# *Thank you for your commitment to green initiatives at the University of Illinois. One of the final steps in completing the terms of the funding agreement for your project is the submission of a Final Report with key information about your project. You will also need to submit a detailed report of expenses (if you don't list it within this document) as well as supporting photos to showcase your project.*

# *Please be as accurate as possible in describing the project (including possible setbacks or challenges in meeting the initial goals of the project). Not fully meeting your project's goals will not disqualify you from making future funding requests as long as your reports are as complete and accurate as possible. If you have any questions, please contact the Student Sustainability Committee, at* *sustainability-committee@illinois.edu**.*

**Project Name:** Illini Formula Electric

**Date of Report Submission:** 5/31/2019

**Project Purpose:**

Illini Formula Electric (IFE) is and organization to promote engineering design and manufacturing experience through developing an eco-friendly fully-electric formula racecar to compete at international competitions hosted by the Society of Automotive Engineers (SAE). By promoting electric transportation, IFE is spreading the concept of sustainable energy to future engineers and the local community.

**Project Summary:**

IFE is currently nearing the completion of its third electric racecar since the funding award from the Student Sustainability Committee. The organization has shown great growth and improvement, and the funding from the SSC has been critical to this growth and success. The newest vehicle has been rebuilt from scratch with a new battery pack, new motor, and new motor controller. These high-investment components make the IFE vehicle much more competitive with other university teams at the competition and much more powerful and efficient as a form of transportation in comparison to gas-powered vehicles. Purchasing these components was only made possible by the SSC funding award.

The team has continued to grow and recruit new members each year, and performance at our annual competition has continually improved.

**Summary of Project Expenditures:**

The project used the $24,750 of the SSC funding award. Some of the award was used for various mechanical component purchases, but the majority was saved for the new motor, motor controller and battery cell purchases for the 2018-2019 vehicle. These major purchases were saved up for by the team as they had to be done in coordination with a complete vehicle redesign.

**Project Progress to Date:**

The major milestones for IFE have been our annual competitions in June in Lincoln, NE, hosted by the SAE organization. Each year IFE develops a new racecar for this competition. At the competition, teams compete in static events such as engineering design judging, vehicle cost analysis, and product marketing presentations, as well as dynamic autocross racing events. In the electric division of the competition, there is a very rigorous electrical inspection, along with mechanical inspections, to pass before the team can compete in the dynamic events. In 2016, the team passed the electrical inspection for the first time, but did not have time to complete the remaining inspections before the end of the competition. In 2017, the team built off the successful electrical system, passed the electrical inspection and were able to compete in the autocross and endurance dynamic events. We placed 7th in autocross and 4th in endurance, and 16th overall, which were major achievements. In 2018, many of the electrical and mechanical system designs of the racecar were improved. This led to a 5th place finish the design event at competition. The team was also able to pass the inspections and achieved 7th in autocross again, but a failure of an electrical component prevented the team from competing in the endurance event. Overall the team achieved 13th place. For 2019, the vehicle has been completely redesigned with a more powerful and efficient battery pack and a more lightweight motor, which will allow the racecar to be competitive with the top teams at competition. The vehicle is currently being completed and tested for the June competition which is just a couple weeks away.

**Problems/Challenges Encountered**

As with any major engineering project, there have been many challenges and setbacks that affected the designs and timeline of the vehicle constructions. Some of the most critical components purchased the year, the motor and the battery cells, were purchased from foreign companies, and the ordering and shipping processes of these components delayed the timeline of the vehicle quite a bit. Key to minimizing the delays and setbacks has been maintaining good project management of the team through weekly meetings and organized task lists.

**Student Involvement and Outreach to Date:**

IFE is a completely student-run organization. We maintain a leadership team of around 15 leaders each year, with older leaders graduating and newer members stepping up into leadership roles. Student involvement includes engineering design and manufacturing experience, as well as team and project management, budgeting and finances, and outreach, promotion, and sponsor communications.

We have recruited close to 100 new members this year, which is similar in scale to most years. Many of these members have worked hard throughout the year with the team and look to becoming more involved as future leaders.

Our student members are typically engineering students, mostly from mechanical and electrical engineering, but include members from all engineering disciplines, as well as some students from business and LAS.

**Marketing and Promotion Efforts to Date:**

IFE markets ourselves to potential members via our website, social media, and campus events like Quad Day and the spring Engineering Open House. The team reaches out to many companies seeking donations and sponsorships in return for recruitment from our team members for jobs and internships. We also promote our team to wider audiences through social media and outreach events.

We attend Quad Day each year alongside the other engineering SAE vehicle teams to recruit new members and promote the organization by displaying our latest vehicle and explaining the projects the team works on and the experiences new members can gain. We also recruit and promote ourselves online through our website (illiniformulaelectric.com), Facebook ([www.facebook.com/IlliniFormulaElectric](http://www.facebook.com/IlliniFormulaElectric)), YouTube (<https://www.youtube.com/channel/UCPJhJ_exYPd9vmN6OqDQEBA>), and Instagram (<https://www.instagram.com/illiniformulaelectric/?hl=en>). We use these platforms to thank our sponsors and donors as well.

Engineering Open House is a major event for IFE, where we demonstrate one of our vehicles driving next to Grainger Library for people from campus and the local community to showcase our engineering efforts and the power and potential of clean, electric-powered vehicles. We also attended the Urbana Drive Electric Fair in the fall of 2017 to join a community promoting clean energy and electric transportation.