



**ECHONET**

Energy Conservation  
and Homecare Network

ECHONET Consortium



## Greetings



### Representative Director

Kenji Shiraishi  
Hitachi Appliances, Inc.

The ECHONET CONSORTIUM was established in 1997 for the purpose of realizing an affluent 21st-century society that is founded on harmony between human beings and the environment.

Since then, we have developed fundamental technologies for home networks that can be used in remote control and monitoring of home appliances to lower CO<sub>2</sub> emissions and advance home security and home health care. In 2011, we developed technologies in the area of home appliances and equipment into the “ECHONET Lite Specifications,” a standard that is easier to use and can work with standard protocols from Japan and abroad. ECHONET Lite was recommended as an open standard interface on HEMS by the Japan Smart Community Alliance’s International Standardization Working Group that same year, and was approved as an international standard in 2015. In addition, we formulated the “ECHONET Lite AIF Specifications” with the goal of achieving multivendor compatibility for ECHONET Lite and launched a certification system for the specification in 2016.

Products and services compatible with the ECHONET Lite specifications continue to spread throughout the market as a result of member companies’ efforts. At the same time, more and more ECHONET Lite-based smart meters are being installed as work proceeds toward the scheduled installation of such meters in all homes by 2024. We sense that our dream of realizing energy-saving, comfortable, safe, and secure living through the linkage of various devices in the home—a dream we have cherished since our establishment—is coming true day by day. We will continue to promote our activities through wide-ranging collaboration with concerned organizations in Japan to achieve even further expansion of the “ECHONET Lite Specifications.” Moreover, we will engage in various activities designed to raise the ECHONET Lite Specifications as an international standard. Such activities will include public relations at international conferences and the building of overseas partnerships. We will also make necessary improvements to the standard as new technologies and services arrive.

To help realize an affluent and sustainable society, we will press forward with diffusion and development of the “ECHONET Lite Specifications” while encouraging even more companies to participate in our Consortium. We earnestly seek the support and cooperation of all parties concerned.

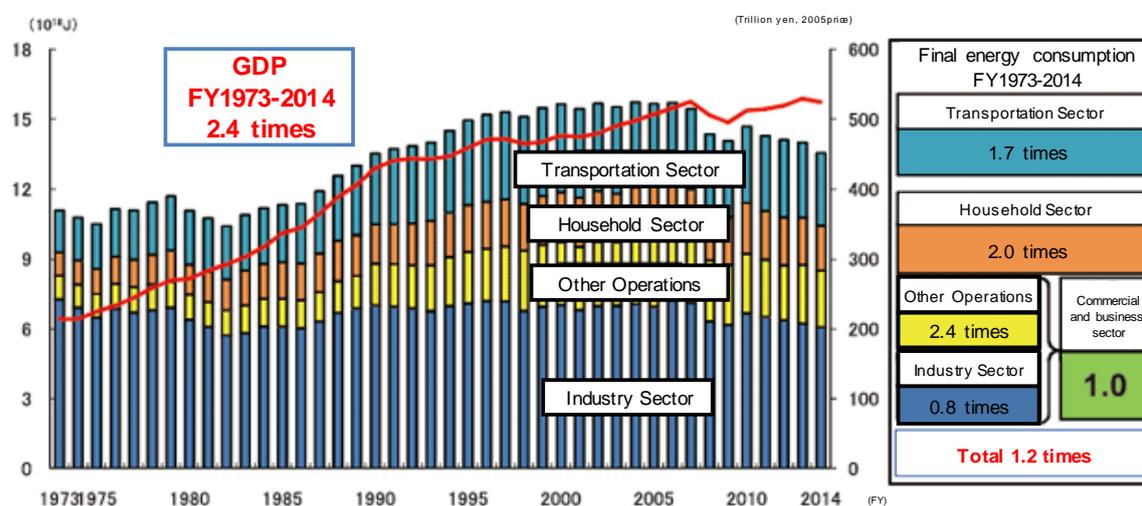
### Officers

Managing Director:	Hisashi Kodama	
Directors:	Takayuki Amatsu Morio Hirahara Michiyasu Kawada Shoji Mochizuki Takashi Murakami Toshio Nomura	Hisashi Kodama Tokyo Electric Power Company Holdings, Inc. TOSHIBA CORPORATION Nippon Telegraph and Telephone Corporation Mitsubishi Electric Corporation Panasonic Corporation Sharp Corporation Hatta Law Office
Auditor:	Nobuhiko Hatta	

## ◆ Changes in the Environment Surrounding Smart Houses

As Japanese energy consumption moves towards energy saving, particularly in the industry sector, the development of energy saving products has become popular. After reaching a peak in FY2004, the energy consumption has been on a downward trend. We have seen a further decrease since FY2011 after an increase in awareness of energy saving following the Great East Japan earthquake.

