

Solar Photovoltaic Power Plant



Group Members:

Mark Leonardo Gliané
Ricardo Jimenez
Alexander Ramirez
Johnny Rosas
John Paolo Sucro

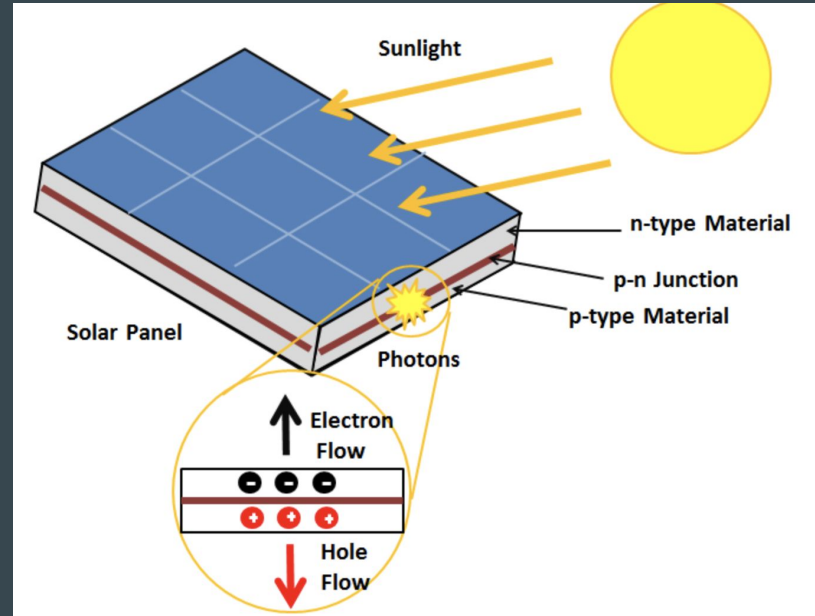
Brief Project Description

- What is Solar Photovoltaic (PV)?
- The Photovoltaic Effect.
- Our goal: 12 MW Solar PV Power Plant



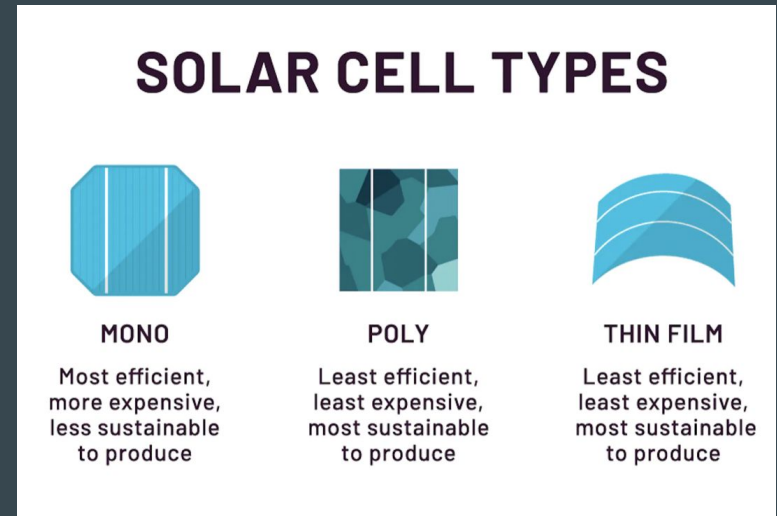
Research Results

- Solar energy is one of the top alternatives in creating clean energy.
- Solar energy is everywhere.
- This energy can be used to power our electric devices that we use in our daily lives.



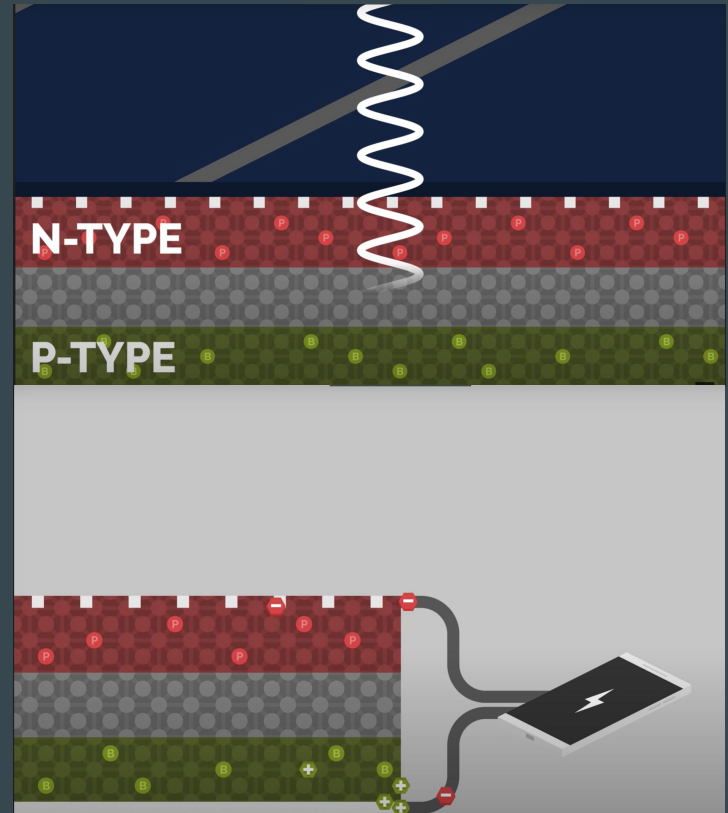
Design Parameters

- To be efficient, it would be best to use a 72 cell solar panel made from monocrystalline.
- It is best for the solar panel to tilt between 30 and 45 degrees
- Increasing the distance between the panels decreases the level of shading.



