

# EE 491 Weekly Report 9

11/07/2024 to 11/14/2024

Team 41

115/34.5kV Solar Plant & Substation

Client: Black & Veatch

Faculty Advisor: Ajarapu Venkataramana

## Team Members:

Andrew Chizek -- Researcher

David Ntako -- Team leader

Ben Palkovic -- Meeting Recorder

Mohamed Sam -- Technical Lead

Sergio Sanchez Gomez -- Documentation

Dallas Wittenburg -- Meetings leader

## Past Week Accomplishments

- Weekly Presentation – All
  - Safety Moment – Heavy Machinery
  - New Technology - Night Solar Panels
  - Research on Ground Mounting Systems
    - Researched ground mounting systems for large scale PV installations
    - Looked into suppliers and design tools
    - Compared typical ground mounting systems vs bifacial mounting systems to see what type would fit our design better
  - Drawings for Project
    - Ben: Created new solar array in AutoCAD based on actual project location in Deming, New Mexico
    - Sergio & Dallas: Created AutoCAD drawings that shows horizontal view of panels and bifacial ground mounting system
    - Received feedback from our client on our most current drawings and noted what to change/modify going forward with the drawings.
    - Expanded on AutoCAD drawings and diagrams to include the latest updates
    - Worked on drawings that show the angle of the panels with respect to the ground, DC combiner box location, mounting of panels to the support system, and panel orientation

- Voltage Drop Calculations
  - Presented updated voltage drop calculations to our client using the tool provided
  - Used Microsoft Excel to perform voltage drop calculations for accuracy
  - Addressed specific feedback from our client and incorporated their insights into further changes
- Cost Analysis
  - Performed research on generation factor, sunshine value for New Mexico, and cost per hour for solar panels
  - Added to the estimation of total costs based on feedback from our client. Changed the breakdown of costs associated with the project including labor, overhead costs, material, PV module equipment
  - Incorporated additional feedback from our client for a more precise cost estimation
- Array Parameter Tool
  - Received feedback from our client and we will work to update this based on their feedback
- Gantt Chart
  - Reviewed our project's Gantt Chart with our client and received feedback on what we need to change
  - Identified key components to modify and improve the project timeline

## Pending Issues

- Finding costs of various equipment including the ground mounting system for a bill of materials list
- Gantt Chart – Continue to modify and improve the Gantt chart, adding new components as suggested by our client
- Cost Analysis Tool – Further develop the cost analysis tool to ensure a true cost estimate
- Wait on pricing for components that do not have a price for yet
- Array Parameter Tool – Continue refining the tool based on our client's feedback
- Drawings and Layouts – Implement further changes to the project drawings and explore additional design options
- Further develop voltage drop calculations based on array design for actual plot of land

## Individual Contributions

<b>Name</b>	<b>Contribution</b>	<b>Hours this Week</b>	<b>Total Hours</b>
Andrew	Worked on voltage drop physics and helped with whatever needed updating	3	31
David	Worked on voltage drop calculation for our second model with Mohammed	4	42
Ben	Updated website, work on AutoCAD, lightning talk, research on PV module physics.	4	38
Mohamed	Worked on volage drop calculation with David	4	42
Sergio	Researched ground-mounting systems for bifacial solar panels, reviewed and analyzed datasheets for different mounting options, worked closely with Dallas on detailed AutoCAD drawings, and helped put together client presentation slides.	4	41
Dallas	Researched ground mounting systems for bifacial solar panels, found datasheets of mounting systems, helped Sergio with AutoCAD drawings	4	45

## Plans for Coming Week

### Action Items for Client

- Start putting together a bill of materials on AutoCAD drawing sheet
- Create a Microsoft Excel sheet of client feedback and provide responses to these comments
- Start working on wiring diagrams for solar farm
- Research adding fencing around the solar farm
- Further expand and work on voltage drop calculations using the spreadsheet tool provided by our client
- Work on Gantt chart and update rows for better documentation for our client
- Continue working with AutoCAD drawings – Modify and add to the side profile drawings that show the angle of the panels with respect to the ground, DC combiner box location, mounting of panels to the support system, and panel orientation
- Further expand on cost analysis spreadsheet
- Look into creating a mock site plan drawing