



# SOLAR ROCKS

Snapshot #1 Presentation



# OUR MISSION

To design and fabricate a system to focus solar energy, to transfer the energy efficiently and store the solar energy within a mining facility.

# OUR TEAM

Team Members: Emily Kliwer, Jakob Hemphill

Team Advisor: Rezaie Benhaz

Team Client: Ray Donelick

Team Graduate Mentor: Austin Anderson

Team Shop Mentor: Melissa Bogert

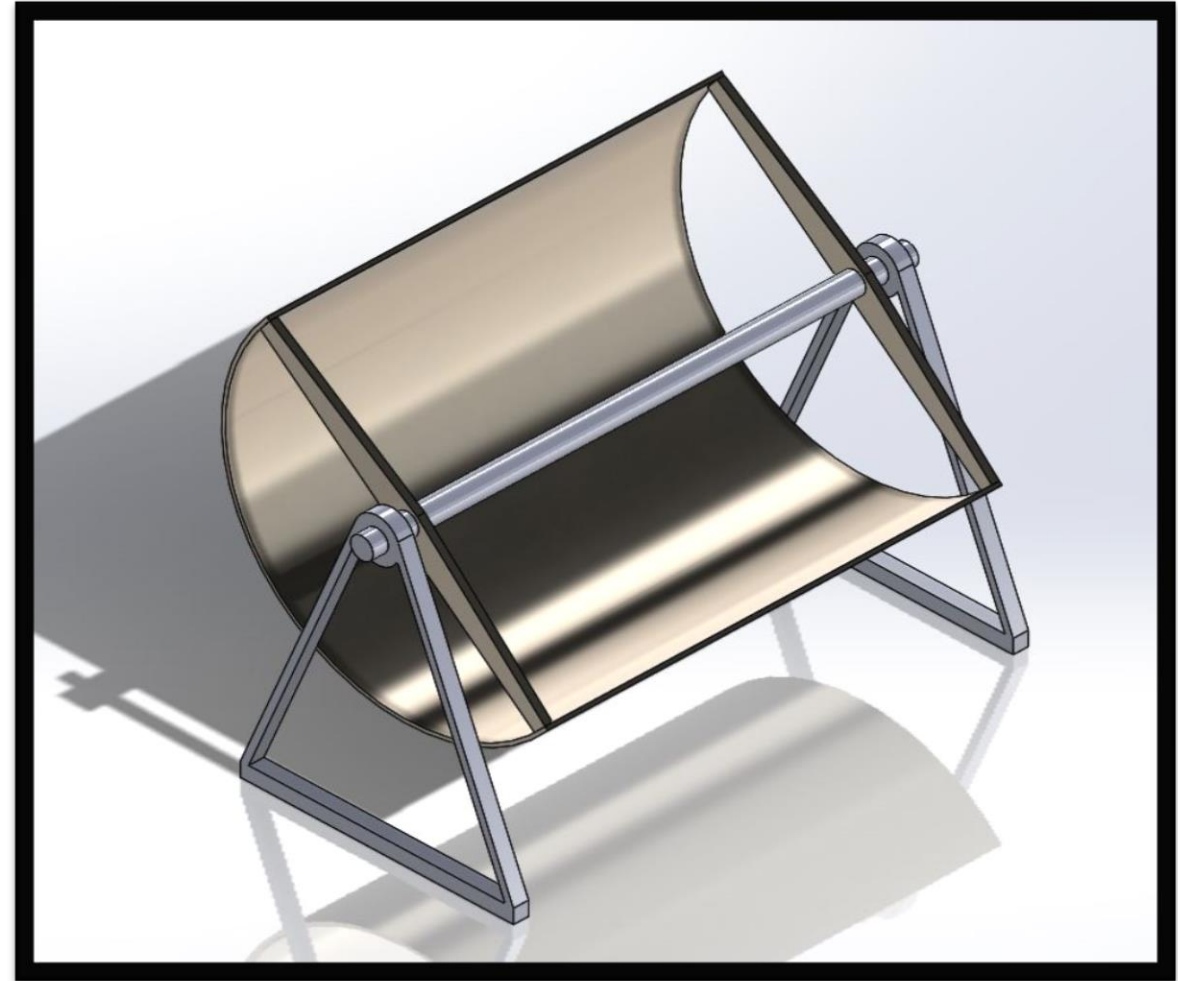
# PARABOLIC TROUGH DESIGN

## Pros:

- Efficiency (~60% Reflective)
- Intense (~ 70 - 80 Suns)