Discussion

- A solar cell is made up of 3 layers
- The top layer is called the N-Type layer
- The bottom layer is called the P-Type layer
- An imbalance of electrons creates a voltage



Calculations

- The target of the Solar PV Power Plant is 12 MW
- One 72-cell solar panel: 300 watts

$$12,000,000 \text{ watts} / 300 \text{ watts} = 40,000 \text{ solar panels}$$

- Project's site location: average of 6 hours of sunlight per day throughout the year.

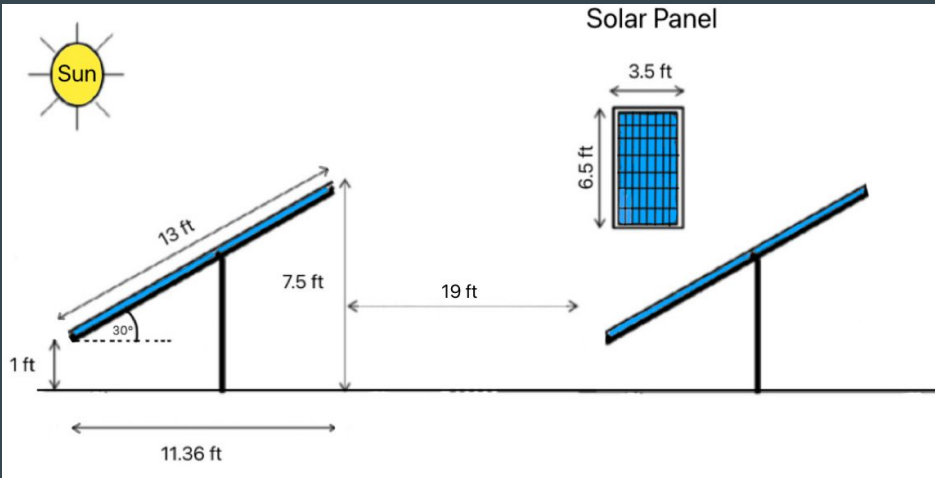
$$300 \text{ watts} * 6 \text{ hours} = 1,800 \text{ Watt-hours or } 1.8 \text{ kWh}$$

- Therefore, the entire power plant, with its 40,000 solar panels will produce:

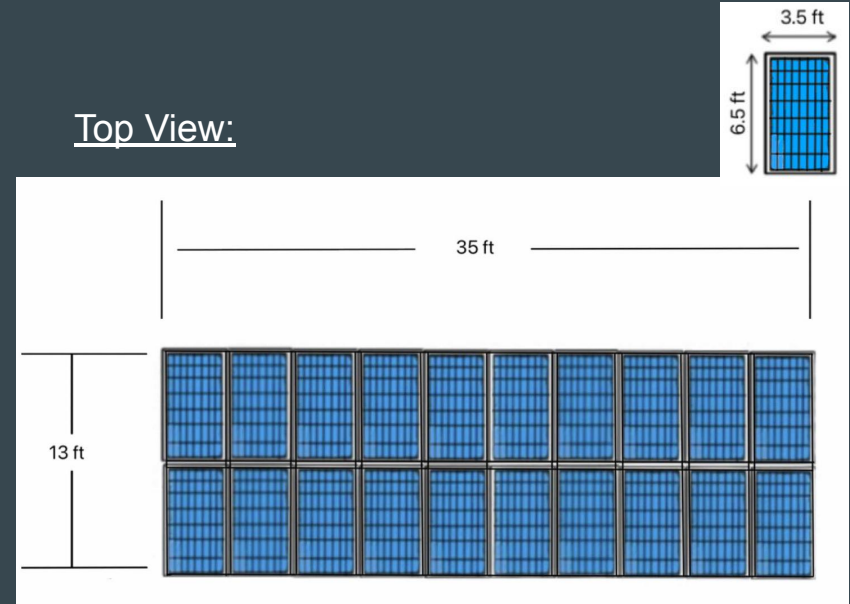
$$1,800 \text{ W-h per panel} * 40,000 \text{ panels} = 72,000,000 \text{ W-h or } 72 \text{ MWh per day}$$

