

EE 491 Weekly Report 5

Start Date: February 28

End Date: March 5

Group number: 18

Project title: Utility Scale Lithium-Ion Energy Storage Project

Client &/Advisor: Burns and McDonnell, Zhaoyu Wang

Team Members/Role:

- ❖ Oksana: Leader; responsible for keeping the team on track
- ❖ Sarah: Organizer; responsible for revising, editing, and helping keep track of all our reports.
- ❖ James: Document Report; responsible for the submission of our reports. Inverter quantity and cable sizing to batteries
- ❖ Cole: Point of Contact/Communicator; responsible for meeting and contacting the clients, faculty advisor, and the AutoCAD site layout design.

Weekly Summary:

This week, we worked on refining the AutoCAD site layout, verifying the spacing and calculations, and designing the one-line diagram in AutoCAD. We also received feedback from our client on our progress thus far. We have started finalizing our overall site layout for the batteries and inverters.

Past Week Accomplishment:

As a group:

- Determined the inverter and battery technology
- Finished calculations for the technology we will be using
- Hand sketched one-lines
- Created one-lines using AutoCAD

Individually

- James: Created AutoCAD one-line drawing.
- Cole: Moved the AutoCAD drawing into CIVIL 3D and added satellite imagery to the background.
- Oksana: I worked on calculations, weekly reports, and verifying the spacing and layout for the battery technology.
- Sarah: I worked on the rough draft for the one-line diagram. I also completed relevant calculations to size components in the one-line.

Pending Issues:

The site layout we created on AutoCAD should have a satellite image of the site as the background. However, the AutoCAD software for Mac will not show this.

Individual Contributions:

Name	Individual Contribution	Hours this reporting period break down	Total hours for the week	Total Hours	
Oksana Grudanov	<ul style="list-style-type: none"> - Calculations - Weekly report - Installation manual research; verifying the layout spacing of batteries and inverters 	1.5(battery installation manual review) 1.0 (weekly report) 1.0 (weekly meeting)	3.5	24.0	
Sarah Ebert	<ul style="list-style-type: none"> - One-line diagram research - One-line diagram sketch - Meeting with James to go over one-line 	3.0 (one-line diagram research and sketch) 0.5 (one-line meeting) 1.0 (weekly meeting) 0.5 (weekly report)	5.0	25.0	
Cole Dustin	<ul style="list-style-type: none"> - Learned some CIVIL 3D - Moved Drawing to CIVIL 3D 	3.0 (CIVIL 3D) 1.0 (Weekly Meeting)	4.0	23.5	
James Mendenhall	<ul style="list-style-type: none"> - Created AutoCAD one-lines - Meet with Sarah to create one-lines 	1.0(Weekly Meeting) 2.5 (AutoCAD drawings) 1 (Weekly Report)	4.5	22.5	

Plans for the upcoming week:

- Finalize the one line diagram
- Two home runs
- Daisy chain connected
- Connect batteries in parallel
- Cable sizing
- Formal battery sizing report for our client

Individual Assignments for the upcoming week:

Oksana: I will be looking at cable sizing for the POI in our one-line diagram. I will also be helping write out the outline for the formal report for our client that will highlight our technology selection and all the calculations we have completed so far on the project.

Sarah: I will complete a final draft sketch of the one-line diagram considering the notes from our client. I will share this with my teammates so they can continue with cable sizing and the final draft of the one-line in AutoCAD.

Cole: I will help with starting the technical documentation outline that will include all of our justifications, math, and progress up to this point.

James: I will update the AutoCAD one-lines with the correct parameters and start a final report rough draft for our project. I will also changed the one-line so that it is daisy-chained. I will also start on the final report rough draft.

