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Battelle Number(s):

16466

Available for licensing in all fields

Available Technologies

Home Energy Management System

SUMMARY

PNNL's Home Energy Management System is a centralized household appliance controller that manipulates household power consumption, thereby increasing power grid stability and allowing for more integration of renewable power sources on the grid.

Residential household load makes up about 33% of the total power system load, yet they are small loads and the usages are random, creating surges in demand that threaten grid stability. Researchers at PNNL believe a solution lies in an autonomous, centralized household appliance controller that evens out demand without sacrificing consumer comfort or convenience.

The PNNL Home Energy Management System schedules appliance functionality or processes based upon inputs from the power grid or a smart metering system while providing customers with total control over household energy demand and consumption with respect to variables such as electricity prices or emergency power grid situations.

The system is comprised of two fundamental components:

- * a scheduler, which can be accessed through a computer, control panel box, or even a cell phone, and

- * a demand response load interface, which is the communication between the scheduler and the appliance (e.g. Zigbee). Inputs coming in from the power grid, a smart meter, or a direct grid monitor help the system decide the optimum controllable load for the house. Armed with that information, the system manipulates consumption by each appliance based on user-defined criteria such as electricity prices or other situations such as a grid emergency. For example, if the electrical grid is under stress, the system could temporarily lower the temperature requirement for a household hot water heater, thus reducing its power requirements.

ADVANTAGES

- * Provides single point of control, monitoring, and measurement for all participating household appliances

- * Conveniently schedules appliance functionality or processes to meet household

load objectives conveniently

- * Preserves customer comfort while managing power loads (e.g. thermostat holds temperature); easy to maintain and upgrade
- * Compatible with different technologies (it operates independently of other smart grid and smart appliance technologies and adapts to different standards)

STATE OF DEVELOPMENT & AVAILABILITY

The software for the Home Energy Management System has been demonstrated and reduced to practice. The Home Energy Management System is available for licensing in all fields, including control system designers/manufacturers and appliance manufacturers. Patent pending and copyright asserted

RELATED LINKS

» Grid Friendly Appliance Controller

Check out complimentary technology for the Home Energy Management System, also developed at PNNL

<http://availabletechnologies.pnl.gov/technology.asp?id=61>

» Water Heater Controller

This technology is complimentary to the Home Energy Management System and was also developed by researchers at PNNL.

<http://availabletechnologies.pnl.gov/technology.asp?id=61>

Technology Portfolio(s)

- » Electricity Infrastructure
- » Smart Grid Devices

Potential Industry Applications

- » Consumer Products
- » Energy & Utilities

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