

PROBLEM DEFINITION

In the modern power grid, consumers are transforming into prosumers where electric power end-users could also generate their own energy from renewable resources such as rooftop photovoltaic panels (also known as PVs) or have stored energy in batteries (electric vehicles) and inject it back into the grid to sell the excess energy. The power distribution system could benefit from this local distributed generation if the adequate controls and sensing are developed as well as using a real-time market auction system.

PROJECT GOALS

- Develop an IEEE 34-Bus model in both RSCAD and ATPdraw
- Implement a PV system in both models using irradiance data from Spokane, WA
- RSCAD and ATP models should be able to send power flow analysis results to the n-bus graphing system
- Create an n-bus graphing system and parser
- Develop a toolset to work with the graphical representation of the network

CONCLUSION

- Completed the IEEE 34-Bus model in both RSCAD and ATPdraw with PV implementation
- Developed toolset to parse, organize, and analyze grid data in an extensible structure
- Helped Avista explore the physical and economic feasibility of participating in a transactive energy network for their business model

PROJECT DEVELOPMENT

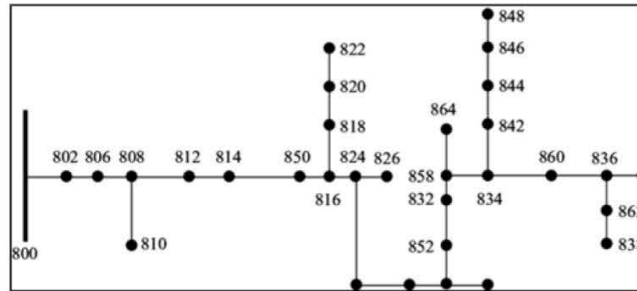


Fig. 1. IEEE 34 bus system

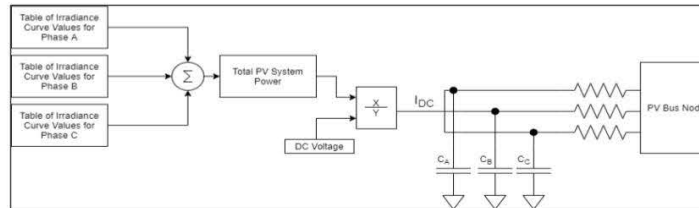


Fig. 2. PV system implemented in ATP

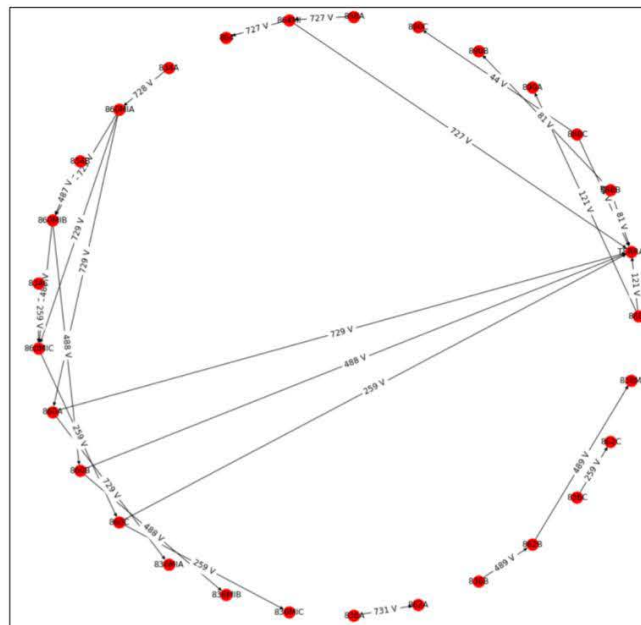


Fig. 3. Graph Theory visualization of two buses using custom filtering

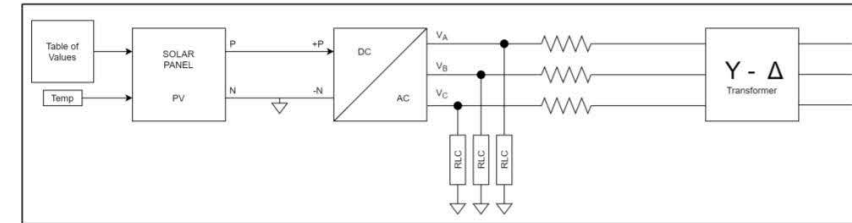


Fig. 4. PV system implementation in RSCAD

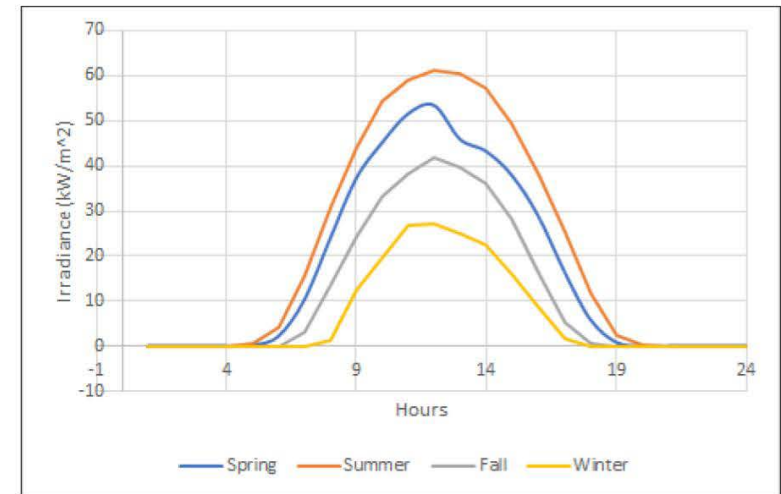


Fig. 5. Seasonal days representing Spokane yearly weather data



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