



Stanford University

TomKat Center for Sustainable Energy  
Precourt Institute for Energy  
SLAC National Accelerator Laboratory  
Energy and Environment Affiliates Program  
Civil and Environmental Engineering  
Department of Electrical Engineering

## Stanford SmartGrid Seminar

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# Data-Driven Management of Large, Distributed Energy Systems – The Case of Residential Solar Networks

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Sunrun



1:00pm-2:00pm, Thursday, May 14, Y2E2 270

**Abstract:** Solar industry is at a critical point in its lifetime. The industry is experiencing exponential growth (residential solar market doubled in 2013). This presentation explains data-driven operation of one of the largest residential solar fleets in the United States. The focus is on developing the data infrastructure and analytical methods to quickly and proactively identify operational issues and their root cause. The data-driven insights are fed back into operations, customer relations management, sales, marketing, product, and design teams. We demonstrate how advanced statistical methods can be deployed to predict production issues and hypothesize their root causes. In particular, we explain a novel method to estimate the long-term, gradual decrease in solar systems productivity, known as performance degradation. The process involves a full cycle of data collection, integration, hypotheses setup, field experiments, calibration, and visualization.

**Bio:** Amir is the first data scientist at Sunrun, where he leads performance analytics on one of the nation's largest distributed renewable energy networks. He develops statistical methods and machine learning algorithms to continuously monitor and optimize the operation of the network to maximize production and happiness of solar customers. Prior to joining Sunrun, Amir was a doctoral student in Engineering at Stanford University, where he worked on high-profile projects such as the ARPA-E project and PG&E's smart meter initiative. Amir's research involved statistical analysis of smart meter data and household profiles to rank buildings energy efficiency and identify the drivers of energy efficiency among households. He has a Masters in Construction Management from Stanford and a B.Sc. in Civil Engineering from Sharif University of Technology. He has experience working on large public projects as well as policy making in energy and transportation sectors, both in the United States and in developing countries.