

Demonstrating and proposing a new lifestyle for the future



## INTELLIGENT HOUSE

Kyushu Electric Power Company, Research Laboratory



intelligent

## 【Research at Intelligent House】

Kyushu Electric, as a power utility confronting evermore-evident energy and environmental problems, has built an “intelligent house”. The idea behind creating the Intelligent House is to reflect on the next generation together with customers and offer a very convenient lifestyle while we put ourselves in the customer’s position. In this house, with the key words “comfortable life with Eco & Web” setting the tone, we are carrying out research and development on environmentally friendly and economical ways of using electricity in the home of the future from new perspectives.

Making the best use of advancing information technology, we are working on research themes such as energy saving, renewable energy and eco technologies to anticipate the coming needs of the time. In addition, the Intelligent House will be used widely as a place for our group companies to develop technology and carry out demonstration testing.

As we continue to receive knowledge and ideas from everyone, we will actively pursue new technologies to respond to the changing times, and promote research and development.



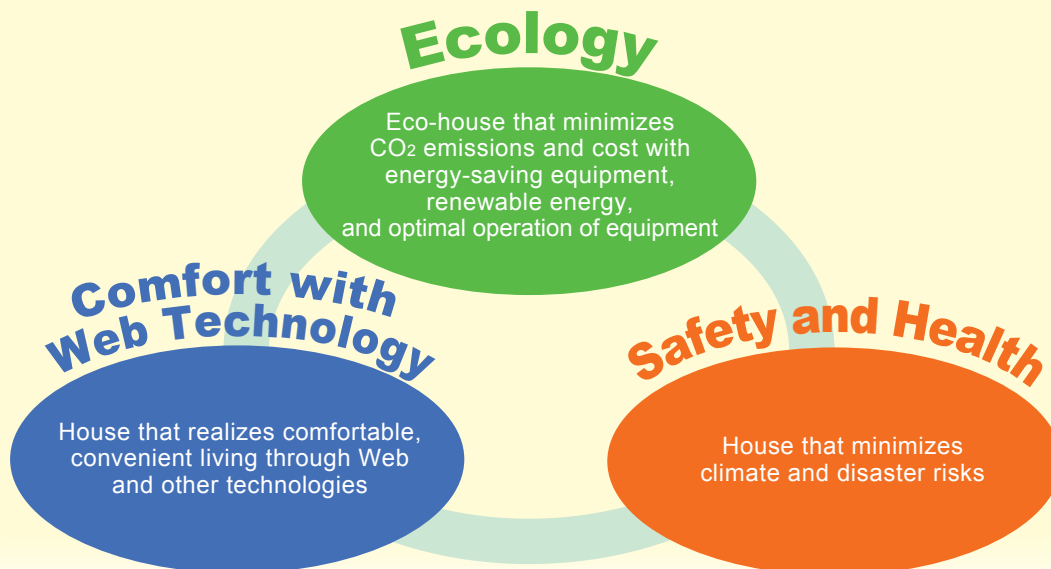
December 2008

Toshiro Noguchi

General Manager, Research Laboratory

## “Comfortable Life with Eco & Web”

Towards eco-friendly and economical living  
with health, safety and comfort  
by application of electrical usage and information technologies



# Research Laboratory, Kyushu Electric Power Co., Inc.



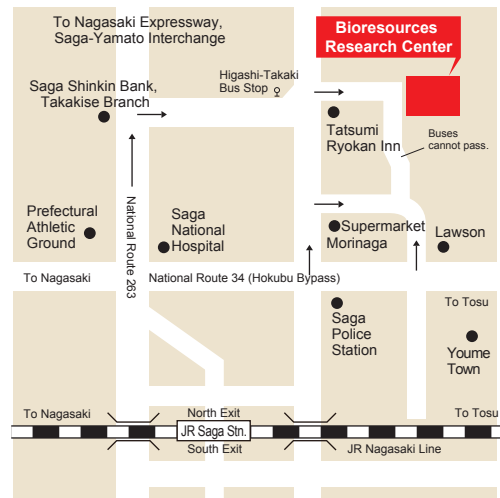
## Research Laboratory



### Access

- Take subway from Fukuoka Airport, get off at Subway Hakata Station
- Take a Nishitetsu bus (Destination Nos. 47s, 48s) from JR Hakata Station, get off at Shimizu 4-chome Bus Stop, and walk 1 min.
- Take a Nishitetsu bus (Destination No. 63s) from Tenjin, get off at Shimizu 4-chome Bus Stop, and walk 1 min.
- Take a Nishitetsu bus (Destination Nos. 49s, 62s) from Tenjin, get off at Minami Keisatsusho-iriguchi (Minami Police Station) Bus Stop, and walk 5 min.
- Take a Nishitetsu bus (Destination Nos. 47s, 48s) from Nishitetsu Ohashi Station (Tenjin-Omuta Line), get off at Shimizu 4-chome Bus Stop, and walk 1 min.
- On foot, 10 min. from JR Takeshita Station
- By taxi, 15 min. from JR Hakata Station and 25 min. from Fukuoka Airport
- 3km from the Hanmichibashi Exit on Route 2 of the Fukuoka Urban Expressway (15 min. by car)

