

Ultra Low Cost Solar Water Heater Progress Report

1/27/13

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Client

- Client: U.S. Environmental Protection Agency (EPA)
 - P3: People, Prosperity, and the Planet Award
- Research, design, and develop solutions to real world challenges involving the overall sustainability of human society

Need Statement

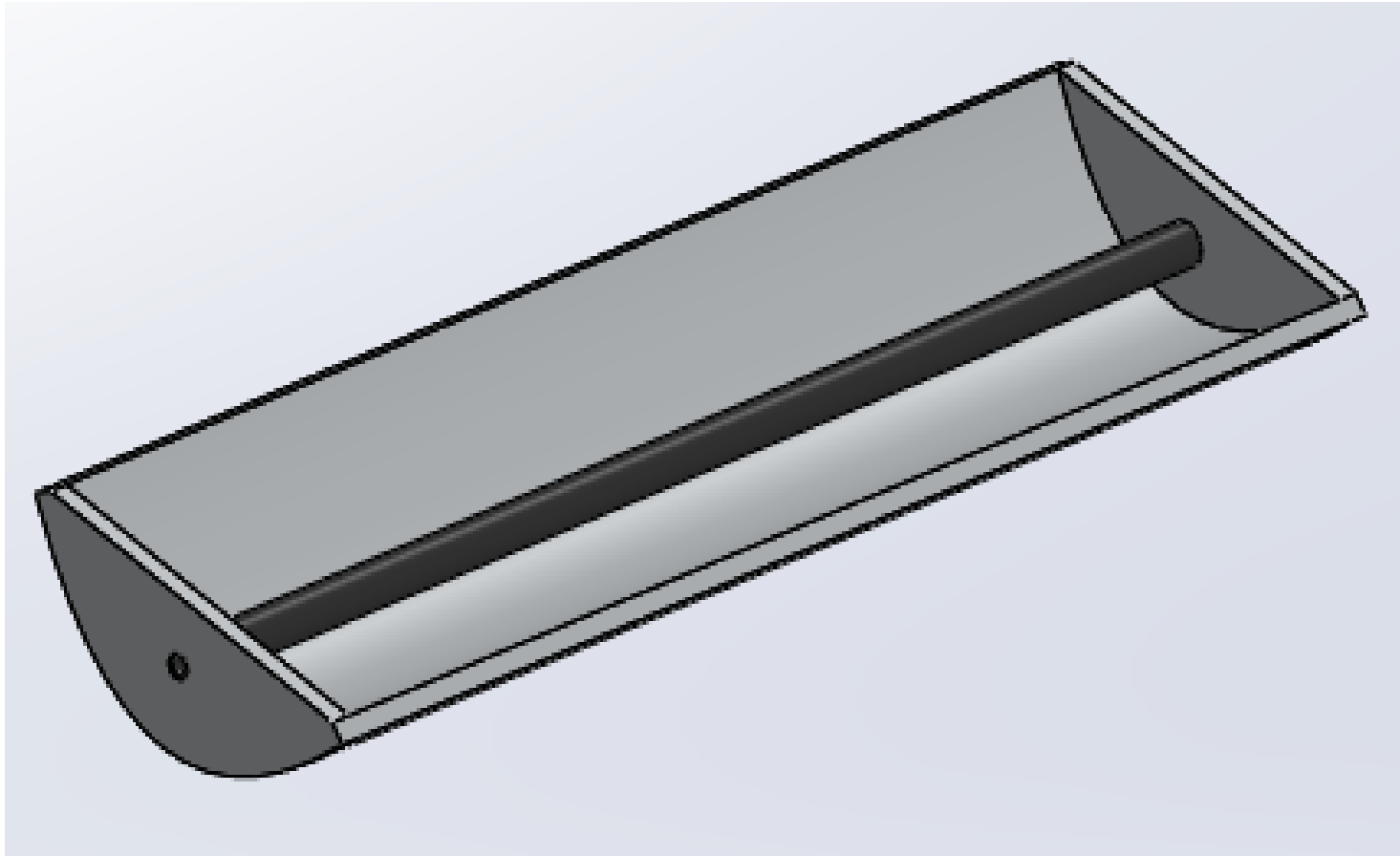
Current solar water heaters are too expensive and it takes a long period of use to make them financially sensible, therefore current solar water heater designs are financially impractical over a short period of use.

The solution is to design a low cost solar water heater that makes minimal sacrifices in efficiency which result in significant reduction in cost.

