

# Efforts to Promote Smart Houses

— Leveraging the spread of HEMS and ECHONET Lite —

**Takuya Tatsuishi**

Deputy Director  
Information Economy Division,  
Commerce and Information Policy Bureau  
Ministry of Economy, Trade and Industry



## 1. Introduction

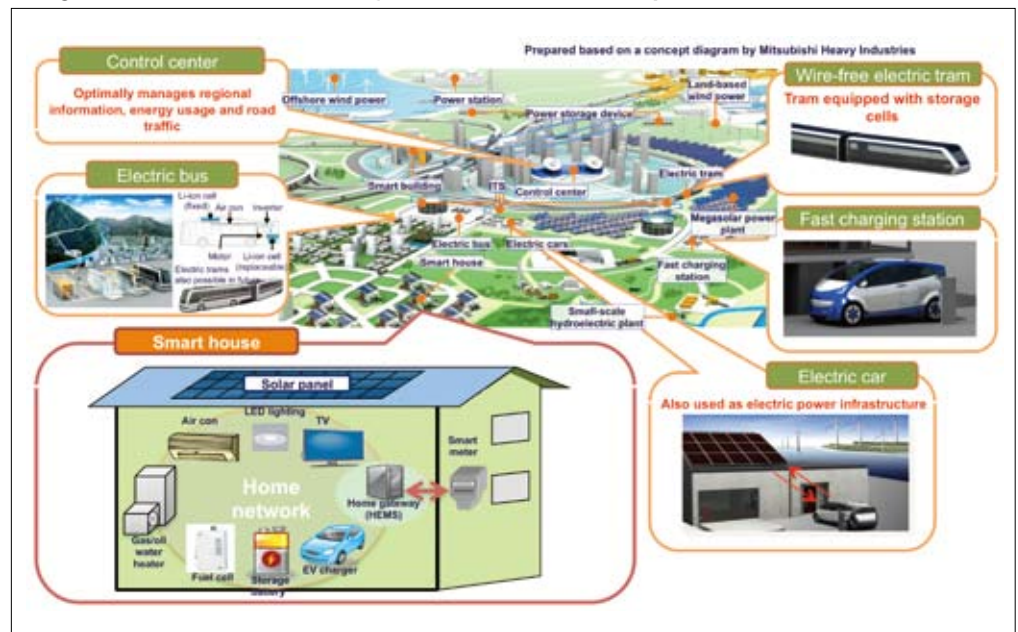
Since the Great East Japan Earthquake of March 2011, Japan has been beset with severe shortfalls in electricity production, and has had to step up its measures relating to energy conservation. These measures include promoting smart communities, where greater convenience and efficiency is achieved by using IT (information technology) to integrate and optimize systems such as energy supply and transportation. In particular, it is expected that Japan would be able to contribute significantly to the promotion of energy savings in the household sector if progress is made in the spread of smart houses (an essential ingredient of smart communities).

A smart house is one that uses IT to control storage energy-saving equipment in the home, centered on a HEMS (Home Energy Management System), and implements energy management by using electric power prudently and widely. The use of IT for fine-grained control of electric power demand enables the implementation of advanced energy management techniques called “peak cut” and “peak shift”.

The pros and cons of introducing HEMS and other energy management systems are strongly dependent on scale of the customer base and their decision-making viewpoint. For example, heavy users of electricity such as factories and large-scale buildings can achieve large energy savings, and since they are able to concentrate on investment efficiency as a corporate activity, they are likely to go ahead and introduce these systems if they decide they are profitable, even if it will take a relatively long time to recoup their investment. On the other hand, ordinary households stand to benefit less from energy-saving measures because they use less electricity per building. Also, people tend to concentrate more on non-economic factors such as convenience and lifestyle fulfillment than on investment efficiency, so they are less likely to install energy management systems.

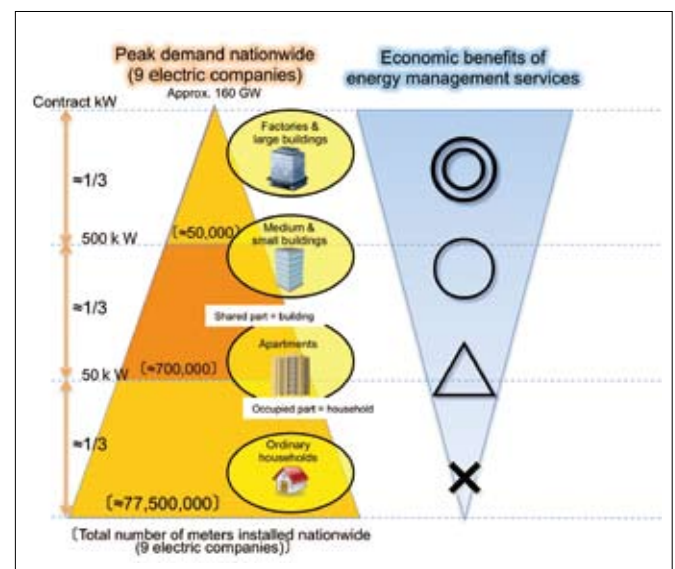
But although the energy consumption per building may be small, there are approximately 50 million ordinary households in

Figure 1: The smart community and smart house concepts



Japan, and together they account for a substantial proportion of the nation's total energy demand. It is therefore becoming essential to promote the spread of smart houses by enticing consumers with new services backed by appropriate policies.

