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Photovoltaic Inverter Dispatch Optimizer (20150142, Dr. Giannakis)

IP Status: Issued US Patent; **Application #:** 15/061,515

Power Grid Performance Enhancement

A system using a combination of mathematical strategies, integrates residential rooftop solar cell installations and optimizes the performance of the power grid via dispatches (requests) from the grid to the solar cell installations. This optimization may provide a competitive advantage for supervisory control and data acquisition (SCADA) providers interested in enhancing remote photovoltaic (PV) electric power input to a central grid. The technology, which can be implemented at both the utility level and the household level, manages power input from non-utility PV power sources and decentralizes the optimal dispatch of PV inverters, improving the power quality, efficiency and reliability of power grids. In addition, it computes optimal real and reactive power set points for PV inverters in residential systems as per specified performance criteria and economic objectives for the grid.

MN-IP Try and Buy

Try

- Trial period is six to twelve months
- Trial fee is $5000 for six months
- Trial fee is waived for MN companies or if sponsoring $50,000+ research with the University
- No US patent expenses during trial period

Buy

- $25,000 conversion fee (TRY to BUY)
- Royalty rate of 3% (2% for MN company)
- Royalty free for first $1M in sales

Outperforms Reactive Power Compensation

The optimization algorithm performs better than existing reactive power compensation (RPC) or active power curtailment (APC) strategies, which are based on heuristics and do not guarantee systemwide optimality. RPC-only strategies yield low power factors as well as high network currents, which translate to power losses and possible lines overheating. APC-only strategies may severely underuse PV units during peak solar irradiation hours. This technology delivers system wide optimization of photovoltaic power input utilization using a combination of mathematical strategies representing a significant departure from other approaches.

BENEFITS AND FEATURES:

Technology ID

20150142

Category

Engineering & Physical Sciences/Instrumentation, Sensors & Controls
Engineering & Physical Sciences/Sustainable Technology
Software & IT/Algorithms
Software & IT/Communications & Networking

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- System wide optimization of photovoltaic power input
- Scalable to large distribution networks
- Improves utilization of photovoltaic units during peak solar irradiation hours compared to existing reactive power compensation (RPC) or active power curtailment (APC) strategies
- Determines optimal inverter set points for both real and reactive power and relays them in real time
- Shares computational burden among multiple devices, circumventing all-to-all communication
- May eliminate low power factors, high network currents, power losses and line overheating associated with RPC-only strategies
- Potential applications in smart grid control systems that require managing photovoltaic power input

APPLICATIONS:

- Supervisory control and data acquisition (SCADA) providers
- Residential rooftop solar cell installations
- Remote photovoltaic (PV) electric power
- Power grids
- Photovoltaic power input

Phase of Development MATLAB simulations with real NREL data

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