

Active Power Control of Single-Phase Nanogrid

Nowadays, the increasing integration of renewable distributed generators is not only limited to power systems at high and medium scales, but also includes low voltage small-scale systems such as at household level. For example, since 2009, Ontario Power Authority (OPA) has launched the micro-feed-in tariff (microFIT) program to provide opportunities for homeowners, farmers and small business owners to develop “micro” renewable electricity generation projects (10 kilowatts or less in size). Meanwhile, there are also a variety of electricity appliances at houses, including electrical vehicles, energy storages, lights, dryers, washers, TVs, etc. This kind of small-scale power systems including both small-scale power generators and electricity loads are called nanogrids. In specific, the residential nanogrids are usually single-phase units. It is challenging to maintain the stable and economical operation of the single-phase nanogrids. In this project, active power regulator will be designed to maintain the stable operation of the single-phase nanogrid and thus enhance the power quality provided by the single-phase nanogrid.

The prerequisites for this project are ELEC 3508 (Power Electronics) and ELEC4602 (Electrical Power Engineering).