Figure 2: Characteristics of the energy management market



## 2. Specific initiatives

As mentioned in the previous section, the key to promoting the spread of smart houses lies in creating new services that are not confined to energy management. Therefore, the government should promote the following three measures: (1) standardization of communication specifications, (2) cultivation of business practitioners (aggregators), and (3) preparation of an environment for the creation of new services.

### (1) Standardization of communication specifications

For efficient and effective energy management, it is important to be able to communicate with and control smart meters and domestic stored-energy equipment produced by any manufacturer.

For this reason, the government initiated a dialog with experts and businesses in the private sector, and in February 2012 it decided to recommend ECHONET Lite as the communication interface between HEMS and smart meters or domestic stored-energy equipment. ECHONET Lite is a Japanese communication standard that is expected to become an international standard during 2015. The government is also studying communication media and drawing up specifications for achieving stronger connectivity, especially for the eight types of equipment that

are envisaged to make a large contribution to domestic energy management (smart meters, photovoltaic solar panels, storage batteries, fuel cells, gas/oil water heaters, air conditioning, lighting equipment and EV chargers).

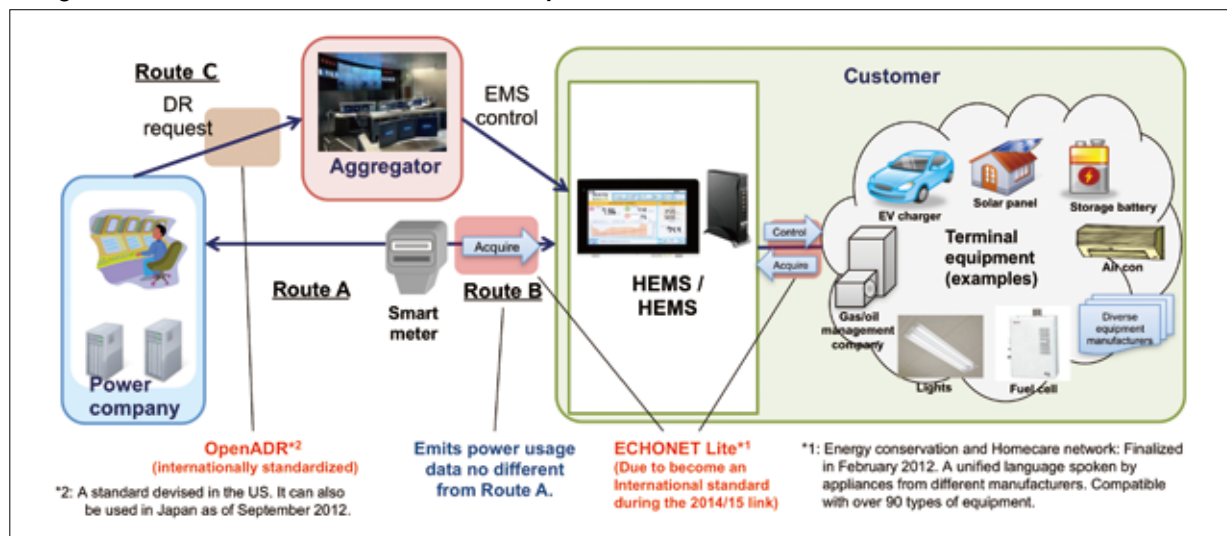
As of February 2015, ECHONET Lite supports over 90 types of equipment, and compatible products in all eight of the key categories have already appeared on the market. The development of compatible products and investment in this market is expected to increase in the future as environments are set up for purposes such as establishing third-party verification schemes to ensure connectivity.

### (2) Cultivation of business practitioners (aggregators)

To promote the spread of energy management, it is essential to cultivate players who can develop it as a business. In energy management, it is generally the case that achievable energy savings are lower for small-scale customers, making it harder for them to recover their investment. Aggregators who provide energy management services through the collective management of small consumers are therefore likely to play a key role in the promotion of energy management in the household sector.

