

Solar Boost Project

Portable Solar-Powered Charging Station for
Outdoor Events

Team Stage

Stage: Fall 2024, Stage 3

Goal: Developing a compact, portable, solar-powered charging station

Team Members

George Williams: Project Lead,
Mechanical Engineering

Sebastian Martinez: Design Lead

Armando Botiller: Customer
research, Design

Aramis Jang: Testing and
Prototyping, Documentation Lead



Background of the Project

Solar Boost was initiated to solve a critical problem: Lack of reliable charging stations at outdoor events.

Solution: harness solar power to charge multiple devices safely and securely.





Vision:

A secure, mobile phone charging solution for outdoor events, military missions, or rural areas without grid power.

Stakeholders

| Name | Role | Organization | Contact Information |
|-------------------|-------------------|--------------|--|
| George Muhn | Community Partner | N/A | geomuhn@gmail.com |
| Daniel Frank | Instructor | ASU | daniel.z.frank@asu.edu |
| George Williams | Project Lead | ASU | ghwilli2@asu.edu |
| Alexandria Bisher | Industry Mentor | Intel | alexandria.bisher@intel.com |

Impact of the Problem

Lack of charging stations leads to few places to charge people's phones.

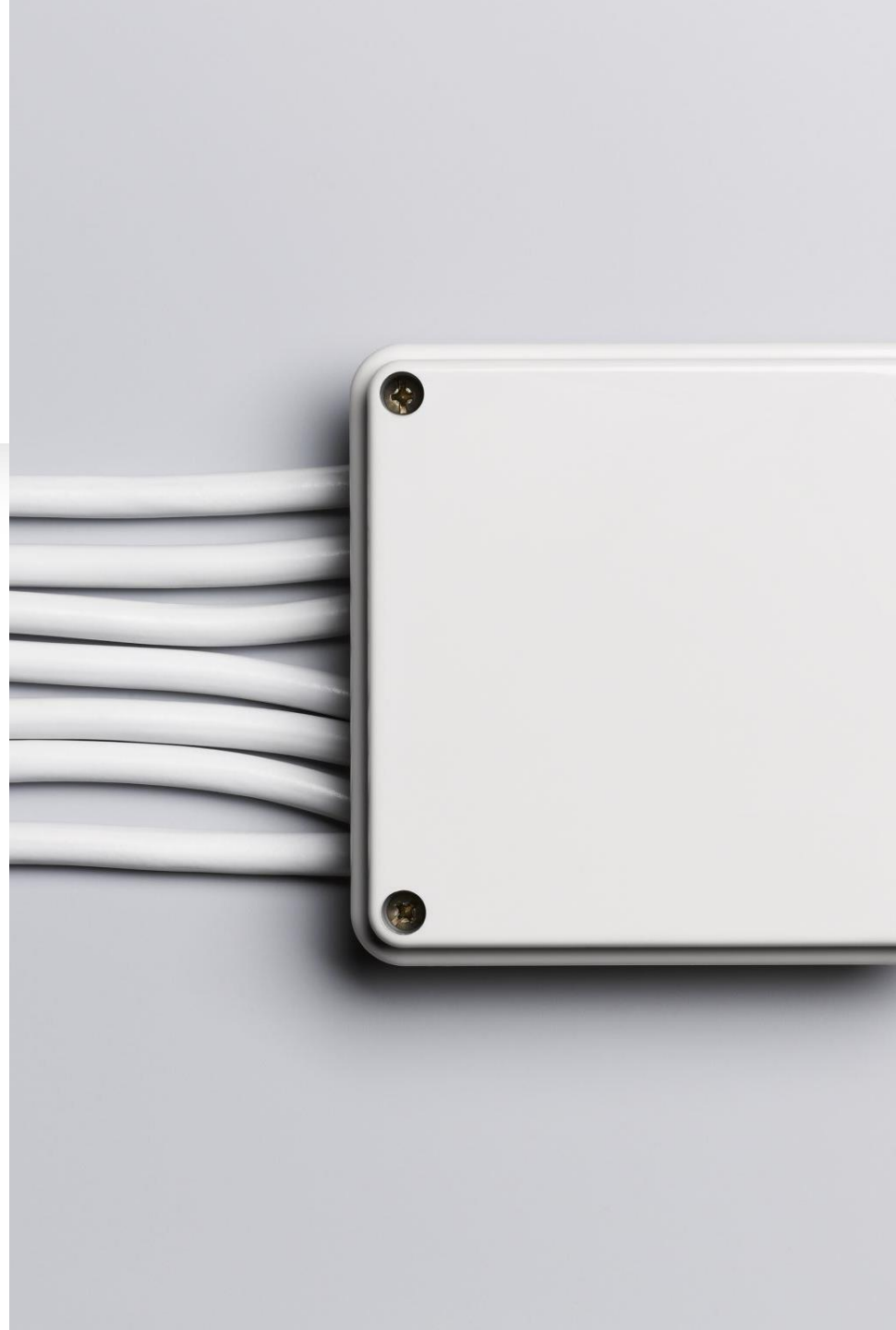


Problem Statement

The community partner, George Muhn, is lacking a compact, portable, and secure solar-powered charging station that can charge multiple devices at outdoor events while ensuring usability, safety, and ease of transport.