Objectives

- Heats water
- Weather resistant
- Low initial cost
- Quick financial return
- Easily integrated into existing system
- Safe
- Reasonable size

Parabolic Collector



Parabolic Collector Cost Analysis

Material	price	% used	# req	cost
Mylar sheeting 25'x50"	\$ 37.15	25%	1	\$ 9.29
Plywood 4'x8'	\$ 18.45	100%	2	\$ 36.90
Flat black paint	\$ 3.00	100%	1	\$ 3.00
1" x 10' PVC	\$ 3.67	100%	1	\$ 3.67
Misc fittings	\$ 5.00	100%	5	\$ 25.00
			Total	\$ 77.86

- Green indicates easily scavenged

Team Member Roles

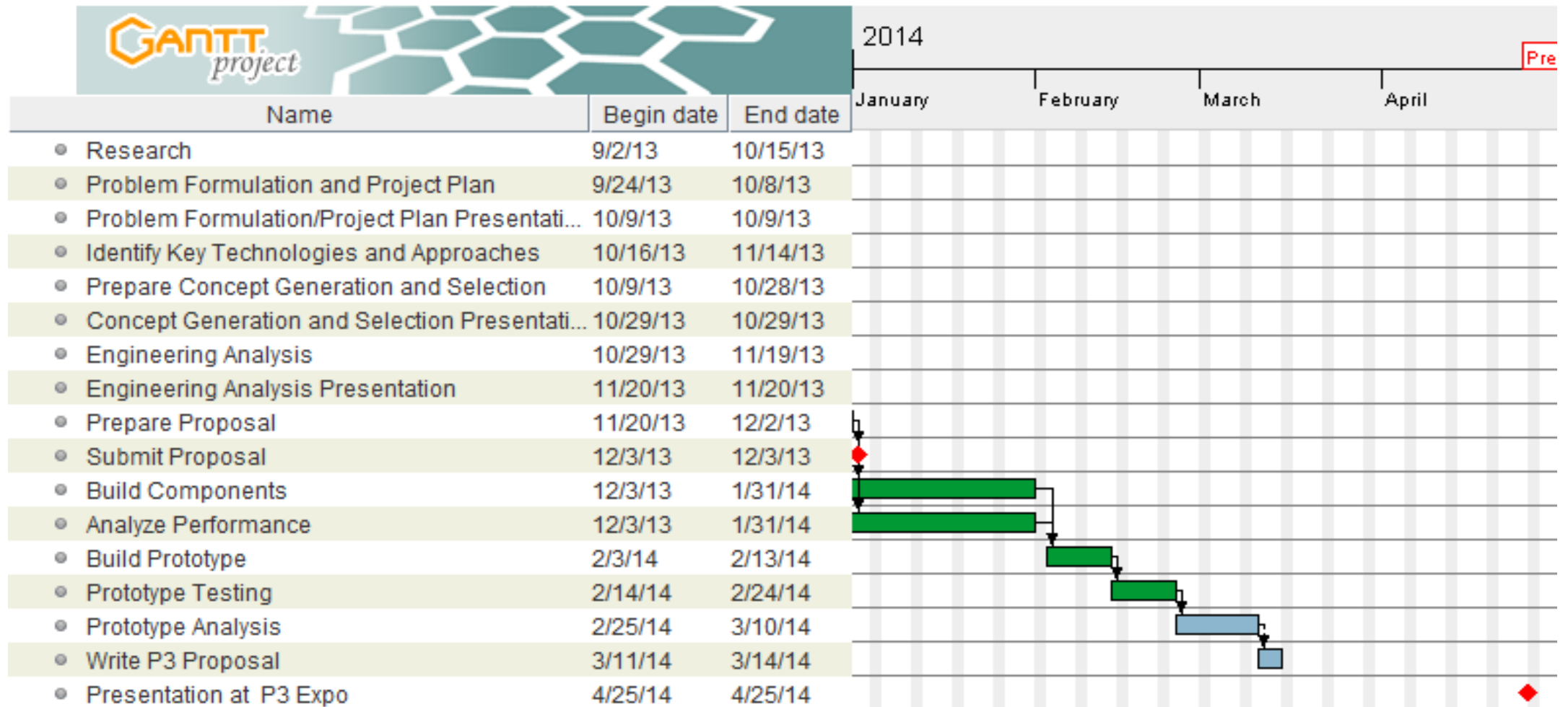
Matt Beckham	Electrical automated systems
Austin Chott	Collector construction/Team Leader
Chris Heine	Plumbing/Integration
Thomas Griffin	Organization/Integration
Saleh Alsadiq	CAD Drawings/Plumbing

Final Design

- Based off of the absorption per area per dollar analysis the parabolic collector will be our final design for this semester.
- We will make 3 parabolic collectors.

Collectors	Absorption/Area/\$ Purchased Cost (W/m²/\$)	Absorption/Area/\$ Scavenged Cost (W/m²/\$)
Parabolic PVC	3.20	4.09
Parabolic Galvanized	2.20	3.10
Parabolic Painted Galvanized	3.11	4.36

Project Timeline



Gantt Chart

January:

- Collect materials
- Begin building collectors
- Meet with MBA team/Dr. Nelson to discuss status and marketability

February:

- 3rd – 13th: Finish collectors, route plumbing
- 14th – 24th: Test components/system
- 25th – 28th: Compile/analyze data

March:

- Milestone: 10th – Complete data analysis for report
- 11th – 14th: Write report for P3 Expo

April:

- 25th – 27th: P3 Expo

Conclusion

- EPA P3 Program **Ultra Low Cost**.
- Project roles assigned to group members.
- Build and test solar water heater designs.
- Compare results to our analysis.
- Compile data and build final prototype.
- Stay on schedule to complete EPA proposal by March 15th.