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:

The team showed completed simulation to our senior design advisor and received official notice to work full bore on the existing hardware. We were given a very long list of tasks to accomplish for next week as well.

Past Week Accomplishments:

Wind Team's objectives are: 1. Finish the Simulink Model 2. Test Wind Turbine to determine its parameters. 3. Look into what hardware we already have and see how we can incorporate the hardware into the project. Solar team tasks are as listed: 1. Test batteries to see if they will charge (with ankit?) 2. Demonstrate working simulink model with hardware parameter verification 3. Call kyocera about solar panels Set hardware up and test components
Solar hardware is up and running, simulations are good aside from one minor error, continued to work on testing out wind turbine generator
We seem to have completed solar simulations by Matt. Eric is still working on Wind simulations with assistance by Pranav.
Solar team met on Tuesday, Thursday, last Friday, as well as this Friday, and Saturday. Friday of last week, we met with our TA advisers and received a detailed walk through of the hardware that we have to work with (solar panels, MPPT, inverter, batteries, and load). We started the process of wiring up the PV array, followed up by circuit verification both Tuesday and Thursday of the following week. Friday, we met with one of our TAs for an update to Prof advisor, followed up by testing the circuit and simulation run throughs. This resulted in solar team powering the load of the array in the following ways: Whole PV array, with the solar panels, and only with the batteries. Saturday, we met up and took current and voltage measurements at various nodes of the array, as well as under various conditions, such as battery isolated with load and with 1,2,3, and 4 lightbulbs being turned on.
Got the wind simulink simulation model to run and produce the correct output signals. Helped to rewire the existing hardware components. Started creating a way to test the parameters of the generator.
The group set up the test that will figure out the Wind Turbine parameters which will be used to calculate theoretical values. The group also cleaned up the current solar hardware and ran tests on it to ensure all of the components are working. We also added more detail to our two simulink models.

Individual Contributions:

Name	Hours this week	Cumulative	Contribution
Nathaniel Byrne	5	49.5	On Friday I attended the meeting and worked on the hardware with Brian. We insured that instruments were working and that any necessary measurements can be made.
Brian Gronseth	11	54	Worked on wiring up the PV array, as well as taking the voltage and current measurements. Also created a circuit diagram of the PV array in AutoCAD, as well as contacted Kyocera and Northern Arizona Wind and Sun to find out about purchasing new solar panels. In doing so, we would exceed current ratings of our equipment and would need all new hardware.
Jeffrey Szostak	9	70.4	I set up the hardware test for the Wind Turbine. Doing so required attaching the Turbine's generator to a motor and learning how to use software specific to the motor we're using. It also required using our hands to secure both the generator and motor in place.
Matthew Lee	8	62.3	I finished the solar simulations and verified the outputs were correct. I also worked with Brian and Nathan to verify the inputs to our model were accurate with the actual hardware we have in the Power Lab.
Mike Trischan	10	66	Set up solar hardware, worked on testing wind generator
Eric Cole	8	59	Got the wind simulink simulation model to run and produce the correct output signals. Helped to rewire the existing hardware components. Started creating a way to test the parameters of the generator.

Summary of Weekly Advisor Meeting:

Dr. Ajjarapu asked to see was that we had working simulations with verified parameters so in order to show him this we brought him to the lab so he could see our simulations. At last he was able to discern that we did have working simulations (like we had been telling him and showing him) and how he wants us to break into software and hardware teams. Eric and Matt will remain on software since they are the main project owners for the simulations anyways. And everyone else will divide respectively into hardware teams for their energy generation platform. Ajjarapu was dissatisfied with the amount of progress we've been making with the hardware so far but that is because he hadn't told us he wanted us to begin working on hardware until now. Definitely a lack in communication.
Reported previous accomplishments, discussed plan for next week
Wind: Split into HW and SW teams obtain wind turbine parameters fix waveforms in simulation go through the previous groups lab document to understand what they did Solar: Split into HW and SW teams

figure out what parts are broken, order replacements
obtain power measurements in various locations around the test setup
create test cases for lab document
create a step-by-step power point of the reasoning behind the design. Show output graphs of every individual part (voltage, current, power, before and after adding new parts, etc.)
go through the previous groups lab document to understand what they did
All:
Create a power point for next week
Meet with Sister design group
go through the previous groups lab document to understand what they did

For solar team, adviser was disappointed in progress we had made on hardware and simulations, although we had accomplished almost all of the tasks he and the TA had given us. Discussed what we need to do for next week, as well as the overall goal of the project.

Fix the input of the simulation to make the generated voltage waveform be a sinusoid.

The meeting took place on Friday 3-Feb-2017 at 1pm. All teammates were there as well as Pranav and Dr. Ajjarapu. We showed Dr. Ajjarapu our current Simulink models and were asked to move onto the next step which is to modify the currently existing labs to match the new simulink models.

Plan for Next Week:

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Solar:
Split into HW and SW teams
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Find out what hardware is missing/broken and order it. Find out specs for wind turbine generator. Wort out the error on simulation

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Solar team will need to give a progress report on Tuesday for hardware components of the system. In doing so, we need to meet with our TAs to discuss the sensor components of the system and the possibility of needing to order new hardware. We also need to look into the lab portion of the project to come up with test cases that involve both the hardware and the software (software lab i already provided).

Fix the generator part of the wind turbine simulation and start make a lab write up for the wind simulation part.

Run the Wind Turbine test, input the found parameters into the wind simulink models, hook up the solar hardware sensors and ensure they work properly, and modify the current lab manuals to fit the new simulink models.

Pending Issues:

Simu output might be 170 Vac instead of 120... But that could also be because we are not measuring RMS voltage. Need to double check that.

Having trouble contacting manufacturer of wind turbine generator to find specs/ find information online

Ta's give us the intermediate tasks in order to complete what our professor wants, which causes us to be unprepared for adviser meetings. A lot of what we need to do hinges on the schedules of the Ta's.

None.

Comments/Extended Discussion:

NA

Matt is the coolest guy ever but I feel a little slighted by the email he sent me this Friday):p

I wish we could make our meetings with Ajjarapu as short as possible. They're not very productive as they require a lot of time.

Na

None

None.