# May1727

## Project Title: Stand-alone Hybrid Solar/Wind Power Plant

## Advisors: Dr. Venkataramana Ajjarapu & Ankit Singhal

## Team Member – Roles

Nathaniel Byrne - Group Leader

Brian Gronseth - Solar Tech. lead

Jeffrey Szostak - Wind Tech. Lead

Matthew Lee - Communications Lead

Mike Trischan - Key Concept Holder

Eric Cole - WebMaster

## Executive Summary:

This week was useful in that it allowed us to test some of our lab experiments prior to implementation. We got a lot of good feedback from our group mates on things that needed to be clarified and altered.

## Past Week Accomplishments:

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| The group continued our work on the Simulink files and fixed some key problems in our combined simulink model. we also tested our Solar hardware experiments on the wind members of the team. We also began designing a program to simulate natural wind and sunlight so we can test the program more naturally. |
| I tested the wind simulation three different ways, one with just the turbine and generator, two with the turbine, generator, AD-DC-AC conversion, and three with everything including batteries. I also worked out how to measure three phase power with a non-sinusoidal and harmonic interfered signal. We also worked out how to run the combined simulation and input a more realistic wind and solar irradiance pattern into the simulation. |
| We completed preliminary hardware experiments, completed majority test cases for simulink simulations, and have a (fully?) working model of the combined wind and solar simulink model. |
| Tested lab experiments on wind team, combined hybrid wind and solar simulink models, created a dynamic wind speed and solar flux profile for combined model, started on irp stuff |
| Solar team met up and took hardware measurements to account for losses within the solar hardware system. Solar team also met with wind team to demo run the solar hardware experiments. Solar team observed and took notes on what to improve within the experiment. |
| To verify the hardware solar team met up to take measurements at all points in the system and find losses with the hardware. Solar team also used the wind team as guinea pigs to test our hardware measurement experiment. |

## Individual Contributions:

| Name | Hours this week | Cumulative | Contribution |
|---|---|---|---|
| Nathaniel Byrne | 3 | 66.5 | I completed the simulink test cases and helped debug when those cases ran error due to PV buck compatibility with removed batteries. |
| Brian Gronseth | 6 | 76 | Helped take hardware measurements and met with wind team to oversee the lab performance. |
| Jeffrey Szostak | 6 | 95.4 | I supplied some of the power equations that were used to analyze our simulink results. I also tested the wind hardware experiments. I also wrote the script that simulates natural wind and sunlight. |
| Matthew | 5.5 | 104.8 | I assisted in taking HW measurements and running the |

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| Lee | | | experiments. I also supervised the wind team taking the lab. |
| Mike Trischan | 6 | 93 | Helped debug some issues in simulink model, worked on wind profile, started irp final poster |
| Eric Cole | 5 | 85 | I tested the wind simulation three different ways, one with just the turbine and generator, two with the turbine, generator, AD-DC-AC conversion, and three with everything including batteries. I also worked out how to measure three phase power with a non-sinusoidal and harmonic interfered signal. |

## Summary of Weekly Advisor Meeting:

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| The meeting went very well. Five of us six were there as well as Dr. Ajjarapu and Pranav Friday at 1pm. |
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| The Ajjarapu was happy. |
| Discussed previous accomplishments, future tasks |
| Updated adviser on progress made from the week prior and received tasks for next week to complete. |
| Absent |

## Plan for Next Week:

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| Finalize our combined simulations, continue work on the wind and sun simulator, and continue solar experiment setup. |
| Fix errors that pop up during simulations. Start working on writing up labs that can be used for EE452. Work on making a final presentation for senior design. |
| Here are the tasks that were given for this week:<br>1. Talk to our sister group about running the PV simulation without battery. Apparently they were able to get an output.<br>2. Ajjarapu seemed interested in seeing some of the experiments that we set up for software.<br>3. Try to match the hardware data with the outputs from simulation in order to put the software measurement experiment with the hardware measurement experiment.<br>4. According to Pranav our number one objective is to focus on getting the NI working to get irradiance measurements, |
| Figure out what is wrong with and how to use national instruments irradiance meter, continue irp prep, confirm that combined model is functioning properly |
| Solar team will look to take irradiance readings with the NI software, meet with our sister group to discuss their simulations, and take more hardware measurements to see if losses within the system are constant. |
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| 3. Try to match the hardware data with the outputs from simulation in order to put the software measurement experiment with the hardware measurement experiment.<br>4. According to Pranav our number one objective is to focus on getting the NI working to get irradiance measurements, |

## Pending Issues:

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| None. |
| Na |
| NA |
| Na |
| NA |
| Length of the lab seemed a bit too long. |

## Comments/Extended Discussion:

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| None. |
| None |
| Winning |
| NA |
| NA |
| NA |