

Innovative Yield Forecasting Paves the Way for Large-Scale Residential Distributed Solar PV

An Israeli-Cypriot consortium has begun a Solar-Era.net backed project to apply the machine learning algorithms developed by the startup [PVpredict \(formally iPV Solar\)](#) over the past five years to electrical grid management software to enable high penetration of residential solar PV energy without suffering the adverse effects currently encountered in such neighborhoods where residential “prosumers” produce more electricity on their rooftops than they consume.



The project focuses on residential neighborhoods in Cyprus and Israel, predicting the next day’s hourly energy generation for each family’s PV system, and aggregating the neighborhood’s rooftop PV systems fed by each distribution transformer into one virtual PV power plant for the grid manager. In Cyprus this



information will aid the national grid manager in reducing expensive spinning reserve. In Israel the focus is on managing voltage fluctuations on the grid as the PV production flows and ebbs. Each day, we continue with an updated “hour ahead” forecast to refine the grid manager’s operational requirements for reserve and to more closely manage the voltage regulation on the grid by automatically signaling the residential solar-inverters to produce reactive energy or to curtail production.

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The system keeps track and credits the owners whose solar inverters served the grid with reactive energy or curtailment.

This software will also be of interest in those markets where neighborhood peer-to-peer energy trading is becoming a reality, such as the SonnenCommunity launched in Germany in December 2015. Accurate next day hourly predictions and hour ahead predictions will enable this type of trading on a much larger scale without needing costly storage batteries to stabilize the grid.

Visit the project website at www.pvtechnology.ucy.ac.cy/projects/inforpv

Innovation

The new Distributed Energy Resource Management System (DERMS) market is dominated by demand side systems, requiring the cooperation of the consumers in managing the distribution system in real time.

Our system works with the solar inverters to manage the impacts of distributed PV on the distribution system, without the consumer having to enlist loads for control by the system.

Instead of attempting to manage the impacts of PV in real time, we are returning to the grid managers the control they have lost with the proliferation of DERs, enabling the grid to be managed more simply, as it once was.

Existing Utility Services

Our consortium has a number of services currently available to a utility company:

- ✓ In a competitive utility market, we offer a State of Health (SoH) service for prosumers of the utility as a customer retention perk
- ✓ Using the same platform we can aggregate all monitored prosumers as a Virtual Power Plant with day ahead and hour ahead values to aid in reducing spinning reserve
- ✓ Our prediction software for next day and hour ahead energy values has been proven more accurate in utility grade PV power stations trading in the national energy market – try us out for free!

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