

Introduction

- Terra Solar aims to create a solar panel canopy that can be put up by 2-3 people in under 3 hours. The canopy will be a temporary, or permanent fixed structure in its completion.
- The canopy kit will provide shade, under a fixed south facing canopy that will capture sun and transfer it into power to be used off grid.
- The structure will be able to withstand the weather elements and have a lifespan greater than 10 years.

Project Scope

- The canopy kit will be able to be moved in its lifetime, unlike rooftop fixed solar panels, this will create a better option for customers not tied to a direct location for their solar panel systems.
- The canopy kit will allow for room under the kit to be used, unlike solar options that use the entirety of the area to be mounted.
- The canopy kit's subframe will be adjustable and have 6-inch holes down inner legs to accommodate for changing angles.

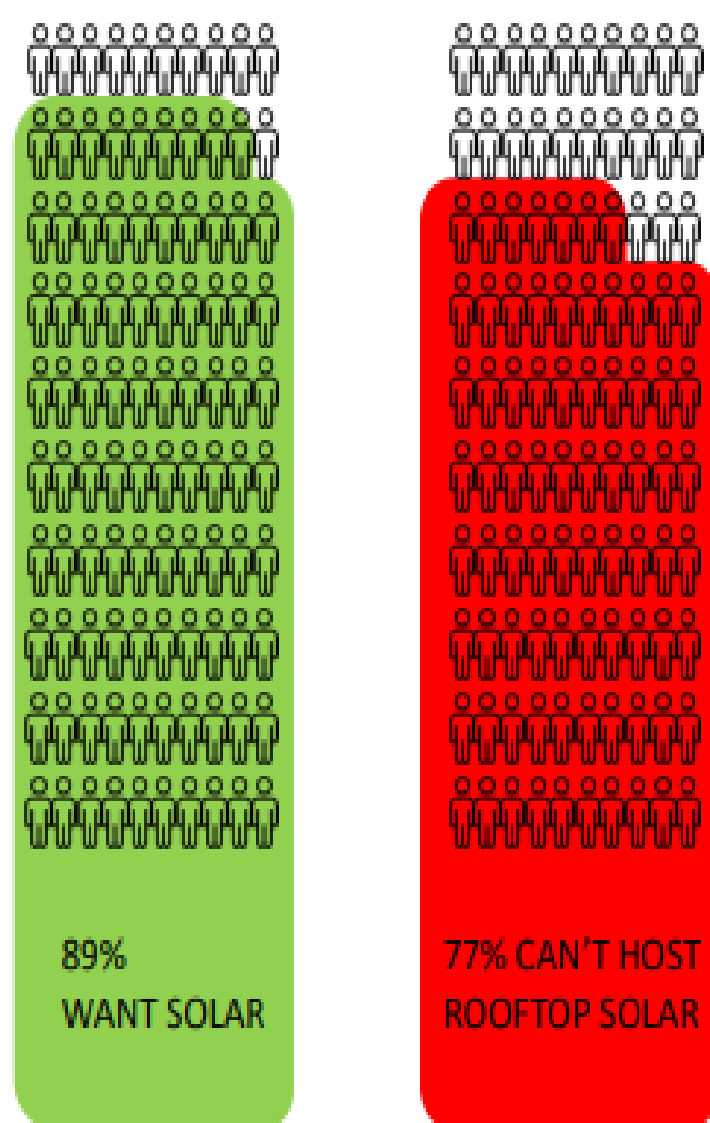


Figure 1: Visual depiction of how many people want solar and how many cannot host it.

