



HelioSucrose

hatchTank EV Carport

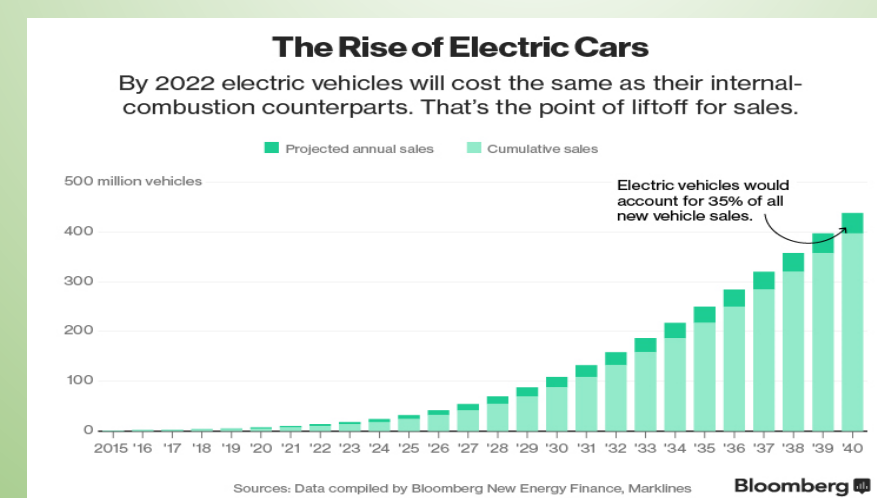


Abstract

The purpose of this project is to create an EV carport for commercial fleets that is powered entirely by solar energy and can be combined to create an array of carports. Our team's task was to implement a microcontroller with a maximum power point tracking algorithm integrated to optimize the circuit. A battery management system will also be utilized in the circuit for direct monitoring of the batteries and the rest of the circuit. These two systems combined will allow for an optimized solar charging experience utilized for commercial car fleets.

Need for product

With the increase in electric vehicles (EVs) on the road between civilian and fleet vehicles, a solution is needed to reduce demand on an already loaded power grid. In addition to demand, the inability to store energy produced has led to "rejected energy". As demand for EVs increase, the importance for a system that can not only produce, but also store that energy has become critical to ensure fleets and individuals can get power to charge their vehicles.



