

Module Embedded Micronverter Smart Grid Ready Residential Solar Electric System

0479-1537

RUI ZHOU/ GE GLOBAL RESEARCH

TECHNOLOGY SUMMARY

Develop and demonstrate power electronics technologies that address the following microinverter system limitations:

Objective 1—An Innovative microinverter topology that reduces the cost from the best in class microinverter and provides high efficiency (>96% CEC - California Energy Commission), and 25+ year warranty, as well as reactive power support.

Objective 2—Integration of microinverter and PV module to reduce system price by at least \$0.25/W through a) accentuating dual use of the module metal frame as a large area heat spreader reducing operating temperature, and b) eliminating redundant wiring and connectors.

Objective 3—Centralization of a subset of microinverter smart grid and safety functions into an intelligent backfeed capable circuit breaker that can protect the dedicated PV circuit and simplify such functionality for individual microinverters for lower total system cost.

KEY PERSONNEL

Charles Korman, Fengfeng Tao, John Glaser – GE Global Research
Mark Johnson, Don Marabell – GE Industrial Systems Lineage Power

PROGRAM SUMMARY

Period of performance: 36 months

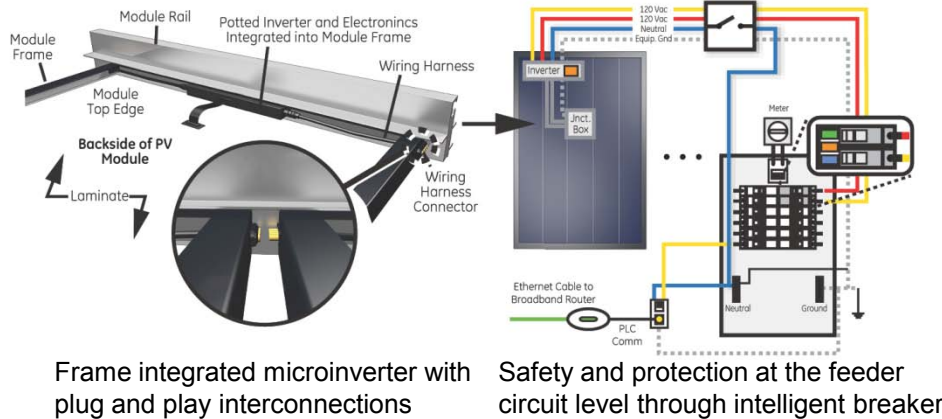
DOE funds: \$2M
Cost-share: \$0.8M
Total budget: \$2.8M

Key Milestones & Deliverables

Year	Milestones & Deliverables
Year 1	<ul style="list-style-type: none"> Lab demonstrations of microinverter breadboard designed for thin film module with 96% CEC efficiency and Volt/VAR support and intelligent circuit breaker System cost projection
Year 2	<ul style="list-style-type: none"> Microinverter prototype and reliability test Microinverter cost data AC PV module design
Year 3	<ul style="list-style-type: none"> 2.5KW pilot system demonstration

Technology Impact

\$3/W total installed price vs. GE base residential system @ \$4/W;
\$0.13/kWh LCOE (< average EIA 2015 retail electricity price)
\$0.10/W (30%) reduction of microinverter cost, and >\$0.25/W reduction of installed price;
Safety, MPPT and grid support functions including Volt/VAR support



Frame integrated microinverter with plug and play interconnections

Safety and protection at the feeder circuit level through intelligent breaker

Main idea of proposed program