The initial and improved results for the 20 test cases are displayed in Figures 5-8. The simulation's outcome demonstrates that by dividing the system's overall capacity among its nodes, the best single installation may be made even better. Secondary system loss and voltage profile improvement are also noted and are displayed in Figures 5-8. Secondary system loss and voltage profile improvement are also indicated as a percent reduction from 25–50% in a single installation to 38–64% in multiple installations.

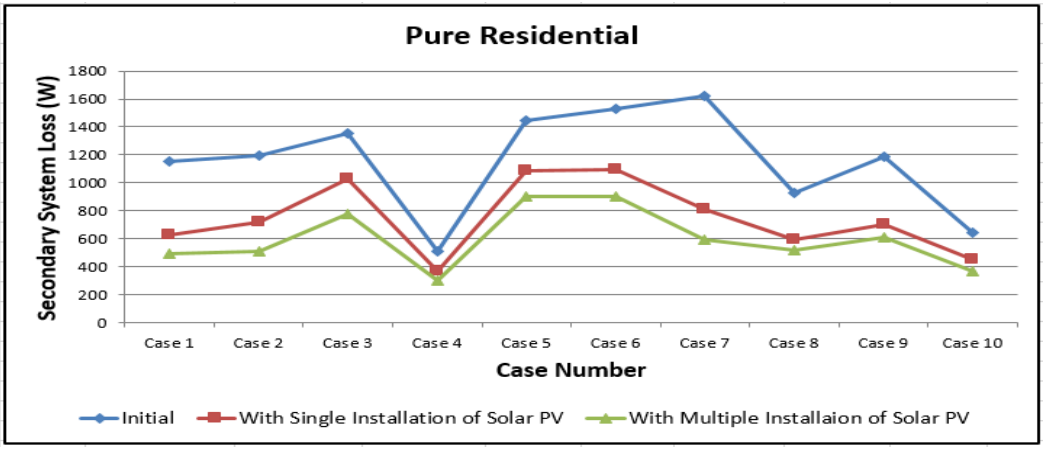

Figure 5. Secondary System Loss: Residential

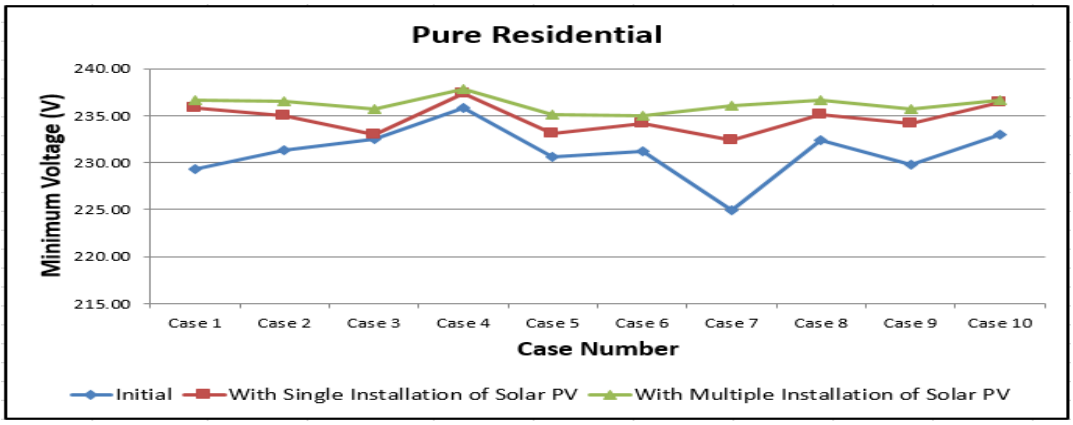

Figure 6. Minimum Voltage: Residential

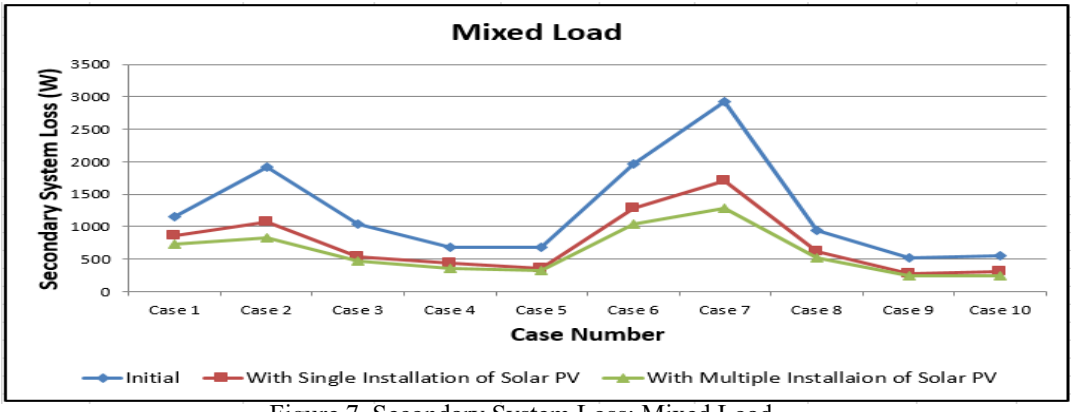

Figure 7. Secondary System Loss: Mixed Load

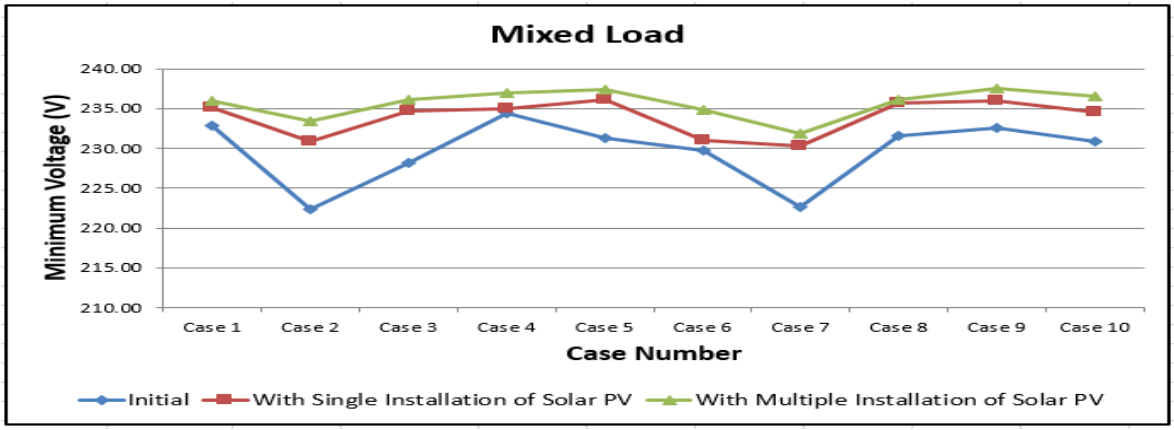

Figure 8. Minimum Voltage: Mixed Load

6. Conclusion and Future works

Using a genetic algorithm, we created a way in this paper to reduce secondary system loss (GA). To prevent voltage profile issues, the procedure is based on optimal single installation. Test examples based on actual secondary distribution network features are used to show how resilient the suggested solution is. The answer demonstrates that by dispersing the ideal single installation capacity to various system nodes, it is possible to achieve a considerably more optimal reduction of secondary system loss and voltage profile. Future research may use the approach outlined in this paper by accurately modeling the solar PV inverter based on real-world geographic characteristics, considering factors like temperature, irradiance, shading, position, tilt angle, etc. To reduce annual energy loss, time-varying loads may be adopted.

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