## Bioresources Research Center

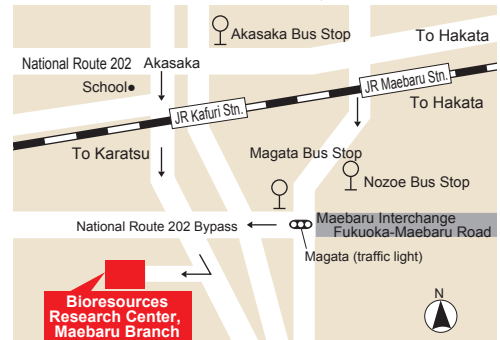


### Access

- Take a Saga Municipal bus (Destination No. 32s) from JR Saga Station, get off at Higashi-Takaki Bus Stop, and walk 10 min.
- 6 km from Saga-Yamato Interchange (15 min. by car)
- 3 km from JR Saga Station (10 min. by car)

10-1, Takakisehigashi 1-chome, Saga City,  
849-0922, Japan  
TEL: +81 (0)952-30-6631 (Main)  
FAX: +81 (0)952-33-8579

## Bioresources Research Center, Maebaru Branch



### Access

- 3 km from Maebaru Interchange (6 min. by car)
- 2.5 km from JR Kafuri Station (40 min. on foot)
- 5 km from JR Maebaru Station (15 min. by taxi)

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POWER CO., INC.**

## Research Laboratory

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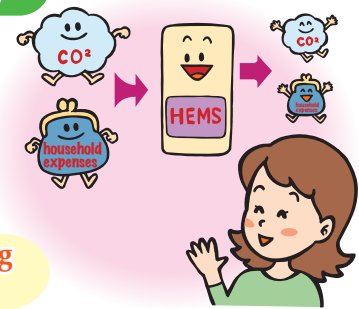
Kyushu Electric Power Co., Inc. <http://www.kyuden.co.jp/>

# Demonstrating and Proposing Eco-living

## ① HEMS (Home Energy Management System)

### Controlling energy usage in the home

- Autonomous control of optimum A/C by season and operation mode
- Optimization of electricity usage with “CO<sub>2</sub> minimization mode” and “energy cost minimization mode” as well as “visualization” of CO<sub>2</sub> emissions and energy cost
- System to minimize the effects of outages



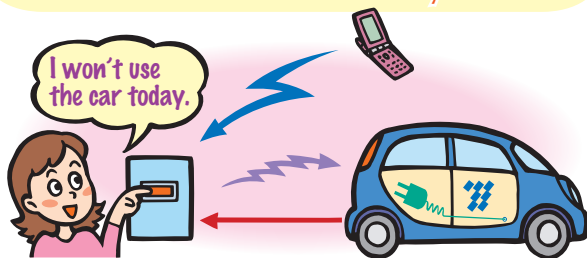
Environmentally-friendly and economical living with energy saving through development of “Kyuden HEMS”

## ② V2H (Vehicle-to-Home) System

### Effective use of electric vehicle lithium-ion battery

- Electricity can be supplied from vehicle to home on days when vehicle is not to be used or to minimize effects of outages
- Vehicle battery can be remotely controlled by mobile phone

Adaptability and effectiveness of V2H System for effective use of vehicle battery

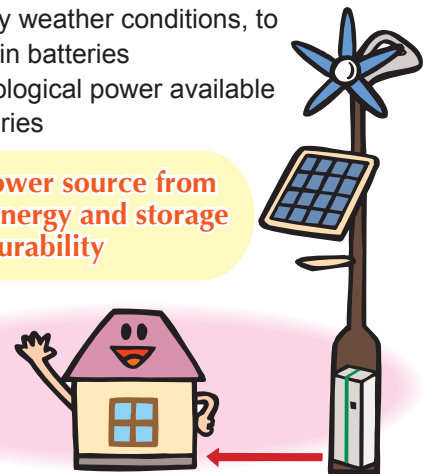


## ③ Home-use sustainable energy

### Combining wind or solar power with lithium-ion batteries

- Natural energy, which is easily affected by weather conditions, to be stored in batteries
- Stable ecological power available from batteries