However, when looking at trends by sector for growth between FY1973 and FY2014, there was a slight increase (1.0 times) for the commercial and business sector with the progress in energy saving, mainly in the manufacturing industry. There was a much larger increase for the household sector and the transportation sector. In particular, with the household sector, the result of a 2.0 times increase was that the share making up consumption as a whole changed from 8.9% at the time of the oil shock in FY1973 to 14.3% in 2014.



Source: Ministry of Economy, Trade and Industry / Agency for Natural Resources and Energy--Japan's Energy White Paper 2016

On the other hand, in the "Action Plan for Building a Low Carbon Society" drawn up by the government in 2008, a policy was taken for promoting the deployment of solar power generation. A policy was demonstrated to increase deployment by 20 times (28GW) by 2020. Based on this, it has increased by an average of approximately 640MW per month, and this is forecast to reach approximately 140GW by 2030.

The result of this is that the generated power has exceeded demand from business offices and homes is flowing into the power distribution system and as this has caused a rise in voltage in the power distribution system, it has the potential to interrupt the high quality and stable provision of power. In order to prevent this, in addition to promoting technical development that would restrain the amount of power generated by solar power generation, there are calls to promote the deployment of equipment that can store energy, such as electric vehicles, storage batteries and heat pump water heaters, thus "creating electricity", "storing electricity" and "efficiently using electricity".

Further, in regard to the measurement of power quantity used, electronic next-generation smart

meters are already being deployed overseas. Domestically, however, there is now a duty to deploy smart meters in all households, and the objective is to complete deployment in all houses by 2025. Deployment started by all power companies from July 2015.

This smart meter uses a means of transmitting information known as “route A” for the measurement of used electricity in previous one month intervals, and can measure the used amount automatically every 30 minutes. Further, using the “route B” means of transmitting information attached to the smart meter, the electricity usage status measured by the smart meter can be acquired in the home as well, enabling us to use electricity efficiently within the home as well.

As this “route B” means of transmitting information has been adopted by the ECHONET Lite Specifications, products using the ECHONET Lite Specifications have become popular within the home.

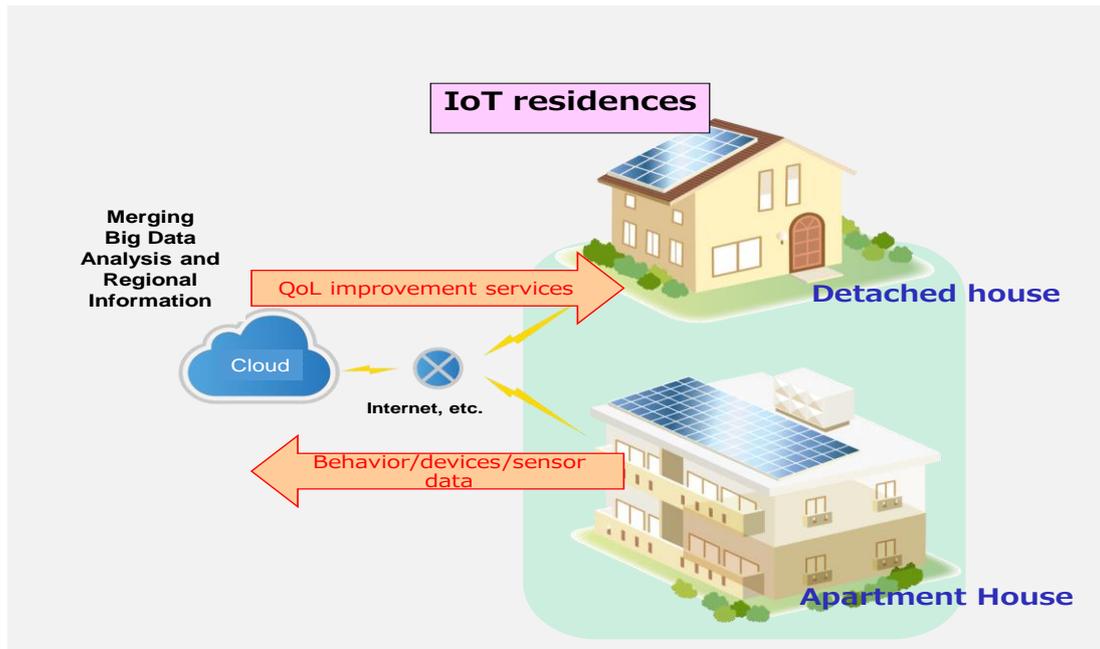
	Smart Meter	Conventional power meter
External appearance <small>Note: The external appearance shown is just one example. This may differ from the actual article.</small>		
Meter inspection work	Automatic meter reading using communications (route A)	Meter reading by staff
Measuring interval	30 minutes	1 month
Provide information within home (HEMS connection)	Providing information by <b>ECHONET Lite</b> (route B)	None
Other merits of smart meters	<ul style="list-style-type: none"> <li>● Lowering burden on customers when moving</li> <li>● Simplification of changes to contracted amperes</li> <li>● Rapid recovery after a power failure etc.</li> </ul>	-

