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[April Seminar: Tuesday, April 19<sup>th</sup> @ 6:00 PM](#)

## A Practical Framework for the Implementation of the Vehicle-to-Grid (V2G) Concept

**George Gross**

Professor of Electrical Engineering  
Champaign, IL

**Date:** Tuesday, April 19<sup>th</sup>, 2016

**Time:** 6:00 PM - 8:00 PM

**Location:** University of Illinois

[5070 Electrical Engineering Building](#)

306 N. Wright St.

Urbana, IL 61801

### Agenda

6:00 - 6:15 PM: Sign-in and Meet & Greet (Refreshments provided)

6:15 - 7:15 PM: Seminar - Talk by Prof. Gross

7:15 - 7:45 PM: Q&A

7:45 - 8:00 PM: Networking

**Organizer:** Nenad Marjanovic, CILS Vice-Chair

For questions, contact Nenad Marjanovic <[nenad.marjanovic@ieee.org](mailto:nenad.marjanovic@ieee.org)>

## **Abstract:**

The desire to end oil dependence and the rising climate change concerns are key drivers in the growing interest in electric and plug-in hybrid vehicles. Car manufacturers, throughout the world, understand this trend quite well and are developing new models. For the 90 % of Americans who use their cars to get to work every day, the average daily commute distance is 45 km and the cars remain parked, on average, 22 hours each day. A salient feature that these vehicles have in common is the batteries, which provide storage capability that may be effectively integrated into the grid. We focus on the design of a conceptual framework to integrate the electric vehicles into the grid – the so-called V2G concept. The basic premise we use is to treat the battery vehicles as distributed energy resources that can act both as supply and demand entities. We assess the deployment of an aggregation of battery vehicles for the provision of frequency regulation – requiring very fast response times – and energy supply for peak shaving. We also investigate the impacts of the aggregated battery vehicle-charging load on the low-load generation schedules and on regulation requirements. The assessment of these impacts takes into consideration the explicit representation of uncertainty and the importance of the state of charge, or s.o.c., as a key variable in the use of the batteries for the supply and demand roles. For the framework completeness, we also explore the role of the energy services provider in the V2G integration. We discuss the role of V2G in the context of renewable resource integration and highlight the role of the Smart Grid in the construction of the communications/metering system to enable the integrated battery vehicles to effectively participate in the operation of the grid and electricity markets. We outline some important challenges that need to be addressed.

## **About the speaker:**

George Gross is Professor of Electrical and Computer Engineering and Professor, Institute of Government and Public Affairs, at the University of Illinois at Urbana-Champaign. His research and teaching activities are in the areas of power system analysis, economics and operations, utility regulatory policy and industry restructuring. He was formerly with the Pacific Gas and Electric Company, where, Dr. Gross founded the company's Management Science Department and held other key management, technical and policy positions. During 1992-93, Dr. Gross was at the

Electric Research Power Institute to develop research directions on open access transmission. George Gross is a co-founder of POWERWORLD and served on its Board of Directors from 1996 – 2001. A Fellow of IEEE, Dr. Gross received the Franz Edelman Management Science Achievement Award by the Institute of Management Science. Dr. Gross is the author of a large number of publications and book chapters. He was a Visiting Professor at the Politecnico di Milano, University of Pavia and the Politecnico di Torino during the academic year 1999 – 2000. George Gross earned his undergraduate degree at McGill University in Montreal, Canada, and he did his graduate studies at the University of California, Berkeley.

Dr. Gross has consulted on electricity issues with utilities, government organizations and research institutions in North America, Europe, South America, Australia and Asia. He has lectured widely and has given numerous invited presentations at leading universities and research institutions throughout the world. His numerous publications have appeared in the leading journals in the field and his research results have been presented at a wide array of international conferences. He has made a broad range of contributions in various areas of power system planning, operations, analysis and control.

His work on smart grid issues has focused on both the technical and the regulatory aspects. The principal areas of involvement include the design of AMI architectures to ensure cyber security, the deployment of AMR for demand response, the integration of demand-side response, renewable and storage resources into the grid and the economics of smart grid implementation. He has co-organized one of the first workshops on the public policy issues in Cyber-Security and Privacy for Smart Grid Technology. He was a co-author of the paper entitled “An Integrated Architecture for Demand Response Communications and Control,” which received the Best Paper Award in the Engineering and Economics Interactions Minitrack of the Electric Power Systems Track at the 2008 Hawaii International Conference on System Sciences HICSS-41, January 2008.

## Directions:

Please click on the "Google Maps" link below for the directions:

[Google Maps](#)

Parking is available and free after 5 pm on the Beckman Circle (east side of Beckman Institute - entrance from N. Mathews Ave.), and in the nearby parking garage (SE corner of University Ave. and N. Mathews Ave.)

[ECE Building Map](#) (Room 5070 is on the 5<sup>th</sup> floor in the corner)

Click the link below for the full agenda and registration information:

[April 19th IEEE CILS Meeting Registration](#)



**\*\* Refreshments will be provided \*\***



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