Stable power source from natural energy and storage system durability

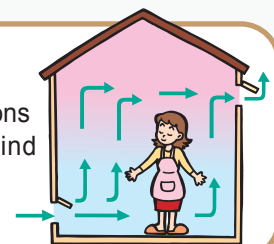


## ④ Natural ventilation

### Natural air flow to improve comfort and energy saving

- Linked to HEMS, ventilation system operates autonomously sensing weather conditions
- When operating, opening and closing of vents is automatically controlled by wind pressure to adjust room temperature

Comfort and energy saving with reduction in energy required for A/C



## ⑤ Walls and rooftop greening

### Room temperature rises limited, load on A/C cut

- Direct sunlight blocked by greening of walls and roof

Comfort and energy saving with effective placement of plants

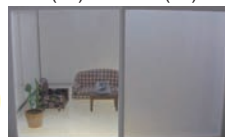


## ⑥ Electronic curtains

### Electronic film curtain on window can be made opaque with a switch

Power saving by allowing in natural light, and privacy

Transparent (on)      Opaque (off)



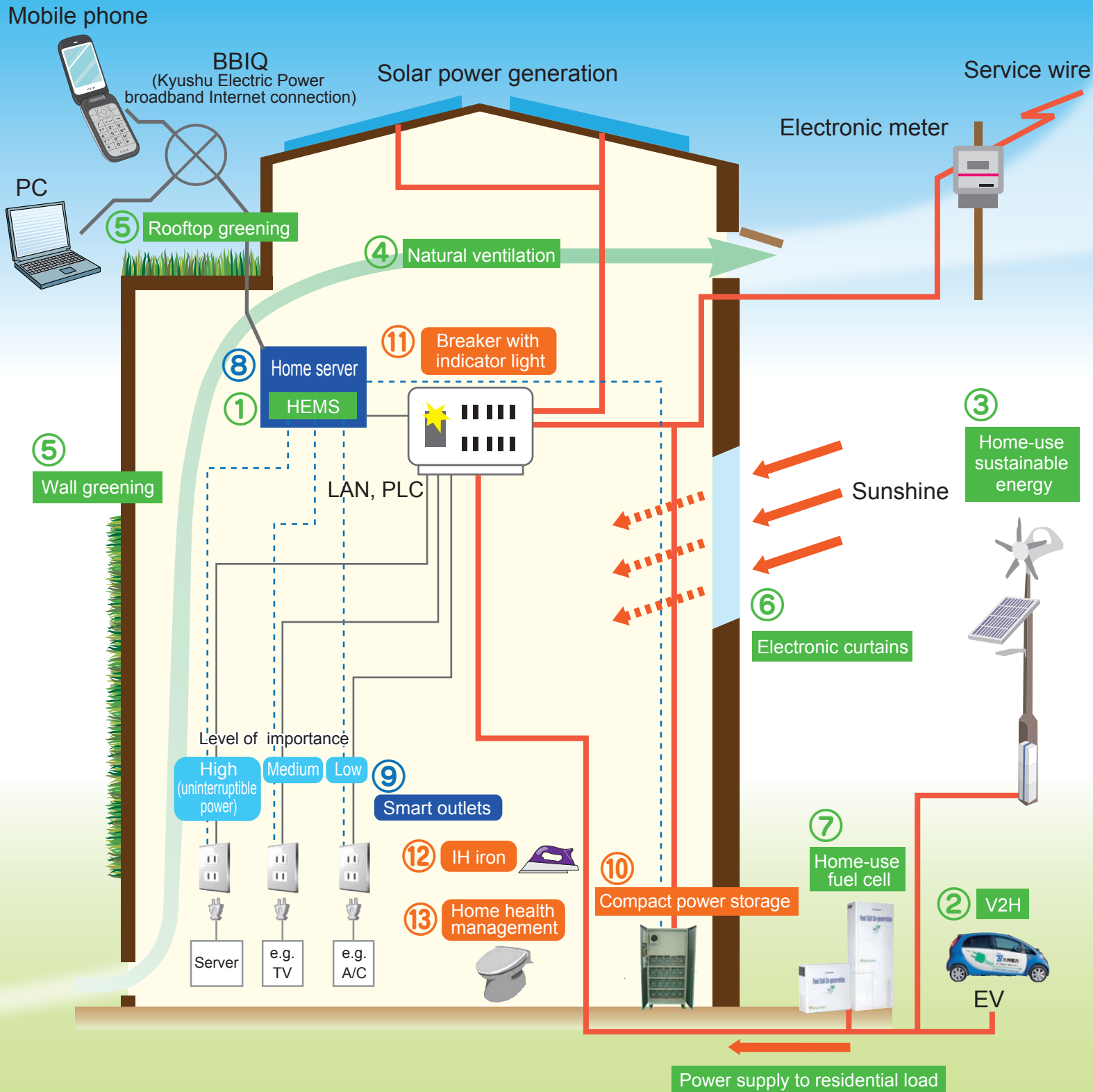
## ⑦ Home-use fuel cell

### Polymer electrolyte fuel cell in practical use

Total electrical and heat efficiency and durability of fuel cell

# Towards an Environmentally-friendly, Economical and “Comfortable Life with Eco & Web”

## Outline of Verification Testing



### Building outline of Intelligent House

Total building area: 165 m<sup>2</sup>

Total floor area: 294 m<sup>2</sup>

Structure: Steel framed, partly reinforced concrete; 2 floors above, and 1 floor below ground



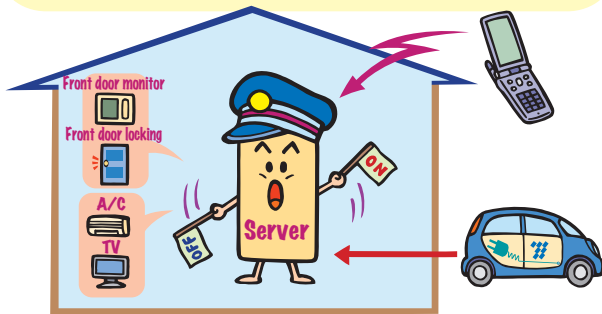
## Demonstrating and Proposing Comfortable Life with Web Technology

### ⑧ Home server

#### Traffic flow regulator to control data flows inside and outside the home

- Platform to control systems such as HEMS and V2H
- Control of home appliances by mobile phone
- Home security, control and monitoring of home appliances

Comfortable and convenient living through IT with multi-use server

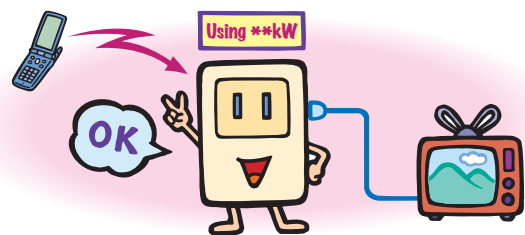


### ⑨ Smart outlets

#### Advanced multifunction power outlets controllable via the Web

- Working in combination with HEMS to monitor and control each home appliance