Proposed Solution

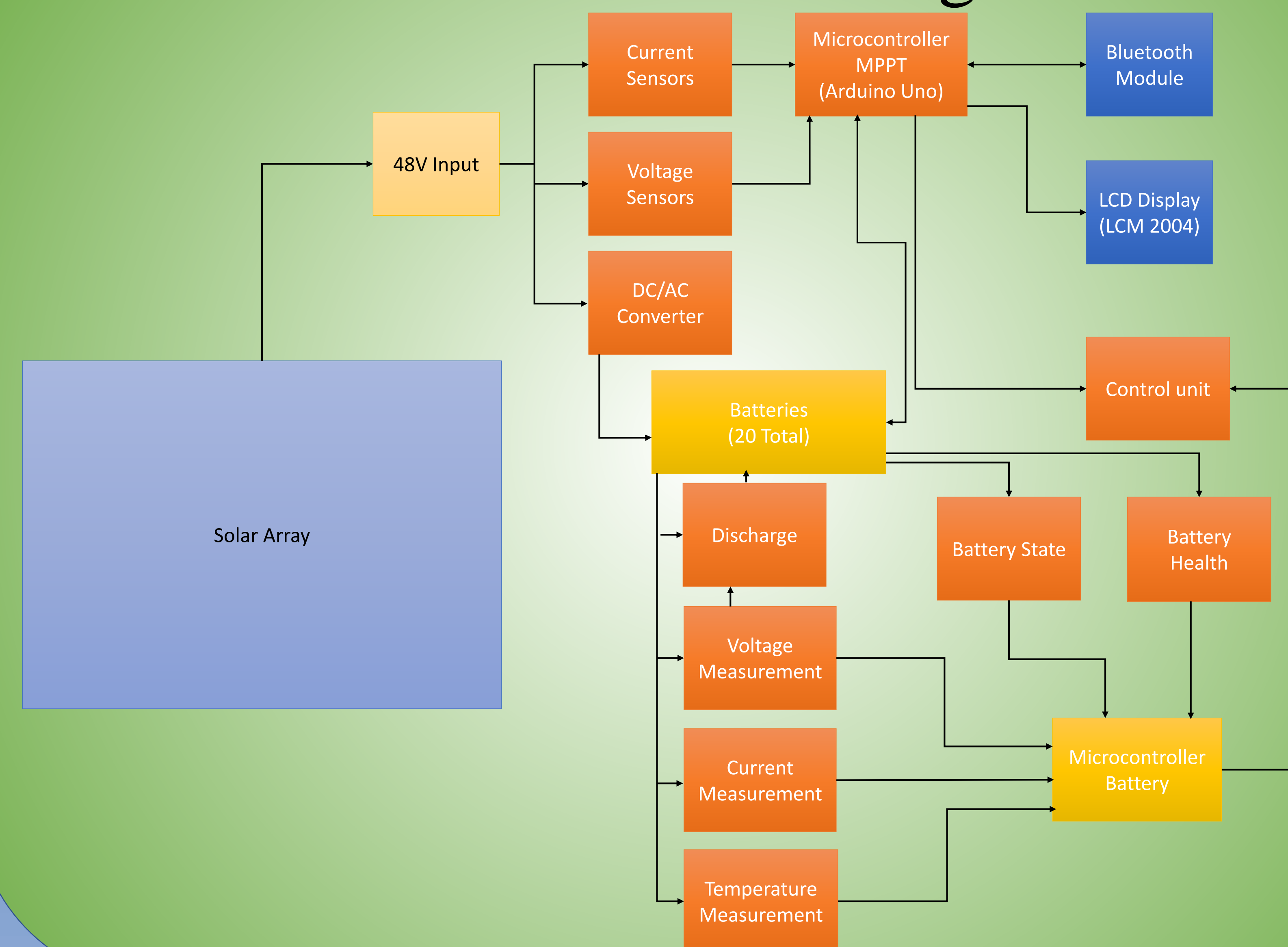
To solve this crisis, we teamed up with HelioSucrose to develop an EV carport that can be combined in unison with other identical carports to create a solar charging array, with the intent to power commercial car fleets. A microcontroller will be utilized to run a maximum power point tracking algorithm to determine if the current and voltage being supplied is optimal. A BMS system will also be implemented to closely monitor all data and ratings affecting the batteries. The microcontroller will output the most basic of this data onto an LCD display attached to the carport, while the more in-depth statistics and calculations will be displayed through a webpage via Bluetooth.



Acknowledgments

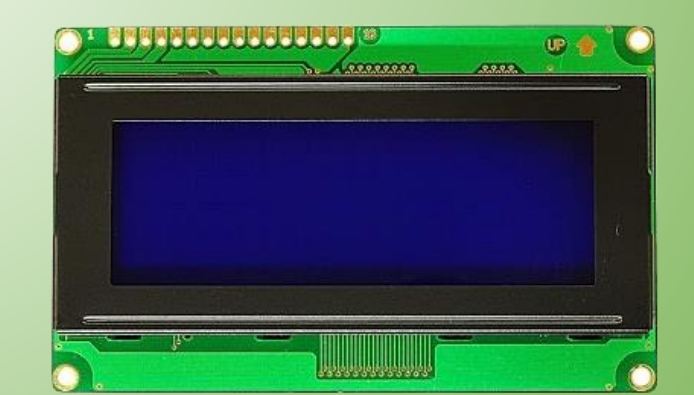
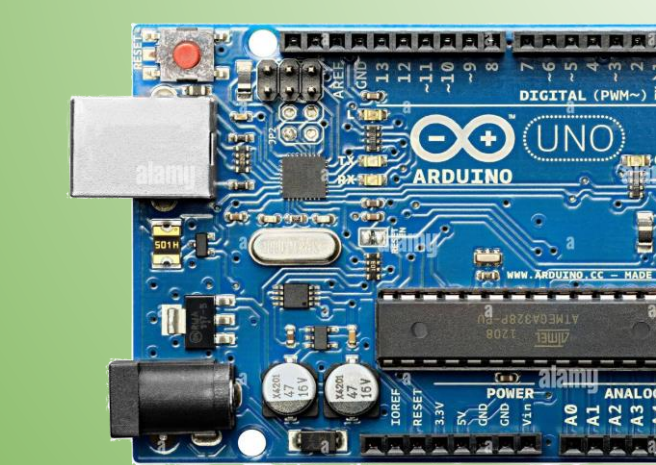
The MILK team would like to give a special thanks to Doctor Morton and Doctor Ahmed for the technical support of our project.

