

## The Development of Ene-Look Plus (HEMS) at Osaka Gas

- Home Energy Visualization Service -

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### 1. INTRODUCTION

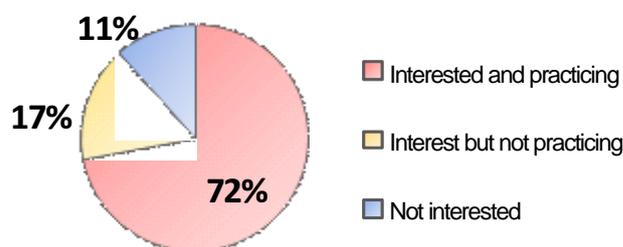
Among various initiatives to mitigate global warming, one of the most important challenges is to reduce CO<sub>2</sub> emissions from the residential sector. To achieve this, people tend to focus on hardware-oriented measures such as improving the airtightness and thermal insulation of residential houses, developing highly efficient water heating systems and other home appliances, and introducing photovoltaic power and other types of renewable energy. However, software-oriented measures are also indispensable, particularly for making residents more aware of energy conservation in their daily life and encouraging them to be more energy efficient.

One possible way to help residents be more energy efficient and aware of energy efficiency is to visualize their energy consumption. By enabling energy consumption to be monitored and displayed at home, residents become more aware of the energy they consume; they tend to be alarmed by wasteful use and can evaluate the potential to reduce the energy consumed by particular appliances. In a demonstration project conducted by NEDO, it was reported that visualizing energy consumption reduced energy consumption by approximately 6.9% by making people more aware of energy efficiency.<sup>\*1</sup> Figure 1 shows the results of a questionnaire survey by Osaka Gas on people's interest in energy conservation in the home. About 90% of the respondents said they were interested in energy conservation, while about 70% were interested in the visualization of energy consumption. These results suggest that energy consumption visualization will be an important service to be provided by energy suppliers in the future.

This article describes Ene-Look Plus<sup>\*2</sup>, an

energy consumption visualization service developed by Osaka Gas.

(1) People's interest and practice of energy saving at home



(2) Interest in using an energy consumption visualization service

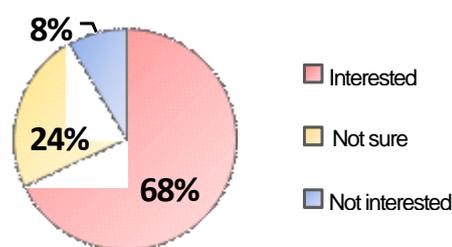


Fig. 1 Questionnaire survey on people's interest in energy saving at home (N = 1036)

### 2. OVERVIEW OF ENE-LOOK PLUS

To help reduce CO<sub>2</sub> emissions from the residential sector, the gas utility Osaka Gas has been selling since 2006 Ene-Look remote controllers that allow users to monitor the consumption of gas, electricity and water and to display rough estimates of the charges.

Ene-Look Plus not only provides all the

features of an Ene-Look remote controller, but also enables more detailed display of the consumption of gas, electricity and water<sup>\*3</sup> at home, gas and electricity charges, CO<sub>2</sub> emission savings, etc., on a PC or mobile phone. It is even possible to make comparisons with other households and to display specific advice on energy efficient behavior, which are generated based on an analysis of the actual energy consumed by a particular household.

At Osaka Gas, Ene-Look Plus is combined with a service that enables the user to remotely control the power of home appliances (such as gas-heated hot water floor heating system and air conditioners) using a mobile phone and a service that remotely shuts off the gas after the user forget to do so when leaving home.

Osaka Gas will make the Ene-Look Plus service available from October 2010, initially targeting the residents of new apartments and condominiums, combined with internet connection for such collective housing.

### 3. SYSTEM CONFIGURATION

Figure 2 shows the configuration of the Ene-Look Plus system. The major components of the Ene-Look Plus system are the power measuring unit and the network adapter. The power measuring unit measures the electric power consumption at the distribution board, acquires information on gas consumption from the gas meter, and also may determine water consumption by interfacing with a pulse-emitting water meter. The network adapter integrates the measurements at one-hour intervals and sends the data to a server at Osaka Gas via the internet. This server then analyzes and processes the collected data, and makes them available for web-based display (with graphs, etc.) at a dedicated site, which the users can access by PC or mobile phone.