Source: Smart Meter System Planning Committee (15<sup>th</sup>) -distributed material  
[http://www.meti.go.jp/committee/summary/0004668/015\\_haifu.html](http://www.meti.go.jp/committee/summary/0004668/015_haifu.html)

On the other hand, in the field of information technology, the IoT(Internet of Things)has been proposed, enabling things to be interconnected via the Internet. This promises to create new value, through the utilization of huge amounts of collected data.

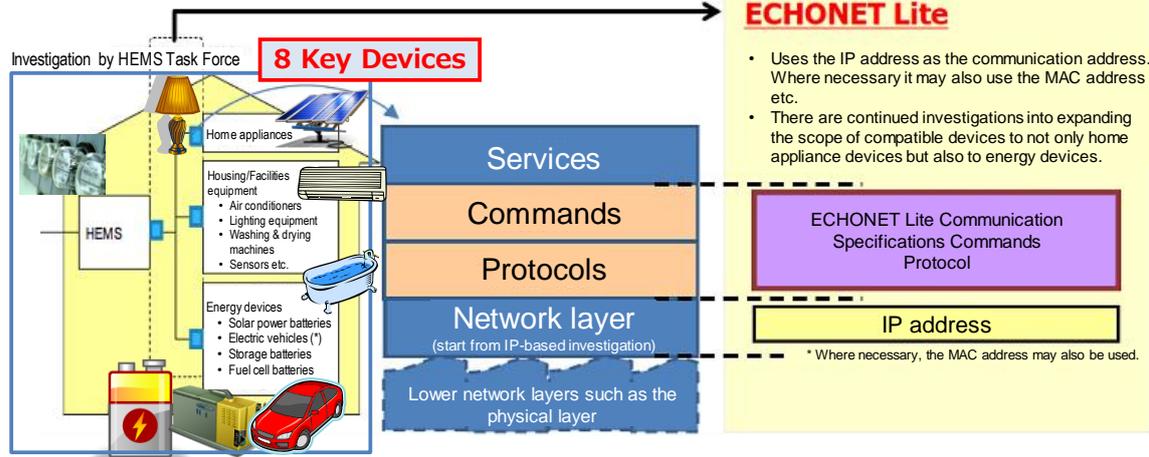
In the home network field as well, through the use of IoT technology, home appliances, residential equipment and a variety of sensors can be connected in a cloud server environment via the Internet. Through the linking of external and information within the premises, we are able to provide a fulfilling lifestyle (QOL: Quality of Life improvement services) to our customers, through automatic controls for the efficient use of energy and security monitoring etc.

Moving forward, it is expected that we will see the spread of IoT homes, in which IoT technology is merged with home networks based on the ECHONET Lite Specifications.



