Easily Scale Up or Down Your PV Power Inverters

A modular multi-pulse inverter to be used in a distributed PV system and tied to a utility power grid

UCF researchers have developed an improved solar panel grid inverter for distributed PV systems which allows new PV strings to be easily added to the inverter when scaling up system voltage. This newly designed inverter provides designers the flexibility to modify the system according to user power requirements.

Solar generated electricity in both residential and commercial markets by way of photovoltaic (PV) systems, or solar panels, has become increasingly popular. Solar panels convert light energy into usable direct current (DC) electricity which is then converted to alternating current (AC) electricity. The conversion from DC to AC is done through inverters. Inverters can also connect the localized electricity from the solar panels to the distributed grid network. In solar grids with multiple solar panels, the inverter connecting to the grid can be centralized to allow the multiple PV strings carrying the current to feed into one unit. The system invented at UCF improves power efficiency by converting the electricity at the same frequency as the grid power lines which means power conversions for medium and high power applications are less expensive. Now, a single inverter can be used as the grid interface for centralized, string, and multi-string systems, and can easily be extended to accommodate additional energy conversion applications connecting to the grid.

Technical Details
The modular grid tied multi pulse inverter consists of several identical 12V pulse source inverter modules connected together to a line-frequency transformer. The transformer can be of delta-star and star-star configuration. For each module, a fixed phase shift is provided to achieve a multi-pulse current output at the transformer’s secondary side. This provides relatively low harmonic distortions compared to the traditional three-phase-leg pulse width modulation (PWM) inverter.

Inventors
Mingyao Ma, Ph.D.; Haibing Hu, Ph.D.; Issa Batarseh, Ph.D.

Advantages:
• Improves flexibility and simplicity of designing solar panel grids
• Easily scale power requirements up or down with a “plug and play” system
• Improves power efficiency

Applications:
• Residential solar systems
• Commercial building solar systems
• PV power plants

Keywords:
solar, photo voltaic, grid, inverter, electricity, renewable, transformer, distributed PV

If you or your company are interested in this opportunity, Contact:
Raju Nagaiah | P 407.882.0593 | E Raju@ucf.edu | Tech ID# 32762, 32801
UCF Office of Technology Transfer | 12201 Research Parkway, Suite 501, Orlando, FL 32826