Development of a Low Cost, Residential Plug and Play PV System

SunShot Grant: Prime Awardee: N.C. State University
Sub Awardee ($1.25 Million Project): University of Toledo

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Project Objective
Reduce total installed cost of residential solar photovoltaic systems through intermediate objectives

Background
Two Generations of development:
Each Generation has four tasks addressing:
• the structure
• the electrical components
• the interface to the utility
• operation in a market/regulatory environment

Gen I – Task Overview

Gen I – PnP System Program

Field Studies of Real World Residential Rooftop Installations
- Perrysburg, OH & Columbus, OH
- Yellowlite & Heirloom Energy Installations
- Avg. Labor Costs: $0.32/Watt

NCSU Plug and Play Project
Desired Outcomes
In 5 Years, demonstrate PnP system that
• Can potentially reach $1.5/Watt target.
• Contractor/homeowner can install without special training/tools in 10 man-hours.
• Supports automation of:
  • Electrical permitting and inspection
  • Structural permitting and inspection
  • Utility interconnection agreement.
• Delivered, installed, inspected and commissioned on same day.

Task 2 Team (UT)
• Cost reductions in refining over-all residential rooftop system design by reducing weight of mount, improving mount design, and integration of balance of systems
• Analyze market practices in design and installation to compare progress against for new PnP systems

Installation Simulation Lab
Bosch D-Tect Scanner: Intern Study
• Stud-finding for rack mount is a slow process
• European installations are known to be faster
• Trials have been done at UT and in the field using the Bosch D-Tect 150 wallscanner. Techniques have raised accuracy to > 85% accuracy, and installers have improved upon this.
• Yellowlite & Heirloom Energy intend on utilizing this product