◆ Well-known standards for realizing Smart Houses/ECHONET Lite

The ECHONET Lite Specifications published in 2011 were later recommended as the well-known standard interface for home networks by the Japan Smart Community Alliance established by the Ministry of Economy, Trade and Industry (METI). Based on this, ECHONET Consortium constructed a framework for improved inter-connectivity between multiple vendors, including the establishment of a certification system and the standardization of methods for operating 8 key devices.



Source : 2012/2/24 Ministry of Economy, Trade and Industry Press Release materials  
<http://www.meti.go.jp/press/2011/02/20120224007/20120224007.html>

## ◆ Roadmap for Expansion and Promotion

### Roadmap for home network market formation/expansion via ECHONET Lite

		FY2015	FY2016	FY2017	FY2018	FY2019	FY2020	FY2030	
Environment surrounding ECHONET	Schedule related to promotion of low carbon homes*1	(Home) Making ZEH (net zero energy house) the standard new residence						Average of new residences with ZEH	
		(Buildings) Achieve ZEB (net zero energy building) for new public buildings etc.						Average of new buildings with ZEB	
	HEMS promotion policies*2	Propagation HEMS to all households till 2030.							
	Energy policies	Smart meter	Complete deregulation of power retailing				Separation of power generation & distribution /charge deregulation		
ECHONET Consortium master schedule	Vision	HEMS connections, utilizing route B and HEMS controller	Usage, Cloud connections for stores condominiums to small/medium-sized buildings		Use with IoT/M2M		Promotion and expansion overseas		
	No. of target shipments (Domestic)	Spread to 8 key devices		Propagation to appliances and equipment for stores and condominiums			Development to other than home appliances/energy devices		
		2M units	4M units	6M units	8M units	10M units / year			
	(Overseas)			10K units	100K units	1M units	5M units	10M units	
Promotion activities	Domestic markets	Product introduction on home page, holding of forums and seminars, and promotion at exhibitions							
	Overseas markets	Market survey in Asia	HEMS market surveys overseas (Europe/America + Asia), draw up promotion and education programs						
Enhancing standards		Controller definition	Expand application of AIF specifications and certification test specifications, device object detailed specifications (twice/year)						
Enhancing certification standards		Third party certification system	Enrichment of certification and test bodies		Investigate expansion of certification range (software, system, servers), investigate engineer certification system				

\*1 Source: Interim summary of policies for promoting "residences and ways of living in a low carbon society", July 2012 Ministry of Economy, Trade and Industry, Ministry of Land, Infrastructure, Transport and Tourism, and Ministry of the Environment

\*2 Source: "Outline of Green Policies (main points)", November 2012, National Strategy Office

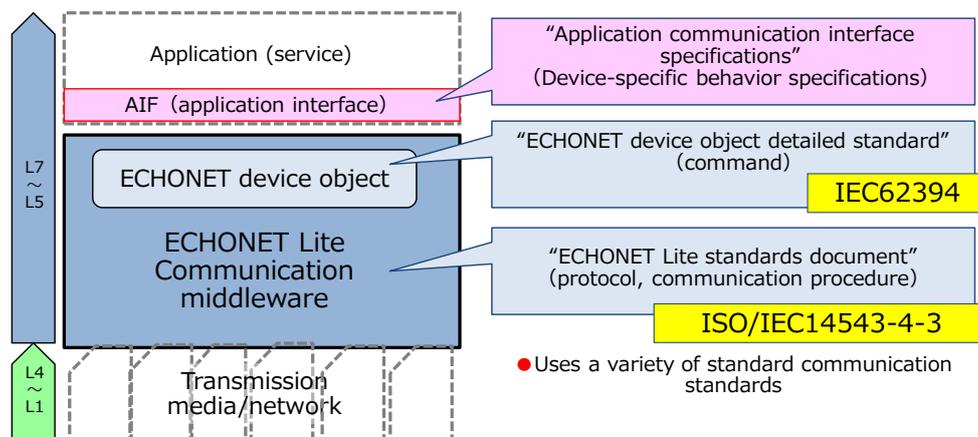
## ◆ ECHONET Lite Specification Overview