Conceptual Design Layout

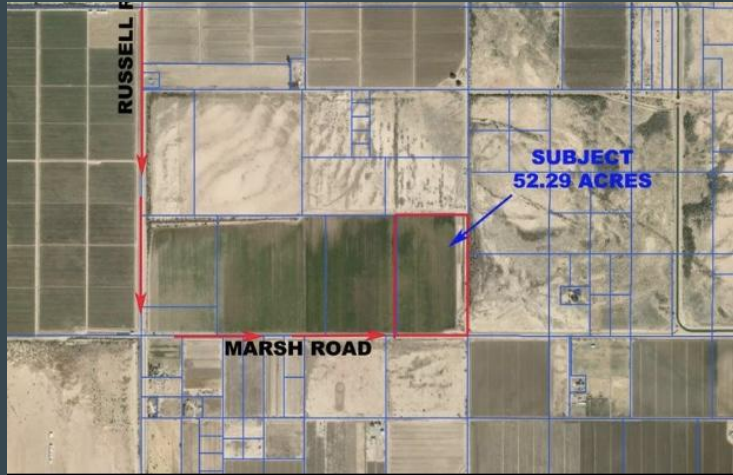
Side View:



Top View:



Project Site Location



41,380 solar panels x 300 watts =
12.4 MW

Buy Sell More Land.com

VIEW TO SOUTH WEST

SUBJECT PROPERTY

UN-NAMED ROAD

VIEW TO EAST

SUBJECT PROPERTY

MARSH ROAD

PHOTO TAKEN FROM SW CORNER OF PROPERTY

View all 11 pictures

PHOTO TAKE FROM SW CORNER OF PROPERTY (APPROX)

2022 Aerials

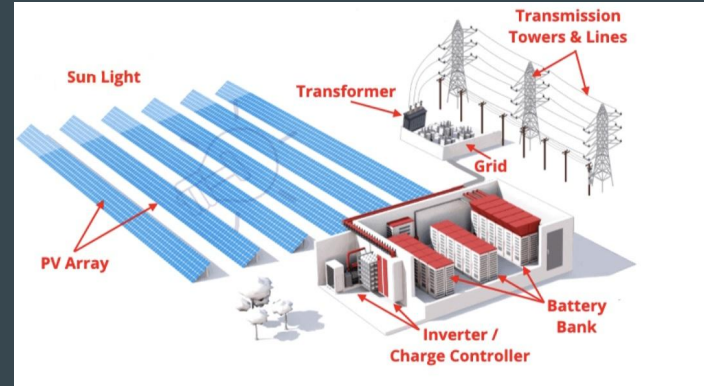
\$627,500 - 53.04 acres Available

32XXX3 W MARSH ROAD (NO ADDRESS) --, Casa Grande, AZ 85193 - Pinal County

Undeveloped

Property ID 15635176

53.04 acres in Pinal County, Arizona



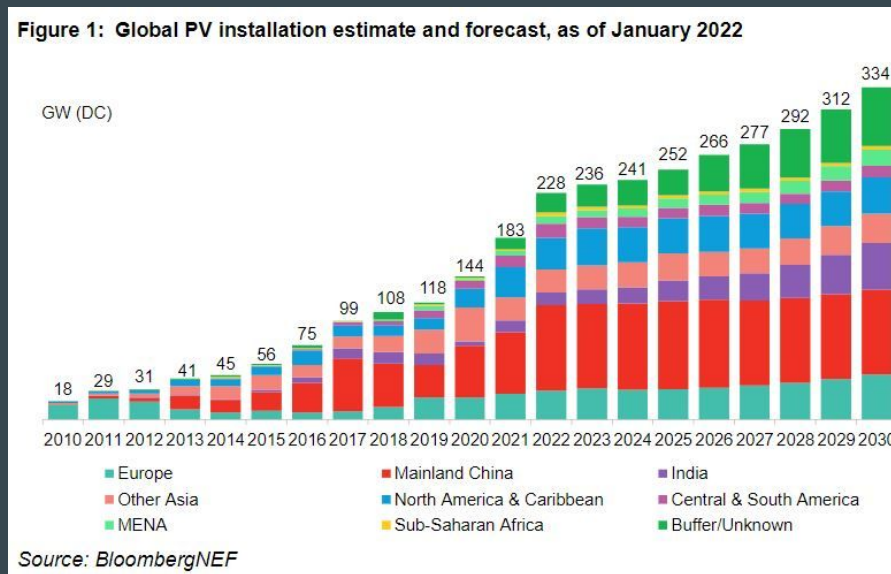
Power Plant Cost Analysis

- Power plant cost: \$10.6 million
- \$0.18/kWh price point
 - \$4 million yearly revenue
- Location cost: \$627,500
- Property & equipment: \$11 million
- Engineering & project management: \$3.3 million
- Construction: \$7.7 million
- Total cost: \$22 million

	Total installed costs		
	(2021 USD/kW)		
	2010	2021	Percent change
Bioenergy	2 714	2 353	-13%
Geothermal	2 714	3 991	47%
Hydropower	1 315	2 135	62%
Solar PV	4 808	857	-82%
CSP	9 422	9 091	-4%
Onshore wind	2 042	1 325	-35%
Offshore wind	4 876	2 858	-41%

Conclusion

- Met project design goal of 12 MW (12.4 MW)
- Is Solar PV worth it?
- The future of Solar PV



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