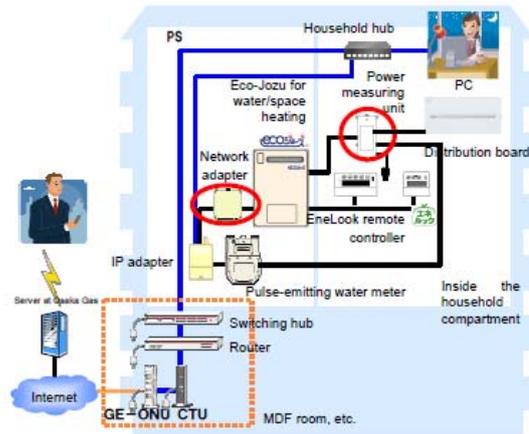


Fig. 2 Ene-Look Plus system configuration (for collective housing)

### 4. SERVICE DETAILS

The major characteristics of the Ene-Look Plus service developed by Osaka Gas are described below. Figure 3 shows a web-based screen image.

#### (1) Visualization of energy consumption and CO<sub>2</sub> emission savings at home

Ene-Look Plus allows the user to monitor the consumption of gas, electricity and water, gas and electricity charges, and CO<sub>2</sub> emission savings using a PC or mobile phone. The user can define an energy-saving target and monitor daily progress toward the target.

Hourly, daily, weekly and monthly data are comparable with past records. Ene-Look Plus also supports comparison with other households in various modes, such as comparing with the average of all households, with the average of all households in the building, and with the average of households of a similar size.

Such varied presentations allow the user to determine the time of the day (on weekdays and at weekends) during which consumption of gas, electricity or water tends to be high or low, and allow comparison with other households. Moreover, the user can display a daily updated estimate of the gas and electricity charges for the month. All these features make the user more aware of the energy consumed at home.

#### (2) Energy saving advice based on an analysis of

actual energy consumed

The visualization feature described above is complemented by the ability to generate energy-saving advice by analyzing and characterizing the energy consumed in terms of consumption level, hours of the day, comparison with other households and comparison with the outdoor temperature. Such advice encourages the user to take specific actions to save energy.

(3) Sending energy saving reports to mobile phones by e-mail (actively visualizing energy consumption)

Simply creating a web site that users can access by PC or mobile phone may not be sufficient, because users will not continuously visit it, and in view of sustainable energy conservation practices. To actively visualize energy consumption, EneLook Plus allows energy saving reports to be mailed to mobile phones, which alert users and encourage them to be more energy efficient. The mails are sent at a user-selected frequency (daily, weekly or monthly) and report on the energy consumed at home, progress toward the target, comparison with energy consumption averaged over all households, etc.

(4) Remote control of space heating appliances, lighting apparatuses, etc., from outside the home

When away from home, the user can use a mobile phone to remotely monitor and control the power of various appliances and equipment in the home, such as filling the bath tub or monitoring and controlling the power to a JEM-A compatible air conditioner. This is not only very convenient but also enables the user to remotely switch off appliances at home in case of forgetting to do so before going out.

(5) Remote shutoff of gas from outside the home

If the user has forgotten to shut off the gas at home before going out, he can use a communication link with the monitoring center to monitor the use of gas at home and issue an instruction to shut off the gas by remote control. This service makes life safer and more secure.



Fig. 3 Web-based screen image (This screen shot is from our field-test system; the final screen design is not yet fixed.)

## 5. CONCLUSION

This article described EneLook Plus, an energy visualization service developed by Osaka Gas. Even though the service is currently intended for residents of collective housing, we plan to make it available also to residents of detached houses equipped with Ene-Farm and/or a photovoltaic system.

\*1 See an article on the NEDO homepage:  
<http://www.nedo.go.jp/informations/events/181004/juukankyoku.pdf>

(Jukankyo Research Institute Inc., *Evaluation and Analysis of the Energy Saving Contributions of the HEMS Demonstration Project*, October 2006)

\*2 "EneLook Plus" refers to a web-based energy information visualization service

(allowing the user to access energy information using a web browser) and/or the web-based service contents. "EneLook Plus" is a service name shared by Tokyo Gas, Toho Gas and Osaka Gas. (The specific details of the EneLook Plus service were developed by each company.)

- \*3 Measurable only if a pulse-emitting water meter is installed.