VEHICLE TO GRID DEMONSTRATION
Project Overview

Opportunity

**BMW MINI E** – Obtain one or more fully electric BMW MINI Cooper vehicles for use in your organization’s fleet at a cost comparable to your other vehicle leases.

**V2G Participant** – By leasing one or more of these vehicles, your Company will be participating in a first in the world field test of “vehicle-to-grid” technology. Your company will be a part of other blue-chip organizations in the greater Philadelphia area to pioneer an important new clean energy technology. Organizations include NRG Energy, BMW, the University of Delaware (UD), and PJM (the entity that operates the electricity grid in 13 eastern states).

Background

Over the past decade, the University of Delaware has pioneered a promising new technology called Vehicle-To-Grid. The concept is based on the use of batteries in electric vehicles to:

1. Provide energy for driving the vehicle.
2. Serve as an important new energy storage resource for the electricity grid.

The University of Delaware’s work was validated in September 2011, when NRG Energy, Inc, a $9 billion/year energy company based in Princeton, NJ, signed a joint venture agreement with UD to form a new company called eV2g. eV2g’s goal is to commercialize the University’s vehicle aggregation software. The software has the capabilities of electronically combining many different vehicle batteries that are housed in different locations and present them as a standalone single energy storage plant. These batteries provide PJM with a service called frequency regulation, which helps the grid operator make small adjustments to overall electricity supply and demand.

Demonstration

A pilot study was successfully conducted by the University of Delaware in 2008, using seven vehicles connected with PJM. Starting in fall 2012, eV2g is expanding the University’s original pilot project to including several dozen vehicles with enough combined energy storage to officially qualify as a power plant with PJM. This will be the first time in the world that electric vehicles will be connected to a power grid with the opportunity to earn revenues.

In order to fully test the viability of the technology, it is important to see how vehicles perform in real-world conditions.

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**Companies and Institution Involved**

A joint venture partnership between NRG Energy and the University of Delaware to commercialize vehicle-to-grid technology.

NRG Energy, Princeton, NJ, is a fortune 250 company with $9 billion in revenues with its major operations in the Northeast, Texas and California.

Vehicle to Grid developed and tested at the University through the Center for Carbon-Free Power Integration.

Partner with BMW for the implementation of V2G using the MINI E in the US. EV Grid has offices in Palo Alto, CA and New Castle, DE.

Located in New Castle, Delaware is involved in the conversion and service of the BMW project in the tri state area.

Regional power grid operator for 13 states in the eastern U.S. who has created new markets for storage technologies and has supported the University of Delaware’s V2G research.

AutoFlexAFV, Inc., Baltimore, MD. is State of Delaware certified MBE/SDVOSB and is preferred commercial leasing company for V2G fleet technology Projects.

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**Vehicles**

BMW has recently completed its successful 2 year U.S. field trial of the all electric MINI E. Based on BMW’s interest in the promise of vehicle to grid technology, they have donated several dozen of these vehicles to this demonstration project. These vehicles have operated for 2 years, but BMW has fully reconditioned them, including outfitting them with new batteries.

**Specific Opportunity**

BMW has partnered with AutoPort, Inc. AutoPort, Inc. is a New Castle, DE based company that has handled, processed and modified over 2 million vehicles in its 30 years in business. AutoPort, Inc. is making the necessary modification to make these vehicles available for the project, and to ensure top-notch maintenance support. AutoPort’s existing staff is being overseen by Level 4 certified BMW trained technicians.

The details of the 2 year lease are:

- $3600/year per vehicle for a limited number of leases.
- A fully reconditioned BMW MINI E with a new battery pack capable of traveling approximately 100 miles on each charge.
- One charging station for each leased vehicle must be installed in the lessee's garage (average cost to buy and install $2500).
- Access to BMW-trained service technicians for any necessary repair work.

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