

Seminar Abstract, Fall 2010

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We are in the midst of an electric vehicle renaissance. The performance and driving pleasure possible in an electric vehicle (EV) has been demonstrated by the Silicon Valley startup Tesla Motors, and several automotive OEMs are scheduled to release affordable, practical EVs within months. With a massive increase in electrical vehicles, the potential exists to either dramatically harm, or help, the stability of the electric system. The unregulated addition of electric vehicle charging loads to summertime evening peak electricity consumption could be very harmful in certain areas, yet with some charging management or better yet the potential of V2G, these same cars, acting as a storage resource, could dramatically increase the ability of the grid to react to unexpected changes in the balance between load and supply. At the same time, the addition of intermittent renewable electricity generation to the grid is at an all time high. Similar analyses of these energy resources indicate that the unpredictable variability of their output could similarly destabilize the grid at penetration levels mandated by Renewable Energy Portfolio standards. Using travel data from GPS instrumented vehicles, I analyze the effects of vehicle design choices on their utility as transportation, and also assess the time-variant resource that they could pose to the grid.