### ☐ Features of the ECHONET Lite Specifications

- Achieving a multi-vendor environment through common specifications  
Enables the interconnection and control of equipment from different vendors
- Possibility of using different types of existing standard transmission media  
A system can be constructed using widely diffused standard transmission media, such as wired LAN (Ethernet) and wireless LAN (Wi-Fi)
- Compatible with a wide range of equipment, such as residential equipment and devices for small/medium-sized buildings and shops etc.  
Commands already defined for 100 or more types of equipment. Commands for new equipment can be added as required.
- Possible to collaborate on services using the Cloud  
Possible to realize sophisticated services through the collaboration with a diverse array of systems on the Internet
- Possible to design network ready equipment  
Through the use of a middleware adapter interface, equipment can be purchased in advance and the system deployed after adding network functionality (adapters) at a later date

### ☐ Layer configuration

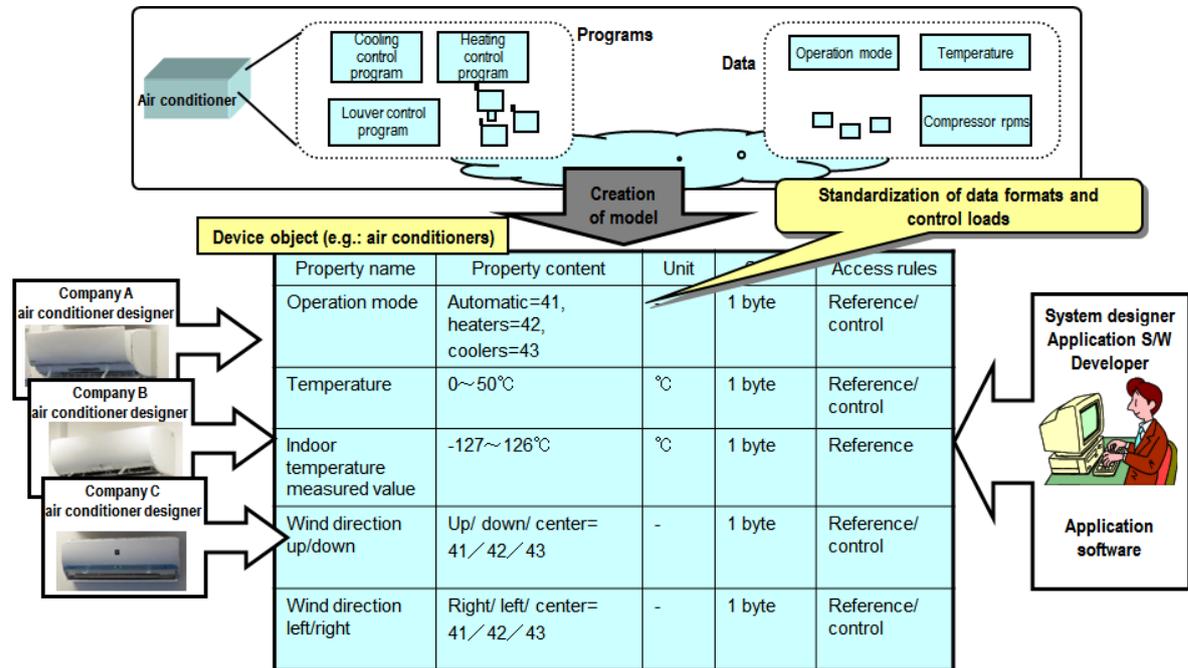
By allowing the use of standard transmission media, a simpler configuration is possible that does not require the 1-4 layered specifications mandated by the previous ECHONET Specifications.



The "ECHONET Lite communication middleware" and "device object detailed specifications", which are the main parts of the ECHONET Lite Specifications, have been certified as international standard specifications by IEC and ISO/IEC.

**Target equipment of ECHONET (ECHONET device objects)**

- Attributes of Housing/Facilities equipment and home appliances are modeled as the ECHONET device objects and their details are specified.



