maximize efficiency of a inverter when paired with a certain motor for drive applications.
- Students will gain a better understanding of how to design for manufacturability with the upright and the gears.

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

We will be recruiting for team at events like Campus Quad day, E-Night and Engineering Open House in addition to other outreach events.

The information for the project will be reported to sponsors as needed and will be sent to FSAE.

Financial Information

In addition to the below questions, please submit the supplemental budget spreadsheet available on the Student Sustainability Committee website. 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?
We applied in the fall 2016 and in the fall of 2019. We applied for general funding for Illini Formula Electric.

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.
If this project is implemented, we will not require ongoing funding besides what we applied for. We will support the product by using our departmental, grant, and donation funding.

We are applying to build 5 inverters along with the funding for 5 motors and sets of gears and hubs. We will use 4 on the car and have 1 as backup.

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.

MechSE Departmental Funding -$9,900
ECE funding- $1,000
EDC allocation (applied)- $9000
SORF allocation- $10,000
Monetary donations- $ 15,500

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 (iCAP) goals?
This project will help teach students about electric vehicle technology and help teach the next generation of engineers, helping produce the next generation of electric vehicles. The project will also bring awareness to the improving state of EV technology.

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.

We want to teach people about the benefits of electrification of the automobile industry.
It is imperative for that we reduce our reliance on fossil fuels. Moving to fully electric vehicles is a large step in the right direction. One of the large reasons that electric vehicles are not as popular is the drivable range, and the amount of power. When compared to a combustion vehicle electric cars often do not have the same range because the power density of batteries is not as large as gasoline. By making our car more efficient than a gasoline car we are able to increase the range. In addition by making our car perform better we are helping to emphasize how electric cars can perform just as good or better than traditional internal combustion cars.

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

By going to elementary, middle, and high schools we are trying to show the younger generation the benefits of driving an electric car in the hopes that we can both inspire some of the to help develop even better technology than we have today, and use more efficient technology by switching to electric cars.

If applicable, how does this project impact environmental injustice or social injustice?
N/A