During the fiscal years from 2011 to 2014, with a view to

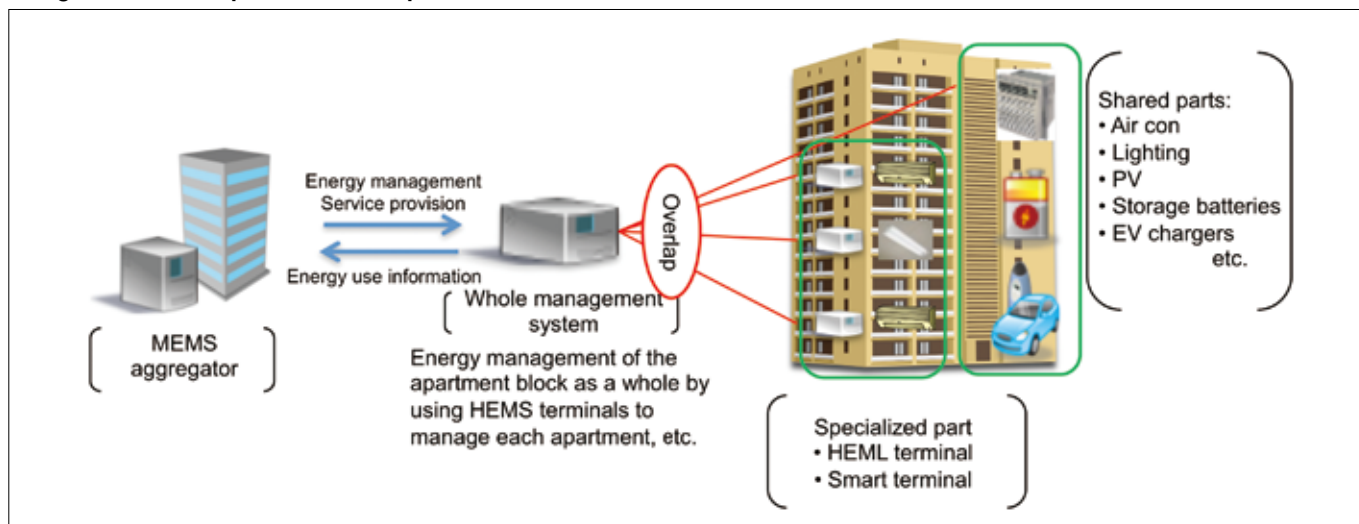
■ Figure 3: Standardization of communication specifications



■ Figure 4: Market penetration of the eight key equipment categories

| Equipment category        | Market penetration   |
|---------------------------|--|
| Smart meters              | Approx. 3.66 million due to be installed during 2014 business year. Due to be installed throughout Japan (approx. 50 million) by the 2024 business year.   |
| Storage batteries         | Compatible with approx. 70% of equipment requested for a 2013 amendment ("Funding to support businesses with the introduction of fixed lithium ion cells") |
| Photovoltaic solar panels | At some large manufacturers, all products have been compatible since the 2014 business year.   |
| Fuel cells                | Compatible with at least half of all City Gas equipment by March 2015.   |
| Gas/oil water heaters     | Compatible with at least half of all City Gas heater equipment by March 2015.  |
| Air conditioning          | Compatible with around 30–40% of all units as of April 2014. Due to be successively increased.   |
| Lighting                  | Market penetration scheduled for 2015 and beyond. (One large manufacturer already has a line-up of about 30 compatible products)                           |
| EV chargers               | Market penetration scheduled for 2015 and beyond.  |

Figure 5: Smart apartment concept



promoting the spread of energy management through aggregators, the government launched subsidized projects for aggregators to introduce energy management systems in small buildings and apartment blocks. In this way, in addition to making progress with cost reductions through the creation of initial demand, the aggregators can increase their involvement not just with electricity providers but also with communication providers, equipment manufacturers, and other businesses that have no involvement with the conventional energy supply industry.

**(3) Preparation of an environment for the creation of new services**

Despite the steady progress being made in the standardization of communication specifications and the cultivation of aggregators, small-scale consumers in the household sector attach importance not only to economic rationality but also to viewpoints such as convenience and lifestyle, as noted earlier. To meet this demand, it will be necessary not only to further enhance the energy management services, but also to create attractive services that use electricity data obtained from HEMS, so as to attract more

consumers and improve the prospects of this business.

On the other hand, there are two problems that stand in the way of creating new services based on electricity usage data obtained from HEMS. One is the standardization of an information infrastructure for the efficient acquisition of electricity usage data by a broad range of services including SMEs and venture businesses. The second is the development of data handling rules that strike the right balance between data utilization and the protection of personal information.

To resolve these issues and prepare an environment where new services can be created, the government began preparing a large-scale HEMS information infrastructure in 2014. This project involved introducing HEMS into 14,000 homes, building a large-scale HEMS information infrastructure system to perform cloud management, standardizing this system, and performing a study of privacy measures based on the opinions of actual consumers. The plan is to complete this project by the end of the 2015 business year with restrained deregulation of the retail electricity market.

**3. Conclusion**

There are various issues to overcome in promoting the spread of smart houses. These include expanding the market for HEMS and ECHONET Lite products, growing the number of aggregators, creating attractive services, and providing an environment for these services. However, advances in the spread of smart houses will reap large benefits for Japan, including the creation of new industries for the utilization of data, and expansion of the market for compatible consumer electrical products.

Against this background, it is possible that deregulation of the retail electricity market scheduled to start from the 2016 business year may provide an opportunity for smart houses to spread. Specifically, it is thought that a wide variety of operators will enter the marketplace as competitive funding for attractive services using power usage data obtained from HEMS. The government is moving forward with short-term intensive environmental improvements, but the ingenuity of private-sector providers will be essential if smart houses are to spread. In the future, it is hoped that the synergistic effects of both efforts will provide a large boost to the spread of smart houses.

Figure 6: Image of new services

