EE/CprE/SE 492 Bi-WEEKLY REPORT 4

2/24/2020-3/8/2020

Group number: 57

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

Client &/Advisor: Dr. Venkataramana Ajjarapu

Team Members/Role: Andrew Chaney – Team Leader

Kenneth Prell – Project Engineer

Daniel Riley – Assistant Project Engineer/Editor

Thomas Coleman – Assistant Project Engineer/Document Architect

BiWeekly Summary

During this time period, we finished the final scripts for modeling the 34-node network. This allowed us to look at what kind of solar implementation is best for improving the voltage of the system. We have also conducted further research on various costs in the system so that we may form our objective function for optimization.

Past biweek accomplishments

- Finished the spot-load solar distribution script. This was the final script needed for full modeling.
- Continued research on costs of solar panel construction, voltage regulators, system power losses, and capacitors.

Pending issues

- Contact was made with Alliant Energy at the beginning of the biweek concerning the NDA and obtaining their network model. As of now, they cannot be reached again (Dr. Ajjarapu is working with us to regain contact and clear up confusion).

Individual contributions

Name	Individual Contributions	Hours this Session	Hours cumulative
Daniel	Continued research on cost data to start the optimization process	12.5	44.5
Andrew	Script for injecting spot solar into the 34-node network Finished the script for running OpenDSS remotely through MATLAB	12	50
Kenneth	Worked with Daniel with regards to cost research	12	46
Thomas	Cost research on parts Worked on developing the objective function that will determine how we will optimize the system	14	49

Plans for the upcoming biweek

- Next week is spring break. We will be working intermittently, continuing to develop the objective function for optimization.
- Familiarize ourselves with CPLEX, the program used for optimization
- Reserve a room for the 23rd of March to give a mock presentation to our advisors of our progress so far this semester

Summary of weekly advisor meeting

- Optimization
  - Use cost of tap changes and losses converted to cost
  - Loss might not be the best approach (high solar penetration leads to unbalanced loading)
  - Look into different objective functions for optimization
    - Voltage deviation
    - Cost
    - Loss
- Look at location of community solar in implementation using the papers provided by Alok and the costs associated with location determination.

- CPLEX will be the program used for optimization. Familiarize yourselves with it.
- Talk to ETG to see if CPLEX can be put in the senior design lab.
- Read the other articles Alok will send pertaining to optimization and linear programming.
- Alliant Energy has not been able to be reached after initial conversation from earlier meeting. If they can be reached again, we will move forward using their model. If not, we will use an IEEE model for optimization.
- Reserve a room for the 23rd of March in order to present to us what you have accomplished so far this semester.