# Engineering Team Goal – Environmental Impact

By March 22, 2021, in order to be completely powered by renewable sources, connect a solar power unit that charges fast enough to be fully charged at least every 3 days in mostly clear weather conditions, in spring, summer, and fall in central Missouri.

## Plan of Action to Achieve This Goal

1. Research possible battery options that can hold the estimated power consumption of 4+ hours usage and choose the one that has the longest lifetime with reasonable price by March 1, 2021.
2. To achieve a full charge over 3 days in good weather conditions, select a solar panel with enough energy production to generate that power in 24 hours of direct sunlight by March 1, 2021.
3. Acquire or construct a maximum power point controller to optimize battery charge time based on our battery and solar panel statistics by March 1, 2021.
4. Test the prototype in various conditions from March 8-20, 2021.
5. On March 21, 2020, using the results from step 4, determine if our system charges fast enough to be available after 3 days.

## Goal Metrics

### Metric Measurand

The elapsed time to completely recharge the battery from a fully discharged state using only solar power will be the measurand.

### Goal Achievement Threshold

The goal is achieved if the charge rate is at least 80 minutes operating power, or at least 33% total battery capacity, per day, charging in partly cloudy to clear conditions during spring, summer, and fall months in Columbia, Missouri.

### Measurand Measurement Method

From full discharge, measure the percentage increase in state-of-charge per hour and per day under various weather conditions during March 2021 in Columbia, Missouri. These values will be determined using the coulomb counting method.