## Cons:

- Large Size (14X6m)
- Expensive (.22 to .33 \$/Kwh)
- Large wind shear force



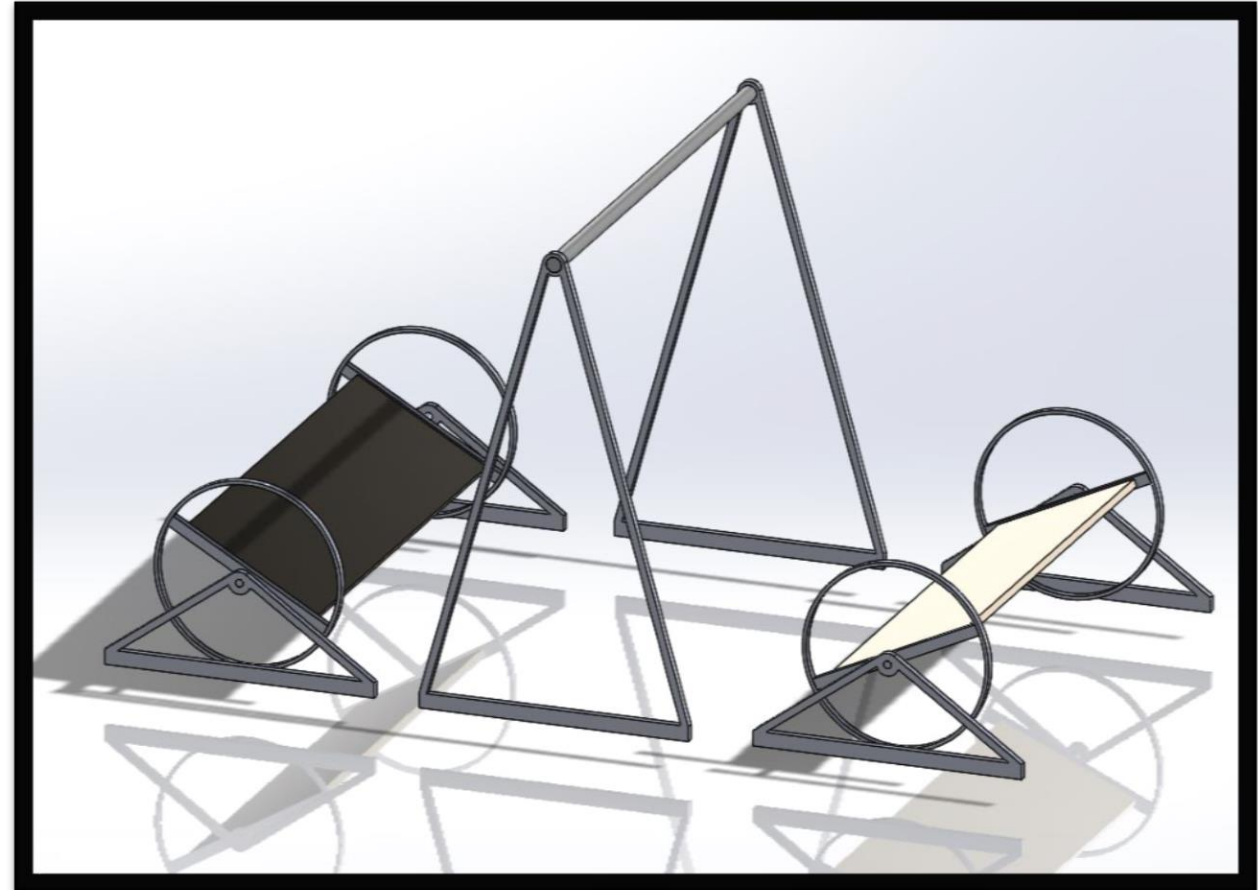
# LINEAR FRESNEL DESIGN

## Pros:

- Lower Cost
- Increased Stability
- Less Framing

## Cons:

- Large Size (15m aperture)
- Less Efficient (~60 suns)



