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The Sharing Economy for the Smart Grid

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Venue: Room **G6302**, City University of Hong Kong
Reception starts at 4:15pm
(Language: **English**)

Abstract

The sharing economy. It is all the rage. Going on vacation? Rent out your home for extra income! Have space in your car? Pick up passengers for extra income! Companies such as AirBnB, VRBO, Lyft, and Uber have disrupted housing and transportation sectors. Their innovative business models are based on resource sharing that leverage underutilized infrastructure. They are enabled by peer-to-peer platforms that match eager sellers with willing buyers. Are there compelling sharing economy opportunities in the electricity sector? What products can be shared in tomorrow's Smart Grid? Could consumers trade electricity via online matching markets? In this talk, we begin by exploring sharing economy opportunities in the electricity sector. We discuss regulatory and technical challenges to these opportunities. We then study the specific problem of a collection of firms sharing their electricity storage. We show that the investment decisions of the firms form a Nash equilibrium which supports the social welfare. We offer explicit expression for optimal storage investments and equilibrium prices for shared storage in a spot market. We discuss control technology platforms necessary for the physical exchange of power, and market platforms necessary to trade electricity storage. We then explore the promise of trading excess PV generation in a sharing economy. We argue that this approach encourages investment in renewables, without imposing unsustainable tariff structures such as net-metering. We suggest that a location-based solar subsidy policy can maximize the social welfare of PV producers.

About the Speaker

Kameshwar Poolla is the Cadence Distinguished Professor at UC Berkeley in EECS and ME. His current research interests include many aspects of future energy systems including economics, security, and commercialization. He was the Founding Director of the IMPACT Center for Integrated Circuit manufacturing. Dr. Poolla co-founded On Wafer Technologies which was acquired by KLA-Tencor in 2007. Dr. Poolla has been awarded a 1988 NSF Presidential Young Investigator Award, the 1993 Hugo Schuck Best Paper Prize, the 1994 Donald P. Eckman Award, the 1998 Distinguished Teaching Award of the University of California, the 2005 and 2007 IEEE Transactions on Semiconductor Manufacturing Best Paper Prizes, and the 2009 IEEE CSS Transition to Practice Award.