- Priority of each outlet can be set to cut power in case of outage

Comfortable eco-living that responds to diversified lifestyles with energy saving system linked to home server and HEMS



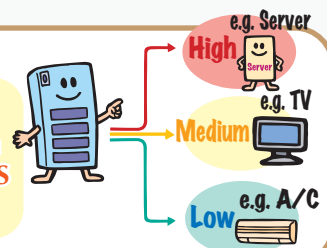
## Demonstrating and Proposing Life with Safety and Health

### ⑩ Compact power storage system

#### Compact, advanced power storage device

- Power is stored at night for home-appliance standby use
- In case of outage or instantaneous voltage drop, stored power is immediately discharged by linkage to HEMS to minimize effect

Reliability and stability of operation with linkage to HEMS and other systems



### ⑪ Breaker with indicator light

#### Breaker with indicator light

- When a breaker trips, even in darkness, the switch can be located with certainty
- Breaker switch can be operated with certainty and safety, even in darkness



Practicality of breaker visibility in darkness for safety in the home

### ⑫ IH (Induction heating) iron

#### Application of IH technology to irons

- No heat source in the body of the iron means there is no danger of burning
- Preheating unnecessary

Practicality of use and safety



### ⑬ Home health management

#### Daily home health check in the bathroom

- Automatic measurements taken in the bathroom include urinary sugar and blood pressure
- Results stored and analyzed in home server

Practicality of system for healthy living



### Other equipment installed

- 4.5 kW household solar power generation system (roof-tile-type)
- Household-use lightning surge arrestor to protect home appliances against lightning surges
- Non-burnt coal ash tiles that do not need heat-treatment
- Water heater with floor-heating using environmentally-friendly "Eco-cute" heat pump system
- Coal ash paving blocks with water retention capability that have the effect of curbing the heat island phenomenon
- Supporting members rust-free even after 100 years with application of "Plazwire" process coating technology