Pacific Northwest NATIONAL LABORATORY

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Battelle Number(s):

15209, 16206, 16272, 16401, 16172

Patent(s) Issued

Available for licensing in some fields

U.S. DEPARTMENT OF ENERGY

Available Technologies

Grid Friendly™ Charger Controller

SUMMARY

Electric vehicles are growing in popularity, and while they represent a cleaner alternative to fossil-fueled vehicles, their increasing may stress the grid if this new and growing load is left unmanaged. What if there was a smart way to charge these vehicles to reduce costs for the consumer while assuring a stable electric grid?

Researchers at Pacific Northwest National Laboratory have developed algorithms and a technology for simplifying electric vehicle charging. These patent pending technologies, if integrated with other components, can initiate the communication between the vehicle and the grid to decide the optimal time to re-charge.

Daily battery charging is fully automatic with the Grid Friendly™ Charger Controller. After initial set-up of the Controller, the consumer plugs in the electric vehicle and then forgets about it. In the morning—or any other specified time—the battery will be fully "topped off." Not only will the charging be done during times of lowest cost (assuming electricity rates vary during the course of a day), but also in a way that helps manage demand on the grid.

Wireless technology embedded in the Grid Friendly Charger Controller will communicate with the utility's smart meter to receive a rate schedule or electric pricing updates in real-time. The Grid Friendly Charger Controller will then determine an optimal charging strategy that reduces the electricity cost to the customer.

The Grid Friendly Charger Controller has another feature, also developed at PNNL, that protects the electrical grid during high grid stress conditions and assist in integrating large amounts of intermittent renewable energy resources, such as wind and solar technologies into the grid. Grid Friendly technology recognizes when the grid is under stress and briefly reduces the charging current to the battery. This sensitivity to grid stress may be critical in preventing power outages.

ADVANTAGES

Simplicity for charging using the consumer's preferences and settings

Reduced electricity costs for consumers—the Grid Friendly Charger Controller determines the optimal charging strategy

Grid support by smoothing out supply and demand stresses on the grid to prevent power outages; also help operate the grid safely under high intermittent renewable energy contributions.

RELATED LINKS

» **Electricity Infrastructure Operations Center at PNNL**
The Electricity Infrastructure Operations Center is available to utilities, vendors, government agencies and universities interested in research, development or training.
http://eioc.pnl.gov/

» **GridWise at PNNL**
Pacific Northwest National Laboratory teamed up with regional utilities and industry partners in the year-long Pacific Northwest GridWiseâ„¢ Demonstration Project to test the notion that smart grid technologies and consumers can play an active role in managing the grid.
http://gridwise.pnl.gov/

Patents & Intellectual Property

» Patent #: 8,183,826 B2

» Patent #: 8,588,511

» Patent #: 8558511

Technology Portfolio(s)

» Smart Grid Devices

Potential Industry Applications

» Automotive & Transportation

» Energy & Utilities

Jennifer J. Hodas
Pacific Northwest National Laboratory
(509) 372-6960
jennifer.hodas@pnnl.gov
http://availabletechnologies.pnnl.gov

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