The electric car: a power bank

April 15 2009

(PhysOrg.com) -- Can you imagine an electric car that stores power and, depending on variable utility rates, returns it to the power grid over the course of a day? Fraunhofer researchers are exploring this visionary idea. At the Hannover Messe tradeshow from April 20 to 24, interested visitors can view a model presentation to gain an understanding of this concept and the latest research in this field.

It's midnight: Powerful wind gusts drive turbines, which produce more energy than is needed. Energy prices go down. The electric car in the garage automatically begins to recharge its battery, and to benefit from the favorable energy prices. Nine o'clock: The car is parked in the underground parking garage at the office; the battery charge has declined slightly on the way to work. By this time, wind strength has waned, yet power needs have risen due to the time of day. So prices go up. The car feeds a certain portion of its stored power back into the network, and the owner gets a monetary offset in exchange. Enough energy remains in the battery so that the owner can make a few stops as needed - like going to the supermarket - on the way back home.

The electric or hybrid car as a storage battery for regenerative power: Researchers at the Fraunhofer Energy Alliance are examining ways to make this vision a reality. Scientists are continuing work on a software program that intelligently controls the charge and discharge process. When energy prices are low, it charges the battery. If prices become high again, it returns energy to the network. At the same time, researchers are also accounting for the habits of the driver. How far is it to the office? Does the driver always drive directly to work, or does he

or she typically run a few errands? To what extent is the driver willing to discharge the battery if the compensation is high enough? The system is also to incorporate spontaneous needs: If there is a long distance trip ahead - such as a vacation trip - then the battery is not discharged, even at high energy prices. The battery has to be full when the vacation starts. Fraunhofer Institutes are also participating as subproject partners in studies on vehicle fleets.

There are various approaches to billing: A meter in the car could record the power flow, and send the data at specified intervals to the utility supplier. These meters could also take over the identification and authentication functions by transmitting the vehicle owner's customer number and the details regarding the network connection point.

Fraunhofer's researchers are unveiling a model of their vision at the Hannover Messe from April 20 to 24: A remote-controlled car is parked at the front door, then it drives to the office and the supermarket. Light diodes indicate which power sources are available at the respective moment - wind, solar power or conventional energy resources - and a monitor reveals the energy prices depending on wind, sun and demand based on the time of day. Even the charge level of the battery and the amount of current the vehicle is currently using are displayed on the model.

Provided by Fraunhofer-Gesellschaft (news : web)