- Equipment stipulated in the ECHONET device objects

Class Group Code	Class group	Examples
0x00	Sensor-related Device Class Group	Fire sensors, motion detectors, temperature sensors, CO2 sensors, electric energy sensors, etc.
0x01	Air Conditioner-related Device Class Group	Air conditioners, fans, ventilation fans, air cleaners, heated carpets, oil fan heaters, etc.
0x02	Housing/Facilities-related Device Class Group	Electrically operated shades/curtains, water heaters, electrically operated locks, smart heaters, smart meters, solar power generations, storage batteries, fuel cells, general lightings, single function lightings, emergency lights, etc.
0x03	Cooking/Household-related Device Class Group	Microwave ovens, dishwashing machines, dish drying machines, washing machines, clothes drying machines, etc.
0x04	Health-related Device Class Group	Weighing machines, body fat analyzers, thermometers, blood pressure meters, blood glucose meters, etc.
0x05	Management/Operation-related Device Class Group	Controllers, switches (HA), etc.
0x06	Audiovisual-related Device Class Group	Televisions, displays, etc.

**Content of the 8 Key Devices and Application Interface (AIF) Certification Specifications**

In order to promote energy saving in the household sector, the government has determined “8 key devices” as home appliances and residential equipment related to energy, and promoted their utilization (optimized control).

For the 8 key devices, in addition to the ECHONET Lite specifications, we have also drawn up the application interface specifications.

These 8 key devices are designated as smart meters, solar power generations, storage batteries, fuel cells, air conditioners, lightings equipment, water heaters and charging/discharging equipment for electric vehicles.

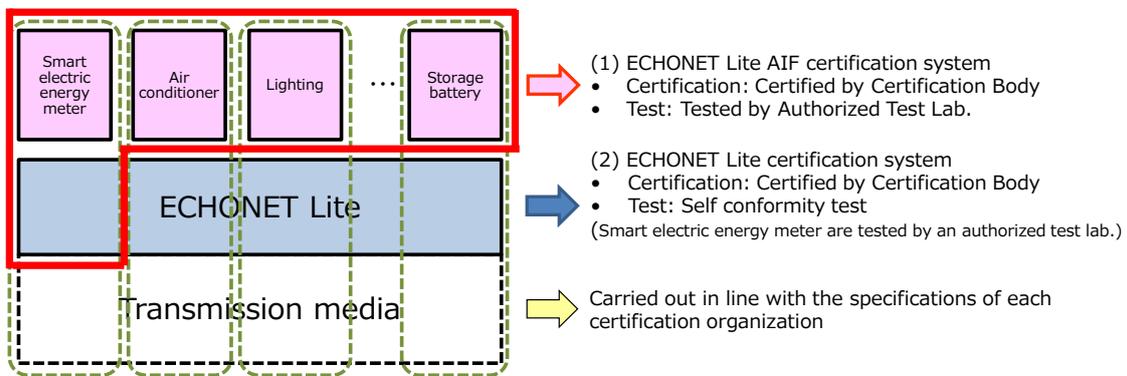
## ◆ Certification System

The ECHONET Lite certification system is comprised of two certifications --- the ECHONET Lite specifications certification and the ECHONET Lite AIF specifications certification.

The ECHONET Lite certification is a self-conformance test carried out by the certification applicant based on the certification test specification, and certification is judged based on the written application including the result of the test by the certification body.

On the other hand, with the ECHONET Lite AIF certification, certification is obtained by first taking a test by the authorized test lab., then passing an examination about the test result by the certification body.

However, as for smart meters, either for the ECHONET Lite certification or the ECHONET Lite AIF certification, it is mandatory to pass the test by the authorized test lab. .



The ECHONET Consortium has accredited the following authorities as certification bodies or authorized test labs.

With the authorized test labs, support or non-support for the tested device or the test method is different, so please confirm at the ECHONET Consortium home page.

(as of April, 2017)

