

Master thesis proposal: Building a self-sufficient community microgrid – an investigation on its strategies and technological planning

Project description:

Microgrids are helping communities to become self-sufficient for their power. Small-scale renewable energy generation with energy storage facility may satisfy the electricity demand of a community and the community can choose to operate in an islanded (autonomous) mode or grid-connected mode. In grid connected mode, the microgrid works as current controller and injects power to the main grid, contributing to the grid resilience and strengthen the power grid. In the events of faults in main grid, it can operate in islanded mode and stay self-sufficient. Imagine you are developing and building a community that is going to be a self-sufficient microgrid. Where will you build it? What renewable energy sources will you consider? What microgrid technologies are needed to implement the idea? Will the savings from the future utility bills justify the cost and investment of such a community? Will people be willing to buy a house in the community and live there? How does the adoption of electric vehicles affect its planning and operation? Can microgrid be actually built into a real estate project and become an incentive? It is an international research project collaborating with a registered energy assessor from Hong Kong who will provide perspective and expertise from the point of view and experience of a major Asian city. The student is expected to write up the research result into a conference paper.

Requirements:

- Regular progress on the research project
- Dedicated to writing up the research results and publishing in a conference/journal
- Basic knowledge on MATLAB can be very useful for modeling, processing and analyzing data

If you are interested in this project, please contact Dr. Philip Pong (philip.pong@njit.edu) to discuss beforehand. Thank you.