Project Advisor Opportunity:
PV Power Quality Phase Balance

For immediate consideration: NRECA is seeking co-op partners to advise and provide technical guidance in the creation of engineering analysis software for studying and mitigating distribution phase unbalance caused by solar PV. **Deadline for letters of support: June 27**.

Research Opportunity Summary

High penetrations of distributed solar PV continually change the net loading on each phase, resulting in time-varying phase unbalances that can damage three-phase devices and violate grid codes. Argonne National Laboratory, in partnership with NRECA, is leading a project to develop control strategies for solar PV inverters that mitigate power quality issues related to phase unbalance. Specifically, this project will use the Steinmetz circuit concept to motivate real-time control actions for the reactive power outputs of solar inverters in order to achieve the goal of balanced operation at specified system locations. The project will study a variety of approaches for achieving this goal, including a decentralized approach that is solely based on local measurements, a grouped approach that considers small sets of loads and PV generators, and a centralized approach that leverages measurements from a variety of locations, including smart meters, in order to compute optimal setpoints for each inverter. The resulting controllers will be computationally evaluated on actual distribution system models obtained from a variety of NRECA members.

Requirements and Benefits of the Advisory Role

In support of this research effort:

1. NRECA is seeking 2 co-op partners who can provide feedback and guidance in the process of developing and testing this research software. Meetings will be by teleconference.
2. This project is a grant-funded effort from the Department of Energy. There is no cost share requirement or financial contribution for participating co-ops.
3. Letters of support are requested to be sent **by June 27th** to David Pinney, NRECA Program Manager of Analytics, at David.Pinney@nreca.coop. NRECA can provide example language for the letter.

Electric cooperatives who participate directly in this project would gain experience in inverter controls for voltage management, help shape research in engineering analysis software, and receive insights in to phase balance on their systems.

Project Team

NRECA has joined a project team that is led by the Argonne National Lab and includes partners at the University of Wisconsin-Madison and the University of Michigan. The research is funded by the Department of Energy's Solar Energy Technologies Office (SETO), whose mission includes "improv[ing] the ability of solar energy to integrate into the country's electric grid." Additional detail on the team and the project can be found in the project overview.

Contact for More Information on How to Participate in the Pilot

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