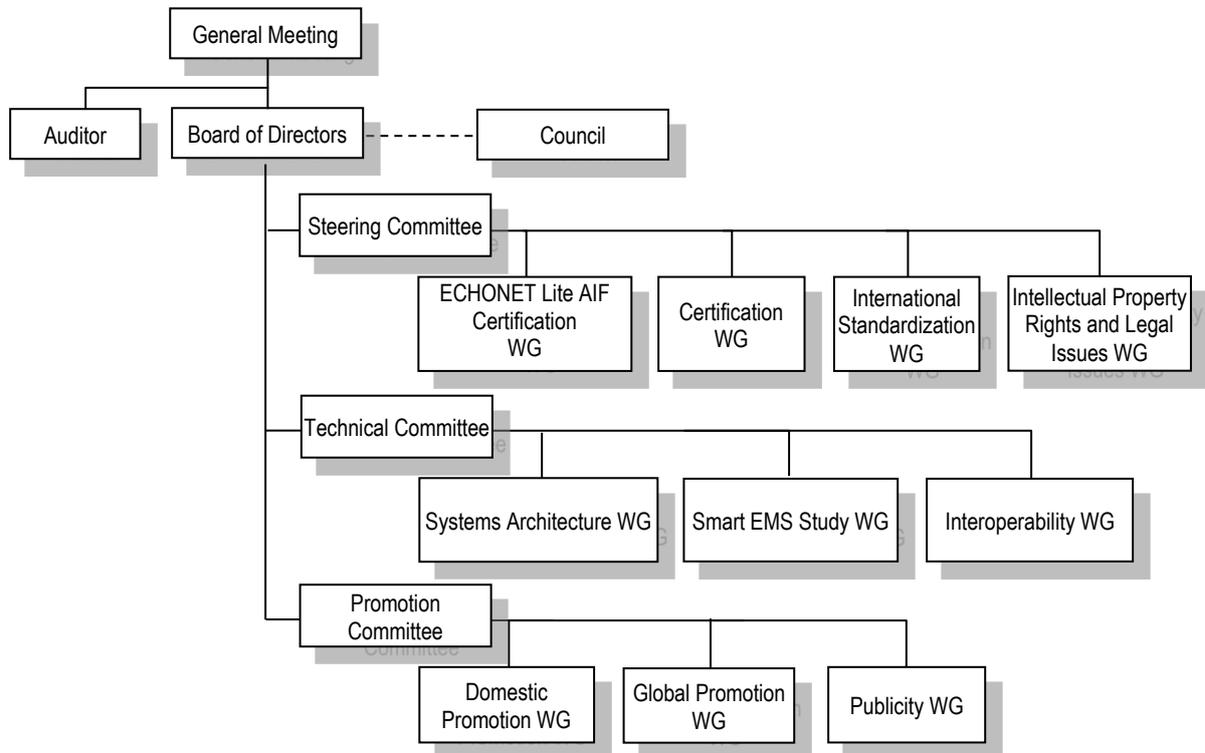
Certification bodies (8 bodies)	
Japan Electric Meters Inspection Corporation	UL Japan, Inc.
TÜV Rheinland Japan Ltd.	Japan Electrical Safety & Environment Technology Laboratories (JET)
Telecom Engineering Center	Computer Engineering & Consulting, Ltd.
Japan Gas Appliances Inspection Association	JAPAN QUALITY ASSURANCE ORGANIZATION

Authorized test lab. (8 bodies)	
Japan Electric Meters Inspection Corporation	UL Japan, Inc.
TÜV Rheinland Japan Ltd.	Japan Electrical Safety & Environment Technology Laboratories (JET)
Product Security Center, Panasonic Corporation	Telecom Engineering Center
Computer Engineering & Consulting, Ltd.	Japan Gas Appliances Inspection Association

Products achieving certification with the ECHONET Specifications, ECHONET Lite Specifications or ECHONET Lite AIF Specifications are published on the ECHONET Consortium home page.

## ◆ Organization and activities

### □ Organization



### □ Committees

#### ● Steering Committee

Engaged in a comprehensive range of activities to ensure the smooth, efficient operation of the Consortium. Responsibilities include planning, budget management, and administration of general assemblies and forums. Also responsible for organizing and coordinating committees and working groups.

#### ● Technical Committee

Engaged in the development of specifications of ECHONET Lite and ECHONET Lite AIF, which will be the building blocks of the next-generation network system. Also investigating about the interoperability and engaged in PlugFest.

#### ● Promotion Committee

Engaged in public relations to promote acceptance of the next-generation network system developed and standardized by the Consortium. It is also involved in the holding of seminars and exhibiting at exhibitions.

## Overview of ECHONET Consortium activities

### Forum

#### ● ECHONET Forums (twice/year)

Special lectures have been given by outside experts, products introduced by the member companies, and the status of ECHONET Consortium activities reported.

#### ● Development of the ECHONET Lite Specifications

We are continually engaged in the addition and revision of ECHONET device objects, and are constantly developing the ECHONET Lite Specifications, etc.