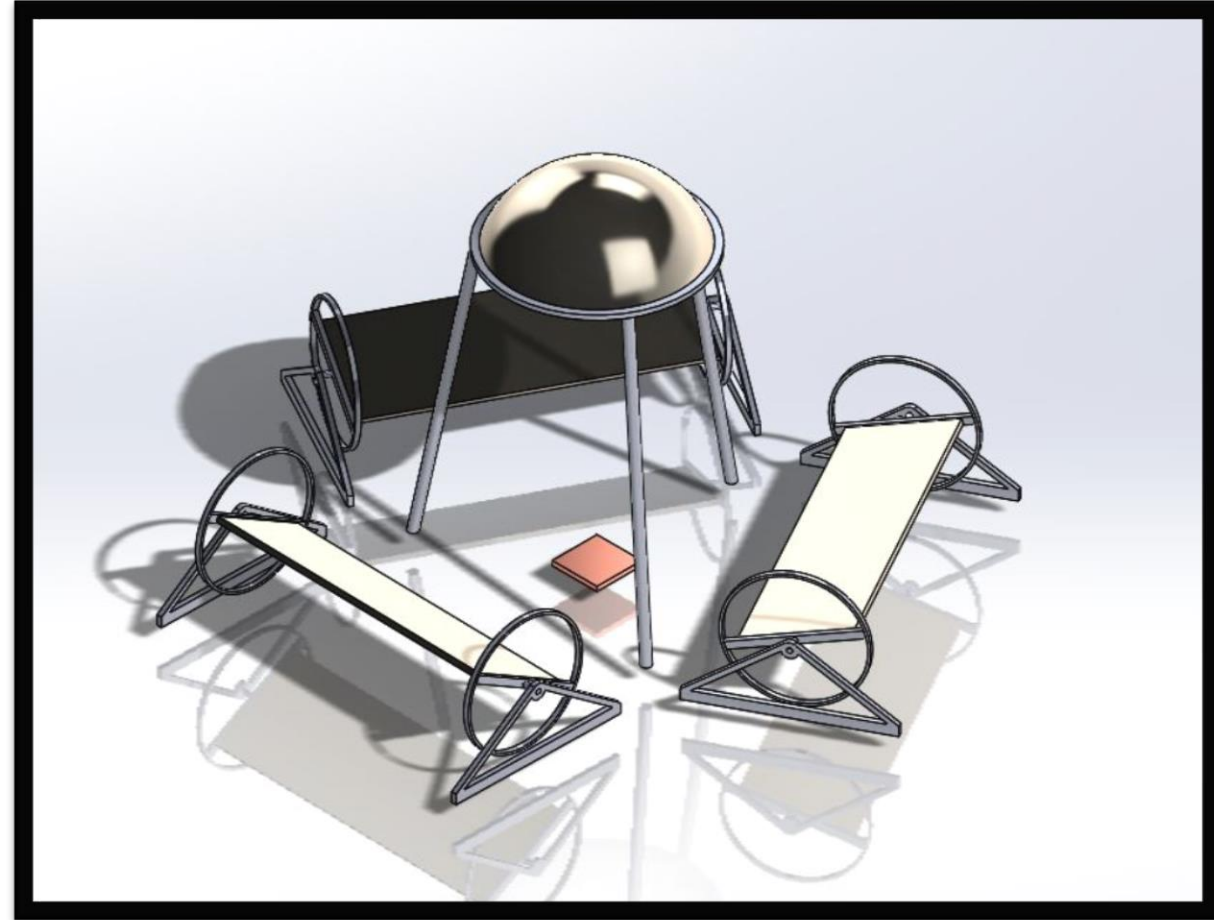
# SOLAR CENTRAL RECEIVER

## Pros:

- High intensity ( $>1000$  suns)
- High temperature (250-1000 °C)

