

Solar Powered System for Community Garden



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Project Background



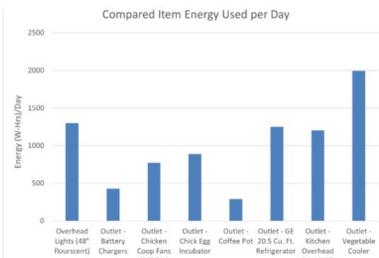
- Valmonte Farm and Garden teaches gardening to those with learning disabilities
- The farm and garden outgrew its old 800W system
- The project had good community impact, hands-on opportunities, and a focus on renewable energy

Objective

- Upgrade the garden's power system to reliably supply power through the winter solstice
- Design a power system that is easily accessible for ease of maintenance
- Power system should have barriers to prevent rodent damage



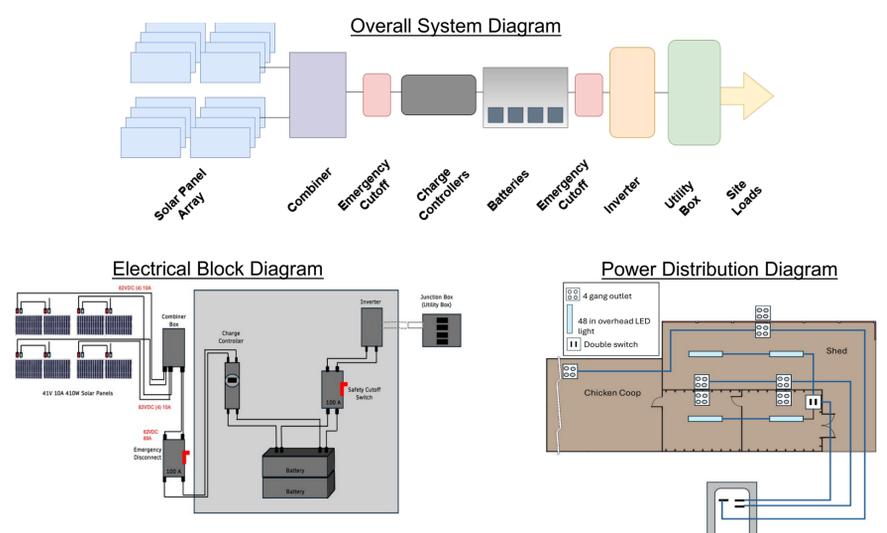
System Engineering



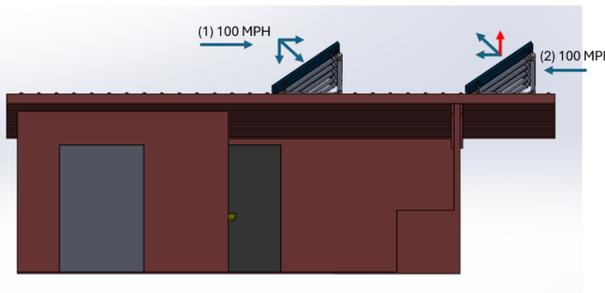
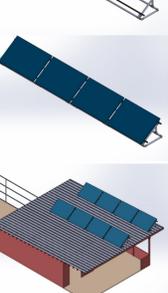
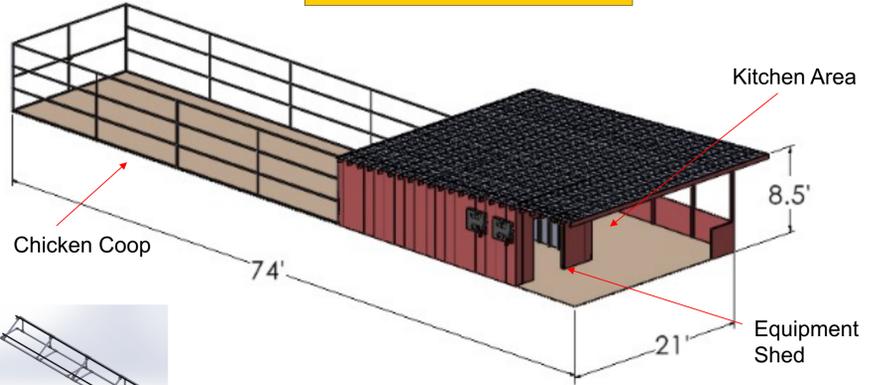
No.	Name	Requirement	Capabilities
1	Power (Instantaneous)	> 1,867 kW	3.75 kW
2	Energy Total	> 9.75 kW-Hr	11.0 kW-Hr
3	Energy Stored	> 7.4 kW-Hr	10.6 kW-Hr
4	Electrical Enclosure	< 23" D x 48" W x 90" H, & Rodent Resistant	18.5" D x 57" W x 83" H
5	Roofing Area	< 20' x 31' Roof	13' x 20'
6	Voltage	120 +0-15 V AC	123.1 V AC
7	Circuit Protection	20 A Circuits, 12 gauge wiring	Complies
8	Electrical Standards	LA County Fire Code, NEC 690	Complies
9	Life Expectancy	> 15 years	15 years (batteries), 25 years (panels)
10	Temperature	120 degrees F max -> 35 degrees F min	Complies
11	Wind	88.9 mph	191 mph (frame), 140 mph (panels)
12	Moisture	100% Relative Humidity (RH)	Complies



Electrical Design



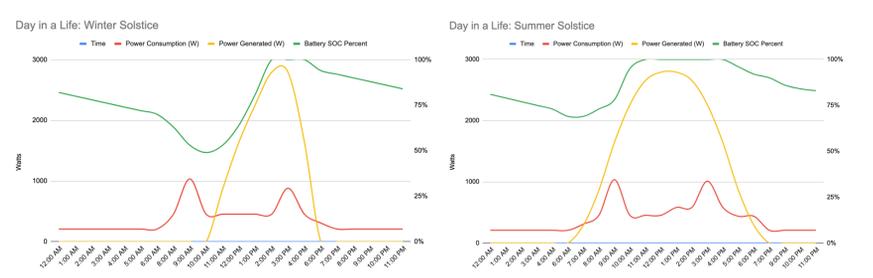
Mechanical Design



Fabrication & Assembly



Power Analysis



Conclusions

- Design meets requirements
- Learned to work together and built electrical system
- Garden has a functioning 3kW solar power system



2025 Spring Senior Design Team 111