#### ● International standardization

The ECHONET Lite specification has been proposing to international standardization bodies, such as the IEC and ISO/IEC. Through these activities, we are increasing international awareness of the ECHONET Lite specifications and contributing to the expansion of business potential overseas.

#### ● PlugFest

We are providing a venue for the members of each company to bring their products and conduct inter-connectivity tests.

#### ● Exhibitions

We are exhibiting to promote the ECHONET Lite Specifications and the compatible products of member companies.

#### ● Cooperation with government and related organizations

We are participating in government-sponsored commissions, and through joint projects with domestic and international home network standardization organizations and related industry organizations, we are contributing to the formation of the home network market.

## ◆ Membership

### Advantages of membership

- Members can view and offer opinions concerning drafts during development of the ECHONET Specifications.
- Members can participate in Forums, where they can obtain information on standardization and industrial trends concerning home networks and HEMS.
- Members can display products at seminars, forums, and exhibitions.
- Members can participate in PlugFest.
- Members can propose ECHONET device objects.
- Members can use trademarks of ECHONET<sub>TM</sub>, ECHONET Lite<sub>TM</sub>, ECHONET Ready<sub>TM</sub> and ECHONET Lite AIF<sub>TM</sub>. Further, they can use the ECHONET trademark.
- Members are provided maker codes needed to develop ECHONET Specification-compliant products.
- Members can view the members-only website as well as the latest standards.
- Members can subscribe to News Letters.

## Membership structure

	Managing member <sup>*1</sup>	General member <sup>*1</sup>	Academic member
Eligibility	Company recognized as being capable of making a technical contribution to ECHONET	Any company in the world having interest in ECHONET	Educational institution having interest in ECHONET (university laboratory, etc.)
Annual membership fee <sup>*2</sup>	3,000,000 yen	300,000 yen	—
Device object proposals	○	○	○ <sup>*3</sup>
Viewing of specification (after approval)	○	○	○
Approval of final specification (voting right)	○	—	—
Viewing of specification drafts and presentation of opinions	○	○	○
Viewing of certification specifications	○	○	— <sup>*4</sup>
Participation in General Meetings	○	○	—
Participation in Board Meetings	○	—	—
Participation in Working Groups	○	○ <sup>*3</sup>	—
Participation in Forums	○	○	○
Participation in PlugFests	○	○	—
Use of trademarks	○	○	—
Supply of maker codes	○	○	—
Viewing of members-only website	○	○	— <sup>*4</sup>
Subscription to “News Letter”	○	○	○

\*1: Managing member or general member can assign affiliated companies as associate members. Annual membership fee for associate member is free of charge and membership rights are the same as a general member.

\*2: Annual membership fees are applied to all areas of the ECHONET Consortium’s operation and are exempt from taxation.

\*3: On request of the upper committee, the general member can participate and make proposals in the Working Group.

\*4: Necessary materials are provided by the ECHONET Consortium based on requests from the members.

## How to apply for membership

### **General membership**

Membership applications are accepted via the following website:

Website: [http://echonet.jp/admission\\_en/](http://echonet.jp/admission_en/)

### **Academic membership**

Applications can be made via the following website.

Website: [http://echonet.jp/admission\\_en/](http://echonet.jp/admission_en/)

Please inquire with the ECHONET Consortium Secretariat for details.

## Secretariat

Shimbashi TS Bldg.4F, 1-22-5 Nishi-Shimbashi, Minato-ku, Tokyo 105-0003 JAPAN

Tel: +81-3-6205-4142

Fax: +81-3-6205-4143

E-mail: [info@echonet.jp](mailto:info@echonet.jp)

URL: <http://echonet.jp/english/>



The ECHONET logo represents people as the central player of ECHONET surrounded by systems and the environment. The continuous line reflects how human life is inextricably linked with systems and the environment. Blue represents the color of the sea which nurtures life, the color of a clear sky spreading toward the future, and the color of a clean environment which is the target of ECHONET. The Logo will be marked on home appliances which meet the ECHONET Specification.

**ECHONET** **エコネット** **ECHONETLite** **ECHONETReady**  
**ECHONETLiteAll** and the above logo are the registered  
trademarks of the ECHONET Consortium respectively.