EE/CprE/SE 492 Bi-WEEKLY REPORT 6

3/30/2020-4/13/2020

Group number: 57

Project title: Impact of High Photo-Voltaic Penetration on Distribution Systems

Client &/Advisor: Dr. Venkataramana Ajjarapu

Team Members/Role: Thomas Coleman – Team Leader

Andrew Chaney – Project Engineer

Daniel Riley – Assistant Project Engineer/Editor

Kenneth Prell – Assistant Project Engineer

BiWeekly Summary

During this time period, we split up into two sub-teams. One team is working on modeling the 123-node system while the other is working on optimizing solar installation on the 34-node.

Modeling the 123-node system is nearing completion pending a few coding errors.

Optimization is going slower than expected due to issues with figuring out how to form the objective function (minimizing loss).

Past biweek accomplishments

o Altered the 34-node scripts to see if they could be changed to model the 123-node system without starting from scratch.
o After successful alteration of scripts, began troubleshooting bugs so that the 123-node system may be modeled.
o In-depth research about our process of optimization and how to implement it on our system.
o Continued familiarization with CPLEX.

Pending issues

o We are working with our advisors to figure out optimization of the 34-node network.

Individual contributions

Name	Individual Contributions	Hours this Session	Hours cumulative
Daniel	Familiarized himself with CPLEX (program used for optimization). Worked with Thomas to read various research papers pertinent to optimization goal.	12	64.5
Andrew	Began working with Kenneth, converting and updating scripts for the 123-node system. Troubleshooting 123-node scripts so modeling is possible. Wrote script for optimization team that extracts additional needed data.	10	70
Kenneth	Began working with Andrew, converting and updating scripts for the 123-node system. Troubleshooting 123-node scripts so modeling is possible.	12	66
Thomas	Worked with Daniel and continued reading through research papers regarding multi-objective optimization. Corresponded with advisor with confusions about optimization	11	69

	(discussed how to implement objective function relative to our system).		

Plans for the upcoming biweek

- o 123-node team will finish troubleshooting scripts and model the system. They will then compare and contrast results with the 34-node system. Once they have finished this process, they will begin working on deliverables for the overall project and preparing for the presentation.
- o Optimization team will continue consulting with advisors on how to move forward with the 34-node system. Once the optimization process has been performed on the 34-node system, they will start working on deliverables for the overall project and preparing for the presentation.
- o Both groups will discuss their results so that all members will be familiar with work done since splitting.

Summary of weekly advisor meeting

- o Optimization (Minimizing loss for cost savings)
    - o Using the paper "Optimal Grid-Connected with Multi-Solar PV Placement and Sizing for Power Loss Reduction and Voltage Profile Improvement" for optimization method
    - o Perform loss minimization first to find locations of solar farms
    - o Do second optimization on PV control modes to compare losses with voltage deviation
    - o Decide whether minimizing loss or regulation operation is better
- o 123-node
    - o Have scripts finished so results can be discussed for next meeting
- o Presentation Feedback
    - o Use higher quality pictures for presentation
    - o Explain more about the results with PV