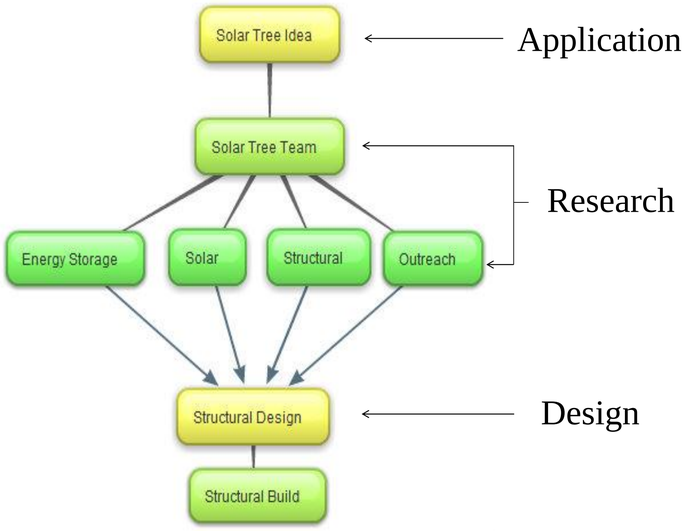
SOLAR TREE PROJECT

ENGINEERS FOR A SUSTAINABLE WORLD

UC San Diego

OBJECTIVES

Research, design, build and test a mobile solar charging station with the following features:
Mobility, **Innovation** and **Aesthetics**.



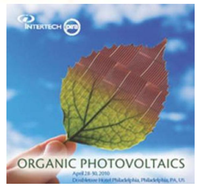
THE TEAM

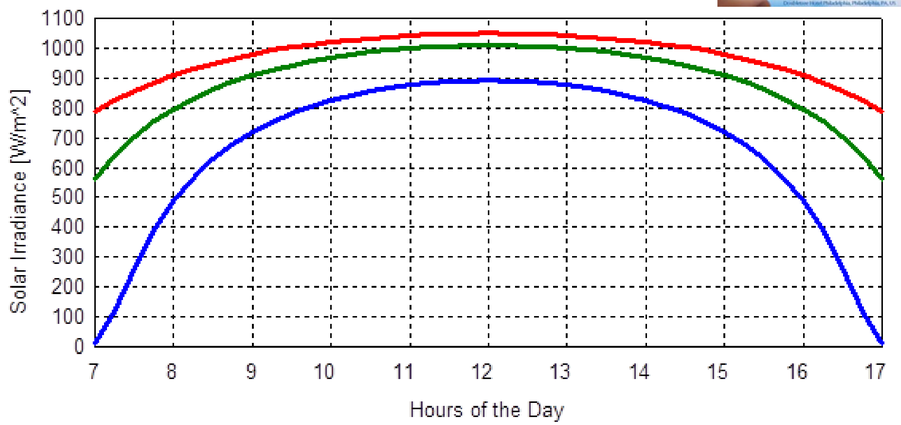
Leadership
Joseph Ocampo
Hien Nguyen
Lauren Rueda
Kelsey Ellis
Eric Tran

Advisors
Jan Kleissl
Kurt Lund
Charlie Johnson
Dave Weil
Byron Washom
Pekka Laine
Jim Ruby
Kristin Hansen

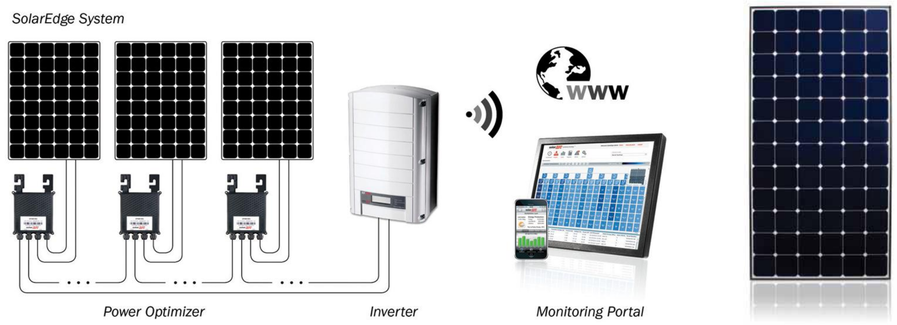
MATERIALS

- Photovoltaics
  - Monocyrstalline, Polycrystalline, Amorphous
  - Organic, Thin-Film, Printed, Standard
- Aluminum Extrusions
- Inverter Systems



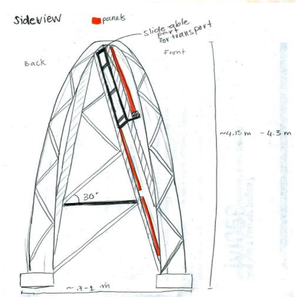


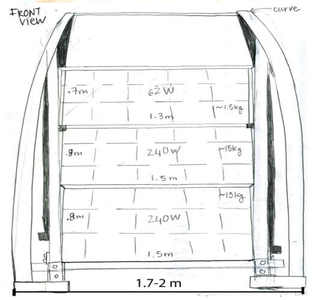
After working with UC San Diego to learn the most common battery and on-board charger setup of the more-than 300 utility vehicles, our team determined that we needed to produce ~1.5 kW. Along with the average solar irradiance in San Diego (shown in the graph above by summer-red, spring-green and winter-blue), we quickly eliminated all but the most efficient, more standard PV.



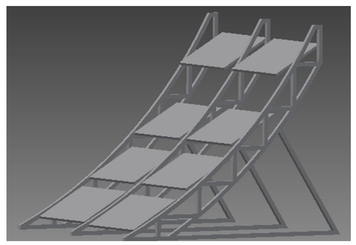
We aimed for the most efficient panels we could get on the market: SunPower E-19 model panels rated ~19% efficiency. With those high efficiency panels, we felt that the Solar Edge System with individual panel power optimizers for maximum power point tracking would be an excellent complement. The Solar Edge system is grid-tied, though; as we look for work-arounds, we have back-up inverter systems we're ready to purchase.

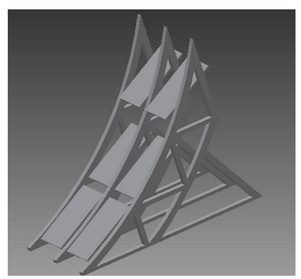
DESIGN





Early designs incorporated multiple panel types in forms that mimicked the aesthetics of plants, flowing logically from the projects name. As the necessary power output and resultant area requirement became obvious, we moved to what would be more practical.





Ultimately, we decided on the structure above: an 8 PV panel structure with 4 stationary panels and 4 sliding panels to minimize area.