# *Thank you for your commitment to green initiatives at the University of Illinois. One of the ongoing requirements listed in the terms of the funding agreement for your project is the submission of semesterly reports with key information about your project. In addition to this form, please provide additional financial documentation and/or progress photos if available.*

# *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:** Eco Illini Supermileage

**Date of Report Submission:** 1/11/2019

**Project Purpose:**

The purpose of this project is to build a porotype vehicle to compete at Shell Eco Marathon Americas and SAE Supermileage Competitions, with a goal of achieving the highest fuel efficiency possible. We aim to teach our members how to design efficiency parts, system, and vehicles. We also help them understand the importance of efficiency in industry, especially when it comes to using less material and reducing manufacturing time. We also aim to start a conversation with students on campus about the importance of fuel efficiency and demonstrating what is possible. The focus of these funds is to provide the team with new parts to replace those that were worn down and to provide the team with a new chassis Dynamometer to test the efficiency of both our engine and drivetrain, and achieve a better engine tune.

**Detailed Accounting of Expenditures to Date:**

To date we have spent $1,848.53 out of the $9,720 allocated. The money has thus far been spent on new tires, replacement batteries and BMS, replacement sensors, wires and other electrical components, and new pistons. A detailed budget is shown below

**Project Progress to Date:**

The biggest item in this project is the Dyno. While we have not purchased the dyno yet we will have it very soon. After discussing our options amongst our team, alumni who work in industry with dynos, and the supplier, we decided to opt for an inertial chassis dyno. This will give us a realistic simulation of our competition runs, as we accelerate and then coast. An inertial dyno will allow us to practice this. The chassis dyno will also allow us to take into account our losses in the drivetrain and both measure them and tune with the drivetrain and wheel in mind, giving us a more holistic tune. We can also take the dyno with us to competition, which would allow us to fine tune our engine to the environment (temperature and altitude). At a later date we can also add an eddy current dynamometer to this set up, which would allow us to program acceleration profile and conduct steady state testing.

We have contacted the manufacturer and they have a model built that they can sell to us right at our price point. It is being ordered by our business office should be here in a month or two.

We were able to purchase new batteries, a charger, and sensors for the car. Our batteries were old and losing total capacity. This has allowed us to test for much longer than we would have on the old batteries. The new sensors have been installed and are much more reliable than the old sensors were.

We were able to purchase a large stock of the Michelin tires. These tires were built for the Shell Competition and have been discontinued. There are among, if not the most, efficient tires on the market. These should serve the team for years and last until a suitable replacement is made or found.

We also purchased new wires and other electric components. We were able to wire the car using these components as opposed to our old hardware, allowing us to use less and make our wiring much neater. Our neat and easy to follow wiring earned us praise at competition from the technical inspection team, being one of the better teams they saw.

Lastly, we used some of the funds to purchase new pistons. While these we not on the original budget, we saved money in other areas allowing us to purchase them. They were needed at a rather dire time. We had two engine accidents in March that resulted in the loss of some of our pistons, leaving us with only one older, low compression piston. We purchased these pistons to replace the ones lost and have spares. We have been accident-free since and the engine has been running smoothly.

Last year in competition our new car earner us 12th place with 614mpg. This is much lower than we had hoped for but we have identified our problems and are ready for a much better season. Our biggest issue was we encountered a fuel leak. The leak was not discovered until the last day of competition when it could not be fixed in time. This had a large impact on our fuel economy and kept us from being successful. We also had a bad gear ratio which meant we had to run our engine more than we would have liked to. Finally, we had a lot of issues with our body panels that increased our drag. We have resolved the fuel leak and gear ration, and are redoing some of our body panels to correct this. We hope to bounce pack and break 1000mpg this year.

**Student Involvement and Outreach to Date:**

The 30 students on our team have designed, built, and tested the car along every step of the way. With student outreached EOH was our largest event. We talked to many students and community members and our car and mission. We also used Quad Day to engage with a large amount of students and spread our mission. Unfortunately the Homecoming Parade was canceled this year. Thus far we have struggled to meet deadlines and have been less focused on outreach. Next semester we will aim to hold more outreach activities.

**Marketing and Promotion Efforts to Date:**

This year we have been very active on Facebook, attempting and succeeding to make weekly, and sometimes biweekly posts. This helps us engage with the student body that follows us and with the greater community. We also attended the McHenry County Green living Expo and showed off our car and developments.

**Additional Comments:**

We are grateful for the support that SSC has provided thus far and are looking forward to tuning on the new dyno.