Demonstrating and proposing a new lifestyle for the future

INTELLIGENT HOUSE

Kyushu Electric Power Company, Research Laboratory
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.

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
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FAX: +81 (0)952-33-8579

3 km from Maebaru Interchange (6 min. by car)

2.5 km from JR Kafuri Station (40 min. on foot)

8 km from Saga-Yamato Interchange (15 min. by car)

285 Oaza Higashi, Maebaru City, Fukuoka 819-1122, Japan
TEL: +81 (0)92-322-2872 (Main)

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

5 km from the Hanmichibashi Exit on Route 2 of the Fukuoka Urban Expressway (15 min. by car)
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 "CO₂ minimization mode" and "energy cost minimization mode" as well as "visualization" of CO₂ 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

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

Total building area: 165 m²
Total floor area: 294 m²
Structure: Steel framed, partly reinforced concrete; 2 floors above, and 1 floor below ground
### Demonstrating and Proposing Comfortable Life with Web Technology

**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

**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

### Demonstrating and Proposing Life with Safety and Health

**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

**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

**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

**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

### 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