Energy Management at home

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Energy Management-related Products

Smart Meter (by regional power company such as CHUBU Electric Power, etc.)

Newly developed field

Energy Management
- HEMS Controller
- Li Battery
- Stationary Charger (V2H)

\[HEMS\] overview

Energy Generator
- Photovoltaic (PV)

Air conditioning/Thermal devices
- CO2 Heat Pump
- Hot Water Supplier
- Air conditioner
- Ventilation system

Vehicle
- PHV/EV

Distribution Board
- Current Sensor

123 KW

PHV/EV

Li battery

HEMS

LAN

Distribution Board

Stationary Charger
V2H

Photovoltaic
generation

Air conditioning

CO2 Heat pump
Hot Water Supplier
Energy Management for Both Vehicle and Home

Adjust demand/supply by energy storage system based on forecast and minimize CO\textsubscript{2}.

Supply forecast

Sunlight

Forecast unstable natural energy supply

V2H

Power supply

Energy storage system

Energy demand/supply adjustment

Consumption forecast

Hot water

EV/PHV

Forecast energy consumption

Power supply schedule

Estimated power consumption

- Battery storage
- Solar generation
- Grid power

Forecast natural energy supply

Surplus → Storing to battery and Ecocute
Shortage → Supplement by battery store and grid power

Minimize CO\textsubscript{2} by optimizing power distribution

Highly accurate forecast of demand/supply at home/vehicle is a key to optimize power distribution.
Life style change of HEMS users

Change in awareness of saving electricity

- "The cooking and using households time depends on the amount of energy used and generated in the home."
- "I try to save electricity when purchased power is large."

Displaying the amount of energy provides guideline for conservation.

Wives, staying home and often using households, is high awareness of energy saving.

Comparison of power saving awareness between husband and wife

People become more aware of saving electricity through the visualization of the amount of energy. 
Summary of result

- Approx. 70% of CO2 was reduced when local generation/local consumption of PV is done, using HEMS, Stationary battery, Heat Pump Hot Water Supplier, PHV and V2H. 20% in home and 50% in PHV were realized

- HEMS, stationary battery, heat pump hot water supplier and air conditioner connected to HEMS have already been commercialized, and started to put into the market

- HEMS makes users to improve energy saving consideration.

Plans

- Promote the low carbon actions in both hardware and user consideration
- Promote use of home devices effective to low carbon
Appendix
Future image of social infrastructure

■ Overall image

＜Smart grid＞
Smart Grid

＜Smart house＞
HEMS (Home Energy Management System)
System to support home energy management

Smart grid
Totally streamlined grid in community, town and home

HEMS
System to support home energy management

Achieve the low carbon society by expanding natural energy
BEMS for commercial facilities
Charge to battery unit from commercial battery or alternator to keep cooling/freezing temperature at idling stop on delivery
HEMS automatic control

HEMS system estimates home power consumption and solar generation, and optimally operate for using the most of solar generation and low-cost grid power, from the weather information, and the electric power unit price information.