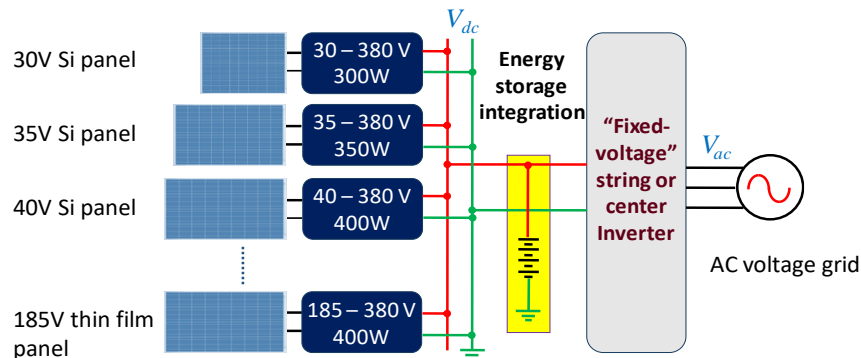


OBJECTIVES

- To develop an ultrahigh efficiency binary-coded multilevel inverter
- To integrate multilevel inverter with paralleled power optimizers for mix and match PV panels.

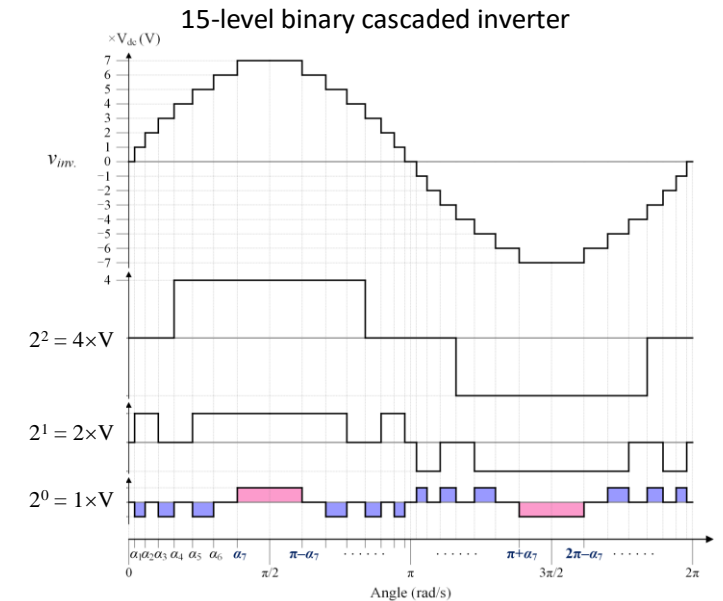
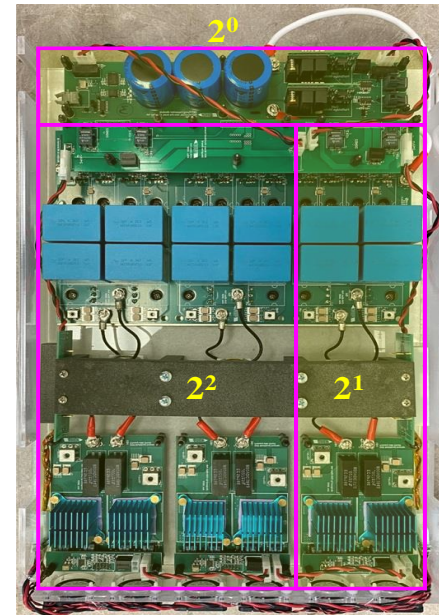
ISSUES AND SOLUTIONS

- **Issues with existing PV systems,**
 - ✗ Inefficient utilization of available space to maximize the PV installation
 - ✗ Limitation on the number of modules to match down-stream inverter
 - ✗ Output voltage may be too high or too low for grid connection
 - ✗ Non-isolated
 - ✗ PV panels are impacted when there is a fault
 - ✗ Leakage current between panels and inverter
 - ✗ Circulation current between inverter and the grid
- **Solutions with integrated multilevel inverter and paralleled power optimizer**
 - ✓ Full utilization of available space for PV panel installation
 - ✓ Totally isolated between PV and utility grid – better safety feature
 - ✓ Power output directly proportional to non-shaded panels
 - ✓ Flexible, not limited by the number of panels for a complete system
 - ✓ Form a common DC bus for energy storage and DC microgrid



TECHNICAL APPROACHES AND ADVANCES

- Mega-hertz switching to reduce magnetic component and overall size
- Stair-case type waveform synthesis to avoid PWM noise and leakage current
- Measured efficiency exceeds >99% for the proposed multilevel inverter and parallel power optimizers



EXPECTED OUTCOMES

- Maximize the space utilization and power output for a given installation
- Integrate multilevel inverter and power optimizer to demonstrate a solar parking port
- Develop and manufacture innovative binary-coded multilevel inverter with 30-kV isolation large-scale utility PV systems