



Stanford University

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

## Stanford SmartGrid Seminar

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### Harnessing Electric Vehicle Demand Flexibility

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1pm Thursday, Feb 6<sup>th</sup>, Y2E2 101

**Abstract:** Harnessing demand flexibility can enable more renewable integration. We start with a data driven analysis of the potential of flexible demands, particularly plug-in electric vehicle load. We first give a measure of flexibility and then show, based on an extensive data-set of driving patterns, that PEV load is flexible. We then illustrate that, if left unmanaged, these loads can exacerbate peaks in the load profile and increase the negative correlation of demand with wind energy production. We propose a simple local policy with very limited information and minimal coordination that can substantially increase the correlation of flexible demand with wind energy production. Such local policies could be readily implemented as modifications to existing "grid friendly" charging modes of plug-in electric vehicles. Our work demonstrates the potential of flexible loads to mitigate the inherent intermittency of renewables in an economically efficient manner. We are currently cooperating with the Electric Reliability Council of Texas (ERCOT) ISO to set up a testbed for EV charging that is implementing these and other policies for harnessing load flexibility.

**Bio:** Ross Baldick is Professor and Leland Barclay Fellow in the Department of Electrical and Computer Engineering at The University of Texas at Austin. His current research involves optimization and economic theory applied to electric power systems, particularly in the context of increased renewables. Dr. Baldick is a Fellow of the IEEE.