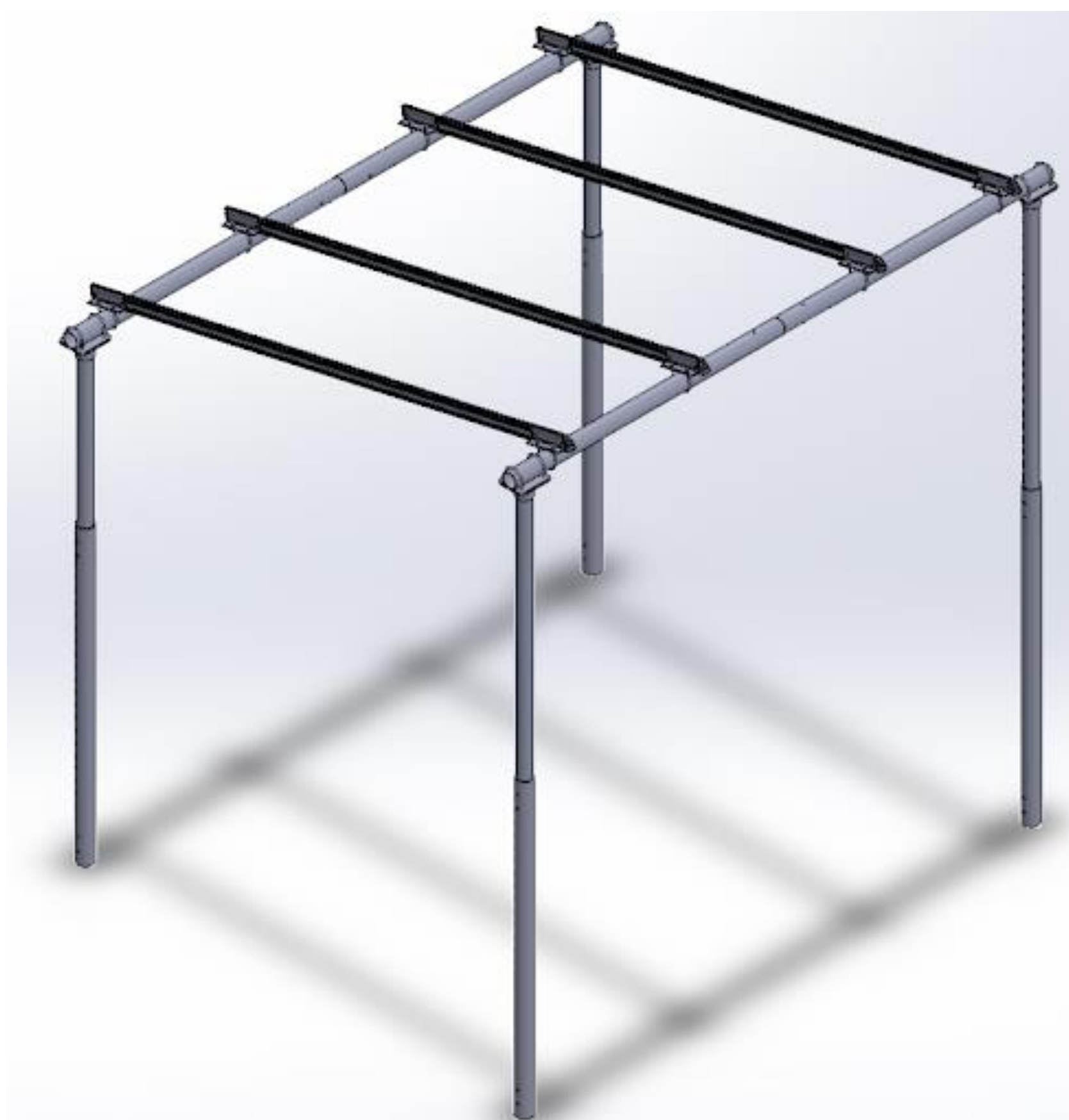


Figure 2: Model of Final Assembly

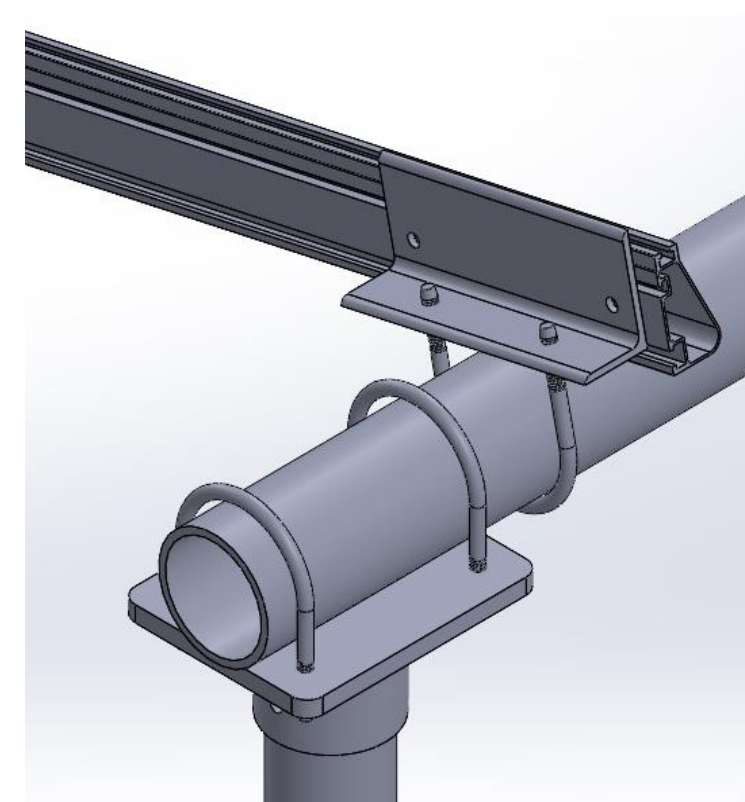


Figure 3: Adjustable Angle Solution

Business Needs

Assembly	Solar Capability	Aesthetics
2-3 People 3 Hours or Less Household Tools Required Standard Shipping	South Facing Direct Sunlight 1200+ Wattage Off-Grid Solar Panels Easy to Maintain	Looks Cohesive in Backyard Locations Pleasing to Have Setup in Plain Eyesight



Figure 4: Final Assembly at Eco Centro in San Antonio, TX

Customer Needs

The cost of the canopy kit including the solar panels must be purchased for below \$4,500 dollars.

- The kit must be able to be moved easily and be durable in the weather elements. This will include a lifespan that will outlast more than 10 years.
- The canopy kit must be able to be put together using exclusively household tools that the average customer will have available in their home. This means that there will be no exclusive tooling required to put together the canopy kit.
- The aesthetics of the canopy kit will be approved by our sponsor and supporting business locations.



Figure 5: Product Design Concept

Design Overview

- The team has decided to create a 4 legged, telescoping main frame. That will extend to create varying heights for the canopy to be set at. The original inspiration for design that we have adapted to our needs is shown in figure 6.
- This main frame will be connected to a subframe that holds the solar panels. The customer will set up the canopy to be south facing, and in the direct sunlight, with interchangeable angle options depending on their needs.
- This design will in total be manufactured to create a 1200+ watt system of off grid solar power.



Figure 6: Ironridge Ground Mount System

Wind Calculations

Level	Height (ft)	Kz	qz, psf
Mean Roof Height	8.5	0.57	4.37

Figure 7: Wind Load Calculations

- Total Uplift Pressure : 4.37 pounds per square foot
- Uplift Force on Roof: 476.72 pounds
- Basic Wind Speed: 60 mph

Acknowledgements

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