User Needs

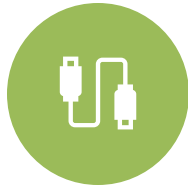
- Secure compartments to lock devices
- Portable and easy to move
- Support for charging multiple devices (up to 8 phones)
- Wireless and wired charging options
- Resistance to outdoor elements like heat and dust



Design Requirements



SIZE REDUCED BY 30%



WIRELESS CHARGING
CAPABILITY FOR 5
DEVICES



SECURE LOCKING
SYSTEM FOR UP TO 8
DEVICES



TEMPERATURE
DISSIPATION BELOW
80°F



WEIGHT OF UNIT
BELOW 70 LBS

Competitor Analysis

Competitors: Solar Boost,
Suscell Power Bank,
EcoFlow River, Blaver
Power Bank, NRG street
charger

Why Competitors Don't
Meet User Needs: Lack
secure compartments,
portability, are too costly,
or are not easy to setup.

Competitor Analysis Table

| Features | Solar Boost | Suscell Solar Power Bank | EcoFlow River + Solar Panel | Blaver Solar Power Bank | NRG Street Charger |
|-------------------------|-----------------|--------------------------|-----------------------------|-------------------------|---------------------|
| Easy to Setup | Yes | No | No | No | No |
| Charge Phone Fast | Yes | No | No | Yes | No |
| Charge Multiple Devices | Yes (5 devices) | Yes (2 devices) | Yes (10 devices) | Yes (3 devices) | Yes (6 devices) |
| Time to Charge Battery | Short (10 hrs) | Long (52 hrs) | Short (4.5 hrs) | Long (192 hrs) | Short (4hrs) |
| Wireless Charging | Yes | No | Yes | Yes | No |
| User Responsibility | No | Yes | No | Yes | No |
| Easy to Use | Yes | Yes | Yes | Yes | Yes |
| Cost | \$300 | \$32 | \$1200 | \$60 | \$12,000 - \$20,000 |

Top Designs



1. Cart with Caster wheels



2. Secure lockboxes integrated into the charging station



3. Lightweight aluminum frame with plastic handles.

Main design challenges

1. Make device
secure

2. Make device
portable and stable
on uneven terrain.

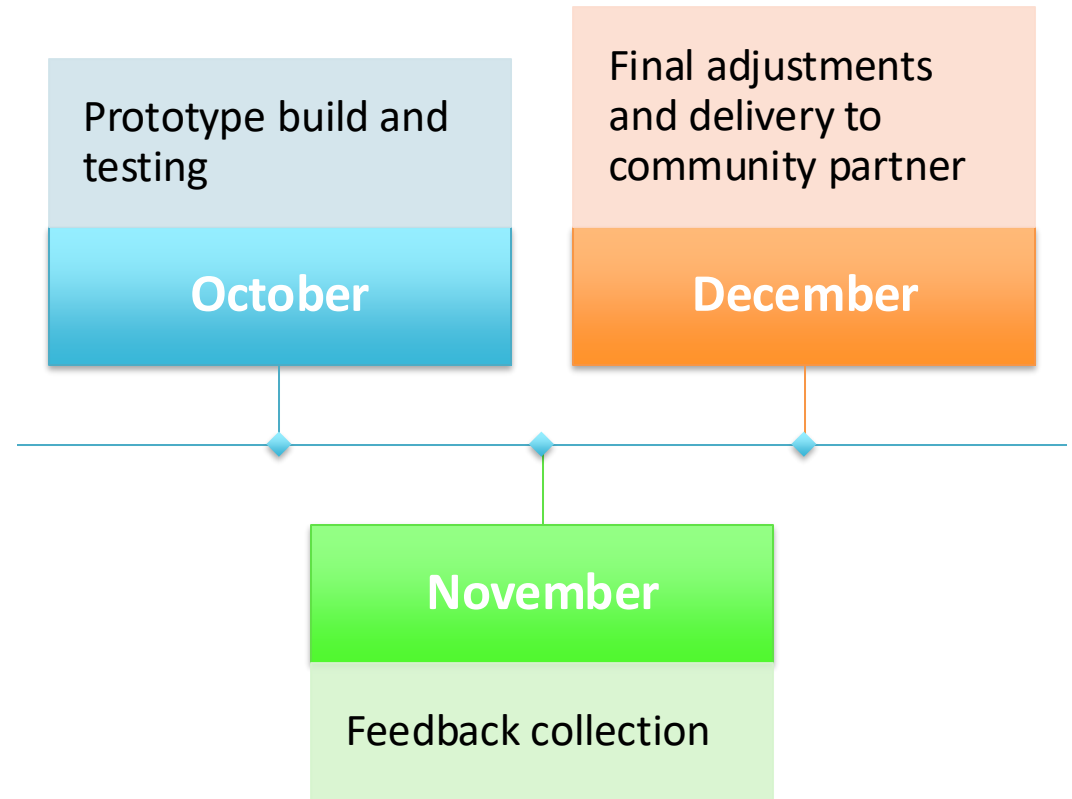
3. Wireless
charging

4. Easily
manipulated
without damage
from heat.

5. Device
compatability and
protection from
vandalism.

[illegible]

Next Steps



Impact of the Solution

1. Provides reliable power at outdoor events

2. Enhances user convenience and safety

3. Promotes sustainable energy through solar technology



Thank You & Questions
