

Design and Implementation of a small scale stand-alone Hybrid Solar PV and Wind Energy Generation system for EE 452 lab

EE 491, Bi-Weekly Status Report #2 February 3 - February 16

Team Members:

Conner Makoben - Electrical Engineer
Mohamed Adam - Electrical Engineer
Daniel Mendez - Lead Engineer
Samah Shabbo - Electrical Engineer
Ben Holt - Electrical Engineer

Summary

The project's status is still currently in the research and planning stage. In our last meeting with our advisor, we had conducted research on and prepared a presentation on PV cells in order to help us gain a better understanding of how solar works in our project. We discussed what the goal of our project should be and developed some ideas on what we should accomplish in order to improve on the last design team's finished product. We also met in the lab and used the documentation from the last team in order to complete the lab they created to test if it is still able to be completed.

Contributions

| Name | Hours Worked Week 2 | Total Hours | Contribution |
|-------------|----------------------------|--------------------|---|
| Ben Holt | 9 | 15 | Looked into condensing and redesigning a totally new PV AC/DC system that functions similarly to the existing system. Went through and learned how each component in the existing system works. Researched how the photovoltaic process works and included slides about that process in our presentation to the |

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| | | | client. Worked on the previous group’s lab experiment 1 with other team members to understand the system’s dynamics. |
| Daniel Mendez | 9 | 15 | <ul style="list-style-type: none"> - Worked through experiments 1 and 3 with Ben Holt - Assessed the current project to understand the functionality - Worked with the team to understand how a pv cell works in terms of theory and in practice - Presented “overall system” portion to client and client’s assistant - Simulated a pv cell using Simulink - Cost analysis of the current equipment - Researched new equipment (solar panels, battery tanks) - Planned path forward in regards to designing new system - Documented informal proposal for wind generation - Reviewed documentation from previous team to understand work completed - Assessed areas of improvement on current system - Worked on informal design proposal for stand alone system |
| Conner Makoben | 8 | 14 | Explored the possibility of adding an AC load onto the existing project with the usage of an inverter. A couple of ideas currently being considered are using the induction motors already present at each lab bench in the lab or by creating an array of incandescent light bulbs that could be used as a load for both the AC and DC aspect of the system. Both of these would also be cheap and readily available which would be beneficial when it comes to |

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| | | | keeping costs down while also having an effective way to implement our AC load. |
| Mohamed Adam | 8 | 14 | For the last two weeks, I held four meetings. In one of our two meetings with our advisor. I present a part of a presentation that shows the project theory, elements, circuitry, and simulink simulation. Also, I conducted experiment 3 in the projects labs manuals with another partner to understand the system parameters and its functions. I did some research on adding more panels to the project as one of the suggestions the team would work on in this project. |
| Samah Shabbo | 8 | 14 | <ul style="list-style-type: none"> ● Attended 8 meetings, has been assigned as a meeting facilitator. ● Collected all the data that we need. ● I learned about the physical function of the PV cell and made a presentation about that matter with my group to our prof. ● Practiced PV cell experiments in the LAB with the group. |

Pending Issues

Our most recent issue currently is the budget of our project. As of now the estimated cost to get the necessary parts and components (ie. new solar panels and batteries) is well over the allotted \$500 budget. However, because our project will be used for the EE 452 labs to help with student learning, we believe that this may help to convince the department to expand our budget and allow us to have more money for these expensive parts.

Plans

Our current plans involve brainstorming and trying to better understand how the last design teams project works so we can rebuild a second prototype while making improvements by downsizing their project, adding more features such as the ability to use and analyze AC loads, and adding more solar panels and batteries to allow for more power when the system is being used by multiple lab benches. Once we understand the last team's design, we can begin reverse

engineering it to begin making improvements and necessary changes while also improving its safety.