

Foreword

Energy Information Administration Projects a Clean Energy Shift that Stifles Oil Growth and Promotes Energy Independence

“The latest look into the future of U.S. energy use from DOE's Energy Information Administration (EIA) projects a steady growth in renewable energy use, a dramatic shift toward cleaner vehicles, and a rapid growth of biofuels, resulting in virtually no growth in U.S. oil consumption through 2030. The reference case for the EIA's *Annual Energy Outlook 2009*, released on December 17, projects renewable energy use to increase steadily at 3.3% per year, with renewable energy power plants competing mainly with natural gas for new additions to the nation's power generating capacity. The EIA's crystal ball also reveals a significant decline in light truck sales and a sharp increase in the sale of unconventional vehicle technologies, as hybrid vehicles account for 38% of all new vehicle sales by 2030. That includes sales of plug-in hybrids, which account for 2% of all new vehicle sales by 2030.” -- **The U.S. Department of Energy, Energy Efficiency and Renewable Energy News Letter January 9, 2009**

With the United States' Department of Energy forecasting such dramatic changes in the years ahead, the wise will be the ones who prepare for that future, armed with the latest tools, technology, and knowledge in order to meet the challenges, and take advantage of the financial opportunities. One such tool is an understanding of vehicle-to-grid (V2G) technology.

What is V2G? In a word -- opportunity.

Vehicle-to-grid (V2G) uses electric vehicles (battery, fuel cell, or hybrid) to provide power for various uses while the vehicles are parked. Within the United States alone, there are currently some 230 million gasoline-powered cars, sport utility vehicles (SUVs) and light trucks, which, if converted to or replaced with a combination of plug-in hybrids and all-electric vehicles, would have 20 times the power capacity of all electricity generation in the country. This large potential power source has great value.

Gas-powered vehicles are underutilized assets which also contribute to air pollution, water pollution, and global warming. The key question is then - how do we totally convert this massive fleet to battery-powered vehicles? What will motivate American car buyers to discard the gas-powered cars for cleaner and more efficient alternatives? Opportunities.

V2G provides an opportunity to convert the current U.S. vehicle fleet to a better-utilized asset as the cars become productive during the average 23 hours per day they sit idle.

V2G provides an opportunity for the country to expand its capacity of clean, domestic renewable power because it allows the grid to become more flexible. When a V2G-enabled vehicle is tied into the electric grid via a power connection, the vehicle's instantly-responsive electric storage system can be directed by a wireless communication device to deliver power services to the region. These power services help to stabilize the electric grid, significantly enhance the capabilities of renewable wind and solar generation, and provide many other value-added services to the community.

V2G provides an opportunity to improve the reliability of the electric grid. The vehicles are typically parked where people use power – at home and at work. Placement of the vehicles on the grid in this manner makes the power supply a 'distributed generation' tool for localized storage and use. When the grid fails, the cars are ready to become a back-up power supply.

And finally, V2G creates an opportunity for the vehicles to become revenue-producing assets, as opposed to liabilities that lose value year after year. The V2G-equipped vehicles participate in specific power markets in return for a fee. Several variables affect the income potential, including the size of the battery pack, the type of power service, the hours-per-day the car is parked and plugged in, and the market rate, or value, of the service. Our early calculations indicate a range of \$200 to \$500 per month income is potentially available to the car owner.

Couple the above opportunities with a cleaner environment and reduced dependence on imported petroleum-based fuels, and V2G is a win-win for everyone. It is no wonder that Len Beck felt compelled to spend some 650 personal hours and most of his free time during 2008 to assemble this text.

This effort brings timely information together in one comprehensive text that will be useful for educational purposes, a cause near and dear to my heart.

Enjoy this invitation to learn about the opportunities and be prepared to experience the surge of 'power' this topic creates in everyone that it touches. Len and I worked with members of the Mid-Atlantic Grid-Interactive Cars Consortium (MAGICC) during the last five years to promote this technology. As you read V2G-101, you too will experience the 'magic' of this evolution to clean, electric-drive transportation underway in the United States and around the globe!

Daniel F. Rydzewski – Editor in Chief, V2G-101
Applications Analyst, Delmarva Power & Light Company
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