Overview
Our capstone assignment was to construct a solar powered electric vehicle in order aid in the day-to-day operations of the Penn State Student Farm on Penn State’s University Park campus. The vehicle was designed with the ability to carry up to 150 pounds in cargo while using a renewable source of energy to power the vehicle – a solar charging station that powers a 52 kW battery. The vehicle was rated to be able to travel up to 80 miles on one battery charge, while upholding all the laws and regulations of electric vehicles in the state of Pennsylvania.

Objectives
- Design a solar-powered electric bicycle that reduces the miles travelled by van, while providing a source of electricity for day-to-day operations on the farm (i.e. charging phones, running appliances, and powering the bicycle).
- Construct a charging station for the bicycle (conceptual design for the purpose of this project) that uses a renewable form of energy (solar power) to provide energy for the battery. This in turn reduces the farm’s incurred costs and the overall carbon footprint.

Approach
- Conducted site visits to the Student Farm
- Reviewed instructor requirements for EGEE 464
- Had our sponsor complete a survey laying out all the client needs
- Procured necessary materials for the conversion process
- Converted a normal bicycle to the Solar Bike
- Tested the trailer and the bicycle to make sure that they fit the specifications of our sponsor

Outcomes
- The client will be provided with a sustainable source of energy via the battery to power everyday appliances
- The client’s carbon footprint will be greatly reduced by using the Solar Bike rather than the van
- The client will save money by not having to pay for gasoline for the van
- This Solar Bike prototype can be reproduced fairly easily at a low cost allowing for the construction of more bikes on a by-needs basis
- The charging station design was completed, therefore, another capstone group could easily construct the design