Functional Block Diagram



Components

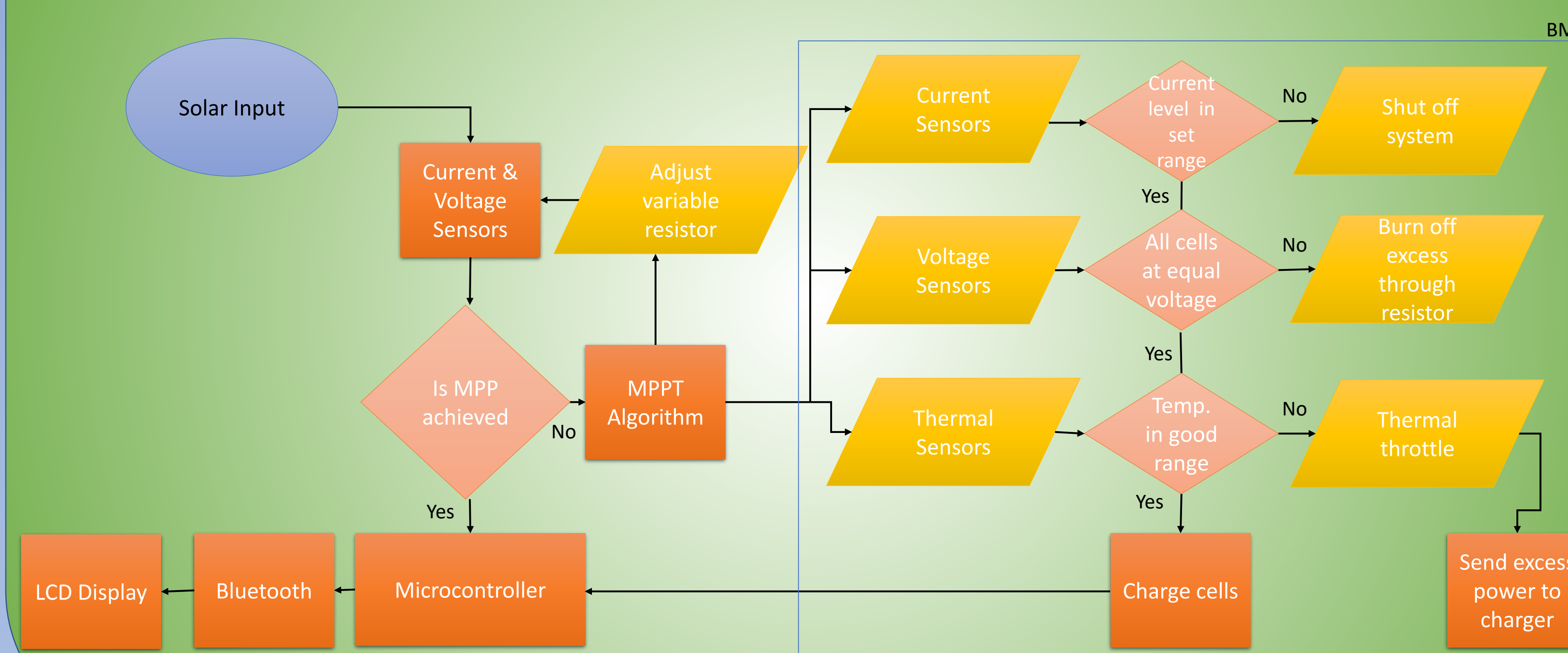
- Arduino Uno
- Bluetooth Module
- LCM2004 LCD
- Batteries
- Custom PCB



Summary

Having a place to not only charge an EV fleet, but also store energy for later will be a major benefit as EVs continue to expand in popularity. With our schematic and parts now selected, our next step is to start designing the PCB for the system. Once our board is fully designed, we will look to join with the Civil engineer team designing the carport and begin assembling the final product.

Software Flowchart



Glossary

- BMS** – Battery Management System – System implemented to closely monitor individual battery cells and charge/discharge as needed
- MPPT** - Multi power point tracking – Algorithm to calculate the optimal current and voltage levels to output maximum power
- Arduino Uno** – Advanced microcontroller, brains of the operation
- EV** – Electric vehicle
- Carport** – Stationary enclosure to house vehicle

SolarMILK

- Maria Camacaro
- Isaac Martinez
- Lucas Bardshar
- Kristopher Sekiguchi

