

**Innovation for Our Energy Future**

Join us for a “bonus” seminar in our series of “brown bag” seminars, sponsored by the National Renewable Energy Laboratory and the U.S. Department of Energy (DOE). Each seminar is held at NREL’s Washington office with a videoconference link to Golden, Colorado. Topics focus on new and innovative renewable energy and energy analysis strategies, models, and technologies.



## Vehicle-to-Grid Power

An analytical seminar presented by DOE and NREL’s Energy Analysis Office (EAO)

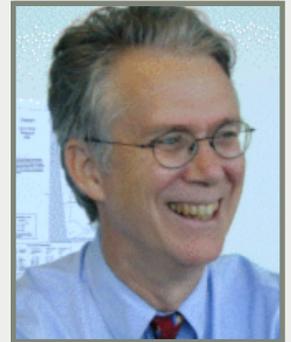
**Willett Kempton**, Professor and Senior Policy Scientist  
Center for Energy and Environmental Policy, University of Delaware

**Wednesday, September 28, 2005**

**Noon – 1 p.m. (in Washington, D.C. - bring your lunch)**

**10 – 11 a.m. (videoconference in Golden, Colo.)**

Vehicle-to-grid power (V2G) uses electric-drive vehicles (battery, fuel cell, or hybrid) to provide power for specific electric markets. In this presentation, Willett Kempton will briefly describe fundamental principles of V2G and the basic equations his research group has developed for V2G power, revenue, and cost. Using comparable metrics, analysts can compare today’s light-vehicle fleet with the electric power system: The vehicle fleet has 20 times the power capacity, less than one-tenth the utilization, and one-tenth the capital cost per prime mover kW. Conversely, utility generators have 10-50 times longer operating life and lower operating costs per kWh. By understanding these fundamental differences, one can match specific electric-drive vehicles with specific electric power markets. Kempton also will discuss the societal advantages of developing V2G, including an additional revenue stream for cleaner vehicles, increased stability and reliability of the electric grid, lower electric system costs – and, eventually, enabling most electricity to be produced from intermittent renewable electricity sources. Prototypes and plans for production of these vehicles will be summarized during the presentation.



**Willett Kempton**

**Willett Kempton** was educated in electrical engineering, computer science, and cognitive anthropology. His career spans 35 years of research experience, five books, and 60 peer-reviewed articles on topics including energy systems, conservation, technology policy, and U.S. public environmental beliefs and values. He is the innovator of vehicle-to-grid (V2G), the concept of connecting electric vehicles to allow two-way electrical flow to the power grid. He has developed the concept, equations, and market analysis in a series of publications and research, with students, colleagues, and businesses – and funded by utilities and public agencies. Kempton is currently associate professor and senior policy scientist at the University of Delaware. His two current research, speaking, and publishing foci are V2G and offshore wind power.

### Golden, Colo., information

1617 Cole Blvd., Golden, Colorado  
Building 15, Conference Room 375

Please contact Lynne Fenn at [lynne\\_fenn@nrel.gov](mailto:lynne_fenn@nrel.gov) or 303-384-7439

### Washington, D.C., information

901 D Street SW (also the Aerospace Building, 370 L’Enfant Promenade), adjacent to the Forrestal Building

Please contact Wanda Addison, of Midwest Research Institute (MRI), at [wanda\\_addison@nrel.gov](mailto:wanda_addison@nrel.gov) or 202-646-5278

If you are interested in participating in the seminar via conference call, please contact Wanda Addison, of MRI, at [wanda\\_addison@nrel.gov](mailto:wanda_addison@nrel.gov) or 202-646-5278 for instructions.