## Cons:

- Difficult to scale (large)
- Environmentally hazardous
- Expensive (\$0.3/Kwh LCOE)



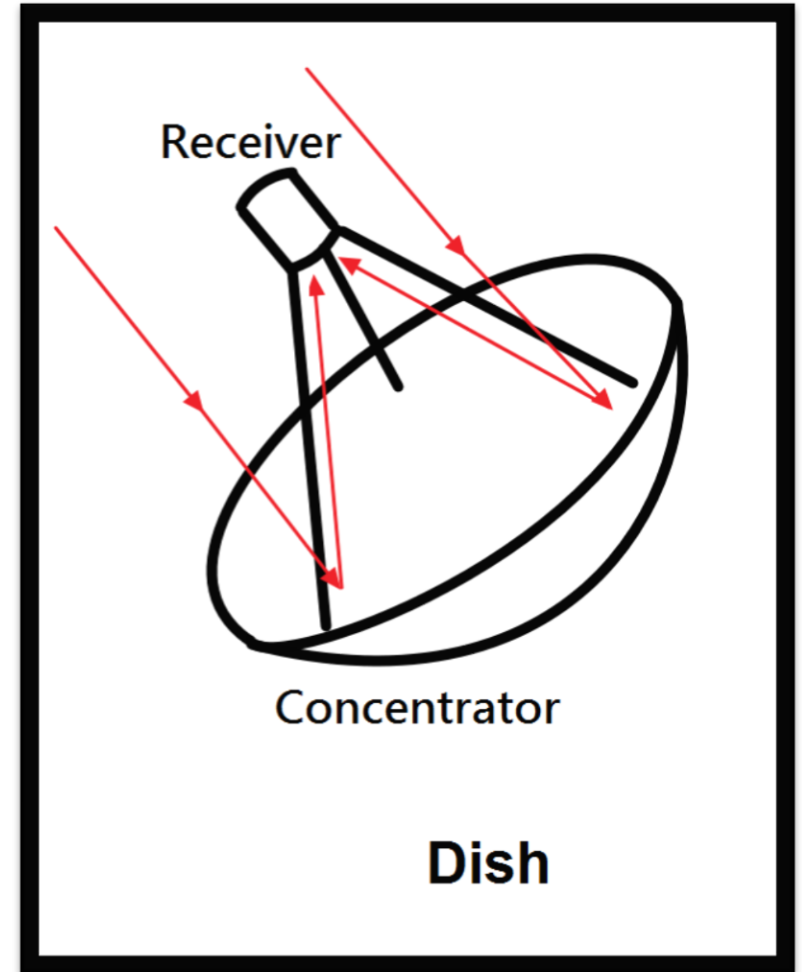
# SOLAR CONCENTRATING DISC

## Pros:

- High intensity ( $> 1300$  suns)
- High temperature (550 - 750°C)

## Cons:

- Expensive
- Not suitable for large scale



# WORKING FLUIDS

| Fluid           | Pros   | Cons   | Cost       |
|-----------------|--|--|------------|
| CO <sub>2</sub> | <ul style="list-style-type: none"><li>• Environmentally friendly</li><li>• Abundant</li><li>• Putting a problem to use</li></ul> | <ul style="list-style-type: none"><li>• Less efficient</li><li>• Requires airtight seals on piping</li></ul> | \$20/Ton   |
| Molten Salts    | <ul style="list-style-type: none"><li>• Higher Efficiency</li></ul>  | <ul style="list-style-type: none"><li>• High Temp Necessary</li></ul>  | \$1000/Ton |
| Water           | <ul style="list-style-type: none"><li>• Environmentally neutral</li><li>• Easy acquisition</li><li>• Versatile</li></ul>         | <ul style="list-style-type: none"><li>• Can freeze</li><li>• Can undergo phase change</li></ul>              | -----      |
| Synthetic Oil   | <ul style="list-style-type: none"><li>• Commercially available</li><li>• System ready</li></ul>                                  | <ul style="list-style-type: none"><li>• Environmentally Caustic</li></ul>                                    |            |