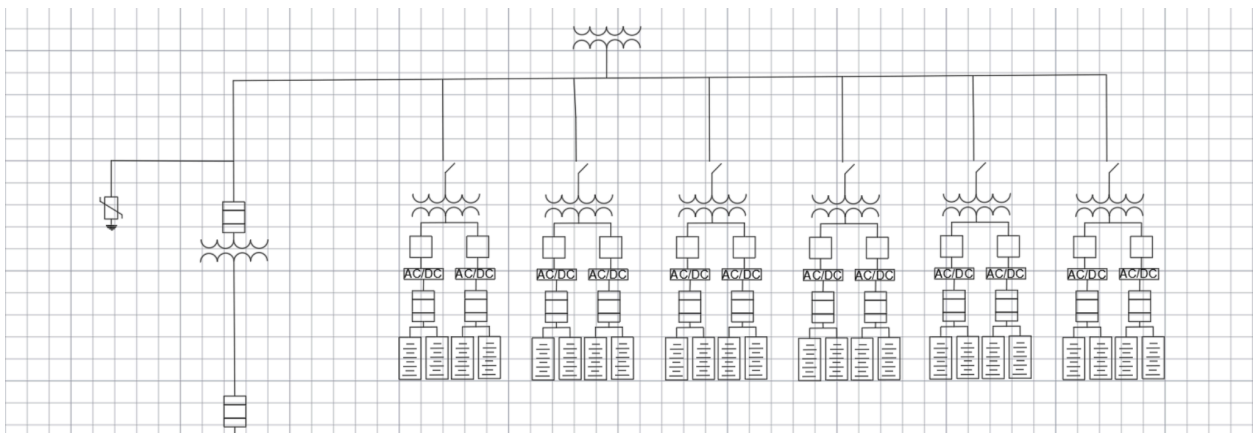
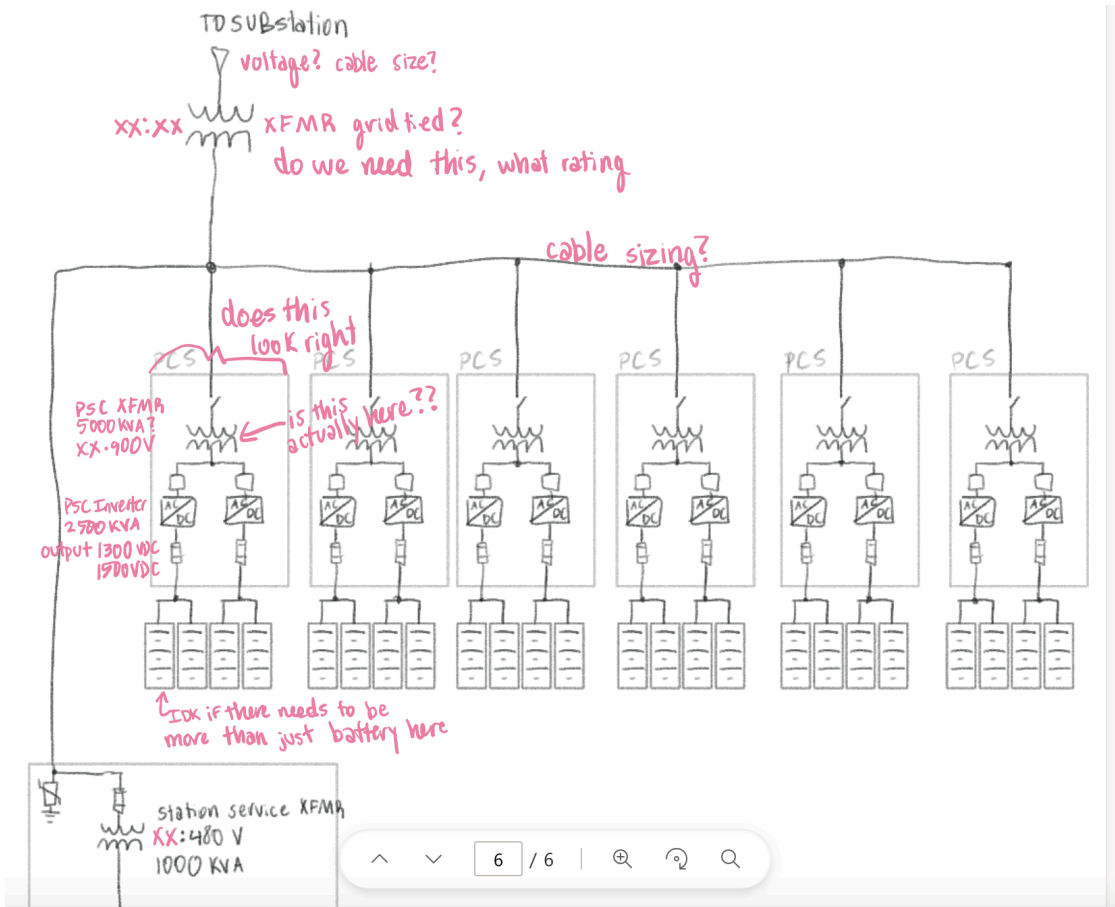
Summary of weekly advisor meeting:

We were unable to meet with our advisor. He has been busy traveling. We currently do not have any questions for him regarding the project; however, we need to find a time to meet with him to go over everything we have completed so far.

Summary of weekly client meeting:

This week, we met with the team to discuss the one-line diagram we had completed. We talked about calculations and how the one-line diagram is expected to look. We also got the NEC code datasheet to look through for cable sizing. We have a few modifications that need to be done on the one-line diagram regarding the "Home Runs." We will want to start a formal report for our client to have a document of all the work we have done so far. We need the transformer ratios for the 4600E Siemens Gamesa. We learned that the voltage on the secondary side is 480V. The output voltage is 1500V DC for the batteries. We should use Article 310 of NEC 2020 to determine cable sizing. All equations must be typed for the final report. For the medium voltage runs, we will be using aluminum wires. There will be two separate runs that are daisy-chained (connected in series). Two homeruns will be used (3 PCS and one aux transformer) and (3 PCS). The auxiliary transformer will connect to all of the inverters. Auxiliary connections will not be shown on main one-line. A note for the 30 auxiliary feeders will be made on one-line diagram. The main breaker will be 2000 amps. We will be using 40 degrees Celsius cables. We have to stay below 565 amps for home runs.

One-line diagram:



CIVIL 3D site layout diagram:

